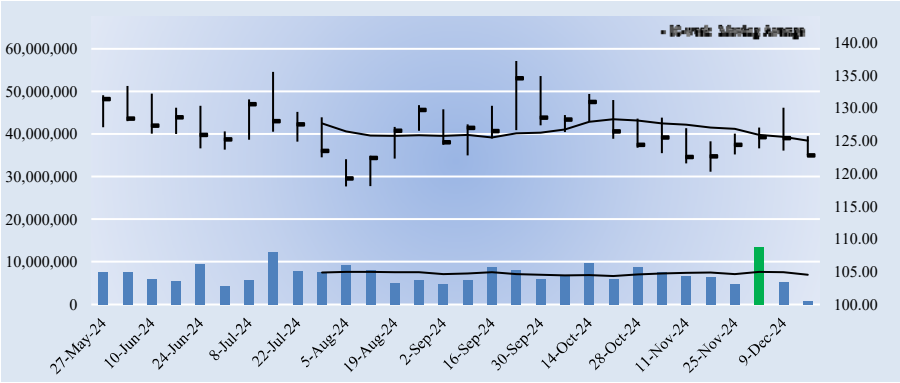
PPG Industries PPG FAIRLY VALUED

Buying Index™ 4 **Value Rating**

Economic Castle	Estimated Fair Value	Fair Value Range	Investment Style	Sector	Industry
Attractive	$126.00	$101.00 - $151.00	LARGE-CAP VALUE	Materials	Mining & Chemicals

PPG Industries is contending with sizable near term headwinds, though its longer term growth outlook remains robust.

Stock Chart (weekly)



The week with the highest trading volume out of the last 30 weeks was a week of heavy selling, or distribution (red bar).

Company Vitals

Market Cap (USD)	$28,981
Avg Weekly Vol (30 wks)	7,054
30-week Range (USD)	118.07 - 137.24
Valuentum Sector	Materials
5-week Return	-0.1%
13-week Return	-3.4%
30-week Return	-6.5%
Dividend Yield %	2.2%
Dividends per Share	2.72
Forward Dividend Payout Ratio	32.9%
Est. Normal Diluted EPS	9.06
P/E on Est. Normal Diluted EPS	13.6
Est. Normal EBITDA	3,362
Forward EV/EBITDA	10.6
EV/Est. Normal EBITDA	9.9
Forward Revenue Growth (5-yr)	-1.2%
Forward EPS Growth (5-yr)	12.6%

NMF = Not Meaningful; Est. = Estimated; FY = Fiscal Year

Returns Summary

	3-year Historical Average
Return on Equity	19.5%
Return on Assets	6.1%
ROIC, with goodwill	9.9%
ROIC, without goodwill	16.4%

ROIC = Return on Invested Capital; NMF = Not Meaningful

Leverage, Coverage, and Liquidity

In Millions of USD

Total Debt	6,060
Net Debt	4,462
Total Debt/EBITDA	2.1
Net Debt/EBITDA	1.6
EBITDA/Interest	11.5
Current Ratio	1.5
Quick Ratio	1.0

NMF = Not Meaningful

Investment Highlights

• PPG Industries is a leading supplier of paints, coatings, specialty materials, flat glass and fiber glass. United States and Canada account for ~40%-45% of the company's business. PPG Industries continues to post excellent financial results, and management is fiscally prudent (albeit acquisitive). The firm was founded in 1883.

• Since 2004, the firm has undergone a significant shift in operational focus. Coatings accounted for ~56% of its business in 2004. Today, coatings account for the entirety of its portfolio. Acquisitions are worth watching going forward.

• We like PPG's organic growth potential via emerging market expansion, increased sales content per airplane, and in the realm of auto production. In the near term, raw material inflation will impact margins, but it continues to optimize its cost structure. The company has material operating leverage and its longer term cash flow growth outlook is bright.

• PPG isn't too capital-intensive (annual capital expenditures have historically averaged ~2.5% of sales), has pricing power, and its top market share position in the ~$140 billion consolidating coatings industry is hard not to like and may be vital for it to fight off the impact of recent cost inflation.

• PPG is a Dividend Aristocrat, having raised its annual dividend over the past ~50 consecutive years. We like the company's dividend growth potential, though we caution share buybacks and acquisitions will compete for capital in the future.

Investment Considerations

DCF Valuation	FAIRLY VALUED
Relative Valuation	ATTRACTIVE
ValueCreation™	EXCELLENT
ValueRisk™	LOW
ValueTrend™	POSITIVE
Cash Flow Generation	STRONG
Financial Leverage	MEDIUM
Growth	DECLINING
Technical Evaluation	BEARISH
Relative Strength	WEAK
Money Flow Index (MFI)	NEUTRAL
Upside/Downside Volume (U/D)	BULLISH
Near-term Technical Resistance, 10-wk MA	125.00

DCF = Discounted Cash Flow; MFI, U/D = Please see glossary. MA = Moving Average

Business Quality

ValueCreation™

ValueRisk™	Very Poor	Poor	Good	Excellent
Low				
Medium				
High				
Very High				

Firms that generate economic profits with little operating variability score near the top right of the matrix.

Relative Valuation

	Forward P/E	PEG	Price / FV
Air Products & Chemicals	24.3	1.8	116.0%
BHP Billiton	11.3	1.5	107.6%
DuPont	21.7	2.1	101.9%
Sherwin-Williams	33.3	2.2	101.0%
Peer Median	23.0	1.9	104.7%
PPG Industries	**14.9**	**1.8**	**97.5%**

Price / FV = Current Stock Price divided by Estimated Fair Value

Financial Summary

	----- Actual -----		Projected
Fiscal Year End:	Dec-22	Dec-23	Dec-24
Revenue	17,652	18,246	17,564
Revenue, YoY%	5.1%	3.4%	-3.7%
Operating Income	1,712	2,288	2,625
Operating Margin %	9.7%	12.5%	14.9%
Net Income	1,028	1,270	1,950
Net Income Margin %	5.8%	7.0%	11.1%
Diluted EPS	4.33	5.35	8.26
Diluted EPS, YoY %	-27.0%	23.6%	54.3%
Free Cash Flow (CFO-capex)	445	1,862	2,114
Free Cash Flow Margin %	2.5%	10.2%	12.0%

In Millions of USD (except for per share items)

Structure of the Chemicals Industry — POOR

The broad chemicals industry includes firms that make thousands of different chemical substances, ranging from basic raw materials to advanced specialty chemicals. Making chemicals is a cyclical and energy-intensive business, with volatile oil/gas prices influencing feedstock, operation, and transportation costs. Specialty providers can carve out niches, but commodity chemicals producers are largely undifferentiated, making it impossible to gain a sustainable competitive edge. The industry is very capital intensive, and large swings in prices and volume should be expected. We don't like the industry structure.

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Economic Profit Analysis

ValueCreation™ EXCELLENT

The best measure of a firm's ability to create value for shareholders is expressed by comparing its return on invested capital (ROIC) with its weighted average cost of capital (WACC). The gap or difference between ROIC and WACC is called the firm's economic profit spread. PPG Industries' 3-year historical return on invested capital (without goodwill) is 16.4%, which is above the estimate of its cost of capital of 9.3%. As such, we assign the firm a ValueCreation™ rating of EXCELLENT. In the chart to the right, we show the probable path of ROIC in the years ahead based on the estimated volatility of key drivers behind the measure. The solid grey line reflects the most likely outcome, in our opinion, and represents the scenario that results in our fair value estimate.

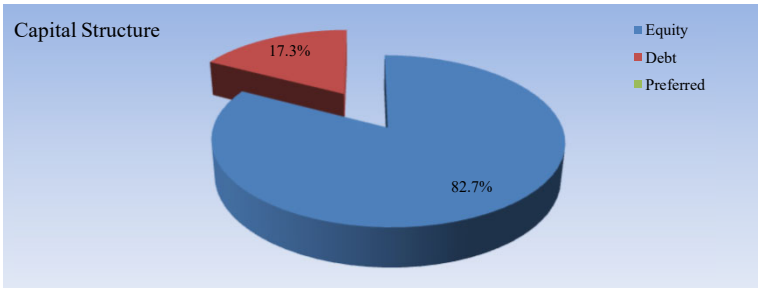
ROIC - WACC Spread, 3-year historical average	7.1%
ROIC - WACC Spread, 5-year projected average	19.2%

These spreads equal the firm's annual average ROIC (excluding goodwill) less its WACC.

ValueTrend™ POSITIVE

PPG Industries receives a ValueTrend™ rating of POSITIVE, which is based on the company's trailing three-year performance. The firm's ROIC (excluding goodwill) increased to 27.4% last year from its trailing 3-year average of 16.4%. We expect ROIC (excluding goodwill) to be in the ballpark of about 30% by the end of our discrete forecast period, with upside potential to about 42% over that time period.

Weighted Average Cost of Capital (WACC)



Cost of Equity

Risk Free Rate Assumption	4.3%
Fundamental Beta (ERP multiplier)	0.9
Estimated Equity Risk Premium	6.5%
Cost of Equity Assumption	**10.2%**

After-tax Cost of Debt

Risk Free Rate Assumption	4.3%
Synthetic Credit Spread	2.33%
Cost of Debt Assumption	6.6%
Cash Tax Rate Assumption	21.0%
After-tax Cost of Debt Assumption	**5.3%**

Cost of Preferred Stock

Preferred Dividends	0
Value of Preferred Stock	0
Cost of Preferred Assumption	NA

Weighted Average Cost of Capital (WACC)	**9.3%**

ERP = Equity Risk Premium

Adjusted Return on Invested Capital (ROIC)

The graph above shows the firm's ROIC (excluding goodwill) compared with historical averages and its WACC.

Assessment of Company Dividend Strategy

Key Strengths

PPG Industries is not too capital-intensive, has pricing power, and its top market share position in a consolidating industry is hard not to like. Its balance sheet is reasonably healthy, and free cash flow generation should remain strong enough to handle a reasonable amount of debt moving forward. As a Dividend Aristocrat, the company has one of the most impressive dividend track records around, having increased its annual dividend over the past ~50 consecutive years. We expect continued growth in the firm's payout. PPG embarked on a restructuring program in June 2020 that should significantly improve its cost structure going forward.

