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WHAT IS AGRICULTURAL LAND VALUE?

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North Dakota has joined several states in valuing farm real estate by its productivity for ad valorem (property) tax purposes. Agricultural value potentially differs from market value of farmland in some important ways. Market value of farmland is created in the real estate market from the actions of buyers and sellers. It reflects the sum of: (1) what an investor is willing to pay today for the future annual income stream generated by the agricultural use of land (its agricultural value), and (2) its value as a hedge against loss of real purchasing power due to inflation. This brief paper discusses agricultural value and contrasts it with market value of farmland. The purposes are: (1) to provide definitions and applications of frequently used terms, and (2) to review how agricultural value is implemented under North Dakota law.

Definition of Terms

Practitioners commonly use the capitalization of income approach to estimate agricultural value. Capitalization of income is simply a short-cut way of converting an assumed constant future stream of income into an equivalent value today. Estimation of agricultural value is not an exact science, even though the mathematical expression makes the capitalization approach appear to be quite exact. The capitalization of income approach employs the equation:

$$V = I/R$$

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where V is the estimated agricultural value of farmland; I is the expected annual net returns to farmland; and R is the appropriate capitalization rate.

The simple form of the capitalization equation makes its use appear easy and desirable in estimating property values, but this may be misleading. The key words are "expected" annual net returns and "appropriate" capitalization rate, since both are potential sources of error in estimating agricultural value.

The annual net return to land is the annual income generated as a return to the land resource, excluding the return associated with labor, management, and nonland purchased inputs (including interest). The net return to land reflects the long-run, average return in its agricultural use.

Farmers are aware that annual net incomes are quite variable due to numerous production and market factors. However, buyers may not use a sufficient number of years on which to base a realistic estimate of land productivity when prices and/or yields are highly variable: ASCS proven yields could be used to estimate average yields, but not exclusively, since they reflect above-average yield expectations. Similarly, the commodity prices used should reflect average actual prices received for the primary crops grown based on recent past and projected future prices.

The return to land can be more directly approximated by what farmers are willing to pay for the use of land--its rent. Two rental arrangements dominate the rental market, cash rent and share rent. Table 1 contains average gross cash rents paid by farmers in North Dakota for whole farms (cropland and noncropland) from 1970-84.

TABLE 1. AVERAGE GROSS CASH RENTS, MARKET VALUE CAPITALIZATION RATES AND FEDERAL LAND BANK MORTGAGE RATES IN NORTH DAKOTA, 1970-84

Year	Average Gross Cash Rent[a]	Landowner's Share of Gross Returns[b]	Market Value Capitalization Rate[c]	Average Federal Land Bank Mortgage Rate[d]
	$/Acre	$/Acre	%	%
1970	$ 8.49	$ 6.19	9.03	6.81
1971	8.51	6.26	8.95	7.22
1972	8.66	6.42	8.84	7.43
1973	9.70	7.32	8.99	7.51
1974	13.40	9.62	9.31	7.53
1975	15.10	12.01	7.74	7.67
1976	19.90	13.34	8.43	7.81
1977	20.10	14.34	7.34	8.04
1978	19.70	15.36	6.57	8.26
1979	22.40	15.27	6.46	8.51
1980	24.10	15.41	6.04	8.84
1981	25.50	15.91	6.10	9.54
1982	27.30	18.13	6.84	10.39
1983	26.90	19.63	6.97	11.04
1984	28.50	19.83	8.05	11.56

[a] Average rent paid for whole farms, (USDA, Farm Real Estate Developments).
[b] Landowner's share is estimated based on the current (1984) state law definition of the returns to agricultural real estate. The North Dakota State University land valuation model was used to derive the series shown.
[c] The ratio of average cash rent/acre for whole farms divided by average market value of farmland, (USDA, Farm Real Estate Developments).
[d] Five-year moving average of the annual FLB mortgage rate in North Dakota.

The capitalization rate is an interest (or discount) rate which represents the annual rate of return an investor is willing to accept over the life of a prospective investment. The "cap" rate converts the annual expected return of the investment to an estimate of its value today (its present value). Dividing the cap rate, say 5 percent, into 1.0 yields an income multiplier of 20 (1.0/.05=20). An income multiplier of 20 indicates that it would take about 20 years of net income (assuming 5 percent annual return) to pay for each $1.00 of farmland. Alternatively, if the buyer were willing to accept a 5 percent rate of return he would be willing to pay 20 times the annual net return per acre to own the land, based on its agricultural income. Under current North Dakota law sets the cap rate at 7.8 percent, which suggests that land should be valued at 12.82 times earnings (1.0/.078=12.82).

