Farmland Ownership

Curriculum Guide

I. Goals and Objectives

    A.   Understand what factors affect land values.
    B.   Learn about historical trends in land values and rent.
    C.   Learn the factors to consider in analyzing land purchase decisions and the basic concepts used in the maximum bid model.

II. Descriptions/Highlights

    A.   Because land is a long-term investment, expectations of future crop production costs, crop yields, crop prices, land financing costs, government farm programs, and legal issues substantially impact land prices.

    B.   Figure 1 depicts historical farmland (cropland, pasture, and buildings) values for Kansas and Texas. Both states follow a similar pattern, indicating that agricultural land is a broad market, not just a local one. Review Figure 1.

    C.   Expectations about future land values are necessary for making decisions about land ownership, and especially when making land purchase decisions. Land values are notoriously difficult to forecast) especially 10 to 30 years in the future) which is often required of land purchase decisions. Kastens and Dhuyvetter show that using the historical annual inflation rate for the most recent 30 years provides a simple, and relatively accurate, land value forecasting method. For example, annual inflation from 1968 through 1998 was 4.9%. Thus, land values are expected to advance 4.9% per year from 1998, meaning $1,000 land in 1998 would be $1,613 land in the year 2008 ($V_{2008} = 1000 * 1.049^{10}$).

    D.   While land values are subject to a number of factors including expectations of economic, social, political, and technological conditions, expected agricultural earnings potential, or rent, is probably most important.

    E.   The concept of rent is as pertinent for owner-operators as it is for tenants. For owner-operators, rent is net returns assigned to land)) the "profit" after all opportunity costs but land costs are considered. Figure 2 shows the 1967 – 1997 relationship between Kansas nonirrigated cropland value and cash rental rates.

    F.   Rent-to-value ratios are often used to characterize the relationship between rents and land values. Alternatively, it can be computed as reported rent divided by reported land value. In the latter case, the value of buildings is included in land values (in the reported data), which makes computed rent-to-value ratios lower than USDA reported ratios. Over the 1976 – 1995 period, Kansas reported (no buildings) nonirrigated, irrigated, and pasture rent-to-value ratios were, respectively, 6.6%, 8.4%, and 4.4%. During the same time comparable Texas values were 3.1%,

5.9%, and 1.5%. Historically, observed rents have risen over time, causing land values to rise as well, but rent-to-value ratios have been more stable.

G. Because land values have risen over time, agricultural landowners get two returns, rents and capital gains. Adding the 1950–1998 capital gains rate stated earlier (Kansas: 4.7%, Texas 5.7%) to the nonirrigated returns of 6.6% and 3.1%, and subtracting an estimated 0.5% for real estate taxes, results in total returns of 10.8% for Kansas and 8.3% for Texas.

H. Rent, at say 6% of value, is not sufficient to cover principal and interest on a 100% loan (assuming an interest rate greater than 6%). However, that is a statement of cash flow, not profitability, as capital gain plus rent would offer sufficient coverage. Thus, land loans have down payments or other land that can contribute collateral mortgage and additional cash flow to meet loan payments. Interestingly, land loans that initially appear infeasible, might end up being workable due to increasing rents over time. Of course, such loans are risky because overestimation of rent can cause such loans to fail. Review the financing example and Figure 3.

I. Land is a capital investment, where profits play out over many years. Consequently, the maximum bid on land that can be supported economically is based on, not only current rents, but expectations of future rents and future land values. Conventionally, in determining maximum bids, land is presumed sold after a certain number of years in the future (referred to as horizon); often 20 or 30 years is used as the horizon. Whether the land will actually be sold at that time is not particularly relevant. Interest, or discount, rates also matter in determining maximum bids, as do income tax rates on ordinary income and capital gains.

J. Land purchase decisions depend intimately on the present value concept. Because money earns interest (at the assumed rate i), a dollar today is worth more than a dollar in the future. Essentially, the amount of money that can be paid for land is the sum of a) the sum of the future cash rents, after paying income tax each year, discounted to the present; and b) the value, after capital gains taxes are paid, of the supposed future land sale, after discounting to the present. Review the 11 components of the maximum bid process.

III. Potential Speakers

A. Extension Economists

IV. Review Questions

A. Describe the historical trend in Texas land values, land rents, and rent-to-value ratios.

Answer: Rents have risen over time which caused land values to rise as well. Rent-to-value ratios have remained more stable over this same period.

