Goldman Sachs | Global Macro Research

ISSUE 133 | November 25, 2024 | 5:00 PM EST

TOP *of* MIND

MARKET CONCENTRATION: HOW BIG A WORRY?

The top 10 stocks in the S&P 500 account for an outsized share of the index's market cap and of its stellar 2024 performance. So, just how anomalous is today's equity market concentration, and how worrying is it? GS' David Kostin argues that the unusually high concentration warrants investor concern because history suggests that high concentration is associated with lower long-run returns. But Acadian's Owen Lamont thinks worries about concentration are overblown, arguing that concentrated markets aren't inherently riskier and don't portend future poor performance, though high valuation often does. At the heart of the matter is whether the outperformance of today's dominant stocks can persist over the longer term. Lamont and Kostin agree this will likely prove difficult, and NYU Stern's Thomas Philippon and Cravath's Noah Phillips opine on a key risk to sustained outperformance: antitrust scrutiny. So, GS strategists advise staying invested in US equities but recommend shifting some assets to equal-weighted indices and diversifying across strategies and regions.

> If the historical pattern persists, high concentration today portends much lower S&P 500 returns over the next decade than would have been the case in a less concentrated market.
>
> - David Kostin

> [Current investor concerns about high US market concentration] are totally overblown...there are many reasons to think that the US stock market is overvalued, but concentration isn't one of them.
>
> - Owen Lamont

> There is substantial reason to believe that the Trump Administration will remain fairly aggressive in the pursuit of antitrust prosecutions and blocking mergers in the tech sector and beyond.
>
> - Noah Phillips

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David Kostin, Chief US Equity Strategist at Goldman Sachs

DIVERSIFY TO AMPLIFY
Peter Oppenheimer, GS Global Portfolio Strategy Research

OPTIMAL PORTFOLIOS AMID HIGH CONCENTRATION
Christian Mueller-Glissmann, GS Multi-Asset Strategy Research

...AND MORE

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Macro news and views

We provide a brief snapshot on the most important economies for the global markets

US

Latest GS proprietary datapoints/major changes in views

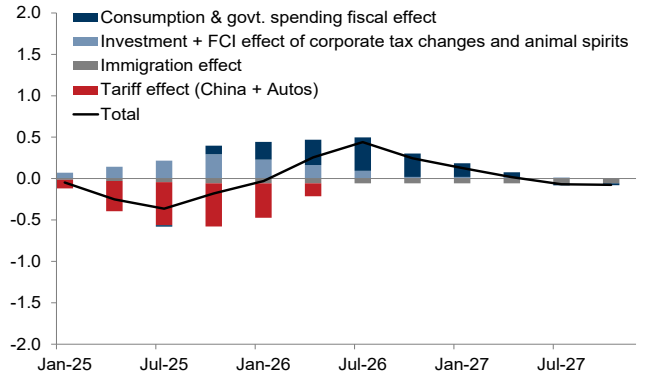
- We recently raised our end-2025 US core PCE inflation forecast to 2.4% yoy (from 2%) on the back of the higher China and auto tariffs we expect in Trump's second term.

Datapoints/trends we're focused on

- US economic policy in Trump 2.0; we expect higher China and auto tariffs, lower immigration, some fresh tax cuts, and regulatory easing to have limited US growth impacts.
- US growth outperformance, which we expect again in 2025 as we forecast above-consensus 2.5% US GDP growth (yoy).
- Fed policy; we expect the Fed to deliver consecutive rate cuts through 1Q25 before slowing the cutting pace, though we see some risk that the Fed could slow the pace sooner.

Trump policy shifts: only modest US growth impacts

Estimated impact of baseline post-election policy changes on US year-over-year real GDP growth, pp



Source: Goldman Sachs GIR.

Japan

Latest GS proprietary datapoints/major changes in views

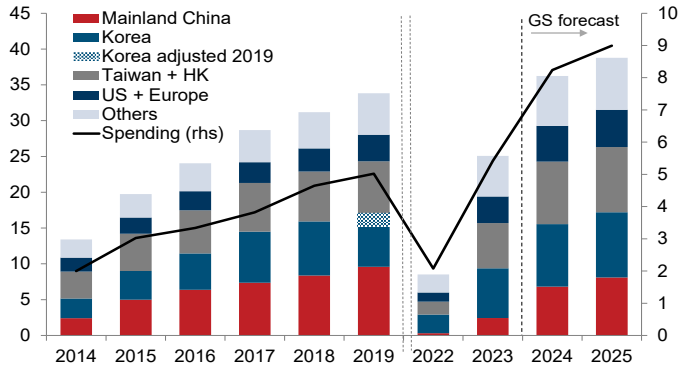
- No major changes in views.

Datapoints/trends we're focused on

- BoJ policy; we expect the BoJ to hike rates again in Jan and Jul 2025, though the Jan hike could be brought forward to Dec 2024 if USD/JPY strengthens to around 160.
- Japan growth; we expect GDP growth to recover to 1.2% in 2025 (vs. -0.2% this year) on the back of solid consumer spending, a rise in goods exports, and increased tourism.
- Japan inflation; we now see evidence of a virtuous cycle between wages and prices, suggesting that the economy has crossed a key checkpoint toward sustainable inflation.

Japan: a boost from increased tourism

Number of foreign visitors to Japan (lhs, mn) and their spending (rhs, ¥tn); GS forecast for 2024 and 2025



Source: BoJ, Japan National Tourism Organization, Goldman Sachs GIR.

Europe

Latest GS proprietary datapoints/major changes in views

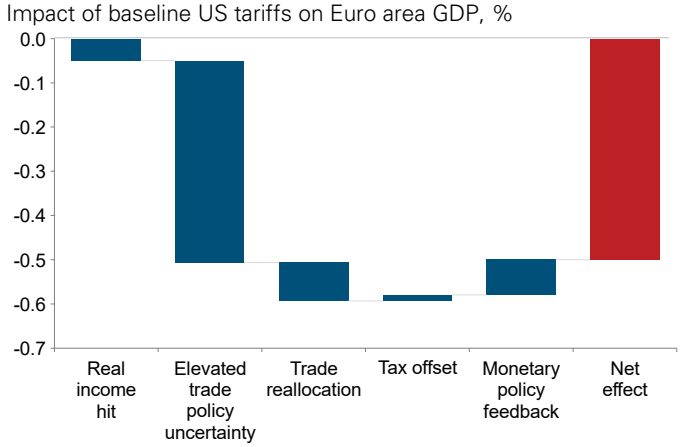
- We recently revised our BoE forecast to a quarterly pace of cuts next year (vs. sequential cuts from Feb previously) to a terminal rate of 3.25% on the back of recent developments that point to stronger near-term UK growth and inflation.

Datapoints/trends we're focused on

- EA growth; we expect below-consensus GDP growth of 0.8% in 2025 (yoy) owing to ongoing structural headwinds in the manufacturing sector, higher trade policy uncertainty following the US election, and further fiscal consolidation.
- ECB policy; we expect a 25bp rate cut in Dec, followed by continued sequential 25bp cuts to a terminal rate of 1.75%.

Euro area: a growth hit from trade tensions

Impact of baseline US tariffs on Euro area GDP, %



Source: Haver Analytics, Goldman Sachs GIR.

Emerging Markets (EM)

Latest GS proprietary datapoints/major changes in views

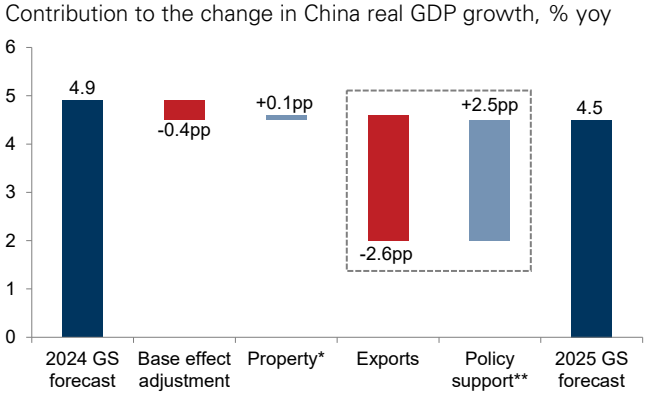
- We recently lowered our 2025 China GDP growth forecast to 4.5% (yoy, from 4.7%) to reflect the impact of likely higher US tariffs that are only partially offset by easier policy.

