# **MGT 8803 FINANCE MODULE**

# **WEEK 6 TRANSCRIPTS**

## Cost of Capital- Part 1: Introduction and Cost of Debt

>> Hi, welcome back to the finance modules. Now, I'm going to be starting to talk about the cost of capital and the learning objectives. What I want to communicate in this module is how to understand risk, how it is measured for financial instruments. Then, I'll start talking about the relationship between risk and expected return using capital asset pricing model.

And finally, ultimately the goal of this module is to help you understand how the weighted average cost of capital is estimated. And also to learn the fact that that's a minimum rate of return the cooperation must earn on its invested capital to break even in economic terms. So let's get started.

So as you can see, the cost of capital is the rate of return the corporation must earn on its invested capital in order to compensate for time value of money and risk. Most American corporations have two sources of financing, namely, debt financing and equity financing. So what you're going to learn is how to estimate a company's cost of debt capital.

And then, also learn how to estimate the cost of equity capital, and multiply by the appropriate proportion of debt used in the company and proportion of equity used in the company. And put it all together and estimate the weighted average cost of capital. One of the important distinction between cost of debt and cost of equity is we know that the interest paid on debt is tax deductible.

So that's why we multiply the cost of debt by 1 minus the tax rate. So in some sense, the tax code encourages the use of debt by the company, okay? So this is all computation. But let me make this concept more clear. I've been using the Home Depot as a good example throughout these modules.

So let's assume that Home Depot trades for around $190 per share. Okay, and we are going to learn how to estimate Home depot's cost of capital. Let's say we come up with 10% as an estimate. And suppose Home Depot announces an acquisition of a company called Bed, Bath and Beyond.

This is a pure speculation on my part. I have no inside knowledge that Home Depot is planning to acquire Bed, Bath and Beyond. If they do so, and the market response to the announcement, and say the Home Depot stock price jumps to $200. That is $10 more than what it was prior to the announcement.

Then, we are going to infer from the announcement that Home Depot's return on the acquisition of Bed, Bath, and Beyond is much greater than 10% cost of capital. So 10% is a minimum rate of return the Home Depot has to earn for its shareholders to break even on the stock price.

If they make a good investment, such as acquisition of Bed, Bath, and Beyond, they're going to earn a rate of return greater than 10%. So that's the notion of weighted average cost of capital, okay? So this is in a pictorial form, how the two costs, the return to the bondholders, times 1 minus the tax rate times the percentage of total capital used as debt.

Similarly, for equity holders times the percentage of capital used as equity provides us with the weighted average cost of capital. So before I explain to you how to compute the cost of debt and cost of equity, I just want to take a few minutes to explain to you how a typical company goes about making a decision on how much debt to take on.

It's dependent upon several factors. I'm here highlighting four important factors. The first one I want to point out is taxes. Because we know that debt financing gives tax advantages. So in case a company does not have a whole lot of taxes to pay, they may not rely so much on debt financing.

The second one is the stability of cash flows and earnings. The idea here is the people are the investors who provide you the debt capital, like a bank or investors at large, they're going to get capital to those companies which have stable cash flows so that they can get back their interest payment and the principal repayment.

The third aspect that gets into the decision making of how much debt to use depends upon the company wanting to maintain a lot of flexibility in financial and operations. So they don't want to be constrained by too much debt in the company. And lastly, as you can imagine, if a company has lot of fixed assets, i.e., building, equipment, etc., more likely it can convince the lenders that they can repay the debt.

So the way to think about debt financing is if companies in mature industries with fairly stable cash flows, tangible assets, can support higher debt levels. On the other hand, companies in growth industries with significant investment opportunities would be reluctant to take on too much debt capital. And I must also point out here that one of the things chief financial officers of corporations are nervous about, taking on too much debt is they do not want the company's bonds to be downgraded.

What do I mean by downgrade? I'll talk about it in a few minutes. So how do you compute a company's cost of debt? It's simply dependent upon how much interest rate the firm would pay on any new bank borrowing or bond issue. So the way to think about it is US government issues lot of debt, right?

Currently, they have close to $20 trillion of debt. Trillion with a T. So these are the bonds issued by the US government to finance our deficit and debt. And almost all of the investors in the world feels fairly confident that the US government will return their money back with the interest.

So people treat the Treasury bond rate as pretty much risk free. Now, if you have got a company like Home Depot, there is a small probability that they may not do well in the coming year and may be unable to make the interest payment. So the investors are going to demand a little bit more than the US Treasury rate.

How much more is going to depend upon the risk of the company, the default risk of the company. So the way we are gonna estimate the cost of debt for any firm is to tag on a default risk premium to the current Treasury bond rate. One of the important points I wanna emphasize here is this is a dynamic cost.

Because every instant in time when the markets are open, the Treasury bond rates are changing. So if the government borrows more, the Treasury bond rate would go up. Accordingly, the cost of debt for a company will also go up. So how do we measure the default risk? Here is where two well-known companies called Moody's and Standard and Poors help us with their bond ratings.

If you want to get the highest bond rating, that's going to be triple A. As you go down the list, you're going to notice that the quality of the bond declines. So anything below triple B is called junk bonds or speculative bonds, etc. So lower the quality of the rating, higher is their default risk.

And most of the time, both the agencies agree on their evaluation of the bonds. Software company. There are only three, four companies in the United States that have the highest triple A ratings. Couple of them that come to my mind are Exxon corporations, and ADP, okay? So you can see the bond ratings, what it means, and I'll let you read the bond ratings.

So the question is where do I go to collect the default spread for industrials? It's pretty hard to get this data, but most recent data available shows that you have to tag on this default risk called basis points. 100 basis points is 1%. So depending on the company who's got debt we want to estimate the cost of debt, we have to know the bond ratings.

And one of the very good sources for bond ratings is the finra website. For Home Depot, I went and checked, and they are rated as A2 by the Moody's. So what I'm going to do is from the previous slide, tag on 1.11% to estimate Home Depot's cost of debt as 3.81%.

2.7 is the current 10-year Treasury bond yield for. So for Home Depot, it would be 3.81%. So what I'm going to do as I'm wrapping up this video, is in the next video I will start talking about cost of equity. And then, we'll put them all together to estimate the weighted average cost of capital.

Thank you.

## Cost of Capital- Part 2: Cost of Equity and Beta

>> Welcome back. In the previous video we learned the cost of debt. If you remember, cost of debt is going to be the US Treasury bond rate plus default risk premium, and the default risk depends upon the bond rating. Similarly, let's get started on cost of equity capital.

The cost of equity capital is the rate of return the shareholders are expecting the firm to earn on its equity capital. So just like cost of debt, cost of equity depends upon a number of factors, but the two most important factors are the current Treasury rate and the risk of equity.

So just like we did for cost of debt, cost of equity is Treasury Bond Rate plus Risk Premium. So I want to emphasize again how important the government borrowing is because that affects not only cost of debt capital but also the cost of equity capital. Now to explain to you the risk of a firm, unfortunately, unlike bonds, there are no rating agencies that give us the measure of risk for companies.

So I want to walk you through a very simple example of understanding the risk of corporations. In this very simple example, you want to invest $1,000 on a development of an oil field. And if you invest the $1,000, there is a 50% chance that you can strike oil, or 50% chance that you'll come up with a dry field.

And if you strike oil, you're going to get 40 barrels of oil. One other factor, which is beyond your control, is the price you can command for a barrel of oil. It's going to depend upon whether the economy's in recession or expansion, right? So to make life simple, I'm going to assume that probability of recession and expansion are equally likely.

So if you are in best of both worlds, i.e, you are in expansion mode and you hit oil, you're going to make $4,000. $100 times 40 is $4,000. If the economy's in recession, you're going to only make $4,000. And it doesn't matter what the economy's doing. If you miss oil, you make nothing, right?

