Lease vs.
Purchase
Analysis

With this program, the user can evaluate lease vs. buy alternatives for the control of a capital asset. The program also assists the user in calculating or negotiating specific terms to make the alternatives equivalent in terms of the Net Present Values (NPV).

Information needed to run this program can come from:

- An individual’s farm records
- Sale bill for asset being sold
- Lease agreement
- Financing information

To make use of this program, the user must be able to provide estimates of purchase and lease costs, financing information, and information on assets traded.

**Lease Information** Text description of asset, down payment, fixed lease payments, length of lease contract (number of years), payments per year, purchase option, terminal value, effect of down payment on lease payments, and return of down payment amount.

**Purchase Information** Text description of asset, purchase price, terminal value, number of years to depreciate, depreciation method, amount of section 179 election.

**Financing the Purchase** Down payment, length of loan (number of years), interest rate, number of payments per year.

**Investor Information** Length of analysis (planning horizon), marginal and Self-Employment tax rates, capital-sale tax rate, after-tax discount rate.

**Information about Item Traded** Adjusted basis of item traded, number of years of depreciation remaining on item traded, number of items represented by item traded, value of item applied to lease.

**Information about Item Sold for Cash** Cash received for item sold (not traded) and the application of the sold item to a lease or purchase.
Navigating the Program

Lease vs. Purchase Analysis

Compare lease versus purchase alternative and calculate terms to make the cashflow equivalent in NPV terms.

- Select Report to Print -
- Select Report to View -

**Fast Tools & Resources**

**In the main menu, above, button and drop-down menu features help the user navigate the program. These features are described below.**

**Selecting** in the lower right-hand section of the main menu, will:

- Calculate **Cash Lease Payments that Would Equate NPV** (net present value) between the two alternatives.
- Calculate the **Original Purchase Price that Would Equate NPV** between the two alternatives.

The main menu’s two drop-down menus assist in navigating to the output reports, as well as printing the output reports. The [Select Report to Print] and [Select Report to View] menus allow the user to print and view the following reports:

- **SUMMARY**
- **PURCHASE DETAILS**
- **LEASE DETAILS**
- **SENSITIVITY TABLES**
- **TAX RATE SENSITIVITY GRAPH**
- **DISCOUNT RATE SENSITIVITY GRAPH**
- **ALL REPORTS** (print option only)
Worksheet tabs at the bottom of the Excel spreadsheet screen can be used to help navigate the user through the program:

**Main-Lease Vs. Buy** takes the user to the main input menu.

**Lease Details** takes the user to the cash-flow summary output report for the lease alternative.

**Purchase Details** takes the user to the cash-flow summary output report for the purchase alternative.

**Sensitivity Tables** takes the user to the sensitivity tables displaying the NPVs of the purchase and lease alternatives for changes in marginal tax rates and discount rates.

**Tax Rate Sensitivity** takes the user to the chart showing the relationships between NPVs of the purchase and lease alternatives to changes in marginal tax rates.

**Discount Rate Sensitivity** takes the user to the chart showing the relationships between NPVs of the purchase and lease alternatives to changes in discount rates.

**Inputs**
The Lease vs. Purchase Analysis program allows the user to enter the required input on a single input screen:

The input required for this program is entered in 5 sections: **Lease, Purchase, Investor Information, Item Traded** and **Item Sold for Cash**.
**Note:** Data can be entered only in shaded (yellow) cells. The other cells, used for calculations, are protected so formulas cannot be changed accidentally. If a user clicks on a “protected” cell, the following message will be generated:

Lease Information

*Description of Item* A text description of the asset leased. In the example, the user entered “Tractor”.

*Cash Down Payment/Security Deposit* The amount of cash paid at time of lease. If the payment is tax-deductible, click on the box that says . There is no down payment used in the example.

*Fixed-Cash Lease Payments per Payment Period* The level of the periodic payments made for the use of the leased property. If these payments are paid at the beginning of payment periods, click on the box that says . In the example, annual payments equal $25,775.

*Length of Lease Contract (Years)* The number of years the lease contract is outstanding. In the example, the lease contract is a 5-year contract.

*Payments per Year* The number of lease payments required per year. An annual lease is used in the example.

*Purchase Option at End of Lease* The residual purchase payment due at the end of the lease if the user wishes to buy the asset. In the example, the user would owe $41,100 at the end of the lease if purchasing the tractor was preferred by the user.

*Terminal Value at the End of Planning Horizon* The estimated market value of the asset at the end of the evaluation horizon. In the example, the tractor is worth $10,000 after the 5-year period.

