CAPITAL STRUCTURE

Dr. P.D.Das CIME, Bhubaneswar

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INTRODUCTION

- The objective of a firm should be directed towards the maximization of the firm's value.
- The capital structure or financial leverage decision should be examined from the point of its impact on the value of the firm.
- The capital structure should be examined from the viewpoint of its impact on the value of the firm. A firm should select such a financing mix as will maximize the shareholders' wealth. Such a capital structure is referred to as the **optimal capital structure**.

Introduction cont.

- The **optimal capital structure** may be defined as the combination of debt and equity that leads to the maximum value of the firm.
- The funds required by a business enterprise can be raised either through the *ownership securities* i.e., equity shares and preference shares and *creditorship securities* i.e., debentures and or bonds.
- A business enterprise has to maintain a proper mix of both these types of securities in a manner that both the cost and the risk are minimum. The mix of different securities is portrayed by the firm's capital structure.

- According to Gerstenberg, capital structure refers to "the make" up of firm's capitalization".
- In other words, it represents the mix of different sources of long-term funds in the total capitalization of the company.

- A proper capital structure planning aims at the maximization of profit for the welfare of shareholders, maximize the value of the firm at minimum cost of capital.
- There is a view point that strongly **supports the close relationship** between leverage and value of a firm. Others believes that financing-mix or the combination of debt and equity **has no impact** on the shareholders' wealth and the decision on financial structure is irrelevant.
- The capital structure decision can influence the value of the firm through the earnings available to shareholders. But the leverage can largely influence the value of the firm through the cost of capital.
- In exploring the relationship between leverage and value of a firm in this chapter we are concerned with the relationship between leverage and cost of capital from the standpoint of valuation.

Assumptions

In order to grasp the elements of the capital structure and the value of the firm or the cost of capital controversy properly, we make the following assumptions:

- 1) Firms employ only two types of capital: debt and equity.
- 2) The total assets of the firm are given. The degree of leverage can be changed by selling debt to repurchase shares or selling shares to retire debt.
- 3) Investors have the same subjective probability distributions of expected future operating earnings for a given firm.
- 4) The firm has a policy of paying 100 per cent dividends.
- 5) The operating earnings of the firm are not expected to grow.
- 6) The business risk is assumed to be constant and independent of capital structure and financial risk.
- 7) The corporate and personal income taxes do not exist. This assumption is relaxed later on.

CAPITAL STRUCTURE THEORIES

- NET INCOME APPROACH
- TRADITIONAL APPROACH
- NET OPERATING INCOME APPROACH
- MODIGLIANI AND MILLER APPROACH

CAPITAL STRUCTURE THEORIES

- Theories supporting the existence of an optimal capital structure
- 1. Net Income Approach
- 2. Traditional Approach
- Theories not supporting the existence of an optimal capital structure
- 1. Net Operating Income Approach
- 2. Modigliani And Miller Approach

NET INCOME APPROACH 1. (David Durand)

According to Durand :

- "a change in the financial leverage will lead to a corresponding change in the overall cost of capital as well as the total value of the firm."
- A higher debt content in the capital structure (i.e Financial leverage) will result in decline in the overall or Weighted average cost of capital (WACC). This will cause increase in the value of the firm and consequently increase in the value of equity shares of the company.
- NI approach is based on the following three assumptions :
- i. There are no corporate tax.
- ii. The cost of Debt is less than cost of Equity
- iii. The debt content does not change the risk perception of the investors.

- According to NI approach both the cost of debt and the cost of equity are independent of the capital structure; they remain constant regardless of how much debt the firm uses.
- As a result, the overall cost of capital declines and the firm value increases with debt.
- This approach has no basis in reality; the optimum capital structure would be 100 per cent debt financing under NI approach.



- Cost of debt (k_d) and Cost of equity (k_e) remain constant.
- Overall Cost of Capital = $k_o = k_e (k_e k_d) \frac{D}{V}$ where,

D is the total value of debt.

V is the total value of the firm.

- It is assumed that $k_d < k_{e_i} \cdot k_o$ will decrease as D/V (i.e. leverage) increases
- $k_o = k_e$ if the firm does not employ any debt
- k_0 will approach k_d as D/V approaches one.

The effect of leverage on the cost of capital under NI approach





• A company expects the Net income of Rs. 80,000. It has 2,00,000, 8% debentures. The equity capitalization rate of the company is 10%. What will be the impact of market value of the firm and the overall capitalization rate if the debt is increased to 3,00,000.

