Deregulation, competition and insurer switching:

Evidence from liberalization reform in China's automobile insurance market[1]

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Abstract:

In 2015, China Insurance Regulatory Commission (CIRC) initiated a liberalization reform in the automobile insurance industry to grant insurers more discretion in policy design, underwriting, and ratemaking. The deregulation intended to increase competition and improve consumer welfare, yet there was little scientific evidence on how the world's second-largest insurance market responded to the reform. This article aims to examine the effectiveness of the deregulation reform in China. Leveraging a large industry dataset of more than seven million automobile insurance policies from 63 automobile insurers operating in China, we study policyholders' switching behavior among insurance providers. To better understand the heterogeneity in the impact of deregulation on market performance and consumer choice, we further analyze the switching pattern among different types of insurers. Overall, the empirical results suggest that the reform has met its original goal, leading to a higher competition in the market and more diversified consumer choices. Yet, our findings also indicate that the company level and jurisdiction level factors are still important in shaping the market structure.

Keyword:
Automobile insurance, competition, deregulation, insurer switching

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Introduction

Deregulation leads to enhanced competition, and this trend has been observed in various industries, such as Airline, telecommunication and healthcare firms. The new low-cost entrants pose threats to incumbent firms, leading to a lower price, improvement in the quality of service, and incentive in new technology investment (Kole and Lehn, 1997). A similar effect of deregulation is found in the insurance industry as well. Scholars have investigated the impact of deregulation on market competition using a variety of measurements, such as efficiency and productivity (Boonyasai et al., 2002; Cummins and Misas, 2006; Hussels and Ward, 2007; Weiss and Choi, 2008), market structure (Turchetti and Daraio, 2004), pricing strategy and profitability (Grabowski et al., 1989; Pope and Ma, 2005, 2008; Peng et al., 2016).

To be more specific, Boonyasai et al. (2002) studied the impact of deregulation in Asian insurance market using measures of efficiency and productivity, and they found an increased productivity in both Korea and Philippines. Similarly, Weiss and Choi (2008) also concluded that insurers in the rate-regulated states are less revenue and cost-scale efficient than those in the competitive states. In terms of market structure, Turchetti and Daraio (2004) observed an significant reduction in total motor insurers following deregulation in the Italian motor insurance market, accompanied by an increase in total factor productivity. In terms of pricing strategy and profitability, Grabowski et al. (1989), using U.S. auto insurance data, showed that deregulated states experienced lower unit price measured by inverse loss ratio. Pope and Ma (2008) investigated the market concentration-profitability relationship in a structure-conduct-performance framework and found that high barriers to enter the market facilitates the collusive behavior of incumbent insurers.

Another stream of literature uses consumer choice in terms of insurer switching to measure market reaction to deregulation. For instance, empirical studies are performed using reform data in health insurance market by Van Rooijen et al. (2011) and de Jong et al. (2008). Although these studies did not find an increase in the percentage of customers who switched insurers after the market reform in the Dutch health insurance system, the results can be more reasonably explained by the high switching cost in the health insurance market. It's well established in the literature that information, search cost and switching cost are important determinants to insurer switching (Schlesinger and von der Schulenburg, 1991, 1993). For health insurance, the switching cost is particularly high for a number of reasons. First, many individuals get access to health insurance using group policies provided by their employers, thus the decision regarding the choice of insurer is not entirely made by the individual. It's further found that the switching cost for firms is also high (Dafny, 2010). Second, many health insurance plans, such as HMOs and PPOs, would restrict services to a specific health provider network, which imposes additional costs and barriers for customers to switch plans. Third, there are also barriers to switching insurers for specific groups, especially those with chronic disease and other preexisting conditions (Hendriks et al., 2009; Van Rooijen et al., 2011).

In this paper, we aim to examine the effects of deregulation on market competition and thus consumer choice in automobile insurance market. In 2015, China Insurance Regulatory Commission (CIRC) initiated a liberalization reform in the automobile insurance industry to grant insurers more discretion in policy design, underwriting, and ratemaking. The reform serves as a quasi-experiment and provides a natural context for us to investigate how market responds to change in regulation. In particular, we use insurer switching as a measure of market competitiveness and examine the effects of deregulation on policyholders' switching behavior among insurance providers. To the best of our knowledge, there is no existing research that uses insurer switching in the auto insurance industry as a measure for the impact of deregulation. Compared with insurer switching in the health insurance market, using automobile insurer switching to measure the impact of

deregulation has its advantage for the following reasons. First, it's not a group policy that bonds an individual's choice with the decision of the employer. Second, it's not as much restricted by service providers (such as auto repair shops) as in the case of health insurance. Third, the switching cost in auto insurance is relatively low. Honka (2014) estimated the average switching cost in the U.S. auto insurance industry to be about $40.

As the world's second largest nonlife insurance market, China's auto insurance market provides rich data to test the effects of deregulation. Specifically, leveraging a large panel dataset of more than seven million automobile insurance policies from 63 automobile insurers operating in China, we study policyholders' switching behavior among insurance providers. To better understand the heterogeneity in the impact of deregulation on market performance and consumer choice, we further analyze the switching pattern among different types of insurers. Overall, the empirical results suggest that the reform has met its original goal, leading to a higher competition in the market and more diversified consumer choices. Yet, our findings also indicate that the company level and jurisdiction level factors are still important in shaping the market structure.

We contribute to the literature in the following aspects. First, we employ the individual-level data in auto insurance market to study the impact of deregulation on consumer's choice of switching insurer. As noted, the previous studies use data from health insurance market, where the consumer's choice of insurer is much restricted, thus, using experience from the auto insurance market is more appropriate in disentangling the impact. Second, we use individual-level data from the industry, and this is in contrast with the existing literature that usually used aggregate data from the industry to study the impact of deregulation on market performance. The intercompany data provides more statistical power in the empirical test, and more importantly, allows us to examine the heterogeneity in switching behavior in terms of insurer types. Third, our study is the first to examine the impact of deregulation in China's insurance market – the largest insurance market among developing countries. The findings complement the existing studies on deregulations of insurance markets in developed economies, such as in the U.S., Japan, Italy, and others (see Cummins, 2002 for a review).

The remainder of the paper is structured as follows. Section 2 describes the automobile insurance products in China and the liberalization reform in China's automobile insurance industry. Section 3 summarizes the insurance data and sample construction process. Section 4 presents the research methodology and Section 5 shows the regression results and discussions. Section 6 concludes.

Automobile Insurance in China

Insurance Products

China became the world's second-largest nonlife insurance market in terms of premium income in 2017.[2] Domestically, automobile insurance is the dominating line of business in the nonlife insurance market, accounting for 76.5% of nonlife premiums in 2017.[3]

In China, there are two types of automobile insurance coverage: the compulsory traffic accident liability insurance (CTALI) offered by the government, and the voluntary commercial automobile insurance policy

[2] Insurance handbook, Insurance Information Institute, https://www.iii.org/publications/insurance-handbook/economic-and-financial-data/world-insurance-marketplace

[3] China Insurance Market Report 2018, Peking University Press.

(CAI) provided by commercial insurance companies. The CTALI policy provides coverage for the financial losses of third parties (both bodily injury and property damage) that the policyholder is liable for while operating the vehicle. It contains a 110,000 yuan (roughly 16,000 USD) in liability coverage for death and disability compensation, 2,000 yuan (roughly 300 USD) in property damage, and 10,000 yuan (roughly 1,500 USD) in medical expense. The rate of CTALI policy is set and regulated by the government directly, and the commercial insurers serve as the agent to supply the product to consumers. On top of a CTALI, the insured could purchase a CAI policy voluntarily. It is a standardized contract that provides comprehensive coverage by combining multiple insuring agreements. Besides the third-party liability coverage, it is common to include physical damage (for collision protection), liability coverage to occupants of the insured vehicle, and whole-vehicle theft. The CAI policy is provided by commercial property insurance companies with a choice of insurance amount.[4] Each private insurer sets the rate for its own CAI policies, subject to the constraints and approval by the CIRC.

Most drivers purchase the CAI policy to obtain comprehensive protection. According to the Insurance Report of Private Car Drivers 2017 released by the Chinese Insurance Information Technology Management Company (CIITMC)[5], 75.48% of drivers purchased CAI policy in 2017 in addition to the CTALI policy, while the remaining 24.52% drivers only purchased CTALI policy.

Liberalization Reform

China Insurance Regulatory Commission (CIRC)[6] initiated the liberalization reform in the automobile insurance industry in June 2015 on a step by step basis. Specifically, it divided 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 the remaining 18 jurisdictions commencing the reform on July 1st, 2016. Figure 1 shows the geographic locations of these three groups of jurisdictions. The detailed list of jurisdictions in the three groups can be found in Appendix Table 1.

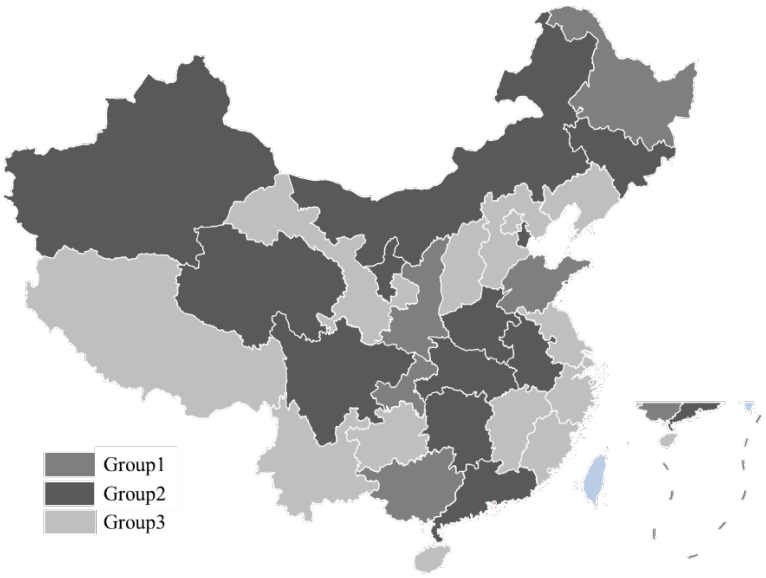

Figure 1. Geographic Location of Three Groups of Jurisdictions Implementing the Reform

[4] The coverage of the third-party liability is chosen by the insured, but the coverage of physical damage (collision) line is set to equal to the car's actual cash value automatically.
[5] The CIITMC becomes China Banking and Insurance Information Technology Management Company (CBIITMC) after the merge of CIRC and CBRC into CBIRC.
[6] CIRC was combined with China Bank Regulatory Commission in 2018 and is now known as China Bank and Insurance Regulatory Commission (CBIRC).

