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THE IMPACT OF THE ECONOMIC RECOVERY TAX ACT OF 1981 ON MACHINERY PURCHASE ALTERNATIVES

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When farmers purchase new machinery two principal alternatives are available: (1) they can trade or exchange an old asset when they make the purchase or (2) they can make the purchase independent of the disposal of the old asset. The factors which influence this decision and the impact of the Economic Recovery Tax Act of 1981 has on this decision is the focus of this paper.

Today the book value of an asset may be substantially less than its sale price or trade-in value. This is the result of increases in used machinery prices associated with general inflation and the use of depreciation systems which do not reflect actual changes in asset value through time even in the absence of inflation. Taxes are paid on the difference between sale price and book value (recaptured depreciation) if an old asset is sold. These taxes, however, must be compared to the tax savings associated with the additional depreciation and investment credit from a larger initial basis when a new asset is purchased without an old asset exchange.

The Economic Recovery Tax Act of 1981 included major changes in the federal tax code which will affect all U. S. taxpayers. Several of the changes focus upon the variables which influence the purchase of new machinery. Specifically, a new rapid depreciation method, the Accelerated Cost Recovery System (ACRS), was adopted, the use of salvage value has been dropped and the concept of additional first-year depreciation has been discontinued. These changes will be considered in the context of a general model.

The environment for the purchase-sale or exchange machinery decision is complex. A farmer's marginal tax rate, depreciation system, after tax

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interest rate and the transaction date are important. The book value, trade-in value and the sale price of the old asset all impact the analysis. In addition, the consequences of this decision are not limited to the year of purchase but take place over the life of the new asset.

Several authors have considered machinery replacement principles and their tax policy impacts. The basic principles of asset replacement were developed by Perrin in 1972 and the tax implications of machinery replacement have been analyzed by Chisholm, Kay and Rister, and Watts. An analysis of machinery exchanges compared to independent purchase and sale transactions under the accelerated cost recovery system was developed by Lybecker and King. However, no analysis of the impact of the Economic Recovery Tax Act of 1981 on the purchase-sale versus exchange decision has been undertaken.

The Internal Revenue Service considers the purchase of a new asset and the sale of an old asset to the same dealer at about the same date to be a mutually dependent transaction and treats such transactions as an exchange rather than a purchase-sale. Thus, sale of the old asset to a third party or to the same dealer after a significant period of time is necessary for a purchase-sale classification.

The analysis presented assumes that the purchase of the new asset and sale or exchange of the old asset occur simultaneously, that no capital gains are associated with the transaction, and that the purchase and sale activities are independent.

A general model for analysis is presented and then the 1981 situation under the Economic Recovery Tax Act of 1981 is compared to that which existed in 1980 for a typical machinery purchase decision.

General Model

Equation (1) presents the general model for the sale versus exchange of an old asset when a new asset is purchased. Positive values of the equation show an advantage for the purchase-sale option and negative values reflect an advantage for the exchange option. Component (1-A) evaluates the difference in investment credit for the two alternatives. The difference in basis eligible for investment credit ($ICB_1 - ICB_2$) times the investment credit rate (ICR) and the investment credit percentage (ICP) compute the investment credit difference.

Equation I. Purchase-Sale Advantage General Model

$$PSA = ICR\,(ICB_1 - ICB_2)ICP \qquad (1\text{-A})$$

$$- MTR\,(SP - BV) \qquad (1\text{-B})$$

$$+ \left(1 + \frac{r}{12}\right)^m (SP - TIV) \qquad (1\text{-C})$$

$$+ MTR \left[(AFYD_1 - AFYD_2) + \sum_{i=0}^{n-1} \frac{(AB_{1,i-1} - AB_{1,i}) - (AB_{2,i-1} - AB_{2,i})}{n\,(1 + r)^i} \right] \qquad (1\text{-D})$$

where:

$AB_{j,i}$ = Adjusted Basis of asset for year i for purchase sale (j = 1) and exchange (j = 2) options

$AFYD_j$ = Additional First Year Depreciation for purchase-sale (j = 1) and exchange (j = 2) options

BV = Book Value of old asset

i = year's owned asset

ICB_j = Investment Credit Basis for purchase-sale (j = 1) and exchange (j = 2) options

ICP = Investment Credit Percentage

ICR = Investment Credit Rate

m = month's old asset sale is prior to payment of income taxes

MTR = Marginal Tax Rate

n = life of new asset in years

PSA = Purchase-Sale Advantage

r = after tax interest rate

SP = net Sale Price of the old asset after sales taxes and sales expenses have been deducted

TIV = Trade-In Value of the old asset

Component (1-B) reflects the taxes to be paid on the recaptured depreciation of the old asset. The marginal tax rate (MTR) is multiplied times the difference between the sale price (SP) and book value (BV) of the old asset. Component (1-C) computes the value of the difference between the sale price and trade-in value of the old asset compounded from the date of sale until income taxes are paid. This is the compounded value of the difference between the net dollars received if the old asset is sold or used as a trade.

