
Farm Machinery & Equipment -- Buy, Lease or Custom Hire

Quick Notes...

Selecting the best method to acquire machinery services presents a complex economic problem.

Net Present Value of Analysis allows decision makers to compare cost and return differences between alternative methods of financing farm machinery.

Farmers traditionally have owned most of their machinery. However, recent economic developments have encouraged greater use of leased, rented, and custom-hired machinery. In some cases you can reduce the adverse economic impact of these developments on the farm business by leasing or renting machinery or contracting the work to a custom hire operator.

Selecting the best method to acquire machinery services presents a complex economic problem for the farm manager. Sound decision making requires managers to identify and carefully consider numerous economic factors: (1) the size and distribution over time of principal, interest, lease, rent, and custom-hire payments; (2) size and distribution over time of finance-related income tax benefits; (3) returns from alternative uses of capital; (4) size of farm business; and (5) relationship between access

to additional debt capital and the method of financing machinery.

Characteristics of Machinery Lease, Rent, and Custom Hire Programs

There is considerable inconsistency in the agricultural industry regarding the distinction between leasing, renting, and custom-hire. To minimize confusion and provide a common basis for departure, the key features of each arrangement as used in this discussion are outlined below.

Lease

A lease is a long-term contractual agreement between the lessor (e.g., machinery dealer) and the lessee (farmer) whereby the lessee acquires possession and right of use of the machinery in exchange for an agreed upon payment. Most lease contracts run 3 to 7 years; however, irrigation equipment leases often run a bit longer (e.g., 7-10 years). Other features common to many lease contracts are:

1. Ownership of the machinery remains with the lessor. The lessee merely acquires the right of temporary possession and use.
2. One or more lease payments are due at the time the lessee obtains possession and subsequent payments are usually made at annual intervals.

3. The lessor may or may not recognize a salvage value in calculating lease payments. If a salvage value is not recognized, lease fees will be set high enough to cover the price paid by the lessor for the machine, various lessor carrying costs, and to ensure the lessor a given return on investment. This full pay-back arrangement is commonly referred to as a financial lease. Where a salvage value is recognized, an adjustment may be made at the conclusion of the lease period in the event the actual salvage value differs from that used to calculate lease payments.
4. Often the lease cannot be canceled, and if canceled, a substantial penalty may be imposed (e.g., payment of all or a designated percentage of the remaining lease fees).
5. Typically, the lessee is responsible for property taxes, insurance, and repairs not covered by the warranty.
6. Basic options at the conclusion of the lease period are: (a) purchase of the equipment; (b) renew the lease; or (c) return the equipment to the lessor.

Rent

In contrast to leasing, a rental agreement is a short-term contract whose duration is less than one year. Contract periods may vary from a few hours to several months. Rental fees are commonly based on the length of time the machine is rented. Consequently, unlike lease fees, rental costs will vary with the extent of machine use.

Considerable variation exists regarding the availability of machinery for rent and who is responsible for the various ownership and operating costs. Many rental opportunities are available only when it is advantageous to the

owner of the equipment to do so. For instance, equipment dealers will often rent machinery only when they have an excess of equipment for sale, but will not rent when their equipment inventory is at normal or below normal levels. This situation often makes the availability of rental equipment somewhat uncertain. When farmers do rent, they typically pay fuel, oil, grease, and repairs due to negligence. The owner is responsible for property taxes and insurance. As with a lease, the farmer must provide an operator for the machinery.

Custom-Hire

Like a rental agreement, a custom-hire agreement is a short-term agreement in which the fees vary with the extent of use. Custom-hire fees are commonly based on the amount of work accomplished (e.g., acres covered, bushels harvested, etc.). However, in certain instances, a custom-hire operator may be paid on an hourly basis.

Typically, the custom-hire operator pays for all ownership and operating costs, and provides an operator for the machinery. In cases when crops require transport, the custom-hire operator may provide that transportation.

