DISCUSSION: ISSUES IN AGRICULTURAL LAND MARKETS: AN EMPIRICAL PERSPECTIVE

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Vandeveer provided an analysis of issues in agricultural land markets and discussed impacts on farm structure and the distribution of wealth. Many policies either directly or indirectly affect land values and thus have an impact on many groups in society. Implementation of solutions to land use problems such as soil erosion and farmland retention will invariably alter property rights. Thus, research is needed to explain the likely consequences of alternative policies. Economic research can provide useful information as long as empirical estimates are based on sound theoretical models and appropriate data.

In 1982, the Economic Research Service sponsored a workshop on rural land values to assess research and data needs in this area (Wunderlich). The proceedings from that workshop included papers covering a broad range of relevant topics such as: concepts of value, effects of taxation, validity of data, and research needs to mention a few. It was recommended that public institutions continue to conduct research on local, regional, and national land markets in order to explain cross-sectional and time-series variation in land values. Workshop participants also discussed the importance of using appropriate land value theory on which to base empirical studies of market behavior.

CRITIQUE OF LAND VALUE THEORIES

Vandeveer utilized the asset valuation theory to analyze aggregate land value relationships over time. He relied heavily on Melichar's contention that the capitalization formula should include an allowance for growth in annual returns. Melichar claimed that an increase in the annual growth rate of the current return will cause: (1) an increase in land values, (2) a decrease in the annual current return as a percentage of asset value, and (3) an increase in the annual capital gain as a percentage of asset value. The reduction in annual current return as a percentage of asset value would result in cash flow problems if debt is used to purchase land. However, the role of debt is not explicitly stated in the growth model. As Harris showed, the growth model may be expressed as:

$$(1) \quad V_o = \frac{R_o \, (1+g)}{(k-g)},$$

where V_o represents current value, R_o is current income, g is the expected rate of growth of current income over time, k is the capitalization rate, and $k > g > 0$.

Shalit and Schmitz have shown that this formulation *"holds for a world without credit restrictions and for a steady-state growth pattern."* They point out that these features are not representative of U.S. agriculture. Shalit and Schmitz developed a life-cycle model for land accumulation and concluded that *"farmland price is determined principally by accumulated debt and less strongly by farm income."* Variables such as net income change rate, land price change rate, interest rate, and debt change rate were of minor importance. They also indicated that debt per acre increases with land prices and declines as farm numbers increase.

Castle and Hoch estimated land prices as the sum of: (1) the capitalized value of net rent, (2) the capitalized value of capital gains arising from factors specific to the agricultural sector, and (3) the capitalized value of gains or losses from changes in the real value of debt. In their analysis, the interaction of inflation, market interest rates, and debt was an important component of land price. As long as market interest rates do not fully account for inflation, an increase in debt leads

to an increase in land prices. From the results of the Shalit and Schmitz and Castle and Hoch studies, one would conclude that debt financing of land purchases plays an important role in land market behavior.

Feldstein used a model of portfolio equilibrium under uncertainty to examine the relationship between land prices and tax rates, rates of return, the expected inflation rate, and the total wealth in land and capital. He found that the interaction of taxes and increased inflation causes a rise in the real value of land.

The point to be made of these relationships is that the asset valuation model used by Vandeveer and others is just one of many theories. It would be helpful if a theory could incorporate the major characteristics of the phenomenon being studied. Land purchases are generally longterm in nature and thus will generate uncertain future income and wealth levels of farm businesses. Land comprises a large percent of the total asset value of farms. The amount of debt used to purchase land is usually a large proportion of the purchase price. Unfavorable returns may create cash flow problems for investors unless other sources of income are used to subsidize the land purchase. Capital gains are taxed differently from annual income. Thin local land markets would tend to make investments in land less liquid than other investments. It should be clear that many factors influence the behavior of land market participants. Modeling the wide range of relationships has been, is, and will continue to be a tremendously difficult task.

QUESTIONS NEED ANSWERS

Vandeveer sees three areas where further discussion is needed: (1) motives—profit versus wealth, (2) measurement of benefits—residual returns versus cash flows, and (3) measurement of market expectations. Vandeveer had provided food for thought that should be beneficial to researchers. In addition to profit and wealth motives, there are many other behavioral postulates from which to choose. The derivation of models and refutable hypotheses will allow researchers to select appropriate variables. I am more concerned about the availability of data and the validity of empirical techniques that are used to test hypotheses.

Regarding the problems in measuring market expectations, I must disagree with Van-

deveer's approach. In his equation (6), Vandeveer expresses the growth model as:

$$(2) \quad \frac{R_1}{V_o} = r - g ,$$

where R is presumed to be the realized aggregate residual cash flow to land at the end of the year, V_o is the aggregate value of land at the beginning of the year, r is the expected discount rate, and g is the expected growth rate of annual cash flows. First, Vandeveer contends that the ratio R_1/V_o represents an estimate of the expected capitalization rate $(r-g)$, an expectation that would, in fact, occur at the beginning of the year. The ratio R_1/V_o more exactly represents a realized rate of return at the end of the year. At the beginning of the year, the expected R_1 is unobservable and could be quite different from the realized R_1 at the end of the year. According to the data for Louisiana, this observed ratio varies over time. It would be better to presume that the ratio for year t represents an expectation for year $t+1$.

Second, certain aspects of the regression model appear to conflict with the theory. Vandeveer's model (equation (7)) may be expressed using my notation as:

$$(3) \quad \frac{C_t + D_t - D_{t-1}}{V_t} = a + b_1 C_t +$$
$$b_2 (V_t - D_t) + u ,$$

where C_t = residual production cash flow to real estate during year t, V_t = real estate value at the beginning of year t, and D_t = farm mortgage debt in year t. In theory, g represents the growth rate of annual returns and is also equal to the growth rate of capital gains. To use equity $(V_t - D_t)$ as a measure of expected growth in earnings seems to conflict with the theory. Furthermore, using the same variables on both sides of the equation would probably provide suspect results. In Vandeveer's Table 2, discount rates around 20 percent and expected growth rates in earnings around 15 percent are produced for the years 1974 to 1981. Surely, Louisiana farmers were not that optimistic.

I would prefer to see the data converted to per acre values and the model respecified so that land values in the current period are a function of residual returns, capital gains, and debt in the previous period. I believe this type of model would be more informative than Vandeveer's specification.

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