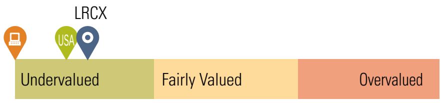
Lam Research Corp LRCX (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★★★ 31 May 2019 22:06, UTC	174.61 USD 31 May 2019	190.00 USD 25 Apr 2019 11:39, UTC	0.92	2.52 31 May 2019	2.52 31 May 2019	26.18 31 May 2019	Semiconductor Equipment & Materials	Standard

Morningstar Pillars	Analyst	Quantitative
Economic Moat	Narrow	Wide
Valuation	★★★	Undervalued
Uncertainty	High	Medium
Financial Health	—	Moderate

Source: Morningstar Equity Research

Quantitative Valuation



	Current	5-Yr Avg	Sector	Country
Price/Quant Fair Value	0.85	1.09	0.77	0.83
Price/Earnings	11.0	19.3	21.4	20.1
Forward P/E	11.6	—	15.9	13.9
Price/Cash Flow	9.6	14.9	15.6	13.1
Price/Free Cash Flow	10.7	18.0	23.0	19.5
Trailing Dividend Yield%	2.52	1.42	1.89	2.35

Source: Morningstar

Bulls Say

- Lam is a leader in the etch and deposition markets and counts major chipmakers, such as Samsung Electronics and Taiwan Semiconductor Manufacturing, as customers.
- Lam has achieved superior share gains in recent years due to its strong equipment offerings in etch and deposition, combined with the 3D NAND and multiple patterning inflections that require more of those particular tools.
- Demand is strong for advanced etch and deposition tools, because they help chipmakers continue down the path prescribed by Moore's law.

Bears Say

- Lam faces major competition from Applied Materials and Tokyo Electron, and would lose market share should it lose its technological edge to either firm.
- The firm operates in the cyclical semiconductor equipment industry.
- The recent wave of consolidation in wafer fabrication equipment customers could have a negative impact on companies such as Lam that sell a wide array of tools.

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Lam Research Records Solid 3Q Despite Weak Appetite by Memory Customers; Raising FVE to $190

Business Strategy and Outlook

Abhinav Davuluri, CFA, Sr. Eq. Analyst, 16 October 2018

Lam Research is a leading vendor of semiconductor fabrication tools. The firm is the market leader in etch, a critical step in the chipmaking process where material is selectively removed. Lam has expanded its product offerings inorganically in recent years. In 2008, the company acquired SEZ for $483 million in cash (net of cash acquired) to enter the clean equipment market. Then in 2012, Lam merged with Novellus in a $3.3 billion stock deal to gain a leading position in the deposition segment. In 2016, Lam's attempted merger with KLA-Tencor fell through as the combination would have resulted in an equipment powerhouse that customers likely viewed as having too much supplier power.

Chipmakers that have continued along the trajectory prescribed by Moore's law have endured significant challenges in terms of cost and complexity. Equipment providers are vital to making the pursuit more economical via advanced chip manufacturing tools. Lam has benefited from the sharp rise in etch, deposition, and clean steps required as a result of major inflections, including FinFET and 3D NAND flash storage, that feature multiple patterning and vertical layers well suited for Lam's advanced etch and deposition offerings. Consequently, Lam is poised to grow faster than the overall equipment industry, as we think it can capture a larger share of the market with technically superior tools.

The volatile nature of demand for semiconductors directly affects the cyclicality of the equipment market. Lam, along with its peers, has benefited from an increase in service revenue in recent years, which we believe will mitigate the reliance on the volatile nature of customer equipment orders. Specifically, maintenance and engineering costs and spare parts are tied into service contracts, that deliver a stable revenue stream distinct from tool purchases. As traversing Moore's law becomes increasingly difficult, we expect the service segment will grow as chipmakers increase their reliance on field service engineers from Lam and its peers, while also helping entrench vendors' installed base of tools at customer facilities.

Analyst Note

Abhinav Davuluri, CFA, Sr. Eq. Analyst, 25 April 2019

Lam Research reported fiscal third-quarter results slightly ahead of its guidance, while CEO Tim Archer reiterated his view that wafer fab equipment spending in 2019 will be in the low $40 billion range. We note this is consistent with our view on 2019 WFE, as considerable memory weakness is partially offset by logic and foundry spending at the leading-edge. Despite the near-term challenges, Lam has done well in controlling expenses, as well as opportunistically repurchasing shares when we believed they were undervalued. We are raising our fair value estimate to $190 per share for narrow-moat Lam, and we maintain our expectation for Lam to resume growth in 2020 thanks to its best-in-class etch and deposition offerings.

