Corporate
Finance Institute

Financial Ratios Definitive Guide

Essential ratios for comprehensive financial analysis

Definitions, formulas, examples, and interpretations of financial ratios for profitability, return, efficiency, and leverage.

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Your Go-To Financial Ratio Resource

Corporate Finance Institute's (CFI's) ***Definitive Guide to Financial Ratios*** provides a focused look at the key ratios used in financial analysis. Within its pages, finance professionals can quickly look up the ratios for profitability, return, efficiency, and financial leverage and find definitions, formulas, in-depth explanations, and examples.

Use CFI's ***Definitive Guide*** to help you or your team master financial ratio analysis. With our comprehensive guide, organizations can establish a shared baseline understanding of financial ratios while enhancing individual skills. Standardizing finance skills across the organization can lead to improved consistency, accuracy, and efficiency in reporting, analysis, and decision-making.

To learn how to conduct a comprehensive financial evaluation of any organization, check out Financial Analysis Fundamentals, a core course in CFI's Certified Financial Modeling & Valuation Analyst (FMVA)® program. This guide's authors, Scott Powell, Duncan McKeen, and Jeff Schmidt, bring decades of financial services and financial analysis training experience to design and teach the curriculum for the FMVA program, providing training for teams and individual learners on essential skills for practical financial analysis.

Practical Finance Training for Teams

A skilled, high-performing finance team can uncover valuable insights and enable better decision-making to keep your business ahead of the competition. Yet, finance leaders face the constant challenge of effectively developing and retaining their workforces while pursuing business goals.

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About Corporate Finance Institute

CFI is the leading online provider of banking and finance training and certifications. Combining industry expertise with hands-on learning, CFI is the go-to resource for 1.8 million professionals and hundreds of teams worldwide.

Learn more at corporatefinanceinstitute.com.

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I. Financial Ratio Analysis Overview

Financial ratios are indispensable tools used across corporations, financial institutions, investment banks, and professional services firms to evaluate business performance and make strategic decisions. Within organizations, finance teams calculate ratios to help them assess profitability, liquidity, leverage, and operating efficiency over time and versus competitors. CFOs and other executives finance teams use these insights to guide capital allocation, cost management, and growth strategies.

Creditors and investors rely heavily on financial ratios to analyze the creditworthiness and investment potential of businesses. Commercial bankers use liquidity and leverage ratios to determine loan terms and risk. Ratings agency analysts consider profitability and coverage ratios when assigning credit ratings that impact borrowing costs. Investment bankers and equity research analysts incorporate financial ratios into valuation models, which they use to make recommendations to buy, sell, or hold a company's stock.

This comprehensive guide to financial ratios empowers finance leaders and their teams across organizations to extract key insights from financial statements. Within this guide, you'll find definitions, calculations, interpretation, industry benchmarks, and examples for all critical categories - liquidity, asset management, debt management, profitability, and market value ratios.

With a solid grip on financial ratios, managers and analysts across corporate finance, banking, investment, and credit teams can thoroughly assess business performance and make smart data-driven decisions.

In addition to using this guide, you or your team can learn how to conduct a comprehensive financial evaluation of any organization in CFI's Financial Analysis Fundamentals course, taught by Scott Powell, CFI Co-Founder, Chief Content Officer, and ***Definitive Guide*** co-author.

What Is Ratio Analysis?

Financial professionals use quantitative measures known as corporate finance ratios to assess businesses. They use these ratios to evaluate the overall financial health of businesses, with the end goal of making better investment decisions. Financial managers and C-suite officers rely heavily on corporate finance ratios to get a better understanding of how their businesses are performing.

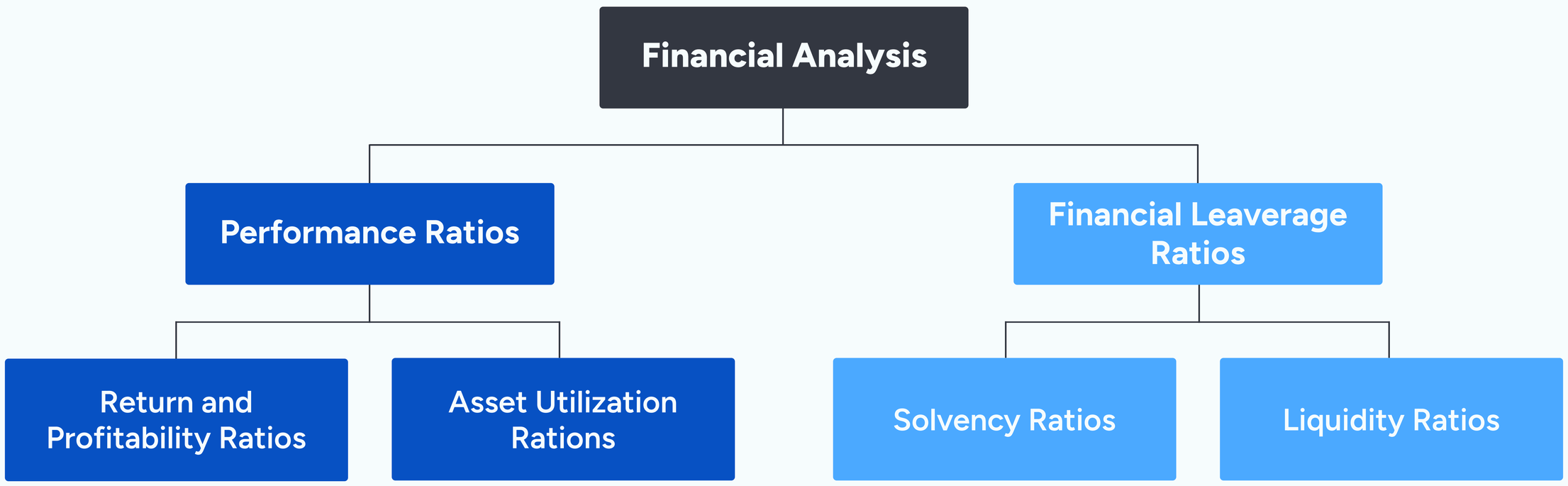
Why Use Ratio Analysis?

Ratio analysis serves as an invaluable method to assess and compare companies that differ in size, operations, and management styles. It provides a comprehensive evaluation of a company's operational efficiency and profitability potential. This analytical approach offers valuable insights into the financial health and stability of a business.

Types of Ratios

Corporate finance ratios can be broken down into two main categories and four subcategories. The first group is performance ratios, which provide insights into how well a company is performing. These ratios examine the company's returns, profitability, and the efficiency with which it utilizes its assets.

In contrast, the second group comprises financial leverage ratios, which assess solvency and liquidity. Solvency ratios focus on evaluating a company's long-term financial health and its ability to meet long-term obligations. On the other hand, liquidity ratios analyze the company's immediate cash position and its capacity to handle short-term financial needs and obligations. Both solvency and liquidity are crucial factors to consider when assessing a company's overall financial well-being.



A Best Practice Approach to Ratio Analysis

Using four essential steps can help you gain valuable insights into a business's financial health and performance through financial ratio analysis.

1. Collect

The first step in conducting a comprehensive financial analysis is to gather multiple years of historical financial statements, including income statements, balance sheets, and cash flow statements. By examining data from multiple years, you can observe patterns and trends, providing a more comprehensive view of the company's financial performance.

2. Calculate

Once you have collected the financial statements, it's time to calculate various financial ratios. Financial ratios are powerful tools that allow you to assess a company's performance and compare it to industry standards. Some commonly used ratios include liquidity ratios, profitability ratios, and solvency ratios. By calculating these ratios, you can gain insights into the company's liquidity, profitability, efficiency, and overall financial stability.

3. Interpret

With the calculated financial ratios in hand, it's crucial to interpret them effectively. Look for trends and patterns that emerge from the ratios and try to uncover the stories behind the numbers. For example, a declining profitability ratio may indicate inefficiencies or increased competition, while a consistent growth in liquidity ratios may suggest a strong cash position. By delving deeper into these ratios, you can better understand the company's financial strengths and weaknesses.

4. Benchmark

Finally, it's important to benchmark the calculated ratios against an appropriate peer group or industry averages to gain a broader perspective on a company's performance. This comparison allows you to evaluate how the company fares in relation to its competitors or the industry. By benchmarking, you can identify areas where the company excels or falls behind, helping you pinpoint opportunities for improvement.

Remember, financial analysis is an ongoing process that requires continuous monitoring and adjustment. Following these four steps—getting historic financial statements, calculating financial ratios, interpreting the ratios, and benchmarking against peers—will equip you to make informed decisions and uncover valuable insights into a business's financial health.

Critical Tips for Effective Ratio Analysis

Here are five important tips that can enhance the quality and accuracy of your financial analysis.

1. Obtain Five Years of Data Minimum

When conducting financial analysis, gather a minimum of five years of historical financial performance. This timeframe allows you to observe long-term trends and assess the company's stability and consistency over time. A longer history of financial data provides a more comprehensive understanding of the business's performance, making it easier to identify patterns and make informed decisions.

2. Make Your Calculations Transparent

Make your calculations in Excel or a similar spreadsheet software to ensure accuracy and maintain transparency in your financial analysis. By systematically organizing your calculations, you can easily trace the numbers back to the financial statements, ensuring the accuracy of your ratios. Transparent calculations also enable you to share your analysis with others and facilitate collaboration or review processes.

3. Identify An Appropriate Peer Group for Benchmarking

Identifying an appropriate peer group is a key step in benchmarking your financial analysis. However, it's important to note that finding two companies that are perfectly similar is often challenging. Instead, aim to select companies that operate in the same industry or share similar business models. While the peer group might not be a perfect match, it can still provide valuable insights into how the company performs relative to its competitors.

4. Keep Ratio Adjustments to a Minimum

When working with financial ratios, keep adjustments to a minimum. Adjusting ratios introduces additional complexity and increases the likelihood of errors creeping into your analysis. If adjustments are necessary, document them clearly and make sure to review and validate them regularly. Minimizing adjustments allows for a more accurate assessment of the company's financial performance.

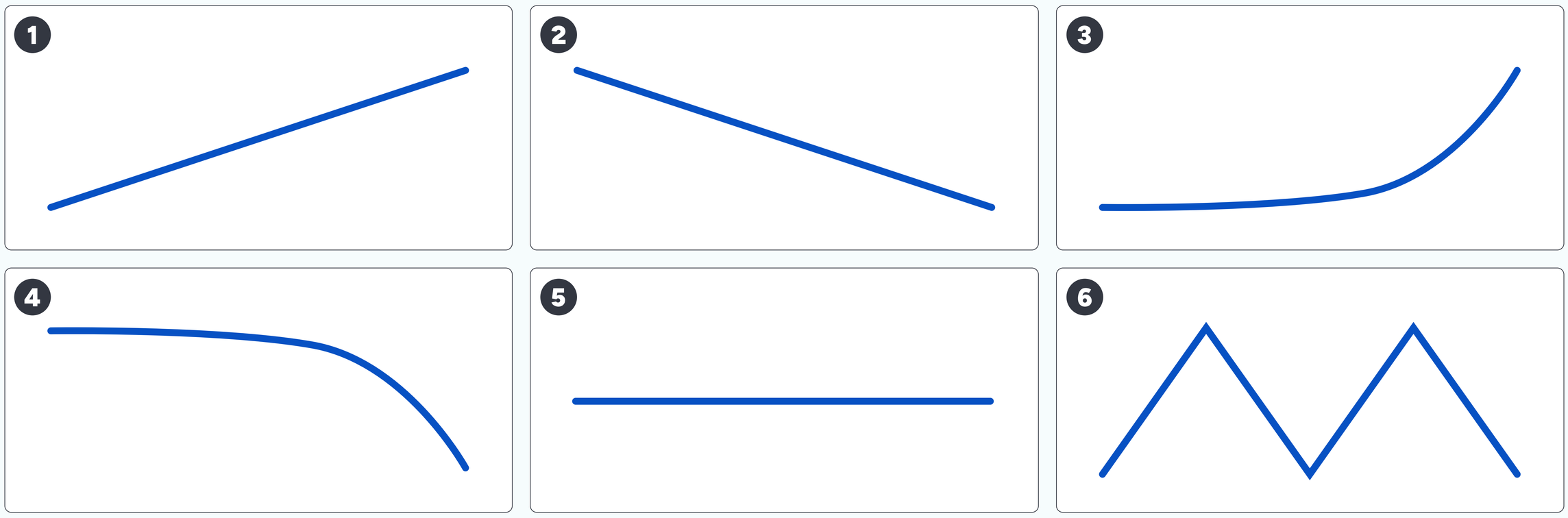
5. It’s Okay to Use Closing Balances Rather Than Averages

When comparing financial ratios, it is common practice to use averages for academic purposes. However, most analysts and professionals rely on closing (current year) balances in real-world scenarios. Closing balances provide a starting point for the analysis and offer a clearer picture of the company's financial performance at the beginning of the period under review. Using closing balances also ensures consistency and facilitates meaningful comparisons over time.

Trend (Horizontal) Analysis

Trend analysis, also known as horizontal analysis, is a crucial component of financial ratio analysis. It involves comparing results across different periods such as months, quarters, or years.

While calculating individual year-over-year change can be insightful, conduct your analysis using multiple years of results, ideally a minimum of five years. This extended timeframe allows trends to emerge, providing valuable insights for forecasting and future projections. Through the examination of historical trends, we gain a better understanding of how to project future performance.



Each of the illustrations above help us make broad observations about trends.

1. We may observe consistent growth, represented by a line indicating a constant year-over-year growth rate.
2. Conversely, we might identify a declining revenue trend over time, depicted by a downward sloping line.
3. Alternatively, significant strategic changes or shifts within an industry may lead to steeper growth, deviating from linear growth patterns seen in the previous examples. This exponential growth curve would be characteristic of a company or industry undergoing a major transformation.
4. On the other hand, if an industry is experiencing disruption, we may witness rapidly declining and accelerating declining revenue, illustrated by a steep downward sloping curve. It is worth noting that this pattern can also apply to costs, where a company drastically reduces its expenses, resulting in a declining cost curve.
5. Further analysis may reveal a situation where revenue or expenses remain flat with no growth or change over time, represented by a straight flat line.
6. Lastly, we may encounter volatility, where a company's revenue and expenses fluctuate, exhibiting periods of growth followed by decline and vice versa.

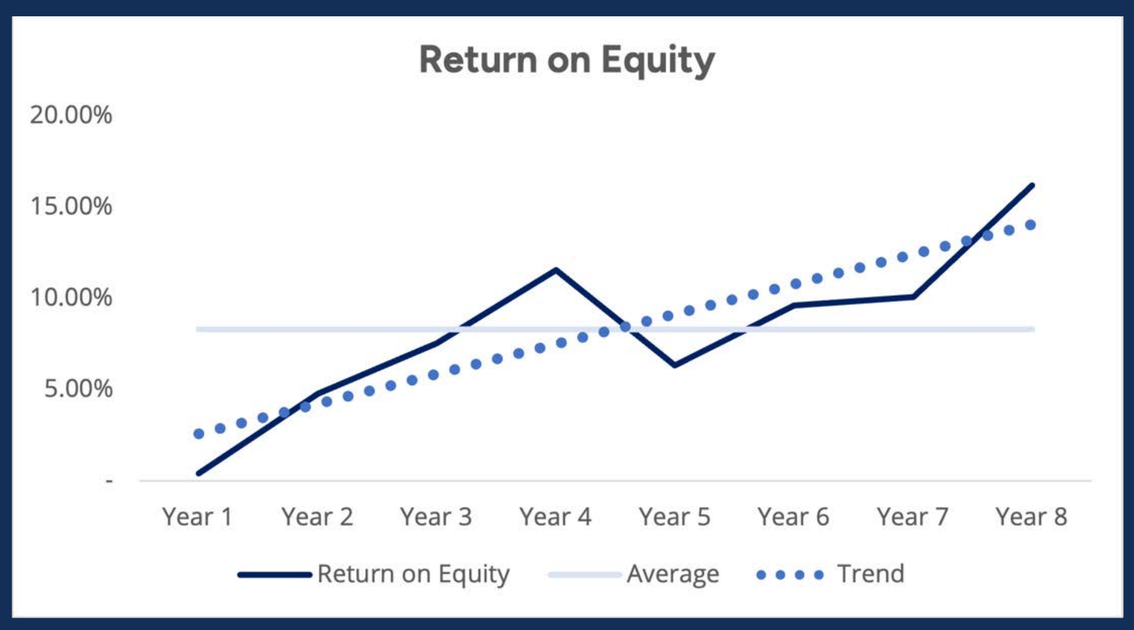
Regardless of the shape of the results, the key is to assess trends over several years of results and use those trends to make projections about future performance. This forward-looking analysis is essential for gaining insights into the company's prospects. Ultimately, this process captures the essence of horizontal or trend analysis.

