

Machinery Financing

With this program, the user can evaluate the financial implications of four types of financing alternatives. A net present value and cash-flow schedule are generated for a:

- **Purchase**
- **Roll-over Purchase**
- **Lease**
- **Rent**

The information needed for this analysis can come from:

- An individual's farm records
- Loan records
- Machinery information
- Lease agreement
- Rental agreement

Required Input

The user must provide estimates of the costs related to purchasing, leasing, and renting machinery, as well as farm characteristics and tax information.

Main Input

Description of analysis; number of acres farmed; number of years for analysis; after-tax discount rate; user's federal income, state income, and Social Security tax rates; and type of machinery.

Purchase

Taxable basis of machinery, amount of Section 179 to be expensed, amount of down payment plus equity, loan information (balance, interest rate, length in years), number of years machinery will stay in possession, and value of machine at time of sale.

Roll-Over Purchase

Yearly repair costs, roll-over costs, increase in annual roll-over costs, remaining basis of trade-in, amount of Section 179 to be expensed, amount of down payment plus equity, loan information (balance and interest rate), number of months of interest expense, number of years roll-over will continue, and value of machine at the end of the contract.



Lease

Lease information (number of years, if payments are equal during lease, cash payment amount), trade-in information when applicable (adjusted basis of trade-in, amount applied toward lease and if this is equally applied over length of lease), security deposit information (amount of security deposit and is it applied toward lease), purchase at end of lease information (purchase payment and remaining value of machine) and end of period information (years machine held).

Rent

Yearly repair costs, rental information (hours used per year, rate per hour, and annual increase in rental costs), and end of period information (years of rental agreement).

Navigating the Program

The Machinery Financing program uses buttons to help the user move among input worksheets. The primary buttons are found on the “Control Menu” that is described later.

Tabs located at the bottom of the Excel spreadsheet screen are another useful tool. With the tabs, the user can navigate between input and output worksheets. To view a worksheet, click on its name. The tabs are described below.

Input Displays the “Main Input” worksheet and a summary of all four alternatives.

Repairs_Salvage Displays the worksheet where total hours used, repair costs, and remaining value of the machine is estimated based on: the machine’s list price, hours of use per year, beginning hours, and current age.

Purchase Displays the input and output worksheets for the purchase alternative.

Roll-Over Displays the input and output worksheets for the rollover alternative.

Lease Displays the input and output worksheets for the lease alternative.

Rent Displays the input and output worksheets for the rent alternative.

How to Use the Input Sections

Information common to all financing alternatives is entered using the “Main Input” menu. A “Control Menu” is used to move among input worksheets and reports. A “Summary of Alternatives” displays the financial information calculated for each alternative included in the analysis.

The inputs are entered in the “Main Input” worksheet as shown below where the text is blue. In addition to the common required input, each financing alternative has input specific to it. The required information needed for each of the four financing alternatives, as well as the output information, will be explained later.

To help explain the input required for this program, the example that John and Sally Smith are planning to purchase a tractor, was developed. The Smiths’ information is entered throughout this documentation.

Example

John and Sally Smith would like to purchase a new John Deere tractor (cost: \$55,000) for their 1,500-acre farm. However, they are unsure about the many financing alternatives available and which is the best for them. They would like a 5-year analysis, as they plan to purchase another new tractor in 5 years. Their tax rates are as follows: federal income, 15%; state income, 3%; and Social Security, 15.3%. Their money-market account currently earns a return of 2.5%. The Smiths would like to analyze all their alternatives. The “Main Input” menu is shown below.

Description	John Deere
Number of acres	1,500 acres
Years in analysis	5 range from 1 to 12
After-tax discount rate	2% per year
Marginal tax rates	
Federal	15%
State	3%
Social security	15.3%
Machine type	tractor

Description Enter a description of the machinery being analyzed. The description can be a name, a color, or anything that will remind the user of what is being analyzed. Once the description is entered here, it will appear automatically on all input worksheets. The Smiths used “John Deere” to describe this analysis.

Number of Acres Enter the number of acres on which the machinery will be used. This number is helpful when analyzing the cost per acre. The Smiths farm 1,500 acres.

Number of Years Enter the number of years for which financing is required for this analysis. The Smiths would like an analysis for 5 years.

After-Tax Discount Rate (atdr) The rate used to calculate the present value of future cash flows. One method for calculating the atdr is to use the before-tax discount rate (dr), or interest rate, and the marginal tax rate (mtr) with the following equation: $atdr = dr \times (1 - mtr)$.

The “*before-tax discount rate*” (dr) represents the opportunity cost of money. For operations with debt, the discount rate may be a blend of debt costs and equity capital. The blended rate may also need to be adjusted to reflect the risk inherent in the investment. For farms with no debt, the discount rate may be the return of off-farm investments, such as a CD or money market rate.

