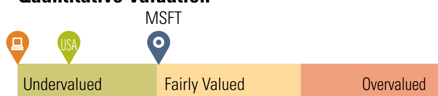
Microsoft Corp MSFT (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★★★★	132.10 USD	143.00 USD	0.92	1.36	1.39	1,012.26	Software - Infrastructure	Exemplary
11 Jun 2019 21:36, UTC	11 Jun 2019	25 Apr 2019 09:49, UTC		11 Jun 2019	11 Jun 2019	11 Jun 2019		

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

Source: Morningstar Equity Research

Quantitative Valuation



	Current	5-Yr Avg	Sector	Country
Price/Quant Fair Value	0.95	0.99	0.77	0.83
Price/Earnings	29.4	32.2	21.4	20.1
Forward P/E	25.8	—	15.9	13.9
Price/Cash Flow	21.6	14.2	15.6	13.1
Price/Free Cash Flow	30.5	18.2	23.0	19.5
Trailing Dividend Yield%	1.36	2.15	1.89	2.35

Source: Morningstar

Bulls Say

- Public cloud is widely considered to be the future of enterprise computing, and Azure is a leading service that benefits the evolution to hybrid environments first, then ultimately to the public cloud.
- Shift to subscriptions accelerates growth after the initial growth pressure, and the company has passed the margin inflection point now such that margins are increasing again and have returned to pre-Nokia and pre-cloud levels.
- Microsoft has monopoly-like positions in various areas (OS, Office) that serve as cash cows to help drive Azure growth.

Bears Say

- Momentum is slowing in the ongoing shift to subscriptions, particularly in Office, which is generally considered a mature product.
- Microsoft lacks a meaningful mobile presence.
- Microsoft is not the top player in its key sources of growth, notably Azure and Dynamics.

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Microsoft Continues to Evolve Into a Cloud Leader

Business Strategy and Outlook

Dan Romanoff, CPA, Analyst, 11 February 2019

Since taking over as CEO in 2014, Satya Nadella has reinvented Microsoft into a cloud leader that has become one of only two providers that can deliver a wide variety of platform-as-a-service/infrastructure-as-a-service solutions at scale. Microsoft has accelerated the transition from a traditional perpetual license model to a subscription model and embraced the open-source movement. Also, Microsoft exited the low-growth, low-margin mobile handset business and is driving gaming to be more cloud-based. These factors have turned Microsoft into a more focused company that offers impressive revenue growth with high and expanding margins.

We believe Azure is the centerpiece of the new Microsoft. Even though we estimate it is already an approximately $7 billion business, it grew at a 92% rate in fiscal 2018. Azure has several distinct advantages, including offering a painless way to experiment on moving workloads to the cloud. Since customers remain in the same Microsoft environment, applications and data are easily moved from on-premises to the cloud. Microsoft can also leverage its massive installed base of Microsoft solutions as a touch point for an Azure move. Azure also continues to launch new services in the secular trends of artificial intelligence, business intelligence, and "Internet of Things."

Microsoft is also shifting its on-premises products to become cloud-based SaaS solutions, including LinkedIn, Office 365, and Dynamics 365. Like any transition, the initial move is painful, as both revenue and margins drop. However, Microsoft is now on the back end of that, where revenue has accelerated and is more predictable and margins are increasing. Office 365 retains its virtual monopoly in office productivity software, which we do not expect to change anytime soon. We believe that customers will continue to drive the transition from on-premises to cloud solutions, and revenue growth will remain robust, with margins continuing to improve for the next several years.

Analyst Note

Dan Romanoff, CPA, Analyst, 25 April 2019

Microsoft reported third-quarter results that were ahead of our consensus expectations, with solid revenue upside driving better margins. A slightly lower tax rate helped drive material earnings per share upside. Management offered a bullish stance on the call, repeatedly saying that various metrics were ahead of plan. Overall, results continue to reinforce our thesis, centering on customer adoption of hybrid cloud environments with Azure. Microsoft continues to use its dominant position of on-premises architecture to allow customers to move to the cloud easily and at their own pace, which we believe will continue. Adoption of cloud services in the form of software as a service, platform as a service, and infrastructure as a service remains robust for Microsoft, and the company has passed inflection points where cloud revenue is strong and margins continue to improve. We maintain our wide moat rating and are raising our fair value estimate to $143 per share from $125 after increasing our revenue growth and margin assumptions. The shares have had a strong run year to date, and we are incrementally more cautious on near-term valuation.

For the fiscal third quarter, revenue grew 14% year over year to $30.6 billion, while EPS was $1.14 compared with a $0.95 a year ago. Intelligent cloud and more personal computing were ahead, while productivity and business processes was slightly light. Revenue growth in the intelligent cloud segment, which contains Azure, accelerated year over year for the 10th consecutive quarter, which is good, but given the law of large numbers and a difficult comparison, we expect this to end in the June quarter. Still, on-premises server results were strong in the face of 73% growth of Azure growth. The chipset shortage noted last quarter eased, allowing Windows to come in ahead of expectations

Economic Moat

Dan Romanoff, CPA, Analyst, 12 June 2019

Overall, we assign Microsoft a wide moat rating arising from switching costs, network effects, and cost advantages. We believe that Microsoft's different segments and products benefit from different moat sources.

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Close Competitors	Currency (Mil)	Market Cap	TTM Sales	Operating Margin	TTM/PE
Amazon.com Inc AMZN	USD	917,559	241,545	6.17	77.52
Apple Inc AAPL	USD	896,335	258,490	25.34	16.31
Alphabet Inc GOOGL	USD	749,697	142,012	22.58	27.10
Oracle Corp ORCL	USD	184,348	39,831	35.80	19.53

We assign Microsoft's productivity and business processes segment, which includes Office, Dynamics, and LinkedIn, a wide moat rating based on high switching costs and network effects.

We believe that Microsoft Office, including both the cloud-based 365 version, available for a monthly subscription, and the perpetual license version, is protected by a wide moat driven by high switching costs and network effects. Together, the two products account for about 26% of revenue and are growing in the low double digits. Office 365 represents more than half of Office revenue. We expect perpetual license sales of Office to continue to decline in terms of both absolute dollars and as a percentage of revenue, with growth in Office 365 more than offsetting the declines.

