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EVALUATION OF CHINESE AGRICULTURAL INSURANCE: THE PERSPECTIVE OF RISK PROTECTION

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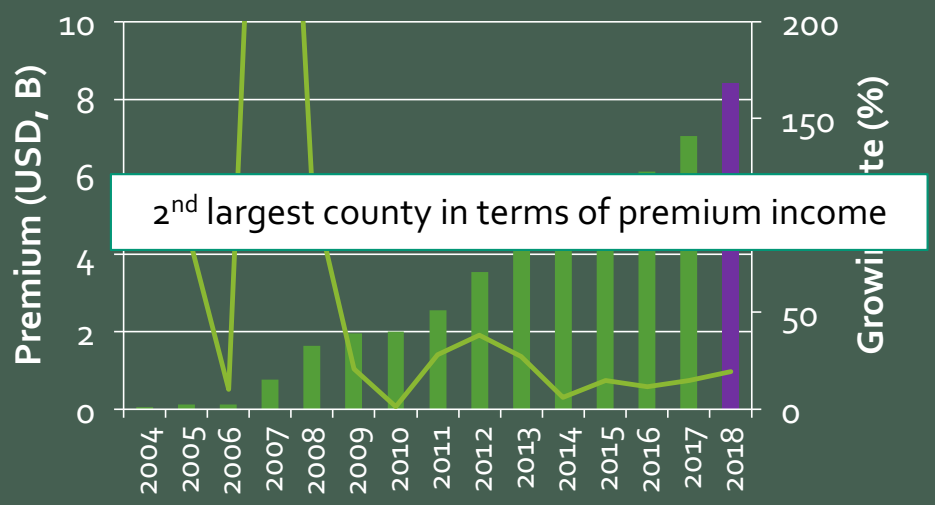
BACKGROUND & MOTIVATION

- **Rapid development in past decade**

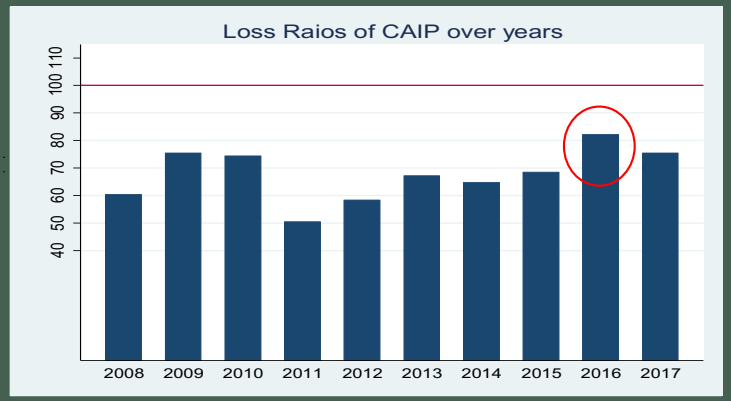
The Premium of CAIP in past decade, in USD



2nd largest county in terms of premium income

Note: 1 USD=6.8 CNY

- **But, farmers and other stakeholders complaint the low risk protection of CAIP**



- The liability of an insurance contracts is about 22% of the value of insured crop/livestock in China. (Zhou et al, 2012).

BACKGROUND & MOTIVATION(CON'T)

- **Need to answer three critical questions,**
  - What is the truly development level of CAIP?
  - What is the problem of CAIP ?
  - What is the solution?

- Many literature had investigated the effect of CAIP in the perspective of
  - farmers' welfare (Wang, 2014)
  - farmers' perception of CAIP and its' subsidies (Zhao, 2013)
  - Its impact on farmers behavior (Zhong and Ning et al, 2007;Zhang et al, 2016)
  - The performance of CAIP in scheme designing, organizing and implication (MOF, 2018)

- Insured. Some crops/livestock are NOT insured! Previous studies failed to provide a whole picture to understanding the CAIP

OBJECTIVE

- This paper would like to
  - introduce a straightforward method to evaluate CAIP
  - evaluate CAIP comprehensively
- Contribution & Implications
  - A new evaluation perspective is proposed
  - enhancing our understanding on CAIP