Third-quarter revenue was down 3% sequentially to $2.44 billion. Specifically, memory sales fell 25% from the prior quarter, as major customers such as Samsung and Micron have been decelerating output and building inventories to navigate the tepid demand environment. We note Micron remains confident in a second-half 2019 rebound, which would bode well for Lam and its peers, particularly entering 2020. That said, we're optimistic in the long-term prospects for Lam regardless if the recovery is delayed, as AI, 5G, and other nascent trends should support overall semiconductor demand longer term. Meanwhile, logic and foundry sales rose 80% sequentially, thanks to investments by the likes of TSMC and Intel, and accounted for 39% of revenue versus 21% last quarter. We were pleased to see the mix-shift in Lam's sales exposure during the quarter, supported by adoption of Lam's tools in multiple patterning applications in nonmemory instances. Gross margins were 44%, down 134 basis points sequentially because of lower volume. Management expects fiscal fourth-quarter sales to be at a midpoint of $2.35 billion, implying a 3.7% sequential decline.

Economic Moat

Abhinav Davuluri, Sr. Eq. Analyst, 25 April 2019

We believe Lam has a narrow economic moat, thanks to cost advantages and intangible assets. We view the scale and resources required to compete for the business of leading-edge manufacturers as major barriers to entry. We

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Close Competitors	Currency (Mil)	Market Cap	TTM Sales	Operating Margin	TTM/PE
Tokyo Electron Ltd 8035	JPY	2,427,245	0	25.39	9.47
Applied Materials Inc AMAT	USD	36,218	15,761	25.21	10.96

also believe that incumbent tool providers have intangible assets derived from service contracts and customer collaboration during process development and subsequent high-volume manufacturing. Taken together, these two sources of competitive advantage allow leading firms to earn excess returns on invested capital over extended periods of time.

Lam is the market leader in etch and a prominent player in the deposition segment of the semiconductor equipment industry. Deposition equipment applies thin-film layers to surfaces while etching selectively removes material. The combination of these two is critical during the chip fabrication process, along with photolithography, which produces the mask that exposes areas for materials to be deposited or removed. Lam provides customers some of the most advanced tools in these segments, and its leadership position creates scale advantages that fuel research and development spending at levels only Applied Materials and Tokyo Electron can match.

Chip manufacturer demand tends to rise and fall in unison, percolating down the value chain to Lam and its competitors, with the latter enduring an unforgiving competitive environment that requires agility and cost control. During recent technology cycles, management has shown a strong ability to better direct resources toward customer-facing issues, including product development and support. Lam has thus been better able to serve a consolidated customer base, even amid volatile swings in their capital spending, and consequently to defend its incumbent positions.

Fair Value & Profit Drivers

Abhinav Davuluri, Sr. Eq. Analyst, 25 April 2019

Our $190 fair value estimate assumes a forward price/earnings ratio of 13 times. Lam Research has enjoyed meaningful growth via share gains in etch and deposition over the past few years. Thanks to continued strength in 3D NAND spending and foundry/logic transitions to the 10/7-nanometer process node, we believe the firm has enough levers to drive future growth. Lam has capitalized on an expanded serviceable market attributed to recent technology inflections related to vertical scaling (3D NAND and fin field-effect transistors) that rely heavily on advanced etch and deposition tools. However, Lam has already benefited immensely from the initial planar to 3D NAND conversion and share gains in recent years, which we think will make it difficult for the company to repeat its recent string of double-digit revenue growth beyond fiscal 2018, leading to high-single-digit growth on average following a down fiscal 2019 (caused mainly by a deceleration in memory spending). Although we expect some competitive pressures from Applied Materials and Tokyo Electron, we believe Lam will maintain a gross margin in the mid-40% range, while operating margins will remain in the high-20s.

Risk & Uncertainty

Abhinav Davuluri, Sr. Eq. Analyst, 25 April 2019

In 2017, five chipmakers accounted for over 70% of equipment spending. This consolidation is a result of the enormous investments required to build today's state-of-the-art semiconductors. Additionally, the cyclical nature of the chip industry is a ubiquitous threat to equipment makers, as capital expenditures for customers can be highly volatile. Lam competes with the likes of Applied Materials and Tokyo Electron, both of which have invested heavily to improve their products in etch to lessen Lam's technological lead. Thus, the firm must maintain a large R&D budget throughout business cycles to keep up with the latest trends in chip manufacturing, which has the potential to be rather difficult during the troughs. Any lapse in technological innovation in the segments in which Lam competes could result in failure to defend key positions in customers' process flows. Meanwhile, the threat of EUV lithography being adopted in a high capacity could negatively affect Lam’s etch and deposition sales, that have benefited from multiple patterning techniques used by logic, foundry, and DRAM customers. Furthermore, the positive trends in 3D NAND could result in excess capacity, leading to a slowdown in Lam’s equipment sales to this end-market. After incorporating these risk factors, we assign a high uncertainty rating to Lam.

