The Effects of Rate Regulation on the Volatility of Auto Insurance Prices

Evidence from Canada

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Abstract

Previous studies using U.S. data have found that rate regulation reduces competition, availability of coverage and increases volatility of insurance premiums. This article extends the U.S. literature to the Canadian context to examine whether rate regulation increases premium volatility in the province of Ontario. Based on an empirical analysis using data covering six provinces over the 18–year period from 1984 to 2001 we find that rate regulation does make insurance premium more volatile for consumers. This finding is consistent with results from other jurisdictions.

Keywords: price regulation, auto insurance, price volatility

JEL code: L510, G280, L500

Introduction*

The effect of rate regulation on auto insurance premiums has been the subject of wide debate and numerous studies. Most empirical research on this question has been conducted in the United States, taking advantage of the rich heterogeneity of systems of rate regulation across fifty states. Considering that the Canadian experience with rate regulation has been somewhat different from that of the United States, the objective of this study is to extend this literature to Canada and estimate whether rate regulation increases premium volatility. Intuitively, volatility conjures visions of "choppy" markets or wide price swings. Throughout this paper we define volatility as a measure of the degree of price movement in insurance premiums.

American experience with auto-insurance regulation differs from Canada because the United States McCarran-Ferguson Act of 1945 exempted from federal anti-trust laws any insurance company that was subject to other state regulations from federal anti-trust laws. In order to take advantage of this exemption, all states established state regulation of insurance by 1951. Since 1945, rate regulation in the United States has become a common feature among many insurance systems in the United States.

Unlike the United States, there has not been the *McCarran-Ferguson* like catalyst legislation to encourage government regulation of insurance premiums in Canada. As a result, active price regulation in Canada is a relatively recent phenomenon and experience is restricted to Ontario. Prior to 1989, Ontario's automobile insurance system operated under a competitive rating model. However, Ontario implemented a strict prior approval regime of rate regulation following the introduction and passage of Bill 10, *the Automobile Insurance Rates Control Act* 1989 and subsequent modifications under Bill 68, *the Insurance Law Statute Amendment Act* 1990. In 2000, the Financial Services Commission of Ontario introduced a respond to market (R2M) rate process whereby filing requirements and approval times are streamlined if rate increases fall below a threshold determined by the regulator. This change has introduced some limited flexibility into the rate regulation process.

Among the other regions, Alberta and the four Atlantic Provinces maintain variations on the file and use system where automobile insurers are required to file rates and, after a period defined in legislation, acquire "deemed approval" for use. Regulatory authorities may disapprove a rate filing at any time prior to the "deemed approval" or may extend the period of evaluation.[1] British Columbia currently does not regulate rates for competitively delivered optional auto coverages. Quebec maintains a use and file system for private insurers. Overall, automobile insurance remains the only line of insurance where rates are regulated in Canada.

Rate regulation is a recent phenomenon in competitive markets. The provinces of British Columbia, Saskatchewan and Manitoba have monopolistic government run insurers for

* The authors wish to thank its two reviewers for reviewing the paper and offering suggestions for improvement. Nevertheless, the authors remain exclusively responsible for all the statements of fact and of opinion in this paper.

[1] Rate filing and underwriting rules were being reviewed in 2003 in Alberta and Atlantic Canada.

mandatory basic automobile coverages and these government run insurers have been subject to state governed price regulation.

The Effects of Rate Regulation

There is a large literature providing statistical evidence of the effects of rate regulation on average automobile insurance premium levels. A smaller body of research has investigated the effects of rate regulation on rate volatility and insurance availability. The customary approach classifies jurisdictions by the form of rate regulation - prior approval, competitive rating, file and use or some other form – and then compares the performance between groups controlling for one or more variables.

The current state of research suggests that the effect on rates from prior approval regulation, relative to claims costs, varies over time (Harrington, 1987; Tennyson, 1997, & Cummins et al, 2001). The research in the United States has noted that while rate regulation tends to compress the premiums collected per dollar of loss experience, insurance premiums in jurisdictions with rate regulation are often higher than in jurisdictions with less rate regulation (Tennyson, 1997). In the long run rate regulation has not been found to result in lower prices (Cummins et al, 2001 & Harrington, 2001). It is interesting to note that seven of the top ten, including all of the top five states with the highest average premiums over the period 1997 – 2000 actively regulated automobile insurance rates.

In general, rate regulation has been found to limit competition, reduce availability of coverage and increase volatility in insurance premiums (Tennyson, 1991 & Harrington, 2002).

