Research Highlights

A weekly summary of our best ideas and developments in the companies we cover.

Morningstar Equity Research
June 11-15, 2018

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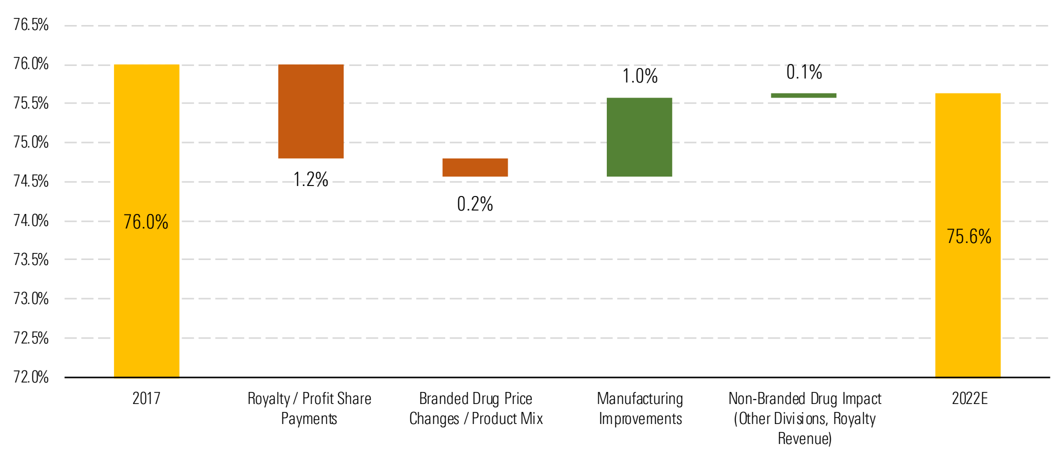
Online
Interactive web-based models are available for our Best Ideas at Trefis.

Tough Pricing Environment for Big Pharma

It has become more difficult for drugmakers to improve gross margins by increasing prices. However, improved manufacturing techniques can offset pricing pressure. These techniques can also manage costs tied to new technologies, such as gene and cell therapy, and to potentially massive drug launches, such as Biogen's Alzheimer's drug candidate aducanumab.

Among the biggest biotech firms we cover, we think Amgen, Biogen, BioMarin, and Roche have the best manufacturing expertise and are currently undervalued, although we stop short of assuming that manufacturing know-how is in itself worthy of a moat. In Big Pharma, we think Glaxo's and Sanofi's commitment to continuous manufacturing supports gross margins, and both names are undervalued. Beyond manufacturing improvements, product mix and royalty agreements can also have a significant impact on gross margin; BioMarin, Bristol, and Merck benefit from positive product mix, but Bristol is also hard-hit by royalty obligations.

Pharma/Biotech Industry Gross Margins: Manufacturing Improvements Counter Net Pricing and Royalty Headwinds



Source: Morningstar, company reports

- **Among undervalued biotechs, Biogen, BioMarin, and Roche stand out:** Biogen's productivity improvements make serving a sizable Alzheimer's market feasible. BioMarin is poised to see the largest margin improvement, as new rare-disease therapies launch at high prices and as it makes headway with manufacturing novel gene therapies. Roche is significantly expanding its manufacturing capacity and increasing its flexibility with a more diverse range of manufacturing methods for its next wave of novel biologics.

- **In Big Pharma, Sanofi, and Glaxo appear to have the strongest commitments to novel manufacturing technologies, and both are undervalued.** Sanofi's experience with continuous biologics manufacturing, both in continuous perfusion and processing, as well as small molecule continuous manufacturing, makes it a leader in manufacturing improvements. Glaxo's continuous manufacturing methods should help it maximize margins on its small-molecule portfolio.
- **We think manufacturing improvements across the drug industry will increase average gross margins by 100 basis points over the next five years.** We expect this to counter the pressure of a 120-basis-point hit from increasing royalty and profit share obligations and a 20-basis-point hit from pricing pressure and mix shift headwinds.
- **Several industry dynamics, including more niche therapies and more complex cell and gene therapies, are pushing drugmakers toward novel manufacturing techniques to lower their cost bases.** We see the potential for new technologies to significantly improve productivity and lower manufacturing costs for the newest wave of medicines, many of which do not fit the traditional blockbuster biologic model.
- **Manufacturing efficiencies and novel technologies support strong sustainability ratings for firms like Amgen, Biogen, and BioMarin.** Amgen's next-generation technology allows for smaller-scale manufacturing, lower operating costs, and less waste. Biogen's productivity improvements meaningfully improve its ability to manufacture large volumes of biologic drug with fewer bioreactors. BioMarin has a long-standing commitment to small, more environmentally friendly, continuous perfusion facilities.