An office productivity suite generally consists of spreadsheet (Excel), word processing (Word), presentation (PowerPoint), and other software applications. Microsoft offers a variety of versions of the Office 365 suite that start at about $6 per month and top out at about $35 per user per month. Lower-cost and even free versions are available for students and educators. The perpetual license version, which Microsoft is offering increasingly fewer of, is $150. Office 365 already has more than 165 million subscribers.

While Office 365 is ubiquitous among white-collar workers, there are a number of other office productivity suites available, many of which are free, notably Google Docs and Apache OpenOffice.

Microsoft eventually came to completely own this market but certainly was not there first. Lotus 1-2-3 and WordPerfect dominated office productivity throughout the 1980s and remained popular even into the 1990s. We believe Microsoft continues to enjoy a dominant market share position in Office Suites, with Google being the only other vendor of consequence. Given that so many users are willing to pay a minimum of $70 per year to use Office 365 when free versions that are generally similar in terms of features and interface are available, we are impressed with the company's pricing power and believe it supports our wide moat stance.

Microsoft Office also benefits from high switching costs. Because of the significant installed base and that critical business processes often involve Excel, we believe it would be highly disruptive for a company to pivot to another office suite. Broadly speaking, critical reports within the financial function of countless enterprise users are pulled from an Oracle, SQL, or other popular database into an Excel file that can then be manipulated and analyzed further.

Lastly, Office 365's moat is supported by a network effect. A large installed base draws in software developers to create products specifically for Microsoft Office. In the financial community, for example, developers have created a wide variety of add-ins for Excel designed to smoothly integrate popular platforms, such as Factset, Bloomberg, and CapitalIQ.

Microsoft Dynamics, including both Dynamics 365 and traditional license versions, has a narrow moat, in our view, that is supported primarily by high switching costs. Dynamics is an enterprise resource planning (ERP) suite of applications designed to help mid-sized companies, or divisions of larger companies, run their businesses. We estimate Dynamics accounts for approximately 2% of total revenue and is growing in the low-double-digits area. The Dynamics revenue base is shifting from a perpetual license and maintenance model into a subscription model (Dynamics 365). Microsoft has invested considerable resources in these applications, which now benefit from being re-architected and modular, creating a strong value proposition for customers. As such, Dynamics has increased its profile and is slowly gaining share market share. Dynamics 365 is a leading cloud-based CRM and ERP package that generally competes with Salesforce.com, Oracle (standalone), Netsuite (owned by Oracle), Workday, and SAP, among others.

An ERP system and its core modules represent the core systems of a company, and these software suites are a significant financial commitment that involve a steep learning curve and a long lead time to implement and test. Because of these factors, an ERP system has traditionally been considered a minimum 10- to 15-year investment. There is also substantial risk in changing from one ERP vendor to another—and enterprise customers are

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risk-averse by nature. The sales process alone is a one-year, if not two-year, process, with implementation taking one to two years, as well. Modern architectures skew toward the shorter end of the range, while legacy systems skew longer.

We believe LinkedIn's narrow moat is supported by network effects. Hailed as a professional networking tool, LinkedIn is at its core a free-to-use networking application similar to Facebook. LinkedIn accounts for a mid-single-digit percentage of revenue and is growing by more than 30%. We believe LinkedIn is the premier tool for professional networking. The company boasts more than 600 million registered users, but no longer reports the more useful figure for monthly active users, which we estimate to be approximately 145 million. When Microsoft announced the acquisition in 2016, LinkedIn had 433 million members and 105 million MAU. In the Americas and Europe, the only larger network of its kind is Facebook (2.3 billion MAU), which is geared more toward social networking. Twitter serves a different purpose, but for context has 326 million MAU.

LinkedIn ultimately provides a large database of professionals for recruiters and companies to comb for talent, the tools to make that process easy, and a platform for targeted advertising. For professional networking, we believe that no comparable platform exists. Engagement among users remains high even as new members continue to join. The large user base attracts more users, recruiters, and advertisers, which in turn, attracts more users still. We do not see a disruptive network or software tool threatening LinkedIn over the next several years.

Microsoft's intelligent cloud segment includes Windows Server, SQL database management system, Azure, enterprise services, and Visual Studio. We assign the segment a wide moat rating based on high switching costs, network effects, and cost advantages.

Windows Server is protected by a wide moat driven by high switching costs and network effects. Microsoft was the clear winner in the move from mainframe computing to client-server architecture. The PC boom helped fuel the server boom beginning in the 1980s and gaining steam in the 1990s. Much cheaper Windows-based servers were severely disruptive to the mainframe server market. Mainframes and Unix-based servers have been hit hard over the last 20 years and now represent just a small piece of the market. Windows remains the server operating system leader and continues to gain share, even as Linux continues to grow faster. Linux is open-source and theoretically free. That said, Red Hat made a business out of offering support contracts to enterprise customers for an otherwise free product. Despite Linux being free and extremely stable, customers are still overwhelmingly willing to pay for Windows Server. We believe such pricing power supports our wide-moat stance.

Microsoft's presence in the PC market, with both its operating system and Office productivity software, allowed it to easily enter the server market just as it was undergoing a major transformation, and great timing helped build a substantial installed base. Today, the IT backbone of many of the world's largest companies is built on Microsoft Server. We reiterate that replacing any part of the core of an enterprise's IT environment would be a significant undertaking in terms of financial cost, time, and risk. In other words, switching costs are high.

Critically, we believe that Microsoft's unique ability to move clients from an on-premises environment to the cloud via Azure is a structural advantage. As the cloud has evolved, it has become increasingly apparent that companies' IT environments will be hybrid-based for years to come.

Lastly, the early lead and substantial market share led to a wide variety of developers joining the ecosystem, bringing in applications, middleware, and development tools. This has helped Microsoft Server become the path of least resistance for CIOs and IT managers, as well: A larger installed base attracts developers, which in turn attracts more customers.

We believe Microsoft's SQL Database Management System (DBMS) is protected by a wide moat driven by high switching costs. Over the years the company has developed a strong technology core for DBMS and continues to add to an already strong portfolio. Beyond the portfolio breadth, Microsoft's DBMS offers a good value for customers, as well. In short, the company has made it easy for customers to select Microsoft and stick with it over time. We view Microsoft DBMS as one of several leading database products along with AWS, SAP, Oracle, and IBM, with Microsoft and Oracle being a cut above the others. This is a core technology in a customer's IT environment, and changing it would involve significant

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costs, take a long time to implement, test, train, and realign with prior day-to-day processes, and involve needless risk. Once again, by virtue of offering clients the ability to migrate to the cloud on their own terms through Azure, we think Microsoft has solidified its position for years to come.