Increased volatility in insurance premiums (the focus of this study) could be the result of delays in the rate approval process under prior approval rate regulation. Regulatory lags under prior approval rate regulation could produce lower rate increases during periods of rapid cost growth and larger rate increases or a slower rate of reduction in periods of stable or declining claims costs (Harrington, 2002). These lags may be the result of the normal process of regulators working through rate filings or the result of a regulatory build up. Regulatory build-ups occur where insurers hold off filing smaller, more frequent, rate increases in favour of larger rate increases that justify the costs of assembling the detailed actuarial filing requirements.

Empirical analysis of the effects of rate regulation on premium volatility suggests that active price controls on insurance affect both the amplitude and length of the insurance underwriting cycle. Analyses of the effects of rate regulation on loss ratios have provided evidence that active price controls on insurance exacerbates premium volatility in the United States (Witt and Miller, 1981; Outreville, 1990 and Harrington, 2001). In addition, there is some cross-country evidence that rate regulation increases the length of underwriting cycles in the insurance system (Lamm-Tennant and Weiss, 1997, Leng et al 2002). For example, in the United States during the period of 1950 to 1970, automobile insurance went through three underwriting cycles while all lines except automobile had only one full cycle. This trend continued during the 1980's but was moderated by

increased competition. The cycle in automobile insurance has been largely statistical, reflecting regulatory lag in adjusting prices to costs (Cummins et al, 1991).

The purpose of this research is to further investigate the impact of rate regulation on insurance premium volatility, drawing upon the methodology and experience of the literature in the United States. To do so, this paper undertakes an econometric analysis of the effects of prior approval rate regulation of auto insurance in Canada. We then compare premium volatility in Ontario under its prior approval rate regulation regime with that of a simulated competitive rating system. Finally, we identify and review two case studies from the United States that offer a practical and real world test of theoretical and statistical literature.

The Empirical Model

The analysis presented here draws upon the methodology and approach outlined in Harrington (2001). In that paper the effects of rate regulation on volatility in the unexplained growth rate of average premiums is analized. The unexplained growth of automobile insurance premiums is the growth in auto premiums that is not predicted by growth in claims costs, accident frequency or other variables expected to contribute to the cost of insurance. Under this framework:

$$\Delta\text{premium} = \Delta\text{explanatory variables} + \text{residual}$$

where the residual represents the unexplained volatility in the system.

Two steps are required. In the first step, we regress average expenditure (total premiums/insured vehicles) on a set of explanatory variables. In the second step, the volatility of average expenditure ,estimated from the first step, is then used as a proxy for the volatility of insurance rates and regressed on a regulation index and a second set of explanatory variables. To achieve this, we apply panel data regression techniques. Note the terms, average expenditure and average premium are used interchangeable throughout.

Model specification:

In the first step, we estimate the following model:

$$\textit{Average expenditure}_{jt} = (\alpha + \lambda_j) + \beta_j X_{jt} + \varepsilon_{jt} \qquad (1)$$

where the subscripts j and t refer to province j in year t, α is the intercept and λ_j is the unobserved fixed effect. X_{jt} is a vector of control variables that could influence average expenditures apart from any effects of regulation and β_j is the set of coefficients for those control variables. Since, automobile insurance is a mechanism for spreading risk, pooling the resources of many to share the losses of a few, claims costs are expected to be an important factor in determining

Table 1: Variable Definitions

	Description
X_{it}	
Average claims	Total losses/# of claims
Loss ratio	Incurred Losses/premiums
Herfindahl index	Measure of competition
CPI	Consumer price index
Average exposure	Accident frequency (# of claims / # insured vehicles insured)

insurance expenditures. Therefore, average claims costs are included as a control variable in order to control for different product/benefit levels among provinces. Similarly, loss ratios are highly correlated with profitability measures and are included to control for underwriting capacity and profitability (Harrington, 2002). A measure of competition, the Herfindahl index, is included to condition the results on the level of competition in the industry. As the cost of inputs to insurance and claims would be expected to increase as the general price level rises, the CPI is also included in the set of control variables. Finally, as motor vehicle collisions are the primary source of claims in automobile insurance, a control for accident frequency is included.

λ_j represents the fixed effects to be estimated, and ε_{jt} is a statistical disturbance term that reflects other factors that are not only particular to the individual provinces but also to time periods. With no further constraints, λ_j and ε_{jt} do not have a unique solution. Thus, before equation (1) can be estimated, we must place an additional constraint on the system. In this case the software package we used for the study assumes $\Sigma\lambda_j = 0$.