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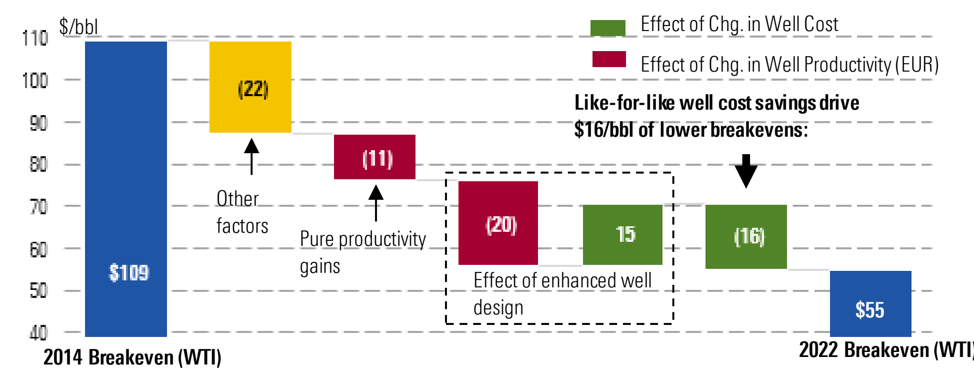
The Shale Revolution Isn't Over

With oil prices hovering about $15 a barrel (25%) above our midcycle forecast of $60/bbl Brent, many are asking whether the era of lower oil prices, introduced by rapid U.S. shale production growth in 2014, is now already over. Indeed, consensus long-term oil prices have now moved up to $66/bbl Brent, about 10% above our midcycle forecast. We believe this consensus view is wrong. It is worth remembering why oil prices fell after 2014 in the first place: lower shale break-evens due mostly to increases in well productivity and decreases in well costs. Both of these factors remain as strong as ever, by our analysis. Therefore, notwithstanding the temporary issues that have elevated short-term prices, we believe shale is still capable of ensuring long-term low-cost oil ($60/bbl Brent).

This report focuses on shale well costs, one of the two key terms in the break-even equation along with productivity. We forecast about 30% in like-for-like well cost savings at midcycle versus 2014 levels. This accounts for about $16/bbl in lower break-evens. We think consensus expects well costs to revert closer to 2014 levels, accounting for a good deal of the higher consensus oil price expectations. Additionally, our bearish shale cost forecasts have important implications for oilfield service companies: we believe Halliburton, pressure pumpers, and land drillers are all overvalued.

Exhibit 1 Well Cost Savings a Powerful Driver of Lower Shale Costs



Source: Energy Information Administration, company filings, Morningstar estimates

- We project shale break-evens of $55/bbl WTI ($60 Brent) at midcycle (2022), underpinning our below-consensus $55/bbl WTI midcycle oil price forecast. This marks a precipitous fall from break-evens over $100/bbl in 2014. Increased well productivity along with decreased well costs (after controlling for upgraded well design) have been the key factors allowing for lower break-evens. We believe the well productivity gains will be largely sustained, as detailed in our December 2017 Observer, "Oil Bulls Beware: Tier 1 Shale Acreage Is Far From Exhaustion." In this report, we focus on well costs. Like-for-like well cost savings account for a hefty $16/bbl of our lower break-even forecast versus 2014.
- Our 2022 shale well cost forecast is $6.8 million per well, incorporating $2.8 million per well (30%) in savings versus our estimated midcycle well cost using 2014 inputs for service pricing and efficiency levels. This takes into account the upgrade in horizontal well designs since 2014—lateral lengths have increased 26% and proppant per well has increased 150%. Thus, without like-for-like cost savings, well costs would have already skyrocketed past 2014 levels.

- Well cost savings fall into two broad categories: pricing and efficiency. Pricing gains include the impact of competitive pressures on high-end service lines (drilling, other completion costs) as well as lower proppant pricing. Efficiency gains include the impact of faster drilling on drilling costs as well as lower completion costs due to multiwell pad efficiencies.
- Faster drilling speeds will mark the continuance of a multiyear trend, enabled by new technology and process improvement. Convergence of Permian drilling speeds closer to levels seen in more mature plays like the Bakken will be a powerful lever in moving drilling days per well lower overall.
- Many efficiency savings stem from multiwell pad development, but the Permian (the largest shale play) has barely scratched the surface of pad efficiencies. As the Permian moves into "factory development" with many wells per pad, we expect large incremental efficiency savings.
- We believe pressure pumping and proppant reinflation has already maxed out. Faster frac jobs will save on pressure pumping, and streamlined logistics as well as low-cost regional sand will save on proppant costs.
- In other high-end service lines (for example, directional drilling, frac chemicals), we see room for savings provided by sustainable pricing cuts versus 2014. Many analysts assume that pricing cuts are unsustainable. Instead, drawing on our Morningstar moat framework, we believe lower pricing is quite natural for many higher-end service lines that generated high returns on capital before the downturn. Shale development's highly repetitive, homogenous nature provides the ideal laboratory for customers to experiment with new, cost-saving products, making it a fiercely competitive market.
- Shale has broken the mold for oil and gas development. Two decades of focus on megaprojects necessitated reinventing the wheel on each project, which inhibited the bottom-up innovation that has historically best advanced productivity in other industries. Shale has ended this era of stagnant productivity for good by unleashing a process of continuous learning and innovation.
- Naturally, our forecast for low shale costs has bearish implications for shale-focused oilfield service companies—we see them as overvalued by about 25% on average. For longtime shale leader Halliburton, shale is a double-edge sword, a fact that the market overlooks.

