

## BUSINESS VALUE FOR SHARE HOLDERS



REAL CONCEPT  
OF VALUATION

## CHALLENGE TO MODIGLIANI & MILLER MODEL

Increase in gearing level of a company will Decrease the Value of Business for Share Holders and there is no tax saving related with gearing.

## Real Concept of Valuation

### Challenge to Modigliani & Miller Model

#### As per Real Concept of Valuation Model:

"Increase in gearing level of a company will Decrease the value of business for share holders and there is no tax saving related with gearing."

This is based on the premises that real valuation of a company is based on the fact that it belongs to equity holders and value of capital employed has different perspective to value of business for share holders as a whole.

This theory is explained in two prepositions:

1. Behavioral Impact of Share Holders on Valuation
2. Net Operating value of Business for Share Holders

Hidden concept of valuation has been highlighted by above prepositions which shows that

- Increase in Gearing will result in decrease in value of business for share holders.
- WACOC will be fixed; increase in gearing level will not affect the WACOC provided PAT is equal to dividend.
- Value of tax for equity holders of Geared & Un-geared Company is same provided equity investment is same.

Debt holders have multiple protections for their Debt and interest on annual profits; or on the assets of the company (in case of loss). This protection is provided by the Equity holders on the basis that in case of loss assets generated from equity funds can also be utilized for the payment of loan and interest due. This extra protection causes decrease in value of geared company. These facts result in increase in the expected rate of return by equity holders.

## Real Value Of Business For Share Holders I will establish that:

Company's actual owners are equity holders not the Financers (Debt providers). Value of company should be calculated on the basis that it belongs to shareholders net of any obligation and liability.

In fact, operating profit is actually profits earned by the business for share holders and later, out of these operating profits; business has to distribute some portion of profits in shape of interest and tax.

The whole concept will be explained in two prepositions:

1. Behavioral impact of share holders on valuation
2. Net operating value of business for share holders

### Preposition # 1 (Behavioral Impact)

Value of business depends upon the expectations of the equity holders who set a level of expectations for a specific return on equity investments.

Value of a company is entirely related with the relation of actual rate of return (Ra) received by the equity holders with the expected rate of return (Re) by equity holders.

Actual dividend will be compared with the expectations of equity holders; If Ra is higher than the Re than value of business for share holders will be higher.

#### Illustration:

Company "XYZ Trading" is for sale with total asset value US\$ 50,000; actual Profit distributions paid to equity holder is US\$ 7,500 and same will be paid in future. Company has asked for the bids to sell this company. (ignore taxation).

Calculate the value of company for Mr. A, Mr. B and Mr. C who have following expectations:

Mr. A has expectation to earn 20% return on his investment.

Mr. B has expectation to earn 15% return on his investment

Mr. C has expectation to earn 10% return on his investment.

#### Solution:

Since existing dividend is the base, we can calculate the value of business taking actual dividend as base with following formula:

$$\text{Value} = \text{Dividend}/\text{Re}$$

$$\begin{aligned} \text{Value of Business for Mr. A} &= \text{US\$ } 7,500/0.20 \\ &= \text{US\$ } 37,500 \end{aligned}$$

$$\begin{aligned} \text{Value of Business for Mr. B} &= 7,500/0.15 \\ &= \text{US\$ } 50,000 \end{aligned}$$

$$\begin{aligned} \text{Value of Business for Mr. C} &= 7,500/0.10 \\ &= \text{US\$ } 75,000 \end{aligned}$$

Based on expectation, value of same business is different for different investors.

### Mr. A

Mr. A wished to earn 20% of its investment; therefore, value of this business for him will be US\$ 37,500.

This value of business for Mr. A is less than the actual value of assets because expected rate of return ( $R_e$ ) is more than the actual rate of profit earned ( $R_a$ ) by Mr. A.  **$R_e > R_a$**

Hence, Business value is less than US\$ 50,000 for Mr. A.

### Mr. B

Mr. B wished to earn 15% of its investment; therefore, value of this business for him will be US\$ 50,000.

This value of business for Mr. B is equal to original assets of the company because expected rate of return ( $R_e$ ) and actual rate of profit earned ( $R_a$ ) are same.  **$R_e = R_a$**

Hence, Business value is same US\$ 50,000.

### Mr. C

Mr. C wished to earn 10% of its investment; therefore, value of this business for him will be US\$ 75,000.

This value of business for Mr. C is higher than the original assets of the company because expected rate of return ( $R_e$ ) is less than the actual rate of profit earned ( $R_a$ ).  **$R_e < R_a$**

Hence, Business value is high.

### Conclusion

- $R_e > R_a$  : Value is low
- $R_e = R_a$  : Value is same to original
- $R_e < R_a$  : Value is high

Based on above impact of valuation, we should be realistic and should assume that

$$R_e = R_a = \text{Dividend}$$

With this major assumption we will now discuss the factors related with the calculation of value of companies and effects of Gearing on net operating value of business for shareholders

### Preposition # 2 (Net Operating Value of Business)

Value of company for share holders must be net of all obligations & liabilities;

1. Operating Profits will belong to shareholders incase there is no distribution from operating profits.
2. In absence of any distribution from operating profits, share holders will have extra funds and these funds will be re-invested in business at same expectations ( $R_e$ ) by share holders.
3. Hence value of these statutory annual distributions for Share Holders shall be calculated through  $R_e$ , because these distributions have opportunity costs for share holders.

We will calculate the value of operating profit (value of EBIT) and than we will deduct the value of Liabilities & obligations to get the net value of business for Equity holders;

### Valuation Steps

- Value of Operating business for equity holders (Vo) shall be calculated by using expected rate of return with following Formula:

$$V_o = \text{EBIT} / R_e$$

- Net Value of EBIT (or Value before interest & Tax); We will deduct the original value of debt from Vo to get net value of EBIT:

$$V_{BIT} = \text{EBIT} / R_e - \text{Debt}$$

- Deduction of Value of Distributions: Taxes & Interest are distributions and payable in perpetuity, hence these have value for share holders and values of these distributions shall be calculated by using following formula:

$$\text{Value of Interest} = I_c = I / R_e$$

$$\text{Value of Tax} = T_c = T / R_e$$

$$\text{Hence: Net Value of Business} = V_{BIT} - I_c - T_c$$

Therefore, the comprehensive formula to calculate the value of a geared or un-geared company as discussed earlier is as follows:

$$V = (\text{EBIT} / R_e) - \text{Debt} - (T / R_e) - (I / R_e)$$

Since interest and debt is zero in un-geared company, hence formula for un-geared company will be as follows:

$$V = (\text{EBIT} / R_e) - (T / R_e)$$

#### Net Operating Value of Business for Share Holders

Gross Operating Value of Business for Share Holders (Vo)	= EBIT/Re
Less: Debt	= (Debt)
Net Value of Business before Interest & Tax (VBIT)	= XXXX
Less: Value of Interest	= (Interest/Re)
Less: Value of Tax	= (Tax/Re)
Net Value of Business for SH	= xxxxx

#### Where as:

- “Vo” is Value of EBIT for share holders
- “Vu” is Value of Un geared company
- “Vg” is Value of geared company
- “Re” is required rate of return by equity holders
- “T” is annual tax payable
- “I” is annual interest payable
- “Tc” is Value of Tax Charge for Share Holders
- “Ic” is value of interest for shareholders
- “D” is Debt (loans payable by Geared Company)

## Assumptions of Theory

Following are major assumptions on which this theory based:

1. Share Capital for un-gearred & at any other levels of gearing will remain same.
2. The gearing of the company can be changed immediately by issuing debt to increase capital employed but it is assumed that repurchase of shares is not allowed for the said illustration purpose because we already have assumed that share capital will remain fixed (assumption 1).
3. There are no transaction costs for increase in debt.
4. Further assumed that whatever level of gearing is on any particular valuation date, it will remain constant in perpetuity.
5. Business is identical with all relevant aspects and working in same circumstances. And return on capital employed, tax rates, interest rates will remain same.
6. Profits after tax will be distributed as dividend and this will be as per the expectations of the share holders; it means;

$$\text{Profits after Tax} = \text{Dividend} = R_e = R_a.$$

7. Business risk is also constant, regardless of how the company invests its funds.
8. Residual value of assets of the company is zero.

