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The Decision to Buy and Sell Land as Affected by Capital Gains Taxation and Income Tax Progressivity

by

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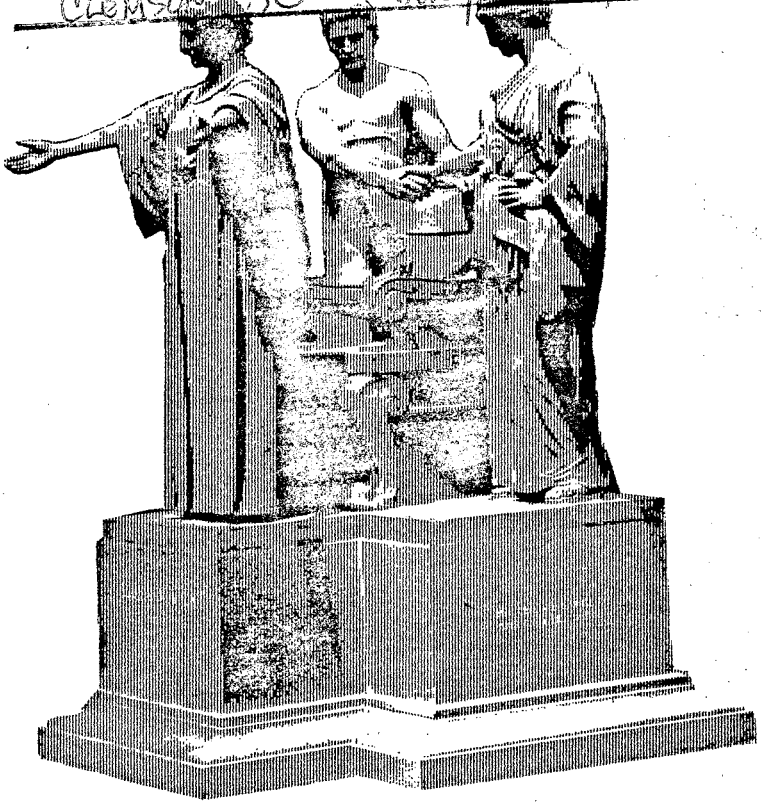

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THE DECISION TO BUY AND SELL LAND AS AFFECTED BY CAPITAL GAINS TAXATION AND INCOME TAX PROGRESSIVITY

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Abstract

A present value model estimates farmland price increases needed by investors in different tax brackets to equate land returns to an investment having higher current return but no change in nominal value. Higher bracket investors have greater advantage in land than low bracket investors. Also, inflation enhances this advantage.

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The Decision to Buy and Sell Land as Affected by Capital Gains Taxation and Income Tax Progressivity

There are many factors which affect the decision-making process when an investor decides to purchase or sell farmland. This paper investigated only a restricted set of economic factors involved in this process. Farmland is only one type of income producing investment. Let us assume that rational investors examine alternatives in light of their future return in the form of expected net cash flow over the holding period and the expected net remainder value of the asset at the end of the holding period.

Investors, including farmers and farmland owners, have become more sophisticated in their investment decisions and more aware of after-tax consequences of alternative investments with the advice of accountants and other tax consultants. Many investors who have attained a satisfactory level of living have come to the conclusion that it is better to develop further income in the form of capital gain than ordinary income, but few have a very good idea how much better it is in a present value sense.

Several authors have developed investment decision models which consider income taxes (Modigliani and Miller, 1958, 1963; Rodewald, 1969, 1971; Devino, 1971; Harris and Nehring, 1976, 1977; Lee and Rask, 1976; Adams, 1977). These models give conflicting results on the decision outcomes for taxpayers in different tax brackets. Rodewald and Devino imply that the income

stream to high bracket taxpayers is less, so they will offer less for farmland. Harris and Nehring follow the same line of reasoning and explicitly state that "A ceteris paribus increase in the marginal tax rate will ... lead to a reduction in the maximum bid price" for farmland (p. 163). Adams states that the "present value of a perpetual stream does not depend on the tax bracket of the individual" (p. 540). One of these models suggests the capital value is less to an individual in a high tax bracket than one in a low tax bracket; the other model says that value is invariant with the tax bracket. These models assume an income stream from a permanent resource and include no actual or tax depreciation.

All but one of these models fails to take into account capital gain and the different tax rate on that form of income. Adams excuses this short-coming on "the assumption that the investor expects to retain the asset (in his family) indefinitely" (p. 540). This assumption does not fit well with the fact that only 16 percent of the farmland transferred is from estates (USDA, 1979). We need a model more relevant to the rest of the land investors. Almost half (47 percent) is sold by owner-operators and 11 percent is sold by retired farmers. The Lee and Rask model does include capital gains considerations but their holding period of 25 years is so long that there is little effect of lower capital gains tax on present value, especially with current high discount rates.

