



What Terminal Value Means, and How to Calculate It in a DCF

Welcome to our third and final financial modeling tutorial, designed to share with you the type of tangible skills that you need to win high-paying jobs in investment banking or private equity and get promoted more rapidly and rewarded more generously once you're in. In the first video in this series, we looked at unlevered free cash flow, what it means, and how to project and use it in a DCF based on a real company, Michael Hill. In the second video, we looked at the discount rate, what it means, how to calculate it, and how to use it in a discounted cash flow analysis.

This time around, we'll finish up our DCF by calculating the terminal value, estimating Michael Hill's implied share price, and figuring out whether or not it's substantially undervalued, as the management team believes. This is just one of the 45 different topics we cover in our valuation and DCF lessons in our Premium course, but it's an important one that comes up in interviews all the time. As with the previous two lessons, everything here goes back to the big idea about valuation and the most important formula in finance: **company value equals cash flow divided by (discount rate minus cash flow growth rate), where the cash flow growth rate must be less than the discount rate.**

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Put simply, this "company value" is the **terminal value**. But to calculate it, you need to get the company's first cash flow in the **terminal period**, and its cash flow growth rate and discount rate in that terminal period as well. So, it's not quite as easy as just looking at a DCF and inputting all the numbers straight from there.

In an unlevered DCF, this all-important formula becomes: Terminal Value = Unlevered FCF in Year 1 of Terminal Period / (WACC – Terminal Unlevered FCF Growth Rate).

You rarely forecast the actual terminal period in a DCF, so you often project just the unlevered free cash flow in year one of the terminal period and use this tweaked formula instead:

Terminal Value = Final Year UFCF * (1 + Terminal UFCF Growth Rate) / (WACC – Terminal UFCF Growth Rate)

[02:03]

The terminal growth rate here should be low, below the long-term GDP growth rate of the country, especially in developed countries like Australia, the U.S., and the U.K. You might use numbers such as 1%, 2%, or 3%, depending on the region. You can also calculate the terminal



value with the Multiples Method, and multiply the company's final year EBITDA, EBIT, or NOPAT by a valuation multiple such as 5x or 10x. You could find the appropriate multiples by searching for similar companies to Michael Hill, also called Comparable Public Companies or Public Comps.

If similar companies trade at multiples of 10x their operating income, or 10x their EBITDA, then it's reasonable to assume that Michael Hill might trade in a similar range in the future. You can use either method, or both methods, to estimate terminal value, but the important part is what comes next. Once you have your initial estimate, you must cross-check it by entering the numbers in Excel and looking at the growth rate or multiple implied by your initial guess.

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Then, you need to tweak the assumptions a bit, and you will discount this terminal value to its present value, what it's worth today, add it to the present value of the unlevered free cash flows, what they're worth today, and then back into the company's implied share price from there. In other words, what, according to your views, the company should be worth today on a per-share basis. And then at the end, you can set up sensitivity tables to look at this number in different cases and see the full range of values the company might be worth.

Now, let's jump into the Excel model and see firsthand how to estimate terminal value, crosscheck our work, and then use it to estimate Michael Hill's implied share price and see if management is correct. If you pull up the "Before" file in the files and Resources section below, you will see the partially completed model for this exercise. In the full course, we go into more detail on where to find all this information and how to think about the proper numbers to use. But here, we're going to focus on the Excel setup and formulas.

[04:01]

So, here we are back in Excel. And this time around, I want to focus on the areas at the top—the terminal value under the Multiples Method and Perpetuity Growth Method. Once we have this, we will get to the company's implied share price. And then, we'll go to the bottom and create some sensitivity tables to look at what Michael Hill's implied share price is under different scenarios and conditions. Then we'll do a quick review of the results so far, look at our valuation graph that shows its valuation at the 25th percentile to 75th percentile across different methodologies, and then go to the case study questions and answer both these questions about the company's current valuation and its best options going forward.

Let's go up to the top and, as usual, I have some notes over here on the right-hand side. Let's start with this process of picking the right numbers for terminal value. So, the general process is



that we want to guess something for both of these and then cross-check our work by looking at the multiple implied by our guess or the growth rate implied by our guess if we're using the Multiples Method.

[05:05]

We'll start with the Perpetuity Growth Rate Method. And for this one, we need to get an idea of what the long-term GDP growth rate in Australia is, and arguably, also in Canada and New Zealand, but they're all developed countries, and the growth rates shouldn't really be that much different. Now, you can easily find this information by just doing a quick Google search. You will find a lot of sites that say the growth in Australia should be somewhere between 2% and 3% in the future, depending on where you're looking. You can also find sources like the OECD long-term forecast that says that overall, the growth rate should slow down to roughly the 2% range over time.

