BIG DATA: Big Benefits and Big Challenges

Data Challenges in Underwriting Model Development for China's Auto Business

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Agenda

- Fast Growing Market

- China P&C Insurance Market Overview

- Rating Products for Auto Insurance

- Business Environment & Challenges in Current Markets

- China Auto Insurance Products' Characteristics

- A Data Cleansing Example for Rating Plan Development

- Q&A

China P&C Insurance Market Overview

- As of 12/2012, there are a total 62 P&C insurance companies in China, of which 41 companies are Chinese owned and 21 are foreign owned.

- The total market share of the 20 foreign companies is only 1.2% with a total premium of 6.7 billion RMB ($1.1 billion US dollars).

- In 2012, the top 3 P&C companies, PICC, Ping An, and CPIC, have a total of 66% market share.

P&C Product Distribution, 2011

	Company	Premium (RMB Billion)	Annual Growth, %	Market Share, %
1	People Insurance Company of China	193.0	11.3	34.9
2	Ping An Property	98.8	18.5	17.9
3	China Pacific Property	69.6	12.9	12.6
4	China United Property	24.6	17.2	4.4
5	China Life P&C	23.5	43.6	4.3
6	China Continent P&C	17.9	10.1	3.2
7	Sunshine Property	14.7	10.1	2.7
8	Sinosure	14.3	39.3	2.6
9	Tian An	8.1	3.9	1.5
10	Taiping	7.8	33.9	1.4
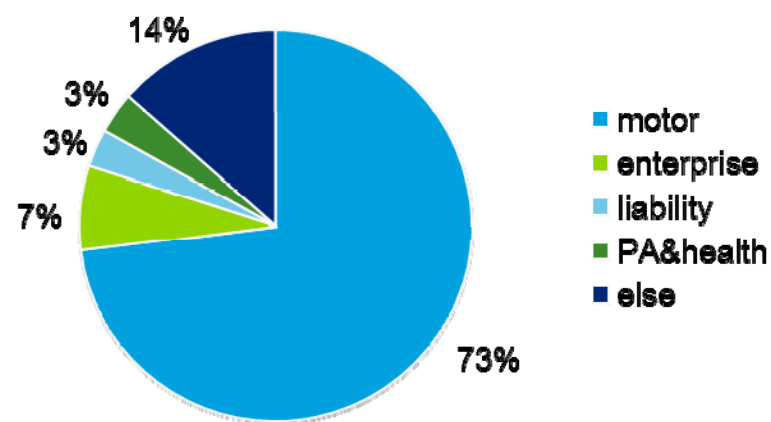
- Auto insurance has been the main growth engine for the China P&C insurance market. As of 2012, Auto insurance accounts for 73% of the total market, about $57 billion US dollars.

- **$1 US Dollar = 6.2 RMB**

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Rating Products for Auto Insurance

- **Compulsory Third Party Liability Insurance**

  o Provides minimum liability coverage required by law. It covers BI with indemnity for death, medical expense, and property damage. No automobiles can be operated on the road without it.

  o The same limits ($122K RMB limit for BI&PD&MP Staggered) are applied for all kinds of vehicles, both private and non-private.

  o The premium is regulated. Premium is differed by vehicle types with no territory differentiations at all.

  o Overall, the industry compulsory insurance has suffered UW loss in the last two years due to an increasing severity trend, but the performance varies widely by region due to the loss cost differentiations of fatal accident by poor regions Vs. rich regions.

- **Voluntary Auto Insurance**

  o Covering both third party liability and physical damages

  o In the current China's auto insurance market, there are 4 government approved rating plans, which are similar to each other.

  o There are two parts in each of the 4 rating plans:

    ❑ Base rating tables - By Coverage

    ❑ Regulated discount rules – All Coverage Combined. The maximum allowed discount is typically 30% with some variation by risk and by region.

