

Counterpoint Global Insights

Valuation Multiples

What They Miss, Why They Differ, and the Link to Fundamentals

CONSILIENT OBSERVER | April 23, 2024

Introduction

Aswath Damodaran, a professor of finance at the Stern School at New York University, likes to distinguish between “pricing” and “valuing” companies. Pricing a company generally means assigning a multiple to a measure of current or prospective earnings or cash flows, and that multiple can vary based on the market’s mood and the prevailing story about the business. Valuing a company involves estimating the present value of future free cash flows and requires study of the firm’s fundamentals. Damodaran argues that most investors spend their time pricing rather than valuing businesses.¹

Surveys of equity analysts support this view.² Researchers collected responses from nearly 2,000 analysts who were members of the CFA Institute, a global association of investment professionals. Asked about their approach to valuation, nearly 93 percent selected “a market multiples approach.”

When questioned about which market multiple they used, 88 percent of the analysts said price-earnings (P/E). Seventy-seven percent replied that they use a multiple with enterprise value in the numerator, and by far the most popular of those was the enterprise value-earnings before interest taxes depreciation and amortization (EV/EBITDA) multiple. The use of P/Es and EV/EBITDAs is not mutually exclusive, of course, and most equity analysts use various methods to price a stock.

Seventy-nine percent of equity analysts indicated that they also use a “present discounted value approach,” and the discounted free cash flow model (DCF) was the most common method. This appears to be an encouraging departure from pricing stocks, but it turns out it is routine for a substantial amount of the model’s value, commonly in excess of 75 percent, to be in the continuing value.³ The continuing value reflects the cash flows beyond the explicit forecast period. Analysts often calculate it using either a formula reflecting growth in perpetuity (generally free cash flow/[cost of capital – growth]) or an EV/EBITDA multiple.⁴

AUTHORS

Michael J. Mauboussin
michael.mauboussin@morganstanley.com

Dan Callahan, CFA
dan.callahan1@morganstanley.com

Both approaches run the risk of embedding unrealistic assumptions. It is common for the growth in perpetuity to assume a growth rate that is too high.⁵ And when the preponderance of value comes from an EV/EBITDA multiple, the result is multiples analysis dressed up as a DCF model.

This report discusses four topics. The first is what multiples miss and why they are becoming less informative than they were in the past. Second is an examination of why the two most popular multiples that equity analysts use, P/E and EV/EBITDA, can provide different signals about a stock's relative attractiveness. Third is a look at the alternative measures of earnings and EBITDA that companies report to see if they add insight. Finally, we focus on EV/EBITDA multiples and link them back to fundamental drivers of value.

What Multiples Miss

A multiple in any form is a shorthand for the process of valuation. Shorthands are useful because they can save us time. A multiple attempts to compress information about the essential assumptions of a proper DCF model into a single figure. This is a tall order.

The numerator of the multiples that analysts use most frequently is the current price of the equity (P of P/E) or the enterprise value of the firm (EV of EV/EBITDA). These sums seek to capture the present value of the relevant cash flows for the life of the business. Stock prices generally reflect company cash flows that extend decades into the future.

The denominator is earnings (E of P/E) or cash flow (EBITDA of EV/EBITDA) that the company has recently earned or is expected to earn in the near future. Right away we see that we are comparing a numerator that represents the long term with a denominator that considers only the short term.

The central determinants of corporate value include the level and sustainability of return on invested capital (ROIC), growth, and risk. Companies create value when their investments earn a return in excess of the opportunity cost of capital. Higher growth generates higher value for firms that earn a return above the weighted average cost of capital (WACC). Higher growth leads to lower value for a given negative spread. And growth has no impact on value for a company that earns its cost of capital.

Multiples provide no direct insight into the magnitude of a firm's investments or whether they will generate a sufficient return. This is the main consideration that multiples miss.

But there is more to this insight because the ability of multiples to capture the underlying economics of a business has degraded over time. This is mainly the result of a shift in how companies invest. In prior generations, businesses invested primarily in tangible assets such as factories and machines. These investments were recorded on the balance sheet and expensed on the income statement through depreciation.

Today, the majority of investments are in intangible assets, including customer acquisition costs and branding. But companies commonly expense these investments on the income statement as they incur them. Accountants record these investments as selling, general, and administrative (SG&A) and research and development (R&D) expenses. This reduces current earnings.

The "matching principle" is an important concept in accounting. The idea is that a company should match expenses to the related revenue. Cost of goods sold (COGS), SG&A, and R&D are the three main categories of expenses that accountants subtract from revenue to calculate earnings before interest and taxes (EBIT).

Anup Srivastava, a professor of accounting at Haskayne School of Business at the University of Calgary, studied how well COGS and SG&A (including R&D) adhere to the matching principle. He sorted U.S. public companies into cohorts based on the decade they were listed, from the 1960s to the 2010s.⁶ Firms that listed in the last 30 years make up more than 80 percent of the total number of public companies today.

Srivastava found that COGS match revenues effectively and consistently for all of the cohorts. But while SG&A matches revenues well for the early cohorts, it is “practically unmatched to revenues” for companies that went public from the 1990s on.

Multiples are supposed to reflect the magnitude and return on investment. But the shift to intangible investments, and how companies record them in financial statements, has wreaked havoc on that ability.⁷ To illustrate this point, we take two looks at the financial results of Microsoft, a multinational technology company that invests heavily in intangible assets. The first is what the company reports and the second is what the figures look like after we capitalize, and amortize, the firm’s intangible investments.⁸

For fiscal 2023, Microsoft reported net income of \$72.4 billion. Adjusted for intangible investment, the figure would be \$83.0 billion, or 14.7 percent higher.⁹ The company’s EBITDA was \$102.4 billion before the adjustment and \$147.0 billion, 43.6 percent more, after the adjustment. Based on figures from June 30, 2023, the end of the company’s fiscal year, the trailing P/E went from 34.9 as reported to 30.5 as adjusted, and EV/EBITDA went from 24.2 to 16.9. These are material differences.

Academics and practitioners use multiples because of the evidence that high multiples often precede below-average returns in the long run.¹⁰ That used to be true because the price reflected expectations for future value creation and growth that was too rosy, resulting in a lofty multiple relative to the near-term profit outlook. But the rise of intangibles means that both earnings and invested capital are understated, weakening the signal that earnings and multiples formerly provided.¹¹

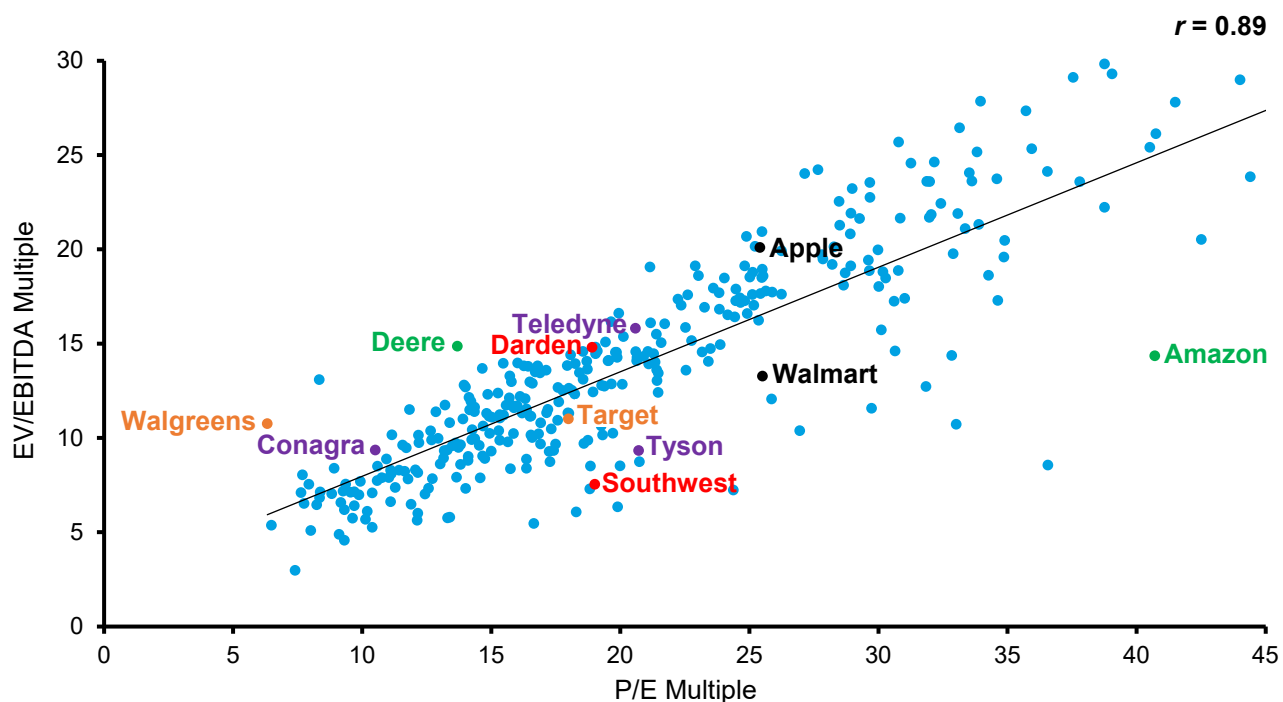
None of this suggests investors should ignore multiples altogether. Indeed, there may be some value in combining multiples.¹² But the main point is that multiples are getting worse at reflecting the economic picture they are supposed to capture. A blind deference to multiples without understanding their limitations can severely hamper the effectiveness of an investment process.

P/E and EV/EBITDA are the most popular multiples equity investors use. What do you do if two companies have a similar P/E but a different EV/EBITDA multiple? Or a dissimilar P/E and the same EV/EBITDA? Understanding how and why these calculations differ helps us bring to light their relative strengths and weaknesses.

Why Am I Getting Different Signals?

Not surprisingly, the correlation between P/E and EV/EBITDA multiples is high (see exhibit 1). But there are cases where two companies are close on one metric and far apart on the other. We highlight a handful of those pairs in the exhibit.

Exhibit 1: P/E and EV/EBITDA Multiples for the S&P 500, March 2024



Source: FactSet and Counterpoint Global.

Note: As of March 5, 2024. Based on FactSet consensus estimates for next 12 months for EBITDA and Non-GAAP EPS; Excludes financials and real estate; Trimmed P/Es at 1st and 99th percentiles; Axes truncated for visualization purposes.

