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Intricacies Involved In Calculating Cost Of Capital- Case Study Of Dish Tv

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Abstract: *Cost of capital is a very fragile concept which need to be applied by the companies with due care after understanding its assumptions and limitations. The WACC is the usual method for measuring cost of capital. One has to ask a fundamental question as to whether, at all, a model is required to estimate cost of capital. In order to evaluate a project, discounted cash flow method is applied. There are no models to estimate future cash flows, and managers have to depend on their experience and expert advice. Why can't the same approach be applied to estimate cost of capital.It is irrational to have a model for developing cost of capital while estimating of fund flow is left to heuristics based on past data. Even in case of cost of capital, modeling started in 1960's only. The present case study tries to highlight the intricacies involved in calculating cost of capital. At the end , one should realize that estimating cost of capital is as much an art as it is science. Applying rational models like CAPM without also resorting to business wisdom may lead to bizarre consequences. After all, if things go wrong, one can't blame the model. The onus is on the manager who applied those models to arrive at an objective figure to arrive at the cost of capital. Keywords : WACC, CAPM, Cost of Capital, Risk Premium, Cost of Equity*

INTRODUCTION

Dish TV is one of the biggest Direct to House (DTH) player of the country. It was subsidiary of ZEE TV, which was a big media conglomerate. The first DTH service was launched in India on 2 October 2003 by Dish TV . The company decided not to compete against entrenched cable operators in metros and urban areas, and instead focused on providing services to rural areas and regions not serviced by cable television. It was the first entrant in the DTH category in India. Dish TV bring to their subscribers, digital quality television viewing and carry over 250 National and International channels for their viewers including 20 voice channels. It also provide various Value added services like Electronic Program Guide(EPG), parental lock, Sports Active, News Active, Games, Near Video on Demand(NVOD). In 2016, Dish TV merged with another entertainment giant, viz. Videocon d2h. The registered subscriber base in Financial Year 2018 was 5 million, which reached 6.9 million in Financial Year 2020. In 2021, promoters' shareholding declined below five percent and institutional investors became major shareholders with Yes Bank taking the lead. The new professional management decided to infuse professionalism in the working of the company to improve its valuation. In that process, they decided to appoint a renowned academician as consultant to calculate cost of capital so that new projects could be evaluated in a more professional manner. Prof Ramesh Sharma started analyzing the company's financials closely. He found that Dish TV was having negative cash flows and have not paid dividends to their shareholders since its inception. Managers at Dish TV were reluctant to use CAPM due to errors in beta in arriving at cost of equity while selecting a project. Next best thing was to calculate through dividend discount model. Since they had no histroy of dividend payments and no clue of future trend , they were not sure about using dividend discount model. To add to their problem, many equity analyst firms arrived at different estimation of beta which were wide apart from each other. As a result , company managers were using adhoc method of measuring cost of capital. Most of the managers in the company were not aware about the exact method of calculating cost of capital or even their values.

Methodology of Calculating Cost of Capital

The WACC equation is the cost of each capital component multiplied by its proportional weight and then summing:

$$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - Tc)$$

Where:
Re = cost of equity
Rd = cost of debt
E = market value of the firm's equity
D = market value of the firm's debt
V = E + D
E/V = percentage of financing that is equity
D/V = percentage of financing that is debt
Tc = Corporate tax rate

Businesses often discount cash flows at WACC to determine the Net Present Value (NPV) of a project, using the formula:
NPV = Present Value (PV) of the Cash Flows discounted at WACC.

Calculating Cost of Equity (Ke)

