

**Estimated Overpayments of Automobile Insurance Premiums
In Newfoundland and Labrador, 2012-2016**

**Prepared for
The Campaign for Accident Victims**

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Executive Summary

On behalf of the Campaign for Accident Victims (“CAV”), we have examined the following:

1. Are the conclusions of the report by Oliver Wyman (OW), for the Board of Commissioners of Public Utilities for Newfoundland and Labrador, valid?
2. What has been the real experience of auto insurance companies in Newfoundland and Labrador?
3. How has this experience compared to what would have been considered a fair return on equity for these companies?
4. What are the implications for the aggregate premiums paid by drivers in Newfoundland and Labrador?

1. The conclusions of the report by Oliver Wyman

The OW report uses without question, the Board of Commissioners of Public Utilities ROE target profit level for private passenger automobile rate filings of 10%. However, as we have argued, based on the commonly used financial models, the target ROE profit level should have declined steadily over the past 15 years. It should be well below the 10% level today.

We compared the ROI and the expense ratios used by OW to those reported by GISA. It appears that OW has consistently underestimated the potential ROIs for automobile insurance companies.

GISA’s operating expense ratio appears to be on average about 5% below those of the IBC, which suggests that the IBC did overstate these expenses, as alluded to by OW.

OW presented the estimates of the average premium deficiencies, based on their methodology and assumptions.

Higher ROIs would reduce OW’s estimates of the premiums required to generate the 10% after-tax ROE, and thus reduce their estimates of the premium deficiencies during the 2012 to 2016 period.

Indeed, a combination of higher ROIs and lower ROEs might have reversed their conclusions regarding premium deficiencies.

2. ROEs for Auto Insurance Companies in Newfoundland and Labrador

When we exclude the TD subsidiaries (Primum and Security National) and three other companies with average negative ROEs over the entire period 2011-2016, the weighted average ROEs for the remaining companies increase 12.2% over the period 2011-2016. Obviously, the companies that have been profitable have been very profitable.

It is reasonable to exclude the companies with negative ROEs and focus on the profitable ones. Economic theory is quite clear that unless a company earns at least a risk-adjusted, competitive rate of return over time, the company will exit the industry. For a company with negative ROEs to remain in the industry, either the accounting rules employed understate its profitability from an

economic perspective, or the business unit with a negative ROE generates value for one or more other business units in the company.

3. How Much Have Consumers in Newfoundland and Labrador Overpaid

For the companies with average positive ROEs, the estimated upper limit for aggregate overpayments is \$92 million. For the companies with positive ROEs, the estimated overpayments represent about 8.6% of the total premiums paid between 2011 and 2016.

For all companies, excluding Primum and Security National, the upper limit for aggregate overpayments during the period 2011 to 2016 is \$54 million.

We believe that the estimated overpayments based on the companies with positive ROEs are the more reasonable estimates.

4. Flows of Capital

Has the aggregate equity (capital) of auto insurance companies in Newfoundland and Labrador decreased between 2011 and 2016? Total premiums have increased by 47% since 2012. The total equity did decline between 2011 and 2013, but overall equity has increased by 32% between 2012 and 2016. Primum and Security National, both of which have experienced significant “losses” since 2013, have had their equity increase every year despite the losses. Since 2012, the total equity of these two companies has increased four-fold. Obviously losses have not deterred their parent company from investing more heavily in auto insurance in Newfoundland and Labrador.

Overall, there does not seem to be any capital problem for the auto insurance industry in Newfoundland and Labrador.

1.0 Introduction

We have been retained by the Campaign for Accident Victims (CAV) to review the report prepared by Oliver Wyman (OW) for the Board of Commissioners of Public Utilities for Newfoundland and Labrador (PUB), and to determine whether drivers in Newfoundland and Labrador have overpaid for automobile insurance. The key questions posed by the CAV are as follows:

- Are the OW conclusions valid?
- What has been the real experience of auto insurance companies in Newfoundland and Labrador?
- How has this experience compared to what would have been considered a fair return on equity for these companies?
- What are the implications for the aggregate premiums paid by drivers in Newfoundland and Labrador?

In section 2.0, we undertake an analysis of the OW Report (“Profit and Rate Adequacy Review – Private Passenger Automobiles, Newfoundland and Labrador Insurance Industry”). We list the key assumptions and compare the findings to those of GISA.

In section 3.0, we take a critical look at the key assumptions underlying the findings in the OW Report – the return on equity (ROE) for automobile insurance companies, the return on investments (ROI) for these companies, the claims ratio, and general operating expenses. As a key part of this exercise, we analyze the financial data available for auto insurance companies in Newfoundland and Labrador to estimate the returns on equity for these companies over the period 2011 to 2016. Appendix 1 describes the source of the data that we used and lists the insurance companies for which we had data.

In this section, we estimate what a reasonable ROE should have been based on the classic Finance Capital Asset Pricing (CAPM) methodology, which has become a staple of the Public Utilities Regulatory Board in Newfoundland and Labrador. In Appendix 2 we describe this model and explain the analysis we used to estimate ROEs for the automobile insurance market in Newfoundland and Labrador.

In our concluding section (section 4.0), we estimate whether drivers in Newfoundland and Labrador have overpaid for automobile insurance, and if so, by how much. We also look at whether the industry is capital-constrained. That is, have the automobile insurance companies operating in Newfoundland and Labrador committed less capital (equity) to their operations in the province over the period 2011 to 2016. If this were the case, then this would be a strong indicator that these companies were earning less than risk-adjusted, competitive rates of return on their investments.

In our work for the Financial Services Commission of Ontario,¹ a common argument that auto

¹ “Review of Profit Provisions for Automobile Insurance in Ontario: Calculating the Return on Equity for Automobile Insurance Companies”, June 14, 2013.

insurance companies put forth was that too low a ROE would constrain the availability of capital for this industry. The auto insurance market in each province competes with other insurance markets and other financial service industries for capital in each province and across Canada and globally.

2.0 Oliver Wyman Report

2.1 Summary of Conclusions

OW calculated their estimated profit levels as follows:

“We use the total of all premium actually charged by insurers in Newfoundland and Labrador for private passenger automobile insurance in each of accident years 2007 to 2016, less the amount *estimated for claims and all expenses* in each of those years based on Industry data as of June 30, 2017, plus *estimated investment income* from associated cash flows and notionally attributed surplus to measure the profit levels realized by insurers in Newfoundland and Labrador”. (p. 2 – emphasis added)

Their estimates for the after-tax ROEs for the entire automobile insurance industry in Newfoundland and Labrador are replicated in our Table 1.

Table 1: Estimated Profit Levels (After-Tax ROE) by Accident Year, 2007-2016

Accident Year	After-Tax ROE
2007	11%
2008	16%
2009	11%
2010	7%
2011	9%
2012	2%
2013	-4%
2014	6%
2015	-8%
2016	-8%

Source: OW Report, Table 1, p. 2

OW concluded (p. 3):

“As can be seen from Table 1...the Industry’s realized profit levels (as we have estimated them to be) are equal to or higher than the Board’s guideline from 2007 through 2009, but the realized profit levels are lower than the Board’s guideline from 2010 through 2016. Of particular note is that the Industry’s realized profit was negative in 2013, 2015, and 2016. The relatively lower profit levels for the more recent five accident years are the result of higher loss ratios (particularly so for 2015 and 2016) and lower investment income returns. The higher loss ratio in 2015 is, in part, due to unusually adverse weather conditions; random large losses may also be

contributing to the higher loss ratios in these years...Based on these estimates, we find that, on average, the premiums charged over years 2007 to 2011, in aggregate, were more than adequate to provide for claim costs, expenses, and the Board’s guideline profit provision. But over years 2012 to 2016, the premiums have proven to be inadequate, particularly years 2013, 2015 and 2016.”

In their Table 11, replicated in our Table 2, OW presented the estimates of the average premium deficiencies, based on their methodology and assumptions, for each of the years 2012 to 2016.

Table 2: Adequacy of Premiums, 2012-2016

Accident Year	2012	2013	2014	2015	2016
Required Average Premium	\$ 1,121	\$ 1,115	\$ 1,126	\$ 1,231	\$ 1,281
Actual Average Premium	\$ 1,014	\$ 1,032	\$ 1,054	\$ 1,075	\$ 1,102
\$ difference	\$ (107)	\$ (83)	\$ (72)	\$ (156)	\$ (179)
% difference	-10.6%	-8.0%	-6.8%	-14.5%	-16.2%

Source; OW Report, Table 11, p. 19

OW pointed out (p. 22):

“The difference we present above between the actual average premium and the required average premium, by accident year, represents an average across all coverages. This difference, on average, is the hindsight shortfall in the actual premium needed to achieve an assumed target after-tax ROE of 10% at a 2 to 1 premium to surplus ratio. Our findings are sensitive to both the assumed target after-tax ROE and the assumed surplus level.

If a target after-tax ROE higher than 10% is instead assumed, the premium shortfall would be greater; and if a target after-tax ROE lower than 10% is instead assumed, the premium shortfall would be less. As well, if the assumed premium to surplus ratio is lowered (e.g., 1.5 to 1), then the premium shortfall would be greater; and if the assumed premium to surplus ratio is higher (e.g., 2.5 to 1), then the premium shortfall would be less.”

Despite their findings, the question we address is: Did consumers of automobile insurance in Newfoundland and Labrador actually pay less for their insurance than what was required for the insurance companies to achieve their target ROE of 10%, (although the target ROE should be calculated based on sound commonly used financial models)? In other words, are OW right?

In part 7 of their report (p. 23-25), OW estimated the current rate level adequacy for the 2017 accident year. They concluded that “the resulting Industry after-tax ROE for Accident Year 2017 to be -9%.”² Are they right?

² “With the caveat that premium and claim cost forecasts for the 2017 accident year are subject to uncertainty, we make the following calculations and assumptions:

- The average written premiums over the latest three fiscal years (2014/15, 2015/16 and 2016/17) has increased by approximately 2.5% each year: \$1,073, \$1,102, and \$1,127, respectively.