Component (1-D) determines the tax value of the discounted differences in the depreciation (or cost recovery) streams including additional first-year depreciation over the life of the asset. The depreciation method (straight line, declining balance, sum of years digits, or accelerated cost recovery system) is reflected in this component as is the availability of additional first-year depreciation.

Comparison of the Purchase-Sale Versus Exchange Alternatives Before and After the Economic Recovery Tax Act of 1981

A comparison of the purchase-sale versus exchange alternatives before and after the Economic Recovery Tax Act of 1981 is presented by contrasting the situation that existed in 1980 with that for 1981. The changes resulting

from the 1981 legislation will be identified and then an example will be used to further analyze the impact of the tax law changes.

The 1981 tax law made four basic changes affecting the purchase-sale versus exchange decision. First, additional first-year depreciation as a taxpayer election has been eliminated. Because this depreciation is claimed during the year of purchase, it permitted a more rapid cost recovery. The elimination of the additional first-year depreciation election will relatively favor the exchange option.

The second major change involves the substitution of the accelerated cost recovery system (ACRS) for the rapid depreciation methods formerly used (sum of years digits and declining balance). The ACRS defines specific cost recovery groups by type of asset. Most farm machinery and equipment will qualify for the five-year classification. Thus, the need to establish asset life has been eliminated. The recovery percentages for the five-year recovery group are 15, 22, 21, 21 and 21 in 1981.[1] The ACRS also eliminates the use of salvage value because the entire unadjusted basis including any potential salvage value is recovered. Because the ACRS allows for faster cost recovery (depreciation) do to its potentially shorter life and the ability to claim the salvage value as a part of the costs to be recovered, this change will relatively favor the purchase-sale option.

The third change that directly concerns the decision involves the modification of the investment credit qualifications. Under the 1981 Act, 100 percent of the unadjusted basis of machinery in the five-year recovery group is eligible for a ten percent investment credit. Under the previous law, the percent of the unadjusted basis that qualified for the ten percent credit depended upon the life of the asset. Assets with lives of four or

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[1]The recovery percentages are 15, 22, 21, 21 and 21 for the years 1981 through 1984. In 1985 the percentages will be 18, 33, 25, 16 and 8 and after 1985 they are 20, 32, 24, 16 and 8.

less years received one-third; those with lives of five or six years two-thirds; and those with lives of at least seven years would receive 100 percent of the potential investment credit. Because the revised law provides for all assets within the five-year recovery group to get maximum value from investment credit, this change will relatively favor the purchase-sale option for assets with lives less than seven years.

The reduction of the marginal tax rates for given taxable income levels is the fourth relevant change in the 1981 law. For a given taxable income level, a lower marginal tax rate will favor the purchase-sale alternative. This is because the full amount of the recaptured depreciation is taxed (component 1-B) while only the discounted value of the added depreciation over the life of the asset (component 1-D) is tax savings.[2]

The aggregate impact of the Economic Recovery Tax Act of 1981 regarding the purchase-sale or exchange decision is ambiguous. Some of the changes favor the exchange option, others favor the purchase-sale option. To obtain further insights a typical example is presented and analyzed.

An Example

In 1982 a farmer could purchase a new tractor for $52,475. The new tractor has an expected life of seven years and a $20,000 salvage value. His old tractor has an expected net sale value of $33,400, a trade-in value of $33,400 and a book value of $6,000. The farmer expects to have a 28 percent marginal tax rate, an after tax interest rate of ten percent and purchase the new tractor and dispose of the old tractor six months prior to paying his income taxes.

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[2]This analysis assumes that the trade-in value and net selling price of the old asset are equal.

Table 1 shows the results of this example under four situations: (1) use of double-declining balance depreciation under the 1980 law, (2) use of straight-line depreciation under the 1980 law, (3) using ACRS under the 1981 law and (4) using the alternative ACRS (five-year straight line) under the 1981 law. The variable levels used in the analysis are those marked with asterisks. Other levels for the key variables are also presented in Table 1, along with their associated purchase-sale advantage (PSA). PSA coefficients which are positive reflect an advantage for the purchase-sale alternative while those that are negative show an advantage for the exchange option.