These multiples are comparing different quantities. The P/E captures the relationship between the company's equity market capitalization and its earnings, or net income. P and E are commonly expressed per share.

The P/E is a levered ratio because it is measured after financing costs, and it therefore links the market value of equity to the earnings attributable to shareholders.

The EV/EBITDA multiple compares the firm's enterprise value to EBITDA. Enterprise value equals the equity market capitalization (including preferred stock) plus debt and other liabilities, minus cash. The multiple is unlevered because it solves for enterprise value. EBITDA does not subtract financing costs or taxes. EBITDA is earnings before interest and taxes (EBIT) plus depreciation and amortization of acquired intangibles (DA). Depreciation and amortization are non-cash charges.

The P/E is almost always higher than the EV/EBITDA for a profitable company. To see why, pretend that the company you are studying has no debt or excess cash, so that P equals EV. E is going to be lower than EBITDA because it is after taxes and does not add back non-cash charges. Since the numerator is the same and the denominator is lower, the P/E multiple will be higher than the EV/EBITDA multiple.

This relationship does not hold for a company with negative net income. Again, assume that P equals EV. You can imagine that a company has negative earnings and positive EBITDA. In this case, the multiple of P/E would be negative and the multiple of EV/EBITDA would be positive.

This discussion points to the reasons that P/E and EV/EBITDA multiples differ (see exhibit 2). We can organize that analysis by going down the income statement. The first reason relates to the mix of tangible and intangible investment. As we saw, COGS tend to match revenues for all companies. COGS are the majority of total expenses for tangible-intensive firms. SG&A is much more prominent for intangible-intensive firms.

For instance, the total expense for Nucor Corporation, a steel company, was 94 percent in COGS and 6 percent in SG&A for 2023. For Eli Lilly, a pharmaceutical company, COGS were about 30 percent of expenses and SG&A the other 70 percent. Revenue minus total expense equals EBIT.

The way to get a consistent picture is to capitalize and amortize intangible investments as we did with the Microsoft example. The important point is that the earnings and EBITDA will increase very little for tangible-intensive businesses and increase a lot for intangible-intensive companies.¹³

Exhibit 2: Factors That Contribute to Differences in P/E and EV/EBITDA Multiples

What	Why	How
Method of investment		
Tangible	Higher depreciation lowers net earnings but has no effect on EBITDA	Physical capital-intensive businesses have a high ratio of depreciation to operating income
Intangible	High SG&A expense that reflects internal intangible investment	Lowers EBIT, earnings, and EBITDA relative to tangible intensive business
Capital structure		
Leverage	Interest expense reflected in P/E but not in EV/EBITDA	Increasing debt to equity results in: - Higher P/E when unlevered P/E is greater than 1/cost of debt - Lower P/E when unlevered P/E is less than 1/cost of debt
Cash holdings	Interest income reflected in P/E but not in EV/EBITDA	Can increase or decrease P/E ratio
Non-operating expenses	Reduce earnings but have no effect on EBITDA	Increase P/E relative to EV/EBITDA
Tax rate	Taxes reduce net income but have no effect on EBITDA	A higher rate increases P/E relative to EV/EBITDA

Source: Counterpoint Global.

Note that capitalization of intangible investments does not affect free cash flow. Multiples have lost relevance because of the widening gulf between earnings and what they are trying to reflect.

The second reason these multiples diverge is because of differences in capital structure, the combination of debt and equity a company uses to finance its growth.¹⁴ Debt has an explicit cost in the form of interest expense. Equity has an implicit cost that financial statements do not capture.

The impact of changes in capital structure on multiples is complex, but we can begin with some straightforward observations. Start with a company that is financed solely with equity and has no excess cash. Now introduce debt.

The “P” of P/E will be unaffected since it reflects the value of the equity only. But the “E” will go down by the amount of interest expense (net of the savings on tax).¹⁵ So the same P and a lower E means that the P/E multiple goes up, all else being equal.

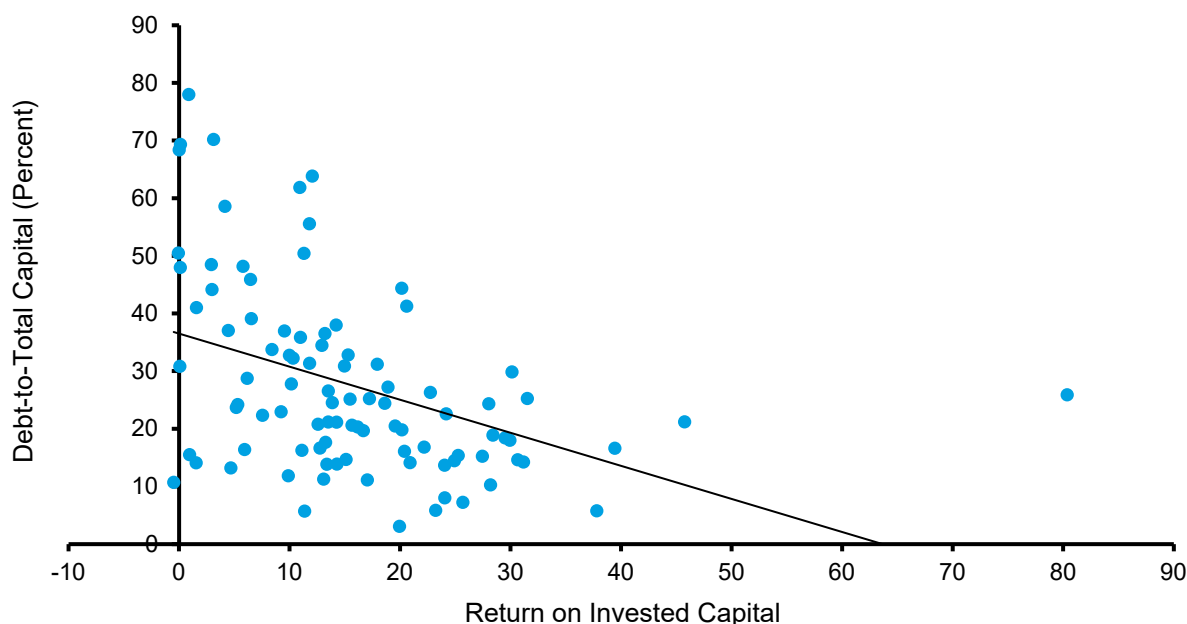
Adding debt increases “EV,” which is mostly equity plus debt, and has no effect on EBITDA, which is by definition before interest expense and taxes. A higher EV and the same EBITDA means that the EV/EBITDA multiple also goes up, all things being equal.

Theory suggests an optimal capital structure, in which a company has just the right amount of debt to maximize the value of the tax shield less the cost of potential financial distress. The vast majority of companies do not make the optimal capital structure their target.

The pecking order theory of capital structure says that to fund their growth, companies start with cash generated internally, then go to debt, and finally go to equity.¹⁶ Businesses with high ROICs often have sufficient cash flow from operations to finance their growth. Businesses with low ROICs commonly generate insufficient cash flow to fund the business and therefore need to issue debt or equity.

Industries with high ROICs tend to have lower debt-to-total capital ratios and those with low ROICs have higher ratios (see exhibit 3). Further, companies with low ROICs tend to have “DA” that is a higher percentage of EBITDA than companies with high ROICs. This means that the gap between the P/E to EV/EBITDA multiple is generally greater for low ROIC companies with lots of debt than for high ROIC companies with little debt.

Exhibit 3: ROIC and Debt-to-Total Capital for U.S. Industries



Source: Aswath Damodaran and Counterpoint Global.
 Note: As of January 2024.

Multiples can also differ as the result of non-operating expenses, which have an impact on earnings but no effect on EBITDA. These include costs associated with restructuring programs, asset write-downs or write-offs, reorganizations, and unrealized capital gains or losses. Companies nearly always report results excluding non-operating expenses.

A final reason P/E and EV/EBITDA multiples can differ is because of tax rates. Earnings are calculated after paying taxes, so earnings rise as the tax rate falls. EBITDA excludes taxes by definition so differences in tax rates do not affect EBITDA.

Exhibit 4 provides an illustration of how these factors can contribute to a gap between P/E and EV/EBITDA. Column A considers a business with no invested capital, debt, or taxes. This is the base case. In this naive scenario, the P/E and EV/EBITDA are both 15.0.¹⁷

Exhibit 4: Factors That Contribute to Differences in P/E and EV/EBITDA Multiples

	A	B	C	D	E
	No Invested Capital	Invested Capital			
	No Debt, No Taxes	No Debt, No Taxes	Debt, No Taxes	No Debt, Taxes	Debt, Taxes
Sales	1,000	1,000	1,000	1,000	1,000
COGS	800	800	800	800	800
SG&A ex-DA	100	100	100	100	100
DA	0	40	40	40	40
EBIT	100	60	60	60	60
Financing	0	0	18	0	18
Taxes	0	0	0	10	7
Net income	100	60	42	50	35
EBITDA	100	100	100	100	100
Debt	0	0	300	0	300
Equity	1,500	1,500	1,200	1,500	1,200
EV	1,500	1,500	1,500	1,500	1,500
P/E	15.0	25.0	28.6	30.0	34.3
EV/EBITDA	15.0	15.0	15.0	15.0	15.0
Financing cost			6.00%	6.00%	6.00%
Debt/total capital			20%		20%
Tax rate				16.67%	16.67%
EV/sales	1.5	1.5	1.5	1.5	1.5
Asset life		12.5	12.5	12.5	12.5
Invested capital		500	500	500	500
ROIC		12.0%	12.0%	10.0%	10.6%

Source: Counterpoint Global.

We then introduce invested capital, which is included in all of the subsequent scenarios, but still have no debt or taxes (column B). Invested capital creates an expense for depreciation and amortization (DA). This reduces earnings but has no effect on EBITDA. As a result, the P/E goes up to 25.0 but the EV/EBITDA stays at 15.0.

Column C assumes the company has debt but does not pay taxes. The financing costs reduce earnings. But we assume that the EV remains the same, so the value of the equity goes down as well. Still, the P/E multiple rises to 28.6 and the EV/EBITDA multiple is unchanged.

Next we assume the company pays taxes but has no debt (column D). This lowers earnings further but has no impact on EBITDA, making the P/E double that of EV/EBITDA.

Column E on the far right assumes debt and taxes. This results in the largest difference between the P/E at 34.3 and the EV/EBITDA of 15.0.