2.2 Key Assumptions

OW point out the key assumptions they use (P. 5):

“We arrive at our findings by comparing the total premium charged by insurers in Newfoundland and Labrador for private passenger automobile insurance in each of the years 2007 to 2016, to the total of:

1. claim and claim related expense costs we estimate insurance companies will pay on claims that occurred in each of these years
2. the operating expense costs reported by IBC (through 2011) and GISA (beginning 2012) that were incurred by insurers in each of these years
3. an estimated provision for investment income attributed as being earned on (i) the cash flow of the insurance operation and (ii) the supporting capital.”

The key assumptions involve claims costs, operating costs, and ROI. OW should have included ROE, but, apparently they were not asked whether the 10% after-tax ROE introduced in 2005³ was appropriate throughout the period 2007-2017. We do examine this question, for if the target

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- The combination of the approved rate changes as of December 31, 2017 including the rate filings for changes to the CLEAR rate group table, is an overall rate level change of approximately +2.6% for 2017 over 2016.
 - The average written premium for calendar year 2016 is \$1,116. We estimate the average written premium for 2017 is \$1,145 (= \$1,116 * 1.026), and roughly estimate the average earned premium for 2017 to be \$1,131.
 - We determine the ultimate claim costs for each of the three fiscal accident years: July 1, 2014 to June 30, 2015, July 1, 2015 to June 30, 2016, and July 1, 2016 to June 30, 2017. We project the estimated claim costs, including loss adjustment expenses, for these three fiscal accident years (2014/15, 2015/16 and 2016/17) to the July 1, 2017 cost level, the middle of Accident Year 2017.
 - Future claim costs will increase (trend) at an average annual rate of +4.2% based on our recent review of claim experience through to June 30, 2017 for the Board. (We trend claim costs by individual coverage.)
 - As presented in Appendix B, based on these loss trend assumptions and our estimate of the average earned premium for 2017, our estimate of the Accident Year 2017 loss ratio underlying our estimates of the trended loss ratios for each of fiscal accident years 2014/15, 2015/16 and 2016/17 are 83.8%, 87.9% and 85.5%, respectively.
 - We weight the trended (projected) loss ratios for fiscal accident years 2014/15, 2015/16, and 2016/17 by 20%, 30%, and 50%, respectively. Based on these weights, applied to fiscal accident years 2014/15, 2015/16 and 2016/17 loss ratios of 83.8%, 87.9% and 85.5%, respectively, we estimate the Accident Year 2017 loss ratio to be 85.9%.
 - We assume a Health Levy per vehicle cost of \$26.49 for 2017 as provided by Board staff and include this fee in these loss ratios noted above.
 - We assume an investment return for 2017 of 2.9% - the average return over the last three years (2014 to 2016) for insurers in Newfoundland and Labrador.
 - We assume the GISA 2016 variable expense ratio will apply in 2017 but increase this by 0.5 percentage points for the change in the premium tax rate effective July 1, 2016.
 - We assume the general expense costs of \$102 for 2016 (as based on the GISA expense exhibit) will increase at an annual rate of 1.7% in line with recent CPI in Newfoundland and Labrador.
 - A target after-tax return on equity of 10% and a premium to surplus ratio of 2 to 1, the Board’s Guidelines.
 - The 2017 corporate income tax rate, 30%, applies to all insurers in Newfoundland and Labrador.”

³ “We note that the Board of Commissioners of Public Utilities (the Board) guideline target profit level for private passenger automobile rate filings is an ROE of 10%.” (p. 2)

ROE should have been set at a different level each year, the premium adequacy estimates of OW would be misleading.

Table 3 sets out OW’s claims loss ratios for each of the years between 2007 and 2016.

Table 3: Claims Loss Ratio Estimates, 2007-2016 (%)

Accident Year	Ultimate Loss Ratio
2007	73.5
2008	67.9
2009	68.3
2010	73.4
2011	73.6
2012	78.7
2013	82.0
2014	78.9
2015	86.7
2016	85.5

Source: OW Report, Table 3, p. 6

OW’s operating expense ratios⁴ are set out in our Table 4. According to OW, these are the average industry operating expense costs as reported by IBC and GISA.

Table 4: Operating Expense Ratios, 2007-2016 (%)

2007	29.7
2008	29.6
2009	30.3
2010	29.5
2011	28.1
2012	28.1
2013	23.3
2014	25.0
2015	23.9
2016	25.7

Source: OW Report, Table 5, p. 7

OW did note (p. 7):

“The expense ratio information provided by IBC is allocated between (a) commission, (b) premium taxes and (c) all other expenses. While the commission expense ratio is specific for private passenger automobile, and the premium tax rate is the same rate for all automobile risks,

⁴ Operating expenses as a percentage of earned premiums.

the reported costs under the “all other expense” category are not specific to private passenger automobiles but include commercial automobiles as well. As such, due to the more complex nature of some commercial automobile risks, the IBC total expense ratios may be slightly overstated for private passenger automobiles.”

GISA’s operating expense ratio appears to be on average about 5% below those of the IBC, which suggests that the IBC did overstate these expenses, as alluded to by OW.

OW did disaggregate the operating expenses into three categories – commissions, premium taxes and fees, and general expenses. The breakdown is presented in Table 5. Their estimates of the general expense ratios for each year seem to have been derived as a residual, after deducting the commissions and premium taxes and fees from the GISA estimates of total operating expenses.

Table 5: Breakdown of Operating Expenses as a Percentage of Total Earned Premiums, 2012-2016 (%)

Accident Year	2012	2013	2014	2015	2016
Commissions	16.1	13.0	12.9	12.9	12.2
Premium Taxes & fees	3.8	3.1	3.6	3.3	4.4
General Expenses	8.2	7.2	8.5	7.7	9.1
Total Expense Ratio	28.1	23.3	25.0	23.9	25.7

Source: OW Report, Table 12, p. 21

On p. 20, OW state: “The commission expense ratios as a percentage of premium are 16.1%, 13.0%, 12.9%, 12.9%, and 12.2% for 2012 to 2016, respectively.”

We do not know where they got these data, but the decline in the commission rates after 2012 should have lead OW to reduce the operating expense assumptions they used. Moreover, OW should have examined how automobile insurance is sold in the province, and whether commission rates in total have declined as online technology has been increasingly adopted.

The investment rates (ROI) that OW used are set out in Table 6:

Table 6: Pre-Tax Investment Rates (ROI), 2007-2016 (%)

Year	ROI
2007	6.1
2008	5.3
2009	3.7
2010	4.4
2011	4.5
2012	4.0
2013	2.8
2014	3.9
2015	2.3
2016	2.4

Source: OW Report, Table 6, p. 8

OW notionally allocated “equity to Newfoundland and Labrador private passenger automobile based on the assumption that there is \$1 of supporting surplus for every \$2 of premium”. (p. 9)

2.3 Comparison to GISA

We relied on the data provided by MSA Research Inc. for private automobile insurance companies operating in Newfoundland and Labrador. As we will highlight below, there are important differences between the data we used and the data reported by GISA. Hence, it is important to consider these differences in the comparisons we make between the GISA report and the OW report. Indeed, the OW results become even more questionable when compared to the MSA data. In this section, we compare OW to GISA because OW referred to this report in their own.

GISA is well aware of the data limitations in its Report (“Automobile Insurance Financial Information Industry Profit and Loss Report Private Passenger Automobile, Newfoundland and Labrador”, September 8, 2017). In the General Disclaimers, GISA pointed out:

“Some of the GISA Financial Information data elements were taken directly from the P&C Returns submitted. Other data elements were required at a level of detail that was not required for the purposes of completing P&C Returns and therefore allocation of some data elements was required. Where allocation of a data element was required (e.g. the allocation of income tax by line of business and coverage), it is understood that reporting companies have used their own company- specific allocation methodology, if available, or have developed an allocation method based on the company’s business. Users should be aware that such methodologies may vary from company to company, and from year to year.”

In the Notes to Users:

“The GISA Financial Information requires companies to appropriately report some of the financial data elements across the automobile class, sub-classes of coverage and

province/territory dimensions. Companies are required to determine how to appropriately ‘allocate’ the following data elements which cannot be taken directly from the P&C Returns:

- Acquisition Expenses
- General Expenses
- Premium Deficiency Adjustments
- Net Investment Income
- Other Revenue and Expenses
- Total Income Taxes
- Allocated Equity

In addition to the ‘allocation’ of some of these items, they may be subject to abnormal accounting activity in a particular year and hence display unusual variation.”

Thus, one needs to be careful in how to use and interpret the data.

Table 7 summarizes what we believe are the key findings for the automobile insurance industry in Newfoundland and Labrador during the period 2012-2016 based on the GISA data.

Table 7: Financial Performance of Automobile Insurance Companies, Newfoundland and Labrador, 2012-2016, Selected Indicators (\$000s)⁵

	Reference	2012	2013	2014	2015	2016
<i>Net premiums earned</i>	[1]	262,726	272,132	277,549	289,561	316,589
<i>Net claims & adjustments</i>	[2]	207,885	218,786	261,505	266,823	235,600
<i>Claims ratio</i>	[2]/[1]	79.13%	80.40%	94.22%	92.15%	74.42%
<i>Underwriting income</i>	[1]-[2]	54,841	53,346	16,044	22,738	80,989
<i>Acquisition expenses</i>	[3]	58,789	59,110	57,941	61,058	65,663
<i>Acquisition expense ratio</i>	[3]/[1]	22.38%	21.72%	20.88%	21.09%	20.74%
<i>General expenses</i>	[4]	15,033	12,968	16,181	16,238	19,104
<i>General expense ratio</i>	[4]/[1]	5.72%	4.77%	5.83%	5.61%	6.03%
<i>Total operating expenses</i>	[3]+[4]	73,822	72,078	74,122	77,296	84,767
<i>Operating expense ratio</i>	([3]+[4])/[1]	28.10%	26.49%	26.71%	26.69%	26.78%
<i>Net investment income</i>	[5]	27,748	17,987	22,001	14,446	13,217
<i>Allocated equity</i>	[6]	183,994	164,618	169,245	100,063	196,045
<i>Investment income/ equity</i>	[5]/[6]	15.08%	10.93%	13.00%	14.44%	6.74%
<i>Premiums/equity</i>	[1]/[6]	1.428	1.653	1.640	2.894	1.615
<i>Pre-tax profits</i>	[7]=[1]-[2]- ([3]+[4])+5	8,767	-745	-36,077	-40,112	9,439
<i>Pre-tax return on equity</i>	[7]/[6]	4.76%	-0.45%	-21.32%	-40.09%	4.81%
<i>Pre-tax return on premiums</i>	[7]/[2]	3.34%	-0.27%	-13.00%	-13.85%	2.98%