For the standard variable levels under the 1980 law the double declining balance depreciation method has a PSA of $2,138.27 compared to $937.37 for the straight line formulation. Thus, regardless of the depreciation method chosen the purchase-sale option is preferred and the advantage is $1,200 greater if the double declining balance method is chosen.

Under the 1981 law the five-year ACRS has a PSA of $1,395.58 while the five-year straight line alternative ACRS shows a PSA of $1,175.41. Thus, both methods show an advantage for the purchase-sale option and the regular ACRS has a PSA $200 larger than that for the five-year straight line alternative ACRS approach.

A comparison of the rapid depreciation methods shows that the advantage for the purchase-sale option is $740 less under the 1981 law. If the two straight line approaches are compared, the 1981 law yields a larger PSA. Under the 1980 law the PSA is $935.37 versus $1,175.41 under the 1981 law.

Additional inspection of Table 1 shows that higher trade-in values, higher after tax interest rates and higher book values all relatively favor the exchange option. Higher net selling prices and marginal tax rates

Table 1. Purchase-Sale Advantage Values for Alternative Variable Levels and Different Cost Recovery or Depreciation Methods Under the 1980 and 1981 Laws.

			Purchase-Sale Advantage**			
			1980 Law		1981 Law	
Variable	Unit	Variable	Double Declining Balance	Straight Line	Five-Year ACRS	Five-Year Straight Line ACRS
1. Trade-in Value	($)	28,400	5531.24	4621.57	4996.18	4816.19
		33,400*	2138.27	937.37	1395.58	1175.41
		38,400	-1216.99	-2746.84	-2205.02	-2465.36
2. Sale Price	($)	28,400	-1716.99	-2917.89	-2459.69	-2679.90
		33,400*	2138.27	937.37	1395.58	1175.41
		38,400	5993.53	4792.63	5250.84	5030.68
3. Marginal Tax Rate	(%)	16	2396.15	1709.92	1971.76	1845.95
		28*	2138.27	937.37	1395.58	1175.41
		54	1579.72	-736.51	147.19	-277.42
4. After Tax Interest Rate	(%)	5	2420.90	1726.96	2004.82	1877.23
		10*	2138.27	937.37	1395.58	1175.41
		15	1886.43	311.79	885.23	597.31
5. Book Value	($)	0	2738.27	1142.62	1701.18	1432.80
		6,000*	2138.27	937.37	1395.58	1175.41
		12,000	1594.18	732.10	1088.98	918.02
6. Months Before Taxes Paid	(mo)	0	2138.27	937.37	1395.58	1175.41
		6*	2138.27	937.37	1395.58	1175.41
		12	2138.27	937.37	1395.58	1175.41

*Standard variable level used in the analysis.

**Analysis assumes a purchase price of $52,475, a life of seven years, a salvage value of $20,000 and that no additional first year depreciation is claimed under the 1980 law.

relatively favor the purchase-sale alternative. Because the selling price and trade-in value of the old asset are equal in the standard values of the example, the PSA does not change when the months before taxes are paid change.

The optimum decision may change with the depreciation or cost recovery method chosen. The 54 percent marginal tax rate level shows that under the ACRS the purchase-sale option is best while under the alternative ACRS the exchange option is more profitable. Also, the optimum decision may change when variable levels for a given depreciation or cost recovery method change. For example, with the regular ACRS approach and the low trade-in value ($28,400) the PSA is $4,996.18 but for higher trade-in levels of the old asset, holding all other variables constant, the PSA will turn negative indicating a switch from the purchase-sale to the exchange option.

The alternative ACRS is not limited to the five-year straight line approach. Farmers may also select a 12 or 25-year straight line alternative. If a 12-year rather than a five-year alternative ACRS were selected the PSA would change from 1,175.41 to -357.97. This reflects the impact of using a depreciation or cost recovery system that is less rapid.

Conclusions

The Economic Recovery Tax Act of 1981 has impacted the purchase-sale or exchange machinery acquisition decision. The PSA equation indicates that the purchase-sale or exchange decision continues to be situation specific under the Economic Recovery Tax Act of 1981. In general, the size of the PSA is smaller under the 1981 ACRS than under the 1980 double declining balance depreciation system.

The 1980 seven-year straight line depreciation system compared to the 1981 five-year straight line alternative ACRS showed a relatively more positive PSA value for the latter. If, however, the 12-year or 25-year straight line alternative ACRS had been selected, the PSA would have been considerably smaller.

One final comment seems appropriate. The Economic Recovery Tax Act of 1981 is the latest step in a continuing walk that separates accurate financial statements and tax preparation procedures. Taxpayers in general, and farmers in particular need to recognize this growing dichotomy.

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