Potential Weaknesses

The fact that we are big fans of the fundamentals at PPG Industries coupled with the firm's strong Dividend Cushion ratio make it difficult for us to speak negatively of its dividend prospects. Outside of significant cost inflation, which we expect management to mitigate to a large degree via price increases, the biggest threat to its future dividend growth is likely from competing options for capital spending; acquisitions have played a major role in the reshaping of the company's business and could take a larger portion of cash use in any given year and impact the pace of dividend growth or add leverage to the balance sheet. Share buybacks are another consideration here.

Note: Valuentum may provide an adjusted ROIC measure to better reflect the economic substance of a company's operations, as in the case of companies with negative invested capital.

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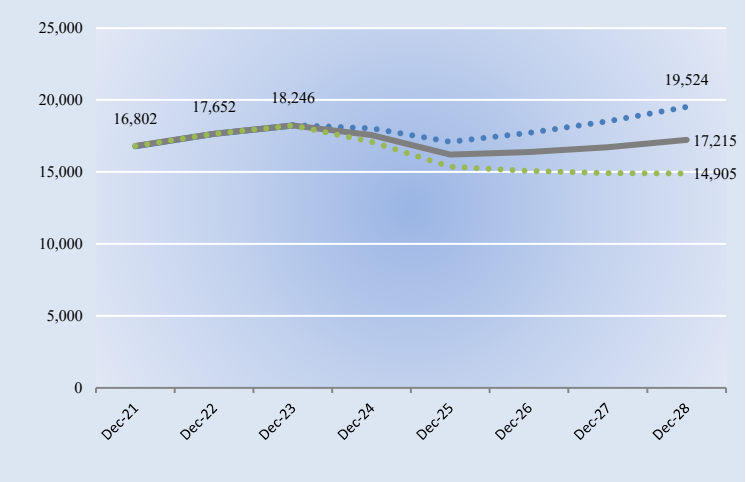
Growth Analysis

Revenue Growth — DECLINING

		Last Fiscal Year Revenue	3-year Historical CAGR	5-year Projected CAGR
PPG Industries	USD	**18,246**	**9.7%**	**-1.2%**
Air Products & Chemical	USD	12,101	5.4%	6.8%
BHP Billiton	USD	55,658	-0.7%	-0.6%
DuPont	USD	12,068	2.7%	4.0%
Sherwin-Williams	USD	23,052	7.9%	4.4%
Peer Median			4.1%	4.2%
Industry Median			8.5%	4.2%

PPG Industries' revenue expansion has been greater than the median of both its peer group and industry group during the past three years. We expect the firm's pace of revenue growth to fall below the median of both its peer group and industry group during the next five years. Our growth assessment of each firm is based on the firm's 5-year forward revenue CAGR. PPG Industries' future pace of revenue growth is DECLINING, in our opinion.

Projected Revenue (in millions of USD) Source: Company Filings, Valuentum Projections



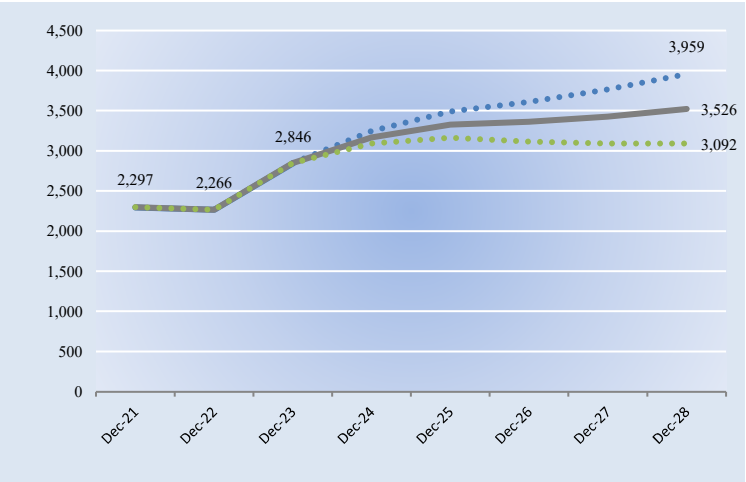
In the chart above, we show our baseline forecast for revenue as well as potential upside and downside cases.

EBITDA Growth

		Last Fiscal Year EBITDA	3-year Historical CAGR	5-year Projected CAGR
PPG Industries	USD	**2,846**	**7.4%**	**4.4%**
Air Products & Chemical	USD	4,299	5.4%	10.8%
BHP Billiton	USD	28,066	-6.2%	-1.1%
DuPont	USD	2,855	3.6%	5.0%
Sherwin-Williams	USD	4,250	7.4%	12.6%
Peer Median			4.5%	7.9%
Industry Median			7.4%	8.7%

PPG Industries' EBITDA expansion has been greater than that of its peer group but has trailed that of its industry group during the past three years. We expect the firm's pace of EBITDA growth to fall below that of both its peer group and industry group during the next five years. Sherwin-Williams sports the highest EBITDA growth rate among peers.

Projected EBITDA (in millions of USD) Source: Company Filings, Valuentum Projections



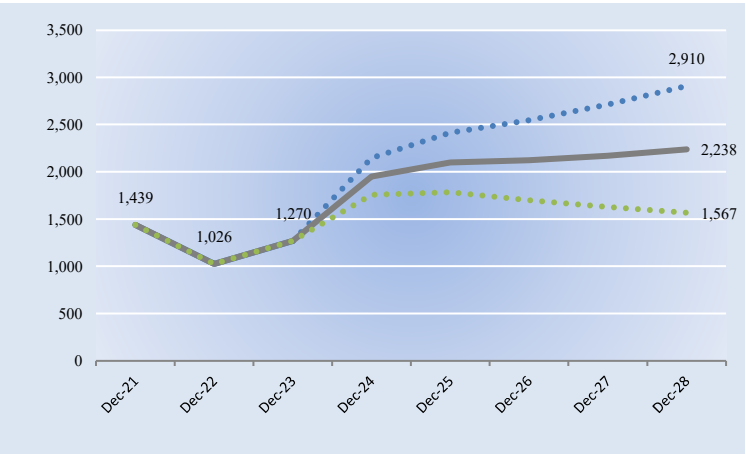
In the chart above, we show our baseline forecast for EBITDA as well as potential upside and downside cases.

Net Income Growth

		Last Fiscal Year Net Income	3-year Historical CAGR	5-year Projected CAGR
PPG Industries	USD	**1,270**	**6.2%**	**12.0%**
Air Products & Chemical	USD	3,842	22.2%	2.3%
BHP Billiton	USD	7,897	-11.3%	12.2%
DuPont	USD	494	-171.1%	35.1%
Sherwin-Williams	USD	2,389	5.6%	17.3%
Peer Median			-2.9%	14.7%
Industry Median			14.7%	10.7%

PPG Industries' net income expansion has been greater than that of its peer group but has trailed that of its industry group during the past three years. We expect the firm's net income to trail its peer group but outpace that of its industry group during the next five years. DuPont sports the highest expected net income growth rate among peers.

Projected Net Income (in millions of USD) Source: Company Filings, Valuentum Projections



In the chart above, we show our baseline forecast for net income as well as potential upside and downside cases.

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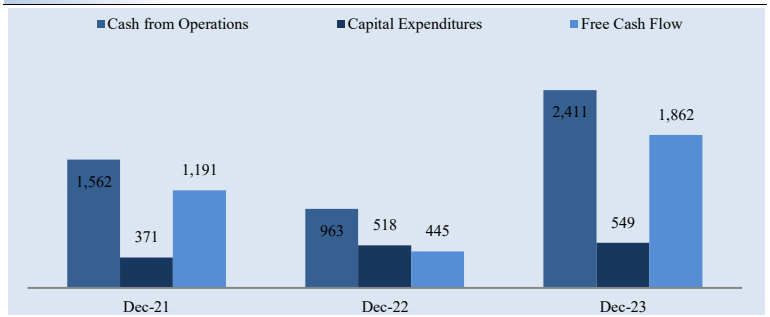
Cash Flow and Financial Leverage Analysis

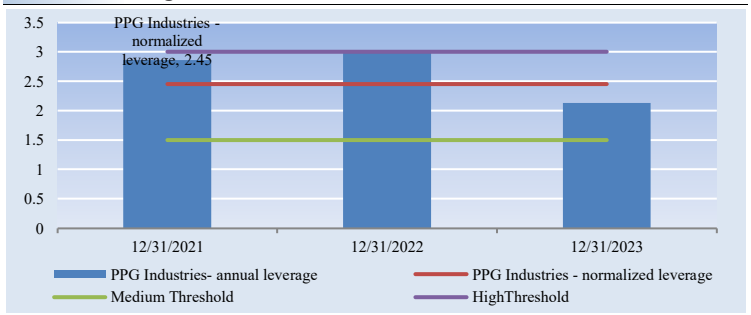
Cash Flow Generation — STRONG



The bars above show the firms operating cash flow, capital expenditures, and free cash flow, respectively.

Firms that generate a free cash flow margin (free cash flow divided by total revenue) above 5% are usually considered cash cows. PPG Industries' free cash flow margin has averaged about 6.6% during the past 3 years. As such, we think the firm's cash flow generation is relatively STRONG. The free cash flow measure shown above is derived by taking cash flow from operations less capital expenditures and differs from enterprise free cash flow (FCFF), which we use in deriving our fair value estimate for the company. For more information on the differences between these two measures, please visit our website at Valuentum.com. At PPG Industries, cash flow from operations increased about 54% from levels registered two years ago, while capital expenditures expanded about 48% over the same time period.

Financial Leverage — MEDIUM



The bars above show the firm's annual debt-to-EBITDA. The red line shows the firm's normalized measure.

Firms that exhibit high leverage tend to be more risky than firms with relatively low debt loads, all else equal. We measure financial leverage by taking a firm's current total debt load and dividing it by the firm's trailing average 3-year annual EBITDA. Firms that are over 3 for this metric, we rate as having high leverage. Companies that have less than 1.5 turns of leverage (or a measure below 1.5), we rate as having low leverage. PPG Industries' normalized debt-to-EBITDA measure of about 2.45 puts it in the MEDIUM camp.