⁵ Raw figures, references [1] to [6], are from the table on page 25 of the GISA report “AUTOMOBILE INSURANCE FINANCIAL INFORMATION INDUSTRY PROFIT AND LOSS REPORT PRIVATE PASSENGER AUTOMOBILE: NEWFOUNDLAND AND LABRADOR 2016”

The following stand out in this table, and all of these observations have important implications for the reported profits:

1. The acquisition expense ratio, which largely includes commissions, has remained at a very high level – in excess of 20% of earned premiums through the period. There undoubtedly has been a shift online for selling insurance, and some of the leading companies likely have adopted this and other practices to reduce their commission costs. Indeed, the Oliver Wyman report assumed declining commission rates over the period 2012-2016. The regulator should not reward old practices. Instead, the regulator should incentivize the automobile insurance companies to become more cost efficient.
2. General expenses have bounced around from year-to-year, especially 2012 to 2013, 2013 to 2014 and 2015 to 2016. Automobile insurance companies pride themselves on being well run organizations. If this were truly the case, we should expect general expenses to hold steady, or even decline as companies find ways to be more efficient, especially with the technology that is increasingly available. The regulator should look at best practices among all automobile companies operating in North America and incentivize the insurance companies in Newfoundland and Labrador to move in this direction. The status quo should not be acceptable.
3. The premium to equity ratios have generally been in the 1.6:1 range, with the exception of 2015. Allocated equity should not change as dramatically as it has, especially between 2012 and 2013, 2014 and 2015 and 2015 and 2016. If allocated equity actually was lower in 2012 and 2016, and higher in 2015, the reported pre-tax ROEs in Table 7 would have been higher in all of these years.⁶
4. The returns on equity, or ROI, keeping in mind the preceding observations, were in excess of 10% for each of the years 2012 to 2015, and almost 7% in 2016. These values, are well above the estimates used by OW.

Table 8 compares the GISA claims loss ratios with those used by OW for the years 2012 to 2016. The GISA claims loss ratio is significantly higher in 2014, but significantly lower in 2016. Obviously, the use of the GISA claims loss ratios would produce much lower ROEs in 2014 and 2015 – they were significantly negative in those two years anyhow; but a higher ROE in 2013 and a significantly higher ROE in 2016. The significant differences between the GISA and OW claims ratios for the years 2014 to 2016 should have raised red flags for OW. This raises the question of what claims loss ratios are appropriate.

⁶ OW pointed out on page 10 in their report: “the premium to surplus ratios that have been reported for Newfoundland and Labrador in the FIIP&L Report are about 1.60 to 1 – except for the 2015 year where the reported ratio is 2.89.” In footnote, 10, they added: “We are not aware of the reason for this high figure for 2015.”

Table 8 : Comparison of GISA Calendar Year Net Loss Ratios and Oliver Wyman Accident Year Direct Loss Ratio Estimates, 2012-2016 (%)

Year	FIIP&L Estimated Net Calendar Year Loss Ratios	Oliver Wyman Estimated Direct Accident Year Loss Ratios
2012	79	79
2013	80	82
2014	94	79
2015	92	87
2016	74	85

Source: OW Report, Table 9, p. 12

We saw in Table 7 that the premium to equity ratios, with the exception of 2015, were consistently below the 2:1 ratio used by the PUB.

With regards to the ROI assumptions used by OW, OW commented (p. 13, 14):

“We suspect, but are not certain, that we apply a different pre-tax investment rate than what underlies the FIIP&L profit levels. We apply a rate of 4.0% for 2012; 2.8% for 2013; 3.9% for 2014; 2.3% for 2015; and 2.4% for 2016. It is not clear what pre-tax investment income rates are reflected in FIIP&L profit levels.”

These comments are confusing. A comparison of their pre-tax investment rate assumptions presented in Table 6 above with those in the GISA report (see Table 7) would have made it obvious that OW’s assumptions were unrealistically low. We make this comparison in Table 9, but keep in mind our previous comments regarding the GISA reported equity for automobile insurance companies operating in Newfoundland and Labrador.

Table 9: Comparison of GISA Pre-Tax Investment Returns with Those of OW, 2012-2016 (%)

Year	GISA	OW
2012	15.1	4.0
2013	10.9	2.8
2014	13.0	3.9
2015	14.4	2.3
2016	6.7	2.4

Sources: Tables 6 and 7

It appears that OW has consistently underestimated the potential ROIs for automobile insurance companies. Higher ROIs would reduce OW’s estimates of the premiums required to generate the 10% after-tax ROE, and thus reduce their estimates of the premium deficiencies during the 2012 to 2016 period. Indeed, a combination of higher ROIs and lower ROEs might have reversed their conclusions regarding premium deficiencies.

Now we turn to the operating expenses ratios. Table 10 compares the general expenses ratios. The GISA ratios are reported in Table 7 above. The OW ratios are reported in Table 5 above.

Table 10: Comparison of General Expenses Ratios, GISA and OW, 2012-2016 (%)

Year	GISA	OW
2012	5.7	8.2
2013	4.8	7.2
2014	5.8	8.5
2015	5.6	7.7
2016	6.0	9.1

If we substitute the GISA general expenses ratio for the corresponding OW ratios into OW’s Table 12, and use the OW commissions and premium taxes and fees ratios, the resulting total expense ratios are now generally below 23%:

- 2012: 25.6%
- 2013: 20.9%
- 2014: 22.3%
- 2015: 21.8%
- 2016: 22.6%.

These lower operating expenses ratios also would have reduced OW’s estimates of the premiums required to generate the 10% after-tax ROE. The combination of lower operating expenses ratios, higher ROIs and lower ROEs might have resulted in excess premiums for drivers in Newfoundland and Labrador, using OW’s methodology.

3.0 Assumptions

3.1 ROEs

Throughout their report, OW use, without question, the Board of Commissioners of Public Utilities ROE target profit level for private passenger automobile rate filings of 10%. On page 18, they noted: “Insurers generally take the position that a target ROE of 10% is too low and that a target of at least 15% is more appropriate.” Of course they do. However, the target ROE profit level should have declined steadily over the past 15 years and should have been well below the 10% target. OW and the automobile insurance companies have conveniently ignored the fact that we have had very low interest rates since 2008. Using the CAPM generates significantly lower ROEs for this industry.

The PUB in its 2016 Decision for rates for Newfoundland Power stated (p. 25):

“The appropriate return on equity to be used for utility rate setting is usually selected based on the results obtained from conventional finance models, including the Capital Asset Pricing Model (CAPM), the Discounted Cash Flow method (DCF), and others...In its most recent

decisions on cost of capital, the Board has relied primarily on equity risk premium tests, giving more weight to CAPM and less weight to DCF results in arriving at a fair return.”

The PUB added (p. 27):

“In this hearing, “The Board will give primary consideration to the CAPM estimates in conjunction with other evidence and information in the determination of a fair return for Newfoundland Power.”

However, the PUB did add:

“As stated on Order No. P.U. 13 (2013) it is Canadian regulatory practice, and the practice of this Board, to use the forecast yield for the long-term Canada bond yield as the risk-free rate in equity risk premium models, including CAPM. However, both Mr. Coyne and Dr. Booth agreed that capital market conditions continue to be abnormal.” (p. 37)

“The Board continues to believe that the risk-free rate should be based on the long-term Canada bond yield. However, the Board believes that the one year forecast of the long-term Canada bond yield may not appropriately reflect the risk-free rate in the circumstances. Therefore the Board will accept a risk-free rate of 3.0%, based on Dr. Booth’s evidence...the Board is satisfied that a market risk premium for CAPM of 6.5% is reasonable...The Board believes that this simple calculation of CAPM does not result in a fair return for Newfoundland Power and should be adjusted to reflect unusual financial market conditions.” (p. 38)

“the Board has in the past given primary weighting to the CAPM results in determining a fair return. However current market conditions required that the Board exercise judgment in considering these results. The Board will look to other evidence, including the results from other models, to inform its final determination of a fair return for Newfoundland Power. This includes the DCF results of Mr. Coyne and Dr. Booth, and the information provided on investor expectations and comparative returns for other utilities in Canada.” (p. 39)

“Considering all of the circumstances, the Board is satisfied that a fair rate of return on equity for Newfoundland Power for rate setting purposes for 2016 and 2017 is 8.5%.” (p. 40)

This 8.5% ROE target compared to the CAPM ROE of 7.4%.

In the 2005 Decision for automobile insurance, the PUB stated:

“Dr. Kalymon recommended a target ROE for setting automobile insurance rates of 9.0-10.0%...According to Dr. Kalymon, current 30-year Canada bond rates are at around 5.03% and 10-year Canada bond rates are at 4.05%. Given that the long-term market risk premium based on previous studies is at around 4.6% and that the beta risk of insurance operations is around 1.0, Dr. Kalymon stated that the cost of equity capital for setting automobile insurance rates should be 9.63%.” (p. 32, 33)

“In considering the issue of the appropriate ROE for automobile insurance benchmark rates in this Province, the Board found Dr. Kalymon’s evidence and testimony most instructive and compelling.” (p. 34)

“Given the variety of methodologies and conclusions introduced as evidence by the cost of capital experts, the Board is persuaded by the CAPM approach and those data similarities of NERA and Dr. Kalymon.” (p. 35)

“The Board finds that an ROE of 10.0% is reasonable for the use in determining the 2005 benchmark rates for automobile insurance in Newfoundland and Labrador.” (p. 36)

Finance uses the CAPM to estimate a risk-adjusted, competitive ROE for a company and/or industry. Despite the views expressed by the PUB in the 2016 Decision (“current market conditions required that the Board exercise judgment in considering these results. The Board will look to other evidence, including the results from other models, to inform its final determination of a fair return for Newfoundland Power”), the CAPM is the most objective and widely used model. Taking into account “other evidence” opens up the process to subjective analysis not founded in theory.