Business Environment & Challenges in Current Markets

Challenges of the current China Auto insurance market:

- External Economic Impacts：
  - Slower growth of global economy
  - Double-digit growth no longer an easy task for China
  - Growth of automobile sales in China slowing down

- Possibilities of changes in pricing:
  - Maintain the current basic pricing, but gradually lower the regulatory bottom line
  - Allow a few company to develop their own pricing, but all other companies follow the same basic pricing and regulatory bottom line
  - Enforce a unified pricing in the market

- Challenges faced by Chinese insurance industry, especially in risk selection and pricing for risks：
  - Loss cost keeps increasing. The current practice of pricing along with the regulatory bottom line is no longer working
  - Risk selection and risk pricing in insurance business become more important due to higher risk and lower profit of investment

- Since the rating product is regulated and unchangeable, applying underwriting modeling for risk segmentation and underwriting pricing is getting more and more popular in the current auto insurance industry

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Business Environment & Challenges in Current Markets- Cont.

- **In China, each vehicle may have two policies, one is for a compulsory liability coverage, one is for voluntary insurance**
  - o The two policies could have different effective date. That creates difficulties for product management, especially for non-private accounts which could have large number of vehicles.
  - o For a given policy, policy number is changed in each renew. To link the history of a vehicle, vehicle id must be used as a key field.
  - o Frequently, it is difficult to decide customer keys to link all policies to corresponding customers
- **Insufficient driver information:**
  - o In new business sales, especially the sales are from a brokerage channel, driver information is frequently not available.
  - o Driver age and gender are not used as base rating variables, they are only used as discounting variables with very flat discount factors (see next slide)
  - o Marital status is never used for either rating or underwriting
- **Vehicle symbol is not valid for either physical damage or liability**
- **Territory rating is not sufficient**
  - o Current territory rating is only by province

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Business Environment & Challenges in Current Markets- Cont.

Current Driver Related Factors in the Rating Table in China for personal vehicle:

	Gender	Years of Driving	Driver's Age				
			< 25	[25, 30)	[30, 40)	[40, 50)	≥ 50
Factor (F12)	Male	≤ 1	0.99	0.97	0.95	0.95	0.99
		(1, 5]	0.97	0.95	0.93	0.93	0.97
		> 5	0.95	0.93	0.91	0.91	0.95
	Female	≤ 1	0.98	0.96	0.94	0.94	0.98
		(1, 5]	0.96	0.94	0.92	0.92	0.96
		> 5	0.94	0.92	0.90	0.90	0.94

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China Auto Insurance Products' Characteristics

Internal Data Vs. External Data:

- The powerful external data resources frequently used in US auto rating and underwriting, such as credit data, demographic data, Carfax data, weather data and etc. are not available in China.

- There are two industry data bases:

  o Industry Vehicle Type Database

    ❑ Using make-model as key field

    ❑ Linked fields including new car value, car weight, number of seats, engine power, etc.

  o Regulated Accident Reporting Platform (similar to MVR in US)

    ❑ A major data source for rate discount

    ❑ On vehicle basis, not on driver basis

    ❑ The platform effective dates were differed by province between 2010 and 2012. The claim frequency was decreased after the platform was effective, but the claim severity was increased.

    ❑ Separated by Compulsory Third Party Liability Insurance Vs. Voluntary Insurance

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A Data Cleansing Example for Rating Plan Development

- **Data Issues:**

  o Issue 1 : Inadequacy of case reserve

    ❑ The liability limits of both compulsory liability coverage and voluntary liability coverage are very low, the liability claims are closed fast

    ❑ In most of the companies in China, case studies are not regularly performed as in US, it's common that case reserve of open claims are inadequate. It's hard to perform an open claim loss development which is a routine for generating ultimate losses in a predictive modeling project.

  o Issue 2 : Different loss pattern - before Vs. after the regulatory claim reporting platform was effected.

- **Analysis:**

  o In 1/12012-6/30/2012, the regulatory claim reporting platform is effective in all the provinces

  o The percentage of policies which are effective in 1/12012-6/30/2012 and associate with an open claim is low.