In the second step, using the residuals from equation (1) as a proxy for the volatility of insurance rates the following model is estimated:

$$\textbf{unexplained volatility}_{jt} \equiv (\varepsilon_{jt} - \overline{\varepsilon_{jt}})^2 = (\eta + \Omega_j) + \gamma \textbf{regulation}_{jt} + \Phi H_{jt} + \varphi_{jt} \qquad (2)$$

and the assumption of $\Sigma\Omega_j = 0$ holds. Unexplained volatility is the demeaned residuals of equation (1), *regulation* is an index of regulation, H_{jt} is a vector of control variables, and φ_{jt} is a statistical disturbance term. Our model assumes that sources of unexplained volatility are the result of structural changes in the environment. Traditionally such structural changes may include the removal/addition of barriers to competition or a systemic shock to the system such as the development of a new risk such as terrorism. We therefore include changes in claims costs and change in the competitive environment (Herfindahl) as control variables.

In estimating the above equations, we utilized several statistical tests in order to identify the appropriate estimation technique. Typically, the literature covering panel data estimation methods makes a distinction between fixed- and random-effects models. Fixed effects models are usually applied when the λ_j and Ω_j are assumed to be fixed parameters to be estimated and the remainder disturbances of the models are assumed to be independent and identically distributed IDD$(0,\sigma^2)$. Essentially, using fixed effects is the same as assuming different intercepts for each province but equal slopes. This model is appropriately used when we intend to study the behavior of a set of groups and our inferences are restricted to the behavior of that set only (Baltagi, 2002). Instead, if we assume that λ_j and Ω_j are random variables (which happens when we consider the observations to be random draws from a large population), we would use a random effects model.

The Hausman specification test was performed to determine whether a random coefficients model would be more appropriate than one with fixed coefficients. Under the null hypothesis both random effects and fixed effects estimates were consistent and H_0:

$E(u_{jt}/X_{jt}) = 0$, when H_0 is false, and $\hat{\beta}_{RE}$ was inconsistent. The statistic is $Chi^2=125.07$ and since Prob> $Chi^2=0$ we reject the null hypothesis. This statistical examination suggested that a fixed effects model was the appropriate specification for our econometric analysis.

In addition, we performed the Breusch-Pagan test for random effects, where the null hypothesis is that there is no within-unit correlation (and that we should use random effects). When the null hypothesis of this test is rejected, it indicates that there are individual specific effects in the model. In this case, the reported statistic is $Chi^2=49.45$, with Prob> $Chi^2=0$. We therefore reject the null hypothesis as there is evidence that there are individual specific effects confirming that a fixed effects model is the appropriate estimation model.

In this study, the results presented are obtained from a fixed effect model, except when correcting for heteroskedasticity, where we estimate the model with corrected standard errors using a feasible generalized least squares (GLS) method. The results of the econometric analysis employing this model were then used to compare premium volatility in Ontario under the historical prior approval rate regulation with a simulated file and use scenario.

In addition, several diagnostic tests were performed. We used the Chow test to test the null hypothesis of whether slopes and intercepts are constant across provinces. The following equation specifies this test:

$$F((N-1)K', N(T-K')) = \frac{(SSR_R - SSR_{UR}) / (N-1)K'}{SSR_{UR} / N(T-K')} = 34.90 \qquad \textbf{(3)}$$

Based on the results of the Chow test, we rejected the null hypothesis at a 5% level ($F(36,84)=1.59$). However, this test treats the residuals as being homoskedastic and Toyoda (1974) has demonstrated that it is wrong to apply the Chow test in case of heteroskedastic variances. Therefore, to test for panel level heteroskedasticity we performed a Likelihood-ratio (LR) test, with the null hypothesis of homoskedasticity. The statistic is an LR $Chi^2=69.05$, and with a Prob> $Chi^2=0$, we reject the null hypothesis, indicating the presence of heteroskedasticity. However, this should not present a material issue in our estimations since they continue being consistent, albeit with efficiency loss.

Nevertheless, we estimated the model using a feasible generalized least squares method which produces an estimate of the model correcting for heteroskedasticity and compared the results with the fixed effects model.

Data

The data used in this study were obtained from provincial statistical plans to which insurance companies submit auto insurance data relating to premiums and losses by type of coverage.

Observations were pooled across six provinces (Ontario, Alberta, Newfoundland, Nova Scotia, New Brunswick and PEI) over an 18-year period (from 1984 to 2001). The initial sample contained 80 companies, including high-risk reinsurers or 'facility' carriers. The final sample contained 68 companies excluding 10 facility carriers as well as two companies for which sufficient data were not available.