Solution

<u>Calculation o</u> <u>Debt is Rs</u>	<u>f the Value of</u> 5.2,000,000	<u>the firm if</u>	<u>Cal</u>	
EBIT	=	80,000	EB	
Less : I	=	<u>16,000</u>	Les	
Earning for sh	areholders :	64,000	Ear	
			$(\bigcirc)^{\vee}$	
Market value of equity (S) = $64.000 / 10\% = 6.40.000$				
Market Valu 16,0	e of Deb (D)00 / 8% = 2) = 00,000	D =	
Value of the 6,40,000	Firm : V = 7 + 2,00,000=	S + D = 8,40,000	V =	
Overall Cost of Capital (Ko) = Earnings (EBIT) / Value of the Firm (V) = 80,000 / 8,40,00				
	= 9.52%			

Calculation of	the Value o	<u>f the firm if</u>		
Debt is raised to Rs.3,00,000.				
EBIT	=	80,000		
Less : I	=	<u>24,000</u>		
Earning for share	reholders:	56,000		

$$\mathsf{D} = 24,000 / 8\% = 3,00,000$$

V = S + D = 8,60,000

Overall Capitalisation Rate(Ko) = 80,000 / 8,60,00 = **9.30%**

- Thus, it is evident that with the increase in debt financing the value of the firm has increased and the overall cost of Capital has decreased.
- a)Debt raised from 2,00,000 to 3,00,000
- b)Value of the firm increased from 8,40,000 to 8,60,000
- c)Overall Cost of Capital decreased from 9.52 to 9.30

Example - 2

• X Ltd is expecting an annual EBIT of Rs. 1,00,000. The company has Rs.4,00,000 in 10% debenture. The equity capitalization rate is 12.5%.

You are required to calculate the total value of the firm and also the overall cost of Capital.

Solution : <u>Solution</u> : <u>Statement showing the value of the firm</u>



The company has decided to raise Rs.1,00,000 by issue of 10% debentures

STATEMENT SHOWING THE VALUE OF THE FIRM Earning Before Interest & Tax (EBIT) : 1,00,000 Less : Interest at 10% on debentures of Rs. 5. Jakhs 50,000 Earnings available for equity shareholders (NI <u>50,000</u> Equity Capitalization Rate (Ke) 12.5% Market value of Equity share (E) NI/ Ke : (50,000/12.5)100 : 4,00,000 Market Value of Debt (D) : 5,00,000 Total Value of the firm (V = E + D): <u>9,00,000</u> Overall Cost of Capital (Ko) : EBIT / V : (1L / 9L) 100 :11.1%

• The calculations shows that raising of additional debt has increased the total value of the firm and reduced the overall cost of capital structure.



Value of Firm (NI Approach)

• In order to examine the effect of change in financing-mix on the firm's WACC and its total value, let us take the amount of debenture @ 10% in three different stages, i.e, Rs. 1,00,000, Rs. 2,00,000 and Rs. 3,00,000.

		1	2	3
Net Operating Income	EBIT	50000	50000	50000
Less: Interest		10000	20000	30000
Earnings avaiabe for Equity Shareholders	NI	40000	30000	20000
Equity Capitalisation rate	Ке	12.5%	12.5%	12.5%
Market Value of Equity (S)	NI / Ke	320000	240000	160000
Market Value of Debt (D)	D	100000	200000	300000
Tota Value (V=S+D)	V	420000	440000	460000
Overa Cost of Capita (Ko)	EBIT / V	11.90	11.36	10.87
Cost of Debt	Kd	10%	10%	10%

The significant conclusion of the NI approach is that the firm can employ almost 100% debt to maximize its value.



2. NET OPERATING INCOME APPROACH (David Durand)

Concepts and Definitions

- This Approach is diametrically opposite to the NI approach. The essence of this Approach is that the capital structure decision of a firm is irrelevant.
- Any change in leverage will not lead to any change in the total value of the firm and market price of shares as well as the overall cost of capital is independent of the degree of leverage.

The NOI approach is based on the following propositions:

- The value of firm (is constant): $V = \frac{EBIT}{Ko}$
- Residual Value of Equity : E = V D
- Value of Debt : D = $\frac{Interest}{Kd}$
- Change in Cost of Equity Capital :Ke increases with the degree of leverage.