So there are four scenarios, equally likely 25% probability. And from basic statistics, we can compute the expected cash flows as 25% chance that it is 2,025% chance, that it's 4,000 and remaining 50% chance that it is 0. You get 1,500 on an expected basis. So since you're putting in $1,000 investment, your return is going to be 50%.

Without going into the computation, you can also do the calculation of standard deviation. It comes to 165.8%. So where I want to take this example is, suppose there are a 1,000 oil companies, okay, with all same opportunity of investment of $1,000, so let's also assume that the success or failure of the oil fields are independent of one another.

How would this expected return and standard deviation number change? Let's try to work through that. So suppose you go from 1 to 10 oil wells, your expected return is going to remain the same, because it's like tossing the coin. Maybe five wells you would strike oil, five you would come up dry.

But your risk is going to dramatically reduce, right, from 165 to 70% because of diversification effort. So if you continue the example to 10 to 25 to 50 to 100 to 1,000, you're going to see that expected return is going to be 50%, but your standard deviation is going to reduce, but reduce at less rapid rate.

So when we jumped from 1 to 10, it went down from 165 to 70.7, but when you go from 50 to 100, there is only about 2% reduction. Similarly 100 to 1,000, there is only 2% reduction. So these numbers I'm going to capture in a picture in the next slide, and this is a very famous picture in finance, you will find it in almost all the textbooks.

The horizontal axis is the number of stocks in your portfolio. The vertical axis is the risk. What this picture is telling us if you put all your money in one stock, let's say Amazon is your favorite company. If you put all of your money in one company, you are going to carry the entire Amazon stocks risks, right?

Whereas if you put Amazon in a portfolio of say 500 companies. So Amazon is one of the one of the 500. I'm using 500 because people always talk about S&P 500 index. Amazon is one of those 500. So what you're going to find is because you put Amazon in a portfolio of 500 companies, you'll diversify the risk from putting all eggs in one basket, i.e., the Amazon stock.

But what you're not able to do is make the risk go away. Why are you not able to make the risk go away? Because remember, you have no control over the macroeconomic factors such as expansion or recession. What you have done by putting Amazon in a portfolio of 500 stocks is reduce or almost eliminated all the firm's specific risk.

In the next few slides, I'll talk through some of the important macro economic risk factors and firm specific risk factors. This is a very, very important concept to understand, that is very seldom the investors own a single stock. They own portfolio of stocks. So what matters for us is risk, how much risk that stock has in terms of macroeconomic factors, okay?

So here are some good examples of firm-specific risks. For example, a firm's CEO suddenly gets killed. So if your portfolio's all one firm, and that firm's CEO gets killed, your portfolio is going to lose a lot of value. In my Amazon example, you can think of the risk of Mr. Jeff Bezos stepping down from the company.

Quite likely the stock would lose good bit of value because the investors would not be confident of how the future leadership is going to look. So by putting stocks in portfolio, you are eliminating firm specific risk factors, but what you are not able to eliminate easily is the market risk factors.

As I mentioned, the macroeconomic events that can drive an expansion or recession. For example, any change in the long term interest rates. That is of course going to be dependent upon the Federal Reserve Bank monetary policy. Or the government policy whether to run deficit budget or balanced budget.

A few years back, the US Congress wanted to give massive tax cuts to corporations, so we all know that the corporate tax rates came down from almost 35% to 20%. That's a good news for corporations. And the expectation is that today encourage companies to invest more and capital investment or unexpected trade tensions driving the value of the dollar down.

So how does one measure market risk? This is where the important concept of beta comes in. So beta is a measure of market risk. And by definition, the S&P 500 index has a beta 1.0, by definition, the beta of Treasury Bonds is 0. So as more a stock is sensitive to macro economic risk, the beta would be greater than 1.0.

If the stock is less sensitive to macro-economic risk, the beta would be less than 1.0. So the finance professors have come up with the concept of beta risk. And if a company has a beta of 0.5, if the S&P 500 goes goes up 10% This 0.5 beta would go up 5%.

On the other hand, if it goes down 10% the 0.5 beta would down 5%. You get the idea, if it is beta is 2, it's going to be twice as risky as average market, okay? So in the next video, what I'm going to do is link beta risk to the expected return of equity and walk you through the weighted average cost of capital.

Thank you.

## Cost of Capital- Part 3: Capital Asset Pricing Model and Weighted Average Cost of Capital

>> In the previous video, I had started talking about betas as the macro-economic risk of the stock. So if you go to finance.yahoo.com, you can find out the betas of different companies. For example, Amazon's betas 1.83. Wal-Mart is 0.52. One way to think about why Walmart's beta is less than 1 is Wal-Mart's consumers typically are not that impacted by economic slowdown, right?

More likely there is an economic recession people are going to shop more at Wal-Mart. So the way to think about beta is, if a company's cash flows and profits are not impacted by business cycle ie expansion or recession, those companies are likely to have beta less than 1.

In the company's risk is cash flow sir affected by business cycle those are likely to have beta greater than 1. So not only can you get beta set of individual companies, but you can also get beta sub industries. So if you're working for a company that is not publicly traded, say for example, you're working in a restaurant business, and you don't know what your company's beta is, as first approximation, you can use the industry average of 1 has stated here.

If you work for electric utilities company, and your company's private as a starting point it can use beta of 0.3 as your company's beta. Now we come to the most important relationship. The professor will develop this model called Capital Asset Pricing Model, got the Nobel Prize in Economics.

And basically, what he did was came up with a very simple expression of estimating the cost of equity capital. He said US Treasury Rate + (Market Risk Premium) x Beta. US Treasury Rate we already learned we can look up the current newspaper to find out what the yield is.

Beta, you can go to the finance page and do it. So how do we get an estimate of market risk premium? Before that what is market risk premium? Market risk premium is the average difference between the rate of return of stocks and bonds over a very a long term.

So if they can explain to you how to compute market risk premium, we can put it altogether and estimate the cost of equity capital for a firm. So one of the best sources of financial information is Professor Damodaran's website at NYU Business School. So in this country, US, we have kept data going back to 1928.

So, what I pulled out the information is the average return and standard deviation of three classes of assets. Treasury bills, those are short term bills issued by the government. Long-term 10 year bonds, that is our focus for risk-free assets, has earned 5.15% and with the risk of 7.72.

And if you had put money in the large company stocks, you would have an 11.53%, with a higher risk close to 20%, right? Two key takeaways from this slide is then you look back almost 90 years of information that includes The Great Depression of the 1930s, The World War II, The Oil Price Crisis, The Vietnam War, The Gulf War, The dot-com bubble, Great Recession of 2008, all put together.

Still if you had put money in the market, SNP500 stocks, you would have earned 11.53% compared to 5.515%. So this difference between the bonds and stocks is what I'm going to call market risk premium 6.38%. 6.38 is 11.53 minus 5.15%. This slide does not tell you that every single year between 1928 and 2017 stocks did better than bonds.

There are going to be several years where bonds did better than stocks. But if you're a long run investor, if you put money in equities, ie stocks, you can expect to earn higher rate of return. So if you take one unit of beta risk, you are going to earn 6.38% more return, okay?

So US Treasury rate was about 2.7%. Market risk premium, we are going to use less than 6.38% as I explained in the previous slide. So, once you know the company's beta and market risk premium 6.38%, we can compute any company's cost of equity. For example, Amazon's beta is 1.83.

So what I would do is take 2.7, remember that the treasury rate, 6.38 is constant for all the firms. The only thing that impacts the company's cost of equity capital is the beta risk of the firm 1.83 and say cost of equity capitalists 14.38. Likewise you can do for all this firms.

So now they have done the cost debt capital, we've done the cost of equity capitals. I'm going to put them all together and talk about overall company's weighted average cost of capital, okay? To do that I'm going to use Home Depot as an example. And there are two slides that list of Home Depot page from Yahoo Finance.