The cap rate will vary depending on: (1) current and projected market and economic conditions, (2) expected tax position of the buyer(s), and (3) the concept of value the buyer is trying to approximate (e.g., market value versus agricultural value). Different cap rates could be suggested.

A market value cap rate would convert a given expected net return per acre into an estimate of its market value. A market cap rate is not observable, however, it can be approximated by computing the ratio of average cash rent paid to the market value of farmland in the area. The market cap rate varies by farming area, but at the state level it was between 6-7 percent during 1980-1982, and increased to about 8 percent by 1984 (see Table 1) as market values declined and cash rents remained relatively stable.

An agricultural cap rate can be approximated by a mortgage interest rate. Mortgage interest payments represent the cash flow required to service debt on land out of annual agricultural net returns. For that reason the Federal Land Bank (FLB) mortgage rate is frequently used as an agricultural cap rate. Table 1 contains a 5-year, moving average of the variable mortgage rate which farmers paid on new FLB mortgages between 1970-84. Comparison of the FLB average rate and the market value cap rate indicates that the market cap rate was consistently higher than the FLB rate from 1970-76. The FLB rate surpassed and remained above the market cap rate from 1977-84.[1]

Comparison of Agricultural and Market Values

The two capitalization rate series shown in Table 1 were used to "capitalize" the gross cash rent series. Gross cash rent divided by the market cap rate results in the average market value. Gross cash rent divided by the FLB rate results in the agricultural value. Both values are illustrated in Figure 1. The resulting market value of farmland is less than the corresponding capitalized agricultural value prior to 1977, and greater than agricultural value in the 1977-84 period. The agricultural value in 1970 was 32 percent higher than market value, by 1984 the agricultural value estimate was 30 percent below the market value estimate. This reversal is due to changes within the respective capitalization rates. The FLB rate increased as inflation escalated, but the market cap rate fell as annual increases in cash rents lagged behind inflationary increases in market value of farmland prior to 1981.[2]

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[1]The lower market value cap rate indicates that farmers were willing to accept a lower annual yield on farmland (they were willing to pay more than its agricultural value) to participate in anticipated land value appreciation.

[2]Between 1970 and 1981 average land values increased at an 18 percent annual rate while average cash rents rose at a 13 percent annual rate.