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When Texas Hype Cools, NRG Energy Will Power Down

The market is too hot on Texas. Stocks of power producers like NRG Energy have soared recently on expectations of high electricity demand in the state this summer. But we think it's time for investors to chill out. NRG's stock has more than tripled during the past 18 months, going from the most undervalued utility in our coverage to the most overvalued. Now we think the stock is 50% overvalued. NRG's corporate reshuffling and a rally in 2018 Texas power prices have created too much enthusiasm, but amid all of the excitement, NRG's long-term fundamentals haven't changed. We think power prices in Texas and NRG's other key markets will moderate as renewable energy and low-cost natural gas generation reach overbuild levels. The retail business, now half of earnings, will suffer from margin contraction as new competitors enter the market, offsetting customer growth. NRG's fixed costs limit profitability even after management completes its cost-cutting and deleveraging. We think investors are best off waiting for the excitement to cool.

- **Summer outlook creates elevated risk:** Coal plant closures and forecasts for a hot summer in Texas have propelled NRG's stock to extreme levels. If electricity demand falls short of expectations this summer, NRG's stock could fall sharply and is unlikely to recover to these levels.
- **Market ignoring bearish long-term fundamentals:** NRG is making a bullish bet on Texas and mid-Atlantic power prices in 2019-20 even though we think bearish fundamentals are developing. Nuclear subsidies, renewable energy growth, energy efficiency, and low gas prices are considerable long-term threats.
- **No economic moat developing:** NRG has slimmed down and simplified its business, concentrating on the Texas and eastern U.S. markets. Although we like the concentration strategy, we think NRG will struggle to maintain retail and power generation margins in those markets. NRG lacks the sustainable cost advantage required for an economic moat in the commoditized energy markets.
- **Valuation multiples too rich:** On an enterprise value basis, NRG trades near 8 times peak 2019 EBITDA as of early June after adjusting for $2 billion of cash we expect it to deploy in the next year. This is a premium to peer Vistra Energy, which trades at 5 times consensus 2019 EBITDA, and a premium to the 7 times multiples that peers Dynegy and Calpine received in recent acquisitions. We think 6 times is a more reasonable EV/EBITDA multiple to use on peak 2019 earnings.

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Best Ideas

Interactive web-based models are available for our Best Ideas at Trefis.

Company and Industry	Morningstar Rating	Fair Value Estimate	Current Price	Uncertainty Rating	Moat Rating	Price / Fair Value	Market Cap (B)	Analyst
Basic Materials								
Cameco (CCJ)	★★★★	$17	$12.1	High	Narrow	0.71	4.75	Inton
Compass Minerals International (CMP)	★★★★	$83	$69.45	High	Wide	0.84	2.35	Goldstein
Martin Marietta Materials (MLM)	★★★★	$265	$230.2	High	Narrow	0.87	14.49	Inton
Communication Services								
BT Group (BT.A)	★★★★★	GBX 360	GBX 214.1	High	Narrow	0.59	21.24	C. Nichols
China Mobile (941)	★★★★	HKD 102	HKD 70.25	Medium	Narrow	0.69	1438.40	Baker
Telefonica (TEF)	★★★★★	$13	$7.44	High	Narrow	0.57	38.67	C. Nichols
Telstra (TLS)	★★★★★	AUD 4.4	AUD 2.94	Medium	Narrow	0.67	34.97	Han
Consumer Cyclical								
Advance Auto Parts (AAP)	★★★★	$157	$133.5	Medium	Narrow	0.85	9.88	Akbari
Bayerische Motoren Werke (BMW)	★★★★	EUR 117	EUR 86.27	High	Narrow	0.74	56.07	Hilgert
Domino's Pizza Enterprises (DMP)	★★★	AUD 53	AUD 52.24	Medium	Narrow	0.99	4.58	Faul
Expedia Group (EXPE)	★★★★	$180	$123.58	High	Narrow	0.69	18.56	Wasiolek
General Motors (GM)	★★★★	$56	$43.57	High	None	0.78	61.41	Whiston
Great Wall Motor (2333)	★★★★★	HKD 13.5	HKD 7	High	None	0.52	99.26	Hu
Hanesbrands (HBI)	★★★★★	$29	$20.17	Medium	Narrow	0.70	7.27	Hottovy
InvoCare (IVC)	★★★★	AUD 15.5	AUD 13.42	Medium	Wide	0.87	1.48	Ragonese
Mattel (MAT)	★★★★	$21.5	$17.92	High	Narrow	0.83	6.16	Katz
Walt Disney (DIS)	★★★★	$130	$108.75	Medium	Wide	0.84	161.68	Macker
Williams-Sonoma (WSM)	★★★★	$68	$60.85	Medium	Narrow	0.89	5.06	Katz
WPP (WPP)	★★★★	GBX 1500	GBX 1230	Medium	Narrow	0.82	15.52	Mogharabi
Consumer Defensive								
G8 Education (GEM)	★★★★	AUD 4	AUD 2.38	High	None	0.60	1.08	James
General Mills (GIS)	★★★★★	$59	$44.51	Low	Wide	0.75	25.38	Vora
Imperial Brands (IMB)	★★★★★	GBX 3900	GBX 2608	Low	Wide	0.67	24.87	Gorham
Kao (4452)	★★★	JPY 8800	JPY 8647	Low	Wide	0.98	4226.81	Wei
Mondelez International (MDLZ)	★★★★	$51	$40.4	Medium	Wide	0.79	59.59	Lash
PepsiCo (PEP)	★★★★	$123	$105.13	Low	Wide	0.85	149.06	Vora
Procter & Gamble (PG)	★★★★★	$98	$75.99	Low	Wide	0.78	191.08	Lash
Reckitt Benckiser Group (RB.)	★★★★	GBX 7300	GBX 6150	Low	Wide	0.84	43.42	Gorham
Energy								
Cenovus Energy (CVE)	★★★★	$21	$12.38	Very High	None	0.59	15.21	Gemino
Enbridge (ENB)	★★★★★	$64	$42.69	Medium	Wide	0.67	72.78	Gemino
Enterprise Products Partners (EPD)	★★★★	$31	$28.81	Low	Wide	0.93	62.59	Ellis
Royal Dutch Shell (RDS.B)	★★★★	$78	$72.94	Low	None	0.94	292.00	Good
Total (TOT)	★★★★	$74	$61.2	Medium	None	0.83	161.32	Good
Financial Services								
American International Group (AIG)	★★★★	$76	$54.8	Medium	None	0.72	49.19	Horn
Capital One Financial (COF)	★★★★	$123	$96.28	Medium	Narrow	0.78	46.83	Plunkett
Credit Suisse Group (CSGN)	★★★★	CHF 22	CHF 15.36	High	Narrow	0.70	39.01	Scholtz
Invesco (IVZ)	★★★★	$40	$27.21	Medium	Narrow	0.68	11.18	Warren
Mitsubishi UFJ Financial Group (8306)	★★★★	JPY 880	JPY 658.7	Medium	None	0.75	8651.90	Wu
QBE Insurance Group (QBE)	★★★★	AUD 13	AUD 9.38	High	Narrow	0.72	12.72	Ellis
Westpac Banking (WBC)	★★★★	AUD 35	AUD 27.9	Medium	Wide	0.80	94.47	Ellis