I'm just going to pull out what three relevant information for us to compute cost of capital. One thing we want is the market value of equity or market chart. That's going to be 226.79, we need that number, right? Then in the next page, couple of numbers we are going to need are the total amount of debt this company has Home Depot, that is $29.2 billion.

And we need the beta risk of the company. So when this page was printed, the beta risk of Home Depot was 1.22. So we are going to use the beta risk of 1.22. Use the market cap of equity and the debt value to compute the overall cost of capital.

So let's get to do that. So remember cost of equity capital, is going to be 2.76, 6.38 times 1.22 which is 10.55%. We had already computed cost of debt using the bond rating of Home Depot, and we said it was 3.81%. We pulled out the total debt number from the Yahoo Finance page, which is $29.2 billion.

The market value of equity, or market cap, If you remember, I circled it as 226.79 billion. So the total value of the firm is going to be, we take 29.2 + 226.79, and say it is 255.99 billion. The last step is to put them all together. So we'll take 29.2, the amount of debt, as a fraction of 255.99, times 1 minus the tax rate.

Tax rate let's assume is 25%, it will be given to you. Times the cost of debt expressed in decimals .0381. Plus fraction of the equity financing to 26.79 divided by 255.99 times the cost of equity capital which is 0.1055. So it comes to 9.67%. So I'm gonna round it off to 10%.

So what's the meaning of this 10%? That's a minimum rate of return Home Depot has to earn on new investment. Either for expansion of their business or acquisition of Bed Bath and Beyond to create value for the shareholders. So that's a notion of cost of capital, okay? So what we covered in this module called cost of capital is to systematically understand the component cost.

We started with cost of debt being treasury rate plus default rsik premium. Then we computed cost of equity capital as treasury rate plus beta times market risk premium. And then overall weighted cost of capital is the minimum rate of return that has to be earned on new investments to break even on the company’s stock price.

Thank you.

## Firm Valuation- Part 1: Discounted Cash Flow and Comparable Methods

>> Okay, in the previous module, we learned the concept of cost of capital. In this module, I'm going to start talking about how they use the cost of capital concept, and how to estimate free cash flows to understand the firm valuation. So, the learning objectives for this module in trying to understand how to value the firm.

You're seeing the present value of projected free cash flows, discounting at its weighted average cost of capital. This method is called DCF approach, Discounted Cash Flow Approach. The second alternative method is the Compatible Firms Method, that we try to identify similar firms in the same industry and try to value the firm off interest to us.

So let's get started on it. Now, before we get into actual details of computing a firm value, I want you to understand that it's probably one of the most important topics in the entire field of finance. Because a lot of times when the companies want to buy other firms or sell some business units, they use the valuation framework.

And also security analysts spend a lot of time trying to identify undervalued stocks so that they can recommend to their lines to buy them. And if you follow IPO's initial public offerings like Uber, Lyft and Beyond Meat, etc. You would notice that at the end of the day, the investment bankers have to come up with the pricing and they use these techniques.

And corporate strategy where the company like GS multiple business units, they would use this framework to understand how much his business unit is worth. And last but not the least, the venture capitalists when their funding firms, technology firms, they use some of these techniques to decide how much money they are going to give to the entrepreneurs and how to price those securities.

So it's an extremely important concept in finance. So the two techniques I'm gonna focus on as I mentioned earlier are DCF method and the Comparable methods. So one last point is after we do the firm valuation, as the present value of expected future free cash flows, discounted at the weighted average cost of capital.

If you want to find the equity value, we would subtract the value of the debt from the firm value. Always remember that firm value is the value of equity plus value of debt. So far our ultimate goal is to estimate the valuation of equity, we would start with the firm valuation and then subtract the debt value to get the value of equity.

Now, that we are ready to use the concept, already in the earlier modules, I emphasize the importance of weighted average cost of capital. As a minimum return a firm should, earn to maintain its value. So, Even whether it be to the project valuation or firm valuation, the weighted average cost of capital is appropriate discount rate that would help you come up with an estimate of the value of the firm.

So when you see this expression, I want to remind you about the module onnet percent value framework. If you remember, we did three or four examples talking about the free cash flow of the project, and essentially we used a similar framework. We took after tax earnings, added back the depreciation, subtracted the capital expenditure and subtracted the investment in working capital.

So we are going to follow the identical framework what we use for project valuation from the firm valuation. The only big difference between a project valuation and a firm valuation is projects have finite life. So if you are a Home Depot investing in a new location, you project the cash flows for ten years as we saw in that MPB example.

On the other hand, If you're trying to value Home Depot stock, you have to do the free cash flow estimation for Home Depot starting from current point in time until as long as you can estimate it. So in all probability Home Depot is run successfully as it has been in the past 40 years.

It's going to outlive almost all of us, so we want to project the free cash flows of the firm. For in finite period. So the basic free cash flow estimation is not different between the project and the firm. Where the difference comes is, how are we going to estimate beyond certain point in time?

What is evaluation of Home Depot? So I'm going to explain that starting with the next slide, okay? So what we are going to do is at some point in time we are going to cut off the estimation portion. So let's say for argument's sake T is 5, okay?

So what I will do is predict the free cash flows for the first five years, and all cash flows beyond five. I'm going to compute the terminal value or time 5 as cash flow at 6 divided by cost of capital minus the growth rate. If you remember in the dividend discount model with constant growth rate, this is exactly the framework we use.

So what we're going to say is if I want the estimated value of a company at time 5 with free cash flows growing at a constant rate of g. I can get that by estimating cash flow at time 6 and dividing by r minus t. And remember cash flow at 6 is cash flow at 5 times 1 plus the growth rate divided by r minus g, so that's the difference.

So the fun valuation we are going to stop at some finite point and beyond that we are going to make a simplifying assumption that it grows at a constant rat. And then estimated as a terminal value, of course the cost of capital less we learned in the previous module.

It's a weighted average of debt and equity costs, and cost of equity is going to be the risk free rate plus beta times market risk premium, okay? So this is the notion of estimating the value of the firm. So in the next video I'm going to walk you in detail through an example of how to apply this concepts to value of firm.

Thank you, and see you in the next video.

## Firm Valuation- Part 2: Discounted Cash Flow Example

>> Hi, welcome back. In this video I'm going to try and apply the formula we learned for firm valuation to value a company called Good Food Corporation. Okay. This company's headquartered in California And operates 10,000 restaurants in 100 different countries. And currently, the market value of he debt is $4 billion and $2 billion is the market value of equity.

You're gonna see a corporate tax rate of 20% Cost of debt as 5%, and cost of equity as 10%, okay, Then the first order of business when you want to estimate the value of the firm is to estimate it's weighted average cost of capital, so what you see.

Here is a list of the market values of Denton Equity, the rates are 2/3 and 1/3 as a part of total value. Remember all this to multiply cost of debt by one minus a tax rate So you get the average weighted average cost of capital as 6%. So if it can forecast the free cash flow for the firm will discount it at 6% to find the value of this company called Good Food.

Corporation, okay? So, Good Food is trying to grow through acquisition, and their investment bankers have identified a company called Happy Meals. Happy Meals, unfortunately, has no publicly traded common stock but makes the same product mix as Good Food. And its direct competitor to go for many markets. It operates 4,000 restaurants, mostly in North America and Europe.

And Happy Meals has $1,318.8 billion of debt. And the market value of debt we are going to assume as same as the book value of that, okay. Additional pieces of information given to us about this company is it's got 12.5 million shares outstanding. And we expect that EBIT or earnings before interest and taxes to grow at 10% per year.

To compute the free cash flow we are to make some assumptions about working capital and capital spending and we are going to assume that each one of them is 24% of EBIT and depreciation is 8% of EBIT. After five years we are going to assume that it grows at 2%.