The “*blended before-tax discount rate*” may be calculated using the following example. If the user has an operating loan being charged an interest rate of *d* (12%) and has a savings account earning interest *e* (4%), the “blended” before-tax discount rate may be found using the following equation: “*d*” x (debt/asset ratio) + “*e*” x (equity/asset ratio) = “dr” or $12\% \times (.5/1) + 4\% \times (.5/1) = 8\%$.

The *marginal tax rate* is the sum of the tax rates used in the analysis.

For John and Sally Smith, their after-tax discount rate is calculated using the following information. They have their money in a money-market account earning 2.5% (before-tax discount rate).

Their marginal tax rates are:

Federal Income Tax	15.0%
State Income Tax	3.0%
<u>Social Security Tax</u>	<u>15.3%</u>
Total	33.3%

Thus, their after-tax discount rate is:
 $[2.5\% \times (1 - 33.3\%)] = 1.67\%$, rounded to 2%.

Machine Type Once the machine type is entered, it automatically appears on all input worksheets. In this example, the machine is a tractor.

The “Control Menu” is shown below.

Control Menu

Evaluate a

Purchase	Yes	<input type="button" value="Go to Purchase"/>
Roll-over purchase	Yes	<input type="button" value="Go to Roll-over"/>
Lease	Yes	<input type="button" value="Go to Lease"/>
Rent	Yes	<input type="button" value="Go to Rent"/>

The “Control Menu” assists the user in the initial stages of the analysis process. It also helps the user navigate through the computer program. The user may choose to include financing alternatives in the analysis by *selecting “yes” or “no”* from the drop-down box located next to each financing alternative. The drop-down box appears when the user clicks on the blue next to the financing alternative. As shown above, the Smiths want to analyze all of the financing alternatives.

To enter inputs, click on the “Go To XXX” button. For example, to enter inputs for the purchasing alternative, click on .

The “Control Menu” also has a button. This button displays the `REPAIRS_SALVAGE` worksheet. In this section, the user estimates the repair costs and remaining values for the asset. This information is used in calculations for determining annualized cash flows, taxable cash flows, and tax savings. The estimates per year will automatically adjust for these values.

ESTIMATED REPAIR COSTS AND REMAINING VALUES

(for tractor)

List price when new	\$55,000		
Hours use per year	300 hrs		
Beginning hours	0 hrs		
Current age of machine	0 years		
Year	Estimated Total Hours	Estimated Repair Costs	Estimated Remaining Value
1	300	\$0	\$35,000
2	600	\$100	\$33,000
3	900	\$200	\$31,000
4	1,200	\$200	\$29,000
5	1,500	\$300	\$27,000
6	1,800	\$400	\$25,000
7	2,100	\$500	\$24,000
8	2,400	\$500	\$22,000
9	2,700	\$600	\$21,000
10	3,000	\$700	\$20,000
11	3,300	\$700	\$19,000
12	3,600	\$800	\$18,000

The “Summary of Alternatives” is shown below.

	Purchase	Roll-over Purchase	Lease	Rent
Net Present Value ¹	\$27,519	\$27,683	\$31,460	\$91,277
Annualized Cash Flow ¹	\$5,688	\$5,722	\$6,502	\$18,865
End of Horizon				
Value of Machine	\$27,000	\$50,000	\$0	\$0
Loan Balance	\$0	\$45,000	\$0	\$0
Net Value	\$27,000	\$5,000	\$0	\$0
Cash Flows In ² :				
Year 1	\$18,474	\$14,703	\$6,004	\$18,142
Year 2	\$7,256	\$4,684	\$6,071	\$18,503
Year 3	\$8,353	\$4,666	\$6,803	\$18,870
Year 4	\$9,156	\$4,651	\$6,803	\$19,245
Year 5	-\$15,606	-\$875	\$6,870	\$19,627

For each alternative, the **Yearly Cash Flows** are calculated as well as the **Net Present Value** of those cash flows. An annualized cash flow gives the average annual cash flow of the alternative, weighting yearly cash flows by the discount rate.

Positive cash flows represent outflows while negative cash flows represent inflows. The alternative with the lowest net present value and annualized cash flow is the least-cost alternative. The last year’s cash flow subtracts the value of the machine and adds to it the remaining loan balance.

In this example, the purchase alternative, with a net present value of \$27,519 and an annualized cash flow of \$5,688 is the least-cost alternative.

Purchase Alternative

The input worksheet for the purchase alternative is shown below. The input information can be entered where the text is blue. Some of the information may already be entered from the “Main Input” worksheet To change information that may be common to other financing alternatives, click on [Link to Main Input](#). This will update the information on the “Main Input” worksheet.

Example

The Smiths have been approved for a \$55,000 loan for the tractor with a 10.4% interest rate for 5 years. They have saved \$10,000 to use as a down payment and will not expense any Section 179 expenses. They would like to keep the tractor at least 5 years.

