Gasoline Price Deregulation in a Concentrated Free Market Structure: Case of Nova Scotia

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Abstract

The Nova Scotia gasoline market has oligopoly structure. The gasoline price is regulated at present but the current government of Nova Scotia is mulling deregulation and other measures like reducing tax on tax to improve market efficiency. The present paper studies the question of difference in gasoline market performance under regulation and under deregulation by comparing different variables from 2001 to 2013. Time series methodology is used in the paper and annual values of the variables are taken for comparison from 2001 to June 2006 when the gasoline market was not regulated and July 2006 to 2013 when gasoline market was regulated.

Since the marketing margins prevalent before regulation were used for regulated market, there was very little difference in the functioning of the regulated and unregulated Nova Scotia gasoline market till 2011. From January 2012, the Regulator increased marketing margins for retailers of gasoline. Another major change in the gasoline market was shift to the use of expensive Brent crude oil by the refiner from October 2011 which increased the cost and hence the gasoline price. However, that decision could have affected the unregulated market in the same manner as the regulated one because, given the oligopoly structure of the market and inelastic short period demand for gasoline, price would have gone up with the cost.

Another reason why the regulated market and unregulated market functioned in the same manner is that the regulator allowed price to be lower than the minimum price prescribed by it because of use of rebates and coupons. Also there was no upper price limit for the full-serve gasoline outlets. Upper limit prices are prescribed only for self-serve gasoline but that too is redundant as price competition forces gasoline station to display only the minimum regulated price. Since the price prescribed by the regulator is not strictly enforced, it is suggested that instead of regulation, we can have a mechanism

under which price is set as recommended or the "target price" rather than the "regulated price" or "prescribed" price and let the market forces of demand and supply determine the actual price. Any dubious variation from the target price can be dealt with the existing laws.

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4. Rack price 5. Deregulation 6. Competitive market

Introduction

Gasoline pricing in Nova Scotia is subject of much scrutiny by general public when prices are high and rising. Policies considered by the Nova Scotia government to give price relief include tax reduction, in particular elimination of tax on tax, and restoring free market by deregulating gasoline price. The purpose of this paper is to study the effect of deregulation on gasoline market. The Nova Scotia consumer has been used to regulated price of gasoline from 1930 to 1991 and then from July 2006 till now. The period time gasoline was not regulated was from 1991 to June 2006. The paper explores the effect of deregulation of gasoline price in Nova Scotia by first examining the existing studies on the subject. Methodology adopted to study the problem is dealt with in the next section of the paper. The data and results are presented in the ensuing sections and concluding remarks are presented in the final section of the paper.

Literature on the subject

Research in the field of regulation of gasoline in Atlantic Canada, which can be applied to Nova Scotia, is very limited. Researchers in this field have very clear positions either supporting regulation or opposing regulation of gasoline. Those who support regulated gasoline in Nova Scotia are led by the Canadian Centre for Policy Alternatives in Nova Scotia (CCPA-NS) and those of consistently oppose are led by the Atlantic Institute for Market Studies (AIMS). Supporters of gasoline price regulation believe that consumers have overall benefited from the gasoline price regulation as the margins rise slower than the rate of inflation and tax collected by the government is used for the benefit of the society. Studies which oppose regulation of gasoline price believe that the market is the best instrument of resource allocation and the competition in the market assures the lowest price of the commodity for consumers. Examples are often cited that the gasoline price fell, and some times gasoline price wars were witnessed, after gasoline price was deregulated in Nova Scotia in 1991. A report by Consumer

advocate on Gasoline Prices in the Province of Newfoundland and Labrador titled, *Gasoline Prices and the Public Interest*, studies in detail gasoline price determination in Atlantic region and Quebec. Its conclusion is that free market pricing best protects consumer interests. All the literature on the subject is in the form of reports rather than the result of an independent study. The present paper is an attempt to study the issue independently.

