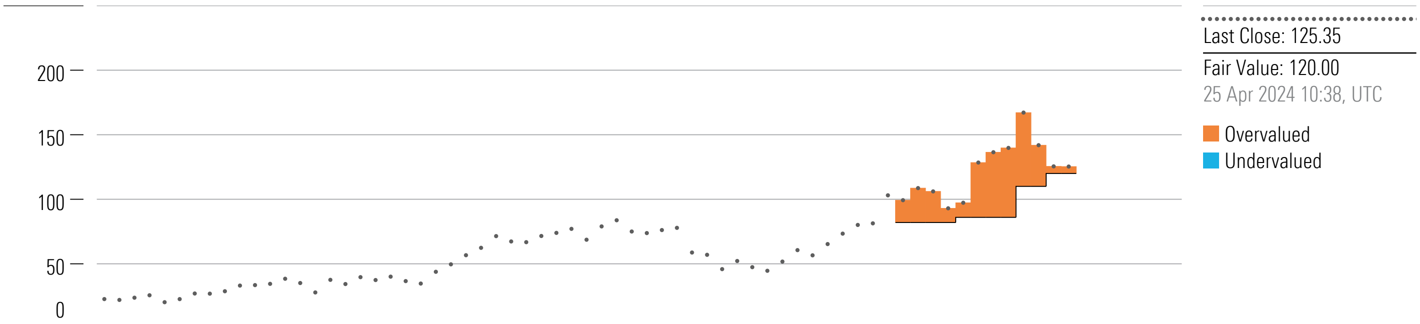
Morningstar Equity Analyst Report | Report as of 4 May 2024 04:17, UTC | Reporting Currency: EUR | Trading Currency: EUR | Exchange: EURONEXT - EURONEXT AMSTERDAM

BE Semiconductor Industries NV BESI ★★★ 4 May 2024 00:26, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
125.35 EUR 3 May 2024	120.00 EUR 25 Apr 2024 10:38, UTC	1.04	9.24 EUR Bil 2 May 2024	Narrow	Mid Growth	High	Exemplary	1 May 2024 05:00, UTC

Price vs. Fair Value



	2019	2020	2021	2022	2023	YTD	
	—	—	—	—	1.59	1.04	Price/Fair Value
	95.53	46.81	54.74	-20.17	146.29	-6.56	Total Return %

Morningstar Rating

Total Return % as of 3 May 2024. Last Close as of 3 May 2024. Fair Value as of 25 Apr 2024 10:38, UTC.

Contents

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The primary analyst covering this company does not own its stock.

[1]The ESG Risk Rating Assessment is a representation of Sustainalytics' ESG Risk Rating.

Besi Earnings: Growth Expected to Ramp Up in H2 2024; Raising Fair Value Estimate to EUR 120

Analyst Note Javier Correonero, Equity Analyst, 25 Apr 2024

Narrow-moat BE Semiconductor Industries' first-quarter revenue was within expectations at EUR 146 million, an 8.3% sequential decline. Gross margins beat management estimates for the seventh consecutive quarter, at 67.2% compared with management's guidance of 64%-66%. The outlook for the second quarter is what likely disappointed investors and sent shares down 3% in early April 25 trading. Orders came in at EUR 127 million (EUR 166 million last quarter) and management said it expects flat sequential revenue in the second quarter with an expected acceleration in second-half 2024, a statement we have heard from many semiconductor companies. Even if we see further delays into 2025, these will just be delays in growth, in our view, as long-term demand for Besi's mainstream and hybrid bonding assembly systems is solid. We raise our fair value estimate to EUR 120 per share to adjust for the time value of money, with shares remaining 17% overvalued. If shares get closer to our fair value estimate, we believe Besi will be a good long-term investment with its industry-leading gross margins, high market share, and exceptional capital allocation skills. Our fair value estimate represents a forward price/earnings of 42 for 2024 and 29 times for 2025.

By the end market, smartphones and automotive continued to be the weak spots with low utilization rates although they keep improving. On the other hand, demand for 2.5D and 3D artificial intelligence-related applications remains strong. Besi has also noted a pause in advanced packaging orders after a strong second-half 2023, although it expects these orders to ramp up during the year. This includes

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Sector	Industry
Technology	Semiconductor Equipment & Materials

Business Description

BE Semiconductor Industries provides equipment for the semiconductor assembly and packaging market (known as the back-end). Besi is one of the market leaders with a focused portfolio and flexible business operations, which allow it to maintain leading gross and operating margins. Besi's main clients are the world's largest foundries (TSMC, Samsung, and Intel) as well as integrated device manufacturers.

expectations for 25-35 hybrid bonding systems from multiple customers in second-quarter 2024, compared with an installed base of 40 as of end-2023. We expect Besi's hybrid bonding revenue to almost triple this year and to represent less than 20% of revenue. Over the long term, hybrid bonding revenue will be Besi's main growth engine.

Business Strategy & Outlook Javier Correonero, Equity Analyst, 22 Feb 2024

BE Semiconductor Industries understands well how to operate in a cyclical industry like semiconductors. Supply/demand balances can change rapidly in the chip industry, so equipment suppliers need flexibility to adapt. Besi runs a very flexible business model by (1) multisourcing from different suppliers to rapidly adapt capacity to demand changes, (2)

having 15%-20% of its staff working flexible/temporary hours, and (3) having 70% of its workforce in Asia, mainly in assembly and production, where it can save personnel and logistics costs, as more than 60% of revenue comes from China, Taiwan (Taiwan Semiconductor Manufacturing Co.), South Korea (Samsung), and Malaysia. This strategy allows Besi to maintain leading gross margins of more than 60% even in downcycle periods, compared with its peers ASMPT and Kulicke & Soffa, which are at 40%-50%.

Over the years, Besi has focused on products with higher-margin potential. For example, Besi has purposely stayed away from manufacturing wire-bonding machines. Although 75% of worldwide chips are still assembled with wire-bonding techniques, this process and the back-end machines that are used for this are more commoditized, which means there is less margin potential. Once a machine becomes too old and service margins are not accretive Besi stops servicing them.

Besi's research and development efforts are also on point. Management has been quick to identify future trends in the semiconductor back-end segment and is several years ahead of its closest competitor, ASMPT. Besi is the market leader in hybrid bonding machines, which will be needed to assemble complex chips during the next 10-15 years, with foundries still needing to build installed equipment bases. Hybrid bonding machines are more critical than machines used previously, will have higher average selling prices (several times more expensive than machines from the previous generation), and will require more expertise to service, which will result in higher service attachment rates and hence higher margins.