Based on the loan information input, the principal and interest payments for 5 years using a constant amortization schedule are calculated. The taxable basis of the machine is \$55,000. Depreciation is calculated using a 5-year MACRS schedule. At the end of 5 years, the tractor is projected to be worth \$27,000.

**PURCHASE
INPUT**

Description	John Deere	
Number of acres		1,500 acres
Taxable basis of new machine		\$55,000 \$
Amt of section 179 expensing		\$0 \$
Loan information		
Downpayment plus equity value of machine traded in		\$10,000 \$
Loan balance		\$45,000 \$ of loan
Interest rate		10.4% rate per year
Years of loan		5 number of years
Payment per year		\$11,992
End of period information		
Years machine is held		5 number of years
Remaining value of machine		\$27,000 \$
After-tax discount rate		2.0% rate per year

In addition to the information required in the “Main Input” worksheet, the required inputs for the Purchase alternative are described below.

Taxable Basis of New Machine The amount paid for the asset minus Section 179 expenses. If an item is traded in for a replacement, the basis of the old asset continues to depreciate as if it were still in possession. Do not combine the basis of the two items. The Smiths enter \$55,000 as the taxable basis because that is the cost of the new tractor and they will not expense any Section 179 expenses.

Amount of Section 179 Expenses The deductible amount allowed for a qualifying property’s cost in its first year of service as determined by the tax code. Again, the Smiths do not deduct any Section 179 expenses.

Down Payment Plus Equity Value of Machine Traded In The sum of the down payment and the value of the trade-in (if applicable). This amount is the collateral used toward the purchase that reduces the amount of money borrowed. The Smiths enter \$10,000, which is the money they saved for a down payment. They do not have a trade-in.

Loan Balance The amount of money borrowed for purchasing the machinery. The Smiths enter \$45,000. This is the difference between the cost of the tractor (\$55,000) and their down payment (\$10,000).

Interest Rate The cost of borrowing money. The Smiths have been approved for a loan with a 10.4% interest rate.

Years of the Loan The number of years over which the loan can be repaid without penalties. The Smiths have been approved for a 5-year loan.

Payment Per Year The model automatically calculates the payment per year based upon the information entered. This is the dollar amount due each year to repay the loan. In this example, the payment is calculated to be \$11,992 per year.

Years Machine Is Held The number of years the machine will be kept. The Smiths plan to keep the tractor for 5 years.

Remaining Value of the Machine The market value of the machine when sold. If the machine's remaining value differs from that entered in the "Main Input" worksheet, click on [Link remaining value](#) to have the calculated remaining value automatically entered. In the example, the tractor's remaining value is \$27,000.

Reports for the Purchase Alternative

The reports are:

- Yearly Cash Flows and Net Present Value
- Annualized Cash Flows
- Taxable Cash Flows and Tax Savings

Purchase Alternative - Yearly Cash Flows and Net Present Value

Based on the input given for the purchase alternative, the yearly cash flows and net present value for the tractor are calculated as shown below. The net present value is \$27,492 and the annualized cash flows total \$5,718.

YEARLY CASH FLOWS AND NET PRESENT VALUE

							Net present value	\$27,492
							Annualized cash flows	\$5,718
Year	Down-Payment	Loan Payment	Repair Costs	Salvage Value	Tax Saving	Net Cash Flow		
1	\$10,000	\$11,992			\$3,518	\$18,474		
2		\$11,992	\$100		\$4,837	\$7,256		
3		\$11,992	\$200		\$3,839	\$8,353		
4		\$11,992	\$200		\$3,036	\$9,156		
5		\$11,992	\$300	\$27,000	\$898	-\$15,606		

The report shows the annualized cash flows in the categories described as follows:

Down Payment The amount of equity financing used in acquiring the machine. In this example, the Smiths used a \$10,000 down payment.

Loan Payment The amount of capital required per year to decrease debt. As calculated in the input worksheet, the amount required is \$11,992 per year for 5 years.

Repair Costs The estimated repair costs per year. Repair costs may be estimated using an engineering function or the user may specify an average yearly repair cost. By default the costs are automatically calculated using an engineering function.

To specify the repair cost, the user must click on [Change Repairs Costs](#) to display the worksheet shown below. Enter the amount of repair costs for each year under the "Revised Entry" column. A revision to repair costs may cause changes in

yearly cash flows and the net present value for the purchase. Either the costs from the original repair input sheet or revised input may be used.

While the Smiths made entries in the “Revised Entry” column, however, they chose to use the default repair costs in the “Repair Sheet” column



by clicking

Year	Repair Sheet	Revised Entry
1	\$	500
2	\$100	100
3	\$200	0
4	\$200	0
5	\$300	0

Salvage Value The value of the machine when sold by the Smiths. This figure is the same as the “Remaining Value of Machine” in the input worksheet. In this example, the salvage value is \$27,000.