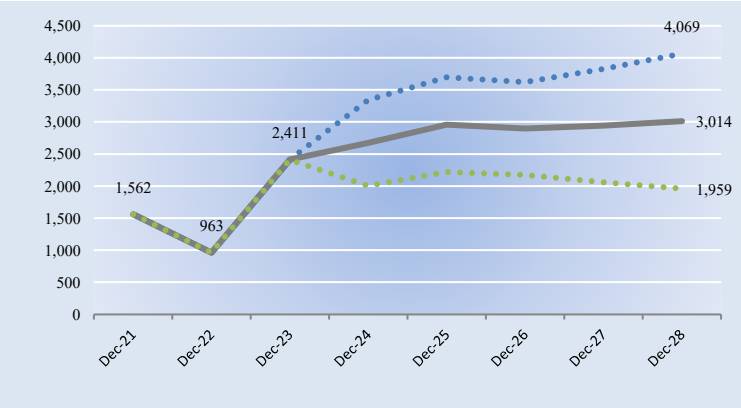
Cash Flow from Operations

		Last Fiscal Year CFO	3-year Historical CAGR	5-year Projected CAGR
PPG Industries	USD	**2,411**	**4.2%**	**4.6%**
Air Products & Chemical	USD	3,647	3.0%	10.4%
BHP Billiton	USD	20,665	-8.8%	0.1%
DuPont	USD	1,918	-22.3%	15.8%
Sherwin-Williams	USD	3,522	1.1%	14.4%
Peer Median			-3.8%	12.4%
Industry Median			2.0%	11.8%

PPG Industries' cash flow from operations expansion has been greater than that of both its peer group and industry group during the past three years. We expect the firm's pace of cash flow from operations growth to fall below that of both its peer group and industry group during the next five years. DuPont sports the highest expected cash flow from operations growth rate among peers.

Projected Operating Cash Flow (in millions of USD)

Source: Company Filings, Valuentum Projections



In the chart above, we show our baseline forecast for CFO as well as potential upside and downside cases.

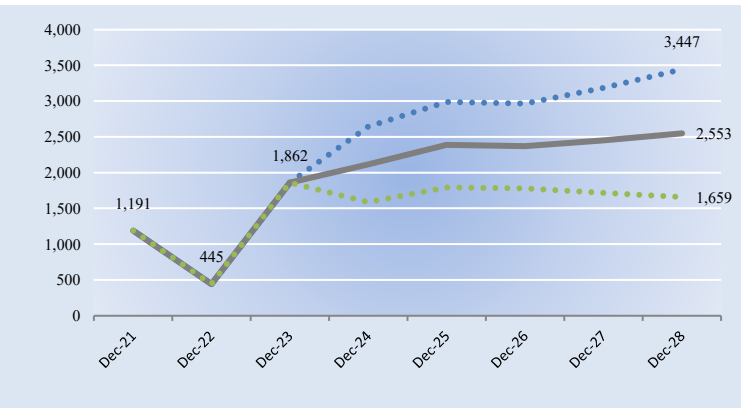
Free Cash Flow (CFO-capital expenditures)

		Last Fiscal Year FCF	3-year Historical CAGR	5-year Projected CAGR
PPG Industries	USD	**1,862**	**0.7%**	**6.5%**
Air Products & Chemical	USD	-3,150	-253.1%	-198.2%
BHP Billiton	USD	11,392	-19.0%	-3.1%
DuPont	USD	1,299	-22.9%	20.6%
Sherwin-Williams	USD	2,634	-5.3%	18.9%
Peer Median			-20.9%	7.9%
Industry Median			-5.6%	16.4%

PPG Industries' free cash flow expansion has been greater than that of both its peer group and industry group during the past three years. We expect the firm's pace of free cash flow growth to fall below that of both its peer group and industry group during the next five years. DuPont sports the highest expected free cash flow growth rate among peers.

Projected Free Cash Flow (in millions of USD)

Source: Company Filings, Valuentum Projections



In the chart above, we show our baseline forecast for free cash flow as well as potential upside and downside cases.

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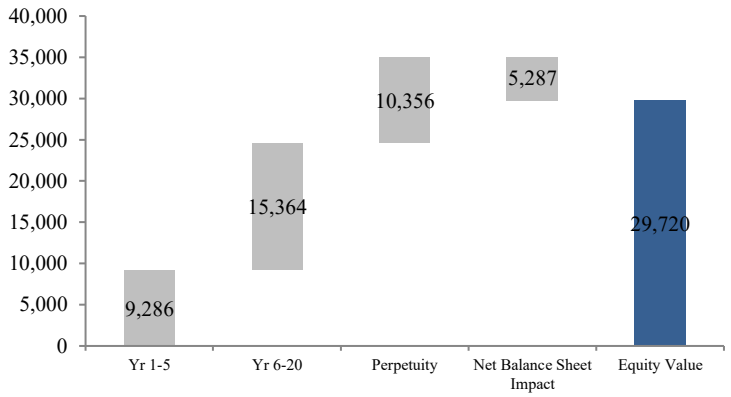
Valuation Analysis

Valuation Assumptions

In Millions of USD (except for per share items)	5-year Projections	
Revenue CAGR %	-1.2%	
Avg. EBIT Margin %	16.9%	
Avg. Cash Tax Rate %	21.0%	
Earnings Before Interest CAGR %	1.8%	
Earnings Per Share CAGR %	12.6%	
Free Cash Flow to the Firm CAGR %	-0.9%	
Earnings before interest = Net operating profits less adjusted taxes	Long-term Projections	
Phase II --> III FCFF CAGR %	2.4% (II)	3% (III)
Cost of Equity %	10.2%	
After-tax Cost of Debt %	5.0%	
Discount Rate (WACC) %	9.3%	
Synthetic credit spread = 2.333%	Results	
Phase I Present Value	9,286	
Phase II Present Value	15,364	
Phase III Present Value	10,356	
Total Firm Value	35,007	
Net Balance Sheet Impact	-5,287	
Total Equity Value	29,720	
Diluted Shares Outstanding	236.0	
Fair Value per Share	$126.00	

Valuation Breakdown

In the chart below, we show the build up to our estimate of total enterprise value for PPG Industries and the break down to the firm's total equity value, which we estimate to be about 29.72USD billion. The present value of the enterprise free cash flows generated during each phase of our model and the net balance sheet impact, which considers the firm's pension, is displayed. We divide total equity value by diluted shares outstanding to arrive at our $126 per share fair value estimate.



In addition to the firm's cap structure, the net balance sheet impact considers the funded status of the firm's pension (-825). In Millions of USD

DCF Valuation Summary

We think PPG Industries is worth $126 per share with a fair value range of $101.00 - $151.00. The margin of safety around our fair value estimate is driven by the firm's LOW ValueRisk™ rating, which is derived from an evaluation of the historical volatility of key valuation drivers and a future assessment of them. Our near-term operating forecasts, including revenue and earnings, do not differ much from consensus estimates or management guidance. Our model reflects a compound annual revenue growth rate of -1.2% during the next five years, a pace that is lower than the firm's 3-year historical compound annual growth rate of 9.7%. Our model reflects a 5-year projected average operating margin of 16.9%, which is above PPG Industries's trailing 3-year average. Beyond year 5, we assume free cash flow will grow at an annual rate of 2.4% for the next 15 years and 3% in perpetuity. For PPG Industries, we use a 9.3% weighted average cost of capital to discount future free cash flows.

Enterprise Free Cash Flow

Fiscal Year End:	12/31/2021	12/31/2022	12/31/2023
Earnings before Interest	1,084	873	2,519
+ Depreciation	389	388	391
- Capital Expenditures	371	518	549
- Change in Working Capital	308	482	-472
- Acquisitions	2,137	114	109
Enterprise Free Cash Flow (FCFF)	-1,343	147	2,724

In Millions of USD

Our future forecasts for key valuation drivers result in a future free enterprise cash flow stream. Above, we show how we calculate enterprise free cash flow and the historical performance of the metric for PPG Industries. Over the next five years, we expect the firm's enterprise free cash flow to expand at about a -1% compound annual growth rate. During years 6 through 20, we expect the measure to grow at a 2.4% rate. Beyond year 20 (in perpetuity), we grow the firm's free cash flow at inflation (3%).

Source: Company Filings, Valuentum Projections

Company Metrics versus Peer and Industry Medians

Company Name	Valuentum Buying Index™	Forward Price-to-Earnings	P/E on Est. Normal Diluted EPS	Price/Earnings-to-Growth (PEG), 5-year	Forward EV/EBITDA	EV/Est. Normal EBITDA	5-year Forward Earnings per Share CAGR	3-year Hist Avg ROIC, without goodwill	Dividend Yield %	Stock Price / Fair Value Estimate
PPG Industries	**4**	**14.9**	**13.6**	**1.8**	**10.6**	**9.9**	**12.6%**	**16.4%**	**2.2%**	**97.5%**
Air Products & Chemical	6	24.3	19.8	1.8	15.3	13.3	2.2%	8.0%	2.2%	116.0%
BHP Billiton	4	11.3	10.6	1.5	6.1	5.8	12.2%	28.2%	5.2%	107.6%
DuPont	3	21.7	18.1	2.1	13.9	12.5	35.8%	-4.6%	1.8%	101.9%
Sherwin-Williams	6	33.3	23.9	2.2	23.0	17.8	18.5%	31.9%	0.8%	101.0%
Peer Median	5.0	23.0	19.0	1.9	14.6	12.9	15.3%	18.1%	2.0%	104.7%
Industry Median	4.5	21.0	17.7	2.1	12.0	10.8	10.6%	14.5%	1.3%	101.2%

View back of report for a full list of industry constituents covered by Valuentum. VBI: Valuentum's ranking for the attractiveness of this investment at the date of the report.

