

The Impact of Institutional Factors On Reserve Errors – A Cross-Border Analysis

Abstract

There is a significant academic literature on the management of loss reserves by insurance companies in order to circumvent regulatory scrutiny, to improve managerial compensation or to smooth tax liabilities. The ability and the incentives of insurers to manage reserves depend not only on company-specific factors, but also on the regulatory and accounting regimes in which firms operate. We capture the impact of these different regimes by undertaking a cross-border analysis that examines the magnitude and direction of reserve errors for property/casualty insurers that operate both in Canada and the United States. Using data from 1995 to 2015 for property/casualty insurers that file annual statements in both countries, we analyze differences in loss reserve errors while controlling for variables known to impact loss reserve errors that are available in both countries.

Introduction

The setting of loss reserves for property/casualty insurers is often used to study managerial discretion. There is a significant academic literature on the manipulation of accounting data by insurance firms in order to circumvent regulatory scrutiny, to improve managerial compensation or to smooth tax liabilities.

For both Canadian and American insurers, loss reserves – money set aside to pay for claims for which the insurer is liable - are the largest liability carried on the balance sheet. Further, there is considerable opacity in the setting of reserves. Many authors have examined incentives for reserve manipulation. Given the complexity of setting reserves, it is not surprising that results are inconclusive. In this paper, we exploit differences in both the regulatory and accounting regimes in Canada and the U.S. to examine the impact of managerial discretion on the setting of loss reserves.

Our goal is to examine the impact of jurisdictional differences on the direction and magnitude of loss reserve error for insurers that operate both in Canada and the United States. We collect data from 1995 to 2015 for property/casualty insurers that file annual statements both in the United States and Canada. We control for variables known to impact loss reserve errors and that can be readily captured in both countries. We hypothesize that there are stronger incentives to manage reserves in the U.S. due to regulatory philosophy, executive compensation and accounting requirements.

Preliminary evidence suggests that there are differences in reserving practice of the same firm across borders. Specifically, the early evidence shows larger/smaller reserve errors for firms in the country in which they are domiciled. We also find larger/smaller reserve errors in jurisdictions where more taxes are paid. Taken together these results suggest firms do actively manage reserves for regulatory reasons.

The paper is organized as follows. After an overview of the literature on loss reserve management, we detail key differences between the U.S. and Canadian property/casualty

insurance markets that may impact incentives to manage reserves. From this examination, we then derive our key hypotheses. We present the data and analysis next. A discussion of policy implications concludes the paper.

Literature Review

Many authors (see for example Weiss, 1985; Grace, 1990; Petroni, 1992; Gaver and Patterson, 2004; Petroni and Beasley, 1996; Beaver, McNichols and Nelson, 2003; Eckles and Halek, 2010, Grace and Leverty, 2012; Kelly, Kleffner and Li, 2012) have examined incentives for reserve manipulation, yet the evidence is inconclusive. Some studies find that insurers facing financial difficulty understate reserves in attempt to look more financially stable, other studies find no systematic difference in the reserving behaviour of healthy and distressed insurers. Some, but not all, studies find that insurers manage reserves to smooth income and reduce their tax liability. Managers whose compensation packages are more bonus laden are associated with larger loss reserve errors. Other studies find that unanticipated changes in inflation and stock market returns also lead to errors in loss reserves.

The choice of actuary and accounting firm has also been shown to impact reserve accuracy. This is of particular interest to our study. Though both countries have requirements that reserves be “approved” by an appointed actuary, Canada typically requires the actuary to be a fellow in the Casualty Actuarial Society or Society of Actuaries (fellowships from other countries are also considered). Most states, however, allow for “less seasoned” actuaries (those only attaining the “associate” level in the CAS/SOA).

Accounting Standards

Previous studies have examined reserving behaviours within a single jurisdiction – typically the United States, but also European countries or Canada – where all insurers file the same annual statement. The NAIC annual statement is completed using statutory accounting principles and the Canadian annual statement is completed under IFRS. With respect to the reporting of both loss reserves, and loss reserve error, there are also significant differences between Schedule P of

the NAIC annual statement and page 60.40 of the Canadian annual statement. For example, the Canadian annual statement provides a measure of scaled reserve error (that can be seen by investors, regulators, policyholders, etc.) whereas the academic literature in the U.S. still debates the best scale factor for reserve error. The U.S. data allows for the calculation of reserve errors up to 10 years, but only shows one and two year development directly on the states. The Canadian annual statement, however, provides for 1-year through 4-year and then a 5-and-greater-year loss reserve error.

