Financial Assets Held by North Dakota Farmers

Cole R. Gustafson and Sydney L. Chama

Financial Assets Held by North Dakota Farmers

Cole R. Gustafson and Sydney L. Chama*

During the farm financial crisis of the 1980s, numerous surveys at national, state, and regional levels sought to determine the financial position of farmers with differing socioeconomic and structural characteristics (USDA, Jolley, et al.). Information from these surveys was used to formulate targeted public responses to the problem; to assist lenders in quantifying the depth and duration of the problem as it affected their financial institutions' profitability, capitalization and risk bearing capacity; and to aid farmers in making the financial, production, and household resource adjustments that were necessary to cope with the prevailing economic environment.

While significant research focused on farm operators with high financial leverage, little attention was placed on the financial management strategies of farmers with high levels of equity and corresponding low levels of debt. They, too, faced an increasingly complicated decision environment in the 1980s. The deregulation of U.S. financial markets led to the introduction of new financial products and a need for new investment strategies. High-equity farmers are likely to have significant holdings of financial assets. Seventy-five percent of North Dakota's farmers, for example, have off-farm investments exceeding $22,000 (Gustafson, Nielson, and Morehart).

Penson reported that yields of equities, government bonds, and time and savings accounts are important determinants of demand for financial assets in the farm sector. However, financial assets offer unique diversification opportunities to farmers as well. Although prior portfolio studies (Barry, 1980; Bjornson and Innes; Irwin, et al.; and Monke, et al.) have found that returns on nonfarm assets were slightly lower than returns to agricultural assets of comparable systematic risk, investment in financial assets is an attractive means of diversification for many farmers.

If yield and diversification of financial assets are important to farmers, little is known about the size, geographic placement, income return, and risk characteristics of actual investments held by North Dakota farmers. The alternative investments of these individuals have important ramifications for the financial well-being and resiliency of highly solvent farms, the availability of investment/venture capital for rural economic development, and the competitiveness of rural financial institutions.

The objectives of this study are to identify the type of financial assets currently held by North Dakota farmers and to relate their investment selections to the socioeconomic charac-

---

teristics of the farm unit. Following sections describe the economic implications of farmers' alternative investment selections, the survey, and the results.

Background

Before 1980, financial markets were highly regulated to safeguard savers and investors, standardize instruments and practices, modify competition, and respond to imperfections and gaps in financial markets (Barry, 1981). However, these regulations discouraged saving at depository financial institutions when interest rates rose in the latter 1970s, induced financial innovations to circumvent existing regulations, reduced financial intermediation, and impeded flows of funds. As a result, financial market deregulation in the early 1980s removed price ceilings on loans and deposits, limited controls on ownership forms and geographic scope of financial institutions, and expanded the types of products and services that depository institutions could offer.

Deregulation has afforded farmers additional investment opportunities, ranging from interest-bearing checking accounts and money market funds at local banks to mutual and venture capital funds across the nation (Barry and Barnard). This new environment gives rise to the question of whether farmers have taken advantage of new investment opportunities or continue to rely on traditional financial institutions.

Financial assets available to farmers differ considerably in terms of the following investment characteristics: yield, safety, liquidity, inflation hedge, convenience, and tax status. Consequently, the optimal amount (q_i) of a given farmer's portfolio (W_o) invested in financial asset i is likely to change as the array of financial assets expands.

Robison and Barry outline the determination of an optimal portfolio based on the expected return (r_i) of the ith asset ($i=1,...,n+1$), the variance of returns (σ_i) on the ith asset, and the covariance (σ_{ij}, where $i \neq j$) for the various choices in a given farmer's choice set.[1] The expected return of a portfolio comprised of $n+1$ assets is:

$$E(y) = \sum_{i=1}^{n+1} r_i q_i \qquad (1)$$

However, investments in $n+1$ assets, $\sum_{i=1}^{n+1} q_i$, are limited by each farmer's initial wealth W_o:

$$W_o = \sum_{i=1}^{n+1} q_i \qquad (2)$$

Solving (2) for q_{n+1} yields:

$$q_{n+1} = W_o - \sum_{i=1}^{n} q_i \tag{3}$$

which can be substituted into (1) to show the relationship between expected returns and initial wealth:

$$E(y) = \sum_{i=1}^{n} (r_i - r_{n+1}) q_i + r_{n+1} W_o \tag{4}$$

The variance of portfolio returns is:

$$\sigma^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} \sigma_{ij} q_i q_j \tag{5}$$

