Boeing Co BA ★★★ 25 Jan 2023 22:28, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Moat Trend™	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
212.68 USD 25 Jan 2023	220.00 USD 27 Oct 2022 02:33, UTC	0.97	126.34 USD Bil 24 Jan 2023	Wide	Negative	High	Standard	4 Jan 2023 06:00, UTC

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Reporting Currency: USD | Trading Currency: USD
Currency amounts expressed with "$" are in U.S. dollars (USD) unless otherwise denoted.

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

Boeing Closed 2022 Books With Good News; Reaffirming $220 Fair Value Estimate

Analyst Note Nicolas Owens, Equity Analyst, 25 Jan 2023

Boeing closed 2022 on a positive note, with two important pieces of news lifting some uncertainty over its path to recovery. We are maintaining our $220 per share fair value estimate, though we may revisit some valuation details after Boeing files its 10-K statement.

In December, the U.S. Congress included a provision in the omnibus spending bill to extend the deadline for the FAA to continue to work with Boeing to certify its new 737 Max-7 and MAX-10 plane designs based on the original application, which should allow Boeing to continue producing a cockpit operational design and pilot feedback mechanisms consistent with other 737s in the air today, albeit with some software updates that will be applied to the rest of the fleet over the next few years. Hundreds of these planes are already on order (many MAX-7s would be destined for the Southwest fleet), and the company lobbied for the FAA extension on the grounds that having a different cockpit design could confuse pilots, require multiple costly training regimes, and ultimately jeopardize passenger safety.

The other cloud that lifted was the return of 737 MAX jets to active flights service in China (coincident with the lifting of severe zero-COVID-19 travel restrictions in that country). Domestic air travel in China alone accounts for approximately one sixth of global traffic (in normal times), and about one fifth of aircraft deliveries before the pandemic were destined for China. Thus, the line of sight for Boeing to be able to deliver hundreds of planes to Chinese airline customers is welcome news—we had assumed it would happen but weren't sure when.

Financial Summary and Key Statistics

	Actual		Forecast	
	2020	2021	2022	2023
Revenue (USD Mil)	58,158	62,286	66,608	80,766
Revenue Growth %	-24.0	7.1	6.9	21.3
Operating Income (Mil)	-6,274	558	882	3,294
Operating Margin %	-10.8	0.9	1.3	4.1
Adjusted EBITDA (Mil)	-9,138	415	-425	6,621
Adjusted EBITDA Margin %	-15.7	0.7	-0.6	8.2
Earnings Per Share (Diluted) (USD)	-20.88	-7.15	-8.30	1.09
Adjusted Earnings Per Share (Diluted) (USD)	-22.80	-8.34	-9.54	-0.29
Adjusted EPS Growth %	635.1	-63.4	14.5	-96.9
Price/Earnings	-9.4	-24.1	-22.2	-731.0
Price/Book	-6.6	-7.9	-7.1	-7.2
EV/EBITDA	-17.3	387.9	-398.3	25.6
Free Cash Flow Yield %	-15.6	-3.3	1.7	3.7

Source: Morningstar Valuation Model. Data as of 25 Jan 2023.

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Boeing Co BA ★★★ 25 Jan 2023 22:28, UTC

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Sector	Industry
Industrials	Aerospace & Defense

Business Description

Boeing is a major aerospace and defense firm. It operates in four segments: commercial airplanes; defense, space & security; global services; and Boeing capital. Boeing's commercial airplanes segment competes with Airbus in the production of aircraft ranging from 130 seats upwards. Boeing's defense, space & security segment competes with Lockheed, Northrop, and several other firms to create military aircraft and weaponry. Boeing global services provides aftermarket support to airlines.

We noted that Boeing delivered 107 MAX jets in the fourth quarter, 22 of them in October, 32 in November, and 53 in December. What remains for Boeing is to execute on its plans to return 737 and 787 assembly to regular pacing, subject to resolving lingering supply chain and employee staffing and training hiccups, which will likely take through 2024.

Business Strategy & Outlook Nicolas Owens, Equity Analyst, 24 Oct 2022

Boeing is a major aerospace and defense firm that makes money mostly by manufacturing large commercial airplanes. Its narrow-bodied planes are ideal for high-frequency, short-haul routes, and wide-bodied ones are used for long-haul and transcontinental flights. Worldwide sales of narrow-bodies have increased over the past 20 years with the rise of low-cost carriers and middle-class consumers in emerging markets.

Boeing's narrow-body business was severely battered by the extended grounding of its 737 MAX due to two fatal crashes of the plane before the COVID-19 pandemic. The pandemic cut air travel by two thirds between 2019 and 2020, and Boeing's primary competitor, Airbus, saw a one-third drop in airplane deliveries while Boeing had to cease deliveries of its workhorse plane entirely for 20 months to rework the navigation and other systems on hundreds of jets. We see pent-up demand for air travel adding to the long-term increase in demand for air travel in emerging-market economies. We anticipate that Boeing will grow 737 MAX production to meet that demand. Critical to our thesis is at least some normalization of U.S.-China trade relations, as our forecast anticipates Chinese carriers will take up to a quarter of new airplanes in the next decade.

We expect wide-body demand to take longer to recover from the pandemic than narrow-body demand because wide-bodies are used for longer and international trips, which are bouncing back slower than domestic routes. We think Boeing's 787 Dreamliner is a fantastic aircraft for long-haul travel, but it, too, experienced a months-long halt of production as manufacturing quality issues got ironed out and planes refurbished. Deliveries recommenced in August 2022 and we expect them to return to 2018 levels by 2024.

Boeing also supplies military products to governments and aftermarket services to its commercial customers. These businesses together generate just over a third of its operating income over a cycle. We are broadly assuming GDP-like growth in the defense business and expect the services business will regain profitability faster than Boeing as a whole because aftermarket revenue increases directly with flight activity.

Bulls Say Nicolas Owens, Equity Analyst, 25 Jan 2023

- Boeing has a large backlog that covers several years of production for the most popular aircraft, which gives us confidence in aggregate demand for aerospace products.
- Boeing is well-positioned to benefit from emerging market growth in revenue passenger kilometers and a robust developed market replacement cycle over the next two decades.
- We expect that commercial airframe manufacturing will remain a duopoly for most of the world for the foreseeable future. We think customers will not have any meaningful options other than continuing to rely on incumbent aircraft suppliers.

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Bears Say Nicolas Owens, Equity Analyst, 25 Jan 2023

- We see substantial operational risk in Boeing's plans to simultaneously ramp production of the 737 MAX and sell those aircraft in storage as the aviation crisis and supply chain issues unwind.
- Long term, changed consumer behavior, especially among business travelers, could be unfavorable for aviation.
- As recent history has proven, aircraft development is notoriously susceptible to development delays, hiccups, and cost overruns.

Fair Value and Profit Drivers Nicolas Owens, Equity Analyst, 25 Jan 2023

We value Boeing's shares at $220 per share, which represents 20 times our 2024 free cash flow and 2 times 2024 sales estimates. We really do think the enormous special charges and fleet groundings are behind Boeing, though we forecast a couple years of hard slogging as it clears up supply chain issues that hamper production pacing. Our valuation includes healthy long-term global demand for Boeing's products and successful scaling up of deliveries and eventually margins on its bread and butter 737 and 787 models.

The COVID-19 crisis shocked the aviation industry and essentially halved global revenue passenger kilometers in 2020. Beyond the pandemic, and lingering manufacturing headaches, we assume robust revenue passenger kilometer growth, as we expect GDP growth will drive above-GDP RPK growth, especially in emerging markets. We assume a replacement cycle among most airlines will take place, and that the vast majority of fleet growth will be from narrow-body aircraft as an emerging market middle class demands more short-haul and point-to-point medium-haul travel.

We expect that mix shift toward the high-margin 737 MAX and eventual returns to learning-curve-based cost efficiencies should help the company improve margins. We expect the firm to return to 2018 levels of 737 MAX production by 2025. We're anticipating the firm can produce 68 737 MAX a month in 2031 versus about 48 per month in 2018. We expect that volume increases in the high-margin 737 MAX will bring Boeing commercial's operating margin to a midteens level. Overall, we expect operating margins to improve to about 13% at midcycle, versus 12% in 2018. These forecasts include aggressive R&D spending on the development of a brand new airframe design within our forecast period, though it won't fly until the 2030s.

We're modeling steady single-digit growth and reasonably consistent margins within the defense business. We are broadly assuming medium-term end market growth from increased geopolitical tensions, but we think growth should normalize at GDP-like levels. We note that Boeing's defense unit is exposed to more fixed-price development contracts than other defense primes, which introduces more operating income variability than peers.

We expect the services business will be able to regain profitability faster than Boeing as a whole because aftermarket revenue increases directly with flights.

Economic Moat Nicolas Owens, Equity Analyst, 24 Oct 2022

We think Boeing merits a wide moat rating because it benefits from durable intangible assets and switching costs. Although we think that Boeing has taken some competitive hits in the commercial aerospace duopoly, the commercial airplane market is large enough and so difficult to break into that it supports two wide-moat aircraft manufacturers. We think Boeing's defense business is more exposed to operational risk than peers due to its higher exposure to fixed-price contracts, but we think the firm is turning a corner operationally and benefits from intangible assets stemming from the technical complexity of its products as well as switching costs from the time and effort the military faces to switch suppliers as well as a lack of viable alternative suppliers. We think Boeing global services possesses intangible assets from proprietary access to aftermarket part designs as the Federal Aviation Administration and other regulators require that spare parts be identical to the original design, as well as benefiting from switching costs stemming from a lack of alternative suppliers for such parts.

In the commercial aircraft manufacturing segment, we believe the technical complexity of aircraft manufacturing and the extensive regulatory barriers to entering the market constitute wide-moat-caliber intangible assets. Both Boeing and Airbus benefit from these barriers to entry and it means they operate in a duopoly in the global large-frame jet aircraft market: we expect virtually all global revenue associated with air travel growth will continue to flow through the two incumbent manufacturers' top lines. What's more, we estimate demand from airlines for their products will remain high enough, long enough, that we expect both firms to generate economic profits for decades.

