

Deregulation, competition and insurer switching:

Evidence from China's automobile insurance market reform

Abstract:

With the rapid growth in automobile insurance premium, the regulator in China initiated a marketization reform for the industry in 2015 to grant insurers more options in rate making, policy design, and underwriting. It intended to increase competition and improve consumer welfare, yet there is little scientific evidence on the impact of deregulation so far. Using a large panel dataset of more than four million automobile insurance policies, covering all insurers operating in China from 2013 to 2017, we use insurer switching as one key indicator measuring market competitiveness, to test whether deregulation increased market competition. And we further analyze the pattern of switching among different types of insurers, and interpret the trends using “Structure-Conduct-Performance” paradigm, in order to better understand the impact of deregulation on market performance and consumer choice.

Keyword:

Automobile insurance, competition, deregulation, insurer switching

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Purpose of the Research

Automobile insurance in China became the second largest nonlife insurance market in the world in terms of premium income in 2017.¹ Domestically, it is also the dominating line of business in the nonlife insurance market, taking up 76.5% of nonlife premium alone in 2017. ²With the rapid growth in premium, the regulator initiated a marketization reform for the automobile insurance industry in 2015 to grant insurers more options in rate making, policy design, and underwriting. We intend to focus on the impact of deregulation on market competition, shown in the trend of insurer switching among policyholders following the reform. Further, we scrutinize the trend of switching between different types of insurers, according to the company's size, history, ownership, as well as the dominating distribution channel.

The previous literature relevant to insurer switching mainly focus on different determinants of consumer's behavior, such as price, quality of service, product heterogeneity, information, search cost and switching cost (Schlesinger and von der Schulenburg, 1991, 1993). Besides, there are empirical studies focusing on different switching tendency after reform for various groups, such as by gender, age, health status, wealth level and more (Hendriks et al., 2009; Jong et al., 2008; Rooijen et al., 2011). Yet most of the existing empirical research use data from health insurance market (Dafny, 2010; Jong et al., 2008; Rooijen et al., 2011) and little is known about switching in the automobile insurance market. We intend to fill the gap by presenting the impact of market deregulation on consumer choice of switching between insurers using a rich dataset, and to interpret the changes in switching trend in a "Structure-Conduct-Performance" (SCP) paradigm, in order to better understand the relationship among regulation, market structure, and consumer choice in this market.

Data and Research Methodology

China's Automobile Insurance Rate Reform and Data

China Insurance Regulatory Committee (CIRC)³ initiated the automobile insurance market reform in June 2015 on a step by step basis. It specific, it divided all the 36 jurisdictions into three groups, with the first group of 6 jurisdictions piloting the reform starting on June 1st, 2015, the second group of 12 jurisdictions implementing the reform on January 1st, 2016, and all the remaining jurisdictions commencing the reform on July 1st, 2016.

Prior to the reform, both the rate and policy of the automobile insurance industry in China are being strictly regulated, enforcing an industry standardized policy form, and a strict price range.⁴ The overall objective for the reform is to facilitate marketization of the automobile insurance industry in China, by granting the insurer more options in rate making, underwriting and policy design. In specific, the Insurance Industry Association is responsible to design a model automobile policy and submit it to the CIRC for approval. Besides, the insurance company is also allowed to design its own innovative automobile policy, subject to approval by the CIRC. In terms of deregulation of rate making, the insurance company is allowed to adjust the base premium, which is decided by the industry average experience, by three additional factors, namely no-claim-discount (NCD) factor

¹ Insurance handbook, Insurance Information Institute, <https://www.iii.org/publications/insurance-handbook/economic-and-financial-data/world-insurance-marketplace>

² China Insurance Market Report 2018, Peking University Press.

³ CIRC was combined with China Bank Regulatory Committee in 2018 and is now known as China Bank and Insurance Regulatory Committee (CBIRC).

⁴ As to the ratemaking, the CIRC regulates the maximum discount for policyholder to be 30% for all insurers prior to the reform.