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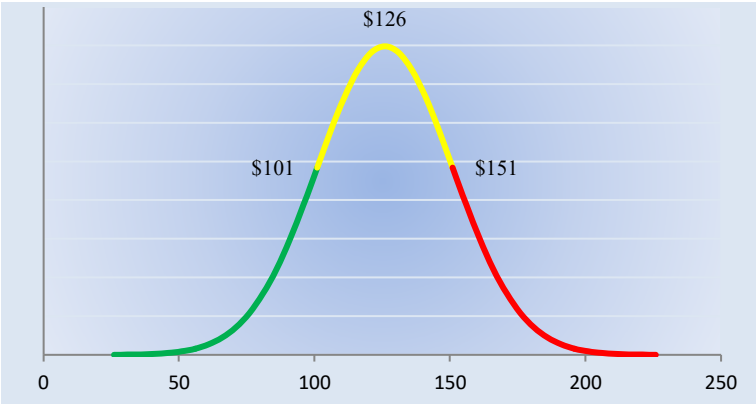
PPG Industries PPG FAIRLY VALUED

Buying Index™ 4 Value Rating

Economic Castle	Estimated Fair Value	Fair Value Range	Investment Style	Sector	Industry
Attractive	$126.00	$101.00 - $151.00	LARGE-CAP VALUE	Materials	Mining & Chemicals

Margin of Safety Analysis

Range of Potential Outcomes



Our discounted cash flow process values each firm on the basis of the present value of all future free cash flows. Although we estimate the firm's fair value at about $126 per share, every company has a range of probable fair values that's created by the uncertainty of key valuation drivers (like future revenue or earnings, for example). After all, if the future were known with certainty, we wouldn't see much volatility in the markets as stocks would trade precisely at their known fair values. Our ValueRisk™ rating sets the margin of safety or the fair value range we assign to each stock. In the graph above, we show this probable range of fair values for PPG Industries. We think the firm is attractive below $101 per share (the green line), but quite expensive above $151 per share (the red line). The prices that fall along the yellow line, which includes our fair value estimate, represent a reasonable valuation for the firm, in our opinion.

ValueRisk™ LOW

PPG Industries receives a ValueRisk™ rating of LOW based of the historical volatility of key drivers of economic value creation. The fair value range sets the margin of safety around our fair value estimate of the firm's shares.

Revenue Volatility	10.7%
Gross Margin Volatility	8.1%
Earnings (EBI) Volatility	31.4%
Cash Flow (FCFF) Volatility	Greater than 50%
Fair Value Range	20.0%

The Fair Value Range sets the premium or discount on our estimate of the firm's fair value.

Upside and Downside Probabilities

Probability (fair value < $0)	Less than 0.1%
Probability (fair value > 2x current share price)	0.00%

We strive to answer a few questions that investors often ask: 1) What are the chances of a total loss of investment in this company? and 2) What is the chance that the company is really worth twice what I paid for it? The probability (fair value < 0) strives to answer the first question. It indicates the chance that the firm may encounter insolvency based on the characteristics of its cash flow stream, capital structure, and risk profile. The probability (fair value > 2x current share price) strives to answer the second question. It is our best estimate of whether investors are participating in a half-off sale by buying the company's shares at current prices.

Future Path of Fair Value

We estimate PPG Industries' fair value at this point in time to be about $126 per share. As time passes, however, companies generate cash flow and pay out cash to shareholders in the form of dividends. The chart to the right compares the firm's current share price with the path of PPG Industries' expected equity value per share over the next three years, assuming our long-term projections prove accurate. The range between the resulting downside fair value and upside fair value in Year 3 represents our best estimate of the value of the firm's shares three years hence. This range of potential outcomes is also subject to change over time, should our views on the firm's future cash flow potential change. The expected fair value of $159 per share in Year 3 represents our existing fair value per share of $126 increased at an annual rate of the firm's cost of equity less its dividend yield. The upside and downside ranges are derived in the same way, but from the upper and lower bounds of our fair value estimate range.

The graph above shows the expected future fair value of the firm's shares relative to its current stock price.

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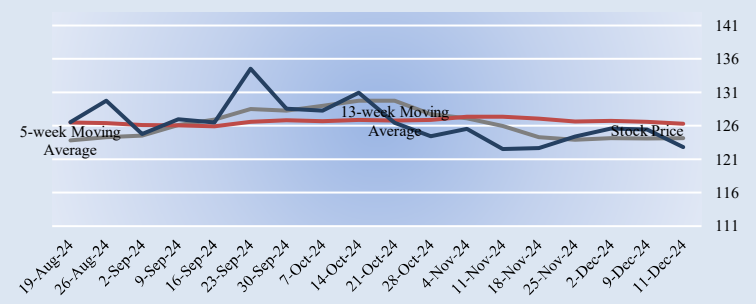
Buying Index™ 4 **Value Rating**

Economic Castle	Estimated Fair Value	Fair Value Range	Investment Style	Sector	Industry
Attractive	$126.00	$101.00 - $151.00	LARGE-CAP VALUE	Materials	Mining & Chemicals

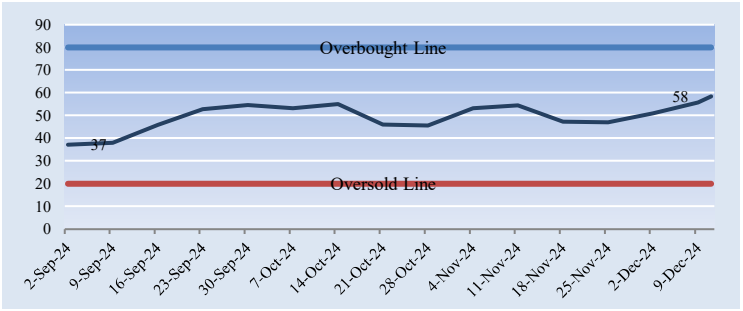
Technical Analysis

Technical Evaluation — BEARISH



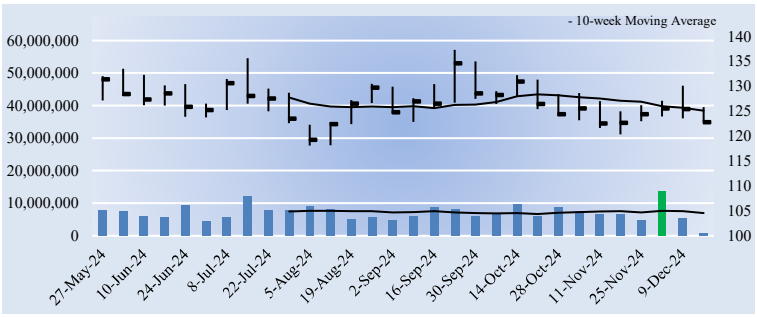
The firm's near-term moving average (5-week, grey line) and medium-term moving average (13-week, red line) are shown in the chart above. Typically, when a shorter-term moving average crosses a medium- or longer-term moving average from below, it represents a bullish signal. If the short-term moving average crosses from above, traders often view this as bearish. PPG Industries's 5-week moving average is below its 13-week measure, indicating a BEARISH trend. This activity further confirms the company's 30-week downtrend.

Money Flow Index (MFI) — NEUTRAL



The Money Flow Index (MFI) is an oscillator that uses price and volume to measure buying and selling pressure. Chartists often look for overbought (above 80) and oversold (below 20) levels to warn of unsustainable near-term price extremes. PPG Industries' MFI of 58 is neutral, suggesting the firm's stock is neither overbought nor oversold at this time. However, a score over 50 tends to favor bulls. The MFI can also be used to gauge the strength or weakness of a firm's price trend. In PPG Industries' case, its stock has generally declined during the past several weeks, but money flow or momentum has improved, a bullish divergence. We'd keep a close watch for improving technicals.

30-week Price and Volume Chart (weekly)



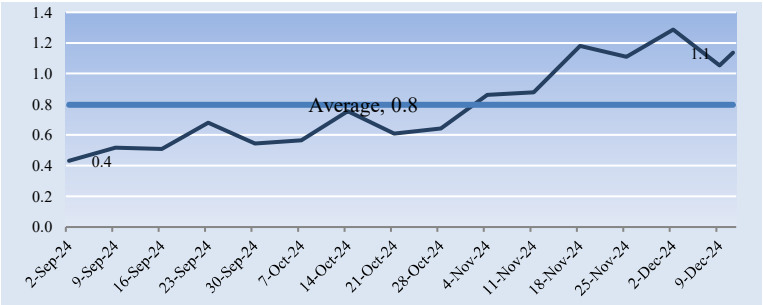
In the chart above, we pinpoint the heaviest accumulation or distribution week of the firm, determined by the week with the highest trading volume during the past 30 weeks. A heavy accumulation (buying) or distribution (selling) week often determines the future near-term direction of the firm's share price, as money managers continue to move in or out of the stock in the days and weeks ahead driving the stock up or down, respectively. For PPG Industries, the week with the highest trading volume out of the last 30 weeks was a week of heavy buying, or accumulation (green bar). Such market activity could indicate a reversal of a downtrend or further confirmation of the firm's uptrend.

Relative Price Strength — WEAK

A firm's relative price strength can be assessed over any number of time horizons. We show the firm's performance over the past 5 weeks, 13 weeks, and 30 weeks below. In arriving at our relative strength rating for each company, we assess the past 13 weeks, which includes the market's reaction to the firm's most recently reported quarter, where applicable, and other more recent economic events. During the past 13 weeks, PPG Industries' shares returned -3.4%, while the market benchmark returned 4.5%. We think PPG Industries' 13-week relative price performance is WEAK.

5-week Company Performance	-0.1%
5-week Market Benchmark Performance	0.8%
5-week Relative Performance vs. Market Benchmark	-0.9%
13-week Company Performance	-3.4%
13-week Market Benchmark Performance	4.5%
13-week Relative Performance vs. Market Benchmark	**-7.9%**
30-week Company Performance	-6.5%
30-week Market Benchmark Performance	15.4%
30-week Relative Performance vs. Market Benchmark	-21.9%

Upside/Downside Volume — BULLISH



The level and trend of the Upside/Downside (U/D) volume ratio reveals whether institutional participation has been bullish or bearish as of late. PPG Industries' U/D volume ratio of 1.1 is not only greater than 1 but also is better than its trailing average, indicating BULLISH institutional interest during the past several weeks.

Timeliness Matrix™

Equity Valuation

Relative Strength	Overvalued	Fairly Valued	Undervalued
Strong			
Neutral			
Weak		■	

Firms that are undervalued and currently showing near-term pricing strength score near the top right of the matrix.

Companies that are undervalued and showing near-term relative price strength could represent timely buys, as the stock may be attractive to both value and momentum investors. A cross section of the firm's equity valuation and its relative share price strength is shown in the matrix above. We tend to prefer undervalued stocks that have strong pricing momentum, also called Valuentum stocks.