So this is a framework and they want to estimate the value of Happe Meals, given EBIT growth rate projection and estimates about working capital and depreciation. So, first important point to note is the 10% growth rate, the EBIT line you get by escalating by 10%. How do you get 165?

150 times 1.1 will give you 165. Similarly, you'll get each one of the numbers. Take out the taxes. You get earnings after taxes Axis for the five years. Depriciation, remeber we were told that depriciation was 8% of EBIT. So, if you take 8% of EBIT, you get And we were told that the capital expenditure and working capital was 24%.

So if we take 24% of 150, you get 36. Similarly, same number. So always remember free cashflow is EBIT times one minus the tax rate, plus depreciation minus cap x, minus changes in working capital. This is such an important Framework and farmland that it's a good idea to remember that.

Let me repeat it one more time, the free cashflow is EBIT times one minus the tax rate plus depreciation minus capital expenditure minus changes in working capital. So the projected five free cashflows Remember, we have to estimate the terminal value our time five, which we are going to do in the next slide.

So how am I going to get the terminal value of time phi? I want three cash flow at time six. How do I get free cash flow or time six 87.8&nbsp;which I estimated in the previous slide I'm going to multiply by 1.02 and divide that by .06 minus 0.

There's a typo here. Please change it to 0. 0.2. And estimate the terminal value as $2.238 billion. So, we want to find the value today. So we have estimated the free cash flow 66 bill discounted for two periods. Why 6% remember that average cost of capital. 72.6, 79.8, 87.8 discounted for 5 You should always remember to discount the terminal value Also, the.

Lot of times, one tends to forget that, just like we did the differential growth model in diffidence, same thing we are doing from evaluation. And estimated at 1978. Okay, now, we were told that the value of the debt The company has is $1.318 billion. Remember that was given to us.

So the value of equity is going to be 659.4. Million dollars. We were also told that the company has 12.5 million shares outstanding that gives off a stock estimated value of $ 52.80. Right. Since this company, Good Food, is wanting to acquire this company, the maximum they would make an offer is $52.80.

Obviously, if they can buy that company for less than $52.80, they're going to create value for the shareholders. Okay? Also, a couple of important points I want to make Since we made an assumption of terminal growth rate of 2%, it's important to do some kind of a sensitivity analysis what you might consider doing is base case of 2%.

What would happen to the stock price estimation if it is one of 3% VRCM cost of capital to be six We can do what would happen if it is 5, 6 or 7, right? We computed the middle case, 52.80$. So, the point I want to emphasize is not tying in one set of projection, but to Take what if questions at the minimum focus on changing the assumption about cost of capital and the growth rate and come up with an estimation of stock price of $52.80 cents.

Okay? It's a. Simple way to do it later in the next video I'll work through one more problem to help you understand how to do the firm valuation. So to wrap up the discounted cash flow method, the first method to value company, there are some weaknesses with this method one is we get one simple point estimate.

Remember being a private company sometimes the beta is estimation can be Challenging. As I mentioned to you, terminal value plays a very big role in overall valuation of the company. So make sure that you try different assumptions about the terminal growth rate. And unfortunately, DCF method assumes the same cost of capital through the life of the firm, but in the real world we know that cost of capital could change.

One way we handle that change is to do a sensitivity analysis. So in the next video I'll focus on the second technique called the compatible method for valuation of businesses. Thank you.

## Firm Valuation- Part 3: Comparable Method Example

>> Welcome back. In the last video, we talked quite a bit about discounted cash flow model. We went through an example. In this video, I'm going to talk about a second method which is a very popular way of estimating the business values core comparable methods. As the name suggests, as the title suggests, all you have to do if you can, identify three to five similar firms with similar risk characteristics.

When I say risk, you can pick from similar betas, similar growth profile. So if you're trying to value a young start up firm, try to pick similar firms which are in high growth stage. Don't try to pick firms that are decaying or very mature firm. Similar debt equity ratio, etc.

How much of our claws you can come to the characteristics, better your estimation would be. One of the challenges in this method is, if you're trying to value a private firm. That is, a firm that is not publicly traded. You can easily get information about those firms. So and sometimes, the entire set of private firms may be having lofty valuation.

So you're aware of the dot com boost in early 2000. And now, currently, some of the firms that are in artificial intelligence space, they get very, very high valuation, so that can take you off on a different path. So it's important to realize some of the weaknesses of the comparable methods.

And if you're going to use the public firms in the Yahoo Finance page, you're going to get. Price earnings ratio, enterprise value to sales ratio, market to book ratio etc. So you can identify those ratios. Say you've gotten four or five comparable firms. Average them and applied that to the firm you're trying to value.

In addition, if you're trying to value private firms you can use industry specific multiple. So if it's an Internet from number of subscribers that subscribe the Internet, or if you're trying to value a Biotechnology firm. You can focus on the number of patterns the company has. If you're trying to value healthcare maintenance organization, you would try to use number of subscribers the HMO has, that's the idea here.

And one last thing is, if all of your comparable firms come from public market that is listed firms, it's important after you do the valuation to reduce your value by about 20, 25% to discount for liquidity. So, what do I mean by liquidity? Liquidity is the notion that, if the firm is publicly traded, you can immediately call up your broker and buy or sell shares, then the markets are open.

That's not going to be possible for private firms, right? So that's why if you're using purely public firms for comparable, you're going to discount the valuation for liquidity by about 20 to 25%, okay? So I'm going to walk you through the example. This is an example that comes from the Harvard Business School handout.

That's part of the course reading pack. So what we are trying to do here is trying to estimate the value of a firm called, Private Health. That's a firm we want to value. Fortunately, we could get two firms from the publicly traded markets which are comparable to private health.

We could not get three or four or five firms. So we're going to do comparison from two firms. So we have computed, we have been given earnings per share data, we have been given price earnings ratio, number of shares outstanding. Since these are in HMO space we also have the number of subscribers the firm has, okay.

This is the basic data behalf, we are going to use five different metrics for each of these firms, average the two and apply to the Private Health firm. Okay, so let's say for example, two different metrics. How did I get enterprise value to sales ratio for Happy Healthcare?

We have been given the enterprise value as $520 million, sales of the firm as 420. So one point two four is the Happy Healthcare enterprise value to sales ratio. Similar computation shows you that the ratio is one point two eight for the community health. Or we can do the enterprise value to member for the first firm, it's 870 second firm 987.

Before I forget, enterprise value is nothing but the market value, plus long term debt, that has been computed here. So we are going to use these two numbers, for the two firms, take an average, and applied to the firm we want to value. So, from the previous slide, we got data for the Happy Healthcare.

We got data for community health, take the average 17.8, apply that to the earnings. If you remember, the earnings was $30 million, if you multiply the two you get 533, right? Same thing you do for, take the average of enterprise value to sales ratio, apply that metric to one point two six to the sales of private health you get 436.

One important point I wanna emphasize is, the valuation is an art, it is not a science. Those of you who are quantitative oriented need to understand that depending upon the metric we use, we are going to get a range of values. But if you are doing this on a regular basis, you would notice that.

533 seems to be way off compared to the other numbers 389, 397, 436. So if you further explore into the details, you would notice that the Happy Healthcare, Has large debt. Whereas Community Health has low debt. The firm we want to value, the Private Health, has zero debt, right?

So maybe you should not be taking an average of 14.5 and 21. Maybe you should just go with 14.5 and apply to this, that's one we'll think about it. So if I apply 30 times 14.5, I'm going to get 435 million. That seems to be more in the range, but this comes with the practice and you can see that is the range you can do.

One more thing, I want to point out is, once you get this, if you want you can take the average of this, then you have to take about 20% of the valuation, For liquidity. Because remember that Community Health and Happy Healthcare are publicly traded firms. And you're trying to value a private health which is private.