The liberalization reform applies to the pricing of the CAI policy. Prior to the reform, both the rate and policy form of the CAI policy in China are being strictly regulated, enforcing an industry standardized policy form, and a strict price range.[7] The overall objective of the reform is to facilitate the marketization of the automobile insurance industry in China, by granting the insurer more discretion in policy design, underwriting, and ratemaking. Specifically, 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 determined by the industry average experience, by three additional factors, namely the no-claim-discount (NCD) factor (also known as bonus-malus system), the insurer underwriting (IU) factor, and the 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 adjustments to award the low-risk drivers and punish the high-risk ones to a larger extent. The detailed information regarding the NCD factors both prior to and after the reform can be found in Appendix Table 2. Besides, both the IU and ISC factors for each policyholder are determined by the insurer, subject to the ranges specified by the CIRC.[8]

In specific, the premium is defined as the following:

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

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

Here, the pure risk premium is determined using the industry average loss cost of a policy taking into account the geographic location and vehicle characteristics including make and model, age, price, and usage of the car. The loading fee percentage is also determined using the industry average. Therefore, all insurers in the market use an universal base premium for the same risk class.

Prior to the reform, for the policyholder with the best claim history (i.e. no claim filed in the previous three years), the best rate that could be offered by any insurer equals to $0.7 \times 0.7 = 0.49$ of base premium due to the NCD factor and price discount regulation rules,[9] while the minimum rate after the reform turns to be $0.6 \times 0.85 \times 0.85 = 0.4335$ of base premium, which represents roughly 11.5% decrease in this specific case.[10]

In our sample, we observe the average premium to be 3,027 Yuan in 2015 and it decreased 13.4% in 2016 with an average premium of 2,622 Yuan. In 2016, the average disposable annual income in China was 23,821 Yuan, and the average annual consumption per capita was 17,111 Yuan.[11]

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

[8] 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 within [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 (0.85x0.85=0.7225).

[9] The maximum NCD discount is 30% off and the maximum discount that the insurer can grant to a policyholder prior to the reform is also 30% off.

[10] This example is used to illustrate the calculation of premium. Please note the base premium after the reform may be different from the previous case, so the 11.5% decrease may not be accurate.

[11] We note it would not be reasonable to compare the average premium with the average disposable income directly because the underlying population are not the same. A more accurate estimation can be derived as follow. There were 194 million automobiles in China; and there were 36 cars for each 100 households in 2016 (http://www.stats.gov.cn/tjsj/zxfb/201702/t20170228_1467424.html) If we assume the wealthiest top 20% in population own private cars, then approximately, the average premium of automobile insurance in 2016 accounts for 4.4% of average income for the individuals in the top 20% income distribution, and this proportion would increase to 8.2% if we assume people in the top 40% income distribution percentile are car owners.

Data and Descriptive Statistics

Data and Sampling

We consider a large dataset obtained from the automobile insurance data platform of Chinese Insurance Information Technology Management Company (CIITMC). Per regulation, all insurance companies operating in China are required to report their underwriting and claim data to CIITMC to support experience rate making.[12] The CIITMC is affiliated with the CIRC to gather and manage the data for the insurance industry, in order to assist policy making for the CIRC.

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 June 30th, 2017 (one year after all the jurisdictions implementing the reform) in China.[13] We further restrict our sample to those cars which have at least one observation both before and after the reform was implemented. By applying this restriction, we can avoid the potential impact of the general increase in automobile ownership during the sampling period on our results. We further require the owner of the car remains the same during the sampling period, to avoid insurer switching due to automobile resale. In addition, a standard automobile insurance policy provides coverages for one year, therefore, we exclude policies with abnormal policy periods.[14]

Excluding observations with missing values, we obtain a sample size of 1.97 million insured cars, with approximately 7.33 million policy-year observations. Figure 2 illustrates the sampling period as well as the timing of reform. Our sample includes automobile insurance policies issued by 46 insurers, as well as policies issued by another 17 companies who joined the market from 2014-2016.[15] Thus, altogether the sample was collected from 63 insurance companies. A list of insurance companies is provided in Appendix Table 5.

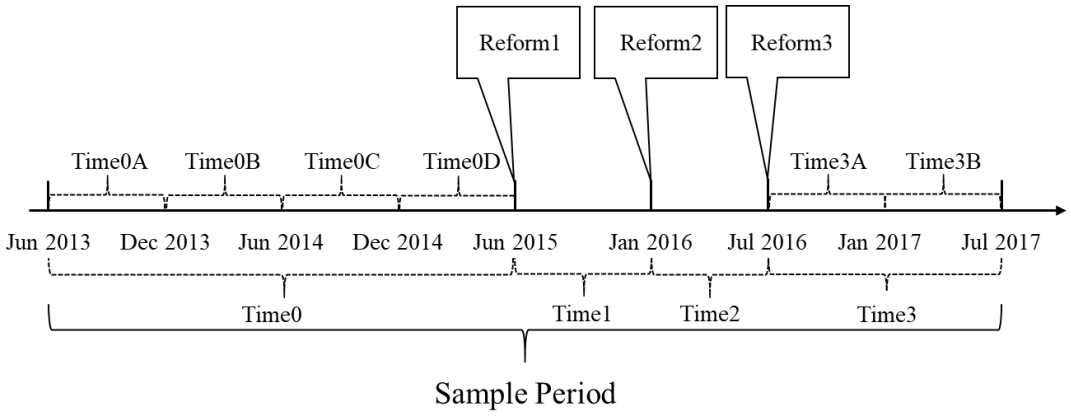

Figure 2. Illustration of Sampling Period and Timing of Reform

Here, we create four dummy variables to denote the time period in regard to the reform. To be specific, Time0

[12] As an exception, policies sold in Beijing and Shanghai are not collected and managed by CIITMC, therefore, we do not have data from these two cities in our sample.

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

[14] In specific, we include the policy into our sample only if the length of policy period is between 335 days and 395 days, i.e., we allow at most 30 days deviation from the normal case.

[15] There were 53 property/casualty insurance companies operating in the automobile insurance line in China in 2013, according to China Insurance Yearbook 2014. The other seven insurers not included in our sample wrote very few business in 2013, so we didn't get enough observations from the 5% random sampling process.

represents the two-year pre-reform period between June 1st, 2013 and May 31st, 2015. Time1 represents the initial stage of reform when the first 6 jurisdictions implemented the reform, between June 1st, 2015 and Dec. 31st, 2015. Time2 represents the expanding stage of reform when another 12 jurisdictions implemented the reform, between January 1st, 2016 and June 30th, 2016. Time3 represents the final stage of reform when all 36 jurisdictions implemented the reform, between July 1st, 2016 and July 1st, 2017.

Because Time0 and Time3 are much longer than Time1 and Time2, so as an alternative way to define time period, we divide the four-year sampling period into eight periods, denoted by Time0A, Time0B, Time0C, Time0D, Time1, Time2, Time3A and Time 3B, with each period lasts for roughly half a year. The detailed definitions are presented in Table 1.

Summary statistics

Our data is a roughly four-year unbalanced panel dataset, and it is composed of all underwriting and claim 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 new 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 definitions of variables and summary statistics are presented in Table 1 and Table 2, respectively.

It should be noted that our key variable of interest, Switch, is a dummy variable which equals 1 if the insurer of the current policy is different from the insurer of the previous policy, otherwise, it equals 0. It doesn't include insurer switching in the middle of a policy term, because we restrict our sample to policies last for a full year. For the first insurance policy of a new car, the dummy variable switch equals 0.

Table 1. Variable Definition

Category	Variable Name	Definition
Characteristics of insured		
Age group	AgeUnder25	= 1 if the insured's age is under 25, otherwise, it equals 0.
	Age25_29	= 1 if the insured's age is between 25 and 39, otherwise, it equals 0.
	Age30_39	= 1 if the insured's age is between 30 and 39, otherwise, it equals 0.
	Age40_59	= 1 if the insured's age is between 40 and 59, otherwise, it equals 0.
	AgeAbove60	= 1 if the insured is older than 59, otherwise, it equals 0.
Gender	Female	= 1 if the insured is female, otherwise, it equals 0.
Bonus-malus system	ThreeYearsNoClaim	= 1 if there is no claim in the previous three years, otherwise, it equals 0.
	TwoYearsNoClaim	= 1 if there is no claim in the previous two years, otherwise, it equals 0.
	OneYearNoClaim	= 1 if there is no claim in the previous year, otherwise, it equals 0.
	LastYearClaims1_3	= 1 if the number of claims was between 1 and 3 in the previous year, otherwise, it equals 0.
	LastYearClaimsAbove3	= 1 if the number of claims was above 3 in the previous year, otherwise, it equals 0.
Characteristics of car		
Type of car	SeatsUnder6	= 1 if the vehicle has less than 6 seats, otherwise, it equals 0.
	Seats6_9	= 1 if the vehicle has seat number between 6 and 10, otherwise, it equals 0.
	Seats10_36	= 1 if the vehicle has more than 36 seats, otherwise, it equals 0.
	Truck	= 1 if the vehicle is a truck, otherwise, it equals 0.
	OtherType	= 1 if the vehicle does not belong to any of the above types, otherwise, it equals 0.
Use of car	Business	= 1 if the vehicle can be only used for business, otherwise, it equals 0.
	NonBusiness	= 1 if the vehicle can be only used for non-business, otherwise, it equals 0.
	MixUse	= 1 if the vehicle is used for both business and non-business purposes, otherwise, it equals 0.
Age of car	CarAge0_2	= 1 if the vehicle's age is less than 2 years, otherwise, it equals 0.
	CarAge3_5	= 1 if the vehicle's age is between 2 and 5 years, otherwise, it equals 0.
	CarAge6_8	= 1 if the vehicle's age is between 6 and 8, otherwise, it equals 0.
	CarAgeAbove8	= 1 if the vehicle's age is above 8, otherwise, it equals 0.
Local	LocalCar	= 1 if the vehicle is registered in the local province, otherwise, it equals 0.
Fleet	NonFleetCar	= 1 if the vehicle does not belong to any fleet, otherwise, it equals 0.