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PPG Industries PPG FAIRLY VALUED

Buying Index™ 4 Value Rating

Economic Castle	Estimated Fair Value	Fair Value Range	Investment Style	Sector	Industry
Attractive	$126.00	$101.00 - $151.00	LARGE-CAP VALUE	Materials	Mining & Chemicals

Pro Forma Income Statement

In Millions of USD (except for per share items)

	Dec-21	Dec-22	Dec-23	*Dec-24*	*Dec-25*
	---------- Historical ----------			---------- *Projected* ----------	
Total Revenue	16,802	17,652	18,246	*17,564*	*16,223*
Cost of Goods Sold	10,245	11,053	10,699	*10,016*	*8,991*
Selling, General and Administrative Expenses	3,821	3,885	4,268	*3,995*	*3,587*
Other Operating Expenses	1,000	1,002	991	*928*	*833*
Operating Income	**1,736**	**1,712**	**2,288**	***2,625***	***2,813***
Unusual items	0	0	0	*0*	*0*
Operating Income, including unusual items	1,736	1,712	2,288	*2,625*	*2,813*
Interest Expense	(121)	(167)	(247)	*(247)*	*(247)*
Other Non-operating Income	200	(164)	(293)	*140*	*140*
Pre-tax Income	**1,815**	**1,381**	**1,748**	***2,518***	***2,706***
Income Taxes	374	325	439	*529*	*568*
Income after tax	**1,441**	**1,056**	**1,309**	***1,989***	***2,138***
Minority Interest and Equity Income	(21)	(28)	(39)	*(39)*	*(39)*
Net Income, excluding extra items	1,420	1,028	1,270	*1,950*	*2,099*
Income Available to Common, excluding extra items	**1,420**	**1,028**	**1,270**	***1,950***	***2,099***
Diluted Earnings per Share, excluding extra items	**5.93**	**4.33**	**5.35**	***8.26***	***8.94***
Diluted Weighted Shares Outstanding	239.4	237.3	237.2	*236.0*	*234.8*

Source: Company Filings, Xignite, Valuentum Projections

Note: Pro forma data in discounted cash-flow valuation may reflect significant adjustments from GAAP accounting data, including cash (not effective) tax rates and other analytical adjustments on a backward-looking and forward-looking basis. No individual data, by itself, found in this report should be used to make any investment decision.

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Buying Index™ 4 Value Rating

Economic Castle	Estimated Fair Value	Fair Value Range	Investment Style	Sector	Industry
Attractive	$126.00	$101.00 - $151.00	LARGE-CAP VALUE	Materials	Mining & Chemicals

Pro Forma Balance Sheet

In Millions of USD (except for per share items)

	Dec-21	Dec-22	Dec-23	*Dec-24*	*Dec-25*
	---------- Historical ----------			---------- *Projected* ----------	
Assets					
Total Cash (including marketable securities)	1,078	1,163	1,598	*2,925*	*4,480*
Inventory	2,171	2,272	2,127	*2,002*	*1,808*
Accounts Receivable	3,152	3,303	3,279	*3,171*	*2,942*
Other Current Assets	373	435	427	*427*	*427*
Total Current Assets	**6,774**	**7,173**	**7,431**	***8,525***	***9,656***
Gross Fixed Assets	8,865	8,806	9,439	*9,999*	*10,565*
(Accumulated Depreciation)	(4,532)	(4,649)	(4,963)	*(5,339)*	*(5,687)*
Net Property, Plant, and Equipment	4,333	4,157	4,476	*4,660*	*4,878*
Goodwill, Net	6,248	6,078	6,200	*6,200*	*6,200*
Intangibles, Net	2,783	2,414	2,424	*2,257*	*2,090*
Other Long-term Assets	1,213	922	1,116	*1,116*	*1,116*
Total Assets	**21,351**	**20,744**	**21,647**	***22,757***	***23,940***
Liabilities					
Accounts Payable	2,734	2,538	2,612	*2,429*	*2,172*
Other Current Liabilities	2,026	1,870	2,136	*2,128*	*2,064*
Current Portion of Long-term Debt	6	313	306	*306*	*306*
Total Current Liabilities	**4,766**	**4,721**	**5,054**	***4,863***	***4,542***
Long-term Debt	6,565	6,512	5,754	*5,754*	*5,754*
Other Long-term Liabilities	3,734	2,919	3,007	*3,007*	*3,007*
Total Liabilities	**15,065**	**14,152**	**13,815**	***13,624***	***13,303***
Preferred Stock	0	0	0	*0*	*0*
Shareholders' Equity					
Common Stock and Additional Paid in Capital	2,050	2,099	2,171	*2,171*	*2,171*
Retained Earnings	20,372	20,828	21,500	*22,847*	*24,295*
Other Equity	(16,136)	(16,335)	(15,839)	*(15,885)*	*(15,830)*
Total Shareholders' Equity	**6,286**	**6,592**	**7,832**	***9,133***	***10,637***
Total Liabilities and Shareholders' Equity	**21,351**	**20,744**	**21,647**	***22,757***	***23,940***

Source: Company Filings, Xignite, Valuentum Projections

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Economic Castle	Estimated Fair Value	Fair Value Range	Investment Style	Sector	Industry
Attractive	$126.00	$101.00 - $151.00	LARGE-CAP VALUE	Materials	Mining & Chemicals

Pro Forma Cash Flow Statement

---------- Historical ---------- ---------- *Projected* ----------

In Millions of USD (except for per share items)

	Dec-21	Dec-22	Dec-23	*Dec-24*	*Dec-25*
Cash from Operations					
Net Income	1,439	1,026	1,270	*1,989*	*2,138*
Depreciation and Amortization	561	554	558	*543*	*515*
Deferred Income Taxes	0	0	0	*0*	*0*
Operating Gains Or Losses	(438)	(617)	583	*100*	*200*
Changes in Working Capital	0	0	0	*42*	*103*
Cash Flow from Operations	**1,562**	**963**	**2,411**	***2,674***	***2,955***
Cash from Investing					
Purchase of Property, Plant, Equipment	(371)	(518)	(549)	*(560)*	*(566)*
Other Investing Cash Flows	(2,033)	57	(7)	*0*	*0*
Cash Flow from Investing	**(2,404)**	**(461)**	**(556)**	***(560)***	***(566)***
Cash from Financing					
Issuance (Retirement) of Stock	(210)	(190)	(86)	*(146)*	*(145)*
Issuance (Retirement) of Debt	827	375	(850)	*0*	*0*
Dividends Paid	(536)	(570)	(598)	*(642)*	*(690)*
Other Financing Cash Flows	12	(24)	(16)	*0*	*0*
Cash Flow from Financing	**93**	**(409)**	**(1,550)**	***(788)***	***(835)***
Foreign Exchange	(72)	1	110	*0*	*0*
Net Change in Cash	**(821)**	**94**	**415**	***1,327***	***1,555***

Source: Company Filings, Xignite, Valuentum Projections

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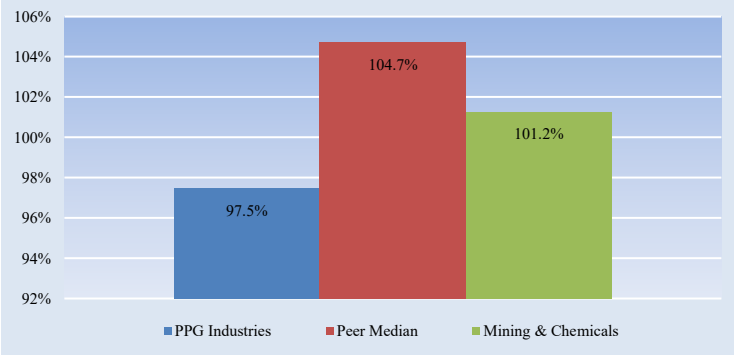
Mining & Chemicals

Mining & Chemicals **FAIRLY VALUED**

We think the Mining & Chemicals industry is fairly valued at this time. The industry's market cap is trading between 80% and 120% of our estimate of its fair value based on our DCF process. Although we use a firm-specific ValueRisk™ measure to determine whether a firm is undervalued or overvalued based on our DCF process, we consider an industry to be undervalued if it is trading below 80% of our estimate of its fair value and overvalued if it is trading at over 120% of our estimate of its fair value. We think these fair value ranges are appropriate given the diversification benefits of holding a basket of stocks. Although there may be individual opportunities within the Mining & Chemicals industry, we don't find the industry as a whole attractive based solely on valuation.



The above bar chart reveals the price/fair value of the company, its peers, and the industry as a whole.

Shaded blue denotes that the firm has earned the highest rating for that respective category.

