

FARM REAL ESTATE DISINVESTMENT STRATEGIES

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The combination of larger farms, rapidly increasing land values, and tax laws has resulted in increasing tax liabilities for the seller of farm real estate. After a real estate owner has made the decision to sell, he must choose the method of sale from several alternative selling strategies. Each selling strategy has a different impact on after-tax earnings. In the U.S., large numbers of farmers face this decision each year, as 4 to 5 percent of farms transfer annually [6]. In addition, more than four-fifths of farm transfers are credit-financed [3]. Sellers have been the predominant source of financing, providing more than two-fifths of all credit extended annually for farm real estate purchases [3].

In the sale of real estate, the seller often faces a crucial choice between alternative sale terms. He may sell outright and reinvest the proceeds, or he may finance the buyer over a number of years. The terms of the sale have many determinants, including (1) tax liability of the seller, (2) alternative financing available to the buyer, (3) alternative investment opportunities of the seller, (4) desire of the seller to assist the buyer (possibly his son) in acquiring the farm, (5) desire of the seller for a stable income during retirement, and (6) compatibility of the sale with the seller's estate plan.

Other authors have examined various aspects of farm real estate sales, including use of installment sales to reduce tax liabilities [4, 5]. But little information is available to help a seller determine the impact of an installment sale on future earnings or to aid the seller in selecting the optimum number of years to finance the sale. As Barry and Levi state, "While there is abundant literature citing general features of seller financing, there is relatively little empirical study of its . . . effects. Much of the literature tends to emphasize tax savings . . . rather than focus on after-tax wealth" [1, p. 43]. Barry and Levi describe the general analytical framework but fail to make a comprehensive analysis of the problem.

The objectives of this article are (1) to de-

velop a model which simulates the growth of a seller's equity and annual consumption over time under current (1977) tax laws, (2) to determine the optimum installment sale term for real estate sellers in a variety of case situations, and (3) to draw conclusions about the impact of installment sales and associated factors on the seller's future earnings.

Income Tax Implications of Selling Real Estate

When property has been held long enough to be treated as a long-term capital asset, the gain from the sale (net sales price minus adjusted basis) is subject to capital gains treatment for income tax purposes. Gains are halved and taxed as part of ordinary income, or they are subject to an alternative tax computation. The alternative tax computation assures that the first \$50,000 of gain is taxed at a maximum rate of 25 percent, and the rest of the gain at a maximum rate of 35 percent.

The obvious question raised is whether the seller should sell the property outright and take advantage of the alternative tax provisions or sell the property over time, thus spreading the gains over several years and holding the marginal income tax rates at lower levels. But other aspects of the tax law complicate the issue: income averaging, minimum tax, and maximum tax. Income averaging allows an unusually large income to be averaged with the previous four years' income, and it may permit a year of high income to be taxed in lower marginal tax brackets. Thus, income averaging reduces the income tax liability even when the sale is made over a short period of time. The maximum tax operates with a somewhat similar objective by allowing a maximum marginal tax rate of 50 percent to be applied to earned income, but it does not include capital gains income. The minimum tax is designed to assure some minimum level of taxation on types of income otherwise exempt from tax. If capital gains and other tax preference items

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exceed the exemption, the 15 percent minimum tax applies.

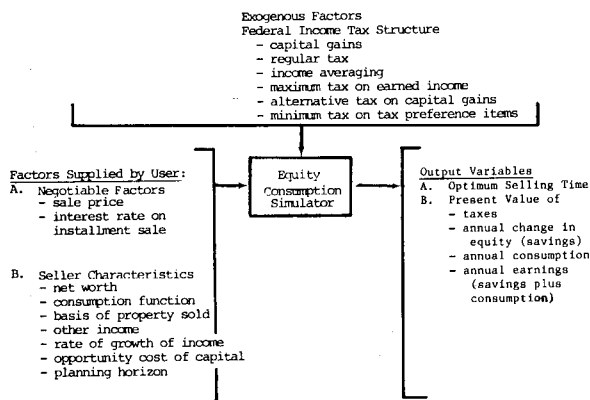
Other factors unique to the seller also affect the tax implications of selling real estate: number of exemptions, level of other income (both investment and earned income), and amount of deductions. Over time still other factors must be considered, such as the opportunity cost of capital in other investments. Certainly, if opportunity costs are high enough the seller would want to sell outright, regardless of the first year tax consequences, and reinvest at the higher installment rate of return. Family consumption affects future equity levels and investment income. Relatively high family consumption reduces future equity and lowers future taxable income. In contrast, inflation tends to increase nominal income levels and, hence, may result in income being taxed at higher marginal rates in the future. The interaction of all these factors affects the choice of strategy in selling farm property.