So after you estimate the value, take an average or let's say, the average comes to 450, you would take 20% of this value and say it's 80% of 450, $360 million, so this is how we would apply the comparable method for valuation. So in the next video, I'm going to wrap up this evaluation by walking through yet another example, and give you the summary of what you should have learned in this module, thank you.

## Firm Valuation- Part 4: Additional Examples and Summary

>> So welcome back. As promised, I'm going to do a couple of more problems. There are two problems that are coming up. But what I'm going to be doing is work out this Schultz Industries problem in great detail. And the problem number two, I'm going to leave it open for you to work through the solution.

And when we have the conference call, video conference call, we look through that problem too. My idea here is for you to get practice and then you can check your answers during the conference call. So problem one is this company called Schultz Industries that's trying to acquire a company call Arras Manufacturing.

And the Arras cash flows are $6.8 million per year and they're expected to grow at 8% for the next five years,. After five years, it's going to level up at 4%. We are given the cost of capital for both of these companies, Schultz at 12 and Arras at 10%.

We also know that the company Arras has $30 million debt. So we have to figure out what is the maximum price Shultz should be for Arras? Okay, one important point I want to make is we have two different cost of capital, 12 and 10%. Rightly, you will have a question in your mind as to which one is better to use.

The important principle to follow is use the cost of capital that captures the risk of that cash flow. So what we are given is the cash flows of Arras, so we have to use the cost of capital corresponding to Arras, 10%. That's a key insight when you're to figured out what discount rate or what cost of capital you have there.

So let's try to work through the problem. So in all such problems, I would encourage you to draw the simple timeline. And here, there are five cash flows. One, two, three, four, and five. And we are told that it's cash flows are growing at 8% per year, right?

The first cash flow is going to be 6.8 times 1.08. That's going to be, if you do the number computation, 7.344. Similarly, the second cash flow 6.8 times 1.08 to the power of 2, you can get 7.93. Third cash flow would be 7.93 times 1.08, that comes to 8.566.

Fourth cash flow is 8.566 times 1.08, that comes to 9.251. And cash flow number 5 is 9.251 times 1.08. That gives you, if you do the math, it gives you 9.991. Remember, we have to compute the terminal value at time five, right? That's going to be cash flow at time six divided by cost of capital minus the growth rate.

How do you get cash flow at time phi? We are going to take the sorry, cash flow at time six? We are going to take cash flow at time five. And multiply by the stated growth rate. We are told it's growing at a constant rate of 4%. And we are going to use the cost of capital of 10 minus .04.

Is this clear? The terminal values cash flow at six. Cash flow at six is cash flow at five times one plus the growth rate. Once you've got the terminal value, it works to $173.2 million. We are in business to compute the valuation. It's going to take 7.344 divided by 1.1, plus 7.93 divided by 1.1 to the power of 2, 8.366 divided by 1.1 to the power of 3, 9.251 divided by 1.1 to the power of 4.

9.991 by 1.1 to the power of 5 and remember, we have to discount the terminal value too, which is 173.2 discounted at 1.1 to the power of 5. If you add them all together, you get $139.72 million. This is the value of the entire business, right? We need to compute the value of equity.

Remember, value of equity is going to be the total value of the business, which we just estimated at 139.72 and we are going to subtract the debt, remember? And the debt is $30 million. So you get value of equity As 109.72 million. Lastly, the price per share. That's what we are interested is, you have to divide 109.72 By the number of shares outstanding, which is 2.5 million.

That comes to $43.89. Right, so there we have it. $43.89. So then this company is thinking in terms of making an offer to acquire this business. They have to, maximum they can pay is $43.89. Of course, they can try to pay $40 but one of the challenges of picking $40 is there could be another competitor who can walk in and say, I'm going to pay you $41.

So often times in the real world, there's a lot of competition to acquire businesses. So at least you know what's the maximum price and then you can work your way up to that point in time. So, this is how you do the firm valuation. Carefully estimate the projected free cash flows and at the point where the company is going to grow at a constant rate, estimate the terminal value.

And discount the terminal value and the intermediate free cash flows to get the value of the business. We did the solution of the company. The second one, Happy Times, as I told you, I want you to do it. And when I meet up with you during the weekly conference call, I'll work through the solution.

It's not going to be difficult, just apply the principles what you have learned in this module and the previous module. So lastly, if you do the comparison of the two methods you have learned. The Comparable and Discounted Cash Flow. Definitely, Discounted Cash Flow is theoretically sound. But the challenges, as I mentioned already is WACC may be difficult to estimate and it's going to be very sensitive to terminal growth assumption.

Comparable firms, very easy to use, commonly used. But the challenges are when you are trying to value private companies, you may find it very difficult to identify comparable firms. And if you are going to.use publicly traded firms as comparables, don't forget to use the liquidity discounts. It is fair to say that investment bankers' method of choice is comparables.

The academic professors like me and others focus a lot on DCF, discounted cash flow method, but both the methods are equally useful. Sometimes if you do both and there are wide discrepancies, then you can make sure that you did not make a mistake in one of the other techniques.

So, that's a point I want to make. There's nothing wrong with using either one of the methods but both are sound methods. So, what I want to do next is to wrap up this module. In summary, the firm valuation is extremely, extremely important in the real world. It's used in a lot of different contexts and the way we are going to value a firm is use two different techniques.

One is the discounted cash flow method. Discounted cash flow method is simply finding the present value of future free cash flows and discounted at the cost of capital. So if you remember in the opening introductory module, I told you that ultimate goal of the business is to maximize the value of the business.

Here you see why maximizing free cash flow and minimizing cost of capital becomes extremely important. And secondly, you could also use comparable methods as an alternative to the discounted cash flow method. So this video concludes the module on firm valuation. Thank you.

## Managing for Value Creation EVA & MVA- Part 1: Economic Profits aka Economic Value Added

>> Hi, welcome back to the last module in Financial Management. In this module I'm going to start talking about the value creation, economic value added and market value added. Before I do that I just want to emphasize what you should have learned this far by watching my previous modules.

These started off by saying that shareholder value creation is the most important thing. If that is important, what kind of investment analysis decision should a manager make? Then we talk quite a bit about the Net Present Value rule. Then we moved on to talk about how the market values a company's stock.

Also we talked quite a bit about how to compute a company's cost of capital, and then in the last module I showed you how to do a firm valuation using discounted cash flow framework, discounting the pre cash flow weighted average cost of capital. What this last module is going to do is bring the mall together and try to help you understand the linkage between the various things we have talked about through the course.

So the two key learning objectives for these modules is, I want to define the concepts of EVA or Economic Value Added and Market Value Added and explain to you how they are linked to the goal of managing for value creation. And in the process, we'll also learn that the Net Present Value of a project, which we talked quite a bit about in the earlier modules and the EVA of the project are one of the same thing.

So let's get started. So I want to motivate the entire discussion with a very, very simple example. In this simple example, suppose you have an investment opportunity to invest $10,000 in an investment project that guarantees you a payment of $10,700 at the end of one year. I want you to note the word guarantees.

That means this investment has no risks. So the question to you is, how would you decide upon this investment? Do you think it's going to create economic value for you? And if so, are you going to make the investment? If you think a little bit more about this question, immediately one thought that would jump into your mind is, what are the alternatives out there that can guarantee you returns?

Obviously there are many investments in the world and in particular if you seek out investments that has zero risk. Some of the items that may come to your mind are investing in a bank or giving the money to the government in terms of treasury bonds, we are guaranteed to get the payment back.

So before we can decide upon this investment, we have to ask ourselves, what is our opportunity costs? That is what is the rate of return we can earn on investments with similar risk, okay? So this is a very important notion, the opportunity cost of capital. We have already learned quite a bit of it using the cost of capital framework.