Tax Saving The tax savings resulting from depreciation, Section 179 expensing, repairs, and interest. Also included are any gains when the machine is sold.

Net Cash Flow The sum of the previous columns. A positive net cash flow represents outflows, while a negative net cash flow represents inflows.

Purchase Alternative - Annualized Cash Flows

The annualized cash flows per year represent the cash spent and saved in a year. This report is separated into the categories as shown below. Each category is expressed in a “total” per year and “per-acre” column. To figure the total cash flow, *add* the loan payments, repair costs, and annualized down payment. From the total, *subtract* the annualized remaining value and tax savings.

ANNUALIZED CASH FLOWS

	Total	Per acre
Loan payments	\$11,757	\$7.84
Repair costs	\$157	\$0.10
Annualized downpayment	\$2,080	\$1.39
Annualized remaining value	-\$5,087	-\$3.39
Tax saving	-\$3,190	-\$2.13
Total cash flow	\$5,718	\$3.81

According to this report, if the Smiths purchase the tractor, they will have the following cash-flow implications to consider: yearly loan payments totaling \$11,757, yearly repair costs averaging \$157 and an annualized down payment (based on one year's portion) of \$2,080. The annualized remaining value is - \$5,087 and the tax savings is -\$3,190. The total annualized cash flow is \$5,718.

Purchase Alternative - Taxable Cash Flows and Tax Savings

The taxable cash flows are: interest expense, depreciation, repairs, and gain on sale. Each of these cash flows affects taxes differently and is described below.

TAXABLE CASH FLOWS AND TAX SAVINGS

Year	Interest	Depreciation	Repairs	Gain on sale	Tax Savings
1	\$4,680	\$5,885			\$3,518
2	\$3,920	\$10,505	\$100		\$4,837
3	\$3,080	\$8,250	\$200		\$3,839
4	\$2,153	\$6,765	\$200		\$3,036
5	\$1,130	\$6,765	\$300	\$10,170	\$898

Interest The payment expense for borrowing money based on a percentage of the debt outstanding. The Smiths will owe \$4,680 in year 1, \$3,920 in year 2, \$3,080 in year 3, \$2,153 in year 4, and \$1,130 in year 5. If they were to increase the payments per year, the interest expense would decrease.

Depreciation Calculated using the 150% declining balance MACRS schedule over a 7-year time span.

Repairs The estimated repair costs per year. The Smiths used the default repair costs as shown above.

Gain on Sale The amount of capital received above and beyond the original capital outlay.

Tax Savings The amount of money saved by deducting the taxable cash flows from income tax returns. The calculation for tax savings is:

1. Total of interest, depreciation, and repairs
2. Total of all tax rates as entered in "Main Input" worksheet (federal income, state income, and Social Security)
3. Gain on sale
4. Total of federal income and state income tax rates. The equation, referring to the numbered descriptions, is as follows (#1 x #2 - #3 x #4). In this example, the maximum tax savings is in year 2, saving \$4,837, and the least tax savings is in year 5, saving \$898.

Roll-Over Purchase

A roll-over purchase occurs when a new piece of machinery is purchased each year for a payment called a “roll-over cost.” As part of the roll-over purchase, the purchaser has a loan on which principal payments are not made. Interest is paid on the loan for a set number of months. The input worksheet for the roll-over purchase alternative is found below. Input information can be entered where the text is [blue](#). Some of the information may already be entered from the “Main Input” worksheet. To change information that may be common to other financing alternatives, click on [Link to Main Input](#). This will update the information on the “Main Input” worksheet.

Example

The Smiths have received an approved roll-over contract. It explains that they would pay \$6,000 each time they purchase a new tractor. This price will not increase over the next 5 years. They would still use the approved loan described in the “Purchase” alternative section. Below is an excerpt from “Purchase” alternative section:

They have been approved for a \$55,000 loan that covers the cost of the tractor at a 10.4% interest rate for a term of 5 years. They have saved \$10,000 to use towards a down payment and will not expense any Section 179 expenses. They’d like to keep the tractor at least 5 years.

In addition to the loan information above, the roll-over contract states that two months of interest are due on the loan. The estimated taxable basis of the machine that is traded in after the first year is \$45,000. The estimated market value of a one-year-old machine at the end of 5 years is \$50,000.

INPUT

Description	John Deere	
Number of acres		1,500 acres
Yearly repair costs		\$0 \$ per year
Roll-over costs		\$6,000 \$ per year
Increase in annual rollover costs		0% % per year
Remaining basis in machine that is traded in	\$45,000	\$ in first year
Section 179 expense		\$0 \$ per year
Loan information		
Downpayment plus equity value of machine traded in	\$10,000	\$
Loan balance	\$45,000	\$ of loan
Interest rate	10.4%	rate per year
Months interest expense	2	no. of months
End of period information		
Years roll-over will continue		5 no. of years
Value of machine at end	\$50,000	\$
After-tax discount rate		2.0% % per year
Ending position		\$5,000 (machine value - loan balance)

In addition to the information required in the “Main Input” worksheet, the required inputs for the roll-over purchase alternative are described below.