Capital theory allows division of present value of a permanent asset into the present value of the income stream to time n

and the present value of the remainder at time n. The remainder is theoretically the present value of the income stream from time n to infinity and the sum of the two discounted income streams should be equal to the present value of the cash flow from 0 to ∞. However, the remainder can be treated as capital gain taxed at a lower level than the income stream. This should change the decision-making outcomes for high tax bracket investors from those suggested in the foregoing literature.

For every buyer there must be a seller. The seller must believe that the price received allows achievement of greater benefits in some other alternative. The buyer must believe that greater benefits will result from buying this particular property than would be received from any other available alternative.

A buyer and seller could face the same alternatives in the market and have the same expectations about the market and the subject property and still conclude a transaction; because the difference in income tax situations and the cost basis associated with the property give different real values to the buyer and seller for the same property at the transfer price. This is true even when the buyer and seller are in the same tax bracket. It is the effect of these differences that are investigated in this paper.

A higher rate of inflation in the economy in the last 10 years relative to the previous 20 years is perceived as likely to persist into the future by many investors. It is partly this higher rate of inflation that has caused some investors to accept a lower current income if the asset value is expected to have

high growth potential. Thus the high bracket taxpayer attempts to tranfer current income into capital gains which are taxed at a lower rate. In the 1976 tax reform act the proportion of capital gain subject to tax was reduced from 50 percent to 40 percent. One early proposal by the Reagan Administration is to further reduce the proportion of capital gain subject to tax from the current 40 percent to 20 percent. Therefore, we examine the effect of changing the gain subject to tax as well as the progressivity of the income tax in the decision of a prospective seller to hold or sell farmland or the decision of a prospective buyer to buy or not to buy farmland. The model should be equally applicable to other assets with qualities similar to farmland. These qualities are no tax depreciation and a rate of current return less than the rate on new government bonds or other alternatives with a higher rate of return but a nominally fixed asset value.

The Decision Model

The model equates the present value of selling farmland now and reinvesting in other assets with the present value of holding the farmland until later. Then the model solves for the growth rate needed in the value of farmland for the decision-maker to be indifferent between selling and holding. The solution of the model when the cost basis is equal to the prospective current selling price gives the growth rate needed by a prospective buyer to purchase farmland.

The present value of selling is:

(1) $a_n (1 - T) IK + V^n K + V^n \Delta K$

and the present value of holding is:

(2) $[a_n (1 - T)] [r \cdot P - R_m] + V^n K_n$

solving for the future price of land (P_n), the annual growth rate (G), and the total growth (TG) required for the expected holding period gives:

(3) $P_n = \{[\text{Equation (1)}] - V^n (TT_c C + M_{bn}) - a_n (1 - T) (r P - R_n)\} / V^n (1 - TT_c)$

(4) $G = 100 (\sqrt[n]{P_n / P} - 1)$

(5) $TG = 100 (P_n / P)$

where:

$K = [P - T \cdot T_c (P - C) - M_b]$

$K_n [P_n - T \cdot T_c (P_n - C) - M_{bn}]$

a_n = the present value of $1 per year for n years

v^n = the present value of $1 received n years from now

T = the marginal income tax rate

I = the rate of return on an alternative asset

P = the net price of the real estate

Pn = the net price expected on the farmland at time n

M_b = the balance of the mortgage now

M_{bn} = the balance of the mortgage at time n

T_c = the proportion of capital gain added to ordinary income

ΔK = the change in value of capital to year n

r = the rate of return on the present real estate

R_m = the annual mortgage payment

C = the cost basis of the real estate

G = the compound growth rate, in percent, and

TG = total growth over the holding period, in percent.

Assumptions underlying this model include: (1) there is no tax depreciation. This is consistent with farmland investment where buildings are a small proportion of the total investment. (2) Decisions made are based upon one marginal tax bracket. Although for many investors the outcome will affect several tax brackets, it may model fairly well the actual decision making process as investors think about their own tax bracket. (3) The model assumes that farmland return is stable and level over the holding period and based on a rate of return on the current net price. Actually returns are variable and net income has increased slowly over a long time period; however, for any short run holding period assuming returns are stable and level is reasonable. (4) The rate of return, I, on the alternative investment is the same as the discount rate used in calculating the returns for a_n and V^n. (5) The tax bracket, T, and the proportion of capital gains taxed, T_c, remain the same during the holding period. (6) The holding period for both assets being evaluated is the same.