That was precisely the point that companies should only invest in projects if the rate of return is greater than cost of capital, because the shareholders can invest of their own accord. So using similar notion here, opportunity cost is the rate of return you could potentially earn on securities with Same Risk.

So let me think of two scenarios. What your best alternative out there is 6% rate of return, and what if your best alternative out there is 8% rate of return, okay? Suppose it is 6% rate of return, and If you compute the accounting profits, notice that accounting profits does not depend upon your opportunity costs.

It becomes very critical to understand what else you could have made on that $10,000. If you could only invested at 6% rate of return, that is for using the capital of $10,000 at 6% you incur a capital charge of $600, you would make economic profits of $100. On the other hand, if your opportunity costs was 8%, that is you could have invested in alternative investment that earns 8% rate of return, the capital charge would be- $800.

You would have lost in economic sense, money, right? So here accounting module illustrated to you the importance of computing counting profits. The point I want to make in the finance module is, before you decide that this investment is going to create economic value for you, it is extremely critical to look at what else you could have done with the money.

That's what the notion of capital charge is. So the most important takeaway from this slide is, unless and until you create economic profits, you're not going to create value in the organization. So that's an important point we want to learn. So accounting versus economic profits. Remember we have to always think of capital charged that measures the opportunity cost of money for your investment project which is simply stated, the opportunity cost of capital r times total capital.

So to create economic value, the investment project must earn positive economic profits, not just positive accounting profits. It's such an important concept that if you go back to my introductory module, when I talked about the Coca Cola CEO creating enormous shareholder wealth. In those states Coca Cola's annual report in the income statement would add an additional line that would show the economic profits created by Coke.

So it's a very, very important concept. One of the reason Mr. Goizueta was very successful in running the Coca-Cola company was simply the fact that he kept decide on creating profits. I'm not minimizing the importance of accounting profits, but I wanna say that just creating accounting profits it's not enough.

It's important to create economic profits to create value for the shareholders, okay? Is that point clear? Okay, so here is an pictorial representation of accounting versus economic profits. Accounting profits simply is return on total capital r\* times the total capital minus the capital charge r times TC or alternatively you can represent it as r\* minus r times TC.

This r\* minus r is called the SPREAD. So the way the successful companies are run is keeping an eye on the SPREAD produced by different business units, and allocate more capital to the divisions that have higher SPREADs. Long, long time back, Coca Cola happened to have Columbia Pictures as part of its business units.

Then CEO Mr. Goizueta realize that they didn't have a lot of expertise in producing and marketing films. So he sold off Columbia Pictures and the capital he raised by the sale of that business, he reinvested in the company to grow the main businesses of coke such as the Dasani, Sprite, Coca Cola and other related products.

So this video captures the importance of economic profits. So in the next video, I'll talk in greater detail about how to break this down even more granular details. So thank you.

## Managing for Value Creation EVA & MVA- Part 2:  Measuring Financial Performance and Economic Profits

>> Hi, welcome back. I'm continuing the conversation about economic profits. Economic profits, as you know, is accounting profits minus charge for capital. So if it's so important, what are the key value drivers of economic profits? So I'm going to argue that the two key metrics one can potentially focus upon is the operating efficiency and the capital efficiency of the firm.

So to help you understand the operating efficiency of a firm, I've listed income statements for two firms, A and B. If you want you can think of Firm B as a competitor to Firm A, like Walmart versus Target, Home Depot versus Lowe's, Coca-Cola versus Pepsi. So Firm A generates an operating profit of $20,000, and Firm B generates an operating profit of $24,000.

After taxes at 35% Firm A's NOPAT, or net operating profit after tax, is $13,000. For firm B it is $15,600. So one way we can measure operating efficiency is to take the ratio of the NOPAT, net operating profit after taxes, to sales. So what you can clearly see is Firm A generates $0.13 per dollar of sales.

Whereas firm B generates $0.15.6 per dollar of sales. So clearly, as measured by operating efficiency, Firm B is operating more efficiently. And very quick check will tell you that one of the problems for Firm A is their cost of goods sold is at 70% of sales compared to Firm B, which is 65% of sales.

So return on sales is a common measure of operating efficiency. Which is nothing but NOPAT divided by sales. That's the measure of operating efficiency. To measure the other metric, capital efficiency, I have to briefly talk about the balance sheet of the firm. As you know, in accounting, you would have learned extensively about balance sheets.

But in a very simple form, the balance sheet primarily consists of working capital, fixed assets. And that constitutes net assets, sometimes small quantity of other assets financed by debt and equity. So you can see that in this example, Firm A has $110,000 of assets financed by $110,000 of long-term debt plus equity.

On the other hand, Firm B has $165,000 of assets financed by $40,000 of debt and $125,000 of equity. So we are gonna use those numbers to measure the capital efficiency. How does one go about measuring capital efficiency? Before I do that, this slide just reinforces the fact that always, always total capital employed by the company should be equal to total assets.

Now the way we are going to measure the financial performance of the firm is to take sales and divide by total capital. So we are telling that for Firm A, for every dollar of capital use, they are generating 90.9% sales. So $1 of assets of total capital generates 90.9.

So higher the turnover number, higher would be the capital efficiency of a firm. So compared to Firm A, Company B is not that efficiently using its capital. Remember Firm B was doing a better job in operating efficiency, but in the capital efficiency they are not doing as well, okay?

So what we are going to do is put them both together in this schematic. That is the return on sales times the capital turnover is called the total efficiency. And that is net operating profit after taxes divided by total capital. So ROTC is return on total capital. So if the firm wants to improve or increase economic profits it becomes critical to increase return on total capital.

And there are a couple of ways they can increase the return on total capital. One is to focus on our improvement of operating efficiency, that is improve profit margins or try to use assets better. So for every dollar of capital use, try to generate more sales. So whichever organization you're working for, you have to always think about, how can I improve these metrics to support the organization's overall goal of increasing value creation for the shareholders, okay?

So what we have done with Firm A and B is we have come up with two concepts, return on sales, capital turnover and the product is return on total capital. So it turns out that Firm A is at 11.82%, Firm B is 9.45%, okay? So you can drill down even more in greater details if you want to get a handle on where you should focus your effort in improving the efficiency.

So for example, I can construct this chart how we come up with the return on total capital measure, right? You start with the, Before-tax return on sales. That's going to be EBIT or sales, which consists of three components. Cost of goods sold, selling general and administrative expenses and other expenses.

That cascades to generate the before-tax return on sales. Multiply by capital turnover. And the capital turnover metric, the total capital, we can break it up into three parts. Net fixed assets, net working capital and other assets. The product of the two generates the pretax return on capital. And multiply by 1 minus tax rate gives you the return on total capital or stock.

So in the example we have been talking about, we can break up for Firm A and B those numbers. So as I said before, if you focus on return on sales, clearly Firm A can see that they should do something about improving the return on sales through the cost of goods sold metric, right?

So that's where they have to focus a lot of their attention to come close to the competitor, Firm B, which has 24% before tax return on sales. On the other hand, we saw that Firm B is less efficiently using the capital. And you can see that part of the problem is their utilization of fixed assets is not that great.

So they have to think about it. So one concrete example to think about it is, let's say you work for a company like United Parcel Service. They are very capital intensive in the sense that they invest in a lot of planes and trucks, etc. So several years back, they wanted to see whether they can use the planes more efficiently because they were just sitting idle during the weekend.

So for a brief while they tried to charter out the plane to others to get sales out of that product. But unfortunately, they found that retrofitting the planes from Sunday evening to Monday morning was very challenging, and they gave up on that experiment. So companies try a lot of different things to make sure that they can use the assets well.

If you think of Delta Airlines, they would do everything possible to minimize the time the plane is sitting at the gate. So that they work through the quickly deplaning the incoming passengers, making sure that the plane is cleaned up while on board the passengers for the next flight.

