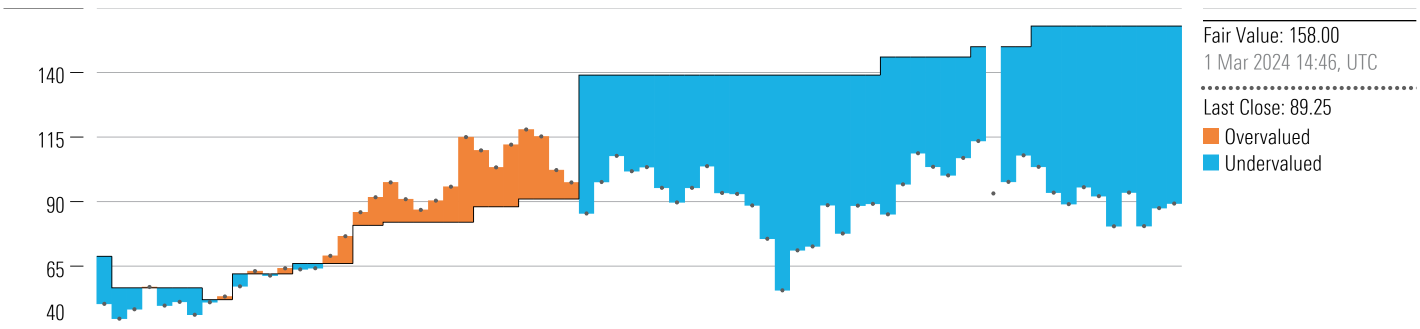
Morningstar Equity Analyst Report | Report as of 31 Dec 2024 00:52, UTC | Reporting Currency: CNY | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS

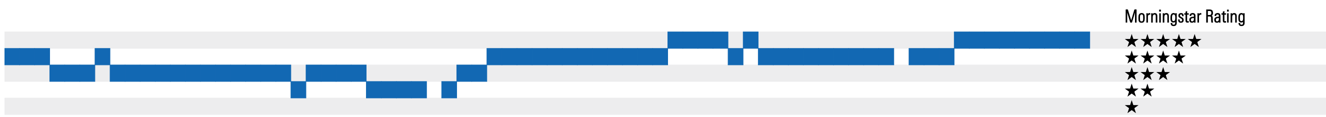
NetEase Inc ADR NTES ★★★★★ 30 Dec 2024 22:32, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
89.25 USD 30 Dec 2024	158.00 USD 1 Mar 2024 14:46, UTC	0.56	57.52 USD Bil 30 Dec 2024	Narrow	Large Blend	High	Standard	4 Dec 2024 06:00, UTC

Price vs. Fair Value



	2019	2020	2021	2022	2023	YTD	
	0.99	1.17	0.73	0.52	0.70	0.56	Price/Fair Value
	34.44	57.67	7.14	-27.14	30.68	-1.57	Total Return %



Total Return % as of 30 Dec 2024. Last Close as of 30 Dec 2024. Fair Value as of 1 Mar 2024 14:46, UTC.

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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.

NetEase's R&D Strengths Are Key to Developing Next-Generation Blockbuster Games

Business Strategy & Outlook Ivan Su, Senior Equity Analyst, 28 May 2024

NetEase started as a Chinese internet portal in the late 1990s but has now become the second-largest mobile game company in the world. The firm owns one of the most well-known massively multiplayer franchise in China—Fantasy Westward Journey. Over the past decade, NetEase has capitalized on the industry shift toward mobile gaming and now focuses on developing innovative, high-quality, and long-cycle games with a mobile-first approach. Over the past years, the firm has established iconic titles such as Onmyoji, Naraka Bladepoint, and Identity V. Every year, the company publishes dozens of games spanning across almost every genre. In addition, NetEase is also collaborating with firms such as Microsoft and Marvel to release games based on famous global intellectual property like Diablo, Harry Potter, and Lord of the Rings. Over the foreseeable future, we expect NetEase to continue to leverage its in-house research and development capabilities and user data to develop next-generation games.

Like its global gaming peers, NetEase maintains a high level of profitability (above 30% operating margin) for its gaming business, thanks to stable revenue from core titles and the steady development of new franchises. We believe the firm is positioned to not only continue capitalizing on the success of Westward Journey titles, but to also keep diversifying its revenue into new franchises.

While games will remain NetEase's core cash flow driver, we think the firm's investments in other areas

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Sector	Industry
Communication Services	Electronic Gaming & Multimedia

Business Description

NetEase, which started on an internet portal service in 1997, is a leading online services provider in China. Its key services include online/mobile games, cloud music, media, advertising, email, live streaming, online education, and e-commerce. The company develops and operates some of the China's most popular PC client and mobile games, and it partners with global leading game developers, such as Blizzard Entertainment and Mojang (a Microsoft subsidiary).

(music streaming, online education, e-commerce) also offer long-term potential. Cloud Village, the group's music streaming arm, had over 200 million monthly active users in 2023 and remained the second-largest music streaming platform in China. Youdao is the group's attempt at cracking the online education market, but recent regulatory changes in China add uncertainty to this business model.

Bulls Say Ivan Su, Senior Equity Analyst, 28 May 2024

- NetEase's expertise in asymmetric multiplayer (Identity V and Dead by Daylight) would allow it to capitalize on future opportunities in this genre.
- The firm has done an admirable job at organically expanding into Japan, and it is likely that it will be able to replicate same success in Europe and the US.
- NetEase Music could see stronger user growth now that Tencent Music was told to end its exclusive licensing agreements with music labels on anti-trust grounds.

Bears Say Ivan Su, Senior Equity Analyst, 28 May 2024

- Leadership changes at Activision Blizzard can further delay the launch of much anticipated Diablo Immortal.
- Further escalation in geopolitical tensions could keep a lid on NetEase's overseas expansions.
- Video game pure-plays like NetEase will remain susceptible to changes in the government's stance on games.