The PUB in the 2005 decision reported:

“The NERA report recommended a range of 11-14% for the cost of equity, based on an analysis using a combination of the Capital Asset Pricing Model (CAPM) and the Discounted Cash Flow (DCF) models. According to NERA, combining both models would alleviate concerns regarding the inherent deficiencies in each of the models, with one model acting as a check on the other.” (p. 29)

“The IBC witness Ms. Nielson acknowledged that the NERA report was sound in its methodology and that the DCF and CAPM models proceedings both were the most widely used financial methods in regulatory in the insurance and public utilities industries. The evidence of Ms. Nielson and Mr. Bernier suggested refinements of the NERA conclusions, especially in light of recent academic developments. In particular Nielson and Bernier cited recent work in the U.S. suggesting an alternate approach, called the full-information beta (FIB) approach, in order to identify the impact of various lines of business on the cost of capital of insurers... The FIB approach uses a pricing model called the Fama-French three-factor (FF3F) model, which retains the CAPM risk premium for systematic market risk but adds risk premia for two additional factors that capture the effects of firm size and financial distress.” (p. 31)

Dr. Kalymon provided a thorough discussion of why the DCF model is inappropriate. In Appendix 3 below, we discuss the limitations of the FF3F model.

As noted in Appendix 2, there are three key variables required to estimate the ROE – a risk-free interest rate, a risk premium and an estimate of beta. Based on the sample of 13 insurance companies operating in Newfoundland and Labrador (excluding Primmum and Security National), we derived an estimate for beta of 0.823. In the 2005 PUB Decision, NERA used a beta of 1.06, and Dr. Kalymon used a beta of 1.0. However, both relied on other studies for their respective betas. We did estimate our beta using data for insurance companies operating in Newfoundland and Labrador, and our estimate is consistent with the betas used in the 2005 Decision.

To estimate the risk-free rate⁷, we considered two options, the one-year forward rate, and the geometric mean of the forward one-year rates for each of the next five years. We opted for the latter since this produced larger estimates for the ROE, and hence lower estimates for the overpayments. The risk-premium is the difference between the market return (based on the average during the preceding 10 years) and the risk-free rate.

Our resulting ROEs are reported in Table 11.

Table 11: Risk-Adjusted, Competitive ROEs, 2011-2016 (%)

	2011	2012	2013	2014	2015	2016	2011-16
Risk-free rate	2.49%	1.37	1.47	1.97	1.33	0.80	1.57
Risk premium	4.08	5.66	7.74	6.00	6.27	3.58	5.55
ROE	5.85	6.03	7.84	6.91	6.49	3.75	6.14

Source: Calculated by Prisman and Lazar (see Appendix 2)

The ROEs based on the CAPM are very low throughout this period, reflecting the historically low interest rate environment. To put our estimates into perspective, it is useful to consider the following reported in the PUB 2005 Decision (p. 34):

“Since 1988 there has been “a drop of about 5.0% in long-term Canada bond yields. With this drop in bond yields Dr. Kalymon submitted that it would be completely inconsistent to believe that investors in the equity of insurance firms have also not lowered their expected returns.”

Risk premiums appear to be in line with estimates over other historic periods. The value for beta suggests that despite the variability in profits from year-to-year, the automobile insurance industry in Newfoundland and Labrador has a marginally lower risk profile than all markets in general.

To smooth out the ROEs derived from CAPM, we would favour a five or 10-year rolling average. Nevertheless, it is apparent that the 10% target ROE for the automobile insurance industry in Newfoundland and Labrador has been much too high, at least over the period 2011 to 2016.⁸ As a result, OW’s estimates of premium deficiencies during this period (Table 2 above) most likely overestimate the deficiencies, if indeed there were any.

⁷ The risk-free rate is calculated as the forward rate based on the yield curve in 2012. This is the risk-free rate that would have been used had a regulator been asked in 2012 to estimate the ROE based on the CAPM. One can argue that an annual spot rate for each year can have been used. However, this would have resulted in a lower ROE based on CAPM and thus we adopted the geometric mean because it produced higher ROEs. A higher ROE reduces our estimates of the premium overpayments.

⁸ The auto insurance companies claimed that their ROEs should be closer to 15%. This is where an understanding of competition enters into the picture. If this is a competitive industry, competition would do at least two things. It would force companies to become increasingly more efficient in order to survive. This implies that their operating expense ratios would be under continuous pressure, and thus should decline over time. Second, competition would drive down the actual ROEs to the risk-adjusted competitive levels. These are the ROEs that we calculated, and they have been well below 15% and 10% for the past decade. Only if the automobile insurance companies collude, and

3.2 ROIs

The comparisons in Table 9 make it clear that OW's assumptions for ROI are unrealistically low. Our estimates of the realized ROIs, using the MSA database (see Table 14 below), also are higher than the OW estimates, reinforcing the comparisons to the GISA data. The very low OW estimates for ROIs also exaggerate their estimated premium deficiencies. But what should be the appropriate assumption?

The PUB highlighted the evidence of Dr. Kalymon in its 2005 decision:

“In considering return on investment (ROI), the Board notes the linkages between ROE and ROI referred to by the cost of capital experts...Dr. Kalymon submitted that the 5.4% used by Mercer, in accordance with the Board's methodology, fails to reflect the actual investment practices of Canadian automobile insurance firms. To support this opinion Dr. Kalymon stated that the level of risk measured by beta studies of proxy samples reflects the risks which insurers actually undertake and that, if all investments were limited to Government of Canada bonds, the risk profile of insurance companies would be lower than observed. It is not appropriate to set the ROE based on observed risk and at the same time set ROI on the basis of a very conservative portfolio. Such an assumed investment portfolio...does not reflect either the opportunity or the reality of insurance company investment practices.” (p. 37)

“The Board agrees with the evidence of Dr. Kalymon and Ms. McShane that ROI should reflect to the extent possible the actual investment practices of Canadian automobile insurers and should bear an internal consistency to ROE in the benchmarking process...On request by the Board the IBC provided a further breakdown of the term deposits and bonds and debentures as of December 31, 2003. This information indicated that approximately 68% of the term deposits and bonds and debentures was held on Government-grade bonds, with the remaining held in investment and non-investment grade instruments, mainly corporate securities.” (p. 38)

This discussion seems to suggest that OW's assumptions likely are too low. But a comparison of the realized ROIs, using both the GISA and MSA data, and OW's assumptions made this clear. In Ontario, the regulator, FSCO, has been using a ROI assumption of 6% to set premiums. This value is still less than the reported ROIs for the automobile insurance industry in Newfoundland and Labrador, but this value for the ROI does serve as a useful counterpart to the OW assumptions. As we noted above in S. 2.3, the use of a more realistic assumption for the ROI would have reduced OW's estimates of the required premiums for automobile insurance companies in the province, and as a result would have reduced, and even possibly eliminated their resulting premium deficiencies.

3.3 General Operating Expenses

At the conclusion of S. 2.3 above, we concluded that the total expenses ratios should be no greater than the following:

- 2012: 25.6%

this would violate the Canadian Competition Act, could they relieve the downward pressures on operating expenses and profits.

- 2013: 20.9%
- 2014: 22.3%
- 2015: 21.8%
- 2016: 22.6%.

Indeed, we argue that the combination of competition and technology should have reduced these ratios closer to 20%. These values are below those used by OW.

4.0 Conclusions

4.1 Impact of Lower Operating Expenses Ratios

OW's estimates of the supposed inadequacy of the premiums for auto insurance resulted from the following key assumptions:

- An excessive ROE of 10%.
- Unrealistically low pre-tax, investment income returns.
- A claims ratio for 2016 that is out of line with the GISA estimate.
- Operating expenses in the 25% range, rather than best-in-class ratios that likely would have been much less.

It would be interesting to see what conclusions OW would reach if they were required to use more realistic assumptions? The starting points should be the ROE, investment income returns, and operating expense ratios. The ROE is much too high; the investment income returns are much too low; and the operating expense ratios are too high. The combination of assumptions OW selected inevitably biases their results towards an inadequacy of premiums.

We proceed in steps to examine various combinations of assumptions. We start by replacing GISA's acquisition expense ratios (Table 7 above) with OW's assumptions for commissions and premium taxes and fees of approximately 16.2% per year. The resulting profitability of the automobile insurance industry increases substantially (Table 12).

Table 12: Adjusted Pre-Tax Profit Rates, (Based on Lower Acquisition Expense Ratio), Automobile Insurance Companies, Newfoundland and Labrador, 2012-2016 (%)

	2012	2013	2014	2015	2016
Pre-tax ROE - original	4.8	-0.4	-21.3	-40.1	4.8
Pre-tax ROE - adjusted	13.6	8.7	-13.6	-26.0	12.2
Pre-tax return on premiums - original	3.3	-0.3	-13.0	-13.8	3.0
Pre-tax return on premiums - adjusted	9.5	5.2	-8.3	-9.0	7.5
Operating expense ratio - original	28.1	26.5	26.7	26.7	26.8
Operating expense ratio - adjusted	21.9	21.0	22.0	21.8	22.2

Thus, we can see clearly the importance of the operating expense assumption. In 2012 and 2016, the resulting pre-tax ROEs are much greater than the estimates provided by GISA. On an after-

tax basis, the ROEs in both these years exceed 8.4%. In 2013, GISA's estimated negative pre-tax ROE actually becomes a positive 8.7% ROE. And for 2014 and 2015, the negative ROEs are reduced significantly.

4.2 ROE Gaps

This brings us to our methodologies and assumptions. Our estimates of potential premium overpayments are based on individual automobile insurance company data.

A company's pre-tax return on equity is defined as the ratio of its pre-tax profits (underwriting and investment) to its shareholders equity as measured on its balance sheet. In the case of companies selling auto insurance in Newfoundland and Labrador, calculating their ROEs requires estimating the following:

- The portion of the total equity of each company that is allocated to its auto insurance business in the province;
- The total net investment income of each company that is attributable to the auto insurance subsidiary or division operating in the province; and
- The pre-tax income from private automobile insurance (earned premiums less incurred claims and operational costs).

