Capital Asset Pricing Model

Posted on November 1, 2018

Weighted Average Cost of Capital depicts the overall combined cost of equity and debts to finance the business operations or acquisitions. It is calculated as follows:

WACC=E/V * Ke + D/V * Kd (1-t)

Where E is Equity

D is total Debts

V is the total of Equity and Debts used for financing

Ke is the cost of Equity

Kd is the cost of Debts

t is the ratio of corporate tax

In the case of Goodway plc holding company, we have relevant figures for the calculation of the weighted average cost of capital.

Market price per share	£ 1.10
Dividend	11.4p
MV of Irredeemable loan stock	£ 31.60
MV of Redeemable loan stock	£ 103.26
MV of Unsecured loan	£ 75.42

And the figures from the balance sheet

Accounts	£

MV of irredeemable debt	442400
MV of redeemable debt	1548900
MV unsecured Loan	1500000
Bank loan	1540000
MV of Equity	2200000
V (equity + debts)	7231300

The cost of equity is calculated on the basis of a formula

Kd = Do/MV

Is the dividend paid

MV is the market value of a share

cost of equity Ke	10.36

The cost of debts for irredeemable loan stock is calculated by

Kd = I/MV

I am the rate of return

MV is the market value per stock

cost of irredeemable debt Kd	9.49

The cost for redeemable loan stock is calculated by the internal rate of return Method

time		Cash flows	DF @ 15%	PV	DF @ 5%	PV

0		-1548900	1	-1548900	1	-1548900
1 to 10	Interest payment (9*(1-0.35))	87750	5.02	440396.9469	7.72	677582.2
	Capital Repayment	1500000	0.25	370777.0592	0.61	920869.9
	NPV			-737725.994		49552.12

IRR = 5% + (49552.12 / (49552.12+737726) × (0.15-0.05)

IRR of redeemable loan	5.63

The unsecured loan cost is also calculated by the IRR

IRR = 0.04+ (483778.2 / (249637+483778.2)) × (0.1-0.04)

time		Cash flows	DF @ 10%	PV	DF @ 4%	PV
0		-1500000	1	-1500000	1	-1500000
1 to 10	Interest payment (6*(1-0.35))	78000	6.14	479276.2342	8.11	632649.9
	Capital Repayment	2000000	0.39	771086.5789	0.68	1351128
	NPV			-249637.187		483778.2

IRR of unsecured loan	7.96

By using all these calculations, the weighted average cost of capital is calculated.

Types Of Capital	Amount £	% of the total cost	Cost pre-tax	Cost After-tax	Weighted cost
MV of Equity	2200000	30%	10%	10%	3%
MV of irredeemable debt	442400	6%	9%	6%	0.3%
MV of redeemable debt	1548900	21%	8%	5%	1%
MV unsecured Loan	1500000	21%	12%	8%	2%
Bank loan	1540000	21%	13%	8%	2%

Weighted Average Cost of Capital	8.11%

2. Task 2:

According to the shilpa Gohal's opinion for different projects, the only cost of capital is inappropriate because the weighted average cost of capital is calculated on the base of debt financing for a particular project. So, for every project, the cost of capital should be calculated separately.

Keeping in mind the above-mentioned statement, it is true because WACC is calculated for particular debts and issued capital. Modigliani and Miller (1958), in corporate finance theory, contributed by saying this only WACC is inappropriate for calculating the cost of capital because, for different risks, the required rate is different.

Moreover, figures of goodway plc show information related to the particular projects. So the WACC calculated could not be used for the evaluation of all the different projects. Similarly, the debts used for financing have a different required rate of return. And the maturity time is also different. So, for example, the Goodway plc invests in long-term projects, then the debt value to finance those projects will also be dissimilar because the long-term projects need major investment and financing, but a company cannot meet all projects with the only cost of capital.

Another side of using WACC for all projects and keeping the point of view of Lord Hariss Tweed, it can be used for projects with the same level of risk as well as the same amount of investment. To support

this argument, Grinblatt and Titman (2002) note that “the WACC of a firm is only relevant to the one of its projects only when these projects has same risk profile as the entire firm”. Similarly, Brealey, Myers, and Allen (2005) particularize that “the weighted average cost of capital formula works only for carbon copies of projects which firm already hold.”

Finally, Shilpa Gohal is right in her opinion that for all projects, the discount rate must be calculated separately. Single WACC is purely unable to describe the cost of capital for all other projects.