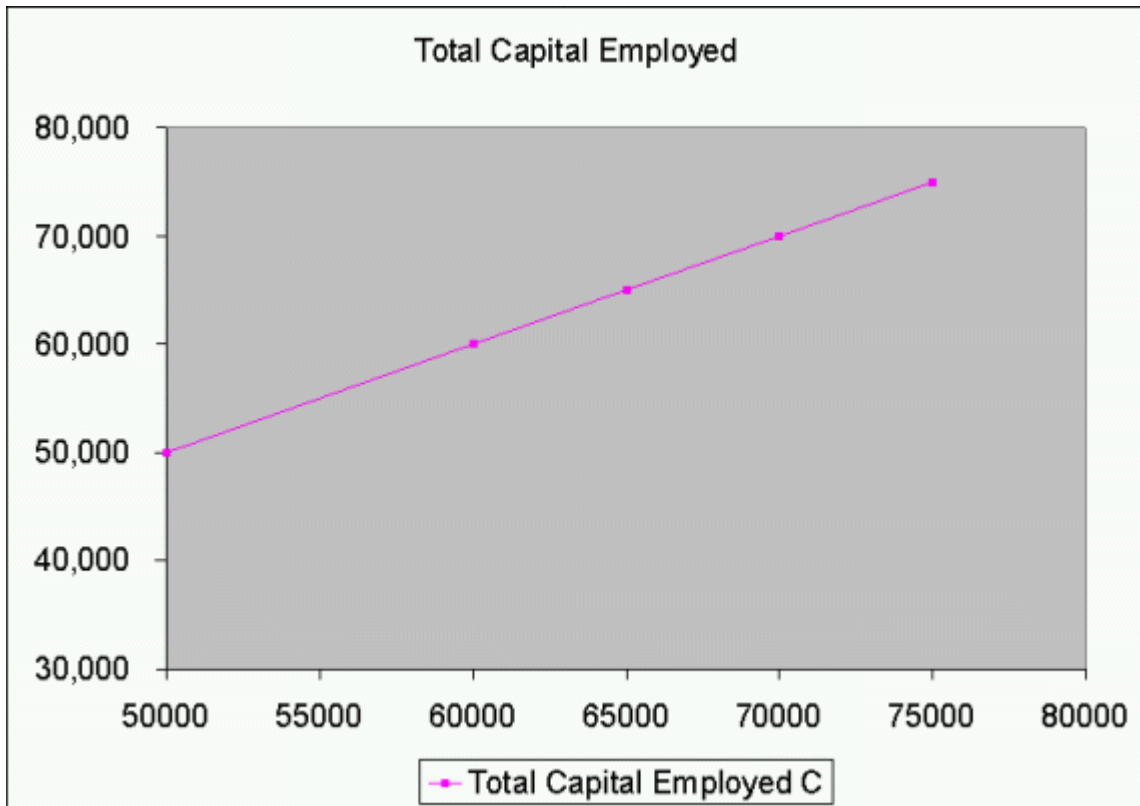
We will discuss complete theory while using following illustration.

### Illustration

- U is un-gearred company and G1, G2, G3, G4 are Companies which are Geared at different levels.
- Share Capital (Equity Investment) of all the companies is fixed at all levels, which is US\$ 50,000.
- Capital employed is increasing with the increase in Gearing.
- ROCE, Interest Rate and Tax Rate are same for all companies.

### Illustration: Un-Gearred & Geared Companies

COMPANY NAME		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Share Capital	<b>E</b> ASSUMED	50,000	50,000	50,000	50,000	50,000
Loan	<b>D</b> ASSUMED	-	10,000	15,000	20,000	25,000
<b>Total Capital Employed</b>	<b>C (E+D)</b>	<b>50,000</b>	<b>60,000</b>	<b>65,000</b>	<b>70,000</b>	<b>75,000</b>
ROCE	<b>R</b> ASSUMED	25%	25%	25%	25%	25%
RATE OF INTEREST	<b>R<sub>i</sub></b> ASSUMED	10%	10%	10%	10%	10%
TAX RATE	<b>R<sub>t</sub></b> ASSUMED	40%	40%	40%	40%	40%



**Income Statement: Un-Geared & Geared Companies**

		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Earning Before Interest & Tax	<b>EBIT</b> CxR	12,500	15,000	16,250	17,500	18,750
Less Interest	<b>I</b> DxRi	-	(1,000)	(1,500)	(2,000)	(2,500)
Earning before Tax	<b>EBT</b> (EBIT-I)	12,500	14,000	14,750	15,500	16,250
Tax @ 40%	<b>T</b> (EBTxRt)	(5,000)	(5,600)	(5,900)	(6,200)	(5,500)
<b>Profit after Tax (Dividend)</b>	<b>D</b> (EBT-T)	<b>7,500</b>	<b>8,400</b>	<b>8,850</b>	<b>9,300</b>	<b>9,750</b>

