

# HOW TO SPEND MONEY (CAPITAL BUDGETING TOOLS)

## Internal Rate of Return

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# INTERNAL RATE OF RETURN

What discount rate makes  $NPV = 0$ ?

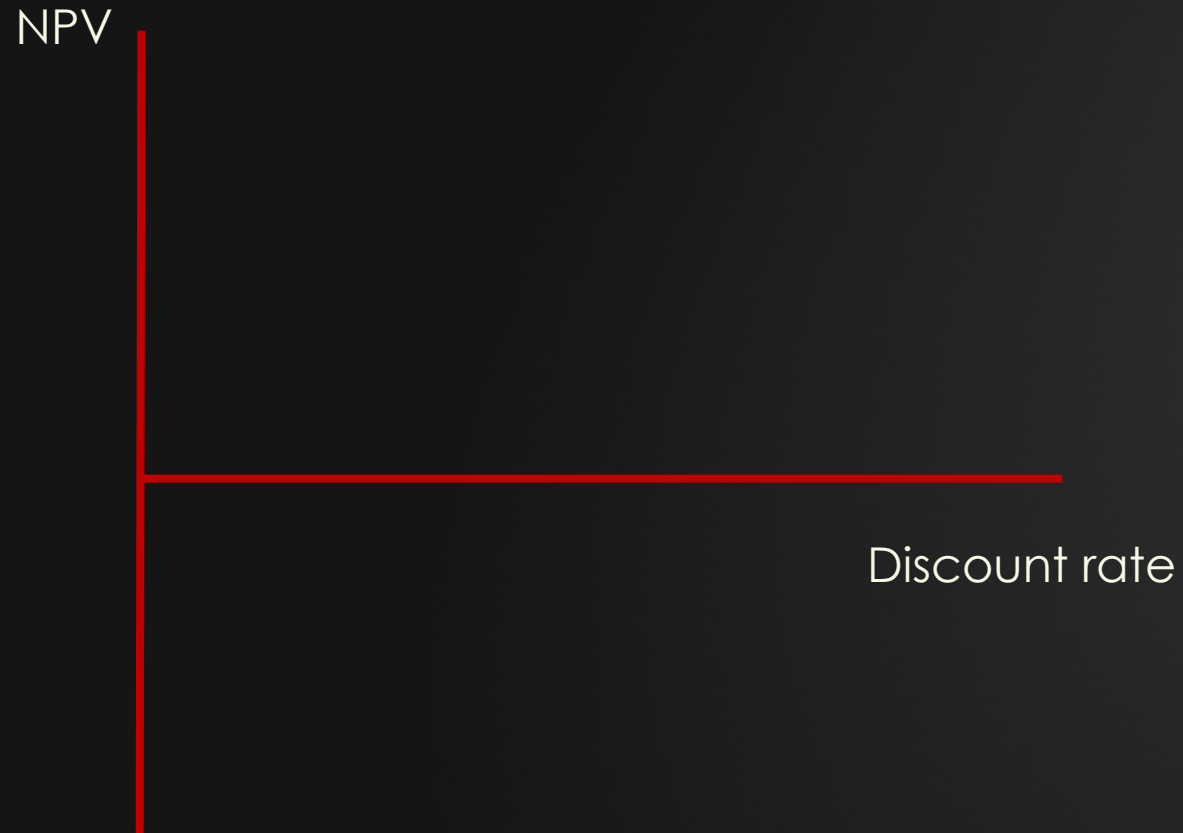
Decision rule: Invest if that rate  $> r$

# IRR

- ▶ Discounting more drives NPV down
- ▶ How hard can NPV get hit and stay  $> 0$
- ▶ This decision rule is similar to NPV

# IRR VS NPV FORMULA

# IRR: RELATION TO NPV RULE



# IRR: EXAMPLE (TRIAL AND ERROR)

Time	Cash Flow	Trial 1 (10%)	Trial 2 (20%)	Trial 3 (16%)
0	(9,364)	(9,364)	(9,364)	(9,364)
1	10,000	9,091	8,333	8,621
2	1,000	826	694	743
NPV	1,636	553	-336	0

# IRR EXAMPLE IN SPREADSHEET

Book1 - Microsoft Excel					
B10    =IRR(B4:B6)					
	A	B	C	D	E
1	Computing IRR in Excel				
2					
3	Time	Cash Flow	PV[Cash Flow]		
4	0	-\$9,364	-\$9,364		
5	1	\$10,000	\$9,091		
6	2	\$1,000	\$826		
7					
8	Disc. Rate	10%			
9	NPV	\$553.36	=SUM(C4:C6)		
10	IRR	16%	=IRR(B4:B6)		
11					

# INTERNAL RATE OF RETURN

- ▶ Similar to NPV
- ▶ Scales NPV into a %
- ▶ More intuitive
- ▶ Accounts for timing, opportunity cost, and risk



# INTERNAL RATE OF RETURN: WRAP-UP

- ▶ Accept projects where  $IRR > r$
- ▶ Good capital budgeting tool
- ▶ Accounts for risk, timing, and opportunity
- ▶ Loses the scale