Methodology

Although there are different methodologies available for judging the effect of regulation, these methodologies are used for electricity and natural gas markets. The most appropriate methodology from the problem at hand is comparison of the effect of regulated and unregulated market on price of gasoline in Nova Scotia. Since Nova Scotia has a long history of gasoline price regulation and a few years of non-regulation, we can compare the two situations using time series analysis. We can also apply cross-section analysis by comparing Nova Scotia market under regulation regime with the nearest non-regulated market. The cross-section analysis has problem because the gasoline price in all the markets of Atlantic region are regulated. Quebec market has also some kind of regulation. The only nearest unregulated market is Toronto. The demand and supply conditions in Toronto are very different than those in Halifax and other parts of Nova Scotia. Comparison of the two for a cross sectional study may not be appropriate.

That leaves us only with time series as a method of study. For time series analysis the first thing is to define the time period of study. Since the latest round of gasoline price regulation in Nova Scotia started in July 2006, time frame chosen for comparison has to be period immediately before that date. The date chosen for our study is from year 2001. The gasoline market was deregulated in 1991. Due to the quick ending of the operation Desert Storm in Kuwait and Iraq war, the gasoline market became unstable. There were gasoline price wars in 1996 when the gasoline was being sold at price below the

rack prices (cost). From year 1992 to 2000 prices mostly fell. From year 2001 till today the trend in gasoline price is upwards. Therefore, free market period is taken between 2001 and June 2006 and the regulated market period is taken from July 2006 to the end of 2013.

The Data

The formula used by the Regulator in Nova Scotia (Department of Municipal Affairs from July 2006 and the Nova Scotia Utility and Review Board from October 1, 2009) for determining weekly price of gasoline involves getting average of daily gasoline prices in New York Commodity Exchange for Wednesday, Thursday, Friday, Monday and Tuesday in Canadian dollars to determine the benchmark price. According to the Board's website on 7th August 2014:

> " In prescribing petroleum product prices, the Board first must set a "benchmark price" as defined in the Regulations. The following amounts are currently added to the benchmark price to calculate the fixed wholesale price, namely, the established wholesale margin (6.65¢ per litre), the federal excise tax (10.0¢ per litre for gasoline and 4.0¢ per litre for diesel), the provincial motive fuel tax (15.5¢ per litre for gasoline and 15.4¢ per litre for diesel), a transportation allowance (0.5¢ to 2.2¢ per litre depending on which zone applies), a forward averaging correction and, when appropriate, a winter blending allowance for diesel only. A retail margin of 4.8¢ per litre, and HST of 15% on the total, is added to the fixed wholesale price to generate the minimum retail price for each petroleum product. The same process is followed, except a retail margin of 6.6¢ per litre is applied, to establish the maximum retail price for each petroleum product. There is, effectively, no maximum retail price for full-serve gasoline or diesel."

The price so prescribed by the Board have upper and lower limit for regular self serve gasoline and only lower limit for the full serve gasoline. There is no upper limit for full serve gasoline. The price prescribed by the Board is not the actual price at the outlet. The actual price is subject to rebates and

coupons or other promotional schemes which could affect actual margins earned by the participants rather than the margins prescribed by the Board. Moreover, the actual margins depends on other factors too. In the gasoline market, according to the *Evaluation of Petroleum Products Pricing Regulation in Nova Scotia – A Two Year Review* on p. 44:

> "Even though the government regulated the margins, several companies used opting out clause. At the inception of regulation all the corporate owned outlets opted out of regulation. Also all outlets owned by agents of the corporations also opted out as they did not want to change their existing contracts with the supplier. Only 50 percent of the independent marketers opted in regulation in 2006. Their number dropped to 40% in 2008"

According to this report which was prepared for Service Nova Scotia and Municipal Relations by Gardner Pinfold Consulting Economists, November 2008, there were only 24% independent retailers and the rest of the outlets were wither directly owned by the gasoline supplier or were the agents of the supplier under contract. Thus, the regulated margins applied only to the independent wholesaler and retailer. Under the law whenever there is contract between the supplier and retailer, the contract prevails. The actual margin earned by 76% of the gasoline market was out of regulation. Since the actual prices under regulation are indeterminate, the real effect on the market of regulation cannot be studied by using them. The actual prices prevailing in Nova Scotia are given by the Kent Marketing Survey reports.

