

WACC Formula: Concept, Quick Calculations, Leases, Interview Questions, and More

How to Obsess Over a Topic That Doesn't
Matter Too Much...



This Lesson: Back to the Basics

We previously published a “DCF Overview” tutorial, but couldn’t go into depth on certain topics, like the **Discount Rate**, due to lack of time...

...and while you do need to understand the calculations, **the concepts** are more important for interviews.

This Lesson: My Upfront Bias

Some academic sources, textbooks, etc., put *a lot* of time and effort into calculating WACC for use in DCF analyses (see: Damodaran's work).

I don't think this is a great use of time in real life – better to be “roughly correct” than “precisely wrong.”

This Lesson: Back to the Basics

If you want this entire tutorial in writing, as well as the Excel file and additional materials, go to:

<https://www.mergersandinquisitions.com/wacc-formula/>

WACC: Lesson Overview

- **Part 1:** The Big Idea Behind the Discount Rate **2:08**
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Part 1: The Big Idea Behind the Discount Rate

- **Valuation:** We value companies by projecting their “cash flows” 5, 10, or more years into the future...
- **BUT:** \$1,000 in 10 years is worth less than \$1,000 today because we could invest \$1,000 today and turn it into more by Year 10!
- **So:** To estimate what that \$1,000 in 10 years is worth today, we use the **Discount Rate** to calculate its Present Value
- **Discount Rate:** The two main options are the **Cost of Equity** (Levered Free Cash Flow) and **WACC** (Weighted Average Cost of Capital) for Unlevered Free Cash Flow



Part 1: The Big Idea Behind the Discount Rate

- **Cost of Equity:** Discount Rate for *just* the company's common shares → Returns from stock price increases and dividends
- **Cost of Debt:** Discount Rate for *just* the company's Debt → Returns from interest and market value of Debt changing
- **Cost of Preferred Stock:** Similar, but not tax-deductible for the company, and higher coupon rates, so it's more expensive
- **WACC:** $\text{Cost of Equity} * \% \text{ Equity} + \text{Cost of Debt} * (1 - \text{Tax Rate}) * \% \text{ Debt} + \text{Cost of Preferred Stock} * \% \text{ Preferred Stock}$



Part 1: The Big Idea Behind the Discount Rate

- **WACC:** You invest *proportionally* in the company's entire capital structure → Your expected long-term annualized return
- **EX:** Company uses 80% Equity and 20% Debt and has a 25% Tax Rate; you invest \$1,000 → \$800 in its Equity and \$200 in its Debt
- **Equity:** Similar companies' stock prices have increased by 8% per year, on average, and an additional 2% has come from Dividends
- **Debt:** Effective yield is 6%, and similar companies are also ~6%
- **WACC:** $10\% * 80\% + 20\% * 6\% * (1 - 25\%) = 8.9\% \rightarrow \$89 \text{ per year (???)}$



Part 2: Quick-and-Dirty WACC

- **Requirements:** You need the company's Cost of Equity, Cost of Debt, Cost of Preferred Stock, and the percentages that these represent in its capital structure
- **Percentages:** Easy → Go to the company's filings and find the Debt and Preferred Stock, and then look up its Market Cap (Equity Value) online
- **Cost of Debt and Preferred:** Also easy → Take the Interest Expense on the Income Statement and divide by the Debt or average Debt for a quick approximation; similar with Preferred Dividends



UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549
FORM 10-K

TO SECTION 13 OR 15(d) OF THE SECURITIES ACT OF 1934
FOR THE PERIOD ENDED
DECEMBER 31, 2020

COMMISSION FILE NUMBER 0-21719
Steel Dynamics, Inc.
(Exact name of registrant as specified in its charter)



Part 2: Quick-and-Dirty WACC

- **Cost of Equity:** Gets trickier here because how can you estimate what a company's stock "should" return?
- **Usual Approach:** Risk-Free Rate + Equity-Risk Premium * Levered Beta
- **Rationale:** Take what you could earn in "risk-free" government bonds, add the *additional return* offered by the stock market, and then multiply by a factor representing *this company's* volatility relative to the market as a whole
- **OK, But:** How do you find all these numbers?



