An empirical study of Ping An Insurance's Listing in G-SIIs

------Based on the ISWCM Model and CoVaR Model

Abstract: In the subprime mortgage crisis triggered by the global financial crisis in 2008,the Lehman Brothers filed for bankruptcy protection, Merrill Lynch was owned to the Bank of America, AIG was surrounded by the crisis .This series of unexpected events in the world shocked all the countries and therefore they paied more attention to financial stability .Strengthening supervision of financial institutions has become the consensus of all countries in the world. How to correctly understand and evaluate the global systemically important financial institutions and then take regulatory measures to avoid the impact of possible unstable financial system have become an important issue for the financial industry of all countries.

Firstly,this paper will make a detailed introduction about the concept of global systemically important financial institutions and its evaluation mechanisms . Then an empirical study on the cause of listing in G-SIIs about Ping An Group[1] in China as the only one company in emerging countries,are maked.The main method is index quantification method (IQM method).In the method,We will firstly select insurance institutions which are representative ,internationally well-known and ranked before Ping An Group from the top five hundred enterprises in 2011 .Then we make quantitative scores according to the different weights of importance provided by IAIS from the selected insurance institutions .At the same time, establishing a quantitative CoVar theory model to calculated. Ultimately, throughing the two methods above reveal the reason why Ping An group can be selected and other international well-known insurance agency failed to be selected. Also, revealing the profound meaning of the concept of global systemically importance .On this basis, putting forward related suggestions. Also,the research has the guiding significance for the steady development of insurance market.

Keywords: G-SIIs ; Indicator-based assessment approach ; ISWCM model; CoVaR model

---

catalogue

An empirical study of Ping An Insurance's Listing in G-SIIs

------Based on the ISWCM Model and CoVaR Model

The financial crisis breaking out in 2008 impacted the global financial industry seriously to shock the financial market violently and maul entity economies in various countries heavily. The banking and insurance industry suffered great losses in the so-called most serious financial crisis since big crisis in the twentieth century, with more and more risks arising thereof spreading continuously to impact and destroy the global financial system seriously.According to statistics, there were 24 commercial banks going bankrupt in 2008 subsequently. Fannie Mae, Freddie Mac, American International Group and other financial institutions were taken over by the government in succession. Lehman Brothers closed down, causing a great sensation. The share price of several investment banks plummeted. Citigroup, the largest bank in America, faced a drop of 60% of its share price within one week[1] .These "huge and sustainable" organizations as bantered have their unique influence in their development scale and relevance to the other organizations. How to ensure these financial giants to develop stably and reduce their systematic risks is an important content for globally financial regulatory reform.

In April 2009, central banks and financial regulator departments of major countries in the world established Financial Stability Board (FSB) in Bank for International Settlements. FSB is responsible for enhancing the monitoring of global systematically important financial institutions, financial tools and financial markets with the systematic importance[2]. On the G-20 Summit of November 2011, "Policy Methods to Regulate Global Systematically Important Financial Institutions" by FSB was officially announced, in which the concept of "global systematically important financial institutions" is raised. Global systematically important financial institutions or G-SIFIs refer to financial institutions with global characteristics and playing a key role in the financial market. Once major risks or operation failures happen to these institutions, it would exert a great influence on the global financial system and economy, or might even cause systematic risk. Global systematically important insurers (G-SIIs) are an important part of G-SIFIs. Driven by the development trend of the global insurance industry, International Association of Insurance Supervisors (IAIS) formulated "Global Systematically Important Insurers: Proposed Assessment Methodology" according to the suggestions of FSB and G-20. Later, on July 18, 2013, "Global Systematically Important Insurers: Preliminary Evaluation Methodology"[1]and "Global Systematically Important Insurers: Policy Measures" were issued. FSB analyzed and measured the business data of relevant insurance institutions in the late 2011. On July 19, 2013, the first batch of nine global systematically important insurers was announced, of which Ping An Insurance was the only enlisted insurance institution of the emerging countries.

In the traditional sense, insurers are not regarded as core financial institutions which can bring systematic risks (Trainar, 2004) [3]. Even if insurers are regarded as the last insurers of the global insurance market and have a highly concentrated business, they are still attributed to the source of the systematic risks for financial institutions (Group of Thirty, 1997) .Robert P. Hartwig, President of Insurance Information Institute, even said that, after the financial crisis, 'Insurers beat bankers as risk managers.' However, with the deepening of economic globalization and financial integration, financial risks are more and more contagious between different countries, industries and departments. The insurance and banking industry have slight risk difference. Although insurance industry plays a role to diversify risks for financial stabilization, risks for both are mutually-influential caused by frequent trading of financial derivatives and mutually-penetrating markets of both. Once one party faces risks, the other party can't spare itself. In 2008, the root cause for the heavy blow dealt to AIG was not insurance business but the large number of Credit Default Swaps (CDSs) that its subsidiary, AIGFP, issued. Through CDs, the credit risks were

---

[1]In this paper，it is referred to as the assessment method for short.

spread from the banking industry to the insurance industry.

