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Article abstract

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ABSTRACT

This article investigates the impact of automobile insurance regulation on the size of the involuntary insurance market as well as the level and volatility of auto insurance loss ratios in Canada. We find that rate reduction orders, product reform and a pricing "Grid" that establishes maximum premiums increase the size of the involuntary market, while prior approval does not have any significant effect. In addition, unlike U.S. studies, we find that prior approval does not significantly impact loss ratio volatility. Our models also incorporate the impact of macroeconomic variables that proxy for the underwriting cycle and investment returns. The results suggest that the insurance underwriting cycle and stock market returns appears to be as important in determining insurers' usage of the involuntary market as regulation. Taken together, our results suggests that regulatory interventions aimed at addressing affordability issues may have the unintended consequence of aggravating availability issues, and underlying market conditions may exacerbate this effect.

Les auteurs :

Mary Kelly and Si Li are both at Wilfrid Laurier University and Anne Kleffner is at the University of Calgary. The authors would like to thank the Insurance Bureau of Canada for providing data; Simon Howey for his research assistance; Gilles Bernier for providing the French abstract; and Dave Simpson (CEO of the Facility Association), seminar participants at the 2008 American Risk and Insurance Annual Meeting and the 2010 C.D. Howe Seminar on Automobile Insurance Rate Regulation for their comments. The financial support of the Social Sciences and Humanities Research Council of Canada is gratefully acknowledged.

RÉSUMÉ

Cet article propose une investigation de l'incidence de la réglementation qui prévaut dans le secteur de l'assurance automobile sur la taille du marché dit «involontaire» qui existe dans cette industrie, ainsi que sur le niveau et la volatilité des ratios de sinistralité qu'affiche cette branche au Canada. Nos résultats montrent que les exigences de diminution de tarifs, les réformes de produits de même que l'application d'une grille tarifaire qui établit l'augmentation maximum des primes d'assurance automobile ont pour effet d'augmenter la taille du marché involontaire. De plus, contrairement aux études américaines, nous trouvons que la présence d'une réglementation imposant une approbation préalable des tarifs n'a pas une incidence significative sur la volatilité des ratios de sinistralité. Nos modèles incorporent aussi l'incidence de variables macroéconomiques qui répliquent approximativement le cycle de souscription qui prévaut sur les marchés assurantiels et les rendements des placements. Les résultats suggèrent que le cycle de souscription ainsi que les rendements boursiers semblent être des facteurs tout aussi importants que la réglementation pour expliquer l'usage que font les assureurs automobiles du marché involontaire. Pris dans leur ensemble, nos résultats semblent suggérer que les interventions réglementaires visant à accroître l'accès à l'assurance à tous les automobilistes peuvent aussi avoir comme effet non désiré d'aggraver les enjeux de disponibilité de l'assurance et que, les conditions sous-jacentes du marché peuvent renforcer cet effet.

1. INTRODUCTION

Automobile insurance is mandatory in every province and territory in Canada, similar to many other countries. However, in contrast to many other countries, since 1990 there has been an increase in regulatory intervention in the auto insurance markets. Due in part to being mandatory, provincial governments are charged with the task of ensuring both the affordability and availability of auto insurance. The common response of politicians and regulators has been to provide this assurance through regulation of both the promulgation of rates and the underlying product offerings. Gambrill (2008) quotes the Ontario insurance regulator as saying,

> *"Our mandate is to protect consumers… The regulatory approval process protects consumers not only in terms of the rates charged and what consumers pay but also what factors insurers can use/not use in rating."*

The impact of automobile insurance regulation, and specifically rate regulation, has been well studied within U.S. insurance markets: Rate regulation leads to greater use of involuntary markets and greater loss ratio volatility, but has minimal impact on insurer profitability. In Canada, regulators have used a variety of tools to

manage affordability and availability concerns within automobile insurance markets while at the same time trying to promote a sustainable market. Regulators' multi-faceted approach has included rate restrictions, product redesign and changes to underwriting criteria to manage the issues of affordable and available auto insurance. An important issue to consider is how these regulations, in combination, impact the functioning of the insurance market.

This research examines the effects of these regulatory interventions on involuntary markets, profitability, and loss ratio volatility in Canada. We observe that the size of involuntary markets over time is cyclical in nature. As shown in the U.S., some regulatory interventions – premium restrictions and rate reduction orders – are associated with greater usage of the involuntary market. However the presence of prior approval rate regulation had no impact on the size of involuntary markets. We further investigate the cyclical nature of involuntary market size in Canada and find that the overall economic environment, as measured by equity market returns and the underwriting cycle, as proxied by the ratio of net written premiums to national GDP, is a more important indicator of the size of involuntary markets. Involuntary market usage increases as the market hardens, and decreases as the market softens. Although other researchers have acknowledged the relationship between surplus holdings, insurer profitability and underwriting cycles, to our knowledge, this relationship between underwriting cycles and the involuntary market has not been documented in previous research.[1]

We find that few regulatory interventions have impacted the level of underwriting profitability, as measured by the loss ratio. Prior approval and rate reductions have not increased loss ratios and, when product reform is successful, loss ratios fall. Unlike U.S. studies, we find that prior approval has no impact on the volatility of loss ratios. In fact we note that loss ratio volatility does not seem to be impacted by any regulatory intervention, nor is it affected by macroeconomic conditions.

The remainder of the paper is organized as follows. We begin with a literature review focusing on the relationship between regulatory stringency and the size of the involuntary market and on the impact of rate regulation on loss ratios and loss ratio volatility. The next section briefly summarizes the structure of auto insurance markets in Canada reviewing both the use of involuntary markets and the various regulatory interventions in the auto insurance markets within each province since 1990. This is followed by a discussion of hypotheses, a description of the data, methodology and results, followed by our conclusion.

2. LITERATURE REVIEW

The impact of rate regulation on the functioning of the U.S. property/casualty insurance market has been well documented. Our brief review here does not attempt to summarize all of the literature on auto insurance regulation, but instead focuses specifically on two topics: how does regulatory stringency impact the size of the involuntary market and what is the impact of rate regulation on loss ratios and loss ratio volatility. With respect to the impact of rate regulation on driving behaviour, the U.S. conclusions are unanimous: more stringent rate regulation is associated with larger involuntary markets, and incentive distortions that are created when premiums do not accurately reflect risk, and more stringent rate regulation leads to higher loss costs and higher premiums overall (see for example, Bartlett, Klein and Russell, 1999; Regan, Tennyson and Weiss, 2008; and Weiss, Tennyson and Regan, 2010).

