

Machinery and Equipment Management Economics

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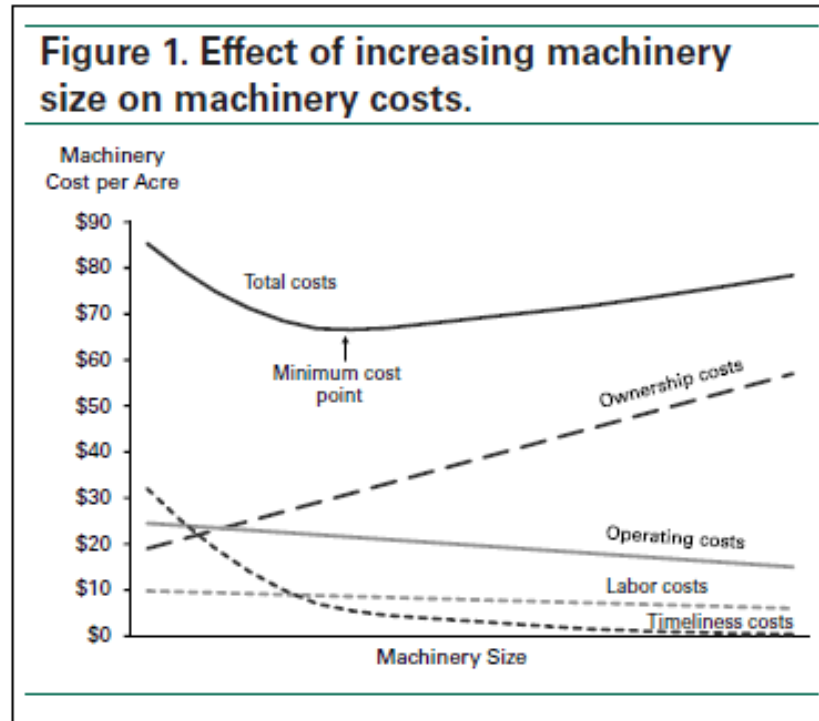
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Machinery Costs

- **Ownership Costs** – include depreciation, opportunity interest on investment, taxes and licenses, insurance and housing.
- **Operating Costs** – include repairs, fuel, maintenance and other costs incurred to operate the machinery. Important to evaluate repair costs and reliability relative to shop skills and initial purchase cost.
- **Labor costs** – includes time cost to complete operations relative to tractor size and needs.
- **Timeliness costs** – reflects to loss in yield or decrease in quality if machinery and equipment is insufficient or unreliable to complete the necessary tasks.

Machinery Costs



Source: <https://www.extension.iastate.edu/agdm/crops/html/a3-28.html>

Example – each machinery item will have unique costs associated with (new versus used purchase), amount of use, driver, etc.

Example



A farm currently has a 40 hp gas tractor that is key tractor for tillage, bed preparation and planting. It is getting costlier to use the tractor each year. It is tired. The farmer has purchased some new equipment that is slightly over-sized for the tractor. The farmer is considering purchasing used, 60 HP, four wheel drive tractor with a bucket, and trading in the 40 hp and financing the remaining amount needed to purchase the “new” tractor

Use Partial Budget

Partial Budget Tractor Purchase - Annual

Additional Revenues		Additional Costs	
Timeliness Gains	\$1,500	New Tractor Payments	\$8,119
5 Additional Acres	\$1,000	Operating fuel, maintenance	\$300
Tax Benefits	?		
Reduced Costs		Revenues Reduced	
200 Hours Labor	\$4,000	None	
Reduced Repairs	\$1,500		
Total Benefits	\$8,000	Total Costs	\$8,419
		Net Benefit	-\$419

- Critical Assumptions need to be correct
- Evaluate cash flow – is labor a cash expense or your time?

Acquisition Options

Business require machinery and equipment in order to operate and grow.

Acquisition options to consider include:

- **Rent** – good for limited use, has high operating costs but no ownership costs
- **Custom hire** – Often custom hire rates are comparable to owning and operating costs when evaluating options. Could have high timeliness costs.
- **Lease** – typically lower ownership costs but may be unavailable for agriculture machinery. No gain in equity. Also has tax benefits
- **Purchase** – Favorable tax provisions (Section 179 and Depreciation) and gain in equity, but high cash flow payments for down payment and debt.

Machinery Tax Considerations – Sec. 179

IRS tax code is designed with incentives for firms to purchase machinery and deduct purchase costs against income. Effective to reduce income tax when profitable.