Yearly Repair Costs The total repair costs incurred per year. The Smiths enter \$0 because with a roll-over purchase, new machinery is acquired each year. Typically, if repairs are necessary on new machinery, they are covered by a warranty.

Roll-Over Costs The payment made when in a roll-over purchase agreement. The Smiths enter \$6,000. This is the amount of interest they will pay each year.

Increase in Annual Roll-Over Costs The percentage the roll-over costs will increase each year. The Smiths estimate that roll-over costs will not increase in the five years of this analysis.

Remaining Basis in Machine Traded in The value of the machinery traded in for the roll-over contract, minus any write-offs or Section 179 expenses. In this example the basis is \$45,000.

Section 179 Expenses The deductible amount allowed for a qualifying property’s cost in its first year of service determined by the tax code. The Smith’s do not deduct any Section 179 expenses.

Down Payment Plus Equity Value of Machine Traded In The sum of the down payment and the value of the trade-in (if applicable). In a roll-over purchase, the Smiths make “interest payments.” By having a down payment, their interest payments are reduced. They entered \$10,000, which is the amount of money they saved for a down payment. They do not have a trade-in.

Loan Balance The amount of money that would be borrowed if purchasing the machinery. In a roll-over purchase, the yearly payment is the interest calculated based on the loan balance. The lower the loan balance, the smaller the payments will be. The Smiths have a \$45,000 loan balance.

Interest Rate The cost of borrowing money. The Smiths have been approved for a loan with a 10.4% interest rate.

Months of Interest Expense The number of months during which payments will be due on the roll-over contract .

Years the Roll-Over Contract Will Continue The number of years the contract will continue. The Smiths enter “5” for a five-year analysis.

Value of Machine at End The market value of the machine when it is traded in. The Smiths estimate the machine to be worth \$50,000 when traded in.

Reports for the Roll-Over Purchase Alternative

The reports are:

- Yearly Cash Flows and Net Present Value
- Annualized Cash Flows
- Taxable Cash Flows and Tax Savings

Roll-Over Purchase - Yearly Cash Flows and Net Present Value

Based on the input given for the roll-over purchase alternative, the yearly cash flows and net present value for the tractor are calculated as shown below. The net present value is \$27,653 and the annualized cash flows is \$5,752.

CASH FLOW AND NET PRESENT VALUE

Net present value of cash flows		\$27,653				
Annualize cash flow		\$5,752				
<hr/>						
Downpayment						
	Rollover		Repair	Ending	Tax	Net
Year	Costs	Interest	Costs	Position	Saving	Cash Flow
<hr/>						
1	\$16,000	\$780			\$2,077	\$14,703
2	\$6,000	\$780			\$2,096	\$4,684
3	\$6,000	\$780			\$2,114	\$4,666
4	\$6,000	\$780			\$2,129	\$4,651
5	\$6,000	\$780		\$5,000	\$2,655	-\$875

The report shows the annualized cash flows in the categories described as follows:

Down Payment Roll-Over Costs The amount of equity financing used in acquiring the machine. This is also referred to as the “roll-over costs.” In this example, the Smiths pay a \$6,000 roll-over cost each year. In year one, however, they also paid a \$10,000 down payment.

Interest The payment expense for borrowing money based on a percentage of debt outstanding. The Smiths have an assumed \$780 interest expense each year. However, in a roll-over purchase agreement, interest is included in the roll-over cost.

Repair Costs The estimated repair costs per year. Since a roll-over purchase agreement gives the user a new machine each year, the user does not have any repair costs.

Ending Position The value of the machine minus the remaining loan balance. This represents the value of the machine if the user had maintained ownership the entire period. In this example, at the end of the 5-year period, the ending value of the machinery is \$5,000.

Tax Saving The tax savings resulting from depreciation, Section 179 expensing, repairs, and interest. Also included are any gains when the machine is sold.

Net Cash Flow The sum of previous columns. A positive net cash flow represents outflows, while a negative net cash flow represents inflows.

Roll-Over Purchase – Annualized Cash Flows

The annualized cash flows per year represent of the cash spent and saved in a year. This report is separated into the categories as shown below. Each category

is expressed in a “total” per year and “per-acre” column. To figure the total cash flow, *add* the roll-over costs, interest costs, repair costs, and annualized down payment. From the *total*, *subtract* the annualized ending value and annualized tax savings.