To maximize expected utility, the farmer must allocate initial wealth among competing investment alternatives. If λ represents the farmer's average absolute risk aversion, equations (4) and (5) can be substituted into the certainty equivalent model:

$$y_{ce} = E(y) - \frac{\lambda}{2} \sigma^2 \tag{6}$$

to determine the optimal q_i's which maximize expected utility when investment funds are limited:

$$y_{ce} = \sum_{i=1}^{n} (r_i - r_{n+1}) q_i + r_{n+1} W_o - \frac{\lambda}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \sigma_{ij} q_i q_j \tag{7}$$

Taking partial derivatives of (7), setting them equal to zero, and expressing the result in matrix form, yields the demand for each individual asset q_j:

$$q_j = \sum_{i=1}^{n} (r_i - r_{n+1}) \frac{D_{ij}}{D_\lambda} \tag{8}$$

where D equals the determinant of the matrix of variances and covariances and D_{ij} is the cofactor of the (i,j)th element of D.

Now, assume financial market deregulation changes the probability density function for asset q_j returns. To what extent will q_j substitute or complement existing assets in the portfolio? If the covariance between asset i's and j's returns are positive, then the assets substitute for each other because the demand for asset j decreases as the return on asset i increases:

$$\frac{dq_i}{dr_i} = \frac{D_{ij}}{\lambda D} = \frac{\sigma_{ij}}{\lambda D} D(i,j) < 0 \text{ for } \sigma_{ij} < 0 \tag{9}$$

where D(i,j) is the original determinant D with the ith row and jth column removed. The converse is true for complimentary assets with negatively correlated returns:

$$\frac{dq_i}{dr_i} = \frac{-D_{ij}}{\lambda D} = \frac{-\sigma_{ij}}{\lambda D} D(i,j) > 0 \text{ for } \sigma_{ij} > 0 \tag{10}$$

Increasing returns on the ith asset lead to greater demand for the jth asset.

Interestingly, Robison and Barry go on to show that if one of the assets (q_{n+1}) is risk-free and the remaining n assets are identically distributed, the optimal solution will contain an infinite number of risky assets. Further, diversification will continue to increase if either wealth or risk aversion increases.

But, if acquisition of the risky asset involves a fee or learning cost, the optimal solution is no longer to diversify away all risks. Thus, if investing is inconvenient (i.e., requires either travel or education costs), the portfolio selections of farmers will be less than optimal.

Secondary Impacts

The secondary impacts of farmers' financial asset selections have important implications for rural economic development and the prosperity of rural financial institutions. Farmers' placement of financial capital in local financial institutions enhances their ability to lend locally and stimulates economic activity.

Several studies have quantified the impact of local commercial bank lending decisions on community development. Dreese identified specific bank lending policies that heightened economic growth in Appalachia. Minsky found that commercial bank lending policies and financial services contributed greatly to California's economic development. Finally, Pariser concluded that efficient, well-managed commercial banks in North Dakota complimented community economic development.

However, greater community economic activity also increases the prosperity of rural financial institutions which, in turn, enhances their ability to lend locally. Gustafson and Beauclair quantified the simultaneous relationship that exists between community development and commercial bank performance. Their results indicate a strong circular relationship whereby economic activity at the retail, wholesale, and farm levels in North Dakota is strongly influenced by commercial bank lending policies, which, in turn, raises bank profits and the availability of loanable funds.

Survey Methods

A random mail survey of 473 North Dakota farmers was conducted to obtain information on their motives for saving as well as the investment characteristics of their selected financial assets. The survey instrument consisted of five sections (Chama). Section one elicited the respondents' attitudes and opinions towards financial planning, financial markets, and deregulation. The second section identified the respondents' motives for saving.

In the third section, respondents completed a matrix that yielded information on the size, type, and geographic location of their financial assets. Alternative types of financial assets included currency, savings accounts, checking accounts, certificates of deposit, U.S. government securities, corporate bonds, common stocks, mutual funds, farm real estate,[2] nonfarm real estate, precious metals, collectibles, and other assets. Geographic alternatives

included the following: within county of residence; within other counties of North Dakota; within surrounding states of Minnesota, South Dakota, or Montana; within other U.S. states; or geographic location unknown. Seven categories of size, ranging from less than $1,000 to more than $100,000, were identified. The respondents' interest in rural development, satisfaction with their current investment portfolio, attitude toward risk, and sources of investment information also were requested.

