Do Farmers Choose the Number of Landlords as A Way to Deal with Risks? Evidence from U.S. Household Level Data

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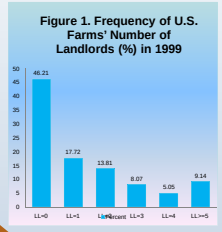
Introduction

Agricultural economists have long recognized that risks play an essential role in the production decisions and marketing actions. Risk management is clearly important to farm operators as well as to researchers and policy makers.

Although prior studies have made considerable efforts to understand farm operators' risk management activities, almost no information exists about the choice of the number of landlords (the total number of landlords that a tenant operator has at a specific time) as a way to deal with risks. In the U.S., about 58% farmers operate lands at least partially rented from others by various types of contracts. Many of these tenant operators rented land from more than one landlord (see Figure 1). Some of them both rented farmland from other landlord(s) and rented own land out to the others. In general, farms with higher coefficient of variation (CV) and/or using share contracts seem to contract with more landlords (USDA 2001).



In light of these facts, a fundamental question arises regarding the number of landlords: do farm operators choose the number of landlords as a way to deal with the risks?

Objectives

The objective of this study is to investigate how and to what extent risk and risk attitudes affect a farmer's choice of the number of landlords.

Data

The data used in this study come from three sources:

- The 1999 Agricultural Economics and Land Ownership Survey (AELOS)
- The 1999 Agricultural Resource Management Survey (ARMS)
- The 1990-1999 Regional Economic Information Systems (REIS)

Methodology

We consider the following models : the Poisson regression model (PRM), the negative binomial regression Model (NBRM), and the hurdle regression model (HRM). In practice, the PRM rarely fits due to *overdispersion*. The NBRM addresses the failure of the PRM by allowing *unobserved heterogeneity* among obs.

However, all three models assume that every farm has a positive probability of renting farmland from landlord(s). Although it is quite common for most of farmers to have chances to lease from at least one landlord, still some of the operators would never (consider or have an opportunity to) rent any land from others, given a certain time period.

Methodology (cont)

It is unrealistic to model the entire zero count data generating process by using a single specification.

Zero-inflated model provides a way to address this issue (Lambert 1992; Greene 1994).

Three steps investigation:

1. Model membership in the *Always Zero Group*: binary choice model (e.g., logit)
2. Model membership in the *Not Always Zero Group*: either PRM or NBRM
3. Compute observed probabilities as a mixture of the two groups

Results

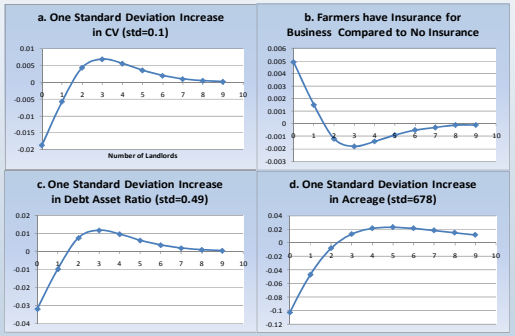
- Likelihood-ratio test comparing ZIP to ZINB indicates that ZINB fits better.
- Results are presented in Table 1 and Figure 2. Risk and risk preference are important determinants of the number of landlords.
- The CV for net farm income and debt asset ratio of the farm both have positive effects on the predicted number of landlords; on the other hand, purchasing insurance and using professional farm management service decrease the number of landlords.
- Figure 2 shows, one std increase in CV decreases the predicted possibility of having zero landlord by 0.02; at the same time, it increases the probabilities of having two and three landlords.
- Other results and implications will be discussed.

Table 1. Zero-inflated Negative Binomial Regression of the Number of Landlords

				Number of obs =	7901 (Nonzero obs = 4758)	
Inflation model = logit				Wald chi2(9) =	178.58	
Log pseudolikelihood = -950198.:				Prob > chi2 =	0.0000	
	Coef.	obust. Er	z	P>|z|	95% Conf.	Interval]
# of Landlord						
CV	0.637	0.179	3.560	0.000	0.286	0.987
Insurance Purchase	-0.014	0.007	-2.000	0.045	-0.028	0.000
Debt Asset Ratio	0.002	0.001	2.470	0.013	0.000	0.004
Net Wealth	0.000	0.000	3.710	0.000	0.000	0.000
Professional Manag. Service	-0.012	0.003	-4.020	0.000	-0.017	-0.006
Farming Exper.	0.030	0.005	5.540	0.000	0.019	0.040
Farming Exper.^2	0.000	0.000	-2.420	0.015	0.000	0.000
Using Share Contract(s)	1.285	0.275	4.680	0.000	0.746	1.824
_cons	-0.423	0.334	-1.270	0.206	-1.078	0.232
Inflate						
CV	-0.333	0.530	-0.630	0.529	-1.372	0.706
Insurance Purchase	0.051	0.125	0.410	0.685	-0.195	0.297
Debt Asset Ratio	0.013	0.007	1.840	0.066	-0.001	0.027
Net Wealth	0.000	0.000	1.670	0.095	0.000	0.000
Professional Manag. Service	0.059	0.015	3.790	0.000	0.028	0.089
Farming Exper.	-0.011	0.012	-0.930	0.353	-0.034	0.012
Farming Exper.^2	-75.777	33.086	-2.290	0.022	-140.625	-10.930
Using Share Contract(s)	-1.910	0.905	-2.110	0.035	-3.683	-0.136
lnalpha	-1.071	0.068	-15.780	0.000	-1.204	-0.938
alpha	0.343	0.023			0.300	0.392

Count Equation: Factor Change in Expected Count for Those Not Always 0				
	b	e^b	e^bStdX	SDofX
CV	0.637	1.890	1.074	0.112
Insurance Purchase	-0.014	0.986	0.974	1.847
Debt Asset Ratio	0.002	1.002	1.058	26.420
Using Share Contract(s)	1.285	3.615	1.773	0.446

Figure 2. Changes in the Predicted Probabilities for the Number of Landlords



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