Part 2: Quick-and-Dirty WACC

- **Risk-Free Rate:** Look up “10-year U.S. Treasury yields” or the name of the 10-year government bond in your country
- **Equity Risk Premium:** You can find many estimates online (Big 4 firms, Damodaran, Statista, etc.) – don’t even bother trying to calculate this yourself
- **Levered Beta:** Look it up on Finviz, Google/Yahoo Finance, or paid services like Capital IQ
- **Result:** You can now calculate WACC with about 5 minutes of work and use it in your DCF



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Part 3: More Complex Calculations for WACC

- **Cost of Debt (and Preferred):** Technically, this represents the cost if the company issued *additional* Debt or Preferred Stock
- **So:** It's more accurate to use the **yield**, or the **yield to maturity (YTM)** on these issuances
- **Why:** If the company issues 5% bonds for \$1,000, but their market value falls to \$950, an investor who buys them at \$950 will earn more than 5% per year if they hold them until maturity
- **So:** It's useful to search for the "Fair Value" or "Fair Market Value" of the Debt in the company's annual or interim filings



Part 3: More Complex Calculations for WACC

- **And:** If we find it, we can use the YIELD function in Excel to get a slightly more accurate number (not a big deal for most companies)
- **Cost of Equity:** You can't really make the Risk-Free Rate or Equity Risk Premium components more complicated...
- **BUT:** Instead of using the company's own Levered Beta, you can calculate it based on the comparable public companies
- **Why:** Argument is that the peer companies better represent risk and potential returns (similar to multiples for valuation)



Part 3: More Complex Calculations for WACC

- **Process:** Need to screen for comparable public companies and get information on all their capital structures, Levered Betas, and tax rates



- **Then:** “Un-lever” Beta to separate the inherent business risk from the risk of leverage (Debt)



- **Unlevered Beta:** $\text{Levered Beta} / (1 + \text{Debt} / \text{Equity} * (1 - \text{Tax Rate}) + \text{Preferred} / \text{Equity})$

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- **Rationale:** It should always be *less than or equal to* Levered Beta, and the “1 +” term ensures that



Part 3: More Complex Calculations for WACC

- **Unlevered Beta:** Levered Beta / (1 + Debt / Equity * (1 – Tax Rate) + Preferred / Equity)

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- **Rationale:** We can estimate and “remove” risk from leverage with the Debt / Equity and Preferred / Equity terms; reduce the Debt one by a bit due to the tax deduction for interest



- **Then:** Get this median “Unlevered Beta” and re-lever it based on the capital structure of your company (current or planned)



- **Idea:** Taking the “inherent business risk” and now adjusting for the risk from your company’s Debt and Preferred Stock



Part 3: More Complex Calculations for WACC

- **Re-Levered Beta:** $\text{Unlevered Beta} * (1 + \text{Debt} / \text{Equity} * (1 - \text{Tax Rate}) + \text{Preferred} / \text{Equity})$

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- **Cost of Equity:** We can then calculate it, and WACC, a few different ways...



- **Method #1:** Simple one – company's Beta and cap structure

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- **Method #2:** Comparables' Beta and current cap structure

β



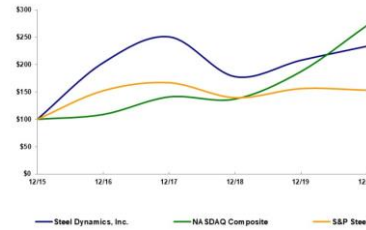
- **Method #2:** Beta *and* cap structure from comparables

β



Part 3: More Complex Calculations for WACC

- **Why?:** We want to establish a reasonable *range of values* for WACC, and these different methods give us a decent range
- **Reality:** 8.157% vs. 8.123% is irrelevant...
- **But:** We want to know if WACC is in the 10-12% range, the 13-15% range, or the 6-8% range
- **Rule of Thumb:** Aim for a range with a difference of about 2-3% between the min and max, at least for large, public companies
- **Here:** Maybe 6-9%, or even 7-8%? Depends on our certainty



Part 4: Leases in WACC

- **Two Basic Types:** “Finance Leases” (some element of ownership potential) and “Operating Leases” (strictly renting an asset)
- **Finance Leases:** Tend to be very small, and companies often group them with Debt without a separate disclosure
- **So:** Most WACC analyses have always counted Finance Leases as part of the Debt balance, but the impact has been very small
- **Operating Leases:** Tend to be much bigger, and before 2019, hardly anyone thought about treating them differently in the WACC calculations, but...