A majority of companies calculate cost of equity based on Capital Asset Pricing Model (CAPM). Even though empirical evidence in favor of CAPM may not be very favorable, still it is widely applied in companies to calculate cost of equity due to its simplicity. It is believed that CAPM calculates pricing of risk while valuing assets. In our frame of things, CAPM calculates the return, which equity holders expect, which if satisfied, market value of the project will not fall. Hence if risk free rate of interest is 5 percent, risk premium is 10 percent and beta of 1.2, and if the company achieves return of 17 percent, then equity holders will not sell their shares and company could retain their values. In the long run, Beta merely calculates , as to how much the company is expected to perform better compared to index. Beta of 1.2 means that in the long run, shareholders expect company to perform 20 percent better than index, taking risk into account. If the company is not able to meet this expectation, valuation of the company will fall. Therefore, discount rate for equity with Beta of 1.2 will be higher in order to protect company value.The models that was used to estimate Cost of Equity (Re) is a single factor model called the "Capital Asset Pricing Model" (CAPM) based on Fama Macbeth regression methodology (Fama E & MacBeth,1973). One of the reasons this model is most popular is because it involves only one factor and is a very simple model. The question is whether it is an accurate model. As lots of critical decisions need to be taken based on this model for project finance and corporate finance area, hence it is important to take a critical view of this model.In order to calculate cost of equity from CAPM, one requires value of beta and risk premium. Value of beta is arrived through first stage of Fama –Macbeth model; risk premium is arrived through second stage. In the first stage, monthly returns of Sensex was regressed with return of Dish TV for one year i.e., from March 31, 2019 to April 1, 2020 in order to calculate beta. First stage is time series analysis. In the second stage, Nifty companies' beta (available with Capital line database) was regressed with their annual return to arrive at risk premium. Second stage is cross section analysis.Prof Ramesh Sharma set out to calculate cost of capital with Fama MacBeth Model after due deliberation with the company CFO.

Stage -1: Calculating Beta

Table -1

Data for Returns of DISH TV Vs Market Returns (SENSEX)

DATE	Index Return
4/1/2020	0.008

DATE	Dish TV Return
4/1/2020	0.5

3/2/2020	6.6
2/1/2020	0.6
1/4/2020	-6.4
12/1/2019	3,1
11/3/2019	6.9
10/1/2019	-7.5
9/1/2019	9.1
8/3/2019	-0.2
7/1/2019	8.1
6/1/2019	-2
5/4/2019	25.7
4/1/2019	17
3/31/2019	0.8

3/2/2020	-2.4
2/1/2020	-11.5
1/4/2020	-0.9
12/1/2019	7.9
11/3/2019	18.2
10/1/2019	-22.3
9/1/2019	-12.1
8/3/2019	9.9
7/1/2019	13.6
6/1/2019	-23.1
5/4/2019	38.9
4/1/2019	32.2
3/31/2019	4.1

Table-2
Result of First Stage of Regression

Parameters	Value
R	0.785807819
R^2	0.61749329
Adjusted R^2	0.58618423
Value of F Significance of F	19.377 0.001
Constant	0.035 0.977 (t value) 0.348 (Significance level)
Sensex	0.786 4.402 (t - value) 0.001 (Significance level)

Based on inputs in table -1, results were mentioned in table -2. DISH TV has a beta of 0.78 based on the monthly returns during March 31, 2019 to April 1, 2020.The t – statistic indicates that the coefficient of intercept (alpha) is not statistically significant. The beta coefficient is significant at 1 per cent level of significance. Capital line data base estimated the beta to be 0.93 using weekly values. Management of the company and the report of brokerage house found that this value of beta is too low for the calculation of cost of capital. Hence the estimate of beta was revised. Report by JM Financial, as on Feb 2020, estimated beta to be 1.2. Report of Morgan Stanley estimated it to be 1.3 as on October 2019. The reason for the revision was because of the threat of increase in competition as more players were likely to enter the market and as a result, the price of share of DISH TV may decrease which may result in increase in beta. That was the reason why experts upward revised Beta as compared to CAPM estimates. The future threat of increased competition due to imitation of good idea could not be accommodated in CAPM which was based on past data. Hence, usually, equity analyst does make adjustments in beta in the light of new information.

Risk Free Rate of Return (Rf)
The yields on the government Treasury securities are used as the risk-free rate of return.
One can use returns either on the short-term or the long-term Treasury securities. It is a common practice to use the return on the short-term Treasury bills as the risk-free rate. Since investments are long-term decisions, most of the researchers prefer to use long-term government bonds as the risk-free rate. Therefore , Prof Ramesh opted for long term government bonds as the risk free rate.
Stage -2 : Ex-ante method of calculating Risk Premium

Market risk premium could be interpreted in many ways and hence, its methodology of estimation may vary (Rajesh M & Edward P,1985). For example, market risk premium of 12 percent means that investor is willing to take risk of one beta if company can earn him 12 percent. Below this return per beta, investors may opt to stay away from capital market. Only when investors decide to enter capital market does the question arise as to which company to invest. Another interpretation is that investor tries to know how much extra return he can earn through equity over and above risk free debt so that he opt for equity and not debt.In the second stage of Fama Macbeth model, beta of each nifty company is regressed with return of respective companies. Market risk premium is the slope in this equation with beta as independent variable and return as dependent variable.

