Nudging farmers to buy agricultural insurance

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Objectives

- To study demand for agricultural insurance
- To study demand for technology based agricultural insurance
- To measure potential dynamic welfare impact of agricultural insurance

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Methodology: Dynamic game experiment

1. Key decision
   - ❖ Production
   - ❖ Borrowing
   - ❖ Insurance
   - ❖ Consumption
2. Uncertainty
   - ❖ Disaster shock
   - ❖ Government uncertainty
   - ❖ Technology uncertainty
3. Randomized treatments
   - 3.1 Game environment
     - ❖ Land size
     - ❖ Cost of default
     - ❖ Social learning
     - ❖ Intensity of government assistance
     - ❖ Government uncertainty
   - 3.2 Nudging instruments
     - ❖ Discount coupon
     - ❖ Buy insurance on credit
     - ❖ Bundling
     - ❖ Video base technology introduction
4. Outcomes
   - ❖ Production decision
   - ❖ Insurance/Technology demand
   - ❖ Income/Debt
   - ❖ Consumption smoothing pattern
5. Dynamic: repeatedly 13 rounds

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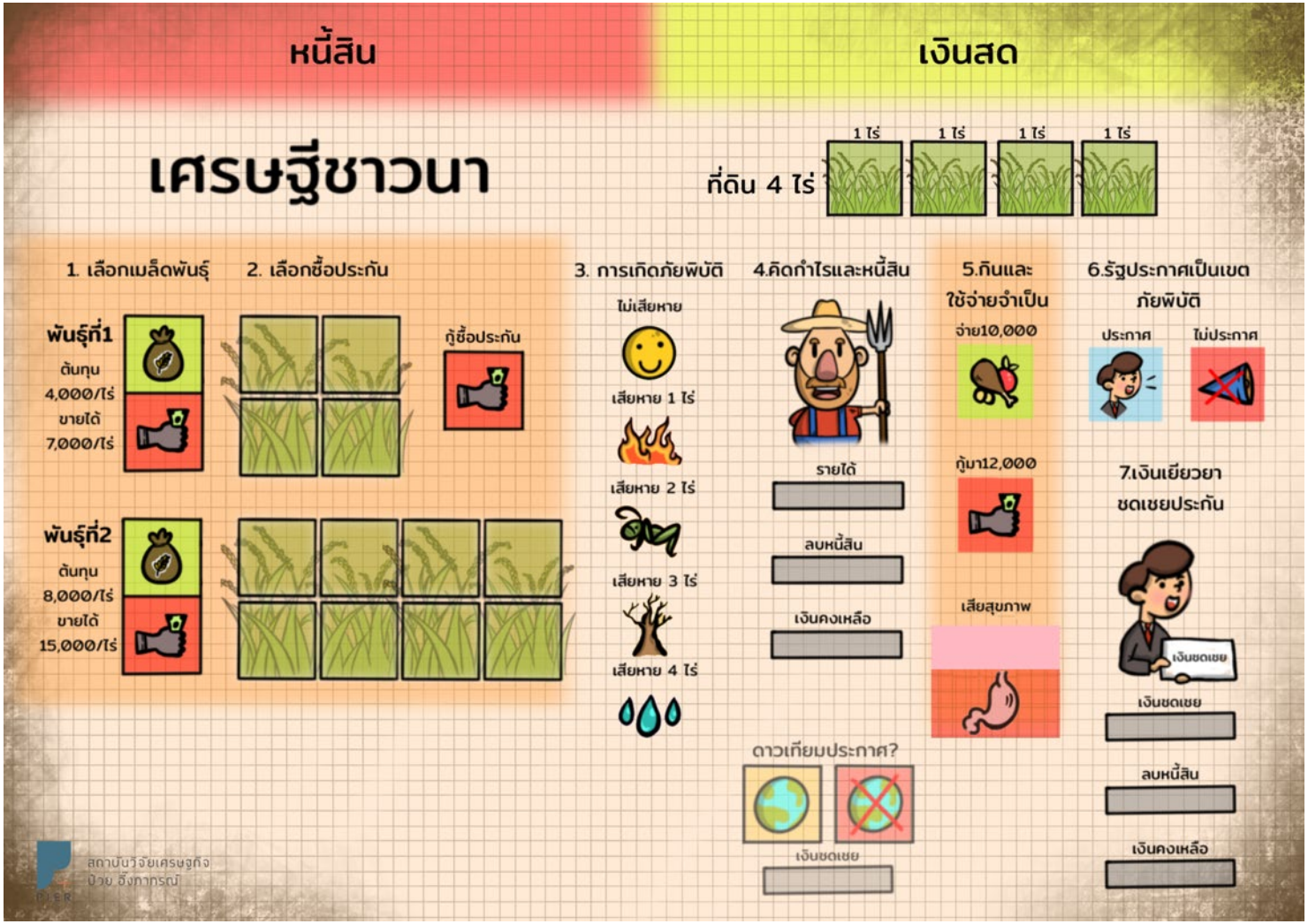
Methodology: Dynamic game experiment



1. No insurance
2. Free insurance
3. Discount coupon
4. Bundling
5. Technology

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Detailed houshold survey

- Demography
- Agricutural practice
- Income and expenditure
- Borrowing
- Saving and investment
- Assets
- Risk and insurance
- Financial attitude
- Behavioural biases

