Disaster Assistance and Crop Insurance Participation in U.S.

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Introduction

- Uncertainty as a result of natural threats like drought or flood has a vital effect on farmers for purchase of crop insurance and disaster assistance payments. Crop insurance was designed to be the main risk management tool for farmers. Federal crop insurance programs and congressionally mandated ad-hoc disaster payments are the two main policies used by the federal government to mitigate financial losses of farmers.

- This research will examine factors influencing farmer purchase of crop insurance and receipt of disaster assistance payments using survey data for more than 13,000 farms across 27 U.S. states. **This study will focus on various economic factors that influence farmer demand for crop insurance and receipt of disaster payments.**

Research Questions

- How does the probability of participating in federal crop insurance programs (a) change with farmer's age; (b) change with farmer's education and farm sales; (c) change with farmer's income?

- How does the probability of receiving disaster payments change with farmers characteristics?

- Do the farmers in states with congressional representation on subcommittees overseeing USDA's direct disaster payment program receive higher probabilities of disaster payments, controlling for other factors?

Data

- Unique data set on the personal characteristics of producers from National Agricultural, Food and Public Policy Preference Survey conducted between October 2005 and April 2006.

- The data on each state's crop insurance premium rate from USDA's Risk Management Agency

- Data on political variables through various Government websites.

Methodology

- Farmer's propensity to purchase crop insurance takes the value of 1(if $Y_{1i}>0$) and 0 ($Y_{1i}\leq 0$) if they are not willing to purchase the crop insurance. The following probit equation is used to explain the model:

$Y_{1i}^{*} = xb_{1i} + \varepsilon_{1i}$

- A farmer's propensity to receive disaster payments is unobservable and takes the value of 1(if $Y_{2i}>0$) and 0 ($Y_{2i}\leq 0$) otherwise.

$Y_{2i}^{*} = xb2i + \varepsilon_{2i}$

- The stochastic error terms ε_{1i} and ε_{2i} are the errors which are jointly standard normally distributed. **Bivariate probit model** was used to estimate the parameters using maximum likelihood methods.

Results

Table 1: Crop Insurance

Variable	Estimate
Agele25	-0.1734
Age25_34	0.0167
Age35_44	0.0313
Age55_64	-0.0331
Agegt65	-0.1380***
Education_1	-0.3152***
Education_2	-0.2463***
Education_3	-0.0864**
Education_5	0.1608***
Education_6	0.0900*
SaleClass_1	-1.1403***
SaleClass_2	-0.5106***
SaleClass_3	-0.2012***
SaleClass_5	0.0903**
SaleClass_6	0.0805
SaleClass_7	-0.0476
%Ownfarm_1	0.1112**
%Ownfarm_2	0.2552***
%Ownfarm_3	0.3191***
%Ownfarm_4	0.2795***
Premium	-0.0029

Table 2: Disaster Assistance

Variable	Estimate
Agele25	-0.3323
Age25_34	0.0456
Age35_44	0.0476
Age55_64	-0.0338
Agegt65	-0.0523
Education_1	-0.3380***
Education_2	-0.066
Education_3	0.0527*
Education_5	0.0681**
Education_6	0.0792*
%Ownfarm_1	0.0245
%Ownfarm_2	0.2082***
%Ownfarm_3	0.1802***
%Ownfarm_4	0.2303***
Diversification	0.0406
Dum_hagcom	0.0609*
Dum_sagcom	0.2806***
Dum_sapcom	0.0022*

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

Conclusion

- Preliminary results show that the probability of participating in federal crop insurance programs is (a) lower for farmers with increase of age; (b) increasing with farmer education and farm sales; (c) lower for farms where farm income is a small share of household income

- The probability of receiving disaster payments (a) increases as farms depend more on farm income for their total household income (b) greater in states experiencing warmer than normal temperatures.

- Farmers in states with representation on subcommittees had higher probabilities of receiving disaster payments, controlling for other factors.

Policy Implications

- Knowing the characteristics of farmers will help the insurance companies to target the farmers with the desirable characteristics and improve their business.

- Government can provide more efficient system of agriculture disaster relief.