The impact of regulatory stringency on the size of the involuntary market is examined by Bouzouita and Bajtelsmit (1997) and Harrington (2002). Bouzouita and Bajtelsmit (1997) study the size of the involuntary market in the U.S. from 1984 to 1992. After controlling for state population growth rates, competition and profitability in the voluntary auto insurance market in each state, compulsory liability laws and joint underwriting associations, they find that involuntary markets are larger in states with more stringent (Prior Approval) rate regulation. Without controlling for other effects, Harrington (2002) examines the size of the involuntary market for the years 1974 to 1997 and finds that involuntary markets are the largest in highly regulated states of Massachusetts, New Hampshire, New Jersey, North Carolina and South Carolina, followed by other prior approval states and are smallest in states with competitive rating. Because of this strong correlation between regulatory stringency and the size of the involuntary market, Regan, Tennyson and Weiss (2008) and Weiss, Tennyson and Regan (2010) use the size of the involuntary market as a proxy for regulatory stringency. Similarly, Weiss and Choi (2008) define the level of regulation by an indicator variable in which stringently regulated states are those with a disproportionate number of drivers assigned to the involuntary market.

Suppressing or compressing rates may reduce insurer profitability if rate regulation increases losses but restricts premiums. This may cause some insurers to leave or not enter the market and insurers that stay in the market may operate at less than efficient levels (Tennyson, 1997; Suponcic and Tennyson, 1998; and Weiss and Choi, 2008). However Harrington (2002) finds no difference in state-wide loss ratios between states with prior approval and those with competitive

rating laws. After accounting for differences in product coverage, possible difference in expenses, and the number of direct writers in each state, Harrington finds that there exists an "*economically negligible and weakly significant relationship between Prior Approval regulation and loss ratios*" (p. 299). Consistent with this result, Barth (2002) examines individual company loss ratios and finds no empirical evidence to support the notion that regulation negatively impacts insurer profitability.

The impact of prior approval rate regulation on the volatility of loss ratios and premiums has also been investigated. Harrington (2002) finds that prior approval rate regulation increases the unexplained volatility of loss ratios and premiums in the U.S. over time. Tennyson (1991) examined the relationship between the underwriting cycle (as measured by the peaks and troughs of state-wide loss ratios) and the presence of rate regulation for 1972 to 1986. Her results show that rate regulation increases the variability of loss ratios over time. However rate regulation does not cause the insurance cycle, nor does regulation dramatically impact the length of the insurance cycle.

Leadbetter, Voll, and Wieder (2008) extend the U.S. literature to the Canadian context and look at the volatility of insurance premiums, instead of loss ratios. Using data covering six provinces from 1984 to 2001, they find that rate regulation makes insurance premiums more volatile. Specifically, their analysis suggests a structural shift in volatility in Ontario following the introduction of prior approval in that province. Controlling for variables that could affect volatility, they find that increased levels of rate regulation are associated with greater volatility in automobile insurance premiums.

The existing literature suggests that more stringent rate regulation leads to larger involuntary market shares and greater volatility of loss ratios. The focus of this research is to investigate the relationship in Canada, while explicitly recognizing that stricter rate regulation is typically coupled with other regulatory interventions. This is the first study that we are aware of that examines multiple regulatory interventions simultaneously. In addition, we incorporate broader economic conditions, highlighting the important role that underwriting cycles play in involuntary market shares.

3. AUTO INSURANCE IN CANADA

The pricing and product features of automobile insurance in Canada are regulated at the provincial or territorial level, not at the federal level. Automobile insurance is mandatory in all jurisdictions with mandatory coverages offered by government-run monopolies in Quebec, Manitoba, Saskatchewan, and British Columbia and by the private marketplace in the remaining six provinces and territories. Kelly, Kleffner and Li (2012) provide a concise overview of the auto insurance markets in Canada. In this paper, we focus on the private auto insurance markets. From east to west the private provinces are: Newfoundland and Labrador (NL), Prince Edward Island (PE), Nova Scotia (NS), New Brunswick (NB), Ontario (ON) and Alberta (AB). A summary of the administration and key features of the automobile insurance product in these six provinces is provided in Table 1.

Ontario has operated under a partial no-fault regime with both monetary and verbal thresholds since 1990. The other five private provinces operate under a tort regime. Correspondingly, first-party benefits are considerably higher in Ontario than the other five private provinces. In addition, both Ontario and New Brunswick (since 2005) have first-party recovery for not-at-fault vehicular property damage and the remaining four provinces operate under a third-party recovery mechanism. Kleffner and Schmit (1999) and Kelly, Kleffner and Tomlinson (2010) have shown that costs, and therefore premiums, differ significantly across compensation systems in Canada and that Ontario has the costliest private automobile insurance system.

Due to its mandatory nature, the affordability and availability of auto insurance is a primary concern of regulators. When automobile insurance premiums increase in a province, consumers turn to provincial politicians for relief. Historically, as detailed in Appendix A: Overview of Regulation, provincial governments have responded to escalating insurance premiums with a combination of rate restrictions and product redesign in an effort to control costs, improve the affordability of insurance, while at the same time trying to promote a sustainable market. Regulators' multi-faceted approach has included rate restrictions, product redesign and changes to underwriting restrictions. Specifically, several provinces have introduced a cap on pain and suffering awards for minor injuries or a cap on benefits for minor injuries; oversight has been increased by separating insurance regulation from the public utilities commission; and several jurisdictions have enacted rate freezes or rate rollbacks. Take-all-comers rules[2] were introduced in Alberta and Ontario, and significant rate classification restrictions were introduced in three of the four Atlantic provinces (Newfoundland and Labrador, Nova Scotia,

TABLE 1
ADMINISTRATION AND REGULATION OF AUTO INSURANCE IN PRIVATE MARKET PROVINCES

	NL	PE	NS	NB	ON	AB
Mandatory Coverages[1]	BI/PD, UA	BI/PD, AB, UA	BI/PD, AB, UA	BI/PD, AB, UA, DC-PD	BI/PD, AB, UA, DC-PD	BI/PD, AB, UA
Regime	Tort	Tort	Tort	Tort	Partial no-fault	Tort
Not-at-fault PD recovery	Third-party	Third-party	Third-party	First-party	First-party	Third-party
Maximum disability benefits 2010	$140/wk (max)	$140/wk. (max)	$250/wk (max), 80% of gross wages	$250/wk (max)	70% of net wages to max. $400/wk	$400/wk (max), 80% of gross wages
Max medical payment for BI 2010	$25,000	$25,000	$25,000	$50,000	$50,000 ($1 million for catastrophic loss)	Yes /yes
Right to sue for pain & suffering / economic loss	Yes with deductible /yes	Yes /yes	Yes /yes	Yes /yes	Yes, verbal threshold & deductible/ yes, monetary & verbal threshold	Yes /yes
Cap on minor injury awards	No	Yes since 2004	Yes since 2004	Yes since 2003	Yes since Oct. 2010	Yes 2005-2007, removed 2008 & restated 2009
Pricing restrictions	Prior Approval since 2005	Prior Approval since 2004	Prior Approval since 2003	Prior Approval since 2005	Prior Approval since 1991	Prior Approval, Grid since 2005[2]
Rate reductions or freezes	Yes in 2004 and 2005	None	Yes in 2003 and 2004	Yes in 2003.	Yes in 1996 and 2003	Yes in 2005,2006 and 2007, 2009
Risk classification restrictions	Yes since 2005	None	Yes since 2004	Yes since 2005	Take-all-comers since 1993	Take-all-comers since 2005
Involuntary market entry	Minimal regulatory oversight	No regulation. RM must have higher premiums	Closely monitored by regulator	Closely monitored by regulator	Must have been declined by insurer based on u/w rules	Tight restrictions based on driving convictions
Risk sharing pool entry	No pool	No pool	New drivers only	New drivers only	Grey risk w.r.t. company pricing and u/w rules. No more than 5% of insurer's business	Grey risk w.r.t. company pricing and u/w rules