This example is simplified and makes a number of unrealistic assumptions. For example, we determine the EV by taking a multiple of sales. The ratio of EV to sales would likely change based on the level of profitability (higher profits mean a higher multiple), as the result of the introduction of debt (tax shield), and because of taxes (government claim on cash flows).

Further, all of the inputs fall on a continuum. For instance, debt-to-total capital ratios and tax rates can range from low, or even negative, to very high. But the exhibit reveals how and why P/E and EV/EBITDA multiples can diverge.

We can look at a pair of companies to make this point concrete. As of early March 2024, Walmart Inc. and Apple Inc. had similar P/E multiples but different EV/EBITDA multiples (see exhibit 1). Walmart is a multinational retailer and Apple is a multinational technology company. The P/E multiple, based on earnings estimated for the next twelve months, was 25.5 for Walmart and 25.4 for Apple. The EV/EBITDA multiple was 13.3 for Walmart and 20.1 for Apple. The ratio of P/E to EV/EBITDA was 1.9 times for Walmart and 1.3 times for Apple.

We can point to three main reasons that Walmart had a bigger gap between its P/E and EV/EBITDA multiples than Apple did. First, Walmart starts with a much lower starting EV/EBITDA because it is less profitable than Apple, based on EBIT margins and ROIC. Second, Walmart has net debt whereas Apple has net cash. The cost of debt lowers Walmart's earnings and increases its P/E. Finally, Walmart has a tax rate that is 10 percentage points higher than that of Apple. This also lowers its earnings and increases its P/E.

Said differently, Walmart has characteristics (modest ROIC, debt, and average tax rate) that would roughly place it in the right column of exhibit 4 and explain the large gap between P/E and EV/EBITDA. Apple has characteristics (very high ROIC, no debt, a low tax rate) that make it look more like the second column in the exhibit justifying a small gap between P/E and EV/EBITDA.

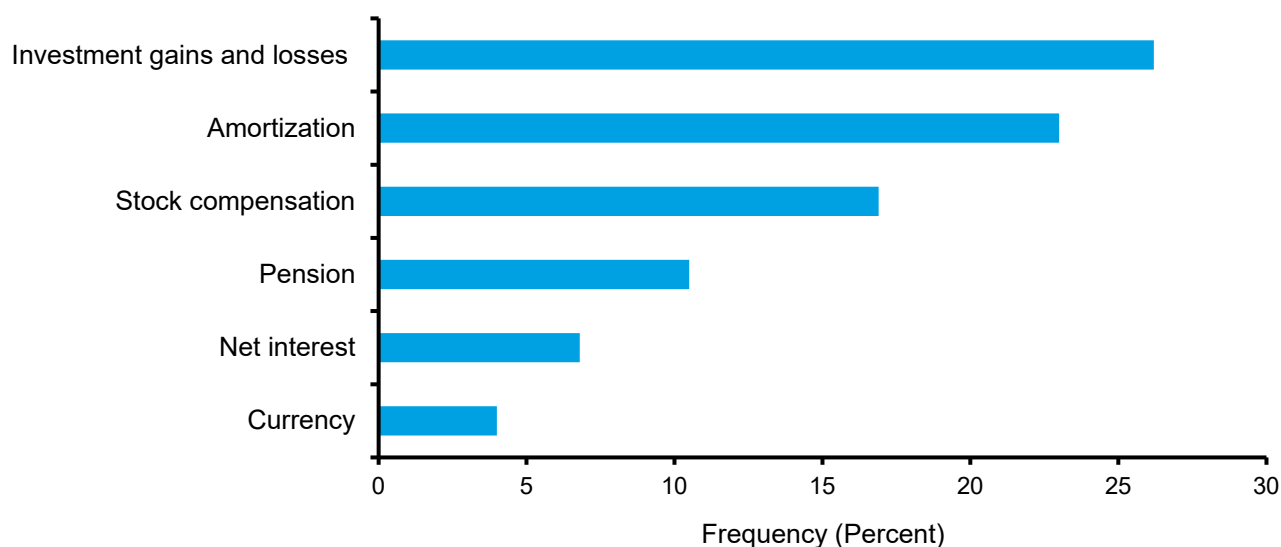
Do Adjusted Measures Obfuscate or Illuminate?

Regulations require companies to report earnings that conform with generally accepted accounting principles (GAAP). The vast majority of companies in the S&P 500, an index of 500 of the largest public companies in the U.S., also report non-GAAP earnings.¹⁸ The question is whether companies share non-GAAP figures to provide the market with better information or to flatter their results.

Exhibit 5 shows the most common exclusions of recurring items that companies make to go from GAAP to non-GAAP results. Most are non-operating, including currency, pension, and investment gains and losses. Others, such as stock-based compensation and net interest, are related to the ongoing operations. Adding back amortization of acquired intangibles is defensible because companies expense the investment to maintain the value of the intangible assets.¹⁹

Companies also adjust their GAAP earnings to remove the effect of non-recurring items, such as restructuring charges, acquisition adjustments, extraordinary legal costs, and asset write-downs and write-offs. Excluding non-recurring items makes earnings more comparable over time.²⁰

Exhibit 5: The Most Common Recurring Exclusions in the Calculation of Non-GAAP Results



Source: Dirk E. Black, Theodore E. Christensen, Jack T. Ciesielski, and Benjamin C. Whipple, "Non-GAAP Earnings: A Consistency and Comparability Crisis?" *Contemporary Accounting Research*, Vol. 38, No. 3, Fall 2021, 1712-1747.

Take Berkshire Hathaway, a conglomerate, as an example of how unadjusted results can be misleading. On a GAAP basis, the company reported a loss of \$23 billion for 2022 and a gain of \$96 billion for 2023. On the face of it the company swung from large losses to large profits.

But Warren Buffett, the company's chairman and chief executive officer, suggested that "operating earnings" are a better way to understand its results. Operating earnings were \$30.9 billion for 2022 and \$37.4 billion for 2023, a more sensible reflection of business performance.

Unrealized investment gains or losses, which can be more than \$5 billion a day for Berkshire Hathaway, explain most of the difference between GAAP earnings and operating earnings.²¹ This is one of the reasons companies routinely report non-GAAP earnings.

In a similar vein, researchers examined core versus non-core earnings.²² Core earnings reflect only the operating results of the ongoing business, and non-core earnings include non-operating items such as transitory shocks or ancillary business activities that are included in GAAP. They found that the average number of non-core items that companies report has risen from 6 to 8 in recent decades and represented about 20 percent of net income. After stripping away non-core items, the resulting core earnings were more stable than the reported net income.

On balance, the academic research suggests that non-GAAP results provide the market with information that is useful.²³ But investors should always be on the lookout for companies that take these adjustments too far.²⁴ One example is adding back stock-based compensation, which we and many others consider a legitimate expense.²⁵

A Deeper Look at EV/EBITDA Multiples

If you are pricing a stock using an EV/EBITDA multiple, you should care how much of EBITDA is EBIT and how much is DA. The reason is that DA is a proxy for the maintenance capital expenditures a company requires to sustain its business.²⁶ That means that for two firms with the same EBITDA, the one with higher EBIT will have more cash flow to distribute to its claimholders and hence a higher value.

Exhibit 6 shows the median EBIT and DA as a percentage of EBITDA by sector. EBIT makes up 75 percent of EBITDA for the consumer discretionary sector and 56 percent for utilities. The ratio of EBITDA to EBIT is called the “depreciation factor.”²⁷ The depreciation factor is 1.3 for consumer discretionary ($1.3 = 100/75$), 1.8 for utilities ($1.8 = 100/56$), and 1.4 for the universe overall. The amount of depreciation and amortization a company recognizes is a function of its capital intensity, the asset lives it assumes, and its acquisitiveness.

Exhibit 6: EBIT and DA as a Percentage of EBITDA by Sector, 2023

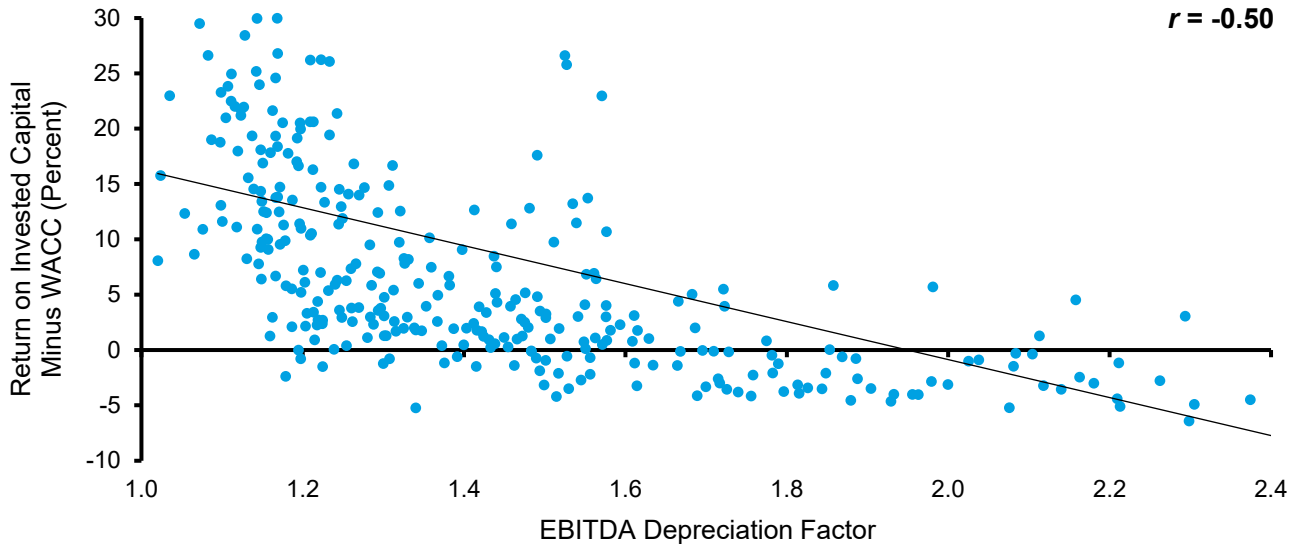
Sector	Percentage of EBITDA	
	EBIT	DA
Consumer Discretionary	75	25
Consumer Staples	75	25
Information Technology	74	26
Industrials	73	27
Health Care	71	29
Materials	68	32
Energy	67	33
Communication Services	60	40
Utilities	56	44
Universe	70	30

Source: FactSet and Counterpoint Global.