We did not have data on the equity allocated to their private auto insurance operations in each province, the net investment income attributable to such operations, and the operational costs of private automobile insurance by individual insurance companies. Hence, the need for estimates. Appendix 2 sets out our estimates and describes how we estimated the ROEs for each company.

Table 13 summarizes our pre-tax ROE estimates for the auto insurance industry in Newfoundland and Labrador for the period 2011-2016.

Table 13: Return on Equity, Automobile Insurance Companies in Newfoundland and Labrador, 2011-2016 (%)

	2011	2012	2013	2014	2015	2016	2011-16 average ¹	2011-16 average ²
<i>Northbridge</i>	75.8%	-25.6	43.1	50.9	15.4	12.8	28.7	28.7
<i>Unifund</i>	53.4	49.0	12.6	-77.2	-22.1	34.7	5.4	8.4
<i>RSA</i>	36.1	28.0	36.9	43.5	-96.9	68.0	20.1	19.3
<i>Intact</i>	21.3	9.7	-62.1	19.7	-3.2	-18.4	-9.7	-5.5
<i>S&Y</i>	41.9	10.5	0.4	-25.9	5.9	-11.4	5.9	3.6
<i>Aviva</i>	31.8	36.5	31.9	42.7	29.2	14.1	28.3	31.0
<i>Security National</i>	10.1	38.0	-20.1	-62.9	-247.2	-78.7	-91.7	-60.1
<i>Primum</i>	21.1	28.6	25.9	-99.8	-256.0	-71.6	-90.9	-58.6
<i>Traders General</i>	89.3	204.2	-226.8	91.2	13.5	-3.3	24.2	28.0
<i>Personal Insurance</i>	-166.5	-93.1	9.6	-43.7	28.3	-128.6	-61.7	-65.6
<i>Co-Operators</i>	15.3	-2.5	23.4	28.6	4.9	20.9	15.1	15.1
<i>Coseco</i>	79.9	18.1	30.9	12.5	-8.3	26.1	24.8	26.5
<i>Elite</i>	180.6	47.6	13.5	-78.3	36.2	-21.5	21.7	29.7
<i>Dominion</i>	-103.8	-36.4	9.2	0.0	14.5	488.8	-16.5	62.0
<i>Scottish & York</i>	28.1	34.6	-1.3	-10.4	-1.9	59.0	15.6	18.0
<i>Average of All Companies³</i>	16.3	14.0	9.5	-17.4	-36.6	4.3	-2.5	-1.6
<i>Average of All Companies ex. Primum & Security National</i>	16.4	12.9	10.5	-11.9	-9.7	19.3	6.4	6.2
<i>Average of All Positive ROE Companies⁴</i>	40.1	22.7	13.5	-14.3	-13.1	22.8	12.2	11.9

Notes: 1. Weighted averages: For each insurance company, the annual ROEs were weighted by the equity in each year as a proportion of the company's total equity over the period 2011-2016.

2. Simple average: Average of the ROEs over the period 2011-2016.

3. Weighted averages: For each year, the annual ROEs of each insurance company were weighted by each company's equity in that year as proportion to the total equity of all insurance companies in that year.

4. All but three companies, in addition to Primmum and Security National, were used. These 10 companies had a positive average ROE over the entire period 2011-2016. Some of these companies did have negative ROEs in some years.

The year-to-year variability stands out.

If we exclude the TD subsidiaries – Primmum and Security National – from our sample, the average ROE for the remaining companies was positive – weighted average of 6.4%, simple average of 6.2% over the entire period.

When we exclude the companies with average negative ROE over the entire period,⁹ the average ROEs for the remaining companies increase to 12.2% (weighted average), or 11.9% (simple average) over the period 2011-2016 – well above the PUB’s 10% and our estimates of reasonable ROEs for this industry in Newfoundland and Labrador.

It is reasonable to exclude the companies with negative ROEs and focus on the profitable ones. Economic theory is quite clear that unless a company earns at least a risk-adjusted, competitive rate of return over time, the company will exit the industry. For a company with negative ROEs to remain in the industry, either the accounting rules employed understate its profitability from an economic perspective, or the business unit with a negative ROE generates value for one or more other business units in the company.¹⁰

Perhaps, some companies offer auto insurance as a loss leader in order to sell other types of insurance and/or other financial products, with these other lines being quite profitable.¹¹ Maybe the auto insurance lines cover some (perhaps even a disproportionate share) of the fixed costs of the parent company or entire group, thus enhancing the reported profitability of other units within the company/group. The parent company could engage in transfer pricing to shift profits, even generating losses, in order to minimize aggregate tax liabilities. There might be other “positive” externalities within a company whose auto insurance business in Newfoundland and Labrador appears to consistently underperform.¹²

Furthermore, the reported or estimated ROEs might be quite misleading with regards to the ability of a company to attract capital to a particular line. As well, without detailed information about the intricacies of intra-corporate transfer pricing and other accounting practices, it is very difficult to measure the real profitability of any one line of business for a P&C company.

Table 14 sets out the year-over year total returns based on investing in a portfolio of stocks that

⁹ In addition to Primmum and Security National, Intact, Personal Insurance and Dominion were excluded.

¹⁰ Each P&C company has the accounting flexibility to move profits around to minimize tax liabilities. Indeed, all multi-divisional and multi-geographic companies have this flexibility.

¹¹ We found in our work on auto insurance in Ontario that TD appeared to consistently lose money on its auto insurance operations. This indicated to us that auto insurance might have been used as a loss leader by TD to attract consumers and generate other types of business and income for the bank.

¹² The auto insurance companies that averaged positive ROEs over the entire period 2011 to 2016 earned an average of 10.8% on their investment portfolios, compared to an average 9.4% return for all companies, excluding Primmum and Security National. Thus, part of the superior financial performance of these companies can be attributed to better returns for their investment portfolios.

comprise the S&P TSX Composite Index. As well, we have included the average investment returns on equity for all auto insurance companies, excluding Primmum and Security National, operating in Newfoundland and Labrador.¹³

Table 14: Annual Total Return S&P TSX and Net Investment Returns on Equity, Auto Insurance Companies (excluding Primmum and Security National), Newfoundland and Labrador, 2011-2016 (%)

	<i>S&P TSX Annual Return</i>	<i>Net Investment Return on Equity, Auto Insurance Companies</i>
2011	-8.71	12.12
2012	5.37	9.73
2013	12.99	8.53
2014	10.55	12.20
2015	-8.32	6.98
2016	21.08	6.94

It is quite clear that the annual returns on investments in equities fluctuate widely from year-to-year. Therefore, it is not surprising that the annual ROEs of auto insurance companies also fluctuated from year-to-year. The net investment returns were relatively more stable than the S&P TSX total returns. Furthermore, our estimates of the aggregate ROIs exceed the ROI assumptions of OW, reinforcing our earlier comments that OW likely has underestimated the profitability of automobile insurance companies in the province, and overestimated their premium deficiencies during the period 2012 to 2016.

Table 15 sets out the aggregate auto insurance premiums in the province and the share of all companies excluding Primmum and Security National, and all companies that had positive ROEs.

The auto insurance companies with positive ROEs throughout the 2011-2016 period accounted for about 75% of total premiums over the entire period, ranging from a low of 66% of total premiums in 2016 to a high of 82% in 2011. When Primmum and Security National are excluded, the companies with positive ROEs accounted for 84% of the remaining total premiums over the period 2011-2016.

¹³ These returns equal the aggregate net investment incomes in each year for all companies excluding Primmum and Security National as a percentage of the aggregate average equity of these companies in each year. The company-wide incomes and equity were used. The proportions of the company-wide incomes and equity allocated to auto insurance in Newfoundland and Labrador are the same for each company; namely, earned auto insurance premiums in the province as a percentage of total earned premiums across all business lines across Canada.

Table 15: Total Premiums, and Share of Total Premiums, Automobile Insurance Companies, Newfoundland and Labrador, 2011-2016

	2011	2012	2013	2014	2015	2016	2011-2016 First row total Remaining rows weighted averages
<i>Total Premiums, All Auto Insurance Companies (\$ millions)</i>	\$207.8	202.3	210.7	241.2	273.0	297.8	1,432.7
<i>Premiums, all Auto Insurance Companies excluding Primmum & Security National out of total Premium of all companies (%)</i>	95.9%	92.8	91.6	90.3	87.4	83.2	89.6
<i>Premiums, all Auto Insurance Companies with Positive ROEs out of total Premiums of all companies (%)</i>	81.6%	78.7	79.2	78.9	71.4	65.6	75.1
<i>Premiums, all Auto Insurance Companies with Positive ROEs out of total Premiums of all companies excluding Primmum and Security National (%)</i>	85.1%	84.8	86.5	87.3	81.7	78.9	83.8

When we compare the total premiums generated by the MSA data to the total premiums produced by GISA (Table 7 above), it is apparent that there are significant differences. The GISA estimates are consistently higher than those produced by the MSA data. Similar differences are likely between the claims data for these two datasets. Such differences complicate the task of the regulators.

Using these data, we estimated potential premium overpayments as follows. Whenever the realized ROEs (Table 13) exceeded the ROEs we estimated for the auto insurance industry (Table 11), it is likely that premiums were too high, and as a result, drivers in Newfoundland and Labrador paid too much for auto insurance.

In Table 16 we report the gaps, when they are positive, between the realized pre-tax ROEs (based on weighted averages) and the CAPM ROEs for two groups of companies – all companies excluding Primum and Security National, and only the companies that reported average positive ROEs over the entire period.

For all companies, excluding Primum and Security National, there were positive gaps for all years except 2014 and 2015. For the companies with positive ROEs, the gaps were much larger, as would be expected.

Table 16: ROE Gaps – Actual less CAPM ROE, 2011-2016 (%)

	2011	2012	2013	2014	2015	2016
<i>All ex. Primum & Security National</i>	10.5	6.6	2.6			15.5
<i>All Positive ROEs</i>	34.3	16.4	5.6			19.1

4.3 Potential Premium Overpayments

There are two options for converting the ROE gaps into premium overpayments estimates. One involves the following calculations. For example, in 2011 the aggregate equity of all companies excluding Primum and Security National was \$116.7 million. The gap was 10.5% in that year for these companies. So we could reduce the pre-tax income (originally \$19.1 million) by 10.5% times the aggregate equity, or \$12.3 million in total. These calculations could be repeated for every year where the gap was positive.