Considering insurance industry plays a greater role for financial stability and economic security, it is important to evaluate the systematically important insurance companies in the world scientifically. Ping An Group selected as Top Nine Global Systematically Important Insurance Companies for the First Session (the unique elected company in Asia and among the developing countries) is beyond expectations of many specialists and scholars. It is really incredible. So the significance of this paper is that: theoretically, application research on criteria for global systematically important insurance companies is to enrich the theoretical framework of systematically important financial institutions further. Besides, it is to reveal the reason to select Ping An Insurance by comparing with insurance companies in world's top five hundred to have deep understanding of systematic importance and provide theoretical basis for evaluating domestic systematically important financial institutions and regulatory practices in the future. Practically, it is to track and compare main sources for systematic importance of various insurance companies by calculating via index method as well as to find out potential ones to become systematically important insurance companies. Insurance companies can find out their shortages as per index differences, from which they can refer to good examples and find out development ideas and direction. In the meantime, this is of great practical significance to maintain international insurance industry steadily and the whole financial system functioning healthily.

二、 Research Methods

This paper will adopt two systems to evaluate systematic importance. One is ISWCM model calculation based on index evaluating method as mentioned in Global Systematically Important Insurers: Proposed Assessment Methodology established by IAIS. Another one is CoVaR model calculation to understand systematically important financial institutions from the perspective of risk contribution made to the whole financial system by a single financial institution on the basis of risk management model in financial market.

1、 Index Evaluation Method

（1）、 This method is similar to that Basel Commission uses to evaluate G-SIB. It is to evaluate systematic importance multi-dimensionally targeted at the evaluated object and simplify interrelations. The special structure and business of insurance companies are reflected in selecting, grouping and weight arrangement of evaluation index[4] (See table 1).The index system includes five categories of indexes, and 18 items of detailed indexes. The five categories of indexes can be divided into scale, global activeness, correlation, untraditional/non-insurance business and substitutability. The five categories of indexes focus on different aspects. The business of insurers which might easily cause systematic risks is concentrated in untraditional/non-insurance business. Index of the category is endowed with a high weight. Correlation and untraditional/non-insurance business account for 40%~50% and 30%~40%, respectively; while scale and global activeness account for 10%, respectively. Besides, the above percentage is further evenly distributed according to the number of detailed indexes[5].

Table 1

Weights given to each category and individualindicator*Category*	*Categoryweighting*	*Individual indicator*	*Indicatorweighting[for2011 data]*
Size	5%	Total assets	2.5%
		Total revenues	2.5%
Global activity	5%	Revenues derived outside of homecountry	2.5%
		Numberof countries	2.5%
Interconnectedness	40%	Intra-financial assets	5.7%
		Intra-financial liabilities	5.7%
		Reinsurance	5.7%
		Derivatives	5.7%
		Large exposures	5.7%
		Turnover	5.7%
		Level 3 assets	5.7%
Non-traditionalinsurance and non-insurance activities	45%	Non-policy holder liabilities and non-insurance revenues	6.4%
		Derivatives trading	6.4%
		Short term funding	6.4%
		Financial guarantees	6.4%
		Minimum guarantee onvariable insurance products	6.4%
		Intra-group commitments	6.4%
		Liability liquidity	6.4%
Substitutability	5%	Premiumsfor specific businesslines	5%

Data sources:IAIS, *Global Systemically Important Insurers:Initial Assessment Methodology.*，2013 P13-15.

2、The CoVar Model Method

This paper utilizes data from stock market to measure the overflow effect of financial institutions collapsing on the whole financial system to calculate the contribution of systematic risks to financial institutions[1].
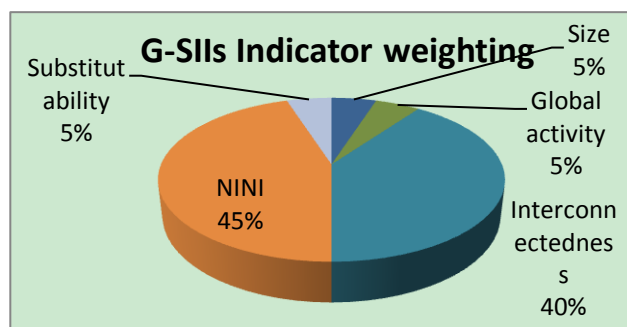
三、The empirical study of Ping An Insurance's Listing in G-SIIs

（一）、The analysis of Index evaluation method

Considering that the first G-SIIs LIST released by FSB is based on evaluation and listing as per year-end data

---

[1] There will be detailed about CoVaR model behind,so it is not repeated here.

in 2011 of 50 insurance companies selected from 14 countries (regions) globally [1].This paper will, by selecting internationally-famous insurance companies listed before Ping An Insurance among world's top five hundred in 2011 not selected as G-SIIs to compare, sets models to calculate systematic importance as per different weights arrangement of indexes(See blow graph). Thus it is to quantify to explain why Ping An Insurance is selected as G-SIIs.