Further, we see the lack of alternative aircraft suppliers, the criticality of their products to the customer, and very long product cycles as presenting powerful switching costs. These three factors usually reinforce each other to allow for long-term economic profits to persist at both Boeing and Airbus. The intersection of airplanes' long service life, the economics of operating them, and that there are only two global suppliers is the arena in which long-term competition between Boeing and Airbus takes place. At present, Boeing has a superior product in the widebody or long-haul category, and Airbus is enjoying the advantage at the long range end of the narrowbody, also referred to as the mid-market category.

Boeing and Airbus supplied more than 99% of the commercial aircraft deliveries for aircraft with more than 130 seats between 2000 and 2022. Going forward, we don't see the process of designing new commercial aircraft as having gotten any easier. And though there were two serious attempts at entering this market in the past two decades; both faced considerable delays and difficulty marketing the aircraft, which we think demonstrates the barriers to entry in action.

The first was Bombardier, an experienced regional jet manufacturer based in Canada, and an ideally qualified new entrant. In 2005, it targeted a relatively untouched market segment between regional jets and narrow bodies with its aircraft design, the CSeries, launched relatively quickly by 2013. The firm had significant engineering talent and experience designing aircraft, but in 2014, roughly a year after the CSeries first flight, one of the test aircraft experienced an uncontained engine failure, which extended development time by two years. The aircraft was certified in mid-2016, and Swiss International Air Lines became the first operator. At that point, the expensive process of aircraft development had bloated Bombardier's balance sheet considerably as the firm borrowed cash to fund it, and Bombardier did not have substantial orders for the aircraft. Bombardier secured a large order for 75 aircraft and 50 additional options from Delta in early 2017, but because customers are highly skeptical of new suppliers (another barrier to entry), Delta demanded a price discount considerably deeper than the industry standard of 50% to close the sale (some industry reports suggested the discount was somewhere between 66% and 75%). Boeing used this knowledge to accuse Bombardier of dumping, that is selling the aircraft below production cost to gain market share. The U.S. Department of Commerce agreed with Boeing and placed a preliminary 300% tariff on the transaction, which effectively killed Bombardier's U.S. marketing efforts, and entering the large U.S. market was critical for the aircraft to succeed.

As Bombardier was in a difficult strategic and financial situation, it reacted by giving away a 50.01% majority stake to Airbus (and later sold its remaining 31% stake in the program to Airbus for $591 million, a small fraction of the program's development cost) so that Airbus could complete final assembly of the aircraft in Mobile, Alabama, and avoid the tariffs. In short, Bombardier used every resource at its disposal to break into the commercial aviation market and was able to design a capable aircraft but still was unable to set up a maintainable business. We think the result was a win for the duopoly, even if it was a relative loss for Boeing because the firm effectively forced a small competitor to sell valuable intangible assets at fire-sale prices to its only other competitor.

Today, the most serious potential new entrant is Comac, which is based in China and has been designing its C919 since 2008 and has successfully introduced the ARJ21, a regional aircraft, after extended development. The C919's development has been the longest in history. The aircraft completed its first flight in 2017 but had not received type certification from any aviation regulator until late September, 2022, when the Chinese civil aviation administration approved the plane for commercial use in China. We assume deliveries will start at a low rate in 2023 and production will accelerate, but we still don't think that the C919 will be able to ramp up quickly enough to satisfy demand in the massive Chinese market. The ARJ-21 was certified in late 2014 and was still delivering at a rate around four aircraft per month in 2022, which we think shows the difficulty of ramping aircraft production. For context, we estimate that between 2015 and 2019, Chinese air carriers took delivery of almost 30 aircraft per month, on average. We have no reason to believe that ramping the larger and more complex C919 will be an easier process than ramping ARJ production.

While we think that the C919 will be supported by Chinese demand, we don't anticipate meaningful international demand for the aircraft. Comac's C919 is inferior in almost every way to modern narrowbody aircraft—the 737 MAX 7, for instance, can travel roughly 75% more nautical miles than COMAC's similarly sized C919, and economics drive airline purchase decisions.

In sum, the technical complexity of aircraft manufacturing is a material barrier to entry, which we believe constitutes intangible assets. Boeing and Airbus are the only two capable suppliers of globally competitive aircraft larger than 130 seats, and we don't see any globally competitive new entrants entering the market any time soon. Therefore, we believe it's reasonable to assume that almost all global demand for new aircraft will flow through the income statement of incumbents, though we concede that some Chinese demand will likely move toward Comac.

To address the second premise, that the market is large enough and undersupplied enough to support two wide moats, we built a 20-year aviation forecast for deliveries. We believe more than one producer can generate economic profits if the industry is structurally undersupplied. This was the case in aviation sales prior to the pandemic, as both manufacturers had backlogs that covered more than five years of production for narrowbody aircraft. We see additional evidence that customers face switching costs from a lack of alternative suppliers as aircraft purchase contracts always allowed for manufacturer-friendly clauses such as the requirement that airlines put down large deposits at signing and pay additional pre-delivery payments for aircraft for years leading up to delivery. We think customers would only accept such terms if the industry were structurally undersupplied. Our long-term aircraft demand forecast supports our assertion that the market will return to an undersupplied state such that both manufacturers would continue to benefit from barriers to entry and switching costs from a lack of alternative suppliers.

To build our forecast, we begin with global GDP estimates and assume that global air travel fully recovers from the COVID-19 downturn in 2024. We assume one year of excess growth, as pent-up demand for travel, measured in revenue passenger kilometers, RPKs, partially catch up to GDP growth that occurred during the COVID-19 aerospace depression. Although we forecast travel reaching 2019 levels by 2024, in this forecast RPKs do not return to the prepandemic trendline: there will be a permanent two- to three-year gap between the prepandemic trend and our forecast. To get there, we assume air travel elasticity to GDP in line with long-term global historical rates, and we assume global load factors follow recent trends and cap at about 88%, leading to a 3.2% available seat kilometer compound growth rate, which implies available seat kilometers will eventually be around double 2019 levels.We then examine aircraft per available seat kilometers globally and in the U.S. to determine a normalized level of aircraft per available seat kilometer and determine that there will need to be a global fleet of about 50,000 aircraft to support this level of travel and we expect about 82% of that fleet will be narrowbodies. We assume about 80% of the current fleet of about 23,000 aircraft will be retired in our 20-year forecast.

When we split the relevant markets between Boeing and Airbus, we assume Boeing will have a 40% delivery share of the narrowbody market (after excluding COMAC, Embraer, and the United Aircraft Corporation deliveries), primarily due to competition from Airbus. Airbus' A321 LR and XLR are the only viable mid-market aircraft today, and Airbus' impressive backlog share at the top end of the market shows its attractiveness to airlines. We think Boeing's 737 MAX 8 is a capable aircraft for the traditional narrowbody market but that Boeing missed the opportunity to build a "light" middle-of-the-market aircraft and is paying the price by ceding a sizable portion of the narrowbody market to Airbus. Even though Boeing now lags in the narrowbody market, we think the market is large enough that the firm will ramp up 737 MAX production well above previous peak production.

We assume Boeing will retain its advantage in widebodies as we expect the 787 will remain the dominant small widebody, the 777X will be launched successfully, and the cargo market remains mostly in Boeing's hands. We expect Boeing will achieve a 60% share in widebodies.

Finally, we think we should address the long-term impact of Boeing's recent operational failures on our moat rating, namely, the 737 MAX grounding and the 787 production problems that led to its the delivery halt in July 2021. Ultimately, we think that it will be difficult to assess the extent to which these changes have improved Boeing's design process for several years because the problems with both the 737 MAX and the 787 predate the changes, so we think the first real test for the company will be the rollout of the 777X by 2025. That noted, we think a significant portion of the portfolio has been heavily scrutinized by regulators and re-worked by Boeing, and we don't think investors should expect incremental failures on the 737 MAX or the 787 after the intense scrutiny these programs have received. These two programs alone compose over half our estimated long term operating income for the firm, so incremental failures on other programs would be less material.

Qualitatively, we don't think Boeing's intangible assets have deteriorated. And while Boeing has a gap in its product lineup in the workhorse narrowbody market, the firm still has the know-how to develop and deliver aircraft, which is ultimately the valuable intangible asset. Switching costs can be shown more empirically through the backlog. Boeing only lost about 30% of its ASC 606 adjusted unit orders from the 737 MAX crisis, which is meaningful as airlines could leave orders without penalty during the crisis. Further, ASC 606 adjustments required Boeing to remove some order from its book from distressed airlines, and we expect some of these airlines to emerge from distress in the aviation upswing, which would bring their orders back onto the books. While Boeing likely had to renegotiate a sizable chunk of the order book, we think this is a temporary condition rather than a permanent change of its relationship to customers, and we believe this is supported by the fact that Boeing has been able to continue to increase the 737 MAX backlog even while clearing existing inventory.

We think Boeing's defense segment possesses intangible assets due to the complexity of manufacturing defense products and from the sole-source contract structure of defense production. Boeing's defense unit primarily produces crewed and uncrewed aircraft and missile products. Military product development costs billions, so the government typically has a competitive contract bidding process and then gives a sole-source contract to the winner to avoid cost redundancy. We think this puts a nearly unshakeable barrier to entry on the firm's existing portfolio, which has years-long contracts to fulfill, as the military does not switch providers after a contract is won. Typically, development programs are granted in a manner that is beneficial to the contractor, as well. During the early stages of development and production, the government generally purchases using cost-plus contracts that shift the financial burden of cost overruns to the customer, but the potential profit to the contractor is generally lower. Given the immense risk of cost overruns in designing complex products such as fighter aircraft, this dynamic works in the contractor's favor. When the costs of the product are better understood, the contract typically switches to a fixed-price contract. While Boeing is more exposed than peers to highly risky fixed-price development programs, we estimate these programs account for only about 15% of the portfolio and some fixed-price development programs have not taken material charges. We think the effects of the most problematic fixed-price development program, the KC-46a tanker, have been taken care of as the military is accepting delivery of the aircraft, but we estimate Boeing spent roughly twice the contract value on product development.