To measure rate regulation, we used provincial statutory regulatory requirements for automobile insurance rates for insurers, based on data from provincial regulatory bulletins and industry sources. Two methods were used to measure the effects of rate regulation. The first was a dummy variable that took on the value of 1 for prior approval regimes and 0 for other forms of rate regulation. The second method involved mapping provincial regulatory requirements to the ranking system widely employed within the literature (Devlin, 2002 & Harrington, 2002). Under this ranking system, the variable regulation takes on one of eight possible values, ranging from 0 (no regulation) to 7 (state determined rates).

Table 2: Type of Rating Regime by Province

Regime		Jurisdiction
No regulation	0	Ontario pre 1989
Advisory/no file	1	
Use and file	2	Quebec (optional coverages)
File and use	3	Alberta, Atlantic provinces, Quebec (mandatory coverages)
Flex rating	4	
Modified prior approval	5	Ontario 1997 - present
Prior approval	6	Ontario, 1989 – 1997
Government determined rates	7	British Columbia, Manitoba, Saskatchewan (mandatory coverages)

Once the data was pooled, seven databases were created using aggregated data: one including all types of coverage, four databases with data by type of coverage (liability, accident benefits, collision, comprehensive), and two databases containing data for mandatory (pooled accident benefits and liability) and optional (pooled collision and comprehensive) coverage.

Premium Volatility and Rate Regulation[2]

In order to test whether volatility in the unexplained growth rate in the average automobile insurance premium differs between Ontario's prior approval rate regime and the file and use rating systems of five other provinces, we first regressed a vector of control variables on average premium expenditure as the dependent variable. Various specifications of the X vector of the model were estimated. Measures of income were added to the regression to capture any income effects that might lead to higher levels of insurance expenditure. However they were not significant and did not contribute to the explanatory power of the model. Measures of household income were therefore excluded from the final specification of the model. In addition, we added a number of interaction

[2] This study estimates the conditional effect of rate regulation on the volatility of the average level of automobile insurance premium expenditures. It does not consider an interesting and important related question of whether rate regulation distorts consumer and insurer incentives for loss control and therefore increases claim costs and average rate levels. However, recent research on the specific effects of regulating the underwriting (one aspect of rate regulation) of automobile insurance in British Columbia suggests that such distortionary effects increase accident frequency and claims costs (Kovacs et al, 2004).

terms including the interaction between average claims costs and accident frequency and the interaction between the loss ratio and the Herfindahl. These interaction terms did not typically contribute much to the overall explanatory power of the model and had no effect on the overall significance or sign of the regulatory variable in the second state of estimation. Therefore for parsimony the final specification of the model includes the set of explanatory variables previously described.

The results from estimating this specification using pooled ordinary least squares (OLS) and generalized least squares (GLS) methods are reported in Table 3.

Table 3: Coefficients and P-values for Equation (1)

	Fixed Effects			GLS		
Variable	**P>| t |**	**Coefficient**	**Predicted sign**	**P>| t |**	**Coefficient**	**Predicted sign**
Average claims	0.000	0.109	Positive	0.000	0.141	Positive
Loss ratio	0.000	-364.166	Uncertain	0.000	-553.499	Uncertain
Price level	0.000	2.116	Positive	0.000	1.845	Positive
Herfindahl	0.668	-0.013	Negative	0.000	-0.098	Negative
Accident frequency	0.000	1605.064	Positive	0.000	2542.978	Positive
Constant	0.161	55.633	No	0.370	34.101	No
R^2						
Within	0.9586					
Between	0.9776					
Overall	0.9182					

The direction and significance of the estimated coefficients on the X vector of variables, with the exception of Herfindahl variable, in the fixed effects model are statistically significant and of the expected sign. Under GLS estimation the Herfindahl variable is also significant and of the expected direction. A higher Herfindahl score implies less competition and theoretically reduced downward pressure on the price of insurance, therefore we expect a negative sign. Thus the efficiency loss of the fixed effects estimates as a result of heteroskedasticity falsely reject competition as a factor in the determination of insurance prices. However, in the heteroskedasticity corrected GLS model, competition is a statistically significant variable in explaining average premiums and the negative sign confirms that it exerts a downward pressure on insurance expenditures.

Consistent with intuitive expectations, we find that the average costs of claims and accident frequency are the primary determinants of insurance expenditures. Together these two variables account for more than 88% of the explanatory power of the model, with average claims costs alone accounting for more than three quarters of the model's explanatory power. Also, as would be expected, these results suggest that a rising general price level also contributes to increased insurance premiums.