In section four, the respondents to rated the relative importance of yield, safety, liquidity, inflation hedge, convenience, tax consequences, paperwork, location, and personnel in their selection of financial assets. The final section obtained information on the socioeconomic and financial characteristics of the farm unit, including age, family size, and education of the respondent as well as the enterprises, income, assets and liabilities of the farm. The last section also screened respondents to exclude retired farmers and nonfarmers from the study.[3]

Pretest and Response Rate

A pretest of the survey instrument was conducted to check the clarity, relevancy, and reliability of questions asked. After a second mailing to nonrespondents, a total of 90 useable questionnaires were obtained for a response rate of 20 percent. The sensitivity of the information being elicited and the timing of the mailings during spring fieldwork activities were negative factors affecting the response rate.

Nonresponse Bias

A population test of nonresponse bias (De Vaus) revealed an under-representation of young farmers (less than 25 years of age) and small farms (less than 500 acres) compared to 1987 Census statistics. None of the survey respondents were less than 25 years of age. Yet 3.2 percent of the North Dakota farmers fall within that classification according to Census statistics. Only 9.1 percent of the survey respondents operated farms of less than 500 acres, but the Census reports that 24.1 percent of all North Dakota farms are that small. A probable explanation is the farm financial crisis, which curtailed the operations of many beginning farmers. A respondent test of nonresponse bias (Fowler) detected no statistical differences in socioeconomic characteristics, financial asset holdings, or saving motives across survey mailings.

Study Results

Although the average age of the 90 respondents was 50 years, only 6 percent of the respondents were over age 65. The respondents had an average family size of three. Half of the respondents graduated from high school and nearly a fourth graduated from college. They had been farming for an average of 25 years and farmed an average of 1,050 acres. The distribution of the respondents' net taxable farm incomes and value of farm assets is shown in Table 1.

Motives for Saving

Their motives for saving included: future emergency (92 percent), retirement (91 percent), investment (69 percent), education of children (63 percent), inheritance to children (49 percent), and to buy a house (48 percent). The divided interest in bequeathing wealth to dependents does not align with Modigliani, who estimated only modest (15.5- 18.5 percent) intergenerational transfers. David and Menchik suggests that intergenerational transfers may account for up to 60 percent of total transfers.

Investment Attitudes

Sixty percent of the respondents thought North Dakota farmers had adequate investment opportunities. While 53 percent of the respondents said that farm and rural people were not at a disadvantage when investing, nearly two-thirds of the respondents agreed that impartial investment advice was difficult to obtain. Consequently, 90 percent of the respondents managed their investment portfolios themselves. Experience (60 percent), newspapers (37 percent), magazine articles (35 percent), and advisers (30 percent) are major sources of investment information. Nearly half of the respondents (44 percent) did not understand financial investment concepts, and 26 percent of the respondents expressed a need for a financial planner. Uninformed respondents either had less education or were older than average. Thus, a significant need for educational programs on the topics of financial investment and financial asset management appears to exist in rural areas.

Sixty percent of the respondents said that financial institutions were not as financially secure as they were in the past. However, 80 percent reported that recent uncertainty surrounding financial markets had not affected their investment behavior.

Slightly more than half of the respondents (54 percent) felt that farmers should increase patronage of local financial institutions. Less than half of the respondents (49 percent) would invest locally to aid rural development. Apparently, either the respondents did not understand the economic linkages embodied in local finance or the personal benefits of such activity did not outweigh the opportunity costs involved.

Important factors influencing their choice of financial assets were yield (85 percent), safety (85 percent), tax consequences (79 percent), friendliness of service (77 percent), and convenience (72 percent). Respondents who were younger, more educated, or either had greater income or wealth placed increased emphasis on yield and safety. Least important factors were geographic location and paperwork requirements. Eighty-eight percent of the respondents rated themselves as either somewhat or very conservative with respect to their investment actions.

Financial Asset Holdings

In terms of frequency, more than 80 percent of the respondents had investments in savings accounts, checking accounts, and farm real estate (Table 2). Over half of the farmers owned a certificate of deposit. Farm investors find these investments attractive because they are widely available at most rural financial institutions, yield stable returns, and require minimal oversight on part of the investor.   Less than a third of the respondents reported investments in mutual funds, government securities, or common stocks. Respondents selecting stocks or mutual funds possessed either higher incomes, more wealth, or more education than average. Except for government securities, these investments yielded higher but more variable returns and generally required greater investor participation. Moreover, mutual funds and stocks cannot be acquired at local banks or savings and loan associations where respondents typically locate their transactions accounts. Consistent with the earlier theoretical development of investment inconvenience (i.e., imposition of either travel or education costs lessens portfolio diversification), the portfolio selections of farmers appear to be less than optimally diversified given the limited presence of stocks, mutual funds, or government securities among older and less affluent respondents. These individuals did not have the incentive or the means to gain expertise in financial asset management.