Datapoints/trends we're focused on

- China growth rotation; we expect policy support to become the key driver of China growth in 2025, taking the reins from exports, which fueled the Chinese economy this year.
- India growth; we expect a cyclical slowdown in 2025 owing to continued fiscal consolidation and slower credit growth, but we believe India's structural growth story remains intact.
- EM easing cycles, which should continue next year, though tariff-related FX pressures could impact the pace of cuts.

China: a growth rotation from exports to policy

Contribution to the change in China real GDP growth, % yoy



**Property contribution includes policy support in the property sector.*
***Policy support refers to non-property policy support to avoid double counting.*

Source: Goldman Sachs GIR.

Market concentration: How big a worry?

S&P 500 returns this year have been nothing short of spectacular, with the index rising an eye-popping 26% year to date, recently breaking the 6000 level. But it's no secret that this stellar performance owes to a handful of technology stocks—the so-called Magnificent 7—which returned 41% year to date versus only 18% for the remaining 493 stocks and accounted for an astonishing 47% of the index's gains. So, just how anomalous is the level of US equity market concentration today, and how worried should investors be about it?

We turn to GS Chief US Equity Strategist David Kostin and Acadian Asset Management's Owen Lamont for answers. Kostin views the S&P 500 as unusually concentrated today, with the current 36% of total index market cap accounted for by the top 10 stocks substantially exceeding the roughly 20% average of the last several decades, and the market cap of the largest stock relative to the 75th percentile stock suggesting the highest level of concentration since 1932. He says that investors don't need to worry about this high concentration over the short term, arguing that no relationship exists between concentration and near-term returns, and forecasts that solid earnings growth amid a still-favorable macro backdrop will lift the S&P 500 to 6500 by year-end 2025—yielding an above-average 9% price return for the year.

But Kostin argues that investors *do* need to worry about market concentration over the longer term, say 10 years, because history suggests that high concentration is associated with lower returns over longer horizons. Specifically, when Kostin adds in market concentration as a distinct variable to his long-run return model, the model forecasts average S&P 500 annualized returns of 3%—sharply below the historical average of 11% and 400bp below the 7% average that the model excluding market concentration would suggest. This drag on long-run returns, he says, owes to the inherently higher volatility of more concentrated portfolios and, more crucially, to the high valuations of the stocks driving the concentration, which today trade at a negative risk premium, suggesting that investors are not being sufficiently compensated for this increased risk.

Lamont, by contrast, contends that the US stock market is not alarmingly concentrated today relative to history—with the 1950s and 60s featuring much more concentrated markets—and to the rest of the world, with some equity markets in Europe and Asia substantially more concentrated. And he argues that market concentration in and of itself should not be a source of investor concern, as it is mainly a mechanical byproduct of profits becoming more concentrated in the largest firms and those firms becoming more richly valued.

While Lamont agrees that more concentrated portfolios are inherently riskier, he says that the same can't be said of more concentrated *markets*. He argues that stock market risk comes from two sources—fundamental risk, and prices departing from fundamentals—neither one of which necessarily increases when stock market concentration rises. Case in point: the US stock market in the 1950s—when just three stocks accounted for nearly 30% of the market—was arguably safer and less volatile than the market today. And he sees no strong relationship between the level of concentration and subsequent performance. So, Lamont's main message to investors is: "if you want to worry about something, worry about the overvaluation of big growth stocks, not concentration."

All that said, at the heart of the matter is whether the outperformance of today's dominant stocks can persist over the medium-to-longer term. And here, Lamont and Kostin agree that sustained outperformance will likely prove difficult. In Lamont's view, an underappreciated risk today is the likelihood that mean reversion in top firms' fundamentals and valuations—which has little to do with these firms' size relative to the market—results in their future underperformance. Kostin puts some numbers around this, finding that over the past four decades, only around 3% of S&P 500 companies were able to generate 20%+ revenue growth—the market's current long-term growth expectations for the Magnificent 7—for 10 consecutive years.

While such deceleration has often occurred for organic reasons, increased regulatory scrutiny also poses risk to future performance. We first dig into the genesis of this scrutiny with NYU's Stern School of Business' Thomas Philippon, who explains that regulators must step in—and often have—when big firms use their market power to prevent competition or to raise prices, which Philippon refers to as "bad concentration". He dismisses the notion that such actions on the part of regulators stifle innovation, arguing that firms are at their most innovative *not* when they are dominant, but rather when they face fierce competitive pressure, such as when Apple created the iMac in a desperate effort to survive against Microsoft.

With this in mind, we then speak with Noah Phillips, former FTC Commissioner and current Co-Chair of the Antitrust Practice at Cravath, to better understand the nuts and bolts of US antitrust policy today and how it may evolve. He argues that not nearly as much daylight existed between Biden's and Trump 1.0's approaches to antitrust as many people seem to think, and warns that investors expecting less regulatory scrutiny in Trump's second term, especially of big tech firms, will likely be disappointed.

So, what does this all mean for investors? Kostin advises non-taxable investors to shift some equity assets from cap- to equal-weighted benchmarks given his estimate that the typical stock will likely return 8% over the next decade—500bp more than the aggregate index. GS Chief Global Equity Strategist Peter Oppenheimer, for his part, sees the US equity market's high concentration and valuation as a reason to diversify equity exposure across strategies and regions more so than in the past, even as a US overweight still makes sense given GS expectations for still-solid US economic and earnings growth next year. GS Research's Head of Asset Allocation Christian Mueller-Glissmann similarly thinks that high US concentration and valuation argue for reducing the weight of US equities in multi-asset portfolios. However, he also finds that the optimal portfolio could remain the tried-and-true 60/40, though with a different mix of equities and bonds below the surface.

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Interview with David Kostin

David Kostin is Chief US Equity Strategist at Goldman Sachs. Below, he argues that investors should be concerned about high US equity market concentration today as history suggests that high concentration is associated with lower S&P 500 index returns over longer horizons. He therefore recommends non-taxable investors shift some equity assets to track equal-weighted benchmarks.

Allison Nathan: How concentrated is the US equity market today relative to history?

David Kostin: The top ten stocks in the S&P 500 by market capitalization today, which are mainly but not exclusively tech companies, account for around 36% of the total market cap of the index. That compares to an average of around 20% over the 45 years for which we have daily data for this metric, and a prior peak of around 25% at the height of the Dot Com boom in 2000. Another metric of concentration, the market cap of the largest stock relative to the 75th percentile stock—for which we have data spanning the last 100 years—suggests that the current level of concentration is the highest since 1932. So, the S&P 500 index is unusually concentrated today relative to history.

Allison Nathan: So, should investors be concerned about the current level of market concentration?

David Kostin: Investors do not need to be concerned about high market concentration over the short run; we have found no relationship between market concentration and S&P 500 returns over the subsequent week, month, six months, or year—when factors such as valuation, near-term economic and earnings growth, money flow, share buybacks/dividend policy, etc. drive returns—and maintain a 9% forecast for S&P 500 price returns over the next 12 months. But investors should be concerned about market concentration over the longer term, say 10 years, because the historical record suggests that a meaningful relationship exists between market concentration and forward returns, with high concentration associated with lower returns over longer horizons.

Specifically, when forecasting long-run returns using several variables, including valuation, profitability, interest rates, economic fundamentals and, importantly, market concentration, we have found that market concentration is a distinct variable that enhances our long-run return model. To see this, consider that, over the last 100 years, the typical annualized return of the S&P 500 over a 10-year window, which sees an average of five quarters of economic contraction, has been 11%. Over the past decade that has seen only two quarters of economic contraction, the annualized return has been roughly 13.5%. But over the coming decade, even assuming a less-than-average four quarters of economic contraction, our model forecasts S&P 500 annualized returns between -1% and +7%, with an average of 3%. Removing concentration from the model would suggest a return ranging from 3% to 11% with an average of 7%—still below average but much less so—suggesting that concentration alone explains 400bp of the additional drag on returns above and beyond other factors such as valuation. So, if the historical pattern persists, high concentration today portends much lower S&P 500 returns over the next decade than would have been the case in a less concentrated market.