G-SIIs Indicator weighting

	Weight
Size	5%
Global activity	5%
Interconnectedness	40%
NINI	45%
Substitut ability	5%

According to the selection criteria above, those insurance companies followed are selected:

Insurance institutions	Nippon Life Insurance	Zurich Financial Services Group	AEGON	China Life	Ping An Group
Influence power	Nippon Life Insurance company had once ranked the third in the world(the first in Asian) at total income in life insurance industry. It is also the one of the world's top life-insurance company.	One of the world's ten largest financial insurance group.	One of the largest listed life insurance group in the world.	China's largest life insurance group, the world's largest listed insurance companies on market value.	It is the first joint-stock insurance company in China and has already developed into a financial group.
The world's top five hundred ranking	81	102	112	113	328

Data sources: the world top five hundred enterprises ranking in 2011and the enterprise website data

---

[1] The non home premium income exceeds the 5% of total premium income with total assets of 60 billion above ; When the non home premium income are less than 5% of total assets ,the total assets should be more than 200 billion. In addition, IAIS also add some insurance institutions according to the judge of regulators.

1、ISWCM (Calculation of Indicator Scoring Weight) Model Construction

In the Global Systemically Important Insurers: Initial Assessment Methodology , selection criteria and calculation method are introduced .[1]According to these standards and measurement methods ,ISWCM model can be constructed.

Nippon Life Insurance is expressed by'n' ;　　Zurich Financial Services Group is expressed by'z';

AEGON is expressed by'a' ;　　China Life is expressed by'c' ;　　Ping An Group is expressed by'p';

'W' express weight ; 'x' express one or other insurance institution ; 'y'express one or other indicator;

't' express some time .

The variable name	Meaning	The variable name	Meaning
SIZE	size	LTA	Level 3 assets
TAS	Total assets	NAN	Non-policy holder liabilities and non-insurance revenues
TRS	Total revenues	DT	Derivatives trading
RDC	Revenues derived outside of homecountry	STF	Short term funding
NOC	Numberof countries	FG	Financial guarantees
IFA	Intra-financial assets	MGD	Minimum guarantee onvariable insurance products
IFL	Intra-financial liabilities	IGC	Intra-group commitments
RSA	Reinsurance	LIP	Liability liquidity
DVT	Derivatives	SIC	Systematical importance score
LE	Large exposures		
TO	Turnover		

$$SICxt= \left\{ \left(Wy \cdot \frac{TASxt}{\sum TASxt}\right) + \left(Wy \cdot \frac{TRSxt}{\sum TRSxt}\right)\right\}_{size} + \left\{ \left(Wy \cdot \frac{RDCxt}{\sum RDCxt}\right) + \right.$$

$$\left. \left(Wy \cdot \frac{NOCxt}{\sum NOCxt}\right)\right\}_{global\ activity} + \left\{ \left(Wy \cdot \frac{IFAxt}{\sum IFAxt}\right) + \left(Wy \cdot \frac{IFLxt}{\sum IFLxt}\right) + \right.$$

$$\left(Wy \cdot \frac{RSAxt}{\sum RSAxt}\right) + \left(Wy \cdot \frac{DVTxt}{\sum DVTxt}\right) + \left(Wy \cdot \frac{LExt}{\sum LExt}\right) + \left(Wy \cdot \frac{TOxt}{\sum TOxt}\right)$$

$$\left. + \left(Wy \cdot \frac{LTAxt}{\sum LTAxt}\right)\right\}_{inter\ connectedness} + \left\{ \left(Wy \cdot \frac{NANxt}{\sum NANxt}\right) + \left(Wy \cdot \frac{DTxt}{\sum DTxt}\right) + \right.$$

$$\left(Wy \cdot \frac{STFxt}{\sum STFxt}\right) + \left(Wy \cdot \frac{FGxt}{\sum FGxt}\right) + \left(Wy \cdot \frac{MGPxt}{\sum MGPxt}\right) + \left(Wy \cdot\right.$$

---

[1]The way in which insurance companies calculate G-SIIs is: first to calculate the score of each corresponding indicator, then multiple this score with the weight of each indicator and calculate the sum.
The score of each indicator equals to the ratio between the corresponding value of the insurance companies' such indicator and the sum of this indicator in all sample insurance companies.

$$IGCxt\big/{\textstyle\sum} IGCxt\big) + （Wy \cdot LIPxt\big/{\textstyle\sum} LIPxt\big)\}_{\text{non-traditional}} + \{（Wy \cdot PFBxt\big/{\textstyle\sum} PFBxt\big)\}_{\text{Substitutability}}$$