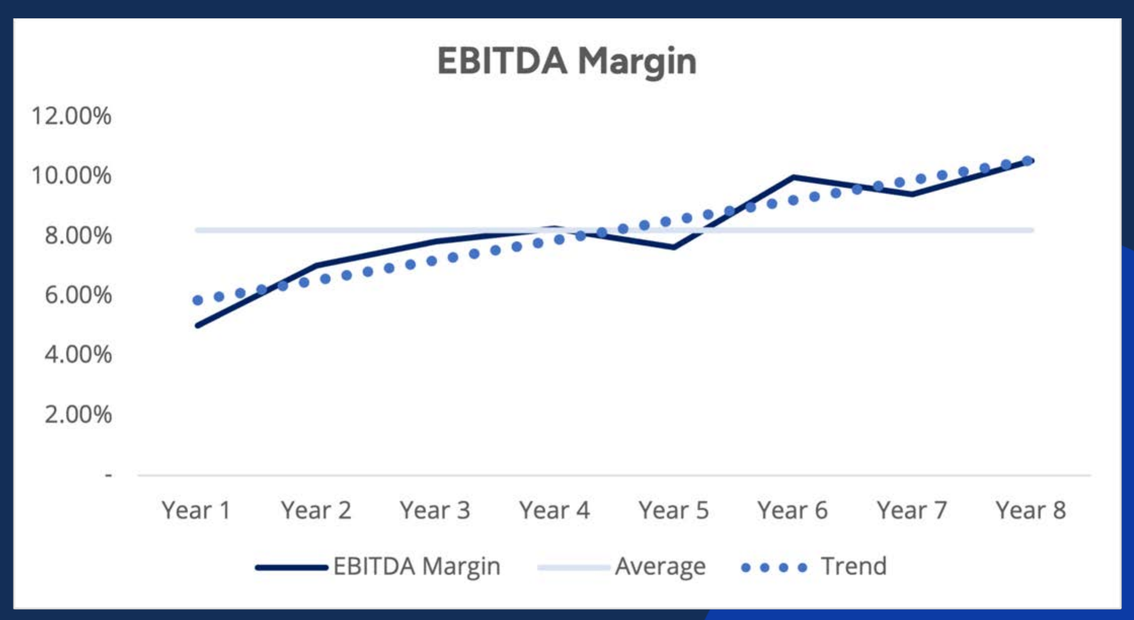
The Importance of Visualizing Trends

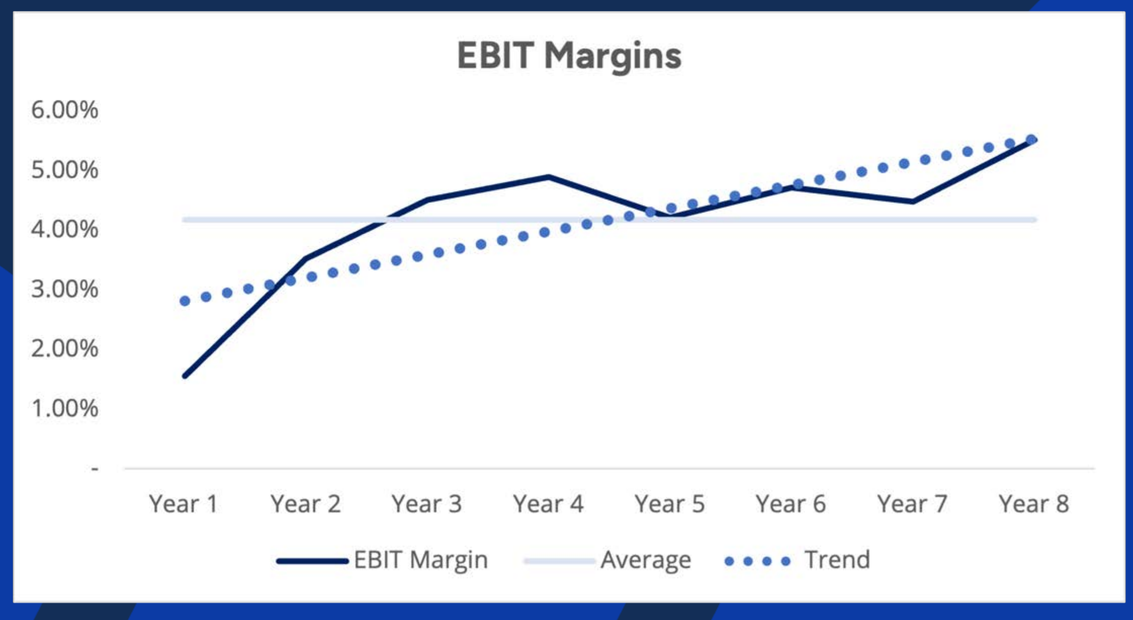
Data visualization is critical to effective horizontal financial analysis. As the saying goes, a picture speaks a thousand words. Look at the following table–can you immediately see the trends? The answer is a clear no.

All figures in USD thousands unless stated	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Average
Return on Equity	0.41%	4.81%	7.56%	11.59%	6.32%	9.62%	10.08%	16.20%	8.32%
Average	8.32%	8.32%	8.32%	8.32%	8.32%	8.32%	8.32%	8.32%	
Gross Margin	28.21%	31.15%	31.72%	32.72%	33.73%	35.97%	35.26%	36.48%	33.15%
Average	33.15%	33.15%	33.15%	33.15%	33.15%	33.15%	33.15%	33.15%	
EBITDA Margin	5.01%	7.03%	7.84%	8.26%	7.63%	9.98%	9.41%	10.53%	8.21%
Average	8.21%	8.21%	8.21%	8.21%	8.21%	8.21%	8.21%	8.21%	
EBIT Margin	1.55%	3.53%	4.51%	4.89%	4.22%	4.73%	4.49%	5.52%	4.18%
Average	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	4.18%	
Net Profit Margin	0.12%	1.39%	2.12%	3.26%	1.64%	2.25%	2.10%	3.53%	2.05%
Average	2.05%	2.05%	2.05%	2.05%	2.05%	2.05%	2.05%	2.05%	

Now, let's look at the same data presented visually in the four graphs below. The trends are clearly visible. We see the addition of two features that make the trend analysis even easier to read. The lightest line in the graphs below are the averages over 5 years, while the dotted line represents a trend line, which is helpful when a trend may be hard to see otherwise.







Benchmarking

As we have already seen, financial ratios are valuable tools for assessing a company's performance. Still, their true significance lies in the context they provide.

Benchmarking allows us to compare a company's ratios against those of its peers operating in the same sector. By doing so, we gain insights into how the company performs relative to its competitors and the industry as a whole. Benchmarking is typically done against a small peer group or an industry benchmark.

Benchmarking against a small peer group provides a focused comparison among direct competitors, offering specific and actionable insights.

On the other hand, benchmarking against the industry at large provides a broader context, capturing overall industry trends and performance expectations.

Each approach has its merits, and both approaches are often used in combination to gain a comprehensive understanding of a company's performance and competitiveness.

1. Industry Benchmarking

Benchmarking against the industry at large involves comparing a company's financial ratios and performance metrics to those of a wide range of companies operating within the same sector. This approach considers companies of varying sizes, market positions, and operational models. Industry benchmarks are formulated by aggregating data from a diverse set of companies within the sector.

With industry benchmarking, companies can gain a broader context that helps them identify overall industry trends, challenges, and opportunities. This context enables them to understand their relative position within the industry and how their performance stacks up against the larger market. Such a perspective is invaluable for strategic decision-making, such as long-term goal setting and identifying potential areas for growth or diversification.

2. Peer Benchmarking

In peer benchmarking, the focus is on comparing financial ratios and performance metrics with a select group of companies that are similar in size, market position, and operational characteristics.

A typical peer group includes direct competitors or companies operating within the same industry niche.

Benchmarking against a small peer group allows for a more granular analysis and comparison. It provides a focused view of how a company is performing relative to its closest competitors. This level of detail can uncover specific strengths, weaknesses, and competitive advantages within a specific market segment.

Realistically picking peers is the most important part of a peer group analysis and where you should spend the bulk of your time, unless you are already a specific-industry expert.

Again, the goal is to find peers with similar risk factors as the company you are analyzing.

If there are no good peers, then you may want to look at companies in different industries that have similar characteristics as the company in question.

But this should be done very rarely and carefully; straying outside a particular sector is rare in practice.

Ultimately, your benchmarking should be determined based on the closest and best peers.

A typical peer group benchmarking checklist involves evaluating the similarity of businesses based on key business and finance characteristics such as:

Business Characteristics

- Industry/Sector (Sub-Sector)
- Geography
- Products/Services
- Customers
- Distribution Network

Finance Characteristics

- Size
- Growth
- Margins
- Seasonality/Cyclicality
- Leverage/Credit Rating

II. Return, Profitability, and Expense Ratios

Return, profitability, and expense ratios are financial metrics used to measure and evaluate the ability of a business to generate income (profit) relative to revenue, assets, operating costs, and shareholders' equity during a specific period.

Return Ratios

Return ratios represent the company's ability to generate returns for its shareholders and other capital providers. It typically compares a return metric to certain balance sheet items.

- Return on Equity
- Return on Assets
- Return on Invested Capital

Profitability Ratios

Profitability ratios, or margin ratios, represent the company's ability to convert sales into profits at various degrees of measurement. Profitability ratios take different profit metrics from the income statement and compare them to revenue.

- Gross Profit Margin
- Operating Profit Margin
- Net Profit Margin

Expense Ratios

Expense ratios represent how much of a company's revenue is absorbed by specific expense categories such as cost of goods sold, selling, general and administrative costs (SG&A), interest, and tax. Like profitability ratios, expense ratios take different expense metrics from the income statement and compare them to revenue.

- Effective Interest Rate
- Interest Burden
- Effective Tax Rate
- Tax Burden

Return Ratios: Return on Equity (ROE)

$$\frac{\text{Net Income}}{\text{Total Shareholders' Equity}}$$

Return on equity (ROE) is a measure of a company's annual return (net income) divided by the value of its total shareholders' equity, expressed as a percentage (e.g., 10%).

INTERPRETATION

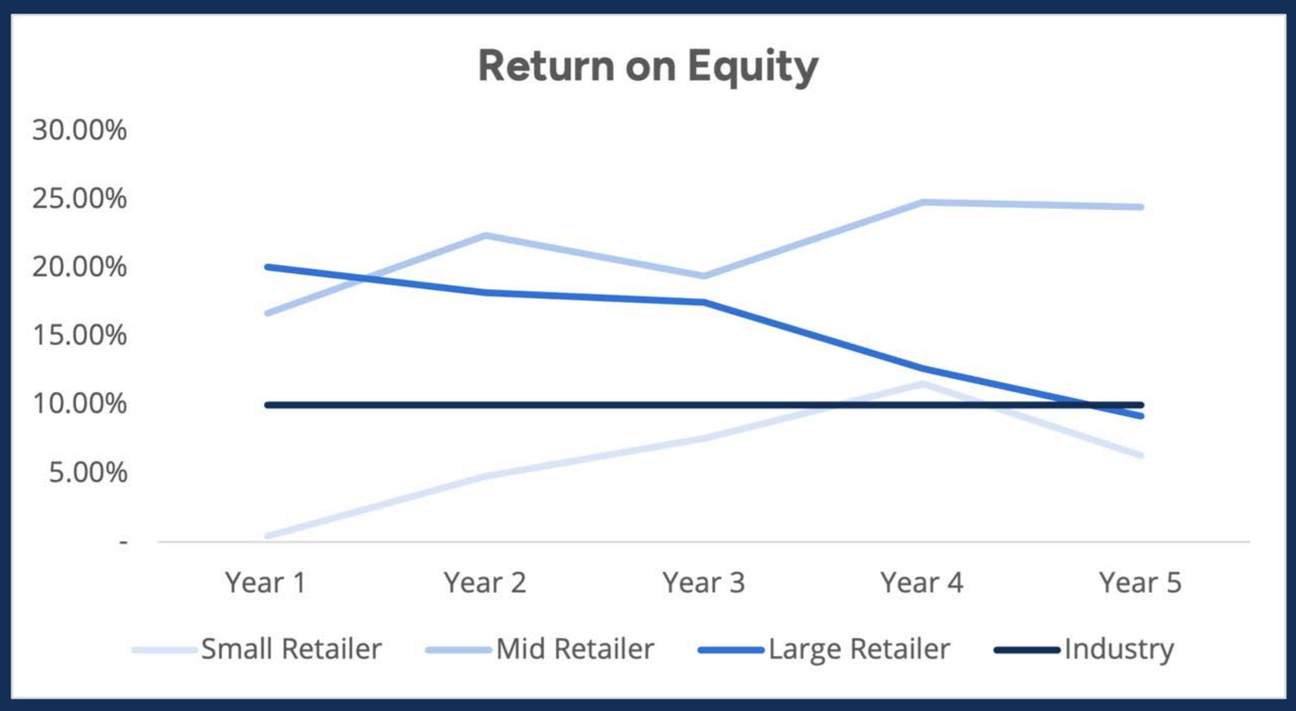
ROE measures the profitability and efficiency of a company in generating returns for its shareholders' equity investment. It shows how effectively a company utilizes its shareholders' capital to generate profits. A higher ROE generally indicates better financial performance. It suggests the company generates higher profits relative to its shareholders' equity investment. A higher ROE is often preferred as it signifies efficient utilization of capital.

EXAMPLE

Here are ROE ratios for small, medium, and large retailers selling similar merchandise, as well as an industry benchmark. These ratios are based on the financial results of real companies with names removed for learning purposes.

The mid-sized retailer has the highest average ROE at 21.58%, more than double the industry average of 10.00%.

The large retailer, on average, also outperformed the industry average by 5.55%. However, there is a worrying downward trend in the large retailer's ROE, which dropped from 20.10% in year 1 and steadily decreased to 9.20% in year 5. The small retailer has the lowest average ROE at 6.14%, significantly below the industry average.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Return on Equity						
Small Retailer	0.41%	4.81%	7.56%	11.59%	6.32%	6.14%
Mid Retailer	16.73%	22.39%	19.46%	24.86%	24.49%	21.58%
Large Retailer	20.10%	18.24%	17.54%	12.66%	9.20%	15.55%
Industry	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%

Return Ratios: Return on Assets (ROA)

$$\frac{\text{Net Income}}{\text{Total Assets}}$$

Return on assets (ROA) is a type of return ratio that measures the profitability of a business in relation to its total assets. This ratio indicates how well a company performs by comparing the profit (net income) it generates to the total invested in assets.

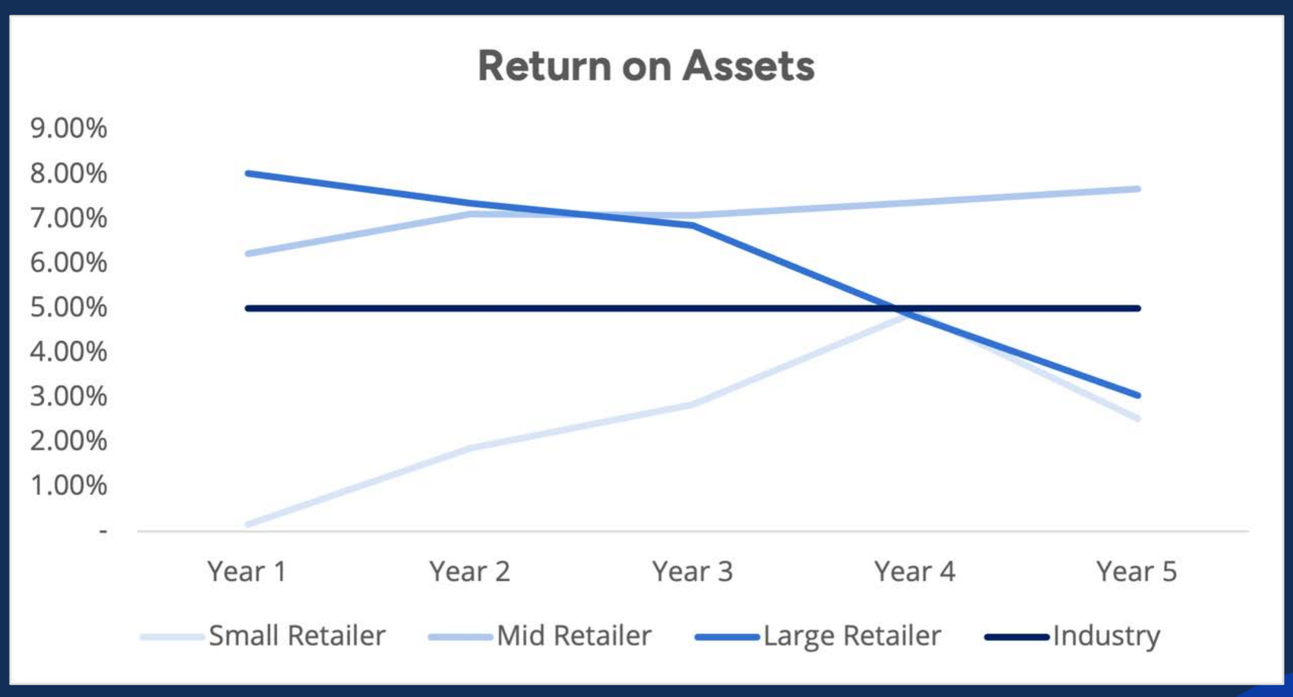
INTERPRETATION

The ROA ratio is crucial for evaluating a company's profitability. ROA is commonly used to assess a company's performance over time or to compare companies within the same industry. When comparing companies using ROA, it is essential to consider the scale of their businesses and the nature of their operations.