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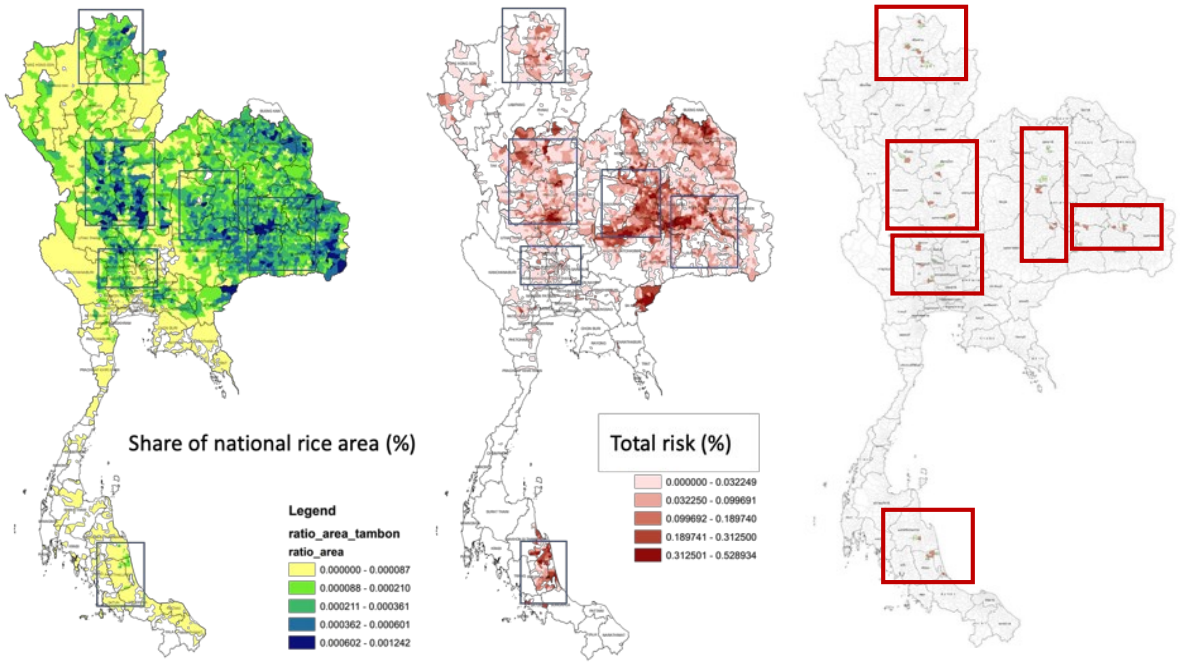
Sampling strategy



- Randomly select 48 subdistricts in 6 key growing zones stratified by risk exposure
- Randomly select 20 farmers in each subdistrict stratified by farm size and BAAC customer from farmer registration

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Randomization

❖Subdistrict level (session)

	Cost of default (No)	Cost of default (Yes)
Social learning (No)	2 sessions	2 sessions
Social learning (Yes)	2 sessions	2 sessions

❖ Group level

	Subsidy (Low)	Subsidy (High)
Government risk (Low)	5 farmers	5 farmers
Government risk (High)	5 farmers	5 farmers

❖ Individual level

1. Discount coupon
2. Buy insurance on credit
3. Bundling
4. Video base technology introduction

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Methodology:
Framed game experiment

Farmers' characteristics

	mean	std	min	median	max
Age	50.68	6.39	27.00	52.00	60.00
Rice area (%)	0.59	0.24	0.04	0.54	1.00
Rent land	0.30	0.46	0.00	0.00	1.00
Organic	0.12	0.33	0.00	0.00	1.00
Risk	0.54	0.50	0.00	1.00	1.00
Insurance area (%)	0.83	0.25	0.14	1.00	1.00
Buy insurance	1.00	0.00	1.00	1.00	1.00
BAAC customer	0.65	0.48	0.00	1.00	1.00
Loan amount	363102	513834	0	238387	4637937
Deposit amount	28290	52283	19	7031	403698
NPL	0.10	0.30	0.00	0.00	1.00