[1] BI/PD – Third-party liability for bodily injury and property damage; PD – third-party liability for property damage only; AB – accident benefits which is first-party bodily injury coverage that applies regardless of fault; UA – uninsured auto protection generally provides BI coverage only to the extent that the insured is not at fault; DC-PD – direct compensation property damage which is first-party compensation for auto damage to the extent that the insured is not at fault; No-fault provinces have a BI/PD component to cover accidents that happen either outside the province, or that involve motorists from outside the province.
[2] The grid pricing and market restructuring started in October 2004, however data collected by Facility Association starts in 2005, and we denote 2005 as the beginning of restrictions.
Source: adapted from Kelly, Kleffner and Li (2012); Facility Association; Provincial Auto Insurance Acts

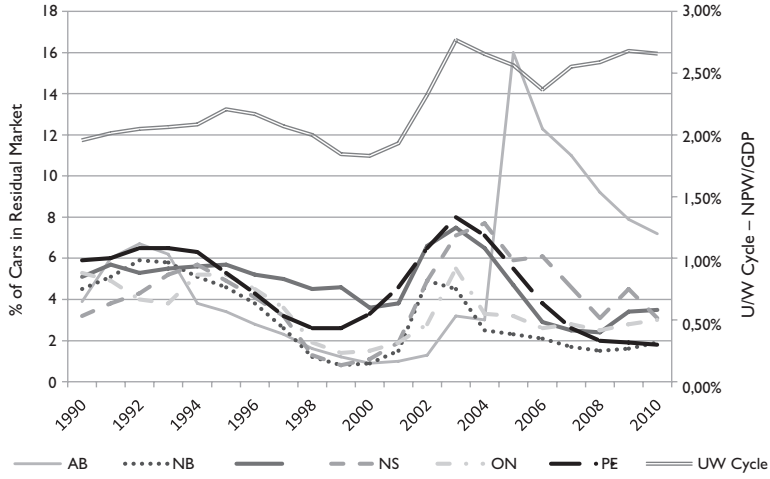
and New Brunswick). The Alberta government created a "Grid" pricing mechanism that sets the maximum premium that insurers can charge for a given driving record. This cap typically applies to both novice and high risk drivers.

To ensure availability, several involuntary market arrangements exist to underwrite risks that the voluntary market deems to be unacceptable. The involuntary auto insurance market in all six provinces is operated by the Facility Association (FA), an unincorporated nonprofit organization of all automobile insurers in the private market provinces. The FA operates a residual market in each province, called the Facility Association Residual Market (FARM), and risk sharing pools in Nova Scotia, New Brunswick, Ontario and Alberta. Entry requirements into provincial FARM and risk sharing pools are set by the provincial regulator and, as outlined in Table 1, vary across provinces. The risk sharing pools in Alberta and Ontario exist because of the take-all-comers restrictions and stricter entry requirements into FARM. The risk sharing pools in Nova Scotia and New Brunswick are for novice drivers with clean driving records. Risks underwritten in Alberta's and Ontario's risk sharing pools are priced at the underwriting firm's normal premium structure with losses shared across all firms in the process. Risks in FARM are priced by FA under a prior approval mechanism in each province.

The size of the involuntary market in each province varies over time as shown in Figure 1. The involuntary market share is measured annually as the number of earned car years within FARM for Newfoundland and Labrador, Prince Edward Island, New Brunswick and Nova Scotia and the number of earned car years within both FARM and the risk sharing pools for Ontario and Alberta, divided by number of earned car years underwritten in the entire province. Because the risk sharing pools of Nova Scotia and New Brunswick are for all new drivers, these are not considered to be involuntary risks and therefore not included in the numerator.

Figure 1 shows the visual relationship between involuntary market size and regulatory interventions. The huge spike in the size of Alberta's involuntary market in 2005 is a result of the introduction of the Grid pricing mechanism and the take-all-comers rule. After years of concern about lack of availability and affordability of auto insurance in Nova Scotia, New Brunswick and Newfoundland and Labrador, product reforms were introduced in 2003/2004. The increase in involuntary market shares for these three provinces before 2003/2004 is evident from the graph as is the reduction in involuntary market size after the product reforms were shown to be successful. Product reforms were also implemented in Ontario in 2003.

FIGURE 1
FARM AND RISK SHARING POOL MARKET SHARE BY PROVINCE



The involuntary market share is calculated as the number of earned exposures in FARM divided by the number of earned exposures in the province for Newfoundland and Labrador (NL), New Brunswick (NB), Nova Scotia (NS), and Prince Edward Island (PE). For Ontario (ON) and Alberta (AB), the involuntary market share is the sum of the earned exposures in FARM and risk sharing pools divided by the number of earned exposures in the province. Following Wang *et al.* (2010) we proxy the underwriting cycle by the ratio of property-casualty insurance premiums written divided to national GDP (this ratio is also referred to as the market penetration index).

Before 2003, all provinces, except Ontario, had very little auto insurance regulation. As such, changes in regulatory stringency cannot explain why all provinces saw a gradual decrease in involuntary market size from the early 1990s to 2000, and why involuntary market usage started to climb in all provinces in 2000. This "roller coaster" movement in involuntary markets has been noted by practitioners. Simpson (2010) notes that FARM usage is driven by many factors including increasing loss ratios in the voluntary market, instability in the auto insurance product, and a lack of capital adequacy. McGlynn (2007) also notes the relationship between FARM usage, market hardening and what he refers to as "*excessive governmental intervention into the insurance market*" (p. 30).

This relationship between the underwriting cycle and involuntary market size implies that even in the absence of changes in regulation, the size of the involuntary market will vary over time. This can also be observed in Figure 1, as we included a proxy for

the underwriting cycle. Following Wang *et al*. (2010), we proxy the underwriting cycle by the ratio of net premiums written divided by national GDP. We investigate this further below by empirically testing the impact of the underwriting cycle on the size of the involuntary market while controlling for other factors.