METHOD

- In insurance sector, two traditional indicators were widely used to measure the development of Insurance sector in particular Country or region.
  - Insurance Penetration (Insurance premium as a % of GDP)
  - Insurance Density (Insurance premium per capita)
- However,
  - The two indicators are more attractive for insurer and investors
  - Agricultural insurance is highly subsided by the government
  - Government cares more on the SOCIAL EFFECT of agricultural insurance rather than the premium income

METHOD(CON'T)

- We propose evaluating CAIP in the perspective of risk protection!
- The term of Risk Protection
  - indicates the degree that citizens can enjoy from insurance and other security measures (Mu, 1997)
  - is the welfare gains from insurance (Kowalski, 2015)
  - is the financial risk reduction because of social health insurance (Barnes et al, 2016)
- In this paper, Risk Protection of agricultural insurance is defined as the potential benefit that individual farmer or agricultural sector could enjoy by providing agricultural insurance

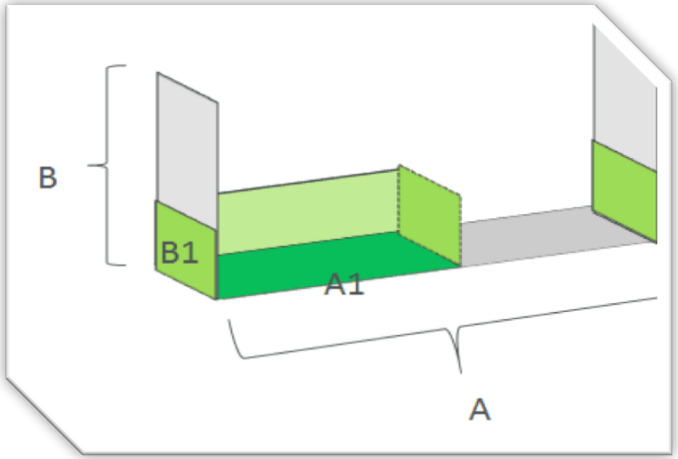
METHOD(CON'T)

- Risk Protection of agricultural insurance can be measured by the indicators of
  - the overall risk protection (ORP)
  - the breath of risk protection (BRP)
  - the depth of risk protection (DRP)

$$ORP = \frac{Liability\ of\ Agri\ Insurance}{Agricultural\ Value(GDP)} = \frac{A1 \cdot B1}{A \cdot B}$$

$$BRP = \frac{Insured\ Number(Acre\ or\ head)}{crop\ planting\ acre\ or\ head\ of\ animal} = \frac{A1}{A}$$

$$DRP = \frac{Unit\ Liability}{AgroValue\ per\ unit} = \frac{B1}{B}$$



RESULTS 1:THE RISK PROTECTION OF CAIP

- Data

Table 1 the specific data indicator, source and usage in this section

Type	Indicator	Data Source	Usage
Agricultural insurance	Total Liability	CIRC	for the calculation of ORP
	Insured number (Acre/head)	CIRC	for the calculation of BRP
	Liability per unit(acre/head)	CIRC	for the calculation of DRP
Agricultural economics	Agricultural GDP	MOA, NBS	for the calculation of ORP
	Unit value of agricultural commodities	COP statistics from NDRC	for the calculation of ORP for each commodities
	Planting acreage	MOA, NBS	for the calculation of BRP
	Feeding head of Livestock	MOA	for the calculation of BRP
	Cost of production	COP statistics from NDRC	for the calculation of DRP

RESULTS 1(CON'T)