Note: Russell 3000 Index as of 2/23/24; Medians for latest fiscal year; Universe excludes financial and real estate sectors and companies with zero or negative EBIT.

Depreciation factors provide a sense of the spread between ROIC and WACC for a company. Firms with low depreciation factors commonly have positive spreads and firms with high factors often have negative spreads (see exhibit 7). This means that companies with a low depreciation factor will have higher multiples than companies with high depreciation factors for a given rate of growth.

Exhibit 7: EBITDA Depreciation Factor and ROIC-WACC for the S&P 500, March 2024



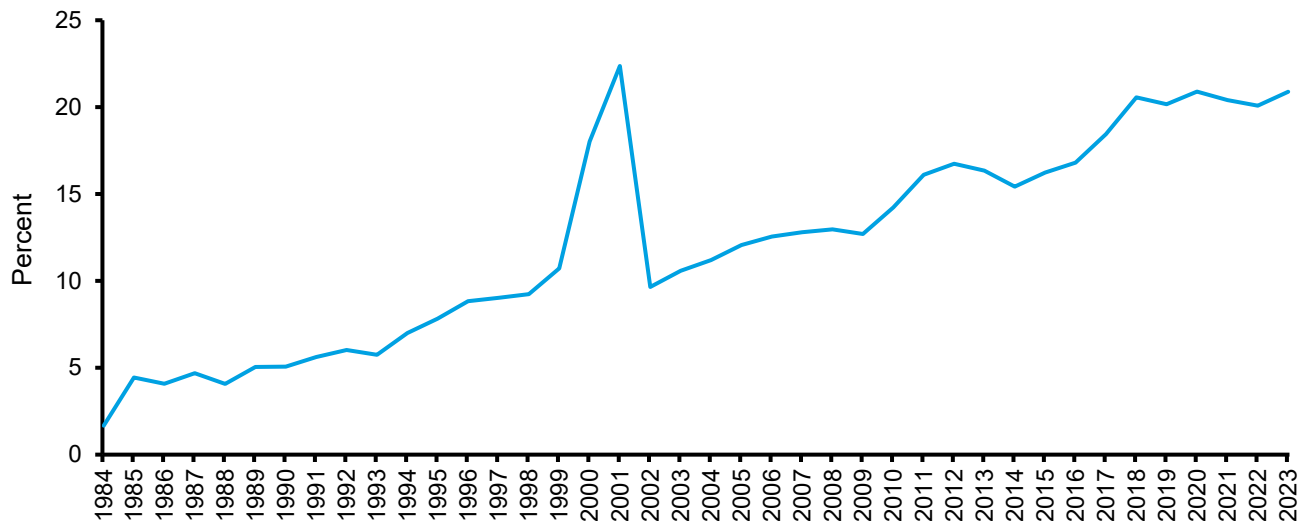
Source: FactSet and Counterpoint Global.

Note: As of 3/12/24; For the latest fiscal year; Excludes financial and real estate sectors; Winsorized each series at 1st and 99th percentiles; Axes truncated for visualization purposes.

Exhibit 8 shows that amortization of acquired intangibles has gone from about 2 to 20 percent of DA in the last 4 decades. Amortization is largely the result of one company buying another at a premium to tangible book value. In that case, the buyer revises its balance sheet to reflect the seller’s tangible and intangible assets. Intangible assets that arise from contractual or other legal rights and can be separated or divided from the company must be amortized over their useful lives.²⁸ The result is the amortization of acquired intangibles.

Accountants record the intangible assets that do not meet those criteria as goodwill. Companies do not amortize goodwill but must check it periodically to see if its value is impaired. About one-third of the value of deals in recent years has been in the form of intangible assets.²⁹

Exhibit 8: Amortization as a Percentage of Depreciation and Amortization, 1984-2023



Source: FactSet and Counterpoint Global.

Note: Russell 3000 excluding financial and real estate sectors; Based on aggregate sums.

The spike in the middle of exhibit 8 is the result of a change in accounting rules for business combinations. Until 2001, companies could use one of two accounting methods, either “pooling of interests” or “purchase,” to record a deal. The pooling-of-interests method allowed companies to simply combine their balance sheets and thus there was no need to record intangible assets. The purchase method required companies to reflect goodwill and to amortize it over a period of up to 40 years.

In 2002, the Financial Accounting Standards Board (FASB) revised the rules so that companies could no longer use the pooling-of-interests method. At the same time, the FASB removed the need for companies to amortize goodwill. The sharp drop in amortization in 2002 reflects that accounting change.

The FASB introduced another change in 2007 that clarified what companies could categorize as intangible versus goodwill assets. As a result, intangible assets increased relative to goodwill assets. The rise in amortization as a percentage of DA from 13 percent in 2007 to 21 percent in 2023 reflects these accounting changes as well as the overall increase in investments in intangible assets.

There is some evidence that EV/EBITDA multiples outperform other multiples, including P/E. Specifically, buying stocks with low EV/EBITDA multiples generates higher excess returns than other metrics.³⁰ That said, the efficacy of P/E and EV/EBITDA can vary by industry.³¹

Exhibit 9 shows the warranted EV/EBITDA multiples, considering various combinations of growth rates and ROICs, for businesses with depreciation factors of 1.2, 1.4, or 1.6. We assume a debt-to-total capital ratio of 20 percent and a cost of capital of 7.6 percent in all cases.³²

Why companies with the same growth, ROIC, and cost of capital would have different EV/EBITDA multiples may not be evident at first glance. The corporate values are in fact the same for the identical assumptions. The key is the difference in depreciation factors.

Think of it this way. Firms with low depreciation factors deliver the same EBIT with lower EBITDA than companies with high depreciation factors.

Here is an illustration to solidify the idea. If you assume a tax rate of 20 percent, a company has to earn EBIT of \$125 to generate \$100 in net operating profit after taxes (NOPAT). This holds for all EBITDA depreciation factors. For a company with a factor of 1.2, depreciation and amortization is \$25, and EBITDA is \$150 ($\$150/\$125 = 1.2$). For a company with a factor of 1.6, depreciation and amortization is \$75, and EBITDA is \$200 ($\$200/\$125 = 1.6$).

Both companies, assuming the return on incremental invested capital is equal to the cost of capital, have an identical value of \$1,315.8 ($\$100/.076$). But the EBITDA multiple is 8.8 ($\$1,316/150 = 8.8$) for the firm with a factor of 1.2 and 6.6 ($\$1,316/200 = 6.6$) for the firm with a factor of 1.6.

The exhibit also reinforces the lesson that growth increases multiples when returns are above the cost of capital and decreases multiples when returns are below the cost of capital. Firms that focus largely on EBITDA growth and fail to consider return on incremental invested capital can find themselves in financial difficulty.³³

Exhibit 9: EV/EBITDA Multiples Based on Depreciation Factor, ROIC, and Growth

		Depreciation factor=1.2 (EBIT to EBITDA=83.3%)				
		Return on Invested Capital				
		4.0%	7.6%	8.0%	16.0%	24.0%
Earnings Growth	4.0%	5.3x	8.8x	9.0x	10.8x	11.4x
	6.0%	2.8	8.8	9.1	12.2	13.3
	8.0%	NM	8.8	9.3	14.0	15.6
	10.0%	NM	8.8	9.5	16.3	18.6

		Depreciation factor=1.4 (EBIT to EBITDA=71.4%)				
		Return on Invested Capital				
		4.0%	7.6%	8.0%	16.0%	24.0%
Earnings Growth	4.0%	4.5x	7.5x	7.7x	9.3x	9.8x
	6.0%	2.4	7.5	7.8	10.5	11.4
	8.0%	NM	7.5	7.9	12.0	13.4
	10.0%	NM	7.5	8.1	14.0	15.9

		Depreciation factor=1.6 (EBIT to EBITDA=62.5%)				
		Return on Invested Capital				
		4.0%	7.6%	8.0%	16.0%	24.0%
Earnings Growth	4.0%	3.9x	6.6x	6.7x	8.1x	8.6x
	6.0%	2.1	6.6	6.8	9.2	10.0
	8.0%	NM	6.6	7.0	10.5	11.7
	10.0%	NM	6.6	7.1	12.2	13.9

Source: Counterpoint Global.

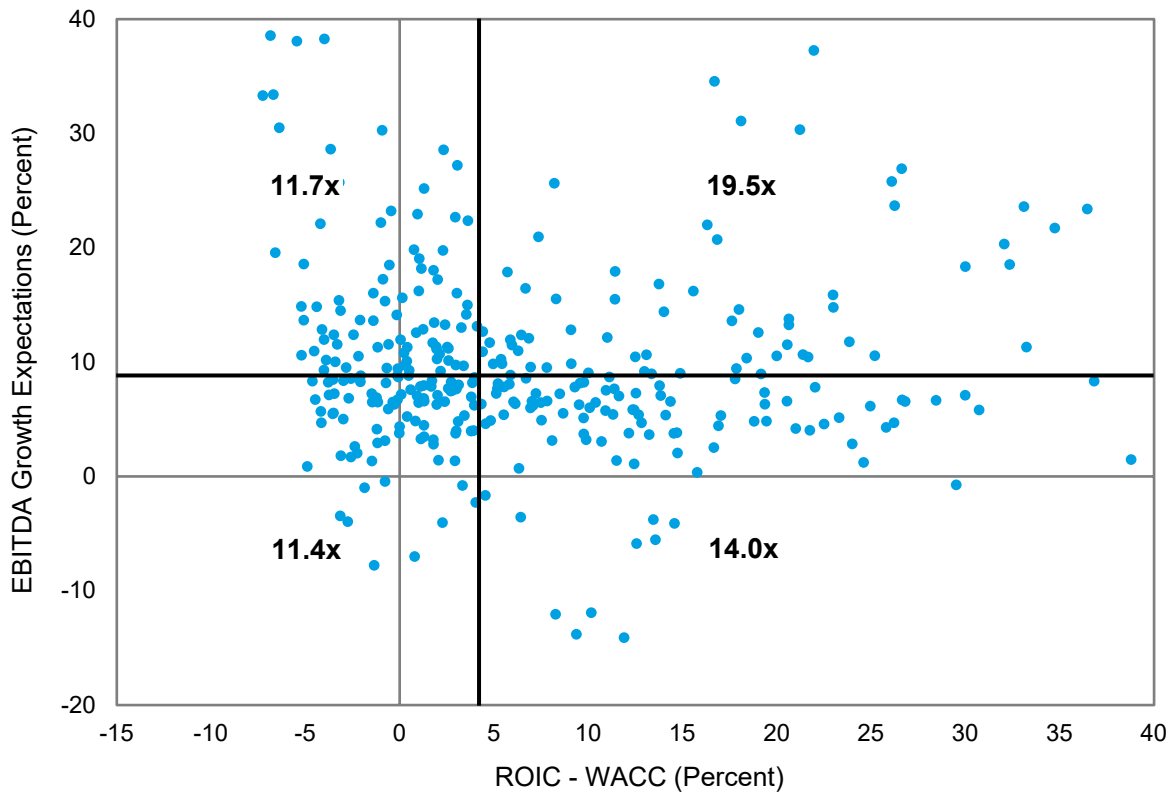
Note: Earnings=NOPAT; Assumes 20 percent debt-to-total capitalization, 7.6% WACC, and 15-year forecast period.