(also known as bonus-malus system), insurer underwriting (IUW) factor and insurer sales channel (ISC) factor. The NCD factor is a set of pre-determined discount factors by the industry for experience rating, and the factors after reform allow for a wider range of adjustment to award the low-risk drivers and punish the high-risk ones.⁵ Both the IUW and ISC factors for each policyholder can be determined by the insurer, subject to the ranges specified by the CIRC.⁶

In specific, the premium is defined as the following:

$$\text{base premium} = \frac{\text{pure risk premium}}{1 - \text{loading fee percentage}} \quad (1)$$

$$\text{premium} = \text{base premium} \times \text{NCD factor} \times \text{IUW factor} \times \text{ISC factor} \quad (2)$$

Here, the pure risk premium reflects the industry average of claim records taking geographic location, make and model of the car, the age of the car and usage type of the car into consideration. The loading fee percentage is determined by the insurer using its expense records in the last three years, or alternatively, it could use the industry average data.

Our empirical application uses a dataset acquired from Chinese Insurance Information Technology Company (CIITC), which is a data platform of insurance industry governed by the CIRC. Based on regulation rules, all insurance companies in China must report their data to CIITC to support experience rate making.

To study the impact of automobile insurance rate deregulation on the consumer's choice of switching between insurers, we randomly sampled 5% of all automobile insurance policies issued between June 1st, 2013 (two years before the reform) and July 1st, 2017 (one year after all jurisdictions implementing the reform) in China.⁷ We further restrict our sample to those cars which have at least one observation both before and after the reform is implemented, and we require the owner of the car remain the same. Excluding observations with missing values, we obtain a sample size of 1.19 million insured cars, with over 4.66 million policy-year observations. Figure 1 illustrates the sampling period and the timing of reform.

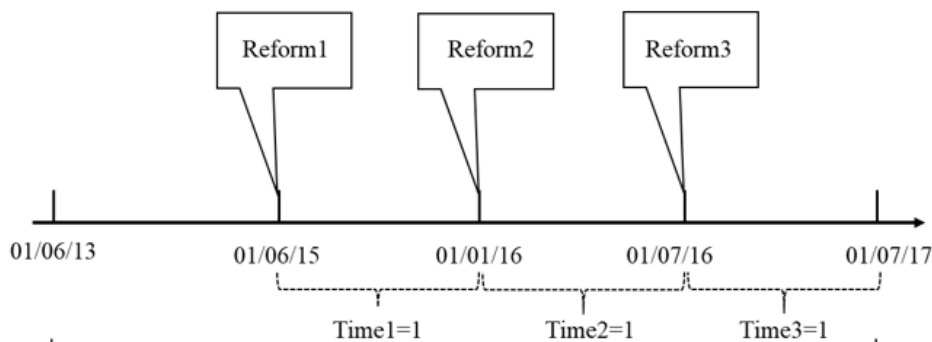


Figure 1 Illustration of Sampling Period and Timing of Reform

Our data is a roughly four-year unbalanced panel dataset, and it is composed of all underwriting and claim

⁵ Detailed information regarding the NCD factors both prior to and after the reform can be found in Appendix Table 1.

⁶ In the reform starting in June 2015, the CIRC specified the range of the insurer underwriting factor and the insurer sales channel factor to be both (0.85, 1.15). For example, the lowest risk policyholder that the insurer wants to attract could enjoy 27.75% additional discount off the base premium ($0.85 \times 0.85 = 0.7225$).

⁷ We sampled 32 out of 34 jurisdictions in China, excluding Beijing and Shanghai only, because their regulatory and data recording rules are different from all the other provinces.

information of the automobile insurance policy. It includes characteristics about insured on age, gender and previous claim history; characteristics about the car on the type, usage type, the age of the car, whether it's registered in the local province, whether it belongs to a fleet, whether it's a used car, and the purchasing price of the car. The dataset also contains policy-level information on the name of the insurer and sales channel. Detailed definition of variables and summary statistics are presented in Appendix Table 2 and Table 3, respectively.