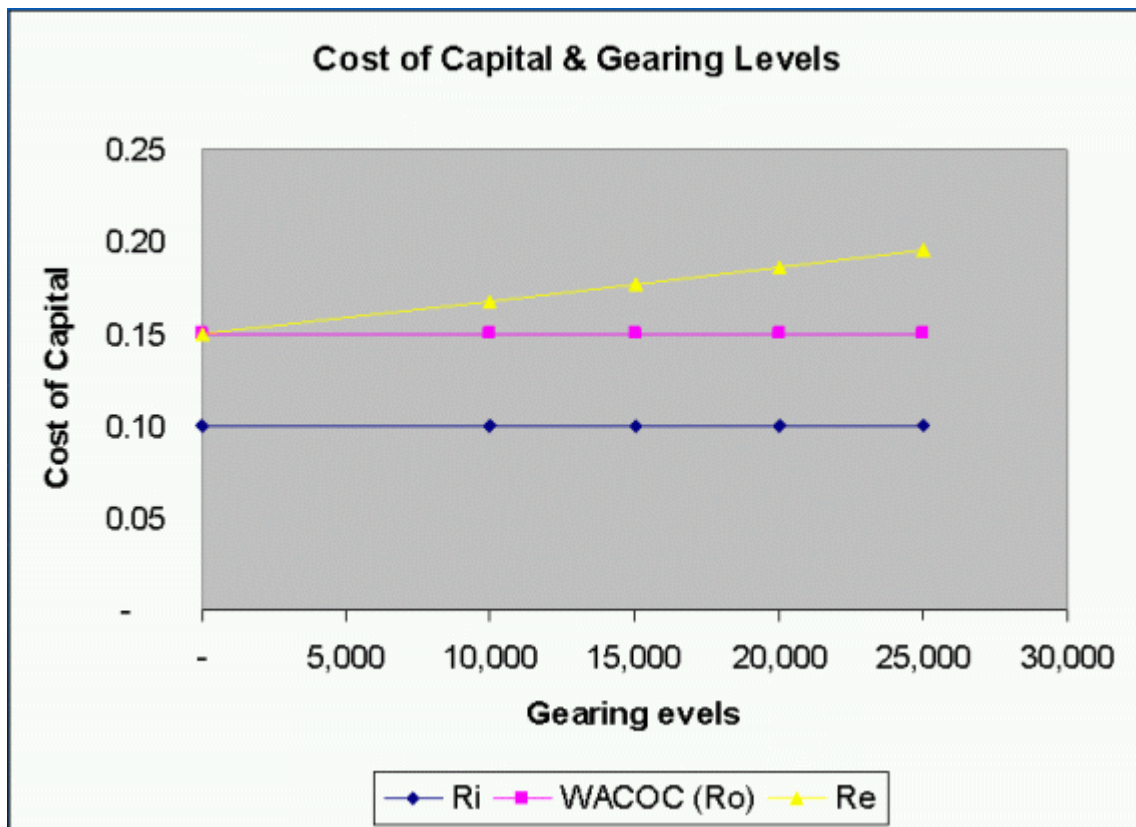
## Return on Equity & WACOC

As we have assumed that Profits after tax will be distributed as dividend, hence

$Re = Ra = \text{Dividend}$  is as follows:

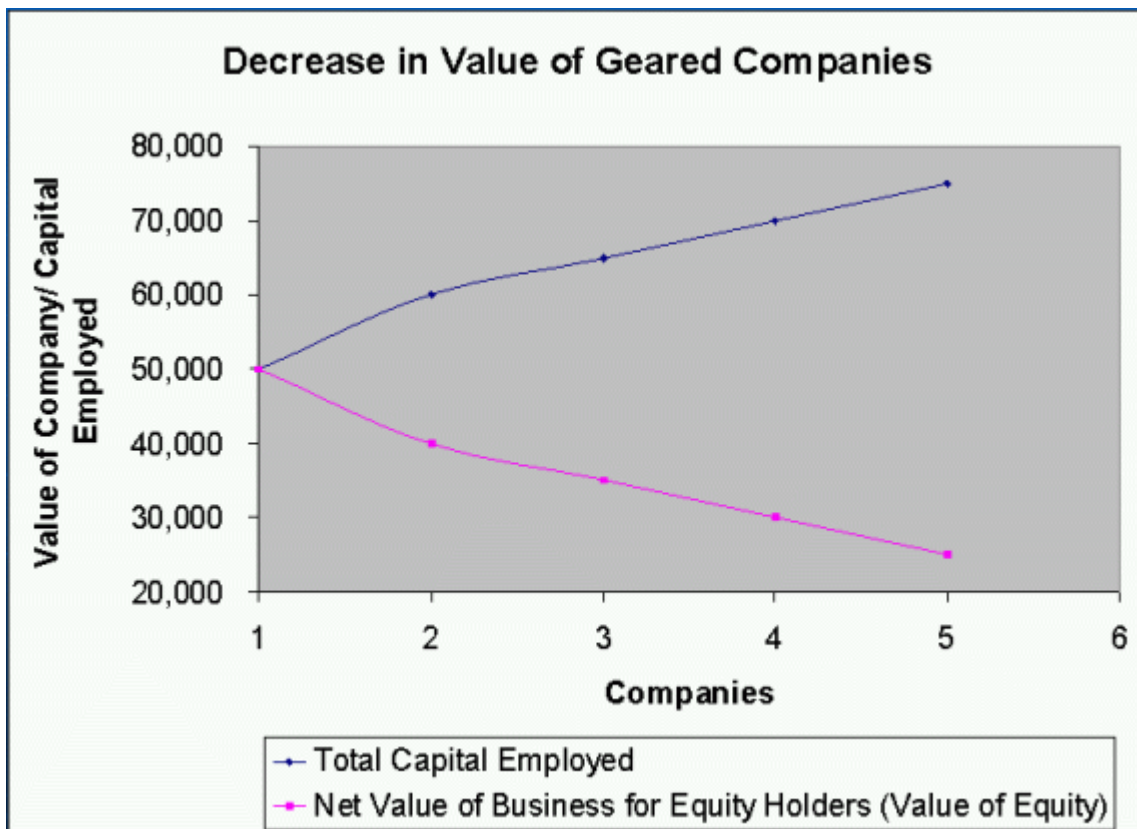
COMPANY NAME		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Share Capital	<b>E</b>	50,000	50,000	50,000	50,000	50,000
Profit after Tax	<b>Div</b>	7,500	8,400	8,850	9,300	9,750
Actual Rate of Return on Equity	<b>Ra, Re</b> (Div/E)	0.150	0.168	0.177	0.186	0.195
<b>WACOC = Ro</b>	<b>Ro</b> (D/C*(1-Rt)*Rd) + (E/C*Re)	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>

- **Re is Increasing because risk increased;**
- **Ro is fixed even after taking the fact of interest as (1-Rt).**



### Valuation of Business for Equity Holders - Detailed working

Valuation of Business for Equity Holders		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Operating Value of Business for Equity Holders	<b>Vo</b> (EBIT/Re)	83,333.33	89,285.71	91,807.91	94,086.02	96,153.85
Less: Loans	<b>D</b> D	-	(10,000.00)	(15,000.00)	(20,000.00)	(25,000.00)
Value of Business for Equity Holder before Interest & Tax Obligations (Gross Value of Equity)	<b>VBIT</b> (Vo-D)	83,333.33	79,285.71	76,807.91	74,086.02	71,153.85
Value of Interest for Equity Holders	<b>Ic</b> (I/Re)	-	(5,952.38)	(8,474.58)	(10,752.69)	(12,820.51)
Value of Business for Equity Holders before Tax		83,333.33	73,333.33	68,333.33	63,333.33	58,333.33
Value of Tax for Equity Holders	<b>Tc</b> (T/Re)	(33,333.33)	(33,333.33)	(33,333.33)	(33,333.33)	(33,333.33)
<b>Net Value of Business for Equity Holders (Value of Equity)</b>	<b>Ve</b>	<b>50,000.00</b>	<b>40,000.00</b>	<b>35,000.00</b>	<b>30,000.00</b>	<b>25,000.00</b>



## FACTS

Based on above calculations under the assumptions mentioned, the following facts emerge in calculations of valuation of Un-Geared & Geared companies:

1. Value of equity in a Un-Geared company remains unchanged/fixed;
2. Value of Geared company decreased by exactly with the value of Loan at all level of Gearing;
3. WACOC is fixed at all levels of gearing and there is no decrease related with gearing.
4. Value of tax for share holders in un geared and geared companies will be the same; there is no tax saving related at any gearing level.

Whether it is a tax world or No tax world, value never relate with Gearing. Theory which states that there is tax saving if we geared up the company's capital is incorrect.