ANNUALIZED CASH FLOWS

	Total	Per acre
Rollover costs	\$6,000	\$4.00
Interest costs	\$780	\$0.52
Repair costs	\$0	\$0.00
Annualized downpayment	\$2,080	\$1.39
Annualized ending value	-\$942	-\$0.63
Annualized tax saving	-\$2,166	-\$1.44
Total cash flow	\$5,752	\$3.83

According to this report, if the Smiths enter into a roll-over purchase contract, they will have the following cash-flow implications: yearly roll-over costs totaling \$6,000, yearly interest costs of \$780, no repair costs, and the down payment (based on one year’s portion) of \$2,080. The annualized ending value is \$942 and the tax savings is \$2,166 The total cash flow is \$5,752.

Roll-Over Purchase - Taxable Cash Flows and Tax Savings

The taxable cash flows are: tax basis, depreciation, interest, repair costs, and gain on sale. Each of these cash flows affects taxes differently and is described below.

Year	Tax Basis	Taxable items			Gain on sale	Tax Savings
		Depreciation	Interest	Repairs		
1	\$51,000	\$5,457	\$780			\$2,077
2	\$51,543	\$5,515	\$780			\$2,096
3	\$52,028	\$5,567	\$780			\$2,114
4	\$52,461	\$5,613	\$780			\$2,129
5	\$52,848	\$5,655	\$780		-\$2,848	\$2,655

Tax Basis The tax basis in the previous year, plus the roll-over cost for that year, minus depreciation for that year. In year 1, the tax basis is simply the trade-in value plus the roll-over costs for year 1.

Depreciation Calculated using the 150% declining balance MACRS schedule over a 7-year time span.

Interest The payment expense for borrowing money based on a percentage of the debt outstanding. The Smiths pay \$780 each year.

Repairs The estimated repair costs per year. Since a roll-over purchase gives the user a new machine each year, the user does not have any repair costs. The Smiths have no repair costs.

Gain on Sale The amount of capital received above and beyond the original capital outlay for tax purposes. In a roll-over purchase agreement, this value represents the amount of money the user would have received, had the user actually owned the machinery. In the example, the gain on sale is \$2,848.

Tax Savings The amount of money saved by correctly reporting the taxable cash flows.

Lease Alternative

The lease alternative represents a contract that has a cost for borrowing an item for a set length of time. The input worksheet for the lease alternative is shown below. The input information can be entered where the text is *blue*. Some of the information may already be entered from the “Main Input” worksheet. To change

information that may be common to other financing alternatives, click [Link to Main Input](#). This will update the information on the “Main Input” worksheet.

Example

Another option for John and Sally Smith is to lease a new tractor for 5 years. The lease payments are \$10,000 per year. The Smiths do not pay a security deposit and do not plan on purchasing the leased tractor at the end of the lease agreement.

INPUT

Description	John Deere	
Number of acres		1,500 acres
Lease information		
Years of lease		5 number of years
Are cash payment on the lease the same in each year?		yes "yes" or "no"
Cash lease payment per year	\$10,000	\$ per year
Trade-in information		
Is there a machine trade-in?		no "yes" or "no"
Security deposit		
Is there a security deposit?		no "yes" or "no"
Purchase at end of lease		
Purchase at end of lease?		no "yes" or "no"
End of period information		
Years machine is held		5 number of years
After-tax discount rate		2.0% rate per year

In addition to the information collected in the “Main Input” worksheet, the required inputs for the lease alternative includes several “yes” or “no” type questions. Depending upon how the question is answered, the user may be prompted for more information. The above input worksheet displays the Smiths’ information.

Reports for the Lease Alternative

The reports are:

- Yearly Cash Flows and Net Present Value
- Annualized Cash Flows
- Taxable Cash Flows and Tax Savings

Lease Alternative – Yearly Cash Flows and Net Present Value

Based on the input given for the lease alternative, the yearly cash flows and net present value for the tractor are calculated as shown below. The net present value is \$31,253 and the annualized cash flows total \$6,501.

YEARLY CASH FLOWS AND NET PRESENT VALUE

		Net present value		\$31,253		
		Annualized cash flows		\$6,501		
Year	Deposits Trade-in	Cash Lease Payment	Repair Costs	Purchase & Salvage Values	Tax Saving	Net Cash Flow
1		\$10,000			\$3,996	\$6,004
2		\$10,000	\$100		\$4,029	\$6,071
3		\$10,000	\$200		\$3,397	\$6,803
4		\$10,000	\$200		\$3,397	\$6,803
5		\$10,000	\$300		\$3,430	\$6,870

The report shows the annualized cash flows in the categories described as follows:

Deposits/Trade-in The amount of equity financing used in acquiring the machine. In the example, the Smiths do not pay a security deposit.

Cash Lease Payment The amount of capital paid per period for leasing an item. The Smiths pay \$10,000 each year.