3、 The calculation of systematical importance of all insurance institutions

Since the data IAIS used in this evaluation came from the end of 2011[6], this calculation has also referred to the financial data of each optional insurance agency at the end of 2011[1]. To take China Ping An as an example in the following passages, carry out quantitative measurement on systemic importance according to the ISWCM model[2]:

$$
\begin{aligned}
SIC_{p\ 2011} = &\ \{（0.025\times TAS\,p2011\big/{\textstyle\sum} TASp2011）+（0.025\times TRS\,p2011\big/{\textstyle\sum} TRSp2011）\}_{\text{size}} + \\
&\ \{（0.025\times RDCp2011\big/{\textstyle\sum} RDCp2011）+（0.025\times NOCp2011\big/{\textstyle\sum} NOCxt）\}_{\text{globalactivity}} + \\
&\ \{（0.057\times IFAp2011\big/{\textstyle\sum} IFAp2011）+（0.057\times IFLp2011\big/{\textstyle\sum} IFLp2011）+ \\
&\ （0.057\times RSAp2011\big/{\textstyle\sum} RSAp2011）+（0.057\times DVTp2011\big/{\textstyle\sum} DVTp2011）+（0.057 \cdot \\
&\ LEp2011\big/{\textstyle\sum} LEp2011）+（0.057\cdot TOp2011\big/{\textstyle\sum} TOp2011）+（0.057\cdot LTAp2011\big/{\textstyle\sum} LTAp2011）\} \\
&\ {}_{\text{inter connectedness}} + \{（0.064\times NANp2011\big/{\textstyle\sum} NANp2011）+（0.064\times DTp2011\big/{\textstyle\sum} DTp2011）+ \\
&\ （0.064\times STFp2011\big/{\textstyle\sum} STFp2011）+（0.064\times FGp2011\big/{\textstyle\sum} FGp2011）+ \\
&\ （0.064\times MGPp2011\big/{\textstyle\sum} MGPp2011）+（0.064\times IGCp2011\big/{\textstyle\sum} IGCp2011）+ \\
&\ （0.064\times LIPp2011\big/{\textstyle\sum} LIPp2011）\}_{\text{non-traditional}} + \{（0.05\times PFBp2011\big/{\textstyle\sum} PFBp2011）\}_{\text{Substitutability}}
\end{aligned}
$$

Through the calculation, we can obtain the scores of globally systemical importance of all insurance institutions (see Table 3).

---

[1] As a result of the inconsistent statistical scope of the financial data in each country, adjustments were firstly made at the time of adopting data.

[2] The insurance agencies chosen by this article were all listed companies which are more strictly monitored and can disclose major events in a timely and accurate manner. There exist no big differences among them and this indicator is ruled out at calculation.

Table 3　　The globally systemic importance of all insurance institutions[1]

Insurance institutions	Size	Global activity	Interconnectedness	Non-traditional insurance and non-insurance activities	Substitutability	The total scores of Systemical importance	Sorting
Ping An group	0.007924665	0.001190476	0.056490586	0.064196001	0.0091	0.138901731	1
Nippon Life Insurance	0.015342842	0.003571429	0.051970232	0.053420078	0.007754	0.132058286	2
Zurich Financial Services Group	0.008795429	0.013095238	0.072059589	0.02335419	0.014431	0.131735013	3
AEGON	0.009413597	0.006547619	0.05707195	0.041113585	0.012658	0.126804827	4
China Life	0.008523466	0.000595238	0.047407643	0.009916146	0.006058	0.072500142	5

4、The analysis of scores about the systemical importance of all insurance institutions

From the above table, it can be seen that the score of Ping An Insurance is the highest in terms of its global systematically importance among the international famous insurers. Thus, undoubtedly, Ping An overtakes the other international famous "World's Top 500" insurers, and gets enlisted as one of G-SIIs. The ranking of "World's Top 500" is mainly based on sales revenues; while the ranking of G-SIIs focus on more factors and systematic influence. With the deepening of economic globalization, many giants in "World's Top 500" will be developed into multinationals to seek diversified development. Such a trend will impose an important influence on global economic development and financial stability, and connect corporate scale with systematic importance. The first batch of insurers enlisted as G-SIIs are all insurers in the top of "World's Top 500." For example, Axa (No. 14) is the global largest insurer; Alianz (No. 27) is the largest European insurer; Generali Group ranks No. 33; AIG ranks No. 44; AVIVA ranks No. 64. However, those in the top of "World's Top 500" might not get listed in G-SIIs, such as Nisay Group (No. 18), ZURN (No. 102), AEG (No. 112) and China Life Insurance (No. 113). All the above companies have ranked far ahead of Ping An (No. 328), but they fail to get enlisted, because the listing of G-SIIs takes some more in-depth reasons into consideration. A correct understanding of the global systematically

---

[1] In statistical calculation of specific indicators, the RMB exchange rate against the dollar by 6.3009 in December 30, 2011, the RMB exchange rate against the euro by 8.1625 in December 30 ,2011.

Because the statistic caliber of financial data between difficient countries is inconsistent, there may be bias when using data.

importance can be achieved from the perspective of evaluation indexes.

（1）、Size

There is a high coincidence between the scale and the other indexes. In order to avoid repetition, IAIS does not pay great attention to the index setting of scale. Though the scale merit of the selected insurance enterprises is all higher than that of Ping An Insurance, none of them are the important insurance agencies in the system (See below graph).