Stewardship

Abhinav Davuluri, Sr. Eq. Analyst, 18 December 2018

We rate Lam's stewardship of shareholder capital as Standard. In December 2018, Lam announced that CEO Martin Anstice has resigned as the company investigates allegations of misconduct. Tim Archer, previously the

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company's president and COO, was named president and CEO effective immediately. Archer was appointed president in January 2018 after serving as solely COO since June 2012, following Lam's acquisition of Novellus. We note Archer was designated to succeed Anstice, according to the board of directors' succession plan, though these allegations of misconduct accelerated the transition. Anstice had been CEO since January 2012, replacing Stephen Newberry, after joining Lam in 2001, and the firm was very successful in growing its presence in the wafer fabrication equipment space during his tenure. Newberry remains chairman.

Nevertheless, we applaud Archer's efforts as COO. He played a major role in leading Lam's services business, where service sales are typically 3 times the cost of a piece of equipment over its lifetime and offer a solid annuitylike revenue stream for the firm.

Anstice had joined Lam in 2001 and served as CFO and COO during his tenure. CFO Doug Bettinger joined Lam in February 2013, taking over from Ernest Maddock. Bettinger was previously the CFO of Avago Technologies.

Management has made a couple of significant acquisitions in recent years. In 2008, Lam made a cash purchase of SEZ for $483 million, net of cash acquired, in order to diversify from etch tools into the adjacent clean equipment market. We think the acquisition has worked out well, as management has streamlined SEZ's operations and Lam has achieved significant technology synergies with SEZ. More recently, Lam acquired Novellus, a top supplier of deposition tools, in a $3.3 billion all-stock deal in June. We think the deal was strategically sound, and management has thus far successfully executed its plans for incorporating Novellus, specifically its electrochemical deposition products. Lam recently raised its quarterly dividend to $1.10 in addition to its ongoing share repurchases.

In October 2015, Lam announced that it intended to acquire KLA-Tencor in a $10.6 billion cash/stock deal. However, the deal fell through roughly a year later because of regulatory concerns. While our overall view of the deal was positive, the supplier power commanded by the joint entity likely would have spurned customers. We expect Lam to focus on organic growth going forward, with the exception for opportunistic tuck-in M&A.

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Analyst Notes Archive

Lam Research CEO Resigns Amid Misconduct Allegations; COO Tim Archer Well-Suited to Take the Reins

Abhinav Davuluri, Sr. Eq. Analyst, 05 December 2018

On Dec. 5, Lam Research announced CEO Martin Anstice resigned as the company investigates allegations of misconduct. The firm's press release stressed the alleged conduct did not involve financial misconduct. Tim Archer, previously the company's president and COO, was named president and CEO effective immediately. Our initial reaction is that the firm remains under worthy leadership, as Archer was appointed president in January 2018 after serving as solely COO since June 2012, following Lam's acquisition of Novellus. We note Archer was designated to succeed Anstice per the Board of Directors' existing succession plan, though these allegations of misconduct accelerated the transition. Anstice had been CEO since January 2012 after joining Lam in 2001, and the firm was very successful in growing its presence in the wafer fabrication equipment space during his tenure. Nevertheless, we applaud Archer's efforts as COO. He played a major role in leading Lam's services business, where service sales typically are 3 times the cost of a piece of equipment over its lifetime and offer a solid annuity-like revenue stream for the firm. The equipment provider also reaffirmed its December 2018 quarter guidance in its press release. We are maintaining our $185 fair value estimate for narrow-moat Lam and see an appropriate margin of safety at current levels.

Memory Headwinds Don't Hamper Our Positive Outlook for Lam Research Beyond 2019

Abhinav Davuluri, Sr. Eq. Analyst, 23 January 2019

Lam Research reported fiscal second-quarter results consistent with our expectations, while new CEO Tim Archer projects wafer fab equipment spending in 2019 will be down in the mid- to high-teens. We note this is consistent with our view on WFE in 2019, with memory down significantly and logic/foundry serving as a partial offset. We are maintaining our fair value estimate of $185 per share for narrow-moat Lam. Despite the near-term headwinds related to weaker NAND and DRAM investments, we believe Lam is well positioned to resume healthy growth in 2020 and beyond as its etch and deposition offerings are critical to enabling future process technologies.