Exhibit 10 shows that the market hears this message. The horizontal (X) axis is ROIC – WACC, with a bold line at the median spread. The vertical (Y) axis is the expected EBITDA growth over the next four quarters, also with a bold line that separates the top and bottom half of companies. This allows us to examine the median EV/EBITDA multiples for each of the four quadrants.

The quadrant on the upper right, which includes companies that are above the median in both the spread between ROIC and WACC and growth in EBITDA, has the highest median EV/EBITDA multiple. The bottom right, high spreads but with slower growth, has the second highest multiple.

The upper left quadrant, above-median growth and below-median spreads, has the third highest median multiple. And the bottom left quadrant, which has spreads and growth below the median, has the lowest multiple.

Exhibit 10: EV/EBITDA Multiples Based on Economic Returns and Expected EBITDA Growth



Source: FactSet and Counterpoint Global.

Note: Median EV/EBITDA; As of 3/12/24; Excludes financial and real estate sectors; EBITDA growth based on consensus estimates for the next three fiscal years; EV/EBITDA is enterprise value divided by consensus estimates of EBITDA for the next four quarters.

Research shows that excess returns are positive for the stocks of companies with actual multiples lower than the warranted multiples, and negative for those with actual multiples higher than the warranted multiples. Fundamental value drivers determine the warranted multiples.³⁴

Conclusion

Most investors and executives price, versus value, the stocks of companies. Pricing a stock generally means assigning a multiple to a measure of earnings or cash flows and rarely explicitly reflects important value drivers such as return on invested capital. Analysts and investment bankers also commonly assign a multiple based on the multiples of comparable companies, and they often select a peer group that leads to the desired answer.³⁵

The most popular multiples are P/E and EV/EBITDA. In each case, the numerator captures the present value of cash flows over the long term while the denominator is a snapshot of earnings or cash flows in the short term. Further, multiples fail to explicitly consider investment needs. For instance, two companies with the same level and growth rate in earnings per share (EPS) but different ROICs have different warranted P/E multiples.

Multiples have also lost informativeness because of how accounting works and the nature of investment. Ideally, accountants should match expenses to revenues. But because there has been a sharp rise in intangible

investment, which is generally expensed, the income statement's ability to match expenses and revenues has degraded substantially in recent decades. Earnings are less informative than they used to be.

In most cases, the multiples of P/E and EV/EBITDA provide a similar signal. But there can be cases where two companies have similar P/Es and dissimilar EV/EBITDA multiples, or dissimilar P/Es and similar EV/EBITDA multiples. These differences are generally attributable to differences in underlying profitability, capital structure, or tax rates.

The vast majority of companies now report earnings that do not conform to GAAP along with the required GAAP results. Overall, non-GAAP earnings appear to be informative, although investors should always be on the lookout for figures that ignore important items.

Warranted EV/EBITDA multiples are based on ROIC and growth prospects. Baseline EV/EBITDA multiples differ based on capital intensity. The depreciation factor, the ratio of EBITDA to EBIT, provides a useful clue about the appropriate steady-state multiple.

We do not discourage the use of multiples. Rather, we encourage those who apply multiples to understand the underlying value drivers that substantiate their choices. The goal is to keep valuation in mind when pricing businesses.

Please see Important Disclosures on pages 24-26

Appendix: From the Gordon Growth Model to Multiples

One of the simplest valuation techniques is the Gordon growth model, named after Myron Gordon, an economist, who formalized the approach in the late 1950s.³⁶

The model says:

$$\text{Value} = \frac{\text{Free cash flow}}{\text{Cost of capital} - \text{growth}}$$

Value is the enterprise value (EV) of the firm, which equals the equity market capitalization plus debt and other liabilities, minus cash.

Free cash flow (FCF) is the cash a firm generates that is free to be distributed to the holders of debt and equity. Formally, it equals net operating profit after taxes (NOPAT) minus investments (I) in future growth. These investments include changes in working capital and capital expenditures (typically expressed net of depreciation).³⁷

The cost of capital is the opportunity cost of capital providers. Investors and executives need to calculate the weighted average cost of capital (WACC) for companies financed with both debt and equity. Growth captures the expected increase in FCF over time.

We will show how to translate the value from the Gordon growth model into multiples, including EV/EBITDA, P/E, and EV/Sales.³⁸ Much of this analysis follows Aswath Damodaran's exposition on the topic.³⁹

We start by decomposing FCF as follows:

$$\text{FCF} = \text{EBIT}(1 - t) - (\text{capital expenditures} - \text{depreciation}) - \Delta \text{ in working capital}$$

EBIT stands for earnings before interest and taxes and t stands for tax rate. The first term on the right side of the equation is NOPAT and the second two terms are investments.

We can rewrite the equation to include EBITDA:

$$\begin{aligned} \text{FCF} &= (\text{EBITDA} - \text{depreciation})(1 - t) - (\text{capital expenditures} - \text{depreciation}) - \Delta \text{ in working capital} \\ &= \text{EBITDA}(1 - t) + \text{depreciation}(t) - \text{capital expenditures} - \Delta \text{ in working capital} \end{aligned}$$

We can substitute free cash flow with these terms to calculate value:

$$\text{Value} = \frac{\text{EBITDA}(1 - t) + \text{depreciation}(t) - \text{capital expenditures} - \Delta \text{ in working capital}}{\text{WACC} - \text{growth}}$$

We divide both sides of the equation by EBITDA in order to calculate the EV/EBITDA multiple (warning, this is a little messy, but we will use some numbers shortly to make it clearer):

$$\frac{\text{EV}}{\text{EBITDA}} = \frac{\text{Depreciation}(t)/\text{EBITDA}}{\text{WACC} - g} + \frac{1 - t}{\text{WACC} - g} - \frac{\text{capital expenditures}/\text{EBITDA}}{\text{WACC} - g} - \frac{\Delta \text{ in working capital}/\text{EBITDA}}{\text{WACC} - g}$$

Before we proceed with the other multiples, let us take a moment to apply figures to show how it works. We assume the company has no debt, but introducing debt is straightforward.

We suppose:

Sales	\$500
EBIT	100
Depreciation	25
EBITDA	125
Tax rate	15.0%
Capital expenditures	31.25
Working capital	0
WACC	8.5%
Growth	4.0%

Let us start with the Gordon growth model.

$$\text{Value} = \frac{\text{EBIT}(1 - t) - (\text{capital expenditures} - \text{depreciation}) - \Delta \text{ in working capital}}{\text{WACC} - g}$$

$$\text{Value} = \frac{\$100(1 - .15) - (\$31.25 - \$25) - 0}{.085 - .04}$$

$$\text{Value} = \frac{\$78.75}{.045} = \$1,750$$

Now we apply the numbers to solve for the EV/EBITDA multiple:

$$\frac{\text{EV}}{\text{EBITDA}} = \frac{25(.15)/125}{0.085 - .04} + \frac{(1 - .15)}{0.085 - .04} - \frac{31.25/125}{0.085 - .04} - 0$$

$$\frac{\text{EV}}{\text{EBITDA}} = \frac{.03}{.045} + \frac{.85}{.045} - \frac{.25}{.045} = 14.0$$

To check our work, we multiply the EV/EBITDA multiple of 14.0 by EBITDA of \$125 to arrive at an EV of \$1,750 ($14.0 \times \$125 = \$1,750$).

We can now continue with the P/E multiple. In this case, NOPAT and earnings are the same because there is no debt. Earnings equals $\text{EBIT}(1 - t)$.

Applying the same figures, we get earnings of \$85 ($\$100 \times .85 = \85). Since the value is \$1,750 and the earnings are \$85, the P/E is 20.6 ($\$1,750 \div \$85 = 20.6$). This presumes value and price are synonymous.

Since we know the warranted EV/EBITDA multiple, it is a short step to calculate the EV/Sales multiple. All we have to do is multiply both sides of the equation by EBITDA/Sales, which is .25 ($\$125/\$500 = .25$).

$$\frac{\text{EV}}{\text{EBITDA}} \times \frac{\text{EBITDA}}{\text{Sales}} = 14.0 \times \frac{\text{EBITDA}}{\text{Sales}}$$

$$\frac{\text{EV}}{\text{Sales}} = 14.0 \times .25 = 3.5$$

In reality, the Gordon growth model is too simplistic to capture the value of most businesses. But this discussion shows how valuation multiples tie to the core drivers of value and to one another.

Endnotes

¹ Aswath Damodaran, "A Viral Market Meltdown III: Pricing or Value? Trading or Investing?" *Musings on Markets*, March 16, 2020.

² Jerald E. Pinto, Thomas R. Robinson, John D. Stowe, "Equity Valuation: A Survey of Professional Practice," *Review of Financial Economics*, Vol. 37, No. 2, April 2019, 219-233; Frank J. Fabozzi, Sergio M. Focardi, and Caroline Jonas, "Equity Valuation: Science, Art, or Craft?" *CFA Institute Research Foundation*, 2017; and Lilia Mukhlynina and Kjell G. Nyborg, "The Choice of Valuation Techniques in Practice: Education versus Profession," *Swiss Finance Institute Research Paper Series No. 16-36*, October 2016.

³ David A. Holland, "An Improved Method for Valuing Mature Companies and Estimating Terminal Value," *Journal of Applied Corporate Finance*, Vol. 30, No. 1, Winter 2018, 70-77.

⁴ Doron Nissim, "Terminal Value," *Columbia Business School Research Paper No. 18-12*, January 4, 2018.