So, we'll be a little bit more conservative here and just say the expected long-term GDP growth will be 2%. You want to pick a long-term FCF growth rate that is somewhere below this expected long-term GDP growth. It certainly shouldn't be above it, because if it's above it, then eventually the company will become bigger than the economy as a whole – which doesn't really make any sense.

[06:02]

So, I'll say 1.5% right here. And then for the baseline terminal value, let's go down to our unlevered free cash flow in our final here, year 10. And then, let's multiply it by one plus this baseline terminal free cash flow growth rate. That gets us the free cash flow in year one of the terminal period. And then we'll divide by the (discount rates minus this baseline terminal free cash flow growth rate), and this gets us our terminal value.

Now, the first thing we can do here is take this and then divided by our final year EBITDA to see what the EBITDA multiple here is. And it comes out to 7.5x. What is that mean? Well, if we go to the public comps and just look at the multiples, the median EBITDA multiple is roughly in the 7x to 8x range for this set of companies. And, of course, Michael Hill, currently is far below that. It's only trading at around a 4x multiple of its EBITDA.

[07:02]

So, if we go by the comparable public companies here, then this seems like a reasonable outcome so far. If we go over to the Multiples Method over here, to start with this, we like to go back to the public comps, and the median one-year forward Enterprise Value / EBITDA



multiple here is 7.7x. So, I'll enter this one. Generally, with the Multiples Method, you want to pick multiples that are a bit into the future such as one-year or two-year. You don't want to pick trailing multiples because usually multiples decline over time as companies' EBITDA, revenue, and other metrics grow. So, you want to pick multiples that are a bit further into the future, so you get slightly lower multiples here.

And then for the baseline terminal EBITDA multiple we'll say 7.5x, which is slightly below this. And then for the terminal value, we will go down and get our EBITDA in the final year and then multiply by this 7.5x number.

[08:00]

And so, we get to our baseline terminal value through that method. Now, to figure out the implied free cash flow growth rate here, the short answer is that there is a lot of algebraic manipulation that goes into it. We don't really have time to get into the details, but I have up on screen a brief slide presentation that we cover in the full course in the valuation and DCF lessons that lays out exactly what to go through and all the steps. You can download this if you want. We just don't have time to go through it in detail right now.

But the bottom line is that, if you manipulate the terms algebraically correctly, you get to this: $(\text{Terminal Value} * \text{Discount Rate} - \text{Final Year Free Cash Flow}) / (\text{Terminal Value} + \text{Final Year Free Cash Flow})$. And that gets you the implied growth rate in this case. So, let's go down and just enter all of that. So, we'll take our terminal value right here. We'll multiply it by the discount rate, WACC, over here. And then we'll go down and we will subtract the final year free cash flow, and then we'll divide all of that by our final year free cash flow plus our terminal value up here.

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And this gets us the growth rate that is implied by our 7.5x EBITDA multiple right here, which is also around 1.5%. **So, in this case, based on this output, we get an implied the multiple that is in line with the multiples of the comparable companies. We get an implied terminal free cash flow growth rate that makes sense relative to this country's long-term GDP growth; it's below it. So, we don't really have to do too much tweaking.**

If we had gotten different results... so, let's say, we had picked 0.5% for the terminal free cash flow growth rate, we'd get a multiple here that is a fair amount below the multiples of the comps. And in this case, we'd say it's probably too low, so, we'd need to boost that to 1.0% or 1.5%, or something like that. So, you can tweak your assumptions a little bit by cross-checking your work with the implied growth rate and the implied multiple. With that done, let's now



move into the next part here and discount the terminal value and calculate the implied share price.

[10:01]

Remember that the terminal value represents Michael Hill's implied value 10 years into the future. But we care about what it's worth today. So, we need to take this value that represents Michael Hill's value from 10 years into the future into infinity, and bring it back to what is worth today – so, its present value now, and then we'll add it to the present value of the unlevered free cash flows to get the company's implied enterprise value, and then we'll back to its equity value from that.

So, for the present value of the terminal value, we'll just take this terminal value, and then divide by $(1 + \text{Discount Rate})$ raised to the power of the number of years in our forecast period. So, it will just be the 10 right here. We have that. And then, for the sum of the present value of the free cash flows, let's go down to where we've calculated the present value of unlevered free cash in each year. I'll press F4 to anchor that, so that does not shift around as we copy this across. And then we'll add them up to get the implied enterprise value.