Second-quarter revenue was up 8% sequentially to $2.52 billion. Specifically, memory sales were slightly below $2 billion in support of higher layers of 3D NAND (96-layers). Meanwhile, logic and foundry revenue was about $530 million for the quarter, and we foresee Lam's revenue from these segments trending up over 2019 as major chipmakers such as TSMC and Intel ramp their latest process nodes. In fact, Archer noted Lam extended its high aspect ratio etch leadership with critical wins for metal interconnect and spacer applications at a leading logic customer (which we assume is Intel in its 10-nanometer process). While Lam has historically been leveraged to the memory markets (79% of revenue for the quarter), we expect logic and foundry exposure to increase over time as chipmakers utilize more etch tools from Lam for multiple patterning purposes. Gross margins were 45.4%, flat sequentially as greater volume was offset by a less favorable product mix. Management expects fiscal third-quarter sales to be at a midpoint of $2.4 billion, implying a 5% sequential decline.

Lam Research Records Solid 3Q Despite Weak Appetite by Memory Customers; Raising FVE to $190

Abhinav Davuluri, Sr. Eq. Analyst, 25 April 2019

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Quantitative Equity Report | Release: 01 Jun 2019, 00:44 UTC | Reporting Currency: USD | Trading Currency: USD | Exchange:XNAS

Lam Research Corp LRCX ★★★★Q

01 Jun 2019 02:00 UTC

Last Close	Fair Value^Q	Market Cap	Sector	Industry	Country of Domicile
31 May 2019	01 Jun 2019 02:00 UTC	31 May 2019			
174.61	204.90	26,178.7 Mil	Technology	Semiconductor Equipment & Materials	USA United States

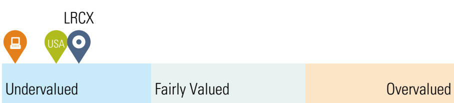
There is no one analyst in which a Quantitative Fair Value Estimate and Quantitative Star Rating are attributed to; however, Mr. Lee Davidson, Head of Quantitative Research for Morningstar, Inc., is responsible for overseeing the methodology that supports the quantitative fair value. As an employee of Morningstar, Inc., Mr. Davidson is guided by Morningstar, Inc.'s Code of Ethics and Personal Securities Trading Policy in carrying out his responsibilities. For information regarding Conflicts of Interests, visit http://global.morningstar.com/equitydisclosures

Company Profile

Lam Research manufactures equipment used to fabricate semiconductors. The firm is focused on the etch, deposition, and clean markets, which are key steps in the semiconductor manufacturing process, especially for 3D NAND flash storage, advanced DRAM, and leading-edge logic/foundry chipmakers. Lam's flagship Kiyo, Vector, and Sabre products are sold in all major geographies to key customers such as Samsung Electronics and Taiwan Semiconductor Manufacturing.

Quantitative Scores

		Scores All	Rel Sector	Rel Country
Quantitative Moat	Wide	100	100	98
Valuation	Undervalued	49	43	43
Quantitative Uncertainty	Medium	99	100	97
Financial Health	Moderate	86	71	86



Source: Morningstar Equity Research

Valuation

	Current	5-Yr Avg	Sector Median	Country Median
Price/Quant Fair Value	0.85	1.09	0.77	0.83
Price/Earnings	11.0	19.3	21.4	20.1
Forward P/E	11.6	—	15.9	13.9
Price/Cash Flow	9.6	14.9	15.6	13.1
Price/Free Cash Flow	10.7	18.0	23.0	19.5
Trailing Dividend Yield %	2.52	1.42	1.89	2.35
Price/Book	4.9	2.9	2.3	2.4
Price/Sales	2.8	2.9	1.7	2.4

Profitability

	Current	5-Yr Avg	Sector Median	Country Median
Return on Equity %	43.7	20.4	12.5	12.9
Return on Assets %	20.1	11.5	6.4	5.2
Revenue/Employee (K)	955.8	816.6	442.6	325.9

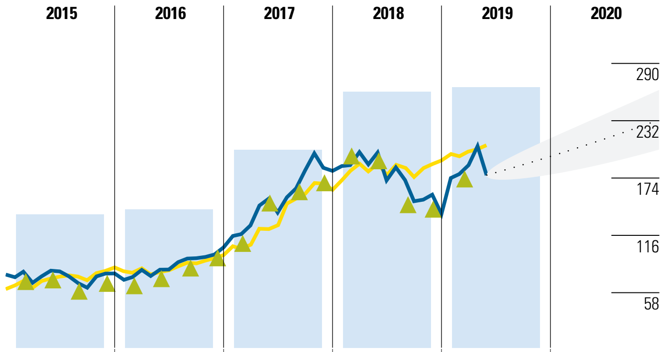
Financial Health

	Current	5-Yr Avg	Sector Median	Country Median
Distance to Default	0.7	0.8	0.6	0.5
Solvency Score	245.3	—	449.9	552.4
Assets/Equity	1.9	1.8	1.6	1.7
Long-Term Debt/Equity	0.3	0.3	0.1	0.4