Bulls Say Javier Correonero, Equity Analyst, 25 Apr 2024

- It is almost certain that hybrid bonding machines will be needed over the next decade. Their average selling price is several times that of previous generations, and they will also generate higher service revenue due to higher complexity.
- Besi has exceptional capital allocation. It has invested in the right product areas, with appropriate shareholder distributions, and a clean balance sheet. Besi knows how to operate in a cyclical industry,

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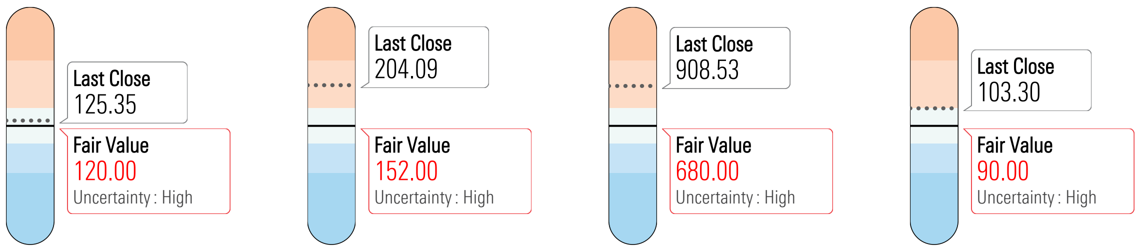
Competitors

	BE Semiconductor Industries NV BESI	Applied Materials Inc AMAT	Lam Research Corp LRCX	ASMPT Ltd 00522



	BE Semiconductor Industries NV BESI	Applied Materials Inc AMAT	Lam Research Corp LRCX	ASMPT Ltd 00522
Economic Moat	Narrow	Wide	Wide	Narrow
Currency	EUR	USD	USD	HKD
Fair Value	120.00 25 Apr 2024 10:38, UTC	152.00 26 Oct 2023 03:54, UTC	680.00 25 Apr 2024 08:54, UTC	90.00 26 Jul 2023 07:17, UTC
1-Star Price	186.00	235.60	1,054.00	139.50
5-Star Price	72.00	91.20	408.00	54.00
Assessment	— —	Overvalued 3 May 2024	Overvalued 3 May 2024	Fairly Valued 3 May 2024
Morningstar Rating	★★★4 May 2024 00:26, UTC	★★3 May 2024 21:22, UTC	★★3 May 2024 21:22, UTC	★★★3 May 2024 16:34, UTC
Analyst	Javier Correonero, Equity Analyst	William Kerwin, Equity Analyst	William Kerwin, Equity Analyst	Dan Baker, Senior Equity Analyst
Capital Allocation	Exemplary	Exemplary	Exemplary	Exemplary
Price/Fair Value	1.04	1.34	1.34	1.15
Price/Sales	16.76	6.49	8.47	3.08
Price/Book	19.23	9.73	14.81	2.73
Price/Earning	53.99	24.01	33.37	74.32
Dividend Yield	1.79%	0.63%	0.85%	2.43%
Market Cap	9.24 Bil	164.44 Bil	115.53 Bil	42.82 Bil
52-Week Range	82.40 — 182.90	111.72 — 214.91	507.19 — 1,007.39	57.65 — 113.40
Investment Style	Mid Growth	Large Core	Large Core	Large Growth

with a strong supply chain and flexible operations.

- Besi could be an acquisition target for a larger front-end manufacturer.

Bears Say Javier Correonero, Equity Analyst, 25 Apr 2024

- Besi operates in a highly cyclical industry, which can cause big swings in revenue, profit, and the share price.
- Besi has high concentration of revenue. The loss of one customer could have a long-term adverse impact on the company's financials.
- Less advanced back-end equipment can be more easily replaced or serviced by third parties.

Economic Moat Javier Correonero, Equity Analyst, 22 Feb 2024

We assign Besi a narrow moat rating supported by intangible assets and switching costs. Although the assembly and packaging of semiconductors (back-end where Besi operates) is normally seen as a less critical process than the manufacturing or front-end (this represents 85% of the chip costs while the back-end represents 15%), we believe Besi has carved out a solid competitive position in this niche thanks to its accumulated know-how and expertise.

Besi sells and services assembly and packaging equipment to semiconductor foundries. Once a chip has been manufactured it needs to be placed mechanically onto a substrate and connected with the remainder electronic components of a system to perform its function. This is known as the "die attach" process, which is Besi's main business line and represents 80% of its revenue. Even though the back-end production of semiconductors requires lower precision than the front-end (micrometer ranges versus nanometer ranges, respectively), a failure to properly establish the required electrical connections or a defective mechanical attachment could compromise the chip's reliability and render it unusable, therefore increasing manufacturing costs. Foundries have very high fixed costs, so they need to maximize yield and utilization. For these reasons we believe they prefer to remain risk-averse when making purchases, only wanting the best equipment providers.

Although replacing assembly equipment in a fab is normally easier than replacing manufacturing equipment (front-end), the chip industry keeps evolving with new technologies constantly being developed. As technology advances, the front-end and back-end of chip manufacturing are getting closer, with more collaboration between equipment suppliers, machines becoming more complex, and higher operational requirements (the air in a chip plant is several thousand times cleaner than the air we breathe). Chipmakers like TSMC, Samsung, and others operate numerous fabs around the world, so maximizing throughput and reducing process variability across their fleets of tools are top priorities. We believe Besi benefits from relationships with foundries as it is constantly getting new insights and creating a positive feedback loop, which it can use to improve its machines. For example, once Besi develops an upgrade for a higher-end machine it gradually introduces this into its older product platforms to keep its entire product portfolio relevant.

Besi is the market-leading supplier of hybrid bonding machines, the most advanced semiconductor packaging machines, and is the main supplier to TSMC, the world's largest semiconductor/chip foundry. Moore's Law claims the number of transistors on the same area of silicon will roughly double every two years. However, the pursuit of Moore's Law has become increasingly challenging (technologically and economically), requiring the industry to find alternatives such as hybrid bonding to achieve desired chip efficiencies in applications such as smartphones, memory, and artificial intelligence. Hybrid bonding allows chips from different technologies and nodes to be closely interconnected, thereby improving power performance and lowering the size and cost of the most advanced chips.

Hybrid bonding will be the main assembly technique for high-end chips in the next decade, with foundries like TSMC or Samsung still needing to build their installed base. We believe the trend toward more complex packaging machines will be healthy for Besi's returns going forward. The average selling price of a hybrid bonding machine is several times that of a flip-chip or thermo compression bonding machine (more mature technologies). They are also more complex, meaning the learning curve for

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foundry engineers is higher and creating switching costs. The trend toward more complex machines will also result in higher service attachment rates in our view, which is a high-margin activity for Besi. Lastly, we estimate the average useful life of semiconductor equipment is around 10 to 15 years, which also gives us certainty on Besi's ability to generate excess returns during the next decade.

In 2020, Applied Materials (front-end) and Besi (back-end) signed a long-term collaboration agreement, which we believe is another indication of Besi's competitive advantage. Instead of trying to build back-end capabilities organically, Applied Materials prefers to collaborate with Besi so they can sell equipment together. The aim of the agreement is to collaborate on technological developments to adapt better to customer needs while also having a common go-to-market strategy

Fair Value and Profit Drivers Javier Correonero, Equity Analyst, 25 Apr 2024

We are raising our fair value estimate to EUR 120 per share from EUR 110 to adjust for the time value of money.

We expect strong sales growth in the next two years, reaching more than EUR 1 billion in 2025 compared with EUR 580 million in 2023. We also assume higher unit pricing of hybrid bonding systems in the long term as Besi introduces new generations of machines with higher accuracy. We are pleased by Besi's high profitability even at the bottom of the semiconductor cycle, with industry-leading gross margin among chip equipment makers. Our fair value estimate represents a forward 2024 and 2025 price/earnings ratio of 42 and 29 times, respectively.