We see switching costs from a lack of viable alternative suppliers for a product as well as the significant time and monetary investment required to switch. Since military products are purchased on a sole-source basis, the military cannot shop around for a new contractor after a product is developed. The military would instead need to cancel the program and invest time and billions of dollars into a new contractor to recreate the capability, which could take several years. During that time, the military would face a capability gap that could be exploited by a military adversary, and military platforms and weapons systems are mission critical for military operations. Due to the immense difficulty of switching and the mission criticality of the product, the military almost always chooses to work with the contractor to fix whatever problem arises rather than to switch to a new military platform. This can lead to cash-cow platforms such as the F-15, a product that was originally developed in the 1970s and is still delivered in significant quantities, though Boeing has made numerous upgrades to the platform.

Boeing global services provides aftermarket parts and services and acts as a manufacturer and distributor of a wide variety of consumable and expendable aftermarket parts. We believe this segment benefits from wide-moat-caliber regulatory intangible assets as airlines must maintain aircraft to type certificate standards, which require aftermarket parts to be identical to the original parts built into the aircraft. Typically, the original equipment manufacturer of the part, which could be a variety of aviation suppliers, is the only source that has access to the original schematics for the part, which gives the manufacturer a monopoly on the aftermarket. We see switching costs from the lack of alternative suppliers and from the mission criticality of aircraft to airlines. Since the manufacturer possesses a monopoly on the market for aftermarket spare parts and airlines need to have functional aircraft to run their business, the airlines have little choice but to accept the prices charged by the manufacturer.

Moat Trend Nicolas Owens, Equity Analyst, 24 Oct 2022

We assign Boeing a negative moat trend as we believe the firm's switching costs are deteriorating in the commercial aircraft manufacturing segment. A key tenet of our switching cost argument for Boeing is that the market is large enough and undersupplied enough that both incumbents can and do benefit from switching costs stemming from a lack of viable alternatives in each aircraft product category. We believe that Boeing's inability to produce a competitive middle-of-the-market aircraft has reduced the market over which it can exert these switching costs as Airbus commercializes the A321 XLR.

We believe Boeing's narrowbody aircraft portfolio is inferior to Airbus' because the range of 737 MAX aircraft decreases with increased aircraft variant size, as the increased weight (due to the increased size) requires more fuel to move a unit of distance. This dynamic is common across civil aircraft. However, Airbus has been able to place additional fuel tanks on its A321LR and the upcoming A321XLR models, which has given the aircraft significant additional range relative to Boeing's comparable offering. The additional range unlocks numerous routes that were previously infeasible with narrowbody aircraft and can lower the unit cost to fly those routes (measured as available seat kilometers). We believe the difference in range for similar-capacity aircraft is the major differentiating factor for these aircraft. Boeing has a relatively comparable backlog share with Airbus for the 737 MAX 8 and Airbus' competitor, the A320neo, however, Boeing has a significantly lower backlog share for the MAX 9 and MAX 10 versus the A321neo. Boeing previously split this market with Airbus relatively equally between the 757 and 767 versus the A321 in the late 1990s-early 2000s aviation cycle, but customer preference shows that airlines far prefer the A321neo to MAX 9 and MAX 10. While we expect Boeing will develop a clean-sheet middle-of-the-market aircraft someday, we don't think it will be available at scale until the 2030s, and we expect Airbus will begin delivering A321XLRs in 2023. We think Boeing will be able to compete for part of this market when the new aircraft is available but that many potential aircraft sales would have already been sold by Airbus at that point, adding to Airbus recurring revenue from maintenance and services, as well. In short, we think Boeing's inability to produce a competitive middle-of-the-market aircraft will materially reduce the market over which it can act as a viable alternative provider, and the current redistribution of the order backlog is indicative of deteriorating switching costs.

We think Boeing has a stable moat trend in its defense segment. We don't think there has been any deterioration in the intangible assets of Boeing's ability to design or build complex military products, we think the primary issue in the military portfolio has been Boeing's inability to properly price some of its products. We see no change in the military's switching costs of a lack of alternative suppliers, as Boeing is generally the sole source provider of a product, the time and money required to replicate capabilities at an alternative supplier, and the essentialness of these products to the customer.

We think Boeing has a stable moat trend in its global services segment. The intangible assets in this segment are based on the FAA's strict regulations regarding an airworthy aircraft, and we don't expect the FAA to loosen regulations for spare parts any time soon. Boeing has access to proprietary designs for spare parts, so we think it will continue to benefit from being the sole supplier of aftermarket spares that airlines need to run their business.

Risk and Uncertainty Nicolas Owens, Equity Analyst, 24 Oct 2022

We think Boeing's biggest risks are macro risks that limit demand and operational risks that constrain supply, both of which it has weathered over the last three years. We think Boeing deserves a High Morningstar Uncertainty Rating, but we note the firm is still working through much higher supply risks than Airbus as it revives 737 MAX and 787 production and deliveries.

On the demand side, the pandemic dramatically reduced air travel and aircraft deliveries. IATA, a trade group, reported that passenger demand declined by nearly two thirds in 2020. While we anticipate travel to return to previous levels eventually, we recognize that its recovery is likely to be patchy and may face renewed disruption. Also, business travel's future is somewhat more uncertain than leisure travel's. Because high-yielding business travelers are some of the most profitable customers for airlines, any lack of business travel resurgence may dampen new aircraft demand. Finally, the 737 MAX is still grounded in China, which is a major aviation market. Although Boeing has completed a test flight for Chinese regulators, the MAX's recertification could be caught in the cross-hairs of U.S.-China trade relations. Further, assuming re-certification of the 737MAX in China in due course, we suspect it may be easier (if not simply more expedient) for local airlines to substitute marginal orders of 737's for COMAC C919s while maintaining or growing their share of orders for Airbus narrowbodies.

On the supply side, the major risk in the aftermath of the 737 MAX grounding and production rework on the 787 lies in global supply chain disruptions that affect Boeing's engine and subsystem suppliers. These suppliers may just not be able to ramp up production at Boeing's desired pace, which would constrain or delay Boeing's ability to get its assembly up to the volumes where it makes money on every plane it delivers, versus having to continue to take massive extraordinary charges for idle assembly capacity.

Financial Strength Nicolas Owens, Equity Analyst, 25 Jan 2023

Boeing's capitalization suffered the brunt of the last three years turmoil. To keep the lights on, the company borrowed over $40 billionand ceased dividends and share purchases in that time.

The company ended 2021 with about $58.1 billion in debt and $16.2 billion in cash. With resumed deliveries of its major aircraft, we have seen improved cash flow in recent quarters, and we expect EBITDA expansion and debt reduction over our forecast period to lead to gross debt/EBITDA levels at about 6.5 in 2023 and gradually lower levels in subsequent years. Our estimated 2023 EBITDA covers interest expense 3.4 times, and the company has access to additional liquidity if necessary. In subsequent years, free cash flow is positive and EBITDA covers interest expense by about 5 or more times.

The firm's first capital allocation priority is to reduce debt, but will face important trade-offs as it needs to also reinvest in new technology to remain competitive. We think the correct balance between debt reduction and reinvestment is the critical question management needs to address.

Capital Allocation Nicolas Owens, Equity Analyst, 24 Oct 2022

We assess Boeing's capital allocation rating to be Standard. This assessment is based on our balance sheet rating, our investment rating, and our shareholder distributions rating.

We think Boeing has a weak balance sheet. As of the end of the 2021, the firm $58.1 billion in debt and $16.2 billion in cash. About 20% of Boeing's debt was on the balance sheet pre-737 MAX grounding, 20% came on the balance sheet while the MAX was grounded but before the COVID-19 pandemic, and 60% entered the balance sheet since the pandemic began. We think CEO Dave Calhoun made the right move by raising $25 billion of debt capital in April 2020. Boeing raised capital in a market that was heavily supported by the Federal Reserve, which we think was better than accepting governmental support. Accepting governmental support would have diluted equity shareholders and given credence to Airbus' claims that Boeing receives unfair subsidies from the government. The firm has refinanced much of its debt over the ensuing period and has begun paying it down as aircraft deliveries have resumed.

Management recognizes that the first use of free cash flow continues to be debt reduction. Thus we think management faces difficult choices between investing in product innovation, which is sorely needed given the firm's weaker position in narrowbody aircraft, potentially restoring a dividend, and debt reduction. We think investors would be best served if management uses most of the cash it will generate from its business recovery for debt reduction and favors product innovation over other uses going forward. Management's plans to use all-digital design techniques to reduce development and testing costs, enhance service transparency, and ultimately the overall cost of an aircraft are as ambitious as they are appealing. They are also necessary for product innovation (such as greenlighting Boeing's so-called New Midsize Aircraft, which we could eventually supplant the 737 design altogether) to make economic sense, as engine technology has not yet improved enough to drive the 25%-30% reduction in fuel burn that generally stimulates demand for a 'next-generation' airframe design.We think the correct balance between debt reduction and reinvestment is the critical question management needs to address over the next five years.

We think Boeing's investments strategy is fair. Boeing's product strategy is in a somewhat precarious position due to the recently rescinded 737 MAX grounding and the success of Airbus' A320neo family of aircraft. Current management was not in charge during the decision-making process that brought the company to this point and management has spent much of its time resolving issues generated by previous managers, including important shifts in how engineering issues are surfaced and addressed. We think management has done a fairly good job, as the 737 MAX has been recertified in most nations with the notable exception of China and has begun to ring up new orders since recertification. Management has not articulated a strategic vision for the firm's product strategy beyond the use of digital design techniques, which is fair given the near-term challenges management faces. We think the firm will need to lay out a clear product strategy and begin designing aircraft to meet that strategy in the next few years or the firm risks calcifying a weak position in the narrowbody market.

We think Boeing shareholder distributions are appropriate on a forward looking basis. Given the combined impact of the 737 MAX grounding and COVID-19 on the company, we think management is correct to have cut the dividend and suspended shareholder repurchases. Arguably, the firm should have suspended repurchases sooner, but current management was not in place until two months before COVID-19 began to spread in the U.S. We think management is also correct to prioritize debt repayment over shareholder remuneration given the state of the firm's balance sheet.