So more number of flights the plane can take within a given day, they're going to generate more sales. That's a way to think about how to improve the capital turnover metric and capital efficiency metric, okay? So creating economic value, it's important, and this is how you have to think in terms of improving the return on total capital.

So I'm going to conclude this recording. And in the next one I'll show you how to overall improve the economic profits, thank you.

## Managing for Value Creation EVA & MVA- Part 3:  Economic Profits Example and Comparison with NPV

>> In the previous video we talked quite a bit about these two companies, A and B, and the question I have for you is which one of the firm, is it A or B that's creating economic value for the shareholders? How would you go about deciding on the criteria?

So I want you to think for a brief minute here. If you remember in the previous video, we said firm A has a return on total capital of 11.82% and firm B, 9.45%. That is accounting return on total capital. So how are you going to decide which one is creating more economic value?

If you answered quickly firm A, you're going to be incorrect because remember, we want to focus on firms which earn return on total capital greater than cost of capital. So it's extremely critical for me to have given you the firm A's and B's cost of capital, right? So let me do that and tell you that both of these company's cost of capital is 10%, okay?

Now I think you can easily answer my earlier question, which one creates more economic value? But before I actually show the computation, just to reinforce, remember the economic profit is Accounting Profit- Capital Charge. There are two different ways you can estimate the economic profits. One way is from net operating profit after taxes, you subtract the charge for capital.

Alternative framework is to use the spread times total capital. It does not matter which framework you use, you'll end up with the same answer. So let's try to work through the economic profits computations for firm A and B given that the cost of capital is 10%, okay? So I'm going to work through this problem.

So remember the total capital for firm A is $110,000, right? So the capital charge is the product of the two, it's going to be $11,000. We computed that NOPAT or net operating profit after taxes for firm A was 13,000. So if I subtract $11,000, I get 2,000, okay?

Doing similar computation for firm B, $165,000 is the total capital. So the capital charge is $16,500, NOPAT, if you remember, was 15,600. So if I subtract 16,500, I get negative Economic Profits. So clearly firm B is not creating economic profit, notwithstanding the fact that it is creating NOPAT of $15,600.

This is one way to compute economic profits. Equivalently the ultimate ways to compute the economic profit is to start with r\*, the return on total capital, that we had computed earlier. So if you remember for firm A we said it was 11.82%. So the spread is 1.82%. I'm going to multiply by $110,000 and come to the same conclusion that firm A creates $2,000 economic profits.

On the other hand, firm B has a return on total capital of 9.45. So the spread is negative 0.55%. So if you multiply by the capital $165,000, you end up with -900. So it doesn't matter what framework you use, you clearly can see that firm B does not create economic profits.

That's the key take away from this. So here's a good example of how to compute, accounting profits economic profits, etc., okay? So we have spent a lot of time on economic profits. Now, I'm going to link economic profits to net present value. Before I do that, in summary, remember that for the firms to get capital from the investors, they have to demonstrate that their investments, Return on Total Capital is greater than Cost of Capital.

So in the long run, successful companies are those that are going to show that they can, on a consistent basis, earn economic profits. And if you don't do that, it's going to be very hard to raise capital from the investors. Think of companies like Sears, they are struggling because they're not able to generate return on capital much greater than cost of capital.

And one other last point is oftentimes economic profits is called by the term economic value added, or EVA. So going forward, I'm going to be using the terms interchangeably, the economic profits, or EVA, okay? So let me show you with a very simple example that the net present value of a project is same as the discounting projects economic profits over its life.

Now we will see or understand the reasons why I was so focused when I talked about capital investment rules that NPV is the way to go. So let me show you with a pretty simple example. Let's say that you are planning to invest in a project which is a four year life span and the initial investment is, let's keep it the same unit, $100.

And you're forecasting that it is going to generate same $80 revenue for the four years. Taking account depreciation of $25 for the four years, you're going to estimate an income of 41.67. Taking away the taxes, you estimate the income after taxes as $25. Remember in the NPV analysis, we had to add back the depreciation which is a non cash expense.

We do that and we get after tax cash flow of $50. Given that the investment is minus 100 using Excel or simple NPV framework, against a 10% cost of capital, you can say that this is a good project with positive net present value, right? That you know from my earlier modules.

Let me recast the same problem in economic profits framework and show you that you'll end up with the same answer, okay? So to do the EVA or economic profit analysis, I need the capital employed and if you see we start with the $100 investment because of the depreciation second year then capital is 75, the third year it's 50, last year's 25.

So the capital charge is going to be 10% times the beginning capital. So 10, 7.55 and 2.5. We have already computed in the earlier slide the after tax profit which was 25. And remember, the EVA or economic profits is after tax profits minus the charge for capital. So I'm going to subtract the charge for capital 10 and say it's 15, 17.5, 25 minus 5, 20, and 22.5.

So if I find the present value of these economic profits. How do you find present value? 15 divided by 1.15, 17.5 divided by 1.1 squared, 20 divided by 1.1 to the power of 3 plus 22.5, 1.1 to the power of 4. You get the same thing. So oftentimes I like to joke that this is old wine in new bottle.

So everyone knew quite a bit about NPV computation, but casting it in the EVA framework tells you that it's a one and the same thing. So that's an important point. That's very important. One of the important learning objective in this module is that NPV of a project is same as the discounted value of economic profits or discounted value of EVA.

So what I'm going to do in the next video is show you the linkage between economic profits, stock prices, and market values, thank you.

## Managing for Value Creation EVA & MVA- Part 4:  EVA, MVA, & Unified Framework

>> Hi, welcome back. And now I'm going to show you the linkage between economic profits and stock prices. I still distinctly remember that Coca Cola's CFO, once, when he was talking to my class, Told the entire class that when Coca Cola draws a simple graph of economic profits and the market value changes of the company, they seem to have a very significant positive correlations.

So one way to keep the scorecard of whether the company is creating economic profits on a sustained basis is to think of a related concept called market value added. Market value added is nothing but market value of equity- minus book value of equity. So you may be wondering, what is book value of equity?

If you remember in the accounting modules, Professor Schneider probably always talked about stockholder equity. So book value of equity is same as stakeholder equity. So what that captures is the amount of money given by the shareholders to the company. The market value of equity, or market cap, reflects the assessment of the investors about the future profits and cash flows.

So the best way to understand the MVA is how much additional wealth the company's management has created on top of the money provided by the stockholders or the shareholders. So this is a good schematic to get a handle on the linkage between market value added and economic profits, okay?

Book value of equity is simply the amount of money provided by the shareholders, okay? And the market value added measure captures the present value of all future economic profits. So supposing one is looking at this issue in a year 2019, what the market value added captures is all the economic profits the investors expect in the future years, Or EVA, Remember, this process continues, is the market value added.

And that is what is what reflected in the market value of equity. So before I get any further, I want to show you with a simple Home Depot example how one goes about computing this market value added for any publicly traded firm, okay? So we are going to do the computation of market value added for Home Depot.

So whenever we want to do the computation, if you remember when I computed the beta and cost of capital for Home Depot, I had provided you with the Yahoo Finance page for Home Depot. Just to refresh your memory, those pages are there even in this slide. So just quickly, I'll move forward and come back to the slide to get the numbers.

So on the day I printed this Yahoo Finance page, Home Depot stock price was $205, right? We need that number to compute the market value added. We also need the book value per share of Home Depot. And if you look at book value, Yahoo Finance page provides that number.

So it turns out that for Home Depot, the book value is -1.7. So you may wonder in your mind, how come a company has a negative book value per share? One way to think about it is maybe Home Depot has a lot of carried forward losses. So the book value of equity is negative.

Alternatively also, they might be monetizing some intangible assets like goodwill and others. So that could end up creating negative book value. Regardless of the reason, it's so turns out that Home Depot has a negative book value per share. And last number we need is the number of shares outstanding, which is 1.18 billion.