Methodology

Given that there are three groups of jurisdictions implementing the reform at different timing, we use a difference-in-difference framework to analyze the impact of automobile insurance reform on policyholder's choice of switching between insurers. We estimate the coefficients using a probit model. The detailed model form is shown in equation (3).

$$\begin{aligned}
 & Prob(Switch_{i,t} = 1) \\
 & = Prob(\beta_{0,i} + \beta_{1,i} \times T1_{i,t} + \beta_{2,i} \times T2_{i,t} + \beta_{3,i} \times T3_{i,t} + \beta_{4,i} \times R1_{i,t} + \beta_{5,i} \times R2_{i,t} + \beta_{6,i} \times R3_{i,t} + \beta_{7,i} \times (T1_{i,t} + T2_{i,t} + T3_{i,t}) \times R1_{i,t} \\
 & + \beta_{8,i} \times (T2_{i,t} + T3_{i,t}) \times R2_{i,t} + \beta_{9,i} \times T3_{i,t} \times R3_{i,t} + \gamma \times X + \varepsilon_a + \varphi_c + \eta_{i,t} > 0)
 \end{aligned} \tag{3}$$

The dependent variable is a dummy variable indicating policyholder i switched to another insurer during policy year t . $T1_{i,t}$, $T2_{i,t}$ and $T3_{i,t}$ are three dummy variables specifying the three time phrases of reform (Time1, Time2 and Time 3 in Figure 1), while $R1_{i,t}$, $R2_{i,t}$, and $R3_{i,t}$ are three dummy variables specifying three groups of jurisdictions implementing the reform (Reform1, Reform2 and Reform3 in Figure 1). X is a vector of control variables including age, gender, claim history, car type, usage type, age of the car, whether it's registered in the local province, whether it belongs to a fleet, whether it's a used car, the purchasing price of the car and the sales channel of insurance policy. We further cluster the error at province level (denoted by ε_a), company level (denoted by φ_c), as well as individual level (denoted by $\eta_{i,t}$). The coefficients of $\beta_{7,i}$, $\beta_{8,i}$ and $\beta_{9,i}$ capture the impact of the three-stage reform on policyholders' tendency to switch between insurers.

In addition, we also apply logit regression and linear probability model (LPM) as alternatives, controlling for fixed effect on province level and firm level. Standard deviation is also clustered on the province level and firm level.

Importance of the Study

The reform starting in June 2015 is an important milestone to facilitate the marketization of the automobile insurance industry in China, and it is still ongoing, demonstrating important implications for the industry. It intended to increase competition and consumer welfare, yet there is little scientific evidence on the impact of deregulation so far. Using a large dataset covering all insurers operating in China from 2013 to 2017, we use insurer switching as one key indicator measuring market competitiveness, to test whether deregulation increased market competition. And we further analyze the pattern of switching among different types of insurers, in order to better understand the impact of reform on market performance and consumer choice.

Appendix

Table 1. Bonus-malus System (NCD factor) and the Corresponding Multiplier for Base Premium

Variable Name	Definition	The multiplier for base premium prior to the reform	The multiplier for base premium after the reform
ThreeYearsNoClaim	Filed no claim for three consecutive years.	0.7	0.6
TwoYearsNoClaim	Filed no claim for two consecutive years.	0.8	0.7
OneYearNoClaim	Filed no claim in the last year.	0.9	0.85
LastYearClaims1_3	Filed one claim in the last year.	1	1
	Filed two claims in the last year.	1	1.25
	Filed three claims in the last year.	1.1	1.5
LastYearClaimsAbove3	Filed four claims in the last year.	1.2	1.75
	Filed five or more claims in the last year.	1.3	2

Note: To keep consistency, we combine those insured who filed more than three claims in the last year into one category named “LastYearClaimsAbove3” because there was an insurance company using this rule in its practice prior to the reform.