- It assumes that overall cost of capital and cost of debt remain constant.
- Cost of equity increases with increase in leverage and is a linear function of the debt-equity ratio.

$$\mathbf{k}_{e} = \mathbf{k}_{o} + (\mathbf{k}_{o} - \mathbf{k}_{d}) \frac{\mathbf{D}}{\mathbf{E}}$$

where

 k_e is the cost of equity k_o is the capitalization rate k_d is the cost of debt

D/E is the debt equity ratio



Example

• XY Ltd., has an EBIT of Rs. 1 lakh. The cost of debt is 10% and the outstanding debt amounts to Rs.4 lakhs. Presuming the overall capitalization rate as 12.5%.

Calculate the total value of the firm and the equity capitalization rate.

The company also decides to raise a sum of Rs.1 lakh through debt at 10% and uses the proceeds to pay off the equity shareholders.

Solution

Overall Capitalization Rate (Ko)

EBIT

Market Value of the Firm (V): $\frac{EBIT}{Ko}$ (1,00,000 / 12.5) 100 Total Value of Debt (D): given Market Value of equity (E = V-D)

: 8,00,000

2.5%

000

- : 4,00,000
- : <u>4,00,000</u>

Equity Capitalization Rate (Ke) : $Ke = \{(EBIT-I) / V-D\} \ 100 = 1,00,000-40,000 \\ 8,00,000-4,00,000 \\ = 15\%$

The value of NOI : Ko = Kd (D / V) + Ke (E/ V) = 10% (4L / 8L) + 15% (4L / 8L)= 12.5%



Comments

- According to NOI approach, the market price per share remains unaffected on account of change in debt equity mix.
- In ex.1. total no of equity shares are 4000, the market price of an equity share would be Rs 100 (4,00,000 / 4,000). In ex.2, the company would be in position to redeem shares of Rs. 1 lakh, and therefore, the total no of outstanding shares would amount to 3,000. The market value of a share would continue to be Rs.100 (3,00,000 / 3,000).

Example-3 with Graph

Net Operating Income	EBIT	50000	50000	50000		
Overall Capitalization Rate	Ко	12.50%	12.50%	12.50%		
Total Market Value of the Firm	V = EBIT/Ko	400000	400000	400000		
Total Value of Debt	D	<u>100000</u>	<u>200000</u>	<u>300000</u>		
Total market Value of Equity	E = V - D	<u>300000</u>	<u>200000</u>	<u>100000</u>		
Cost of Debt	Kd	<u>10%</u>	<u>10%</u>	<u>10%</u>		
	I = EBIT - 10% of					
Earning available to eq.sh. EBT	EBIT	<u>40000</u>	<u>30000</u>	<u>20000</u>		
Equity Capitalization Rate	Ke = (EBIT-I)/(V-D)	13.3	15.0	20.0		
$\begin{array}{c c} & & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & &$						
	10			k _d		
	0 Degree	ee of Levera	age	33		

Conclusion

• Due to the assumption that Ko and Kd remain unchanged as the degree of leverage changes, we find that both the curves are parallel to the X-axis. But as the degree of leverage increases, the Ke increases continuously.

3. TRADITIONAL APPROACH (Ezra Solomon)

Concept

- The preceding discussions clearly shows that the NI Approach as well as NOI Approach represents two extremes as regards the theoretical relationship between financing decisions as determined by the capital structure, the WACC and the total value of the firm.
- While the NI approach takes the position that the use of debt in the capital structure will always affect the Overall Cost of Capital (Ko) and the total valuation. The NOI Approach argues that capital structure is totally irrelevant.
- The Traditional Approach is midway between the two approach. It partakes of some features of both these approaches. It is also known as the Intermediate approach.
- It resembles the NL approach in arguing that Ko and V are not independent of the capital structure. Bur does not subscribe to the view of NI approach that value of firm will necessarily increase fir all degrees of leverage.

- In one respect it shares a feature with the NOI approach that beyond a certain degree of leverage, the Ko increases leading to a decrease in the total value of the firm. But it differs from the NOI approach in that it doesn't argue that the WACC is constant for all degree of leverage.
- The crux of the Traditional view relating to leverage and valuation is that, a firm can increase it's total value and thereby reduce it's overall cost of capital.

- Cost of debt capital remains more or less constant up to a certain degree of leverage but rises thereafter at an increasing rate.
- Cost of equity capital remains more or less constant or rises only gradually up to a certain degree of leverage and rises sharply thereafter.
- Overall cost of capital decreases upto a certain point, then remains more or less unchanged for moderate increases in leverage thereafter. And eventually rises beyond a certain point.

