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Farmer Credit Worthiness: Sectoral and Regional Analysis

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Introduction

Agriculture is one of the high risk enterprises where farmers are continuously faced with a lot of uncertainties. These uncertainties mostly come in the form of shocks and may generate high costs, most at times in amounts which are not readily available to the farmer.

As to whether a farmer would be able to make the said repayment in the stipulated time depends on several factors which differ across farms, communities, regions as well as countries.

Factors that affect timely loan repayment vary across sectors and geographical locations, though there sure would be similarities across board.

This study basically seeks to find out the factors that influence farmer loan delinquencies and defaults, specifically factors that make farmers reluctant on paying their loans on time. The paper also uses a credit-risk model to describe the behavior of default farmers, and under what circumstances they may be highly probable to miss their loan repayment deadlines.

Methodology

The study estimates the probability of default using a credit risk model. Following Durguner's (2007) approach, this study also uses a farm-level data to measure creditworthiness instead of the conventional practice of using lender data. Other related farm-level data studies include Novak *et al* (1994) and Escalante *et al* (2004).

In order to examine the credit riskiness of a borrowing farmer, the paper models the effect of financial ratios on farms' credit risk level, where credit risk level refers to repayment capacity. Higher repayment capacity implies a lower credit risk. Coverage ratio is used as a measure for repayment capacity. Farmers are considered to have low (high) credit risk if they have high (low) repayment capacity and a coverage ratio greater (less) than 1.

The estimated model is as follows:

$$Y_i = \beta_0 + \sum_{i=1}^5 \beta_i X_i + \sum_{j=1}^2 \beta_j \text{dummy } j + \sum_{j=1}^5 \sum_{i=1}^5 \beta_{ij} \text{dummy } j * X_i$$

The X_i represents the financial ratios. They are the working capital to gross return, debt-to-asset ratio, return on assets, asset turnover ratio, and tenure ratio. These financial ratios are used as proxies for liquidity, solvency, profitability, and financial efficiency and tenure respectively. Dummy j represents the farm type dummy i.e. either grains, cotton, tobacco, poultry, cattle, dairy products, fruits or vegetables.

Data

All data are obtained from the Agricultural Resource Management Survey (ARMS) database (Phase III). A ten-year period (2003–2012) survey data of the ARMS are amalgamated into a pool-cross sectional data. The rich farm-level information provided by the ARMS data provides a ground for detailed analyses and much more reliable results. The 10-year pooled-cross sectional ARMS data comprise of a total of 174,003 observations.

Table 1. Variable definition

Financial Ratios	Definitions	Expected sign
Repayment Capacity: Coverage Ratio	(Net Farm Income from Operations + Non-Farm Income + Depreciation + Interest on Term Debt + Interest on Capital – Income Taxes – Family Living Withdrawals) / (Annual Scheduled Principal + Interest Payments on Term Debt and Capital Leases)	-
Liquidity: Working Capital to Gross Returns	(Current Assets - Current Liabilities) / Value of Farm Production	+
Solvency: Debt-to-Asset Ratio	Total debt / Total Assets (fair market value)	-
Profitability: Return on Assets	(Net Farm Income from Operations + Farm Interest Payments - Unpaid Labor Charge for Operator and Family) / (Average Total Farm Assets in terms of Fair Market Value)	+
Financial Efficiency: Asset Turnover Ratio	Value of Farm Production / Total Average Farm Assets (fair market value)	+
Tenure: Tenure	Owned Acres / Total Acres Operated	-

Table 2. Summary statistics

Variable	Mean	Std. Dev.	Min	Max
Working Capital to Gross Returns	5.2	266.87	-16,795	44,968.5
Debt-to-Asset Ratio	19.73	1,499.64	0.00025	435,672
Return on Assets	18.17	5,861.94	-123,971.6	1,678,380
Asset Turnover Ratio	2.13	389.02	0.0000003	108,491
Tenure	1.10	17.36	0.000005	4,500

Results

- * Creditworthiness of farmers that cultivate grains (corn, peanuts etc.) are significantly affected by all of the financial variables, each of them meeting the a priori expectation.
- * Compared to Alabama grains farmers, Florida grain farmers are more creditworthy, whilst Mississippi and South Carolina grain farmers are less creditworthy.
- * Compared to Alabama cattle farmers, Florida, Kentucky, North Carolina and Tennessee cattle farmers are all more creditworthy.
- * For poultry farmers, Georgia, Kentucky and Tennessee farmers are less creditworthy as compared to Alabama poultry farmers.
- * Compared to Alabama cotton growers, Georgia cotton growers are more creditworthy whilst Mississippi, North Carolina and Virginia cotton farmers are less creditworthy.
- * Florida and South Carolina vegetable farmers are more creditworthy compared to Alabama vegetable growers.
- * For fruits farmers, Florida, Georgia, South Carolina and Virginia farmers are more creditworthy as compared to Alabama fruits farmers.
- * Lastly, Georgia, Mississippi and Tennessee dairy product farmers are all less creditworthy in comparison to Alabama dairy product farmers.