I asked the Kent Marketing Services about the difference in their margin data and the Regulator's margin data on May 7th 2014 in the following words:

> "I was just looking your data on gasoline margins in Nova Scotia. The information you have provided on margins, though consistent with your series, is different than regulated wholesale and retail margins in Nova Scotia.... I would greatly appreciate if you can explain to me the difference in marketing margins provided at your web site and regulated wholesale

+ retail margins in Nova Scotia."

I received the following reply from Mr. Jason Parent, Vice-President of MJ Ervin & Associates (a division of The Kent Group Ltd.):

> "Simply put, Nova Scotia's prices are not set based on our data. Our data is a representation of the margins realized in the province and they would differ from the regulated margins for many reasons including:
>
> "- we use the posted average crude/rack/retail prices to calculate margins, whereas the province applies predetermined maximum margins (likely based on some representation of a reasonable ROI - these are reviewed semi-regularly to ensure they are relevant) to a benchmark wholesale price (which is, I believe, based on NYH spot prices - not regional rack prices);
>
> "- Nova Scotia's regulated margins represent a maximum margin (not necessarily the realized margin), whereas our calculation uses the actual retail prices and the posted rack price (which acts as a proxy for the actual contracted wholesale product price)."

The wholesale prices based on the Board's benchmark prices for regular self serve gasoline by the are proven to be higher than the actual wholesale prices worked out from Kent Marketing Survey data. Moreover, the pricing details are available after the Board took over responsibility of prescribing regulated prices from the Department of Municipal Affairs. Therefore, a realistic assessment of the difference in regulated and free market prices we use only the data from the Kent Marketing Surveys.

The present study takes data for Halifax (previously known as Halifax Regional Municipality or HRM). This is because this is the largest municipality in Nova Scotia and the only oil refinery (it may close in the near future and become an oil terminal) in Nova Scotia is located there. Also, the study is

limited to comparing the free market situation with regulated market for regular self serve gasoline. Other grades of oil and other types of fuel are not taken for study.

Any market, regulated or not, has two sides: the demand side and the supply side. In unregulated market price is determined by the demand both sides. The influence of demand side, or consumer side, and the supply side, the supplier side, on price depends on the market power of each entities as is reflected by elasticity of demand and supply. In the regulated market, price is given and the buyer does not have any negotiating power except to buy less quantity and look for other alternatives. The regulated prices change when the external supply and price conditions change. The regulated price is influenced by external price stimuli rather than the local demand conditions.

When we want to compare the regulated and unregulated markets, the price paid by consumer becomes the main focal point. The wholesale price ex-tax paid to the seller of gasoline can be used for comparing the free and regulated markets because the consumer has to pay the tax irrespective of regulation. But from consumer's point of view the price paid inclusive of tax is important because that is the true cost of buying gasoline. The latter shows the government revenue from the sale of gasoline. We take both the wholesale ex-tax price and retail price paid by the consumer in this study.

Nova Scotia is divided into 6 regions by the Regulator for gasoline pricing purpose. The largest population base is in the region 1 or the Halifax region (former HRM). Moreover, the only gasoline refinery is located in Halifax. Instead of discussing all the regions of Nova Scotia, this study focuses on Halifax only. The regional price differences reflect mostly transport cost differences and the distance in between gasoline dispensing outlets, particularly between rural and urban outlets. The distant rural outlets are full serve gasoline stations where Regulator sets the minimum gasoline price but there is no upper limit.

After selection of method and the region of study, the next question relates to choice of variables we need to compare in two situations. The retail prices of gasoline before taxes for comparison over time

would reflect not only the change in margin in regulated-unregulated market conditions but also the change in cost. Taxes will have to be paid irrespective of competitive or regulated market. But the absolute value of margin over long period of time has little relevance when the cost and the price level has changed. One way to compare over time is to build a constant price series of margin by selecting a base period. The choice of base period is a selective decision. A simpler, and probably better way, is to take ratio of *retail ex-tax price* of gasoline to rack price. Ratio can be compared over time. If we take margin per litre as a ratio of *retail price* over time we can see the effect of change of gasoline price on margins.