Model

A simulation model developed to incorporate the foregoing considerations is used to trace financial condition in individual cases under alternative real estate sales strategies. A key assumption is that the seller has made the decision to sell, and the purpose of the model is to determine the optimum financing period.

The model is outlined in Figure 1. The in-

FIGURE 1. SAVINGS AND CONSUMPTION SIMULATED BY THE MODEL



dividual user identifies several "negotiable factors" and "seller characteristics." Negotiable factors are conditions of the real estate sale which are predetermined and include sale price and interest rate. In practice the seller and buyer negotiate a sale price and interest rate. When applying the model to an individual situation, the user would want to make several runs varying these controllable

factors.

"Seller characteristics" are also user supplied and include the seller's net worth, consumption function, adjusted basis of property sold, other income, opportunity cost of capital, and planning horizon. These characteristics are independent of the conditions of the sale.

"Exogenous factors" are the tax structures applicable to the seller. Capital gains treatment of gains from the sale, regular tax structure, income averaging, maximum tax, alternative tax, and minimum tax provisions all have a bearing on taxes paid, equity growth, and funds available for consumption.

The "equity consumption simulator" is a series of equations identifying consumption and equity change through time. In years when no installment sale or outright sale occurs, these equations are:

- (1) $EARNED_t = EARNED_0 (1 + GROWTH)^t$
- (2) $TAXINC_t = EARNED_t + (RETURN) (EQUITY_{t-1}) - EX - DED$
- (3) $TAX_t = f(TAXINC_t, TAXINC_{t-1}, \dots, TAXINC_{t-4}, EARNED_t)$
- (4) $EQUITY_t = (1 + RETURN) EQUITY_{t-1} - TAX_t - CONS_t + EARNED_t$
- (5) $CONS_t = f(EQUITY_t, EARNED_t)$

where

$EARNED_t$ = earned income from other sources

$GROWTH$ = rate of growth in earned income

$TAXINC_t$ = taxable income in year t

$RETURN$ = opportunity cost of capital

$EQUITY_t$ = equity in year t

EX = annual exemptions

DED = annual deductions

TAX_t = tax paid in year t

$CONS_t$ = consumption in year t.

Figure 2 depicts the equity consumption simulator.

In the year in which an outright sale is made, equations 2 and 3 are modified slightly as follows.

- (2') $TAXINC_1 = GAIN/2 + EARNED_1 + (RETURN) (EQUITY_0) - EX - DED$
- (3') $TAX_1 = f(GAIN, TAXINC_1, TAXINC_0, \dots, TAXINC_{-3}, EARNED_1)$

where $GAIN$ = net sales price minus the adjusted basis.

During the years in which an installment sale occurs the following modified equations would be used.

- (2'') $TAXINC_t = EARNED_t + (RETURN) (EQUITY_{t-1} - UNPAD_{t-1}) + PAYINT_t$

$$+ (\text{PAYPRN}_t/2) ((\text{SALES} - \text{BASIS}) / \text{SALES}) - \text{EX} - \text{DED}$$

$$(3'') \text{ TAX}_t = f(\text{PAYPRN}_t, \text{SALES}, \text{BASIS}, \text{TAXINC}_t, \text{PAYINT}_t, \text{TAXINC}_{t-1}, \dots, \text{TAXINC}_{t-4}, \text{EARNED}_t)$$

$$(4'') \text{ EQUITY}_t = \text{EQUITY}_{t-1} + (\text{RETURN})(\text{EQUITY}_{t-1} - \text{UNPAD}_{t-1}) + \text{PAYINT}_t + \text{EARNED}_t - \text{CONS}_t - \text{TAX}_t$$