> "If the historical pattern persists, high concentration today portends much lower S&P 500 returns over the next decade than would have been the case in a less concentrated market."

Allison Nathan: What's the intuition behind why high concentration drags on longer-run returns?

David Kostin: The drag intuitively comes from two sources. First, high concentration suggests that forward realized volatility will likely be greater given the narrow group of companies driving the index; any portfolio with a small number of constituents subject to idiosyncratic risk will be more volatile than a broadly diversified portfolio. But, perhaps even more crucially, the high valuations of the stocks driving the high concentration mean that investors are not being sufficiently compensated for this increased risk.

> "The high valuations of the stocks driving the high concentration mean that investors are not being sufficiently compensated for this increased risk."

To put some numbers on this, these stocks today trade with a negative risk premium, which hasn't happened in over 20 years, since the Dot Com boom. Back then, the internet companies at the center of the boom traded at 47x earnings, suggesting an earnings yield—the inverse of the earnings multiple—of roughly 2% compared to a 10-year Treasury yield of roughly 6%, which amounted to around a 400bp negative risk premium. Today, the valuation of the leading tech companies is smaller at roughly 31x earnings, the inverse of which is around 3.2%, compared to a 10-year Treasury yield of roughly 4.4%, which amounts to over 100bp of negative risk premium versus the rest of the market that is trading at a positive risk premium. So, these companies are trading at extremely high valuations relative to the risk investors face by owning them. And with these companies returning 42% ytd—accounting for 56% of the index's return—that risk is large.

Second, driving these exceptionally high valuations are expectations of continued strong long-term earnings growth—on the order of 20%—and persistently high margins. But

history shows that the number of companies that can consistently deliver 20% or greater growth and high margins is extremely small and fades dramatically over time, with almost no companies able to successfully do so over a decade. Putting some numbers around this, over the past four decades, the share of S&P 500 companies that were able to generate 20%+ revenue growth for 10 consecutive years was only around 3%, and only 0.1% of firms were able to maintain EBIT margins of over 50%. So, history suggests that the earnings performance of these companies will likely disappoint current euphoric market expectations over the longer run.

> "History suggests that the earnings performance of these [dominant] companies will likely disappoint current euphoric market expectations over the longer run."

Allison Nathan: Both of these factors relate back to valuation though, so why doesn't valuation capture the risk that market concentration poses to future returns?

David Kostin: Again, concentration is related to valuation but distinct from it. While concentration and valuation can be correlated at some points, as was the case during the Dot Com boom and is the case today, oftentimes no relationship exists; correlation has ebbed and flowed over the decades, and we have found that less than 10% of the variation in market concentration can be explained by variation in valuation. That's why incorporating concentration as a distinct variable into a model that forecasts long-term returns makes sense—it adds explanatory power to the model.

Allison Nathan: Why is the market underappreciating the risk that high concentration poses to longer-run returns?

David Kostin: That's hard to say. Obviously, some ebullience about the market is at work. But it's difficult to square the level of focus on market concentration I observe from investors and the reality that most investors totally ignore it when forecasting long-run returns. It's particularly head-scratching given that these return assumptions are critically important for the investment strategy and asset allocation decisions of longer-term investors like sovereign wealth funds and especially public pension funds, many of which are dramatically underfunded.

That said, it's worth mentioning that most of these investors nevertheless share our view that S&P 500 annualized returns over the next decade will likely be lower than the 11% average just given the high valuations of the largest companies today. That recognition has led expectations for 10-year returns among longer-term investors to cluster in the 5-8% range, with the average around 6%. Based on my observations, few investors expect average or above-average returns, even if we seem to be on the low end of the range of expectations at 3%.

Allison Nathan: Where could your assumption that current high levels of market concentration will drag on longer-run returns go wrong?

David Kostin: Our analysis is based on historical patterns, and this time could prove different than the past for several reasons. First, generative AI technology could be a more sustainable driver of growth for today's largest companies than we assume. Historically, our long-term return model has proven too pessimistic in periods of rapid technological change. Second, constituent turnover presents some risk. Historically, around 3.5% of S&P 500 constituents turn over every year on average and, since 1980, 36% of S&P 500 constituents have turned over during the average 10-year period. So, the index is continually reconstituted and less successful companies are replaced by new firms that may have better growth prospects. If this pattern persists, faster growing and more profitable companies could enter the index over the next decade, which would boost returns.

And third, demand for US equities from US households—the primary owners of US stocks—could rise. Based on data from the Federal Reserve, the allocation of US household portfolios to equities is around 50%—the highest reported level since the data series began in 1952. These already record-high levels of ownership suggest that this is perhaps a smaller risk than the others we've discussed, but a growing equity-oriented investment culture among households nonetheless presents risk of higher allocations to equities in the years ahead.

> "It's critical to understand that we are **not** saying that equities generally are likely to deliver low returns… the typical stock will likely return 8% over the next decade—500bp greater than the aggregate index."

Allison Nathan: Given all that, how should equity investors be positioned going forward?

David Kostin: It's critical to understand that we are **not** saying that equities generally are likely to deliver low returns; our analysis suggests that returns for capitalization-weighted indices, like the S&P 500, will likely be substantially lower than average over the next decade—**not** the returns of the average stock, which trades at a lower valuation, etc. today. We estimate that the typical stock will likely return 8% over the next decade—500bp greater than the aggregate index.

For non-taxable investors like sovereign wealth and pension funds, this suggests that an equal-weighted benchmark would provide a better risk-adjusted return for investments in the US public stock market today than a cap-weighted benchmark. And we find that, since 1970, the equal-weighted benchmark has outperformed the cap-weighted S&P 500 index during nearly 80% of rolling 10-year periods. So, at the current moment of high concentration, we recommend that non-taxable investors not only recognize, but act on, the increased risk this concentration poses to long-run returns and shift public equity allocations toward equal-weighted indices.

Interview with Owen Lamont

Owen Lamont is Senior Vice President and Portfolio Manager at Acadian Asset Management LLC. Below, he argues that current investor concerns about elevated US equity market concentration are overblown, and that the more worrying feature of today's stock market is its overvaluation.

The views stated herein are those of the interviewee and do not necessarily reflect those of Goldman Sachs or Acadian Asset Management LLC.

Allison Nathan: How concentrated is the US equity market today in both absolute and relative terms?

Owen Lamont: The top ten firms account for more than 30% of the total market cap of US equities, a level of concentration higher than in 2000 but similar to other points in US history, such as the 1930s, 1950s, or 1960s. By some measures, markets are less concentrated today than historically. In the mid-1950s, just three stocks—IBM, AT&T, and GM—accounted for around 28% of the total market cap of the stock market. And in 1960, a single stock, AT&T, represented 13% of the entire market—roughly double the weight of today's largest stock, Nvidia. So, market concentration is within historical norms for the US.

Relative to international markets, the US stock market is far less concentrated. Some countries in Europe, notably Switzerland and France, have much more concentrated stock markets than the US. In both Taiwan and South Korea, one stock accounts for over 20% of total market cap. And two decades ago, a single stock accounted for over 70% of the Finnish stock market. So, both historically and internationally, the US stock market is not alarmingly concentrated today.

> "Both historically and internationally, the US stock market is not alarmingly concentrated today."

Allison Nathan: So, are current investor concerns about high US market concentration overblown?

Owen Lamont: Yes, totally overblown.

It's certainly true that market concentration has risen over the past decade, but that is mainly a mechanical byproduct of two trends. First, total profits have become more concentrated in the largest firms. So the concentration of market cap is just appropriately reflecting the concentration of fundamentals. Second, mega cap tech firms are somewhat more richly valued than they were ten years ago. Put these two facts together, and they imply that the largest firms have outperformed, and that mechanically makes concentration rise.

There are many reasons to think that the US stock market is overvalued, but concentration isn't one of them. If you want to worry about something, worry about the overvaluation of big growth stocks, not concentration.

Wonderful things have happened to large growth firms in recent years. The underappreciated risk is that normalization takes hold and large growth firms will underperform in the future. But that's not about concentration, that's about mean reversion.