From Table 3, the sign of the estimated coefficient on loss ratios suggests that average automobile expenditures are negatively related to this variable. This would appear counterintuitive as it might be expected that as the loss ratio increases, or profitability

falls, prices would rise. The estimated sign on the coefficient might be the result of the complex interplay between the numerator (claims costs) and the denominator (premiums) of the loss ratio variable. As claims increase/decrease, the loss ratio rises/falls. Inversely, as premiums increase/decrease the loss ratio would fall/rise. The negative sign on the loss ratio variable may be capturing the premium effect dominating the claims effect, resulting in the inverse relationship.

Equation (2) is used to test whether rate regulation is significant in explaining volatility in the unexplained growth rate in average automobile insurance premiums. This analysis of volatility in premium growth provides an indirect test of whether rate regulation increases volatility in automobile insurance prices. Table 4 reports the results of this estimation.

Table 4: Coefficients and P-values for Equation (2)

	Fixed effects		GLS	
Variable	**P>| t |**	**Coefficient**	**P>| t |**	**Coefficient**
Regulation	0.001	42685.9	0.000	52487.7
Change in average claims	0.805	-2.916	0.647	6.525
Change in competition	0.645	-18.012	0.423	-37.582
Constant	0.000	15881.66	0.000	0.000

The index for regulation is positive and significant for both the fixed effects and GLS models. These empirical results provide evidence that unexplained volatility in automobile insurance premiums is higher, on average, under prior approval rate regulation than a less regulated systems. The lack of significance for the proxy for opportunities for strategic behaviour (the change in the level of competition) suggests that the scope for firm action to adapt and innovate following a change in its competitive environment is limited.

In addition to testing whether rate regulation is important in explaining volatility in automobile insurance premiums for all coverages, we test the effects of rate regulation for mandatory and optional coverages and by individual line of coverage. Table 5 reports these results.

The direction and significance of the rate regulation variable is significant and positive for both mandatory and optional automobile coverages. This is consistent with the practice in Canada of applying the rate regulation regime consistently to both mandatory and optional automobile insurance purchases. In addition, the proxy for opportunities for strategic behaviour is of the predicted sign but is not significant.

Reviewing the results by line of coverage using the fixed effects model, we find that rate regulation is statistically significant and of the expected sign for accident benefits at the five percent level of significance and for comprehensive coverages at the ten percent level of significance.[3]

[3] We also estimated these regressions using GLS but the results were similar.

Table 5: Rate Regulation and Volatility by Type of Coverage

	Regulation		Strategic Behaviour	
	P>| t |	**Coefficient**	**P>| t |**	**Coefficient**
Mandatory	0.000	49132.37	0.390	-26.981
Optional	0.003	43611.49	0.721	-16.384
Accident benefits	0.000	24589.99	0.712	-4.115
Third party liability	0.501	3457.205	0.954	1.624
Collision	0.775	-322.86	0.039	-7.453
Comprehensive	0.066	-269.684	0.934	-0.038

The introduction of a prior approval regime in Ontario was concurrent with the introduction of a no-fault insurance system. Under this no-fault system accident benefit claims costs grew by 476 percent between 1989 to 2001. Such growth in claims costs placed upward pressure on premiums and therefore the influence of rate regulation would be expected to be important.

Rate regulation is not significant for third party liability or collision coverages. Claims costs for third party liability and collision coverages were generally stable over the period of the study, growing below the rate of inflation over the period.[4] With less pressure on premiums from claims costs, the effects of rate regulation would be expected to be limited.[5]

An interesting result is that change in the competitive environment is a statistically significant variable for collision coverage. One possible interpretation of this result is that the firms in the industry have greater scope for engaging in strategic behaviour in the repair of physical damage to vehicles as they respond to changes in the competitive environment. As an example, firms in Ontario are able to enter into preferred collision repair agreements to control quality and costs or have greater flexibility in responding to consumers than is permitted in other lines of coverage.