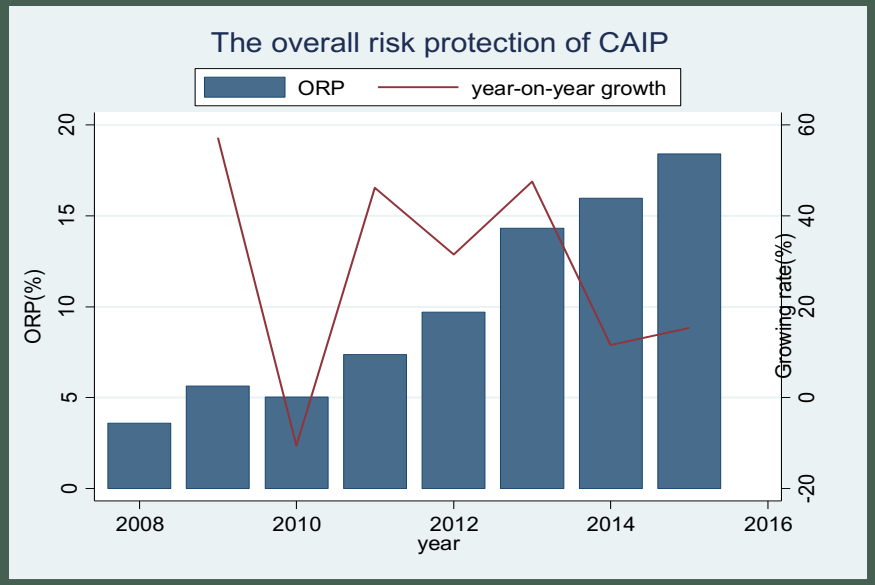
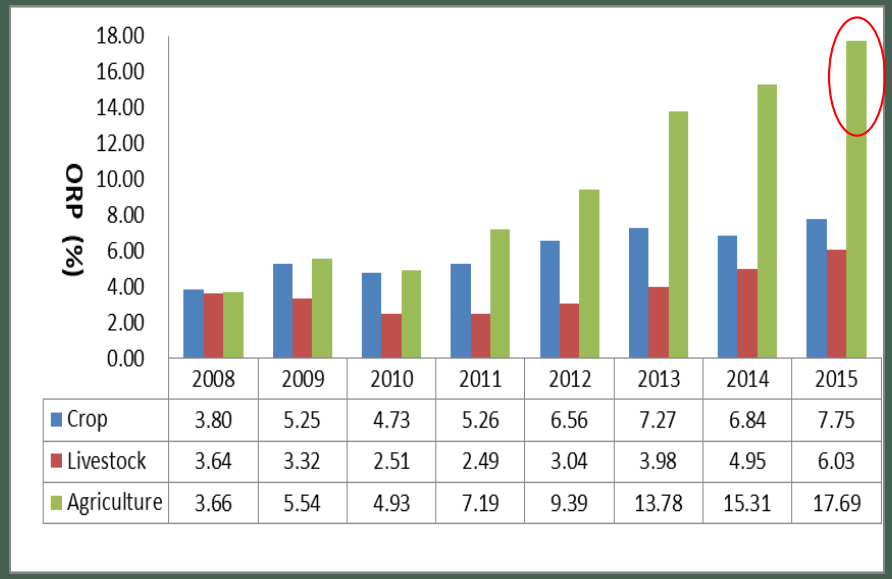


Figure 1: the overall risk protection of CAIP from 2008-2015

Note: the overall risk protection of CAIP goes down in 2010, but grows rapidly after that year

- Crop insurance have a higher ORP than livestock insurance, while the gap is narrowing



	2008	2009	2010	2011	2012	2013	2014	2015
Crop	3.80	5.25	4.73	5.26	6.56	7.27	6.84	7.75
Livestock	3.64	3.32	2.51	2.49	3.04	3.98	4.95	6.03
Agriculture	3.66	5.54	4.93	7.19	9.39	13.78	15.31	17.69

Note: Agriculture includes the forest in above table

Figure 2: the overall risk protection of CAIP, by sector

RESULTS 1(CON'T)

- What drives the increase of CAIP's risk protection?