Non-new	NonNewCar	= 1 if the vehicle was bought for more than 365 days, otherwise, it equals 0.
Price	CarPrice	A continuous variable equals the price of the insured's car (in 10,000 yuan).
Characteristics of insurance		
Sales channel	TraditionalSale	= 1 if the policy is sold over the counter, otherwise, it equals 0.
	DirectSale	= 1 if the policy is sold by an insurance company directly, otherwise, it equals 0.
	EcommerceSale	= 1 if the policy is sold online, otherwise, it equals 0.
	AgentSale	= 1 if the policy is sold by an individual agent, otherwise, it equals 0.
	PartTimeAgent	= 1 if the policy is sold by a part-time agent (such as an automobile dealer), otherwise, it equals 0.
	ProfessionalAgent	= 1 if the policy is sold by a professional agent company, otherwise, it equals 0.
	BrokerSale	= 1 if the policy is sold by an insurance broker company, otherwise, it equals 0.
	CallSale	= 1 if the policy is sold by a call center, otherwise, it equals 0.
	OtherChannel	= 1 if the policy is sold by other channels not mentioned above.
Time	Time0	= 1 if the policy commenced between June 1st, 2013 and May 31st, 2015, otherwise, it equals 0.
	Time0A	= 1 if the policy commenced between June 1st, 2013 and November 30th, 2013, otherwise, it equals 0.
	Time0B	= 1 if the policy commenced between December 1st, 2013 and May 31st, 2014, otherwise, it equals 0.
	Time0C	= 1 if the policy commenced between June 1st, 2014 and November 30th, 2014, otherwise, it equals 0.
	Time0D	= 1 if the policy commenced between December 1st, 2014 and May 31st, 2015, otherwise, it equals 0.
	Time1	= 1 if the policy commenced between June 1st, 2015 and December 31st, 2015, otherwise, it equals 0.
	Time2	= 1 if the policy commenced between January 1st, 2016 and June 30th, 2016, otherwise, it equals 0.
	Time3	= 1 if the policy commenced between July 1st, 2016 and June 30th, 2017, otherwise, it equals 0.
	Time3A	= 1 if the policy commenced between July 1st, 2016 and December 31st, 2016, otherwise, it equals 0.
	Time3B	= 1 if the policy commenced between January 1st, 2017 and June 30th, 2017, otherwise, it equals 0.
Reform	Group 1	= 1 if the policy commenced after the reform in the 1st group of 6 jurisdictions, otherwise, it equals 0.
	Group 2	= 1 if the policy commenced after the reform in the 2nd group of 12 jurisdictions, otherwise, it equals 0.
	Group 3	= 1 if the policy commenced after the reform in the 3rd group of 18 jurisdictions, otherwise, it equals 0.
Switch	Switch	= 1 if the insurer of the current policy is different from the insurer of the previous policy, otherwise, it equals 0. It doesn't include insurer switching in the middle of a policy term, because we restrict our sample to policies last for a full year. For the first insurance policy of a new car, the dummy variable switch=0.

Table 2. Summary Statistics of Key Variables (Number of Observation=7,334,012)

Variable	Mean	Standard deviation
Switch	0.2908	0.4541
AgeUnder25	0.0451	0.2075
Age25_29	0.1502	0.3572
Age30_39	0.3506	0.4772
Age40_59	0.4340	0.4956
AgeAbove60	0.0201	0.1403
Female	0.2533	0.4349
ThreeYearsNoClaim	0.2064	0.4047
TwoYearsNoClaim	0.1639	0.3702
OneYearNoClaim	0.2468	0.4311
LastYearClaims1_3	0.3808	0.4856
LastYearClaimsAbove3	0.0021	0.0462
SeatsUnder6	0.8284	0.3771
Seats6_9	0.1077	0.3100
Seats10_36	0.0006	0.0245
Truck	0.0601	0.2376
OtherType	0.0032	0.0566
MixUse	0.0010	0.0309
Business	0.0289	0.1677
NonBusiness	0.9701	0.1703
CarAge0_2	0.4954	0.5000
CarAge3_5	0.3383	0.4731
CarAge6_8	0.1250	0.3307
CarAgeAbove8	0.0413	0.1991
LocalCar	0.9813	0.1356
NonFleetCar	0.9964	0.0600
NonNewCar	0.8966	0.3045
CarPrice	11.4514	8.0531
TraditionalSale	0.0469	0.2114
DirectSale	0.0069	0.0827
EcommerceSale	0.1613	0.3679
AgentSale	0.1651	0.3713
PartTimeAgent	0.2083	0.4061
ProfessionalAgent	0.1032	0.3042
BrokerSale	0.0072	0.0844
CallSale	0.2932	0.4552
OtherChannel	0.0079	0.0891
Group1	0.1063	0.3082
Group2	0.3540	0.4782
Group3	0.5397	0.4984

Note：All variables in Table 2 are dummy variables, except for CarPrice, therefore, we didn't report minimum value and maximum value. The minimum of CarPrice in our sample is 5,960 Yuan (equivalent to

approximately 855 USD), and the maximum of CarPrice is 17,000,000 Yuan (equivalent to approximately 2,441,000 USD).

Research methodology

Given that there are three groups of jurisdictions implementing the reform at different times, we use a difference-in-difference framework to analyze the impact of the 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).

$$Prob\left(Switch_{i,\ t} = 1\right)$$

$$= \beta_{0i} + \beta_{1i} * T1_{it} + \beta_{2i} * T2_{it} + \beta_{3i} * T3_{it} + \beta_{4i} * G1_{it} + \beta_{5i} * G2_{it} + \beta_{6i} * G3_{it}$$

$$+\beta_{7i} * (T1_{it} + T2_{it} + T3_{it}) * G1_{it} + \beta_{8i} * (T2_{it} + T3_{it}) * G2_{it} + \beta_{9i} * T3_{it} * G3_{it} + \gamma * X + \varepsilon_i > 0 \quad (3)$$

The dependent variable is a dummy variable indicating policyholder i switched into the current insurer during policy year t, i.e., his/her insurer in the previous year was different from the current insurer. $T1_{i,t}, T2_{i,t}\ and\ T3_{i,t}$ are three dummy variables specifying the three time phrases of reform (Time1, Time2 and Time 3 in Figure 2), while $G1_{i,t}, G2_{i,t}, and\ G3_{i,t}$ are three dummy variables specifying three groups of jurisdictions implementing the reform. 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 new car, the purchasing price of the car, and the sales channel of insurance policy. The key coefficients of interest, $\beta_{7,i}, \beta_{8,i}$ and $\beta_{9,i}$ capture the impact of the three-stage reform on policyholders' tendency to switch among insurers.

Results and discussions

Key results

In order to ensure these three groups are comparable in terms of the tendency of insurer switching before the reform, we provide evidence regarding the pre-reform and post-reform trends in insurer switching in these three groups of jurisdictions in Table 3. The detailed list of jurisdictions is provided in Appendix Table 1. We further illustrate the time trend of insurer switching among these three groups of jurisdictions in Figure 3.

Table 3 shows the proportion of policyholders who switched insurer increases after the reform for all three groups. The trends in the proportion of switched customers are comparable across all three groups before the reform. Figure 3 also confirms these consistent trends before the reform. Detailed data for the entire sampling period (from Time 0A till Time 3B) are included in Appendix Table 3.

Table 3. Comparison of Trends in Insurer Switching in Three Groups of Jurisdictions

		1st Group		2nd Group		3rd Group	
		Switch	Non-Switch	Switch	Non-Switch	Switch	Non-Switch
Pre-reform	Count	87,056	275,218	428,139	1,149,072	813,465	2,100,669
	%	24.03	75.97	27.15	72.85	27.91	72.09
Post-reform	Count	134,158	283,107	341,099	677,837	328,783	715,409
	%	32.15	67.85	33.48	66.52	31.49	68.51
Total	Count	221,214	558,325	769,238	1,826,909	1,142,248	2,816,078
	%	28.38	71.62	29.63	70.37	28.86	71.14

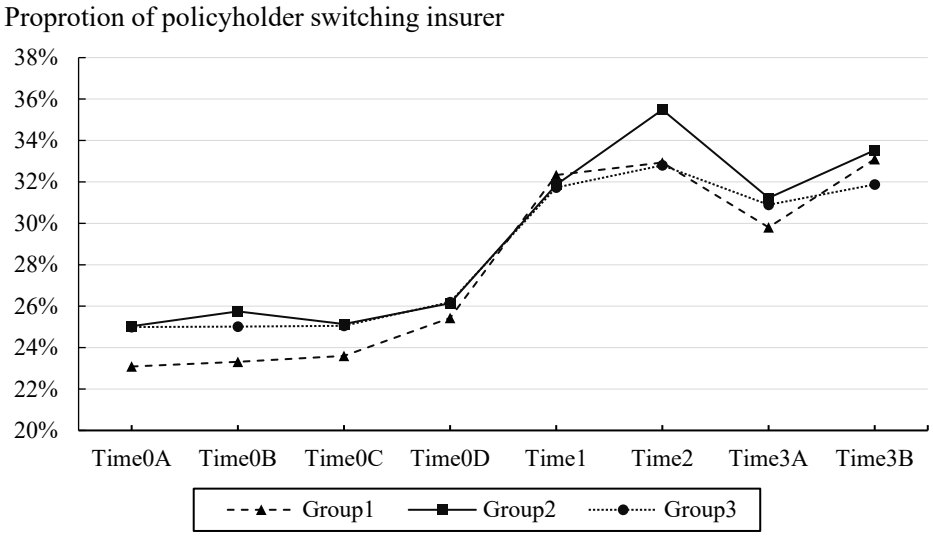

Figure 3. Time Trend of Insurer Switching among Three Groups of Jurisdictions

Table 4 shows the key coefficients capturing the impact of reform on the trend of insurer switching. The complete regression results can be found in Appendix Table 4. For the panel data, we use five fixed-effect models to control for effect of time-invariant unobservable on various levels. The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. The results in column (1) controlled for fixed effects on the person, area (jurisdiction) and time. In specific, we divide the roughly four-year sampling period into eight time variables, according to the timing of the three-step reform.[16] The eight time variables are roughly evenly distributed, each lasts for around six months. This could measure the impact of time more accurately than using the calendar year, given some reforms were taking place in the middle of a year. In column (2), instead of using time, we use the calendar year as an alternative way to depict time. We also control for fixed effects on person level and area (jurisdiction) level in column (2). The results reported in column (3) controlled for fixed effect on the person, company and time. Those reported in column (4) and (5) controlled for fixed effects on all four levels, i.e. person, company, jurisdiction and calendar year (or time).