  o The data of 1/12012-6/30/2012 after cleansing is credible for the Rating Plan Development project
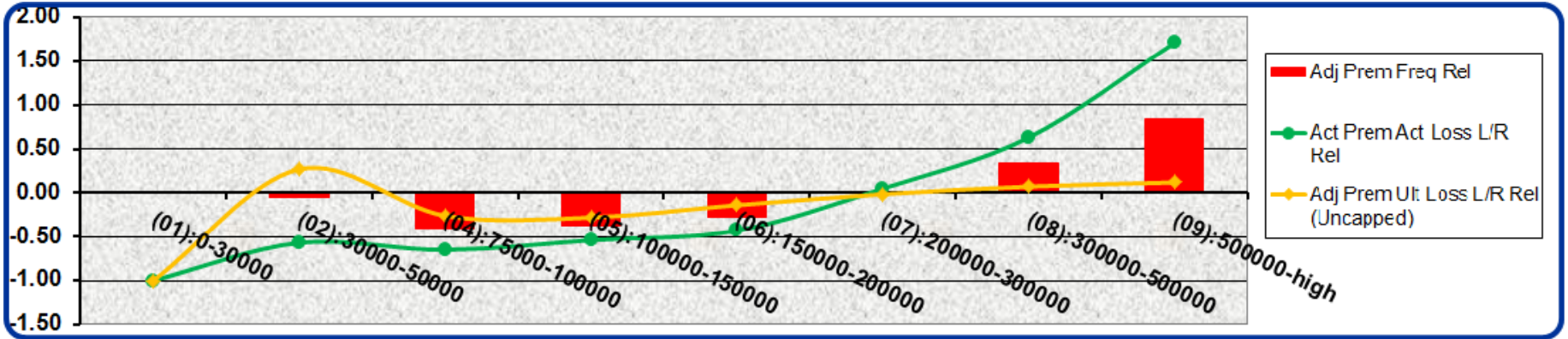
- **Solution:**

  o Only keep the data records with effective date within 1/12012-6/30/2012, and no open claim associated.
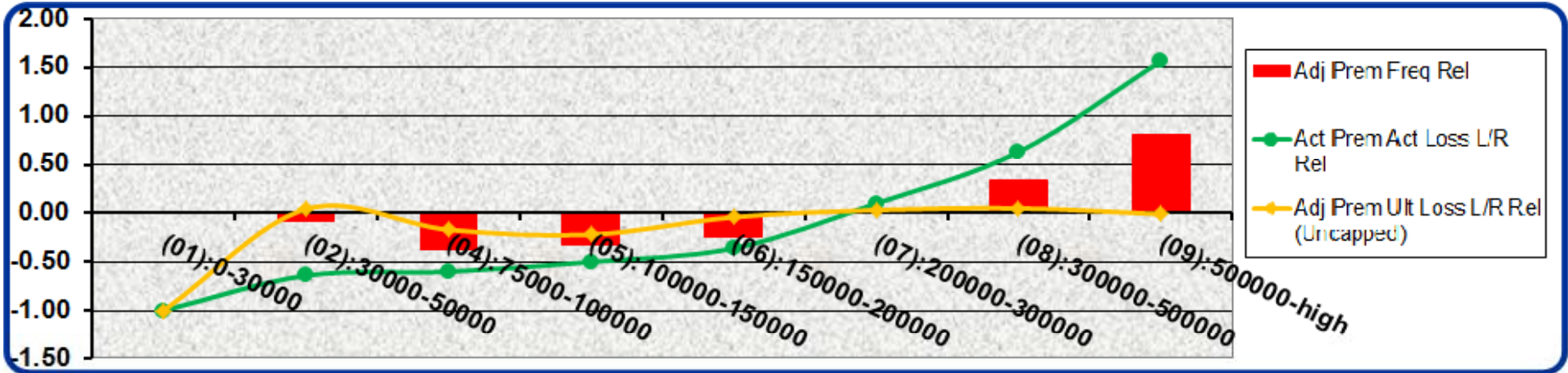
A Data Cleansing Example for Rating Plan Development– Cont.