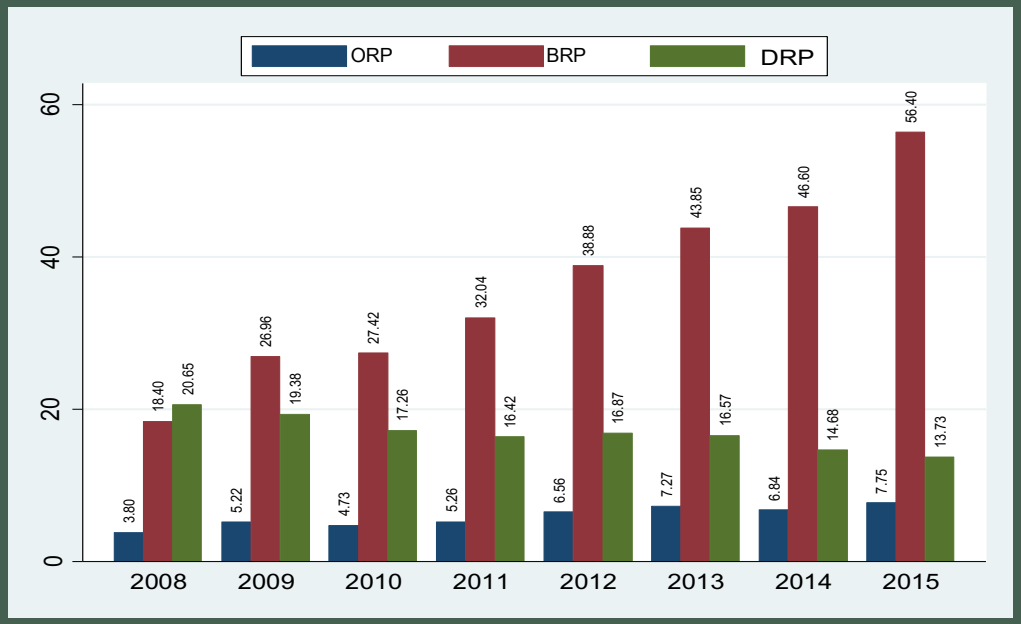


Figure 3: The ORP, BRP, and DRP of CAIP over years

- Main driver is the expand of insured number.
- >56% of acres/head had been insured in 2015

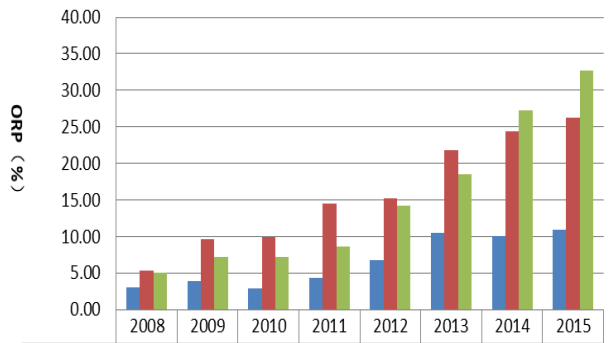
- DRP is decreasing over years which explains why farmers complain

RESULTS 1(CON'T)

- is unbalance among regions *(10% v.s. 25+%)*
- The top provinces in terms of agricultural value in China have lowest ORP, especially in livestock

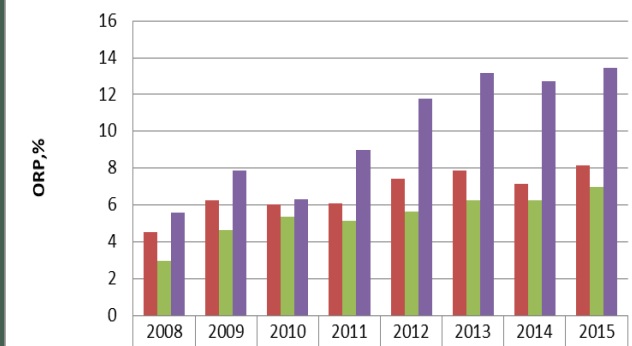
- Does CAIP provides solid risk protection for producers ?