Company Name	Ticker	Market Cap (USD-mil)	Investment Style	DCF Valuation	Relative Valuation	ValueCreation™	ValueRisk™	ValueTrend™	Technicals	Relative Strength
Air Products & Chemicals	APD	70,576	LARGE-CAP CORE	FAIRLY VALUED	NEUTRAL	POOR	MEDIUM	NEGATIVE	BULLISH	STRONG
Albemarle	ALB	12,359	LARGE-CAP VALUE	FAIRLY VALUED	NEUTRAL	POOR	MEDIUM	NEGATIVE	NEUTRAL	STRONG
Alcoa	AA	7,707	MID-CAP CORE	FAIRLY VALUED	UNATTRACTIVE	GOOD	HIGH	NEGATIVE	BULLISH	STRONG
BHP Billiton	BHP	71,002	LARGE-CAP CORE	FAIRLY VALUED	ATTRACTIVE	EXCELLENT	MEDIUM	POSITIVE	VERY BEARISH	WEAK
Carlisle Companies	CSL	22,648	LARGE-CAP CORE	FAIRLY VALUED	NEUTRAL	EXCELLENT	MEDIUM	POSITIVE	BULLISH	NEUTRAL
Chart Industries	GTLS	8,002	MID-CAP GROWTH	FAIRLY VALUED	NEUTRAL	POOR	MEDIUM	POSITIVE	BULLISH	STRONG
DuPont	DD	37,038	LARGE-CAP CORE	FAIRLY VALUED	UNATTRACTIVE	VERY POOR	LOW	POSITIVE	VERY BEARISH	WEAK
Eastman Chemical	EMN	11,828	LARGE-CAP CORE	FAIRLY VALUED	ATTRACTIVE	GOOD	LOW	NEGATIVE	VERY BEARISH	NEUTRAL
Ecolab	ECL	71,216	LARGE-CAP CORE	FAIRLY VALUED	UNATTRACTIVE	EXCELLENT	MEDIUM	POSITIVE	BEARISH	WEAK
Freeport McMoRan	FCX	67,468	LARGE-CAP CORE	FAIRLY VALUED	NEUTRAL	GOOD	HIGH	NEGATIVE	BULLISH	NEUTRAL
Graco	GGG	14,847	LARGE-CAP CORE	FAIRLY VALUED	UNATTRACTIVE	EXCELLENT	MEDIUM	POSITIVE	BULLISH	WEAK
LyondellBasell	LYB	27,894	LARGE-CAP VALUE	FAIRLY VALUED	ATTRACTIVE	EXCELLENT	LOW	NEGATIVE	BEARISH	WEAK
Martin Marietta	MLM	35,673	LARGE-CAP CORE	FAIRLY VALUED	UNATTRACTIVE	GOOD	MEDIUM	POSITIVE	BULLISH	STRONG
Newmont Corp	NEM	35,393	LARGE-CAP BLEND	FAIRLY VALUED	NEUTRAL	GOOD	HIGH	NEGATIVE	BEARISH	WEAK
Nucor	NUE	37,557	LARGE-CAP VALUE	FAIRLY VALUED	NEUTRAL	EXCELLENT	HIGH	NEGATIVE	BULLISH	WEAK
PPG Industries	PPG	28,981	LARGE-CAP VALUE	FAIRLY VALUED	ATTRACTIVE	EXCELLENT	LOW	POSITIVE	BEARISH	WEAK
Rio Tinto	RIO	98,747	LARGE-CAP VALUE	FAIRLY VALUED	NEUTRAL	EXCELLENT	MEDIUM	NEGATIVE	BEARISH	WEAK
Sherwin-Williams	SHW	97,359	LARGE-CAP CORE	FAIRLY VALUED	UNATTRACTIVE	EXCELLENT	MEDIUM	POSITIVE	BULLISH	NEUTRAL
Vale	VALE	43,216	LARGE-CAP VALUE	FAIRLY VALUED	NEUTRAL	EXCELLENT	HIGH	NEGATIVE	BEARISH	WEAK
Valmont	VMI	3,679	MID-CAP CORE	FAIRLY VALUED	ATTRACTIVE	EXCELLENT	MEDIUM	POSITIVE	NEUTRAL	STRONG
Vulcan Materials	VMC	33,291	LARGE-CAP CORE	FAIRLY VALUED	UNATTRACTIVE	GOOD	MEDIUM	POSITIVE	BEARISH	WEAK
Wheaton Precious Metals	WPM	27,038	LARGE-CAP GROWTH	FAIRLY VALUED	UNATTRACTIVE	POOR	MEDIUM	POSITIVE	VERY BEARISH	WEAK

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Valuentum's Full Page Stock Report

A DCF Valuation
Shows whether the firm is undervalued, fairly valued, or overvalued based on our DCF process and by how much.

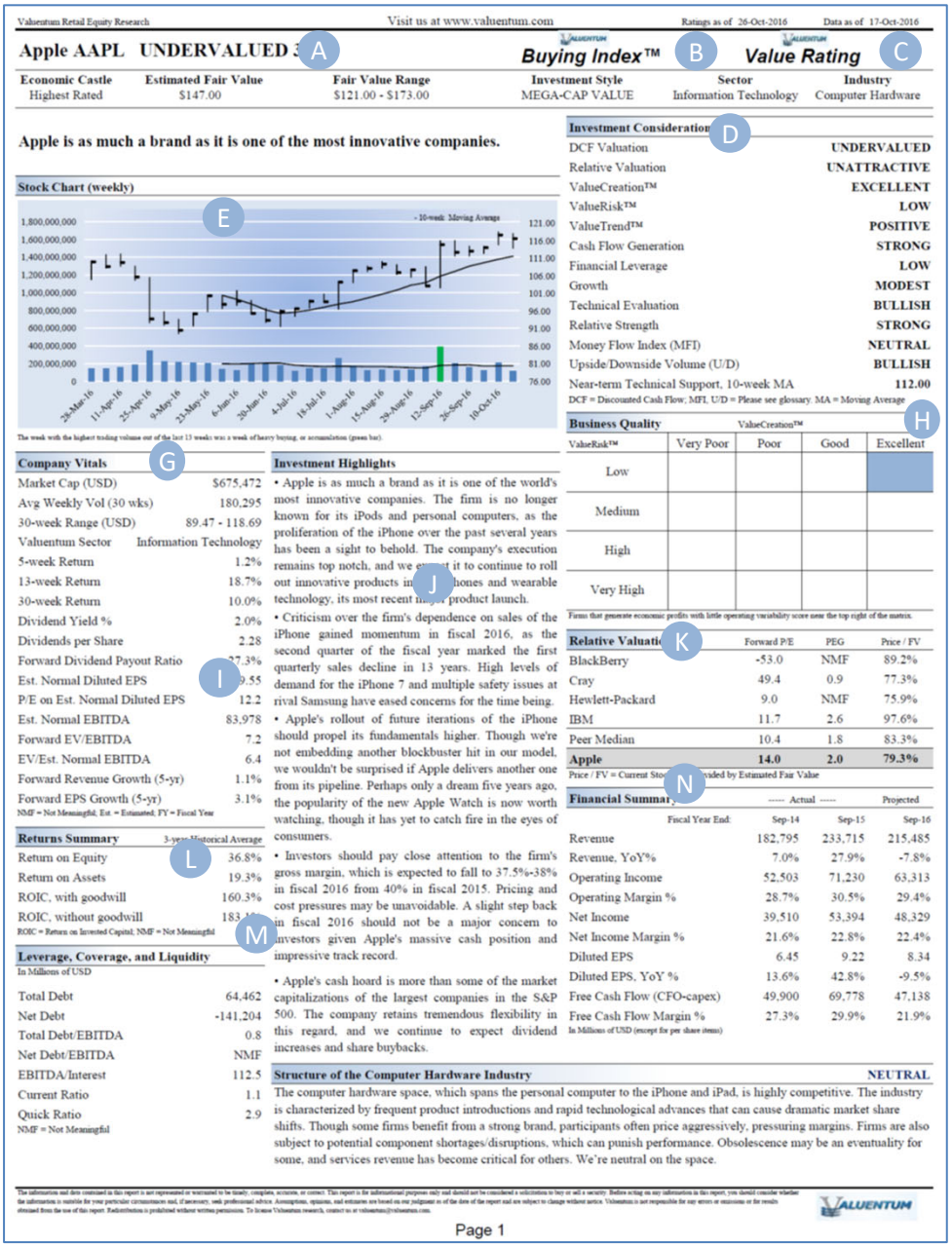
B Valuentum Buying Index (VBI)
Provides insight into the timeliness of an investment opportunity. We rank firms from 1 to 10 based on rigorous fiancial, valuation, and technical analysis. A 10 represents one of our top picks.

C Valuentum Value Rating (VVR)
Indicates whether we think a firm is undervalued, fairly valued, or overvalued on the basis of our DCF process.

UNDERVALUED
FAIRLY VALUED
OVERVALUED

D Investment Considerations
Evaluates firms on 12 different measures, from the firm's growth and cash flow generation to the stock's money flow index and upside/downside volume. We reveal technical support and resistance levels.

E 30-week Price and Volume Action
Displays the last accumulation or distribution week of the stock and historical price and volume action.



Valuentum Retail Equity Research — Visit us at www.valuentum.com — Ratings as of 26-Oct-2016 — Data as of 17-Oct-2016

Apple AAPL UNDERVALUED (A) — Buying Index™ (B) — Value Rating (C)

Economic Castle	Estimated Fair Value	Fair Value Range	Investment Style	Sector	Industry
Highest Rated	$147.00	$121.00 - $173.00	MEGA-CAP VALUE	Information Technology	Computer Hardware

Apple is as much a brand as it is one of the most innovative companies.

Stock Chart (weekly) (E)

Investment Considerations (D)

DCF Valuation	UNDERVALUED
Relative Valuation	UNATTRACTIVE
ValueCreation™	EXCELLENT
ValueRisk™	LOW
ValueTrend™	POSITIVE
Cash Flow Generation	STRONG
Financial Leverage	LOW
Growth	MODEST
Technical Evaluation	BULLISH
Relative Strength	STRONG
Money Flow Index (MFI)	NEUTRAL
Upside/Downside Volume (U/D)	BULLISH
Near-term Technical Support, 10-week MA	112.00

DCF = Discounted Cash Flow; MFI, U/D = Please see glossary. MA = Moving Average

Business Quality (H) — ValueCreation™ / ValueRisk™

	Very Poor	Poor	Good	Excellent
Low				
Medium				
High				
Very High				

Firms that generate economic profits with little operating variability score near the top right of the matrix.

Company Vitals (G)

Market Cap (USD)	$675,472
Avg Weekly Vol (30 wks)	180,295
30-week Range (USD)	89.47 - 118.69
Valuentum Sector	Information Technology
5-week Return	1.2%
13-week Return	18.7%
30-week Return	10.0%
Dividend Yield %	2.0%
Dividends per Share	2.28
Forward Dividend Payout Ratio	27.3%
Est. Normal Diluted EPS	9.55
P/E on Est. Normal Diluted EPS	12.2
Est. Normal EBITDA	83,978
Forward EV/EBITDA	7.2
EV/Est. Normal EBITDA	6.4
Forward Revenue Growth (5-yr)	1.1%
Forward EPS Growth (5-yr)	3.1%

NMF = Not Meaningful; Est. = Estimated; FY = Fiscal Year

Investment Highlights (J)

• Apple is as much a brand as it is one of the world's most innovative companies. The firm is no longer known for its iPods and personal computers, as the proliferation of the iPhone over the past several years has been a sight to behold. The company's execution remains top notch, and we expect it to continue to roll out innovative products in smartphones and wearable technology, its most recent major product launch.

• Criticism over the firm's dependence on sales of the iPhone gained momentum in fiscal 2016, as the second quarter of the fiscal year marked the first quarterly sales decline in 13 years. High levels of demand for the iPhone 7 and multiple safety issues at rival Samsung have eased concerns for the time being.

• Apple's rollout of future iterations of the iPhone should propel its fundamentals higher. Though we're not embedding another blockbuster hit in our model, we wouldn't be surprised if Apple delivers another one from its pipeline. Perhaps only a dream five years ago, the popularity of the new Apple Watch is now worth watching, though it has yet to catch fire in the eyes of consumers.