B. Assume the typical rent-to-value ratio for non-irrigated crop land in your area is 3.5% and that a land owner is offering you a $25 per acre cash rent arrangement. What value is the land owner placing on this land?

Answer: $25.00 / .035 = $714 per acre

V. For More Details

Information from the Texas A&M University Real Estate Center is available on the Internet at:
http://RECenter.tamu.edu

Land Investment Factors

☞ Long-term investment (10-30 years)
☞ Future expectations for:
  ✓ Crop production costs
  ✓ Crop yields
  ✓ Crop prices
  ✓ Financing costs
  ✓ Government farm programs
  ✓ Legal issues
  ✓ Economic conditions
  ✓ Social conditions
  ✓ Political conditions
  Technological conditions
  ✓ Expected agricultural earnings potential

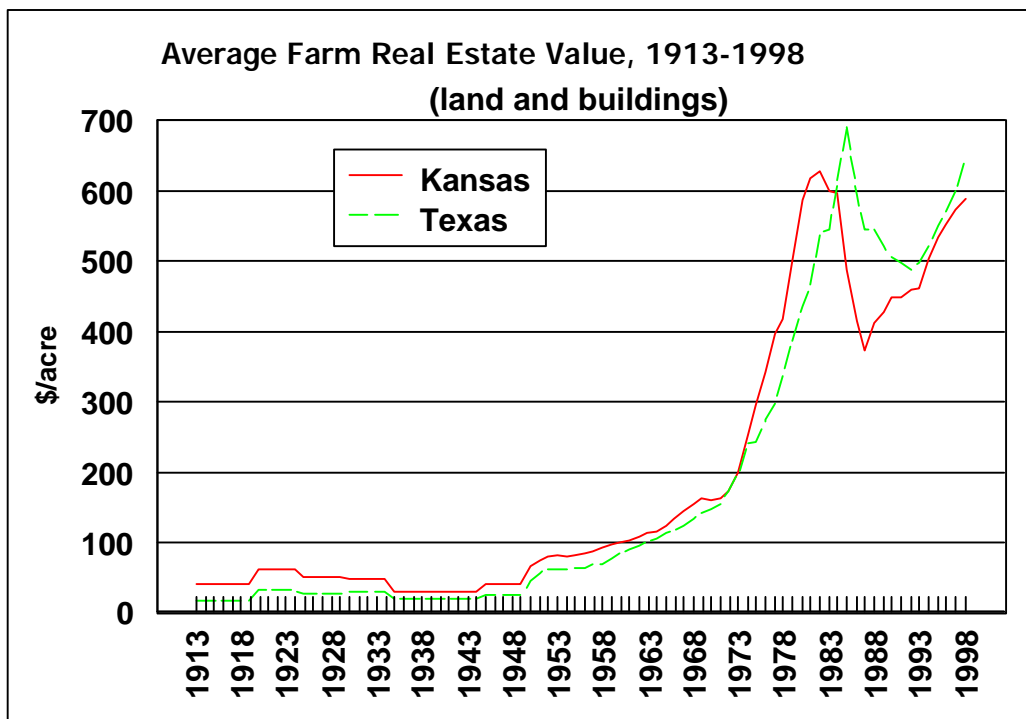**Average Farm Real Estate Value, 1913-1998**
(land and buildings)

Figure 1

Future Land Values

☞ Necessary for making land ownership/purchasing decisions

☞ Are difficult to forecast

☞ 10-30 year time line

☞ Annual land value inflation from 1968-1998 was 4.9%

☞ Using this historical average, $1,000 land in 1998 would be worth $1,613 in 2008

The Concept of Rent

☞ For owner-operators, rent is net returns assigned to the land

☞ "Profit" after all opportunity costs but land costs are considered

☞ Rent-to-value ratio

☞ From 1967 - 1997, average Texas rent-to-value ratios were:

   ✓ Non-irrigated: 3.10%

   ✓ Irrigated: 5.9%

   ✓ Pasture: 1.5%

The Concept of Rent (continued)

☞ Historically, rents have risen

☞ Causing land values to rise

☞ Rent-to-value ratios have been more stable

☞ Landowners receive two returns, rent and capital gains
For Texas:

    ✓ 1950-1998 capital gains (growth) of 5.7%

    ✓ Non-irrigated returns (rent) of 3.1%

    ✓ Less estimated 0.5% real estate taxes
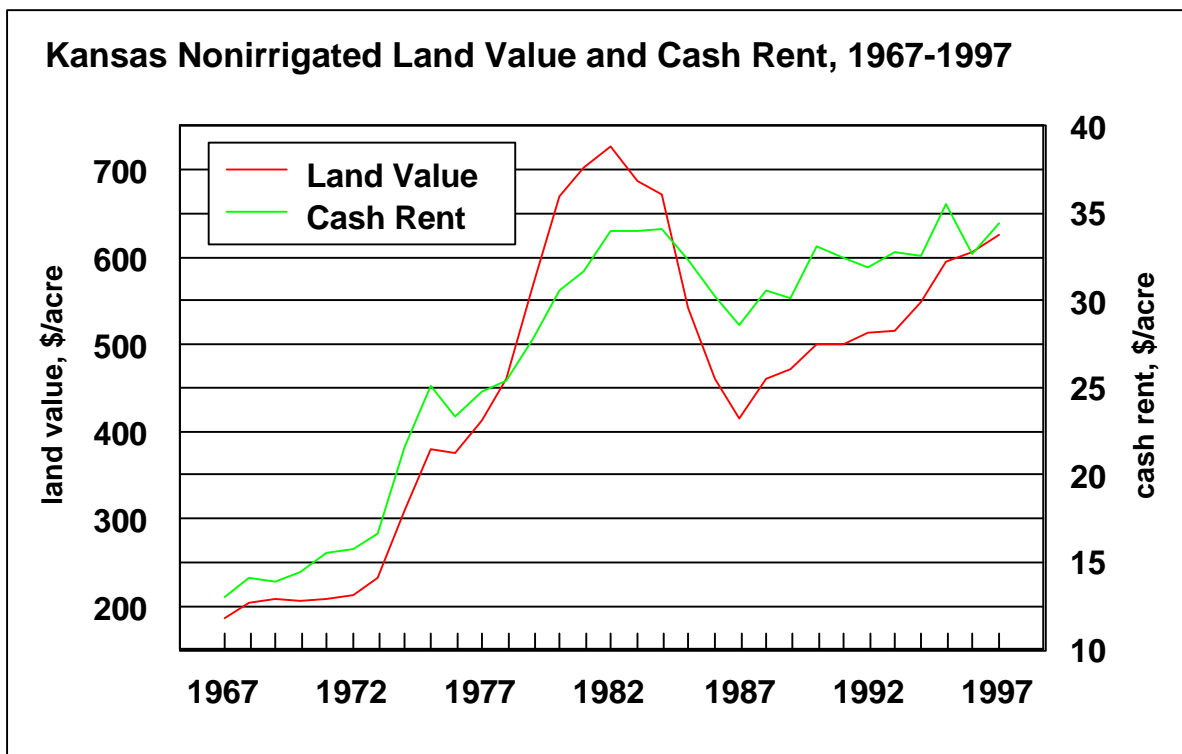
    ✓ Equals estimated total returns of 8.3%

Figure 2

Financing Land

☞ Down payment
☞ Other land as contributed collateral
☞ Consider future increases land value and rent
☞ Example:
  ✓ $1,000 purchase price, 15% down ($150/acre)
  ✓ 10% interest
  ✓ Rent-to-value of 6% (ignoring land taxes)
  ✓ Capital gains and rent growth of 4%
  ✓ In year 1, $60 cash rent is insufficient to cover the $85 interest cost (10% x $850/acre financed)
  ✓ If the loan balance is allowed to increase (due to payment shortfalls), rents that grow at 4%/year will ultimately make the loan pay out
  ✓ Of course, this is a risky proposition