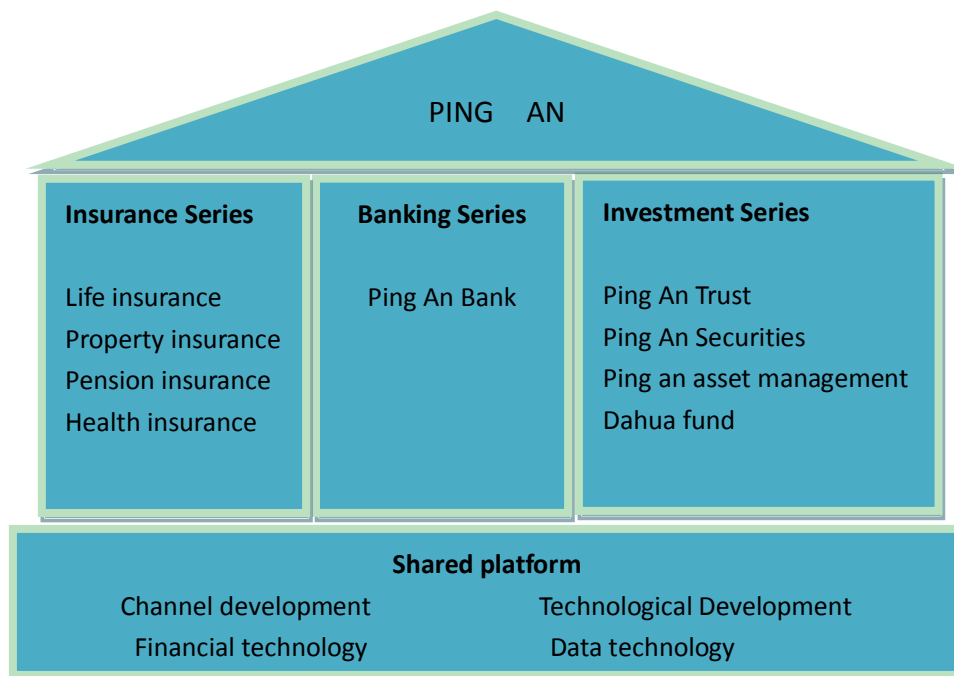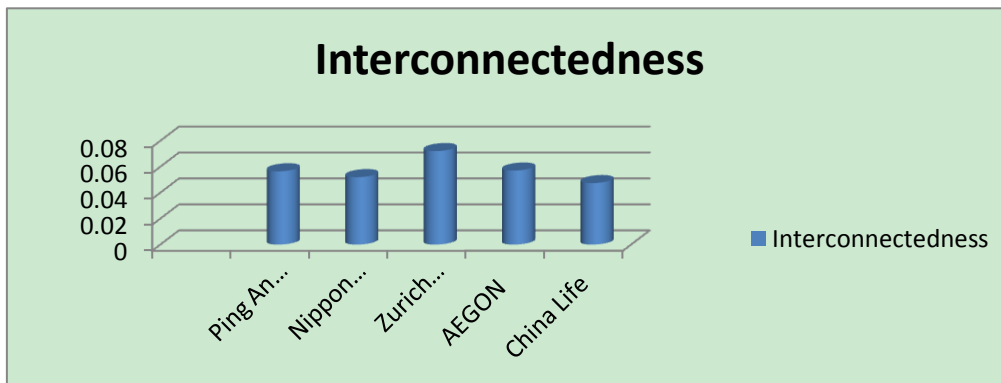**SIZE**
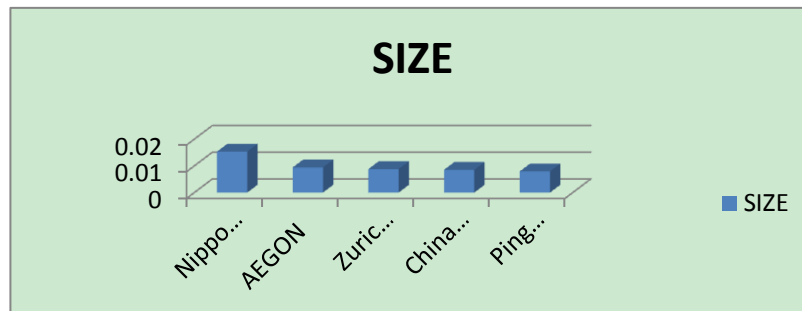
（2）、Global activity

The index evaluates insurers' global activeness from two dimensions, namely total income obtained from countries excluding the parent country, and the number of countries (excluding the parent country) distributed with insurers' branches or subsidiaries. The index measurement of internationally famous insurance agencies obtains a significantly higher score. However, Ping An Insurance and China Life Insurance obtains the lowest score, which suggests that the overseas market share of the domestic insurance companies is relatively low and their international business expansion ability calls for improvement(See below graph).