*Effect of Down Payment/Trade on Lease Payments* Three drop-down box options allow the user to select the effect that down payments have on lease payments. Choices include:
- Having no effect on lease payments
- Reducing initial lease payments
- Equally reducing all lease payments

In the example, the user chose to reduce the initial lease payments had there been a down payment.
**Return of Down Payment/Security Deposit** The amount of the down payment/security deposit returned to the user when the leased asset is returned at the end of contract. In the example, there was no down payment or security deposit, thus no money is returned.

**Purchase Information**
**Description of the Item** A text description of the asset purchased. In the example, the user entered “Tractor.”

**Purchase Price (Cash Boot)** The price of the asset minus the value of the item traded for the new asset. This is ultimately the amount that is financed. In the example, the tractor costs $122,000.

**Terminal Value at the End of Planning Horizon** The estimated market value of the asset at the end of the evaluation horizon. In the example, the tractor’s terminal value is $10,000.

**Length to Depreciate (Years)** The recovery period for which the Internal Revenue Service allows for depreciation to be claimed. Available selections are: 3, 5, 7, 10, 15 or 20 years. The tractor is a 7-year asset.

**Depreciation Method** The method used to calculate depreciation. Under current tax law, specific depreciation methods are permitted for different classes of property.
Options within the program are:
- **MACRS 150% (Half-Year)** An accelerated method of depreciation that is available for most farm property, including farm machinery.
- **MACRS 200% (Half-Year)** The most accelerated method of depreciation, but not available for most farm property.
- **Straight Line** Available for most farm property.
- **No Depreciation**
The user selected “MACRS 150% (Half-Year)” in the example.

**Section 179 Election** the amount of deduction allowed for a qualifying property’s cost in its first year of service. There was no election made in the example.

**Financing the Purchase**
**Down Payment (% of Purchase)** The amount of the purchase price not financed. The percentage entry can range from 0% to 100%. An entry of 100% means that the item is purchased entirely with cash. An entry of 50% indicates that 50% of the purchase price (cash boot) is financed with debt. In the example, 75% of the tractor’s purchase price is financed with debt, thus the entry for the “down payment” was 25%.

**Length of Loan (Years)** The loan amortization period, or number of years that the loan is outstanding. The loan is a 5-year loan in the example.
Interest Rate on Loan The annual interest rate on the loan. The example assumes an 8% interest rate.

Payments per Year The number of payments required per year. Available selections are 1, 2, 3, 4, 6 or 12. The loan in the example is an annual loan with one payment per year.

Investor Information
Planning Horizon (Years) The number of years the user would like to analyze the lease versus purchase. The example will be analyzed for 5 years.

Marginal Tax and SE Tax Rate The marginal income and self-employment tax rates for the user. An entry of 30% indicates that 30% of the next dollar earned goes toward income and self-employment taxes. The user has entered 32% in the example.

Tax Rate on Capital Sale The tax rate applied on the capital sale. The tax rate includes the city, county and state taxes that apply to this purchase. In the example, the tax rate is 20%.

After-Tax Discount Rate (atdr) The after-tax discount rate used to calculate the present value of future cash flows. One method for calculating the after-tax discount rate is to use the before-tax discount rate (dr) and the marginal tax rate (mtr) in the following equation: \( \text{atdr} = \text{dr} \times (1 - \text{mtr}) \). The dr may be the rate of the loan entered in the financing section and the mtr is entered previously in this section. In this example, the atdr equals 8% \( \times (1 - 32\%) \), or 5.44%, which is rounded to 6%.

Information about Item Traded
Adjusted Basis of Item Traded or Sold Item The amount paid for the asset minus Section 179 expenses and/or depreciation claimed. In the example, the adjusted basis is $10,000.

Years Remaining Depreciation on Item Traded The number of years remaining to depreciate the original purchase price of the item that was traded in. There are two years remaining on the tractor’s depreciation schedule.

Number of Additional Items Still Being Depreciated The number of other items that are currently being depreciated in the business. There are no other items being depreciated.

Value of Traded Item Applied Towards Lease The amount of the trade-in’s value that is applied toward the lease, instead of receiving cash. In the example, $15,000 is the value of the tractor that is applied toward the lease.
Item Sold for Cash

Cash Received for Item Sold (Not Traded) The amount of money received for a sales transaction of an asset that was not traded, but sold elsewhere. The user did not sell an item in the example.

Note: Mark the correct box, as shown below, if the cash applies to the “Lease”, “Purchase”, or both alternatives.

Summary of Results and Reports
The summary of results is presented on the main menu page. Also generated are three additional reports: PURCHASE DETAILS, LEASE DETAILS and SENSITIVITY TABLES and two graphs: NPV Sensitivity Analysis to Changes in Marginal Tax Rate and NPV Sensitivity Analysis to Changes in Discount Rate.

Results
The “Present Value of the Net Outflows,” or costs, for the purchase and lease alternatives are calculated and compared as shown below. The preferred plan, the plan with the “lower-cost” alternative, is stated along with the dollar amount by which the two plans differ.