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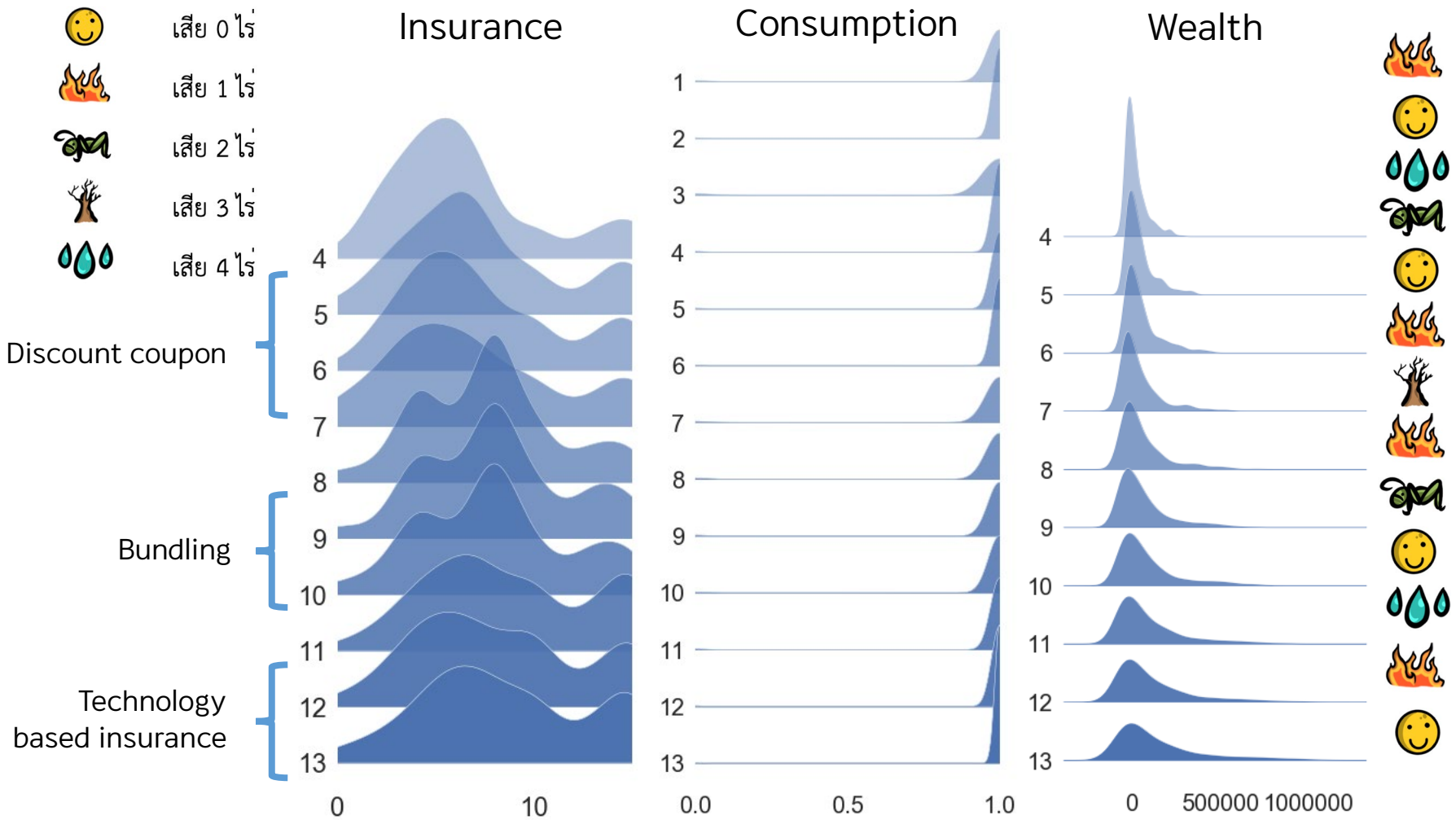
Findings : dynamic in game



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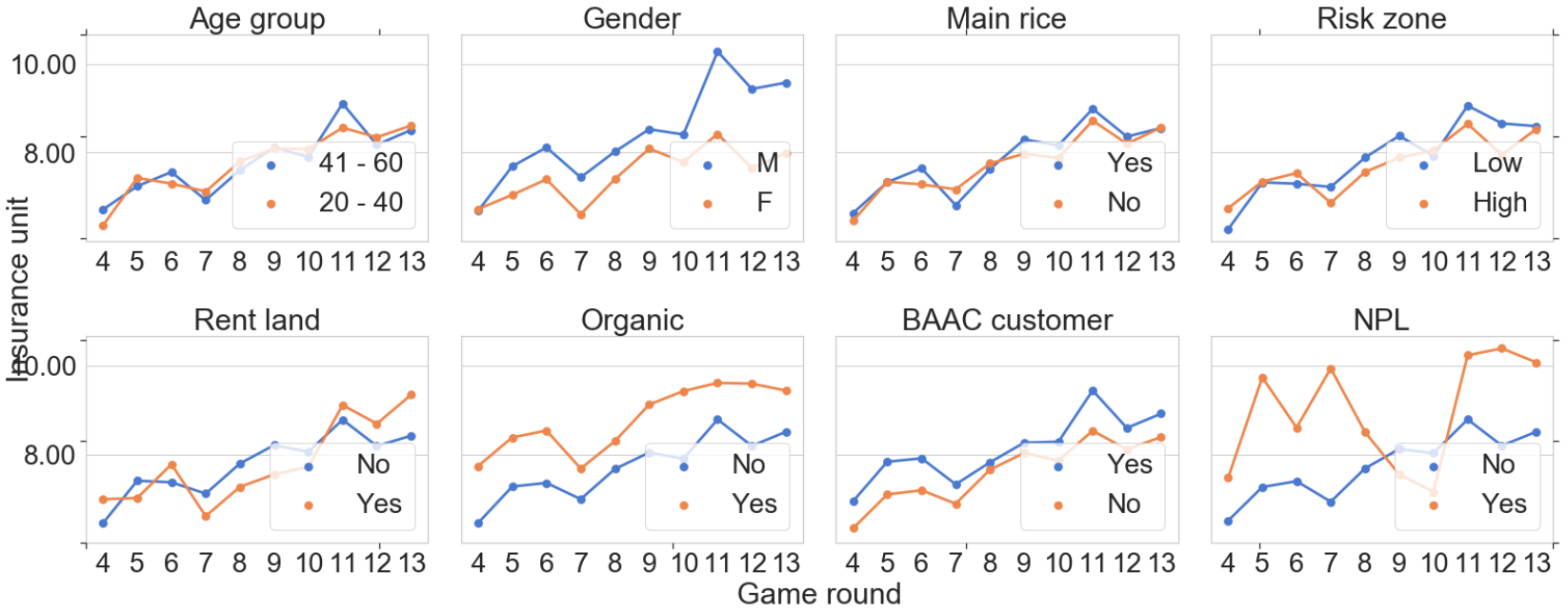
Findings: demand pattern over farmers' characteristic



- Male farmers tend to buy more insurance unit
- Organic farmers tend to buy more insurance unit
- BAAC customers tend to buy more insurance unit
- NPL customers tend to buy more insurance unit