4. IMPACT OF REGULATORY STRINGENCY ON INVOLUNTARY MARKET SIZE AND INDUSTRY PROFITABILITY AND LOSS RATIO VOLATILITY

Regulatory intervention in the auto insurance market is expected to have several effects. As noted previously, studies in the U.S. have shown that involuntary markets are larger in states with more stringent rate regulation, where typically a regulated state is defined to be one with a prior approval (either strict or modified) mechanism (Bouzouita and Bajtelsmit, 1997; Harrington, 2002). Although it has been hypothesized that rate restrictions should lead to lower firm profitability, Harrington (2002) and Barth (2002) have not found that profitability is impacted. However, rate restrictions uncouple the relationship between pricing and immediate past losses, thus the presence of rating restrictions is expected to increase the volatility of loss ratios. Both Harrington (2002) and Leadbetter et al. (2008) find that rate regulation increases the unexplained volatility of loss ratios and premiums, respectively, over time.

The impact of changes in regulatory oversight are difficult to disentangle in Canada, as changes in rate regulation have been introduced with changes in product design, changes in underwriting standards, and in some jurisdictions, mandated rate reductions. Recognizing the interrelationships, we hypothesize:

i) Consistent with the U.S. results, increases in regulatory stringency will increase use of the involuntary market, increase loss ratios and increase the volatility of loss ratios because increased regulatory stringency uncouples the relationship between pricing and immediate past losses.

ii) Product reform will increase the use of the involuntary market because it creates uncertainty. Product reform, if successful, will decrease loss ratios, but because it creates uncertainty in pricing models, loss ratio volatility is expected to increase.

To test these hypotheses, we examine the impact of regulatory interventions simultaneously on i) the size of the involuntary market (FARM plus risk sharing pools in Ontario and Alberta) and on industry profitability in each province, and ii) the size of the involuntary market and the volatility of loss ratios in each province. The regulatory interventions we consider are: risk classification restrictions, take-all-comers rule, prior approval rate regulation, Alberta's premium grid, rate reduction or freeze order, and a cap on minor injury awards. The expected relationship between regulatory intervention variables and involuntary market size, profitability, and the volatility of loss ratios is described further below.

Restrictions on risk classification are expected to lead to compression of rates since rate classification variables capture differences between high and low risk drivers. This is expected to increase the use of the involuntary market. In addition, more high-risk drivers might be encouraged to drive if affordability is improved. Restricted premium increases for high risk drivers are expected to lead to higher loss ratios. Also, to the extent that any resultant rate compression changes the mix of drivers in an insurer's portfolio and restricts an insurer's ability to accurately price risks, we expect to see an increase in volatility arising from the presence of risk classification restrictions.

A take-all-comers rule has the immediate impact of restricting risks that can be placed within the involuntary market. However, provinces that have enforced a take-all-comers rule have also created the risk sharing pools to underwrite risks that don't qualify for the restricted involuntary market but which are riskier than insurers prefer to underwrite. Thus we expect to see an increase in the use of the involuntary market through the risk sharing pool if take-all-comers legislation is enacted. Since a take-all-comers rule changes the risk profile of those insured through voluntary markets, loss ratios could be impacted if insurers cannot increase rates to cover the increased risk. However, it is not clear whether there would be an impact on the volatility of loss ratios.

A prior approval rate approval process constrains insurer's ability to adjust prices as losses trend upwards, increasing the likelihood of using the involuntary market. In addition to prior approval, Alberta created a grid pricing mechanism which sets maximum premiums for all drivers. Involuntary market usage is expected to increase in those years in which the grid is in place. Consistent with the literature, the prior approval process is not expected to impact loss ratios. The mismatch in timing between premiums and losses will mean that loss ratios will be higher than they should be in some periods and lower in

others, and therefore loss ratio volatility will increase. Grid pricing is expected to have a significant and positive impact on loss ratios since insurers face ceilings on premiums that can be charged. The impact of the presence of the grid pricing on the volatility of loss ratios is unclear, since higher loss ratios do not imply greater variance.

Regulators artificially improve affordability by enforcing rate reduction orders or rate freezes. We anticipate that the rate reduction order will result in higher usage of the involuntary market. Typically a rate reduction order is enacted with product reform, thus the impact on loss ratio levels will depend on the alignment of the premium reduction with eventual reductions in losses. However, we expect that the rate reduction order will create greater volatility in loss ratios because of the uncertainty in losses that arise when product reform is enacted.

Some reforms have been shown to have an immediate impact on controlling the costs of claims. One common reform is a cap placed on minor injury costs: either a cap on what can be paid out in first-party accident benefits, or a cap on pain and suffering awards. To the extent that these caps are successful in cost control, we expect to see a depopulation of the involuntary market. However the change in the insurance product increases uncertainty in pricing, and firms have traditionally responded to such uncertainty by transferring more risks to the involuntary market. The net impact is ambiguous. The cost containment measures are expected to decrease loss ratios, but may also increase the volatility of loss ratios because of pricing uncertainty.

5. DATA AND METHODOLOGY

In this section we describe the data and methodology used to test the above two hypotheses.

5.1 Data

To test our hypotheses we use data for the time period 1991 to 2008 that is collected from a variety of sources for the six private market provinces. The auto insurance data are industry level data as compiled by the Insurance Bureau of Canada (IBC). Market sizes for the various involuntary markets (FARM) and risk sharing pools in the provinces are provided by the Facility Association for the same time period. Data from provincial regulatory agencies are used to

develop the regulatory intervention variables. Lastly, we collect control variables, as defined below, from Statistics Canada via CANSIM and from A.M. Best and MSA Research.

To capture regulatory interventions, we define provincial level indicator variables for each of the following regulatory interventions: risk classification restrictions, take-all-comers rule, prior approval rate regulation, Alberta's premium grid, rate reduction or freeze order, and a cap on minor injury awards. Specifically:

- Risk Classification Restriction is set to one if the province has materially restricted the use of age, gender or territory for rating purposes.
- The Take-All-Comers rule variable is set to one if the province has enacted take-all-comers regulation.
- Prior Approval is set to one if auto insurance rates must be approved before they can be used. Following Harrington (2002), among others, we do not distinguish between strict and modified prior approval mechanisms.
- The variable Grid is set to one for those years in which this pricing mechanism is in place in Alberta and zero otherwise. This indicator variable is set to zero for all other provinces.
- Rate Reduction Order is set to one if the regulator enacts premium freezes, orders rates to be rolled back or announces to the public that all insurance companies must file new (and lower) rates.
- Cap on Minor Injury is set to one if reforms have been enacted which cap either the amount that can be paid out in first-party accident benefits or pain and suffering awards for minor injuries.

In addition to regulation, other demographic, industry and economic factors may impact the size of the involuntary market and the level of loss ratios and/or loss ratio volatility in each province. Some variables have been shown in the literature to impact one of these dependent variables but not others. The demographic and industry variables are: population density, average earned premium, profit margin, market concentration, and the ratio of accident benefit premiums to third party liability premiums.[3] In addition, we account for the underwriting cycle and stock market performance.