⁵ Jeremiah Green, John R. M. Hand, and X. Frank Zhang, "Errors and Questionable Judgments in Analysts' DCF Models," *Review of Accounting Studies*, Vol. 21, No. 2, June 2016, 596-632.

⁶ Anup Srivastava, "Trivialization of the Bottom Line and Losing Relevance of Losses," *Review of Accounting Studies*, Vol. 28, No. 3, September 2023, 1190-1208. Srivastava places all companies listed before 1960 into one cohort.

⁷ For a conceptual example of two companies with identical economics but different accounting, see Michael J. Mauboussin and Dan Callahan, "Good Losses, Bad Losses: All Losses Are Not Created Equal," *Consilient Observer: Counterpoint Global Insights*, July 20, 2022.

⁸ There are a lot of judgment calls involved in this. We use the method described in Charles R. Hulten, "Decoding Microsoft: Intangible Capital as a Source of Company Growth," *NBER Working Paper 15799*, March 2010. For a newer approach, see Aneel Iqbal, Shivaram Rajgopal, Anup Srivastava, and Rong Zhao, "A Better Estimate of Internally Generated Intangible Capital," *Management Science*, forthcoming.

⁹ As it stands, intangible investments on the income statement create a valuable tax shield. Were accounting rules to change, this shield would either go away or become less valuable.

¹⁰ Ricardo De la O, Xiao Han, and Sean Myers, "The Return of Return Dominance: Decomposing the Cross-Section of Prices," *Jacobs Levy Equity Management Center for Quantitative Financial Research Paper*, December 2023.

¹¹ Feng Gu and Baruch Lev, "Time to Change Your Investment Model," *Financial Analysts Journal*, Vol. 73, No. 4, Fourth Quarter 2017, 23-33 and Baruch Lev and Anup Srivastava, "Explaining the Recent Failure of Value Investing," *Critical Finance Review*, Vol. 11, No. 2, February 2022, 333-360.

¹² Yong Keun Yoo, "The Valuation Accuracy of Equity Valuation Using a Combination of Multiples," *Review of Accounting and Finance*, Vol. 5, No. 2, 2006, 108-123.

¹³ Michael J. Mauboussin and Dan Callahan, "Intangibles and Earnings: Improving the Usefulness of Financial Statements," *Consilient Observer: Counterpoint Global Insights*, April 12, 2022.

¹⁴ You can argue that there are other sources of capital, including leases (very similar to debt), convertible bonds (debt and an equity option), deferred taxes (a "loan" from the government), and a negative cash conversion cycle (effectively supplier financing).

¹⁵ Interest expense is subtracted from operating profit to calculate pretax profit, and the tax rate is then applied to that sum. Introducing interest expense lowers pretax profit and, assuming the tax rate stays constant, lowers the amount of taxes. This is called a "tax shield." The tax shield has value, as it reduces the claim of the government. This can increase corporate value. There are limits to the deductibility of interest expense in the U.S. For example, the Tax Cuts and Jobs Act of 2017 sets a limit on the tax deductibility of interest at 30 percent of earnings before interest and taxes (EBIT) for U.S. companies with sales of \$25 million or more. This went into effect in 2022.

¹⁶ Stewart C. Myers, "The Capital Structure Puzzle," *Journal of Finance*, Vol. 39, No. 3, July 1984, 575-592.

¹⁷ Edward Bodmer, *Corporate and Project Finance Modeling: Theory and Practice* (Hoboken, NJ: John Wiley & Sons, 2015), 445-451.

¹⁸ Vijay Govindarajan, Anup Srivastava, and Rong Zhao, "Mind the GAAP," *Harvard Business Review*, May 4, 2021.

¹⁹ Adding back amortization of acquired intangibles but not depreciation (both are non-cash charges) may seem peculiar. Here is the reasoning. Depreciation is correctly considered an operating expense because it reflects wear and tear on physical assets. For instance, a company that buys a machine with a useful life of five years will record it in property, plant, and equipment (PP&E) on its balance sheet and depreciate the asset on the income statement over its life. Amortization of acquired intangibles reflects different accounting. Assume a company acquires a customer list. The company would post the list as an intangible asset on the balance sheet and amortize it over its estimated useful life. But the money it spends to maintain and grow the list is expensed on the income statement.

²⁰ Dirk E. Black, Theodore E. Christensen, Jack T. Ciesielski, and Benjamin C. Whipple, “Non-GAAP Earnings: A Consistency and Comparability Crisis?” *Contemporary Accounting Research*, Vol. 38 No. 3, Fall 2021, 1712-1747.

²¹ Warren E. Buffett, “Letter to Shareholders,” *Berkshire Hathaway Annual Report*, 2023. See <https://berkshirehathaway.com/2023ar/2023ar.pdf>.

²² Non-core expenses, similar to non-operating expenses, reflect “ancillary business activities or transitory shocks.” See Ethan Rouen, Eric C. So, and Charles C.Y. Wang, “Core Earnings: New Data and Evidence,” *Journal of Financial Economics*, Vol. 142, No. 3, December 2021, 1068-1091.

²³ Jason V. Chen, Kurt H. Gee, and Jed J. Neilson, “Disclosure Prominence and the Quality of Non-GAAP Earnings,” *Journal of Accounting Research*, Vol. 59, No. 1, March 2021, 163-213; Jeremiah W. Bentley, Theodore E. Christensen, Kurt H. Gee, and Benjamin C. Whipple, “Disentangling Managers’ and Analysts’ Non-GAAP Reporting,” *Journal of Accounting Research*, Vol. 56, No. 4, September 2018, 1039-1081; John L. Campbell, Kurt H. Gee, and Zac Wiebe, “The Determinants and Informativeness of Non-GAAP Revenue Disclosures,” *The Accounting Review*, Vol. 97, No. 7, November 2022, 23-48; and Black, Christensen, Ciesielski, and Whipple, “Non-GAAP Earnings: A Consistency and Comparability Crisis?”

²⁴ Jason Zweig, a journalist, reports on the many “mutations” of EBITDA, including EBITDAC (with a change in acquisition costs used by insurers); EBITDAO (with option expense, a cost of paying management); EBITDAP (pension and other retirement benefits); EBITDAR (the costs of leasing real estate or airplanes, depending on the industry); EBITDARE (losses, gains and other adjustments on real estate); EBITDAS or EBITDASC (stock-based pay for management); and EBITDAX (exploration costs for oil-and-gas companies).” See Jason Zweig, “How Companies Use the Latest Profits Fad to Fool You,” *Wall Street Journal*, June 1, 2018.

²⁵ For example, Warren Buffett writes about items companies should not add back to calculate non-GAAP earnings: “‘Stock-based compensation’ is the most egregious example. The very name says it all: ‘compensation.’ If compensation isn’t an expense, what is it? And, if real and recurring expenses don’t belong in the calculation of earnings, where in the world do they belong?” See “Letter to Shareholders,” *Berkshire Hathaway Annual Report*, 2015. See <https://berkshirehathaway.com/2015ar/2015ar.pdf>. See also Zvi Bodie, Robert S. Kaplan, and Robert C. Merton, “For the Last Time: Stock Options Are an Expense,” *Harvard Business Review*, Vol. 81, No. 3, March 2003, 62-71.

²⁶ If anything, this assumption is too optimistic. See Michael J. Mauboussin and Dan Callahan, “Underestimating the Red Queen: Measuring Growth and Maintenance Investments,” *Consilient Observer: Counterpoint Global Insights*, January 27, 2022.

²⁷ The term “EBITDA Depreciation Factor” was coined by Chris Mercer. See Z. Christopher Mercer, “EBITDA Single-Period Income Capitalization for Business Valuation,” *Business Valuation Review*, Vol. 35, No. 3, Fall 2016, 86-102.

²⁸ FASB 141.

²⁹ Wayne Landsman, Alexander Liss, and Sönke Sievers, “The Pricing of Acquired Intangibles,” *TRR 266 Accounting for Transparency Working Paper Series*, No. 65, October 2021.

³⁰ Wesley R. Gray and Jack Vogel, “Analyzing Valuation Measures: A Performance Horse Race over the Past 40 Years,” *Journal of Portfolio Management*, Vol. 39, No. 1, Fall 2012, 112-121, Tim Loughran and Jay W. Wellman, “New Evidence on the Relation between the Enterprise Multiple and Average Stock Returns,” *Journal of Financial and Quantitative Analysis*, Vol. 46, No. 6, December 2011, 1629-1650; and Doron Nissim, “EBITDA, EBITA, or EBIT?” *Columbia Business School Research Paper No. 17-71*, January 10, 2018.

³¹ Jennifer Francis, Katherine Schipper, and Linda Vincent, “The Relative and Incremental Explanatory Power of Earnings and Alternative (to Earnings) Performance Measures for Returns,” *Contemporary Accounting Research*, Vol. 20, No. 1, Spring 2003, 121-64.

³² Companies with higher EBITDA Depreciation Factors have higher debt-to-total capitalization ratios on average. But the difference in cost of capital is not material if you use a higher cost of equity and debt and reweight the contributions. Return on invested capital and growth are the main drivers of valuation. See Robert W. Holthausen and Mark Zmijewski, “Valuation with Market Multiples: How to Avoid Pitfalls When Identifying and Using Comparable Companies,” *Journal of Applied Corporate Finance*, Vol. 24, No. 3, Summer 2012, 26-38.

³³ Consider this passage from the book, *Conspiracy of Fools*:

“We need to keep investing to grow as fast as possible. Merrill Lynch says our valuation is all about EBITDA, not earnings.”

EBITDA. A fancy Wall Street term for profits, with all of the financial expenses removed. It stood for “earnings before interest, taxes, depreciation, and amortization.” Steady growth in EBITDA could be a sign of future strong profits, but not if it was being accomplished by manufacturing full, after-tax losses.

[Ken] Lay couldn’t believe what he was hearing. Was [Rebecca] Mark really arguing that the deeper into a hole she got, the better off her company would be?

“Rebecca, that doesn’t make any sense,” he said. “Surely you understand that if you put capital into projects with returns that are below the cost of that capital, ultimately you’re going to go bankrupt.”

“This is what Merrill tells me is the way things are around this industry,” Mark replied. “We have to grow EBITDA. That’s all that matters.”

See Kurt Eichenwald, *Conspiracy of Fools: A True Story* (New York: Broadway Books, 2005), 278.