Situations Simulated

In order to make comparisions under different situations, the model was calculated for each of the federal income tax brackets for married couples filing jointly. Selected rates of return, discount rates, capital gain rates, farmland costs, and two holding periods (5 and 10 years) were used. Then the land price, compound growth rate, and total percent change in land price needed to break even with the alternative investment were

calculated for each combination. The discount rate and the rate of return on the alternative investment were always set equal to each other and were 6, 8, 10, and 12 percent. The rate of return on current price of farmland was set at 3 percent for all runs. This is the approximate long-term rate earned on high quality farmland in the midwest. The current price, P, was set at $3,000 per acre for all runs. The cost, C, was set at the following levels: $500, $1,000, $2,000, and $3,000. A farm selling today for $3,000 per acre would have sold for approximately $500 in 1955, $1,000 in 1973, and $2,000 in 1976. Assumptions were further simplified by assuming no change in capital value of the alternative investment (such as government bonds), during the holding period and that there was no mortgage. These assumptions allow us to drop $V^n\Delta K$ and M_b from equation (1) and R_m and M_{bn} from equation (2).

The various farmland cost basis levels used allow simulation of different holding periods for the present landowner who is trying to make a decision as to whether to sell now or hold longer. The past holding periods would be (1981-1955) or 26 years, 8 years, and 5 years, respectively, for the different levels of the cost basis, C.

Model Outcomes

The computer output printed the land price required at the end of the holding period, the compound growth rate during the holding period, and the total percentage change during the holding period for each tax bracket. Due to space limitations, we

reproduce here only selected tables showing the range in outcomes.

Tables 1 and 2 show the outcomes for the present 40 percent capital gain treatment for holding periods of 5 and 10 years. The alternative rate of return, I, and discount rate are each 12 percent. The cost basis is $500 in Table 1, thus simulating a farmland owner who has held the land for approximately 26 years and is now deciding whether to sell or hold another 5 or 10 years. The first column is the tax bracket, the next column is the per acre price needed at the end of the holding period (assuming the price now is $3,000 per acre), the third column is the compound growth rate, and the last column is the total percent change. If the farmland owner is in the 49 percent tax bracket, he or she would need at least a 5.1 percent per year growth rate to hold another 5 years and almost a 6 percent per year growth rate to hold another 10 years. There is a substantial range in growth rate needed depending on the tax bracket of the decision-maker from a high of 8.3 percent in the lowest tax bracket to a low of 3.1 percent in the highest tax bracket. This means that those with lower incomes must expect a higher growth rate than those in higher tax brackets for them to justify continuing to hold farmland as an investment on the basis of present value. If all have the same expectations and the expected growth rate is in the middle of the range shown, farmland will gravitate out of the hands of those with lower incomes and continue to be held by those having higher incomes. This outcome flows from an income

tax system which favors transfer of current income into capital gain by the high tax bracket investor.

Table 2 shows the same situation except for a prospective purchaser of farmland whose cost basis will be the present price at $3,000 per acre. Clearly a prospective buyer must be more optimistic for the future growth in asset value of farmland to close a transaction than the seller, given that the buyer and seller are in the same tax bracket. With the same growth expectations, prospective buyers in the higher tax brackets could buy from landowners in the lower tax brackets. This is true whether the anticipated holding period is 5 or 10 years. Again to hold for 10 years, the prospective buyer in all tax brackets needs a higher growth expectation. The model uses a level income cash flow. The growth rate needed for the longer holding period is probably over-estimated because in that length of time, income is likely to increase if the asset growth rate is positive allowing a lower required capital gain than that shown. There is a wide range of growth rate needed over the tax bracket range, but a smaller range for farmland owners who have held for a long-term period.

Simulation of the effects on these outcomes under the proposed 20 percent capital gain treatment is given in Table 3 and Table 4. Comparing Table 3 with Table 1 shows a higher growth rate needed to justify continuing to hold farmland for a longer period of time when the capital gain tax is on 20 percent rather than 40 percent. The seller would now have a greater incentive to sell since his expectations of growth would have to increase

in order to continue holding. His after tax capital gain is now greater. So a seller would be more likely to cash in on this profit now. The lower the cost basis, the greater is the windfall gain from such a change in tax treatment. However, the actual difference is unexpectedly small in changing capital gain taxation from 40 to 20 percent of the gain on the growth rate needed to break even with an alternative investment. In fact, the difference is so small that any change in decision to hold or sell after a reduction in the capital gains taxation is likely to be more psychological than economic or based on other criteria entirely.