ORP of Agricultural Insurance



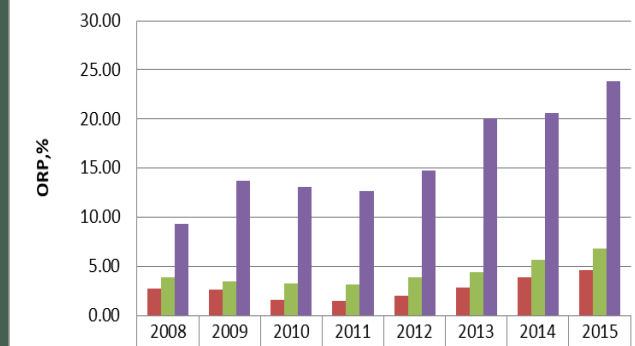
	2008	2009	2010	2011	2012	2013	2014	2015
Top 10	3.05	3.83	2.91	4.26	6.76	10.55	10.07	10.90
Top 11-20	5.38	9.63	9.83	14.53	15.27	21.75	24.32	26.30
Top 21-30	4.99	7.20	7.11	8.63	14.14	18.47	27.25	32.70

ORP of Crop Insurance



	2008	2009	2010	2011	2012	2013	2014	2015
Top 10	4.52	6.27	6.05	6.11	7.41	7.86	7.15	8.12
Top 11-20	2.99	4.64	5.35	5.15	5.64	6.24	6.23	6.96
Top21-30	5.6	7.87	6.3	8.98	11.79	13.18	12.7	13.46

ORP of Livestock Insurance



	2008	2009	2010	2011	2012	2013	2014	2015
Top 10	2.73	2.64	1.61	1.50	2.00	2.89	3.89	4.67
Top 11-20	3.92	3.51	3.29	3.14	3.93	4.40	5.71	6.82
Top21-30	9.34	13.68	13.13	12.67	14.75	20.06	20.61	23.90

Figure 4 the ORP of agricultural insurance, Crop Insurance and Livestock Insurance in China, by group

Note: Top 10 means the top 10 provinces of agricultural production in China

RESULTS 1(CON'T)

The risk protection of CAIP for specific commodities

Table 2: The risk protection of CAIP for key crop/ livestock in 2015

			ORP,%	BRP,%	DRP,%
Crop (10)	Grain	Rice	18.62	68.91	27.03
		Wheat	21.11	55.54	38.01
		Maize	23.52	67.27	34.96
		Total	21.08	63.91	33.33
	Soybean		13.22	33.73	39.18
	Cotton		44.63	58.73	76.00
	Oil crops	Rapeseed	15.46	41.18	37.55
		Peanut	1.74	6.92	25.09
		Total	8.60	24.05	31.32
	Sugar crops	Sugar Cane	9.14	43.59	20.97
		Sugar beet	15.73	52.70	29.84
		Total	12.44	48.15	25.41
Livestock (4)	Cattle		0.05	0.15	32.36
	Dairy cattle		8.59	26.68	32.21
	Pig/Hog		7.14	23.04	31.01
	Sheep		1.90	4.20	2.69

- Great gap exists in the risk protection of specific crops/livestock insurance in China.
- Cotton have the highest ORP and DRP in China, followed by grain crops, soybean, sugar crops and oil crops
- Dairy and Hog have the highest risk protection in livestock sector, but still lower than the risk protection for crop sector

RESULTS 2:THE INT'L COMPARISON OF CROP INSURANCE

What is the level of CAIP if compared with other typical countries?

- Table 3: Dataset for calculating CROP insurance' risk protection in five typical countries/region

Country /Region	Sown Acreage	Value of Production	crop insurance
U.S	NASS	ERS, NASS	Summary of Business, RMA
Manitoba, Canada	the statistics bureau of Canada (CANSIM)	the statistics bureau of Canada (CANSIM)	annual report of MASC
Japan	the Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF)	MAFF	MAFF
India	Ministry of Agriculture and Farmers' Welfare, India	FAO	Ministry of Agriculture and Farmers' Welfare, India
Philippines	CountrySTAT Philippines	CountrySTAT Philippines	Annual report of PCIC

RESULTS 2(CON'T)

- The ORP of Chinese crop insurance is largely lagged because it stays in the same level as that of U.S and Canada in 1980s, about 1/8 of U.S., 1/6 of Manitoba, and half of Japan right now.

