NPV and Other Investment Criteria

F305 Intermediate Corporate Finance

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Fall 2025

Slide Set A4 – NPV

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Reminder

Group request for final project due by Wednesday, Sep 10 at 5 PM.

If you're not enrolled in a group by then, I will do so by 5 PM on Friday, Sep 12.

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Overview

- Applying Capital Budget Decision Rules for "Straightforward" Cash Flows
- More Complex Situations (and When Some Capital Budgeting Decision Rules Break)
- Choosing Between Mutually Exclusive Projects
- A Look Ahead: Evaluating Ford's 2025 Investment in EVs

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Applying Capital Budget Decision Rules for "Straightforward" Cash Flows

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Typical Capital Budgeting Decision Rules

- Net Present Value
- The Payback Rule
- The Discounted Payback
- The Average Accounting Return
- The Internal Rate of Return
- The Profitability Index

Capital Budgeting Technique	Large Firms	Small Firm
Net present value (NPV)	77%	40%
Internal rate of return (IRR)	75	40
Payback period	64	66
Accounting rate of return	57	44
Profitability index	39	31

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	B	C	D	E	F	G	H	I	J	K	L	M
1	Period	0	1	2	3	4	5	6	7	8	9	10
2	Periodic Inflows		$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000		
3	Periodic Outflows		-$14,000	-$14,000	-$14,000	-$14,000	-$14,000	-$14,000	-$14,000	-$14,000		
4	Net Inflow		$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ -	$ -
5	Capital Investments Flows	-$30,000								$2,000		
6	Net Expected Cash Flows	-$30,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 8,000	$ -	$ -
7												
8	r	15.00%										
9	Target Accounting Return	20.00%										
10												
11	NPV	-$2,422.27	=NPV(C8,D6:M6)+C6		REJECT	=IF(C11<0, "REJECT", "ACCEPT")						
12	IRR	12.57%	=IRR(C6:M6)		REJECT	=IF(C12<C8, "REJECT", "ACCEPT")						
13	MIRR	11.03%	=MIRR(C6:M6,C8,0.1)		REJECT	=IF(C13<C8, "REJECT", "ACCEPT")						
14	Average Accounting Return	21.43%	=AVERAGE(D4:K4)/ABS(C5+K5)		ACCEPT	=IF(C14<C9, "REJECT", "ACCEPT")						
15	Profitability Index	0.92	=NPV(C8,D6:M6)/ABS(C6)		REJECT	=IF(C15<1, "REJECT", "ACCEPT")						
16												
17												
18		6										
19	Cumulative Cash Flows	$ (30,000)	$ (24,000)	$ (18,000)	$ (12,000)	$ (6,000)	$ -	$ 6,000	$ 12,000	$ 20,000	$ 20,000	$ 20,000
20	Switch Point		-	-	-	-	4	-	-	-	-	-
21	Partial Year Flow to Get to Payback		-	-	-	-	1.00	-	-	-	-	-
22	Payback	5.00	ACCEPT	=IF(C22>B18, "REJECT", "ACCEPT")								
23												
24		6										
25	Cumulative PV of CFs	$ (30,000)	$ (24,783)	$ (20,246)	$ (16,301)	$ (12,870)	$ (9,887)	$ (7,293)	$ (5,037)	$ (2,422)	$ (2,422)	$ (2,422)
26	Switch Point		-	-	-	-	-	-	-	-	-	-
27	Partial Year Flow to Get to Discounted Payback					-	-	-	-	-	-	-
28	Discounted Payback	999.00	REJECT	=IF(C28>B24, "REJECT", "ACCEPT")								

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More Complex Situations (and When Some Capital Budgeting Decision Rules Break)

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More Complex Situations

- NPV as a function of r is "smooth" as long as there is only 1 change in sign in the cash flow stream
- If there is more than 1 change in sign, there *can* be as many IRRs as there are changes in sign

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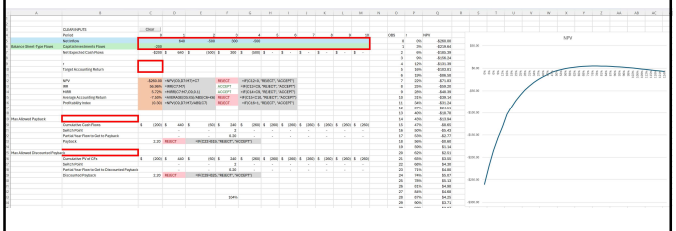
Exploratory Calculator



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Choosing Between Mutually Exclusive Projects

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Choosing Between Mutually Exclusive Projects

1st question: WHY are they mutually exclusive

- NPV will always give you a "better" answer that any rate-based capital budgeting technique

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Typical Capital Budgeting Decision Rules

- Net Present Value $
- The Payback Rule Time
- The Discounted Payback Time
- The Average Accounting Return %
- The Internal Rate of Return %
- The Profitability Index %