The regulator prescribes weekly prices. But handling such a mass of data for long period, as against taking annual averages for the variables under consideration does not improve the quality of results. Moreover, yearly averages are available on all variables we need for our study. Therefore, a choice is made in favour of annual averages for retail price ex-tax, rack price, margin, and price including tax for this study.

Analysis of Results

Table-1 gives average of yearly ex-tax price per litre and yearly average rack price per litre of regular self serve gasoline in Halifax covering both free market and regulated market periods. Whenever rack prices increased, ex-tax prices also increased and whenever rack prices fell ex-tax prices also fell. Column 4 in table-1 gives the ratio of ex-tax retail price to rack price. It has been observed that from 2001 to 2008 the ratio was continuously falling, from highest in 2001 when the rack prices were lowest in the period covered. The rack prices continued to rise till 2008 and the fall in ratio continued to till 2008. In 2009, rack prices fell and the ratio increased. It is interesting to observe that in 2005 in the unregulated market period the rack price averaged 52.7 cents per litre and ex-tax retail price was 60.2 cents per litre. In 2009, the regulated market period, the rack price was 52.6 cents and the ex-tax retail

price was 59.6 cents per litre giving ratio in column 4 to 1.14 in 2005 and 1.13 in year 2009. The cost and margins situation changed for 2012 and 2013. The cost situation changed when Nova Scotia decided in October 2011 to switch to expensive Brent crude oil which affected margins. The Regulator in Nova Scotia increased the selling margin from January 2012. That is why despite the increase in rack prices , the ratio increased in 2012 and 2013.

From table 1 results two things become clear: (a) the gasoline market prices in Nova Scotia respond to international market fluctuations in the same manner with or without regulation of prices by provincial government; and (b) the ratio of ex-tax retail prices to rack prices changes with market conditions, higher value when prices are low and lower value when prices are high, with or without regulation. When the regulator changes margins or the refinery changes the quality of crude, a readjustment is made in the market and after that the price response is similar to that described in (a) and (b) above.

Table-2 gives retail prices (including all taxes and margins) and rack prices. Consumers pay retail prices and their decision to purchase the quantity of gasoline depends on their need and price. The retail price as a ratio of rack price is given in column four. In 2001 when rack price was low, the retail price was more than twice the rack price. When rack prices increased, the ratio of retail to rack prices fell, but always staying much above 1.

Comparing table-1 and table-2 results we find in table-1 that when rack prices fell, the ratio of ex-tax retail prices to rack prices, in column 4, increased; and in table 2 the ratio of retail to rack prices increased. There is one difference between these two table results. When the Regulator increased margins from 2012, the table 1 ratios in column 4 show an increase. But in table 2 column 4 ratios show a decline for 2012 and 2013. Taxes fixed amount of federal and provincial taxes, which cause reduction in ratio when rack price rises, weigh more heavily than the increase in margins, which caused

increase in ratio when it was increased. Thus the combined net effect was reduction in ratio when rack prices increased despite an increase in margin.

The ratio pattern of table 2 also shows that the increase and decrease in ratios, apart from those impacted by certain decision of tax by the government, margin by the regulator and change of crude oil in refinery to Brent by the business, is similar in free market and regulated market situations.

The table-3 show actual realized margins measured in cents per litre of regular self-serve gasoline in Halifax. The table also shows the ratio of margins to rack prices, retail prices and ex-tax prices. The actual margins column is important for this study. It shows that variations in actual margin (cents per litre) were small when prices while gas prices changed quite a bit. From 2001 to 2011 margins oscillated around 7 cents per litre. Margins were increased by the regulator from 2012, they were 8.1 for years 2012 and 2013. Why were the margins same in the regulated and unregulated markets? When regulation of gasoline was decided, the regulator based the regulated margins at par with free market margins which prevailed at the time of regulation. There is thus no difference in the actual margins before and after regulation. The only time margins have increased is when the regulator increased them from 2012. As for the ratios are concerned, they show predictable pattern, rising when prices fall and falling when prices rise.