where

UNPAD_t = unpaid balance on installment sale in year t

PAYINT_t = interest received from installment sale in year t

PAYPRN_t = principal payment in year t

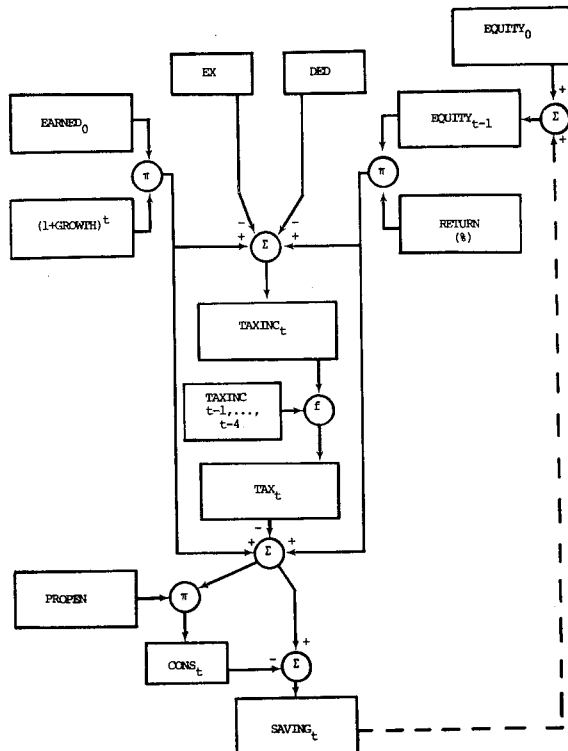
SALES = net sale price

BASIS = adjusted basis.

An amortized, even-payment loan repayment schedule is used.

"Output variables" include the optimum selling interval defined as the number of years of the sale which maximizes the net present value of savings and consumption over a user's time horizon. The user's time horizon is predetermined and might represent his life expectancy. A complete search is made of all

FIGURE 2. EQUITY CONSUMPTION SIMULATOR



possible lengths of the sale from outright sale to selling over the number of years in the time horizon. The length of sale that gives the highest present value of annual equity changes (savings) and annual consumption is selected as the optimum. Other output variables for each alternative sale length include equity at the end of the planning horizon, annual consumption, and taxes paid over the planning horizon.

Case Situations Analyzed

The critical parameters in deciding the length of the sale as identified by equations 2'' through 4'' are initial equity (EQUITY_0), opportunity cost of capital (RETURN), interest received from installment sale (PAYINT_t), gain of the sale (SALES minus BASIS), and other income (EARNED_t). Opportunity cost of capital is held at 7 percent, but several values of the other factors are examined to establish a set of representative cases as a basis for drawing conclusions about optimum terms of real estate sales. The values examined are: Sales Price of \$100,000, \$200,000, and \$500,000; Capital Gain as a Percentage of Initial Equity of 25, 50, and 75 percent; Interest Rate on Installment Sale of 6, 7, and 8 percent on the unpaid balance; and Other Earned Income of \$6,000 and \$12,000. The downpayment is assumed to be 1/number of years of sale, except for 2- or 3-year sales. In those situations the downpayment is assumed to be 30 percent. It is assumed that the seller's equity in the property is equal to the sales price.¹

All possible combinations of assumed values of these four parameters produce 54 cases to analyze. For each case the consumption function is:

$$\text{CONS}_t = (.409)(\text{EARNED}_t) + (.04)(\text{EQUITY}_t)$$

That is, annual consumption is equal to 40.9 percent of annual earned income plus 4 percent of net worth [2].

Annual savings is the portion of returns from investments and "other income" not consumed, i.e.:

$$\text{SAVING}_t = [\text{EARNED}_t + \text{RETURN}(\text{EQUITY}_t - \text{UNPAD}_t) + \text{PAYINT}_t - \text{TAXPAY}_t] - \text{CONS}_t$$

For each of the 54 cases, the owner is expected to have a 5 percent growth in "other income" over a 20-year time horizon and to have annual exemptions and deductions totaling \$1,500 and \$2,800, respectively.