Growth Per Share

	1-Year	3-Year	5-Year	10-Year
Revenue %	38.2	28.2	25.2	16.2
Operating Income %	68.9	54.7	93.6	20.0
Earnings %	42.5	52.7	82.0	14.3
Dividends %	54.6	44.8	—	—
Book Value %	-2.9	7.6	7.9	11.4
Stock Total Return %	-9.7	30.1	24.3	21.5

Price vs. Quantitative Fair Value

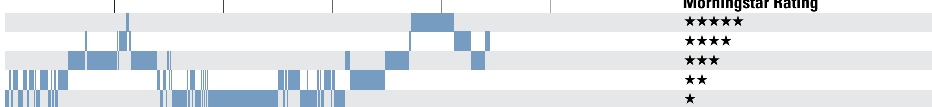


Momentum:	Neutral
Standard Deviation:	32.15
Liquidity:	High

122.64	52-Wk	209.50
61.20	5-Yr	234.88

2015	2016	2017	2018	2019	2020	
1.5	34.8	75.8	-24.0	29.0		Total Return %
0.8	22.4	54.4	-18.9	17.9		+/– Market (Morningstar US Index)
1.36	1.28	1.01	2.79	2.52		Trailing Dividend Yield %
1.51	1.70	1.09	3.23	2.52		Forward Dividend Yield %
17.4	21.0	16.8	10.3	11.0		Price/Earnings
2.5	3.2	3.8	2.2	2.8		Price/Revenue

Morningstar Rating^Q

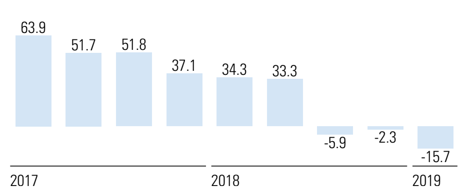


2014	2015	2016	2017	2018	TTM	Financials (Fiscal Year in Mil)
4,607	5,259	5,886	8,014	11,077	10,418	Revenue
28.0	14.2	11.9	36.1	38.2	-5.9	% Change
678	867	1,074	1,902	3,213	2,803	Operating Income
465.3	28.0	23.8	77.1	68.9	-12.8	% Change
632	656	914	1,698	2,381	2,671	Net Income
717	786	1,350	2,029	2,656	3,014	Operating Cash Flow
-146	-198	-175	-157	-273	-317	Capital Spending
572	587	1,175	1,872	2,382	2,697	Free Cash Flow
12.4	11.2	20.0	23.4	21.5	25.9	% Sales
3.62	3.70	5.22	9.24	13.17	15.92	EPS
448.5	2.2	41.1	77.0	42.5	20.9	% Change
2.92	3.14	5.90	8.53	13.28	16.33	Free Cash Flow/Share
0.18	0.84	1.20	1.65	2.55	4.40	Dividends/Share
30.75	33.29	36.65	42.80	43.88	35.62	Book Value/Share
159,294	158,568	162,357	159,451	153,961	149,927	Shares Outstanding (K)
						Profitability
12.8	12.4	16.0	25.9	35.1	43.7	Return on Equity %
8.3	7.6	8.5	13.9	19.4	20.1	Return on Assets %
13.7	12.5	15.5	21.2	21.5	25.6	Net Margin %
0.60	0.61	0.54	0.66	0.90	0.78	Asset Turnover
1.5	1.8	2.0	1.7	1.9	2.4	Financial Leverage
43.6	43.4	44.5	45.0	46.6	45.7	Gross Margin %
14.7	16.5	18.3	23.7	29.0	26.9	Operating Margin %
817	1,001	3,384	1,785	1,807	3,802	Long-Term Debt
5,213	5,345	6,102	6,987	6,580	5,341	Total Equity
8.0	9.0	9.3	12.1	13.9	11.2	Fixed Asset Turns

Quarterly Revenue & EPS

Revenue (Mil)	Sep	Dec	Mar	Jun	Total
2019	2,330.7	2,522.7	2,439.0	—	—
2018	2,478.1	2,580.8	2,892.1	3,125.9	11,077.0
2017	1,632.4	1,882.3	2,154.0	2,344.9	8,013.6
2016	1,600.0	1,425.5	1,314.1	1,546.3	5,885.9
Earnings Per Share ()					
2019	3.23	3.51	3.47	—	—
2018	3.21	-0.06	4.33	5.82	13.17
2017	1.47	1.81	3.10	2.82	9.24
2016	1.66	1.28	0.82	1.46	5.22

Revenue Growth Year On Year %



Research Methodology for Valuing Companies

Qualitative Equity Research 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. We believe this bottom-up, long-term, fundamentally based approach allows our analysts to focus on long-term business drivers, which have the greatest valuation impact, rather than short-term market noise.