Allison Nathan: But aren't more concentrated markets inherently riskier?

Owen Lamont: No. That argument is the right intuition for constructing individual portfolios, but the wrong intuition for evaluating the riskiness of the market as a whole. It is certainly true that when an individual investor chooses assets to own in their portfolio, bigger weights on a single or small number of assets generally increases risk. But it isn't necessarily true that a more concentrated stock market is riskier. For example, the stock market in the 1950s was more concentrated but arguably safer and less volatile than the stock market today, and the US economy more broadly wasn't especially risky during that period even though one giant phone company, three large automakers, and a handful of big oil companies dominated it.

Ultimately, stock market risk comes from two sources: fundamental risk, or prices departing from fundamentals. And neither one of those necessarily increases when stock market concentration rises. The breakup of AT&T in the early 1980s provides a good example of this point. After many years of legal battles, the Department of Justice (DOJ) forced the company, which was the second largest stock in the US market at the time, to split into several independent firms—one "Ma Bell" became seven "Baby Bells" in 1984. As a result, market concentration declined overnight. But the market didn't become any safer just because seven stocks now existed where before there was one. On the contrary, one monopolistic phone company is arguably *less* risky for investors than seven competing Baby Bells.

Many people also underappreciate the fact that individual companies can be diverse in and of themselves. The Magnificent 7 companies have a vast array of business lines—streaming, e-commerce, cloud storage, etc. And putting a bunch of highly successful, profitable, and relatively uncorrelated businesses into one stock that has significant weight in the index is not, in itself, problematic.

> "I don't see a strong historical relationship between the level of market concentration and subsequent performance."

Allison Nathan: Even if concentrated markets aren't necessarily riskier, do they lead to lower market returns?

Owen Lamont: I don't see a strong historical relationship between the level of market concentration and subsequent performance. The more important determinant of future performance is valuation. And while concentration and valuation have been positively correlated in the past, high valuation is not an inherent feature of highly concentrated markets. Take the tech bubble of the late 1990s, during which a very concentrated market eventually underperformed. The causal mechanism behind the underperformance was not concentration, but rather the expensiveness of the market, and of growth stocks in particular. Expensive stocks—whether they dominate the market or not—historically experience poor future performance.

Many troubling measures suggest that the US stock market is overvalued today, including value spreads, or the price of growth stocks relative to value stocks, which indicate that growth stocks are overpriced. And while that metric does not necessarily speak to the valuation of the market as a whole, it is likely an indication of overexuberance in the broader market. That is the more worrying aspect of today's stock market, not concentration.

> "Many troubling measures suggest that the US stock market is overvalued today… That is the more worrying aspect of today's stock market, not concentration."

Allison Nathan: Some argue that elevated market concentration leads to lower returns because top firms can't maintain high levels of sales growth/profit margins over sustained periods. How concerned are you about an eventual deceleration in today's dominant firms?

Owen Lamont: The top firms of today will probably decelerate over time. But that has little to do with their size relative to the rest of the market, and more to do with, as you noted, an eventual deterioration in their fundamentals as well as their expensive valuations. While the recent period has been somewhat anomalous in that the companies dominating the market today have done so for the last decade, big growth stocks eventually underperform as their profits mean-revert and their stock prices return to fundamentals. But that is not especially concerning. Creative destruction is an inevitable part of the American experience. The firms that were important to the US economy 30 years ago are not the firms that are important today. And 30 years from now a whole new set of firms—not the Magnificent 7—will very likely be generating jobs and profits and dominating the economy. So, I am not overly concerned about individual firms doing poorly; it's part of how our system works.

Allison Nathan: Concerns about market concentration and the power of the dominant firms has led to a wave of antitrust efforts. Are you concerned that these efforts could lead to company breakups and lower returns?

Owen Lamont: It's not clear that a straight line exists between a stock comprising a large part of the US market and that stock becoming the target of antitrust concerns. The aim of antitrust policy is to halt anticompetitive practices, not the success of large companies just because they're large and successful. So, it's a stretch to say that the rising market cap of a company will necessarily make it a target of antitrust action.

That said, it is clear that while some government-mandated breakups may be good for society, they are not necessarily good for investors. If a company would function better by being broken up into separate, smaller companies, shareholders would have already done precisely that. Again, consider the breakup of AT&T in the 1980s. If holding seven Baby Bells was better than holding one big monopolistic phone company, shareholders should have voluntarily acted to split up the company. Similarly, I see no reason why breaking up the Magnificent 7 into the Magnificent 49 would benefit investors today. So, the potential for more antitrust action is a concern for investors.

Allison Nathan: Are you concerned about concentration risk in that it's a significant amount of market cap in the hands of just a few individuals that run these large firms?

Owen Lamont: That's a valid concern, but not a new one. In the 1950s, the CEO of General Motors, Charles Wilson—who eventually became Secretary of Defense under President Eisenhower—controlled far more of the US economy and stock market than any CEO in America today.

And it is possible for one individual to control two separate listed firms, in which case concentration does not reflect individual-specific risk. If you are worried about one individual running amuck, concentration is not the right way to measure the problem.

Allison Nathan: So, you're not concerned about concentration, but you are concerned about valuation. What does that mean for the likely return profile of equities over the next decade?

Owen Lamont: Given that the US stock market is expensive today and, as we discussed, expensive stocks historically have experienced low subsequent returns, equities will likely deliver lower returns in the next decade compared to the previous one.

Allison Nathan: What else should investors be concerned about?

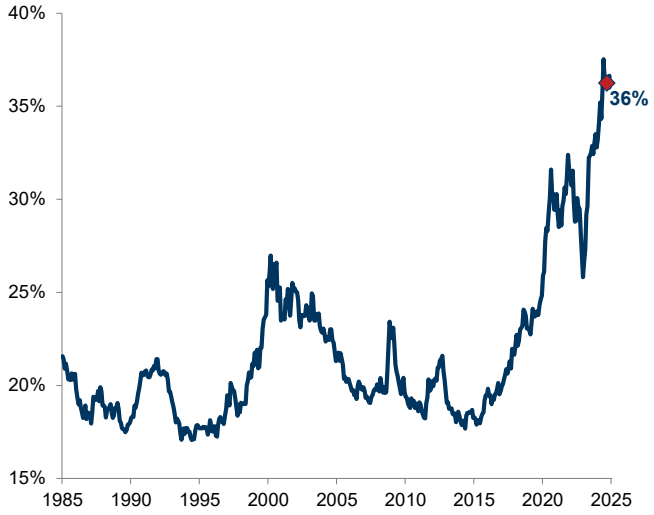
Owen Lamont: Aside from well-known geopolitical risks, AI technology is the great wildcard of the next decade. This technology has the power to be as transformative as the rise of the internet in the 1990s, and likely more so. The internet significantly altered the landscape of the stock market, destroying some firms—like Blockbuster—while creating previously unimagined ones. But, in the process, it generated a huge market bubble that eventually burst. AI could follow the same pattern, setting the market up for an eventual downturn. I am already seeing some signs of a bubble today.

On the other hand, if the benefits of AI technology broaden out to smaller companies, a sharp turnaround in underperforming small cap value stocks could lift the broader market. So, I see both massive AI-related upside and downside risks for the US stock market in the next 5-10 years.

US equity market concentration...

The 10 largest stocks in the S&P 500 currently account for over a third of total market cap

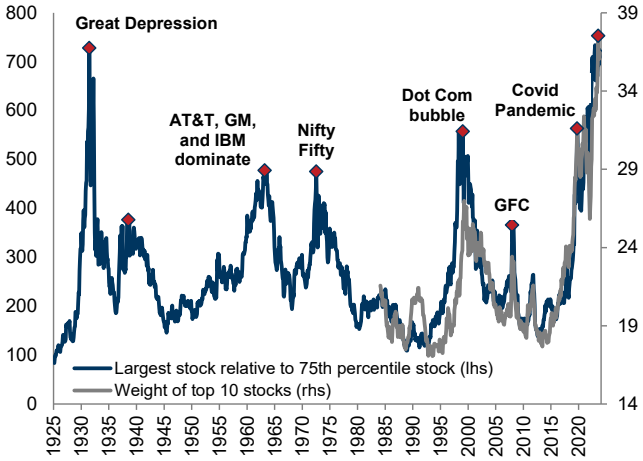
Market cap of 10 largest S&P 500 firms, % of index total



Source: FactSet, Compustat, Goldman Sachs GIR.