We believe high switching costs and cost advantages drive a wide moat for Azure. Azure is clearly the growth engine for the Intelligent Cloud segment, and one of the critical products the "new" Microsoft will be built around. Azure is a next-generation service offering that builds upon the Dynamics 365 and Office 365 SaaS business to offer Infrastructure as a Service (IaaS) and Platform as a Service (PaaS). The lines are often blurry between IaaS and PaaS. In an IaaS model, the provider offers the necessary hardware, virtualization, networking, and storage as a computing service delivered over the Internet. Other basic software-level functionality can be layered in and still have the offering be considered IaaS. However, as software is added, IaaS quickly becomes PaaS. In PaaS model, the provider also offers and hosts operating systems, middleware, and core IT applications (notably database). Additionally, PaaS is generally thought of as an application development platform, which is again another level of complexity. Overall, the practical boundaries between different PaaS offerings is murky. We view Azure, AWS, and Google Compute as leaders in this category, with AWS and Azure being the clear leaders. We also view Salesforce and ServiceNow as competitors in this area for some use cases.

We estimate that revenue from Azure itself is a mid- to high-single-digit percentage of revenue, growing by more than 75% annually. We believe the company's presence in traditional on-premises deployments of Server (and SQL database) have helped guide customers toward Azure for both fully public and hybrid deployments. It is simply the path of least resistance for many CIOs—Microsoft offers a worry-free product and a seamless transition from on-premises to Azure. Users would overwhelmingly not even notice the company shifted workloads to the cloud.

Further, we believe it is cheaper initially for companies to move workloads to the cloud, as there are less upfront costs and a lower bar to clear for maintenance and administration. Along those lines, Microsoft offers scale advantages to Azure clients in that at least some offerings are cheaper than AWS', and it has scale by being larger than all but one competitor and possessing the largest global data center footprint, with 54 locations around the world. Compliance regulations in many countries are increasingly requiring local data storage, so a global footprint is critical.

We believe that given the commodity-like nature of consulting services, as evidenced by its lower-margin structure, Microsoft Enterprise Services is not protected by a true moat. However, we believe MES should be able to maintain its market position as a result of being part of the largest software company in the world. The move from on-premises to cloud and/or hybrid environments remains a complex task. Given the company's position as a leader in both traditional (Windows Server and SQL products) and cloud (Azure), we believe customers will continue to engage with Microsoft for professional services. This is also supported by the broader trend within technology to consolidate vendors to ease the burden on CIOs and IT management professionals.

Visual Studio, an integrated development environment, or IDE, used to develop computer applications, mobile apps, websites, and web apps, has a narrow moat supported by high switching costs and network effects. It supports more than 35 languages with code editing, automated code completing, and debugging. Additionally, Microsoft includes with its Windows OS license the .NET framework, effectively a library of source code that developers can access to ensure common functions work correctly without having to actually write the code themselves, thus saving time and reducing the need for debugging. To further bolster Visual Studio, Microsoft acquired Xamarin, a software development tool that allows for cross-platform application development. For example, one set of code written in C# (or various other languages) can be used for the same app on both Apple iOS and Android. Once again, Microsoft has used its presence to attract more users, which in turn attracts more developers in a virtuous circle. Additionally, developers have a lot of man-hours invested into learning certain languages and how to efficiently write software under a given umbrella. Our experience informs us that it would be time-consuming, and therefore costly, to learn additional languages on a different platform.

The GitHub acquisition, which closed on Oct. 26, 2018, bolsters Microsoft's position for developers' tools. Given that GitHub is a repository for source code and an online

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collaboration community for software developers, it enjoys some level of network effect as the "Facebook for programmers," and makes Visual Studio a stickier product. Our preliminary assessment of the company suggests it reinforces our narrow moat rating. GitHub will retain its developer-first mentality, operate independently, and remain an open platform. It will be incorporated into the Intelligent Cloud segment so that Microsoft and GitHub will work together to empower developers to achieve more at every stage of the development lifecycle, accelerate enterprise use of GitHub, and expand its community of developers. The company was exploring an IPO and last saw a public valuation in 2015 at approximately $2 billion. Google, Apple, Amazon, Facebook, and Microsoft each have a material presence on GitHub and use if for documentation and code. It remains to be seen if these mega-cap tech competitors will allow their developers to continue to use GitHub.

What Microsoft calls its More Personal Computing segment includes Windows, gaming, devices, and search. We assign the segment a narrow moat rating based on high switching costs and network effects.

Microsoft Windows' wide moat is supported by high switching costs and a network effect. Windows accounts for approximately 18% of total revenue and is growing in the midsingle digits. It enjoys an 83% global market share for PC operating systems. Apple has the next largest share at 13%. The only other realistic alternatives are Linux and Chrome. We believe Windows has very slowly been bleeding market share with the rise of Apple and the introduction of some alternative PC operating systems. Despite this, Windows revenue has grown for three consecutive years. We simply do not believe there is a viable OS alternative. Additionally, other than IT managers and CIOs, PC users overwhelmingly do not contemplate their operating system.

At the core of Windows' longevity is the fact that its predecessor, Microsoft DOS, enjoyed a first-mover advantage, coupled with a liberal licensing strategy that allowed it to quickly become the de facto standard in desktop operating systems from the outset. The timing could not have been better, as this was right as the PC was born and the market opportunity was completely new.

At the enterprise level, CIOs and IT managers require proven reliability, significant software support, and a product roadmap to ensure their investment in IT infrastructure will offer an appropriate return. With literally billions of installations, Windows is ubiquitous and proven. Enterprises will often skip Windows versions and overwhelmingly not even upgrade to newer versions until the first (or second) service pack is released. We believe there is simply too much at stake in financial, operational, and informational terms to warrant companies switching to competing operating systems.