Source: Morningstar. As of June 15, 2018

Best Ideas

Interactive web-based models are available for our Best Ideas at Trefis.

Company and Industry	Morningstar Rating	Fair Value Estimate	Current Price	Uncertainty Rating	Moat Rating	Price / Fair Value	Market Cap (B)	Analyst
Healthcare								
Allergan (AGN)	★★★★★	$263	$173.95	Medium	Wide	0.66	58.98	Waterhouse
McKesson (MCK)	★★★★	$210	$150	Medium	Wide	0.71	30.31	Lekraj
Medtronic (MDT)	★★★★	$105	$86.57	Medium	Wide	0.82	117.23	Wang
Ramsay Health Care (RHC)	★★★★	AUD 82	AUD 58.94	Medium	Narrow	0.72	11.91	Kallos
Roche Holding (ROG)	★★★★★	CHF 325	CHF 211.85	Low	Wide	0.65	181.39	Andersen
Shire (SHP)	★★★★	GBX 4890	GBX 4069.5	Medium	Narrow	0.83	37.19	Andersen
Industrials								
Allegion (ALLE)	★★★★	$91	$81.79	Medium	Wide	0.90	7.77	Bernard
Anixter International (AXE)	★★★★★	$107	$66	Medium	Narrow	0.62	2.21	Bernard
Beijing Enterprises Holdings (392)	★★★★	HKD 58	HKD 42.35	Medium	Narrow	0.73	53.45	Song
Brambles (BXB)	★★★★	AUD 11.2	AUD 9.19	Medium	Wide	0.82	14.62	Fleck
CK Hutchison Holdings (1)	★★★★	HKD 124	HKD 88.5	Medium	None	0.71	341.40	Tan
G4S (GFS)	★★★★	GBX 337	GBX 279.5	Medium	None	0.83	4.34	Field
GEA Group (G1A)	★★★★	EUR 47	EUR 32.03	Medium	Wide	0.68	5.78	Molina
Grupo Aeroportuario del Pacifico (GAP B)	★★★★	MXN 216	MXN 181.93	High	Wide	0.84	102.06	Higgins
Guangshen Railway (525)	★★★★	HKD 6.8	HKD 4.43	High	None	0.65	37.54	Song
Johnson Controls International (JCI)	★★★★	$53	$34.89	High	Narrow	0.66	32.32	Bernard
KION GROUP (KGX)	★★★★	EUR 90	EUR 72.52	Medium	Narrow	0.81	8.55	Molina
Royal Philips (PHIA)	★★★★	EUR 42	EUR 36.95	Medium	Narrow	0.88	35.12	Vonk
Sodexo (SW)	★★★★	EUR 110	EUR 85.72	Medium	Narrow	0.78	12.71	Field
Stericycle (SRCL)	★★★★	$86	$64.21	High	Narrow	0.75	5.49	Young
Real Estate								
AVEO Group (AOG)	★★★★	AUD 3.1	AUD 2.35	Medium	None	0.76	1.36	Sherlock
Sun Hung Kai Properties (16)	★★★★	HKD 153	HKD 123.3	Medium	Narrow	0.81	357.20	Zhong
Welltower (WELL)	★★★★	$74	$57.64	High	None	NA	21.44	Brown
Technology								
Intel (INTC)	★★★★	$62	$55.54	Medium	Wide	0.90	258.82	Davuluri
KLA-Tencor (KLAC)	★★★	$125	$113.13	High	Wide	0.91	17.60	Davuluri
Microchip Technology (MCHP)	★★★★	$112	$102.57	Medium	Wide	0.92	24.11	Colello
Microsoft (MSFT)	★★★★	$122	$101.42	Medium	Wide	0.83	779.23	Nelson
MYOB Group (MYO)	★★★★	AUD 3.82	AUD 2.81	Medium	Narrow	0.74	1.68	James
Qualcomm (QCOM)	★★★★	$75	$59.46	High	Narrow	0.79	88.17	Davuluri
Salesforce.com (CRM)	★★★★	$158	$138.41	Medium	Wide	0.88	102.83	Nelson
Synaptics (SYNA)	★★★★	$64	$48.09	Very High	None	0.75	1.66	Davuluri
TDK (6762)	★★★	JPY 11500	JPY 11490	High	None	1.00	1450.04	Ito
Tencent Holdings (700)	★★★★	HKD 641	HKD 410	High	Wide	0.64	3896.31	Tam
Utilities								
Dominion Energy (D)	★★★★★	$84	$65.52	Low	Wide	0.78	42.77	Fishman
FirstEnergy (FE)	★★★★	$40	$34.27	Low	Narrow	0.86	16.34	Fishman
Gas Natural SDG (GAS)	★★★	EUR 23.5	EUR 21.87	Medium	Narrow	0.93	21.87	Fulop
SCANA (SCG)	★★★★★	$57	$36.9	Medium	Narrow	0.65	5.26	Miller