<table>
<thead>
<tr>
<th>RESULTS:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Value Purchase Outflows</td>
<td>$81,297.83</td>
</tr>
<tr>
<td>Present Value Lease Outflows</td>
<td>$79,214.34</td>
</tr>
<tr>
<td>Under these terms, the lease is preferred by an amount equal to:</td>
<td>$2,083.50</td>
</tr>
<tr>
<td>Cash lease payments that would equate NPV</td>
<td>$26,502.37</td>
</tr>
<tr>
<td>Original purchase price that would equate NPV</td>
<td>$119,240.84</td>
</tr>
</tbody>
</table>

Also provided are the dollar amounts for cash-lease payments and the original purchase price that would create equal NPVs for the lease and purchase.

In the above example, the “Purchase” alternative costs $81,297.83 and the “Lease” alternative costs $79,314.34. The lease alternative is preferred by a total of $2,083.50. The annual lease payment that would make the NPV between the two alternatives equal is $26,502.37. Moreover, a purchase price (cash boot) of $119,240.84 (remaining inputs remain the same) results in equal NPVs.
**Reports**

The three reports generated by the program can be accessed using the drop-down menu on the main menu, or by selecting worksheet tabs at the bottom of the Excel screen.

**PURCHASE DETAILS** This report provides a cash-flow summary of the payment schedule when purchasing an asset. The cash-flow summary is a detailed worksheet that reports:

- Loan Balances
- Down Payments and Loan Payments
- Interest and Depreciation Expenses
- After-Tax Terminal Value & Loan Balance
- Adjustment for Taxes
- Net After-Tax Cash Flows
- Discount Factor
- Present Value

<table>
<thead>
<tr>
<th>Cash Flow Summary</th>
<th>Return to Main</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NPV Analysis</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Credit Purchase</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Loan Balance</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>End of Period</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Downpayment and Loan Payment</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Interest Expense</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Depreciation Expense</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>After Tax Terminal Value &amp; Loan Balance</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Adjustment for Taxes</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Net After Tax Cash Flows</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Discount Factor</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
<tr>
<td><strong>Present Value</strong></td>
<td><strong>Return to Main</strong></td>
</tr>
</tbody>
</table>

The example shown above represents an initial purchase of $122,000. A down payment of $30,500 is made in the initial period, leaving a loan balance of $91,500 to be paid in 5 years. Annual payments are approximately $22,916. Interest and depreciation expenses are calculated, as well as the adjustments for taxes, net after-tax cash flows, discount factor and present value for each period.

**LEASE DETAILS** This report provides a cash-flow summary of the payment schedule when leasing an asset. The cash-flow summary is a detailed worksheet that reports:

- Downpayment/Security Payment and Refund
- Contractual Lease Payments
- Lease Payment Adjustments
- Cash Lease Payments
- Adjustment for Taxes
- Terminal Purchase
- Depreciation Expense Purchase Option
- After-Tax Terminal Value
- Net After-Tax Cash Flows & Trade Value
- Discount Factor
- Present Value
In the example, the asset is leased for 5 years. The contractual lease payments equal $25,775 per period. However, the first period payment is adjusted by the market value of the traded item, or $15,000. Adjustments for taxes, the discount factor, net after-tax cash flows, and present value for each period are also calculated.

**SENSITIVITY TABLES** This report displays the net present values (NPV) for both the purchase and lease options as marginal tax rates and discount rates change. This information helps analyze the extent that the net present values are sensitive to changes in the marginal tax rate and discount rate.

The left table displays the NPV for the purchase and lease alternatives according to changes in the marginal tax rate. The preferred alternative is the one with the lower NPV. In this example, the lease alternative is preferred when marginal tax rates are 5% or greater.

The right table displays the NPV for the purchase and lease alternatives for different discount rates. The lease alternative is preferred when discount rates are 6% or greater.
**Sensitivity Graphs**

These display the present value of net outflows with respect to marginal tax rates and interest rates. The **red** line represents the **purchase** option, while the **blue** line represents the **lease** option.

The graph offers a visual representation of the sensitivity of each option to changes in marginal income tax rates.

**Tax Rate Sensitivity Graph** This graph presents the relationship between the present value of net outflows and the user’s marginal income tax rate. It is a visual representation of the sensitivity of each option to changes in income tax rates. The preferred acquisition alternative is the lower of the two lines.

This example shows that the lease alternative is preferred for marginal tax rates of 5% or greater.
Discount Rate Sensitivity Graph This graph displays the present value of net outflows with respect to discount rates. It is a visual representation of the sensitivity of each option to changes in the discount rate. The preferred acquisition is the lower of the two lines. This example shows that the lease alternative is preferred for discount rates greater than 6%. 