We believe Besi will enjoy double-digit revenue growth rates during the next decade thanks to the sale and servicing of hybrid bonding machines. Foundries and integrated device manufacturers still have to build their hybrid installed bases, which will support strong top-line growth for Besi. We model Besi's remainder portfolio (flip-chip, thermos-compression bonding, and so on) will grow at a high-single-digit CAGR, in line with the overall semiconductor market, and hybrid bonding will grow at a 27% CAGR, resulting in a blended revenue CAGR of around 14%. Based on this, hybrid bonding will represent more than 40% of revenue by 2027 and beyond, compared with around 10% today. It will also bring higher service revenue, which is high margin, due to the higher complexity of the machines. We expect Besi's growth will come in waves, given the cyclicality of the semiconductor equipment market.

We model yearly gross margins in the 60% to 65% range long term, even in periods of cyclical downturns, given Besi's flexible cost model, supply chain multisourcing, flexible headcount, and a high proportion of personnel in Asia. We expect operating margins in the high-30s to mid-40s range, in line with historical averages and assuming slightly higher operating leverage coming from SG&A and R&D expenses. R&D expenses will remain around 8%-11% of revenue in the long term to support Besi's innovation and market position.

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Risk and Uncertainty Javier Correonero, Equity Analyst, 22 Feb 2024

We give Besi a High Morningstar Uncertainty Rating.

Although Besi has proper risk mitigation strategies in place (strong supply chain management with a multisourcing strategy and flexible workforce to adapt to the semiconductor cycle) it is still exposed to the cyclical semiconductor industry. As demand for chips changes so does demand for equipment and Besi's top line can fluctuate wildly. As an example, Besi’s revenue cumulatively declined by 40% from 2017 to 2019, only to rebound by 110% from 2019 to 2021. Equipment manufacturers have to be ready and able to increase or decrease their output as chip manufacturers increase or decrease their production, something Besi does well. Service revenue, which represents 15% to 20% of total revenue and is one of Besi’s profit engines, is more resilient through the cycle.

Although Besi has not been significantly affected by the US-China trade tensions in the past, we believe this could change in future. We don’t believe Besi’s more standard equipment such as flip-chip or thermo-compression bonding machines could be considered strategically important. However hybrid bonding machines, which are used to assemble the most advanced chips at the smallest nodes could be considered as such in the following years, limiting Besi’s ability to sell these machines in China to foundries like SMIC.

Besi has low exposure to environmental, social, and governance issues. One of Besi’s main challenges is finding experienced engineering personnel needed to develop new products and service existing customers. Besi seems to be managing well on this front after it lowered its employee turnover rate from 15% in 2018 and 2019 to 10% or less since 2020. From an environmental perspective Besi has a low impact, given it outsources most of its manufacturing.

Capital Allocation Javier Correonero, Equity Analyst, 25 Apr 2024

We give Besi an Exemplary Morningstar Capital Allocation Rating, supported by its accretive organic investments, clean balance sheet and appropriate shareholder distributions.

We believe Besi’s strong ROICs are underscored by management’s good allocation of capital. During the past decade Besi has focused on accretive product areas, purposely staying away from some products. As an example, Besi has not been manufacturing wire bonding machines. Although 75% of worldwide chips are still assembled with wire bonding techniques, this process and the back-end machines used for it are more commoditized, meaning there is less margin potential.

Besi was the first back-end player to see the trend toward hybrid bonding machines and began its research and development efforts back in 2016. Hybrid bonding machines are expected to be in great demand for the next 10 to 15 years for the manufacturing of advanced chips, and we estimate Besi is ahead of its closest competitors. The higher selling prices and complexity of these machines will result in incremental revenue and service attachment rates in the next decade. Most of the world's foundries still have to build their installed base of hybrid bonding machines, which Besi estimates will be between 800 and 1900 cumulative systems by 2030. The average selling price of a hybrid bonding machine is around EUR 1.5 million in 2022, with prices expected to grow above EUR 3 million-EUR 4 million in a few years.

Besi's gross margins outperform other peers thanks to (1) multisourcing from different suppliers to adapt capacity rapidly to demand changes, (2) 15%-20% of its staff work flexible/temporary hours, and (3) 70% of its workforce is in Asia, mainly in assembly and production, where it can save personnel and logistics costs as more than 60% of revenue comes from China, Taiwan (TSMC), South Korea (Samsung), and Malaysia. All this allows Besi to maintain leading gross margins even in periods of weaker demand (60% gross margins compared with its peers at around 40%-50%).

Since 2017, Besi has been funding itself organically and by issuing convertible bonds. We believe these issuances have been accretive for shareholders, as diluted EPS have expanded significantly since 2015. Besi normally distributes 90% of its net profits in dividends. However, as the semiconductor industry is cyclical, this can cause big fluctuations in dividend payments. We consider shareholder distributions to be appropriate as it seems to us Besi is investing enough in R&D.

As of December 2023, Besi had close to EUR 300 million long-term debt, most of it convertible debt issued since 2016. We expect most of this debt will be converted into equity given that Besi's share price has been consistently above the exercise price of these bonds for a long time. Besi has offset the dilution from these issuances with consistent, price-agnostic share repurchase programs. Besi has EUR 400 million in cash as of December 2023, having kept a significant cash position every year since 2015. We support this cash management strategy as cyclical companies should maintain some cash buffer for industry downturns.

Analyst Notes Archive

BE Semiconductor Industries Earnings: Raising Valuation; We Expect a Strong 2024 and 2025 Javier Correonero, Equity Analyst, 22 Feb 2024

Narrow-moat BE Semiconductor Industries, or Besi, impressed with another very solid quarter, beating management's guidance once again for both revenue and gross margins. Revenue grew by 29.4% sequentially, compared with expected growth of 15% to 25%, and gross margin came in at 65.1%, compared with guidance of 62% to 64%. Investors liked the results, and shares are up by 15% in Feb. 22 trading. We are raising our fair value estimate to EUR 110 per share from EUR 86 as we increase our forecast for hybrid bonding sales and raise long-term gross margins to 63%. Despite guidance of a 5% to 15% decline in sales for the next quarter, we expect 2024 will be strong as foundries and integrated device manufacturers increase their installed base of hybrid bonding systems. Besi expanded from three to nine hybrid bonding customers across all continents, reaching an installed base of 40 at year-end. We expect very strong sales in the next two years, reaching more than EUR 1 billion in 2025 compared with EUR 580 million in 2023. We also assume higher long-term unit pricing of hybrid bonding systems as Besi introduces new generations of machines with higher accuracy. Despite the raise in valuation, we still see the shares overvalued and recommend investors wait for more margin of safety. Our Capital Allocation Rating is Exemplary.

We like Besi's business model. The firm is an example of product focus, only staying in categories that allow high pricing to support the firm's 60% to 65% gross margins. Management is also focused on a flexible cost structure to rapidly adjust to higher and lower demand, which allows the firm to maintain high gross margins even in periods of double-digit revenue declines. Besi consistently shows higher gross margins than much larger semiconductor equipment peers like ASML, Applied Materials, or Lam Research. We believe the simplicity of back-end semiconductor machines compared with front-end allows for faster production adjustments to supply and demand.