Source: Morningstar. As of June 15, 2018

Highlighted Stocks

Sodexo SW:FR

Morningstar Rating	Industry	Moat Trend	Currency	Fair Value Estimate	Current Price	Uncertainty Rating	Moat Rating	Price/Fair Value	Market Cap (Bil)
★★★★	Industrials	Stable	EUR	110	86.74	Medium	Narrow	0.79	12.71

Source: Morningstar. As of June 15, 2018

While many on the sell side are on the fence about whether Sodexo's model is structurally impaired, with almost 50% of ratings currently "Hold" despite the magnitude of the recent sell-off, we are firmly of the view that the business model remains robust.

Select Report, June 13, 2018
The fall in Sodexo's share price during April was one of the steepest and most dramatic in recent years, offering what we believe is an opportunity for investors to acquire a portion of a high-quality narrow-moat company at a material discount to its intrinsic value. While many on the sell side are on the fence about whether Sodexo's model is structurally impaired, with almost 50% of ratings currently "Hold" despite the magnitude of the recent sell-off, we are firmly of the view that the business model remains robust. Our confidence in Sodexo stems from the company's stable client retention rate, which has averaged 94% over the past decade; its ability to increase business on existing sites; and, finally, the fact that the current issues affecting the company exist in only two specific businesses in just one geographic region. We believe that a quick change in management in these areas, combined with a rollout of sales processes from other successful areas of the business, should provide these divisions with the resources to build their sales pipeline and return to growth. While our near-term forecasts sit toward the middle of the consensus range, it is our longer-term belief in Sodexo's business and its ability to improve revenue and operating margins that gives us our differentiated view.

- Sodexo's April 29 profit warning related to only two specific divisions within one geographical area, while the rest of the business has been performing robustly.
- We believe the problems in the affected areas are self-inflicted and can be quickly reversed, through personnel changes and the implementation of processes that work in other business areas.
- There is about a 30% upside to our EUR 110 fair value estimate after the recent sell-off.
- This sell-off offers an opportunity for investors to acquire a stake in a high-quality business in a structurally growing space.

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Ingredion INGR

Morningstar Rating	Industry	Moat Trend	Currency	Fair Value Estimate	Current Price	Uncertainty Rating	Moat Rating	Price/Fair Value	Market Cap (Bil)
★★★★	Consumer	Stable	USD	131	114.68	Medium	Narrow	0.88	8.17

Source: Morningstar. As of June 15, 2018

Although management has already lowered 2018 guidance due to higher raw materials and freight costs, we point to the company's growing portfolio of higher-value specialty ingredients as a long-term catalyst for profitable growth.

Analyst Note, June 12, 2018

After taking a fresh look at narrow-moat Ingredion, we're raising our fair value estimate to $131 per share from $125. We now forecast a modestly higher midcycle operating margin stemming from a greater proportion of sales from higher-margin specialty ingredients and lower costs. Our narrow moat rating remains intact, as the company benefits from intangible assets and switching costs related to its specialty ingredients operations.