Economic Moat Ivan Su, Senior Equity Analyst, 28 May 2024

We assign NetEase a narrow moat rating based on its intangible assets from its widely recognized intellectual property in the form of compelling game franchises. We believe that NetEase will continue to generate excess returns on capital over the next decade. Games generated more than 70% of NetEase's total revenue and more than 100% of its net profit in 2023. The operating margin for the segment has been running at above 30%. Over the past 10 years, NetEase generated an average ROIC of 89%, and we expect the business to generate an average ROIC of 30% for the next decade, well exceeding its weighted average cost of capital of 8.5%.

NetEase is the second-largest game publisher in China, with about 20% of the revenue market share in 2023. Over the past decade, China's game industry has seen a shift from PC to mobile, and NetEase has capitalized on the transition and turned itself into a publisher with multiple franchises across mobile and PC. The firm has published a total of more than 30 PC games and 100 mobile games. Some of the most well-known franchises include Fantasy Westward Journey, Westward Journey Online, Onmyoji, and the recently published Naraka Bladepoint.

The initial success of NetEase was primarily found in its title, Fantasy Westward Journey (FWJ)—one of the most played and highest-grossing franchises over the past two decades. The importance of FWJ to

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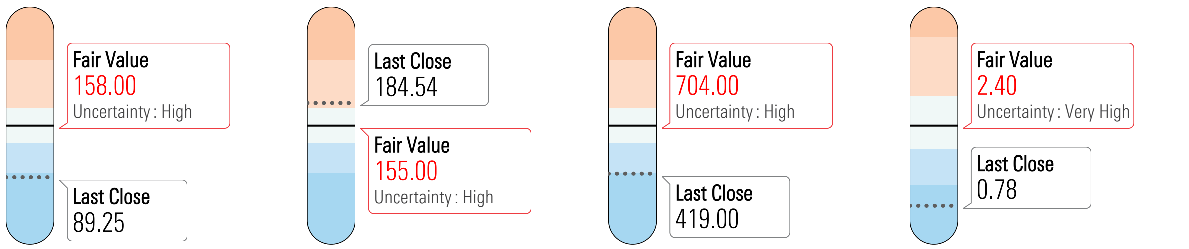
Competitors



	NetEase Inc ADR NTES	Take-Two Interactive Software Inc TTWO	Tencent Holdings Ltd 00700	CMGE Technology Group Ltd 00302
Economic Moat	Narrow	Narrow	Wide	None
Currency	USD	USD	HKD	HKD
Fair Value	158.00 1 Mar 2024 14:46, UTC	155.00 17 May 2024 19:24, UTC	704.00 12 Jan 2023 03:57, UTC	2.40 2 Apr 2024 09:37, UTC
1-Star Price	244.90	240.25	1,091.20	4.20
5-Star Price	94.80	93.00	422.40	1.20
Assessment	Undervalued 30 Dec 2024	Overvalued 30 Dec 2024	Undervalued 30 Dec 2024	Undervalued 30 Dec 2024
Morningstar Rating	★★★★★30 Dec 2024 22:32, UTC	★★30 Dec 2024 22:32, UTC	★★★★★30 Dec 2024 17:23, UTC	★★★★★30 Dec 2024 17:24, UTC
Analyst	Ivan Su, Senior Equity Analyst	Michael Hodel, Director	Ivan Su, Senior Equity Analyst	Ivan Su, Senior Equity Analyst
Capital Allocation	Standard	Standard	Exemplary	Standard
Price/Fair Value	0.56	1.19	0.60	0.33
Price/Sales	4.03	5.88	5.80	0.91
Price/Book	3.13	5.64	3.77	0.39
Price/Earning	15.15	—	19.26	—
Dividend Yield	2.67%	0.00%	0.81%	0.00%
Market Cap	57.52 Bil	32.41 Bil	3,827.77 Bil	2.34 Bil
52-Week Range	75.85—114.50	135.24—191.91	260.20—482.40	0.63—1.62
Investment Style	Large Blend	Mid Growth	Large Growth	Small Value

NetEase is comparable to the relationship between World of Warcraft (WoW) and Blizzard. Like WoW, FWJ is a massively multiplayer online game (MMO) that comes with a step learning curve and requires massive time investments. Because playing MMOs requires many combat and non-combat collaborations between different players, virtual relationships (friends, mentors, guilds, or even families) naturally formed between players. These relationships, coupled with deep knowledge of the game and high sunk investments, have effectively kept players sticking around FWJ. This is why the game can maintain a high level of concurrent players after 18 years of launch. With players continuing to spend time in the game, NetEase monetizes their IP year after year through expansion packs, version upgrades, merchandise sales. We estimate that the FWJ franchise contributed to more than 10% of NetEase's game revenue in 2023.

NetEase has capitalized on the industry shift toward mobile gaming by (re)developing new high-quality

IP with a mobile-first approach. The group's mobile game portfolio has expanded from just 12 titles in 2014 to over 100 in 2023. The mobile version of FWJ was launched in 2015 and remained in the top 10 global highest grossing income in history. Onmyoji is another flagship IP that was developed in-house by NetEase. Since its launch in 2016, Onmyoji's annual revenue has been grossing over CNY 2 billion. The success of the first Onmyoji game has allowed NetEase to create multiple other games based on the same IP but with different genres. In addition to what has already been mentioned, NetEase has also seen successes with self-owned titles like Identity V, Invincible, and Naraka Bladepoint. In essence, we think NetEase's existing portfolio of successful franchises will allow the firm to monetize its intellectual property through in-game microtransactions for an extended period while the firm invests some of these returns into creating more innovative titles.