The five different fixed effect specifications yield consistent results regarding the impact of reform on insurer switching. The signs and magnitude of coefficients are robust to various model specifications. We use the results in column (5) to make our interpretations, and the key coefficients are highlighted in bold. We find the reform taking place in the first group of six jurisdictions in June 2015 increases the probability of insurer switching by 0.7 percentage point, the second reform with additional 12 jurisdictions joining the reform in January 2016 also increases the probability of insurer switching by 1.1 percentage point, and the last step of reform in July 2016 to implement in all jurisdictions further increase the probability of insurer switching by 0.7 percentage point. Overall, the impact is consistent with our expectations and the goal of the reform.[17] The magnitude of the impact is relatively moderate, and it's sensible given the reform is performed on a step by step basis, and the change in rate regulation by CIRC is also carried out in a prudent manner.[18]

[16] In specific, the eight time variables are Time0A, Time0B, Time0C, Time0D, Time1, Time2, Time3A, and Time3B. The detailed definitions are given in Table 1.

[17] Another factor that may cause insurer switching is the insured moving to another territory where the original insurer is not operating. In our sample, there are 2.48% of policyholders who moved to a different jurisdiction during the sampling period. It's a relatively small proportion.

[18] To date, there are in total three regulatory reforms in the automobile insurance market in China since 2015. The first reform took place from June 2015 to July 2016, and our paper focuses on the impact of the first reform. The price ranges allowed by the CIRC for IU factor and ISC factor are both [0.85, 1.15] for all jurisdictions in this reform. Later on, the second reform in July 2017 allowed pilot

Table 4. Key Results from Regression (Full Sample, N=7,334,012)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	0.0091***	0.0097***	0.0081***	0.0081***	**0.0074*** **
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
(T2+T3)×G2	0.0092***	0.0099***	0.0112***	0.0120***	**0.0113*** **
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
T3×G3	0.0063***	0.0068***	0.0065***	0.0060***	**0.0065*** **
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes
Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.2030	0.2030	0.2150	0.2150	0.2150

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Heterogeneity

Size of insurer

To further analyze the heterogeneity as regard to the impact of reform, we divide all 63 insurers in our sample into three groups according to their premium income in 2014, the large insurers (the top three players), the medium-large insurers (the top 10 biggest players excluding the top 3), and the small insurers (those remaining insurers which ranked below the 10th in the market). The market share in terms of the automobile insurance premium in 2014 for large insurers, medium-large insurers, and small insurers is approximately 67%, 22%, and 11%, respectively.

Figure 4 shows the trend of market share for the large insurers, medium-large insurers and small insurers in the sampling period. The market share of the large insurers dropped from 68% in 2013 to 64.7% in 2017, while the share of the medium-large insurers increased from 21.4% to 24.7%. The market share of the small insurers kept stable around 10%. A list of insurance companies and their premium income in 2014, premium ranking, and category by size provided in Appendix Table 5.

jurisdictions to further expand the price ranges to [0.70, 1.25]. The third reform in March 2018 in addition allowed for price ranges to be [0.65, 1.15] for specific jurisdictions. We would expect the level of market competitiveness to further increase as the deregulation continues.

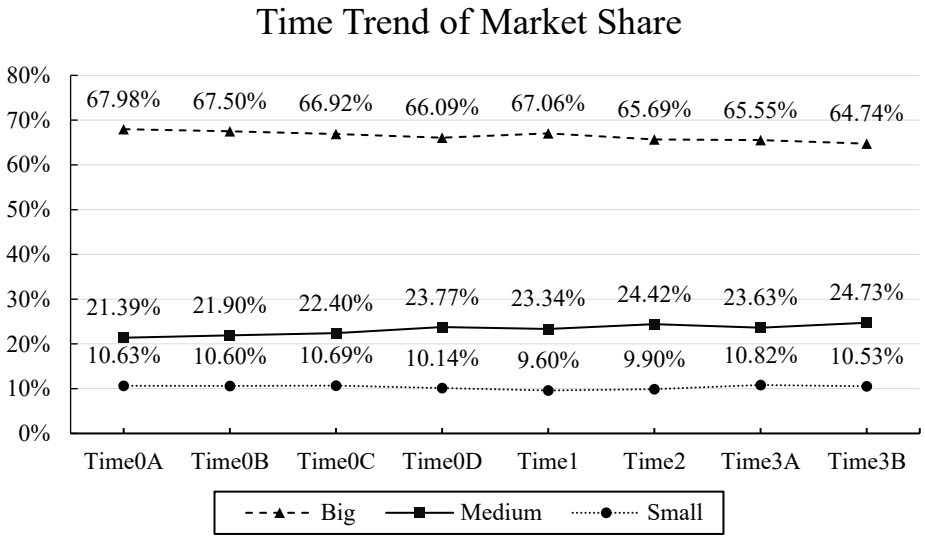

Figure 4. The Trend of Market Share for Large, Medium Large and Small Insurers

We further calculate the Herfindahl-Hirschman Index (HHI) of the market during the entire sampling period and show the results in Table 5. It's apparent that the HHI decreases over the sampling period, suggesting the market is getting more competitive.

Table 5. HHI for Automobile Insurance Market in China (2013-2017)

Year	2013	2014	2015	2016	2017
HHI	0.1934	0.1912	0.1895	0.1883	0.1886

The goal of deregulation is to allow for more market mechanisms in rate making and underwriting, however, it's unclear whether the impact of deregulation would be the same for insurers of different sizes (or market power). Prior to the reform, the rate is strictly regulated, and the market concentration measurement was high. With the deregulation, the smaller insurance companies now have the option to diversify their own pricing strategies and compete with the larger companies, but the large companies also have advantages in financial resources, distribution channels, research expertise, and brand name. Therefore, it's essential to evaluate the impact empirically.

Table 6 to Table 8 show the impact of reform on insurer switching for the large insurers, medium-large insurers, and small insurers, respectively. The complete regression results can be found in Appendix Table 6-8.

We highlight the key coefficients which are statistically significant in bold. Combining the results in Table 6 to Table 8, we observe there was business flowing out of the top three insurers since the 2nd group implemented the reform, and this trend continued to the end of our sample period in 2017. Meanwhile, the reform facilitates business flowing into the medium-large insurers, as well as the small insurers in general. The results support the positive impact of reform enhancing the market competition in encouraging insurer switching, and we show preliminary evidence suggesting the market power of the largest insurers is weakened.

Table 6. Key Results from Regression (Large Insurers, N=4,863,886)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	0.0025*	0.0415***	0.0054***	0.0058***	**0.0051*** **
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
(T2+T3)×G2	-0.0108***	0.0270***	-0.0082***	-0.0074***	**-0.0082*** **
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
T3×G3	-0.0074***	0.0286***	-0.0046***	-0.0040***	**-0.0047*** **
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes
Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.1590	0.1130	0.1610	0.1600	0.1610

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 7. Key Results from Regression (Medium-Large Insurers, N=1,713,163)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	0.0116***	0.0479***	0.0111***	0.0118***	**0.0104*** **
	(0.0030)	(0.0032)	(0.0030)	(0.0030)	(0.0030)
(T2+T3)×G2	0.0352***	0.0813***	0.0346***	0.0359***	**0.0346*** **
	(0.0024)	(0.0025)	(0.0024)	(0.0024)	(0.0024)
T3×G3	0.0278***	0.0610***	0.0278***	0.0286***	**0.0279*** **
	(0.0025)	(0.0026)	(0.0024)	(0.0025)	(0.0024)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes
Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.2040	0.1320	0.2070	0.2050	0.2070

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 8. Key Results from Regression (Small Insurers, N=756,963)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	0.0010	0.0307***	-0.0011	0.0002	**-0.0015**
	(0.0045)	(0.0047)	(0.0045)	(0.0045)	(0.0045)
(T2+T3)×G2	0.0153***	0.0313***	0.0173***	0.0187***	**0.0173*****
	(0.0040)	(0.0041)	(0.0040)	(0.0040)	(0.0040)
T3×G3	0.0355***	0.0484***	0.0335***	0.0349***	**0.0336*****
	(0.0039)	(0.0041)	(0.0039)	(0.0039)	(0.0039)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes
Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.2260	0.1520	0.2370	0.2350	0.2370

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

For the three largest insurers, we also investigate the impact of reform on insurer switching for each company separately. In general, the results are consistent with those reported in Table 6, showing there are fewer customers switched into these large insurers after the reform.[19]

Dominance Level of automobile insurance line within the company

Another dimension that may result in the impact of reform on insurers to be different lies in the importance of the automobile insurance line for the specific company. We expect those companies who rely heavily on auto insurance premium to act more aggressively after the reform, resulting in more business in-flow.

To test the heterogeneity, we divide 41 companies operating in China with valid data in 2014 into two groups according to the share of automobile insurance premiums in the overall premium income.[20] The average share of automobile insurance premiums in the property/casualty business in China in 2014 was 72.24%. The first group includes 27 companies whose share of automobile insurance were higher than the industry average, and we define those as automobile insurance line being "dominant" in the company. The other group includes 14 companies whose share lies below the industry average, and we label it as the automobile insurance line being "less dominant". A list of insurance companies with their automobile insurance premium proportions in 2014 and category by automobile premium proportion are provided in Appendix Table 5.

The key regression results are presented in Table 9 and Table 10 for auto insurance dominated insurers and less dominated insurers respectively, while the corresponding complete results are provided in Appendix Table 9 and Table 10.

We find that indeed after the reform there are more policyholders switched into those companies where the

[19] PICC, Ping An and CPIC are the top three insurers in the market. The detailed regression results are available upon request.
[20] The observation from these 41 companies account for 99.88% in our sample. There were another 22 companies who either joined the market after 2014 or had missing data in China Insurance Yearbook. We also did the same analysis for these 21 companies. Due to space limitation, we didn't report it in the paper. The results are available upon request.

automobile insurance line is the dominating one within the company. For all three groups of jurisdictions implementing the reform, we observe a consistent increase in business for various fixed effect setups. In comparison, the 1st group implements the reform significantly reduce customer switch into the companies whose automobile insurance lines are less dominant. The impact of the 2nd and the 3rd group are not statistically significant.