Additionally, software is overwhelmingly written for Windows. Because of the first-mover advantage and concurrent de facto status as the standard in desktop OS software, software was initially written for Windows. Initially, this was a virtuous circle, as developers wrote software for the large installed base of DOS-based PCs, and users quickly coalesced around DOS because it became the most useful. Over time, Microsoft introduced a variety of other software solutions that brought it additional users and developers. The same applies today, when business software is overwhelmingly written for the Windows OS. Consumer PC software is also predominantly written for Windows.

We do not believe Microsoft's gaming segment, which includes Xbox unit sales; game software sales; Xbox Live transactions, subscriptions, and advertising; and third-party video game royalties, warrants an economic moat; while the life cycle of a gaming console has been expanding, it is realistically still four to six years, so we do not have enough confidence that the business can generate excess returns over the next 10 years. We believe that gaming is supported by high switching costs and a network effect, but such benefits are not necessarily sustainable over the next decade. Gaming revenue is approximately 9% of the total and is growing in the low double digits.

High switching costs are explicit in the hardware platform, which for leading-edge units is $500, while trailing versions of the device are $250. New games typically retail for $60. Battery packs, second controllers, and headsets will cost another $100 in aggregate. In short, with a handful of games, essential accessories, and the console itself, a user is looking at an investment of approximately $1,000. Games have typically been backward-compatible but in recent new platform releases, console makers have skipped this, which has certainly angered users.

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Gamers inevitably enjoy gaming with friends or within a community of gamers they are familiar with, and cross-platform gaming has generally not been possible. Therefore, users tend to want to be on the same platform as their friends. More gamers on a particular console attract developers to write more games and offer exclusive content on a given platform, which in turn attracts more gamers. Microsoft currently boasts 56 million MAU on Xbox Live. Meanwhile, Microsoft has added features over the years to make the Xbox platform more sticky for its gaming community, including Xbox Live, xCloud streaming, various apps on the console itself, networking functionality, free games, and Xbox Game Pass (Netflix for video games).

We do not believe the Microsoft Surface enjoys a moat of any kind. We do not believe that there is much, if any sustainable differentiation between a Microsoft Surface and generally competitive products such as a Windows or Mac laptop, an Apple iPad, or a Google Chromebook, reflected in lower product gross margins. Other devices in this category include computer peripherals (keyboards, mice) and the HoloLens. On the HoloLens in particular, we remain skeptical on virtual and augmented reality within the next several years. Microsoft has not enjoyed much success in noncore devices in recent years, with the high-profile Zune and large acquisition of Nokia serving as reminders that hardware is a challenging business. Finally, we also do not believe there is a sustainable moat in Microsoft's Bing search engine.

Fair Value & Profit Drivers

Dan Romanoff, CPA, Analyst, 12 June 2019

Our fair value estimate for Microsoft is $143 per share, which implies a fiscal 2020 enterprise value/sales (EV/S) multiple of 8 times, adjusted price/earnings (P/E) multiple of 28 times, and a 4% free cash flow yield.

We model total revenue growth slowing from 13% in fiscal 2019 to 7% in fiscal 2028, representing a 10-year compound annual growth rate (CAGR) of approximately 10%, ahead of the 6% CAGR Microsoft generated over the previous 10-year period. We foresee stronger revenue growth ahead as Microsoft's prior decade was bogged down by the downturn in 2008, the complete evaporation of mobile handset revenue from the disposal of the Nokia handset business, as well as the onset of the model transition to subscriptions (which initially results in slower revenue growth). We believe revenue growth will be driven by Azure, Office 365, Dynamics 365, and LinkedIn. Azure, in particular, is the single most critical revenue driver over the next 10 years, in our view, as hybrid environments (where Microsoft excels) drive mass cloud adoption. We believe the combination of Azure, DBMS, Dynamics 365, and Office 365 will drive above market growth as CIOs continue to consolidate vendors. We believe More Personal Computing will grow modestly above GDP over the next 10 years. By segment we model a 9% 10-year CAGR for Productivity & Business Processes (Office 365, Dynamics 365, LinkedIn), 15% for Intelligent Cloud (Azure), and 4% for More Personal Computing.

We also model operating margins increasing steadily from 33% in fiscal 2019 to 42% in fiscal 2028, driven largely by an approximately 700 basis point improvement in gross margin as Azure continues to scale, and more than 200 basis points of scale-related reductions in operating expenses. While Azure gross margins are still below the corporate average, they are now increasing rapidly. Further, the impact of the transition from perpetual licenses to subscriptions for Dynamics and Office is no longer a drag on margins. We note that the most recent peak in Microsoft's operating margin was 39% in fiscal 2011.

Risk & Uncertainty

Dan Romanoff, CPA, Analyst, 12 June 2019

Microsoft faces varied risks among its products and segments. High market share in the client-server architecture over the last 30 years means significant high-margin revenue is at risk, particularly in OS, Office, and Server. Microsoft has thus far successfully grown revenue in a constantly evolving technology landscape and is enjoying success in both moving existing workloads to the cloud for current customers and attracting new clients directly to Azure. However, it must continue to drive revenue growth of cloud-based products faster than revenue declines in on-premises products. Microsoft is acquisitive, and while many of its smaller acquisitions fly under the radar, it has had several high-profile flops, including Nokia and aQuantive. The LinkedIn acquisition was expensive but served a purpose and seems to be working out well, in our view. It is not clear how much Microsoft bought in the Permira-led Informatica leveraged buyout, and it may have been an important strategic investment, but Informatica was certainly not a growth catalyst. The jury is out on GitHub, but our early read is that this is an expensive but strategic investment. Lastly,

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MORNINGSTAR®

Microsoft Corp MSFT (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★★★★	132.10 USD	143.00 USD	0.92	1.36	1.39	1,012.26	Software - Infrastructure	Exemplary
11 Jun 2019 21:36, UTC	11 Jun 2019	25 Apr 2019 09:49, UTC		11 Jun 2019	11 Jun 2019	11 Jun 2019		

the public cloud buildout remains in its early phases. AWS has taken the market by storm, with Azure trailing, but the two are seen as clear leaders. This is a rapidly evolving market, and Microsoft must continually adjust its offerings, add solutions to the stack, and compete with a company that has built a business around aggressive pricing.