Traditional Approach

The traditional approach argues that moderate degree of debt can lower the firm's overall cost of capital and thereby, increase the firm value. The initial increase in the cost of equity is more than offset by the lower cost of debt. But as debt increases, shareholders perceive higher risk and the cost of equity rises until a point is reached at which the advantage of lower cost of debt is more than offset by more expensive equity



The traditional theory on the relationship between capital structure and the firm value has three stages:

- First stage: Increasing value
- Second stage: Optimum value
- Third stage: Declining value

Criticism of the Traditional View

- The contention of the traditional theory, that moderate amount of debt in 'sound' firms does not really add very much to the 'riskiness' of the shares, is not defensible.
- There does not exist sufficient justification for the assumption that investors' perception about risk of leverage is different at different levels of leverage.

Example

• The Net Operating income of a company is 2,00,000, with the total investment is 10,00,000. Evaluate three situations :

	» Situation-1	Situ	ation-2	Situation-3	
Debt	Nil	4,0)0,000	6,00,00	0
Ke	10% 🥥	<u>⊸</u> 11	%	13%	
Kd		5%)	6%	
Suppose	Rs.4,00,000	can be	raise	d @5%	anc
Rs.6,00,0	00 is raised (@6%. Fi	nd out	WAAC (Ko
and value	in each case.				

Solution

	S-1	S-2	S-3
EBIT	2,00,000	2,00,000	2,00,000
Less Interest		<u>20,000</u>	<u>36,000</u>
Earnings for Eq Shareholders	<u>2,00,000</u>	<u>1,80,000</u>	<u>1,64,000</u>
Equity Capitalization Rate(Ke)	10%	11%	13%
	Con the second s		
E= Earnings / Ke	20,00,000	16,36,363	12,61,538
D=I/Kd		<u>4,00,000</u>	<u>6,00,000</u>
V= E + D	<u>20,00,000</u>	<u>20,36,363</u>	<u>18,61,538</u>
Ko = EBIT / V	10%	9.8%	10.74%
RU			

Comments

• It is clear that if debt of Rs4,00,000 is used the value of the firm increases and the overall cost of capital decreases. But, if more debt is used to finance in place of equity, i.e., Rs.6,00,000 debentures, the value of the firm decreases and the overall cost of capital increases.

Example

- Assume a firm has EBIT of Rs.40,000. The firm has 10% debenture of Rs. 1,00,000 and its current equity capitalization rate is 16%. Calculate the current value of the firm and cost of capital.
- The firm is considering increasing its leverage by issuing additional Rs.50,000 and increases Kd =11% and Ke =17%. Further the firm issues additional Rs.1,00,000 debenture @Kd=12.5% and Ke=20%. Calculate the current value of the firm and cost of capital at all the situations.

Net Operating Income	EBIT	40000	40000	40000 given
Less: Interest		10000	16500	25000
Earning available to eq.sh. EBT	NI	30000	23500	15000
Cost of Debt	Kd	10%	11%	12.50% given
Total market Value of Debt	D	100000	150000	200000given
Total market Value of Equity	E = NI/Ke	<u>187500</u>	<u>138235</u>	<u>75000</u>
Total Market Value of the Firm	v	287500	288235	275000
Equity Capitalization Rate	Ke	16%	17%	20% given
Overall Capitalization Rate	Ko = EBIT/V	13.9%	13.8%	14.5%

• Thus, according to the traditional approach, the cost of capital of a firm as also its valuation is dependent upon the capital structure of the firm and there is an optimal capital structure in which the firm's Ko is minimum and its V the maximum.

4. MODIGLIANI AND MILLER APPROACH

(H. Modigliani and M.H.Miller)

Who are Modigliani and Miller (MM)?

- They published theoretical papers that changed the way people thought about financial leverage.
- They won Nobel prizes in Economics because of their work.
- MM's papers were published in 1958 and 1963. Miller had a separate paper in 1977. The papers differed in their assumptions about taxes.

What assumptions underlie the MM models?

- Firms can be grouped into homogeneous classes based on business risk.
- Investors have identical expectations about firms' future earnings.
- There are no transactions costs.
- All debt is riskless, and both individuals and corporations can borrow unlimited amounts of money at the risk-free rate.
- All cash flows are **perpetuities**. This implies perpetual debt is issued, firms have zero growth, and expected EBIT is constant over time.
- MM's first paper (1958) assumed zero taxes. Later papers added taxes.
- No agency or financial distress costs.
- These assumptions were necessary for MM to prove their propositions on the basis of investor arbitrage.