Table 9. Key Results from Regression (Auto Insurance Dominated Insurers, N=6,864,135)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	0.0095***	0.0102***	0.0097***	0.0097***	**0.0090*** **
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
(T2+T3)×G2	0.0010***	0.0106***	0.0111***	0.0119***	**0.0112*** **
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
T3×G3	0.0081***	0.0086***	0.0078***	0.0084***	**0.0078*** **
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes
Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.2000	0.2000	0.2110	0.2110	0.2110

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 10. Key Results from Regression (Auto Insurance Less Dominated Insurers, N =454,193)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	-0.0203***	-0.0184***	-0.0197***	-0.0183***	**-0.0202*** **
	(0.0057)	(0.0057)	(0.0057)	(0.0057)	(0.0057)
(T2+T3)×G2	-0.0033	-0.0022	-0.0004	0.0007	**-0.0004**
	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)
T3×G3	0.0015	0.0025	0.0015	0.0025	**0.0016**
	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0049)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes
Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.2060	0.2040	0.2120	0.2100	0.2120

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Degree of market power within the geographic area

We further examine the heterogeneity in the impact of reform by market power within the jurisdiction prior to the reform. In specific, we calculated the HHI in 2014 for all 32 jurisdictions available in our sample, and we use the median HHI value (0.206) as the threshold to divide them into two groups. The first group includes 16

jurisdictions where the HHI are relatively high prior to the reform, and we label this group as "jurisdictions with high market power", and the second group includes16 jurisdiction where the HHI is relatively low prior to the reform, and we label this group as "jurisdictions with low market power". A list of jurisdictions with their HHI in 2014, ranking by HHI, and category by market power is included in Appendix Table 11.

The key regression results are presented in Table 11 and Table 12 for jurisdictions with low market power and high market power respectively, while the corresponding complete results are provided in Appendix Table 12 and Table 13.

We expect more insurer switching after the reform in general for all jurisdictions, however, we find that there is increased insurer switching after the reform only for the jurisdictions with low market power previously. The probability of insurer switching increased 1.5, 1.6 and 1.6 percentage points for the first, second and third group implementing the reform respectively, and these results are consistent with various fixed-effect specifications. As to jurisdictions with high market power prior to reform, we fail to witness an increase in insurer switching. In fact, the probability of insurer switching decreased by 2.9 and 0.7 percentage points for the first and third group of jurisdictions after they implemented the reform. These results suggest the market power in different jurisdictions cannot easily be removed, and it still plays an important role in impacting consumer choice.

Table 11. Key Results from Regression (Insurers in Low Market Power Jurisdictions, N=4,350,810)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	0.0179***	0.0185***	0.0152***	0.0153***	**0.0147*** **
	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
(T2+T3)×G2	0.0146***	0.0152***	0.0155***	0.0163***	**0.0156*** **
	(0.0012)	(0.0013)	(0.0012)	(0.0012)	(0.0012)
T3×G3	0.0144***	0.0150***	0.0162***	0.0170***	**0.0164*** **
	(0.0013)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes
Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.2020	0.2020	0.2110	0.2110	0.2110

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 12. Key Results from Regression (Insurers in High Market Power Jurisdictions, N=2,983,202)

	(1)	(2)	(3)	(4)	(5)
(T1+T2+T3)×G1	-0.0331***	-0.0315***	-0.0285***	-0.0271***	**-0.0287*** **
	(0.0036)	(0.0036)	(0.0035)	(0.0035)	(0.0035)
(T2+T3)×G2	0.0013	0.0020	0.0011	0.0017	**0.0010**
	(0.0021)	(0.0021)	(0.0020)	(0.0020)	(0.0020)
T3×G3	-0.0051**	-0.0046**	-0.0063***	-0.0060***	**-0.0065*** **
	(0.0021)	(0.0021)	(0.0021)	(0.0021)	(0.0021)
Person level FE	Yes	Yes	Yes	Yes	Yes
Company level FE			Yes	Yes	Yes

Area level FE	Yes	Yes		Yes	Yes
Time level FE	Yes		Yes		Yes
Year level FE		Yes		Yes	
Adjusted R^2	0.2050	0.2050	0.2240	0.2240	0.2240

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Conclusion

The rate deregulation reform during 2015-2016 is an important milestone in China's automobile insurance industry. It intended to increase competition and consumer welfare, and it is just the first step in the marketization and liberalization of the automobile insurance market in China. Given that China is the world's second-largest nonlife insurance, it is interesting to investigate the effects of the deregulation. The size of the market justifies the importance of this study.

Using a large dataset sampled from all automobile insurers operating in China, we found evidence of deregulation leading to a higher tendency of insurer switching which further suggests an increased market competition. The results are consistent with the trend of the Herfindahl-Hirschman Index over the same period. And we further analyzed the pattern of switching among different types of insurers, to test for heterogeneity as regards to the size of the insurer, the importance of auto line in the company, and the degree of market power within the geographic area.

Our results suggest there are business outflow from the large insurers to the medium and small insurers after the reform, which is consistent with the intention of promoting a more competitive market; however, our results also show business inflow after the reform for those companies whose automobile insurance business was critically important prior to the reform. Besides, contrary to our expectation, the insurer switching decreased after the reform for policyholders in jurisdictions with high market power prior to the reform. These findings indicate the company level and jurisdiction level factors are still important in shaping the market structure and consequently on consumer's choice. The liberalization reform should be deepened to further improve the competitiveness in this market.

Overall, we found evidence supporting that the liberalization reform has met its original goal of deregulation in product design and rate making, leading to diversified consumer choices and an increasing level in market competitiveness. One limitation of our study is the sampling period ends one year after the reform is fully implemented in all jurisdictions, so the long-term impact of reform on the market may not manifest fully. Future research could focus on a longer period to confirm our findings. Another interesting topic for future research is to empirically test the impact of reform on insurer's ability of underwriting, and its implication for the level of information asymmetry in this market.

Appendix

Appendix Table 1. Three Groups of Jurisdictions Implementing the Reform

Group	Timing of reform	Number of jurisdictions	List of jurisdictions
1st	June 1st, 2015	6	Heilongjiang, Shandong, Tsingtao, Guangxi, Shaanxi, Chongqing
2nd	January 1st, 2016	12	Tianjin, Inner Mongolia, Jilin, Anhui, Henan, Hubei, Hunan, Guangdong, Sichuan, Tsinghai, Ningxia, Xinjiang
3rd	July 1st, 2016	18	Beijing, Hebei, Shanxi, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Jiangxi, Hainan, Guizhou, Yunnan, Tibet, Gansu, Shenzhen, Dalian, Ningbo, Xiamen

Appendix Table 2. 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.

Appendix Table 3. Detailed Time Trend of Proportion of Policyholders Switching Insurer During the Sampling Period for Three Groups of Jurisdictions

Time	Group1	Group2	Group3
Time0A	23.09%	25.03%	24.99%
Time0B	23.31%	25.75%	25.01%
Time0C	23.60%	25.13%	25.06%
Time0D	25.43%	26.14%	26.19%
Time1	32.33%	31.86%	31.73%
Time2	32.93%	35.48%	32.80%
Time3A	29.80%	31.23%	30.89%
Time3B	33.10%	33.53%	31.88%

Appendix Table 4. Complete Regression Results (Full Sample, N=7,334,012)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0068***	-0.0082***	-0.0063***	-0.0080***	-0.0066***
Age30_39	-0.0148***	-0.0178***	-0.0138***	-0.0174***	-0.0144***
Age40_59	-0.0169***	-0.0220***	-0.0161***	-0.0217***	-0.0166***
AgeAbove60	-0.0184***	-0.0258***	-0.0177***	-0.0253***	-0.0179***
ThreeYearsNoClaim	-0.1160***	-0.1190***	-0.1120***	-0.1140***	-0.1110***
TwoYearsNoClaim	-0.1270***	-0.1300***	-0.1230***	-0.1250***	-0.1230***
OneYearNoClaim	-0.0530***	-0.0542***	-0.0491***	-0.0501***	-0.0489***
LastYearClaims1_3	-0.0117***	-0.0127***	-0.0089**	-0.0100***	-0.0090**
SeatsUnder6	0.1400***	0.1410***	0.1420***	0.1370***	0.1360***
Seats6_9	0.1150***	0.1160***	0.1180***	0.1130***	0.1130***
Seats10_36	0.0240	0.0238	0.0137	0.0078	0.0081
Truck	0.0858***	0.0858***	0.0744***	0.0679***	0.0679***
Business	-0.0257***	-0.0253***	-0.0202***	-0.0190***	-0.0194***
NonBusiness	-0.0252***	-0.0249***	0.00588***	0.0063***	0.0061***
CarAge0_2	-0.0885***	-0.0732***	-0.0923***	-0.0771***	-0.0923***
CarAge3_5	-0.0980***	-0.0876***	-0.1000***	-0.0900***	-0.100***
CarAge6_8	-0.0451***	-0.0399***	-0.0469***	-0.0416***	-0.0469***
LocalCar	-0.0567***	-0.0574***	-0.0490***	-0.0486***	-0.0480***
NonFleetCar	-0.0448***	-0.0448***	-0.0359***	-0.0358***	-0.0357***
NonNewcar	0.5060***	0.5020***	0.4980***	0.4930***	0.4970***
TraditionalSale	0.0122***	0.0122***	-0.0072***	-0.0069***	-0.0069***
DirectSale	0.0213***	0.0211***	-0.0212***	-0.0215***	-0.0213***
EcommerceSale	-0.0206***	-0.0212***	-0.0261***	-0.0265***	-0.0259***
AgentSale	0.0139***	0.0140***	0.0161***	0.0157***	0.0157***
PartTimeAgent	0.0590***	0.0592***	0.0475***	0.0478***	0.0475***
ProfessionalAgent	0.0986***	0.0986***	0.0794***	0.0796***	0.0797***
BrokerSale	0.0926***	0.0926***	0.0876***	0.0878***	0.0877***
Group1			0.0608***		
Group2			0.0565***		
Time1	-0.0259***	-0.0187***	-0.0229***	-0.0164***	-0.0225***
Time2		0.0185***		0.0177***	
(T1+T2+T3)×G1	0.0091***	0.0099***	0.0081***	0.0080***	0.0074***
T2+T3)×G2	0.0092***	0.0099***	0.0112***	0.0120***	0.0113***
T3×G3	0.0063***	0.0068***	0.0065***	0.0070***	0.0065***
Interpret	-0.0581*	-0.0643**	-0.0909***	-0.0657**	-0.0600**
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.2030	0.2030	0.2150	0.2150	0.2150