3. Task 3:

3.1. (a)

3.1.1. Capital Asset Pricing Model:

CAPM is used for the risk-adjusted required rate of return or the cost of capital. It is calculated on the basis of β, which is the relative measure of risk. β shows how much riskier the investment is for a particular firm. The firms paying more than the average required rate of return are considered to have more risk than the market.

Required rate = risk-free rate + β(average return on market – risk-free rate)

3.1.2. Risk:

The risk is a most probable loss of Investment. There are two types of risk: systematic or symmetric risk and other is unsystematic or asymmetric risk.

1. Symmetric Risk: this risk is known as a market risk, which is almost the same for all. This risk is a non-diversifiable risk for investors.
2. Asymmetric risk, the risk is known as a firm risk, which varies for firms. This is the diversifiable risk of creating a portfolio.

Mostly, the Investors demand asymmetric risk from the firm, so on average, the required rate of return meets their demands.

3.1.3. Beta understanding:

Beta is known as the relative measure of risk, which determines the actual risk associated with the firms. It is calculated statistically by using the variance and covariance. Once β is calculated, it shows the riskiness of firms as follows.

If the value of β >1, it shows that Investment is more risky than average.

If the value of β<1, it shows that investment is less risky than average.

If β =0, it shows investment is risk-free.

3.1.4 Beta for project appraisal:

For a firm, it is difficult to make decisions while investing in another company. Because which β should be used for calculating the cost of capital. So, the β for a geared company is calculated by this formula.

β a= {Ve/(Ve+Vd(1-t))* βe} + {Vd(1-t)/(Ve+Vd(1-t))* βd}

βa = assets beta

Ve = market value of equity

Vd = market value of debt

βe= equity beta

βd = debt beta

t = corporate tax

This beta is used for calculating the cost of equity by CAPM and is also useful for the calculation of the weighted average cost of capital.

CAPM is useful for both Investors and equity issuers. Firstly, according to the Investor's point of view, it provides the accuracy in the required rate of return. Return calculation is accurate because it provides the extra return for taking the asymmetric risk. Secondly, it is important for equity issuers because the cost of equity is calculated by adjusting the riskiness of the firms.

3.2. (b):

3.2.1. Cost of Equity by CAPM:

Firstly, the asset beta of the company is calculated by de-gearing where good way plc wants to invest.

The formula is

β a = {Ve/(Ve+Vd(1-t))* βe} + {Vd(1-t)/(Ve+Vd(1-t))* βd}

In this company, β is assumed equal to zero, so the formula is

βa = Ve/(Ve+Vd(1-t))* βe

The market value of Noggin plc is,

Equity beta	1.51
Vd long-term debt value	2600000
Ve equity value	2106000
T	35%

βa = 0.837

Now by using this assets beta, goodway plc's beta would be found by re-gearing.

debt beta	0.2
MV of Equity	2200000
MV of irredeemable debt	442400
MV of redeemable debt	1548900
MV unsecured Loan	1500000
Bank loan	1540000
V (equity+debts)	7231300

β a= {Ve/(Ve+Vd(1-t))* βe} + {Vd(1-t)/(Ve+Vd(1-t))* βd}

Where βa = 0.837

0.837= {2200000/2200000+5031300(1-0.35)}* βe + {5031300(1-0.35)/ 2200000+5031300(1-0.35)* 0.2}

βe = 1.784

This is beta for Goodway plc, and this will also be used for calculating the cost of equity by using the standard CAPM formula.

Ke = Rf+ β(Rm- Rf)

Ke is the cost of equity

Rf is risk free rate

Rm is market risk-return

Ke = 0.05+ 1.784(0.14-0.05)

Ke= 0.2105 = 21.05%

3.2.2. Risk-adjusted WACC:

Now, the risk-adjusted cost of capital is.

Types Of Capital	Amount £	% of the total cost	Cost pre-tax	Cost After-tax	Weighted cost
MV of Equity	2200000	30%	21%	21%	6%
MV of irredeemable debt	442400	6%	9%	6%	0%
MV of redeemable debt	1548900	21%	8%	5%	1%
MV unsecured Loan	1500000	21%	12%	8%	2%
Bank loan	1540000	21%	13%	8%	2%
Weighted Average Cost of Capital			11%		

The risk-adjusted cost of capital is 11%, while the weighted average cost of capital for Goodway is 8.11%. Goodway plc will face a 2.89% extra cost of capital if they invest in Noggin plc because the beta for Noggin plc is higher than 1, so the investors will demand a higher rate of return. Finally, the higher demand will result in an increase of Ke, so the Risk-adjusted cost of capital would be higher.