An example of the loss reserve error reported in the Canadian annual statement is given in Figure 1. This figure, which displays the development of undiscounted loss reserves is page 60.41 in the Canadian statutory annual statement. This page is the same for both insurers incorporated in Canada and for branch insurers. We calculate one year, three year and four year reserving errors. The four-year reserving error is given as

$$re_4 = \frac{\text{reserve}_t - \left[\text{reserve}_{t+4} + \sum_{j=1}^4 \text{amts pd}_{t+j} \right]}{\text{reserve}_t},$$

and the one and three year errors are calculated in a similar manner. A negative reserving error implies that the firm has under reserved, and a positive reserving error denotes over-reserving.

insert Figures 1 and 2 about here.

Figure 2 displays Schedule P – Part 2 from the NAIC annual statement. Both annual statements develop loss adjustment expenses with incurred losses.

Regulatory Philosophy

There are fundamental differences in the solvency oversight between Canada and the U.S. that could affect the use of reserving to influence solvency measurements. Because loss reserves are the largest liability carried by insurers, and substantial management judgment is involved in setting the loss reserve, many researchers have hypothesized that insurers may manage loss reserves to appear financially stronger. In the United States, loss reserves impact several

regulatory monitoring mechanisms (e.g. IRIS, FAST, RBC). As an example, either directly or indirectly (through income or surplus-related measures) loss reserving practices can affect 10 of the 13 Insurance Regulatory Information System (IRIS) ratios used by the NAIC to monitor property and casualty insurers.

Whereas solvency standards in the United States are ratio driven, in Canada solvency oversight by the Office of the Superintendent of Financial Institutions is more holistic in nature, and has been designed to be intentionally different from the U.S. approach:

In Canada, we do not look at ratios; we try to analyze the risks facing the company and the quality of its risk management. Our approach is really based on understanding each company and the unique risks that the company faces. (Private communication, OSFI, 11 June 2009)

There is only one key solvency test in Canada – prior to 2003, it was the Minimum Asset Test (MAT) for Canadian incorporated insurers or the Deposit Adequacy Test (DAT) for insurers operating in Canada with a foreign head office. Canada adopted risk based capital standards with the introduction of the MCT/BAAT (Minimum Capital Test for Canadian incorporated insurers or Branch Adequacy of Assets Test for foreign insurers) in 2003. The amount of surplus required to be held is a function of the level of loss reserves, and the riskiness of both lines underwritten and assets held for investment.

The smaller market in Canada, in terms of the number of insurers (put in number), makes it feasible to conduct this greater level of oversight.

Federal versus state/provincial oversight. In Canada, for federally registered insurers, the Office of the Superintendent of Financial Institutions (OSFI) is the federal prudential regulator of property/casualty insurers. Their mandate is to supervise member institutions to ensure that they are in sound financial condition; to advise institutions and take corrective actions to restore financial health; to develop a regulatory framework that supports prudent risk taking; and to monitor system wide issues that may negatively impact institutions. In the U.S. solvency is monitored at the state level, introducing the possibility of regulator arbitrage.

Executive Compensation

Executive compensation mechanisms also vary somewhat between Canada and the United States, with pay-for-performance compensation being much less prominent in Canada. See for example Zhou (1999). On the other hand, executives in the United States often have incentive-based components in their compensation packages. Further, Eckles and Halek (2010) show a relationship between executive incentive-based compensation and insurer reserve errors.