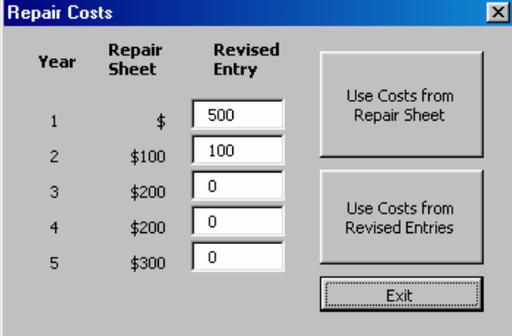
Repair Costs The estimated repair costs per year. Repair costs may be estimated using an engineering function or the user may specify an average yearly repair cost.

To specify the repair cost, the user must click on [Change Repair Costs](#) to display the worksheet shown below. Enter the amount of repair costs for each year under the “Revised Entry” column. A revision to repair costs may cause changes in yearly cash flows and the net present value for the purchase.

Either the costs from the original repair input sheet or revised input may be used.

While the Smiths made entries in the “Revised Entry” column, however, they chose to use the default repair costs in the “Repair Sheet” column

by clicking .



Year	Repair Sheet	Revised Entry
1	\$	500
2	\$100	100
3	\$200	0
4	\$200	0
5	\$300	0

Purchase and Salvage Values The value of the machine when it is sold at the end of the lease. However, in a lease agreement, the user does not sell the machine at the end because the user never owned it. Thus, there is no purchase or salvage value.

Tax Savings The tax savings resulting from deposits/trade-in, cash lease payments, and repair costs. Also included in this value are any gains earned when the machine is sold.

Net Cash Flow The sum of previous columns. A positive net cash flow represents outflows while a negative net cash flow represents inflows.

Lease Alternative - Annualized Cash Flows

The annualized cash flows per year represent the cash spent and saved in a year. This report is separated into the categories as shown below. Each category is expressed in a “total” per year and “per-acre” column. To figure the total cash flow, *add* the deposits/trade-ins, lease payment, and repair costs.

From the total, *subtract* the annualized purchase (sale) and tax savings.

ANNUALIZED CASH FLOWS

	Total	Per acre
Deposits/Trade-ins	\$0	\$0.00
Lease payments	\$48,077	\$32.05
Repair costs	\$756	\$0.50
Annualized purchase (sale)	\$0	\$0.00
Tax saving	-\$17,580	-\$11.72
Total cash flow	\$31,253	\$32.56

I don't think these calculations in the program are correct- annualized lease payment can't be \$48,077 divide by 5 maybe??

According to this report, if the Smiths enter into a lease agreement, they will have the following cash-flow implications to consider: total lease payments equaling \$48,077 and yearly repair costs of \$756 The tax savings is \$17,687. Their total cash flow is \$31,460.

Lease Alternative - Taxable Cash Flows and Tax Savings

The taxable cash flows are: taxable lease payments, repairs, depreciation, and gain on sale. Each of these cash flows affects taxes differently and is described below.

TAXABLE CASH FLOWS AND TAX SAVINGS

Year	Taxable Lease Payment	Repairs	Depreciation	Gain on Sale	Tax Saving
1	\$12,000				\$3,996
2	\$12,000	\$100			\$4,029
3	\$10,000	\$200			\$3,397
4	\$10,000	\$200			\$3,397
5	\$10,000	\$300			\$3,430

Taxable Lease Payment The dollar amount paid for the use of machinery. The Smiths pay \$12,000 or \$10,000 each year. **Why are first two years \$12,000?? Error??**

Repairs The estimated repair costs per year. The Smiths use the default repair costs as shown above.

Depreciation In a lease agreement, no depreciation is claimed.

Gain on Sale The amount of capital received above and beyond the original capital outlay. In a lease agreement, the asset is not owned by the farm couple, so they cannot sell it.

Tax Saving The amount of money saved by correctly reporting the taxable cash flows.

Rent Alternative

The rent alternative is similar to the lease alternative in that a fee is paid for a borrowed item. However, the rent alternative represents a shorter amount of time. The input worksheet for the rent alternative is shown below. The input information can be entered where the text is *blue*. Some of the information may already be entered from the “Main Input” worksheet. If any information is to be changed that may be common to other alternatives, click [Link to Main Input](#). This will update the information on the “Main Input” worksheet.

Example

The Smiths found a tractor to rent. The rental rate is \$55 per hour with an expected annual increase of 2% per year. The estimated need is 300 hours per year for 5 years. The yearly repair costs are estimated at \$200 per year.

INPUT

Description	John Deere	
Number of acres		1,500 acres
Yearly repair costs		\$200 \$ per year
Rental information		
Hours used per year		300 hrs per year
Rate per hour		\$55 \$ per hour
Rental costs per in year 1	\$16,500	
Annual increase in		
rental costs		2% % per year
End of period information		
Years of rental arrangement		5 number of years
After=tax discount rate		2.0% rate per year

In addition to the information collected in the “Main Input” worksheet, the required inputs for the rent alternative are described below.