It's important to note that different industries typically have different ROAs. Industries that require substantial investments in fixed assets and have capital-intensive operations tend to have lower ROAs. A lower ROA occurs because the larger asset base increases the denominator of the ROA formula. Ultimately, the interpretation of ROA should be relative and consider the specific industry and company circumstances.

EXAMPLE

Here are ROA ratios for the same retailers with an industry benchmark ROA of 5.00%. All three of these retailers have significant amounts of property, plant, and equipment (such as stores and distribution centers) and are required to hold large inventories. These factors help explain a lower ROA on average.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Return on Assets						
Small Retailer	0.16%	1.86%	2.85%	4.92%	2.53%	2.46%
Mid Retailer	6.23%	7.11%	7.09%	7.37%	7.68%	7.09%
Large Retailer	8.03%	7.36%	6.86%	4.82%	3.04%	6.02%
Industry	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%

In comparison, the telecom sector, which is even more asset-intensive than retail, has an average ROA of 3.00%. On the other end of the spectrum, the technology sector, which is much less asset-intensive, has an average ROA of 12.00%.

When analyzing this data, we observe a similar downward trend in the large retailer's ROA, dropping from 8.03% to 3.04%. In contrast, the mid-sized retailer maintained a consistently steady ROA over the same period.

Return Ratios: Return on Invested Capital (ROIC)

$$\frac{\text{Net Operating Profit After Tax}}{\text{Net Debt} \quad \text{Equity}}$$

NOPAT = EBIT x (1 - Tax Rate)

Return on invested capital (ROIC) is a return ratio that looks at returns to all capital providers, both debt and equity. It is sometimes referred to as the return on capital employed (ROCE) ratio. Net operating profit after tax is calculated by taking earnings before interest and tax (EBIT) from the income statement and multiplying it by 1 minus the tax rate. Net debt includes all interest-bearing liabilities (current and non-current) less cash. The assumption here is the company could use its cash to pay down debt at any point. Equity is total shareholders' equity.

INTERPRETATION

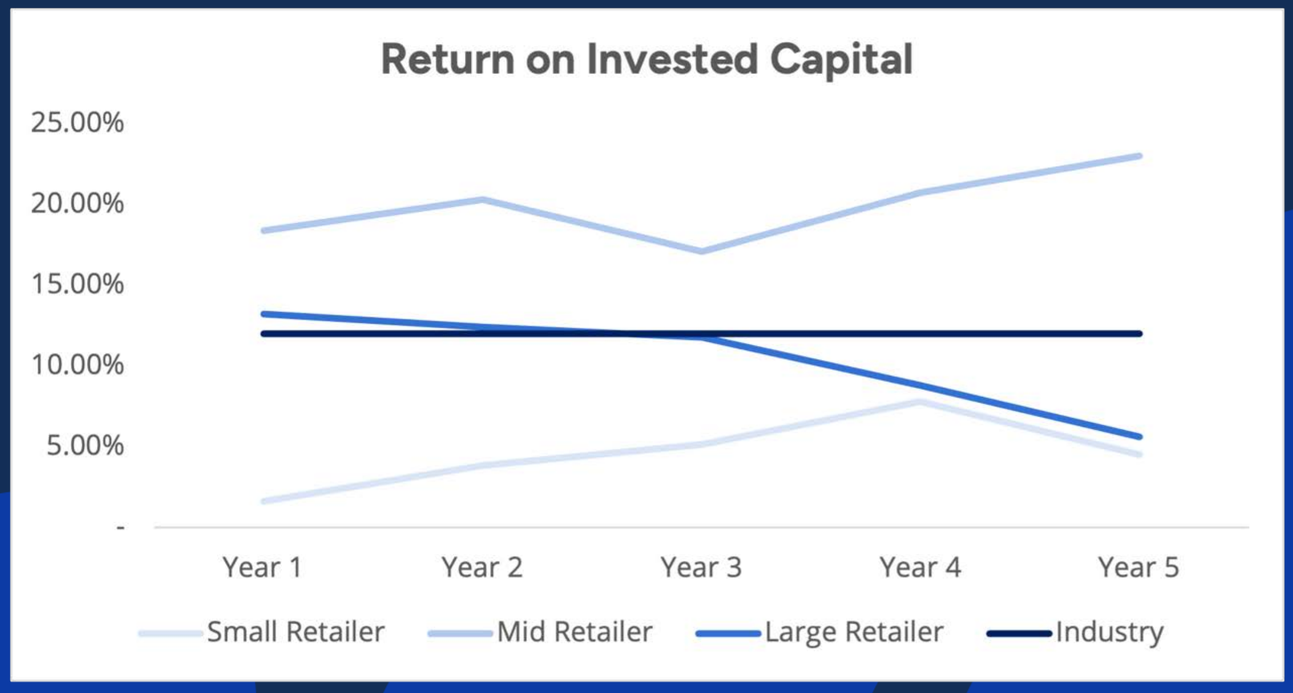
Let's discuss a fundamental principle that should always be at the forefront of your mind when conducting financial analysis: the principle of comparing apples to apples and oranges to oranges. This principle emphasizes the importance of ensuring that you compare metrics of the same nature and relevance.

Take a closer look at the return on equity (ROE) ratio. Since the profit that belongs to shareholders is net income, we calculate ROE by dividing net income by equity. This ratio specifically focuses on the returns generated for equity investors.

Now, let's shift our attention to ROIC. Here, we need to incorporate a profit metric that considers both shareholders and debtholders. Therefore, we calculate a profit figure that excludes interest expenses, representing the returns to debtholders.

EXAMPLE

Here are ROIC ratios for the same three retailers. The mid-sized retailer has the highest average ROIC at 19.90%, almost 8.00% higher than the industry average. Again, the small retailer has the lowest average ROIC at 4.57%. ROIC and ROE commonly move in line with each other as we see here.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Return on Invested Capital						
Small Retailer	1.61%	3.81%	5.14%	7.79%	4.51%	4.57%
Mid Retailer	18.35%	20.32%	17.08%	20.72%	23.01%	19.90%
Large Retailer	13.19%	12.40%	11.79%	8.80%	5.61%	10.36%
Industry	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%

Profitability Ratios: Gross Margin

$$\frac{\text{Gross Profit}}{\text{Revenue}}$$

The gross margin ratio, also known as the gross profit margin ratio, is a profitability ratio that compares a company's gross profit to its revenue. It shows how much profit a company makes after paying off its cost of goods sold (COGS). The ratio indicates the percentage of revenue the company retains as gross profit, so naturally a high gross margin is preferable.

INTERPRETATION

A low gross margin ratio does not necessarily indicate a poorly performing company. It is important to compare gross margins between companies in the same industry rather than across industries. For example, a legal service company reports a high gross margin because it operates in a service industry with low production costs. In contrast, the ratio will be lower for a car manufacturing company because that industry has a high direct operating cost of goods.

This ratio is an example of vertical analysis where each line item on the income statement is compared to revenue. In contrast, the term horizontal analysis is used to describe comparing periods with each other (i.e., quarters, years, etc.).

EXAMPLE

Here are gross profit margin ratios for the same three retailers. We see a wide range of performance, which is somewhat uncommon within an industry and suggests very different retail strategies. The mid-sized retailer's gross margins are about half those of the small and large retailers and 6.00% on average lower than the industry average. This metric suggests the mid-sized retailer may operate on much lower profit margins by selling at lower prices, or it has a problem controlling its direct operating costs.

Both the large and mid retailers have very steady predictable gross margins, while the small retailer has the best margins, and they are trending upwards.

	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Gross Margin						
Small Retailer	28.21%	31.15%	31.72%	32.72%	33.73%	31.51%
Mid Retailer	13.50%	13.99%	14.38%	14.35%	14.03%	14.05%
Large Retailer	26.71%	27.09%	27.72%	27.48%	27.17%	27.23%
Industry	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%

Profitability Ratios: Operating Profit Margin

$$\frac{\text{Operating Profit (EBIT)}}{\text{Revenue}}$$

The operating profit margin is a profitability ratio used to calculate the percentage of profit a company produces from its operations before subtracting taxes and interest expenses. It is calculated by dividing operating profit by total revenue and is expressed as a percentage. This margin ratio is also known as the EBIT (Earnings Before Interest and Tax) margin.

INTERPRETATION

The operating profit margin calculation is the percentage of operating profit derived from each currency unit of revenue. For example, if the company's reporting currency is dollars, you can interpret a 15% operating profit margin as follows: for every $1 of revenue, the company generates 15 cents of profit after covering all its operating costs.

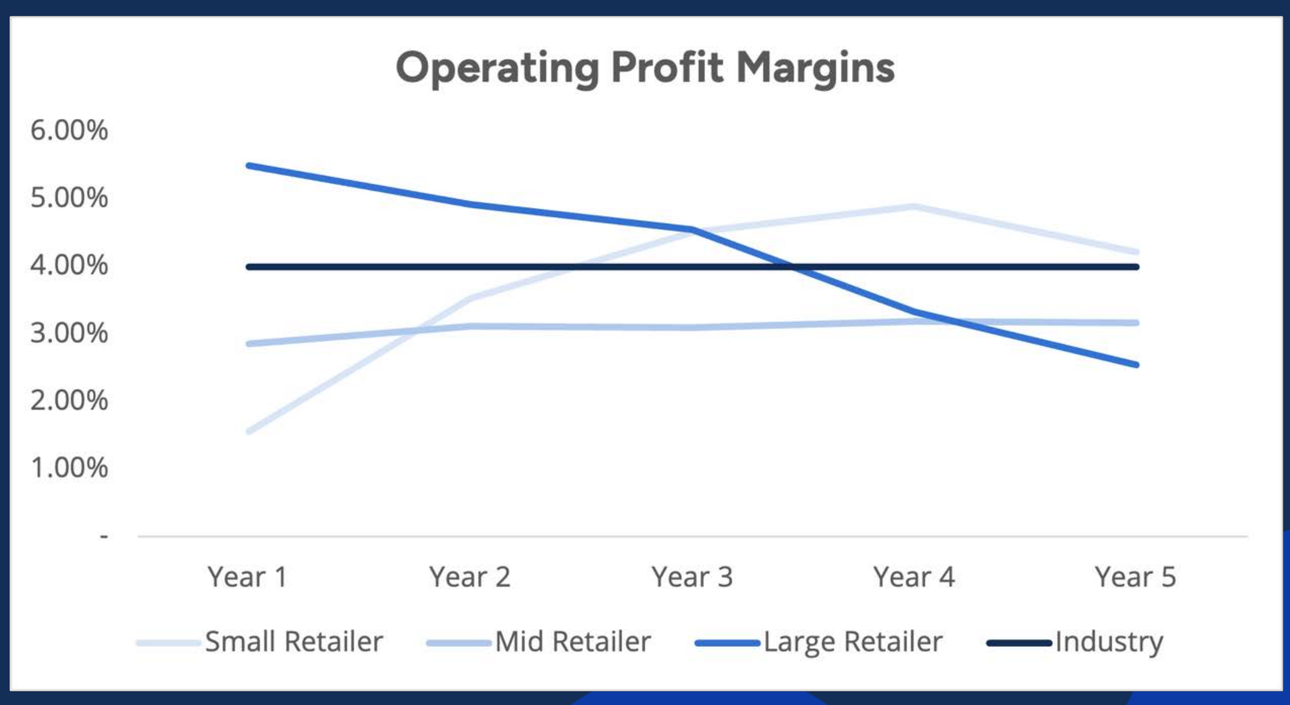
Some analysts prefer to calculate this ratio with EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization) rather than EBIT as depreciation and amortization are non-cash operating expenses. If in doubt, calculate both. In most instances the EBIT and EBITDA versions of these ratios will be highly correlated. A large difference between the two could mean very different asset structures and/or asset useful lives.

EXAMPLE

Here are operating profit margin ratios for the same three retailers. Unlike the wide range of gross margins among the retailers, all the retailers' operating profit margin ratios range between 3% and 4%. Recall the mid-sized retailer's gross margins were significantly lower than the rest.

Now, the mid-sized retailer is much closer to the other retailers, suggesting its selling, general, & administration (SG&A) expenses are much lower as a percentage of revenue. This shift may be the result of economies of scale or lower indirect operating expenses.

The large retailer's EBIT margins show a clear downward trend.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Operating Profit Margins						
Small Retailer	1.55%	3.53%	4.51%	4.89%	4.22%	3.74%
Mid Retailer	2.86%	3.12%	3.09%	3.19%	3.16%	3.08%
Large Retailer	5.50%	4.92%	4.55%	3.33%	2.54%	4.17%
Industry	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%

Profitability Ratios: Net Profit Margin

$$\frac{\text{Net Income}}{\text{Revenue}}$$

Net profit margin (also known as “profit margin” or “net profit margin ratio”) is a financial ratio used to calculate the percentage of profit a company produces from its total revenue. It measures the amount of profit left for shareholders after all expenses. The net profit margin is equal to net profit (also known as net income) divided by total revenue, expressed as a percentage.

INTERPRETATION

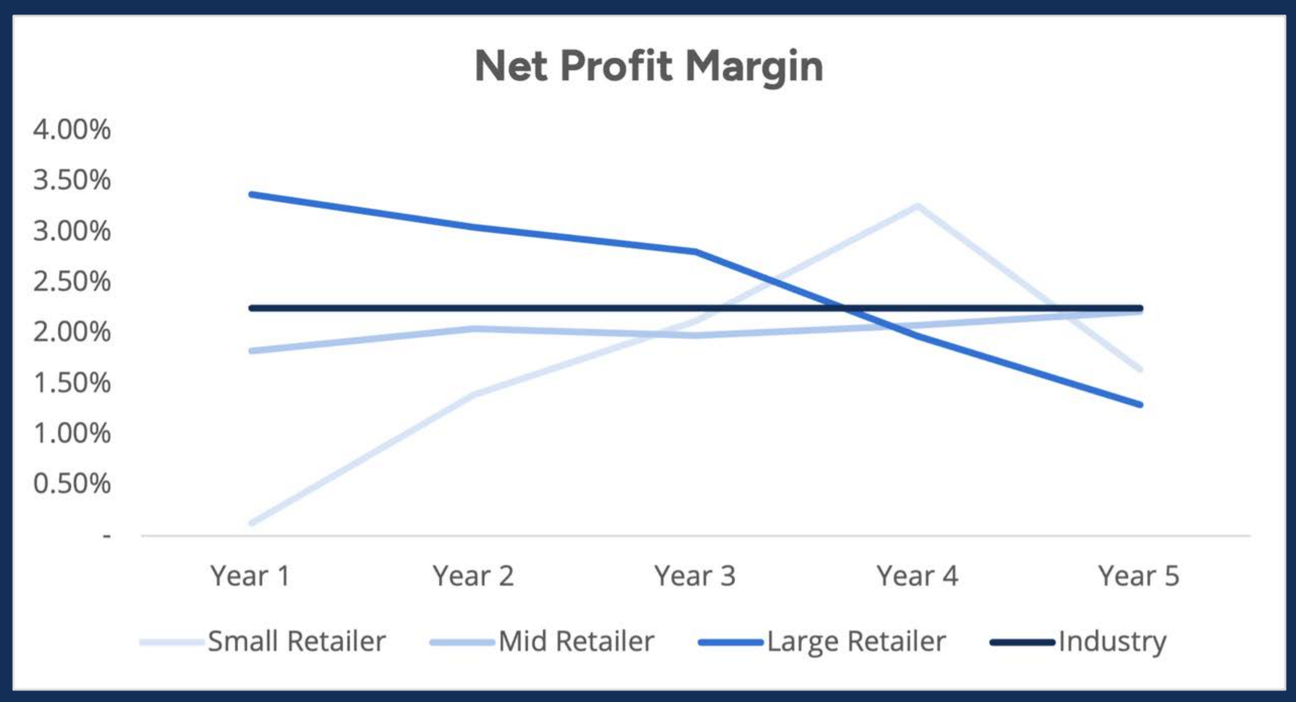
For example, if the company’s reporting currency is dollars, a 5% net profit margin, you can interpret as, for every $1 of revenue, the company generates 5 cents for its shareholders. The typical profit margin ratio of each company differs depending on the industry.