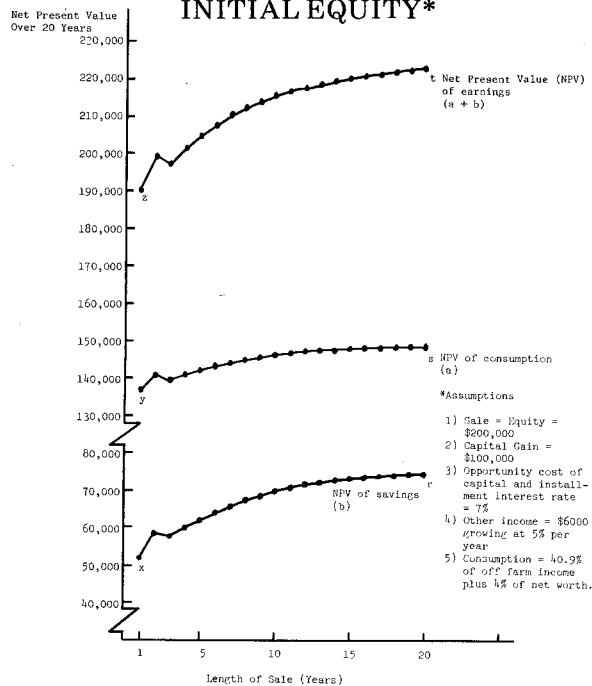
¹If the seller had debt capital in the property, the analysis would change slightly. Less capital would be available for reinvestment after the sale.

Results

The criterion used to select the best installment sale is the net present value (NPV) of future earnings. For each of the 54 cases, an outright sale and 19 different lengths of installment sales are compared by simulating the savings and consumption over the 20-year planning horizon. That length of sale producing the highest NPV of future earnings is chosen as the best.

Looking at one case in detail, assume a sale price of \$200,000, 50 percent capital gain, 7 percent interest rate on the installment sale, and initial "other income" of \$6,000. If the real estate is sold outright and the savings and consumption are simulated over 20 years, the present value of savings over the 20 years is \$52,453 (point x, Figure 3), the present value of consumption over the 20 years is \$137,928 (point y, Figure 3), and the present value of earnings (savings plus consumption) is \$190,381 (point z, Figure 3).

FIGURE 3. NET PRESENT VALUE FOR TWENTY YEARS OF EARNINGS, CONSUMPTION AND SAVINGS FOR OUTRIGHT AND VARIOUS LENGTH INSTALLMENT SALES, \$200,000 INITIAL EQUITY*



If the sale in this case is stretched over 20 years, present value of earnings is improved. With a 20-year amortized sale, the 20-year savings, consumption, and earnings total \$74,534 (point r), \$148,411 (point s), and \$222,945 (point t), respectively.

Using the criterion of choosing the highest NPV of earnings as the best, one would choose the 20-year installment sale. In this case any installment sale is preferred to an outright sale. Many of the tax advantages of an installment sale are gained by a 2-year sale (Figure 3). This fact is related to the present federal tax structure. For any installment sale, IRS requires that a maximum of 30 percent of the sale price be received in the first year. With a 2-year installment sale, principal payments are 30 percent in year 1 and 70 percent in year 2. Thus income averaging greatly reduces taxes in each year. As the installment sale is stretched beyond 2 years, added tax advantages are gained but at a diminishing rate.

The current tax structure generally favors an installment sale (Table 1). Even for the seller with an installment interest rate slightly below the opportunity cost of capital, the case sellers usually prefer an installment sale. When the installment interest rate exceeds the opportunity cost of capital, the case sellers have a strong incentive to extend the sale for as long a time as possible. It is obvious that the relative return on installment sales versus other investments is a key to the optimum length of sale. However, the seller also may want to know the potential gain of using an installment sale over the optimum number of years. Because of the uncertainties associated with seller financing, the seller may prefer having a short time horizon for the sale even though the 20-year sale produces the greatest earnings.