Table - 4 relates to calculation of tax ratio from retail price and ex-tax ratio. We can get tax amount to rack price ratio (column 4) by subtracting ex-tax price to rack price ratio (column 3) from retail price to rack price ratio (column 2). For 2001 and 2002, the tax ratio to rack price ratio was more than 1. It means that total amount paid per litre by way of tax was higher than the cost of gasoline (its rack price). The effect of fixed taxes in monetary terms (cents per litre) outweigh the HST whish is percentage of price when the gasoline price is low. The ratio falls as gasoline prices rise. In the rising

price market, the fixed amount taxes become less as a percentage and the HST amount increase. Therefore, when prices rose ratio declined irrespective of whether it is competitive market or regulated market. Only time in the entire period of this study that the ratio increased (in 2009) because rack prices fell.

In summary our results show no difference in working of the free market pricing and other variables and regulated market pricing and variables relating to regular self-serve gasoline in Halifax except when the Regulator increased margins from 2012. If gasoline price is deregulated then this excess margin earned by retailers become open to competitive process.

Concluding remarks

The objective of the paper is to study the effect of deregulation of gasoline market in Nova Scotia. The interest in the study arose from the stated policy objective of the government to do away with regulation and encourage competition with the hope that competition will increase efficiency in market which would result in lower prices for consumers. Economists who favour regulation argued that the society has benefited from regulated price as fluctuations in prices have reduced, there is one price in the market, and has reduced the number of rural gas stations being closed.

The current study, done with open mind, takes data of the Kent Marketing Services on retail price, rack price, and ex-tax price of regular self serve gasoline for Halifax area. The period of study covers unregulated market, from period 2001 to June 2006 and regulated market, from July 2006 to the end of year 2013. Different ratios are used to check if they point out any difference in regulated market and unregulated market functioning. Barring a few instances where the government of Canada raised HST from 13% to 15% (in 2010) , and when the regulator increased the margins (from January 2012), the variables show a consistent movement and depict no substantial difference in the functioning of

regulated and free market of gasoline in Nova Scotia.

One reason why there is no substantial difference between the regulated and the unregulated gasoline market in Nova Scotia is that the regulated margins were set in tune with the unregulated margins which existed in the unregulated market. The second reason is that the actual prices paid by the consumer could be lower than the regulator prescribed lower end prices because of the existence of rebates, coupons and other schemes. Thus, the actual price could be lower than that prescribed by the regulator. Third reason is that the upper limit prices are prescribed for self-serve gasoline outlets only. The full serve outlets, mostly in rural areas, have no such maximum price limit. In Halifax, gasoline outlets display the prescribed prices and charge the price displayed by their neighbourhood outlet. This displayed price is generally the lower limit price. The upper end prescribed prices are not charged and displayed by retail outlets for fear of competition. Thus, the only relevant price for display is the lower-end prescribed price (the actual price could be lower) and the for the full-serve gasoline stations in the rural areas there is no upper limit for prices. So practically the regulated prescribed prices are not enforced.

If so, then why was the gasoline market regulated in the first place? It was regulated to reduce the number of outlets being closed in the rural areas when the gasoline outlets entered price wars, particularly from 1996 to 1998. Also, some times, in 2005, consumers blamed gasoline outlets for price gouging when the gasoline price jumped up as a result of hurricanes affecting oil refineries in Texas. Can we have a situation when we can have free market benefits as well have some kind of mechanism which would avoid price wars or price gouging? The answer is in affirmative if we can have a regulator whose function is to set the recommended or the "target price" rather than the "regulated price" or "prescribed" price and let the market forces of demand and supply determine the actual price. Any dubious variation from the target price can be dealt with the existing laws.