EXAMPLE

Here are net profit margin ratios for the same three retailers. The net profit margins amongst the retailers have now much more closely converged with all retailers delivering around the industry average of 2.25%. General retailers typically deliver very low margins compared to other industries.

In the software and technology sector net profit margins are typically much higher around 20% to 30%. Luxury goods often have extremely high profit margins, as high as 60% as the perceived value of the products allows for significant markups.

We can still see the clear downward trend for the large retailer. In contrast, the mid-sized retailer continues to deliver stable profitability for shareholders. Lastly, the small retailer made the most improvement of the three retailers save for a large decrease in year 5.



Net Profit Margin	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Small Retailer	0.12%	1.39%	2.12%	3.26%	1.64%	1.71%
Mid Retailer	1.83%	2.05%	1.98%	2.08%	2.21%	2.03%
Large Retailer	3.37%	3.05%	2.81%	1.97%	1.30%	2.50%
Industry	2.25%	2.25%	2.25%	2.25%	2.25%	2.25%

Expense Ratios: Effective Interest Rate

$$\frac{\text{Total Interest Expense}}{\text{Total Interest Bearing Liabilities}}$$

The effective interest rate ratio calculates a business's effective interest rate on its debt. To calculate this ratio accurately, you need to make sure to use gross total interest expense rather than net interest expense.

Gross total interest expense is divided by total interest-bearing liabilities, which means finding all debt irrespective of current or non-current. When using figures from the balance sheet such as interest-bearing liabilities, some financial analysts look at averages over two years – especially if the balance sheet items move significantly from year to year. That said, many financial analysts simply use the current year balance sheet accounts rather than averages over two years.

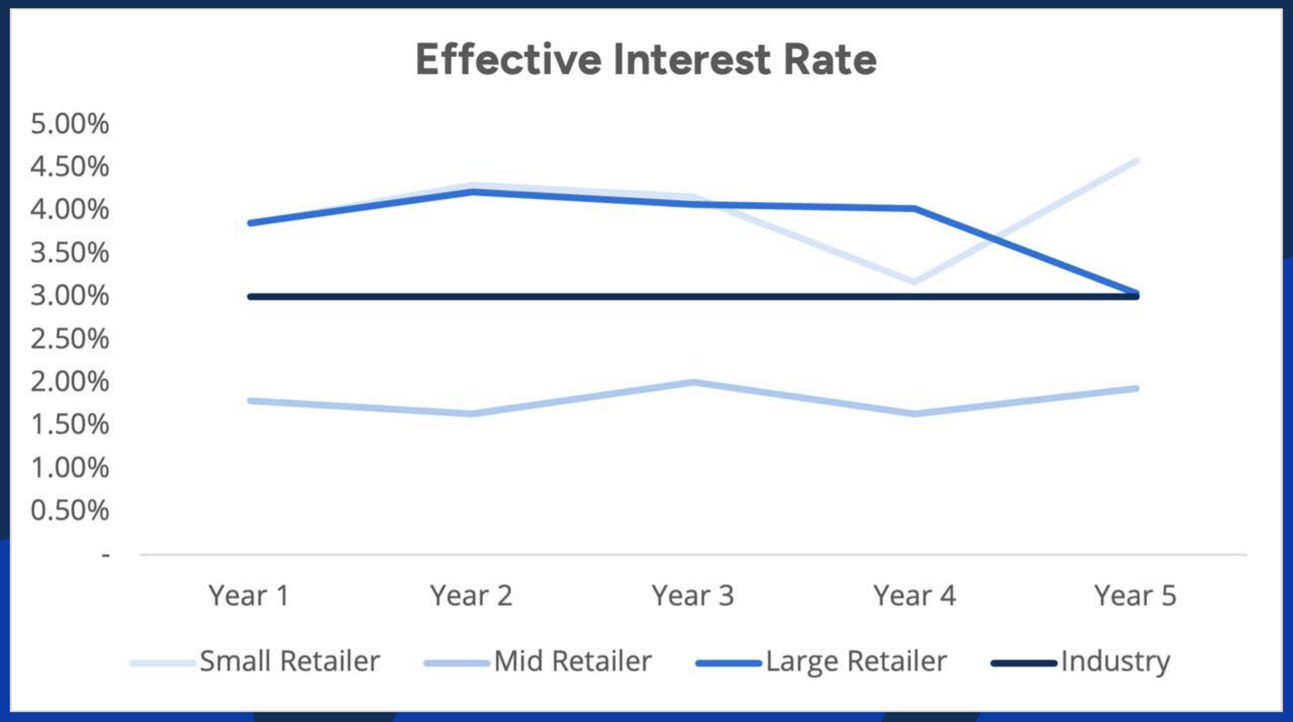
INTERPRETATION

It's really important to use gross interest expense in this ratio. Sometimes companies show only net interest expense on the income statement (which is where interest income is netted off against interest expense). If you can't see interest expense presented separately on the income statement, it can be found in the notes to the financial statements.

Also know that another name for interest expense and income that many companies use is finance expense and income.

EXAMPLE

Here are the effective interest rates the three retailers paid on their debt financing / debt capital. Overall, they are relatively stable and in line with the industry overall. The exception is the mid-sized retailer whose effective interest rate is half the others.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Effective Interest Rate						
Small Retailer	3.85%	4.30%	4.17%	3.17%	4.58%	4.01%
Mid Retailer	1.79%	1.64%	2.01%	1.64%	1.94%	1.80%
Large Retailer	3.86%	4.22%	4.08%	4.03%	3.04%	3.85%
Industry	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%

Expense Ratios: Interest Burden

$$\frac{\text{Earnings Before Tax}}{\text{Earnings Before Interest and Tax}}$$

The interest burden ratio is analyzed less commonly except in conjunction with the DuPont pyramid analysis covered later in this guide. This ratio takes earnings before tax (EBT) and divides it by earnings before interest and tax (EBIT).

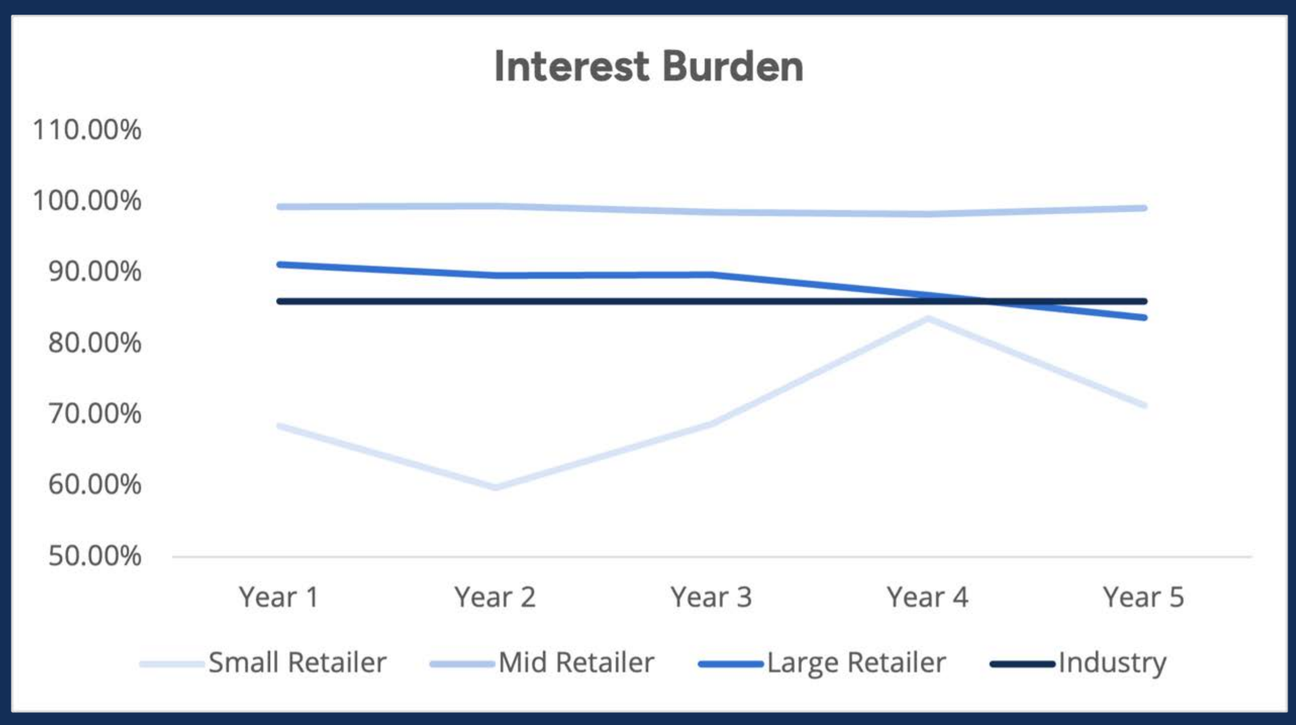
INTERPRETATION

An interest burden ratio like 65% means earnings before tax is 65% of EBIT, or that 35% of EBIT is consumed by interest expenses. From the perspective of shareholders, the higher the ratio, the better. A high number means a low interest burden. A low number means a high interest burden.

Generally, this ratio moves in the opposite direction to the effective interest rate. The higher the effective interest rate, the more EBIT interest expenses will consume.

EXAMPLE

Recall that the mid-sized retailer has the lowest effective interest rate of the three retailers. Here it has the lowest interest burden (i.e., highest ratio). Conversely, the small retailer has the highest interest burden as more of its EBIT is consumed by interest expenses.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Interest Burden						
Small Retailer	68.50%	59.78%	68.79%	83.60%	71.37%	70.41%
Mid Retailer	99.29%	99.45%	98.56%	98.25%	99.15%	98.94%
Large Retailer	91.20%	89.60%	89.75%	86.91%	83.72%	88.24%
Industry	86.00%	86.00%	86.00%	86.00%	86.00%	86.00%

Expense Ratios: Effective Tax Rate

$$\frac{\text{Total Taxes}}{\text{Earnings Before Tax}}$$

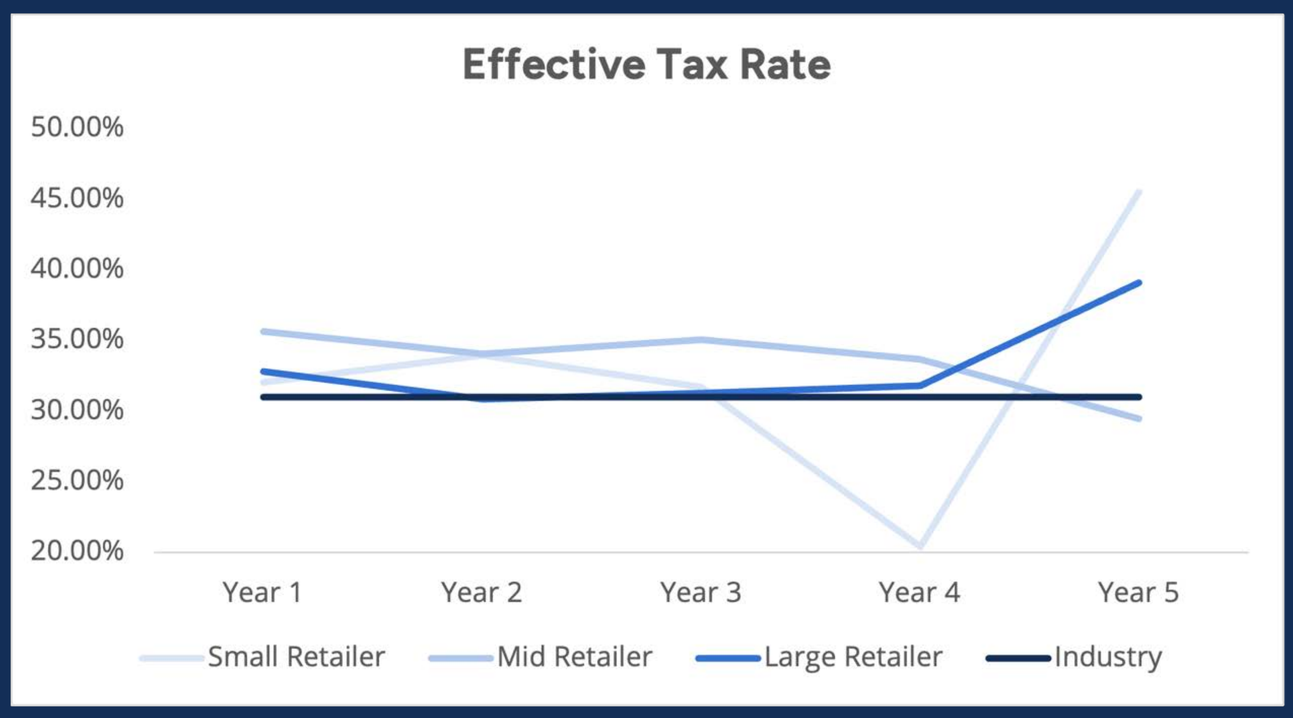
The effective tax rate looks at the relationship between total taxes and earnings before tax. In general, this ratio shows how well a company manages its taxes.

INTERPRETATION

Generally, from a shareholder perspective, the lower the effective tax rate, the better, as this means more profits remain for shareholders. You can also compare the effective tax rate to corporate tax rates in the jurisdiction(s) in which the company operates. Typically, a company's effective tax rate ratio should trend towards the corporate tax rate.

EXAMPLE

The average effective tax rates for the three retailers show very little difference. At the same time, all three retailers paid more tax on average than the industry as a whole. Here we see the corporate tax rates for all three retailers very close together when we look at the averages. The small retailer has the widest swings in its effective tax rate with year 4 at a low of 20.41% and, in year 5, rising to 45.52%. This large difference may be the result of one-off items that you should investigate further.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Effective Tax Rate						
Small Retailer	32.05%	33.96%	31.69%	20.41%	45.52%	32.73%
Mid Retailer	35.63%	34.05%	35.06%	33.67%	29.45%	33.57%
Large Retailer	32.80%	30.86%	31.26%	31.81%	39.09%	33.16%
Industry	31.00%	31.00%	31.00%	31.00%	31.00%	31.00%

Expense Ratios: Tax Burden

$$\frac{\text{Net Income}}{\text{Earnings Before Tax}}$$

The tax burden ratio compares net income to earnings before tax. The only difference between these two numbers is a company's tax expense.

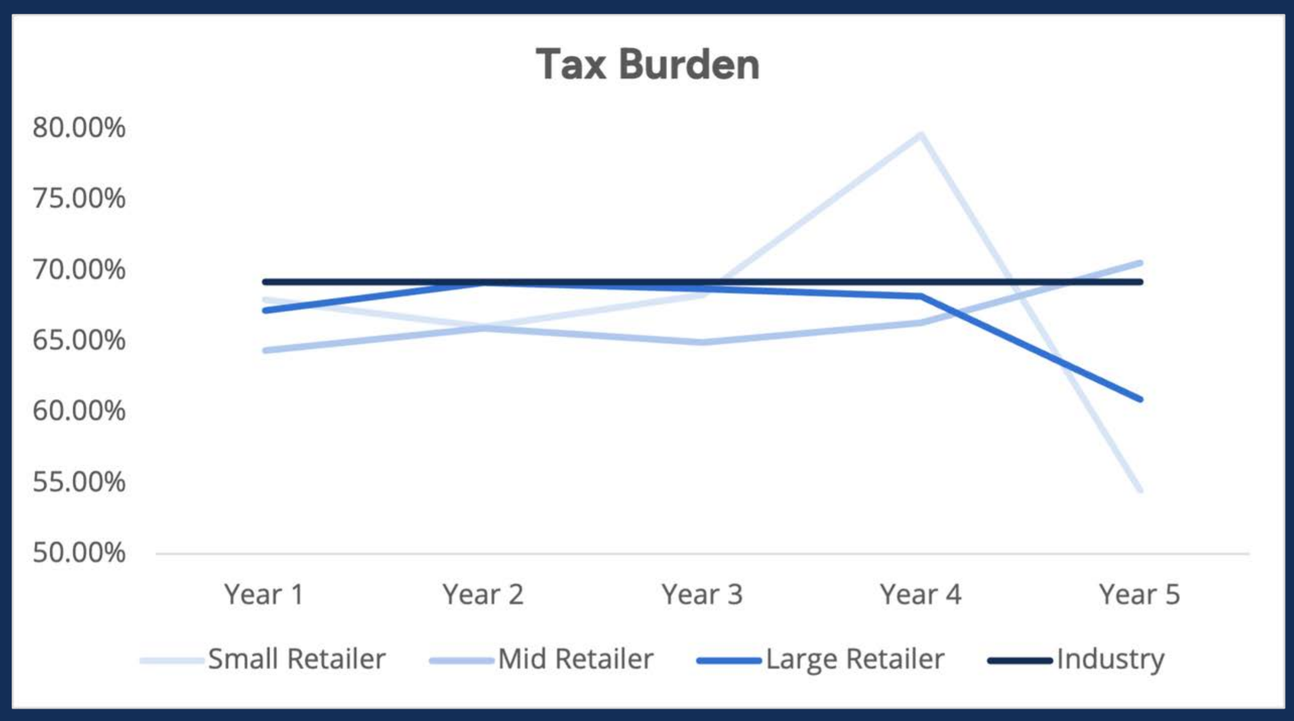
INTERPRETATION

If you see a percentage like 70%, it means shareholders receive 70% of earnings before tax. Alternatively, it means 30% of a company's earnings before tax go to taxes. If you have already calculated the effective tax rate, you can quickly calculate a tax burden ratio by taking 100% and subtracting the effective tax rate.