So I'm going to use the market value per share, book value per share, number of shares, to show you how to compute market value added for Home Depot, okay? Let's do that. So remember, the stock price was 205.66. The book value turns out to be -1.70. So stock price minus book value, the market value added per share is 207.36.

Number of shares outstanding is 1.6 billion. So if you multiply 1.16 billion by market value added per share, 228.01 billion. So the big takeaway from this number is Home Depot management is so good that they have added for every share, $207 per share. And that translates overall to $288 billion.

Okay, so what does a large market value added for a company denote or reflect. Okay, what the investors are thinking is, this Home Depot company is so good that they will be in a position to continue to sustain a return on capital that far exceeds the cost of capital over a foreseeable period in time.

So the company has a sustainable competitive advantage over its competitors. And that gets rewarded in the marketplace in terms of higher stock price, right? So whatever organization you are looking for, you have to think of, what is the company's primary competitive advantage? Some of the well-known companies I have listed here, like General Electric, the fact that it operates globally over 100 different markets, it's a source of competitive advantage for the company.

Brand names company like Coca cola, or Altria, that make cigarettes, their valuation sustainable advantage comes from the brand. Apple is very good in coming up with innovative products like iPhone, iPad, etc, that's their sustainable competitive advantage. Walmart, Home Depot are able to control the costs, have lot of buying power.

So anybody who supplies to Walmart and Home Depot, Walmart and Home Depot can squeeze the suppliers for as low as price possible so that they attract customers to their marketplace. So every company you think of has some source of competitive advantage. And you have to always think, what is it your company has, right?

And for Georgia Tech, it's not a for profit company. Our sustainable competitive advantage is the marketplace. The companies that hire our graduates believe that we inculcate good education and we graduate students with a lot of can-do attitude and turn out to be very successful managers in the long run, right?

So that's a way to think about sources of competitive advantage. And people have done a lot of research and shown that if you run a simple regression of market value added changes and use some of the explanatory variables like net income, or earnings per share, or return on equity, or return on assets, they do a good job, but they're only able to explain 25%.

EVA, or economic profits, is able to explain 40%. So the way to think about it is two different ways. One, if you have to choose a metric, choose EVA. But also remember that EVA can only explain 40% of the changes in the value creation process. One of the important sources of capital not captured in the balance sheet is the human capital.

So any organization heavily depends on the motivation, the enthusiasm, of the employees to create value. So we should never forget that, but economic profits framework is an important one than you want to think about what you want to focus upon in a company. Given that it's so important, economic value creation process simply is to manage businesses, improve the efficiency of the organization.

Try to give more capital to the business units that are positive spreads. And try to reduce capital from the business units where the accounting profits return on capital is lower than cost of capital. And lastly, it's very important that the compensation of the managers are tied to not accounting profits economic profits.

More and more companies are going in that direction so they will focus on this concept. Because the economic profit clearly shows you that to generate the accounting profits, you use up the capital. And you have to make every effort to make economic profits. That is, after subtracting the usage costs for capital, are you creating value?

So in the next video, I'll wrap up this entire module and bring it all together. Thank you.

## Summary of Finance Modules

>> Hi, welcome back. It's been a long journey and this is the last video that wraps up the entire financial management module of the business analytics course fundamentals of business analytics. If you have to remember one good picture, overarching picture in terms of the value creation process, this is a great one.

So what this picture tells you is you have to focus on improving operating efficiency and capital efficiency so that you can increase the return on invested capital multiplied by one minus tax rate gives you this expected after tire tax ROC. And we spend quite a bit of time in the earlier module on learning about the weighted average cost of capital.

So to create economic profits, your return on invested capital should be greater than weighted average cost of capital. So, for example, this metric captures the economic profits for one year, but what the market value added concept captures is, it's the company going to create future streams of economic Profits.

That's a key question. And how much is the growth rate going to be? And that's going to critically depend upon all of the environments in which the company operates economic, political and social environments. So let me motivate it with couple of examples. Supposing a new president gets elected and the expectation in the marketplace is the new president is going to invest lot on defense related investments.

So companies like Lockheed Martin, Boeing, and others that operate in that space, they are going to get boost in the stock prices because investors feel that their economic profits are going to grow quite a bit in the coming years at least as long as the current president operates on that promise of increasing defense related investment.

On the other hand, the current president also believes that healthcare costs, especially the pharmacy drug prices, are going through the roof. And he is going to bring down with the deliberate effort pushing down the drug prices, then it can pharmaceutical firms are going to be impacted negatively because the investors are going to feel that the negative spread is going to last for a long time.

So as and when the political environment or the economic environment changes, or regulatory environment changes. It's going to have a negative impact. So if you think of a company like Facebook, it is facing lot of regulatory challenges in terms of how they're going to monitor the fake advertisement on its space.

So the jury's out there and that's cause for concern for investors about Facebook's ability to handle this. And as I recorded, there is a lot of trade tensions with China. So any company that is impacted by exports to China, for example, Boeing Corporation, the marketplace is going to revalue future economic profits for Boeing.

So the reason the stock prices change on any given day or every second of the day is because the investors change their expectations about future economic profits. So that sorta wraps up. And so what I'm going to do in the next few slides is to capture the overall summary of the finance modules.

The first point I want you to remember that the economic value of a long lived investment projects is measured by NPV. So to create value for shareholders, you are to invest in projects with positive net present value, and we learned that stock price is the present value of all future expected dividends.

And the cost of equity capital depends upon the current level of interest rates proxy by treasury bond rates and the beta risk of the stock. And the relationship between risk and return is captured by this famous expression called Capital Asset Pricing Model, which is cost of equity capital is the treasury bond rate plus market risk premium times beta.

Remember, market risk premium is the reward for taking one unit of risk. How much S&P 500 index fund earned relative to treasury bonds over a long period in time? Roughly it's around 6.38%, but it's going to change over coming years, but not significantly. It's going to be around 6%.

Next, cost of capital is the minimum rate of return a company should earn to compensate investors for time value of money and risk. And in particular, to be focused on Weighted Average Cost of Capital, which is the weighted average of debt and equity cost of capital. So I want to again emphasize that even if a company does not borrow any money, that is the debt is zero, still the company has a cost of capital which is exactly equal to its cost of equity capital.

And we also learned that the firm valuation is nothing but the present value of all future cash flows discounted a weighted average cost of capital. And economic profits is important concept. And earning economic profits is key to the financial success of business. You can express it in two different ways.

Simply subtract the charge for capital from net operating profit after taxes or use the spread, r star minus r and multiply by total capital. And remember stock prices are closely related to the economic profit. And lastly, I started the modules by saying that market value is the focus of any well run organization.

And if you want to create market value, you have to give investors confidence that your company can continue to maintain and grow the economic profit over extended period in time. So it's all coming together hopefully in your mind. And I want to tell you that if you want to learn lot more about finance, these are two very good books we use in our regular degree programs and executive education programs, and I would encourage you to consider investing in one of these two books.

If you're not that much into financing, probably the second book by Hagen's would be good, but many of the successful MBA programmes used the first book by Ross, Westerfield, Jaffe and Jordan. And also a lot of the terms I've used throughout the presentation. I've captured some of them in the glossary here.

So I'm pretty much wrapping up the finance modules and it was great recording all this material and I hope you find them very useful. And over the recording of different modules, they are been 3, 4 or 5 problems I've left blank for you to vote them out, and definitely, I would walk through those problems when you engage with us through those weekly video conference calls.

And finance is an exciting field and I would be remiss if I do not mention that if you are not already in the habit of reading the Wall Street Journal on a regular basis, you should do so. Because that's where you're going to pick up a lot of business-related concepts.

Not only finance, but also accounting, marketing, information, technology, etc. So, as the best time, I'll see you on future media recorded conference course. Thank you so much.