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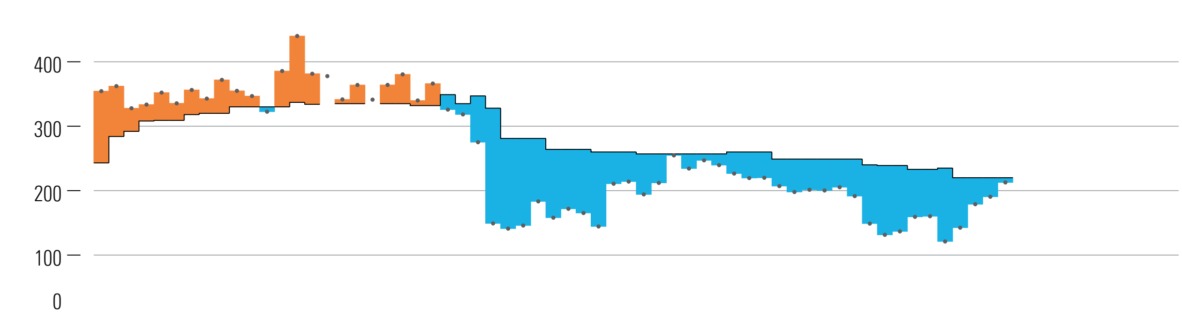
Price vs. Fair Value



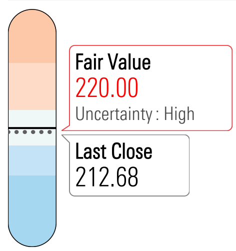
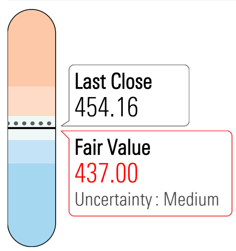
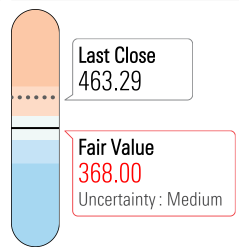
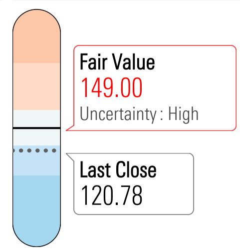
Fair Value: 220.00
27 Oct 2022 02:33, UTC

Last Close: 212.68
Over Valued
Under Valued

2018	2019	2020	2021	2022	YTD	
0.98	0.93	0.82	0.81	0.87	0.97	Price/Fair Value
11.67	3.56	-33.66	-5.95	-5.38	11.65	Total Return %

Morningstar Rating

Competitors

	Boeing Co BA	Lockheed Martin Corp LMT	Northrop Grumman Corp NOC	Airbus SE AIR
				
Economic Moat	Wide	Wide	Wide	Wide
Moat Trend	Negative	Stable	Stable	Positive
Currency	USD	USD	USD	EUR
Fair Value	220.00 27 Oct 2022 02:33, UTC	437.00 27 Oct 2022 02:33, UTC1	368.00 27 Oct 2022 02:33, UTC2	149.00 27 Oct 2022 02:33, UTC3
1-Star Price	341.00	589.95	496.80	230.95
5-Star Price	132.00	305.90	257.60	89.40
Assessment	Fairly Valued 24 Jan 2023	Fairly Valued 24 Jan 2023	Over Valued 24 Jan 2023	Under Valued 24 Jan 2023
Morningstar Rating	★★★25 Jan 2023 22:28, UTC	★★★25 Jan 2023 22:28, UTC	★★25 Jan 2023 22:28, UTC	★★★★25 Jan 2023 01:26, UTC
Analyst	Nicolas Owens, Equity Analyst	Nicolas Owens, Equity Analyst	David Whiston, Sector Strategist	Nicolas Owens, Equity Analyst
Capital Allocation	Standard	Exemplary	Standard	Exemplary
Price/Fair Value	0.97	1.04	1.26	0.81
Price/Sales	2.05	1.80	2.04	1.72
Price/Book	1,626.81	12.31	5.07	14.95
Price/Earnings	—	20.74	13.10	22.96
Dividend Yield	0.84%	2.54%	1.47%	1.24%
Market Cap	126.34 Bil	114.10 Bil	70.69 Bil	95.12 Bil
52-Week Range	113.02—223.23	370.78—498.95	364.62—556.27	86.52—120.78
Investment Style	Large Value	Large Core	Large Core	Large Growth

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Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Moat Trend™	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
212.68 USD 25 Jan 2023	220.00 USD 27 Oct 2022 02:33, UTC	0.97	126.34 USD Bil 24 Jan 2023	Wide	Negative	High	Standard	4 Jan 2023 06:00, UTC

Morningstar Valuation Model Summary

Financials as of 25 Jan 2023	Actual			Forecast				
Fiscal Year, ends 31 Dec	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Revenue (USD Mil)	76,559	58,158	62,286	66,608	80,766	95,620	104,373	108,566
Operating Income (USD Mil)	6,284	-6,274	558	882	3,294	5,033	8,870	10,939
EBITDA (USD Mil)	296	-10,521	-758	-1,568	5,221	6,912	10,719	12,796
Adjusted EBITDA (USD Mil)	1,711	-9,138	415	-425	6,621	8,312	12,119	14,196
Net Income (USD Mil)	-636	-11,873	-4,202	-4,935	642	2,131	5,300	6,938
Adjusted Net Income (USD Mil)	-1,754	-12,966	-4,899	-5,677	-174	1,171	4,287	5,901
Free Cash Flow To The Firm (USD Mil)	-4,209	-18,402	-4,030	2,470	4,494	6,655	6,992	8,693
Weighted Average Diluted Shares Outstanding (Mil)	565	569	588	595	590	577	550	524
Earnings Per Share (Diluted) (USD)	-1.12	-20.88	-7.15	-8.30	1.09	3.70	9.64	13.25
Adjusted Earnings Per Share (Diluted) (USD)	-3.10	-22.80	-8.34	-9.54	-0.29	2.03	7.80	11.27
Dividends Per Share (USD)	7.19	8.22	2.06	0.00	0.33	1.11	2.89	3.13

Margins & Returns as of 25 Jan 2023		Actual			Forecast					
	3 Year Avg	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**5 Year Avg**
Operating Margin %	-0.6	8.2	-10.8	0.9	1.3	4.1	5.3	8.5	10.1	5.9
EBITDA Margin %	—	0.4	-18.1	-1.2	-2.4	6.5	7.2	10.3	11.8	—
Adjusted EBITDA Margin %	-4.3	2.2	-15.7	0.7	-0.6	8.2	8.7	11.6	13.1	8.2
Net Margin %	-9.3	-0.8	-20.4	-6.8	-7.4	0.8	2.2	5.1	6.4	3.1
Adjusted Net Margin %	-10.8	-2.3	-22.3	-7.9	-8.5	-0.2	1.2	4.1	5.4	0.4
Free Cash Flow To The Firm Margin %	-14.5	-5.5	-31.6	-6.5	3.7	5.6	7.0	6.7	8.0	6.2

Growth & Ratios as of 25 Jan 2023		Actual			Forecast					
	3 Year CAGR	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**5 Year CAGR**
Revenue Growth %	-14.9	-24.3	-24.0	7.1	6.9	21.3	18.4	9.2	4.0	11.8
Operating Income Growth %	-64.5	-49.5	-199.8	-108.9	58.1	273.5	52.8	76.2	23.3	81.3
EBITDA Growth %	0.0	—	—	—	—	—	—	—	—	0.0
Adjusted EBITDA Growth %	-70.0	-88.9	-634.1	-104.5	-202.4	-1658.0	25.5	45.8	17.1	102.7
Earnings Per Share Growth %	-180.3	—	—	—	—	—	—	—	—	—
Adjusted Earnings Per Share Growth %	-180.3	-119.3	635.1	-63.4	14.5	-96.9	-789.6	284.2	44.5	—

Valuation as of 25 Jan 2023	Actual			Forecast				
	2019	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Price/Earnings	—	-9.4	-24.1	-22.2	-731.0	104.4	27.2	18.8
Price/Sales	—	2.1	1.9	1.9	1.6	1.3	1.2	1.2
Price/Book	—	-6.6	-7.9	-7.1	-7.2	-5.3	-4.4	-3.8
Price/Cash Flow	—	-6.4	-30.7	60.1	27.1	17.5	17.1	14.0
EV/EBITDA	—	-17.3	387.9	-398.3	25.6	20.4	14.0	11.9
EV/EBIT	—	-25.3	288.5	191.9	51.4	33.6	19.1	15.5
Dividend Yield %	—	3.8	1.0	—	0.2	0.5	1.4	1.5
Dividend Payout %	-639.2	-39.4	-28.7	0.0	30.0	30.0	30.0	23.6
Free Cash Flow Yield %	—	-15.6	-3.3	1.7	3.7	5.7	5.8	7.1

Operating Performance / Profitability as of 25 Jan 2023	Actual			Forecast				
Fiscal Year, ends 31 Dec	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
ROA %	-8.3	-2.9	-3.6	0.5	1.6	4.1	5.5	8.2
ROE %	88.2	25.2	30.1	-3.7	-10.6	-21.4	-25.0	-38.3
ROIC %	-24.2	-0.9	-2.8	9.8	13.1	19.9	22.5	22.8

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Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Moat Trend™	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
212.68 USD 25 Jan 2023	220.00 USD 27 Oct 2022 02:33, UTC	0.97	126.34 USD Bil 24 Jan 2023	Wide	Negative	High	Standard	4 Jan 2023 06:00, UTC

Financial Leverage	Actual			Forecast				
Fiscal Year, ends 31 Dec	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Debt/Capital %	140.5	134.8	145.5	144.7	172.4	189.5	197.8	185.6
Assets/Equity	-8.3	-9.2	-7.8	-7.8	-5.7	-4.8	-4.3	-5.1
Net Debt/EBITDA	-3.6	-55.2	-24.8	7.0	5.7	4.1	3.6	2.5
Total Debt/EBITDA	-7.0	140.0	-134.1	8.5	6.6	4.7	4.1	2.9
EBITDA/ Net Interest Expense	-4.2	0.2	-0.2	2.6	3.3	4.9	5.5	7.2

Key Valuation Drivers as of 25 Jan 2023

Cost of Equity %	9.0
Pre-Tax Cost of Debt %	8.0
Weighted Average Cost of Capital %	8.3
Long-Run Tax Rate %	17.3
Stage II EBI Growth Rate %	5.0
Stage II Investment Rate %	16.7
Perpetuity Year	20

Additional estimates and scenarios available for download at https://pitchbook.com/.