Hypotheses

We hypothesize that there will be greater incentive to manage reserves for U.S. operations than for Canadian operations. The reason for this is three-fold:

- Because of accounting standards, reserve error is more opaque in the U.S. than in Canada. The NAIC annual statement reports 1 and 2 year errors, whereas the Canadian annual statement reports 1, 2, 3 and more than 4 year errors. In addition, the Canadian annual statement reports errors both on an absolute (dollar) basis and scaled by the size of the original estimated reserve, facilitating a straightforward comparison between companies and years.
- The solvency framework in Canada also makes it less likely for insurers to be able to successfully manipulate reserves. All federally regulated insurers and foreign insurers are regulated by a single entity (as opposed to the U.S. where solvency regulation occurs at the state level). Although there is a binary solvency test in Canada (the MCT/BAAT), overall solvency regulation in Canada is more holistic in nature and not ratio based as in the United States. The smaller marketplace in general in Canada also holds insurers up to greater regulatory scrutiny.
- Lower levels of executive compensation in Canada imply weaker incentives to manage reserves.

Data and Methodology

We examine the impact of differences noted above on the direction and magnitude of loss reserve error for insurers that operate both in Canada and the United States. We collect data from 1995 to 2015 for property/casualty insurers that file annual statements both in the United States and Canada. We will control for variables known to impact loss reserve error and that can be readily captured in both countries. These will include firm characteristics such as premium growth, firm size, percentage of short-tailed lines written and geographic and line of business dispersion. We will also account for macroeconomic factors such as the level of unanticipated inflation, the market cycle (proxied by the rate on line for reinsurance, and stock market returns) that may impact reserve errors. We will include managerial discretion variables such the incentives to smooth income, to reduce taxes paid, to appear more financially robust and reduce regulatory oversight.

In 2014, there were 51 U.S. owned insurers that had operations in Canada, and roughly another 50 companies domiciled outside of North America that have operations in Canada and the United States. Although the number of companies is not large by American standards, our examination of the reserve errors of these companies provides a unique insight in to the role of regulatory and accounting standards and the setting of loss reserves.

Univariate Analysis

We initially collected data at the firm level for insurers with group operations in both Canada and the United States for the years 1995 to 2011 (data until year end 2014 was used to calculate 3 year reserve errors). We have done one preliminary screen for outliers, removing observations with negative surplus values and observations with absolute reserving errors exceeding 100 percent of either the initial or develop reserve. We then scale reserve errors by asset size and then the variables are windsorized¹ at the 1 percent and 99 percent level to preserve maximum possible sample size. For the Canadian data, this provides 866 observations for the 3 year reserve error and 808 observations for the 4 year reserve error, representing 72 companies. For the U.S. data, this provides 1130 observations for the 3 year reserve error and 1065 observations for the 4 year reserve error representing 57 unique companies. Summary statistics for the sample are given in Table 1.

Our univariate analysis shows that for both the three and four year reserve errors scaled by asset size there are statistically significant differences across the two countries. Over the time frame, U.S. insurers reported negative average scaled reserve errors of -0.72 and -1.20 for three and four year errors, whereas Canadian insurers reported positive average scaled reserve errors of 0.123 and 0.3045 respectively.

Insurers in both countries are more likely to over reserve than under reserve. We also find that Canadian insurers are more likely to over reserve than under reserve, and these differences are statistically significant at the 1 percent level. Using the 3 year reserve error, 70.8% of Canadian insurers over reserved compared to 54.3% of American insurers. Similar results hold for the 4 year reserving error.

¹ To calculate the Windsorized mean, the highest and lowest observations are temporarily censored, and replaced with adjacent values from the remaining data (Barnett & Lewis, 1994).

Future Work

Our initial analysis reveals differences between reserving behavior across jurisdictions. This preliminary evidence suggests that Canadian insurers are more likely to over reserve than American insurers. Going forward, we will be able to more thoroughly examine our univariate results in a multivariate framework. Of particular importance, we will be able to account for the insurance group to which each insurer belongs. This will allow us to potentially control for company / group characteristics that influence the setting of reserves so that we can focus on the broader institutional factors that influence loss reserves.

Further, we have the ability to identify the appointed actuary for all companies. We would like to undertake a smaller analysis on those companies which used the same appointed actuary in both Canada and the United States. We also to be able to find compensation details for our limited sample. We have not examined any tax differences between the two countries – differences in tax regimes may also drive incentives to manage loss reserves.