4. Task 4:

4.1. Critical Analysis:

According to Mark Darcy's comment, if Goodway plc issues more debt rather than equity, it will lower the weighted average cost of capital. To some extent, issuing more debt will result in a decrease in the weighted average cost of capital because it will provide tax relief to the company. Similarly, the values of cash flows and discount rates are opposite for the company. The cash flows can be maximized when the WACC is minimized. So, the problem is how to minimize the weighted average cost of capital.

In support of Mark Darcy's comment, when a company uses more debts than equity, this terminology is known as financial leverage. If it is assumed that the corporate tax is zero then the levered company will increase the shareholder's wealth. Issuing more debt will increase the earnings per share and the return on equity, which will describe the better performance of the company. If Goodway plc's operating activities are good enough to generate higher earnings before interest and taxes, then issuing more debt than equity will be beneficial for the company. Moreover, it depends upon the other factors faced by the company. It should select the optimal point of equity and debts to maintain or minimize the weighted average cost of capital.

For optimal debt-to-equity ratio, two noble Laureates, Modigliani and Miller, gave their point of view, which is known as the "Modigliani and Miller proposition." They noted that corporate borrowings are less significant when it comes to corporate structure because investors can borrow or lend on their own. So, the value of stock remains the same whatever the cost structure is chosen. According to their first proposition, it is totally irrelevant how a firm chooses to arrange its finances, but when the firm issues more debts than equity, it takes to the firm's credibility to pay its debts. On another hand, if it issues more equity than its debts, the cost of capital increases because the investors demand more for the compensation of risk. In their second proposition, they explained that if firms issue more debts than equity, the financial risk increases and shareholders demand more return for financial risk. The business risk which is associated with operational activities is already compensated in their return Modigliani and Miller (1958). Finally, Modigliani and Miller suggested that firms should select the optimal point where the tax benefits from debts are equal to the direct bankruptcy and indirect bankruptcy costs resulting from the increased probability of financial distress.

Finally, keeping in mind the existing literature, Mark Darcy's comment should not be considered in the case of Goodway investment. The contradiction to Mark Darcy's comment is due to the current

financial situation of the company. In the current scenario, the Goodway capital structure is already divided into 30% equity and 70% debt, so increasing debts will result in an increase in the cost of equity. If a company increases its debts, the shareholders and bondholders will demand more returns to compensate for their financial risk, as well as the weighted cost of capital will increase. So the company should issue some equity to finance the upcoming projects to lower the weighted average cost of capital.

5. Task 5:

5.1. Critical Analysis:

Organic growth is the growth rate that a company can achieve by enhancing its output and sales rather than merging or acquiring subsidiary companies. To some extent, organic growth is better for the companies because when the company sets a goal and does its best to achieve that goal without involving and dividing its efforts into other tasks. Companies following organic growth can easily meet their liabilities and increase the wealth of shareholders.

For more understanding, if there are two companies, A and B. Company A is growing at a constant rate of 8%, but company B's growth rate after a decision is 20%. The investors would probably want to invest in company B because of its growth rate. But actually, Company B purchased its competitors due to the decrease in their sales of 5%. By acquiring its competitors, the risk of Company B increases as well, but Company A's risk is the same. So, the better option for investment is A.

The acquisition is basically the inorganic growth of a company. It is done when a company wants to minimize the threats of competitors. In acquisition, a company buys not all but 50% of the stake to control it. The acquiring company takes all the decisions related to production, financing, and operation.

In the case of Goodway plc, if the company focuses on the organic growth rate, it is beneficial for the company because the current financial position is in favor of organic growth. If the company invests in other projects related to their production their risk will remain constant. The bondholders and shareholders will not put extra pressure on the financial disasters. With constant growth, goodway plc will be able to meet all its liabilities.

If the company invests in the Noggins plc, this would be a riskier investment. The target company has a beta of more than 1, which is very risky. By acquiring Noggins plc, the weighted average cost of capital will increase because equity holders and bondholders will ask for more return. The overall liabilities will also increase, which is a negative sign for Goodway because it already has a high debt-to-equity ratio. So, good way should focus on organic growth.

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