Besi Earnings: Highly Profitable in the Bottom of the Cycle; Raising Fair Value Estimate 5% Javier Correonero, Equity Analyst, 26 Oct 2023

Shares of narrow-moat BE Semiconductor were up 13% after a very strong third-quarter report and healthy guidance for the fourth quarter. We remain impressed by Besi's ability to deliver industry-leading gross margins (64%-65%) in a year of cyclical contraction for semiconductors; quarterly revenue was down 27% year over year to EUR 123 million. As an example, wide-moat equipment peers Applied Materials, KLA, and ASML have delivered 46%, 60%, and 51% gross margins during 2023. Besi can achieve high gross margins thanks to a laser-focused product portfolio, high-margin service revenue, a flexible operating cost model, and excellent management of the supply chain. EBIT margin came in at 35% compared with 31% and 39% in the previous two quarters. We are raising our fair value estimate to EUR 86 per share from EUR 82 after slightly raising our medium- and long-term revenue and gross margin assumptions. The shares of this high-quality name appear overvalued, though, trading near EUR 100, so we recommend that investors be patient until a good opportunity arises. Our Capital Allocation Rating for Besi is Exemplary.

The market appeared pleased by Besi's fourth-quarter guidance for revenue growth of 15%-25%, which might indicate that the bottom in the chip assembly market has been reached. Order intake also fared well, up 13.1% sequentially to EUR 127 million after two quarters of 20% year-over-year declines. The main drivers of demand were equipment for computing applications, photonics applications, and hybrid bonding machines. Management confirmed that it has received several orders for hybrid bonding systems during the third quarter and the ongoing fourth quarter, which should translate into strong revenue growth in 2024.

Besi Earnings: Impressive Gross Margin in an Industry Downturn; Recovery Should Arrive in Q4

Javier Correonero, Equity Analyst, 27 Jul 2023

Narrow-moat Besi closed the second quarter with EUR 162.5 million in sales, down 24% year over year but up 21.8% sequentially as demand for the smartphone market begins to recover, a narrative we also heard from Soitec on July 24. Despite the sales decline, Besi closed the quarter with a gross margin of 65.6%, its highest ever, which we consider impressive for a company in a cyclical downturn but which does not surprise us. Besi runs a very flexible business model, with supply chain multisourcing, a flexible workforce, and premium pricing, which lead to gross margins. If this cycle behaves like previous semiconductor cycles, management expects the third quarter to be weaker than the second quarter given a seasonal pattern, and a strong rebound in the fourth quarter where they expect revenue above the first quarter. We are maintaining our EUR 82 fair value estimate and Exemplary Capital Allocation Rating. Soon, we expect to adjust our short- and medium-term top-line and bottom-line expectations.

In the earnings call, CEO Richard Blickman's comments gave us further insight into Besi's operations. Besi's current hybrid bonding machines are operating at around 1,500 units per hour, although they will be able to reach 3,000 UPH in the future with new software and additional preparations. According to management, 1,500 UPH is still 3 times faster than competing solutions, which we believe shows Besi's edge in hybrid bonding. Managers also said they are in constant conversations with their customers to help them bring assembly operations to a cleanroom environment, given the criticality of the change. Lastly, Blickman said the main reason for Besi's gross margin leadership versus peers is its pricing, although good cost management is also important.

Besi: Initiate Coverage With Narrow Moat; Revenue Tailwinds, but Shares Priced for Perfection

Javier Correonero, Equity Analyst, 27 Jun 2023

We are initiating on BE Semiconductor Industries, or Besi, with a narrow moat supported by intangible assets and switching costs, an Exemplary Morningstar Capital Allocation Rating, and EUR 82 fair value estimate, with shares overvalued by 20% as of the last trading session. Its Capital Allocation Rating comes from accretive organic investments and research and development, cost discipline, appropriate dividends and buybacks, and a clean balance sheet.

Besi understands how to operate well in a cyclical industry like semiconductors. It runs a flexible business model by 1) multisourcing from different suppliers as well as rapidly adapting capacity to demand changes, 2) having 15% to 20% of its staff on flexible/temporary contracts, and 3) having 70% of its workers in Asia, mainly in assembly and production, where it can save personnel and logistics costs as more than 60% of revenue comes from China, Taiwan (TSMC), Korea (Samsung), and Malaysia. This strategy allows Besi to maintain leading gross margins of about 60% even in downcycle periods compared with peers ASMPT and Kulicke & Soffa, which are at 40% to 50%.

Besi's strong share price appreciation (up 110% in the last 12 months) comes from the expected arrival

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of hybrid bonding machines. These machines will be needed over the next 10 to 15 years to assemble the most advanced chips and foundries still need them to build installed bases. In 2016 Besi saw the need for these machines, so it invested early and gained a lead. It is years ahead of its closest competitor ASMPT. Hybrid bonding machines are more critical than previous generations of machines, the average selling prices are two to five times higher, and they require more expertise, which will result in higher service attachment rates and hence higher margins. In future, we model revenue growing at midteens CAGR with strong operating margins in the range of high-30% to low-40% and a higher proportion of service revenue coming from hybrid bonding machines.

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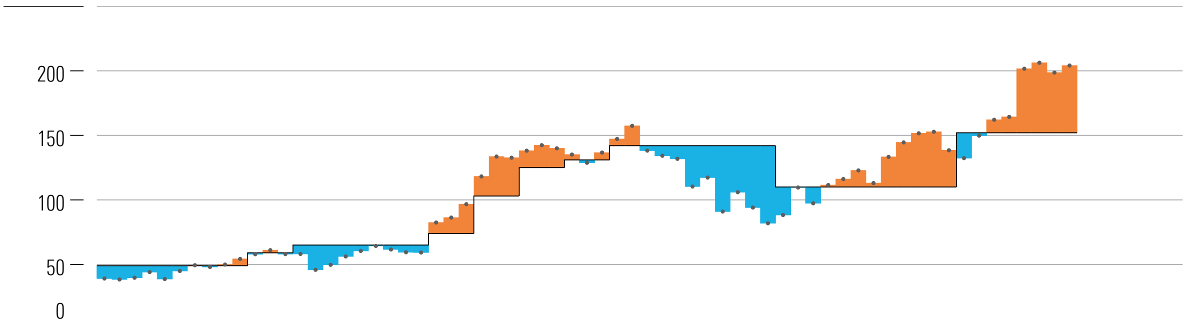
Competitors Price vs. Fair Value