5. Value of Business will only be affected if there is difference in expected rate of return ( $R_e$ ) and actual rate of return ( $R_a$ ) earned by business for equity holders;

i.e.; if expected rate of return by equity holder is less than the earned rate, than value of that business will be high and Vice versa.

$R_e = R_a$  Value unchanged (Actual Value)

$R_e < R_a$  Value will be high

$R_e > R_a$ , Value of business will be less

## Relation between Un-Geared & Geared Company

- Value of business for share holders will remain unchanged for an Un-g geared company and is equal to actual value of equity investment.
- Value of Business for sShare holders will decrease by the exact amount of loan in Geared company Hence under any particular risk relation between the geared & Un-g geared value of the company can be explained as follows:

$$V_u = V_g + \text{Debt}$$

## Factors that Result in Decrease in Value of Geared Company

The decrease in value of Equity is due to following factors:

- Increase in Liabilities of the geared company as compared with Un geared company which result in increase in risk.
- Providers of the loan have invested, at the stake of available funds of equity holders, on less risk;

At the time of dissolution, business has to pay back this loan first (first charge), before the equity holders get paid.

## Reconciliation

Upon conversion of Un-g geared company into Geared company although capital employed is increased but Value of equity will be decreased; Reconciliation can be made upon comprehensive analysis of costs & benefits involved in the procedure of gearing up an un-g geared company.

Most of the analysts compare the short term monetary benefits, which show some extra net profits but never reach to the point where loss of equity is a final result.

A proper reconciliation between the profits of Un-g geared & Geared Companies will prove the same loss of equity as calculated in previous calculations.

We can categorize the costs and benefits involved in gearing up any company as follows:

### Benefits Earned by Geared Companies:

- Extra operating profits earned by Geared companies.

### Additional Liabilities on Geared Company:

- Loan
- Interest payable
- Extra tax payable due to increase in profit before tax

### Loss of value upon Gearing up an Un-Geared Company:

- Risk and Re will be increase and value of un-g geared profits will be calculated at increased Re which results in decrease of value of company for existing share holders.

- When an Un-g geared company transforms into a geared company than value of current Un-g geared profits in a gearing company decreased.

**Net affect of Savings/Extra Profit earned: Against Acceptance of Loan as Liability on Business while using same above illustration**

COMPANY NAME	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Extra Profit Earned	-	2,500	3,750	5,000	6,250
Extra Distributions from Profits Interest	-	(1,000)	(1,500)	(2,000)	(2,500)
Tax	-	(600)	(900)	(1,200)	(1,500)
<b>Net Increase in Profits (loss) of Geared company</b>	<b>-</b>	<b>900</b>	<b>1,350</b>	<b>1,800</b>	<b>2,250</b>
Re	0.150	0.168	0.177	0.186	0.195
Value of Extra Profits Earned	-	5,357	7,627	9,677	11,538
Less: Loans	-	(10,000)	(15,000)	(20,000)	(25,000)
<b>Value of Loss of Equity on Extra Profits Earned</b>	<b>-</b>	<b>(4,643)</b>	<b>(7,373)</b>	<b>(10,323)</b>	<b>(13,462)</b>

**Loss on Value of Un Geared Profits after Increase of Risk and Re:**

Value of Un Geared Net Profits for Geared Companies	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Net Profits of Un Geared Company	7,500	7,500	7,500	7,500	7,500
Re	0.150	0.168	0.177	0.186	0.195
Value of Net Profits	50,000	44,643	42,373	40,323	38,462
<b>Decrease in Value of Equity Due to increase in Risk &amp; Re</b>	<b>-</b>	<b>(5,357)</b>	<b>(7,627)</b>	<b>(9,677)</b>	<b>(11,538)</b>

**Total Loss of Equity:**

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Value of Loss of Equity on Extra Profits	-	(4,643)	(7,373)	(10,323)	(13,462)
Value of Loss of Equity on Original ungeared Profits of Business	-	(5,357)	(7,627)	(9,677)	(11,538)
<b>TOTAL LOSS OF EQUITY</b>	<b>-</b>	<b>(10,000)</b>	<b>(15,000)</b>	<b>(20,000)</b>	<b>(25,000)</b>

**Above reconciliation shows that total net loss is the same as calculated & discussed in earlier pages.**

## SUMMARY

### Effects upon conversion of Un-Geared Company into Geared Company

When-ever any company is raising funds through gearing up and increase the risk of equity, than following will be the net results:

- Value of existing profits will be decrease on the day it will be geared;
- Extra profits earned when compared with extra liabilities again the NPV will be negative;

Total of both of above losses will be equal to net decrease in value of equity which is exactly the loan amount.

## Criticism of MM Model

### Elucidations/Clarifications

- Every company belongs to share holders whether it is Geared or not; Hence we should evaluate any business with the net effect on equity of the company.
- Debt is asset for the financial institutions who are not the owners of the geared companies. Debt is a Liability payable by the company and real value of company for share holders must be net of Debt.
- Equity (E)+ Debt (D) = Capital Employed (CE) is different and value of business as a whole for share holders is different.
- WACOC is the factor can only be used for valuation of capital employed only not for value of business for share holders because value of business for share holders is different from value of capital employed.
- **WACOC is fixed not decreasing with increase in Gearing:** MM claimed that in tax world Weighted Average Cost of capital is decreasing in a geared company, hence value of capital employed is increasing but fact is that WACOC is fixed not decreasing.
- **Relation of Ro & Re:** MM claimed that in tax world we can calculate Re & Ro through

$$Re = Ro + (Ro-Rd)(1-Rt) (D/E)$$

Re calculated through above formula is incorrect and does not match with original Re figures.

**Tax Shield is a wrong Concept:** MM claims that Tax Shield should be added to calculate the value of company. This addition is wrong.

### WACOC Fixed and Relation of Re & Ro

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Equity	50,000	50,000	50,000	50,000	50,000
Debt	-	10,000	15,000	20,000	25,000
<b>Capital Employed</b>	<b>50,000</b>	<b>60,000</b>	<b>65,000</b>	<b>70,000</b>	<b>75,000</b>
Profit after Tax	7,500	8,400	8,850	9,300	9,750
RETURN ON EQUITY Re (Profit after tax/Share Capital)	0.150	0.168	0.177	0.186	0.195
<b>WACOC=Ro=(D/C*(1-Rt)*Rd)+(E/C*Re)</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>

Equity/CE	100%	83%	77%	71%	67%
Debt/CE	0%	17%	23%	29%	33%
Interest Net effect	60%	60%	60%	60%	60%
Debt Costs	0.00%	1.00%	1.38%	1.71%	2.00%
Equity Costs	15.00%	14.00%	13.62%	13.29%	13.00%
<b>WACOC = Ro</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>
Formula for Relation of Re & Ro Re = Ro + (Ro-Rd)(1-Rt) (D/E)	15.00%	15.60%	15.90%	16.20%	16.50%
Original Re	15.00%	16.80%	17.70%	18.60%	19.50%
<b>Difference</b>	<b>0.00%</b>	<b>-1.20%</b>	<b>-1.80%</b>	<b>-2.40%</b>	<b>-3.00%</b>

## Summary

- It is now evident that WACOC remains same even after taking the effect of Tax and there is no decrease in WACOC which was claimed by MM model.
- Reason for this is that as company is distributing all PAT as dividend therefore what ever saved is distributed as dividend, hence WACOC remains fixed and does not decreases. (MM ignores this fact).
- Relation between Re & Ro as explained by MM is incorrect. We can see that Re actually calculated in the illustration is different from that calculated through the following formula:

$$\text{Re} = \text{Ro} + (\text{Ro}-\text{Rd})(1-\text{Rt}) (\text{D}/\text{E}) \text{ derived by MM model}$$

This formula does not give accurate figures because this formula is not taking the effect of extra payment made to equity holders due to gearing.