Basic Propositions

- **Proposition I:** Market value of the firm is independent of D/E ratio and is computed as $\frac{NOI}{\rho_i(i.e.capitalization rate)}$.
- [Ko and V are independent of its capital structure. Ko and V are constant for all degree of leverage.]
- **Proposition II:** The expected yield on equity can be computed as

Yield on Equity (Ke) = Ko + (Ko – Kd) (D/E)

where, Ko is the firm's cost of capital and Kd is the yield on debt D is the market value of the debt and E is the market value of equity. [Ka=opportunity cost of capital =cost of equity =Ke]

• **Proposition III:** Average cost of capital is unaffected by the financing decision.

Concept

- It is relating to the relationship between the capital structure, cost of capital and valuation is akin to the NOI approach.
- NOI Approach is conceptual and lack of behavioral significance. It doesn't prove operational justification for the irrelevance of the capital structure.
- The MM proposition supports the NOI approach relating to the independence of the cost of capital of the degree of leverage at any level of debt-equity in the capital structure.

• MM maintains that the WACC does not change; with a change in the proportion of debt to equity in the capital structure.



Proposition - I

- ...the total value of the firm must be constant irrespective of DoL (debt-equity ratio). Similarly, the cost of capital as well as the market price of shares must be the same regardless of the financing-mix.
- The operational justification for the MM hypothesis is the arbitrage process.
- Arbitrage implies buying a security in one market (at lower prices) and selling it in another (at higher price).

Assume there are two firms, L and U, which are identical in all respects except that firm L has 10%,Rs.5,00,000 debentures. The EBIT of both the firms are equal i.e.,Rs.1,00,000. the equity capitalization rate of firm L is higher, 16% than of firm U 12.5%.

TOTAL VALUE OF FIRMS L AND U					
Firm		L	U		
Net Operating Income	EBIT	100000	100000_{given}		
Less: Interest (10% of 500000)	1	50000			
Earning available to eq.sh. EBT	NI	50000	100000		
Cost of Debt	Kd	10%	given		
Equity Capitalization Rate	Ке	16%	$12.5\%_{given}$		
Total market Value of Debt	D	500000	given		
Total market Value of Equity	E = NI/Ke	<u>312500</u>	<u>800000</u>		
Total Market Value of the Firm	V = D + E	812500	800000		
Overall Capitalization Rate	Ko = EBIT/V	12.3%	12.5%		
Debt - Equity Ratio	D/E	1.6			

- Thus, the total market value of the firm which employs debt in the capital structure (L) is more than that of the unlevered firm (U).
- According to the MM hypothesis, this situation cannot continue as the arbitrage process, based on the substitutable of personal leverage for corporate leverage, will operate and the values of the two firms will be brought to an identical level.

MODIGLIANI AND MILLER APPROACH

- In the absence of taxes, a firm's market value and cost of capital remain unaffected by the capital structure changes.
- Assumptions
- Perfect Capital Markets
- Firms can be grouped into homogenous risk classes.
- Absence of corporate and personal taxes.
- Firm has 100% dividend payout ratio.

MM with Zero Taxes (1958)

 $V_L = V_U$

• Proposition I:

- Proposition II: $Ke_L = Ke_U + (Ke_U K_d) (D/E)$

Given the following data, find V, S, Ke, and WACC for Firms U and L. Firms U and L are in same risk class. $\text{EBIT}_{\text{U,L}} = \text{Rs.500,000}.$ Firm U has no debt; $Ke_1 = 14\%$. Firm L has Rs.1,000,000 debt at $K_d = 8\%$. The basic MM assumptions hold. There are no corporate or personal taxes.

1. Find V_U and V_L: $V_U = \frac{EBIT}{Ke_U} = \frac{Re.500,000}{0.14} = Rs. 3,571,429$ $V_L = V_U = Rs. 3,571,429$

2. Find the market value of Firm L's debt and equity: $V_L = D + E = Rs. 3,571,429$ Rs. 3,571,429 = Rs.1,000,000 + ES = Rs. 2,571,429.