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 an uncertainty-adjusted 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.

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.

1. 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 excess economic profits as returns on invested capital (or ROIC) over and above our estimate of a firm's cost of capital, or weighted average cost of capital (or 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.

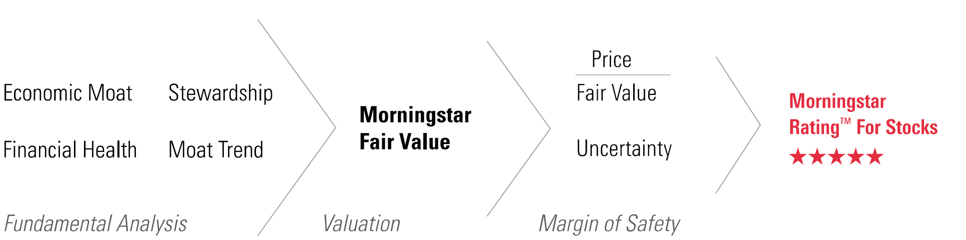
Companies with a narrow moat are those we believe are more likely than not to achieve normalized excess returns for at least the next 10 years. Wide-moat companies are those in which we have very high confidence that excess returns will remain for 10 years, with excess returns more likely than not to 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 the firm's cost of capital more quickly than companies with moats.

To assess the direction of the underlying competitive advantages, 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 when we see signs of deterioration.

All the moat and moat trend ratings undergo periodic review and any changes must be approved by the Morningstar Economic Moat Committee, comprised of senior members of Morningstar's equity research department.

2. 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.

Morningstar Research Methodology for Valuing Companies



Our model is divided into three distinct stages:

Stage I: Explicit Forecast
In this stage, which can last five 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, or EBI, and the net new investment, or 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, or RONIC, and the number of years until perpetuity, when excess returns cease. The investment rate and return on new invested capital decline until the perpetuity stage is reached. 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.

Research Methodology for Valuing Companies

3. 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 of 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.

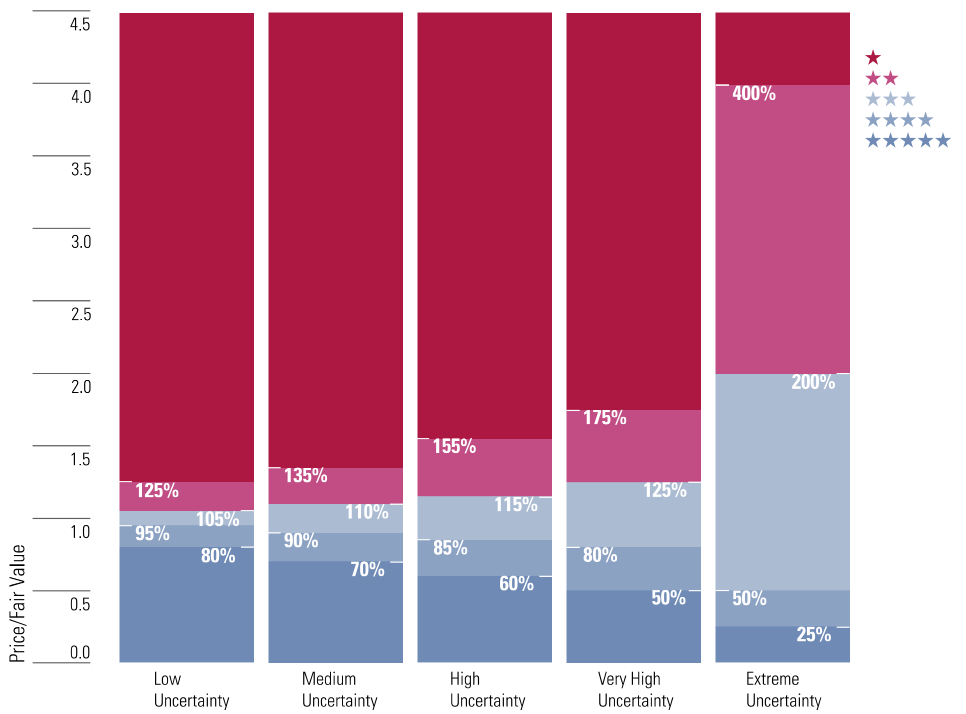
- Low–margin of safety for 5-star rating is a 20% discount and for 1-star rating is 25% premium.
- Medium–margin of safety for 5-star rating is a 30% discount and for 1-star rating is 35% premium.
- High–margin of safety for 5-star rating is a 40% discount and for 1-star rating is 55% premium.
- Very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

4. Market Price

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

For more details about our methodology, please go to https://shareholders.morningstar.com.

Morningstar Equity Research Star Rating Methodology



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 re-calculated at the market close on every day the market on which the stock is listed is open.