Generally, installment sales have a relatively small impact on future earnings for the smaller (\$100,000) sales (Table 1). For 8 of the 12 case situations having \$100,000 sales, earnings are improved less than 10 percent with an installment sale. Thus sellers of smaller farms may feel the earnings differences are small and look mainly at other factors in determining whether or not to use an installment sale and in choosing terms of an installment sale. However, the importance of the question, "How long should the terms of the sale be?" becomes very relevant for some of the medium to large sales (in one case shown in Table 1, the cost of a wrong decision is 91 percent of potential future earnings).

For most case situations outlined in Table 1, improvements in earnings due to the length of the installment sale show diminishing returns. That is, future earnings are increased dramatically when the 2-year sale is used rather than the outright sale. As more years are added to the length of the sale, the marginal improvement in future earnings increases but at a declining rate. Notice that

the 10-year sale captures most installment sale advantages in comparison with the 20-year sale, especially in the case of the smaller volume sale (Table 1).

These results reflect the interaction of earned income, amount of sale, percentage of capital gains, and interest rates. Sensitivity analysis is used to investigate the effects of each of these factors. To separate the effects, NPV's for installment sales are compared with NPV's of outright sales as each factor is varied (Table 2). For example, for the first factor, earned income, with all factors equal and \$6,000 base year earned income, the NPV of an outright sale is \$190,382. With the same factors, the NPV for a 2-year installment sale is \$200,778 or 106 percent of the outright sale. With a \$12,000 base year earned income, the NPV of a 2-year installment sale is only 104 percent of the outright sale. Comparing the two proportions indicates that a higher level of earned income may slightly reduce the effectiveness of an installment sale. In a comparison of NPV's from 10-year and 20-year installment sales with NPV's of outright sales, a similar reduction occurs as earned income has a slight adverse effect on optimum length of sale. Higher earned income lowers the proportion of income which can receive favorable tax treatment by installment sales. This dilution

effect produces a smaller advantage for installment sales as earned income becomes larger.

What is the effect of the other factors — levels of sale, capital gain, and interest rate?

TABLE 2. EFFECT OF 4 MAJOR FACTORS ON NET PRESENT VALUE (NPV) OF 20 YEARS OF EARNINGS AND OPTIMUM LENGTH OF SALE^a

	NPV of Outright Sale	% of NPV for Installment Sale to Outright Sale		
		2 Year Sale/Outright Sale	10 Year Sale/Outright Sale	20 Year Sale/Outright Sale
	(1)	(2)	(3)	(4)
1) Earned Income				
\$6,000 per year	\$190,382	106	114	117
\$12,000 per year	258,708	104	110	112
2) Amount of Sale ^b				
\$100,000	137,697	109	119	122
\$200,000	190,382	106	114	117
\$500,000	317,760	102	108	111
3) Percent Capital Gain				
25 percent	213,628	102	106	107
50 percent	190,382	106	114	117
75 percent	166,416	111	122	131
4) Interest Rate ^c				
Below opportunity rate	190,382	104	109	109
Equal to opportunity rate	190,382	106	114	117
Above opportunity rate	190,382	107	115	125

^aEach factor is evaluated assuming the following levels for all other factors: \$6,000 earned income growing at 5 percent per year, \$200,000 sale, sale equals equity, \$100,000 or 50 percent capital gain, 7 percent interest rate for the installment sale contract, 7 percent earnings on other investments, and annual consumption equals 40.9 percent of the off-farm income plus 4 percent of net worth.

^bAll have the same amount of capital gain, \$100,000.

^cCompares interest rate of sale contract with opportunity rate on other investments.

TABLE 1. PERCENT CHANGE IN PRESENT VALUE OF EARNINGS FOR THREE ALTERNATIVE LENGTHS OF REAL ESTATE SALES, THREE PERCENTAGES OF GAIN, TWO LEVELS OF OTHER INCOME, AND TWO INTEREST RATES ON INSTALLMENT SALES BY LENGTH OF SALE.