3. Find Ke_L

 $Ke_{L} = Ke_{U} + (Ke_{U} - K_{d}) (D/E)$ =14.0% + (14.0% - 8.0%) = 14.0% + 2.33% = **16.33%**. Rs. 2,571,429 4. Proposition I implies WACC = Ke_U . Verify for L using WACC formula WACC= Wd x Kd + We x Ke = (D/E) K_d + (E/V) Ke

 $= \frac{\text{Rs. } 1,000,000}{\text{Rs. } 3,571,429} (8.0\%) + \frac{\text{Rs. } 2,571,429}{\text{Rs. } 3,571,429} (16.33\%)$

= 2.24% + 11.76% = 14.00%.



- The more debt the firm adds to its capital structure, the riskier the equity becomes and thus the higher its cost.
- Although K_d remains constant, Ke increases with leverage. The increase in Ke is exactly sufficient to keep the WACC constant.



Find V, S, Ke, and WACC for Firms U and L assuming a 40% corporate tax rate

With corporate taxes added, the MM propositions become:

VL = VU +

Proposition I:

Proposition II:

KeL = KeU + (KeU - Kd)(1 - T)(D/E).

Notes About the New Propositions

- 1. When corporate taxes are added, $V_L \neq V_U$. V_L increases as debt is added to the capital structure, and the greater the debt usage, the higher the value of the firm.
- 2. Ke_L increases with leverage at a slower rate when corporate taxes are considered.

1. Find V_{II} and V_{II} $\frac{\text{EBIT}(1 - T)}{\text{Ke}_{U}} = \frac{\text{Rs.500,000(0.6)}}{0.14} \text{Rs.2,142,857}$ $V_{IJ} =$ *Note:* Represents a 40% decline from the no taxes situation. = Rs.2,142,857 + 0.4(Rs.1,000,000) $V_{I} = V_{II} + TD$ = Rs.2,142,857 + Rs.400,000 = Rs.2.542.857.2. Find market value of Firm L's debt and equity. $V_{I} = D + E = Rs. 2,542,857$ Rs. 2,542,857 = Rs. 1,000,000 + E E = Rs.1,542,857.

3. Find Ke_L Ke_L = Ke_U + (Ke_U - K_d)(1 - T)(D/E)

- $= 14.0\% + (14.0\% 8.0\%)(0.6) \frac{\text{Rs.1,000,000}}{\text{Rs.1,542,857}}$
 - = 14.0% + 2.33% = 16.33%.

4. Find Firm L's WACC

- WACC_L = $(D/V) K_d(1 T) + (E/V) Ke$
 - $= \frac{\text{Rs.1,000,000}}{\text{Rs.2,542,857}} (8.0\%)(0.6) + \frac{\text{Rs.1,542,857}}{\text{Rs.2,542,857}} (16.33\%)$ = 1.89% + 9.91% = 11.80%.
- When corporate taxes are considered, the WACC is lower for L than for U.





Under MM with corporate taxes, the firm's value increases continuously as more and more debt is used.

Arbitrage Process

- Suppose two identical firms, except for their capital structures, have different market values. In this situation, **arbitrage** (or **switching**) will take place to enable investors to engage in the **personal** or **homemade leverage** as against the **corporate leverage**, to restore equilibrium in the market.
- On the basis of the arbitrage process, MM conclude that the market value of a firm is not affected by leverage. Thus, the financing (or capital structure) decision is irrelevant. It does not help in creating any wealth for shareholders. Hence one capital structure is as much desirable (or undesirable) as the other.
MM's Proposition II

- Financial leverage causes two opposing effects: it increases the shareholders' return but it also increases their financial risk. Shareholders will increase the required rate of return (i.e., the cost of equity) on their investment to compensate for the financial risk. The higher the financial risk, the higher the shareholders' required rate of return or the cost of equity.
- The cost of equity for a levered firm should be higher than the opportunity cost of capital, k_a ; that is, the levered firm's $k_e > k_a$. It should be equal to constant k_a , plus a financial risk premium.



Criticism of the MM Hypothesis

- Lending and borrowing rates discrepancy
- Non-substitutability of personal and corporate leverages
- Transaction costs
- Institutional restrictions
- Existence of corporate tax

Miller's Model

- To establish an optimum capital structure both corporate and personal taxes paid on operating income should be minimised. The personal tax rate is difficult to determine because of the differing tax status of investors, and that capital gains are only taxed when shares are sold.
- Merton miller proposed that the original MM proposition I holds in a world with both corporate and personal taxes because he assumes the personal tax rate on equity income is zero. Companies will issue debt up to a point at which the tax bracket of the marginal bondholder just equals the corporate tax rate. At this point, there will be no net tax advantage to companies from issuing additional debt.
- It is now widely accepted that the effect of personal taxes is to lower the estimate of the interest tax shield.