- Correct formula can be derived from WACOC formula and will be as follows which will clear up the actual relation between Ro and Re.

$$\text{Re} = \text{C}/\text{E} * \text{Ro} - \text{D}/\text{E} (1-\text{Rt}) * \text{Rd} \text{ (derived from actual formula of WACOC)}$$

Actual Re calculated through above formula will be same as original.

## Criticism

### Tax Shield - Duplication of tax

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
EBIT	12,500	15,000	16,250	17,500	18,750
Less Interest	-	(1,000)	(1,500)	(2,000)	(2,500)
<b>Earning before Tax</b>	<b>12,500</b>	<b>14,000</b>	<b>14,750</b>	<b>15,500</b>	<b>16,250</b>
<b>Tax @ 40% on EAI</b>	<b>(5,000)</b>	<b>(5,600)</b>	<b>(5,900)</b>	<b>(6,200)</b>	<b>(6,500)</b>
<b>Profit after Tax (Dividend)</b>	<b>7,500</b>	<b>8,400</b>	<b>8,850</b>	<b>9,300</b>	<b>9,750</b>

### Alternate way to present above

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
EBIT	12,500	15,000	16,250	17,500	18,750
Less: Tax @ 40% on EBIT	(5,000)	(6,000)	(6,500)	(7,000)	(7,500)
Less Interest	-	(1,000)	(1,500)	(2,000)	(2,500)
EAIT	7,500	8,000	8,250	8,500	8,750
Add: Tax Saving	-	400	600	800	1,000
<b>Profit after Tax</b>	<b>7,500</b>	<b>8,400</b>	<b>8,850</b>	<b>9,300</b>	<b>9,750</b>

### Summary

- If we calculate tax on operating profits @ 40% with out taking the affect of Interest, than we will have to add tax saving due to interest, to get actual NET PROFIT.
- Point should be noted that if we take gross tax at the time of deduction than we should add separately the tax saving.

If we took net tax for calculation of net profits and than again if we add tax savings, it will create double effect of tax saved which is incorrect.

## Criticism

### INTERPRETATION OF Modigliani- Miller Model with wrongly added of tax shield

		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Value of Business	EBIT/Re(1-Rt)	50,000	53,571	55,085	56,452	57,692
Add: Tax Shield	RtxD	-	4,000	6,000	8,000	10,000
<b>Value of Business as per MM model</b>		<b>50,000</b>	<b>57,571</b>	<b>61,085</b>	<b>64,452</b>	<b>67,692</b>

### Alternative way to calculate same

		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Value of Business	EBIT/Re	83,333	89,286	91,808	94,086	96,154
Less: Value of Tax (full value)	T/Re	(33,333)	(33,333)	(33,333)	(33,333)	(33,333)
Value of Business net of Tax		50,000	53,571	55,085	56,452	57,692
Add: Tax Shield Tax Saved per annum	IxRt	-	400	600	800	1,000
Value of Tax Saved	Ts/Ri	-	4,000	6,000	8,000	10,000
<b>Total Value of Business</b>		<b>50,000</b>	<b>57,571</b>	<b>61,085</b>	<b>64,452</b>	<b>67,692</b>

### Duplication of Tax effect in MM Model

- Tax Shield is a wrong concept created.
- We have seen that value of tax is deducted in a net form not in a gross form.
- We can only add tax shield if value of tax is taken at gross at the time of deduction.
- It is wrong if first we deduct the value of net tax and than again add the saving.
- Duplication is incorrect.

### SUMMARY- Conclusion

**Loan with interest obligation will create extra liabilities on Geared Company... This always results in decrease in the value of Company by exact amount of loan. Increase in gearing decrease in value of business for share holders.**

**WACOC is fixed not decreasing with increase in Gearing.**

**Value of tax for all companies remains same.**

**Debt providers always invest at the stake of equity for more protection.**

**Whether it is a tax world or No tax world, value of a company entirely depends upon the relation of actual rate of return (Ra) received by the equity holders, with the expected rate of return (Re) by equity holders.**

## ILLUSTRATION- Fixed Capital Employed

### Business Valuation

After narrating the detail theory we will now see the net results on the companies which are working with fixed capital employed at different gearing levels.

### Assumptions

1. Capital employed will remain same for all companies.
2. The gearing of the company can be changed immediately by issuing debt to repurchase the shares.
3. There are no transaction costs for increase in debt.
4. Upon valuation it is further assumed that Geared companies will remains geared at the same actual level of gearing in perpetuity.
5. Business is identical with all relevant aspects and working in same circumstances. And return on capital employed, tax rates, interest rates will remain same.
6. Net Profits of all companies are distributable to share holders; it means

$$\text{Net Profits} = \text{Dividend} = \text{Re} = \text{Ra.}$$

7. Business risk is also constant, regardless of how the company invests its funds.
8. Residual value of assets of the company is zero.

### Illustration

- U is un-gearred company and G1, G2, G3, G4 are companies which are Geared at different levels
- Capital employed of all the companies is fixed at all levels, which is US\$ 50,000.
- Equity is decreasing with increase in Debt.
- ROCE, Interest Rate and Tax Rate are same for all companies.

### Illustration: Un-Geared & Geared Companies

Company Name		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Share Capital	<b>E</b> ASSUMED	50,000	40,000	35,000	30,000	25,000
Loan	<b>D</b> ASSUMED	-	10,000	15,000	20,000	25,000
<b>Total Capital Employed</b>	<b>C (E+D)</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>
ROCE	<b>R</b> ASSUMED	25%	25%	25%	25%	25%
Rate Of Interest	<b>Ri</b> ASSUMED	10%	10%	10%	10%	10%
Tax Rate	<b>Rt</b> ASSUMED	40%	40%	40%	40%	40%

### Income Statement: Un-Geared & Geared Companies

		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Earning Before Interest & Tax	<b>EBIT</b> CxR	12,500	12,500	12,500	12,500	12,500
Less Interest	<b>I</b> DxRi	-	(1,000)	(1,500)	(2,000)	(2,500)
Earning before Tax	<b>EBT</b> (EBIT-I)	12,500	11,500	11,000	10,500	10,000
Tax @ 40%	<b>T</b> (EBTxRt)	(5,000)	(4,600)	(4,400)	(4,200)	(4,000)
<b>Profit after Tax (Dividend)</b>	<b>D (EBT-T)</b>	<b>7,500</b>	<b>6,900</b>	<b>6,600</b>	<b>6,300</b>	<b>6,000</b>