US equity market concentration today is particularly high relative to history

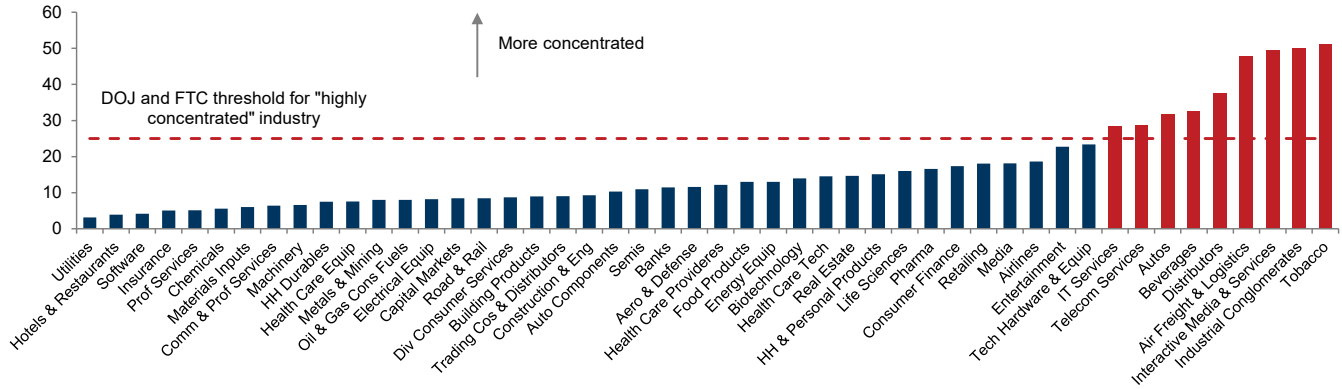
Market cap of the largest stock relative to 75th percentile stock (x, lhs), weight of top 10 stocks in S&P 500 (%, rhs)*



**Consists of US stocks with price, shares, and revenue data listed on the NYSE, AMEX, or NASDAQ. Series prior to 1985 estimated based on data from Kenneth French data library reflecting the market cap distribution of NYSE stocks.*
Source: Compustat, CRSP, Kenneth French, Goldman Sachs GIR.

According to the Herfindahl-Hirschman Index, another common measure of market concentration, the most concentrated areas of the US equity market today are tobacco, industrial conglomerates, and interactive media & services...

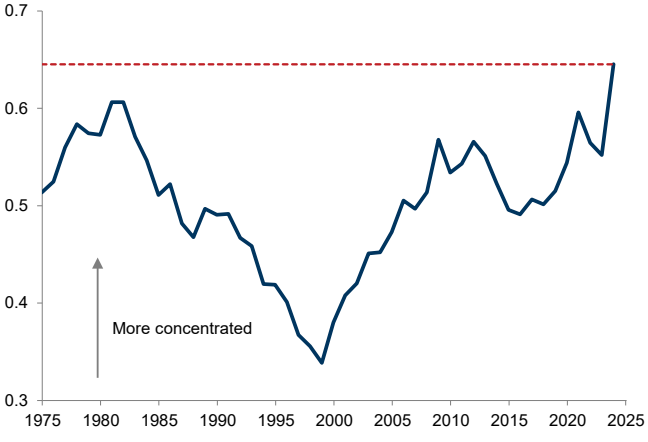
Current Herfindahl-Hirschman Index (HHI) across the public US equity market by industry (based on 2023 US sales)*



**Universe is S&P Total Market Index using GICS level 2 and 3 industries.*
Source: Compustat, Goldman Sachs GIR

...though the HHI for the market as a whole is high

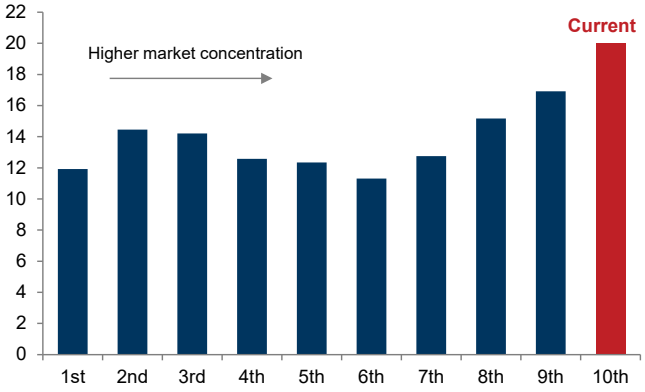
HHI for the US equity market, based on total annual sales*



**Universe is publicly-listed US companies. HHI is calculated by summing the squares of each firm's share of total sales in a given year.*
Source: Compustat, Goldman Sachs GIR.

Higher market concentration is associated with higher volatility...

S&P 500 1y forward realized volatility (y-axis) based on starting level of market concentration (x-axis, decile) (1930-2024)

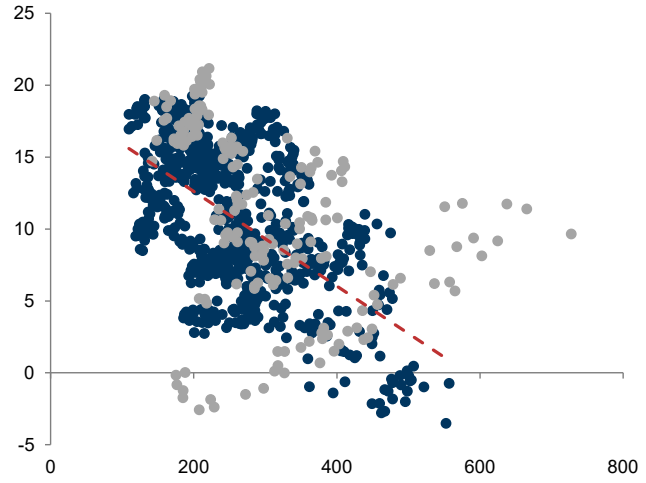


Source: Goldman Sachs GIR.

...in pics

...as well as with lower forward returns

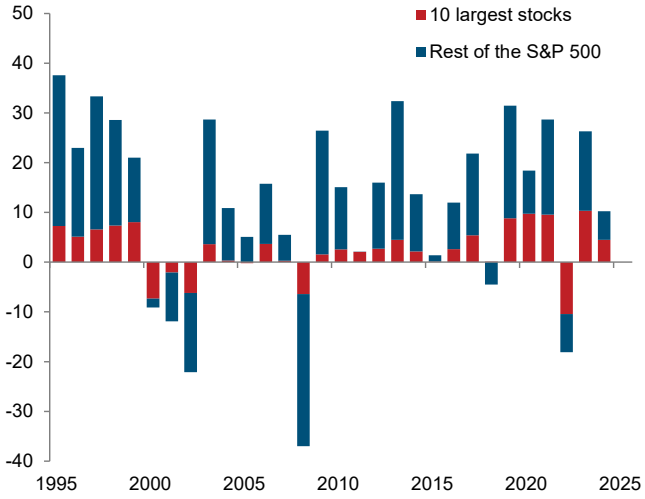
S&P 500 market concentration (x-axis, x) vs. 10-year annualized forward return (y-axis, %)



Note: Market concentration is defined as the market cap of the largest stock relative to the 75th percentile stock; grey observations are recessions.
Source: Goldman Sachs GIR.

The 10 largest stocks have been significant drivers of the aggregate S&P 500 return in recent years...

