LAND RENTS, VALUES, AND EARNINGS

by

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Introduction

Measurement and explanation of farm real estate prices and farm real estate rents have concerned agricultural economists for several decades. Inasmuch as real estate represents a major share of the assets used in farm production, changes in both returns to real estate and real estate value have significantly affected the income and wealth position of farm operators and landowners. At least since 1950, researchers have pondered the upward trend in land values and have attempted to explain why land values have increased in the face of a seemingly low return per dollar of market value.

Many of those concerned began their search by hypothesizing that land values are justified by earnings and, therefore, land income (rents) must be increasing over time. [6,7,8,9] Lacking a good measure of land rents, they turned to net farm income per acre as a proxy and found that land values and income followed similar trends before 1940; but from 1940 on, net farm income per acre and land values began to diverge. Therefore, they said factors other than net farm income (implicitly factors other than net land income from production) must be important in explaining the rise in land values.

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Other researchers looked at rapid changes in the current dollar value of farm real estate and became convinced that here was a source of income that was being overlooked. Land values rising at 4 to 5 percent or more per year yielded a great but unrealized return on the buyer's original capital investment. [1,2]

Still other researchers, attempting to measure the profitability of the farm production sector, developed measures of earnings by comparing residual returns to land to the current dollar value of land. This measure seemed to verify that real estate returns from farm production were low compared with other investment alternatives. [5,8]

In an attempt to rationalize apparently low production returns with rising values, some have suggested that annual appreciation in value should be added to production returns to provide a better measure of the actual rate of return. [4]

Objectives

The purpose of this report is to evaluate the relationship between earnings and values. That is, to explore more fully the aspects of capitalization theory as they relate real estate rents to market values and demonstrate that $PV = \frac{a}{r}$

where PV = The present value

a = The annual earnings

r = The discount rates

has been an inappropriate model for estimating returns to real estate, except for shortrun investment alternatives where annual returns and

discount rates are nearly constant. This model is useful for longrun comparison for the special case of an infinite or very long time horizon with constant rents, constant discount rates, and no changes in use.

In our world of changing income, values, and uses, the general model where:

$$PV = \sum_{t=1}^{n} \frac{a_t}{(1+r_t)^t}$$

seems preferable in evaluating the return to real estate. Several modifications of the general form (excluded for brevity) are possible in order to recognize the many features of the land market including increasing or decreasing annual earnings on a constant or proportional change basis and the possibility of capital gains or losses in the year of sale.

The evidence presented in the following section includes gross rent and value data collected from SRS crop reporters in Illinois, Mississippi, North Dakota, and New Jersey from 1940 through 1973. Data at the State level are crop reporters' judgement estimates of rents and values for each year in the series and are averages for all reporters. Net rents were determined by subtracting real estate taxes and a charge of 3 percent of the value of buildings as an estimate of repairs, depreciation, and insurance.

Analysis

Both net rents and real estate values increased in Illinois, North Dakota, and Mississippi from 1940 to 1973 (table 1). In New Jersey, land values increased, but net rents declined. In both Illinois and North Dakota, gross and net rents increased at about the same rate. That is,

Table 1.--Net cash rents and market value per acre of cash rented land and rent as a percentage of value
Selected States, 1940-73