But this “short-cut” methodology for estimating premium overpayments is incomplete. The second option takes into account that as premiums might have been lower, so too might have been operating costs (by 20% of the reduction in premiums). This would tend to understate the premium overpayments. On the other hand, lower premiums would have reduced both the share of aggregate company investment income attributable to auto insurance in Newfoundland and Labrador (resulting in overstating the premium overpayments), and the share of aggregate company equity allocated to auto insurance in the province (resulting in an underestimate of the resulting ROE and hence an overestimate of the premium overpayments).

We chose the second option. Through an iterative process, we adjusted the actual premiums till the resulting ROEs equaled the CAPM ROEs (Table 11).

Table 17 summarizes the resulting estimated premium overpayments.

Table 17: Estimated Premium Overpayments, Newfoundland and Labrador, 2011-2016 (\$ millions)

	2011	2012	2013	2014	2015	2016	2011-2016 total
<i>All ex. Primmum & Security National</i>	\$15.4	9.5	3.4			26.0	54.2
<i>All Positive ROEs</i>	42.1	19.6	6.2			24.3	92.1

For all companies, excluding Primmum and Security National, the aggregate overpayments during the period 2011 to 2016 might have been as large as \$54.2 million. This should be viewed as the upper bound using this sample since it does not take into account that premiums might have been set too low in those years where the gap was negative.

For the companies with positive ROEs, the estimated aggregate overpayments were approximately \$92 million. Again, this should be viewed as the upper bound using this sample.

These estimated overpayments translate into the following excess premiums as a percentage of the actual premiums paid (Table 18). For the companies with positive ROEs, the overpayments represent about 8.6% of the total premiums paid between 2011 and 2016.

Table 18: Estimated Premium Overpayments, Newfoundland and Labrador, as % of Actual Premiums Paid, 2011-2016 (%)

	2011	2012	2013	2014	2015	2016	2011-2016
<i>All ex. Primmum & Security National</i>	7.7%	5.1	1.8			10.5	4.2
<i>All Positive ROEs</i>	24.8	12.3	3.7			12.4	8.6

One can challenge our estimates, claiming that drivers in the province might have underpaid in the other years when the actual ROEs were less than the CAPM ROEs. But in those years, if auto insurers set premiums that generated very low or negative ROEs, they did so voluntarily, perhaps to attract money to be invested, or to use auto insurance as a loss leader for other financial products, including other types of insurance.

On the other hand, the dismal performance of some of the auto insurance companies might have been the result of underestimating risks and mis-pricing of risks, or of internal transfer pricing to reduce the parent company's tax liabilities.

Overall however, we have tried to err on the side of underestimating the premium overpayments. The use of simple averages would have produced larger estimates. And the use of a simple methodology also appears to have produced lower premium overpayment estimates.

Now we turn to the OW estimates for 2017. As we noted above, OW concluded, based on their assumptions, that the resulting industry after-tax ROE for Accident Year 2017 could be -9%, and this indicated that there would be a premium deficiency for this year as well. However, what happens to their estimate if more reasonable assumptions are used?

We have done this, using the following assumptions:

- Net premiums earned in 2017 – net premiums earned in 2016 plus 3% growth;
- Claims ratio – 79% (approximately half way between the GISA estimate for 2016 and the OW assumption for 2017);
- Total operating cost ratio – 20% (10% commission rates, 4% taxes and fees, 6% general expenses)
- Equity – based on premium to equity ratio of 1.6:1;
- Expected investment income return on equity – 6%
- Tax rate – 30%.

These assumptions produced pre-tax profits of \$15.5 million and after-tax profits of \$10.8 million. In turn, these result in pre-tax profits on premiums of 4.75%; and an after-tax ROE of 5.32%. While the latter is below the 10% target ROE, it is greater than what we have estimated the ROE should have been for this industry in 2016 (Table 11), and well above the OW estimates. With a more appropriate ROE, the industry as a whole might be charging premiums that are too high.

4.4 Capital Availability

We also explored the issue of capital availability.

Has the aggregate equity (capital) of auto insurance companies in Newfoundland and Labrador decreased between 2011 and 2016? Total premiums have increased by 47% since 2012 (Table 15).¹⁴ Table 19 presents our estimates of total equity for auto insurance companies in Newfoundland and Labrador.

¹⁴ Based on the GISA data, earned premiums have increased by only 20.5% over this period (Table 7).

Table 19: Aggregate Equity (Average of Preceding and Current Year), All Automobile Insurance Companies, Newfoundland and Labrador, 2011-2016 (\$ millions)

	<i>All Companies</i>	<i>All Companies, excluding Primum and Security National</i>
2011	122.1	116.7
2012	120.2	114.0
2013	112.1	104.7
2014	120.4	109.9
2015	143.2	127.2
2016	158.4	133.6

The total equity did decline between 2011 and 2013, but overall equity has increased by 32% between 2012 and 2016. Primum and Security National, both of which have experienced significant “losses” since 2013, have had their equity increase every year despite the losses. Since 2012, the total equity of these two companies has increased four-fold. Obviously, losses have not deterred their parent company from investing more heavily in auto insurance in Newfoundland and Labrador.

Overall, there does not seem to be any capital problem for the auto insurance industry in Newfoundland and Labrador.

4.5 Wrap-up

Assumptions are critical for determining whether drivers in the province have overpaid for auto insurance. So too are the data that are used to support the assumptions and provide the basis for calculating whether premiums have been too high or too low.

OW used a number of assumptions that biased their results towards a conclusion that drivers paid less than they should have in order for the automobile insurance companies to earn a 10% after-tax return on their equity investments. Their key assumptions do not appear to be supported either by the GISA data or the MSA data. More reasonable assumptions for the ROIs, operating expenses, and claims most likely would have resulted in a conclusion of premium over-payments for 2012 and 2016, and possible premium deficiencies for 2014 and 2015.

OW also did not address whether the 10% ROE assumption was appropriate throughout the entire period, despite the steady decline in interest rates since 2008. Our analysis showed that the ROE should have been reduced steadily to reflect the changes in financial market conditions. With more appropriate ROE targets, we concluded that drivers in Newfoundland and Labrador might have overpaid for auto insurance by \$50 million between 2012 and 2016. As well, the overpayments likely continued into 2017 based on our update of the OW findings for this year.

Appendix 1: The Database

The data for private automobile insurance companies operating in Newfoundland and Labrador were provided by MSA Research Inc.¹⁵ Since the dataset separates private auto insurance from commercial auto insurance only from 2011, the data available for our use are those for the years 2011 to 2016. We used annual data for this period.¹⁶ The list of insurance companies in the private auto insurance market in the province are as follows:

- Northbridge
- Unifund
- RSA
- Intact
- S&Y
- Aviva
- Security national
- Primmum
- Traders General
- Personal Insurance
- Co-Operators
- Coseco
- Elite
- Dominion
- Scottish & York

There were two other companies – Tokio Marine and Nichido, and Zurich. We excluded both. Tokio Marine and Nichido were marginal players at best in the industry in the province, with an average of \$8,833 in written premiums during the period 2011 to 2016. Zurich appeared to operate in this market only in 2011, 2015 and 2016.

For each insurance company, we received data for written premiums in each line of business for each of the years 2011 to 2016. The auto insurance line of business was separated between private auto insurance in Newfoundland and Labrador and auto insurance in the rest of Canada.¹⁷ In addition, we received data for each insurer for their respective aggregate equity and investment income for each year.

Appendix 2: Estimating Risk-Adjusted, Competitive ROEs

Capital Asset Pricing Model

The U.S. Task Force on Rate of Return of the Casualty Committee of the Actuarial Standards Board produced the “Actuarial Standard of Practice, No. 30: Treatment of Profit and

¹⁵ See: www.msaresearch.com.

¹⁶ We chose to use annual data instead of quarterly data because there might be some degree of seasonality in the auto insurers’ data. Seasonality is not an issue with annual data.

¹⁷ For these two lines of business we also received data on their earned premiums in each year.

Contingency Provisions and the Cost of Capital in Property/Casualty Insurance Ratemaking”, which was adopted by the Actuarial Standards Board in July 1997.

This Task Force defined the cost of capital as follows: “The rate of return that capital could be expected to earn in alternative investments of equivalent risk; also known as opportunity cost.”¹⁸

The Task Force added:¹⁹

“In estimating the cost of capital, the actuary should consider the relationship between risk and return. The methods used for estimating the cost of capital should reflect the risks involved in the risk transfer under consideration. These risks may include insurance, investment, inflation, and regulatory risks, as well as diversification, debt structure, leverage, reinsurance, market structure, and other appropriate aspects of the social, economic, and legal environments.”

The Task Force also pointed out that there are several methodologies available to estimate the cost of capital, including, “but not limited to the following”:²⁰

“1. Comparable Earnings Model—The comparable earnings model is used to analyze historical returns on equity for entities or industries of comparable risk. The cost of capital is related to the average rate of return over a historical period.

2. Discounted Cash Flow Model—One form of the discounted cash flow model, the dividend discount model, is used to analyze the current prices and dividend levels of publicly traded securities that pay dividends. The cost of capital is calculated as the sum of the expected first-year dividend yield plus the expected annual growth rate in dividends.

3. Risk Premium Model—The risk premium model is used to analyze the spread in returns for investments of different risk. The cost of capital is estimated as the sum of the expected return on a reference investment plus a margin to reflect relative risk. One widely used form of risk premium analysis is known as the capital asset pricing model, in which the reference security is a risk-free Treasury security, and the risk margin is determined using a measure of risk known as *beta*, defined as the covariance of an investment's return with returns in capital markets as a whole.”

We opt for the Capital Asset Pricing Model. It has become the most widely used model in Finance to calculate the cost of equity capital. Regulators in the UK and Australia use the CAPM to establish a risk premium for equity holders. The PUB in Newfoundland and Labrador also prefer the use of CAPM, although the OUB does consider other factors as well. The CAPM, while not free of some deficiencies, is widely used in valuing and assessing risk, and determining the risk premiums for assets.