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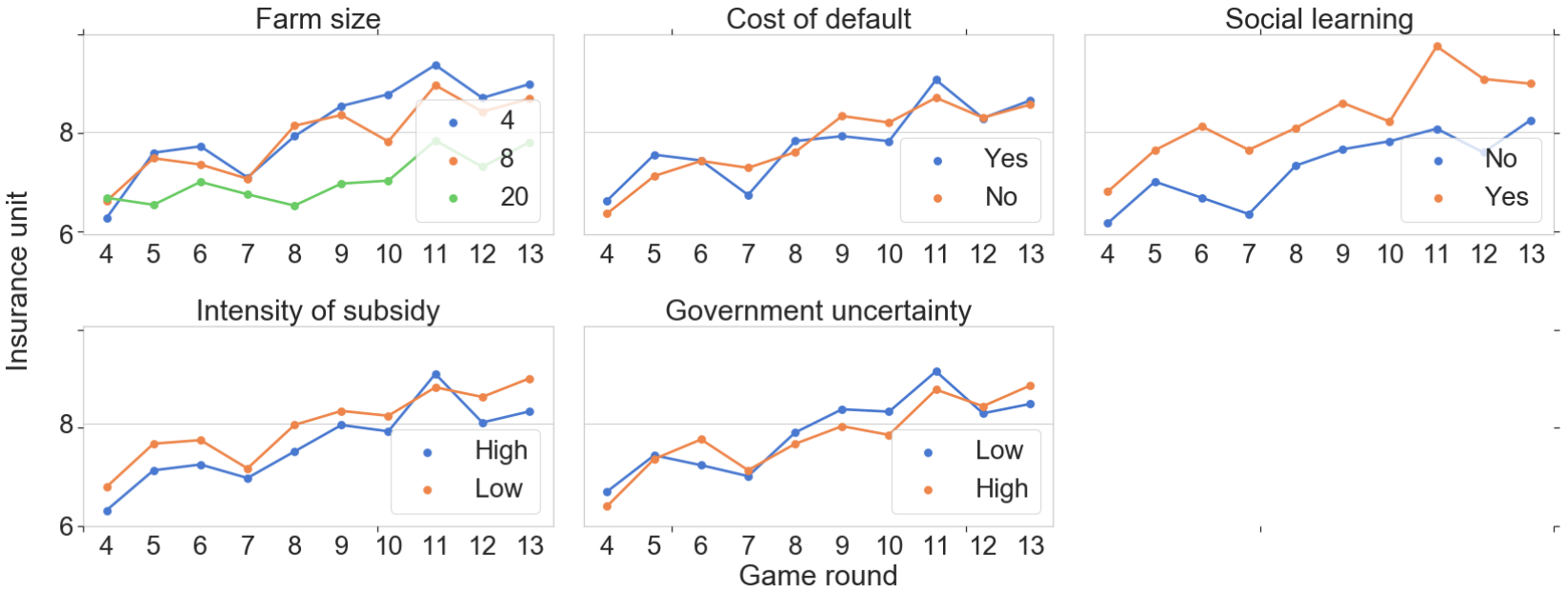
Findings: demand pattern over randomized treatment



- Large and medium size farmers tend to buy less insurance unit compared to small size farmers
- Farmers in social learning session tend to buy more insurance unit
- Farmers with low intensity of government subsidy tend to buy more insurance unit

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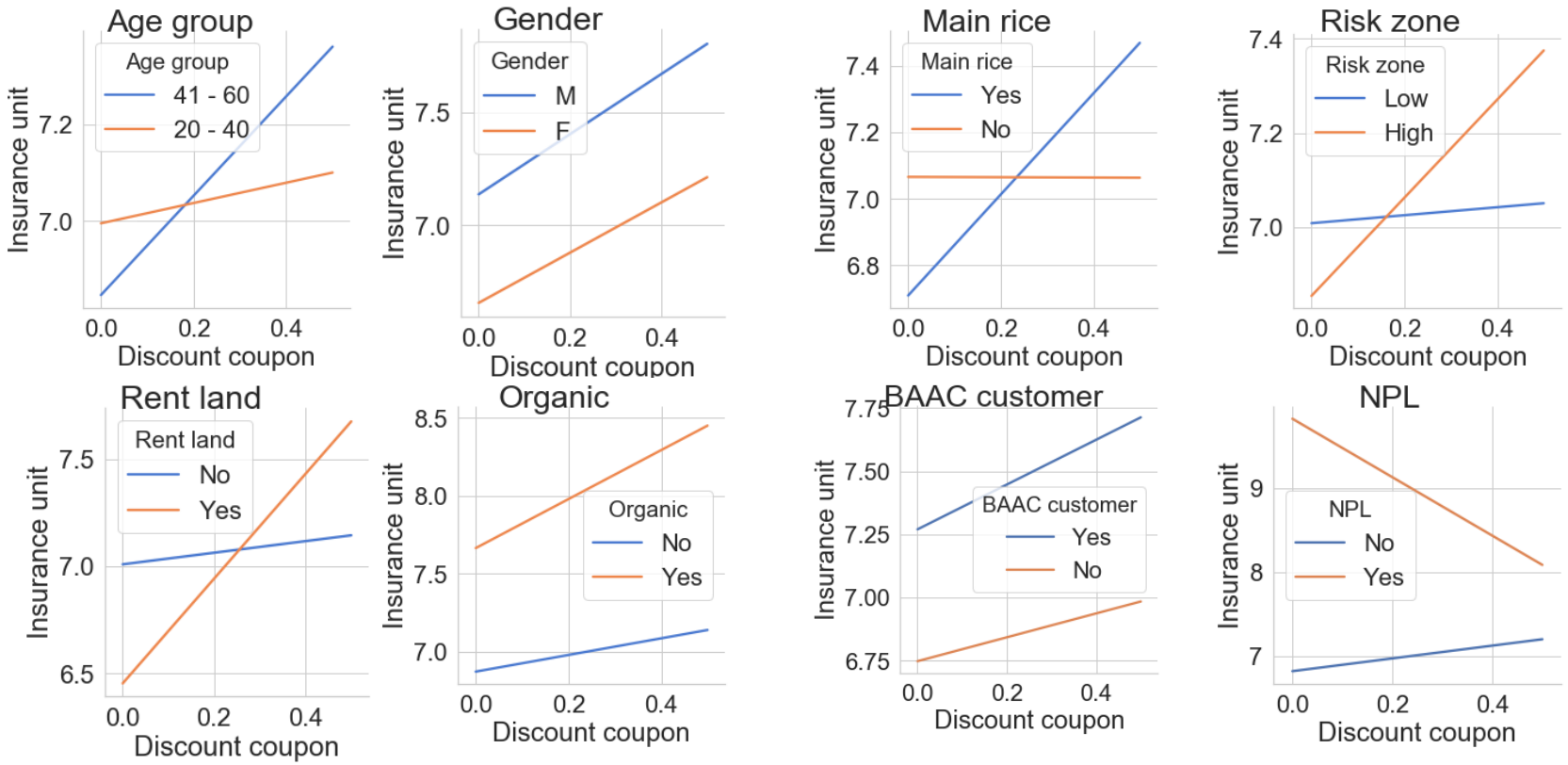
Findings: price elasticity over farmers' characteristic



