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DISCUSSION: RISK AND FINANCIAL MANAGEMENT IMPLICATIONS FOR FIRM GROWTH IN AN UNCERTAIN MARKET

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The Walker, Hardin, Mapp, and Roush (WHMR) article has the stated purpose to "develop and present a firm growth and estate planning model capable of addressing most of the complex firm growth and estate planning issues currently facing farm operators." Emphasis is on father-son arrangements, estate transfer costs, net value of property transferred, and liquidity positions under conditions of risk and uncertainty and differing economic patterns affecting land values and capital requirements. The importance of these matters is clearly established in the introductory section of the article.

A simulation approach was selected over alternatives such as multiperiod programming. The need for an on-line package to assist individual farmers and the general suitability of simulation for research on the economics of growth and estate planning of farm firms are given as the major reasons for development of the particular models. The resulting two models can be described as rich in real world content pertaining to a father-son entry, exit, transfer sequence in Great Plains wheat and cattle agriculture. Stochastic simulation of father and son firm growth coupled with deterministic modeling of father exit and transfer to the son provides both the extension and research tools proposed by the authors.

FIRM GROWTH AND SURVIVAL SIMULATOR

Situations included in the analysis and results of the study represent a range of economic projections related to land value, prices of farm inputs and products, initial equity position, and gift strategies. Base assumptions resulted in 98 son failures in 100 runs of the model, whereas the father's net worth remained essentially unchanged in the worst results, increased 3.7 fold in the best results, and increased 2.5 times on the average in 100 runs. The number of farm failures by the son in relation to the success of the father raises concern about the construction of father-son alternatives. The authors indicate that the father

could provide assets to secure the son's loan in a majority of iterations.

Formal testing of the effect of the father's support on the son's survival was made in three situations involving alternative gift strategies and land value appreciation rates: (1) a \$3,000 annual gift to the son with 4 percent land value appreciation, (2) a \$3,000 annual gift plus a gift of land in year 11 with 4 percent land value appreciation, and (3) a \$3,000 annual gift with 7 percent land value appreciation. The \$3,000 annual gift resulted in an improved son situation without causing any father failures in 100 model runs. The annual gift plus a land gift in year 11 added further to the son's survival, but caused a father failure in 3 out of 100 runs. Land value appreciation of 7 percent, rather than the base 4 percent, yielded more substantial results than either of the gift strategies.

Do the situations presented adequately explore the trade-off in father-son viability? Are there feasible plans for increasing survival of the son without unduly damaging the situation of the father? The authors indicate that the simulation models presented are capable of considering alternative business organizations. The degree of son versus father failures in the WHMR analysis suggests a need to examine further the father-son arrangements. The father-son partnership and family corporation are the standard alternatives to the proprietorship business organization. These options should be explored and compared with the results presented.

Perhaps there are other proprietorship arrangements that should be considered. Land and non-land asset leasing, purchase of custom services rather than expensive machines, and even custom cattle feeding are frequently suggested [1]. Indexed (based on farm income) and even deferred principal and interest payments could increase firm survival without extreme lender risk in periods of inflating price levels. More conservative control over the son's line of credit should also be evaluated. The WHMR analysis permits new loans as long as a specified equity ratio limit (equity/long-term assets $\geq .2$) is not violated. The same equity ratio is

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This article discusses the original Walker, Hardin, Mapp and Roush paper as it was presented in New Orleans at the annual meeting of the Southern Agricultural Economics Association. The WHMR article as it appears in this Journal has been significantly revised including deletion of the section examining alternative models for financial management.

used in the model as the "survival test." Thus the son is either able to increase his debt, or is out of business. A dual control over borrowing and failure is suggested. One control would signal business failure as an equity ratio below a specified level. A second control would permit new loans only when the equity ratio exceeds a somewhat higher level.

Are there less conventional arrangements available to the father-son combination that could increase overall growth? Assume the father and son have very different taxable incomes. Perhaps the son has no taxable income. The father could buy a needed new combine and receive greater benefit from investment tax credit. Through reasonable exchange of land preparation and planting equipment for combining equipment, each business could have timely operation with less total initial cost as a result of the tax credit.