In addition to in-house games, NetEase partners with global leading game developers, mainly Blizzard and Mojang, to publish their popular games in mainland China, which has diversified the genres of NetEase's online games offering. Although we don't think the intangible assets derived from these exclusive licenses are as significant, we believe these partnerships have strengthened NetEase's leading position in China. In addition, we believe that there are certain switching costs for NetEase's partners because all the licensed games are operated on NetEase's servers. If they switch to another local operator, they will need to discontinue the operation of the games for a while for the replacement of the server, which will impact players' experiences. Since 2008, Blizzard has licensed NetEase the exclusive rights to publish its PC-client and mobile games, including StarCraft II series, World of Warcraft, Heroes of the Storm, Hearthstone, Diablo III, and Overwatch.

Like other Chinese conglomerates, NetEase has leveraged its online presence and robust profitability from games to create new products in other high-growth categories. Most of these new ventures operate at negative margins to achieve market share, dragging down the overall company's profitability.

Youdao is NetEase's online education business, but recent regulatory changes in China add massive uncertainty to this business model. Even before the regulatory crackdown, Youdao has been generating losses since 2017. Given the highly competitive landscape in Chinese online education, we surmise this would be a no-moat business even if the government allows them to profit from after-school academic tutoring.

Lastly, we do not have confidence that NetEase's other ventures will generate excess ROICs. This segment (mainly consists of online music streaming and audio live streaming) has been generating operating losses for the group for many years. While its music streaming arm, Cloud Village, is the second-largest one in China, we do not expect the business to achieve operating breakeven until 2025, as it will continue to invest in content acquisition, sales and marketing, and research and development over the next few years. Nonetheless, we are confident that the business will see margin expansion thanks to the cost leverage from increasing subscribers and lower fixed content payment to music labels under nonexclusive agreements.

Fair Value and Profit Drivers Ivan Su, Senior Equity Analyst, 1 Mar 2024

Our fair value estimate is $158 per share. Our valuation implies a 2024 P/E of 20 times.

We expect the company to record a five-year total revenue CAGR of 11%. Operating margin should increase as the core gaming business expands into more-profitable overseas markets. Therefore, we forecast NetEase to record a five-year operating income CAGR of 16%.

For the firm's core gaming segment, we forecast a five-year revenue CAGR of 10%. We continue to be confident in NetEase's international expansion and strong research and development capabilities in developing popular games. We expect gross margin for the segment to gradually go up to 65% over the next five years, as the result of: 1) a growing revenue base that brings more operating leverage; and 2) the increasing popularity of cross-platform games, which means more gamers will be paying NetEase directly on their PCs, allowing the firm to pay less in revenue sharing fees to mobile app stores.

Cloud Music, NetEase's music streaming arm, is expected to generate a five-year revenue CAGR of 11%. This is supported by continued subscriber growth and subscription price hikes, while partially offset by declining livestreaming revenue.

Youdao, the online education subsidiary, used to be a note worthy segment for the company, but not anymore. Tightened regulation on K-12 education will continue to weigh on Youdao, but at today's market cap, that business makes up to less than 1% of NetEase's valuation.

Innovative businesses accounted for 8% of the firm's revenue in 2023. The segment includes a variety of noncore businesses such as e-commerce and livestreaming. We forecast that this segment's revenue CAGR will be 5% over the next five years, while gross margin should improve as these businesses gain scale.

Our sum-of-the-parts analysis assigns a 25 times 2024 P/E multiple to NetEase's core game business—a valuation that is equivalent to close to 80% of total group valuation. Cloud Village (freemium music streaming business) contributes another 2%, Youdao (online education provider) makes up a negligible 0.3% of group valuation, while the rest comes from equity investments and net cash.

Risk and Uncertainty Ivan Su, Senior Equity Analyst, 28 May 2024

Our Morningstar Uncertainty Rating for NetEase is High.

Our assessment of NetEase's risks is shadowed by the precarious nature of regulation in China. In December 2023, Chinese regulators introduced draft rules designed to curtail video game spending—a move that can materially impact publishers' revenue. Although there have been indications of a possible relaxation in some of these measures, the long-term regulatory framework remains unclear.

The unpredictable nature of China's regulatory environment was demonstrated from August 2021 to April 2022, when the issuance of gaming licenses came to a halt. This pause was a response to new limitations on gaming hours for under-18s and a more stringent examination of game content. The potential for further regulatory interventions of this kind poses a material threat to NetEase's financial performance.

Moreover, the online gaming market is characterized by its capricious user interests, negligible switching costs, and fierce competitive landscape. The success or failure of new game releases, as well as the upkeep and enhancement of existing titles, can cause considerable volatility in earnings for NetEase.

In terms of environmental, social, and governance, or ESG, risks, we have identified two sources of major uncertainty for NetEase. Government policies regarding online gaming present a clear risk, yet societal attitudes amplify this challenge. If the trend of public opinion shifts toward viewing online games as addictive substances, gaming could become stigmatized. This could substantially tarnish NetEase's brand reputation, complicating its ability to maintain its current user base and attract new players. While there are also other ESG risks that are worth monitoring, such as human capital and data privacy, we do not expect these risks to have a material impact on NetEase's revenue and profit.

Capital Allocation Ivan Su, Senior Equity Analyst, 28 May 2024

We assign NetEase a Standard Capital Allocation Rating. We view the firm's balance sheet as sound—evidenced by its strong net cash position. The firm generated free cash flow over the past 10 years and is expected to continue doing so over the foreseeable future.

NetEase's growth has been mainly driven by organic growth instead of mergers and acquisitions. NetEase's R&D investment (which has been growing at nearly 36% the last five years) remains at around 15% of revenue. Returns on those investments are indicated by further growth in players and their monetization. The company's founder and CEO, Ding Lei, has demonstrated a focus on long-term organic investments, which we view as positive. With NetEase's overseas ambitions, we expect it to become more active in buying up stakes in small to medium game studios to fill out gaps in development capabilities.

Given the business' cash position and the cash flow generation, we believe that NetEase can issue a very large amount of debt to fund any potential acquisitions.

Under Ding's leadership, NetEase has also expanded into various other internet services such as music, online dictionary, Cloudnote, education, and e-commerce. Some of these investments have done well, while others struggle on the path to profit. Overall, we believe management has a decent approach to capital allocation, which has been proved by strong earnings growth over the past couple of years.