³⁴ Jiyoun An, Sanjeev Bhojraj, and David T. Ng, “Warranted Multiples and Future Returns,” *Journal of Accounting, Auditing, and Finance*, Vol. 25, No. 10, April 2010, 143-169 and Sanjeev Bhojraj and Charles M. C. Lee, “Who Is My Peer? A Valuation-Based Approach to the Selection of Comparable Firms,” *Journal of Accounting Research*, Vol. 40, No. 2, May 2002, 407-439.

³⁵ Gregory W. Eaton, Feng Guo, Tingting Liu, and Micah S. Officer, “Peer Selection and Valuation in Mergers and Acquisitions,” *Journal of Financial Economics*, Vol. 146, No. 1, October 2022, 230-255.

³⁶ M. J. Gordon, “Dividends, Earnings, and Stock Prices,” *Review of Economics and Statistics*, Vol. 41, No. 2, Part 1, May 1959, 99-105.

³⁷ Investments also include net mergers and acquisitions (mergers and acquisitions minus divestitures).

³⁸ Andreas Schueler, “Valuation with Multiples: A Conceptual Analysis,” *Journal of Business Valuation and Economic Loss Analysis*, Vol. 15, No. 1, February 2020, 20190020.

³⁹ Aswath Damodaran, “EV/EBITDA.” See <https://pages.stern.nyu.edu/~adamodar/pdfiles/vebitda.pdf>. More formally, NOPAT starts with operating income, or earnings before interest and taxes (EBIT). But you then add amortization from acquired intangible assets (A) and the embedded interest component of operating lease expense. Finally, you subtract cash taxes, which include the tax provision, deferred taxes, and the tax shield.

References

- Jiyoun An, Sanjeev Bhojraj, and David T. Ng, "Warranted Multiples and Future Returns," *Journal of Accounting, Auditing, and Finance*, Vol. 25, No. 10, April 2010, 143-169.
- Jeremiah W. Bentley, Theodore E. Christensen, Kurt H. Gee, and Benjamin C. Whipple, "Disentangling Managers' and Analysts' Non-GAAP Reporting," *Journal of Accounting Research*, Vol. 56, No. 4, September 2018, 1039-1081.
- "Berkshire and Wesco Annual Meetings," *Outstanding Investor Digest*, Vol. 18, Nos. 3-4, Year End 2003, 36.
- Peter L. Bernstein, "Two Little-Noted Features of The Markets and The Economy," *Economics & Portfolio Strategy*, November 3, 2008.
- Sanjeev Bhojraj and Charles M. C. Lee, "Who Is My Peer? A Valuation-Based Approach to the Selection of Comparable Firms," *Journal of Accounting Research*, Vol. 40, No. 2, May 2002, 407-439.
- Dirk E. Black, Theodore E. Christensen, Jack T. Ciesielski, and Benjamin C. Whipple, "Non-GAAP Earnings: A Consistency and Comparability Crisis?" *Contemporary Accounting Research*, Vol. 38 No. 3, Fall 2021, 1712-1747.
- Stanley Block, "Methods of Valuation: Myths vs. Reality," *Journal of Investing*, Vol. 19, No. 4, Winter 2010, 7-14.
- Zvi Bodie, Robert S. Kaplan, and Robert C. Merton, "For the Last Time: Stock Options Are an Expense," *Harvard Business Review*, Vol. 81, No. 3, March 2003, 62-71.
- Edward Bodmer, *Corporate and Project Finance Modeling: Theory and Practice* (Hoboken, NJ: John Wiley & Sons, 2015), 445-451.
- Jan Bouwens, Ties de Kok, and Arnt Verriest, "The Prevalence and Validity of EBITDA as a Performance Measure," *Comptabilité Contrôle Audit*, Vol. 25, No. 1, January 2019, 55-105.
- Warren E. Buffett, "Letter to Shareholders," *Berkshire Hathaway Annual Report*, 2023.
- George Calhoun, *Price and Value: A Guide to Equity Market Valuation Metrics* (Jersey City, NJ: Apress, 2020).
- John L. Campbell, Kurt H. Gee, and Zac Wiebe, "The Determinants and Informativeness of Non-GAAP Revenue Disclosures," *The Accounting Review*, Vol. 97, No. 7, November 2022, 23-48.
- Jason V. Chen, Kurt H. Gee, and Jed J. Neilson, "Disclosure Prominence and the Quality of Non-GAAP Earnings," *Journal of Accounting Research*, Vol. 59, No. 1, March 2021, 163-213.
- Aswath Damodaran, "A Viral Market Meltdown III: Pricing or Value? Trading or Investing?" *Musings on Markets*, March 16, 2020.
- Gregory W. Eaton, Feng Guo, Tingting Liu, and Micah S. Officer, "Peer Selection and Valuation in Mergers and Acquisitions," *Journal of Financial Economics*, Vol. 146, No. 1, October 2022, 230-255.
- Kurt Eichenwald, *Conspiracy of Fools: A True Story* (New York: Broadway Books, 2005).
- Frank J. Fabozzi, Sergio M. Focardi, and Caroline Jonas, "Equity Valuation: Science, Art, or Craft?" *CFA Institute Research Foundation*, 2017.
- Jennifer Francis, Katherine Schipper, and Linda Vincent, "The Relative and Incremental Explanatory Power of Earnings and Alternative (to Earnings) Performance Measures for Returns," *Contemporary Accounting Research*, Vol. 20, No. 1, Spring 2003, 121-64.

Paul Gompers, Steven N. Kaplan, and Vladimir Mukharlyamov, "What Do Private Equity Firms Say They Do?" *Journal of Financial Economics*, Vol. 121, No. 3, September 2016, 449-476.

M. J. Gordon, "Dividends, Earnings, and Stock Prices," *Review of Economics and Statistics*, Vol. 41, No. 2, Part 1, May 1959, 99-105.

Samuel Eliot Gould, *Stock Growth and Discount Tables* (Boston, MA: Financial Publishing Company, 1931).

Vijay Govindarajan, Anup Srivastava, and Rong Zhao, "Mind the GAAP," *Harvard Business Review*, May 4, 2021.

Benjamin Graham and David Dodd, *Security Analysis* (New York: McGraw-Hill Book Company, 1934).

Wesley R. Gray and Jack Vogel, "Analyzing Valuation Measures: A Performance Horse Race over the Past 40 Years," *Journal of Portfolio Management*, Vol. 39, No. 1, Fall 2012, 112-121.

Tim Koller, Marc Goedhart, and David Wessels, *Valuation: Measuring and Managing the Value of Companies, 7th Edition* (Hoboken, NJ: John Wiley & Sons, 2020),

Jeremiah Green, John R. M. Hand, and X. Frank Zhang, "Errors and Questionable Judgments in Analysts' DCF Models," *Review of Accounting Studies*, Vol. 21, No. 2, June 2016, 596-632.

Feng Gu and Baruch Lev, "Time to Change Your Investment Model," *Financial Analysts Journal*, Vol. 73, No. 4, Fourth Quarter 2017, 23-33

Martin Hallmark, Frederic Duranson, Iker Ballesterro Barrutia, and Richard Etheridge, "EBITDA Adjustments on the Rise but Fewer Will Be Achieved," *Moody's Investors Service*, June 27, 2018.

Charles J. Higgins, "What's Wrong with PEG?" *Journal of Finance and Bank Management*, Vol. 3, No. 2, 2015, 1-6.

David A. Holland, "An Improved Method for Valuing Mature Companies and Estimating Terminal Value," *Journal of Applied Corporate Finance*, Vol. 30, No. 1, Winter 2018, 70-77.

Robert W. Holthausen and Mark E. Zmijewski, "Valuation with Market Multiples: How to Avoid Pitfalls When Identifying and Using Comparable Companies," *Journal of Applied Corporate Finance*, Vol. 24, No. 3, Summer 2012, 26-38.

Charles R. Hulten, "Decoding Microsoft: Intangible Capital as a Source of Company Growth," *NBER Working Paper 15799*, March 2010.

Aneel Iqbal, Shivaram Rajgopal, Anup Srivastava, and Rong Zhao, "A Better Estimate of Internally Generated Intangible Capital," *Management Science*, forthcoming.

Wayne Landsman, Alexander Liss, and Sönke Sievers, "The Pricing of Acquired Intangibles," *TRR 266 Accounting for Transparency Working Paper Series*, No. 65, October 2021.

Baruch Lev and Anup Srivastava, "Explaining the Recent Failure of Value Investing," *Critical Finance Review*, Vol. 11, No. 2, February 2022, 333-360.

Tim Loughran and Jay W. Wellman, "New Evidence on the Relation between the Enterprise Multiple and Average Stock Returns," *Journal of Financial and Quantitative Analysis*, Vol. 46, No. 6, December 2011, 1629-1650.

Michael J. Mauboussin and Alfred Rappaport, *Expectations Investing: Reading Stock Prices for Better Returns—Revised and Updated* (New York: Columbia Business School Publishing, 2021).

Michael J. Mauboussin and Dan Callahan, "Underestimating the Red Queen: Measuring Growth and Maintenance Investments," *Consilient Observer: Counterpoint Global Insights*, January 27, 2022.

_____, "Intangibles and Earnings: Improving the Usefulness of Financial Statements," *Consilient Observer: Counterpoint Global Insights*, April 12, 2022.

_____, "Good Losses, Bad Losses: All Losses Are Not Created Equal," *Consilient Observer: Counterpoint Global Insights*, July 20, 2022.

Z. Christopher Mercer, "EBITDA Single-Period Income Capitalization for Business Valuation," *Business Valuation Review*, Vol. 35, No. 3, Fall 2016, 86-102.

Merton H. Miller and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business*, Vol. 34, No. 4, October 1961, 411-433.

Stewart C. Myers, "The Capital Structure Puzzle," *Journal of Finance*, Vol. 39, No. 3, July 1984, 575-592.

Doron Nissim, "Terminal Value," *Columbia Business School Research Paper No. 18-12*, January 4, 2018.

_____, "EBITDA, EBITA, or EBIT?" *Columbia Business School Research Paper No. 17-71*, January 10, 2018.

Lilia Mukhlynina and Kjell G. Nyborg, "The Choice of Valuation Techniques in Practice: Education versus Profession," *Swiss Finance Institute Research Paper Series No. 16-36*, October 2016.

Jerald E. Pinto, Thomas R. Robinson, John D. Stowe, "Equity Valuation: A Survey of Professional Practice," *Review of Financial Economics*, Vol. 37, No. 2, April 2019, 219-233.