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15. Data used in the study is mostly taken from The Kent Group Limited (Kent Marketing Services + M.J. Ervin & Associates). The author expresses his thanks to the company. Data is available at *www.kentmarketingservices.com*

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Table-1

Yearly Average Ex-Tax Prices and Rack Prices of Regular Self-Serve Gasoline in Halifax for 2001 to 2013 (in cents per litre except year and ratio)

Year	Yearly Average Ex-Tax Retail Price	Yearly Average Rack Price	(2) / (3) Ratio
(1)	(2)	(3)	(4)
2001	39.8	32.8	1.213414634
2002	38.9	32.3	1.204334365
2003	41.9	35.8	1.170391061
2004	50.4	43.5	1.15862069
2005	60.2	52.7	1.142314991
2006	65.2	57.5	1.133913043
2007	68.6	61.1	1.122749591
2008	78.7	71.1	1.106891702
2009	59.6	52.6	1.133079848
2010	67.3	60.3	1.116086235
2011	83.5	76.1	1.097240473
2012	88.7	80.6	1.100496278
2013	88.6	80.5	1.100621118

Table-2
Yearly Average Retail Prices (including tax) and Rack Prices of Regular Self-Serve Gasoline
in Halifax for 2001 to 2013 (in cents per litre except year and ratio)

Year	Retail Price	Rack Price	Retail/Rack Price Ratio
(1)	(2)	(3)	(4)
2001	72.8	32.8	2.219512195
2002	73.4	32.3	2.27244582
2003	77.5	35.8	2.164804469
2004	87.2	43.5	2.004597701
2005	98.6	52.7	1.870967742
2006	103.9	57.5	1.806956522
2007	107.3	61.1	1.75613748
2008	117.8	71.1	1.656821378
2009	96.2	52.6	1.828897338
2010	105.8	60.3	1.754560531
2011	125.4	76.1	1.6478318
2012	131.4	80.6	1.630272953
2013	131.2	80.5	1.629813665

Table-3
Yearly Average Margin (in cents per litre), Margin/Ex-Tax Price Ratio, Margin Rack/ Price Ratio and Margin/Retail Prices(including tax) ratio of regular Self-Serve Gasoline in Halifax for 2001 to 2013

Year	Yearly Average Margin in Cents Per Litre	Margin/Ex-Tax Price Ratio	Margin/Rack Price Ratio	Margin/Retail Price Ratio
(1)	(2)	(3)	(4)	(5)
2001	7	0.175879397	0.213414634	0.096153846
2002	6.6	0.16966581	0.204334365	0.089918256
2003	6.2	0.14797136	0.173184358	0.08
2004	6.8	0.134920635	0.156321839	0.077981651
2005	7.6	0.126245847	0.144212524	0.077079108
2006	7.7	0.11809816	0.133913043	0.074109721
2007	7.5	0.109329446	0.122749591	0.069897484
2008	7.7	0.097839898	0.108298172	0.065365025
2009	7	0.117449664	0.133079848	0.072765073
2010	7.1	0.105497771	0.11774461	0.06710775
2011	7.4	0.088622754	0.097240473	0.059011164
2012	8.1	0.091319053	0.100496278	0.061643836
2013	8.1	0.091422122	0.100621118	0.061737805

Table-4
Yearly Retail Price/Rack Price Ratio, Ex-Tax Price/Rack Price Ratio and Total Tax/Rack Price Ratio of regular Self-Serve Gasoline in Halifax for 2001 to 2013

Year	Retail Price/ Rack Price Ratio	Ex-Tax Price/ Rack Price Ratio	Total tax/ Rack Price Ratio
(1)	(2)	(3)	(2)-(3) = (4)
2001	2.219512195	1.213414634	1.006097561
2002	2.27244582	1.204334365	1.068111455
2003	2.164804469	1.170391061	0.994413408
2004	2.004597701	1.15862069	0.845977011
2005	1.870967742	1.142314991	0.728652751
2006	1.806956522	1.133913043	0.673043478
2007	1.75613748	1.122749591	0.633387889
2008	1.656821378	1.106891702	0.549929677
2009	1.828897338	1.133079848	0.69581749
2010	1.754560531	1.116086235	0.638474295
2011	1.6478318	1.097240473	0.550591327
2012	1.630272953	1.100496278	0.529776675
2013	1.629813665	1.100621118	0.529192547