NetEase has also being pay dividends, with an average payout ratio of 30% over the past three years. Barring major acquisitions, we expect the company to maintain this dividend policy over the near-term before gradually increasing payout ratio as the business matures.

Analyst Notes Archive

NetEase Earnings: Upcoming Release of Where Winds Meet Should Boost Game Revenue Ivan Su, Senior Equity Analyst, 15 Nov 2024

Narrow-moat NetEase’s third-quarter earnings were in line with our estimates. We maintain our long-term forecasts and fair value estimate of $158 (HKD 246). We continue to view the firm's shares as undervalued, trading at 11 times 2025 earnings and a 50% discount to our valuation.

During the third quarter of 2024, NetEase’s revenue declined 4% year over year due to the shutdown of its PC live-streaming service to concentrate on its game division. Estimated game billings (incorporating changes in deferred revenue) grew by 2% compared with last year, underperforming the industry due to a lack of new game releases. But with the high-profile title Where Winds Meet coming out in December, revenue growth should accelerate starting in the first quarter of 2025. We estimate the game to generate CNY 10 billion in annual sales, contributing to about 11% of NetEase's game revenue for 2025.

Profitability remains decent despite revenue decline, with an operating margin of 27.3% versus 27.7% from the same period last year. Over the next five years, we expect NetEase to see margin expansion, driven by 1) a lower percentage of revenue sharing expense with app stores, as Android lowers distribution fees while Apple loosens restrictions around third-party payment methods; 2) operating leverage at both core and noncore businesses like Cloud Village. Over a five-year horizon, we expect the firm to record an operating profit compound annual growth rate of 13%, outpacing revenue CAGR of 9%. Our operating margin assumption for 2028 is 31.4%, up from 26.2% in 2023.

NetEase Earnings: Investors Overreact to Temporary Gaming Slowdown Ivan Su, Senior Equity Analyst, 23 Aug 2024

Narrow-moat NetEase’s second-quarter results were mixed with slightly lower revenue yet higher operating income compared with our estimates. Concerns about the near-term outlook were sparked by slowing game revenue and mid-single-digit deferred income growth, as evidenced by a more than 10% decline in share price during US trading. However, we view this reaction as shortsighted, overly fixated on minor fluctuations in near-term revenue. In our view, NetEase's commitment and patience in developing next-generation games will yield substantial rewards over time. We anticipate that the upcoming release of Where Winds Meet will be a commercial success and a significant driver of growth in 2025 and beyond. Overall, we maintain NetEase's fair value estimate at $158 (HKD 246) and consider the shares as undervalued.

Revenue in the second quarter grew by 6% year over year, with game revenue increasing by 12%. However, after adjusting for changes in deferred revenue, total game billings only rose by 6%, marking a deceleration from the 16% growth observed in the first quarter. This slowdown is primarily attributed to a drop in sales of Fantasy Westward Journey and Eggy Party. Nevertheless, this decline is likely temporary, in our view. Management indicated that user metrics remain strong for both games, so we believe it can reignite growth with future content updates.

Profitability stood out in the second quarter, with a gross margin of 62.9%, marking an expansion of 300 basis points from the same period last year. A favorable shift in revenue mix mainly drove this improvement in profitability. We see long-term upside to gross margin as Chinese mobile platforms progressively reduce their take rates from 50% to 30%. Additionally, the shift toward cross-platform gaming should also divert some game sales from mobile to PC, where there is no app-store take rate, further lifting game developers' profitability.

From Myth to Reality: What's Next After Wukong? Ivan Su, Senior Equity Analyst, 22 Aug 2024
History was made when Wukong: Black Myth became the second most popular game on Steam, yet several questions about its implications remain unanswered. Here, are some of our thoughts.

First, the majority of Wukong's sales are from China, evidenced by less than 10% of its Steam reviews being in English. This is much lower than AAA titles like Elden Ring, which has over 50% English reviews, and 37% for Resident Evil 2. In our view, this indicates that Wukong's success is driven by domestic enthusiasm, and while Chinese AAA are poised to gain more global recognition, progress is likely to be gradual.

Second, Wukong's immense popularity in China prompted questions about a shift in gaming preferences, evidenced by a 20-fold increase in searches for "PS5" on WeChat. Yet, challenges like content restrictions and minimal social buzz for foreign games limit adoption. Additionally, long work hours in China challenge the deeper engagement required by AAA games. Therefore, we don't expect Wukong's success to take away the popularity of mobile gaming.

Third, although Wukong's release was celebrated in state media, this does not signal an immediate shift in the regulatory outlook for the industry. Positive coverage from Xinhua merely reflects their viewpoint. The National Press and Publication Administration sets the regulatory framework. Given the complex interactions between government bodies, we should be cautious about extrapolating broader regulatory shifts.

Lastly, looking beyond Wukong, AAA development remains a lengthy process and not always a priority for Chinese developers, leading to a limited pipeline. However, NetEase's upcoming AAA release of Where Winds Meet could spark interest. This open-world RPG, reminiscent of Elden Ring, will be available across all platforms. If successful, the game could further elevate China’s position in the global gaming scene and potentially influence more studios to expand into AAA development.

Huawei's Potential Fee Shakeup Could Be a Win for Game Developers Ivan Su, Senior Equity Analyst, 19 Jun 2024

There have long been complaints that app stores take too big a share of in-app purchases, but nothing has managed to shake the 30% take-rate standard over the past decade. However, Bloomberg’s recent report on Huawei's talks with Tencent to establish a lower-than-industry share of 20% for in-game purchases provides hope for a reset. This move also reinforces our call for higher profitability for gaming companies over the long run. Although the Huawei HarmonyOS mobile operating system currently represents a small percentage of smartphones in China, the potential lowering of its app store fee to 20% could pressure other mobile app platforms to follow suit.