Yearly Repair Costs The total repair costs incurred per year. The Smiths enter \$200.

Hours Used Per Year The number of hours the machine is used per year. The machine is rented on a “per-hour” basis. The Smiths estimate their use of the tractor at 300 hours per year.

Rate Per Hour The rental cost paid for each hour of machinery use. The current rate is \$90 per hour.

Rental Costs in Year 1 These costs are automatically calculated when inputs are entered. The rental fees are \$16,500 the first year.

Annual Increase in Rental Costs The percentage that rental costs will increase each year. The Smiths anticipate a 2% increase each year.

Years of the Rental Arrangement The number of years the arrangement continues. This number should be consistent with the other financing alternatives for an accurate comparison. Since John and Sally Smith were approved for financing for a 5-year loan, they chose to analyze all alternatives for 5-years.

Reports Generated for the Rent Alternative

The reports are:

- Yearly Cash Flows and Net Present Value
- Annualized Cash Flows
- Taxable Cash Flows and Tax Savings

Rent Alternative - Yearly Cash Flows and Net Present Value

Based on the input given for the rent alternative, the yearly cash flows and net present value for the tractor are calculated as shown below. The net present value is \$55,669 and the annualized cash flows total \$11,579.

YEARLY CASH FLOWS AND NET PRESENT VALUE

	Net present value		\$55,669	
	Annualized cash flows		\$11,579	
<hr/>				
				Net
	Rental	Repair	Tax	Cash
Year	Payment	Costs	Savings	Flow
<hr/>				
1	\$16,500	\$200	\$5,561	\$11,139
2	\$16,830	\$200	\$5,671	\$11,359
3	\$17,167	\$200	\$5,783	\$11,584
4	\$17,510	\$200	\$5,897	\$11,813
5	\$17,860	\$200	\$6,014	\$12,046

The report shows the annualized cash flows in the categories described as follows:

Rental Payment The cost incurred by renting the machinery.

Repair Costs The total repair costs incurred per year. The Smiths estimate \$200 for repairs each year.

Tax Savings The tax savings resulting from rental payments and repair costs.

Net Cash Flow The sum of the previous columns. A positive net cash flow represents outflows, while a negative net cash flow represents inflows.

Rent Alternative - Annualized Cash Flows

The annualized cash flows per year represent the cash spent and saved in a year. This report is separated into the categories as shown below. Each category is expressed in a “total” per year and “per-acre” column. To figure the total cash flow, *add* the rental costs and repair costs. From the total, *subtract* the tax savings.

ANNUALIZED CASH FLOWS

	Total	Per acre
Rental costs	\$17,160	\$11.44
Repair costs	\$200	\$0.13
Tax saving	-\$5,781	-\$3.85
Total cash flow	\$11,579	\$7.72

According to this report, if the Smiths rent the tractor they will have the following yearly cash-flow implications to consider: rental costs totaling \$17,160 and repair costs equaling \$200. The tax saving is -\$5,781. Their total cash flow is \$11,579 per year.

Summary

Now that the Smiths have entered all of the required inputs into the four financing alternative input sheets, what does it all mean?

Easily compare the four alternatives by clicking [Go to Main](#) to return to the “Main Input” worksheet. Scroll down to the third worksheet, “Summary of Alternatives”, which is shown below:

This summary contains the net present value, annualized cash flows, the end of horizon value for the machine and loan balance (when applicable), as well as the cash flows for each year of the analysis.

Summary of Alternatives

	Purchase	Roll-over Purchase	Lease	Rent
Net Present Value ¹	\$27,492	\$27,653	\$31,253	\$55,669
Annualized Cash Flow ¹	\$5,718	\$5,752	\$6,501	\$11,579
End of Horizon				
Value of Machine	\$27,000	\$50,000	\$0	\$0
Loan Balance	\$0	\$45,000	\$0	\$0
Net Value	\$27,000	\$5,000	\$0	\$0
Cash Flows In ² :				
Year 1	\$18,474	\$14,703	\$6,004	\$11,139
Year 2	\$7,256	\$4,684	\$6,071	\$11,359
Year 3	\$8,353	\$4,666	\$6,803	\$11,584
Year 4	\$9,156	\$4,651	\$6,803	\$11,813
Year 5	-\$15,606	-\$875	\$6,870	\$12,046

The financing alternative that is the least-cost alternative is the one with the lowest net present value and the lowest annualized cash flows.

In this example, the least-cost alternative is the “purchase alternative.” It is recommended that John and Sally Smith purchase a new tractor. While the purchase and the roll-over purchase alternatives are similar in costs, they are both much cheaper than the lease and the rent alternatives.