Stewardship

Dan Romanoff, CPA, Analyst, 25 April 2019

We believe Microsoft deserves an Exemplary stewardship rating. Satya Nadella took over as CEO in February 2014 after Steve Ballmer resigned in August 2013. Nadella joined Microsoft in 1992 and worked his way up to a variety of business unit leadership roles, mainly involving cloud, business, and server and tools groups. He was the president of the server and tools division for the three years before becoming CEO. The company he took over is very different than the company we see today, and the transformation has been nothing short of dramatic.

We can point to several specific actions Nadella has undertaken. The first was the $2.5 billion acquisition of Mojang in 2014, which brought in the popular Minecraft title to the gaming division. His next move in 2015 was to invest alongside Permira in its acquisition of Informatica, a data integration middleware provider that's now available on Azure as part of Microsoft's PaaS offering. In 2016, Microsoft wrote Nokia off and jettisoned the division. We believe the Nokia acquisition was a desperate attempt to have a relevant presence in the mobile world. Unfortunately, it was too late by then, as Apple and Alphabet had already come to dominate the market in mobile operating systems. Almost immediately after selling the remaining Nokia assets, Microsoft announced the LinkedIn acquisition for $26.2 billion. LinkedIn's Recruiter tool was an important SaaS product that can be either a stand-alone offering or used as part of Dynamics. LinkedIn also provided something Microsoft badly needed-a meaningful Internet presence. Microsoft disclosed in January 2019 that LinkedIn has 600 million members. Most recently, Microsoft acquired privately held GitHub for $7.5 billion in October 2018, which fits in well and expands tools available to Microsoft's extensive developer community.

While the direct actions under Nadella are easy to identify, he has also had a critical impact on strategic and cultural areas. Strategically, Nadella has increasingly shifted the company's focus to the cloud, accelerated the shift to a subscription-based model, and embraced the open-source movement in IT more broadly. His acquisitions fit with and contributed to the new strategic direction. Embracing the open-source movement is a strategically sound decision, but shifting the culture of the company to allow that to happen in such a short period was an impressive feat, in our view. Old Microsoft viewed open-source code as a threat, while new Microsoft has sponsored the Open Source Initiative, an influential open-source advocacy group. In our experience, there are few examples of such a dramatic shift in the direction of technology companies. Under his watch, Microsoft very quickly became more open and more nimble as an organization.

These direct and indirect actions, and perhaps good timing, led naturally to pushing Azure as a centerpiece of the new company. While it has certainly taken some investment and patience, Azure has taken off. While Microsoft does not disclose figures directly, it noted that Azure grew by more than 90% in fiscal 2018, to more than $7 billion by our estimate. We believe hybrid deployments will carry the day over the next several years and that Nadella's leadership has significantly strengthened Microsoft's competitive position. The company is also making other moves into what should be significant markets. The company is increasingly talking about artificial intelligence, Internet of Things, and virtually reality, and is introducing new offerings on Azure to capitalize on these substantial opportunities. While we are skeptical in the near term on HoloLens and virtual reality, artificial intelligence is already being integrated into various solutions. Further, IoT is an interesting market to explore how a Windows OS, Azure, and Power BI combination can help distill insights from an ocean of data.

Microsoft continues to increase quarterly dividends and shrink the share count. Dividends per share have grown at a 13% CAGR over the last five years. The dividend yield is approximately 1.7%. Microsoft has repurchased more than $53 billion in stock over the last five years. We believe the company will continue to buy back shares, shrink the share count, and raise the quarterly dividend over the next several years. Insiders own 109 million shares, or 1.4% of shares outstanding. The board consists of 14 members, two of whom are internal—Nadella and the iconic founder, Bill Gates. Lastly, management compensation skews heavily toward equity equivalents and therefore aligns well with shareholder interests. We do not see

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governance issues.

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Analyst Notes Archive

Microsoft 2Q Slightly Underwhelms; Hybrid Cloud Provides Growth Runway; Shares Undervalued

Andrew Lange, Eq. Analyst, 30 January 2019

Microsoft reported results that fell modestly short of our and consensus expectations, with revenue in line and EPS light due to several nonoperating factors including a slightly higher tax rate, a slightly higher share count, and slightly lower other income. Overall, results continue to reinforce our thesis, centering around customer adoption of hybrid cloud environments with Azure. Adoption of cloud services in the form of SaaS, PaaS, and IaaS remains strong for Microsoft, and the company has now passed inflection points where cloud revenue continues to accelerate and margins improve. Revenue growth in the intelligent cloud segment, which contains Azure, accelerated year over year for the ninth consecutive quarter. Microsoft continues to use its dominant positions of on-premise architecture to allow customers to move to the cloud easily and at their own pace. We believe this theme will continue in the foreseeable future. Shares are down 2% in the after-market after finishing the day up 3%, which seems appropriate given generally in line to slightly light results and guidance. We maintain our $130 fair value estimate and wide moat rating after these results.

For the fiscal second-quarter, revenue grew 12% year over year to $32.5 billion, while EPS was $1.08 compared with a loss of ($0.82) a year ago. Productivity & business processes and intelligent cloud were modestly better than expected, with Azure up 76% year over year. More personal computing was slightly light in our view and offset strength in the other segments. Lower Windows revenue was driven by lower PC volumes, which was driven in turn by a shortage of chipsets.

Microsoft Continues to Evolve Into a Cloud Leader; Shares Undervalued vs. Our $125 FVE

Dan Romanoff, CPA, Analyst, 11 February 2019

We believe Microsoft is a blue-chip technology stock that offers approximately 15% EPS growth in each of the next several years, powered by impressive 11%-12% top-line growth. We maintain our wide moat and stable moat trend ratings for Microsoft, and although we are lowering our fair value estimate to $125 per share from $130, we still view the shares as modestly undervalued. Our fair value estimate implies a price/earnings of 25 times on fiscal 2020 EPS.

Since taking over as CEO in 2014, Satya Nadella has reinvented Microsoft into a cloud leader. Most obviously, Microsoft has become one of two public cloud providers that can deliver a wide variety of platform-as-a-service and infrastructure-as-a-service solutions at scale. Additionally, Microsoft has accelerated the transition from a traditional perpetual license model to a subscription model. Lastly, Microsoft exited the low-growth, low-margin mobile handset business and is increasingly cloud-driven even in gaming. These factors have combined to drive a more focused company that offers impressive double-digit revenue growth with high and expanding margins.