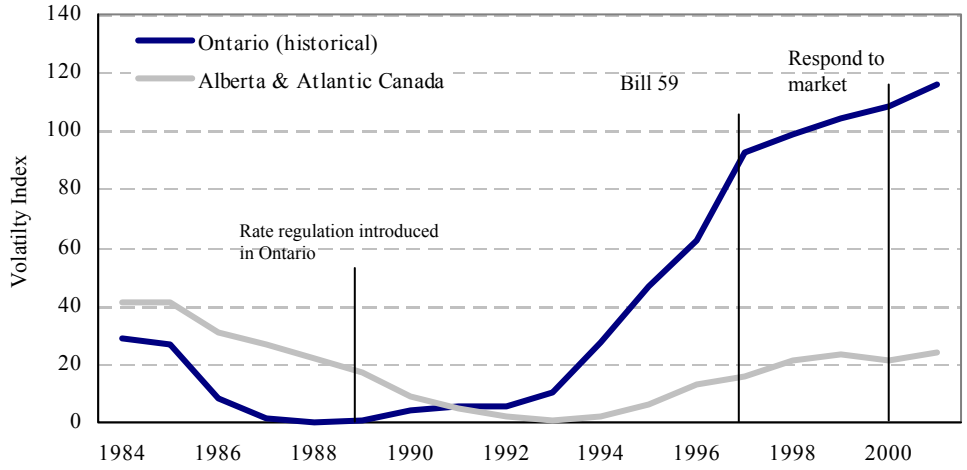
Premium volatility in Ontario

Using the residuals obtained from equation (1) we find that the unexplained volatility in automobile insurance prices in Ontario began increasing following the introduction of rate regulation in Ontario in 1989. Prior to this, unexplained volatility in Ontario's automobile insurance premiums was less than that of Alberta and the Atlantic provinces, which operated with file and use regulatory regimes while Ontario allowed prices to be determined by market forces. Figure 1 shows the substantial increase in unexplained volatility experienced in Ontario between 1989 and 2000.

[4] Third party liability claims costs in Ontario experience significant volatility but on average over the period claims cost growth was below inflation.

[5] We tested whether the CPI variable was in fact a factor for these coverages and found that, while there did appear to be some influence on the regulation variable, it did not materially alter the results.

Figure 1: Unexplained Volatility in Ontario



The patterns depicted in Figure 1 are sharp and they provide strong evidence that rate regulation, after accounting for changes in the environment (claims costs, accidents), increases volatility in automobile insurance prices. It is interesting to note the change in the slope of the volatility curve following the introduction of modifications to Ontario's prior approval rate regulation regime. Nevertheless, while the modified prior approval system appears to have somewhat mitigated volatility in Ontario, it is clear from Figure 1 that it has not reduced unexplained volatility to the level of the file and use systems in the other provinces. In addition, it is interesting to note that the slope of the curve changed with the introduction of the 'take-all-comers' rule (1993) and the Bill 59 changes to the province's rate regulation system (1996).

While filing requirements in other provinces remain unchanged over the studied period, rate review bodies in those provinces began asking for greater actuarial detail than they previously required, as more detailed and sophisticated actuarial analysis became available from solvency requirements and upgrades in insurer information technology systems. This change in administrative practice is reflected in the increase in volatility in those provinces following 1994. Additionally, after accounting for changes in claims costs, accident frequency, inflation and competition, the observed trend continued into 2001 with unexplained volatility in Ontario remaining 4.93 times that of the other provincial private insurance systems with file and use regimes.

Using our results from the analysis of rate regulation on premium volatility in the previous section, we simulated the expected volatility for Ontario under a competitive rating system, holding all other parameters at their historical level for the period between 1990 and 2001. Given the competitive rating system in Ontario prior to 1990, changes in automobile expenditures were driven by changes in claims costs, accident frequency and inflation and the province experienced very little unexplained volatility. Intuitively we would expect to find that simulation of this system past 1989, in the absence of external shocks to the system, would continue this trend. As expected, the simulation produced a low and stable level of unexplained volatility after 1989.

Volatility and Rate Regulation: Illinois and South Carolina

The United States, with a rich heterogeneity of rate regulation across fifty states, provides a number of natural experiments for the implications of rate regulation. We review the experience for two illustrative United States jurisdictions, Illinois and South Carolina as case studies with lessons for Ontario.