- Old farmer are more sensitive to insurance price
- Farmers in high risk zone are more sensitive to insurance price
- Organic farmers are more sensitive to insurance price
- BAAC customers are more sensitive to insurance price

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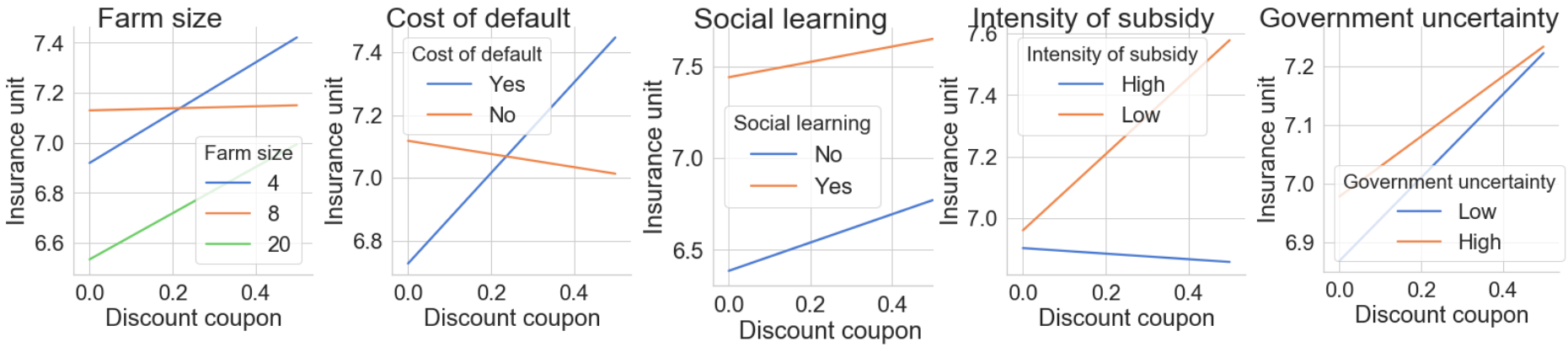
Findings: price elasticity over randomized treatment



- Farmers in cost of default sessions are more sensitive to insurance price
- Farmers in social learning sessions are more sensitive to insurance price
- Low intensity of government subsidy increase farmers' price sensitivity
- High government uncertainty decrease farmers' price sensitivity

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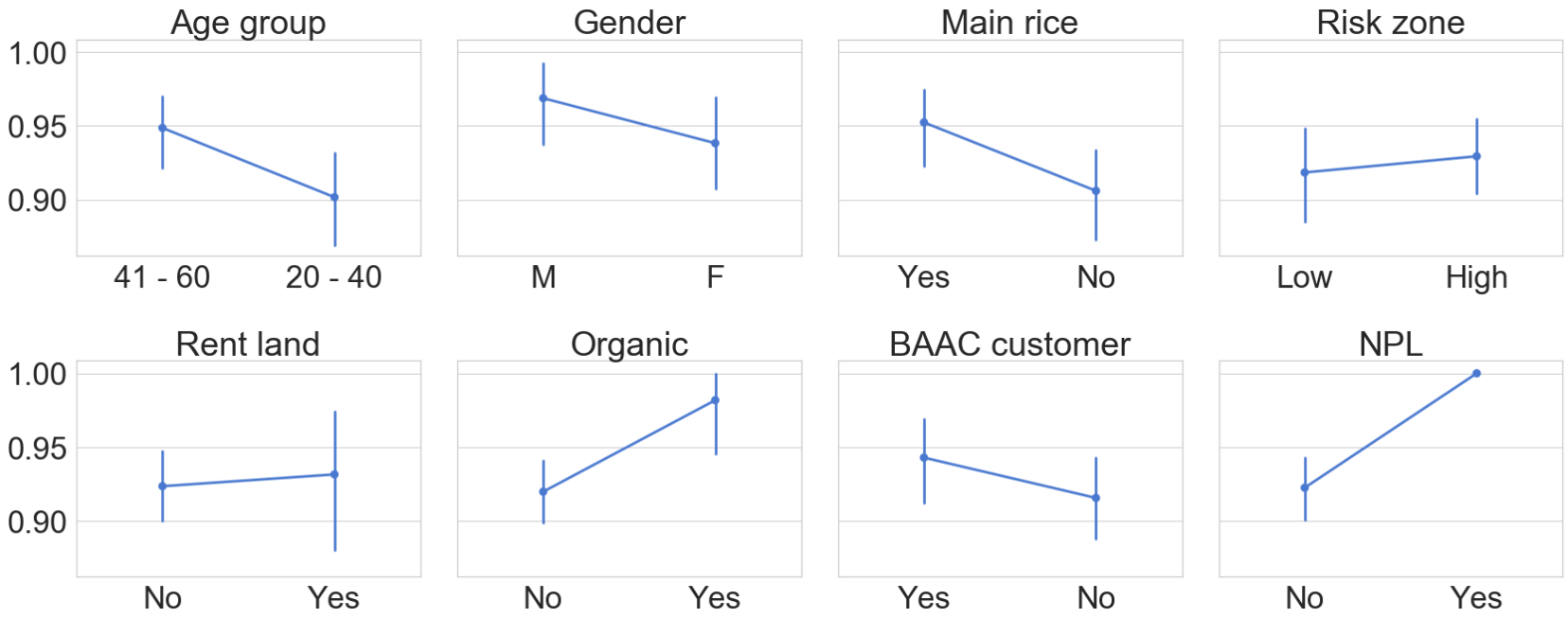
Findings: demand for bundling