We see attractive risk-adjusted return potential for Ingredion, as shares are trading firmly in 4-star territory. Although management has already lowered 2018 guidance due to higher raw materials and freight costs, we point to the company's growing portfolio of higher-value specialty ingredients as a long-term catalyst for profitable growth.

Ingredion's specialty ingredients business, which generated 28% of sales in 2017, should benefit from the continued development of new products but also enjoys strong switching costs for existing products. Ingredion has done a commendable job expanding its specialty portfolio through both smaller acquisitions and increased research and development expenses over the last few years. As the company's specialty portfolio grows, we expect it to generate over one third of total sales by 2022.

A greater proportion of specialty ingredient sales should boost margins and profits as Ingredion's specialty products command pricing power. For the company's specialty flavor and texture ingredients, consumer packaged goods companies are typically unwilling to jeopardize the brand equity of their products by changing specialized ingredients that are critical to the consumer experience. Further, for Ingredion's functional specialty ingredients, customers are willing to pay a premium to reduce overall product manufacturing expenses such as recipe savings and energy costs. We forecast that operating margins will increase from the five-year average of 12.5% to roughly 16% by 2021.

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Anta Sports Products 02020:HK

Morningstar Rating	Industry	Moat Trend	Currency	Fair Value Estimate	Current Price	Uncertainty Rating	Moat Rating	Price/Fair Value	Market Cap (Bil)
★★★★	Consumer	Stable	HKD	55	43	Medium	Narrow	0.78	115.44

Source: Morningstar. As of June 15, 2018

We urge investors to focus on the company's strong fundamentals, with cash flow growth driven primarily by strong growth in Fila and online direct-to-consumer sales that lift margins.

Analyst Note, June 14, 2018
In response to a negative report by short-seller GMT Research, Anta came out in the evening of June 14 calling it "inaccurate and misleading." Management's response largely matches our view, that Anta's profitability is on par with global peers' China operations and that the company does not pay royalties for sales of Fila products in China as it owns the trademark. With its shares currently trading at a 25% discount to our fair value estimate of HKD 55, we believe the margin of safety has widened, and it presents an opportunity for investors to enter the stock.

In an analyst-facing conference call, Anta management disclosed that Fila Korea (which owns 15% of Fila China), converted its preferred shares (with USD 600,000 fixed dividends annually) into ordinary shares in 2017. We believe this indicates Fila Korea's increased optimism about Anta's ability to market Fila products in the greater China region.

Regarding concerns over the company's cash balance, Anta management stressed that cash is deposited in banks located in mainland China and Hong Kong. We assign a low probability of Anta manipulating its reported cash balances. We urge investors to focus on the company's strong fundamentals, with cash flow growth driven primarily by strong growth in Fila and online direct-to-consumer sales that lift margins, stable growth in core brand Anta, and rising contribution from newly acquired brands Descente, Kolon, and Kingkow. We believe these factors will drive a five-year revenue CAGR of 25.1%, and lead to a midcycle growth rate of 7.8% in 2027.

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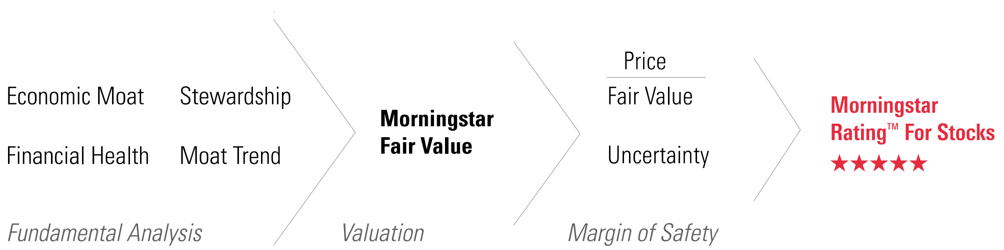
Research Methodology for Valuing Companies

Overview
At the heart of our valuation system is a detailed projection of a company's future cash flows, resulting from our analysts' research. Analysts create custom industry and company assumptions to feed income statement, balance sheet, and capital investment assumptions into our globally standardized, proprietary discounted cash flow, or DCF, modeling templates. We use scenario analysis, in-depth competitive advantage analysis, and a variety of other analytical tools to augment this process. Moreover, we think analyzing valuation through discounted cash flows presents a better lens for viewing cyclical companies, high-growth firms, businesses with finite lives (e.g., mines), or companies expected to generate negative earnings over the next few years. That said, we don't dismiss multiples altogether but rather use them as supporting cross-checks for our DCF-based fair value estimates. We also acknowledge that DCF models offer their own challenges (including a potential proliferation of estimated inputs and the possibility that the method may miss short-term market price movements), but we believe these negatives are mitigated by deep analysis and our long-term approach.

Morningstar's equity research group ("we," "our") believes that a company's intrinsic worth results from the future cash flows it can generate. The Morningstar Rating for stocks identifies stocks trading at a discount or premium to their intrinsic worth—or fair value estimate, in Morningstar terminology. Five-star stocks sell for the biggest risk-adjusted discount to their fair values, whereas 1-star stocks trade at premiums to their intrinsic worth.