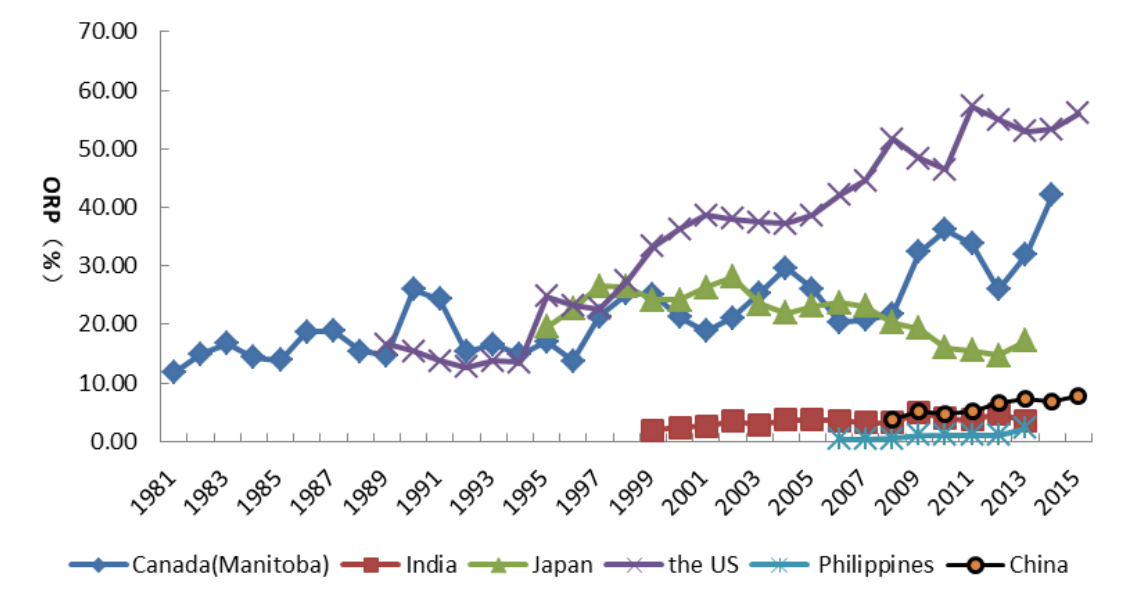


Figure 5: the overall risk protection of crop insurance in the six countries

RESULTS 2(CON'T)

- The BRP of Chinese crop insurance performs well, reaching the level of that in U.S. and Canada(Manitoba) in the mid-1990s and much higher than India and the Philippines.