Discounted Cash Flow Valuation as of 25 Jan 2023

	USD Mil
Present Value Stage I	58,360
Present Value Stage II	51,390
Present Value Stage III	68,067
Total Firm Value	**177,817**
Cash and Equivalents	8,122
Debt	-58,102
Other Adjustments	-9,711
Equity Value	**118,126**
Projected Diluted Shares	590
Fair Value per Share (USD)	**219.00**

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Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Moat Trend™	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
212.68 USD 25 Jan 2023	220.00 USD 27 Oct 2022 02:33, UTC	0.97	126.34 USD Bil 24 Jan 2023	Wide	Negative	High	Standard	4 Jan 2023 06:00, UTC

Income Statement (USD)	Actual			Forecast				
Fiscal Year, ends 31 Dec	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Revenue (Mil)	**76,559**	**58,158**	**62,286**	**66,608**	**80,766**	**95,620**	**104,373**	**108,566**
Cost of Goods Sold (Mil)	63,834	57,350	55,809	63,106	69,414	81,696	86,136	88,156
Gross Profit (Mil)	**12,725**	**808**	**6,477**	**3,502**	**11,352**	**13,923**	**18,237**	**20,410**
Selling, General, Administrative & Other Expenses (Mil)	3,909	4,817	4,157	4,187	4,915	5,628	5,935	5,956
Advertising & Marketing Expenses	—	—	—	—	—	—	—	—
Research & Development	—	—	—	—	—	—	—	—
Depreciation & Amortization (if reported separately)	—	—	—	—	—	—	—	—
Adjusted Operating Income (Mil)	**6,284**	**-6,274**	**558**	**882**	**3,294**	**5,033**	**8,870**	**10,939**
Financial Non-Cash (Gains)/Losses (Mil)	0	0	0	0	0	0	0	0
Irregular Cash (Gains)/Losses (Mil)	8,259	6,493	3,460	4,429	0	0	0	0
Operating Income (Mil)	**-1,975**	**-12,767**	**-2,902**	**-3,547**	**3,294**	**5,033**	**8,870**	**10,939**
Net Interest Expense (Mil)	284	1,709	2,131	1,475	2,517	2,456	2,462	2,550
Income Tax Expense (Mil)	-1,623	-2,535	-743	31	134	446	1,109	1,451
After-Tax Items (Mil)	0	0	0	0	0	0	0	0
(Minority Interest) (Mil)	0	68	88	118	0	0	0	0
Net Income (Mil)	**-636**	**-11,873**	**-4,202**	**-4,935**	**642**	**2,131**	**5,300**	**6,938**
Adjusted Net Income (Mil)	**-1,754**	**-12,966**	**-4,899**	**-5,677**	**-174**	**1,171**	**4,287**	**5,901**
Weighted Average Diluted Shares Outstanding (Mil)	565	569	588	595	590	577	550	524
Diluted Earnings Per Share	**-1.12**	**-20.88**	**-7.15**	**-8.30**	**1.09**	**3.70**	**9.64**	**13.25**
Diluted Adjusted Earnings Per Share	**-3.10**	**-22.80**	**-8.34**	**-9.54**	**-0.29**	**2.03**	**7.80**	**11.27**
Dividends Per Common Share (USD)	7.19	8.22	2.06	0.00	0.33	1.11	2.89	3.13
EBITDA (Mil)	**296**	**-10,521**	**-758**	**-1,568**	**5,221**	**6,912**	**10,719**	**12,796**
Adjusted EBITDA (Mil)	**1,711**	**-9,138**	**415**	**-425**	**6,621**	**8,312**	**12,119**	**14,196**

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Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Moat Trend™	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
212.68 USD 25 Jan 2023	220.00 USD 27 Oct 2022 02:33, UTC	0.97	126.34 USD Bil 24 Jan 2023	Wide	Negative	High	Standard	4 Jan 2023 06:00, UTC

Key Cash Flow Items (USD)	Actual			Forecast as of 25 Jan				
Fiscal Year, ends 31 Dec	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Cash from Working Capital (Mil)	-1,361	-8,238	-1,261	4,285	1,419	2,316	-209	-209
(Capital Expenditures) (Mil)	-1,500	-1,007	-451	-1,187	-1,450	-1,631	-1,879	-1,954
Depreciation (Mil)	2,271	2,246	2,144	1,979	1,927	1,879	1,848	1,857
Amortization (Mil)	0	0	0	0	0	0	0	0
Net New (Investment), Organic (Mil)	**-214**	**-13,524**	**-5,899**	**5,783**	**1,853**	**2,519**	**-286**	**-353**
(Purchases)/Sales of Companies & Assets (Mil)	-455	0	-6	0	0	0	0	0
Net New (Investment), Total (Mil)	**-669**	**-13,524**	**-5,905**	**5,783**	**1,853**	**2,519**	**-286**	**-353**
Other Non-Cash Items, From Cash Flows (Mil)	-508	8,161	3,528	112	0	0	0	0
Free Cash Flow to the Firm (Mil)	**-4,209**	**-18,402**	**-4,030**	**2,470**	**4,494**	**6,655**	**6,992**	**8,693**

Balance Sheet (USD)	Actual			Forecast				
Fiscal Year, ends 31 Dec	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Assets								
Cash and Equivalents (Mil)	9,485	7,752	8,052	15,514	17,202	12,295	9,904	9,073
Inventory (Mil)	—	81,715	78,823	78,151	71,651	70,151	68,651	66,601
Accounts Receivable (Mil)	12,309	9,950	11,261	11,151	12,661	13,971	14,138	13,549
Net Property, Plant and Equipment (Mil)	12,502	11,820	10,918	10,126	9,648	9,401	9,431	9,528
Goodwill (Mil)	8,060	8,081	8,068	7,956	7,956	7,956	7,956	7,956
Other Intangibles (Mil)	3,338	2,843	2,562	2,562	2,562	2,562	2,562	2,562
Other Operating Assets (Mil)	6,087	6,409	4,110	4,514	4,616	5,198	5,579	5,787
Non-Operating Assets (Mil)	4,677	5,728	6,566	6,566	6,566	6,566	6,566	6,566
Total Assets (Mil)	**133,625**	**152,136**	**138,552**	**139,146**	**135,208**	**130,639**	**127,536**	**124,599**
Liabilities								
Accounts Payable (Mil)	15,553	12,928	9,261	10,200	11,125	12,981	13,568	13,766
Debt (Mil)	27,302	63,583	58,102	57,001	56,209	54,511	56,463	58,415
Other Operating Liabilities (Mil)	78,254	75,155	73,403	77,103	72,582	73,363	71,511	68,627
Non-Operating Liabilities (Mil)	20,816	18,545	12,632	12,632	12,632	12,632	12,632	12,632
Total Liabilities (Mil)	**141,925**	**170,211**	**153,398**	**156,936**	**152,548**	**153,487**	**154,174**	**153,440**
Equity								
Shareholders' Equity (Mil)	-8,617	-18,316	-14,999	-17,825	-17,375	-22,883	-26,674	-28,876
Minority Interest (Mil)	317	241	153	35	35	35	35	35
Total Equity (Mil)	**-8,300**	**-18,075**	**-14,846**	**-17,790**	**-17,340**	**-22,848**	**-26,639**	**-28,841**

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Management & Ownership

Management Activity as of 31 Mar 2022

Name	Position	Share Held	Report Date*	Insider Activity
Lawrence W. Kellner	Non-Executive Chairman of the Board	25,551	31 Mar 2022	8,749
Leanne G. Caret	Executive Vice President and Senior Advisor to the Chief Executive Officer.	98,090	31 Mar 2022	7,278
Bertrand-Marc Allen	Chief Strategy Officer and Senior Vice President, Strategy and Corporate Development	56,759	31 Mar 2022	4,381
Theodore Colbert	President and Chief Executive Officer, Boeing Defense, Space and Security	79,387	31 Mar 2022	4,833
Brett C. Gerry	Chief Legal Officer and Executive Vice President, Global Compliance	43,080	31 Mar 2022	137
David L. Calhoun	President, Chief Executive Officer and Director	211,607	31 Dec 2022	30,629
Steven M. Mollenkopf	Independent Director	8,068	31 Dec 2022	3,911
Michael D'Ambrose	Chief Human Resources Officer and Executive Vice President, Human Resources	52,061	31 Dec 2022	274
Gregory L. Hyslop	Chief Engineer and Executive Vice President, Engineering, Test and Technology	48,924	31 Dec 2022	2,989
Stanley A. Deal	Executive Vice President, President and Chief Executive Officer, Boeing Commercial Airplanes	91,392	31 Dec 2022	775

Fund Ownership as of 31 Dec 2022

Top Owners	% of Shares Held	% of Fund Assets	Change (k)	Portfolio Date
Vanguard US Total Market Shares ETF	3.04	0.32	222,619	31 Dec 2022
Vanguard Total Stock Market Index Fund	3.04	0.30	222,619	31 Dec 2022
Vanguard Instl Ttl Stck Mkt Idx Tr	2.97	0.20	282,369	30 Sep 2022
Vanguard 500 Index Fund	2.17	0.33	159,786	31 Dec 2022
SPDR® S&P 500 ETF Trust	1.04	0.33	-35,631	31 Dec 2022
Concentrated Holders				
Fidelity® Select Defense & Aero Port	0.22	16.18	0	30 Nov 2022
First Trust Indxx Aerspc & Defns ETF	0.00	9.57	0	29 Dec 2022
iShares US Aerospace & Defense ETF	0.32	7.71	6,789	30 Dec 2022
MUKAM Drone Related Equity Index MF	0.00	7.54	4,251	17 Aug 2022
Invesco Aerospace & Defense ETF	0.10	6.84	-127,674	31 Dec 2022

Institutional Transactions as of 31 Dec 2022

Top 5 Buyers	% of Shares Held	% of Fund Assets	Shrs Bought/Sold (k)	Portfolio Date
Capital World Investors	1.99	0.32	2,887,868	30 Sep 2022
Capital Research & Mgmt Co - Division 3	0.68	0.14	1,557,937	30 Sep 2022
FMR Inc	3.18	0.24	1,080,504	30 Sep 2022
Citadel Advisors Llc	0.25	0.04	1,005,331	30 Sep 2022
Vanguard Group Inc	7.58	0.16	670,698	30 Sep 2022
Top 5 Sellers				
BMO Capital Markets Corp.	0.15	0.13	-1,989,203	30 Sep 2022
Bank of Montreal	0.15	0.13	-1,989,203	30 Sep 2022
Viking Global Investors LP	0.00	—	-1,391,238	30 Sep 2022
Balyasny Asset Management LLC	0.00	0.01	-1,281,723	30 Sep 2022
Millennium Management LLC	0.03	0.01	-925,546	30 Sep 2022

*Represents the date on which the owner's name, position, and common shares held were reported by the holder or issuer.