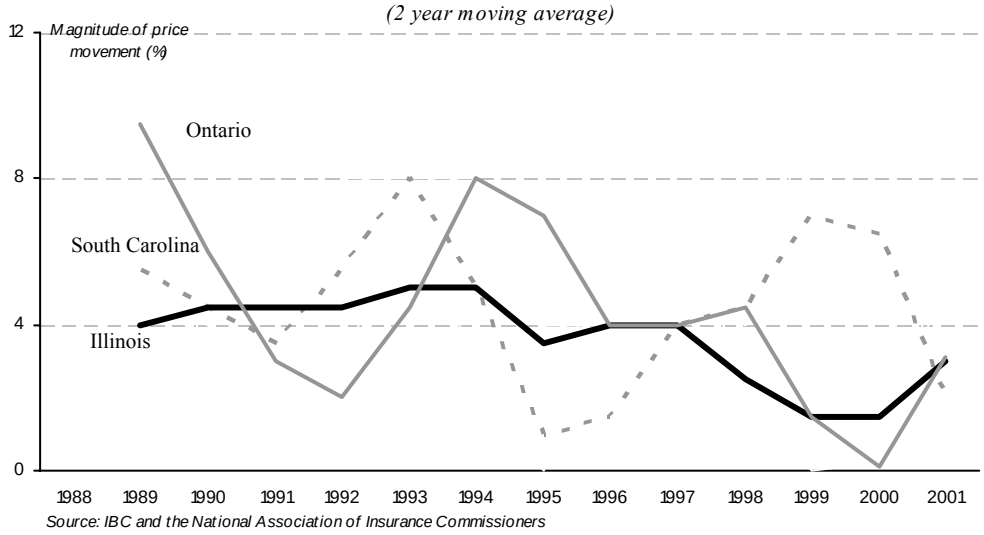
Table 6: Comparative Summary of Ontario, Illinois and South Carolina (2002)

(USD converted using purchasing power parity)	**Ontario CAN$**	**Illinois CAN$**	**South Carolina CAN$**
Population	11,697,600	12,419,293	4,012,012
GDP per capita	$37,054	$44,681	$33,279
Gross Domestic Product	$433 billion	$555 billion	$134 billion
GDP manufacturing (%)	19%	15%	21%
GDP construction(%)	3%	5%	9%
GDP transportation & utilities (%)	5%	9%	9%
Insured (private passenger) vehicles	5,563,813	7,190,347	2,695,427
Number of automobile insurers	104	386	65 (1998)
% of vehicles in the residual market	0.17%	0.03%	2.7%
Accident frequency per 1,000 insured vehicles	43	63	38
Reforms to rate/underwriting system 1989-2001	3	0	2

Differences in the automobile insurance product and other factors (legal environment etc) mean that caution should be exercised in comparing jurisdictions. Nevertheless, the overview of Ontario, Illinois and South Carolina (for 2000) provided in Table 6 highlights the relative similarity between Ontario and Illinois in terms of population and the relative importance of key industrial sectors. It is interesting to note that since 1989 Ontario and South Carolina have repeatedly reformed their auto insurance rate regulation system in response to challenges in the market, where as Illinois has been free of such legislative activity.

Additionally, United States jurisdictions provide interesting case comparisons with Ontario for other reasons. Specifically, in the United States there has been much discussion and research regarding the effects of rate regulation on insurance expenditures. Proponents of rate regulation argue that it is necessary to protect consumers from high prices and price instability. Others argue rate regulation distorts incentives and increases price volatility without necessarily leading to lower average prices. While it is generally noted that claims costs are the primary drivers of changes in insurance premiums, evidence from recent studies has supported the hypothesis that rate regulation increases premium volatility. Anecdotal support for this idea can be found in insurance expenditure data from Insurance Bureau of Canada and the National Association of Insurance Commissioners (NAIC) showing (see Figure 3) price instability in the state of South Carolina and the province of Ontario over the period of 1989 to 1999. Premium volatility in the state of Illinois was relatively stable over the same period, with average premiums moving with inflation.

Figure 3: Premium Volatility in Selected Jurisdictions



Source: IBC and the National Association of Insurance Commissioners

Finally, the experience of South Carolina's automobile insurance market, in terms of its rate regulation regime and rising health care related claims costs, prior to the 1999 reform, in some respects bears resemblance to Ontario's experience in recent years. Therefore, South Carolina's rate regulation reforms in 1999 provide an illustrative case study on the consumer and market impacts for transitioning from a prior approval regime to a competitive rating system. Illinois, a jurisdiction similar to Ontario, but which does not regulate rates, preferred to support a competitive environment. Through a competitive rating regime that the state has maintained for over three decades, Illinois provides an interesting case study on the long-term implications of a competitive rating regime.

South Carolina

Similar to many other states, South Carolina introduced a prior-approval regulatory system for auto insurance as a method of preventing insurer insolvency. More recently the focus of rate regulation became consumer protection from rising insurance prices. From the mid-1970s through 1998, South Carolina intensively regulated auto insurance. Rate levels and structures were restricted, insurers' underwriting discretion was limited, and large cross-subsidies were channeled through its residual market (Skinner, 2003). By 1997 South Carolina suffered from a significant availability crisis as the suppression of both voluntary and residual rates prompted insurers to exit from the state. The distortion of economic incentives resulting from rate regulation escalated costs and prices and caused the residual market to balloon (Shapo, 2003).