Table 2. Variable Definition

Category	Variable Name	Definition
<i>Characteristics of insured</i>		
Age group	AgeUnder25	A dummy variable which equals 1 if the insured’s age is under 25, otherwise, it equals 0.
	Age25_29	A dummy variable which equals 1 if the insured’s age is between 25 and 39, otherwise, it equals 0.
	Age30_39	A dummy variable which equals 1 if the insured’s age is between 30 and 39, otherwise, it equals 0.
	Age40_59	A dummy variable which equals 1 if the insured’s age is between 40 and 59, otherwise, it equals 0.
	AgeAbove60	A dummy variable which equals 1 if the insured is older than 59, otherwise it equals 0.
Gender	Female	A dummy variable which equals 1 if the insured is female, otherwise it equals 0.
Bonus-malus system	ThreeYearsNoClaim	A dummy variable which equals 1 if there is no claim in the previous three years, otherwise it equals 0.
	TwoYearsNoClaim	A dummy variable which equals 1 if there is no claim in the previous two years, otherwise it equals 0.
	OneYearNoClaim	A dummy variable which equals 1 if there is no claim in the previous one year, otherwise it equals 0.
	LastYearClaims1_3	A dummy variable which equals 1 if the number of claims was between 1 and 3 in the previous year, otherwise it equals 0.
	LastYearClaimsAbove3	A dummy variable which equals 1 if the number of claims was above 3 in the previous year, otherwise it equals 0.
<i>Characteristics of car</i>		

Type of car	SeatsUnder6	A dummy variable which equals 1 if the vehicle has less than 6 seats, otherwise it equals 0.
	Seats6_9	A dummy variable which equals 1 if the vehicle has seat number between 6 and 10, otherwise it equals 0.
	Seats10_36	A dummy variable which equals 1 if the vehicle has more than 36 seats, otherwise it equals 0.
	Truck	A dummy variable which equals 1 if the vehicle is a truck, otherwise it equals 0.
	OtherType	A dummy variable which equals 1 if the vehicle does not belong to any of the above types, otherwise it equals 0.
Usage of car	MixUse	A dummy variable which equals 1 if the vehicle is used for business and non-business purposes, otherwise it equals 0.
	Business	A dummy variable which equals 1 if the vehicle can be only used for business, otherwise it equals 0.
	NonBusiness	A dummy variable which equals 1 if the vehicle can be only used for non-business, otherwise it equals 0.
	GovUse	A dummy variable which equals 1 if the vehicle can be used by the government, otherwise it equals 0.
	PersonalUse	A dummy variable which equals 1 if the vehicle is for personal transportation only, otherwise it equals 0.
	PersonalFreight	A dummy variable which equals 1 if the vehicle is a truck, otherwise it equals 0.
Age of car	CarAge0_2	A dummy variable which equals 1 if the vehicle's age is less than 2 years, otherwise it equals 0.
	CarAge3_5	A dummy variable which equals 1 if the vehicle's age is between 2 and 5 years, otherwise it equals 0.
	CarAge6_8	A dummy variable which equals 1 if the vehicle's age is between 6 and 8, otherwise it equals 0.
	CarAgeAbove8	A dummy variable which equals 1 if the vehicle's age is above 8, otherwise it equals 0.
Local	LocalCar	A dummy variable which equals 1 if the vehicle is registered in the local province, otherwise it equals 0.
Fleet	NonFleetCar	A dummy variable which equals 1 if the vehicle does not belong to any fleet, otherwise it equals 0.
Used	UsedCar	A dummy variable which equals 1 if the vehicle is used, otherwise it equals 0.
Price	CarPrice	A continuous variable which equals to the price of insured's car (in 10,000 yuan).
<i>Characteristics of insurance</i>		
Sales channel	traditional sale	A dummy variable which equals 1 if the policy is sole via the traditional channel, otherwise it equals 0.
	DirectSale	A dummy variable which equals 1 if the policy is sold by an insurance company directly, otherwise it equals 0.
	EcommerceSale	A dummy variable which equals 1 if the policy is sold via E-commerce channel, otherwise it equals 0.
	AgentSale	A dummy variable which equals 1 if the policy is sold by an agent, otherwise it equals 0.
	PartTimeAgent	A dummy variable which equals 1 if the policy is sold part-time agent, otherwise it equals 0.
	ProfessionalAgent	A dummy variable which equals 1 if the policy is sold by a professional agent, otherwise it equals 0.
	BrokerSale	A dummy variable which equals 1 if the policy is sold by insurance broker company, otherwise it equals 0.
	CallSale	A dummy variable which equals 1 if the policy is sold by phone, otherwise it equals 0.
Time	Time1	A dummy variable which equals 1 if the policy commenced between 01/06/2015 and 31/12/2015, otherwise it equals 0.
	Time2	A dummy variable which equals 1 if the policy commenced between 01/01/2016 and 30/06/2016, otherwise it equals 0.