Miller's Model.....

After-tax earnings of Unlevered Firm:

$$\overline{X}^{T} = \overline{X}(1-T)(1-T_{e})$$

Value of Unlevered Firm:

$$V_u = \frac{\overline{X}(1-T)(1-T_e)}{k_u}$$

 \wedge

After-tax earnings of Levered Firm:

$$\overline{X}^{T} = (\overline{X} - k_{d}D)(1 - T)(1 - T_{e}) + k_{d}D(1 - T_{d})$$
$$= \overline{X}(1 - T)(1 - T_{e}) + k_{d}D(1 - T_{d}) - k_{d}D(1 - T_{d})(1 - T_{e})$$

Value of Levered Firm:

$$V_{\mu} = \frac{X(1-T)(1-T_{e})}{k_{u}(1-T_{e})} + \frac{k_{d}D[(1-T_{d}) - (1-T)(1-T_{e})]}{k_{d}(1-T_{b})}$$
$$= V_{u} + D\left[1 - \frac{(1-T)(1-T_{e})}{(1-T_{b})}\right]$$

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THE TRADE-OFF THEORY: COSTS OF FINANCIAL DISTRESS AND AGENCY COSTS

Financial Distress

- Financial distress arises when a firm is not able to meet its obligations to debt-holders.
- For a given level of debt, financial distress occurs because of the business (operating) risk . with higher business risk, the probability of financial distress becomes greater. Determinants of business risk are:
 - Operating leverage (fixed and variable costs)
 - Cyclical variations
 - Intensity of competition
 - Price fluctuations
 - Firm size and diversification
 - Stages in the industry life cycle

Costs of Financial Distress

- Financial distress may ultimately force a company to insolvency. **Direct costs** of financial distress include costs of insolvency.
- Financial distress, with or without insolvency, also has many **indirect costs**. These costs relate to the actions of employees, managers, customers, suppliers and shareholders.

Financial distress reduces the value of the firm. Thus, the value of a levered firm is given as follows: Value of levered firm = Value of unlevered firm + PV of tax shield – PV of financial distress

 $V_l = V_u + PVINTS - PVFD$

Agency Costs

- In practice, there may exist a conflict of interest among shareholders, debt holders and management.
- These conflicts give rise to agency problems, which involve agency costs.
- Agency costs have their influence on a firm's capital structure.
 - Shareholders–Debt-holders conflict
 - Shareholders-Managers conflict
 - Monitoring and agency costs

PECKING ORDER THEORY

- The "pecking order" theory is based on the assertion that managers have more information about their firms than investors. This disparity of information is referred to as **asymmetric information**.
- The manner in which managers raise capital gives a signal of their belief in their firm's prospects to investors.
- This also implies that firms always use internal finance when available, and choose debt over new issue of equity when external financing is required.
- The pecking order theory is able to explain the negative inverse relationship between profitability and debt ratio within an industry.
- However, it does not fully explain the capital structure differences between industries.

Implications:

- Internal equity may be better than external equity.
- Financial slack is valuable.
- If external capital is required, debt is better.

CAPITAL STRUCTURE PLANNING AND POLICY

- Theoretically, the financial manager should plan an optimum capital structure for the company. The optimum capital structure is one that maximizes the market value of the firm.
- The capital structure should be planned generally, keeping in view the interests of the equity shareholders and the financial requirements of a company.
- While developing an appropriate capital structure for its company, the financial manager should *inter alia* aim at maximizing the long-term market price per share.

Elements of Capital Structure

- 1. Capital mix
- 2. Maturity and priority
- 3. Terms and conditions
- 4. Currency
- 5. Financial innovations
- 6. Financial market segments

Analysis helpful in choosing the capital structure

- •EBIT-EPS analysis
- ROI ROE analysis
- Guidelines for capital structure planning



Illustration

Let us suppose the following data is given for company XYZ.

Existing Capital Structure: 1 million equity shares of Rs 10 each.

Tax rate:

50 percent

the company plans to raise additional capital of Rs 10 million for financing an expansion project. In this context it is evaluating two alternative proposals.

(1) issue equity share (1 million equity shares at Rs 10 per share).