Morningstar Research Methodology



Source: Morningstar.

Four key components drive the Morningstar rating: (1) our assessment of the firm's economic moat, (2) our estimate of the stock's fair value, (3) our uncertainty around that fair value estimate, and (4) the current market price. This process ultimately culminates in our single-point star rating.

Economic Moat
The concept of an economic moat plays a vital role not only in our qualitative assessment of a firm's long-term investment potential, but also in the actual calculation of our fair value estimates. An economic moat is a structural feature that allows a firm to sustain excess profits over a long period of time. We define economic profits as returns on invested capital (ROIC) over and above our estimate of a firm's cost of capital, or weighted average cost of capital (WACC). Without a moat, profits are more susceptible to competition. We have identified five sources of economic moats: intangible assets, switching costs, network effect, cost advantage, and efficient scale.

Companies with a narrow moat are those we believe are more likely than not to achieve normalized excess returns for at least the next 10 years. Wide-moat companies are those in which we have very high confidence that excess returns will remain for 10 years, with excess returns more likely than not to remain for at least 20 years. The longer a firm generates economic profits, the higher its intrinsic value. We believe low-quality, no-moat companies will see their normalized returns gravitate toward their cost of capital more quickly than companies with moats.

To assess the sustainability of excess profits, analysts perform ongoing assessments of the moat trend. A firm's moat trend is positive in cases where we think its sources of competitive advantage are growing stronger, stable where we don't anticipate changes to competitive advantages over the next several years, or negative where we see signs of deterioration.

Estimated Fair Value

Combining our analysts' financial forecasts with the firm's economic moat helps us assess how long returns on invested capital are likely to exceed the firm's cost of capital. Returns of firms with a wide economic moat rating are assumed to fade to the perpetuity period over a longer period of time than the returns of narrow-moat firms, and both will fade slower than no-moat firms, increasing our estimate of their intrinsic value.

Our model is divided into three distinct stages:

Stage I: Explicit Forecast

In this stage, which can last 5 to 10 years, analysts make full financial statement forecasts, including items such as revenue, profit margins, tax rates, changes in working capital accounts, and capital spending. Based on these projections, we calculate earnings before interest, after taxes (EBI) and net new investment (NNI) to derive our annual free cash flow forecast.

Stage II: Fade

The second stage of our model is the period it will take the company's return on new invested capital—the return on capital of the next dollar invested (RONIC)—to decline (or rise) to its cost of capital. During the Stage II period, we use a formula to approximate cash flows in lieu of explicitly modeling the income statement, balance sheet, and cash flow statement as we do in Stage I. The length of the second stage depends on the strength of the company's economic moat. We forecast this period to last anywhere from one year (for companies with no economic moat) to 10–15 years or more (for wide-moat companies). During this period, cash flows are forecast using four assumptions: an average growth rate for EBI over the period, a normalized investment rate, average return on new invested capital (RONIC), and the number of years until perpetuity, when excess returns cease. The investment rate and return on new invested capital decline until a perpetuity value is calculated. In the case of firms that do not earn their cost of capital, we assume marginal ROICs rise to the firm's cost of capital (usually attributable to less reinvestment), and we may truncate the second stage.

Stage III: Perpetuity

Once a company's marginal ROIC hits its cost of capital, we calculate a continuing value, using a standard perpetuity formula. At perpetuity, we assume that any growth or decline or investment in the business neither creates nor destroys value and that any new investment provides a return in line with estimated WACC.

Because a dollar earned today is worth more than a dollar earned tomorrow, we discount our projections of cash flows in stages I, II, and III to arrive at a total present value of expected future cash flows. Because we are modeling free cash flow to the firm—representing cash available to provide a return to all capital providers—we discount future cash flows using the WACC, which is a weighted average of the costs of equity, debt, and preferred stock (and any other funding sources), using expected future proportionate long-term, market value weights.

Uncertainty Around That Fair Value Estimate

Morningstar's uncertainty rating captures a range of likely potential intrinsic values for a company and uses it to assign the margin of safety required before investing, which in turn explicitly drives our stock star rating system. The uncertainty rating represents the analysts' ability to bound the estimated value of the shares in a company around the fair value estimate, based on the characteristics of the business underlying the stock, including operating and financial leverage, sales sensitivity to the overall economy, product concentration, pricing power, and other company-specific factors.