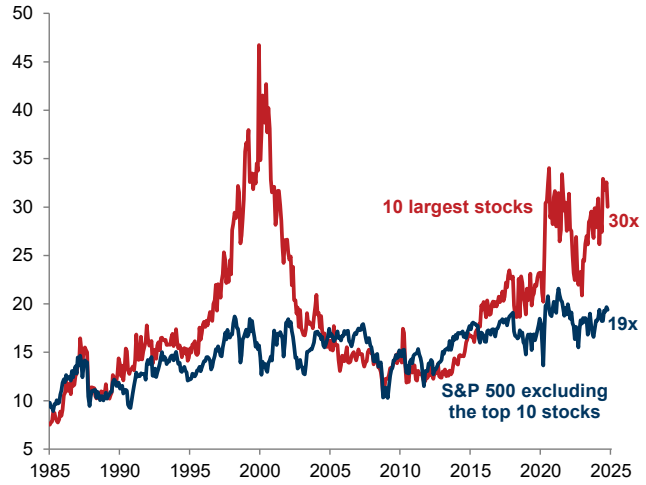
Contribution to annual S&P 500 return, pp



Source: Goldman Sachs GIR.

...and the valuations of these stocks have risen significantly...

Median company P/E multiple



Source: Compustat, Goldman Sachs GIR.

...though today's leaders generally have relatively high profit margins and returns on equity...

Characteristics of largest stocks in 2024

Largest stocks in 2024							
		Market cap		P/E ratio		Trailing 12m profits	
Company	Sector	$bn	% of S&P 500	Last 12m	Next 12m	ROE	Net margin
NVIDIA	Info Tech	$3,608	7%	56x	36x	81%	54%
Apple	Info Tech	3,474	7	36	30	163	24
Microsoft	Info Tech	3,069	6	34	30	31	36
Amazon.com	Consumer Dis	1,853	4	41	33	18	8
Alphabet	Comm Services	1,795	4	22	19	29	28
Meta Platforms	Comm Services	1,230	2	26	22	31	35
Tesla	Consumer Dis	942	2	136	105	12	8
Berkshire Hathaway	Financials	865	2	24	24	7	17
Broadcom	Info Tech	763	2	33	26	34	46
JPMorgan Chase	Financials	696	1	13	14	16	31
Top 10 total / median		**$18,296**	**36%**	**33x**	**28x**	**30%**	**29%**

Source: Compustat, FactSet, Goldman Sachs GIR.

...compared to the top stocks in either 1973...

Characteristics of largest stocks in 1973

Largest stocks in 1973							
		Market cap		P/E ratio		Trailing 12m profits	
Company	Sector	$bn	% of S&P 500	Last 12m	Next 12m	ROE	Net margin
IBM	Info Tech	$47	7%	38x		18%	13%
Eastman Kodak	Info Tech	24	4	48		20	15
Exxon	Energy	20	3	13		12	7
Sears Roebuck	Consumer Dis	18	3	31		14	5
General Electric	Industrials	13	2	26		18	5
Xerox	Info Tech	12	2	49		21	11
Texaco	Energy	10	2	12		13	10
Minnesota Mining & Mfg	Industrials	10	2	41		19	12
Procter & Gamble	Consumer Staples	9	1	32		18	8
Coca-Cola	Consumer Staples	9	1	48		24	10
Top 10 total / median		**$171**	**27%**	**35x**		**18%**	**10%**

Source: Compustat, FactSet, Goldman Sachs GIR.

...or 2000

Characteristics of largest stocks in 2000

Largest stocks in 2000							
		Market cap		P/E ratio		Trailing 12m profits	
Company	Sector	$bn	% of S&P 500	Last 12m	Next 12m	ROE	Net margin
Microsoft	Info Tech	$557	4%	65x	60x	29%	39%
Cisco Systems	Info Tech	533	4	181	133	22	20
General Electric	Industrials	513	4	50	43	26	9
Intel	Info Tech	442	3	57	45	27	26
Exxon Mobil	Energy	271	2	31	22	18	5
Walmart	Consumer Staples	252	2	45	39	23	3
Oracle	Info Tech	222	2	150	108	41	15
IBM	Info Tech	212	2	36	27	30	7
Citigroup	Financials	202	2	18	19	24	13
Lucent Technologies	Info Tech	196	2	77	41	20	9
Top 10 total / median		**$3,398**	**27%**	**53x**	**42x**	**25%**	**11%**

Source: Compustat, FactSet, Goldman Sachs GIR.

Special thanks to the US Portfolio Strategy team for all charts.

Interview with Noah Phillips

Noah Phillips served as Commissioner of the Federal Trade Commission from 2018 to 2022 and is Co-Chair of the Antitrust Practice at Cravath. Below, he discusses the workings of US antitrust policy and what may lie ahead for antitrust under the new administration, arguing that investors looking for less regulatory scrutiny of big tech firms may be disappointed.

The views stated herein are those of the interviewee and do not necessarily reflect those of Goldman Sachs.

Allison Nathan: Which institutions are responsible for antitrust initiatives in the US today, and how do their roles differ?

Noah Phillips: The US oddly has two government agencies responsible for antitrust enforcement and policymaking, and much of their jurisdictions overlap: the Department of Justice (DOJ) and the Federal Trade Commission (FTC). Both bring conduct—involving alleged anticompetitive behaviors—and merger cases. But several important differences exist between the two. One, their processes. Take mergers as an example. The DOJ brings cases to block mergers in federal court, whereas the FTC typically brings two merger cases—one in federal court and the other in its in-house administrative court, with the federal case to enjoin the merger so the FTC can resolve the case in its administrative court. Two, their structures. At the DOJ, the assistant attorney general for the Antitrust Division leads antitrust efforts on the agency's behalf. At the FTC, five commissioners, one of whom is the chair and directs the staff, run the agency.

Three, the legal statutes they enforce. The DOJ enforces the Sherman Antitrust Act and the Clayton Antitrust Act, Section 7 of which is the federal merger statute. The FTC enforces the Clayton Act as well but also Section 5 of the FTC Act, which "prohibits unfair methods of competition". Section 5 is broader than the Sherman Act, though how much broader has been a matter of debate for over a century. And four, the industries they focus on, which is generally more a matter of historical precedent than law—except in a few areas such as common carriers, where the FTC is barred by statute from involvement. Over time, for example, the DOJ has come to focus on media and energy transmission and production, while the FTC has come to focus on pharmaceuticals and oil and gas. But in a lot of sectors, including tech, the lines are not clearly drawn. In the rare case when the agencies can't decide who should deal with a merger, they literally flip a coin, which happened once during my time as FTC Commissioner.

Allison Nathan: To what extent does the US president have authority in the antitrust arena?

Noah Phillips: The president's main authority in this arena is over appointments. The president can appoint the assistant attorney general and his/her superiors in the DOJ as well as FTC commissioners, so long as the positions of the latter are open. That's important to note because FTC commissioners' terms don't necessarily align with elections or the transfer of power between administrations. And because the FTC is an independent agency in the scheme of the federal government, under prevailing law, the president can't fire FTC commissioners for policy differences—only for cause—and the commissioners can't be forced to step down when a new president is elected. That said, the FTC chair has historically stepped down when a new president assumes office to allow that president to effectuate his policy views via a new chair. The president can designate a new chair from among the commissioners. But a degree of leadership continuity still exists, as many or all of the non-chair commissioners stay on.

The DOJ leadership isn't statutorily protected from firing by the president, so the DOJ is less independent, although the agency has generally been protected from White House involvement since the Nixon years. That said, on day one of a new administration, political appointees at the head of government agencies and divisions such as the DOJ typically step down and different political appointees and some career officials temporarily step in until new senior leadership are confirmed.

The president can also guide antitrust policy through his/her actions. Over the years, presidents have exercised this authority to varying degrees. President Biden was very focused on competition early in his term and adopted a "whole-of-government" approach to competition policy, issuing an Executive Order in 2021 that directed many federal agencies, including the FTC and DOJ, to take action against dozens of practices identified by the Administration and established the White House Competition Council, with Biden also appointing a special assistant for competition policy, Tim Wu, to coordinate the whole effort. So, the president can play a strong role in the antitrust arena.

Allison Nathan: So, what will likely happen at the FTC and DOJ now that Trump has been reelected?