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Appendix Table 5. Categories of Insurance Companies by Size (Premium) and Dominance Level of Auto Insurance Premium (Auto Premium %)

Company Code	Company	Premium (2014)	Ranking by Premium (2014)	Category by size	Auto Premium %	Category by Auto Premium %
PICC	PICC P&C Company	252,419.50	1	Big	73.3%	1
PAIC	PingAn P&C Insurance Company of China	142,879.50	2	Big	77.4%	1
CPIC	China Pacific Property Insurance Company	92,837.33	3	Big	78.8%	1
GPIC	China Life P&C Insurance Company	40,397.42	4	Medium	86.6%	1
CICP	China Insurance Company	34,865.20	5	Medium	68.1%	2
CCIC	China Continent P&C Insurance Company	22,358.05	6	Medium	79.8%	1
YGBX	Sunshine P&C Insurance Company	21,173.41	7	Medium	77.5%	1
TPIC	Taiping General Insurance Company	13,350.28	8	Medium	81.9%	1
TAIC	TianAn Property Insurance Company	11,152.56	9	Medium	85.5%	1
HAIC	Sinosafe General Insurance Company	7,762.87	10	Medium	86.1%	1
YAIC	YongAn Property Insurance Company	6,993.97	11	Small	79.1%	1
TPBX	AXA Tianping P&C Insurance Company	6,639.55	12	Small	94.7%	1
HTIC	Huatai P&C Insurance Company	6,516.48	13	Small	55.3%	2
YDCX	Yingda Taihe Property Insurance Company	6,511.81	14	Small	53.6%	2
AICS	Alltrust Insurance Company of China	5,889.18	15	Small	70.1%	2
BOCI	Bank of China Insurance Company	5,365.24	16	Small	40.5%	2
ABIC	Anbang P&C Insurance Company	5,294.55	17	Small	90.0%	1
DBIC	Dubon Property Insurance Company	3,578.20	18	Small	87.1%	1
XDCX	Guoren P&C Insurance Company	3,516.48	19	Small	84.2%	1
ZKIC	Zking P&C Insurance Company	3,372.69	20	Small	79.0%	1
ZSIC	Zheshang P&C Insurance Company	3,293.36	21	Small	89.5%	1
AHIC	Anhua Agricultural Insurance Company	3,262.91	22	Small	45.9%	2
MACN	MinAn P&C Insurance Company	2,772.28	23	Small	83.5%	1
ACIC	Ancheng P&C Insurance Company	2,495.54	24	Small	86.3%	1
CAIC	China Chang An Property & Liability Insurance Company	2,457.31	25	Small	84.3%	1
DHIC	Dinghe Property Insurance Company	2,444.97	26	Small	57.3%	2
BPIC	Bohai Property Insurance Company	2,176.16	27	Small	87.4%	1
AMIC	Groupama-AVIC Property Insurance Company	1,525.06	28	Small	19.8%	2
TSBX	Taishan P&C Insurance Company	1,114.37	29	Small	80.7%	1

AAIC	Anxin Agricultural Insurance Company	1,109.09	30	Small	26.1%	2
JTIC	Jintai P&C Insurance Company	1,093.69	31	Small	66.8%	2
BGIC	Beibu Gulf P&C Insurance Company	911.27	32	Small	63.5%	2
SPIC	Samsung P&C Insurance Company (China)	868.36	33	Small	25.7%	2
LIHI	Liberty Insurance Company	818.14	34	Small	89.6%	1
ZMBX	China Coal Insurance Company	813.65	35	Small	72.0%	2
FPIC	Fubon P&C Insurance Company	692.54	36	Small	77.4%	1
CATH	Cathy P&C Insurance Company	547.48	37	Small	79.5%	1
HNIC	China Huanong P&C Insurance Company	526.32	38	Small	85.1%	1
CJCX	Changjiang P&C Insurance Company	506.38	39	Small	46.6%	2
CRIC	Funde P&C Insurance Company	501.29	40	Small	90.6%	1
CHAC	Champion P&C Insurance Company	486.25	41	Small	75.7%	1

Note: We ranked the insurance companies by premium income in 2014 and defined the largest three companies to be large insurers; the 4^{th} to 10^{th} companies were defined as medium-large insurers while the remaining ones were small insurers. We calculated the proportion of auto insurance premiums, i.e., auto insurance premium divided by gross insurance premium for each company. We used the average auto insurance premium proportion in 2014 (72.2%) as the threshold, and we defined those companies with higher than average auto insurance premium ratio to be auto insurance dominated company while those with lower than average ratio to be auto insurance less dominated company. The premium income and auto insurance premium in 2014 were collected from China Insurance Yearbook 2015. There were 52 companies operating in automobile insurance in 2014, and the China Insurance Yearbook included 41 companies who publicly released their data.

Appendix Table 6. Complete Regression Results (Large Insurers, N=4,863,886)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0136***	0.0303***	-0.0143***	-0.0160***	-0.0145***
Age30_39	-0.0246***	0.0330***	-0.0255***	-0.0289***	-0.0258***
Age40_59	-0.0264***	0.0287***	-0.0272***	-0.0327***	-0.0275***
AgeAbove60	-0.0200***	0.0173***	-0.0207***	-0.0286***	-0.0209***
ThreeYearsNoClaim	-0.0747***	-0.1270***	-0.0778***	-0.0810***	-0.0774***
TwoYearsNoClaim	-0.0883***	-0.1230***	-0.0911***	-0.0936***	-0.0908***
OneYearNoClaim	-0.0194***	-0.0370***	-0.0219***	-0.0234***	-0.0217***
LastYearClaims1_3	0.0045	-0.0851***	0.0027	0.0013	0.0027
SeatsUnder6	0.1300***	0.1160***	0.1410***	0.1400***	0.1400***
Seats6_9	0.1090**	0.0960**	0.1210***	0.1200***	0.1200***
Seats10_36	0.0002	0.0085	0.0180	0.0168	0.0148
Truck	0.0550**	0.0750***	0.0561**	0.0547**	0.0551**
MixUse	-0.0709***	-0.0277**	-0.0775***	-0.0748***	-0.0753***
Business	-0.0589***	-0.0613***	-0.0472***	-0.0465***	-0.0468***
NonBusiness	-0.0672***	-0.0787***	-0.0494***	-0.0490***	-0.0493***
CarAge0_2	-0.0976***	0.208***	-0.0998***	-0.0842***	-0.0999***
CarAge3_5	-0.0967***	0.120***	-0.0984***	-0.0877***	-0.0985***
CarAge6_8	-0.0434***	0.0634***	-0.0443***	-0.0388***	-0.0443***
LocalCar	0.000434	-0.0320***	0.0100***	0.0102***	0.0112***
NonFleetCar	-0.0395***	-0.0682***	-0.0446***	-0.0441***	-0.0441***
NonNewcar	0.3960***	0.3960***	0.3910***	0.3860***	0.3910***
TraditionalSale	0.0263***	-0.0577***	0.0289***	0.0289***	0.0293***
DirectSale	0.00514	-0.0465***	-0.0129	-0.0123	-0.0125
EcommerceSale	0.0128***	-0.0340***	0.0009	0.0005	0.0010
AgentSale	0.0356***	-0.0495***	0.0397***	0.0393***	0.0393***
PartTimeAgent	0.0671***	-0.0546***	0.0561***	0.0564***	0.0561***
ProfessionalAgent	0.0721***	-0.0190***	0.0691***	0.0692***	0.0693***
BrokerSale	0.0687***	-0.0610***	0.0664***	0.0664***	0.0666***
Group1			0.0283***		
Group2			0.0508***		
Time1	-0.0251***	0.0195***	-0.0249***	-0.0292***	-0.0247***
Time2		0.0712***		0.0692***	
(T1+T2+T3)×G1	0.0025*	0.0415***	0.0054***	0.0058***	0.0051***
(T2+T3)×G2	-0.0108***	0.0270***	-0.0082***	-0.0074***	-0.0082***
T3×G3	-0.0074***	0.0286***	-0.0046***	-0.0040***	-0.0047***
Interpret	-0.1160***	0.1080***	-0.1400***	-0.1290***	-0.1190***
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.1590	0.1130	0.1610	0.1600	0.1610