• Investors should pay close attention to the firm's gross margin, which is expected to fall to 37.5%-38% in fiscal 2016 from 40% in fiscal 2015. Pricing and cost pressures may be unavoidable. A slight step back in fiscal 2016 should not be a major concern to investors given Apple's massive cash position and impressive track record.

• Apple's cash hoard is more than some of the market capitalizations of the largest companies in the S&P 500. The company retains tremendous flexibility in this regard, and we continue to expect dividend increases and share buybacks.

Relative Valuation (K)

	Forward P/E	PEG	Price / FV
BlackBerry	-53.0	NMF	89.2%
Cray	49.4	0.9	77.3%
Hewlett-Packard	9.0	NMF	75.9%
IBM	11.7	2.6	97.6%
Peer Median	10.4	1.8	83.3%
Apple	**14.0**	**2.0**	**79.3%**

Price / FV = Current Stock Price divided by Estimated Fair Value

Returns Summary (L) — 3-year Historical Average

Return on Equity	36.8%
Return on Assets	19.3%
ROIC, with goodwill	160.3%
ROIC, without goodwill	183.1%

ROIC = Return on Invested Capital; NMF = Not Meaningful

Leverage, Coverage, and Liquidity (M)

In Millions of USD

Total Debt	64,462
Net Debt	-141,204
Total Debt/EBITDA	0.8
Net Debt/EBITDA	NMF
EBITDA/Interest	112.5
Current Ratio	1.1
Quick Ratio	2.9

NMF = Not Meaningful

Financial Summary (N)

Fiscal Year End:	Actual Sep-14	Actual Sep-15	Projected Sep-16
Revenue	182,795	233,715	215,485
Revenue, YoY%	7.0%	27.9%	-7.8%
Operating Income	52,503	71,230	63,313
Operating Margin %	28.7%	30.5%	29.4%
Net Income	39,510	53,394	48,329
Net Income Margin %	21.6%	22.8%	22.4%
Diluted EPS	6.45	9.22	8.34
Diluted EPS, YoY %	13.6%	42.8%	-9.5%
Free Cash Flow (CFO-capex)	49,900	69,778	47,138
Free Cash Flow Margin %	27.3%	29.9%	21.9%

In Millions of USD (except for per share items)

Structure of the Computer Hardware Industry — NEUTRAL

The computer hardware space, which spans the personal computer to the iPhone and iPad, is highly competitive. The industry is characterized by frequent product introductions and rapid technological advances that can cause dramatic market share shifts. Though some firms benefit from a strong brand, participants often price aggressively, pressuring margins. Firms are also subject to potential component shortages/disruptions, which can punish performance. Obsolescence may be an eventuality for some, and services revenue has become critical for others. We're neutral on the space.

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G Company Vitals
Shows sector, industry and other relevant company information.

H Business Quality
Summary of the firm's ability to create value for shareholders compared wth the underlying risk of its operations.

I Normalized EPS and EBITDA
Estimation of the firm's normalized earnings measures and the corresponding valuation mutliples.

J Investment Highlights
Our opinion of the company, including analysis of its financial and technical strengths and weaknesses.

K Relative Valuation
Comparison of the firm's PE, PEG, and Price/FV ratios versus peers.

L Returns Summary
3-year averages of the firm's key return measures, including return on invested capital, with and without goodwill.

M Leverage, Coverage, and Liquidity
A snapshot of the company's financial health.

N Financial Summary
A summary of the proforma financial statements found in the extended report.

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@Valuentum, we strive to stand out from the crowd. Most investment research publishers fall into a few camps, whether it be value, growth, income, momentum, chartist or some variant of the aforementioned. We think each in its own right holds merit, but we think the combination of these approaches can be even more powerful. After all, stock price movements aren't just driven by investors of the value or growth variety, but by all market participants. Therefore, we look at stocks from a variety of investment perspectives in order to better understand and identify ideas. We want to provide relevant information.

The core of our process is grounded in rigorous discounted cash flow analysis and incorporates the concept of a margin of safety. We offer a fair value estimate for each company and provide a relative valuation assessment in the context of a company's industry and closest peers. A cross section of our ValueCreation™ and ValueRisk™ ratings provides a financial assessment of a company's business quality, while our ValueTrend™ rating offers insight into the trajectory of a firm's economic profit creation. The Economic Castle rating measures the magnitude of future economic value generation, and the Dividend Cushion ratio assesses the financial capacity of a company to keep raising its dividend.

Our analysis doesn't stop there. We also offer a technical evaluation of the stock as well as other momentum indicators. We not only want to reveal to readers which firms may be undervalued, in our view, but we also want to provide readers with information to help them assess entry and exit points. Most research publishers focus on arriving at a target price or fair value estimate, but may fall short of providing a technical assessment to bolster buy and sell disciplines. We strive to go the distance and provide readers with answers--not half the story.

An explanation of our approach would not be complete if we didn't describe our ideal stock idea. We're looking for companies that are undervalued--both on a DCF basis and versus peers--have strong growth potential, have a solid track record of creating economic profits for shareholders with reasonable risk, are strong cash flow generators, have manageable financial leverage, and are currently showing bullish technical and momentum indicators. For dividend growth ideas, we look for companies that have both the capacity and willingness to keep raising the dividend.

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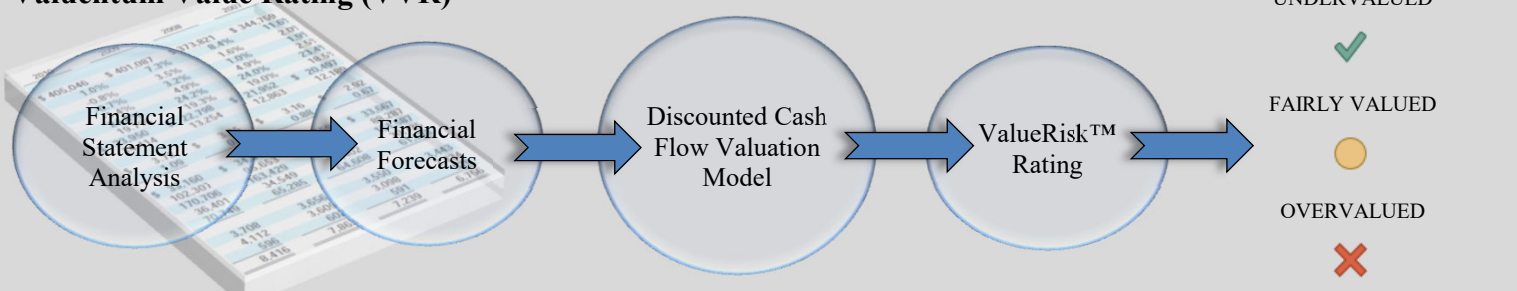
Valuentum Value Rating (VVR)



Historical firm-specific financial data generates our ValueCreation™, ValueRisk™, and ValueTrend™ ratings. The data provides the basis for our financial forecasts.

Full annual forecasts of income statement, balance sheet, and cash flow statement items. Firm-specific cost of equity, cost of debt, weighted average cost of capital, and long-term growth and profitability measures estimated.

A complete three-stage free cash flow to the firm valuation model generates an estimate of the firm's equity value per share based on estimated future free cash flows.

The volatility of key valuation drivers are estimated and a margin of safety is determined.

- Revenue Volatility
- Margin Volatility
- Earnings Volatility
- Cash Flow Volatility

The firm's stock price is compared to the suggested margin of safety. If a firm's stock price falls below the lower bound of our estimated fair value range, it receives Valuentum's highest Value Rating.

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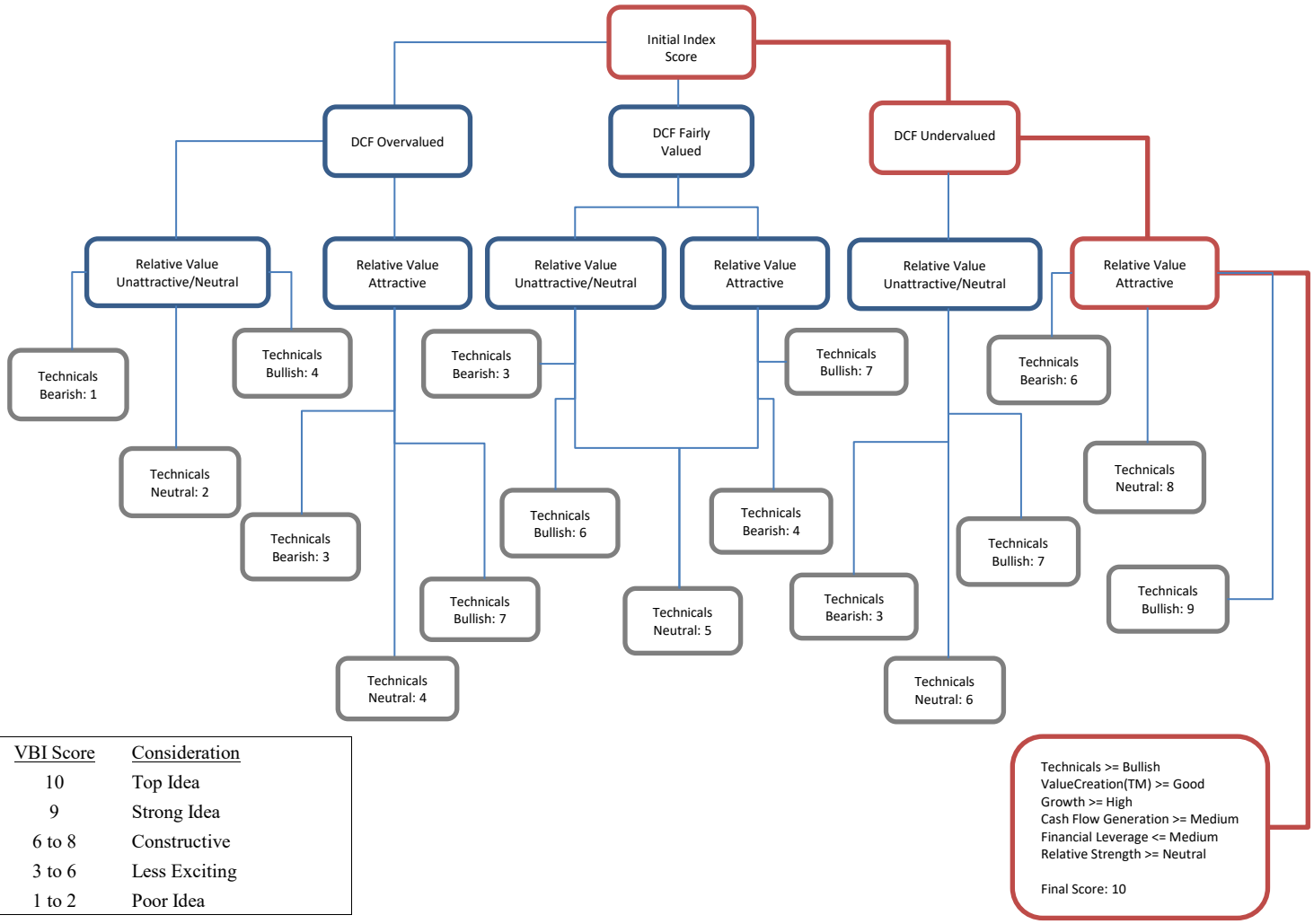
Methodology for Picking Stocks - Valuentum Buying Index™ (VBI)