We don’t expect a whopping 10-percentage-point increase in profit margins for Chinese developers under our coverage. Our models generally bake in a 5-percentage-point increase in margins over the next 10 years due to a combination of lower take rates and the rising popularity of cross-platform games. However, news like this paves the way for higher margins at an earlier date. While we maintain our fair value estimates for Chinese gaming companies under our coverage for now, we recognize that a shift in app store fee structures could serve as a potential driver for future revisions. We recommend closely monitoring developments in this area as a 10-percentage-point improvement in margin is very significant for gaming companies that currently generate operating margins of around 30%.

NetEase Earnings: Management Reassures as Growth Continues Amid Regulatory Stability Ivan Su, Senior Equity Analyst, 24 May 2024

Narrow-moat NetEase’s first-quarter earnings were in line with our expectations. Management clarified recent updates to its legacy title, Fantasy Westward Journey, confirming that these were not regulatory-driven, thereby providing reassurance to investors. With an impressive lineup of releases scheduled for this summer, NetEase is poised for a strong showing. We maintain our earnings estimates and keep our fair value estimates at USD 158 and HKD 246 per share. We continue to view shares as undervalued.

NetEase’s shares recently faced pressure due to updates made to Fantasy Westward Journey. This sparked market concerns that the company might have been compelled to scale back monetization to comply with regulators. However, NetEase clarified that the changes were intended to foster a more vibrant gaming community and that it doesn't anticipate a negative financial impact. Reinforcing this,

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the game's mobile version has achieved record revenue since its updates, underscoring the success of NetEase's adaptive strategies.

Recapping recent regulatory developments, in December 2023, a brief appearance of a new regulatory draft alarmed the gaming industry. Although quickly withdrawn with no further action, it led to widespread investor speculation. NetEase and Tencent reassured stakeholders, expressing confidence that the rule wouldn't reappear. Additionally, the steady issuance of new game licenses should further stabilize investor confidence and support a positive outlook for the sector.

Building on this positive regulatory environment, NetEase's first-quarter financial performance was strong. Revenue increased by 7% year over year, with game revenue up 10%. After accounting for changes in deferred revenue, total cash billings were up by a further 15% from a year earlier, indicating an even stronger outlook as we move further into 2024. Profitability remains solid, with an operating margin of 28.4%, largely unchanged from the same period last year.

NetEase Earnings: Leveling Up in Shareholder Returns Eclipse Slight Revenue Miss Ivan Su, Senior Equity Analyst, 1 Mar 2024

Even though fourth-quarter earnings were slightly below our estimates, NetEase's enhanced commitment to capital returns reflects improving corporate governance. Our confidence in NetEase remains unshaken, as management again demonstrated unwavering dedication and patience in crafting next-generation games. This commitment should translate to continued outperformance, cementing it as our top selection in the interactive media space. We fine-tune our near-term estimates, roll forward our model, and lift NetEase's fair value estimate by 5% to $158 per ADR (HKD 246 per H-share). Reflecting on the words from NetEase's management about the regulatory climate in China, it seems prudent to dial back NetEase's Morningstar Uncertainty Rating to High from Very High, aligning with its status before the unsettling regulatory draft in December 2023. The firm's shares remain undervalued, trading at a 30% discount to our valuation, and we would treat any weakness in the stock as an opportunistic entry point.

NetEase concluded 2023 with an 11.5% year-over-year increase in game revenue for the fourth quarter. After incorporating changes in deferred revenue, total game billings in the quarter were up 15.7% compared with the same period last year, suggesting solid demand for its gaming content and robust momentum heading into 2024. Although the fourth-quarter revenue growth rate slightly trailed our projection, there are no fundamental concerns to prompt a revision of our long-term view. Profitability improved in the quarter, as NetEase's operating margin reached 25.3%, up almost 400 basis points on a like-to-like basis from the same period last year. The improvement in profitability was primarily due to the rising operating leverage in its music streaming subsidiary—Cloud Music.

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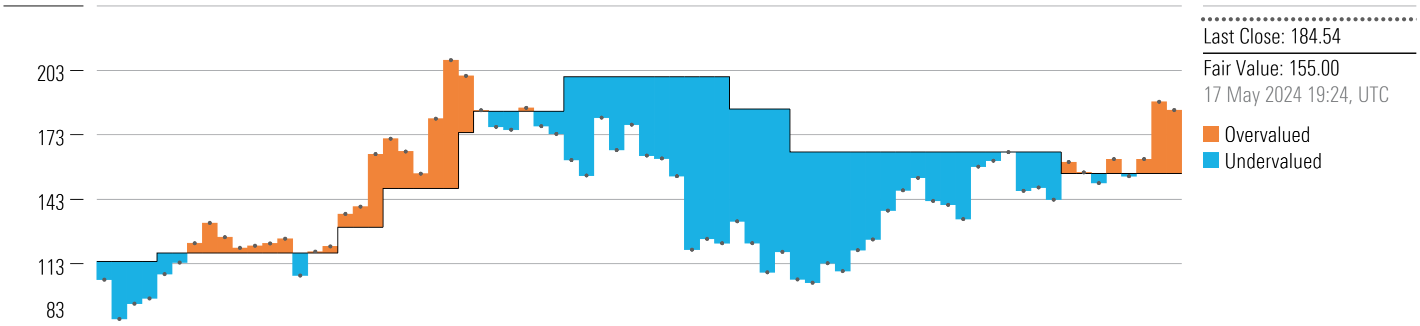
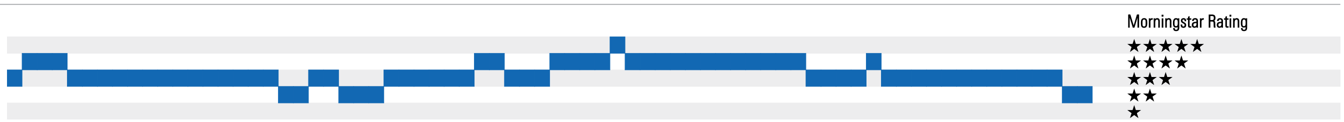
Competitors Price vs. Fair Value

