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EXAMINING OPTIONS FOR FARM MACHINERY ACQUISITION

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Analysis of machinery acquisition options is important as farmers attempt to reduce costs and better manage their cash flows. It is also important for entering farmers and for farmers who are restructuring their operations. Lone and Janssen discussed two major acquisition alternatives, credit purchase and financial leasing, in this Newsletter one year ago (No. 221, May 15, 1985). They described common lease and credit purchase terms, based on a recent survey, and indicated some advantages and disadvantages of each option.

This Newsletter contains a description of how one can compare machinery acquisition options from a cost minimization standpoint. Assume that the decision to acquire a particular machine of a certain size has already been made. The question remaining is whether to purchase, lease, or rent the machine. Although it is not applicable to the example given in this Newsletter, custom hiring could be examined in a similar way.

Break-even Analysis

Machinery acquisition options can be compared by examination of costs associated with each option. For the example shown here, the Agricultural computer NETWORK (AGNET) system was used to make the necessary calculations. The BUYORLEASE program in AGNET's FINANCE package is designed to compare machinery acquisition options under various economic conditions. This program shows results in terms of cash flows of costs and equivalent annual after-tax costs. The latter is the result of summing discounted cash flows and then amortizing them so that they are on an "equivalent" annual basis. In this way, options with different time horizons (such as a

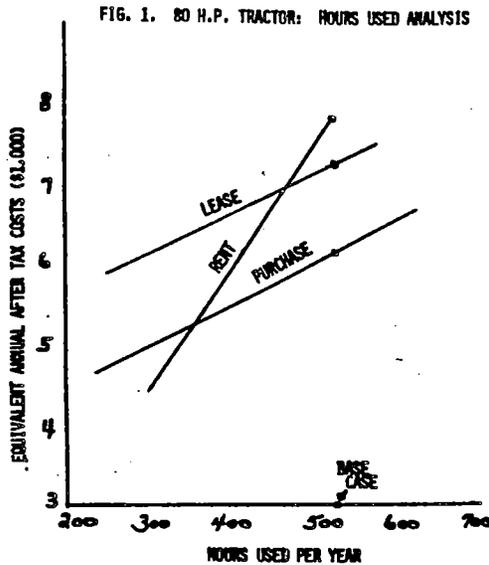
purchase in which the machine is held for 8 years versus a lease covering only 5 years) can be appropriately compared.

To illustrate the analysis, suppose a farmer has decided to replace or add an 80 horsepower tractor to his farm operation. Assume the following initial economic conditions in comparing purchase, lease, and rental options for acquiring use of such a tractor: (1) the tractor would be used for 525 hours/year; (2) the farmer is in a 22% marginal tax bracket; (3) the tractor would have a \$22,660 new purchase price (including applicable sales taxes); (4) if it were used for 8 years, the tractor would then have a salvage (sale) value of \$2,500; (5) 70% of the purchase price could be financed with a 5-year loan; (6) a 10% investment tax credit is available to the farmer if he purchases the tractor; (7) the lessor, rather than the lessee, utilizes the investment tax credit in the case of the lease option; (8) the tractor could be leased for 5 years with annual payments of \$4,950; (9) although the lease contains an option for purchase of the tractor at the end of 5 years, the farmer does not exercise that option; (10) the tractor could be rented each year at a charge of \$12/hour used; and (11) the discount rate is 12%, for adjusting costs to "present value" and "equivalent annual" bases. Certain other fixed and variable cost information necessary for running the BUYORLEASE program can be estimated using Allen's SDSU Econ Pamphlet 153 (Costs Per Hour and Per Acre for Machine Operations) or similar sources.

Using AGNET's BUYORLEASE program, the equivalent annual after-tax costs for the tractor example under initial conditions are as follows: (1) purchase option = \$6,124; (2) lease option = \$7,232; and (3) rent option = \$7,782. From a cost minimization standpoint, the purchase option would therefore be best and the lease option would be next best. Of course, costs associated with the various alternatives can be different in each individual situation, so this example should be used only to understand the process for comparing options.

(Purchase of used machinery could be compared to these options in the same way, if such factors as repair costs, machine life, and salvage value are appropriately adjusted).

The option for which costs are minimized with the assumed conditions may not be the least cost option if some of the conditions--concerning, for example, hours of annual use, lease and rental rates, loan terms, and tax brackets--are changed. Figure 1 shows the results of a break-even analysis for varying hours of annual use, based on calculations performed with the AGNET BUYORLEASE program.



With the "base case" condition of 525 hours/year of tractor use, the pur-

chase option involves lower annual costs than does either the lease or the rent option. When annual use is relatively high, the rent option is the most costly. However, as hours of annual use decline (moving left on the horizontal axis of Fig 1), the rent option becomes more competitive. The break-even point for rent and lease options is at about 460 hours. At around 350 hours, the rent option breaks even with the purchase option. In other words, if the tractor will be used for less than 350 hours/year, it will be least costly to rent the machine.

Access to Analytic Aids

Farmers in South Dakota who are not already users of the AGNET system can inquire about access through their County Cooperative Extension Service Office or through Dr. Don Peterson in SDSU's Economics Department.

The same kind of economic comparison of machinery acquisition options can be done (in a more time consuming way, however) with a desk calculator, using forms and guidelines available from the author of this Newsletter. Individuals can request EMC 888 (Computational Instructions for Economic Comparisons of Farm Machinery Purchase-Lease-Rent-Custom Hire Options), as well as the previously mentioned Economics Pamphlet 153. Each costs \$1.00; checks should be made out to the SDSU Economics Department.

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