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Boeing Co BA ★★★ 25 Jan 2023 22:28, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Moat Trend™	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
212.68 USD 25 Jan 2023	220.00 USD 27 Oct 2022 02:33, UTC	0.97	126.34 USD Bil 24 Jan 2023	Wide	Negative	High	Standard	4 Jan 2023 06:00, UTC

Comparable Company Analysis These companies are chosen by the analyst and the data are shown by nearest calendar year in descending market capitalization order.

Valuation Analysis as of 25 Jan 2023	**Price/Earnings**			**EV/EBITDA**			**Price/Free Cash Flow**			**Price/Book**			**Price/Sales**		
Company/Ticker	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*
Lockheed Martin Corp LMT	14.6	*20.4*	*23.0*	13.4	*14.9*	*20.7*	15.4	*12.5*	*18.7*	16.6	*9.0*	*23.7*	1.5	*1.4*	*1.8*
Northrop Grumman Corp NOC	12.9	*15.1*	*18.6*	12.9	*10.4*	*17.3*	17.6	*28.1*	*37.0*	4.8	*4.8*	*5.0*	1.4	*1.7*	*1.9*
Airbus SE AIR	-61.9	*21.0*	*22.8*	705.2	*10.4*	*10.7*	-10.5	*32.6*	*27.3*	10.9	*9.3*	*7.7*	1.4	*1.7*	*1.7*
Average	-11.5	*18.8*	*21.5*	243.8	*11.9*	*16.2*	7.5	*24.4*	*27.7*	10.8	*7.7*	*12.1*	1.4	*1.6*	*1.8*
Boeing Co BA	**-24.1**	***-22.2***	***-731.0***	**387.9**	***-398.3***	***25.6***	**-30.7**	***60.2***	***27.1***	**-7.9**	***-7.1***	***-7.2***	**1.9**	***1.9***	***1.6***

Returns Analysis as of 25 Jan 2023	**ROIC %**			**Adjusted ROIC %**			**Return on Equity %**			**Return on Assets %**			**Dividend Yield %**		
Company/Ticker	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*
Lockheed Martin Corp LMT	17.8	*17.8*	*11.4*	26.9	*26.8*	*16.9*	149.5	*57.0*	*65.7*	13.9	*9.5*	*10.5*	2.8	*3.0*	*2.5*
Northrop Grumman Corp NOC	11.4	*17.9*	*8.5*	26.6	*40.6*	*19.0*	32.9	*59.6*	*28.4*	7.4	*16.1*	*9.0*	1.9	*1.6*	*1.5*
Airbus SE AIR	-7.0	*11.6*	*11.9*	-4.9	*8.4*	*8.3*	-18.2	*53.0*	*38.0*	-1.0	*3.9*	*3.8*	—	*1.3*	*1.2*
Average	7.4	*15.8*	*10.6*	16.2	*25.3*	*14.7*	54.7	*56.5*	*44.0*	6.8	*9.8*	*7.8*	2.3	*2.0*	*1.7*
Boeing Co BA	**-0.9**	***-2.8***	***9.8***	**-0.8**	***-2.2***	***7.6***	**25.2**	***30.1***	***-3.7***	**-2.9**	***-3.6***	***0.5***	**1.0**	—	***0.2***

Growth Analysis as of 25 Jan 2023	**Revenue Growth %**			**EBIT Growth %**			**EPS Growth %**			**FCF Growth %**			**DPS Growth %**		
Company/Ticker	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*
Lockheed Martin Corp LMT	9.3	*2.5*	*-2.9*	1.2	*5.5*	*-9.7*	10.7	*-28.3*	*11.8*	-18.5	*65.5*	*-33.7*	8.9	*8.2*	*7.6*
Northrop Grumman Corp NOC	8.7	*-3.1*	*1.7*	2.4	*39.0*	*-35.8*	11.5	*8.4*	*-3.7*	-21.9	*-10.3*	*-65.8*	9.9	*8.6*	*9.7*
Airbus SE AIR	-29.2	*4.5*	*9.3*	-36.1	*-313.5*	*-1.3*	-17.5	*-470.8*	*-1.5*	-106.6	*-1956.6*	*63.7*	—	—	*0.3*
Average	-3.7	*1.3*	*2.7*	-10.8	*-89.7*	*-15.6*	1.6	*-163.6*	*2.2*	-49.0	*-633.8*	*-11.9*	6.3	*5.6*	*5.9*
Boeing Co BA	**7.1**	***6.9***	***21.3***	**-108.9**	***58.1***	***273.5***	**-63.4**	***14.5***	***-96.9***	**-78.1**	***-161.3***	***81.9***	**-75.0**	***-100.0***	—

Profitability Analysis as of 25 Jan 2023	**Gross Margin %**			**EBITDA Margin %**			**Operating Margin %**			**Net Margin %**			**FCF Margin %**		
Company/Ticker	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*
Lockheed Martin Corp LMT	17.2	*17.8*	*16.9*	12.3	*10.5*	*9.7*	13.2	*13.6*	*12.7*	10.5	*7.2*	*8.1*	9.8	*11.5*	*9.7*
Northrop Grumman Corp NOC	23.8	*29.4*	*22.7*	13.4	*19.0*	*13.3*	11.1	*15.8*	*10.0*	10.8	*11.6*	*10.6*	7.8	*6.0*	*5.3*
Airbus SE AIR	12.6	*23.8*	*23.2*	0.2	*15.6*	*14.7*	-5.5	*11.2*	*10.1*	-2.3	*8.1*	*7.3*	-13.4	*5.2*	*6.1*
Average	17.9	*23.7*	*20.9*	8.6	*15.0*	*12.6*	13.5	*13.5*	*10.9*	6.3	*9.0*	*8.7*	1.4	*7.6*	*7.0*
Boeing Co BA	**10.4**	***5.3***	***14.1***	**0.7**	***-0.6***	***8.2***	**0.9**	***1.3***	***4.1***	**-7.9**	***-8.5***	***-0.2***	**-6.2**	***3.2***	***5.8***

Leverage Analysis as of 25 Jan 2023	**Debt/Equity %**			**Debt/Total Cap %**			**EBITDA/Net Int. Exp**			**Total Debt/EBITDA**			**Asset/Equity**		
Company/Ticker	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*
Lockheed Martin Corp LMT	202.3	*106.5*	*303.8*	66.9	*51.6*	*75.2*	13.6	*12.4*	*10.8*	1.5	*1.7*	*2.5*	8.4	*4.6*	*9.8*
Northrop Grumman Corp NOC	134.8	*98.9*	*89.8*	57.4	*49.7*	*47.3*	8.3	*12.2*	*9.6*	2.9	*1.9*	*2.6*	4.2	*3.3*	*3.0*
Airbus SE AIR	265.2	*158.9*	*128.2*	72.6	*61.4*	*56.2*	0.3	*24.4*	*23.0*	162.8	*1.8*	*1.9*	17.1	*11.3*	*9.0*
Average	200.8	*121.4*	*173.9*	65.6	*54.2*	*59.6*	7.4	*16.3*	*14.5*	55.7	*1.8*	*2.3*	9.9	*6.4*	*7.3*
Boeing Co BA	**-387.4**	***-319.8***	***-323.5***	**134.8**	***145.5***	***144.7***	**0.2**	***-0.2***	***2.6***	**140.0**	***-134.1***	***8.5***	**-9.2**	***-7.8***	***-7.8***

Liquidity Analysis as of 25 Jan 2023	**Cash per Share**			**Current Ratio**			**Quick Ratio**			**Cash/Short-Term Debt**			**Payout Ratio %**		
Company/Ticker	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*	2021	*2022(E)*	*2023(E)*
Lockheed Martin Corp LMT	11.2	*13.0*	*10.3*	1.4	*1.4*	*1.4*	1.1	*1.2*	*1.1*	6.3	*600.7*	*465.2*	40.3	*60.8*	*58.5*
Northrop Grumman Corp NOC	29.3	*21.9*	*17.7*	1.6	*1.3*	*1.2*	1.5	*1.2*	*1.1*	—	—	*4.0*	29.8	*14.1*	*27.4*
Airbus SE AIR	18.4	*18.6*	*22.6*	1.2	*1.2*	*1.2*	0.6	*0.6*	*0.6*	4.8	*7.5*	*3.8*	0.0	*28.0*	*28.4*
Average	18.2	*19.9*	*19.9*	1.4	*1.3*	*1.3*	0.9	*0.9*	*0.8*	4.3	*152.8*	*119.1*	10.3	*25.7*	*36.1*
Boeing Co BA	**13.7**	***26.1***	***29.1***	**1.3**	***1.2***	***1.2***	**0.4**	***0.4***	***0.4***	**6.2**	***3.0***	***3.4***	**-28.7**	***0.0***	***30.0***

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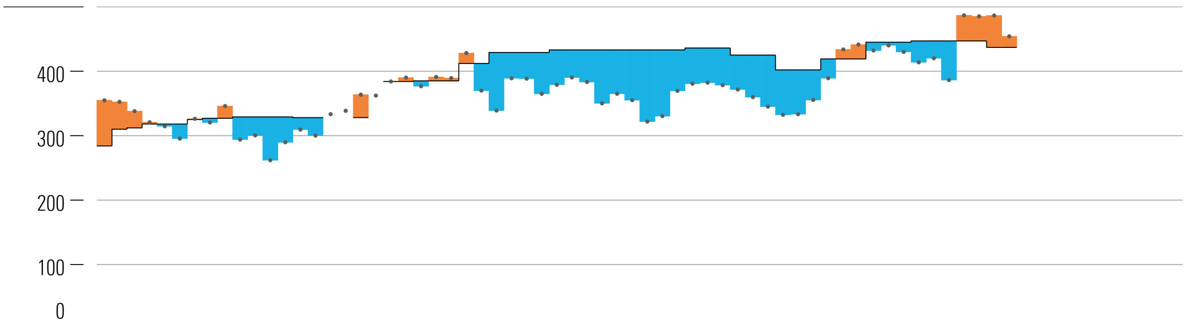
Boeing Co BA ★★★ 25 Jan 2023 22:28, UTC