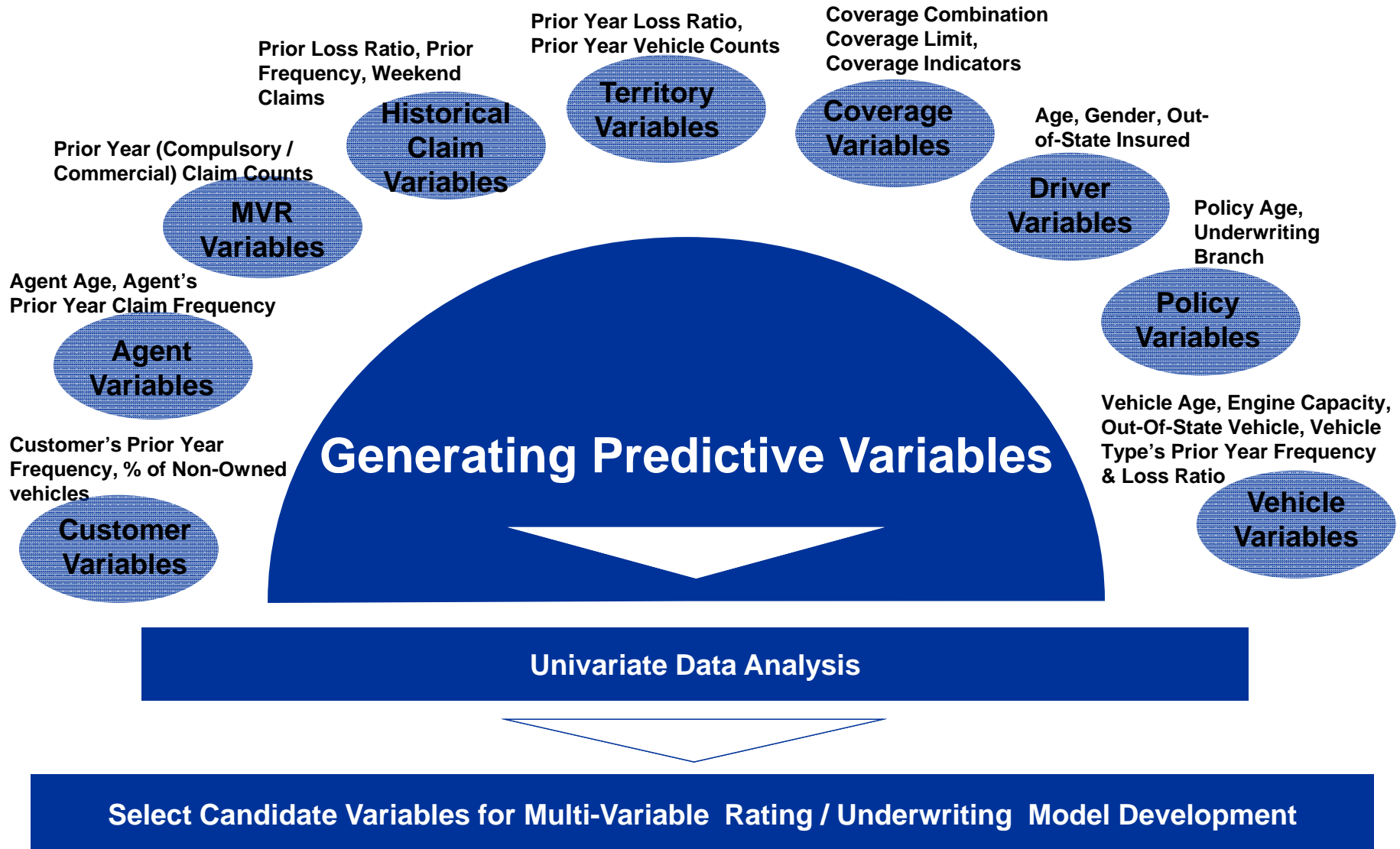## Validation Using Univariate Analysis example: Coverage Limit

Before Data Cleansing

After Data Cleansing

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Variables Created with the Data Challenges

Prior Year Loss Ratio,
Prior Year Vehicle Counts

Coverage Combination
Coverage Limit,
Coverage Indicators

Prior Loss Ratio, Prior
Frequency, Weekend
Claims

**Territory
Variables**

**Historical
Claim
Variables**

**Coverage
Variables**

Age, Gender, Out-
of-State Insured

Prior Year (Compulsory /
Commercial) Claim Counts

**MVR
Variables**

**Driver
Variables**

Policy Age,
Underwriting
Branch

Agent Age, Agent's
Prior Year Claim Frequency

**Agent
Variables**

**Policy
Variables**

Generating Predictive Variables

Customer's Prior Year
Frequency, % of Non-Owned
vehicles

Vehicle Age, Engine Capacity,
Out-Of-State Vehicle, Vehicle
Type's Prior Year Frequency
& Loss Ratio

**Customer
Variables**

**Vehicle
Variables**

Univariate Data Analysis

Select Candidate Variables for Multi-Variable Rating / Underwriting Model Development

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Q&A