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Appendix Table 7. Complete Regression Results (Medium Large Insurers, N =1,713,163)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0356***	0.0260***	-0.0359***	-0.0387***	-0.0362***
Age30_39	-0.0600***	0.0233***	-0.0607***	-0.0662***	-0.0612***
Age40_59	-0.0668***	0.0150**	-0.0675***	-0.0761***	-0.0681***
AgeAbove60	-0.0544***	0.0018	-0.0556***	-0.0677***	-0.0558***
ThreeYearsNoClaim	-0.1070***	-0.1770***	-0.1070***	-0.1120***	-0.1070***
TwoYearsNoClaim	-0.1480***	-0.1920***	-0.1480***	-0.1520***	-0.1490***
OneYearNoClaim	-0.0732***	-0.0920***	-0.0732***	-0.0748***	-0.0734***
LastYearClaims1_3	-0.0119	-0.1260***	-0.0113	-0.0124	-0.0118
SeatsUnder6	0.0945	0.0524	0.1210	0.1270	0.1230
Seats6_9	0.0731	0.0198	0.1000	0.1050	0.1010
Seats10_36	0.1040	0.1260	0.1320	0.1400	0.1330
Truck	0.0752*	0.0994**	0.0942**	0.0955**	0.0946**
Business	-0.0115	-0.0143	-0.0156	-0.0133	-0.0137
NonBusiness	0.0111***	-4.4E-06	0.0113***	0.0117***	0.0114***
CarAge0_2	-0.2350***	0.1420***	-0.2360***	-0.2150***	-0.2360***
CarAge3_5	-0.2040***	0.0644***	-0.2050***	-0.1910***	-0.2050***
CarAge6_8	-0.0976***	0.0354***	-0.0982***	-0.0912***	-0.0983***
LocalCar	-0.1860***	-0.2040***	-0.1970***	-0.1970***	-0.1960***
NonFleetCar	-0.0025	-0.0064	0.0013	0.0004	0.0008
NonNewcar	0.5970***	0.5970***	0.5940***	0.5860***	0.5930***
TraditionalSale	-0.0362***	-0.1160***	-0.0320***	-0.0311***	-0.0318***
DirectSale	-0.0561***	-0.1120***	-0.0666***	-0.0665***	-0.0666***
EcommerceSale	-0.0484***	-0.0919***	-0.0502***	-0.0512***	-0.0500***
AgentSale	-0.0380***	-0.1170***	-0.0375***	-0.0370***	-0.0377***
PartTimeAgent	-0.0013	-0.0954***	-0.0106***	-0.0096***	-0.0105***
ProfessionalAgent	0.0427***	-0.0294***	0.0371***	0.0374***	0.0373***
BrokerSale	0.0192***	-0.0679***	0.0206***	0.0229***	0.0211***
Group1			0.0984***		
Group2			0.0830***		
Time1	0.0144***	0.0017	0.0148***	-0.0558***	0.0151***
Time2		0.1300***		0.1280***	
(T1+T2+T3)×G1	0.0116***	0.0479***	0.0111***	0.0118***	0.0104***
(T2+T3)×G2	0.0352***	0.0813***	0.0346***	0.0359***	0.0346***
T3×G3	0.0278***	0.0610***	0.0278***	0.0286***	0.0279***
Interpret	0.1880**	0.5250***	0.1350	0.1650*	0.1750**
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.2040	0.1320	0.2070	0.2050	0.2070

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Appendix Table 8. Complete Regression Results (Small Insurers, N =756,963)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0176***	0.0486***	-0.0210***	-0.0242***	-0.0208***
Age30_39	-0.0542***	0.0329***	-0.0572***	-0.0637***	-0.0571***
Age40_59	-0.0710***	0.0128	-0.0734***	-0.0838***	-0.0733***
AgeAbove60	-0.0482***	0.0101	-0.0505***	-0.0647***	-0.0502***
ThreeYearsNoClaim	-0.0983***	-0.1520***	-0.1040***	-0.1090***	-0.1030***
TwoYearsNoClaim	-0.1380***	-0.1670***	-0.1430***	-0.1470***	-0.1420***
OneYearNoClaim	-0.0682***	-0.0743***	-0.0715***	-0.0737***	-0.0712***
LastYearClaims1_3	-0.0203	-0.1220***	-0.0235	-0.0253	-0.0235
SeatsUnder6	0.3880***	0.3280**	0.4160***	0.3730***	0.3750***
Seats6_9	0.3830***	0.3320**	0.4030***	0.3610***	0.3640***
Seats10_36	0.2200	0.2550	0.2050	0.1690	0.1790
Truck	0.2230***	0.2310***	0.2420***	0.1860***	0.1890***
Business	0.0088	0.0173	0.0080	0.0110	0.0100
NonBusiness	0.0336***	0.0596***	0.0304***	0.0303***	0.0305***
CarAge0_2	-0.2070***	0.1670***	-0.2080***	-0.1840***	-0.2080***
CarAge3_5	-0.2020***	0.0662***	-0.2040***	-0.1870***	-0.2040***
CarAge6_8	-0.1020***	0.0320***	-0.1030***	-0.0947***	-0.1030***
LocalCar	-0.0179**	-0.0285***	-0.0224***	-0.0206**	-0.0193**
NonFleetCar	-0.0968***	-0.1030***	-0.0924***	-0.0902***	-0.0917***
NonNewcar	0.6570***	0.6570***	0.6570***	0.6460***	0.6570***
TraditionalSale	-0.0592***	-0.1160***	-0.0668***	-0.0678***	-0.0670***
DirectSale	-0.0330***	-0.0874***	-0.0199***	-0.0223***	-0.0201***
EcommerceSale	-0.1160***	-0.1570***	-0.1070***	-0.1100***	-0.1070***
AgentSale	-0.0464***	-0.1060***	-0.0579***	-0.0594***	-0.0584***
PartTimeAgent	-0.0109***	-0.1160***	-0.0232***	-0.0228***	-0.0232***
ProfessionalAgent	0.0197***	-0.0378***	0.0107***	0.0108***	0.0108***
BrokerSale	0.0629***	-0.0047	0.0696***	0.0700***	0.0694***
Group1			0.2720***		
Group2			0.1060***		
Time1	-0.0082**	-0.0101***	-0.0035	-0.0497***	-0.0031
Time2		0.1120***		0.1010***	
(T1+T2+T3)×G1	0.0010	0.0307***	-0.0011	0.0002	-0.0015
(T2+T3)×G2	0.0153***	0.0313***	0.0173***	0.0187***	0.0173***
T3×G3	0.0355***	0.0484***	0.0335***	0.0349***	0.0336***
Interpret	-0.1650	0.2480*	-0.2500*	-0.1420	-0.1420
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.2260	0.1520	0.2370	0.2350	0.2370

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Appendix Table 9. Complete Regression Results (Auto Insurance Dominated Insurers, N=6,864,135)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0086***	-0.0101***	-0.0079***	-0.0096***	-0.0082***
Age30_39	-0.0170***	-0.0200***	-0.0158***	-0.0194***	-0.0163***
Age40_59	-0.0180***	-0.0232***	-0.0171***	-0.0227***	-0.0176***
AgeAbove60	-0.0205***	-0.0280***	-0.0195***	-0.0273***	-0.0198***
ThreeYearsNoClaim	-0.1130***	-0.1160***	-0.1090***	-0.1120***	-0.1090***
TwoYearsNoClaim	-0.1250***	-0.1280***	-0.1210***	-0.1230***	-0.1210***
OneYearNoClaim	-0.0496***	-0.0509***	-0.0457***	-0.0468***	-0.0455***
LastYearClaims1_3	-0.0102***	-0.0112***	-0.0072*	-0.0083**	-0.0073*
SeatsUnder6	0.1440***	0.1450***	0.1600***	0.1550***	0.1540***
Seats6_9	0.1230***	0.1240***	0.1420***	0.1380***	0.1370***
Seats10_36	0.0490	0.0481	0.0590	0.0520	0.0531
Truck	0.0904***	0.0905***	0.0867***	0.0805***	0.0804***
Business	-0.0466***	-0.0462***	-0.0285***	-0.0273***	-0.0277***
NonBusiness	-0.0298***	-0.0295***	0.0053**	0.0057**	0.0055**
CarAge0_2	-0.0926***	-0.0772***	-0.0970***	-0.0815***	-0.0970***
CarAge3_5	-0.1000***	-0.0895***	-0.1030***	-0.0925***	-0.1030***
CarAge6_8	-0.0453***	-0.0399***	-0.0474***	-0.0420***	-0.0473***
LocalCar	-0.0573***	-0.0578***	-0.0493***	-0.0491***	-0.0486***
NonFleetCar	-0.0500***	-0.0501***	-0.0379***	-0.0377***	-0.0376***
NonNewcar	0.4940***	0.4890***	0.4850***	0.4810***	0.4850***
TraditionalSale	0.0118***	0.0119***	-0.0044***	-0.0042***	-0.0041***
DirectSale	0.0574***	0.0576***	-0.0047	-0.0048	-0.0049
EcommerceSale	-0.0186***	-0.0193***	-0.0248***	-0.0251***	-0.0245***
AgentSale	0.0123***	0.0124***	0.0186***	0.0183***	0.0182***
PartTimeAgent	0.0612***	0.0615***	0.0503***	0.0507***	0.0504***
ProfessionalAgent	0.0908***	0.0908***	0.0770***	0.0773***	0.0773***
BrokerSale	0.0865***	0.0866***	0.0836***	0.0837***	0.0837***
Group1			0.0567***		
Group2			0.0556***		
Time1	-0.0252***	-0.0211***	-0.0231***	-0.0190***	-0.0227***
Time2		0.0303***		0.0291***	
(T1+T2+T3)×G1	0.0095***	0.0102***	0.0097***	0.0097***	0.0090***
(T2+T3)×G2	0.0099***	0.0106***	0.0111***	0.0119***	0.0112***
T3×G3	0.0081***	0.0086***	0.0078***	0.0084***	0.0078***
Interpret	-0.0530*	-0.0603*	-0.1040***	-0.0808**	-0.0739**
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.2000	0.2000	0.2110	0.2110	0.2110

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Appendix Table 10. Complete Regression Results (Auto Insurance Less Dominated Insurers, N=454,193)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0580***	-0.0601***	-0.0595***	-0.0616***	-0.0595***
Age30_39	-0.0895***	-0.0944***	-0.0920***	-0.0970***	-0.0921***
Age40_59	-0.1130***	-0.1200***	-0.1150***	-0.1220***	-0.1150***
AgeAbove60	-0.0691***	-0.0796***	-0.0707***	-0.0815***	-0.0710***
ThreeYearsNoClaim	-0.0647***	-0.0696***	-0.0680***	-0.0730***	-0.0680***
TwoYearsNoClaim	-0.1080***	-0.1120***	-0.1120***	-0.1150***	-0.1120***
OneYearNoClaim	-0.0602***	-0.0621***	-0.0633***	-0.0654***	-0.0635***
LastYearClaims1_3	-0.0203	-0.0217	-0.0232	-0.0249	-0.0235
SeatsUnder6	0.2220	0.2260	0.1870	0.1980	0.1930
Seats6_9	0.1160	0.1140	0.0772	0.0826	0.0834
Seats10_36	-0.2890	-0.2680	-0.3270	-0.3000	-0.3210
Truck	0.1090	0.1050	0.1240	0.1280	0.1320
Business	0.0481**	0.0485**	0.0288	0.0300	0.0295
NonBusiness	0.0075	0.0075	0.0060	0.0060	0.0060
CarAge0_2	-0.2010***	-0.1820***	-0.2020***	-0.1820***	-0.2020***
CarAge3_5	-0.1810***	-0.1670***	-0.1810***	-0.1670***	-0.1810***
CarAge6_8	-0.0902***	-0.0834***	-0.0899***	-0.0832***	-0.0900***
LocalCar	-0.1220***	-0.1260***	-0.1240***	-0.1230***	-0.1190***
NonFleetCar	-0.0441**	-0.0432**	-0.0410**	-0.0401**	-0.0410**
NonNewcar	0.4710***	0.4630***	0.4680***	0.4600***	0.4680***
TraditionalSale	0.0300***	0.0288***	0.0266***	0.0255***	0.0267***
DirectSale	-0.0166***	-0.0175***	-0.0165***	-0.0174***	-0.0164***
EcommerceSale	0.0072*	0.0059	0.0033	0.0019	0.0033
AgentSale	0.0133***	0.0114***	0.0060*	0.0040	0.0059*
PartTimeAgent	0.0024	0.0017	0.0022	0.0018	0.0026
ProfessionalAgent	0.0787***	0.0774***	0.0693***	0.0679***	0.0694***
BrokerSale	0.0776***	0.0775***	0.0789***	0.0789***	0.0790***
Group1			0.2740***		
Group2			0.0523		
Time1	0.0273***	-0.0582***	0.0282***	-0.0592***	
Time2		0.1150***		0.1160***	
(T1+T2+T3)×G1	-0.0203***	-0.0184***	-0.0197***	-0.0183***	-0.0202***
(T2+T3)×G2	-0.0033	-0.0022	-0.0004	0.0007	-0.0004
T3×G3	0.0015	0.0025	0.0015	0.0025	0.0016
Interpret	0.0723	0.0727	0.0610	0.1040	0.1040
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.2060	0.2040	0.2120	0.2100	0.2120