When investments were weighted according to value, the respondents' financial assets were concentrated in farm real estate (Table 3). On a value basis, farm real estate comprised 50 percent of the respondents' portfolios. Although widespread in terms of frequency, the value of the respondents' certificates of deposits, savings accounts, and checking accounts ranged from only 6 to 8 percent of their total investment portfolio. The high concentration of illiquid farm real estate in the respondents' investment portfolio directly conflicts with their highest motive for saving, for future emergency, but may align with their other motives of retirement and investment.

Forty-five percent of the respondents were satisfied with the composition of their present portfolio; while 15 percent were not. The remainder were indifferent. Those dissatisfied were younger than average and wanted to invest more in farm real estate and fixed yield assets. Farm real estate investment was preferred because the respondents understood the investment. Respondents favored fixed-yield assets because they provided an income stream that balanced variable farm earnings. If the respondents were to receive a windfall, new marginal funds would be invested in certificates of deposit (37 percent), mutual funds (20 percent), and farm real estate (18 percent).

The geographic location of their investments was primarily within their own county and other North Dakota counties (Table 4). Only 10 percent of all investments were located outside the state. Thus, few respondents have taken advantage of the geographic liberalization that deregulation of financial markets affords.

147

Conclusion

North Dakota farmers responding to this mail survey have not taken great advantage of the financial innovations afforded by deregulation of financial markets. Their investments are concentrated in local savings accounts, checking accounts, and farm real estate. Few respondents had investments outside of the state. In addition, less than a third of the respondents reported holdings of mutual funds, government securities, or common stocks. Nearly all of the respondents managed their own investment portfolios and were primarily concerned with the yield and safety of financial assets. They saved primarily for emergency and retirement.

The results of this study raise several interesting questions. First, if farmers and other rural residents continue to patronize rural financial institutions, why are capital shortages still perceived to exist in rural areas - especially for economic development? A study investigating the investment and portfolio management activities of rural financial institutions appears warranted. Secondly, why do farmers' investments remain concentrated in agriculture. Further study of farmers' financial management skills and risk-bearing capabilities, the transaction costs associated with financial asset investing in rural areas, and the ability of rural financial markets to provide the necessary equity capital that would permit financial asset diversification on the part of farmers is also needed.

Footnotes

1. For mathematical brevity, several intermediate steps are omitted. Refer to Robison and Barry for derivation of these results.

2. Although farm real estate technically is not considered a financial asset, it is included in the analysis because of the importance it is expected to have in the respondent's investment portfolios.

3. Nonfarms are defined by the U.S. Department of Agriculture and the Census of Agriculture to be any establishment that sold or would sell less than $1,000 of agricultural products in one year.

References

Barry, P.J. "Capital Asset Pricing and Farm Real Estate." *Amer. J. Agr. Econ.* 62(1980):548-53.

Barry, Peter J. "Impacts of Regulatory Change on Financial Markets for Agriculture." *Amer. J. Agr. Econ.* 63(1981):905-912.

Barry, Peter J. and Freddie L. Barnard. "Interaction Effects on Rural Financial Intermediaries of Financial Stress and Deregulation." *Amer. J. of Agr. Econ.* 67(1985):1191-95.

Bjornson, B. and R. Innes. "Another Look at Returns to Agricultural and Nonagricultural Assets." *Amer. J. Agr. Econ.* 74(1992):109-119.

Chama, Sydney L. *Saving and Investment Patterns of North Dakota Farmers*, Unpublished M.S. thesis, Dept. Agr. Econ., North Dakota State University, September 1991.

David, M. and P. Menchik. "Distribution of Estate and Its Relationships to Intergenerational Transfers." Statistics of Income and Related Administration Record Research Statistics of Income Division, Internal Revenue Service, Department of Treasury, October 1982.

De Vaus, A.D. "Contemporary Social Research." *Survey in Social Research*, Dept. of Soc., Latrobe University, Melbourne, 1986.

Fowler, Floyd J., Jr. "Applied Social Research Methods Series." *Survey Research Methods, Vol I.* Saye Publications, Beverly Hills, California, 1984.

Gustafson, Cole R. and Shaun C. Beauclair. "Community Development and Commercial Bank Performance: A Mutually-Dependent Relationship." *J. Comm. Dev. Soc.* 22(1991):83-97.