One-off items in a company's financial statements can sometimes bring volatility to single year tax burdens. As a result, financial analysts often prefer to look at averages rather than single years.

EXAMPLE

Here we see the average tax burdens for the three retailers are all very close. We also see the tax burden is higher (represented by a lower number) for the three retailers than the industry overall. The retailers' shareholders are all receiving around 67% of earnings before tax while the industry overall retains 69% of earnings before tax for shareholders.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Tax Burden						
Small Retailer	67.95%	66.04%	68.31%	79.59%	54.48%	67.27%
Mid Retailer	64.37%	65.95%	64.94%	66.33%	70.55%	66.43%
Large Retailer	67.20%	69.14%	68.74%	68.19%	60.91%	66.84%
Industry	69.20%	69.20%	69.20%	69.20%	69.20%	69.20%

III. Asset Utilization Ratios

Asset utilization ratios measure how well a company is utilizing its assets and resources. These ratios are sometimes referred to as efficiency ratios. These ratios compare revenue and cost of goods sold to various assets and liabilities on the balance sheet. Typically, most financial analysts focus on what we call the “top 6”.

- Total Asset Turnover
- Property, Plant & Equipment Turnover
- Cash Turnover/ Cash Days
- Accounts Receivable Turnover / Accounts Receivable Days
- Inventory Turnover / Inventory Days
- Accounts Payable Turnover / Accounts Payable Days

When pulling numbers from the balance sheet, some financial analysts prefer to calculate averages over two years or periods rather than using the current year. Although this is more correct academically and more accurate, it is rarely done in practice. Instead, most analysts use only the current year as it is quicker and easier to do.

Asset Turnover

$$\frac{\text{Revenues}}{\text{Total Assets}}$$

The asset turnover ratio, also known as the total asset turnover ratio, measures how efficient a company uses its assets to generate sales. This ratio looks at how many dollars in sales are generated per dollar of total assets that the company owns. The asset turnover ratio divides revenues by total assets.

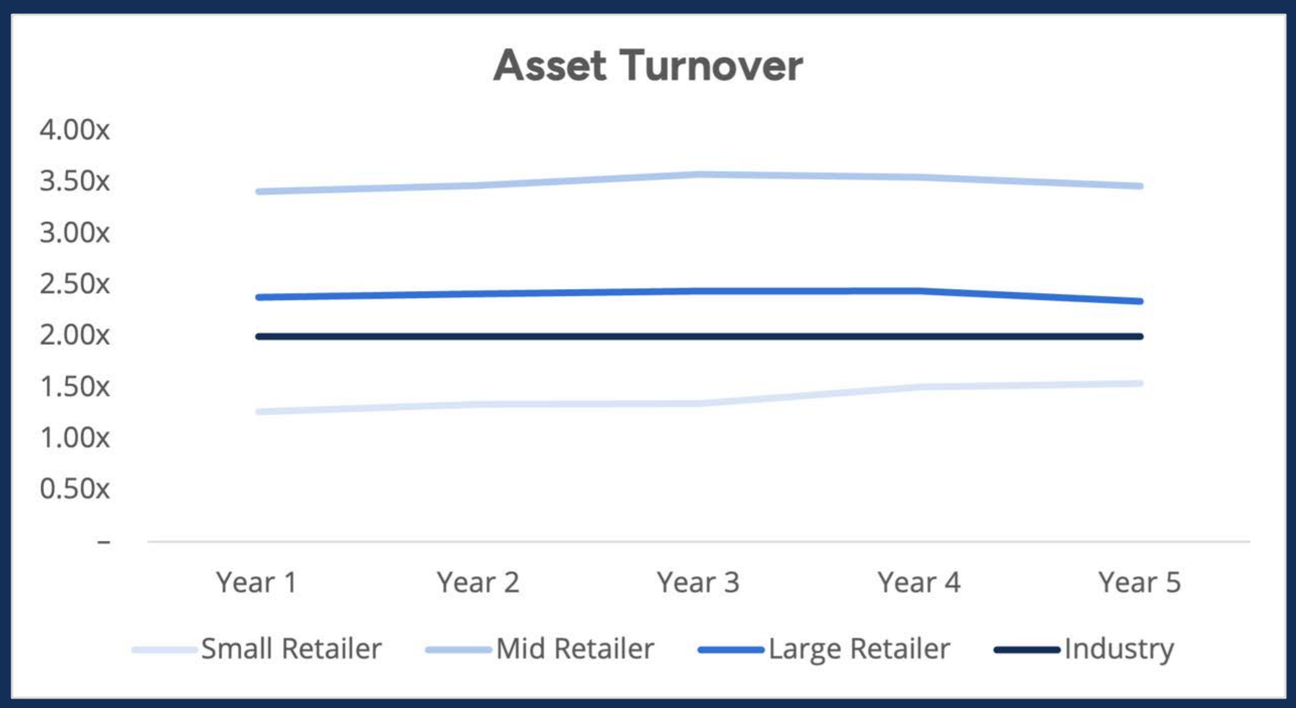
INTERPRETATION

Asset turnover ratios are typically greater than 100%, so it is convention to quote them as a multiple rather than as a percentage. Let's imagine the asset turnover ratio was 1.27. We would say the ratio is 1.27 times (marked by an x) rather than 127%.

For these ratios, the larger, the better. To make these ratios more understandable, it is often helpful to talk using currency language. For example, assume an asset turnover ratio is 1.27 times. You can interpret this as, for every dollar invested in assets, the business gets $1.27 of annual revenue.

EXAMPLE

Here we see the same three retailers, and we can see a clear difference between the three. The mid-sized retailer has the highest asset turnover, followed by the large retailer and then the small retailer. The quality and location of the three retailers' stores can explain a large part of the differences. The mid-sized retailer's stores are large, warehouse-style buildings located in suburban areas where real estate is less expensive. In contrast, the large retailer operates stores in both urban and suburban areas, and its stores have a more traditional retail layout. The small retailer operates primarily in urban areas with the most expensive real estate, and it's stores have more expensive fixtures and fittings. Asset turnover is very stable for all three retailers.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Asset Turnover						
Small Retailer	1.27x	1.34x	1.35x	1.51x	1.54x	1.40x
Mid Retailer	3.41x	3.47x	3.58x	3.55x	3.47x	3.50x
Large Retailer	2.38x	2.42x	2.44x	2.45x	2.35x	2.41x
Industry	2.00x	2.00x	2.00x	2.00x	2.00x	2.00x

Property, Plant & Equipment (PP&E) Turnover

$$\frac{\text{Revenues}}{\text{Property, Plant, \& Equipment}}$$

The property, plant, and equipment (PP&E) turnover ratio, measures how efficiently a company uses its PP&E to generate sales. This ratio looks at how many dollars in sales is generated per dollar of PP&E that the company owns.

INTERPRETATION

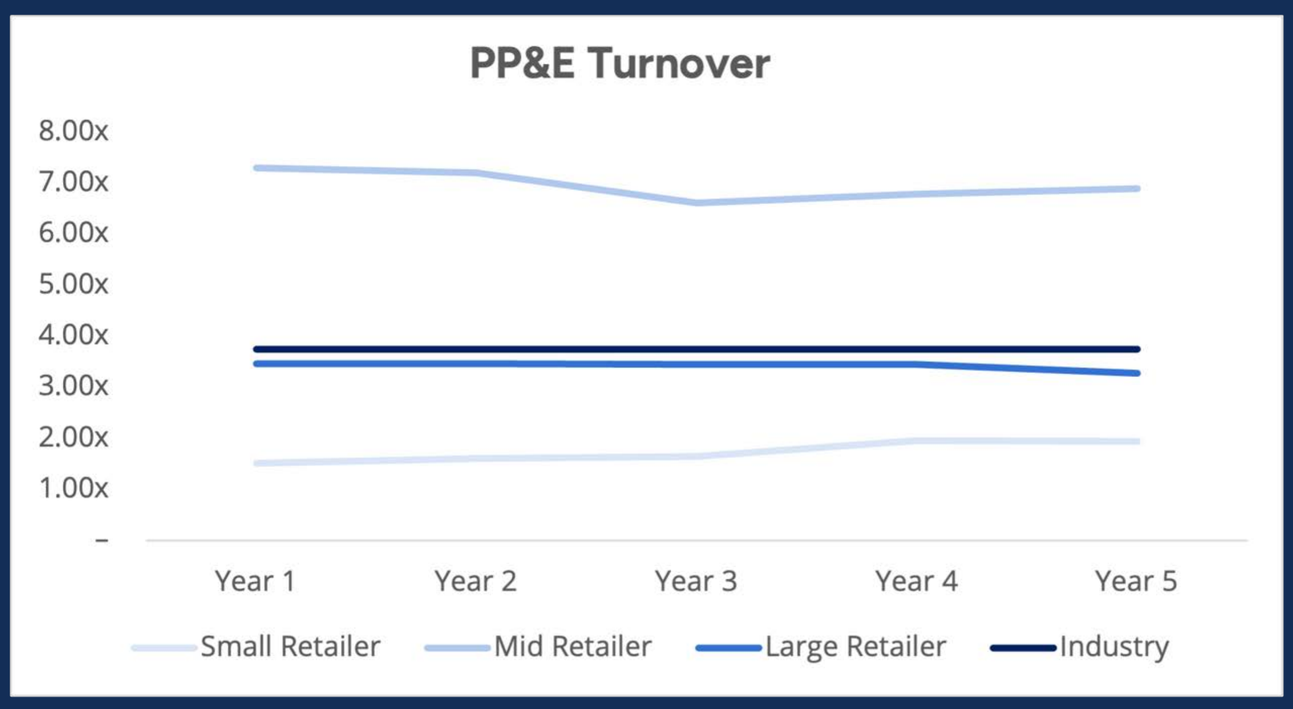
Like the asset turnover ratio, the PP&E turnover ratio is typically greater than 100%, so it is convention to quote them as a multiple rather than as a percent. Let's imagine the PP&E turnover ratio was 3.75. We would say the ratio is 3.75 times (marked by an x) rather than 37550%.

For these ratios, the larger, the better. While PP&E represents a large part of total assets, typically total asset turnover and PP&E turnover will be highly correlated – in other words, moving in line with each other.

EXAMPLE

Our three retailers have significant amounts of PP&E, so it should not be surprising that their PP&E ratios move very similarly to total asset turnover. Again, we see the impact of the mid-sized retailer having spent less on its stores and real estate by building warehouse-like stores in suburban areas. The mid-sized retailer gets double the average revenue out of its PP&E (6.96x) when compared with the large retailer (3.42x). The mid-sized retailer gets four times the average revenue out of its PP&E compared with the small retailer. Recall the small retailer operates in expensive urban areas with high quality fixtures and fittings to enhance the shopping experience and draw in customers.

As we saw with asset turnover, PP&E turnover is relatively stable for all three retailers over this five-year period.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
PP&E Turnover						
Small Retailer	1.52x	1.61x	1.64x	1.96x	1.94x	1.73x
Mid Retailer	7.30x	7.20x	6.62x	6.78x	6.89x	6.96x
Large Retailer	3.46x	3.46x	3.44x	3.45x	3.27x	3.42x
Industry	3.75x	3.75x	3.75x	3.75x	3.75x	3.75x

Cash Turnover and Days

Cash Turnover:

$$\frac{\text{Revenues}}{\text{Cash}}$$

Cash Days:

$$\frac{\text{Cash} \times 365}{\text{Revenues}}$$

The cash turnover ratio is used to determine the number of times cash is turned over in an accounting period. Like the previous turnover ratio, the cash turnover ratio, takes revenues and divides it by cash. To get the cash days ratio, take the cash turnover ratio and divide it by 365 or use the formula below.

INTERPRETATION

For the next four turnover ratios, you'll encounter two versions: a turnover version and a days version. Let's consider an example where we calculate a cash turnover ratio of 40 times. This implies that for every dollar we hold in cash, we generate $40 in revenue. An alternative interpretation is that our current cash balance cycles through 40 times in a single year.

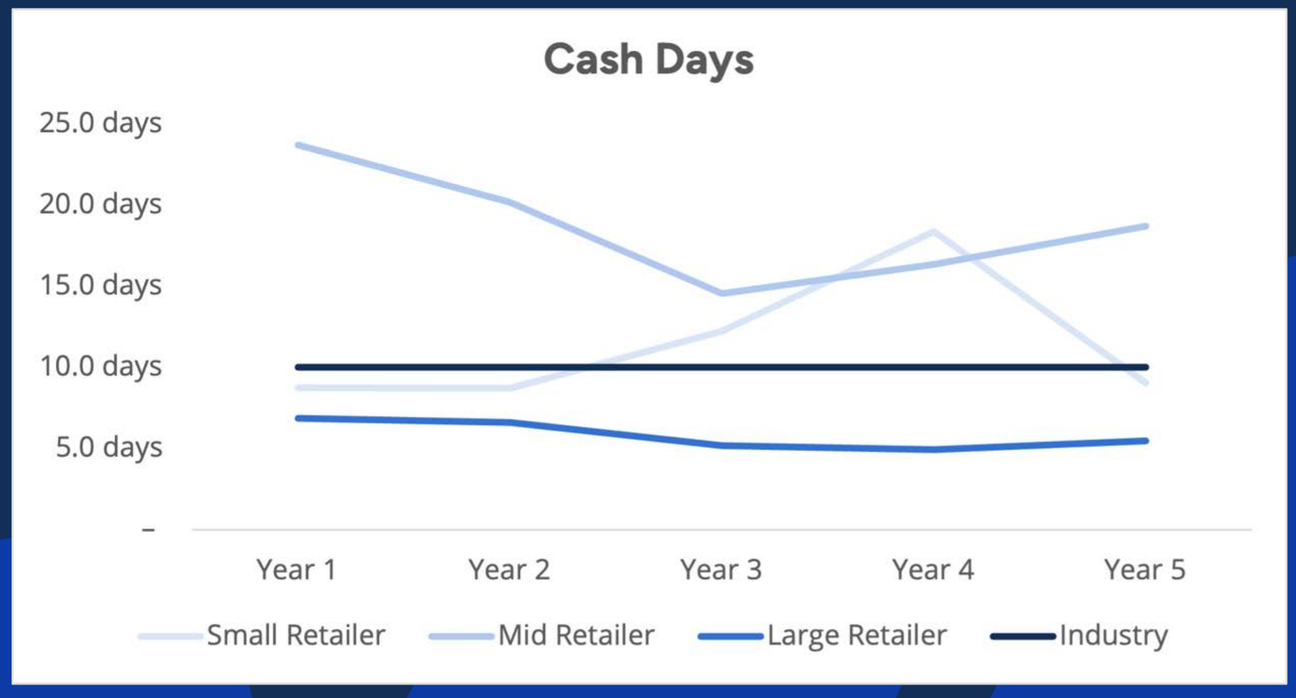
Understanding the cash turnover rate can help you understand the concept of the cash days ratio. If the cash turns over 40 times in a year, and there are 365 days in a year, then dividing 365 by 40 yields 9.125 days. In simpler terms, our current cash balance turns over approximately every 9.125 days.

To put it another way, if our company generated no revenue for 9.125 days, our existing cash reserves would sustain us. Generally, a lower number is preferable because idle cash, or cash in the bank, isn't being utilized to expand the business.

However, it's important to note that industry-specific factors can influence cash days . For instance, seasonal businesses may require larger cash reserves to continue operating during off-peak periods. Similarly, tech startups often need substantial cash reserves to sustain them until their revenues begin to grow significantly.