We believe that Azure is the centerpiece of the new Microsoft. Even though we estimate it is already an approximately $7 billion business, it grew at a staggering 92% rate in fiscal 2018. Azure has several distinct advantages, including that it offers customers a painless way to experiment and move select workloads to the cloud. Since existing customers remain in the same Microsoft environment, applications and data are easily moved from on-premises to the cloud. Microsoft can also leverage its massive installed base of all Microsoft solutions as a touch point for an Azure move. In addition, Azure is an excellent launching point for secular trends in artificial intelligence, business intelligence, and Internet of Things as it continues to launch new services centered on these broad themes.

Microsoft Delivers Strong 3Q Results; Increasing FVE to $143

Dan Romanoff, CPA, Analyst, 25 April 2019

Microsoft reported third-quarter results that were ahead of our consensus expectations, with solid revenue upside driving better margins. A slightly lower tax rate helped drive material earnings per share upside. Management offered a bullish stance on the call, repeatedly saying that various metrics were ahead of plan. Overall, results continue to reinforce our thesis, centering on customer adoption of hybrid cloud environments with Azure. Microsoft continues to use its dominant position of on-premises architecture to allow customers to move to the cloud easily and at their own pace, which we believe will continue. Adoption of cloud services in the form of software as a service, platform as a service, and

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infrastructure as a service remains robust for Microsoft, and the company has passed inflection points where cloud revenue is strong and margins continue to improve. We maintain our wide moat rating and are raising our fair value estimate to $143 per share from $125 after increasing our revenue growth and margin assumptions. The shares have had a strong run year to date, and we are incrementally more cautious on near-term valuation.

For the fiscal third quarter, revenue grew 14% year over year to $30.6 billion, while EPS was $1.14 compared with a $0.95 a year ago. Intelligent cloud and more personal computing were ahead, while productivity and business processes was slightly light. Revenue growth in the intelligent cloud segment, which contains Azure, accelerated year over year for the 10th consecutive quarter, which is good, but given the law of large numbers and a difficult comparison, we expect this to end in the June quarter. Still, on-premises server results were strong in the face of 73% growth of Azure growth. The chipset shortage noted last quarter eased, allowing Windows to come in ahead of expectations

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Microsoft Corp MSFT ★★★Q 12 Jun 2019 02:00 UTC

Last Close	Fair ValueQ	Market Cap	Sector	Industry	Country of Domicile
11 Jun 2019	12 Jun 2019 02:00 UTC	11 Jun 2019			
132.10	138.96	1,012.3 Bil	Technology	Software - Infrastructure	USA United States

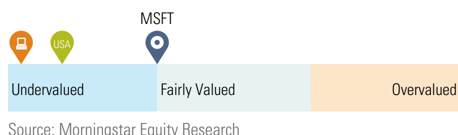
There is no one analyst in which a Quantitative Fair Value Estimate and Quantitative Star Rating are attributed to; however, Mr. Lee Davidson, Head of Quantitative Research for Morningstar, Inc., is responsible for overseeing the methodology that supports the quantitative fair value. As an employee of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

Company Profile

Microsoft develops and licenses consumer and enterprise software. It is known for its Windows operating systems and Office productivity suite. The company is organized into three overarching segments: productivity and business processes (legacy Microsoft Office, cloud-based Office 365, Exchange, SharePoint, Skype, LinkedIn, Dynamics), intelligence cloud (infrastructure- and platform-as-a-service offerings Azure, Windows Server OS, SQL Server), and more personal computing (Windows Client, Xbox, Bing search, display

Quantitative Scores

		Scores All	Rel Sector	Rel Country
Quantitative Moat	Wide	100	100	100
Valuation	Undervalued	26	23	26
Quantitative Uncertainty	High	95	97	93
Financial Health	Strong	94	86	94



Source: Morningstar Equity Research

Valuation

	Current	5-Yr Avg	Sector Median	Country Median
Price/Quant Fair Value	0.95	0.99	0.77	0.83
Price/Earnings	29.4	32.2	21.4	20.1
Forward P/E	25.8	—	15.9	13.9
Price/Cash Flow	21.6	14.2	15.6	13.1
Price/Free Cash Flow	30.5	18.2	23.0	19.5
Trailing Dividend Yield %	1.36	2.15	1.89	2.35
Price/Book	10.7	6.3	2.3	2.4
Price/Sales	8.4	5.5	1.7	2.4

Profitability

	Current	5-Yr Avg	Sector Median	Country Median
Return on Equity %	40.1	23.8	12.5	12.9
Return on Assets %	13.7	10.0	6.4	5.2
Revenue/Employee (K)	932.9	778.5	442.6	325.9

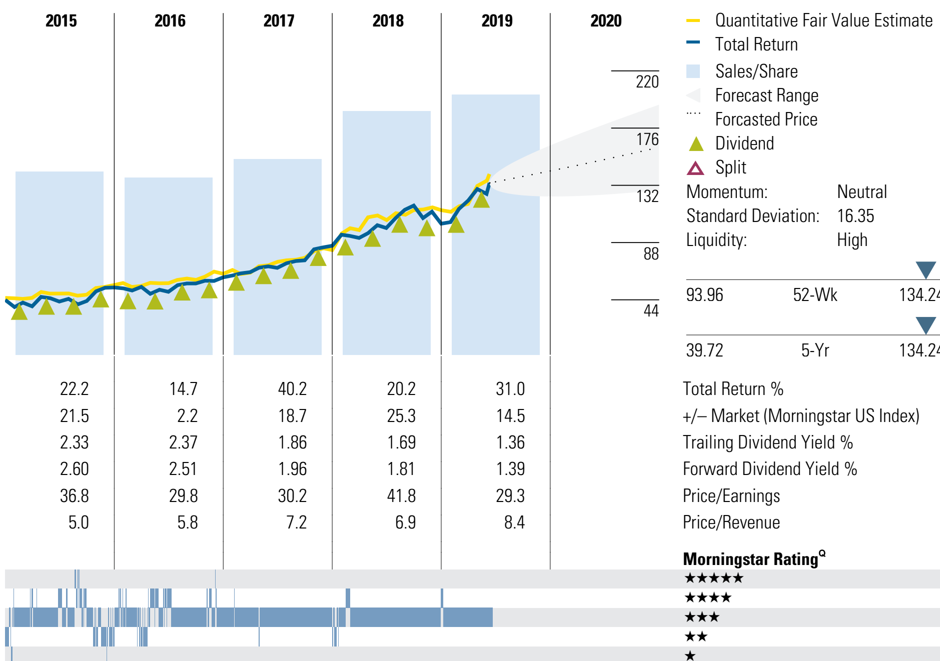
Financial Health

	Current	5-Yr Avg	Sector Median	Country Median
Distance to Default	0.8	0.8	0.6	0.5
Solvency Score	288.0	—	449.9	552.4
Assets/Equity	3.1	2.7	1.6	1.7
Long-Term Debt/Equity	0.9	0.6	0.1	0.4