Income Tax Considerations

With purchased machinery, the size of the tax shield is highly dependent on the amount expensed, depreciation, and interest. That is in contrast to hired machinery where lease, rental, and custom-hire fees are the tax-deductible expense. An exception occurs when a lease arrangement is interpreted by the Internal Revenue Service to be a conditional sale. If classified as a sale, the lease payments, to the extent they do not represent interest or other finance charges, must be capitalized and depreciated. The criteria used by the Internal Revenue Service in determining whether the agreement is a lease or sale are outlined in the *Farmer's Tax Guide*.

In addition to comparing the size of the tax shield, farmers should note differences in the distribution of tax savings over time. The earlier a tax savings is realized; the greater the advantage, since the savings can be invested at an earlier point in time.

Other Considerations

One of the biggest disadvantages of hired machinery is the farmer's loss of its residual value. When machinery is rented, the farmer has no equity interest in the machinery at the end of the rental period. The same is true for custom-hire and many lease agreements. This is in contrast to purchased machinery where part of the investment can be recovered when the machinery is sold or traded. This disadvantage, however, can at least be partially offset in lease agreements by specifying a buyout price at the time the contract is negotiated.

Because of the trend toward larger, higher-capacity machinery, and inflation in machinery prices, the investment required for individual items of machinery has increased. This makes it more difficult for farmers to purchase the most economic quantity of machinery services. The problem is particularly troublesome for smaller businesses where machine use is not great enough to economically justify large investments. This problem can be partially overcome by renting machinery or by hiring a custom operator. Through renting or custom-hiring, farmers can obtain machinery for only the time period needed to perform specific tasks without a large capital outlay.

Farm business size will also be an important factor in comparing the cost of controlling machinery. Since rental and custom-hire costs are often tied to the amount of work performed (e.g., a given cost per hour of work), costs per unit of work will remain relatively constant. On the other hand, total finance costs for purchase and lease typically will not vary with the amount of work

performed; consequently, per work unit costs decrease with increased machinery use. It follows that purchase and lease will compare more favorably with renting and custom hiring as the size of the business increases.

Many farmers traditionally preferred to own and operate the latest in farm machinery. Due to pride in ownership, some farmers will not seriously consider hiring machinery, yet have no reservations about leasing land. This attitude is somewhat puzzling in that the advantage more likely lies with leasing the asset that depreciates in value (machinery).

As additional demands are placed on farmers' sources of capital, they will realize increasingly that effective machinery operation, not its ownership is essential to profit making. Thus, pride of ownership will undoubtedly play a smaller role in future machinery decisions.

Example Analysis

Because of the large number of variables that determine the lowest cost financing alternative and the wide variation in these variables among individual farms, it is inappropriate to generalize as to which alternative is the best for all situations. Consequently, each individual situation requires its own analysis, thereby permitting consideration of variables that are unique to the individual business.

The four alternatives considered in the example are obtaining a combine by: (1) credit purchase; (2) financial lease; (3) rent; or (4) custom hire. Assumptions adopted for the analysis are:

1. The cost of the combine is \$140,000 plus a 7.3% sales tax (\$10,220).
2. The farmer is in the 28% marginal tax bracket (i.e., the bracket where the tax on additional income is 28%).

3. Capital available to the farm and not invested in machinery can be invested where a before-tax return of 13% can be realized. This translates to a 9.36% after-tax [$13 \times (1-.28)$] cost of capital.
4. The combine will be operated 135 hours per year over 1,000 acres.
5. If purchased, the combine will be owned for 5 years. The combine will be depreciated over a 7 year period using the Modified Accelerated Cost Recovery System (MACRS) accelerated depreciation. It is estimated that the salvage value of the machine at the end of 5 years will be \$75,000.
6. The annual inflation rate for machinery variable costs (fuel, oil, repairs, labor), rental fees, and custom-hire rates is 6%.

The specific details on the five available financing alternatives are as follows:

CREDIT PURCHASE: A down payment of \$45,066 (30% of the total purchase price) is required at the time of acquisition. The loan of \$105,154 is to be repaid in four equal annual installments. Interest is due annually and is calculated at 13% on the loan's remaining balance. The expensing option is not exercised. Estimated first-year variable cost is \$8,562. Estimated annual variable costs from the second to the final year (disregarding the annual inflation rate) is \$12,634 per year. Estimated average annual fixed costs for taxes, insurance, and housing are \$3,290 per year.