Part 4: Leases in WACC

- **2019:** Operating Leases moved onto companies' Balance Sheets
- **Result:** Lots of OCD people are now freaking out about what to do with Operating Leases in Enterprise Value, WACC, multiples, etc.
- **Our Recommendation:** Ignore them, deduct the Full Lease Expense in the Unlevered Free Cash Flow projections, and do not count Leases as "capital" in the DCF
- **Why:** Both Finance and Operating Leases are operational decisions, and the goal in a DCF is to capture cash inflows and cash outflows (and Rent is a major cash outflow)



Part 4: Leases in WACC

- **U.S. GAAP:** Easy – Operating Expenses should already deduct the Rental Expense; make a small adjustment for Finance Leases, if applicable
- **IFRS:** Need to deduct the Interest Element for both types of Leases in the UFCF calculation
- **Another Option:** You *could* count Operating Leases as “capital” in the WACC formula
- **Requirements:** Add another term in the Unlevered and Re-Levered Beta formulas and the WACC formula



Part 4: Leases in WACC

- **Unlevered Beta** = Levered Beta / (1 + Debt / Equity * (1 – Tax Rate) + Leases / Equity * (1 – Tax Rate) + Preferred Stock / Equity)
- **(Re)Levered Beta** = Unlevered Beta * (1 + Debt / Equity * (1 – Tax Rate) + Leases / Equity * (1 – Tax Rate) + Preferred Stock / Equity)
- **WACC** = Cost of Equity * % Equity + Cost of Debt * (1 – Tax Rate) * % Debt + Cost of Leases * (1 – Tax Rate) * % Leases + Cost of Preferred Stock * % Preferred Stock
- **Overall Effect:** WACC tends to *decrease* for companies with low/reasonable leverage because the Cost of Leases is usually \leq the Cost of Debt



Part 4: Leases in WACC

- **But:** Counting Operating Leases as “capital” creates *a lot* of extra work and barely affects the DCF output
- **Why:** You also need to add back the full Lease Expense in Unlevered Free Cash Flow, use EBITDAR instead of EBITDA, change the Enterprise Value calculations, etc.
- **So:** We think it’s easiest to leave Operating Leases out of the WACC formula and calculate it the conventional way



Part 5: How Does WACC Change When...

- **Short Answer:** Take a look at the summary chart in the Excel file



- **Logic:** Think about the **risk and potential returns** from changes to different components of WACC



- **Example:** Smaller companies and ones in emerging markets tend to be riskier, but also offer higher potential returns



- **Example 2:** A higher Risk-Free Rate, Equity Risk Premium, and Beta all *increase* the Cost of Equity → Cost of Equity is a part of WACC, so WACC must increase as well



Part 5: How Does WACC Change When...

- **Trickier:** If Debt “increases,” it depends on how much Debt the company already has
- **Initially:** No Debt to some Debt reduces WACC because Debt is cheaper than Equity, and that outweighs its drawbacks
- **But:** Above a certain Debt / Total Capital, the **drawbacks** of Debt (added bankruptcy risk) start to outweigh its benefits, which increases WACC
- **Taxes:** A higher tax rate gives Debt a *bigger* cost advantage, pushing down WACC – but only if the company has Debt!



Recap and Summary

- **Part 1:** The Big Idea Behind the Discount Rate



- **Part 2:** Quick-and-Dirty WACC



- **Part 3:** More Complex Calculations



- **Part 4:** Leases in WACC: What to Do



- **Part 5:** “How Does X Affect WACC?” Interview Questions