Year	New Jersey			Illinois			North Dakota			Mississippi		
	Value	Net rent	Rent as percentage of value	Value	Net rent	Rent as percentage of value	Value	Net rent	Rent as percentage of value	Value	Net rent	Rent as percentage of value
1940	103	2.63	2.6	100	3.96	4.0	10	.61	6.1	25	3.98	15.9
1941	114	2.72	2.4	102	4.18	4.1	10	.60	6.0	24	3.78	15.8
1942	152	3.10	2.0	112	4.69	4.2	12	.80	6.7	30	4.39	14.6
1943	135	3.26	2.4	122	5.36	4.4	13	1.10	8.5	32	5.07	15.8
1944	131	3.50	2.7	139	5.77	4.2	16	1.13	7.1	36	5.07	14.1
1945	139	3.21	2.3	148	6.11	4.1	19	1.16	6.1	39	6.24	16.0
1946	161	3.97	2.5	161	6.09	3.8	22	1.48	6.7	44	5.84	13.3
1947	151	3.36	2.2	183	7.56	4.1	23	1.61	7.0	53	6.44	12.2
1948	158	4.55	2.9	199	7.97	4.0	27	1.48	5.5	52	6.50	12.5
1949	178	4.48	2.5	202	7.80	3.9	28	1.75	6.2	51	7.41	14.5
1950	162	4.24	2.6	210	8.11	3.9	29	2.00	6.9	53	6.32	11.9
1951	183	3.76	2.1	266	8.62	3.2	36	1.60	4.4	51	6.71	13.2
1952	197	4.30	2.2	272	9.96	3.7	37	2.06	5.6	60	7.78	13.0
1953	222	4.44	2.0	280	10.09	3.6	38	2.01	5.3	67	7.28	10.9
1954	214	6.63	3.1	284	10.71	3.8	39	2.19	5.6	76	8.35	11.0
1955	257	6.48	2.5	294	10.96	3.7	36	1.97	5.5	78	8.92	11.4
1956	272	5.78	2.1	303	11.47	3.8	39	2.49	6.4	91	11.64	12.8
1957	282	6.45	2.3	329	12.60	3.8	43	2.72	6.3	88	11.10	12.6
1958	378	5.67	1.5	329	13.74	4.2	45	3.00	6.7	100	10.72	10.7
1959	353	7.28	2.1	367	12.74	3.5	50	3.62	7.2	93	11.35	12.2
1960	408	3.91	1.0	379	13.53	3.6	53	3.76	7.1	103	11.75	11.4
1961	353	7.67	2.2	364	13.78	3.8	54	3.58	6.6	105	10.99	10.5
1962	388	3.01	.8	367	13.68	3.7	56	3.64	6.5	117	12.52	10.7
1963	476	.38	.1	390	14.89	3.8	60	4.11	6.8	132	12.51	9.5
1964	382	4.77	1.2	396	15.48	3.9	64	4.29	6.7	122	13.04	10.7
1965	433	2.96	.7	441	16.26	3.7	67	4.59	6.9	158	14.67	9.3
1966	515	1.77	.3	478	19.34	4.0	75	5.60	7.5	184	15.85	8.6
1967	593	- .73	- .1	517	20.56	4.0	78	5.81	7.4	199	16.70	8.4
1968	686	.12	0.0	533	23.36	4.4	88	6.65	7.6	201	22.72	11.3
1969	707	-2.88	- .4	586	23.25	4.0	90	7.00	7.8	223	14.58	6.5
1970	740	.28	0.0	613	23.37	3.8	95	7.11	7.5	234	16.68	7.1
1971	923	-2.24	- .2	601	24.01	4.0	95	6.95	7.3	244	14.18	5.8
1972	1,685	-19.56	-1.2	628	24.30	3.9	100	7.03	7.0	274	16.03	5.9
1973	1,843	-18.27	-1.0	702	25.02	3.6	105	7.38	7.0	278	13.61	4.9

Table 2.--Farm Real Estate Values: Results of simple regression of farmland values on net rents per acre

State	Period	r^2	r	Intercept	Regression coefficient	Implicit Earning/Price ratio
New Jersey.....	1940-73	.84	.916	544.09	62.33	1.6
	40-55	.75	.869	41.84	30.75	3.3
	56-73	.95	-.976	654.36	-56.79	-1.8
Illinois.....	1940-73	.98	.991	4.57	25.59	3.9
	40-55	.97	.985	-27.05	29.73	3.4
	56-73	.95	.976	27.59	24.35	4.1
North Dakota.....	1940-73	.98	.991	5.72	12.91	7.8
	40-55	.88	.940	-3.25	18.98	5.3
	56-73	.98	.992	8.43	12.37	8.1
Mississippi.....	1940-73	.76	.872	-41.68	14.64	6.8
	40-55	.70	.839	-18.20	10.61	9.4
	56-73	.43	.633	-33.68	14.17	7.1

In Mississippi the data and the results of the regression model show that structural change has been occurring over the entire period from 1940 to 1973. Rents as a percentage of market values have declined sharply and in the later period averaged 2.3 percentage points less than in the earlier period. Also they appeared to be less closely correlated with values. The cause of the structural change in this State seems to be somewhat different than in New Jersey. The net rent model still appears valid, although it has less explanatory power in the later period. Reasons for the changes in relationship apparently are tied to changes in the relationship between the farmland rental and sales market and seem to reflect a breakdown of the tight tenancy system in the South, the decline in trapped labor, the influx of outside funds into the land purchase market, and the movement away from a one-crop agriculture.