Population Density, reported by Statistics Canada, is calculated as the population within a province divided by the size (in square kilometres) of the province. More densely populated provinces will have a higher frequency of accidents, leading to more drivers

assigned to the involuntary market (Bouzouita and Bajtelsmit 1997). Cole *et al*. (2012) also find that greater population density leads to higher claims costs. If firms are restricted in their ability to increase premiums then increasing claims costs will lead to higher loss ratios. Thus we anticipate a positive relationship between population density and loss ratios. A greater population density, because it leads to greater number of insureds in each risk class, will increase the predictability of future losses and therefore lower loss ratio volatility.

If insurers can charge higher premiums for higher risk drivers, there should be less reliance on involuntary markets. However Regan, Tennyson and Weiss (2008) note that because higher premiums are indicative of higher costs, and higher costs often result in greater regulatory oversight, this leads to greater usage of involuntary markets. Thus the net impact of Average Earned Premium on the use of involuntary markets is ambiguous. We calculate average earned premium as provincial level CPI adjusted (in 1986 dollar) total earned auto insurance premiums for both mandatory and optional coverages divided by earned exposures in each province.[4]

In theory, overall industry profitability, calculated as the one year lagged underwriting Profit Margin, is expected to be negatively related to the size of the involuntary market: profitable firms have less need for the involuntary market. However U.S. studies have found no relationship between use of residual markets and industry profitability. The underwriting profit margin is calculated as the difference between earned premiums and total incurred losses and loss adjustment expenses (LAE) divided by total earned premium.

The Market Concentration of auto insurers is expected to impact the size of the involuntary market and firm profitability. Using data from A.M. Best and MSA Research, we calculate a Herfindahl index to measure the level of competition in each province.[5] A higher ratio implies greater concentration and less competition. Bouzouita and Bajtelsmit (1997) find that higher concentration in a state is related to higher profitability, which should lead to lower usage of the involuntary markets. In contrast, Suponcic and Tennyson (1998) find that stricter regulation reduces the number of insurers operating in state, leading to a positive correlation between market concentration and involuntary market size. Market concentration, however, should be negatively related to provincial loss ratios as competition increases loss ratios.

We control for the relative size of Accident Benefits to Third Party Liability coverage using the ratio of earned premiums for each of these mandatory coverages. This will control for differences in the

auto insurance product across provinces, specifically different settlement patterns, different limits and differing levels of uncertainty.

In addition to regulation variables, insurers' use of the involuntary market is influenced by insurance market conditions, as seen in Figure 1. Following from Wang et al. (2010) we use the ratio of net premiums written for all property-casualty insurers to national GDP to capture the Underwriting (U/W) Cycle. An upwards movement in the ratio indicates a hardening market, and a downward movement indicates a softening market. This variable is expected to be positively related to the use of the involuntary market and negatively related to loss ratios. We also anticipate a negative relationship between the underwriting cycle and loss ratio volatility because the unexplained volatility in loss ratios is expected to be lower in harder markets.

Simpson (2010) also notes that equity market conditions influence insurer behaviour as the usage of involuntary markets decreases as capital adequacy increases (indicating a negative relationship between stock returns and use of the involuntary market). In periods of abundant capital, insurers are more likely to practice cash flow underwriting, loosening underwriting standards and writing higher risks. We measure the impact of equity markets on involuntary market size using the MSCI Barra global equity index. We use a global index because the majority of Canadian property-casualty insurers are part of international conglomerates.[6] We lag the equity index by one year, expecting that firms that incur lower than anticipated investment gains have a greater incentive to use the involuntary market in the upcoming year. This insurer behaviour should also lead to a positive relationship between stock returns and loss ratios.

Descriptive statistics for the dependent and control variables are presented Table 2. Panel A shows that the average involuntary market share across the six private provinces and over the sample period is 4.25 percent, with New Brunswick having the lowest provincial mean of 3.17 percent and Alberta the highest mean of 5.11 percent. Overall there is little variation in loss ratios between the provinces, but loss ratios in Ontario are most volatile. Summary statistics reported in Panel B indicate that earned premium per car is highest in Ontario, and the auto insurance market is the most competitive in Ontario and the most concentrated in Newfoundland and Labrador. The extremely high ratio of Accident Benefits to Third Party Liability premiums in Ontario is due to the partial no-fault system whereas the other five provinces operate under a tort model.

The summary of definitions of all the variables is reported in Table 3.

TABLE 2
SUMMARY STATISTICS FOR 1991 TO 2008

Panel A: Summary Statistics of Dependent Variables

Variable	# of Obs.	Overall mean	Provincial means					
			NL	PE	NS	NB	ON	AB
Involuntary Market Share (%)	108	4.25	4.87	4.82	4.21	3.17	3.37	5.11
Province Wide Loss Ratio	108	0.77	0.78	0.73	0.79	0.79	0.80	0.78
Volatility of Loss Ratios	108	0.81	0.92	0.42	0.47	0.91	1.22	0.94

Panel B: Summary Statistics of Control Variables

Variable	#. of Obs.	Overall mean	Provincial means					
			NL	PEI	NS	NB	ON	AB
Population Growth Rate (%)	108	0.52	-0.72	0.41	0.16	0.04	1.27	1.94
Population Density	108	11.86	1.45	23.94	17.62	10.51	12.90	4.72
Average Earned Premium	108	543.58	541.66	446.39	464.85	563.58	685.59	559.41
Profit Margin	108	0.20	0.19	0.23	0.19	0.19	0.20	0.20
Market Concentration (%)	108	6.95	10.87	9.78	6.00	5.40	3.93	5.71
Ratio of AB to 3rd Party Liability Premiums	108	0.23	0.08	0.13	0.16	0.21	0.72	0.09

All insurance variables, except for market concentration, are calculated using industry level data provided by Insurance Bureau of Canada. Demographic variables are calculated using data collected from Statistics Canada Cansim database. Market concentration is calculated using company level data collected by MSA Research and A.M. Best. The details of definitions and measurements of all the variables are reported in Table 3.