@ Valuentum, we like to look at companies from a number of different perspectives. The Valuentum Buying Index (VBI) combines rigorous financial and valuation analysis with an evaluation of a stock's technicals to derive a rating between 1 and 10 for each company. The VBI places considerable emphasis on a company's discounted cash-flow (DCF) valuation, its relative valuation versus peers (both forward PE and PEG ratios), and its technicals in order to help readers assess entry and exit points on the most interesting ideas.

Let's follow the red line on the flow chart below to see how a company can score a 10, the best mark on the index. First, the company would need to be 'undervalued' on a DCF basis and 'attractive' on a relative value basis. The stock would also have to be exhibiting 'bullish' technicals. The firm would need a ValueCreation™ rating of 'good' or 'excellent', exhibit 'high' or 'aggressive' growth prospects, and generate at least a 'medium' or 'neutral' assessment for cash flow generation, financial leverage, and relative price strength.

This is a tall order for any company. Stocks that don't make the cut for a 10 are ranked accordingly, with the least attractive stocks, in our opinion, garnering a rating of 1. Most of our coverage universe registers ratings between 3 and 7, but at any given time there could be large number of companies garnering either very high or very low scores, especially at market lows or tops, respectively.

The Best Ideas Newsletter portfolio puts the VBI into practice.



VBI Score	Consideration
10	Top Idea
9	Strong Idea
6 to 8	Constructive
3 to 6	Less Exciting
1 to 2	Poor Idea

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Glossary

Estimated Fair Value. This measure is our opinion of the fair equity value per share of the company. If our forecasts prove accurate, which may not always be the case, we may expect a firm's stock price to converge to this value within the next 3 years.

Fair Value Range. The fair value range represents an upper bound and lower bound, between which we would consider the firm to be fairly valued. The range considers our estimate of the firm's fair value and the margin of safety suggested by the volatility of key valuation drivers, including revenue, gross margin, earnings before interest, and enterprise free cash flow (the determinants behind our ValueRisk™ rating).

DCF Valuation. We opine on the firm's valuation based on our DCF process. Firms that are trading with an appropriate discount to our fair value estimate receive an UNDERVALUED rating. Firms that are trading within our fair value range receive a FAIRLY VALUED rating, while firms that are trading above the upper bound of our fair value range receive an OVERVALUED rating.

Relative Value. We compare the firm's forward price-to earnings (PE) ratio and its price/earnings-to-growth (PEG) ratio to that of its peers. If both measures fall below the peer median, the firm receives an ATTRACTIVE rating. If both are above the peer median, the firm receives an UNATTRACTIVE rating. Any other combination results in a NEUTRAL rating.

ValueCreation™. This is a proprietary Valuentum measure. ValueCreation™ indicates the firm's historical track record in creating economic value for shareholders, taking the average difference between ROIC (without goodwill) and the firm's estimated WACC during the past three years. The firm's performance is measured along the scale of EXCELLENT, GOOD, POOR, and VERY POOR. Those firms with EXCELLENT ratings have a demonstrated track record of creating economic value, while those that register a VERY POOR mark have been destroying economic value.

ValueRisk™. This is a proprietary Valuentum measure. ValueRisk™ indicates the historical volatility of key valuation drivers, including revenue, gross margin, earnings before interest, and enterprise free cash flow. The standard deviation of each measure is calculated and scaled against last year's measure to arrive at a percentage deviation for each item. These percentage deviations are weighted equally to arrive at the corresponding fair value range for each stock, measured in percentage terms. The firm's performance is measured along the scale of LOW, MEDIUM, HIGH, and VERY HIGH. The ValueRisk™ rating for each firm also determines the fundamental beta of each firm along the following scale: LOW (0.85), MEDIUM (1), HIGH (1.15), VERY HIGH (1.3).

ValueTrend™. This is a proprietary Valuentum measure. ValueTrend™ indicates the trajectory of the firm's return on invested capital (ROIC). Firms that earned an ROIC last year that was greater than the 3-year average of the measure earn a POSITIVE rating. Firms that earned an ROIC last year that was less than the 3-year average of the measure earn a NEGATIVE rating.

Cash Flow Generation. Firms' cash flow generation capacity are measured along the scale of STRONG, MEDIUM, and WEAK. A firm with a 3-year historical free cash flow margin (free cash flow divided by sales) greater than 5% receives a STRONG rating, while firms earning less than 1% of sales as free cash flow receive a WEAK rating.

Financial Leverage. Based on the firm's normalized debt-to-EBITDA metric, we rank firms on the following scale: LOW, MEDIUM, and HIGH. Companies with a normalized debt-to-EBITDA ratio below 1.5 receive a LOW score, while those with a measure above 3 receive a HIGH score.

Upside/Downside Volume. Heavy volume on up days and lower volume on down days suggests that institutions are heavily participating in a stock's upward advance. We use the trailing 14-week average of upside and downside volume to calculate an informative ratio. We rank each firm's U/D volume ratio along the following scale: BULLISH, IMPROVING, DETERIORATING, and BEARISH.

Investment Style. Valuentum uses its own proprietary stock-classification system. Nano-cap: Less than $50 million; Micro-cap: Between $50 million and $200 million; Small-cap: Between $200 million and $2 billion; Mid-cap: Between $2 billion and $10 billion; Large-cap: Between $10 billion and $200 billion; Mega-cap: Over $200 billion. Blend: Firm's that we think are undervalued and exhibit high growth prospects (growth in excess of three times the rate of assumed inflation). Value: Firm's that we believe are undervalued, but do not exhibit high growth prospects. Growth: Firms that are not undervalued, in our opinion, but exhibit high growth prospects. Core: Firms that are neither undervalued nor exhibit high growth prospects.

Company Vitals. In this section, we list key financial information and the sector and industry that Valuentum assigns to the stock. The P/E-Growth (5-yr), or PEG ratio, divides the current share price by last year's earnings (EPS) and then divides that quotient by our estimate of the firm's 5-year EPS growth rate. The estimated normalized diluted EPS and estimated normalized EBITDA represent the five-year forward average of these measures used in our discounted cash flow model. The P/E on estimated normalized EPS divides the current share price by estimated normalized diluted EPS. The EV/estimated normalized EBITDA considers the current enterprise value of the company and divides it by estimated normalized EBITDA. EV is defined as the firm's market capitalization plus total debt, minority interest, preferred stock less cash and cash equivalents.

Business Quality Matrix. We compare the firm's ValueCreation™ and ValueRisk™ ratings. The box is an easy way for investors to quickly assess the business quality of a company. Firms that generate economic profits with little operating variability score near the top right of the matrix.

Timeliness Matrix. We compare the company's recent stock performance relative to the market benchmark with our assessment of its valuation. Firms that are experiencing near-term stock price outperformance and are undervalued by our estimate may represent timely buys.

Range of Potential Outcomes. The firm's margin of safety is shown in the graphic of a normal distribution. We consider a firm to be undervalued if its stock price falls along the green line and overvalued if the stock price falls along the red line. We consider the firm to be fairly valued if its stock price falls along the yellow line.

Return on Invested Capital. At Valuentum, we place considerable emphasis on return on invested capital (both with and without goodwill). The measure focuses on the return (earnings) the company is generating on its operating assets and is superior to return on equity and return on assets, which can be skewed by a firm's leverage or excess cash balance, respectively.

Technical Evaluation. We evaluate a firm's near-term and medium-term moving averages and money flow index (MFI) to assign each firm a rating along the following scale: VERY BULLISH, BULLISH, NEUTRAL, BEARISH, and VERY BEARISH.

Stock Price Relative Strength. We assess the perfomance of the company's stock during the past quarter, 13 weeks, relative to an ETF that mirrors the aggregate performance of constituents of the stock market. Firms are measured along the scale of STRONG, NEUTRAL, and WEAK. Companies that have outperformed the market index by more than 2.5% during this 13-week period receive a STRONG rating, while firms that trailed the market index by more than 2.5% during this 13-week period receive a WEAK rating.

Money Flow Index (MFI). The MFI is a technical indicator that measures buying and selling pressure based on both price and volume. Traders typically use this measure to identify potential reversals with overbought and oversold levels. We use a 14-week measure to rank firms along the following scale: EXTREMELY OVERBOUGHT (>90), OVERBOUGHT (80-90), NEUTRAL (20-80), OVERSOLD (10-20), EXTREMELY OVERSOLD (0-10).

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PPG Rating History	Price	Fair Value	VBI
11-Dec-24	$122.80	$126.00	4
24-Sep-24	$128.75	$130.00	7
3-Jul-24	$124.87	$133.00	4
16-Apr-24	$134.30	$144.00	4
22-Feb-24	$143.54	$144.00	4
1-Dec-23	$143.63	$148.00	7
1-Nov-23	$122.97	$128.00	5
20-Jun-23	$142.03	$146.00	6
19-Dec-22	$125.86	$121.00	7
1-Jul-22	$116.24	$146.00	6
30-Jul-21	$163.52	$158.00	4
18-Nov-20	$143.10	$123.00	6
13-Dec-19	$133.42	$115.00	5
8-Apr-19	$114.90	$101.00	6

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