Noah Phillips: The fact that FTC Chair Lina Khan's term recently expired wouldn't force her to step down until the lengthy process of appointing and confirming a new commissioner takes place, but she is most likely to observe the historical norm and do so. That would leave the FTC with an even split of two Republican commissioners, Melissa Holyoak and Andrew Ferguson, and two Democratic commissioners, Rebecca Kelly Slaughter and Alvaro Bedoya. So, in the immediate term, while Trump will likely designate a new chair or acting chair from among the remaining commissioners, given that they agree on the overwhelming bulk of matters and decisions are made by majority vote, it will probably be largely business as usual at the FTC. Trump filling the open fifth commissioner slot would break any possible tie regardless of whether that person comes in as the new chair or a non-chair commissioner. But that probably wouldn't happen for months given that the Senate must confirm FTC commissioners. At the DOJ, Assistant Attorney General for the Antitrust Division Jonathan Kanter will also likely step down, setting the stage for

Trump's appointee to take the helm as soon as the Senate confirms them.

Allison Nathan: You served as FTC Commissioner for four years that spanned the Trump and Biden Administrations. How did antitrust policy and enforcement evolve over the two administrations?

Noah Phillips: Biden's Executive Order purported to shift US antitrust policy to a more interventionist and aggressive stance relative to the prior several decades in response to rising economic populism that featured concerns about the conduct and power of large corporations. This shift in approach was visible along several dimensions, from the rhetoric the White House and enforcers used, to the types of cases the agencies brought, to the policy statements they adopted, to the Administration's "whole-of-government" strategy.

But, as a practical matter, the biggest change the Biden Administration brought to merger control was its aversion to remedies—deals that the parties in a case agree to in order to address concerns about competition. The DOJ's current public position is that it doesn't do remedies, although it has been forced to in a few cases. The FTC, by contrast, issued a policy in 2021 stating that it would do remedies, but only if the surviving party agreed to seek prior approval before closing any future deals; the government would no longer have to challenge a deal to block it. While the FTC hasn't fully abided by that policy, for example, allowing Exxon to acquire Pioneer and Chevron to acquire Hess without including prior approval requirements, most of the agreements the FTC has struck in merger cases have involved such requirements.

All that said, as much as the Biden Administration has strived to strike a different tone on antitrust, the reality is that the road toward more aggressive policy and enforcement began before it. While it's not often characterized as such, antitrust enforcement was fairly aggressive during the first Trump Administration, which blocked many mergers and oversaw the initiation of monopolization cases, including the DOJ's case against Google as well as the FTC's case against Facebook. So, not nearly as much daylight exists between Biden's and Trump term one's approaches to antitrust as the former envisioned and as many people seem to think. There is also reason to believe that Trump term two will be closer to Biden than Trump term one.

Allison Nathan: So, are investors that expect less regulatory scrutiny of big tech firms under the new administration likely to be disappointed?

Noah Phillips: Yes. Some variations in antitrust policy and the basis for enforcement may occur, but the appetite to scrutinize large firms, especially tech firms, will probably remain given that the political salience of economic populism has only grown since Trump's first term. An underappreciated but consequential issue to watch will be how regulators' approach to remedies evolves—will they do remedies, and what kind? For every case that the FTC or DOJ files, whether it ends up in liability—meaning, the company has been found legally responsible for violating antitrust laws—or the parties reach an agreement to settle the case, the agencies need to have a view on the appropriate remedies. And regulators could find themselves in a fraught situation because the expectations of them could differ from the public posture of the agency. For example, in an interview before the election, Trump suggested that he would not support breaking up Google, despite the DOJ's current public position that it is seeking Google's breakup now that it has been found liable in a court of law. Whether that changes will be important to watch and will largely depend on who ends up running these efforts at the DOJ under Trump. If Trump wants the DOJ to switch course on the Google case, he would likely attempt to appoint someone who shares that view.

Allison Nathan: Several other cases against big tech firms, including the FTC's case against Amazon and the DOJ's case against Apple, are pending. What could happen to those cases?

Noah Phillips: Each agency will need to decide whether they want to drop, settle, or continue to prosecute their respective cases, and what outcome they hope to achieve by doing so. At the DOJ, the fate of each case will largely depend on what the new assistant attorney general for Antitrust wants to do. At the FTC, if a majority of the Commission can't come to an agreement on a pending case, the case will continue. That said, the FTC chair has the ability to steer much of what the staff does, which includes the government's litigating position. So, the new chair could decide to include some remedies in the case filing, that he/she doesn't want to make a certain argument, or, at the extreme, to tell the court that he/she doesn't believe the FTC has the power to take a certain action, just as the Republican commissioners did when the FTC tried to ban non-competes.

Allison Nathan: What sectors beyond tech are worth keeping an eye on in terms of how antitrust policy may evolve during Trump's second term?

Noah Phillips: Many sectors—not just big tech—have been the objects of antitrust scrutiny under the Biden Administration; in general, that may well continue. However, some sectors were also singled out in odds ways that may not continue, such as the way in which the FTC allowed the Exxon-Pioneer and Chevron-Hess mergers to proceed. Private equity is another area to watch. Even though it wasn't mentioned in Biden's Executive Order, both Lina Khan and Jonathan Kanter have been very focused on private equity and skeptical of the business model. Whether that continues under Trump is an open question.

Allison Nathan: What will you be watching to gauge the direction of antitrust policy and enforcement ahead?

Noah Phillips: I will be closely watching whom Trump nominates for the open FTC and DOJ positions, which will give some indication of where antitrust policy and enforcement may be headed. At the end of the day, though, the headlines about how permissive the Trump Administration could be in its second term will probably prove too bullish. As we've discussed, there is substantial reason to believe that the Trump Administration will remain fairly aggressive in the pursuit of antitrust prosecutions and blocking mergers in the tech sector and beyond.

Interview with Thomas Philippon

Thomas Philippon is the Max L. Heine Professor of Finance at New York University's Stern School of Business and author of *The Great Reversal: How America Gave Up on Free Markets*. Below, he makes the case that while higher industry concentration is not always harmful, the rise of "bad" concentration in the US has hurt consumers and the economy, which argues for ensuring fierce competition among firms in the tech industry and AI space.

The views stated herein are those of the interviewee and do not necessarily reflect those of Goldman Sachs.

Jenny Grimberg: How concentrated are US industries today?

Thomas Philippon: US industries are currently more concentrated than they have been since the post-war period, but concentration should be evaluated on an industry-by-industry basis, because the relevant market will differ depending on the industry. Using a US consolidated measure of concentration to determine how concentrated the restaurant industry is makes no sense because people don't eat at restaurants across the country from them, but using a consolidated measure for the telecoms industry does make sense, as few people would purchase a phone that only works in their zip code. Most US industries fall somewhere in between these two extremes. According to this method, concentration has increased in 75% of US industries since 2000. But the degree of concentration varies significantly across industries. The tech industry always comes to mind as the quintessential highly concentrated industry, but some retail, wholesale trade, and transportation industries are also quite concentrated, and in many cases, concentration has reached fairly high levels relative to history.

Jenny Grimberg: Is higher industry concentration necessarily a bad thing?

Thomas Philippon: No. Concentration can be "good" or "bad". After Apple launched the iPhone in 2007, its share of the smartphone market rose significantly and, as a result, the industry became more concentrated. But that was clearly a positive development because it was the direct consequence of Apple inventing a great product. Walmart also became a dominant player in the supermarket sector in the 1990s for a good reason—it offered lower prices than its competitors thanks to its more efficient supply chain. Good concentration can also be linked to trade. The European car industry, for example, is still quite competitive, but the number of independent firms has declined over recent decades because some firms have merged, not to gain undue advantage but rather in response to global competition.

By contrast, bad concentration occurs when incumbent firms try to protect their market share by preventing competitors from entering the market or when firms merge and then use their increased market power to raise prices. Good concentration is a feature of many markets, including the US, Europe, and Japan. But bad concentration is more of a US-specific phenomenon.

Jenny Grimberg: Why has the US experienced more bad concentration than other countries?

Thomas Philippon: The increase in bad concentration in the US is the result of high barriers to entry in some industries and unchecked mergers in others. The US wireless market is a good example of both. New firms find it difficult to enter the wireless market because cellphone plans must cover a significant share of the population, which can be extremely costly. Regulators can facilitate entry by, for example, mandating that new entrants be allowed to rent part of an existing network while they build up capacity to eventually offer their own services, which is the approach French regulators took several years ago. As a result, French cellphone bills went from being roughly 50% higher to 50% lower than in the US, where regulators essentially forgot the antitrust playbook they had invented and took the opposite approach, allowing several cellphone company mergers that drove prices higher.