Table 3. Marginal Effects of Credit Model Regressions for different farmers

cov_ratio	Grains	Tobacco	Cotton	Vegetables	Fruits	Dairy Pds	Cattle	Poultry
capital_gross returns	0.0005**	-0.001	0.0001	0.0013	0.0003	0.0037	0.0015**	0.0058**
debt_asset ratio	(0.0002)	(0.0009)	(0.0002)	(0.0007)	(0.0002)	(0.0025)	(0.0005)	(0.0024)
Rate of return	0.0003**	0.0002**	0.0001**	0.0002**	0.0006*	0.0068***	0.0001*	0.0034**
Asset_turn over	(0.0002)	(0.0005)	(0.0007)	(0.0007)	(0.0005)	(0.0006)	(0.0006)	(0.0001)
Tenure	(0.0013)	(0.0179)	(0.0021)	(0.0079)	(0.0177)	(0.0433)	(0.0361)	(0.0038)
Florida	(0.0006)	(0.0118)	(0.0011)	(0.0175)	(0.0072)	(0.0251)	(0.0091)	(0.0022)
Georgia	(0.0002)	(0.059)	(0.0027)	(0.0017)	(0.0431)	(0.1133)	(0.0087)	(0.0189)
Kentucky	(0.0014)	(0.0021)	(0.0005)	(0.035)	(0.0129)	(0.1096)	(0.0106)	(0.0105)
Mississippi	(0.0008)	(0.0135)	(0.0024)	(0.0478)	0.0105	(0.0771)	(0.0087)	(0.0222)
North Carolina	(0.0005)	(0.0051)	(0.0013)	(0.0363)	(0.0194)	(0.1152)	(0.0119)	(0.0066)
South Carolina	(0.0009)	(0.0219)	(0.0003)	(0.0301)	(0.0127)	(0.0596)	(0.0082)	(0.006)
Tennessee	0.0006**	0.0137	0.0004	0.0245**	0.0288*	0.0282	0.0278*	0.0084
Virginia	(0.0003)	(0.019)	(0.0011)	(0.0057)	(0.0098)	(0.0986)	(0.0117)	(0.0071)
Robust Standard errors in parentheses	0.0004	-0.018**	-0.0004	0.0175	0.0233	-0.1302**	0.0513**	-0.0209*
	(0.0008)	(0.0087)	(0.0013)	(0.0213)	(0.0121)	(0.061)	(0.007)	(0.0148)
	-0.0001	-	-0.0089*	-0.0029	0.0203*	-0.0967	0.0069	-0.0052
	(0.0011)	(0.0124)	(0.0302)	(0.0114)	(0.0794)	(0.0104)	(0.0098)	(0.0098)

***p<0.01, **p<0.05, *p<0.1

Conclusion

Credit worthiness of different kind of farmers vary across space, are significantly affected by key financial ratios like liquidity, solvency, profitability, and financial efficiency. It is imperative for the lender to evaluate the group of farmer, his/ her area of operation and consequently the likelihood of repayment.

Literature Cited

- Durguner, S. and Katchova, A. L. 2007. "Credit Scoring Models in Illinois by Farm Type: Hog, Dairy, Beef and Grain." Paper Presented at the American Agricultural Economics Association Meeting, Portland, Oregon, July 29-August 1, 2007.
- Durguner, S. and Katchova, A. L. 2011. "Credit Risk Models by Type of Business." *The Business Review*, vol. 19: pp.46-54.
- Escalante, C. L., Barry, P. J., Park, T. A. and Demir, E. 2004. "Farm-Level and Macroeconomic Determinants of Farm Credit Risk Migration Rates." *Agricultural Finance Review*, vol. 64: pp.135-149.
- Novak, M. P. and LaDue, E. L. 1994. "An Analysis of Multi-period Agricultural Credit Evaluation Models for New York Dairy Farms." *Agricultural Finance Review*, vol. 54: pp.55-65.