### Return on Equity & WACOC

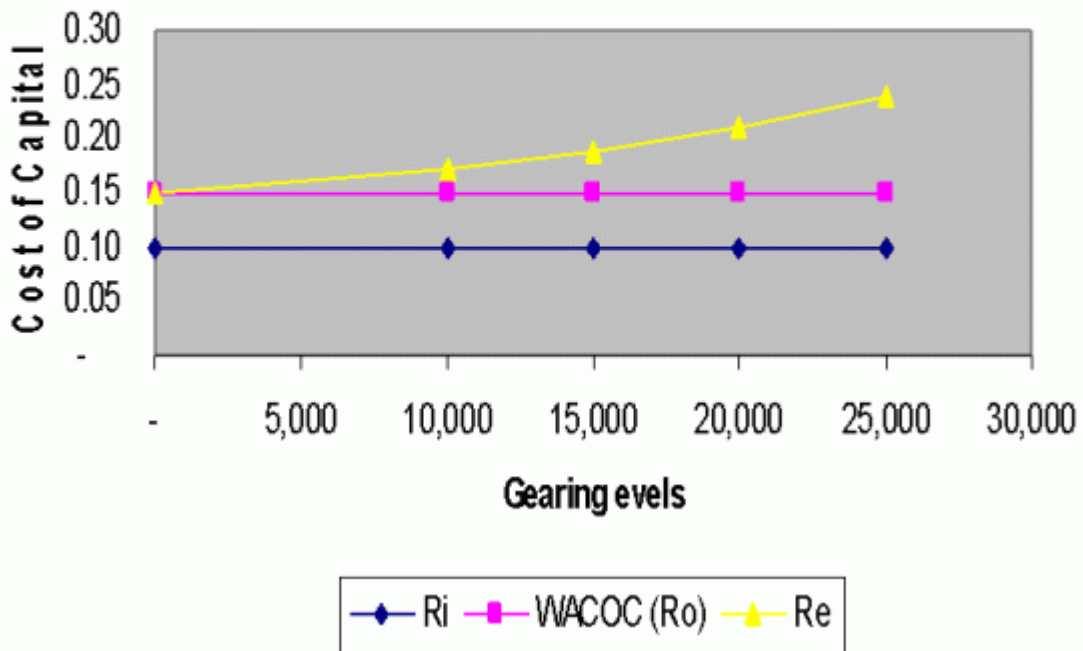
As we have assumed that Profits After Tax will be distributed as Dividend, hence

**Re = Ra = Dividend is as follows:**

COMPANY NAME		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Share Capital	<b>E</b>	50,000	40,000	35,000	30,000	25,000
Profit after Tax	<b>Div</b>	7,500	6,900	6,600	6,300	6,000
Actual Rate of Return on Equity	<b>Ra, Re</b> (Div/E)	0.150	0.173	0.189	0.210	0.240
<b>WACOC = Ro</b>	<b>Ro</b> (D/C*(1-Rt)*Rd) + (E/C*Re)	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>

- **Re is increasing with increase in risk.**
- **Ro is fixed even after taking the fact of interest as (1-Rt).**

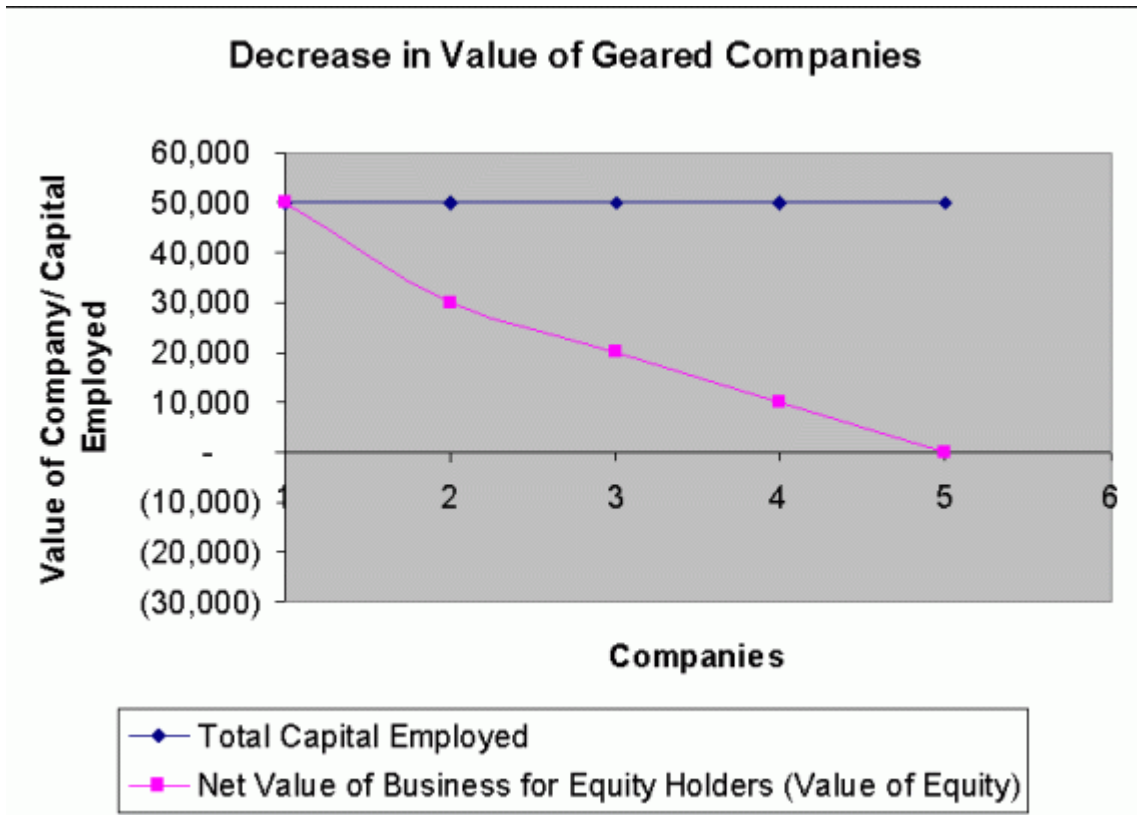
### Cost of Capital & Gearing Levels



### Valuation of Business for Equity Holders - Detailed working

Valuation of Business for Equity Holders		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Operating Value of Business for Equity Holders	<b>Vo</b> (EBIT/Re)	83,333.33	72,463.77	66,287.88	59,523.81	52,083.33
Less: Loans	<b>D</b> D	-	(10,000.00)	(15,000.00)	(20,000.00)	(25,000.00)
Value of Business for Equity Holder before Interest & Tax Obligations (Gross Value of Equity)	<b>VBIT</b> (Vo-D)	83,333.33	62,463.77	51,287.88	39,523.81	27,083.33
Value of Interest for Equity Holders	<b>Ic</b> (I/Re)	-	(5,797.10)	(7,954.55)	(9,523.81)	(10,416.67)
Value of Business for Equity Holders before Tax		83,333.33	56,666.67	43,333.33	30,000.00	16,666.67

Value of Tax for Equity Holders	$T_c$ (T/Re)	(33,333.33)	(26,666.67)	(23,333.33)	(20,000.00)	(16,666.67)
Net Value of Business for Equity Holders (Value of Equity)	$V_e$	50,000.00	30,000.00	20,000.00	10,000.00	-



## FACTS

Based on above calculations under the assumptions mentioned, we can see the following facts in calculations of valuation of Un-Geared & Geared companies:

1. Value of equity in an Un-Geared company remains unchanged/fixed.
2. Value of Geared company decreased by exactly with the value of loan at all level of Gearing.
3. WACOC is fixed at all levels of gearing and there is no decrease related with gearing.
4. Value of tax for share holders in un geared and geared companies will be the same (as proved in theory); the decrease in value of tax in calculations is only because of the difference in equity investment in each company.
5. Value of Business will only be affected if there is difference in expected rate of return (Re) and actual rate of return (Ra) earned by business for equity holders;

i.e if expected rate of return by equity holder is less than the earned rate, than value of that business will be high and Vice versa.