FINANCIAL LEASE: A 5-year lease requires an annual payment of \$36,819. The first payment is due at the time of initial possession. Property taxes, casualty insurance, housing, repairs (after the first

year), and other operating expenses are the farmer's responsibility (same as the purchase situation). Ownership of the combine remains with the lessor throughout the lease period and upon termination of the lease. No agreement has been reached regarding any equity the lessee might accumulate and therefore be able to apply towards the renewal of the lease or purchase of the machine.

RENT: The rental rate for the first year is \$125 per hour. It is assumed that inflation will increase the annual rental rate approximately 6% per year. Property taxes and casualty insurance are paid by the owner as are repairs not due to negligence. Fuel, oil, and other operating expenses, including repairs due to negligence, approximately \$8,562, are the farmer's responsibility. The combine is returned to the lessor at the conclusion of the farmer's harvest.

CUSTOM-HIRE: The custom-hire rate is \$36.70 per acre including hauling and operator expenses, or \$36,700 per year assuming 1,000 acres of annual use. It is assumed that inflation will cause the custom-hire rate to rise at approximately 6% per year. All property taxes, insurance, repairs and other operating expenses are paid by the custom operator.

Decision making regarding the four alternatives should be based on the present value of after-tax cash costs. Costs and returns incurred at future points in time should be discounted to obtain their present values. By basing decisions on the present value of costs and returns, differences between alternatives in the timing of costs and returns can be included in the analysis. Moreover, when the length of life between two or more alternatives differ, the present value of costs should be converted to an equivalent annual cost comparison. Cost comparisons should be made on an after-tax basis, since the tax treatment of costs differs depending on the method of acquisition.

For each of the four situations presented, the first step in the analysis is to project for each year of combine use the after-tax cash costs. The second step is to discount these costs to derive their present value. The third step is to calculate the annual equivalent cost. The fourth and final step in the analysis is to compare the present value of after-tax costs and/or the equivalent annual after-tax costs and make a decision.

Credit Purchase Option

Table 1 illustrates the calculations used to derive the after-tax cash costs and their present values. Since the cash outlay for the down payment is made at the very beginning, no discount is allowed from the downpayment. However, in situations where credit payments are made periodically throughout the year (monthly, quarterly, etc.) each payment should be discounted on a periodic basis. In this case, \$105,154 is to be financed over a 4-year period. The annual payment of principal and interest for each of the 4-year periods is \$35,352.16.

Since credit payments are made but once a year, it is assumed they are made at the end of the year and discounted on an annual basis.

Since it is difficult to determine when fixed and variable costs will occur and also for consistency in making alternative comparisons, these values are discounted on an annual basis at the year's end. Tax savings are also discounted on an annual basis at year's end. Similarly, the return realized from the salvage value and depreciation recapture tax is discounted at the end of the year.

The formula for discounting cash costs is:

$$\text{Present Value} = \frac{\text{Prediscounted Cash Value}}{(1+i)^n}$$

where i is the after-tax cost of capital for the period (monthly, quarterly, yearly, etc.) and n is the period number. In this example, with the exception of the downpayment, discounting occurs at the end of the year for all entries.

Table 1: Projected actual and present value of costs for the credit purchase of a combine.

Year	Downpayment/ Principal Payment	Interest @ 13.00%	Depre- ciation ^a	Taxes Insurance Housing	Fuel, Oil, Grease, Hauling, Operator Labor, and Repairs
	\$	\$	\$	\$	\$
0	45,066.00 ^e	-	-	-	-
1	21,862.14	13,670.02	16,088.56	3,290.00	8,562.00 ^f
2	24,500.82	10,851.34	28,737.09	3,290.00	13,392.04
3	27,685.92	7,666.24	22,578.07	3,290.00	14,195.57
4	31,285.12	4,067.04	18,401.95	3,290.00	15,047.30
5	-	-	-10,585.67 ^g	3,290.00	15,950.14
Total	150,220.00	36,254.65	75,220.00	16,450.00	67,147.05

Year	Tax Savings ^b	Salvage Value	After-Tax Cash Cost ^c	Present Value After-Tax Cash Cost (9.36% ^d Discount Rate)
	\$	\$	\$	\$
0	-	-	45,066.00	45,066.00
1	11,650.96	-	35,553.20	32,510.24
2	15,755.73	-	36,278.47	30,334.16
3	13,364.37	-	39,473.36	30,180.65
4	11,425.76	-	42,263.70	29,548.36
5	2,423.25	75,000.00	-58,183.11	-37,196.71
Total	54,620.07	75,000.00	140,451.62	130,442.72

^a Seven-year MACRS accelerated depreciation.