（3）、Interconnectedness

Against the backdrop of separate operation, after the 1970s, with the liberalization of finance, relaxation of financial regulation and rapid development of information and technology, the financial structure has undergone dramatic changes; the boundary between various insurers and securities or trust institutions has been blurred; the financial functions tend to converge; different markets start integrating with each other, thus increasing the correlation between them. These indexes can better reflect the influence that insurance suffers from the financial system. Therefore, these indexes have been given a high weight. Among the Chinese counterparts, Ping An Insurance obtains a relatively higher score（See blow graph）, which is benefited from Ping An Insurance's strategy of making itself into a comprehensive financial service groups providing diversified financial services,

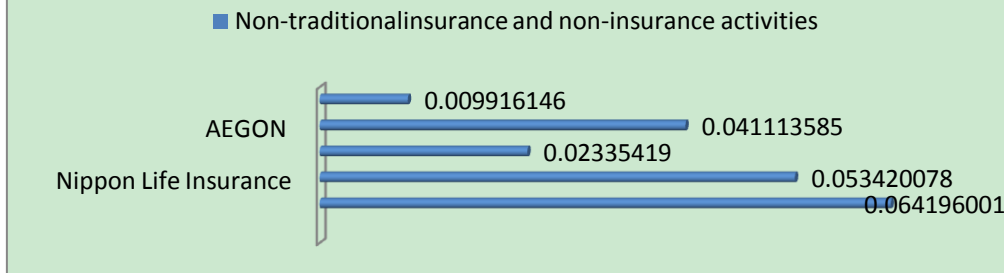including insurance, banking, securities and trust, with insurance at its core .

Interconnectedness

PING AN

Insurance Series	Banking Series	Investment Series
Life insurance Property insurance Pension insurance Health insurance	Ping An Bank	Ping An Trust Ping An Securities Ping an asset management Dahua fund

Shared platform

Channel development   Technological Development

Financial technology   Data technology

Source: Ping An official website

Ping an organization structure

（4）、Non-traditionalinsurance and non-insurance activities

Compared with insurers specializing in traditional business, those engaged in untraditional insurance business or non-insurance business (such as financial guarantee, CDS, derivative trading and variable annuity) are relatively fragile. Once influenced by the development of the financial market, they might generate or expand their systematic risks[7].Considering the non-traditional and non-insurance business is the major business which might cause the systematic risks, the index weight is set as 45%. Since there is a high percentage of business services of Ping An Insurance concentrating in this two fields, its index score is the highest. This is the major reason why it can be successfully selected in the G-SIIs.

Non-traditionalinsurance and non-insurance activities

■ Non-traditionalinsurance and non-insurance activities

AEGON — 0.009916146 / 0.041113585

Nippon Life Insurance — 0.02335419 / 0.053420078 / 0.064196001

（5）、Substitutability

Due to the high similarity between various insurance businesses, the score of substitutability shows no significant difference. Moreover, the substitutability is low in terms of its weight, so it is not of vital importance of the evaluation system.

5、Through the **SPSS 22.0 software**, carrying on the analysis of bivariate correlation can deduce the data set, as follows:

Correlations

		Size	Globalactivity	Interconnectedness	NINI	Substitutability	Systemicalimportance
Size	Pearson Correlation	1	-.063	-.265	.319	-.266	.235
	Sig. (2-tailed)		.920	.667	.600	.665	.704
	N	5	5	5	5	5	5
Globalactivity	Pearson Correlation	-.063	1	.917*	-.249	.905*	.408
	Sig. (2-tailed)	.920		.028	.686	.035	.495
	N	5	5	5	5	5	5
Interconnectedness	Pearson Correlation	-.265	.917*	1	-.051	.905*	.559
	Sig. (2-tailed)	.667	.028		.935	.035	.327
	N	5	5	5	5	5	5
NINI	Pearson Correlation	.319	-.249	-.051	1	-.014	.781
	Sig. (2-tailed)	.600	.686	.935		.983	.119
	N	5	5	5	5	5	5

Substitutability	Pearson Correlation	-.266	.905[*]	.905[*]	-.014	1	.567
	Sig. (2-tailed)	.665	.035	.035	.983		.319
	N	5	5	5	5	5	5
Systemical importance	Pearson Correlation	.235	.408	.559	.781	.567	1
	Sig. (2-tailed)	.704	.495	.327	.119	.319	
	N	5	5	5	5	5	5

*. Correlation is significant at the 0.05 level (2-tailed).

From the table above , non-traditional and non-insurance business index has the highest correlation with the systemic importance .Its correlation coefficient is 0.781 and the other is 0.235, 0.559, 0.408, 0.567 respectively.Those furtherly verify the aforementioned result that the main renson of Ping An Insurance listed in G-SIIs is that it has a large number of business services in non-traditional and non-insurance .

（二）、The analysis of systematic importance of the system based on CoVaR model

1、CoVaR model overview

Among the traditional methods to measure the market risks, VaR (Value at Risk) is a prevailing one, but its focus is on the risks of a single financial institution. Based on the old VaR model, Adrian and Brunnermeier (2009) established a new VaR model reflecting the risk overflow relationship between financial institutions, which is called the CoVaR model[8].

This paper utilizes data from stock market to measure the overflow effect of financial institutions collapsing on the whole financial system to calculate the contribution of systematic risks to financial institutions.

(1)、Systemical importance analysis based on CoVaR model

In the basic VaR model, VaR can be defined as q's quantile and can be expressed as Pr (X＜VaR)=q, of which X stands for a random variable about the assets lose of financial institutions during the holding period of Δt ."1-q" stand for the confidence level.