¹⁸ Task Force on Rate of Return of the Casualty Committee of the Actuarial Standards Board, “Actuarial Standard of Practice, No. 30: Treatment of Profit and Contingency Provisions and the Cost of Capital in Property/Casualty Insurance Ratemaking” (Doc. No. 057, July 1997), p.1.

¹⁹ Ibid, p. 3.

²⁰ Ibid, p. 7.

The CAPM is a market-based approach and hence is an objective approach that relates to actual conditions in financial markets. The CAPM has a strong theoretical foundation in the academic finance literature. Major stock exchanges provide estimates for betas for all companies listed on the exchanges. Finally, implementing the CAPM is relatively simple and requires use of data that are readily available.

In financial markets, a “fair” or correct price of an asset, or a financial instrument, is the price that does not induce free lunches in an economy. This notion of a correct price is not only derived from economic intuition but is also supported by rigorous arguments and characterizations of no-arbitrage in financial markets. The absence of arbitrage opportunities is the cornerstone of modern Financial Economics.

Consider a risk-free environment, such as the debt market consisting of short-term, Government of Canada bonds. In this case, the present value of the future cash flows of a bond is calculated by discounting them at the risk-free rate to obtain the present value.

The value, or the correct price, of a risky asset that promises an uncertain cash flow is also the present value of its future cash flows. However, in a risky environment discounting cannot be done at a risk-free rate. Thus, a risk adjusted discount factor must be used. Obviously, a future risky dollar is worth less than a sure dollar. Hence, if the discount factor for the sure dollar is $1/(1 + r)$, where r is the risk-free rate, the discount factor for a risky dollar must be $1/(1 + r + r_p)$, where r_p is a positive constant representing the risk premium.

In competitive markets, investors who hold a risky asset must be compensated for the risk they bear; otherwise, they would have no incentive to prefer this asset to the risk-free asset. This compensation is usually presented in the form of the expected rate of return. The expected rate of return on a risky asset, $E(R)$, must be greater than the rate of return offered by the risk-free asset, R_f . Hence, $E(R) > R_f$ and the difference $E(R) - R_f$ is termed the risk premium.

The Capital Asset Pricing Model is credited with the contribution of calculating the risk premium and its relation to the “risk” assumed by the investors who hold the asset. In the CAPM, the risk of an asset is measured by its beta (“ β ”). The beta of an asset measures the sensitivity of the expected rate of return of a risky asset to the expected rate of return of the “market” (R_M). The “market” is usually represented by an index that captures the market. The CAPM specifies the risk premium of an asset as a function of the excess rate of return of the market over the risk-free rate. That is

$$\text{Risk Premium} = E(R) - R_f = (E(R_M) - R_f) \quad (1)$$

Hence, the security market line is given by

$$E(R) = R_f + \beta(E(R_M) - R_f) \quad (2)$$

The beta, as a sensitivity measure, tells us the change in the risk premium of an asset for each percentage change in the market return.

Given the above relation, the risk premium of an asset for public companies can be estimated by a regression. Having observations on the rate of return of the market and of the risky asset, beta is estimated by trying to fit the observations to the linear relation

$$R_t = \alpha + \beta R_{Mt} + \varepsilon_t \quad (3)$$

Beta is therefore the slope of the “best line” that fits the observed coordinates (R_t, R_{Mt}) where t denotes the time index of the observation. The beta of a firm thus tells us the risk premium that should be used in evaluating the firm.

Beta is therefore the slope of the “best line” that fits the observed coordinates (R_t, R_{Mt}) where t denotes the time index of the observation. The beta of a firm thus tells us the risk premium that should be used in evaluating the firm.

The risk measured by a beta that is estimated from stock prices, β_e , (referred to as equity beta) measures not only business risk but also financial risk. The risk of a company that has no debt (commonly referred to as unlevered beta, β_u) is implicit in β_e . Under some simplifying assumptions:

$$\beta_e = \beta_u (1 + D/E) \quad (4)$$

where D/E is the debt-equity ratio.

The risk measured by a beta is usually estimated from stock prices. However, when companies are not publicly traded, or when the companies operate in different markets (geographic and/or product), beta is estimated directly from the accounting data. Such is the case for the auto insurers that operate in Newfoundland and Labrador, and thus beta is estimated directly from accounting data.

In a regulated environment in which a regulator aims to set a fair rate of return, the allowed rate of return is set to be $R_f + \beta(E(R_M) - R_f)$, when $D/E = 0$ and beta is estimated directly from accounting data. Fixing the allowed rate of return in such a way compensates for the assumed risk with the appropriate risk premium.

While the methodology for calculating the unlevered ROE is quite straightforward, applying the methodology likely will encounter several problems. In applying the CAPM, there are two key variables:

- Risk-free rate
- Market return premium

The risk-free rate can equal the sum of the real yield on the Government of Canada real return bond and the average annual inflation forecast derived from the nominal yield on five-year Government of Canada bonds. The real yield should be averaged over a period of time, the appropriate period depending on economic conditions and monetary policy. An alternative for estimating the risk-free rate is to use prices of “zero coupon” Government of Canada bonds.

However, is it appropriate to set the risk-free rate according to the current spot rates, or based on the forward rates, or perhaps on some average of rates as justified by the mean reverting property of interest rates?

It might be reasonable to assume that the spot rate, which is at historically low levels, should not be used as it is not a fair representation of the rate likely to prevail over the next several years. The decision should therefore be between:

- The forward rate, as it is an estimate of the spot rate that will prevail in the future;
- Some historical average of spot rates; or
- Even a longer term rate (e.g., the yield on five-year Government of Canada Bonds) since this can be considered as an average of the short-term rates.

The forward rate is considered a good estimate for a future spot rate. Thus an estimate of the spot interest rate at a future date t (measured in years), spanning the time interval $[t, u]$ is the forward rate $r(t, u)$. Given the discrete observations on the zero coupon curve,²¹ a continuous function $h(t)$ can be fitted to the observations. The forward rate will thus be $(1+r(t,u))^{u-t}=(1+h(u))^u(1+h(t))^{-t}$.

The time period for which the beta and the market risk premium should be estimated is also an issue. The CAPM studies generally estimate betas based on the last 60 months, but the market risk premium also might be based on a much longer-term average (e.g. market returns averaged over a 30, 50 or even a 100-year period). There is also the question of what stock market index should be used to estimate the market risk premium. We calculated the equity market return from the S&P/TSX composite total return index using annual changes in this index.

Nevertheless, while there are legitimate areas for disagreement in applying the CAPM – the time period for measuring the risk free rate, the time period for measuring the market equity return, and the sample of companies for measuring beta – the CAPM is the most widely accepted methodology in the finance literature for determining the risk premiums for individual companies.

Estimating Beta

We used the CAPM and accounting data in our study. The MSA database facilitates the direct estimation of the accounting beta. The pre-tax ROE is defined as pre-tax income divided by equity.

The pre-tax income of a company is defined as: Underwriting profits/losses plus net investment income. The pre-tax underwriting profits/losses of a company are defined as: total earned premiums less total claims less operating expenses.

²¹ A simplified version of the above will be just to use the yields on Government of Canada bonds in order to derive forward rates.

In Ontario, FSCO assumed that operating expenses averaged 25% of earned premiums. Our analysis suggested that this percentage likely was too high in light of consolidation in the industry and new technologies. Consequently, we used a 20% assumption for auto insurance companies in Newfoundland and Labrador.

We assumed, as we did in our FSCO report, that the share of the net total investment income of each Property and Casualty (“P&C”) Insurance company allocated to each company’s private auto insurance operations in Newfoundland and Labrador equaled the ratio of the total earned private auto insurance premiums in the province to the total Canada-wide earned P&C premiums. This is also the same assumption as the one we used to allocate the total equity of an insurance company to its Newfoundland and Labrador auto insurance operations. Thus, the pre-tax ROE ($R_{e,t}$) for private auto insurance for an insurer j in year t is defined as:

$$R_{e,t} = [0.8 * E_{jt} - C_{jt} + In_{jt} * P_{jt}] / [(Eq_{jt} + Eq_{jt+1}) / 2] * P_{jt} \quad (5)$$

Where: E_{jt} are the earned premiums for private auto insurance in the province for company j in year t ; C_{jt} are the total auto insurance claims paid in the province by company j in year t ; In_{jt} are the aggregate net investment returns for company j in year t (across all lines of business and across Canada); P_{jt} is the ratio of earned premiums from auto insurance in the province to total earned premiums for all lines of business across Canada for company j in year t ; Eq_{jt} is the aggregate equity for company j at the beginning of year t ; and Eq_{jt+1} is the aggregate equity for company j at the beginning of year $t+1$.

FSCO used a 2:1 rule between 2001 and 2012 to determine the equity base for auto insurance companies in Ontario. That is, each year the equity of auto insurance companies in Ontario was assumed to equal 0.5 times their net earned auto insurance premiums in the province. Starting in 2013, FSCO changed to a 1.7:1 rule, so that going forward the equity of auto insurance companies in Ontario is assumed to equal 0.588 times their net earned auto insurance premiums in the province. Instead of using a fixed ratio to estimate the equity base for auto insurance companies in Newfoundland and Labrador, we assumed that the share of a company’s aggregate equity (for all types of insurance products sold across Canada) allocated to auto insurance in Newfoundland and Labrador equaled the ratio of earned premiums for auto insurance in the province to total insurance premiums earned from all lines of business across Canada. These ratios were quite low, as one would expect.

The equity base for each year was the average of the estimated equity at the end of the preceding year and the current year.

Table A summarizes our estimated ratio of equity to earned premiums for auto insurance in Newfoundland and Labrador over the period 2011 to 2016 for all insurance companies; all companies excluding Primmum and Security National (TD subsidiaries); and all companies that had an average positive ROEs over the entire period.

Table A: Estimated Automobile Insurance Equity/Premiums, Newfoundland and Labrador, 2011-2016 (%)

	2011	2012	2013	2014	2015	2016
<i>All</i>	58.7%	59.4	53.2	49.9	52.5	53.2
<i>All ex. Primmum & Security National</i>	58.6	60.7	54.3	50.5	53.3	53.9
<i>All Positive ROEs</i>	57.9	60.0	53.2	48.5	51.0	52.3

Interestingly, the ratios tended to fall in the 50% to 59% range used in Ontario.