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. 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. The market is pricing in an excessively optimistic outlook, limiting upside potential and leaving the investor exposed to Capital loss.

Research Methodology for Valuing Companies

Other Definitions

Last Price: Price of the stock as of the close of the market of the last trading day before date of the report.

Stewardship Rating: Represents our assessment of management's stewardship of shareholder capital, with particular emphasis on capital allocation decisions. Analysts consider companies' investment strategy and valuation, financial leverage, dividend and share buyback policies, execution, compensation, related party transactions, and accounting practices. Corporate governance practices are only considered if they've had a demonstrated impact on shareholder value. Analysts assign one of three ratings: "Exemplary," "Standard," and "Poor." Analysts judge stewardship from an equity holder's perspective. Ratings are determined on an absolute basis. Most companies will receive a Standard rating, and this is the default rating in the absence of evidence that managers have made exceptionally strong or poor capital allocation decisions.

Quantitative Valuation: Using the below terms, intended to denote the relationship between the security's Last Price and Morningstar's quantitative fair value estimate for that security.

- Undervalued: Last Price is below Morningstar's quantitative fair value estimate.
- Fairly Valued: Last Price is in line with Morningstar's quantitative fair value estimate.
- Overvalued: Last Price is above Morningstar's quantitative fair value estimate.

Risk Warning

Please note that investments in securities are subject to market and other risks and there is no assurance or guarantee that the intended investment objectives will be achieved. Past performance of a security may or may not be sustained in future and is no indication of future performance. A security investment return and an investor's principal value will fluctuate so that, when redeemed, an investor's shares may be worth more or less than their original cost. A security's current investment performance may be lower or higher than the investment performance noted within the report. Morningstar's Uncertainty Rating serves as a useful data point with respect to sensitivity analysis of the assumptions used in our determining a fair value price.

Quantitative Equity Reports Overview

The quantitative report on equities consists of data, statistics and quantitative equity ratings on equity securities. Morningstar, Inc.'s quantitative equity ratings are forward looking and are generated by a statistical model that is based on Morningstar Inc.'s analyst-driven equity ratings and quantitative statistics. Given the nature of the quantitative report and the quantitative ratings, there is no one analyst in which a given report is attributed to; however, Mr. Lee Davidson, Head of Quantitative Research for Morningstar, Inc., is responsible for overseeing the methodology that supports the quantitative equity ratings used in this report. As an employee of Morningstar, Inc., Mr. Davidson is guided by Morningstar, Inc.'s Code of Ethics and Personal Securities Trading Policy in carrying out his responsibilities.

Quantitative Equity Ratings

Morningstar's quantitative equity ratings consist of:
(i) Quantitative Fair Value Estimate
(ii) Quantitative Star Rating
(iii) Quantitative Uncertainty
(iv) Quantitative Economic Moat
(v) Quantitative Financial Health
(collectively the "Quantitative Ratings").

The Quantitative Ratings are calculated daily and derived from the analyst-driven ratings of a company's peers as determined by statistical algorithms. Morningstar, Inc. (""Morningstar," "we," "our") calculates Quantitative Ratings for companies whether it already provides analyst ratings and qualitative coverage. In some cases, the Quantitative Ratings may differ from the analyst ratings because a company's analyst-driven ratings can significantly differ from other companies in its peer group.

Quantitative Fair Value Estimate: Intended to represent Morningstar's estimate of the per share dollar amount that a company's equity is worth today. Morningstar calculates the quantitative fair value estimate using a statistical model derived from the fair value estimate Morningstar's equity analysts assign to companies. Please go to https://shareholders.morningstar.com for information about fair value estimates Morningstar's equity analysts assign to companies.

Quantitative Economic Moat: Intended to describe the strength of a firm's competitive position. It is calculated using an algorithm designed to predict the Economic Moat rating a Morningstar analyst would assign to the stock. The rating is expressed as Narrow, Wide, or None.

- Narrow: assigned when the probability of a stock receiving a "Wide Moat" rating by an analyst is greater than 70% but less than 99%.
- Wide: assigned when the probability of a stock receiving a "Wide Moat" rating by an analyst is greater than 99%.
- None: assigned when the probability of an analyst receiving a "Wide Moat" rating by an analyst is less than 70%.

Quantitative Star Rating: Intended to be the summary rating based on the combination of our Quantitative Fair Value Estimate, current market price, and the Quantitative Uncertainty Rating. The rating is expressed as 1-Star, 2-Star, 3-Star, 4-Star, and 5-Star.