Take-Two Interactive Software Inc TTWO

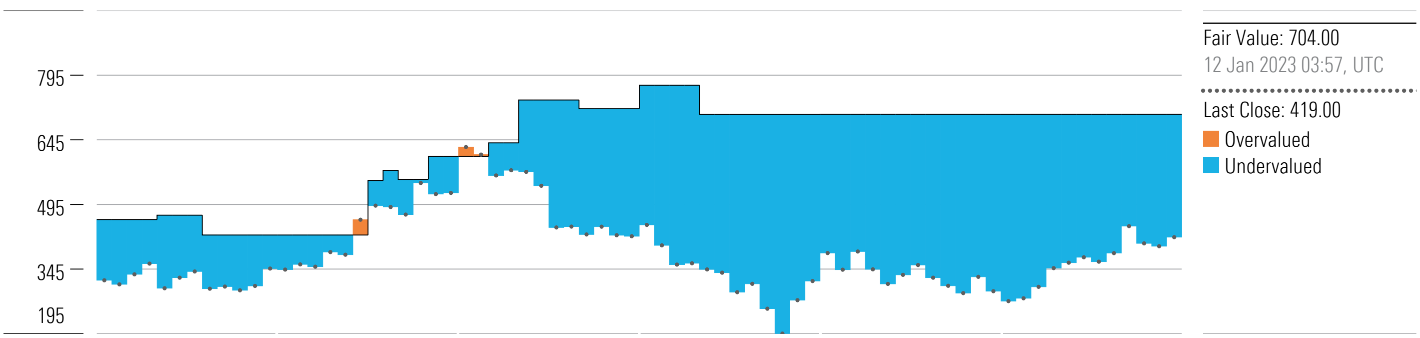


	2019	2020	2021	2022	2023	YTD
Price/Fair Value	1.04	1.40	0.89	0.63	0.98	1.19
Total Return %	18.93	69.72	-14.47	-41.41	54.57	14.66

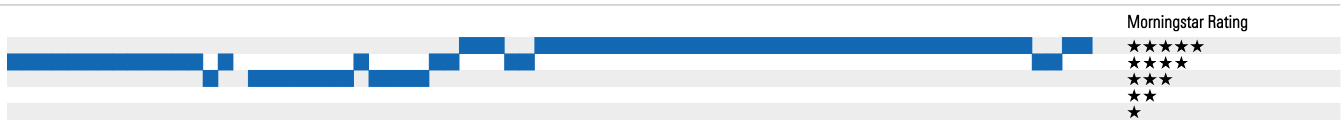


Total Return % as of 30 Dec 2024. Last Close as of 30 Dec 2024. Fair Value as of 17 May 2024 19:24, UTC.

Tencent Holdings Ltd 00700



	2019	2020	2021	2022	2023	YTD
Price/Fair Value	0.82	0.86	0.59	0.45	0.42	0.60
Total Return %	19.94	51.01	-19.01	-29.99	-7.43	43.87



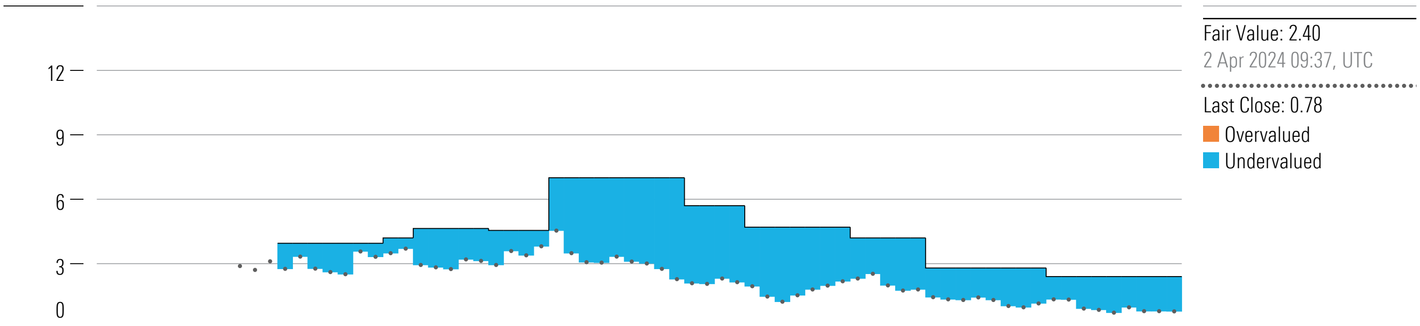
Total Return % as of 30 Dec 2024. Last Close as of 30 Dec 2024. Fair Value as of 12 Jan 2023 03:57, UTC.

Morningstar Equity Analyst Report | Report as of 31 Dec 2024 00:52, UTC | Reporting Currency: CNY | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS Page 12 of 21

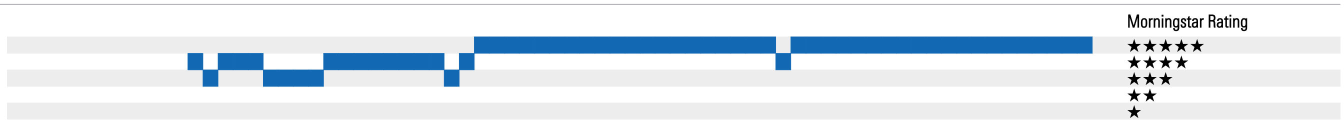
NetEase Inc ADR NTES ★★★★★ 30 Dec 2024 22:32, UTC

Competitors Price vs. Fair Value

CMGE Technology Group Ltd 00302



	2019	2020	2021	2022	2023	YTD	
	—	0.59	0.44	0.38	0.47	0.33	Price/Fair Value
	—	-10.43	16.10	-41.94	-27.22	-40.46	Total Return %



Total Return % as of 30 Dec 2024. Last Close as of 30 Dec 2024. Fair Value as of 2 Apr 2024 09:37, UTC.