- Slighly different but not statistically significant

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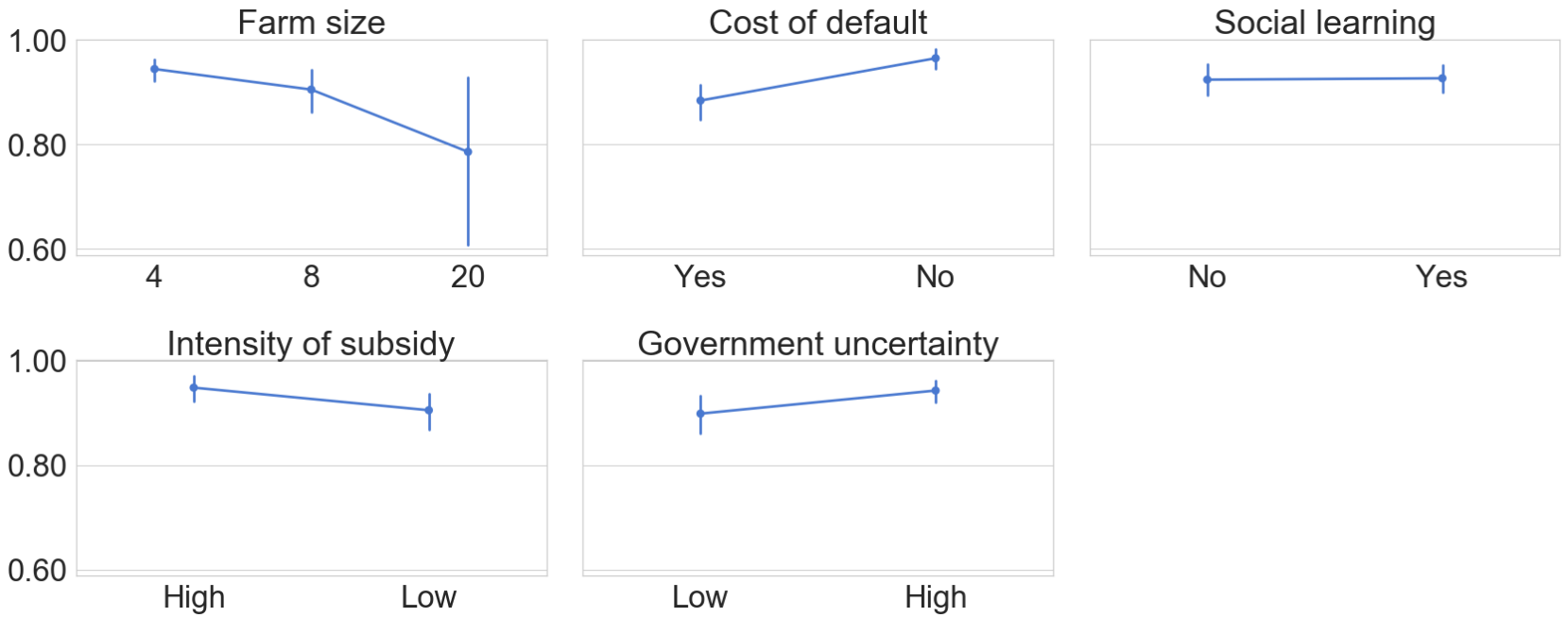
Findings: demand for bundling



- Small and medium size farmers tend to choose bundling than large size farmers
- Sessions without cost of default, farmers tend to choose bundling
- Increasing in intensity of government subsidy increase rate of bundling adoption
- Increasing in government uncertainty increase rate of bundling adoption