EXAMPLE

Overall, the cash days for our three retailers and the industry may be surprisingly very low. That said, all these retailers sell necessities which means cash walks in the door every day. This constant influx of cash allows these retailers to operate with low cash reserves and deploy their cash into the business instead.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Cash Days						
Small Retailer	8.7 days	8.7 days	12.2 days	18.4 days	9.1 days	11.4 days
Mid Retailer	23.7 days	20.2 days	14.5 days	16.3 days	18.7 days	18.7 days
Large Retailer	6.9 days	6.6 days	5.2 days	4.9 days	5.5 days	5.8 days
Industry	10.0 days	10.0 days	10.0 days	10.0 days	10.0 days	10.0 days

Accounts Receivable (A/R) Turnover and Days

A/R Turnover:

$$\frac{\text{Revenues}}{\text{A/R}}$$

A/R Days:

$$\frac{\text{A/R} \times 365}{\text{Revenues}}$$

The accounts receivable (A/R) turnover ratio measures the number of times over a given period that a company collects its average accounts receivable. Like the previous turnover ratio, the accounts receivable turnover ratio takes revenues and divides it by accounts receivable. To get the accounts receivable days ratio, you simply take the accounts receivable turnover ratio and divide it by 365 or use the formula below.

INTERPRETATION

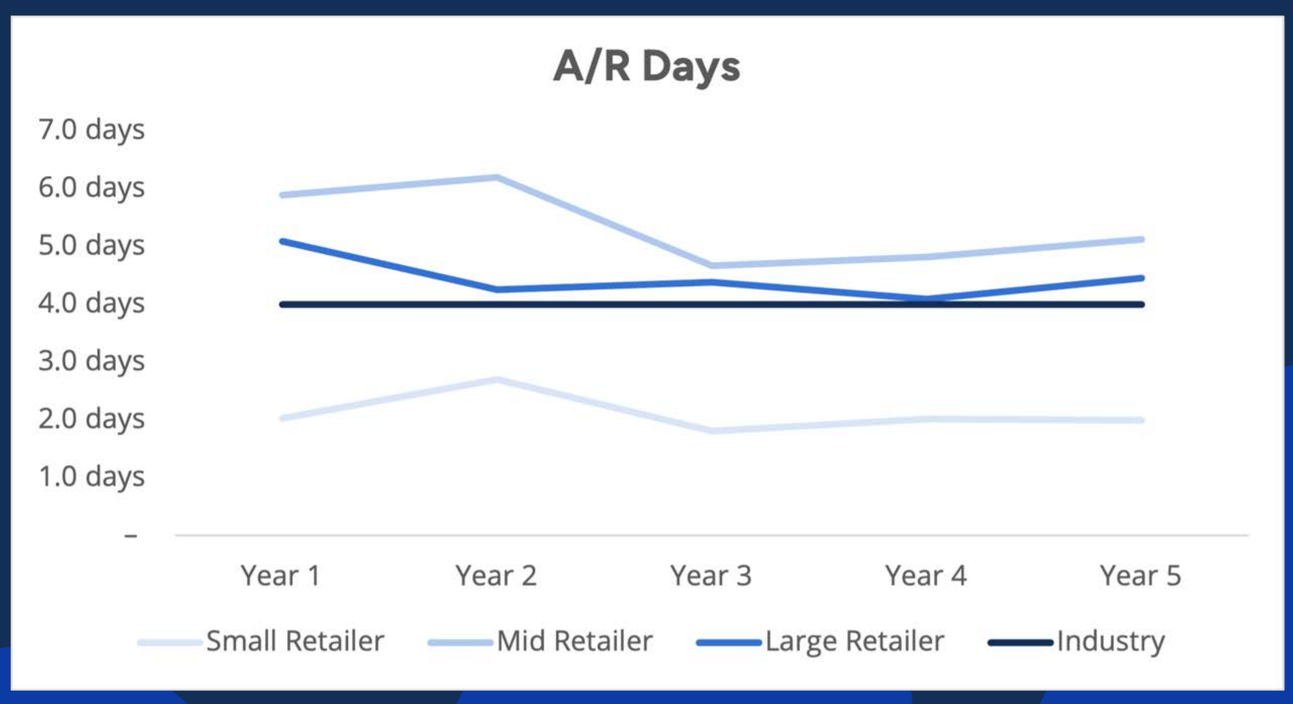
Suppose we have an A/R turnover ratio of 12. This means that for every dollar in accounts receivable, we generate $12 in revenue. This ratio indicates that our accounts receivable turns over 12 times a year.

To understand how long it takes to collect payment, we can calculate the A/R days ratio. We do this by dividing 365 by the turnover ratio of 12, which gives us just over 30 days. This means that it takes about 30 days on average to collect payment after a sale.

Generally, a higher turnover ratio or fewer days to collect payment is better for a business. However, it's important to note that different industries have varying standard credit terms. For example, grocery stores typically require immediate payment, resulting in low A/R days. In contrast, some industries may have standard credit terms of 30 days, leading to a longer collection period.

EXAMPLE

It should be no surprise that A/R days are low for a retailer because general merchandise retailers require immediate payment and generally don’t give customers credit terms. You will rarely, if ever, see A/R days for a retailer exactly at zero because retailers may extend credit to a few clients (e.g., large corporate accounts). The small retailer has the lowest A/R days, which suggests that they are the least likely of the three retailers to provide credit to customers.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
A/R Days						
Small Retailer	2.0 days	2.7 days	1.8 days	2.0 days	2.0 days	2.1 days
Mid Retailer	5.9 days	6.2 days	4.7 days	4.8 days	5.1 days	5.3 days
Large Retailer	5.1 days	4.3 days	4.4 days	4.1 days	4.5 days	4.5 days
Industry	4.0 days	4.0 days	4.0 days	4.0 days	4.0 days	4.0 days

Inventory Turnover and Days

Inventory Turnover:

$$\frac{\text{Cost of Goods Sold}}{\text{Inventory}}$$

Inventory Days:

$$\frac{\text{Inventory} \times 365}{\text{Cost of Goods Sold}}$$

The inventory turnover ratio measures how many times a business sells and replaces its stock of goods in a given period of time. Unlike the previous turnover ratios, the inventory turnover ratio uses cost of goods sold (COGS) rather than revenue. The rationale is that the COGS more closely aligns with inventory as it is the cost of inventory. To get to the inventory days ratio, you simply take the inventory turnover ratio and divide it by 365 or use the formula.

INTERPRETATION

One of the key principles in effective ratio analysis is to make like-for-like comparisons—compare apples to apples and oranges to oranges. When calculating the inventory turnover ratio, some analysts use revenue as the numerator to maintain consistency. However, using the COGS is more accurate because COGS reflects the actual cost of the inventory, providing a more precise measure of how frequently the inventory turns over.

Let's say the inventory turnover ratio is 4. This means the inventory turns over four times a year. To convert this into a "days ratio," divide 365 by 4, resulting in 91.25 days. In general, businesses aim for a higher inventory turnover or fewer days in inventory, similar to the accounts receivable (A/R) ratio.

However, it's crucial to remember that different industries have varying norms for how long they hold inventory. To revisit the grocery store example, you would expect a high inventory turnover (or low inventory days) because many of the items sold are perishable.

EXAMPLE

Here are the inventory days for our three retailers. All the retailers' inventory days are relatively stable over this five-year period except the small retailer in year 5. Although all three retailers sell general merchandise (food, clothes, household items, etc.), their different merchandise mixes might be driving these different days ratios. For example, the mid-sized retailer focuses on food/grocery the most while the small retailer focuses on food/grocery the least.

	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Inventory Days						
Small Retailer	51.4 days	50.5 days	50.4 days	51.7 days	56.7 days	52.1 days
Mid Retailer	31.7 days	32.5 days	32.2 days	32.5 days	33.1 days	32.4 days
Large Retailer	48.6 days	47.7 days	46.8 days	47.6 days	46.7 days	47.4 days
Industry	45.0 days	45.0 days	45.0 days	45.0 days	45.0 days	45.0 days

Accounts Payable (A/P) Turnover and Days

A/P Turnover:

$$\frac{\text{Cost of Goods Sold}}{\text{Accounts Payable}}$$

A/P Days:

$$\frac{\text{Accounts Payable x365}}{\text{Cost of Goods Sold}}$$

The accounts payable (A/P) turnover ratio measures how many times a business pays off its creditors. Like the inventory turnover ratio, the A/P turnover ratio uses cost of goods sold rather than revenue. Again, the rationale is that COGS more closely aligns with A/P. To get the A/P days ratio, you simply take the A/P turnover ratio and divide it by 365 or use the formula.

INTERPRETATION

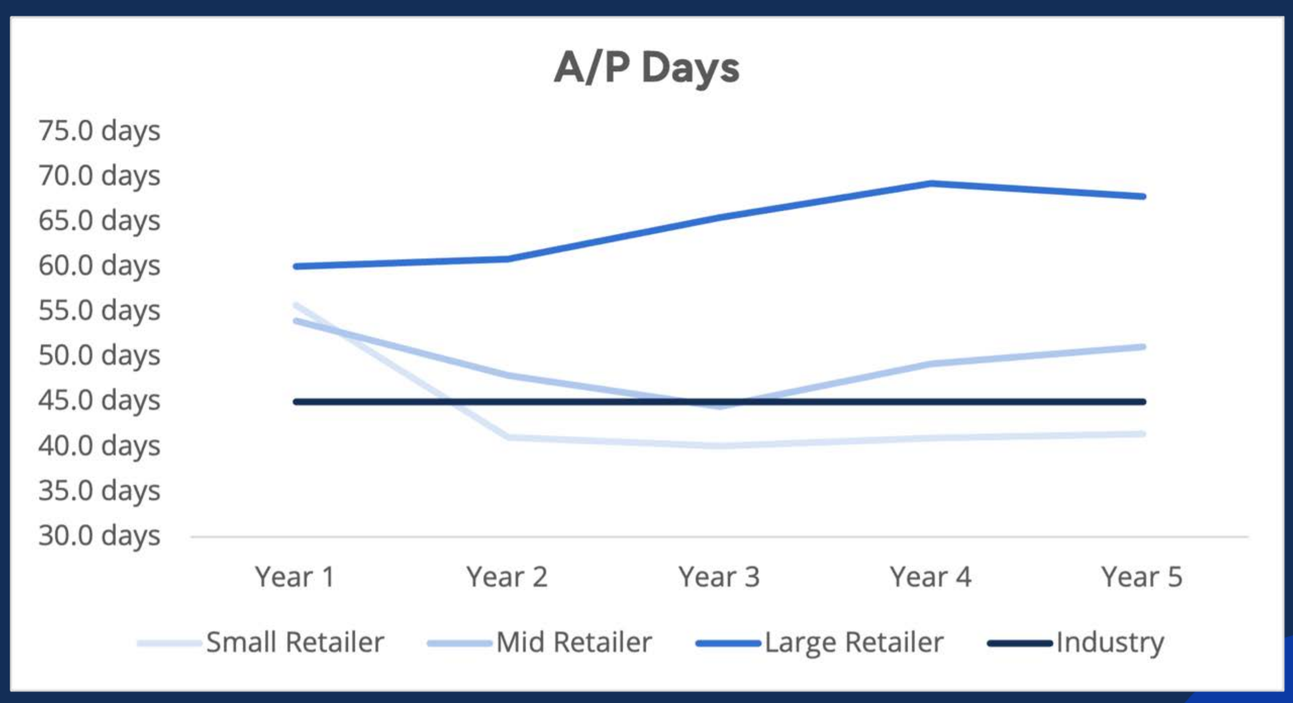
Like the inventory turnover ratio, some analysts use revenue as the numerator to maintain the consistency of the A/P turnover ratios with the other turnover ratios. However, using COGS is more precise.

If A/P turnover is 12 times, we say A/P turns over 12 times in a period. This means accounts payable days are about 30 days.

Generally, a lower A/P turnover ratio or a higher A/P days ratio is better for a business. However, it's important to note that different industries and geographies have varying standard credit terms.

EXAMPLE

We can see that the industry standard of A/P days is 45 days. Both the small and mid-sized retailers have A/P days around the industry average. The large retailer has significantly more A/P days which is likely due to the company's ability to negotiate better terms with its suppliers because of its size and scale.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
A/P Days						
Small Retailer	55.7 days	41.1 days	40.1 days	41.0 days	41.4 days	43.9 days
Mid Retailer	54.0 days	47.9 days	44.5 days	49.2 days	51.1 days	49.4 days
Large Retailer	60.1 days	60.9 days	65.5 days	69.3 days	67.9 days	64.7 days
Industry	45.0 days	45.0 days	45.0 days	45.0 days	45.0 days	45.0 days

IV. Solvency Ratios

Financial leverage ratios look at both solvency and liquidity. Solvency ratios focus on a company's long-term financial health and ability to meet long-term obligations. Liquidity ratios assess the company's short-term cash position and ability to handle immediate financial needs and obligations. Both solvency and liquidity are important considerations when evaluating a company's financial well-being.

When we talk about financial leverage, we are really talking about how much interest-bearing debt funding a business has relative to its equity funding. We say that financial leverage increases when a company takes on more debt financing relative to its equity financing.

Another name for financial leverage is financial gearing. The terms "financial gearing" and "financial leverage" are often used interchangeably to refer to the practice of using borrowed funds (debt) to finance a company's operations or investments. Both terms describe the concept of amplifying the company's returns and risks through the use of borrowed capital.

This section explores the following financial leverage and solvency ratios:

- Total Assets to Equity
- Debt to Equity
- Debt to Tangible Net Worth
- Debt to EBITDA

Total Assets to Equity

$$\frac{\text{Total Assets}}{\text{Total Shareholders' Equity}}$$

The total assets to equity ratio is a big-picture finance leverage ratio where we divide total assets by shareholders' equity. It is used in the DuPont pyramid of ratios covered later in this guide.

INTERPRETATION

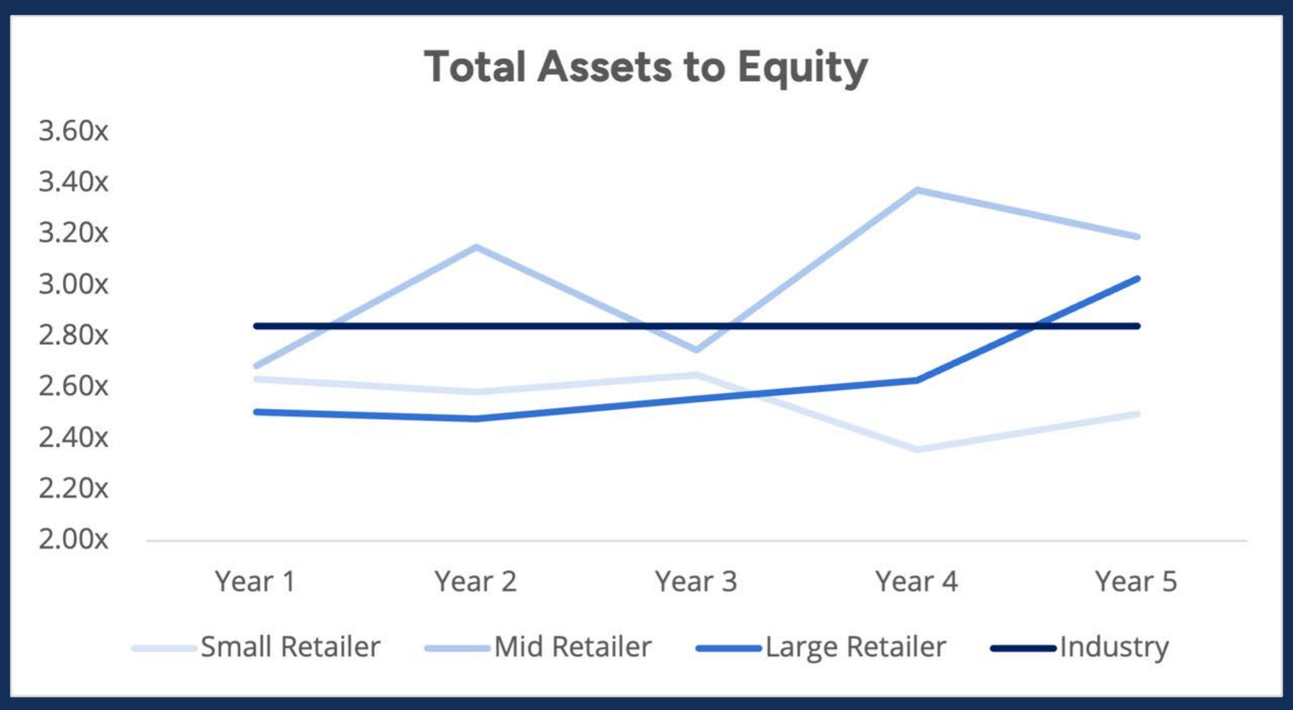
We typically express all financial leverage ratios as multiples rather than percentages. Let's imagine a company's asset to equity ratio is 2.5. We would say the ratio is 2.5 times (marked by an x) equity rather than 250% of equity.