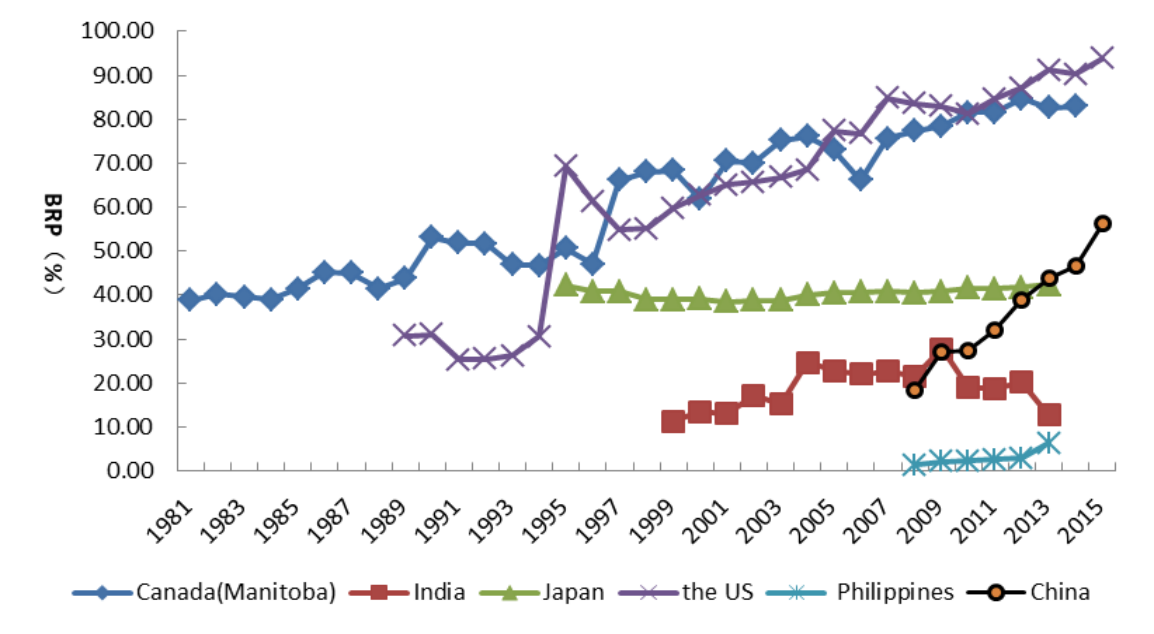


Figure 6: the breath of risk protection of crop insurance in the six countries

RESULTS 2(CON'T)

- The DRP of Chinese crop insurance is the lowest among these countries. Its value is similar to that of India in a decade ago.

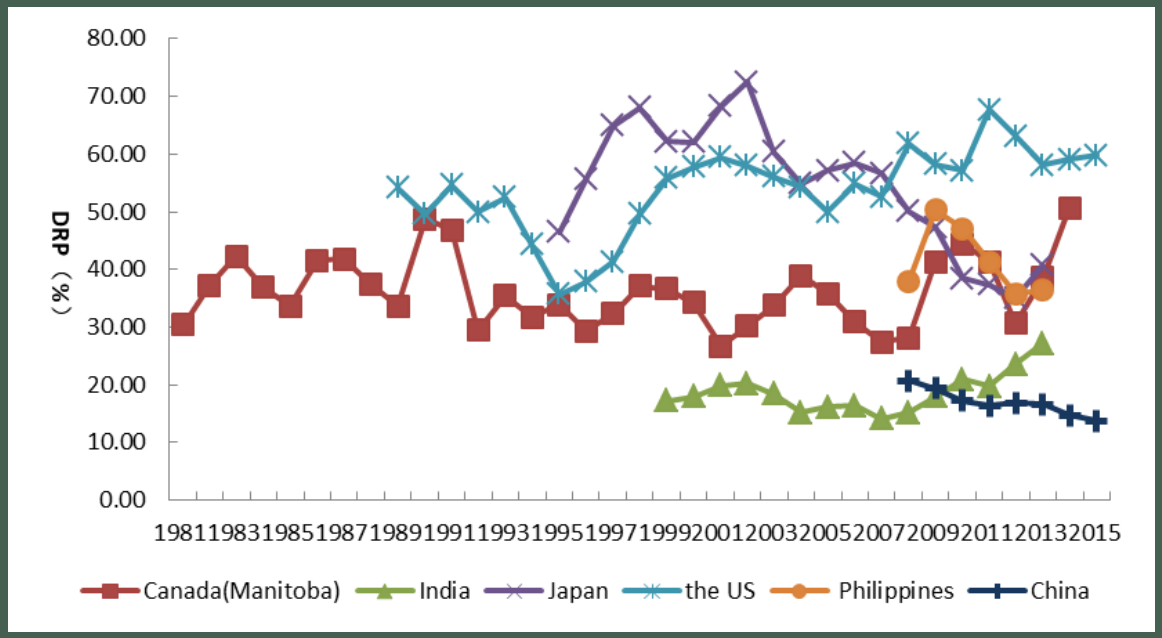
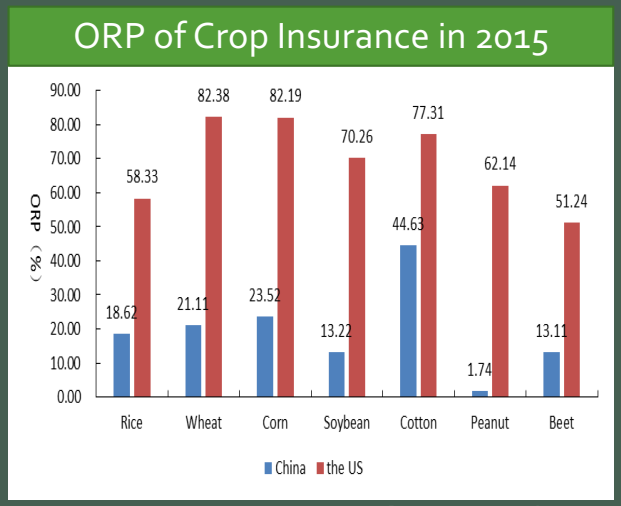
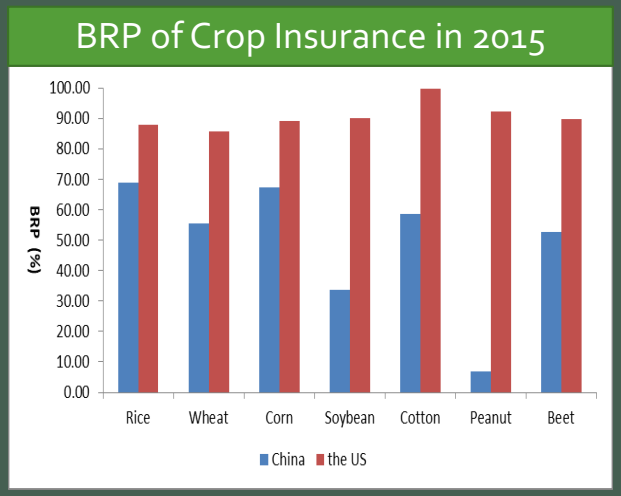


