

ANSWER KEY for Land Ownership and Leasing Homework #1 (MAST 11-12)

contact Terry Kastens or Kevin Dhuyvetter

This homework is based on using the *KSU-Landbuy.xls* spreadsheet. This spreadsheet is available on the website: www.agmanager.info.

To simplify comparisons in this homework, the blue-box assumptions in the spreadsheet should start at these values (call this the base scenario):

160 acres of crop land in KS state where land is located

\$1,500 market price

\$1,600 purchase price

\$60 ag rent

\$6.00 real estate tax (0.40% of market value)

\$0 non-ag rent

30 time horizon

0.43 income tax rate (shows 43%)

0.15 capital gains tax

0.065 interest rate

0.40 part financed

0.0264 growth rate on ag rent

0.00 growth rate on non-ag rent

0.0395 growth rate on total (ag+non-ag) land value

Question #1:

Given the assumptions above, *KSU-Landbuy* should say you can pay up to around \$2,239 for the land (see the *PVL* cell). We'll call this the maxbid price. Notice that the *PVL* formula is the sum of three others (*PVRA*, *PVRN*, *PVS*). Which of these others change when current ag rent changes?

Question #2:

If current ag rent actually were \$75 rather than the \$60 assumed, how much more could be paid for the land? Is the percentage change in the maxbid price about the same as the percentage change assumed for ag rent? Why or why not?

What is the expected ROE at this initial rent if land is still purchased at the initial price (\$1,600)?

Question #3:

Can a person who is in a higher income tax bracket pay more, or less, for land than someone in a lower bracket? Can you explain the intuition behind what you have found?

Question #4:

Do higher capital gains tax rates imply higher or lower maxbid prices? Are capital gains tax rates more or less important to buyers with short time horizons, such as real estate traders?

Question #5:

Consider the base scenario where the expected return on equity (ROE) is 10.77% annually. Which of these events would be the most harmful to you in terms of ROE: a) finding out that the land was not as productive as everyone had believed, implying a rent that should be 10% lower than you had thought, thus \$54.00 (but the market doesn't know that so land market value stays at \$1,600); b) finding out that you had been duped by the real estate agent into believing the market was at \$1,500 when it actually was 10% worse, thus \$1,350; c) learning that the Fed had just announced a 10% higher interest rate, causing your effective interest rate to rise from 6.5% to 7.15%; d) finding out that the ag growth rate actually is half a percentage point lower than you had thought, thus 2.14% instead of 2.64% ag growth?

Question #6:

Going back to the base scenario, how much more could you pay for land if you believe you can capture a non-ag rent of \$5 per acre AND you believe that these rents will grow at roughly the rate of inflation, which you assume is 3.0%?

Assume the land market price stays at \$1,500, what is the purchase price you could pay with this added income and still maintain an expected ROE of 10.77%?

Question #7:

Go back to the base scenario but put \$1,500 in the purchase price cell. You should see an expected ROE of 11.60%. Now, suppose the government subsidies drop out of the picture and so you are left with a cash rent equivalent of only say \$45 per acre. Approximately to what level would the market price and purchase price (keep them the same) need to fall in order to maintain an expected ROE of 11.60%?

Question #8:

Go back to the base scenario but change the amount of land financed from 40% to 70%. What happens to return on assets (ROA) and return on equity (ROE)? Now put the land growth rate at 0.0% rather than the 3.95% of the base scenario. Now, what happens when leverage goes from 40 to 70%?