This initial analysis has been undertaken at the firm (and not group) level. Until 2012, Canadian insurance companies filed annual reports on a firm and not group basis. With the introduction of IFRS in Canada in 2012, Canadian firms were required to file on a group basis. The change in filing requirement may also impact incentives to manage reserves, but this will require more years of data to be collected.

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Figures and Tables

Figure 1 - Page 60.40: Net Claims and Adjustment Expenses Run-Off (\$'000)

		2010 and prior years (02)	2011 (03)	2011 and prior (02)+(03) (04)	2012 (05)	2012 and prior (04)+(05) (06)	2013 (07)	2013 and prior (06)+(07) (08)	2014 (09)	2014 and prior (08)+(09) (10)	2015 (11)	2015 and prior (10)+(11) (12)
*UCAE, end of year	01	30,279										
IBNR, end of year	02	38,837										
Paid during year	10	14,219	2,543	16,762								
UCAE, end of year	11	32,021	5,384	37,405								
IBNR, end of year	12	26,902	12,751	39,653								
Ratio: excess (deficiency)	19	-582%										
Paid during year	20	17,920	4,217	22,137	4,085	26,222						
UCAE, end of year	21	26,675	6,637	33,312	5,932	39,244						
IBNR, end of year	22	17,737	10,571	28,308	7,199	35,507						
Ratio: excess (deficiency)	29	-10.76%		-8.69%								
Paid during year	30	12,813	3,142	15,955	3,961	19,916	2,823	22,739				
UCAE, end of year	31	24,252	6,768	31,020	6,428	37,448	8,661	46,109				
IBNR, end of year	32	12,097	6,876	18,973	2,772	21,745	23,676	45,421				
Ratio: excess (deficiency)	39	-17.63%		-14.31%		-5.83%						
Paid during year	40	11,126	1,143	12,269	3,376	15,645	1,698	17,343	2,394	19,737		
UCAE, end of year	41	18,054	6,528	24,582	5,868	30,450	7,813	38,263	10,143	48,406		
IBNR, end of year	42	11,957	5,204	17,161	79	17,240	21,011	38,251	43,321	81,572		
Ratio: excess (deficiency)	49	-24.56%		-19.53%		-11.37%		-2.54%				
Paid during year	50	7,574	2,668	10,242	2,064	12,306	1,939	14,245	2,278	16,523	1,708	18,231
UCAE, end of year	51	15,974	4,739	20,713	3,864	24,577	6,807	31,384	9,546	40,930	11,934	52,864
IBNR, end of year	52	9,977	4,731	14,708	1,091	15,799	17,503	33,302	41,201	74,503	60,719	135,222
Ratio: excess (deficiency)	59	-29.64%	-13.81%^c	-24.61%	-9.33%	-18.05%^b	13.58%	-5.18%	0.82%^a	-1.52%		

* UCAE= Unpaid Claims and Adjustment Expenses (excluding IBNR)

^a 1 year reserving error, ^b 3 year reserving error, ^c 4 year reserving error

Table 1 – Summary Statistics

Variables	N	Mean	Standard Deviation	Median	Min	Max
Firms Operating in United States						
Three year reserving error / Assets (%)	1130	-0.72*	7.41	0.42	-34.10	23.00
Four year reserving error /Assets (%)	1065	-1.20*	1.02	0.37	-50.52	30.09
Number of three year over reserving errors	1157	0.543**	0.498	1	0	1
Number of four year over reserving errors	1065	0.556**	0.497	1	0	1
Assets (\$millions)	1399	8781	17,554	1348	0.553	133,432
Surplus (\$millions)	1399	2810	6924	423	0.446	75,679
Firms Operating in Canada						
Three year reserving error / Assets (%)	866	0.123*	1.778	0.011	-8.373	6.391
Four year reserving error /Assets (%)	808	0.3045*	2.825	0.012	-11.96	16.37
Number of three year over reserving errors	866	0.708**	0.455	1	0	1
Number of four year over reserving errors	808	0.696**	0.460	1	0	1
Assets (\$millions)	1006	552	917	156	0.552	6,326
Surplus (\$millions)	1006	162	277	52	-0.149	2940

* Canada / U.S. differences statistically significant at 5 percent. ** Canada / U.S. differences statistically significant at 5 percent.