TABLE 3
VARIABLE NAMES AND DEFINITIONS

Variable Names	Variable Definitions
	Dependent Variables
Average Earned Premium	Provincial level CPI (in 1986 dollars) adjusted total earned auto insurance premiums for both optional and compulsory coverages divided by number of earned vehicles.
Cap on Injury	An indicator variable that takes the value one if there is a restriction on pain and suffering payments for minor injuries and zero otherwise.
Grid	Indicator variable that takes the value one for the province of Alberta for years in which premiums are capped based on grid pricing, and zero otherwise.
Involuntary Market Size	Number of written vehicles in each province by the Facility Association residual market (plus the risk sharing pools in Ontario and Alberta) divided by the total number of written vehicles in each province for each year.
Loss Ratio	For each year, the ratio of total provincial direct auto losses and adjustment expenses incurred divided by total provincial direct auto premiums earned.
Market Concentration	The Herfindahl index for each province is the sum of the squares of direct written auto insurance premiums for each private insurer divided by the square of total direct written private auto premiums for the province, where a larger value implies a greater concentration.
MSCI	The MSCI Barra global equity index. Morgan Stanley Capital World total return index with net dividends, scaled by 100. There are 24 countries included in this index. This variable is lagged one year.
Population Density	Population density is provincial population divided by size of province as measured in square kilometres. Provincial population is reported by Statistics Canada.
Prior Approval	An indicator variable that takes the value one if rates must be approved before they are used and zero otherwise.
Profit Margin	For each year and province profit margin is total earned auto insurance premiums – total auto insurance losses and LAE incurred divided by total earned premiums. The value is lagged one year in regressions.
Rate Reduction Order	An indicator variable that takes the value one if the provincial regulator enacts a premium freeze, orders rates to be rolled back by a certain percentage or announces to the public that insurance rates will not increase for a given time frame and zero otherwise.

TABLE 3 (CONTINUED FROM PREVIOUS PAGE) VARIABLE NAMES AND DEFINITIONS	
U/W Cycle	Following Wang *et al.* (2010), we proxy the underwriting cycle by the ratio of net premiums written divided by national GDP.
Ratio of Accident Benefits to 3rd Party Liability Premiums	For each province and year, accident benefits earned premiums divided by third party (both BI and PD) auto insurance earned premiums.
Risk Classification Restrictions	An indicator variable that takes the value one if the provincial regulator has materially restricted the use of age, gender or territory as a rate classification variable and zero otherwise.
Take-All-Comers Regulations	An indicator variable that takes the value one if the province has enacted take-all-comers regulation.
Volatility of Loss Ratio	The methodology used to calculate volatility of loss ratios follows Harrington (2002) and Leadbetter *et al.* (2008) and is given in the footnotes to Table 5.

5.2 Methodology

Our hypotheses jointly examine the impact of regulatory changes first on the size of the involuntary market and industry loss ratios and secondly on the size of the involuntary market and the volatility of loss ratios. However, as suggested by Figure 1, we note that the size of the involuntary market, because it is impacted by the underwriting cycle, is also a function of industry profitability and potentially the volatility of loss ratios.[7] To model this endogeneity, we use a three-stage least squares (3SLS) regression model. The 3SLS estimation is one of the methods used to estimate a simultaneous equations system, combining the two-stage least squares (2SLS) with seemingly unrelated regressions (SUR).

For both models, we use heteroskedastic robust t-statistics adjusted for clustering within each province. Because the regulation variables are indicator variables, we do not include provincial indicators in this model, as many of the regulatory impacts would be captured by the provincial indicators. Similarly the inclusion of year indicator variables would capture the impacts of the economic environment that are currently estimated by the inclusion of the MSCI and the underwriting cycle. Other studies of regulatory stringency and insurance industry performance (Regan, Tennyson and Weiss, 2008 and Weiss, Tennyson and Regan, 2010) have controlled for the proportion of population aged 18 – 24 since young drivers tend to

have more accidents. However in Canada, the percentage of young adults has been slowly but steadily declining since 1991 in every province, whereas loss costs have been steadily increasing. Including this variable captures this time series effect and not a cross-sectional effect.[8] Bouzouita and Bajtelsmit (1997) use annual population growth as a proxy for asymmetric information that arises when firms underwrite new drivers. We exclude this variable because it creates multicollinearity problems.

6. RESULTS

6.1 Involuntary Market Size and Loss Ratios

The top panel in Table 4 shows the impact of the regulation variables on the size of the involuntary markets. Some, but not all, of the regulatory indicator variables are significant. Take-all-comers regulation, grid, rate reduction order, and cap on injury all are associated with a statistically significant increase in the use of residual markets. There is no significant relationship between involuntary market use and the presence of risk classification restrictions and prior approval mechanism. This is in contrast to U.S. evidence. The positive relationship between rate reduction orders, which have been issued in four provinces, and the size of the involuntary may indicate that insurers do not expect that the product reform associated with the rate reduction order will result in a level of savings great enough to account for the reduction in rates.

The underwriting cycle variable is positively related to the size of the involuntary market. When the market hardens, auto insurers respond by tightening underwriting standards and transferring more risk to the involuntary market in an attempt to improve the bottom line. Lagged movements in equity returns also impact the use of the involuntary market. As market returns fall, and insurers earn lower investment returns, they respond by transferring more high-risk insureds to the involuntary market. The impact of these variables is significant: regressing the size of the involuntary market on these two market variables alone accounts for 22.5 percent of the variation observed in the size of the involuntary market.

With respect to provincial characteristics, the coefficient for population density is not statistically significant. Provinces with fewer insurers in the market (greater market concentration) make

TABLE 4
EFFECT OF RATE REGULATION ON INVOLUNTARY MARKET SIZE AND LOSS RATIOS

LHS Variable = Involuntary Market Size	Expected sign	Coefficient	
Risk Classification Restrictions$_t$	+	0.437	(0.90)
Take-all-comers Regulation	+	0.941	(2.31)**
Prior Approval$_t$	+	0.080	(0.24)
Grid$_t$	+	7.610	(9.29)***
Rate Reduction Order$_t$	+	0.852	(1.81)*
Cap on Injury$_t$	ambiguous	1.097	(2.37)**
Population Density$_t$	+	0.012	(0.66)
Average Earned Premium	ambiguous	-0.003	(-2.12)**
Profit Margin $_{t-1}$	0 or -	-3.084	(-4.77)***
Market Concentration$_t$	ambiguous	27.067	(4.96)***
U/W Cycle$_t$	+	3.421	(6.27)***
MSCI$_{t-1}$	-	-0.014	(-9.70)***
LHS Variable = Loss Ratio	**Expected Sign**	**Coefficient**	
Involuntary Market Size	+	0.128	(4.57)***
Risk Classification Restrictions$_t$	+	-0.038	(-0.67)
Prior Approval$_t$	0	-0.048	(-1.27)
Grid$_t$	+	-1.068	(-4.29)***
Rate Reduction Order$_t$	ambiguous	-0.082	(-1.29)
Cap on Injury$_t$	-	-0.215	(-4.23)***
Population Density$_t$	+	-0.004	(-1.63)
Market Concentration$_t$	-	-4.393	(-5.33)***
Ratio Of Accident Benefits To 3rd Party Liability Premiums$_t$		-0.080	(-1.18)
U/W Cycle$_t$	-	-0.656	(-7.24)***
MSCI$_{t-1}$	+	0.002	(4.99)***
Adjusted R^2 for 3SLS		0.74	
Number of Observations		108	

The table presents the 3 stage least squares regression results on the effect of various rate regulation variables on the size of the involuntary market and on the loss ratio. The three-stage least squares estimation is one of the methods used to estimate the simultaneous equations system. 3SLS combines two-stage least squares (2SLS) with seemingly unrelated regressions (SUR). The details of definitions and measurements of all the variables are reported in Table 3. Heteroskedastic robust t-statistics adjusting for clustering within provinces are in parentheses. Significance at the 10 percent, 5 percent, and 1 percent levels is indicated by *, ** and *** respectively.

greater use of the involuntary market. *Ex ante*, there were competing arguments describing the potential relationships between market concentration and the size of the involuntary market. Our results support the Suponcic and Tennyson (1998) argument that stricter regulation leads to fewer insurers, and therefore a positive correlation between involuntary market share and market concentration.