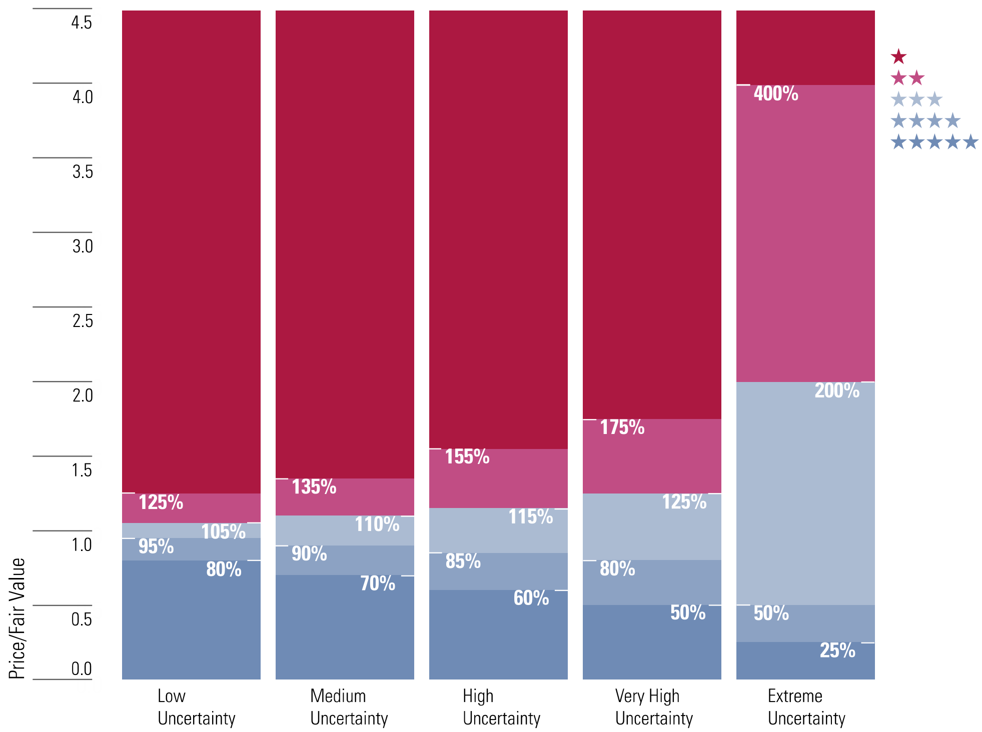
Analysts consider at least two scenarios in addition to their base case: a bull case and a bear case. Assumptions are chosen such that the analyst believes there is a 25% probability that the company will perform better than the bull case and a 25% probability that the company will perform worse than the bear case. The distance between the bull and bear cases is an important indicator of the uncertainty underlying the fair value estimate.

Our recommended margin of safety widens as our uncertainty regarding the estimated value of the equity increases. The more uncertain we are about the estimated value of the equity, the greater the discount we require relative to our estimate of the value of the firm before we would recommend the purchase of the shares. In addition, the uncertainty rating provides guidance in portfolio construction based on risk tolerance.

Our uncertainty ratings for our qualitative analysis are low, medium, high, very high, and extreme.

- Low: Margin of safety for 5-star rating is a 20% discount and for 1-star rating is a 25% premium.
- Medium: Margin of safety for 5-star rating is a 30% discount and for 1-star rating is a 35% premium.
- High: Margin of safety for 5-star rating is a 40% discount and for 1-star rating is a 55% premium.
- Very high: Margin of safety for 5-star rating is a 50% discount and for 1-star rating is a 75% premium.
- Extreme: Margin of safety for 5-star rating is a 75% discount and for 1-star rating is a 300% premium.

Morningstar Equity Research Star Rating Methodology



Market Price

The market prices used in this analysis and noted in the report come from the exchange on which the stock is listed, which we believe is a reliable source.

For more details about our methodology, please go to http://global.morningstar.com/equitydisclosures.

Morningstar Star Rating for Stocks

Once we determine the fair value estimate of a stock, we compare it with the stock's current market price on a daily basis, and the star rating is automatically recalculated at the market close on every day the market on which the stock is listed is open. Our analysts keep close tabs on the companies they follow and, based on thorough and ongoing analysis, raise or lower their fair value estimates as warranted.

Please note, there is no predefined distribution of stars. That is, the percentage of stocks that earn 5 stars can fluctuate daily, so the star ratings, in the aggregate, can serve as a gauge of the broader market's valuation. When there are many 5-star stocks, the stock market as a whole is more undervalued, in our opinion, than when very few companies garner our highest rating.

We expect that if our base-case assumptions are true, the market price will converge on our fair value estimate over time, generally within three years (although it is impossible to predict the exact time frame in which market prices may adjust).

Our star ratings are guideposts to a broad audience, and individuals must consider their own specific investment goals, risk tolerance, tax situation, time horizon, income needs, and complete investment portfolio, among other factors.

The Morningstar Star Ratings for stocks are defined below:

★★★★★ We believe appreciation beyond a fair risk-adjusted return is highly likely over a multiyear time frame. Scenario analysis developed by our analysts indicates that the current market price represents an excessively pessimistic outlook, limiting downside risk and maximizing upside potential.

★★★★ We believe appreciation beyond a fair risk-adjusted return is likely.

★★★ Indicates our belief that investors are likely to receive a fair risk-adjusted return (approximately cost of equity).

★★ We believe investors are likely to receive a less than fair risk-adjusted return.

★ Indicates a high probability of undesirable risk-adjusted returns from the current market price over a multiyear time frame, based on our analysis. Scenario analysis by our analysts indicates that the market is pricing in an excessively optimistic outlook, limiting upside potential and leaving the investor exposed to capital loss.

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