Generally, the smaller the number, the better. As a financial analyst, you need to make sure that a business hasn't taken on too much debt, which would increase the risk of it becoming insolvent and potentially declaring bankruptcy.

That said, a company can have too little debt as well. Optimal capital structures are typically based on the industry. It's useful to know the industry standard capital structures first so you can better evaluate this ratio.

EXAMPLE

Here are total assets to equity ratios for our three general merchandise retailers. The mid-sized retailer has the most financial leverage of the three. The challenge with this ratio is that we don't necessarily get a clear picture of how much debt financing a company has because it infers the size of total liabilities versus total interest-bearing liabilities.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Total Assets to Equity						
Small Retailer	2.63x	2.58x	2.65x	2.36x	2.49x	2.54x
Mid Retailer	2.68x	3.15x	2.75x	3.37x	3.19x	3.03x
Large Retailer	2.50x	2.48x	2.56x	2.63x	3.02x	2.64x
Industry	2.84x	2.84x	2.84x	2.84x	2.84x	2.84x

Debt to Equity

$$\frac{\text{Interest Bearing Liabilities}}{\text{Total Shareholders' Equity}}$$

The debt to equity ratio focuses on interest-bearing liabilities, which excludes liabilities such as accounts payable and unearned/deferred revenue. Note that interest-bearing liabilities can be current, non-current, or both. Include all interest-bearing liabilities, wherever they appear, when calculating this ratio.

INTERPRETATION

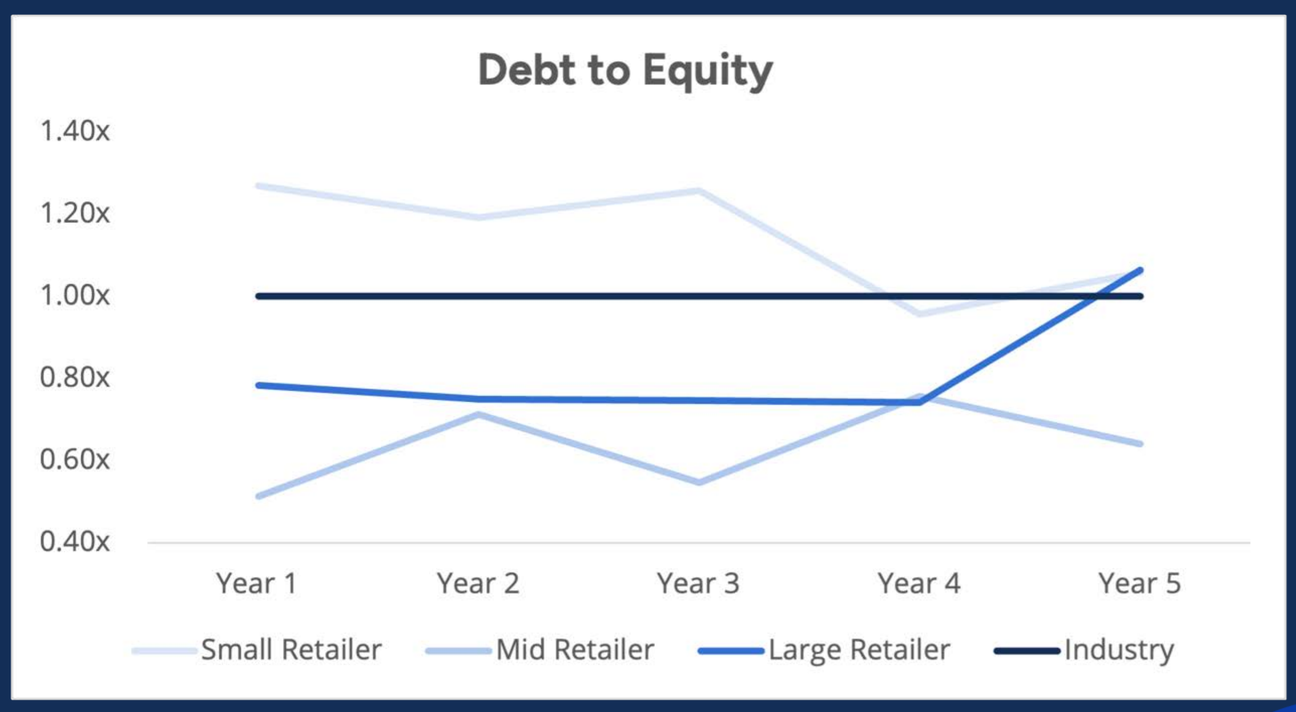
The debt to equity ratio is the most commonly used by financial analysts to measure financial leverage because it allows you to compare debt and equity financing precisely.

As before, the smaller the number, the better. You want to make sure a company hasn't taken on too much debt, which increases risk of insolvency and bankruptcy.

That said, a company can have too little debt as well. Optimal capital structures are typically based on the specific industry. It's useful to know industry standard capital structures first so you can better evaluate this ratio.

EXAMPLE

Here are the debt to equity ratios for our three retailers. The mid-sized retailer has the least leverage and the small retailer has the most. Given that the industry has a typical debt to equity split of 1 to 1, one could argue the mid-sized retailer is potentially under-leveraged. That said, all three retailers have conservative amounts of debt financing.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Debt to Equity						
Small Retailer	1.27x	1.19x	1.26x	0.96x	1.06x	1.15x
Mid Retailer	0.51x	0.71x	0.55x	0.76x	0.64x	0.63x
Large Retailer	0.78x	0.75x	0.75x	0.74x	1.06x	0.82x
Industry	1.00x	1.00x	1.00x	1.00x	1.00x	1.00x

Debt to Tangible Net Worth

$$\frac{\text{Interest Bearing Liabilities}}{\text{Total Shareholders' Equity - Intangible Assets}}$$

The debt to tangible net worth is a very conservative version of the debt to equity ratio. Debt to tangible net worth compares all interest-bearing liabilities to total shareholders' equity after subtracting intangible assets.

INTERPRETATION

Businesses and commercial bankers often use this conservative debt to equity ratio when evaluating a corporate borrower. They want to look at the business through a very conservative lens.

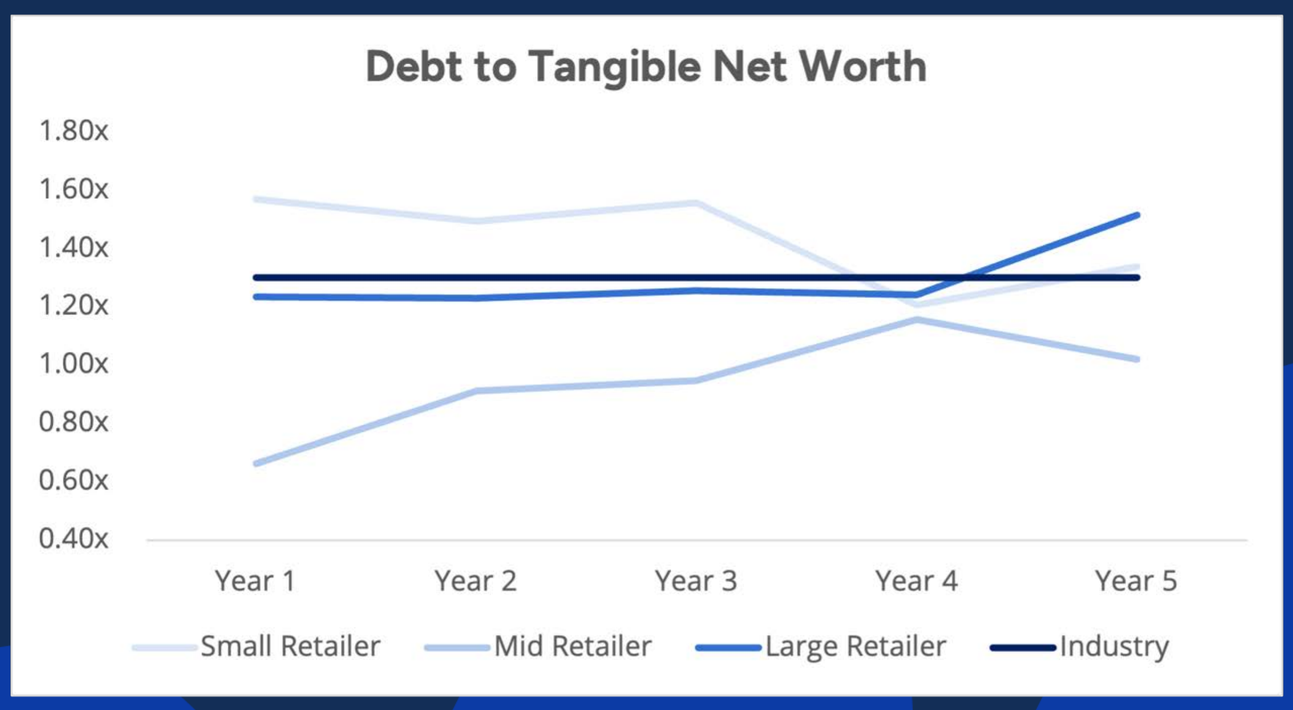
Deducting intangible assets from equity to calculate tangible net worth provides a clearer picture of a company's financial strength and the tangible value of its assets. Tangible net worth focuses on a company's tangible assets, meaning the physical assets with clear market value, such as property, plant, and equipment (PP&E), inventory, and cash.

Intangible assets, such as patents, trademarks, copyrights, and goodwill, are non-physical assets that derive their value from intellectual or legal rights rather than physical properties. Since these assets do not have readily ascertainable market values, or can be difficult to sell or monetize, we exclude them when calculating tangible net worth.

By deducting intangible assets from equity, investors and analysts can evaluate a company's financial position by considering only the assets that have a more tangible and measurable value.

EXAMPLE

Here we see debt to tangible net worth for our three retailers. By deducting intangible assets from equity, all the retailers have seen their debt to equity ratio increase (as the denominator has decreased). Nevertheless, the ratios are still very much in line with our standard debt to equity ratios suggesting all the retailers have similar amounts of intangible assets.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Debt to Tangible Net Worth						
Small Retailer	1.57x	1.49x	1.56x	1.21x	1.34x	1.43x
Mid Retailer	0.66x	0.91x	0.95x	1.16x	1.02x	0.94x
Large Retailer	1.23x	1.23x	1.26x	1.24x	1.51x	1.30x
Industry	1.30x	1.30x	1.30x	1.30x	1.30x	1.30x

Debt to EBITDA

$$\frac{\text{Interest Bearing Debt}}{\text{EBITDA}}$$

The debt to EBITDA ratio compares only the interest-bearing liabilities on a company's balance sheet with its EBITDA. Some analysts adjust the numerator of this ratio by deducting cash from interest-bearing debt to get net debt divided by EBITDA. The assumption is that the company can use cash to pay down interest-bearing debt.

INTERPRETATION

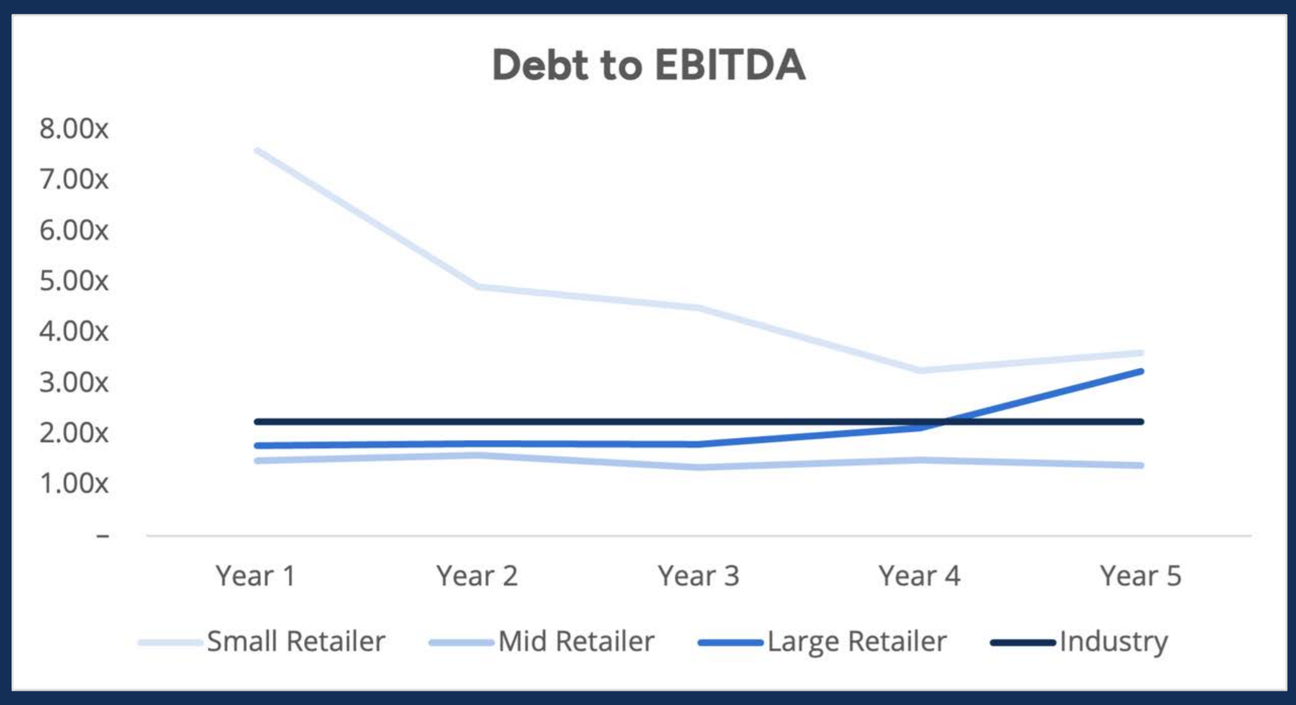
Whether we use gross interest-bearing debt or net debt, a high debt to EBITDA ratio may indicate higher financial risk, while a lower ratio suggests lower risk and better debt repayment capacity.

Investors and lenders frequently use this specific ratio to evaluate a company's ability to generate sufficient earnings (EBITDA) to cover its debt payments.

These ratios are also very popular with M&A professionals who typically talk in EBITDA multiples when they are valuing a business.

EXAMPLE

Here are gross debt to EBITDA multiples for our three retailers. The mid-sized retailer operates with a capital structure using the least amount of financial leverage. The large retailer is in line with industry averages. The small retailer has the most leverage, but there is a clear downward trend from 7.60x in year 1 to 3.60x in year 5.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Debt to EBITDA						
Small Retailer	7.60x	4.91x	4.50x	3.26x	3.60x	4.77x
Mid Retailer	1.48x	1.59x	1.34x	1.49x	1.38x	1.46x
Large Retailer	1.78x	1.82x	1.80x	2.13x	3.25x	2.15x
Industry	2.25x	2.25x	2.25x	2.25x	2.25x	2.25x

V. Liquidity Ratios

Financial analysts use liquidity ratios to evaluate the short-term financial soundness of a company. These ratios assess the company's short-term cash position and its ability to handle immediate financial needs and obligations. In this section, we look at three commonly used liquidity ratios.

- Current Ratio
- Quick Ratio
- EBITDA to Interest

Current Ratio

$$\frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The current ratio, also known as the working capital ratio, measures a business's ability to meet its short-term obligations that are due within a year. This ratio compares total current assets to total current liabilities. It also looks at how a company can maximize the liquidity of its current assets to settle its debt obligations.

INTERPRETATION

The current ratio is more comprehensive than other liquidity ratios, such as the quick ratio, as it considers all current assets, including cash marketable securities, accounts receivable, and inventory.