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Appendix Table 11. Market Power Category of Jurisdictions by HHI

Reform Group	Jurisdiction	HHI	Ranking by HHI	Market Power Category by HHI
1	Qingdao	0.1341	1	Low
2	Henan	0.1601	2	Low
1	Shandong	0.1615	3	Low
3	Zhejiang	0.1657	4	Low
2	Hunan	0.1822	5	Low
2	Sichuan	0.1833	6	Low
3	Shanxi	0.1840	7	Low
2	Tianjin	0.1841	8	Low
2	Inner Mongolia	0.1854	9	Low
2	Guangdong	0.1870	10	Low
3	Yunnan	0.1916	11	Low
2	Hubei	0.1971	12	Low
1	Shaanxi	0.1995	13	Low
1	Guangxi	0.2003	14	Low
3	Guizhou	0.2015	15	Low
1	Chongqing	0.2040	16	Low
3	Hebei	0.2082	17	High
3	Jiangxi	0.2120	18	High
3	Gansu	0.2128	19	High
2	Jilin	0.2174	20	High
2	Anhui	0.2201	21	High
3	Jiangsu	0.2334	22	High
3	Fujian	0.2342	23	High
3	Hainan	0.2354	24	High
2	Xinjiang	0.2354	25	High
3	Dalian	0.2460	26	High
1	Heilongjiang	0.2569	27	High
3	Liaoning	0.2672	28	High
3	Xiamen	0.2693	29	High
2	Qinghai	0.3150	30	High
2	Ningxia	0.4263	31	High
3	Tibet	0.5110	32	High

Appendix Table 12. Complete Regression Results (Insurers in Low Market Power Jurisdictions, N=4,350,810)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0081***	-0.0096***	-0.0073***	-0.0091***	-0.0076***
Age30_39	-0.0178***	-0.0210***	-0.0165***	-0.0202***	-0.0170***
Age40_59	-0.0200***	-0.0254***	-0.0189***	-0.0248***	-0.0193***
AgeAbove60	-0.0195***	-0.0274***	-0.0178***	-0.0262***	-0.0182***
ThreeYearsNoClaim	-0.1130***	-0.1170***	-0.1090***	-0.1120***	-0.1090***
TwoYearsNoClaim	-0.1260***	-0.1290***	-0.1220***	-0.1240***	-0.1220***
OneYearNoClaim	-0.0498***	-0.0509***	-0.0456***	-0.0467***	-0.0455***
LastYearClaims1_3	-0.0051	-0.0060	-0.0021	-0.0030	-0.0021
SeatsUnder6	0.1690***	0.1700***	0.1700***	0.1660***	0.1650***
Seats6_9	0.1370***	0.1380***	0.1410***	0.1370***	0.1360***
Seats10_36	-0.0883	-0.0864	-0.1010	-0.1070	-0.1090
Truck	0.1060***	0.1060***	0.0939***	0.0886***	0.0885***
Business	-0.0201***	-0.0199***	-0.0174**	-0.0173**	-0.0174**
NonBusiness	-0.0289***	-0.0286***	-0.0027	-0.0023	-0.0026
CarAge0_2	-0.1010***	-0.0841***	-0.1030***	-0.0866***	-0.1030***
CarAge3_5	-0.1090***	-0.0975***	-0.110***	-0.0989***	-0.110***
CarAge6_8	-0.0504***	-0.0447***	-0.0513***	-0.0456***	-0.0513***
LocalCar	-0.0494***	-0.0505***	-0.0437***	-0.0427***	-0.0415***
NonFleetCar	-0.0668***	-0.0670***	-0.0522***	-0.0521***	-0.0519***
NonNewcar	0.5150***	0.5100***	0.5090***	0.5040***	0.5090***
TraditionalSale	-0.0004	-0.0003	-0.0173***	-0.0171***	-0.0171***
DirectSale	0.0151***	0.0149***	-0.0173***	-0.0176***	-0.0174***
EcommerceSale	-0.0305***	-0.0310***	-0.0369***	-0.0372***	-0.0367***
AgentSale	-0.0019**	-0.00176**	-0.0003	-0.0003	-0.0004
PartTimeAgent	0.0417***	0.0420***	0.0308***	0.0311***	0.0308***
ProfessionalAgent	0.0878***	0.0879***	0.0717***	0.0720***	0.0719***
BrokerSale	0.0813***	0.0814***	0.0764***	0.0766***	0.0765***
Group1			0.0685***		
Group2			0.0793***		
Time1	-0.0261***	-0.0180***	-0.0241***	-0.0150***	-0.0239***
Time2		0.0223***		0.0213***	
(T1+T2+T3)×G1	0.0179***	0.0185***	0.0152***	0.0153***	0.0147***
(T2+T3)×G2	0.0146***	0.0152***	0.0155***	0.0163***	0.0156***
T3×G3	0.0144***	0.0150***	0.0162***	0.0170***	0.0164***
Interpret	-0.0573	-0.0640*	-0.120***	-0.0744**	-0.0678*
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.202	0.202	0.211	0.211	0.211

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Appendix Table 13. Complete Regression Results (Insurers in High Market Power Jurisdictions, N=2,983,202)

	(1)	(2)	(3)	(4)	(5)
Age25_29	-0.0062***	-0.0075***	-0.0059***	-0.0073***	-0.0060***
Age30_39	-0.0123***	-0.0151***	-0.0119***	-0.0149***	-0.0122***
Age40_59	-0.0145***	-0.0191***	-0.0141***	-0.0189***	-0.0144***
AgeAbove60	-0.0188***	-0.0255***	-0.0193***	-0.0259***	-0.0194***
ThreeYearsNoClaim	-0.1220***	-0.1250***	-0.1180***	-0.1210***	-0.1180***
TwoYearsNoClaim	-0.1330***	-0.1360***	-0.1300***	-0.1320***	-0.1300***
OneYearNoClaim	-0.0636***	-0.0650***	-0.0597***	-0.0610***	-0.0596***
LastYearClaims1_3	-0.0289***	-0.0300***	-0.0264***	-0.0276***	-0.0264***
SeatsUnder6	0.0641	0.0644	0.0638	0.0633	0.0630
Seats6_9	0.0452	0.0452	0.0432	0.0428	0.0429
Seats10_36	0.2170	0.2130	0.1960	0.1930	0.1970
Truck	0.0415	0.0410	0.0338	0.0321	0.0326
Business	-0.0384***	-0.0378***	-0.0272***	-0.0253***	-0.0259***
NonBusiness	-0.0196***	-0.0194***	0.0192***	0.0194***	0.0192***
CarAge0_2	-0.0709***	-0.0574***	-0.0773***	-0.0641***	-0.0773***
CarAge3_5	-0.0823***	-0.0731***	-0.0866***	-0.0776***	-0.0865***
CarAge6_8	-0.0373***	-0.0328***	-0.0407***	-0.0361***	-0.0405***
LocalCar	-0.0716***	-0.0715***	-0.0537***	-0.0562***	-0.0564***
NonFleetCar	-0.0336***	-0.0334***	-0.0273***	-0.0268***	-0.0270***
NonNewcar	0.4950***	0.4910***	0.4810***	0.4770***	0.4810***
TraditionalSale	0.0280***	0.0281***	0.0089***	0.0091***	0.0092***
DirectSale	0.0231***	0.0228***	-0.0375***	-0.0377***	-0.0374***
EcommerceSale	-0.0080***	-0.0088***	-0.0116***	-0.0122***	-0.0115***
AgentSale	0.0340***	0.0339***	0.0375***	0.0371***	0.0372***
PartTimeAgent	0.0796***	0.0799***	0.0671***	0.0674***	0.0671***
ProfessionalAgent	0.1100***	0.1100***	0.0854***	0.0854***	0.0856***
BrokerSale	0.1060***	0.1060***	0.1050***	0.1050***	0.1050***
Group1			0.0956***		
Group2			0.0519***		
Time1	-0.0258***	-0.0204***	-0.0218***	-0.0195***	-0.0217***
Time2		0.0122***		0.0133***	
(T1+T2+T3)×G1	-0.0331***	-0.0315***	-0.0285***	-0.0271***	-0.0287***
(T2+T3)×G2	0.0013	0.0020	0.0011	0.0017	0.0010
T3×G3	-0.0051**	-0.0046**	-0.0063***	-0.0060***	-0.0065***
Interpret	0.0084	0.0037	-0.0069	0.0031	0.0073
Fixed Effect	Person, Area, Time	Person, Area, Year	Person, Company, Time	Person, Company, Area, Year	Person, Company, Area, Time
Adjusted R^2	0.205	0.205	0.224	0.224	0.224

Note: The dependent variable is a dummy variable indicating the current insurer of the policyholder is different from the one in the previous year. Standard errors are shown in parentheses.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

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