	Time3	A dummy variable which equals 1 if the policy commenced between 01/07/2016 and 01/07/2017, otherwise it equals 0.
Reform	Reform1	A dummy variable which equals 1 if the policy commenced after reform in the 1 st group of jurisdictions, otherwise it equals 0.
	Reform2	A dummy variable which equals 1 if the policy commenced after reform in the 2 nd group of jurisdictions, otherwise it equals 0.
	Reform3	A dummy variable which equals 1 if the policy commenced after reform in the 3 rd group of jurisdictions, otherwise it equals 0.
Switch	Switch	A dummy variable which equals 1 if the policyholder switch to a different insurer from the last year, otherwise it equals 0.

Table 3. Summary Statistics of Key Variables (Number of Observation=4,661,633)

Variables	Mean	Std.	Min	Max
AgeUnder25	0.0247	0.1553	0	1
Age25_29	0.1131	0.3167	0	1
Age30_39	0.3468	0.4759	0	1
Age40_59	0.4900	0.4999	0	1
AgeAbove60	0.0254	0.1574	0	1
Female	0.2457	0.4305	0	1
ThreeYearsNoClaim	0.3043	0.4601	0	1
TwoYearsNoClaim	0.1627	0.3691	0	1
OneYearNoClaim	0.2267	0.4187	0	1
LastYearClaims1_3	0.3037	0.4598	0	1
LastYearClaimsAbove3	0.0026	0.0511	0	1
SeatsUnder6	0.8327	0.3733	0	1
Seats6_9	0.1001	0.3001	0	1
Seats10_36	0.0007	0.0269	0	1
Truck	0.0626	0.2422	0	1
OtherType	0.0039	0.0627	0	1
MixUse	0.0011	0.0338	0	1
Business	0.0335	0.1800	0	1
NonBusiness	0.0106	0.1025	0	1
GovUse	0.0009	0.0299	0	1
PersonalUse	0.9328	0.2503	0	1
PersonalFreight	0.0210	0.1433	0	1
CarAge0_2	0.2380	0.4258	0	1
CarAge3_5	0.4953	0.5000	0	1
CarAge6_8	0.2019	0.4014	0	1
CarAgeAbove8	0.0649	0.2463	0	1
LocalCar	0.9784	0.1454	0	1
NonFleetCar	0.9965	0.0593	0	1
UsedCar	0.9996	0.0211	0	1
CarPrice	12.4231	9.0279	0.42	1,355
TraditionalSale	0.0454	0.2081	0	1
DirectSale	0.0073	0.0851	0	1
EcommerceSale	0.1637	0.3700	0	1
AgentSale	0.1505	0.3576	0	1
PartTimeAgent	0.1609	0.3674	0	1
ProfessionalAgent	0.0915	0.2884	0	1
BrokerSale	0.0054	0.0736	0	1
CallSale	0.3674	0.4821	0	1
Time1	0.1403	0.3473	0	1
Time2	0.1243	0.3299	0	1
Time3	0.2431	0.4289	0	1
Reform1	0.0513	0.2206	0	1
Reform2	0.1249	0.3306	0	1
Reform3	0.1346	0.3413	0	1
Switch	0.2888	0.4532	0	1

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