Morningstar Equity Analyst Report | Report as of 31 Dec 2024 00:52, UTC | Reporting Currency: CNY | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS Page 13 of 21

NetEase Inc ADR NTES ★★★★★ 30 Dec 2024 22:32, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
89.25 USD 30 Dec 2024	158.00 USD 1 Mar 2024 14:46, UTC	0.56	57.52 USD Bil 30 Dec 2024	Narrow	Large Blend	High	Standard	4 Dec 2024 06:00, UTC

Morningstar Historical Summary

Financials as of 30 Sep 2024

Fiscal Year, ends 31 Dec	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	YTD	TTM
Revenue (CNY Bil)	12	23	38	44	51	59	74	88	96	103	79	106
Revenue Growth %	27.4	94.7	67.4	16.4	15.2	15.8	24.3	18.9	10.2	7.2	2.9	3.9
EBITDA (CNY Bil)	4.94	7.45	12.96	13.79	12.04	16.40	18.00	19.69	22.49	30.76	23.48	31.01
EBITDA Margin %	42.2	32.7	33.9	31.0	23.5	27.7	24.4	22.5	23.3	29.7	29.9	29.3
Operating Income (CNY Bil)	4.77	7.27	12.63	12.99	9.98	13.79	14.54	16.42	19.63	27.71	21.76	28.63
Operating Margin %	40.7	31.9	33.1	29.2	19.5	23.3	19.7	18.7	20.3	26.8	27.7	27.1
Net Income (CNY Bil)	4.76	6.74	11.60	10.71	6.15	21.24	12.06	16.86	20.34	29.42	20.93	27.51
Net Margin %	40.6	29.5	30.4	24.1	12.0	35.9	16.4	19.2	21.1	28.4	26.7	26.0
Diluted Shares Outstanding (Mil)	655	661	661	663	651	650	670	673	659	650	648	648
Diluted Earnings Per Share (CNY)	7.25	10.20	17.55	16.15	9.45	32.65	18.00	25.05	30.85	45.25	32.30	42.45
Dividends Per Share (CNY)	3.03	2.25	3.91	4.92	2.24	8.90	6.42	5.30	10.33	12.57	14.29	17.80

Valuation as of 29 Nov 2024

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Recent Qtr	TTM
Price/Sales	8.5	11.9	7.3	6.8	3.9	3.9	6.0	5.3	3.5	4.2	4.0	3.9
Price/Earnings	18.0	31.5	24.9	22.8	28.4	35.7	29.4	36.4	15.6	16.1	14.8	14.9
Price/Cash Flow	15.0	25.1	21.4	18.1	22.0	18.6	18.7	17.8	12.4	13.3	11.3	10.7
Dividend Yield %	2.48	0.98	1.36	1.05	0.71	2.07	0.97	0.81	2.1	1.88	2.68	2.79
Price/Book	3.6	5.7	5.6	6.6	4.8	4.4	4.9	5.1	3.1	3.5	3.2	3.1
EV/EBITDA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Operating Performance / Profitability as of 30 Sep 2024

Fiscal Year, ends 31 Dec	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	YTD	TTM
ROA %	17.3	18.8	23.4	16.6	7.8	21.3	9.5	11.4	12.5	16.4	—	15.4
ROE %	21.8	25.6	34.4	25.5	13.5	39.8	16.8	19.0	20.3	25.7	—	21.8
ROIC %	18.1	21.9	30.3	21.5	10.2	29.9	11.9	14.2	14.9	18.6	—	16.9
Asset Turnover	0.4	0.6	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	—	0.6

Financial Leverage

Fiscal Year, ends 31 Dec	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Recent Qtr	TTM
Debt/Capital %	—	—	—	—	—	0.4	0.6	2.1	4.0	0.8	0.3	—
Equity/Assets %	77.1	71.0	65.8	64.4	52.0	54.8	57.9	62.0	60.6	66.8	71.5	—
Total Debt/EBITDA	0.4	0.3	0.3	0.5	1.1	1.1	1.1	1.1	1.3	0.7	0.5	—
EBITDA/Interest Expense	—	—	—	—	—	—	—	—	—	—	—	—

Morningstar Analyst Historical/Forecast Summary as of 15 Nov 2024

Financials

Fiscal Year, ends 31 Dec 2023	2022	2023	Estimates 2024	2025	2026
Revenue (CNY Mil)	96,496	102,612	104,665	118,605	132,324
Revenue Growth %	10.2	6.3	2.0	13.3	11.6
EBITDA (CNY Mil)	24,959	32,136	30,572	37,454	44,148
EBITDA Margin %	25.9	31.3	29.2	31.6	33.4
Operating Income (CNY Mil)	19,629	26,853	27,251	32,999	39,285
Operating Margin %	20.3	26.2	26.0	27.8	29.7
Net Income (CNY Mil)	22,870	31,766	30,492	33,461	39,311
Net Margin %	23.7	31.0	29.1	28.2	29.7
Diluted Shares Outstanding (Mil)	3,296	3,252	3,234	3,244	3,254
Diluted Earnings Per Share(CNY)	6.94	9.77	9.43	10.31	12.08
Dividends Per Share(CNY)	1.87	3.63	2.66	3.66	4.85

Forward Valuation

	2022	2023	Estimates 2024	2025	2026
Price/Sales	3.5	4.0	4.1	3.6	3.2
Price/Earnings	14.6	13.5	13.8	12.6	10.8
Price/Cash Flow	—	—	—	—	—
Dividend Yield %	1.8	2.8	2.0	2.8	3.7
Price/Book	3.2	3.5	3.0	2.6	2.4
EV/EBITDA	9.9	9.7	10.2	8.3	7.1