Competitors Price vs. Fair Value

Lockheed Martin Corp LMT



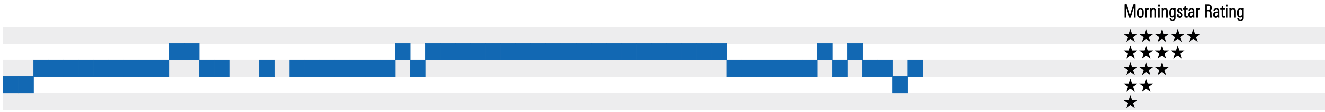
Last Close: 454.16

Fair Value: 437.00
22 Dec 2022 00:38, UTC

Over Valued
Under Valued

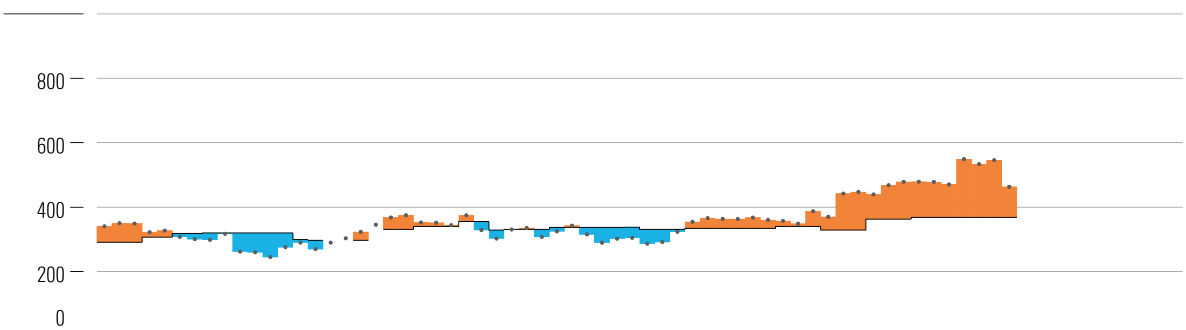
2018	2019	2020	2021	2022	YTD	
0.80	1.01	0.82	0.88	1.11	1.04	Price/Fair Value
-15.89	52.15	-6.32	3.11	40.09	-6.65	Total Return %

Morningstar Rating



Total Return % as of 25 Jan 2023. Last Close as of 25 Jan 2023. Fair Value as of 22 Dec 2022 00:38, UTC.

Northrop Grumman Corp NOC



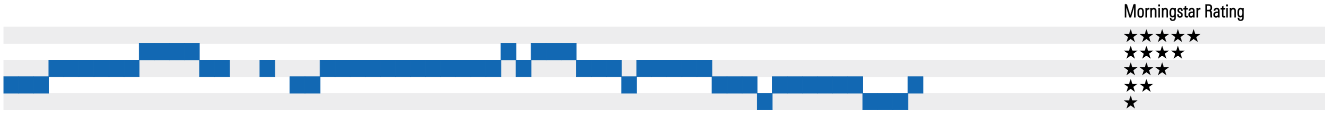
Last Close: 463.29

Fair Value: 368.00
29 Jul 2022 00:03, UTC

Over Valued
Under Valued

2018	2019	2020	2021	2022	YTD	
0.77	1.01	0.90	1.14	1.48	1.26	Price/Fair Value
-18.67	42.56	-9.76	29.05	42.71	-15.09	Total Return %

Morningstar Rating



Total Return % as of 25 Jan 2023. Last Close as of 25 Jan 2023. Fair Value as of 29 Jul 2022 00:03, UTC.

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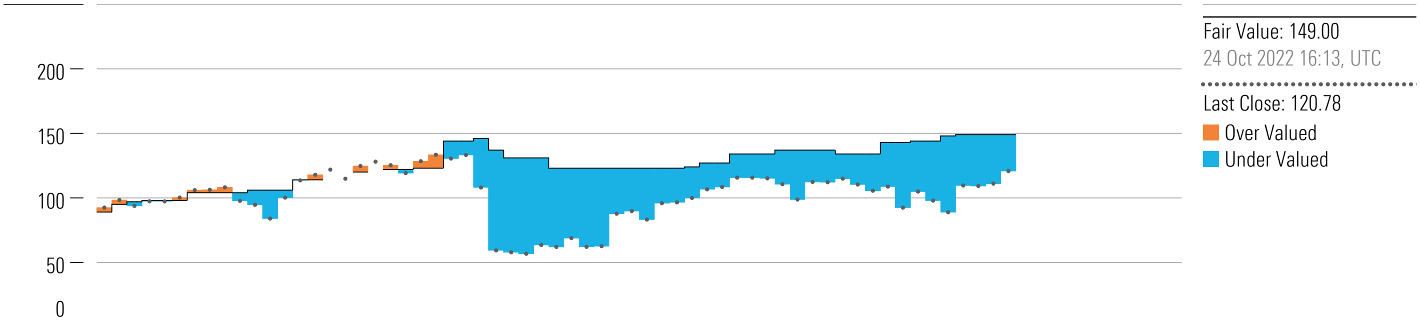
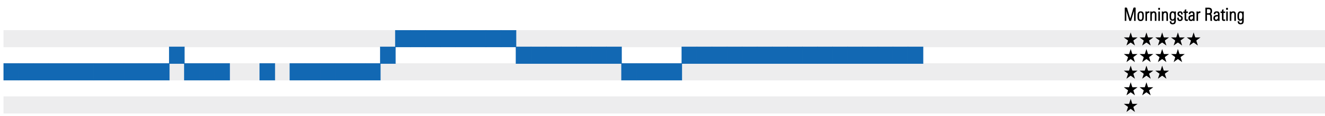
Competitors Price vs. Fair Value (Continued)

Airbus SE AIR



	2018	2019	2020	2021	2022	YTD	
	0.79	0.91	0.73	0.82	0.75	0.81	Price/Fair Value
	2.96	57.37	-31.19	25.15	0.14	8.79	Total Return %



Total Return % as of 24 Jan 2023. Last Close as of 24 Jan 2023. Fair Value as of 24 Oct 2022 16:13, UTC.

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Boeing Co BA ★★★ 25 Jan 2023 22:28, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Moat Trend™	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
212.68 USD 25 Jan 2023	220.00 USD 27 Oct 2022 02:33, UTC	0.97	126.34 USD Bil 24 Jan 2023	Wide	Negative	High	Standard	4 Jan 2023 06:00, UTC

Recent Analyst Notes

Supply Chain and Learning Curve Hamper Boeing's Ascent; Still Cheap Compared to New $220 FVE Nicolas Owens,Equity Analyst,27 Oct 2022

Based on Boeing's third-quarter results and management's discussion of operating conditions at the company, we reduced our fair value estimate to $220 from $238. The main reason is that supply-related risks are taking longer to resolve: recovery of commercial aircraft deliveries will take longer and the company has again incurred cost overruns in its fixed-price defense contracts. Both difficulties stem from supply chain shortages and labor instability. Part of what makes big seasoned manufacturers special (a core ingredient of the intangible asset to which we attribute this firm's wide economic moat) is the learning curve, which isn't working very well for Boeing right now, and management indicated it doesn't expect it to for at least another year.In smooth operating conditions, the learning curve means that as thousands of team members build complex systems like KC-46A tankers (based on the 767 jet body), they get better at it with repetition so it costs much less to deliver successive aircraft of a given design. Firms like Boeing quantify this phenomenon, and bake it into their budgets.But we live in interesting times. Boeing's suppliers, who deliver systems like jet engines and face their own versions of these disruptions, combined with what management described as labor instability, are wreaking havoc on Boeing's ability to get things done cheaper or faster than before. Boeing has hired 10,000 new employees recently, some of whom need time for training on specialized metal-casting techniques or clearance to work on classified programs, setting back the collective learning curve at Boeing.Our updated forecast pushes out Boeing's aircraft deliveries (notwithstanding healthy demand), with some inventoried 737 MAX and potentially 787s not leaving the lot until 2025. We also shaved profits from the defense unit, as Boeing indicated it has re-budgeted the completion of those programs affected by the third-quarter charge assuming no gains from the learning curve.

As Boeing Climbs Out of a Very Stormy Patch, We See A Bright Future For the Company and Investors Nicolas Owens,Equity Analyst,24 Oct 2022

We have reviewed recent performance at Boeing and monitored its progress in resuming deliveries from its beleaguered 737 and 787 assembly lines. We've increased our fair value estimate by $3 to $238 and we are maintaining Boeing's wide economic moat and negative moat trend ratings.After seemingly endless delays and setbacks, production of 737s climbed to 31 per month in summer 2022, along with deliveries (some from inventory) at a similar rate. And while new 787s are still being produced at very low rates (about 5 per quarter), with over 100 of these in inventory, Boeing will be able to start ringing the cash register at an extraordinary pace after having charged more than $10 billion to still its factories and rework hundreds of 737 and 787 jets.Even if the remainder of 2022 holds some more turbulence in store, for example, a delay in re-certifying the newest 737MAX-9 and 737MAX-10 models, further delay in re-certifying the 737MAX for Chinese airlines, and a slow rise in 787 manufacture rates, all told we see very strong tailwinds for Boeing for the next few years as pent up demand for air travel and aircraft boost growth and volumes approach prepandemic levels. Our forecast for 2022 is slightly more modest than our previous version, but is more than compensated for by stronger deliveries and cash flows in 2023, eventually reaching our normalized 2031 estimates of lower midcycle growth and stable profitability.