Growth Per Share

	1-Year	3-Year	5-Year	10-Year
Revenue %	14.3	5.7	7.2	6.2
Operating Income %	19.5	7.6	5.6	4.6
Earnings %	-34.5	12.9	-3.8	1.3
Dividends %	7.8	10.9	13.1	14.4
Book Value %	-5.3	2.6	2.6	10.5
Stock Total Return %	32.1	38.4	27.8	20.1

Price vs. Quantitative Fair Value



Momentum: Neutral
Standard Deviation: 16.35
Liquidity: High

93.96 52-Wk 134.24
39.72 5-Yr 134.24

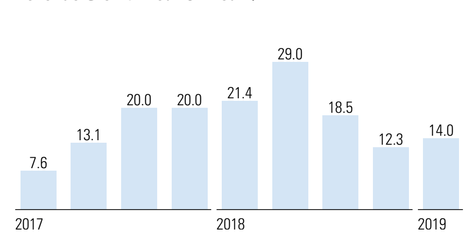
2015	2016	2017	2018	2019	2020	
22.2	14.7	40.2	20.2	31.0		Total Return %
21.5	2.2	18.7	25.3	14.5		+/– Market (Morningstar US Index)
2.33	2.37	1.86	1.69	1.36		Trailing Dividend Yield %
2.60	2.51	1.96	1.81	1.39		Forward Dividend Yield %
36.8	29.8	30.2	41.8	29.3		Price/Earnings
5.0	5.8	7.2	6.9	8.4		Price/Revenue

2014	2015	2016	2017	2018	TTM	**Financials** (Fiscal Year in Mil)
86,833	93,580	85,320	89,950	110,360	122,211	Revenue
11.5	7.8	-8.8	5.4	22.7	10.7	% Change
27,886	28,172	21,292	22,632	35,058	40,933	Operating Income
4.2	1.0	-24.4	6.3	54.9	16.8	% Change
22,074	12,193	16,798	21,204	16,571	34,926	Net Income
32,231	29,080	33,325	39,507	43,884	47,495	Operating Cash Flow
-5,485	-5,944	-8,343	-8,129	-11,632	-13,854	Capital Spending
26,746	23,136	24,982	31,378	32,252	33,641	Free Cash Flow
30.8	24.7	29.3	34.9	29.2	27.5	% Sales
2.63	1.48	2.10	2.71	2.13	4.50	EPS
1.9	-43.7	41.9	29.0	-21.4	111.3	% Change
2.69	3.16	2.93	3.62	4.30	4.33	Free Cash Flow/Share
1.07	1.21	1.39	1.53	1.65	1.76	Dividends/Share
10.61	11.23	9.58	9.05	10.32	12.38	Book Value/Share
8,218	7,925	7,730	7,705	7,683	7,663	Shares Outstanding (Mil)
						Profitability
26.2	14.4	22.1	29.4	21.4	40.1	Return on Equity %
14.0	7.0	9.1	9.8	6.6	13.7	Return on Assets %
25.4	13.0	19.7	23.6	15.0	28.6	Net Margin %
0.55	0.54	0.46	0.41	0.44	0.48	Asset Turnover
1.9	2.2	2.7	3.3	3.1	2.8	Financial Leverage
69.0	64.7	61.6	61.9	65.3	65.4	Gross Margin %
32.1	30.1	25.0	25.2	31.8	33.5	Operating Margin %
20,645	27,808	40,783	76,073	72,242	66,585	Long-Term Debt
89,784	80,083	71,997	72,394	82,718	94,864	Total Equity
7.6	6.7	5.2	4.3	4.1	4.0	Fixed Asset Turns

Quarterly Revenue & EPS

Revenue (Bil)	Sep	Dec	Mar	Jun	Total
2019	29.1	32.5	30.6	—	—
2018	24.5	28.9	26.8	30.1	110.4
2017	20.5	24.1	22.1	23.3	90.0
2016	20.4	23.8	20.5	20.6	85.3
Earnings Per Share ()					
2019	1.14	1.08	1.14	—	—
2018	0.84	-0.82	0.95	1.14	2.13
2017	0.60	0.66	0.61	0.83	2.71
2016	0.57	0.62	0.47	0.39	2.10

Revenue Growth Year On Year %



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Research Methodology for Valuing Companies

Qualitative Equity Research Overview

At the heart of our valuation system is a detailed projection of a company's future cash flows, resulting from our analysts' research. Analysts create custom industry and company assumptions to feed income statement, balance sheet, and capital investment assumptions into our globally standardized, proprietary discounted cash flow, or DCF, modeling templates. We use scenario analysis, in-depth competitive advantage analysis, and a variety of other analytical tools to augment this process. We believe this bottom-up, long-term, fundamentally based approach allows our analysts to focus on long-term business drivers, which have the greatest valuation impact, rather than short-term market noise.