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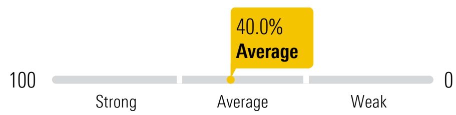
NetEase Inc ADR NTES ★★★★★ 30 Dec 2024 22:32, UTC

Last Price	Fair Value Estimate	Price/FVE	Market Cap	Economic Moat™	Equity Style Box	Uncertainty	Capital Allocation	ESG Risk Rating Assessment[1]
89.25 USD 30 Dec 2024	158.00 USD 1 Mar 2024 14:46, UTC	0.56	57.52 USD Bil 30 Dec 2024	Narrow	Large Blend	High	Standard	4 Dec 2024 06:00, UTC

ESG Risk Rating Breakdown

Exposure	
Company Exposure[1]	25.8
– Manageable Risk	24.3
Unmanageable Risk[2]	**1.5**
Management	
Manageable Risk	24.3
– Managed Risk[3]	9.7
Management Gap[4]	**14.6**
Overall Unmanaged Risk	**16.1**

● Subject ○ Subindustry (26.0)



- 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 40.0% 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 Dec 04, 2024. Highest Controversy Level is as of Dec 08, 2024. Sustainalytics Subindustry: Entertainment Software. 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 04 Dec 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	
NetEase Inc	25.8 | Low	0 – 55+	40.0 | Average	100 – 0	16.1 | Low	0 – 40+
Take-Two Interactive Software Inc	26.9 | Low	0 – 55+	43.6 | Average	100 – 0	15.9 | Low	0 – 40+
Tencent Holdings Ltd	37.3 | Medium	0 – 55+	53.9 | Strong	100 – 0	18.6 | Low	0 – 40+
CMGE Technology Group Ltd	27.0 | Low	0 – 55+	33.7 | Average	100 – 0	18.5 | Low	0 – 40+
—	— | —	0 – 55+	— | —	100 – 0	— | —	0 – 40+

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Appendix

Historical Morningstar Rating

NetEase Inc ADR NTES 30 Dec 2024 22:32, 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
★★★	★★★	★★★	★★★	★★★	★★★★	★★★	★★★	★★★	★★★★	★★★★	★★★★

Take-Two Interactive Software Inc TTWO 30 Dec 2024 22:32, 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
★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★★	★★★★	★★★★	★★★

Tencent Holdings Ltd 00700 30 Dec 2024 17:23, 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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CMGE Technology Group Ltd 00302 30 Dec 2024 17:24, 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
—	—	—	—	—	—	—	—	—	—	—	—

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.

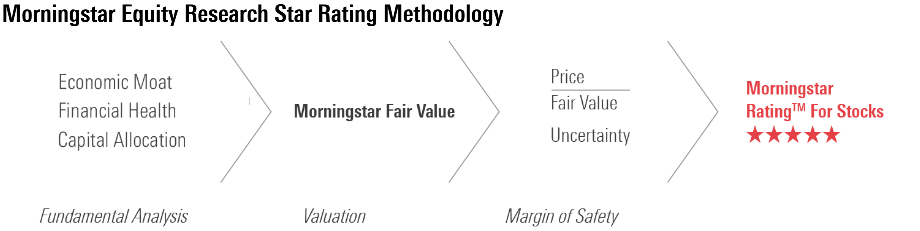
Because a dollar earned today is worth more than a dollar earned tomorrow, we discount our projections of cash flows in stages I, II, and III to arrive at a total present value of expected future cash flows. Because we are modeling free cash flow to the firm—representing cash available to provide a return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



Morningstar Equity Analyst Report | Report as of 31 Dec 2024 00:52, UTC | Reporting Currency: CNY | Trading Currency: USD | Exchange: NASDAQ - ALL MARKETS

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.

	Margin of Safety	
Qualitative Analysis Uncertainty Ratings	★★★★★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.

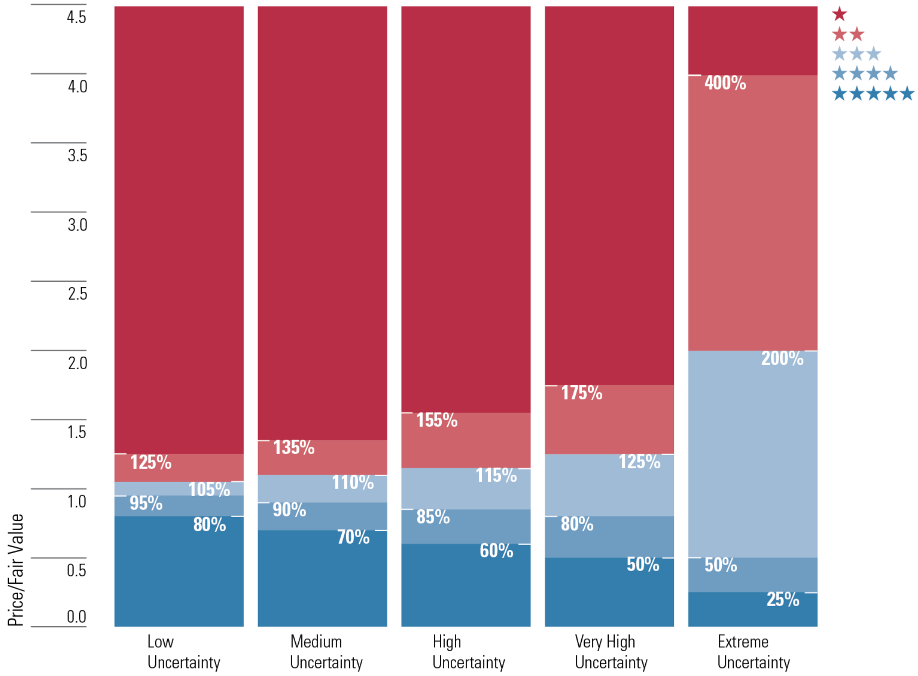
4. Market Price

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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