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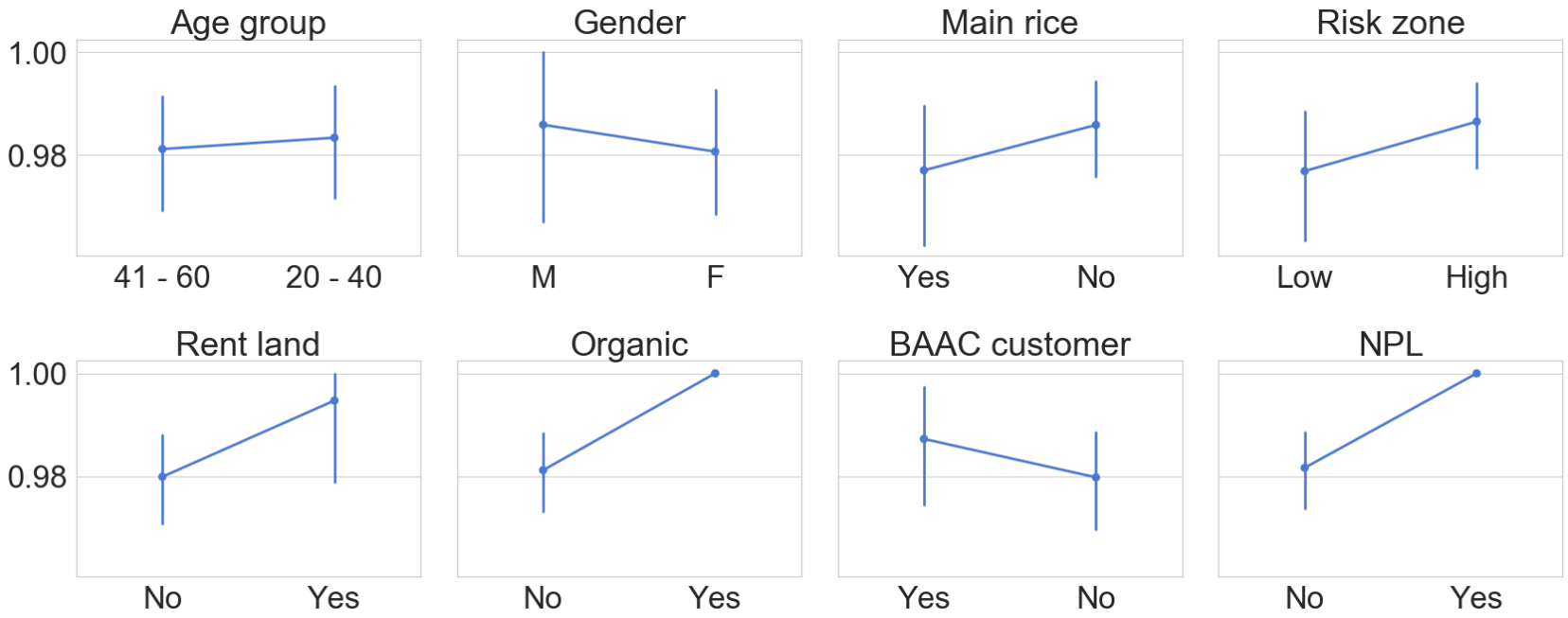
Findings: demand for technology-based insurance