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

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

1. Economic Moat

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

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

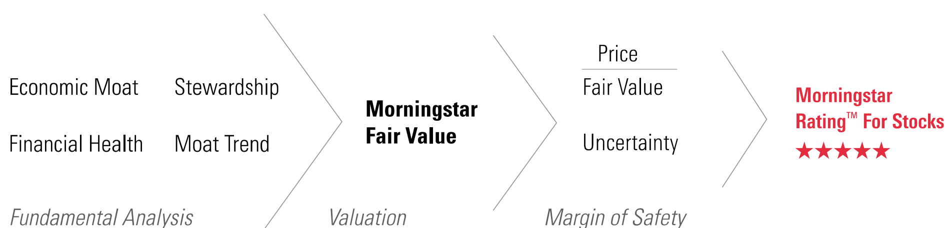
To assess the direction of the underlying competitive advantages, analysts perform ongoing assessments of the moat trend. A firm's moat trend is positive in cases where we think its sources of competitive advantage are growing stronger; stable where we don't anticipate changes to competitive advantages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

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

2. Estimated Fair Value

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

Morningstar Research Methodology for Valuing Companies



Our model is divided into three distinct stages:

Stage I: Explicit Forecast

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

Stage II: Fade

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

Stage III: Perpetuity

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

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

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3. Uncertainty Around That Fair Value Estimate

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

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

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

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

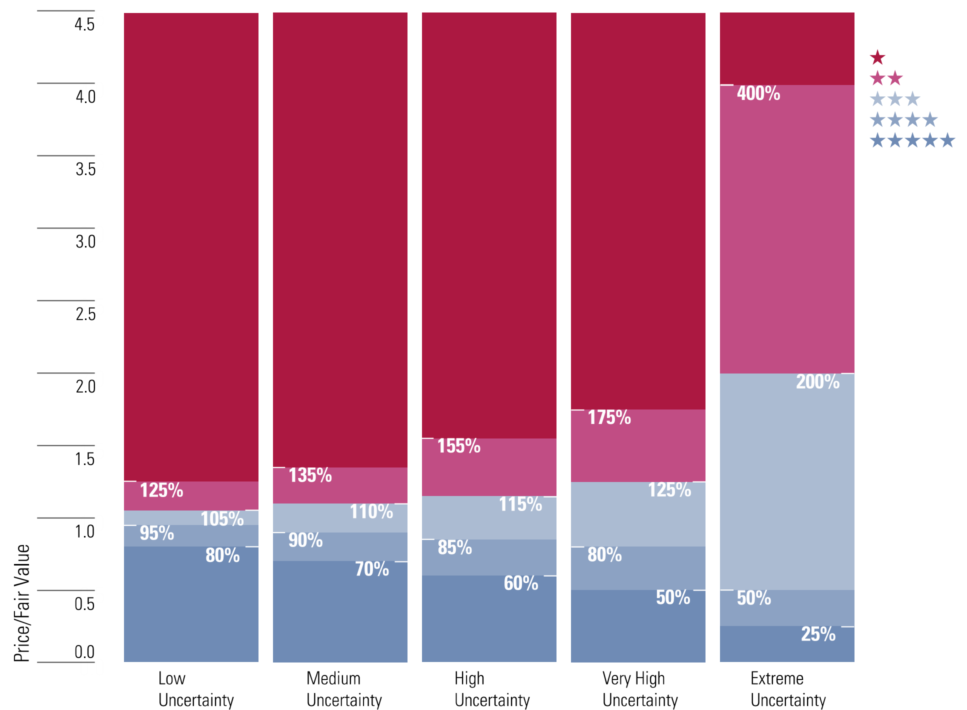
- Low–margin of safety for 5-star rating is a 20% discount and for 1-star rating is 25% premium.
- Medium–margin of safety for 5-star rating is a 30% discount and for 1-star rating is 35% premium.
- High–margin of safety for 5-star rating is a 40% discount and for 1-star rating is 55% premium.
- Very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

4. Market Price

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

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

Morningstar Equity Research Star Rating Methodology



Morningstar Star Rating for Stocks

Once we determine the fair value estimate of a stock, we compare it with the stock's current market price on a daily basis, and the star rating is automatically re-calculated at the market close on every day the market on which the stock is listed is open.

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

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

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

The Morningstar Star Ratings for stocks are defined below:

★★★★★ We believe appreciation beyond a fair risk-adjusted return is highly likely over a multiyear time frame. The current market price represents an excessively pessimistic outlook, limiting downside risk and maximizing upside potential.

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

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

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

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

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Other Definitions

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

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

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

Risk Warning

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

Quantitative Equity Reports Overview

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

Quantitative Equity Ratings

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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- Overvalued: Last Price is above Morningstar's quantitative fair value estimate.

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

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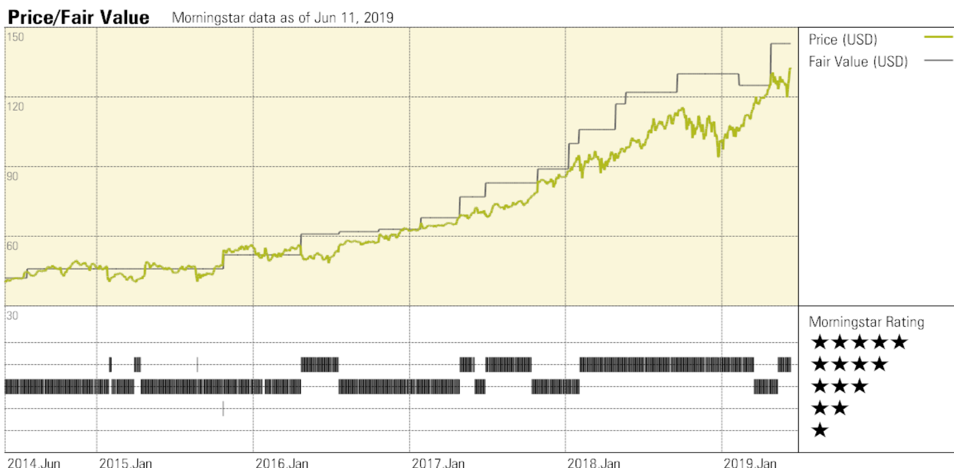
Microsoft Corp MSFT (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★★★★	132.10 USD	143.00 USD	0.92	1.36	1.39	1,012.26	Software - Infrastructure	Exemplary
11 Jun 2019 21:36, UTC	11 Jun 2019	25 Apr 2019 09:49, UTC		11 Jun 2019	11 Jun 2019	11 Jun 2019		



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Microsoft Corp MSFT (XNAS)

Morningstar Rating	Last Price	Fair Value Estimate	Price/Fair Value	Trailing Dividend Yield %	Forward Dividend Yield %	Market Cap (Bil)	Industry	Stewardship
★★★★	132.10 USD	143.00 USD	0.92	1.36	1.39	1,012.26	Software - Infrastructure	Exemplary
11 Jun 2019 21:36, UTC	11 Jun 2019	25 Apr 2019 09:49, UTC		11 Jun 2019	11 Jun 2019	11 Jun 2019		

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