Table 4 shows that the anticipated growth rate needed for prospective buyers is now less than it was with 40 percent of the capital gains taxed. The difference the capital gain tax treatment change makes for buyers is greater than it is for sellers. This could create a significant stimulus on the demand side. The most striking differences shown in the tables are the differences caused by the income tax brackets. The higher the tax bracket, the lower the growth rate required on farmland in order to break even with an alternative investment that has no change in asset value.

Table 1. Growth Rates Needed by an Owner to Continue Ownership for 5 Years and 10 Years[1]

N = 5 Years

Marginal Income Tax Rate	Price Needed in $ per Acre	Annual Percentage Growth Rate Needed	Total Percentage of Growth Needed
.14	4465	8.28	48.85
.16	4430	8.11	47.67
.18	4394	7.94	46.48
.21	4341	7.67	44.71
.24	4288	7.41	42.94
.28	4218	7.05	40.59
.32	4147	6.69	38.25
.37	4060	6.24	35.33
.43	3955	5.68	31.84
.49	3851	5.12	28.37
.54	3765	4.65	25.50
.59	3679	4.17	22.64
.64	3594	3.68	19.80
.68	3526	3.28	17.54
.70	3492	3.09	16.41

N = 10 Years

.14	7048	8.92	134.92
.16	6949	8.76	131.65
.18	6851	8.61	128.38
.21	6705	8.37	123.49
.24	6558	8.14	118.61
.28	6363	7.81	112.11
.32	6169	7.48	105.64
.37	5927	7.05	97.57
.43	5638	6.51	87.94
.49	5351	5.96	78.36
.54	5113	5.48	70.42
.59	4876	4.98	62.53
.64	4640	4.46	54.68
.68	4453	4.03	48.44
.70	4360	3.81	45.33

[1] Assumes 40 percent of the capital gain is taxed and a cost basis of $500 per acre.

Table 2. Growth Rates Needed by a Purchaser for Holding Periods of 5 and 10 years[1]

5 = 5 Years

Marginal Income Tax Rate	Price Needed in $ per Acre	Annual Percentage Growth Rate Needed	Total Percentage of Growth Needed
.14	4563	8.75	52.09
.16	4539	8.64	51.31
.18	4516	8.52	50.50
.21	4479	8.35	49.31
.24	4442	8.17	48.07
.28	4391	7.92	46.36
.32	4338	7.65	44.59
.37	4268	7.31	42.28
.43	4181	6.86	39.36
.49	4088	6.39	36.27
.54	4006	5.96	33.55
.59	3921	5.50	30.68
.64	3830	5.01	27.67
.68	3754	4.59	25.13
.70	3715	4.37	23.82

1 = 10 Years

.14	7316	9.32	143.87
.16	7252	9.23	141.73
.18	7186	9.13	139.55
.21	7086	8.98	136.20
.24	6983	8.82	132.77
.28	6841	8.59	128.05
.32	6695	8.36	123.15
.37	6503	8.04	116.78
.43	6261	7.64	108.72
.49	6005	7.19	100.18
.54	5780	6.78	92.66
.59	5543	6.33	84.75
.64	5292	5.84	76.42
.68	5083	5.41	69.42
.70	4974	5.19	65.80

[1] Assumes 40 percent of the capital gain is taxed and a cost basis of $3,000 per acre.

Table 3. Growth Rates Needed by an Owner to Continue Ownership for 5 and 10 Years[1]

N = 5 Years

Marginal Income Tax Rate	Price Needed in $ per Acre	Annual Percentage Growth Rate Needed	Total Percentage of Growth Needed
.14	4470	8.30	49.02
.16	4436	8.14	47.85
.18	4401	7.96	46.69
.21	4349	7.71	44.95
.24	4296	7.45	43.21
.28	4227	7.10	40.90
.32	4158	6.74	38.59
.37	4071	6.30	35.70
.43	3968	5.75	32.25
.49	3864	5.19	28.81
.54	3778	4.72	25.95
.59	3693	4.24	23.09
.64	3607	3.76	20.25
.68	3539	3.36	17.98
.70	3505	3.16	16.84

N = 10 Years

.14	7061	8.94	135.38
.16	6965	8.79	132.17
.18	6869	8.64	128.96
.21	6725	8.41	124.15
.24	6581	8.17	119.35
.28	6389	7.85	112.96
.32	6197	7.52	106.57
.37	5958	7.10	98.61
.43	5672	6.58	89.08
.49	5387	6.03	79.57
.54	5150	5.55	71.67
.59	4914	5.06	63.79
.64	4678	4.54	55.93
.68	4490	4.11	49.65
.70	4396	3.89	46.52

[1] Assumes 20 percent of the capital gain is taxed and a cost basis of $500 per acre.