(2) issue of debenture carrying 14 percent interest.

What will be the EPS under two alternative financing plans for two levels of EBIT, say 4 million and 2, million?

Solution

When the entire financing is done through issue of equity?

EBIT:2,000,000

Interest

Profit before tax 2,000,000

Tax (50%)

PAT

Number of equity shares

EPS

Fill in the blanks EPS (for EBIT =2,000,000) = 0.5 , EPS (for EBIT =4,000,000) = 1

4,000,000

EBIT:4,000,000

Solution

When the entire financing is done through issue of debt.

EBIT:2,000,000

Interest

Profit before tax 2,000,000

Tax (50%)

PAT

Number of equity shares

EPS

Fill in the blanks EPS (for EBIT =2,000,000) = 0.3 , EPS (for EBIT =4,000,000) = 1.3

4,000,000

EBIT:4,000,000



The breakeven EBIT for two alternative financing schemes is the level of EBIT for which the EPS is the same under both the schemes.

$$\frac{(\text{EBIT}^* - I_1)(1-t)}{n_1} = \frac{(\text{EBIT}^* - I_2)(1-t)}{n_2}$$

Where

EBIT^{*} = indifference point between the two alternative financing plans I_1, I_2 = interest expenses before taxes under financing plans 1 and 2 n_1 , n_2 = number of equity shares outstanding under financing plans 1 and 2

Calculate Indifference point for the previous example.

Conclusion of the analysis

- If the most likely EBIT value exceeds the indifference value of EBIT, the option debt financing option, prima facie, may be advantageous.
- If the most likely value of EBIT is going to fall below indifference value of EBIT, the option of debt financing may not be regarded as desirable.

Illustration

Paramount produces Itd. Wants to raise Rs 100 lakhs for a diversification project. Current estimate of earnings before interest and taxes (EBIT) from the new projects is Rs 22 lakhs per annum. Cost of debt will be 15 percent for the amounts up to and including Rs 40 lakhs, 16 percent for additional amounts up to and including Rs 50 lakhs and 18 percent for additional amounts above Rs 50 lakhs.

The equity shares (face value Rs 10) of the company have a current market value of Rs 40. This expected to fall to Rs 32 if debts exceeding Rs 50 lakhs are raised. The following options are available.

Option	Equity	Debt
I	50%	50%
II	60%	40%
III	40%	60%

Illustration

Determine the EPS for each option and state which option the company should exercise. Tax rate applicable to the company is 50 percent.

Solution: option I

on I

Role of financial manger

- Compare expected value of EBIT with its indifference value
- Asses the probability of EBIT falling below its indifference value of EBIT.

ROI-ROE analysis

- ROI is defined as EBIT divided by Total assets.
- ROE is defined as equity earnings divided by net worth.

Relationship between ROI and ROE is given by

ROE = [ROI + (ROI - r)D/E](1-t)





Conclusion

- The ROE under capital structure A is higher than ROE under capital structure B when ROI is less than the cost of debt.
- The ROE under the two capital structures is the same when ROI is equal to the cost of debt. Hence the indifference value of ROI is equal to the cost of debt
- The ROE under capital structure B is higher than the ROE under capital structure A when ROI is more than the cost of debt.

Risk return trade off

The firm's decision to use otherwise debt in the capital structure affects two types of risk

- Financial risk- The financial risk arises on account of the use of debt in the capitalisation plan. The debentures carry fixed obligations as to return on capital. Lack of ability to honour these obligations increase risk of liquidation.
- Non-employment of debt capital(NEDC) -these risks vary inversely with the ratio of debt to total capital. The greater the value of D/C ratio, the lower will be the NEDC risks and vice versa, other things being equal.

Components of NEDC risks

- The excessive reliance on equity source leads to the sacrifice of the opportunity of earning higher EPS on account of beneficial affects of financial leverage.
- Financial plan should be compatible with the management objective of retaining control.
- Floatation costs of equity are higher in equity than debt.
- In determining the optimum level of debt and equity the financial executives have to balance between financial risk and NEDC risks.

Capital Structure planning

- Avail of the tax advantage of debt
- Ensure that total risk is reasonable
- Examine control implications of alternative financing plans
- Resort to timing judiciously.
- Finance proactively and not reactively
- Know the norms of lenders and credit rating agencies.
- Issue of innovative securities
- wide range of financing resources.

END OF SESSION for any query, please contact @ pddas1@gmail.com , # 9438485460