- **Section 179** – allows a taxpayer to elect to deduct the cost of qualified machinery on their income taxes as an expense, rather than requiring the cost of the property to be depreciated.
 - For machinery purchases up to \$1,040,000
 - You can deduct all or portion of the purchase cost and depreciate the remaining balance
 - Section 179 deduction is limited to taxable income

IRS Schedule F

SCHEDULE F (Form 1040)		Profit or Loss From Farming		OMB No. 1545-0074 2020 Attachment Sequence No. 14
Department of the Treasury Internal Revenue Service (99)		▶ Attach to Form 1040, Form 1040-SR, Form 1040-NR, Form 1041, or Form 1065. ▶ Go to www.irs.gov/ScheduleF for instructions and the latest information.		
Name of proprietor			Social security number (SSN)	
A Principal crop or activity		B Enter code from Part IV		C Accounting method: <input type="checkbox"/> Cash <input type="checkbox"/> Accrual
			D Employer ID number (EIN) (see instr.)	
E Did you "materially participate" in the operation of this business during 2020? If "No," see instructions for limit on passive losses <input type="checkbox"/> Yes <input type="checkbox"/> No				
F Did you make any payments in 2020 that would require you to file Form(s) 1099? See instructions <input type="checkbox"/> Yes <input type="checkbox"/> No				
G If "Yes," did you or will you file required Form(s) 1099? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Part I Farm Income—Cash Method. Complete Parts I and II. (Accrual method. Complete Parts II and III, and Part I, line 9.)				
1a Sales of livestock and other resale items (see instructions)		1a		
b Cost or other basis of livestock or other items reported on line 1a		1b		
c Subtract line 1b from line 1a				1c
2 Sales of livestock, produce, grains, and other products you raised				2
3a Cooperative distributions (Form(s) 1099-PATR)		3b Taxable amount		3b
4a Agricultural program payments (see instructions)		4b Taxable amount		4b
5a Commodity Credit Corporation (CCC) loans reported under election				5a
b CCC loans forfeited		5c Taxable amount		5c
6 Crop insurance proceeds and federal crop disaster payments (see instructions):				
a Amount received in 2020		6b Taxable amount		6b
c If election to defer to 2021 is attached, check here <input type="checkbox"/>		6d Amount deferred from 2019		6d
7 Custom hire (machine work) income				7
8 Other income, including federal and state gasoline or fuel tax credit or refund (see instructions)				8
9 Gross income. Add amounts in the right column (lines 1c, 2, 3b, 4b, 5a, 5c, 6b, 6d, 7, and 8). If you use the accrual method, enter the amount from Part III, line 50. See instructions				9
Part II Farm Expenses—Cash and Accrual Method. Do not include personal or living expenses. See instructions.				
10 Car and truck expenses (see instructions). Also attach Form 4562		10		
11 Chemicals		11		
12 Conservation expenses (see instructions)		12		
13 Custom hire (machine work)		13		
14 Depreciation and section 179 expense (see instructions)		14		
15 Employee benefit programs other than on line 23		15		
16 Feed		16		
17 Fertilizers and lime		17		
18 Freight and trucking		18		
19 Gasoline, fuel, and oil		19		
20 Insurance (other than health)		20		
21 Interest (see instructions):				
a Mortgage (paid to banks, etc.)		21a		
b Other		21b		
22 Labor hired (less employment credits)		22		
23 Pension and profit-sharing plans		23		
24 Rent or lease (see instructions):				
a Vehicles, machinery, equipment		24a		
b Other (land, animals, etc.)		24b		
25 Repairs and maintenance		25		
26 Seeds and plants		26		
27 Storage and warehousing		27		
28 Supplies		28		
29 Taxes		29		
30 Utilities		30		
31 Veterinary, breeding, and medicine		31		
32 Other expenses (specify):				
a		32a		
b		32b		
c		32c		
d		32d		
e		32e		
f		32f		

Machinery Tax - Depreciation

Depreciation is the expense you deduct annually to recover the cost of machinery purchased.