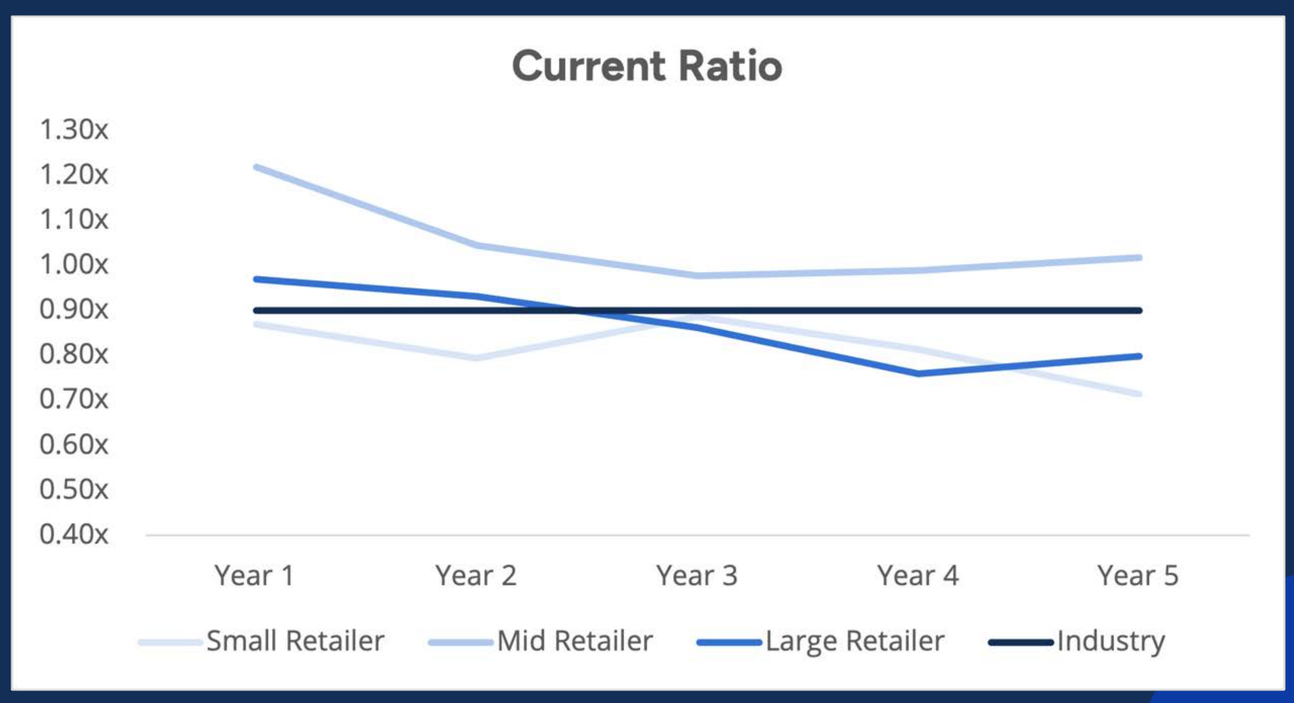
If a business has current assets of $60 million and current liabilities of $30 million, then it has a current ratio of 2. You can interpret this ratio of 2 as indicating the business can pay off its current liabilities, such as accounts payable, twice with its current assets.

Typically, a current ratio greater than 1 suggests financial well-being for a company. However, a very high current ratio could suggest the company is leaving too much excess cash unused instead of investing it into company growth initiatives.

EXAMPLE

Here are the current ratios for the same three retailers. Recall that, typically, a current ratio greater than 1 suggests satisfactory liquidity. However, for our three retailers, only the mid-sized retailer hits the target of 1 on average.

You can see that the industry average is at 0.90, suggesting this sector doesn't need a high current ratio to maintain sufficient liquidity to cover immediate liabilities. For a general merchandise retailer, a lower current ratio makes sense. These retailers sell day-to-day necessities, meaning cash comes in the door daily, which allows the retailers to operate with less in current assets.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Current						
Small Retailer	0.87x	0.79x	0.89x	0.81x	0.71x	0.82x
Mid Retailer	1.22x	1.05x	0.98x	0.99x	1.02x	1.05x
Large Retailer	0.97x	0.93x	0.86x	0.76x	0.80x	0.86x
Industry	0.90x	0.90x	0.90x	0.90x	0.90x	0.90x

Quick Ratio

$$\frac{\text{Current Assets - Inventory}}{\text{Current Liabilities}}$$

The quick ratio, also known as the acid-test ratio, measures the ability of a business to pay its short-term liabilities by having assets that are readily convertible into cash. These assets are cash, marketable securities, and accounts receivable. These assets are considered "quick" assets because converting them into cash is quick and easy.

INTERPRETATION

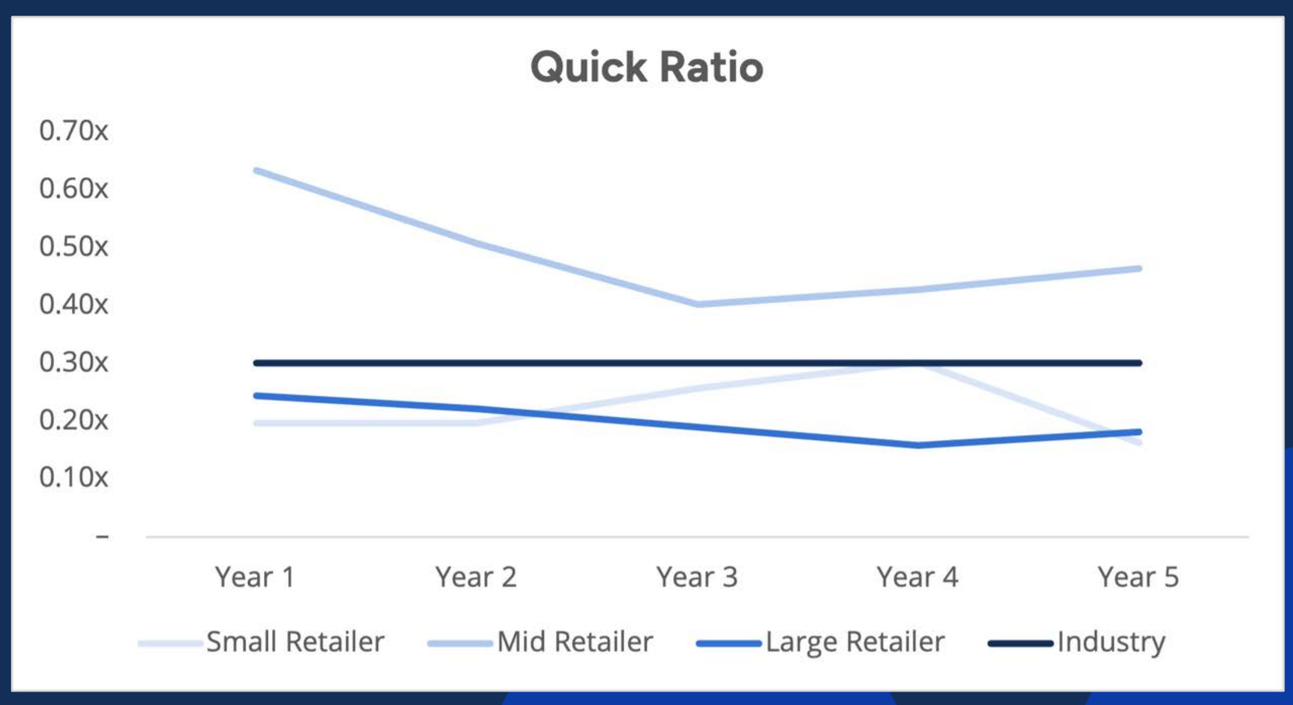
Compared to the current ratio, the quick ratio only looks at the most liquid assets. The quick ratio evaluates a company's ability to pay its short-term liabilities with only assets that can quickly be converted into cash. Therefore, the quick ratio excludes accounts like inventories and prepaid expenses.

Suppose a company has cash of $20 million, marketable securities of $10 million, accounts receivable of $18 million, and current liabilities of $25 million. Its quick ratio is 1.52, which means the business can pay off 1.52 times its current liabilities using its most liquid assets.

A quick ratio greater than 1 implies strong financial well-being for the company as it shows that the company can repay its short-term debt obligations with only its liquid assets. However, like the current ratio, a very high quick ratio suggests that the company leaves too much excess cash instead of investing it in growth or to generate returns.

EXAMPLE

The quick ratios for our three retailers are significantly less than 1. The industry average suggests that retailers can succeed with an average quick ratio of 0.30x. It should come as no surprise that this ratio is much lower than the current ratio because retailers typically need to hold significant amounts of inventory.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
Quick						
Small Retailer	0.20x	0.20x	0.26x	0.30x	0.16x	0.22x
Mid Retailer	0.63x	0.51x	0.40x	0.43x	0.46x	0.49x
Large Retailer	0.24x	0.22x	0.19x	0.16x	0.18x	0.20x
Industry	0.30x	0.30x	0.30x	0.30x	0.30x	0.30x

EBITDA to Interest Ratio

$$\frac{\text{EBITDA}}{\text{Interest Expense}}$$

The EBITDA to interest ratio, also known as the interest coverage ratio, shows how much cash a company has to cover its interest payments using EBITDA as a proxy for cash. The EBITDA to interest ratio takes EBITDA and divides it by interest expense.

INTERPRETATION

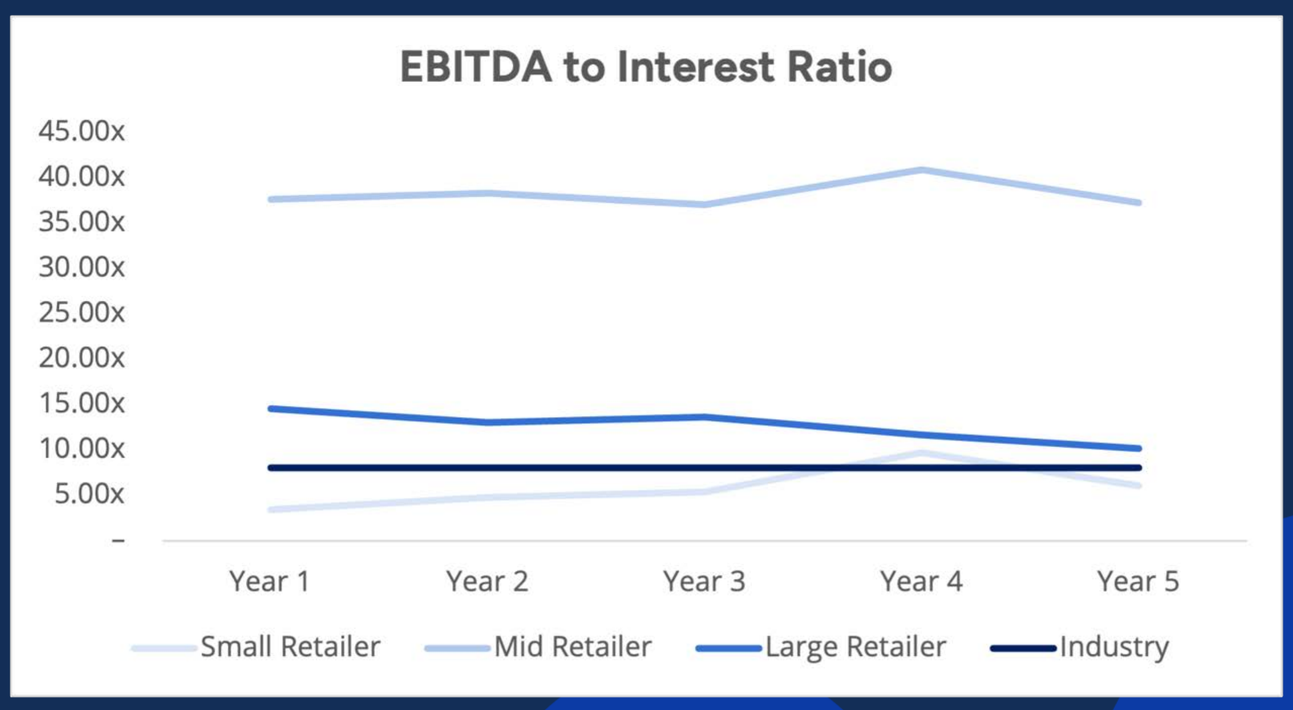
As with the other two liquidity ratios, a higher number is better. However, the interpretation of the EBITDA to interest expense ratio should consider industry norms, as different industries may have varying benchmarks for acceptable levels of coverage.

Many different versions of this ratio exist. Some analysts use EBIT in place of EBITDA. Other analysts use EBITDA but deduct capex. The logic of this approach is to take out depreciation and amortization, which are non-cash expenses, and replace them with CAPEX, which is an actual cash expense.

Another version of this ratio, the fixed charge coverage ratio, uses EBITDA minus CAPEX in the numerator, while the denominator is the interest expense and the current portion of long-term debt owed in the current year. This version is more comprehensive as it measures a company's ability to service all required, short-term financing obligations.

EXAMPLE

Here, only the small-retailer's EBITDA to interest ratio falls below the industry average. The large retailer's EBITDA to interest is comfortably above the industry average. The mid-size retailer's EBITDA to interest is a real outlier, which suggests the mid-size retailer may hold too little debt.



	Year 1	Year 2	Year 3	Year 4	Year 5	Average
EBITDA to Interest						
Small Retailer	3.41x	4.74x	5.34x	9.69x	6.07x	5.85x
Mid Retailer	37.60x	38.31x	37.05x	40.90x	37.21x	38.22x
Large Retailer	14.57x	13.02x	13.60x	11.66x	10.13x	12.60x
Industry	8.00x	8.00x	8.00x	8.00x	8.00x	8.00x

VI. The DuPont Pyramid of Ratios

The DuPont pyramid of ratios, also known as the DuPont analysis, is an advanced technique that uses ratio analysis to assess a company’s financial performance. The DuPont pyramid framework was developed by the DuPont Corporation in the 1920s.

This analysis aims to assess a company's return on equity (ROE) by breaking it down into its key components. It provides a structured approach to understand the factors driving a company's profitability and efficiency.

Two-Lever Pyramid

$$\text{Return on Assets} = \frac{\text{Net Income}}{\text{Total Assets}} \times \text{Financial Leverage} = \frac{\text{Total Assets}}{\text{Equity}}$$

The standard DuPont pyramid has three levers, but we start by breaking ROE into two ratios. Importantly, you need to make sure that when you multiply these two ratios, you get the ROE.

The first ratio is the return on assets (ROA) ratio. The ROA ratio measures a company's profitability in relation to its total assets. It provides insight into how effectively a company utilizes its assets to generate profit.

The second ratio is the equity multiplier, more commonly referred to as financial leverage. It measures the extent to which a company relies on debt financing. Financial leverage is calculated by dividing total assets by shareholders' equity. As you can see here, multiplying these two ratios produces ROE. The total assets in both ratios cancel each other out.

Three-Lever Pyramid

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Total Assets}} \times \text{Total Asset Turnover} = \frac{\text{Revenues}}{\text{Total Assets}} \times \text{Financial Leverage} = \frac{\text{Total Assets}}{\text{Equity}}$$

You can move from the two-lever pyramid to a three-lever pyramid by breaking down the ROA ratio into net profit margin and total asset turnover. As mentioned, the three-lever pyramid is the most commonly used pyramid. Breaking down ROE into three levers allows you to see if changes in ROE are due to changing profit margins, asset utilization, or financial leverage.

Five-Lever Pyramid

Most financial analysts stop with the three-lever approach. However, the five-lever approach takes net profit margin and breaks it down into three component ratios.

Tax Burden

$$\frac{\text{Net Income}}{\text{Earnings Before Tax}}$$

x

Interest Burden

$$\frac{\text{Earnings Before Tax}}{\text{Earnings Before Interest and Tax}}$$

x

Operating Profit Margin

$$\frac{\text{Earnings Before Interest and Tax}}{\text{Revenue}}$$

As we covered in an earlier section, tax burden measures the percentage of pre-tax earnings that are retained as net income after accounting for taxes. A tax burden ratio closer to 1 indicates that the company retains a larger portion of its pre-tax earnings, leading to a higher ROE.

Next comes interest burden, which is the ratio of EBT to EBIT. An interest burden ratio closer to 1 indicates the company has little debt.

Finally, operating profit margin tells us what's left from revenue after accounting for operating expenses.

A five-lever pyramid replaces the net profit margin ratio with the three ratios above.

Tax Burden

$$\frac{\text{Net Income}}{\text{Earnings Before Tax}}$$

Interest Burden

$$\frac{\text{Earnings Before Tax}}{\text{Earnings Before Interest and Tax}}$$

EBIT Margin

$$\frac{\text{Earnings Before Interest and Tax}}{\text{Revenue}}$$

Total Asset Turnover

$$\frac{\text{Revenues}}{\text{Total Assets}}$$

Financial Leverage

$$\frac{\text{Total Assets}}{\text{Equity}}$$

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Scott has a passion for teaching with over 30 years of experience in delivering learning solutions for financial services clients spanning commercial and investment banking, capital markets, and asset management. His client roster has included JP Morgan, Bank of America Merrill Lynch, Credit Suisse, Royal Bank of Scotland, TD, and HSBC, among others. Now based in Vancouver, Scott spent a significant portion of his career in London, New York, and Hong Kong.

For nearly a decade, Duncan has designed and taught courses in financial modeling to employees working in accounting, financial valuation, investment banking, equity research, and private equity. Duncan has extensive experience providing financial modeling consulting services to large corporations and institutions. Prior to teaching, Duncan held senior equity research positions with top banks and brokerages. He holds an Engineering degree, Master of Finance degree, and a CFA Charter.

For over a decade before joining CFI, Jeff taught financial modeling and valuation to thousands of learners worldwide. Prior to his career in financial education, Jeff worked as an equity research analyst covering approximately 50 companies with a combined market cap of $500 billion. He background also includes working in corporate development, leading M&A due diligence and financial planning and analysis, and investment banking and restructuring.

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