Higher earned premiums per car are associated with lower involuntary market shares, which supports the theory that when rates are adequate, insurers are less likely to use the involuntary market. In addition, the coefficient for profit margin is negatively related to involuntary market size, indicating that when profit margins fall, the use of involuntary markets increase.

The lower panel of Table 4 reports the results from a 3SLS regression where the dependent variable is the loss ratio (incurred losses and LAE/Earned premiums). Because of collinearity issues we remove the regulatory indicator take-all-comers.[9]

As with U.S. studies (e.g., Weiss, Tennyson and Regan, 2010), we find that the involuntary market is significantly and positively related to the loss ratio, yet prior-approval does not impact loss ratios. This is consistent with previous U.S. studies that find a positive or no relationship (see Barth, 2002 and Harrington, 2002). As expected, the coefficient of the grid variable is positive and significant. Insurers react to premium caps by moving more high-risk drivers to the involuntary market. The negative coefficient on the cap on injury suggests that the product reforms were successful in reducing losses. Risk classification restrictions and rate reduction orders, although creating rate compression, have not resulted in higher loss ratios.

The insurance underwriting cycle variable is negatively related to the loss ratio, as expected since a hardening market leads to tighter underwriting standards and lower losses. The coefficient of the equity index variable is also positive, as anticipated.

6.2 Involuntary Market Size and Volatility of Loss Ratios

We next examine the effects of the regulatory, market and control variables on involuntary market shares and on the volatility of loss ratios and report the results in Table 5.

The results in the top half of Table 5 are consistent with Table 4, with two exceptions: the coefficients for take-all-comers regulation and average earned premium are not statistically significant. Overall

TABLE 5
EFFECT OF RATE REGULATION ON INVOLUNTARY MARKET SIZE AND VOLATILITY OF PROVINCIAL LOSS RATIO

LHS Variable = Involuntary Market Size	Expected sign	Coefficient	
Risk Classification Restrictions$_t$	+	0.536	(1.05)
Take-all-comers Regulation	+	0.577	(1.10)
Prior Approval$_t$	+	0.004	(0.01)
Grid$_t$	+	8.168	(8.39)***
Rate Reduction Order$_t$	+	0.807	(1.66)*
Cap on Injury$_t$	ambiguous	0.917	(1.86)*
Population Density$_t$	+	0.024	(1.11)
Average Earned Premium	ambiguous	-0.0003	(-0.13)
Profit Margin $_{t-1}$	0 or -	-1.888	(-1.53)
Market Concentration$_t$	ambiguous	27.399	(4.55)***
U/W Cycle$_t$	+	2.769	(4.29)***
MSCI$_{t-1}$	-	-0.014	(-9.52)***
LHS Variable = Volatility of Loss Ratio	**Expected sign**	**Coefficient**	
Involuntary Market Size	+	0.208	(0.74)
Risk Classification Restrictions$_t$	+	-0.515	(-1.39)
Prior Approval$_t$	+	0.093	(0.38)
Grid$_t$		-2.082	(-0.84)
Rate Reduction Order$_t$	+	-0.398	(-0.89)
Cap on Injury$_t$	+	0.357	(1.03)
Population Density$_t$	-	-0.034	(-2.27)**
Market Concentration$_t$	ambiguous	0.416	(0.05)
Ratio Of Accident Benefits To 3rd Party Liability Premiums$_t$		0.869	(1.83)*
U/W Cycle$_t$	-	-0.709	(-0.92)
MSCI$_{t-1}$		0.001	(0.26)
Adjusted R^2 for 3SLS		0.66	
Number of Observations		108	

The table presents the 3 stage least regression results on the effect of various rate regulation variables on the size of the involuntary losses and on the volatility of loss ratio. The details of definitions and measurements of all the variables are reported in Table 3 . The three-stage least squares estimation is one of the methods used to estimate the simultaneous equations system. 3SLS combines two-stage least squares (2SLS) with seemingly unrelated regressions (SUR). The methodology used to calculate volatility of loss ratios follows Harrington (2002) and Leadbetter, Voll, and Wieder (2008). Two steps are required. We regress provincial loss ratios on the rate regulation variables and control variables used in the loss ratio regression shown in Table 4 and use the residuals, e_{pt} , from this regression. We average $e_{\tilde{p}}$ over time by province and obtain $e_{\tilde{p}}$, which is provincial level average residuals. The unexplained volatility of loss ratios is thus equal to $(e_{pt}-e_{\tilde{p}})^2$. In the second step, we regress the volatility on the same independent variables as used in the loss ratio regression shown in Table 4. Because the value of the volatility is very small, we express the volatility in percentages in the regressions. Heteroskedastic robust t-statistics adjusting for clustering within provinces are in parentheses. Significance at the 10 percent, 5 percent, and 1 percent levels is indicated by *,** and *** respectively.

the results provide evidence that regulatory interventions increase involuntary market shares, and both insurance market conditions and equity market conditions also impact insurers' use of the involuntary market: as the insurance market hardens and as equity returns decrease, more risks are placed into the involuntary market.

None of the regulatory variables in our model impact the volatility of loss ratios, suggesting that the volatility of loss ratios is not adequately explained by changes in the regulatory, industry, demographic or economic environment. When we control for the endogenous relationship between firm profitability and involuntary market size, volatility is largely unexplainable by regulatory changes and market conditions, in contrast to Leadbetter et al. (2008) who found that volatility of premiums increased under rate regulation.

The only variable that is significant at the 5 percent level is population density. The negative relationship between population density and volatility of loss ratios indicates that greater population density improves predictability of losses and reduces loss ratio volatility, as expected.

The ratio of Accident Benefits to TPL premiums is positively related to loss ratio volatility (at the 10 percent level). Although first-party accident benefits are typically associated with lower volatility, this result may be driven by the high level of accident benefits in Ontario and volatile loss results. According to the Ontario Auto Insurance Anti-Fraud Task force (2011), accident benefits in Ontario have grown more rapidly than accident benefit costs elsewhere in Canada, and this is evidenced mostly in higher claim severity.