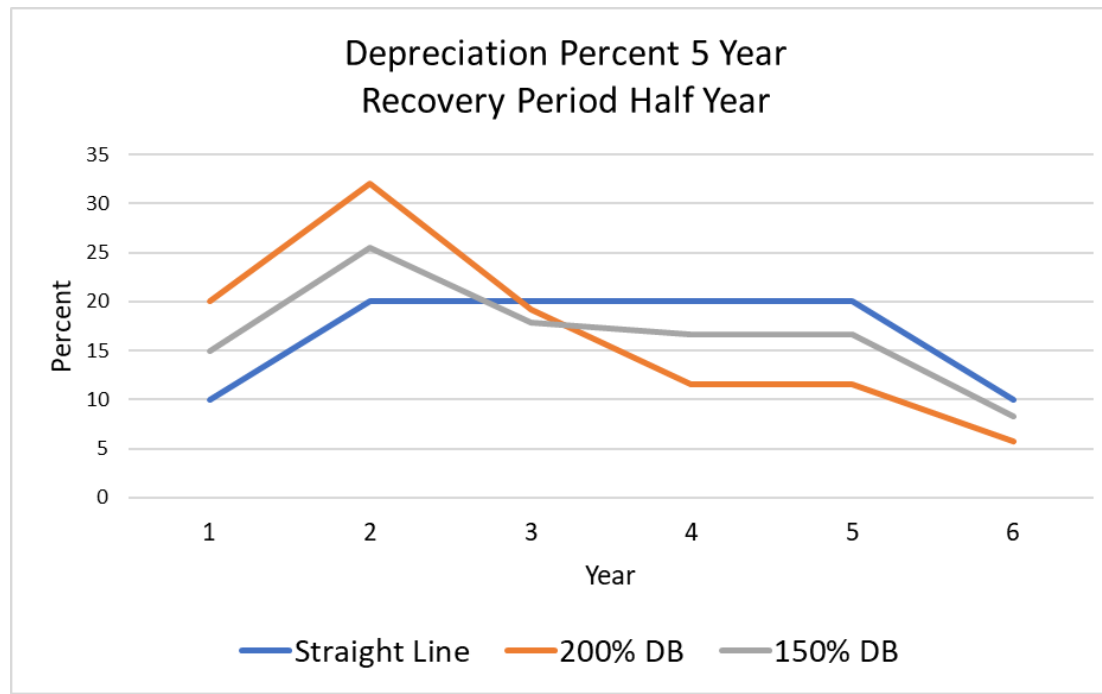
“Economic/accounting theory is to **match** the annual expense of the multi-year life machinery against annual income generated”

“Tax theory was to economically incentivize machinery purchases by providing accelerated depreciation methods.”

Depreciation methods:

- Straight Line
- 150% Declining balance
- 200% Declining balance

Depreciation Rates



- 5 year recovery period = 6 years of depreciation expense due to IRS rules of when placed in service ½ year versus mid quarter
- Note front loaded depreciation expense for MACRS
- TCJA change Farm Equip. from 7 to 5 year recovery

Depreciation Recapture

Book Value

- $\text{Purchase Price} - \text{Section 179} - \text{Accumulated Depreciation} = \text{Book Value}$

Depreciation Recapture

- $\text{Sale price} - \text{book value} = "X"$
- If $X > 0$ then pay taxes on depreciation recapture
- $\text{Depreciation recapture} = X * \text{tax rate}$
- Tax rate is income tax rate (historical capital gains rate)
- IF $X < 0$ then a capital loss

Importance of Record Keeping

	Date Placed	Purchase	Section	Adjusted	Recovery	Depreciation	Book
Description of Property	In Service	Cost	179	Basis	Year	Expense	Value
Branson 35 HP	4/12/2018	\$21,000	\$5,000	\$16,000	1	\$3,200	\$12,800
					2	\$5,120	\$7,680
					3	\$3,072	\$4,608
					4	\$1,843	\$2,765
					5	\$1,843	\$922
					6	\$922	\$0

Need for 3 Farm Record Keeping Systems

1

Cash Flow

Cash Revenue
Cash Expenses
Cash Debt
Net Cash Flow

2

IRS Schedule F Cash Basis

Cash Revenue
Cash Expenses
Depreciation
Net Taxable Income

3

Farm Management Accrual Basis

Accrual Revenue
Accrual Expenses
Depreciation
Accrual Net Income

Measures actual
gain in equity

Thanks for the opportunity to make this presentation

- Use partial budget logic to evaluate new machinery and equipment investment
- Understand debt obligation if financing
- Evaluate cash flow ability to make payments
- Understand tax incentives of Section 179 and depreciation
- Commit to enhanced record keeping



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