Increasing health care related claims were driving rising claims costs in the automobile insurance system and, during the period of 1993 to 1998, claims were increasing faster than premiums. Insurers exiting the auto insurance system outpaced entries and the residual market held forty percent of drivers in the state. By 1996, there were only 78 companies in the auto insurance market (Grace et al, 2002).

The 1999 auto insurance reforms replaced the prior-approval system with competitive market rating. In addition, underwriting restrictions were substantially eased as the

requirements for uniform classification, merit rating and rating territories were all abolished. The residual market and its large subsidies are currently being phased out and will be ultimately replaced by an assigned risk plan charging adequate rates (Grace et al, 2002).

Since the reforms for competitive rating were instituted, there are more insurers operating in the state. Further, South Carolina's ranking in terms of average premium expenditures has improved and the residual market has decreased from 600,000 policies in 1999 to 340 policies in 2003 (Csiszar, 2003).

While most of South Carolina's reforms became effective only in 1999, the initial impact on the state automobile insurance market has been positive. First, the number of insurers writing auto insurance has doubled with the implementation of the reforms. Second, many insurers have implemented more refined risk classification and pricing structures, as well as alternative policy options for consumers, resulting in increased choice and greater scope for competition among insurers. Yet, while early reviews of the reform have indicated improvement to both the affordability and availability of automobile insurance in the state, it is still too early to draw conclusions regarding the effects of rate regulation reforms on the volatility of premiums. Nevertheless, the South Carolina experience provides evidence of the potentially positive effects of a competitive based rating system.

Illinois

Since 1971, Illinois has been the only U.S. jurisdiction that has not formally regulated automobile insurance rates. While insurance companies are required to file rate manuals, insurance rates in the regular market are not subject to regulatory approval. Illinois remains a distinct and interesting case because, in addition to not regulating price and imposing few underwriting restrictions, the state does not possess the pro-market regulation common in other jurisdictions. Illinois therefore provides an interesting case for study because it could provide insights into whether automobile insurance rate regulation is necessary at all.

Research on the Illinois experience has highlighted the long-run effects of a competitive rating regime (Witt, 1977, Illinois Department of Insurance, 1979 and D'Arcy, 2002). Since 1971, Illinois has been described as having one of the healthiest markets in the United States with few affordability or availability issues. In general, the average premium in Illinois has been consistently lower and experienced less volatility than the United States average (NAII, 2003).[6] Further, the state residual market has consistently maintained a very small number of drivers, making up only one tenth of one percent of the total market. Further, the number of insurers in Illinois is higher than the national average providing more choice to consumers (D'Arcy, 2002).

In general, the literature has noted that due to their competitive based pricing system, the Illinois Insurance Department has been able to focus its resources on addressing

[6] According to NAIC data, Illinois was ranked 27th out of 50 states in year 2000 in terms of average premiums

insurance solvency issues and monitoring market conduct. This has been described as contributing to the benefits experienced by the Illinois auto insurance market.

Conclusion

Previous studies using U.S. data have argued that rate regulation of insurance affects both the amplitude and length of the insurance cycle. Increased volatility in insurance premiums is argued to be the result of delays in the rate approval process under prior approval rate regulation. In addition, rate regulation, through higher costs of filing requirements, also affects insurer filing and rate setting behaviour, further amplifying rate swings caused by regulatory lag. Regulatory lags under prior approval rate regulation could produce lower rate increases during periods of rapid cost growth and larger rate increases or a slower rate of reduction in periods of stable or declining claims costs (Harrington, 2002).

Our results show that the variation in insurance premiums can be largely attributable to variation in claims costs. This is consistent with the literature based on research in the United States supporting the hypothesis that rate regulation increases the volatility of auto insurance premiums for consumers. As the Canadian experience with rate regulation has been somewhat different from that of the United States, the objective of this study was to extend this literature to the Canadian context using panel data and estimate whether rate regulation produces increased premium volatility.

The analysis of this paper suggests that a structural shift in volatility occurred in Ontario following the introduction of rate regulation in that province. Increased levels of rate regulation are reliably associated with greater volatility in automobile insurance premiums after controlling for other variables that could affect volatility. In addition, the experiences of South Carolina and Illinois provide a natural experiment on the effects of rate regulation, supporting the statistical evidence on the negative effects of rate regulation and the benefits for consumers of a less regulated price system.

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