Joshua Rosenbaum and Joshua Pearl, *Investment Banking: Valuation, Leveraged Buyouts, and Mergers & Acquisitions, Third Edition* (Hoboken, NJ: John Wiley & Sons, 2020).

Ethan Rouen, Eric C. So, and Charles C.Y. Wang, "Core Earnings: New Data and Evidence," *Journal of Financial Economics*, Vol. 142, No. 3, December 2021, 1068-1091.

Oded Rozenbaum, "EBITDA and Managers' Investment and Leverage Choices," *Contemporary Accounting Research*, Vol. 36, No. 1, Spring 2019, 513-546.

Pamela M. Stumpp, "Putting EBITDA In Perspective: Ten Critical Failings of EBITDA As The Principal Determinant Of Cash Flow," *Moody's Investors Service*, June 2000.

William Thorndike, *The Outsiders: Eight Unconventional CEOs and Their Radically Rational Blueprint for Success* (Boston, MA: Harvard Business Review Press, 2012), 91.

Andreas Schueler, "Valuation with Multiples: A Conceptual Analysis," *Journal of Business Valuation and Economic Loss Analysis*, Vol. 15, No. 1, February 2020, 20190020.

Matthew Shaffer, "Which Multiples Matter in M&A? An Overview," *Review of Accounting Studies*, 2023.

Anup Srivastava, "Trivialization of the Bottom Line and Losing Relevance of Losses," *Review of Accounting Studies*, Vol. 28, No. 3, September 2023, 1190-1208.

John Burr Williams, *The Theory of Investment Value* (Cambridge, MA: Harvard University Press, 1938).

Yong Keun Yoo, "The Valuation Accuracy of Equity Valuation Using a Combination of Multiples," *Review of Accounting and Finance*, Vol. 5, No. 2, 2006, 108-123.

Jason Zweig, "How Companies Use the Latest Profits Fad to Fool You," *Wall Street Journal*, June 1, 2018.

IMPORTANT INFORMATION

The views and opinions and/or analysis expressed are those of the author or the investment team as of the date of preparation of this material and are subject to change at any time without notice due to market or economic conditions and may not necessarily come to pass. Furthermore, the views will not be updated or otherwise revised to reflect information that subsequently becomes available or circumstances existing, or changes occurring, after the date of publication. The views expressed do not reflect the opinions of all investment personnel at Morgan Stanley Investment Management (MSIM) and its subsidiaries and affiliates (collectively "the Firm"), and may not be reflected in all the strategies and products that the Firm offers.

Forecasts and/or estimates provided herein are subject to change and may not actually come to pass. Information regarding expected market returns and market outlooks is based on the research, analysis and opinions of the authors or the investment team. These conclusions are speculative in nature, may not come to pass and are not intended to predict the future performance of any specific strategy or product the Firm offers. Future results may differ significantly depending on factors such as changes in securities or financial markets or general economic conditions.

Past performance is no guarantee of future results. This material has been prepared on the basis of publicly available information, internally developed data and other third-party sources believed to be reliable. However, no assurances are provided regarding the reliability of such information and the Firm has not sought to independently verify information taken from public and third-party sources.

This material is a general communication, which is not impartial and all information provided has been prepared solely for informational and educational purposes and does not constitute an offer or a recommendation to buy or sell any particular security or to adopt any specific investment strategy. The information herein has not been based on a consideration of any individual investor circumstances and is not investment advice, nor should it be construed in any way as tax, accounting, legal or regulatory advice. To that end, investors should seek independent legal and financial advice, including advice as to tax consequences, before making any investment decision.

This material is a general communication, which is not impartial, is for informational and educational purposes only, not a recommendation to purchase or sell specific securities, or to adopt any particular investment strategy. Information does not address financial objectives, situation or specific needs of individual investors.

Any charts and graphs provided are for illustrative purposes only.

This material is not a product of Morgan Stanley's Research Department and should not be regarded as a research material or a recommendation.

The Firm has not authorised financial intermediaries to use and to distribute this material, unless such use and distribution is made in accordance with applicable law and regulation. Additionally, financial intermediaries are required to satisfy themselves that the information in this material is appropriate for any person to whom they provide this material in view of that person's circumstances and purpose. The Firm shall not be liable for, and accepts no liability for, the use or misuse of this material by any such financial intermediary.

The whole or any part of this material may not be directly or indirectly reproduced, copied, modified, used to create a derivative work, performed, displayed, published, posted, licensed, framed, distributed or transmitted or any of its contents disclosed to third parties without the Firm's express written consent. This material may not be linked to unless such hyperlink is for personal and non-commercial use. All information contained herein is proprietary and is protected under copyright and other applicable law.

Eaton Vance, Atlanta Capital, Parametric and Calvert are part of Morgan Stanley Investment Management. Morgan Stanley Investment Management is the asset management division of Morgan Stanley.

This material may be translated into other languages. Where such a translation is made this English version remains definitive. If there are any discrepancies between the English version and any version of this material in another language, the English version shall prevail.

DISTRIBUTION

This material is only intended for and will only be distributed to persons resident in jurisdictions where such distribution or availability would not be contrary to local laws or regulations.

MSIM, the asset management division of Morgan Stanley (NYSE: MS), and its affiliates have arrangements in place to market each other's products and services. Each MSIM affiliate is regulated as appropriate in the jurisdiction it operates. MSIM's affiliates are: Calvert Research and Management, Eaton Vance Management, Parametric Portfolio Associates LLC, Parametric SAS, and Atlanta Capital Management LLC.

This material has been issued by any one or more of the following entities:

EMEA

This material is for Professional Clients/Accredited Investors only.

In the EU, MSIM materials are issued by MSIM Fund Management (Ireland) Limited ("FMIL"). FMIL is regulated by the Central Bank of Ireland and is incorporated in Ireland as a private company limited by shares with company registration number 616661 and has its registered address at 24-26 City Quay, Dublin 2, DO2 NY19, Ireland.

Outside the EU, MSIM materials are issued by Morgan Stanley Investment Management Limited (MSIM Ltd) is authorised and regulated by the Financial Conduct Authority. Registered in England. Registered No. 1981121. Registered Office: 25 Cabot Square, Canary Wharf, London E14 4QA.

In Switzerland, MSIM materials are issued by Morgan Stanley & Co. International plc, London (Zurich Branch) Authorised and regulated by the Eidgenössische Finanzmarktaufsicht ("FINMA"). Registered Office: Beethovenstrasse 33, 8002 Zurich, Switzerland.

Italy: MSIM FMIL (Milan Branch), (Sede Secondaria di Milano) Palazzo Serbelloni Corso Venezia, 16 20121 Milano, Italy. **The Netherlands:** MSIM FMIL (Amsterdam Branch), Rembrandt Tower, 11th Floor Amstelplein 1 1096HA, Netherlands. **France:** MSIM FMIL (Paris Branch), 61 rue de Monceau 75008 Paris, France. **Spain:** MSIM FMIL (Madrid Branch), Calle Serrano 55, 28006, Madrid, Spain. **Germany:** MSIM FMIL Frankfurt Branch, Große Gallusstraße 18, 60312 Frankfurt am Main, Germany (Gattung: Zweigniederlassung (FDI) gem. § 53b KWG). **Denmark:** MSIM FMIL (Copenhagen Branch), Gorrissen Federspiel, Axel Towers, Axelortov2, 1609 Copenhagen V, Denmark.

MIDDLE EAST

Dubai International Financial Centre: This information does not constitute or form part of any offer to issue or sell, or any solicitation of any offer to subscribe for or purchase, any securities or investment products in the UAE (including the Dubai International Financial Centre and the Abu Dhabi Global Market) and accordingly should not be construed as such. Furthermore, this information is being made available on the basis that the recipient acknowledges and understands that the entities and securities to which it may relate have not been approved, licensed by or registered with the UAE Central Bank, the Dubai Financial Services Authority, the UAE Securities and Commodities Authority, the Financial Services Regulatory Authority or any other relevant licensing authority or government agency in the UAE. The content of this report has not been approved by or filed with the UAE Central Bank, the Dubai Financial Services Authority, the UAE Securities and Commodities Authority or the Financial Services Regulatory Authority.

Saudi Arabia

This financial promotion was issued and approved for use in Saudi Arabia by Morgan Stanley Saudi Arabia, Al Rashid Tower, Kings Sand Street, Riyadh, Saudi Arabia, authorized and regulated by the Capital Market Authority license number 06044-37.

U.S.

NOT FDIC INSURED | OFFER NO BANK GUARANTEE | MAY LOSE VALUE | NOT INSURED BY ANY FEDERAL GOVERNMENT AGENCY | NOT A DEPOSIT

ASIA PACIFIC

Hong Kong: This document has been issued by Morgan Stanley Asia Limited, CE No. AAD291, for use in Hong Kong and shall only be made available to “professional investors” as defined under the Securities and Futures Ordinance of Hong Kong (Cap 571). The contents of this document have not been reviewed nor approved by any regulatory authority including the Securities and Futures Commission in Hong Kong. Accordingly, save where an exemption is available under the relevant law, this document shall not be issued, circulated, distributed, directed at, or made available to, the public in Hong Kong.

Singapore: This material is disseminated by Morgan Stanley Investment Management Company, Registration No. 199002743C. This material may not be circulated or distributed, whether directly or indirectly, to persons in Singapore other than to (i) an accredited investor, (ii) an institutional investor as defined in Section 4A of the Securities and Futures Act, Chapter 289 of Singapore (“SFA”); or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA. This publication has not been reviewed by the Monetary Authority of Singapore.

Australia: This material is provided by Morgan Stanley Investment Management (Australia) Pty Ltd ABN 22122040037, AFSL No. 314182 and its affiliates and does not constitute an offer of interests. Morgan Stanley Investment Management (Australia) Pty Limited arranges for MSIM affiliates to provide financial services to Australian wholesale clients. This material will not be lodged with the Australian Securities and Investments Commission.

Japan

This material may not be circulated or distributed, whether directly or indirectly, to persons in Japan other than to (i) a professional investor as defined in Article 2 of the Financial Instruments and Exchange Act (“FIEA”) or (ii) otherwise pursuant to, and in accordance with the conditions of, any other allocable provision of the FIEA. This material is disseminated in Japan by Morgan Stanley Investment Management (Japan) Co., Ltd., Registered No. 410 (Director of Kanto Local Finance Bureau (Financial Instruments Firms)), Membership: the Japan Securities Dealers Association, the Investment Management Association of Japan and the Type II Financial Instruments Firms Association.