Applied Materials Inc AMAT



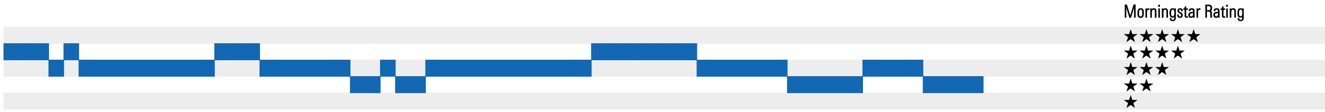
Last Close: 204.09

Fair Value: 152.00
26 Oct 2023 03:54, UTC

Overvalued
Undervalued

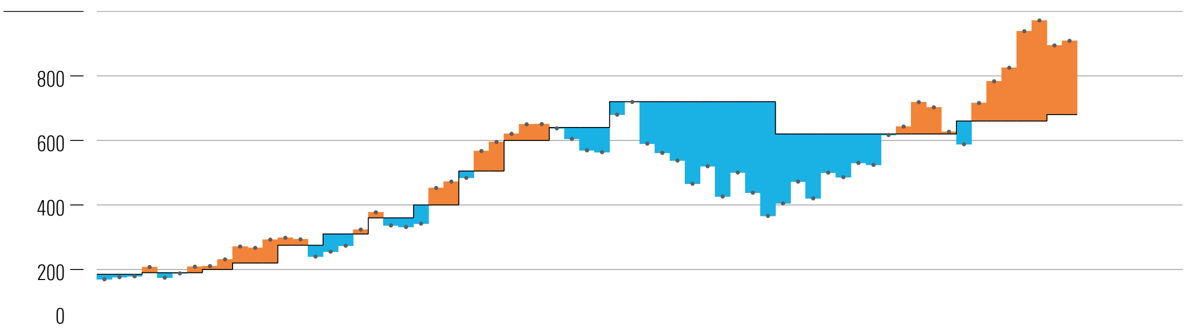
	2019	2020	2021	2022	2023	YTD
Price/Fair Value	1.03	1.17	1.11	0.89	1.07	1.34
Total Return %	88.97	42.81	83.43	-37.47	67.68	26.12

Morningstar Rating



Total Return % as of 3 May 2024. Last Close as of 3 May 2024. Fair Value as of 26 Oct 2023 03:54, UTC.

Lam Research Corp LRCX



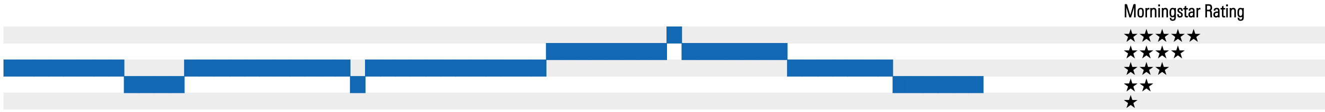
Last Close: 908.53

Fair Value: 680.00
25 Apr 2024 08:54, UTC

Overvalued
Undervalued

	2019	2020	2021	2022	2023	YTD
Price/Fair Value	1.33	1.18	1.00	0.68	1.19	1.34
Total Return %	118.04	63.19	53.46	-40.66	88.13	16.25

Morningstar Rating



Total Return % as of 3 May 2024. Last Close as of 3 May 2024. Fair Value as of 25 Apr 2024 08:54, UTC.

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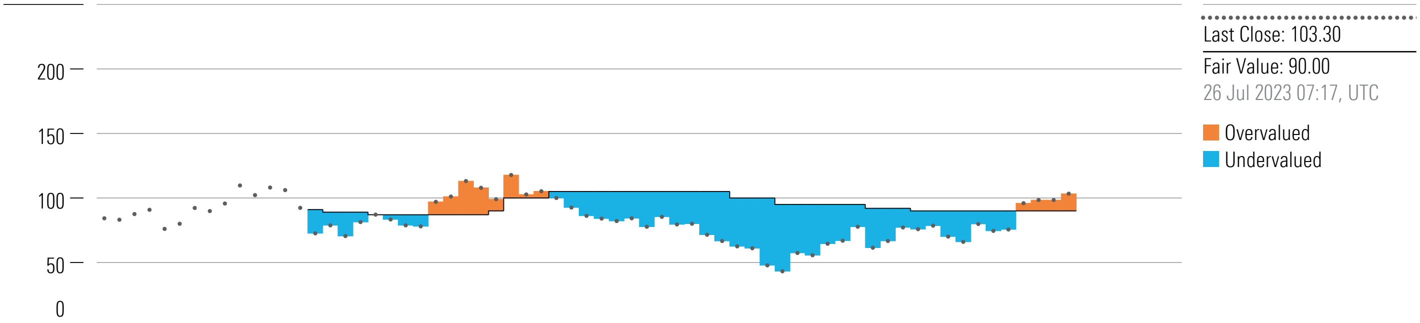
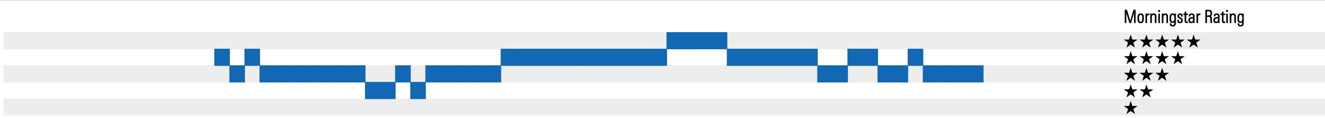
BE Semiconductor Industries NV BESI ★★★ 4 May 2024 00:26, UTC

ASMPT Ltd 00522



	2019	2020	2021	2022	2023	YTD	
	—	1.16	0.80	0.59	0.83	1.15	Price/Fair Value
	46.85	-5.18	-13.40	-29.32	38.38	38.66	Total Return %



Total Return % as of 3 May 2024. Last Close as of 3 May 2024. Fair Value as of 26 Jul 2023 07:17, UTC.

BE Semiconductor Industries NV BESI ★★★ 4 May 2024 00:26, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
125.35 EUR 3 May 2024	120.00 EUR 25 Apr 2024 10:38, UTC	1.04	9.24 EUR Bil 2 May 2024	Narrow	Mid Growth	High	Exemplary	1 May 2024 05:00, UTC

Morningstar Historical Summary

Financials as of 31 Mar 2024

Fiscal Year, ends 31 Dec	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	YTD	TTM
Revenue (EUR Mil)	379	349	375	593	525	356	434	749	723	579	146	592
Revenue Growth %	48.6	-7.8	7.5	57.9	-11.4	-32.2	21.7	72.8	-3.5	-19.9	9.7	-9.5
EBITDA (EUR Mil)	82	72	89	218	180	108	169	332	311	245	48	244
EBITDA Margin %	21.6	20.7	23.7	36.8	34.2	30.4	38.9	44.4	43.0	42.3	32.5	41.3
Operating Income (EUR Mil)	72	58	75	209	173	92	150	318	294	213	41	212
Operating Margin %	19.0	16.6	20.0	35.3	32.9	25.8	34.6	42.4	40.7	36.9	27.8	35.9
Net Income (EUR Mil)	71	49	65	173	136	81	132	282	241	177	34	177
Net Margin %	18.7	14.0	17.4	29.2	25.9	22.8	30.5	37.7	33.3	30.6	23.2	29.8
Diluted Shares Outstanding (Mil)	76	77	77	82	85	83	84	85	86	83	82	82
Diluted Earnings Per Share (EUR)	0.95	0.64	0.85	2.12	1.61	1.06	1.67	3.39	2.90	2.23	0.44	2.23
Dividends Per Share (EUR)	0.17	0.75	0.50	0.70	2.32	1.67	1.01	1.70	3.33	2.85	0.00	2.85