In Illinois and North Dakota, the basic economic model appears to be valid over the entire period. That is, values are determined by rents. However, breaking the time series at 1955-56 shows that rents average somewhat higher in the later period in both areas. Using confidence interval overlap as a test of significance, the regression coefficients are significantly different for the two periods at the 10-percent level in both States implying some form of structural shift.

The data give strong support to the idea that the perpetuity discount framework has been inappropriate for estimating values or rates of return in the farm sector in the last 30 years.

Rents have been increasing in three States and declining in New Jersey, while values have risen in all four States. Even in Illinois and

North Dakota, where the current rent-current value relationships provide a close fit in the regression model for the 30-year period, rents appear to have increased in relation to value during the later part of the period.

The data show that a more general model--incorporating increasing or decreasing rents and changes in capital value--is necessary to measure returns or to approximate expectations from historical data. The relatively constant rent-value relationships in Illinois and North Dakota do not improve the current market relationships as a measure of earnings. They only suggest that expectations may have remained nearly unchanged and that expected future rents from production are the primary determinant of value in these States.

If past experience has any validity for determining expectations, we may be able to set a base for expectations by looking at the interval rate of return received by the average landlord during the 1940-73 period. By using the 30-year period and determining the discount rate that would equalize the value of the actual stream of income and the market value in the beginning year (1944), we can arrive at the return received by an average (1944) landbuyer. Alternatively, we can determine what he could have paid for the land and still have received an average return equal to the net rent as a percentage of the purchase price.

The data show that returns from production and from the sale of the property in the final year averaged 9.7 percent in Illinois, 20 percent in Mississippi, 10.4 percent in New Jersey, and 14.0 percent in North Dakota (table 3). These returns are equivalent to the yield to maturity on a long-term investment.

Table 3.--Comparison of net rents, values, and actual average annual earnings, 1944-1973, selected States

State	1944			1973			Actual average percent return on 1944 values			Value in 1944 if actual rents and value changes are discounted at	
	Rent	Value	Rent as percentage of value	Rent	Value	Rent as percentage of value	From rent	From appreciation	Both	6 percent	1944 rent-value ratio
	Dollars		Percent	Dollars		Percent	------- Percent -------			---- Dollars ----	
Illinois	5.77	139	4.2	25.02	702	3.6	6.7	3.0	9.7	277.91	403.82
Mississippi	5.07	36	14.1	13.61	278	4.9	19.3	.7	20.0	176.52	59.26
New Jersey	3.50	131	2.7	-18.27	1,843	-1.0	2.8	7.6	10.4	367.27	872.19
North Dakota	1.13	16	7.1	7.38	105	7.0	12.2	1.8	14.0	56.16	46.44

The yield from rents alone average 6.7 percent, 19.3 percent, 2.8 percent, and 12.2 percent, respectively. Thus, except for New Jersey, increasing agricultural rents were the primary factor in earnings. It seems that buyers either received windfalls or discounted the possibility of increasing rents and capital gains rather heavily. In either case, returns at this level are competitive with long-term investment opportunities elsewhere in the economy.

Looking at the earnings another way, if current (1944) rent-value relationships had been appropriate discount rates for rents received and reversion value, buyers could have paid $404 for Illinois land in 1944, $59 in Mississippi, $872 in New Jersey, and $46 in North Dakota compared with actual 1944 prices of $139, $36, $131, and $16, respectively.

Implications and Conclusions

The data suggest that a rather close relationship exists between rents and values in the more stable agricultural areas of the country. Also, structural change in the land purchase and rental markets had modified the rent-value relationship in urbanizing areas and in areas undergoing rapid change in the structure of agricultural production activities. Changing rent-value relationships are a symptom of the structural change. Stable relationships reflect a rather stable agricultural base and, perhaps, similar expectations about rents and values over time. However, the stability of the current rent-value relationship does not validate its use as an appropriate measure of earnings or expectations.

The appropriate measure of returns and proxy for expectations would appear to be the earnings on long-term investments of comparable liquidity

and risk. Current rent-value relationships serve more appropriately for short-term alternatives with a high degree of liquidity.

If the analysis in this paper is correct, the rationale for continuing investment by farmers and others in farm real estate and the continued rise in land values is rather simple. Real estate investments have yielded long-term returns equal to, or better than, other long-term investment alternatives.

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