★: the stock is overvalued with a reasonable margin of safety.
Log (Quant FVE/Price)<–1*Quantitative Uncertainty

★★: the stock is somewhat overvalued.
Log (Quant FVE/Price) between (–1*Quantitative Uncertainty, –0.5*Quantitative Uncertainty)

★★★: the stock is approximately fairly valued.
Log (Quant FVE/Price) between (–0.5*Quantitative Uncertainty, 0.5*Quantitative Uncertainty)

★★★★: the stock is somewhat undervalued.
Log (Quant FVE/Price) between (0.5*Quantitative Uncertainty, 1*Quantitative Uncertainty)

★★★★★: the stock is undervalued with a reasonable margin of safety. Log (Quant FVE/Price) >1*Quantitative Uncertainty

Quantitative Uncertainty: Intended to represent Morningstar's level of uncertainty about the accuracy of the quantitative fair value estimate. Generally, the lower the quantitative Uncertainty, the narrower the potential range of outcomes for that particular company. The rating is expressed as Low, Medium, High, Very High, and Extreme.

- Low: the interquartile range for possible fair values is less than 10%.
- Medium: the interquartile range for possible fair values is less than 15% but greater than 10%.
- High: the interquartile range for possible fair values is less than 35% but greater than 15%.
- Very High: the interquartile range for possible fair values is less than 80% but greater than 35%.
- Extreme: the interquartile range for possible fair values is greater than 80%.

Quantitative Financial Health: Intended to reflect the probability that a firm will face financial distress in the near future. The calculation uses a predictive model designed to anticipate when a company may default on its financial obligations. The rating is expressed as Weak, Moderate, and Strong.

- Weak: assigned when Quantitative Financial Health <0.2
- Moderate: assigned when Quantitative Financial Health is between 0.2 and 0.7
- Strong: assigned when Quantitative Financial Health >0.7

Research Methodology for Valuing Companies

Other Definitions

Last Close: Price of the stock as of the close of the market of the last trading day before date of the report.

Quantitative Valuation: Using the below terms, intended to denote the relationship between the security's Last Price and Morningstar's quantitative fair value estimate for that security.

- Undervalued: Last Price is below Morningstar's quantitative fair value estimate.
- Fairly Valued: Last Price is in line with Morningstar's quantitative fair value estimate.
- Overvalued: Last Price is above Morningstar's quantitative fair value estimate.

This Report has not been made available to the issuer of the security prior to publication.

Risk Warning

Please note that investments in securities are subject to market and other risks and there is no assurance or guarantee that the intended investment objectives will be achieved. Past performance of a security may or may not be sustained in future and is no indication of future performance. A security investment return and an investor's principal value will fluctuate so that, when redeemed, an investor's shares may be worth more or less than their original cost. A security's current investment performance may be lower or higher than the investment performance noted within the report.

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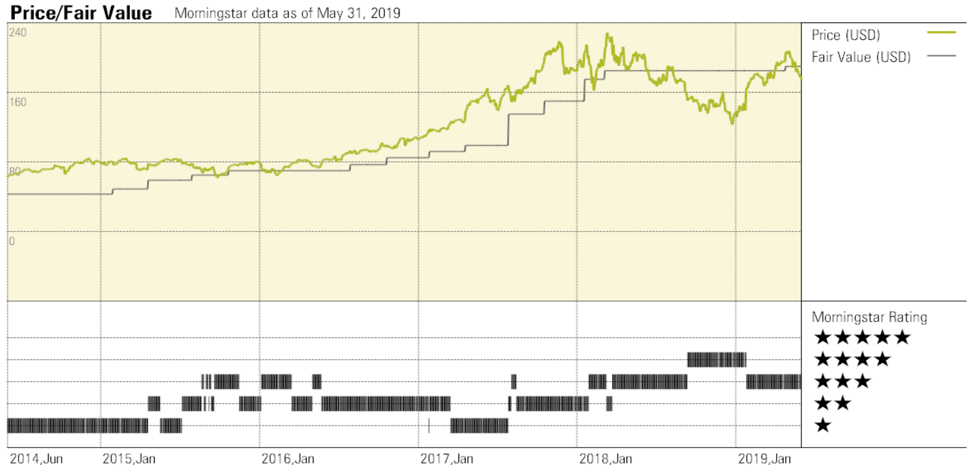
A change in the fundamental factors underlying the quantitative equity ratings can mean that the valuation is subsequently no longer accurate.

For more information about Morningstar's quantitative methodology, please visit http://global.morningstar.com/equitydisclosures.

Lam Research Corp LRCX (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★★★ 31 May 2019 22:06, UTC	174.61 USD 31 May 2019	190.00 USD 25 Apr 2019 11:39, UTC	0.92	2.52 31 May 2019	2.52 31 May 2019	26.18 31 May 2019	Semiconductor Equipment & Materials	Standard



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Lam Research Corp LRCX (XNAS)

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