$Re = Ra$  Value unchanged (Actual Value)

$Re < Ra$  Value will be high

$Re > Ra$  Value of business will be less

## Reconciliation

### Net affect of Savings/Extra Profit earned: Against Acceptance of Loan as Liability on Business

COMPANY NAME	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Extra Profit Earned	-	-	-	-	-
Extra Distributions from Profits Interest	-	(1,000)	(1,500)	(2,000)	(2,500)
Tax	-	(400)	(600)	(800)	(1,000)
<b>Net Increase (decrease) in Profits of Geared company</b>	<b>-</b>	<b>(600)</b>	<b>(900)</b>	<b>(1,200)</b>	<b>(1,500)</b>
Re	0.150	0.173	0.189	0.210	0.240
Value of Extra Profits (Loss)	-	(3,478)	(4,773)	(5,714)	(6,250)
Less: Loans	-	(10,000)	(15,000)	(20,000)	(25,000)
<b>Value of Loss of Equity on Extra Profits Earned</b>	<b>-</b>	<b>(13,478)</b>	<b>(19,773)</b>	<b>(25,714)</b>	<b>(31,250)</b>

### Loss on Value of Un Geared Profits After Increase of Risk and Re:

Value of Un Geared Net Profits for Geared Companies	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Net Profits of Un Geared Company	7,500	7,500	7,500	7,500	7,500
Re	0.150	0.173	0.189	0.210	0.240
Value of un-geared Net Profits (Loss)	50,000	43,478	39,773	35,714	31,250
<b>Increase (Decrease) in Value of Equity Due to increase in Risk &amp; Re</b>	<b>-</b>	<b>3,478</b>	<b>4,773</b>	<b>5,714</b>	<b>6,250</b>

### Total Loss of Equity:

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Value of Loss of Equity on Extra Profits	-	(13,478)	(19,773)	(25,714)	(31,250)
Value of gain (Loss) of Equity on Original ungeared Profits of Business	-	3,478	4,773	5,714	6,250
<b>TOTAL LOSS OF EQUITY</b>	<b>-</b>	<b>(10,000)</b>	<b>(15,000)</b>	<b>(20,000)</b>	<b>(25,000)</b>

**Above reconciliation shows that Total Net Loss is the same as calculated & Discussed in earlier pages.**

## SUMMARY

### Effects upon conversion of Un-Geared company into Geared Company

When ever any company is raising funds through gearing up and increase the risk of Equity, than following will be the net results:

- There will be small increase in Value of Existing profits if equity is decreasing and capital employed is fixed (on the day it will be geared). However it will decrease if equity investment is fixed at all geared levels.
- Extra profits/loss earned when compared with extra liabilities again the NPV will be negative.

Total of both of above will be equal to net decrease in value of equity which is exactly the loan amount.

## Criticism (Interpretation Of Modigliani- Miller Model)

### WACOC Fixed or Decreasing with increase in Gearing

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Equity	50,000	40,000	35,000	30,000	25,000
Debt	-	10,000	15,000	20,000	25,000
<b>Capital Employed</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>
Profit after Tax	7,500	6,900	6,600	6,300	6,000
RETURN ON EQUITY Re (Profit after tax/Share Capital)	0.150	0.173	0.189	0.210	0.240
<b>WACOC=Ro=(D/C*(1-Rt)*Rd) + (E/C*Re)</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>	<b>0.15</b>
Equity/CE	100%	80%	70%	60%	50%
Debt/CE	0%	20%	30%	40%	50%
Interest Net affect	60%	60%	60%	60%	60%
Debt Costs	0.00%	1.20%	1.80%	2.40%	3.00%
Equity Costs	15.00%	13.80%	13.20%	12.60%	12.00%
	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>
Formula for relation of Re & Ro $Re = Ro + (Ro-Rd)(1-Rt) (D/E)$	0.1500	0.1575	0.1629	0.1700	0.1800
Original Re	0.1500	0.1725	0.1886	0.2100	0.2400
<b>Difference</b>	<b>-</b>	<b>1.5%</b>	<b>2.571%</b>	<b>4.00%</b>	<b>6.00%</b>

### Summary- relation of Re & Ro

- We can see from above that WACOC remains same even after taking the effect of Tax and there is no decrease in WACOC which was claimed by MM model.
- Reason for this is that as company is distributing all PAT as dividend therefore what ever saved is distributed as dividend, hence WACOC remains fixed and not decreasing. (MM ignores this fact)
- Relation between Re & Ro as explained by MM is incorrect. We can see that Re actually calculated in the illustration is different from the calculated through the following Formula

$$Re = Ro + (Ro-Rd)(1-Rt) (D/E) \text{ derived by MM model.}$$

This formula does not give accurate figures because this formula is not taking the effect of extra payments made to equity holders.

- Correct formula can be derived from WACOC formula and will be as follows, which will show the actual relation between Ro and Re.

$$Ro = (D/C*(1-Rt)*Rd) + (E/C*Re) \text{ OR}$$

$$Re = C/E* Ro - D/E (1-Rt)*Rd$$

Actual Re calculated through above formula will be same as original.

## Criticism (Interpretation Of Modigliani- Miller Model)

### Other Ways to Present Income Statement

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
EBIT	12,500	12,500	12,500	12,500	12,500
Less Interest	-	(1,000)	(1,500)	(2,000)	(2,500)
<b>Earning before Tax</b>	<b>12,500</b>	<b>11,500</b>	<b>11,000</b>	<b>10,500</b>	<b>10,000</b>
<b>Tax @ 40% on EAI</b>	<b>(5,000)</b>	<b>(4,600)</b>	<b>(4,400)</b>	<b>(4,200)</b>	<b>(4,000)</b>
<b>Profit after Tax (Dividend)</b>	<b>7,500</b>	<b>6,900</b>	<b>6,650</b>	<b>6,300</b>	<b>6,000</b>

	U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
EBIT	12,500	12,500	12,500	12,500	12,500
Less: Tax @ 40% on EBIT	(5,000)	(5,000)	(5,000)	(5,000)	(5,000)
Less Interest	-	(1,000)	(1,500)	(2,000)	(2,500)
EAIT	7,500	6,500	6,000	5,500	5,000
Add: Tax Saving	-	400	600	800	1,000
<b>Profit after Tax</b>	<b>7,500</b>	<b>6,900</b>	<b>6,600</b>	<b>6,300</b>	<b>6,000</b>

## Summary

- We can see above that Tax actually was @ 40% on operating Profits without effect of Interest.
- Tax saving due to interest is added later to calculate NET PROFIT.
- The point that should be noted is that if we take gross tax at the time of deduction than we should add separately the tax saving.