We used a weighted average of the estimated ROEs for each year to derive an average ROE for the entire period 2011 to 2016. The weights were the proportion of each year's equity to the aggregate equity over the entire period.

The ROE (R_{eit}) on private automobile insurance for each company i in time period t was defined in equation 5. Hence, regressing R_{eit} for every insurer on the return on the market in time period t (R_{Mt}), will generate an estimate of the beta of private automobile insurance for each insurer.

The beta of private automobile insurance in NFL can be estimated as the simple average of the individual beta of the different insurers or a subgroup of the insurers. It can also be estimated as a weighted average of the individual betas, where the weights are based on the average equities. That is, for each insurer i let AvE_i be the average (over the years) of $[(Eq_{it} + Eq_{it+1})/2]$ as defined above. The weight of beta of insurer i is $AvE_i / (AvE_1 + AvE_2 + \dots + AvE_{15})$. The beta estimates of the different possibilities are stipulated in Table A.

Table B: Estimates of Beta for Automobile Insurance Companies in Newfoundland and Labrador

	All Insurers	<i>Excluding Primmum & Security National</i>
Simple Average of individual betas	0.538	0.26
Weighted Average of individual betas	1.029	0.823

The beta of a portfolio is the weighted average of the betas of the components of the portfolio. The collection of insurers that offer private automobile insurance in Newfoundland and Labrador is essentially a portfolio. Hence the appropriate beta to use is a weighted average beta. The simple average beta is reported for information only.

Appendix 3: Critiques

Critique of CAPM

The CAPM model is not without problems and critics.

The after-tax income for property and casualty insurance companies in general, and auto insurance companies in particular, consists of the sum of net underwriting income and net investment income. However, for P&C insurance companies that are not pure auto insurance companies, and the companies we used in performing our calculations are not pure auto insurance companies, the allocation of their total equity across the various lines of business poses problems.

Professor Basil Kalymon suggested using the level of reserves as the basis for allocating the total equity of a P&C insurance company among its various lines. In his testimony to the Ontario Automobile Insurance Board (June 20, 1988), he argued the following:²²

“The allocation of equity to any given line of business should recognize the principle of treating that business on a stand-alone basis. Specifically, the level of equity attributed to automobile insurance should be sufficient to sustain that business in the absence of the other components of activity. Similarly, a fair distribution of the equity of a multi-line firm must be made to the non-auto lines of business so that these elements are similarly self-sufficient. In this manner, auto insurance equity will neither be supporting nor supported by other non-regulated activities of the firm and cross-subsidization is avoided.

One allocator of the total equity of a company to its various lines of business and to auto insurance in particular, which is adopted in this study, is the level of reserves required to sustain each business. The reserves to equity ratio for each line of business is assumed to be the same for every line... The level of reserves for each line of business is an actuarial measure of the expected liabilities arising from the particular line of business. Thus, reserves measure the extent of exposure to claims arising from a line of business or the underwriting exposure of the activity. Generally, insurance regulators require that insurers hold at least a minimum level of capital or special reserves in addition to the actuarial reserve to assure the solvency of the firm. In essence, this is the role of the equity capital of an insurer, which provides the investment that must bear the risks of the business. Allocation of total equity proportionally to the actuarial reserves of each line of business recognizes an equal degree of solvency protection across lines.”

An alternative, to avoid the problem of deciding how to allocate the total equity of a P&C company among its various lines, is to use the full information beta (FIB) methodology

²² Testimony of Professor Basil Kalymon, Faculty of Management, University of Toronto, to the Ontario Automobile Insurance Board, June 20, 1988, p. 12, 13.

pioneered by Ehrhardt and Bhagwat²³ refined by Lazar and Prisman²⁴ and used by Cummins and Phillips for the U.S. P&C market.²⁵ Zhang and Nielson used this methodology to estimate the underwriting betas of property insurance, auto insurance, and liability insurance for Canadian P&C insurance companies.²⁶ However, the size of the database and the small number of insurers in Newfoundland and Labrador make it unreliable²⁷ to use the FIB methodology.

There is no need to disentangle a company's total equity among its various lines when using this methodology. The CAPM can be used to estimate a beta for the entire company and the betas for the individual lines can be derived from the aggregate company beta using the distribution of written premiums among the various lines. As pointed out by Zhang and Nielson:²⁸ "the underwriting beta of an insurer is the weighted average of the betas of its distinct business lines", where the weights are the proportion of total written premiums by line.

There are disagreements regarding the appropriateness of the basic CAPM to estimate the aggregate risks facing a company. The relation suggested by the CAPM falls into what is referred to as a one-factor model as the ROE in it depends on one factor. The main multifactor model in the literature is the Arbitrage Pricing Model ("APT"), which does not specify its factors. Usually the factors are identified by a statistical procedure called the principal component procedure.

Doron Nissim has noted:²⁹

"For many years, the most common approach for estimating the cost of equity capital has been the Capital Asset Pricing Model (CAPM), in spite of extensive research that demonstrates problems with this method. Over the years, as evidence contradicting the CAPM has accumulated, the market model has been extended to include additional macro factors such as unexpected inflation, unexpected changes in interest rates, and the returns on factor-mimicking portfolios. Under these models, the risk premium is calculated as the sum of the products of the stock's sensitivity to each factor and the premium associated with that factor. The primary additional factors that are currently used are the size and book-to-market factor-mimicking portfolios."

²³ Ehrhardt, M. C., and Y. N. Bhagwat, "A Full-Information Approach for Estimating Divisional Betas, Financial Management", (1991) 20: 60-69.

²⁴ Lazar F. & Prisman E. Z., "Regulator's Determination of Return on Equity in the Absence of Public Firms: The Case of Automobile Insurance in Ontario", Risk Management and Insurance Review, 2, 2015, pp 1199-216,

²⁵ Cummins, J. D., & Phillips, R. D., "Estimating the Cost of Equity Capital for Property-Liability Insurers", *Journal of Risk and Insurance*, 2005, 72(3), 441-478.

²⁶ Li Zhang and Norma Nielson, "The Pricing of Multiple Line P&C Insurance Based on the Full Information Underwriting Beta", Insurance and Risk Management, October 2009-January 2010, vol. 77 (3-4), 237-264.

²⁷ Applying the FIB, as per Ehrhardt & Bhagwat, for NFL requires solving a system of 15 equations (like the number of insurers) and 17 variables (like the number of lines of businesses when automobile insurance is split between private passengers in NFL and the rest of Canada). The noise in the data and the fact that the number of variables is bigger than the number of equations make the results unreliable. Even applying the refined FIB method as in Lazar and Prisman does not produce reliable results.

²⁸ Ibid, p. 243.

²⁹ Doron Nissim, "Analysis and Valuation of Insurance Companies", Columbia Business School Center for Excellence in Accounting and Security Analysis, November 2010.

The latter extension of the CAPM – the Fama-French three-factor model³⁰ – has gained support, especially among P&C insurance companies.

The Fama-French three-factor model (“2F3” model) has been extended further to calculate sumbetas. Lagged values are included among the independent variables, and the sumbetas are the sum of the betas on the coincident and lagged values of each of the variables.

Critique of the Fama-French Three-Factor Model (“2F3”)

The APT model puts a greater demand on data and does not specify the “factors”. Hence, while it has a sound theoretical foundation, it is harder to interpret economically. On the other hand, while there is no theoretical basis for the 2F3 model, the suggested economic justification is that the book-to-market variable provides a proxy for financial distress, and thus allows for additional compensation to shareholders for this risk that is not captured in the basic CAPM. The size variable compensates for the fact that small market cap companies are riskier (less diversified) and thus must offer added compensation in terms of expected return.³¹

In spite of the absence of a theoretical basis, the 2F3 model is supported by empirical evidence that indicates that adding these factors better explains the variations of ROE across companies. It is well known in econometrics that adding more variables should improve the goodness of fit and possibly the predictive powers of the resulting estimates. But this does not imply that the added variables are the right “missing” variables, or that indeed, there are “missing” variables.

Further, one should expect that the effect of these two additional variables should be neutral on the overall, average industry beta, or level of risk. While smaller companies might be viewed by investors as more risky on average, larger companies should be viewed as less risky on average. Similarly, while companies with high book-to-market values might be viewed as more risky, those with lower values for this variable should be viewed as less risky on average. It is also conceivable that the equity prices, and hence the market values of companies with high book-to-market values, have taken a hit because of the perceived higher level of financial distress, and so, going forward investors in such companies might not necessarily face any additional risks.

Some researchers claim that the “superior” results of the 2F3 model are the result of “data snooping” whose bias could be immense³² and/or a selection (survival) bias.

Advocates of the 2F3 model claim that a ROE based on the CAPM will not allow small companies and/or those in financial distress to survive in the market. Investors in the market will not invest in these riskier companies if they are not compensated for the additional risk. Consequently, if a regulator relies on the 2F3 model to set company-specific ROEs, the regulator should increase the likelihood of survival of small companies and/or of those in financial

³⁰ In a series of papers starting in 1992, Fama and French developed a three factors model.

³¹ Liebenberg and Sommer (2008) developed and tested a model that explains insurers’ performance as a function of line-of-business diversification and other variables using a sample of property-liability insurers over the period 1995-2004. Interestingly, their results indicate that undiversified insurers consistently outperform diversified insurers. In terms of accounting performance, the diversification penalty was at least 1% of return on assets 2% of return on equity.

³² Lo and MacKinlay (1990).

distress. Presumably, the additional ROE allowed for these insurers would translate into higher premiums that they would be allowed to charge their customers.

The customers, on the other hand, would not be getting substantially different services from these companies than what would be available in the market from all other insurance companies. Thus, competition will drive consumers to move to the “cheaper” larger companies and/or those in a strong financial position. Consequently, the survival of small companies, or those that are under financial distress is questionable.

Furthermore, for about almost two decades the after-tax ROE for auto insurers in Newfoundland and Labrador was set at 10%. Yet we see that insurers of different sizes survived in the market for a long period. Therefore, the claims of the 2F3 advocates that utilizing the CAPM for allowable ROE will cause a market failure is questionable, at least in the Newfoundland and Labrador auto insurance market.³³

³³ We reached the same conclusion for Ontario in our work for FSCO.