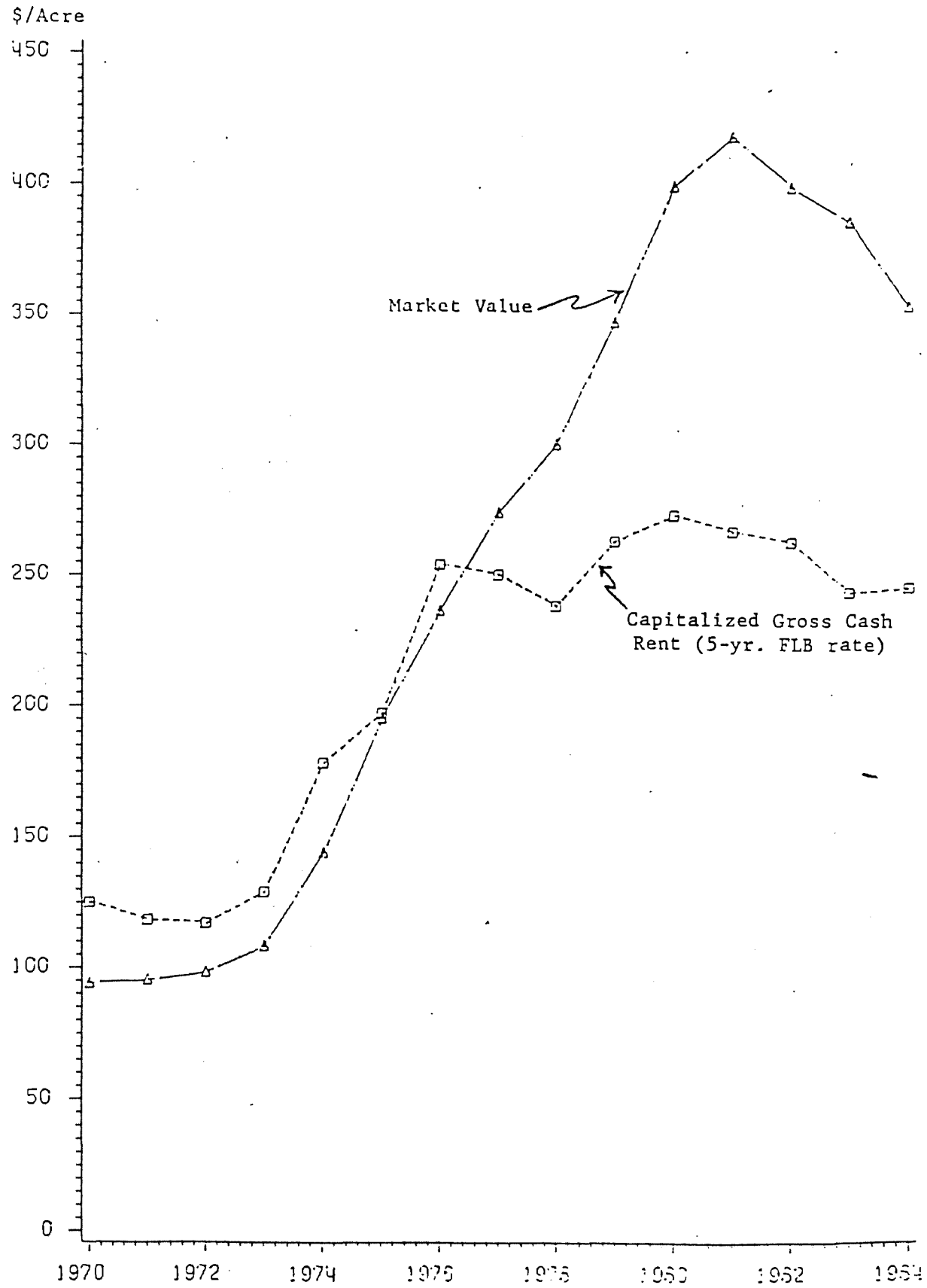

Figure 1. Capitalized Gross Cash Rent and Market Value of Farmland in North Dakota, 1970-84.

Determination of Agricultural Value Under North Dakota State Law

North Dakota state law defines agricultural value somewhat differently than what has been discussed above. The landowner's share of annual gross returns (see Table 1) is used in place of the annual gross cash rent per acre, since cash rental data are not available. Also, the capitalization rate has been allowed to move only within a restricted range over time.[3]

Current North Dakota law requires that the county-average gross returns to land received by farmers be estimated by using a four-of-six year, moving average of annual gross returns. The landowner's net return is set by law at 30 percent of the gross returns for most crops, 20 percent for potatoes and sugarbeets, and 25 percent for grazing and pastureland. Government payments made directly to farmers in lieu of production are considered part of the returns to farmland. The objective of this process is to derive an estimate of the ability of land to generate annual realized income. The estimated state average landowner's share of annual gross returns has fluctuated around 70 percent of the average gross cash rents presented in Table 1.

A comparison of estimated average capitalized agricultural values can be made using Figure 2. The full and true agricultural value is the land value which the state has used for assessment and equalization during the 1981-84 period. It increased from 1981 through 1984 (1985 assessment year) while other agricultural values generally showed declines or stable values in the post-1980 period. The two other capitalized landowner's share value series indicate what the approximate true and full agricultural

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[3]Current state law allows the cap rate to move with the the-of-twelve year, moving average of the FLB rate, but no more than 0.3 percent during any two-year period. The resulting cap rate was 7.8 percent in 1984.