Valuation as of 30 Apr 2024

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Recent Qtr	TTM
Price/Sales	2.0	2.0	3.4	5.3	2.6	8.1	9.9	9.3	6.4	20.4	20.3	17.5
Price/Earnings	14.4	12.4	17.9	19.4	10.4	41.2	31.9	24.0	17.6	66.7	63.7	56.2
Price/Cash Flow	12.7	8.0	12.4	22.8	7.6	20.6	28.1	28.2	16.9	47.2	56.2	49.8
Dividend Yield %	1.78	7.91	3.16	1.99	12.56	4.85	2.04	2.27	5.89	2.09	2.01	1.71
Price/Book	2.2	2.2	3.7	6.8	3.7	9.2	11.0	10.7	6.7	28.0	25.8	20.0
EV/EBITDA	7.5	8.5	11.9	11.6	7.7	23.3	21.8	17.2	14.2	43.3	0.0	0.0

Operating Performance / Profitability as of 31 Mar 2024

Fiscal Year, ends 31 Dec	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	YTD	TTM
ROA %	18.1	11.2	12.8	23.7	16.5	11.1	16.5	27.5	21.1	17.4	3.7	17.2
ROE %	24.0	14.9	19.4	44.5	33.8	24.3	39.5	57.0	38.6	33.7	7.5	32.8
ROIC %	22.5	14.1	15.7	29.7	21.3	14.4	21.0	34.1	26.3	20.6	4.6	22.0
Asset Turnover	1.0	0.8	0.7	0.8	0.6	0.5	0.5	0.7	0.6	0.6	0.2	0.6

Financial Leverage

Fiscal Year, ends 31 Dec	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Recent Qtr	TTM
Debt/Capital %	0.9	3.9	26.3	38.1	42.2	48.8	52.3	33.3	34.9	42.6	36.7	—
Equity/Assets %	73.6	76.4	58.4	49.6	48.2	42.8	40.7	54.1	55.4	47.0	51.2	—
Total Debt/EBITDA	0.2	0.3	1.5	1.3	1.5	2.7	2.4	0.9	1.1	1.3	—	—
EBITDA/Interest Expense	215.7	155.2	140.6	39.1	18.4	10.6	14.2	30.3	25.5	21.0	80.7	22.8

Morningstar Analyst Historical/Forecast Summary as of 25 Apr 2024

Financials

			Estimates		
Fiscal Year, ends 31 Dec 2023	2022	2023	2024	2025	2026
Revenue (EUR K)	722,870	578,862	760,865	1,036,990	1,336,402
Revenue Growth %	-3.5	-19.9	31.4	36.3	28.9
EBITDA (EUR K)	313,075	235,044	319,563	445,906	554,607
EBITDA Margin %	43.3	40.6	42.0	43.0	41.5
Operating Income (EUR K)	294,116	213,392	296,737	414,796	514,515
Operating Margin %	40.7	36.9	39.0	40.0	38.5
Net Income (EUR K)	240,647	177,084	229,259	324,281	401,902
Net Margin %	33.3	30.6	30.1	31.3	30.1
Diluted Shares Outstanding (Mil)	86	83	80	78	78
Diluted Earnings Per Share(EUR)	2.81	2.14	2.86	4.18	5.18
Dividends Per Share(EUR)	2.85	2.85	3.28	3.77	3.39

Forward Valuation

			Estimates		
	2022	2023	2024	2025	2026
Price/Sales	6.2	18.1	12.6	9.3	7.2
Price/Earnings	20.1	63.8	43.8	30.0	24.2
Price/Cash Flow	—	—	—	—	—
Dividend Yield %	5.0	2.1	2.6	3.0	2.7
Price/Book	7.7	26.8	72.5	-121.7	162.8
EV/EBITDA	14.1	45.1	30.2	21.7	17.4

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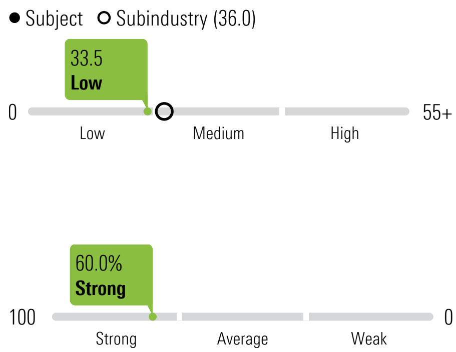
BE Semiconductor Industries NV BESI ★★★ 4 May 2024 00:26, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
125.35 EUR 3 May 2024	120.00 EUR 25 Apr 2024 10:38, UTC	1.04	9.24 EUR Bil 2 May 2024	Narrow	Mid Growth	High	Exemplary	1 May 2024 05:00, UTC

ESG Risk Rating Breakdown

Exposure	
Company Exposure[1]	33.5
– Manageable Risk	31.6
Unmanageable Risk[2]	**1.9**
Management	
Manageable Risk	31.6
– Managed Risk[3]	19.0
Management Gap[4]	**12.6**
Overall Unmanaged Risk	**14.5**



- Exposure represents a company's vulnerability to ESG risks driven by their business model
- Exposure is assessed at the Subindustry level and then specified at the company level
- Scoring ranges from 0-55+ with categories of low, medium, and high-risk exposure

- Management measures a company's ability to manage ESG risks through its commitments and actions
- Management assesses a company's efficiency on ESG programs, practices, and policies
- Management score ranges from 0-100% showing how much manageable risk a company is managing

ESG Risk Rating

ESG Risk Ratings measure the degree to which a company's value is impacted by environmental, social, and governance risks, by evaluating the company's ability to manage the ESG risks it faces.

1. A company's Exposure to material ESG issues 2. Unmanageable Risk refers to risks that are inherent to a particular business model that cannot be managed by programs or initiatives 3. Managed Risk = Manageable Risk multiplied by a Management score of 60.0% 4. Management Gap assesses risks that are not managed, but are considered manageable 5. ESG Risk Rating Assessment = Overall Unmanaged Risk = Management Gap plus Unmanageable Risk

ESG Risk Rating Assessment[5]

ESG Risk Rating is of May 01, 2024. Highest Controversy Level is as of Apr 08, 2024. Sustainalytics Subindustry: Semiconductor Equipment. Sustainalytics provides Morningstar with company ESG ratings and metrics on a monthly basis and as such, the ratings in Morningstar may not necessarily reflect current Sustainalytics' scores for the company. For the most up to date rating and more information, please visit: sustainalytics.com/esg-ratings/.

Peer Analysis 01 May 2024

Peers are selected from the company's Sustainalytics-defined Subindustry and are displayed based on the closest market cap values

Company Name	Exposure		Management		ESG Risk Rating	
BE Semiconductor Industries NV	33.5 | Low	0 55+	60.0 | Strong	100 0	14.5 | Low	0 40+
Lam Research Corp	34.5 | Low	0 55+	65.7 | Strong	100 0	13.1 | Low	0 40+
Applied Materials Inc	34.4 | Low	0 55+	66.7 | Strong	100 0	12.8 | Low	0 40+
ASMPT Ltd	36.3 | Medium	0 55+	40.8 | Average	100 0	22.4 | Medium	0 40+
Haesung DS Co Ltd	53.6 | Medium	0 55+	18.4 | Weak	100 0	44.5 | Severe	0 40+

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Appendix
Historical Morningstar Rating