^b Equals the marginal tax rate (28%) times the sum of tax deductible expenses (interest, depreciation, property tax, insurance, housing, fuel, oil, grease, hauling, operator labor, and repairs).

^c Equals down payment or principal payment plus interest, taxes, housing, insurance, fuel, oil, grease, hauling, operator labor and repairs, minus tax savings and savings value.

^d $13\% \times (1 - \text{MTR}) = 9.36\%$. Marginal Tax Rate (MTR) = 28%.

^e Equals 30% of purchase price.

^f First-year repairs covered by warranty.

^g Depreciation recapture (\$75,000.00 salvage value - \$64,414.33 accumulated depreciation).

Lease Option

Table 2 presents the annual after-tax cash cost and their present values. It is assumed that lease payments are made at the beginning of each year and discounted accordingly. Thus, in this example the first lease payment is not discounted. As with the buy option, fixed and variable costs are discounted on an annual basis at year end, as are tax savings.

Table 2: Projected actual and present value of cash costs for the lease of a combine.

Year	Lease Payment ^a	Taxes, Insurance, Housing	Fuel, Oil, Grease, Hauling, Operator Labor, and Repair ^b	Tax Savings ^c	After-Tax Cash Cost ^d	Present Value After-Tax Cash Cost (9.36% ^e Discount Rate)
	\$	\$	\$	\$	\$	\$
0	36,819.00	-	-	-	-	-
1	36,819.00	3,290.00	8,562.00	13,627.88	35,043.12	35,195.12
2	36,819.00	3,290.00	13,392.04	14,980.29	38,520.75	35,090.62
3	36,819.00	3,290.00	14,195.57	15,205.28	39,099.29	32,529.59
4	36,819.00	3,290.00	15,047.30	15,443.76	39,712.54	30,174.16
5	-	3,290.00	15,950.14	15,696.56	40,362.58	28,007.17
Total	184,095.00	16,450.00	67,147.05	74,953.77	192,738.28	160,996.65

^a Lease payments made at the beginning of the year and discounted accordingly.

^b First-year repairs covered by warranty.

^c Equals the marginal tax rate (28%) times sum of tax deductible expenses (lease payments, taxes, insurance, housing, fuel, oil, grease, repairs, hauling, and operator labor).

^d Equals the sum of lease payments and other cash costs, minus tax savings.

^e $13\% \times (1 - \text{MTR}) = 9.36\%$. Marginal Tax Rate (MTR) = 28%.

Rent Option

It is assumed that the rental expense is incurred at the beginning of the year and discounted accordingly. As with the buy option and the lease option, variable costs are discounted on an annual basis at year end, as are tax savings. Table 3 presents the calculations needed to derive the after-tax costs and their present values.

Table 3: Projected and present value of cash costs for the rent of a combine.

Year	Rent ^a	Fuel, Oil, Grease, Hauling, Operator and Repairs	Tax Savings ^b	After-Tax Cash Cost ^c	Present Value After-Tax Cash Cost (9.36% ^d Discount Rate)
	\$	\$	\$	\$	\$
1	16,875.00	8,562.00	7,122.36	18,314.64	18,191.42
2	17,887.50	9,075.72	7,549.70	19,413.64	17,632.51
3	18,960.75	9,620.26	8,002.68	20,578.33	17,090.76
4	20,098.40	10,197.48	8,482.85	21,813.03	16,565.66
5	21,304.30	10,809.33	8,991.82	23,121.81	16,056.69
Total	95,125.95	48,264.79	40,149.41	103,241.33	85,537.04

^a Base rental rate of \$125 per hour with a 6% annual compound rate of increase. Rental payments made at the beginning of the year and discounted accordingly.