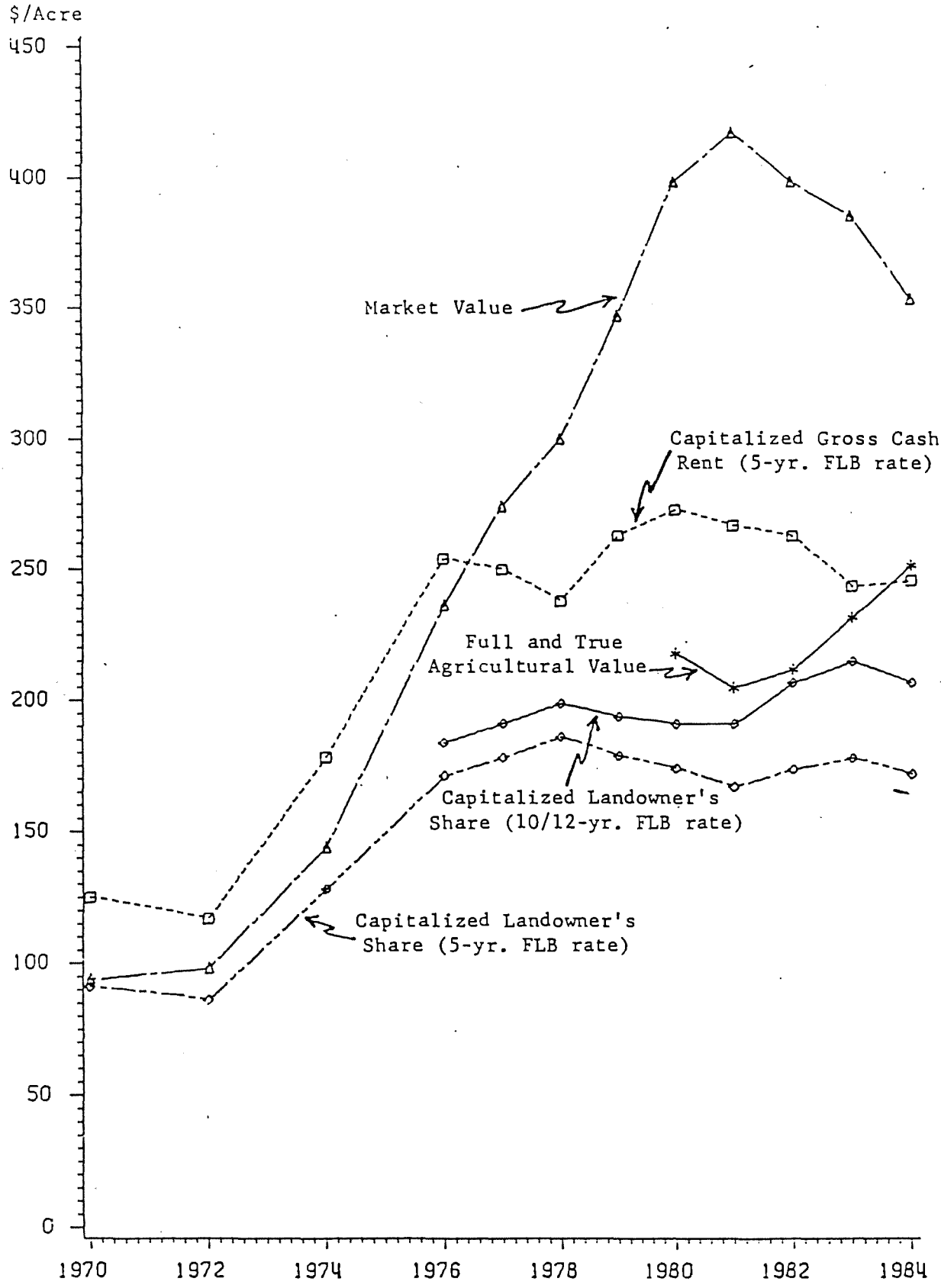

Figure 2. Capitalized Gross Cash Rent, Capitalized Landowner's Share, Full and True Agricultural Value, and Market Value of Farmland in North Dakota, 1970-84.

value of farmland would have been if the 5-year FLB rate (or the 10-of-12 year FLB rate) had been used instead of the cap rates which were set by the legislature.

Under state law the effects of higher gross returns due to the higher level of commodity prices and yields were not offset with increases in nonland costs of production.[4] The result was increasing estimated gross productivity of farmland in the post-1980 period when actual net returns to land were declining.

Restrictions placed on the agricultural cap rate compounded the problem. In 1980 the capitalized landowner's share (5-year FLB rate) was 55 percent of average market value, however, by 1984 that value rose to 71 percent of market value. The capitalized landowner's share (using a 10/12-year FLB cap rate) increased from 48 percent of the market value in 1980 to 58 percent in 1984.

Need for a True Productivity Approach

Weaknesses in the current method of determining the agricultural value of farmland are quite apparent. The current system of land valuation fails primarily because it does not measure the true productivity of the land resource. A superior system of land valuation has been outlined and applied in a pilot study (Pederson et al., 1984). The new approach utilizes detailed soil survey data and enterprise budgets to develop tract-specific estimates of the net return to land. The improved system is not costless, it requires both funds and initiative at the county level.

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[4] Nonland costs of production were fixed in percentage terms when the landowner's share was set.

Conclusions

Agricultural value can (and should) be differentiated from market value of farmland. Representative estimates of agricultural value can be derived from careful estimation of the expected net return to farmland and selection of an appropriate caitalization rate. Historical data indicates that agricultural value is currently less than market value of farmland. Yet, agricultural value can also be greater than market value when certain economic conditions prevail.

The existing system for estimating agricultural use value needs to be improved. Potential benefits of the improved system are substantial and are likely to eventually outweigh the costs which would be incurred in the near term.

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