[10:59]

We'll copy across these formulas here. And so, we have our implied enterprise value under both methods. We can look at the percent of the implied enterprise value from the present value of the terminal value as well. And this is around 51% or 52%, which is a good sign. We don't want this to be too high. If this were 90% or 95%, that would be way too high. We generally like it to be somewhere in this range of 40%, 50%, 60%, and maybe up to 70% or 80%, depending on the company.

Now, the next step is, enterprise value is a metric that represents the core business assets of the company, but to all investors – the equity investors, debt investors, and the preferred stock investors. We need to move from that to equity value because this is a public company, and equity value represents everything the company has, all its assets, but only to the common shareholders. That means that we have to subtract out other investor groups like the debt, the lenders, here. And we have to add non-core-business assets; mostly cash, but sometimes other things are going to this as well.

[01:05]

Fortunately, we already have all these numbers over here. So, let's take all of these, copy them down, and we can just set up the same links over here. Copy these down. And then for the



implied equity value, we'll take the implied enterprise value, and then just add up everything here. So, we have this under both methods. For the diluted shares outstanding, we already have this number entered up here, but you can find it in the company's filings if you want. And then, we'll copy it over there.

And then for the implied share price, we will just take our implied equity value, so, this is not the company's current market cap, but what we think its market cap *should* be. And we'll divide by its current share count. We can then compare this to the company's current share price. We'll take this, divide by the share price and subtract one. And then we can do the same thing over here.

[13:04]

And so, we can see that if we believe these numbers, then the company is significantly undervalued right now. We're not talking a 30% or 50% difference. We're talking about a 140% to 150% difference. We think its share price should actually be more like \$1.66, whereas right now, it is only \$0.68. So, there is a pretty massive difference here. Now, whether or not we think that's correct and the company should actually be worth this much is a separate story. We'll get into that in the next part, where we look at the sensitivity tables and the valuation conclusions.

So, that takes us to the end of step two here, discounting the terminal value and calculating the implied share price. Now, we're going to step back a little bit and look at the sensitivity tables and draw some valuation conclusions. Now, the first thing to note here is that we don't get super-specific instructions here about what to do. They just tell us the ranges for the sensitivity are up to you, but make sure you look at a wide variety of plausible outcomes, and make sure they are linked to the public comps and the discount rate calculations and everything else here that has been set up.

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So, generally speaking with sensitivity tables, with something like WACC or the discount rate, you want the value that you're actually using to be somewhere in the middle of the table. And then you want to go up and down below it, usually based on the range that you've calculated in the actual WACC calculations, where we looked at this number under a couple of different methods and methodologies. Now, here we'd say the range is a little bit too narrow. We don't want to make it just 8.8% to 9.4%. So, we want to go a little bit beyond that.

With the multiples and growth rates, similarly, we want to span the range of values here. So, roughly a 7x to 8x EBITDA multiple, we'd say, might be appropriate. Let's now go down and set



up these tables. So, if we want a 9.16% to be right in the middle here, we can start this at around 7.91% and we can make it go up by 0.25% in each column.

[15:08]

So, the 9.16% is right in the middle. And on the lower end it goes down to around 8.0%; on the upper end it goes up to close to 10.5%, which we'd say is a fairly good range. Normally, you want this range to be at least in the 2% to 3%, going to from one end to the other. You don't want to make it as narrow as 0.5% or just 1.0%. You want to have it span a good amount, but not too wide a range.

For example, you don't want to make this go from 5% to 15%, but something like 8% to 10%, or 7.5% to 10.5% is reasonable. We can just copy or rather link to these numbers in the bottom table as well. So, let's copy this across. And then, for the Enterprise Value / EBITDA multiples, here we could start at 8x and then just decrease it by 0.1x in each row.

[15:59]

But that give us 7.6x right in the middle, and our baseline multiple is 7.5x, so, I'll change this to 7.9x instead. For the terminal free cash flow growth rate, a reasonable range here might be 1% to 2%, so, we're still well below GDP growth, but we represent the 1.5% we've selected as our default value. So, if I say 2% and then make these go down by 0.1% each row, we get to 1.6% in the middle. I'll change this to 1.9%, so, we get the 1.5% in the middle instead. So, we have that.

And then, to create these tables, let's go to the top-left corner of each one, and then we will go to where we've calculated the implied share price in the DCF and anchor that with F4. Then we'll go to our other terminal calculations under the Perpetuity Growth Method, link to this and press F4. Then, we'll press Shift + Ctrl + Down and then Right to select the whole table. Alt, D, T, and then for the row input cell, for the first one, we will select our discount rate.