7. CONCLUSION

Due in large part to the mandatory nature of automobile insurance in Canada, regulators are charged with ensuring affordability,

availability, and fairness for policyholders. Over the past decade, there has been an increase in the level of regulatory intervention in the private automobile insurance provinces. This is largely in response to increasing insurance premiums and dissatisfied consumers. Although such regulatory interventions--risk classification restrictions, take-all-comers rules, prior approval rates, a pricing grid, rate reduction orders and a cap on minor injury awards – typically result in short term improvement, our results suggest that they also can cause a growth in the involuntary market. When regulators attempt to improve affordability of auto insurance, they aggravate availability issues, either because they decouple the pricing mechanism from the underlying losses or because they create uncertainty in future expected losses. This effect is exacerbated by the underwriting cycle.

A well-functioning auto insurance market is characterized by small involuntary market shares (less than 2 percent of written premiums) and healthy competition (Facility Association, 2003). Regulation that prevents insurers from setting competitive prices leads to greater use of the involuntary market by insurers. This is in direct contrast to the recommendation that "*Regulations should be designed to produce desired outcomes and to avoid, or at least minimize, adverse unintended consequences.*" (Facility Association, 2003, page 2). Going forward, regulators need to recognize the effects – both direct and indirect – of intervention, especially in light of the fact that the underwriting cycle can exacerbate the problems of availability, resulting in greater uncertainty and instability in the market.

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Notes

1. This relationship has been recognized in the practitioner's literature (see for example, McGlynn, 2007 and Simpson, 2010).

2. With a take all comers rule, an insurer cannot deny mandatory (and, in Ontario, optional) coverage to any applicant or current insured if the insured meets the company's underwriting guidelines. Furthermore, regulators also approve the company level underwriting guidelines.

3. Most studies of involuntary market size also control for the number of insured motorists. This measure is typically proxied by the uninsured auto claim rate, calculated as the number of uninsured auto claims divided by the number of bodily injury liability claims. We do not use this measure as data are not available for all provinces.

4. Due to multi-collinearity issues we do not include Average Earned Premium in the loss ratio regressions.

5. A.M. Best and MSA Research data are compiled from company level annual statements filed with the federal regulator, the Office of the Superintendent of Financial Institutions. The Herfindahl index for each province is the sum of the squares of direct written auto insurance premiums for each firm operating within the province divided by the square of total direct written auto insurance premiums for the province.

6. Similar results would be obtained using the domestic stock index, the S&P/TSX Composite, as the correlation between the two annualized indices is 95 percent. However, since the majority of Canadian insurers are part of a global conglomerate, using an international index captures the global economic conditions that impact the entire insurance group. Information on MSCI indices can be found at http://www.msci.com.

7. In both regressions of industry profitability and volatility of loss ratios, the Hausman specification test rejects the hypothesis that the involuntary market size is determined exogenously.

8. There is very little cross sectional difference in the proportion of young adults across the provinces. For the years 1991 to 2007 the proportions of 18 to 24 year olds in the population were: 10.8 percent in Newfoundland and Labrador; 10 percent in Prince Edward Island; 9.7 percent in Nova Scotia; 10 percent in New Brunswick; 9.6 percent in Ontario and 10.3 percent in Alberta. The standard deviation ranges from 0.3 percent in both Prince Edward Island and Alberta to 1.2 percent in Newfoundland and Labrador.

9. We determine which variables to drop based on the model variance inflation factors (VIF).

APPENDIX A
OVERVIEW OF REGULATION

This section briefly describes the regulatory interventions in the auto insurance markets in the six private provinces between 1991 and 2010

Reforms in Newfoundland and Labrador, starting in 2004, introduced restrictions on rate variables, a prior approval mechanism for rates, product reform and a rate freeze in both 2004 and 2005. Regulators provide minimal oversight to the involuntary market.

Prince Edward Island has seen the smallest increase in regulation. In 2004, caps on awards for minor injuries were instituted as well as a Prior Approval mechanism for rates. The only involuntary market restriction is that FARM premiums must exceed voluntary market premiums.

2003 reforms for New Brunswick mandated auto insurance premium reductions, instituted caps on awards for minor injuries and placed restrictions on which drivers could be placed in FARM. In 2005, the New Brunswick government introduced a 'no frills' auto insurance product with lower limits, mandated further rate decreases and introduced a Prior Approval filing mechanism. Restrictions were put on risk classification variables and an insurance regulator position, separate from the regulatory process for public utilities, was created. The 'no frills' auto product was repealed in December 2007. With respect to the involuntary market, a risk sharing pool was started to insure novice drivers with clean driving records. The insurance regulator closely monitors placement of risks within FARM.

Similar reforms were undertaken in neighbouring Nova Scotia. Reforms passed in the fall of 2003 introduced a $2500 limit on pain and suffering awards to people who have sustained minor, non-permanent injuries. This cap, in a court challenge, was determined to be constitutional. The 2003 Act mandated 20 percent reductions in auto insurance premiums, a future freeze on premiums, and a removal of age and gender as risk classification variables. A separate insurance regulator was appointed and a Prior Approval mechanism was introduced. In 2007, a risk sharing pool for new drivers was introduced. The regulator closely monitors placement of risks within the province's FARM. In 2009, oversight of auto insurance was placed again with the Public Utilities Commission.

Of all the private provinces, Ontario has had the longest history of intervention in the automobile insurance market. Prior Approval rate regulation was introduced in 1989 and modified no-fault auto insurance a year later. A take-all-comers rule was instituted in 1993 and in 1994, the right to sue was further restricted. Spiralling claims costs led to more reforms in 1996 including a two-tiered schedule of accident benefits, streamlined Prior Approval process for some filings, and tightening of the criteria for entry into the involuntary market. 2003 saw another round of accident benefit reforms combined with a rate freeze. In 2006 changes were made to the assessment process for those claiming accident benefits. Further reforms – a sharp reduction in benefits for non-catastrophic losses, a cap on assessment fees, and a cap of $3500 on medical

APPENDIX A (CONTINUED FROM PREVIOUS PAGE) OVERVIEW OF REGULATION

and rehabilitation benefits for minor injury– were enacted in 2010 in an attempt to curtail costs. Because of the take-all-comers rule, there are both FARM and a risk sharing pool within the province. The risk sharing pool underwrites 'grey market' risks, whereas only those drivers that have been declined insurance may be placed into FARM. The most dramatic regulatory reforms with respect to pricing have occurred in Alberta. Although it has always had a Prior Approval system and a separate insurance regulator, increasing claims costs lead to an overhaul of the system in 2003. To increase affordability to high-risk drivers the government introduced a grid pricing system that represents the maximum that can be charged. Firms are free to set premiums below the grid pricing, but even those must be approved before put into place. In addition, premium freezes for two years were put in place, a take-all-comers rule was introduced and pain and suffering awards for minor injuries were capped at $4000. This cap was struck down on February 2008 as unconstitutional, but was reinstated early in 2009. Rules on entry into the involuntary market were tightened to allow only the highest risk drivers, and two risk sharing pools – one for drivers priced at the grid and a non-grid pool – were introduced in response to the take-all-comers rule.