Table- 3
Result of Second Stage of Regression

Parameters	Value
R	0.2
R^2	0.04
Adjusted R^2	0.02
Value of F Significance of F	2.037 0.160
Risk premium coefficient	0.256 0.160 (t - value) 0.024 (Significance level)

Problem with this method, which one can call as ex-ante risk premium method is that more the nifty increases in the period under study, more will be the return per unit of beta and hence higher will be the risk premium. Since Prof Ramesh calculated annual return from 2019 to 2020 and took beta of 2020, risk premium of 25.6 came out to be very high. In addition, Value of F as per table -3 has low significance level even though risk premium coefficient has significantly high confidence level. R was also very low of 0.2. This meant that there may be other variables other that beta which are influencing returns of Dish TV. Hence Prof Ramesh tried an alternate method, which he described as ex-post method of calculating risk premium.

Ex-Post method of calculating Risk Premium

Thus Prof Ramesh followed the approach of calculating the market risk premium by considering long-term, historical arithmetic averages of market return and current risk free rate. In this method, for proper analysis, it is always preferable that one should use a long series of market returns i.e. preferably for the data of more than 5 years. Thus, in this, Prof Ramesh took market return data from the year 2000-01 to 2019-10 on a monthly basis.

Here the calculated Market Risk Premium with the following input as specified in table -4: Table-4

Nifty Index

From 2000-01			From 2019-10	
Date	Close		Date	Close
3/1/2001	3604.38		4/1/2020	17692.62
2/1/2001	4247.04		3/2/2020	17527.77
1/2/2001	4326.72		2/1/2020	16429.55
12/1/2000	3972.12		1/4/2020	16357.96
11/1/2000	3997.99		12/1/2019	17464.81
10/3/2000	3711.02		11/3/2019	16926.22
9/4/2000	4090.38		10/1/2019	15896.28

8/1/2000	4477.31		9/1/2019	17126.84
7/3/2000	4279.86		8/3/2019	15666.64
6/1/2000	4748.77		7/1/2019	15670.31
5/2/2000	4433.61		6/1/2019	14493.84
4/3/2000	4657.55		5/4/2019	14625.25
3/31/2000	5001.28		4/1/2019	11403.25
			3/31/2019	9708.5
Average	4272.925			15499.27

Risk Premium Equation (Rm):
Average market return during 2000-01 * $(1 + Rm)^{19}$ = Average market return during 2019-10.
Thus, putting value in the equation
4272.925 * $(1 + Rm)^{9}$ = 15499.27
= $(1 + Rm)^{9}$ = 15499.27 / 4272.925 = 3.627
After calculation:
Rm = 15.39%
Thus, Market risk premium (Rm – Rf):
Rm = 15.39 %
Rf = 7.58 %
(Rm – Rf) = (15.39 % - 7.58 %)
= 7.81 %
Thus, the value of ex-post market risk premium is equal to 7.81 %.
Summarize the values under CAPM for calculating Return on Equity:
Basically, econometric methods are based on parsimony principles as a result of which taking additional variables are highly penalized while evaluating F test for validating the models. That is why, one factor CAPM is successful and popular in the corporate sector amongst corporate finance managers. Normally, accuracy is not that much a matter of concern in econometric methods as more importance is given to significance and confidence level of the models (through 'F' test) and variables (through 't' test). Hence accuracy takes a back seat and the consultants have to depend on their wisdom and experience to arrive at appropriate figures. Another problem of increasing accuracy by increasing independent variable is to create problems like multicollinearity and decreasing degree of freedom, which may make the model insignificant.

Table -5
Calculated Values for Measuring Cost of Equity:

BETA	Beta as per Capital line	Risk – free rate as per Govt long term Bonds	Calculated Market Risk Premium
0.786	0.974	7.58 %	7.81 %
Return On Equity : 15.19 %			

Prof Ramesh found that his calculation of beta is little bit on a lower side and those calculated by JM Financial Report and Morgan Stanley Report was on a higher side. To be on a safer side, he took the beta calculated by capita line and arrived at the expected return on equity of 15.19 percent as per table-5.