Figure 7: the depth of risk protection of crop insurance in the six countries

RESULTS 2(CON'T)

- What is difference of crop insurance's risk protection between China and the U.S, by crop?





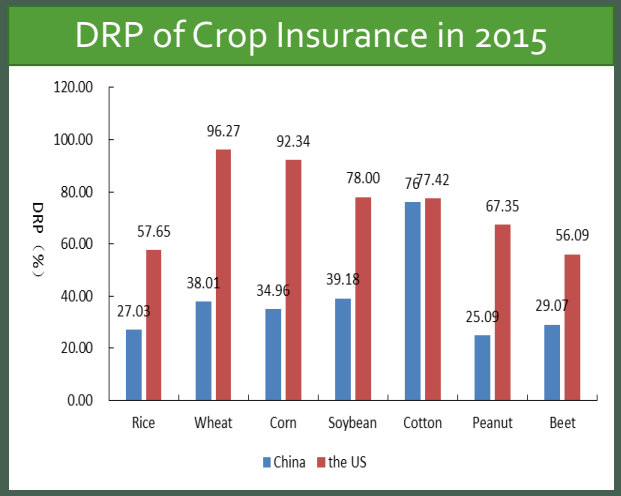


Figure 8: the risk protection of crop insurance in China and the U.S. (by crops type)

Note that, 1) Overall, the crop insurance in China has lower ORP, BRP, and DRP than that of U.S.; 2) Cotton insurance has the smallest risk protection gap between China and the U.S. ; 3) The risk protection of insurance for grain crops is about ¼ of that in the U.S.

CONCLUSIONS

- CAIP had achieved remarkable achievement in past years. But, in spite of the 2nd global market in terms of premium**, CAIP stays in the middle level of the world in terms of risk protection** and has a great gap compared to the developed countries, especially the U.S. (China's ORP= 1/8 of the current level of the US, 1/6 of Canada's and less than 1/2 of Japan's)
- The increasing of CAIP's risk protection is mainly driven by the rapidly expanded of BRP, and the low and decreasing of CAIP's DRP had become the utmost challenge for China to deal with
- China also faces the challenge of unbalanced development of agricultural insurance among region, sector, and agricultural commodities. The unbalance feature of CAIP is highlighted when compared with the risk protection of U.S's crop insurance.
- In the future, China needs to take actions to increase the DRP of CAIP and address the unbalanced problem of CAIP to improve the effects of agricultural insurance in China.

Thanks very much for your attentions!

If you have any questions and comments, welcome to contact Dr. Ke Wang.

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