BE Semiconductor Industries NV BESI 4 May 2024 00:26, UTC

Dec 2024	Nov 2024	Oct 2024	Sep 2024	Aug 2024	Jul 2024	Jun 2024	May 2024	Apr 2024	Mar 2024	Feb 2024	Jan 2024
—	—	—	—	—	—	—	—	★★★	★★	★★	★
Dec 2023	Nov 2023	Oct 2023	Sep 2023	Aug 2023	Jul 2023	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023
★	★★	★★	★★★	★★	★★	★★	—	—	—	—	—
Dec 2022	Nov 2022	Oct 2022	Sep 2022	Aug 2022	Jul 2022	Jun 2022	May 2022	Apr 2022	Mar 2022	Feb 2022	Jan 2022
—	—	—	—	—	—	—	—	—	—	—	—
Dec 2021	Nov 2021	Oct 2021	Sep 2021	Aug 2021	Jul 2021	Jun 2021	May 2021	Apr 2021	Mar 2021	Feb 2021	Jan 2021
—	—	—	—	—	—	—	—	—	—	—	—
Dec 2020	Nov 2020	Oct 2020	Sep 2020	Aug 2020	Jul 2020	Jun 2020	May 2020	Apr 2020	Mar 2020	Feb 2020	Jan 2020
—	—	—	—	—	—	—	—	—	—	—	—
Dec 2019	Nov 2019	Oct 2019	Sep 2019	Aug 2019	Jul 2019	Jun 2019	May 2019	Apr 2019	Mar 2019	Feb 2019	Jan 2019
—	—	—	—	—	—	—	—	—	—	—	—

Applied Materials Inc AMAT 3 May 2024 21:22, UTC

Dec 2024	Nov 2024	Oct 2024	Sep 2024	Aug 2024	Jul 2024	Jun 2024	May 2024	Apr 2024	Mar 2024	Feb 2024	Jan 2024
—	—	—	—	—	—	—	★★	★★	★★	★★	★★★
Dec 2023	Nov 2023	Oct 2023	Sep 2023	Aug 2023	Jul 2023	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023
★★★	★★★	★★★	★★	★★	★★	★★	★★	★★★	★★★	★★★	★★★
Dec 2022	Nov 2022	Oct 2022	Sep 2022	Aug 2022	Jul 2022	Jun 2022	May 2022	Apr 2022	Mar 2022	Feb 2022	Jan 2022
★★★	★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★	★★★	★★★
Dec 2021	Nov 2021	Oct 2021	Sep 2021	Aug 2021	Jul 2021	Jun 2021	May 2021	Apr 2021	Mar 2021	Feb 2021	Jan 2021
★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★	★★	★★★	★★
Dec 2020	Nov 2020	Oct 2020	Sep 2020	Aug 2020	Jul 2020	Jun 2020	May 2020	Apr 2020	Mar 2020	Feb 2020	Jan 2020
★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★★	★★★★	★★★★	★★★	★★★
Dec 2019	Nov 2019	Oct 2019	Sep 2019	Aug 2019	Jul 2019	Jun 2019	May 2019	Apr 2019	Mar 2019	Feb 2019	Jan 2019
★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★★	★★★	★★★★	★★★★	★★★★

Lam Research Corp LRCX 3 May 2024 21:22, UTC

Dec 2024	Nov 2024	Oct 2024	Sep 2024	Aug 2024	Jul 2024	Jun 2024	May 2024	Apr 2024	Mar 2024	Feb 2024	Jan 2024
—	—	—	—	—	—	—	★★	★★	★★	★★	★★
Dec 2023	Nov 2023	Oct 2023	Sep 2023	Aug 2023	Jul 2023	Jun 2023	May 2023	Apr 2023	Mar 2023	Feb 2023	Jan 2023
★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★★	★★★★	★★★★	★★★★
Dec 2022	Nov 2022	Oct 2022	Sep 2022	Aug 2022	Jul 2022	Jun 2022	May 2022	Apr 2022	Mar 2022	Feb 2022	Jan 2022
★★★★	★★★★	★★★★	★★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
Dec 2021	Nov 2021	Oct 2021	Sep 2021	Aug 2021	Jul 2021	Jun 2021	May 2021	Apr 2021	Mar 2021	Feb 2021	Jan 2021
★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★
Dec 2020	Nov 2020	Oct 2020	Sep 2020	Aug 2020	Jul 2020	Jun 2020	May 2020	Apr 2020	Mar 2020	Feb 2020	Jan 2020
★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★
Dec 2019	Nov 2019	Oct 2019	Sep 2019	Aug 2019	Jul 2019	Jun 2019	May 2019	Apr 2019	Mar 2019	Feb 2019	Jan 2019
★★	★★	★★	★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★

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Dec 2024 —	Nov 2024 —	Oct 2024 —	Sep 2024 —	Aug 2024 —	Jul 2024 —	Jun 2024 —	May 2024 ★★★	Apr 2024 ★★★	Mar 2024 ★★★	Feb 2024 ★★★	Jan 2024 ★★★★
Dec 2023 ★★★	Nov 2023 ★★★	Oct 2023 ★★★★	Sep 2023 ★★★★	Aug 2023 ★★★	Jul 2023 ★★★	Jun 2023 ★★★★	May 2023 ★★★★	Apr 2023 ★★★★	Mar 2023 ★★★★	Feb 2023 ★★★★	Jan 2023 ★★★★
Dec 2022 ★★★★★	Nov 2022 ★★★★★	Oct 2022 ★★★★★	Sep 2022 ★★★★★	Aug 2022 ★★★★	Jul 2022 ★★★★	Jun 2022 ★★★★	May 2022 ★★★★	Apr 2022 ★★★★	Mar 2022 ★★★★	Feb 2022 ★★★★	Jan 2022 ★★★★
Dec 2021 ★★★★	Nov 2021 ★★★★	Oct 2021 ★★★★	Sep 2021 ★★★	Aug 2021 ★★★	Jul 2021 ★★★	Jun 2021 ★★★	May 2021 ★★★	Apr 2021 ★★	Mar 2021 ★★★	Feb 2021 ★★	Jan 2021 ★★
Dec 2020 ★★★	Nov 2020 ★★★	Oct 2020 ★★★	Sep 2020 ★★★	Aug 2020 ★★★	Jul 2020 ★★★	Jun 2020 ★★★	May 2020 ★★★★	Apr 2020 ★★★	Mar 2020 ★★★★	Feb 2020 —	Jan 2020 —
Dec 2019 —	Nov 2019 —	Oct 2019 —	Sep 2019 —	Aug 2019 —	Jul 2019 —	Jun 2019 —	May 2019 —	Apr 2019 —	Mar 2019 —	Feb 2019 —	Jan 2019 —

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, indepth 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 shortterm market-price movements), but we believe these negatives are mitigated by deep analysis and our longterm 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.

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 singlepoint 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 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.

When considering a company's moat, we also assess whether there is a substantial threat of value destruction, stemming from risks related to ESG, industry disruption, financial health, or other idiosyncratic issues. In this context, a risk is considered potentially value destructive if its occurrence would eliminate a firm's economic profit on a cumulative or midcycle basis. If we deem the probability of occurrence sufficiently high, we would not characterize the company as possessing an economic moat.

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.

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 workingcapital accounts, and capital spending. Based on these projections, we calculate earnings before interest, after taxes (EBI) and the 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.