According to Adrian and Brunnermeier, CoVaR can be definied as the VaR of the agency "i" when the unconditional VaR of the agency "j" is given. Therefore, $CoVaR_q^{ij}$ can be defined by the quantile q of the conditional probability distribution:

$$Pr(\ X^j \leq CoVaR_q^{ij} \mid X_q^i = VaR^i) = q \quad （3.1）$$

$CoVaR_q^{ij}$ stands for the total VaR of the agency "i," which includes the unconditional VaR and the overflown VaR. In order to more authentically reflect the influence of the "j" agency's risk event on the "i" agency's risk overflowing value, the overflown VaR is defined as $\Delta CoVaR_q^{ij}$:

$$\Delta CoVaR_q^{ij} = CoVaR^{i|j} － VaR^j \quad （3.2）$$

This paper employs quantile regression method to measure the value of CoVaR and established the following "q" quantile regression model:

$$R_q^i = \alpha + \beta R^j + \varepsilon \quad （3.3）$$

Where, R^i and R^j respectively sands for the return series of agency "i" and "j;" R_q^i for the predicted value of excess earnings of the agency "i" under the "q" quantile. VaR can be directly defined as:

$$VaR_q^i | R^j = \hat{R}_q^i \quad （3.3）$$

The above equation means the predicted earnings value of the agency "i" with the agency "j" as the basis can be obtained through the quantile regression. The VaR of R^j can be worked out based on the above conditions. By conducting the parameter estimation of the regression equation through the quantile regress, $\hat{\alpha}$ and $\hat{\beta}$, the estimated value of the parameters, can be obtained. Based on that, the estimated value of VaR is worked out.

$$Va\hat{R}_q^i = \hat{\alpha} + \hat{\beta} R^j \quad （3.4）$$

Based on the above equation and the quantile regression framework, the measurement of CoVaR can be simply defined as:

$$CoVaR_q^{ij} = Vaj_q^i | VaR_q^i = \hat{\alpha} + \hat{\beta} VaR_q^i \quad （3.5）$$

Using the equation above can get the value of CoVaR, then $\Delta CoVaR_q^{ij}$ can be obtained according to (3.2).

2、 The analysis of systematic importance of the system based on CoVaR model

The listed share earnings data of the five international famous insurers chosen above are adopted as the analysis samples[1]. The quantile regression method is employed to measure the value of CoVaR so as to study the contribution of various insurers to systematic risks.

In order to simplify the model operation so as to more clearly and theoretically measure the systematic importance through the CoVaR model. The earning is defined as:

$$R_t = 100\% * \ln(r_t / \sum r) \quad （3.7）$$

Where, "rt" stands for the earnings per share of the insurer in the year "t."

Since the risk overflow effect is two-way, the risk overflow effect on the single insurer when the whole insurance financial system is stuck in risks, and the risk overflow effect on the whole insurance financial system when the single insurer is stuck in risks are considered. This paper assumes the risk overflow effect when the confidence coefficient is 95%. Take Ping An Insurance for example. The quantile regression model is established:

$$R_{0.05}^p = \hat{\alpha}^{p/bx} + \hat{\beta}^{p/bx} R_{0.05}^{bx}$$

---

[1]Because Nippon Life Insurance was listed in 2010 and lacked sufficient stock data, it will not be considered here.

$$\mathrm{R}_{0.05}^{\mathrm{bx}} = \hat{\alpha}^{\,\mathrm{bx/p}} + \hat{\beta}^{\,\mathrm{bx/p}}\mathrm{R}_{0.05}^{\mathrm{p}}$$

$$\mathrm{VaR}_{0.05}^{\mathrm{bx}} = \hat{\alpha}^{\,\mathrm{bx/p}} + \hat{\beta}^{\,\mathrm{bx/p}}\mathrm{R}_{0.05}^{\mathrm{p}}$$

$$\mathrm{CoVaR}_{0.05}^{\mathrm{p/bx}} = \hat{\alpha}^{\,\mathrm{p/bx}} + \hat{\beta}^{\,\mathrm{p/bx}}\mathrm{VaR}_{0.05}^{\mathrm{bx}}$$

Where, "p" stands for "Ping An Insurance;" "bx" stands for the whole insurance share.

According to the Ping An and insurance industry overall rate of return data of stock, using **SPSS22.0 software** makes quantile regression analysis and we can get the results of $\hat{\alpha}^{\,\mathrm{p/bx}}$=-2.25075, $\hat{\beta}^{\,\mathrm{p/bx}}$=3.37272, $\hat{\alpha}^{\,\mathrm{bx/p}}$=1.56265、$\hat{\beta}^{\,\mathrm{bx/p}}$=1.1268.

We substitute the resulting parameters above into the quantile regression model and hypothetically calculate the minimum income risk value as a non conditional value at risk. with 0.05 quantile selected. So $\mathrm{R}_{0.05}^{\mathrm{p}}$=2.31561 and then we can get $\mathrm{VaR}_{0.05}^{\mathrm{bx}}$=-4.2735、$\mathrm{CoVaR}_{0.05}^{\mathrm{p/bx}}$=-6.5274、$\Delta\mathrm{CoVaR}_{0.05}^{\mathrm{p/bx}}$=-1.35299. Simultaneously, we can get the value of risk spillover effects about other insurance companies (See Table 4).