Financing a Land Purch, Rent=6%, Cap Gain=4%
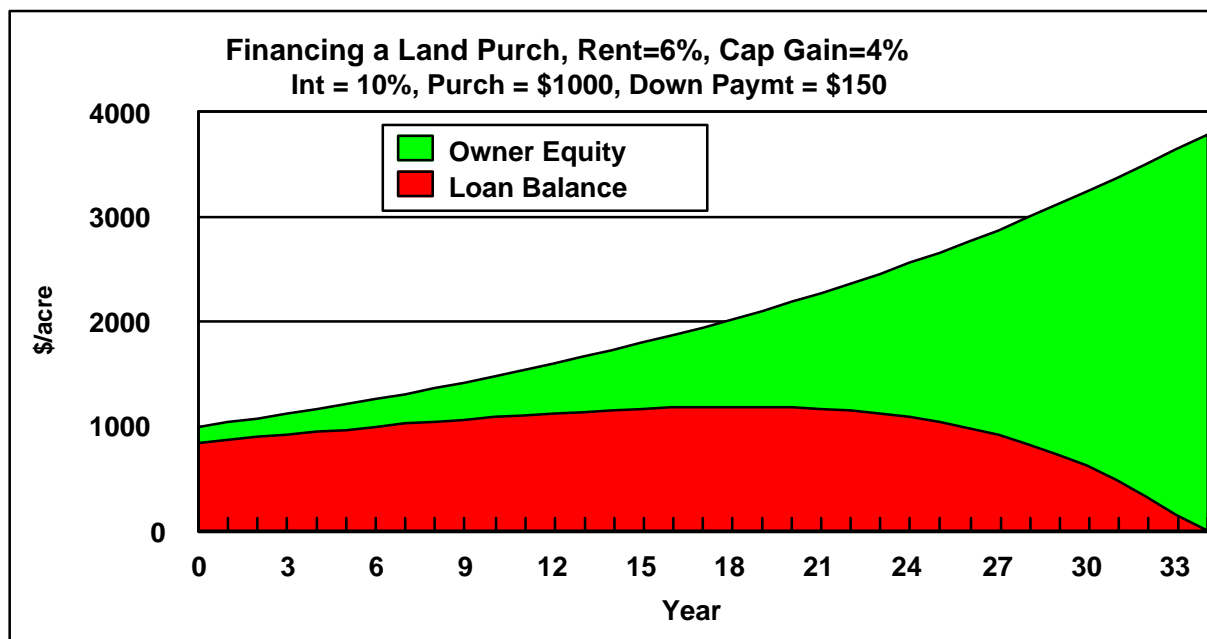**Int = 10%, Purch = $1000, Down Paymt = $150**

Figure 3

Maximum Bids on Land Purchases

☞ Conventionally, in determining a maximum bids, land is assumed sold after a certain number of years

☞ Based on current and future expectations of rent

☞ And future expectations of land values

☞ Interest, or discount rates

☞ Income taxes on ordinary and capital gains

☞ Time value of money

☞   The amount that can be paid for land is sum of:
   - ✓   Sum of future cash rents
   - ✓   After paying income tax each year
   - ✓   Discounted to the present, and
   - ✓   The value, after capital gains taxes, of the supposed future land sale
   - ✓   After discounting to the present

Components of a Maximum Bid Model

1) Select a time horizon in years, *N*, as in *N* = 30.

2) Determine the market interest rate on land loans, *r*, as in *r* = 0.09.

3) Determine the typical income tax rate paid on the last dollar of earned income, *t*, as in *t* = 0.43. Be sure to include self-employment tax if you normally pay that on earned farm income.

4) Determine the tax rate expected on capital gains on land, *ct*, as in *ct* = 0.15.

5) Determine an expected annual growth rate on rents, *g1*, as in *g1* = 0.03.

6) Determine an expected annual growth rate on land values, *g2*, as in *g2* = 0.04. Historically, *g1* and *g2* have been around 0.03 to 0.05. Also, unless non-agricultural demand for farm land is expected to spur prices, *g2* should be identical to *g1*. The two growth rates are different here to expedite the example.

7) Determine the current cash rent in $/acre, R_0, as in R_0 = 40.

8) Determine the current annual property taxes in $/acre, *CPT*, as in *CPT* = 3. Typically, property taxes are about 0.5% of land values.

9) Determine the after tax interest rate on land loans, $ar = r * (1 - t) = 0.09 * (1 - 0.43) = 0.0513$ in the example.

10) Determine the current after-income-tax, after-property-tax rent, $aR_0 = (R_0 - CPT) * (1 - t) = (40 - 3) * (1 - 0.43) = 21.09$ in the example.

11) Compute the actual bid price, BP_0, given available information.

! Maximum bid price software is available from the Texas Agricultural Extension service. Please contact Dr. Jim McGrann at (979) 845-8012 or by e-mail at jmcgrann@tamu.edu.