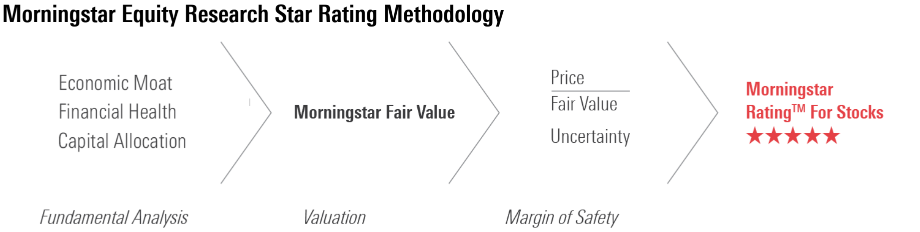
Because a dollar earned today is worth more than a dollar earned tomorrow, we discount our projections of cash flows in stages I, II, and III to arrive at a total present value of expected future cash flows. Because we are modeling free cash flow to the firm—representing cash available to provide a return 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.

3. Uncertainty Around That Fair Value Estimate

Morningstar's Uncertainty Rating is designed to capture the range of potential outcomes for a company's intrinsic value. This rating is used to assign the margin of safety required before investing, which in turn explicitly drives our stock star rating system. The Uncertainty Rating is aimed at identifying the confidence we should have in assigning a fair value estimate for a given stock.

Our Uncertainty Rating is meant to take into account anything that can increase the potential dispersion of future outcomes for the intrinsic value of a company, and any-

Morningstar Equity Research Star Rating Methodology



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Research Methodology for Valuing Companies

thing that can affect our ability to accurately predict these outcomes. The rating begins with a suggested rating produced by a quantitative process based on the trailing 12-month standard deviation of daily stock returns. An analyst overlay is then applied, with analysts using the suggested rating, historical rating data, and their own knowledge of the company to inform them as they make the final Uncertainty Rating decision. Ultimately, the rating decision rests with the analyst. Analysts take into account many characteristics when making their final decision, including cyclical factors, operational and financial factors such as leverage, company-specific events, ESG risks, and anything else that might increase the potential dispersion of future outcomes and our ability to estimate those outcomes.

Our recommended margin of safety—the discount to fair value demanded before we'd recommend buying or selling the stock—widens as our uncertainty of the estimated value of the equity increases. The more uncertain we are about the potential dispersion of outcomes, 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 are: Low, Medium, High, Very High, and Extreme.

Qualitative Analysis Uncertainty Ratings	Margin of Safety ★★★★★Rating	★Rating
Low	20% Discount	25% Premium
Medium	30% Discount	35% Premium
High	40% Discount	55% Premium
Very High	50% Discount	75% Premium
Extreme	75% Discount	300% Premium

Our uncertainty rating is based on the interquartile range, or the middle 50% of potential outcomes, covering the 25th percentile–75th percentile. This means that when a stock hits 5 stars, we expect there is a 75% chance that the intrinsic value of that stock lies above the current market price. Similarly, when a stock hits 1 star, we expect there is a 75% chance that the intrinsic value of that stock lies below the current market price.

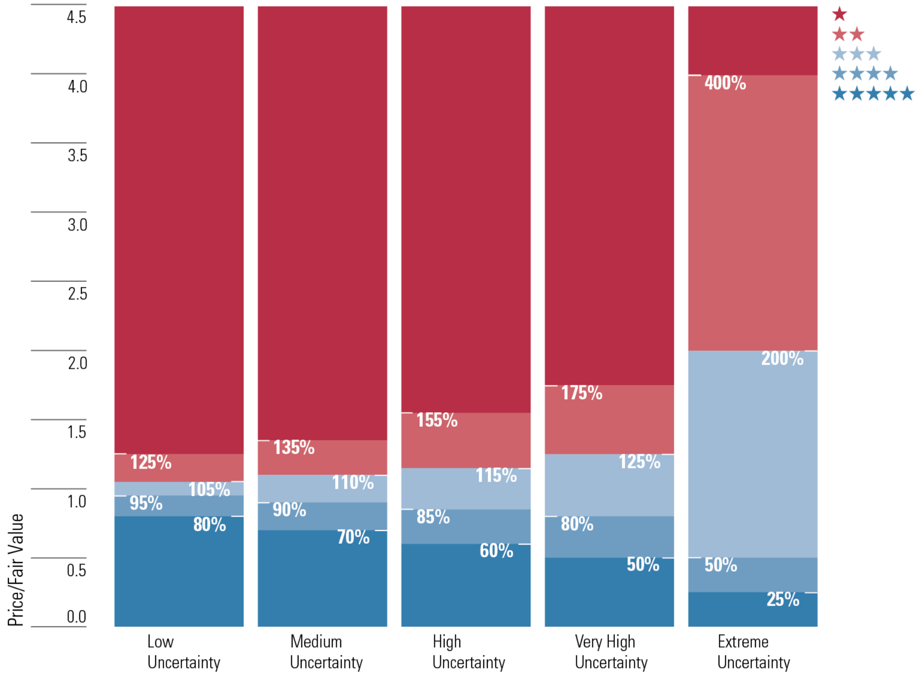
4. Market Price

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 Star Rating for Stocks

Morningstar Equity Research Star Rating Methodology



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. 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.

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.

Capital Allocation Rating: Our Capital Allocation (or Stewardship) Rating represents our assessment of the quality of management's capital allocation, with particular emphasis on the firm's balance sheet, investments, and shareholder distributions. Analysts consider compan-

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ies' investment strategy and valuation, balance sheet management, and dividend and share buyback policies. Corporate governance factors are only considered if they are likely to materially impact shareholder value, though either the balance sheet, investment, or shareholder distributions. Analysts assign one of three ratings: "Exemplary", "Standard", or "Poor". Analysts judge Capital Allocation from an equity holder's perspective. Ratings are determined on a forward looking and absolute basis. The Standard rating is most common as most managers will exhibit neither exceptionally strong nor poor capital allocation.

Capital Allocation (or Stewardship) analysis published prior to Dec. 9, 2020, was determined using a different process. Beyond investment strategy, financial leverage, and dividend and share buyback policies, analysts also considered execution, compensation, related party transactions, and accounting practices in the rating.

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Sustainalytics' ESG Risk Ratings measure the degree to which company's economic value at risk is driven by environment, social and governance (ESG) factors.

Sustainalytics analyzes over 1,300 data points to assess a company's exposure to and management of ESG risks. In other words, ESG Risk Ratings measures a company's unmanaged ESG Risks represented as a quantitative score. Unmanaged Risk is measured on an open-ended scale starting at zero (no risk) with lower scores representing less unmanaged risk and, for 95% of cases, the unmanaged ESG Risk score is below 50.

Based on their quantitative scores, companies are grouped into one of five Risk Categories (negligible, low, medium, high, severe). These risk categories are absolute, meaning that a 'high risk' assessment reflects a comparable degree of unmanaged ESG risk across all subindustries covered.

The ESG Risk Rating Assessment is a visual representation of Sustainalytics ESG Risk Categories on a 1 to 5 scale. Companies with Negligible Risk = 5 Globes, Low Risk = 4, Medium Risk = 3 Globes, High Risk = 2 Globes, Severe Risk = 1 Globe. For more information, please visit sustainalytics.com/esg-ratings/

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