^b Equals marginal tax rate (28%) times sum of rent and variable costs.

^c Equals rent plus variable cost minus tax savings.

^d $13\% \times (1 - \text{MTR}) = 9.36\%$. Marginal Tax Rate (MTR) = 28%.

Custom-Hire Option

It is assumed that the custom-hire expense is incurred at the beginning of the year and discounted accordingly. Tax savings are discounted on an annual basis at year end. Table 4 illustrates how to derive the after-tax cash costs and their present values.

Table 4: Projected and present value of cash costs for the custom hire of a combine.

Year	Custom Fees ^a	Tax Savings ^b	After-Tax Cash Cost ^c	Present Value After-Tax Cash Cost (9.36% ^d Discount Rate)
	\$	\$	\$	\$
1	36,700.00	10,276.00	26,424.00	27,303.51
2	38,902.00	10,892.56	28,009.44	26,464.63
3	41,236.12	11,546.11	29,690.01	25,651.53
4	43,710.29	12,238.88	31,471.41	24,863.40
5	46,332.90	12,973.21	33,359.69	24,099.50
Total	206,881.31	57,926.76	148,954.55	128,382.57

^a Base custom-hire rate of \$36.70 per acre with a 6% annual compound rate of increase. Custom-hire payments are made at the beginning of the year and discounted accordingly.

^b Equals marginal tax rate (28%) times custom fees. Savings are realized at the end of the year.

^c Equals custom fee minus tax savings.

^d $13\% \times (1 - \text{MTR}) = 9.36\%$. Marginal Tax Rate (MTR) = 28%.

Summary of Analysis

The final step in determining the best method to finance the acquisition of machine services is to compare the present value of after-tax costs and/or the equivalent annual after-tax cost and make a decision. When the length of life between two or more alternatives differ, the present value of costs should be converted to an annual equivalent after-tax cost basis for comparison purposes. When the annual equivalent after-tax cost is discounted on an annual basis at the after-tax discount rate over the life of the financial alternative, the resulting sum will equal the present value of after-tax

cash cost of that financial alternative. For instance, as shown in Table 5, which presents a summary of the present value after-tax cost and the annual equivalent after-tax cost for the example analysis, the annual equivalent after-tax cost of the credit purchase option is \$33,849.68. If this value is discounted annually at the after-tax discount rate of 9.36% over the 5-year life of the alternative, the resulting sum of the annual discounted figures will equal \$130,442.72.

Table 5: Present value of after-tax cash cost and equivalent annual after-tax cost for alternative financing methods of obtaining the services of a combine.

Financial Alternative	After-Tax Cash Cost	Present Value of After-Tax Cash Cost (9.36% Discount Rate)	Equivalent Annual After-Tax Cost
	\$	\$	\$
Credit Purchase	140,451.62	130,442.72	33,849.68
Financial Lease	192,738.26	160,996.65	41,778.37
Rental	103,241.33	85,537.04	22,196.72
Custom-Hire	148,954.55	128,382.57	33,315.07

As shown in Table 5, the actual after-tax cash cost of renting plus the more favorable cash-flow makes renting the most profitable alternative by a significant margin. The \$75,459.61 separating the present value after-tax cash cost of the low and high cost alternative underlines the importance of thoroughly analyzing available financing alternatives. An error in decision making can easily cost farmers thousands of dollars. The results of the analysis, however, depend entirely upon the outlined assumptions. Small changes in financing terms, as well as farm-to-farm variation in discount rate (after-tax return realized from alternative investments), combine use, tax bracket, etc., can affect

the cost ranking. Furthermore, certain alternatives, such as rental, may not be available in some situations.

Performing the above analysis by hand requires considerable time and expertise. Further, to adequately analyze a machinery financing alternative, several analyses should be made to test its sensitivity to varying assumptions. When one considers the time and expertise involved, it is little wonder that most farmers and lenders fail to adequately analyze alternative methods of financing farm machinery. Contact an Agriculture and Business Management staff person to assist you.

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