

APV Example:

Data Given:

Debt/Equity of project=	40%	
Tc =	28%	
Levered equity (Rs)	15%	
Debt Issue	\$ 9.57 m	retiring at the end of year 3.
IR =	8%	
PMT =	\$3.19 m	fixed per year for 3 years
YEAR	UCF	
0	-18.5 m	
1	5.79 m	
2	9.59 m	
3	8.89 m	

Q: Calculate Value of the Project. What would happen if there is a flotation cost?

Hints:

1. APV = NPV (UCF) at R_0 + NPV (Financing at R_B)
2. $R_S = R_0 + (B/S)(R_0 - R_B)(1 - T_C)$
3. **NPV (debt financing)** = Proceeds – Aftertax PV(Interest Payments) – PV(Principal Payments)
4. Each year, an equal principal payment will be made, which will reduce the IR accrued during the year.
5. Given a known level (AMT) of debt. Debt cash flows should be discounted at the pretax cost of debt,
6. Use APV if the project's level of debt is known over the life of the project.
Use WACC or FTE if project uses firm's target D/V ratio over project's life.

Use APV- the level of debt for the project is known throughout the life of the project

APV = NPV (UCF) at R_0 + **NPV (Financing at R_B)****I. Find NPV (UCF) discounted at R_0**

$$R_S = R_0 + (B/S)(R_0 - R_B)(1 - T_C)$$

$$0.15 = R_0 + 0.4(R_0 - 0.08)(1 - 0.28)$$

$$0.15 = R_0 + 0.4 * 0.72 * R_0 - 0.4(0.08) * 0.72$$

$$0.15 + 0.4(0.08) * 0.72 = R_0 + 0.4 * 0.72 * R_0;$$

$$0.17304 = R_0 * 1.288$$

$$R_0 = 13.43\%$$

YEAR	UCF	Discounted at R_0	PV of UCF
0	-\$18.50		-\$18.50
1	\$5.79	$=B41/(1+B$39)^{A41}$	\$5.10
2	\$9.59	$=B42/(1+B$39)^{A42}$	\$7.45
3	\$8.89	$=B43/(1+B$39)^{A43}$	\$6.09
		NPV=	\$0.15

2. Find PV (debt financing)

$NPV(\text{debt financing}) = \text{Proceeds} - \text{Aftertax PV}(\text{Interest Payments}) - \text{PV}(\text{Principal Payments})$

a. Aftertax PV(Interest Payments)

YEAR	AT=(1-T)	Interest PMT= 8% of loan balance	PV at Rb
0			
1	0.72	\$0.77	\$0.51
2	0.72	\$0.51	\$0.32
3	0.72	\$0.26	\$0.15
PV of Aftertax (Interest Payments)=			\$0.97

b. PV(Principal Payments)

YEAR	Repayment of Principal	PV at Rb
0		
1	\$3.19	\$2.95
2	\$3.19	\$2.73
3	\$3.19	\$2.53
PV(Principal Payments) =		\$8.22

C. NPV (debt financing) = Proceeds – Aftertax PV(Interest Payments) – PV(Principal Payments)

$NPV(\text{debt financing}) = 0.38 \text{ m}$

3. APV = NPV (UCF) at Ro + NPV (Financing at RB) = #1+ #2c = 0.15+0.38 \$ 0.5300 m

4.. In the event there are flotation cost, then

Total flotation cost = loan amount * flotation cost %

The Annual flotation cost will be:

- Deducted from the loan proceeds
- Should be included in the calculation of the PV of Flotation cost Tax Shield if there is an annual flotation cost

PV of Flotation cost Tax Shield = PV of an annuity (Annual Flotation cost * Tax rate) for n number of years discounted at the loan rate.

$NPV_{\text{Loan}} = \text{Proceeds net of flotation costs} - \text{Aftertax present value of interest and principal payments} + \text{Present value of the flotation cost tax shield}$