ESTATE PLANNING SIMULATOR

Transfer of farm assets to the son from the father and mother estates is presented for high (favorable yields and prices), medium (average yields and prices), and low (poor yields and prices) runs of the firm growth simulator. Four situations are illustrated: no gift, \$3,000 annual gift, \$3,000 annual gift plus a land gift at 4 percent land value appreciation, and a no gift 10 percent land value appreciation. At 4 percent land value appreciation, the son's, eventual survival must be seriously questioned. Only the \$3,000 annual gift plan yielded a positive equity for the son at the second death under the medium or average yield and price assumption. As a contrast, high, medium, and low runs had positive son equity at the second death under the 10 percent land value appreciation, no gift situation. The high or favorable yield and price assumption was always positive, but is of little interest to anyone other than a risk seeker. Thus, land inflation takes its recognized role in farm financial success.

In a breakeven type of analysis, WHMR determined 7 percent land value appreciation as the necessary level to divide approximately equally the survival and failure runs for the son. This situation was not run for the father because survival was determined essentially certain at the 4 percent land value appreciation level.

Land value appreciation as the key determinant of survival for the son gives very little comfort. Land values are high because of productivity and anticipated future inflation. The market places extreme pressure on entrants into farming, because ever-increasing land values increase both the anticipation of eventu-

al success and the difficulty of carrying through with the entry process.

Like the firm growth analysis, the WHMR estate planning results are not encouraging to the son situation. However, the father situation is strong under high, medium, and low runs. An obvious alternative analysis would include an increase in life insurance on the father. A beginning financial position of \$650,000 assets, \$160,000 liabilities, and \$490,000 in net worth, plus a farm income stream sufficient to accumulate \$1,240,000 in ending net worth, could most likely support added life insurance, especially in light of the level of risk carried by the son throughout and at the end of the simulated period. Another \$100,000 of life insurance on the father appears to improve the son's equity greatly at the second death. In fact, this amount should be sufficient to eliminate all negative equity positions for the son after the father and mother deaths.

A low level of life insurance on the part of exiting farm operators is probably not uncommon. Even so, the firm growth estate planning simulation models presented by WHMR provide an excellent means of analyzing the proper balance among income, equity positions, and life insurance of farm families.

A CONCLUDING COMMENT

The task of developing the foregoing discussion of the WHMR article was most satisfying. The models presented will serve both extension and research purposes as proposed by the authors. However, two additional limitations of the presented models must be considered. First, the Great Plains wheat and cattle agriculture is somewhat limited in terms of diversification as a strategy to reduce income variability. Second, the stochastic procedures used in the firm growth simulator are not designed to assess shocks such as a complete crop failure or even a high income year such as 1973 in many parts of U. S. agriculture.

Even though diversification options are fewer in Great Plains agriculture than in southeast agriculture, certain options could be considered. A key option which is available to farmers in either region is custom cattle feeding. In a risk and uncertainty analysis, care should be taken to include as many diversification options as possible. A risk-spreading option included in multiperiod programming solutions of a Georgia farm is grain storage [2]. This option is particularly useful in informal income averaging to reduce income taxes. It also applies to Great Plains wheat farming.

WHMR recognizes that the simulation models can accommodate shocks such as an

untimely death. Similarly, crop failures and extremely high income years could be included in the model runs. Even the best-made plans can be substandard in the event of extreme shocks. One concern of the WHMR analysis is the treatment of beef prices. Stocker prices "in the \$50 range" appear to be somewhat limited in ability to reflect economic conditions observed in the 1970's.

The WHMR article presents a useful addition to the firm growth estate planning metho-

dology and tools available to commercial agriculture. Some of my comments are beyond the scope intended by the authors. They are not, however, beyond the scope of the subject, "Risk and Financial Management Implications for Firm Growth in an Uncertain Market." They may be of some interest to researchers with a continuing interest in this topic.

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