Other Income & Installment Sale Interest ^a	Length of Sale (yrs)	Sales Price and Initial Equity									
		\$100,000			\$200,000			\$500,000			
		Gain (% of Sale)			Gain (% of Sale)			Gain (% of Sale)			
		25	50	75	25	50	75	25	50	75	
\$6,000 Initial Other Income	6%	2	0.3	1.8	4.0	0.8	4.3	11.5	2.0	11.8	38.7
		10	-0.4	4.0	9.3	1.2	9.3	16.7	4.8	14.8	33.8
		20	-1.7	3.3	9.2	-0.2	9.4	22.0	5.6	25.4	59.3
	8%	2	2.4	3.7	5.5	3.4	6.6	11.8	4.2	12.0	33.0
		10	5.8	10.6	16.2	9.8	18.6	27.3	15.1	28.1	52.9
		20	8.2	13.7	20.4	13.5	24.7	39.2	22.7	47.4	91.1
\$12,000 Initial Other Income	6%	2	0.3	1.3	2.5	0.7	3.0	6.6	1.2	7.9	24.5
		10	-0.1	2.8	6.2	1.3	6.8	11.5	4.3	12.1	25.7
		20	-0.7	2.6	6.5	0.7	7.5	15.9	5.2	21.4	45.4
	8%	2	1.5	2.5	3.6	2.3	4.3	7.6	3.3	8.1	21.4
		10	3.6	6.6	10.1	6.9	12.6	18.0	12.9	23.3	40.6
		20	5.0	8.6	12.7	9.5	17.1	26.5	18.8	38.5	69.1

^aResults were also computed for installment sales using a 7 percent interest rate, but to conserve space they were not reported here.

Larger sales produce higher investment returns which also tend to reduce the effectiveness of installment sales, especially short-term sales. Larger sales produce higher investment returns which are taxed like ordinary income. Like higher levels of earned income, these higher investment returns lower the proportion of income receiving favorable tax treatment, and thus the relative advantage of installment sales declines as sales increase, *ceteris paribus*. The greater the percentage of capital gain for any size of sale, the greater is the need to consider an installment sale. Obviously, larger capital gains, with other factors equal, increase the benefits of spreading these capital gains over more years and receiving the favorable tax treatment associated with installment sales. Likewise, increasing the interest rate in an installment contract makes a long installment contract desirable to maximize the NPV of earnings. Of course, it is not just the interest rate in the installment sale that is important, but its level in relation to the seller's opportunity cost of capital. Even when the installment sale rate is below opportunity costs, sellers may favor installment sales if there is a high capital gain. However, when the installment sale rate is equal to or exceeds the opportunity rate, a long installment sale is very profitable.

The results indicate that future earnings are more sensitive to (1) the level of capital gain and (2) the installment interest rate *vis-à-vis* the opportunity rate than to changes in size of the sale or earned income. Numerous cases were run with variations in the basic case situations. Results are omitted, but generalizations from these results are consistent with the case results.

Conclusions

The authors present the basic outline of a

simulation model developed to evaluate the consequences of various sales strategies available to sellers of farm real estate. The model evaluates after-tax earnings from an outright sale and alternative installment sale strategies. The model also allows total gain to be split between capital and ordinary gain (this feature is not discussed here). Individual sellers can use this simulation model to evaluate potential tax liability and the stream of future earnings associated with various ways to complete the sale of farm property.

This brief analysis suggests several "rules of thumb" to sellers of farm property based on the NPV of potential earnings. Factors that strongly favor installment sales are an installment interest rate that is equal to or greater than the seller's opportunity cost of capital and a large percentage of capital gain (i.e., low basis in the property). Even with an unfavorable installment interest rate, the seller may want to consider an installment sale.

Alternatively, higher levels of other income and larger size sales — in relation to a constant amount of capital gains — diminish the utility of installment sales. However, these two factors appear to have a smaller impact on the potential NPV of earnings than interest rate and capital gain. In effect, these two factors are reducing the percentage of total income composed of capital gains income, and thus dilute the need for income averaging of installment sales.

If considerations other than tax liability cause the seller to avoid long installment sales, selling over a 2-year period captures much of the monetary advantage of the longer sale. Future earnings increase as the length of the sale is increased past two years, but at a diminishing rate. For the relatively small volume sale with small capital gains, little is to be gained by the long-term installment sale.

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