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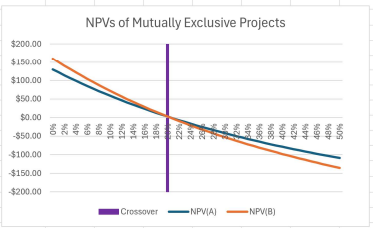
Mutually Exclusive Projects

	A	B	C
1	Year	Project A	Project B
2	0	-$400	-$500
3	1	$250	$320
4	2	$280	$340
5	3		
6	4		
7	5		
8	6		
9	7		
10	8		
11	9		
12	10		
13			
14	IRRs	20.56%	20.45%
15			



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A Look Ahead: Evaluating Ford's 2025 Investment in EVs

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Ford announced a $5 billion total investment in US electric vehicle (EV) production, with approximately $2 billion dedicated to a new assembly plant and production system in Louisville, Kentucky, and another $3 billion for a battery plant in Michigan. This investment will support the development of a new, more affordable midsize EV pickup truck, expected to launch in 2027, and features a new, flexible "universal EV platform" and a tree-like assembly system designed to dramatically increase efficiency and speed. The initiative aims to create or secure nearly 4,000 U.S. jobs and strengthen the domestic supply chain.

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FORD MOTOR COMPANY AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(in millions)

	December 31, 2023	December 31, 2024
ASSETS		
Cash and cash equivalents (Note 9)	$ 24,862	$ 22,935
Marketable securities (Note 9)	15,309	15,413
Ford Credit finance receivables, net of allowance for credit losses of $256 and $247 (Note 10)	46,425	51,850
Trade and other receivables, less allowances of $64 and $84	15,601	14,723
Inventories (Note 11)	15,051	14,951
Other assets	3,633	4,602
Total current assets	121,481	124,474
Ford Credit finance receivables, net of allowance for credit losses of $626 and $617 (Note 10)	99,690	99,788
Net investment in operating leases (Note 12)	21,394	22,947
Net property (Note 13)	40,821	41,928
Equity in net assets of affiliated companies (Note 14)	5,548	6,821
Deferred income taxes (Note 7)	16,985	16,375
Other assets	11,441	12,865
Total assets	$ 273,310	$ 285,196
LIABILITIES		
Payables	$ 25,992	$ 24,128
Other liabilities and deferred revenue (Note 15 and Note 24)	25,870	27,752
Debt payable within one year (Note 18)		
Company excluding Ford Credit	477	1,756
Ford Credit	49,192	53,193
Total current liabilities	101,531	106,833
Other liabilities and deferred revenue (Note 15 and Note 24)	28,414	28,832
Long-term debt (Note 18)		
Company excluding Ford Credit	19,467	18,898
Ford Credit	80,099	84,675
Deferred income taxes (Note 7)	1,005	1,974
Total liabilities	230,512	240,338
EQUITY		
Common Stock, par value $0.01 per share (3,993 million shares issued of 6 billion authorized)	41	41
Class B Stock, par value $0.01 per share (71 million shares issued of 530 million authorized)	1	1
Capital in excess of par value of stock	22,128	23,582
Retained earnings	31,029	33,740
Accumulated other comprehensive income/(loss) (Note 22)	(9,042)	(9,639)
Treasury stock	(2,384)	(2,810)
Total equity attributable to Ford Motor Company	42,773	44,833
Equity attributable to noncontrolling interests	25	23
Total equity	42,798	44,856
Total liabilities and equity	$ 273,310	$ 285,196

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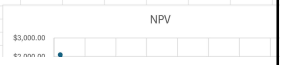
	A	B	C	D	E	F	G	H	I	J	K	L
1	Example: Ford 2025 EV Investment		(Informed) Guesses									
2												
3	Period	0	1	2	3	4	5	6	7	8	9	10
4	Units		15,000	75,000	100,000	200,000	250,000	300,000	300,000	300,000	300,000	300,000
5	Price per Unit		$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000
6	Proft Margin		15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
7	Gross Profits ($Millions)		$ 68	$ 338	$ 450	$ 900	$ 1,125	$ 1,350	$ 1,350	$ 1,350	$ 1,350	$ 1,350
8	Capital Investments ($Millions)	-$5,000					-2000					
9	Net Expected Cash Flows	-$5,000	$ 68	$ 338	$ 450	$ 900	$ (875)	$ 1,350	$ 1,350	$ 1,350	$ 1,350	$ 1,350
10												
11												
12	r	8.50%		r	NPV							
13				1%	$ 2,100.93							
14	NPV	-$693.33		2%	$ 1,616.88							
15	IRR	6.15%		3%	$ 1,173.50							
16	MIRR	7.59%		4%	$ 766.88							
17				5%	$ 393.53							



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Up Next

Making Capital Investment Decisions

Chapter 10

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