## Interpretation Of Modigliani- Miller Model with wrongly added of tax shield

		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Value of Business	EBIT/Re(1-Rt)	50,000.00	43,478.26	39,772.73	35,714.29	31,250.00
Add: Tax Shield	RxD	-	4,000.00	6,000.00	8,000.00	10,000.00
<b>Value of Business as per MM model</b>		<b>50,000.00</b>	<b>47,478.26</b>	<b>45,772.73</b>	<b>43,714.29</b>	<b>41,250.00</b>

## Alternative way to calculate same

		U (US\$)	G1 (US\$)	G2 (US\$)	G3 (US\$)	G4 (US\$)
Value of Business	EBIT/Re	83,333.33	72,463.77	66,287.88	59,523.81	52,083.33
Less: Value of Tax (full value)	T/Re	(33,333.33)	(26,666.67)	(23,333.33)	(20,000.00)	(16,666.67)
Value of Business net of Tax		50,000.00	43,478.26	39,772.73	35,714.29	31,250.00
Add: Tax Shield Tax Saved per annum	IxRt	-	400.00	600.00	800.00	1,000.00
Value of Tax Saved	Ts/Ri	-	4,000.00	6,000.00	8,000.00	10,000.00
<b>Total Value of Business</b>		<b>50,000.00</b>	<b>47,478.26</b>	<b>45,772.73</b>	<b>43,714.29</b>	<b>41,250.00</b>

## Duplication of Tax effect in MM Model

- Tax shield is a wrong concept created.
- We can see that value of Tax is deducted in a net form not in a gross form.
- We can only add tax shield if value of tax is taken at gross at the time of deduction.
- Hence it is wrong that first we deduct the value of net tax and than again add the saving.
- Duplication is incorrect basis.

## SUMMARY- Conclusion

Loan with interest obligation will create extra liabilities on Geared Company... These always result in decrease in the value of company by exact amount of loan. Increase in Gearing Decrease in value of business for share holders.

WACOC is Fixed not decreasing with increase in Gearing.

Value of tax for all companies remains same.

Debt providers always invest at the stake of equity for more protection.

Whether it is a tax world or No tax world, value of a company entirely depends upon relation of actual rate of return ( $R_a$ ) received by the equity holders with the expected rate of return ( $R_e$ ) by equity holders.

## Comments on Current Theories

### Value of all equity in a Firm in No Tax World Modigliani- Miller Model

Nature of Company	Formula	Remarks/ Criticism
Un-gearred Company	$V_u = EBIT/R_o$ & $R_e = R_o$ Because it is no tax world and un geared company.	For the calculation of Value of business for share holders, we should use the $R_e$ instead of $R_o$ (wacoc) because $R_o$ is used for the calculation of Capital Employed. Ref: Theory
Gearred Company	$V_g = EBIT/ R_o$ & $WACOC = R_o = (D/(D+E))(R_d) + (E/(E+D))(R_e)$ $WACOC = \text{Fixed \&}$ $V_g = E + D = \text{Dividend}/R_e + \text{Interest}/R_d.$	There is a conceptual mistake in the valuation of a geared company while using WACOC; this is value of capital employed not value of business for share holders. Ref: Theory
Preposition # 1	$V_u = V_g$	If we assume as equity investment is fixed and capital employed is increasing with the increase in gearing than this formula will be wrong even for calculation of Capital employed. As our objective is to calculate the value of Business for shareholders so we should use correct formula. Ref: Theory
Preposition # 2 No Tax World	$R_e = R_o + (R_o - R_d)(D/E)$ $R_o = WACOC = \text{Fixed}$	This show that $R_e$ will increase as company will be more geared and equity will be more risky. This relation is accurate in no tax world and we can calculate the actual $R_e$ if we know $R_o$ and vice versa. And WACOC is fixed at all levels of Gearing in no tax world.
Preposition # 2 (Relation of $R_e$ & $R_o$ )	$R_e = R_o + (R_o - R_d)(1 - R_t)(D/E)$ WACOC = Decreasing with increase in gearing due to tax saving. $R_o = (D/C * (1 - R_t) * R_d) + (E/C * R_e)$	Formula to calculate $R_e$ is not correct. WACOC is FIXED not decreasing as claimed by MM model. WACOC formula is correct but reverse calculation to calculate $R_e$ is not correct.
<b>We will consider the same illustration discussed earlier and will see the actual figures and calculated figures for WACOC and <math>R_e</math>.</b>		
Preposition # 2	$V_g = E + D$ & $E = \text{Dividend}/R_e$ $D = \text{Interest}/R_d$ Or $E = V_g - D$	This formula actually showing that $V_g$ is capital employed into a company. Ref: Theory
Un-Gearred Company	$V_u = EBIT(1 - R_t)/ R_o$ & $R_e = R_o$	We should use the $R_e$ instead of $R_o$ (wacoc) and correct formula should be $V_u = EBIT(1 - T_c)/R_e$ Or we can interpret this as follows: $V_u = (EBIT/R_e) - (\text{Tax}/R_e)$

Ref: Theory

<p>Geared Company</p>	<p><math>V_g = E + D</math>  <math>V_g = (EBIT - \text{Interest})(1 - R_t) / R_e + \text{Interest} / R_d</math></p>	<p>Factor <math>(EBIT - \text{Interest})(1 - R_t) / R_e</math>          very good factor which can be represented by the following formula:  <math>\text{Value of EBIT} = \text{EBIT} / R_e</math>          Less: <math>\text{Value of Interest} = \text{Interest} / R_e</math>  <math>\text{Value of Tax} = \text{Tax} / R_e</math>          If we are calculating net value of business for share holders we should deduct the debt instead of adding it.          Ref: Theory</p>
<p>Geared Company</p>	<p><math>V_g = V_u + \text{PV Of tax shield}</math>          or <math>V_g = \text{EBIT} (1 - T_c) / R_e + \text{Interest} * T_c / R_d</math>          Or <math>V_g = \text{EBIT} (1 - T_c) / R_e + D * T_c</math></p>	<p>We can interpret &amp; represent the formula as follows:  <math>\text{Value of EBIT} = \text{EBIT} / R_e</math>          Less: <math>\text{Value of Tax} = \text{Tax} / R_e</math>          Add: <math>\text{Tax Shield}</math>          In above details we can see that we already deducted the total actual value of tax from the value of EBIT and there is no need to add further saving of tax shield involved.          Ref: Theory</p>

## Shahzad Shaukat

### Shahzad Shaukat, ACA

Did his M.Com from University of Punjab and qualified his professional degree of Chartered Accountant from Institute of Chartered Accountant of Pakistan in June 2000.

### Experience

After four years of his Articles and professional qualification, Mr. Shahzad Shaukat started his professional career as a Chief Financial Officer of a renowned textile mills in Lahore and then join a multinational group in United Arab Emirates and has proven himself as a successful professional Chartered Accountant.

After 10 years of his experience it can be concluded that he is

"A fairly astute operational finance professional, with great all round experience from Accounting & auditing firms to broad based multinationals, who provided dynamic financial & Managerial leadership for best utilization of financial & all other resources of the organizations and has ability to synchronise practical business management decisions with prudent financial requisites to achieve pragmatic results, after applying the world class financial and business management expertise in his professional career."

### Research

**Complete research basics** were the questions raised in the mind of the author during the study years and those basic points have been highlighted to the world for understanding the facts related to real business valuation.

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