Table 4. Growth Rates Needed by a Purchaser for Holding Periods of 5 and 10 Years.[1]

N = 5 Years

Marginal Income Tax Rate	Price Needed in $ per Acre	Annual Percentage Growth Rate Needed	Total Percentage of Growth Needed
.14	4518	8.53	
.16	4489	8.39	
.18	4459	8.25	
.21	4415	8.03	
.24	4369	7.81	45.65
.28	4308	7.51	43.61
.32	4246	7.20	41.54
.37	4167	6.79	38.90
.43	4070	6.29	35.66
.49	3970	5.76	32.33
.54	3885	5.30	29.49
.59	3797	4.83	26.58
.64	3708	4.33	23.61
.68	3635	3.92	21.18
.70	3598	3.70	19.95

N = 10 Years

.14	7192	9.14	139.73
.16	7111	9.01	137.04
.18	7030	8.89	134.33
.21	6907	8.70	130.23
.24	6782	8.50	126.07
.28	6614	8.23	120.45
.32	6442	7.94	114.73
.37	6223	7.57	107.44
.43	5955	7.10	98.49
.49	5679	6.59	89.29
.54	5443	6.14	81.44
.59	5202	5.66	73.41
.64	4956	5.15	65.20
.68	4755	4.71	58.49
.70	4653	4.49	55.09

[1] Assumes 20 percent of the capital gain is taxed and a cost basis of $3,000 per acre.

Concluding Remarks

Output for the rest of the selected values stated earlier is available. These tables show that as the alternative rate of return and discount rate approach (from above) the rate of return of farmland, the growth rate needed to either continue holding farmland or to buy farmland declines over all tax brackets. For example, for a return of 3 percent on land and 6 percent return on a "safe" investment such as a savings account, the growth rate needed declines for the high tax brackets to less than one percent for a 5 year holding period and the range over all the tax brackets is from less thasn one percent to about 3 percent.

The breakeven growth rate is the same across all tax brackets and all alternative rates of return if and only if 100 percent of capital gains are taxed or if there are no capital gains (as in the Adams model). Otherwise, the higher tax brackets can always accept a lower growth rate than the lower tax brackets and still break even with an alternative higher current return investment whose asset value remains unchanged. Because of the lower capital gains tax rates, it is always more advantageous for persons in the higher tax brackets to buy and hold farmland compared to those in the lower tax brackets, assuming they anticipate selling later with a price gain.

These findings have implications for the distribution of ownership of farmland. A disquieting result is that as inflation increases (the alternative return on a stable valued asset increases) the problem is further exacerbated. It becomes more and more advantageous for high income taxpayers to invest in farmland

and for low income taxpayers to disinvest in farmland. This has further implications for tenants or beginning farmers who aspire to own farmland some time during their farming career.

Literature Cited

Adams. Roy D., "The Effect of Income Tax Progressivity on Valuation of Income Streams by Individuals," Amer. J. Agr. Econ., 59(1977):538-42.

Devino, Gary T., "A Method for Analyzing the Effect of Taxes and Financing on Investment Decisions: Comment," Amer. J. Agr. Econ., 53(1971):134-35.

Feldstein, Martin, "Inflation, Portfolio Choice, and the Price of Land and Corporate Stock," Amer. J. Agr. Econ., 62(1980):910-916.

Harris, Duane G., and Richard F. Nehring, "Impacts of Farm Size on the Bidding Potential for Agricultural Land," Amer. J. Agr. Econ., 58(1976):161-169.

_____ "Impacts of Farm Size on the Bidding Potential for Agricultural Land: Reply." Amer. J. Agr. Econ., 59(1977):388-390.

Lee, Warren F., and Norman Rask, "Inflation and Crop Profitability: How Much Can Farmers Pay for Land?" Amer. J. Agr. Econ., 58(1976):984-990.

Modigliani, Franco, and Merton H. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment", American Economic Review 48(1958):261-97.

____ "Corporate Income Taxes and the Cost of Capital, A. Correction," Amer. Econ. Rev. 53(1963):433-43.

Rodewald, Gordon E., Jr., "A Method for Analyzing the Effect of Taxes and Financing on Investment Decision," Amer. J. Agr. Econ., 51(1969):1178-81.

_____ "A Method for Analyzing the Effect of Taxes and Financing on Investment Decision: Reply." Amer. J. Agr. Econ., 53(1971):135-36.

USDA, ESCS, "Farm Real Estate Market Developments," CD-84, August, 1979.