Gustafson, Cole. R., Elizabeth Nielsen, and Mitchell J. Morehart. "Comparison of the Financial Results of Recordkeeping and Average Farms in North Dakota." *N. Centr. J. Agr. Econ.* 12(1990):165-72.

Irwin, S., D. Forster, and B. Sherrick. "Returns to Farm Real Estate Revisited." *Amer. J. Agr. Econ.* 70(1988):580-87.

Jolley, Robert W., Arnold Paulson, James D. Johnson, Kenneth H. Baum, and Richard Prescott. "Incidence, Intensity, and Duration of Financial Stress Among Farm Firms." *Amer. J. Agr. Econ.* 67(1984):1108-1115.

Minsky, H.P. *California Banking in a Growing Economy, 1946-75.* Institute of Business and Economic Research, Berkeley, California, 1965.

Modigliani, F. "The Role of Intergenerational Transfers and Life Cycle Saving in the Accumulation of Wealth." *J. Econ. Pers.* 2(1988):15-40.

Monke, J., M. Boehlje, and G. Pederson. "Farm Returns: They Measure Up to Returns to Other Investments." *Choices* 7(1992):28-30.

Pariser, D.B. *Structure and Performance of the North Dakota Commercial Banking System, 1962-71.* Bureau of Business and Economic Research, University of North Dakota, Grand Forks, 1974.

Penson, J.B. "Demand for Financial Assets in the Farm Sector: A Portfolio Balance Approach." *Amer. J. Agr. Econ.* 54(1972):163- 173.

Robison, Lindon J. and Peter J. Barry. *The Competitive Firm's Response to Risk.* Macmillan Publishing Co., New York, 1987.

U.S. Department of Agriculture. *Financial Characteristics of U.S. Farms, January 1, 1988.* Agricultural Information Bulletin 551, Washington, D.C., Economic Research Service, October 1988.

TABLE 1. NET FARM INCOME AND TOTAL FARM ASSETS OF RESPONDENTS

	Percent of Respondents	Median Value
Net taxable farm income:		
Net loss	12.2	
Less than $5,000	8.5	
$5,000 - $9,999	15.9	
$10,000 - $19,999	20.7	$15,000
$20,000 - $34,999	19.5	
$35,000 - $49,999	11.0	
$50,000 and over	12.2	
Total farm assets:		
Under $200,000	32.5	
$200,000 - $399,999	27.3	
$400,000 - $599,999	18.2	$300,000
$600,000 - $799,999	6.5	
$800,000 - $999,999	3.9	
$1,000,000 and over	11.7	

TABLE 2. FREQUENCY OF RESPONDENTS HOLDING VARIOUS FINANCIAL
ASSETS

Financial Assets	Percent of Respondents Holding Asset
Checking account	97
Farm real estate	89
Savings account	83
Cash	79
Certificates of deposit	60
Nonfarm real estate	34
Mutual funds	30
U.S. government securities	29
Common stocks	27
Other nonfarm investments	25

TABLE 3. PROPORTION OF RESPONDENTS' FINANCIAL ASSETS BY ASSET
CATEGORY AND INVESTMENT VALUE

Asset Category	Investment Value				
	Under $25,000	$25,000 -49,999	$50,000 -99,999	Over $100,000	Total
	------------------------------percent of total financial assets-------------------------				
Farm real estate	0	2	6	42	50
Nonfarm real estate	0	1	3	4	8
Certificates of deposit	1	3	1	3	8
Savings account	2	1	2	2	7
Checking account	2	1	1	2	6
Mutual funds	0	1	2	2	5
Common stocks	1	0	1	2	4
Corporate bonds	0	1	0	2	3
U.S. government securities	0	1	1	1	3
Others	1	1	1	3	6
Total	7	12	18	63	100

TABLE 4. GEOGRAPHICAL LOCATION OF FINANCIAL ASSETS BY INVESTMENT VALUE

Item	Within County	In Other North Dakota Counties	In Minnesota, Montana, or South Dakota	Outside the Northern Plains Region	Total
	-----------------------------percent-----------------------------				
Farm real Estate	43	6	1	0	50
Nonfarm real estate	7	1	0	0	8
Certificates of deposit	5	2	1	0	8
Checking account	4	2	0	0	6
Savings account	3	2	0	2	7
Mutual funds	3	0	0	2	5
Common stocks	2	0	0	2	4
Corporate bonds	2	0	0	1	3
Other	5	3	0	1	9
Total	74	16	2	8	100