Table 4   **The Value of　Risk Spillover Effects**

	Ping An Group	**ZurichFinancial Services Group**	**AEGON**	**China Life**
$\mathrm{CoVaR}_{0.05}^{\mathrm{ij}}$	-6.5274	-6.3832	-5.4712	-4.1394
$\Delta\mathrm{CoVaR}_{0.05}^{\mathrm{ij}}$	-1.3529	-1.2168	-0.8495	-0.3929

According to the table blow, we can see clearly that under the conditions of confidence level of 95% ,Ping An's value of ΔCoVaR is the most remarkable and make the highest contribution to the systemic risk of insurance market. From the CoVaR model perspective, Ping An Group's Global systemically important institution of insurance status is verificated again.

四、 Conclusions and Revelation

In 2009, IMF's survey into G20 showed that most member countries did not have a legal or official definition about what institutions are systematically important[9]. While evaluating factors of systematic importance, most regulatory authorities in various countries think that scale is the most important factor for the division of system importance (IMF fetal., 2009). However, the lesson offered by the international financial crisis was that "The insurers engaged in untraditional and non-insurance business and connected with the other institutions rather than the largest insurers are attributed for the crisis and the spread of the crisis." [10] Apart from the index of scale and global activeness, the score of China Ping An is high in terms of the other three indexes. Besides, China Ping An is a leading Chinese comprehensive financial group which provides diversified financial products and services, and an insurer with the highest internationalization and diversification in China. The subsidiaries of China Ping An cover various fields of the financial industry, including life insurance, industrial insurance, pension, health insurance, banking, securities, trust and funds. In terms of untraditional business, China Ping An has developed diversified businesses, including Lufax, Asia Miles, auto market, house market, payment and mobile social contact and business ports. Due to its important role in both aspects, China Ping An becomes the only insurer from the emerging markets and the developing countries to be enlisted inn G-SIIs.

The empirical analysis of reasons why China Ping An got listed in G-SIIs can deepen the understanding of

the concept of "systematic importance," and can offer some references for the amendment of G-SIIs evaluation methods, and the annual evaluation of G-SIIs by IAIS, and how to better monitor insurers with systematic importance. It is essential to scientifically set evaluation standards for insurers with systematic importance. If the monitoring scope is too broad, the risk monitoring might be too general, thus reducing the monitoring efficiency. However, if the monitoring scope is too narrow, it will pose a threat to the macro financial stability[11]. Thus, reasonable and scientific evaluation is important to the enhancement of the cross-industry business monitoring of insurers with systematic importance, the establishment of the risk isolation mechanism and the prevention of the cross-market risk transfer and infection.

China Ping An was the only Chinese insurer enlisted in the first batch of nine G-SIIs by FSB in 2013. However, with the improvement of Chinese comprehensive national strength and economic influence, Chinese insurance industry will make greater strides. Then, more and more China-invested comprehensive insurers will impose an increasingly influence on the international insurance field. With the development of Chinese insurance industry and the deepening of reform and opening up, Chinese insurers are doomed to march into the international market. Chances are high that more and more Chinese insurers will be listed as G-SIIs. This means both a challenge and opportunity to Chinese insurance industry. It is imperative for Chinese insurers to refer to the monitoring measures and framework of the relevant international monitoring institutions about insurers with systematic importance. Only in this way can Chinese insurers with systematic importance be better monitored.

Reference

[1]Yang Xia. The role of the insurance industry in the country's financial stability---Thinking of the insurance industry in Post Crisis Era [J]. Insurance Research ,2010,02:31-36.

[2]Ba Shu song,Gao Jiang jian. Evaluate systemically important banks in China based on index evaluation method. [J]. Research on financial and economic issues,2012,09:48-56.

[3]Trainar, P. , 2004, Insurance and Financial Stability, Financial Stability Review, No.5, Banquede France,73- 89.

[4] IAIS, Global Systemically Important Insurers :Initial Assessment Methodology , www.iais web,org , 18 July 2013.

[5] FSB,Global systemically important insurers (G一SIIs) and the policy measures that will apply to them, www . financial stability board. org , 18 July2013.

[6]FSB .Effective Resolution of Systemically Important Financial Institutions: Recommendations and Timelines[R] .Financial Stability Board, 2011.

[7]Acharya,Pedersen, Philippon and M Richardson. "Measuring Systemic Risk"[R]. Working Paper, NYU Stern School,2010, 1-30.

[8]Adrian and Brunnermeier. "CoVaR"[R]. Working Papers,Federal Reserve Bank of New York ,2009,6-19.

[9]Elliott,D. J. , Robert, E. L. "Identifying and Regulating Systemically Important Financial Institutions: The Risks of Under and Over Identification and Regulation "[R]. Brookings Working Paper, 2011.

[10]Tarashev,Borio and Tsatsaronis. "Attributing Systemic Risk to Individual Institutions"[R]. BIS working Papers 2010 (5) : 308-321.

[11]Nier,Yang, Yorulmazer and Alentorn. "Network Models and Financial Stability" [R]. Working Paper, Bank of England, 2008 (346) :12-15.