Cost of Debt (Rd):
Cost of debt is the effective rate that a company pays on its current debt. This can be measured in either before- or after-tax returns; however, because interest expense is deductible, the after-tax cost is most often used. This is one part of the company's capital structure, which also includes the cost of equity.After

estimating the cost of equity capital, Re which came to 15.91%, Prof Ramesh proceeded to estimating the other component of DISH TV for calculating WACC. This entails estimating the after – tax cost of (interest – bearing) debt and debt's relative weight within capital structure. A company has lots of options to raise debt. It may borrow funds from intermediary like banks or go for disintermediation in the form of public deposits or debentures (bonds) for a specified period of time at a certain rate of interest. Dish T V went for long – term secured and unsecured loans, and other types of short – term loans, bridge loans, but in his analysis for calculating the Cost of Debt and as per project requirement , he considered only long-term secured loans. Cost of long term secured debt varied between 11 to 13 percent for Dish TV. Therefore, Prof Ramesh considered the Cost of Debt as 12%.

Cost of Capital of DISH TV:

Formulae Applied:

$$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - Tc)$$

Where:

Re = cost of equity
Rd = cost of debt
E = market value of the firm's equity
D = market value of the firm's debt
V = E + D
E/V = percentage of financing that is equity
D/V = percentage of financing that is debt
Tc = corporate tax rate assumed 32 %

E	16,344.41	(MV of equity)
D	9,177.98	(BV of debt)
V	25522.391	(E+D)
Re	15.91%	(Cost of equity)
Rd	12.00%	(cost of debt)
Tc	32.00%	(Corp Tax rate)
WACC	E/V*Re+D/V*Rd*(1-Tc)	
	13.12%	

Table -6

Calculated Values:

BETA	BETA as per Capital line	Risk – free rate as per Govt long term Bonds	Calculated Market Risk Premium
0.786	0.974	7.58 %	7.81 %
Return On Equity : 15.19 %			
Cost of Debt : 12 %			
WACC : 13.12 %, 36 percent D/V ratio.			

Table -7

Values as per Research Report by JM Financial Report (Feb 2020)

BETA	RISK – FREE RATE	RISK PREMIUM
1.3	7.5 %	6.0 %
Cost of equity = 14.7 %		
Cost of Debt = 9.6 %		
WACC = 14.0 %		

Table -8

Values as per Research Report by Morgan Stanley Report (Oct 2019)

Assumed BETA	RISK – FREE RATE	RISK PREMIUM

1.2	**6.4 %**	**7.0 %**
Cost of equity / WACC = 14.8 % **Because the Cost of Debt is not specified in the report.**		

Finally, as per calculation by Prof Ramesh shown in table-6, WACC was estimated 13.22. J M Financial report arrived at figure of 14 percent as per table -7. Morgan Stanley report arrived at figure of 14.8 as per table-8. One can see the wide divergence in the calculation of cost of capital. Certainly , this will affect the total valuation of the company and intrinsic value of share price. CAPM usually tends to overestimate cost of equity. Over and above that, company tends to add error margin to arrive at hurdle rate . This is done by the managers to be on a safer side. Usually, managers in charge of project, which he is recommending (because his career depends on it) tends to overestimate cash flows. Even after such overestimation of cost of capital, if a project could be selected , then managers think that errors of overestimation of cash flows could be taken care. Cash flows are estimated by managers while cost of capital for discounting purpose is decided by the top management. Top management knows that managers tend to overestimate cash flows and hence they overestimate cost of capital.

CONCLUSION

It is well known that the model based method of calculating cost of capital tends to overestimate as compared to historical average method. Due to slight change in the parameters used to compute cost of capital, final value may diverge by large range. Managers calculate cost of capital for two basic purpose. One is to value the company. Another is to select the best project amongst various alternatives in a scenario of capital rationing. While for selecting the best project, provided all have positive NPVs, one need not calculate cost of capital through rigorous modeling. Negative NPV projects may be ignored in the initial stages of appraisal of projects. One may use heuristics to arrive at approximate figure through managerial consensus. A wrong cost of capital figure may still lead to correct project decision provided all the projects have positive NPVs. Still the project with highest NPV will be selected as ranking amongst projects may not vary considerably. It is only for valuation that modeling is required , especially in cases like ' Merger & Acquisitions or going for long term debt. In such cases, modeling may be used after adjusting for the possibility for overestimation of cost of capital.There is no harm in using rational models of cost of capital for applying for financial decision making but it should be supplemented by business wisdom and managerial experience.

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