[16:59]

And then for the column input cell, I will select the terminal free cash flow growth rate. And then for the other table right up here, Alt, D, T after we select the whole table, and then for the row input cell, we will have our discount rate. And then for the column input cell, our baseline terminal EBITDA multiple. And so, we have that.

Now, if these tables are not refreshing for you, you can go to options in Excel: Alt, T, O, Formulas, and then change "workbook calculation" here to "automatic" or "automatic except for data tables." If you change it to automatic, then these will update and you will see the full



range of values. **So, the first thing that stands out is that nowhere in these tables are we even close to the company's current share price of \$0.68. So, by any metric, and certainly according to our DCF, this company seems dramatically undervalued.**

Now, the question of whether or not that's actually true, depends a bit of what the other valuation methodologies here tell us. So, let's go over and take a look at those in the Val_Graph tab right now.

[18:02]

And as you can see right here, pretty much all of these methodologies tell us that Michael Hill should be worth more than the \$0.68 that it's currently trading at, because pretty much everything is above that. The public comps are a little bit close if you go down to the 25th percentile, but pretty much everything else is right above it. If you look at the median for all the methodologies here, for the public comps it seems to be in the \$1.25 range. The percent transactions seem to be roughly \$1.75, and the DCF also seems to produce values around \$1.60 to \$1.70.

So, based on all that, we'd say the management team seems to be correct, and this company seems to be quite undervalued. But one issue here is that we don't know if this business of exiting the company's U.S. business and Emma & Roe stores altogether is actually complete.

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They have a lot of notes to it in their filings. But if you look at their balance sheet, we don't know how many of these assets actually correspond to the company's discontinued operations, how many the assets the company is going to sell, and all that could make a pretty big difference on our valuation here. We also want to know what their remaining costs to continue shutting down all the stores, cancelling the leases, and exiting the business actually are.

So, based on that, and based on the fact that the public comps show a bit of a different picture, the company is still undervalued, but not by 150%. The company might be worth more like \$1.00 to \$1.20, or \$1.30. **So, we'd say overall, the company is probably more like 30% to 50% undervalued.** Also, we haven't looked at other cases here. What if there is a prolonged restructuring, or what if there is an economic downturn or recession in Australia and New Zealand, and maybe even Canada? So, those are some other things to think about here.

[19:57]



You can see all these written out in Word form in the case study solutions PDF that I've linked to below this tutorial video. On the second question about pursuing a sale, raising capital, and making acquisitions, a sale doesn't really make sense when a company is dramatically undervalued because they're not going to get a 150% premium for the company if they go to sell it. Public company sales are based on some type of modest premium, like 15%, 30%, maybe up to 50% relative to the company's current share price. So, Michael Hill might get that, but they're not going to get what the company should actually be worth – since the public markets undervalue it so much now.

Add-on acquisitions don't make a whole lot of sense because that company's cash balance is very low. It shouldn't really issue equity at such a low valuation because they'd be giving up too much of percentage ownership in itself. So, the add-on acquisitions would have to be funded by debt. That's possible, but we think the most logical scenario here, the most logical recommendation, is to make more progress on its turnaround and show the market that it has successfully exited the U.S. and the Emma & Roe stores.

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And then think about add-on acquisitions or growth strategies in some of the markets, like Canada. Once the company's share price has risen and stabilized a bit more in the future, then the management team can consider some more growth strategies and possibly some debt-funded add-on acquisitions. But for now, we don't recommend doing a whole lot. Since it's just made a lot of changes to its business recently, and we think it needs time to show the market that it has really turned itself around.

So, that's it for the rest of our Excel model here and our case study answers for this company. That brings us to the conclusion of part three of our free tutorial series on valuation and DCF analysis. I hope you've gotten a lot out of this lesson, and that you'll get even more out of the full course. In fact, here is what one recent student had to say about it. As Josh says right here, he was a former bulge bracket investment banker who left the industry and then signed up for our courses.

[21:59]

"By a long shot, BIWS," *Breaking into Wall Street*, "far exceeds the competition. I recommend it to anyone looking to break into the industry." And not only does he recommend it to friends, family, and students looking to get into the industry, but he continues to find it helpful himself in his current role at a technology company.



That's it for our three-part tutorial series. But if you stay tuned, you might get a bonus lesson or two coming your way. Keep an eye on your inbox. If you already know you want in to our full training, you can sign up right here: <https://breakingintowallstreet.com/premium/>. As soon as you sign up, you will be granted access to our entire suit of in-depth financial modeling courses to help you get hired, get promoted, and succeed on the job.