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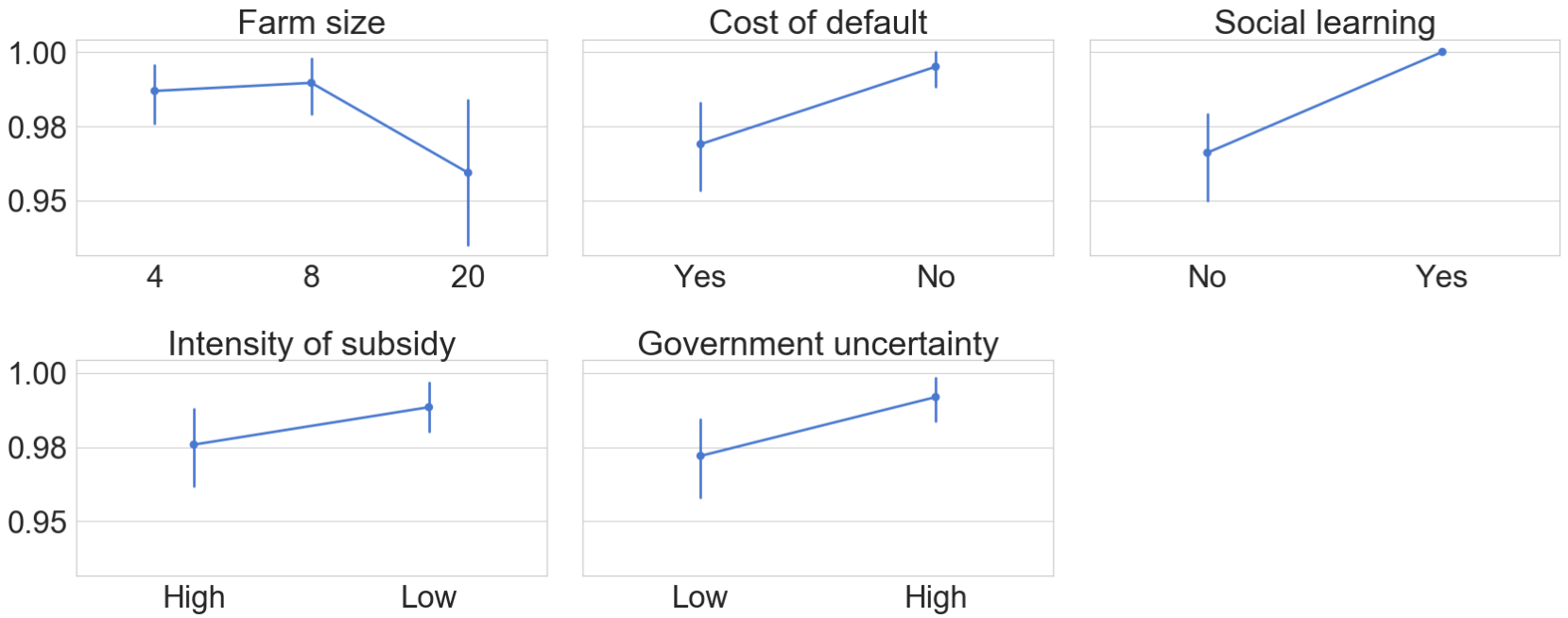
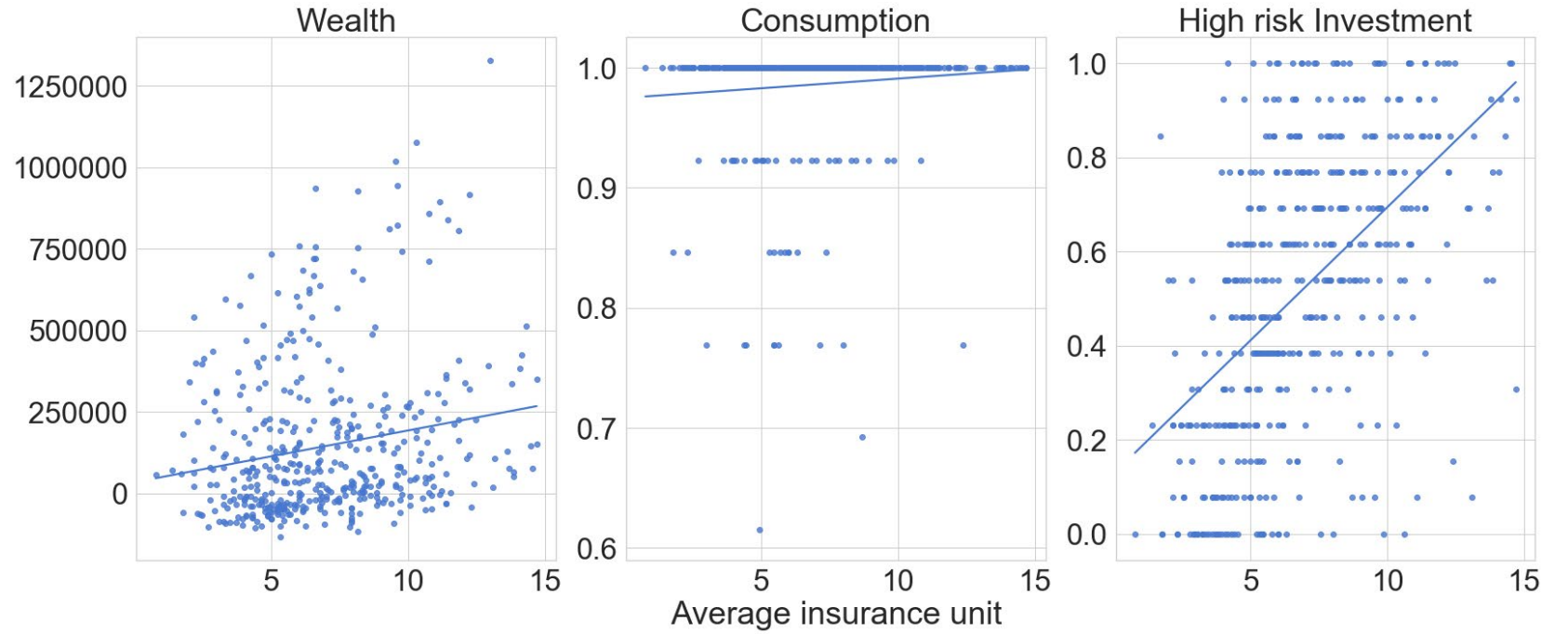
Findings: demand for technology-based insurance



- Farmers in cost of default sessions are buy less insurance unit
- Farmers in social learning session are buy more insurance unit
- Increasing in government uncertainty increase rate of technology-based insurane adoption

Findings: welfare impact of insurance



- Positive relationship between insurance unit and welfare outcomes

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Findings: welfare impact of insurance

VARIABLES	(1) Seed	(2) Consumption	(3) Wealth
Insurance unit	0.215***	0.0511	8,814***
	(0.00836)	(0.0358)	(260.4)
Farm size.Medium	-0.392***	0.613**	91,403***
	(0.0752)	(0.294)	(3,622)
Farm size.Large	-0.568***	1.556***	337,202***
	(0.0915)	(0.536)	(4,446)
Cost of default	0.404***	0.324	3,889
	(0.0673)	(0.279)	(3,240)
Social learning	0.377***	0.708**	2,173
	(0.0672)	(0.295)	(3,267)
Government uncertainty	0.545***	-0.898***	-39,784***
	(0.0674)	(0.299)	(3,262)
Intensity of subsidy	0.00142	0.683**	27,359***
	(0.0670)	(0.288)	(3,226)
Region.2	-0.460***	0.949**	34,701***
	(0.0821)	(0.378)	(3,976)
Region.3	-0.297***	0.258	-4,358
	(0.0817)	(0.308)	(3,941)
High risk seed		0.450	24,774***
		(0.322)	(3,594)
Constant	-1.742***	2.853***	-127,656***
	(0.117)	(0.418)	(5,230)
Observations	4,700	4,700	4,700
R-squared			0.614

- High risk seed adoption increase with insurance unit, farm size and social learning
- No effect of insurance on consumption rate
- Consumption rate reduce with high givernment uncertainity, but increase with intensity of government subsidy
- Wealth increase with insurance unit and high risk seed adoption

Key take away

- Nudges that work are discount coupon and bundling
- Government may distort farmers incentives
- Farmers prefer technology-based insurance than government-based insurance
- Insurance can help smooth farmers' consumption but result is not statistically significant.
- Insurance increase farmers' adoption rate of high risk high return seed, so increase wealth of them too.

Thank you

Q&A