Boeing Posts Decent Q2, but Still Faces Operational Overhang and Long-Term Challenges Burkett Huey,Equity Analyst,27 Jul 2022

Wide-moat-rated Boeing reported improved cash flow and significant new orders in the second quarter as the firm re-ramps 737 MAX production and moves closer to a resumption of 787 deliveries. Sales of $16.7 billion and core loss per share of $0.37 missed FactSet consensus estimates by 4.3% and 146.7%, though we view the reduction in cash burn from $3.6 billion to about $0.2 billion as the more meaningful metric, as it makes the firm's full-year target of positive free cash flow considerably more believable. We are reducing our fair value estimate for Boeing to $233 per share from $239 as we tweak our deliveries forecast and reduce our medium-term profitability targets.Boeing posted $6.2 billion of commercial revenue on 121 aircraft deliveries. We found the narrow-body results encouraging. Boeing reduced inventory as it delivered an average of 34 737 MAX aircraft per month while reaching its production target of 31 per month. While we were discouraged that management didn't guide as to when it intends to step up MAX production because of supply shortages for engine castings, we're anticipating a step-up next year. During the quarter, the firm received 169 orders for 737-MAX type aircraft and secured an additional 278 orders for 737 MAXes at the Farnborough Air Show in July. We view these orders as encouraging but continue to see operational execution as a huge risk for shareholders. Currently, we think the most material aspects of operational risk in the narrow-body portfolio are supply shortages that may delay MAX production ramping behind materially behind our schedule and the additional regulatory hurdles Boeing would need to navigate if it does not receive 737 MAX-10 certification before Dec. 31, 2022.

Updating Our Moat Trend Ratings for Commercial Airplane Manufacturers; Both Look Cheap Burkett Huey,Equity Analyst,12 May 2022

After reassessing our long-term outlook for aviation, we are adjusting our Boeing fair value estimate to $239 per share from $240 and our Airbus fair value estimate to EUR 143/$37 per share from EUR 146/$38.50. We are reiterating our wide moat ratings for both companies, but we are updating our moat trend ratings to negative for Boeing and positive for Airbus.We think both names are undervalued. While we think Boeing is the cheaper stock at current prices, we think Airbus is the higher-quality name in the industry. We think the market is not fully appreciating the long-term growth runway of emerging-market GDP growth driving above-GDP revenue passenger kilometer growth.Broadly, we assume that Boeing will move from a roughly even share of the narrow-body market to about a 40% share as Airbus' A321LR and XLR are the only viable middle-of-the-market aircraft. We think the narrow-body market will continue to be the growth engine for aviation for the foreseeable future as airlines in developing countries build out short-haul networks. We assume Boeing will retain a 60% share of the wide-body market, but we don't think wide-body deliveries will return to peak levels until about 2030 as we expect the recovery in international travel will lag domestic travel and we expect aircraft deliveries will lag a travel recovery.We think Boeing's switching costs are deteriorating and Airbus' are improving. A key tenet of our switching cost argument for Boeing is that the market is large enough and undersupplied enough that incumbents benefit from switching costs stemming from a lack of viable alternatives. We believe that Boeing's inability to produce a competitive middle-of-the-market aircraft will structurally reduce the market over which it can exert these switching costs as Airbus launches the A321XLR, and that Airbus' increasing monopolization of the middle of the market will give it even more market power.

Boeing Was Unable to Overcome Operational Difficulties in Q1; Reducing FVE to $240 Per Share Burkett Huey,Equity Analyst,28 Apr 2022

Wide-moat-rated Boeing reported 777X development delays, delays on 787 delivery resumption, and uncertainty regarding 737 MAX delivery resumption in China. Sales of $14.0 billion missed FactSet consensus by 12.7% and core loss per share of $2.75 missed these estimates by a large enough percentage that the comparison isn't meaningful.We are reducing our fair value estimate for Boeing to $240 per share from $249 as we incorporate first-quarter results and include the development costs of a new midsized aircraft development within our explicit forecast. Shares look cheap to us, though we recognize the firm is mired in operational issues that are difficult for outside observers to fully contemplate.Narrowbody aircraft deliveries increased by 36.5% to 86 737 MAX aircraft, and while these delivery figures are below the 31 per month production target, Boeing anticipated resuming 737 MAX deliveries in China this quarter, which did not occur. We believe the two main reasons why 737 MAX deliveries have not resumed in China yet is the China Eastern 737-800 crash that occurred in March and the significant restrictions the Chinese government is imposing to contain the spread of COVID-19. While there hasn't been any official rationale given as to why the aircraft crashed yet, the Civil Aviation Administration of China has had access to internal flight data for about a month and China Eastern has resumed 737-800 flights as of April 17. We think the fact that the airline has resumed flights is indicative that Boeing is probably not at fault for the crashes. With regards to the restrictions, Chinese domestic travel is down 70% as of February 2022, so Chinese airlines are not rushing to take the aircraft. We don't have any informational advantage regarding when zero-COVID-19 policies will be loosened, but evidence from prior COVID-19 waves suggests that Chinese consumers return to travel quickly as restrictions relax.

We're Waiting for U.S. Budgetary News Before Updating Defense Valuations; Risk Skews to the Upside Burkett Huey,Equity Analyst,28 Feb 2022

As the Russian military is conducting significant military operations throughout Ukraine, we believe it is worthwhile to reconsider the effects of the war on global defense budgets and the subsequent effects on defense prime contractor valuations. As of Feb. 28, the German Chancellor Olaf Scholz announced that Germany would increase defense spending from roughly 1.5% of GDP to over 2% of GDP and the Japanese Ministry of Defense announced in November that Japan's fiscal 2022 defense budget would rise to about 1.14% of GDP, which would be the first time since the 1960s that Japanese defense spending exceeded 1% of GDP. Despite the increases in defense budgets, we are maintaining our valuations across our North American prime contractor coverage as we await news from Washington on defense spending for fiscal 2023. This noted, we would expect that the military operations will encourage more spending that would buoy the justified valuations of prime contractors, so we think the risks to our valuations skew to the upside. Valuation-wise, our preferred names within our defense prime coverage are Lockheed Martin and Huntington Ingalls.We think waiting to update our valuations is prudent because the domestic market remains by far the most important market for defense prime contractors. Most U.S.-based defense primes have about 10%-30% top-line exposure to international customers, with Lockheed Martin and Raytheon Technologies having relatively more international defense exposure and Huntington Ingalls, Northrop Grumman, and General Dynamics having relatively lower levels of international defense exposure. Procurement accounts tend to be the most cyclical defense budget account, so changes in defense spending have an outsized impact on procurement. Still, a large increase in these nations' defense budgets seems unlikely to us to drive more than a 5% change in any contractor's top line.

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.

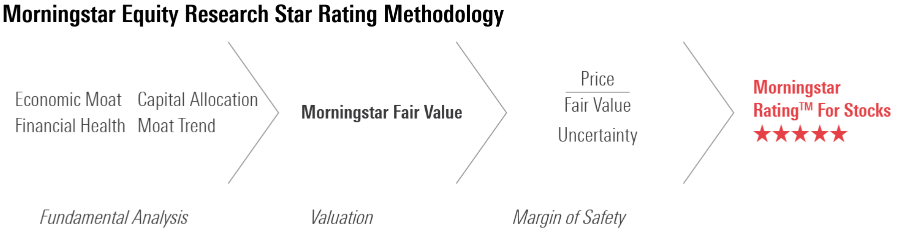
When considering a company's moat, we also assess whether there is a substantial threat of value destruction, stemming from risks related to ESG, industry disruption, financial health, or other idiosyncratic issues. In this context, a risk is considered potentially value destructive if its occurrence 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.

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

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 Equity Research Star Rating Methodology



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

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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 anything 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.

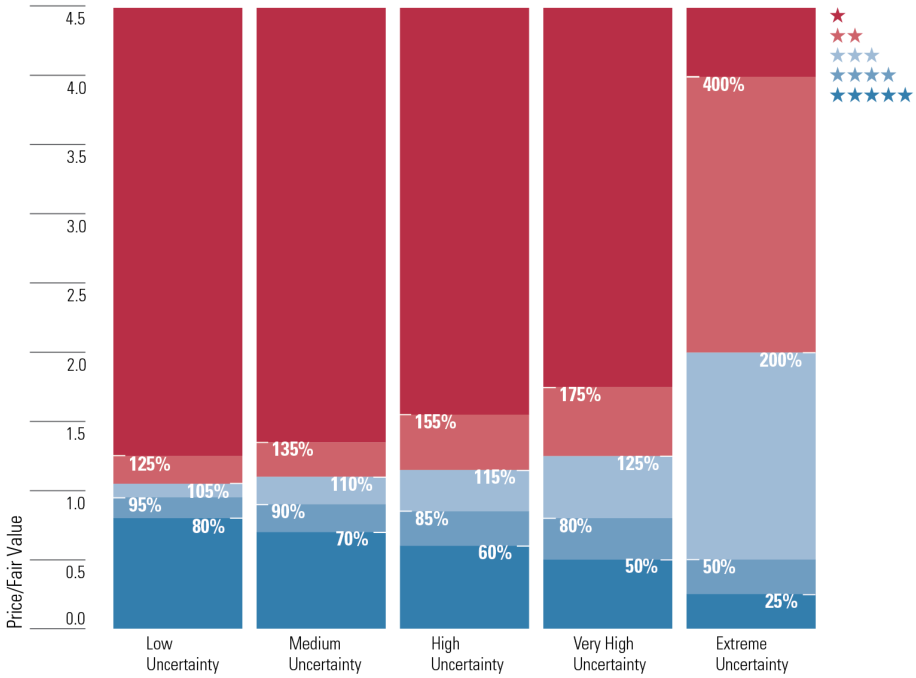
Our recommended margin of safety—the discount to fair value demanded before we'd recommend buying or selling the stock—widens as our uncertainty of the estimated value of the equity increases. The more uncertain we are about the potential dispersion of outcomes, the greater the discount we require relative 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.

Morningstar Equity Research Star Rating Methodology



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

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

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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 companies' 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 Rating Assessment: The ESG Risk Rating Assessment is provided by Sustainalytics; a Morningstar company.

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/

Ratings should not be used as the sole basis in evaluating a company or security. Ratings involve unknown risks and uncertainties which may cause our expectations not to occur or to differ significantly from what was expected and should not be considered an offer or solicitation to buy or sell a security.

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.

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