This is a problem because high cellphone bills—together with expensive high-speed internet bills—are killing US household budgets, which was entirely avoidable. The US wireless market probably could have remained competitive even with as little as four, five, or six players; an industry doesn't need dozens of firms to be competitive. But decades of mergers have left just a few players in the wireless industry, similar to the US airline industry, where mergers have whittled down the number of carriers servicing specific routes, resulting in high prices, in contrast to Europe where fierce competition among many carriers has resulted in relatively low fares.

Jenny Grimberg: Has the rise in bad concentration been a net negative for the US economy?

Thomas Philippon: It has undoubtedly been a net negative for consumers. Whether that is also true for the broader economy is a more complicated question, with the answer essentially boiling down to the impact of concentration on investment. In theory, it can go either way. It is possible for concentration to spur higher investment because some markets have significant fixed costs, and to recoup those costs, firms must be able to enjoy healthy profit margins. But competition also forces firms to invest and innovate to survive. Barriers to entry would then lower investment. Empirically, we see that when competition increases, firms may take a hit on margins or cut their dividends, but they don't slash their capital expenditures and, if anything, increase them. So, the investment rate is actually higher when firms compete more. For that reason, I'm fairly confident that bad concentration negatively affects not just consumers, but the economy as a whole.

Jenny Grimberg: Big tech firms are the focal point of current concerns about market concentration. How unique are these companies in terms of their size and the factors behind their success compared to past superstar firms?

Thomas Philippon: They aren't particularly unique in either sense. IBM and AT&T are two former superstar companies that were monopolies in their respective industries in the mid-to-late 20th century. Apple's sales relative to US GDP are currently only slightly higher than IBM's and AT&T's were back then, and Apple's sales as a share of global GDP are roughly the same as those of the two former superstars. So, while big tech firms have undoubtedly earned their moniker, they are not unusually large by historical standards. It's also long been the case that superstar firms earned their success through innovation and efficiency, and the same is true of Apple, Google, Facebook, etc. So, these firms aren't anything new under the sun and therefore shouldn't be treated any differently than every successful firm in the past: their success should be welcomed, but they cannot be allowed to flout the rules or abuse their market power because of it.

Jenny Grimberg: So, how would you characterize the role of regulators in scrutinizing these firms?

Thomas Philippon: It's difficult to find a US company that became big without being innovative, but it's also difficult to find a company that became big and then didn't try to abuse its market power. Ultimately, that problem can be resolved in one of two ways—by the market or by government intervention. In the case of Walmart, Amazon entered the market in the early 2000s, effectively disrupting Walmart's dominance. And today, the US supermarket industry is comprised of a handful of large, efficient firms that compete fiercely, resulting in low retail prices.

When the market can't solve the problem, regulators must step in. Unfortunately, the historical record shows that these remedies tend to come too late—by the time the government stepped in to rein in Microsoft in the late 1990s, its competitor, Netscape, was already dead. However, regulatory action can still enable the next round of innovation. It's probably not a coincidence that the tech industry experienced its most innovative decade following the *US vs. Microsoft* trial. Before the trial, Microsoft was buying up every competitor it could get its hands on and left unchecked, this buying spree likely would've continued. So, Google and Facebook may never have had an opportunity to become Google and Facebook. The same is true of today's big tech firms. Regulatory action will undoubtedly come too late to undo the harm these companies have inflicted on potential competitors over the last several years, but such action can still make room for new competitors to grow and thrive.

Jenny Grimberg: But hasn't the US been so innovative and dynamic in large part because US regulators have not clamped down on companies? Europe, for example, strictly enforces antitrust laws and has few world-class companies.

Thomas Philippon: I strongly disagree on the causality here. Apple was at its most innovative the year before it launched the iPhone, when the company wasn't nearly big enough in the smartphone space to warrant regulatory scrutiny. Google was most innovative when it was developing its first search algorithm, which, similarly, occurred when the company had little market power. So, the argument that the US' innovation and dynamism owes to lax antitrust enforcement is misplaced. On the contrary, breaking up monopolies and ensuring healthy competition is what *helped* make the US economy the most dynamic in the world. But that wasn't the only factor; top universities, an ecosystem between those universities and private R&D, and an integrated market that allows firms to scale up quickly are also a key part of why the US is home to so many world-class companies. Europe, by contrast, lacks a single market and an ecosystem of innovation, so the idea that Europe would suddenly become a hub of innovation if it could just "fix" its antitrust policies is crazy. In reality, as discussed, these policies are increasing competition and innovation; it's these other factors that are missing from Europe's economy.

All that said, the ideal antitrust policy is one that allows firms to have some market power while also ensuring that competition remains fierce. The optimal level of monopoly rent is not zero, as firms must have some monopoly power in order to recoup their costs. But fierce competition motivates companies to innovate. Apple arguably began developing innovative products like the iMac because it was desperate to survive following several years of financial difficulties amid intense competition from more successful rivals like Microsoft. So, it's all about balance when it comes to crafting the right antitrust policy to encourage the creation of new and innovative firms.

Jenny Grimberg: Some investors are concerned about today's high level of market concentration because history suggests that dominant firms ultimately lose their dominance. Are such concerns warranted?

Thomas Philippon: Yes and no. Past superstar companies are, in many cases, still the dominant players in their respective industries. GM and Ford are still two of America's largest car manufacturers, and AT&T remains among the top firms in the telecoms business. Ultimately, industries exhibit a strong vintage effect, with the firms born at the time of a technical revolution tending to remain dominant in their industry. So, in all likelihood, Apple will retain its dominance in cellphone manufacturing, Google in search, etc. That said, past superstar firms no longer dominate the US stock market and economy as the leading-edge industry has changed owing to the nature of innovation. And whether today's tech giants will dominate the next innovative frontier, which seems likely to revolve in some way around AI, is an open question. The next AI breakthrough will probably not come from feeding even more data into large language models—which favors large incumbent firms due to the significant costs associated with doing so—but rather the development of better/smarter algorithms, which doesn't inherently favor a Google vs. a startup or a company that doesn't even exist yet.

Jenny Grimberg: What would it mean for the US economy if today's tech giants come to dominate the AI space and, conversely, if they don't?

Thomas Philippon: It would ultimately depend on why they dominate—because they were the most innovative companies in the space, or because high barriers to entry or lax antitrust enforcement stifled competition? As we've discussed, the answer will determine the impacts on consumers and the broader economy. Remember: fierce competition benefits consumers and improves—not harms—innovation, thereby benefitting the US economy. So, whether tech giants dominate will be just as important to watch as *why* they dominate.

A history of US antitrust regulation

1890
Congress passes the **Sherman Antitrust Act**, which prohibits anticompetitive practices and conduct that monopolizes or attempts to monopolize a market, including price fixing.

1911
The Supreme Court orders **Standard Oil** to break up into over 30 independent companies after ruling that it violated the Sherman Antitrust Act, controlling almost all oil production, processing, and transportation in the US.

1919
The DOJ establishes an **Antitrust Division** to enforce antitrust laws and competition laws that prohibit anticompetitive practices and mergers.

September 1914
President Wilson signs the **Federal Trade Commission Act** into law, which establishes the FTC to enforce antitrust laws and prohibit unfair business practices as well as unfair methods of competition.

October 1914
The **Clayton Antitrust Act** prohibits certain actions that could restrict competition, including mergers and acquisitions where the effect "may be substantially to lessen competition, or to tend to create a monopoly."

1936
The **Robinson-Patman Act** prohibits certain anticompetitive practices by producers, including discriminatory prices, services, and allowances, to protect smaller retail shops.

1948
The DOJ sues **Paramount Pictures**, accusing the studio of violating the Sherman Antitrust Act in its control over movie distribution and exhibition. As a result, film production companies are banned from owning exhibition companies.

1950
The **Celler-Kefauver Act** expands the Clayton Antitrust Act to include a ban on vertical and conglomerate mergers that reduce competition.

1956
The **Bank Holding Company Act** prohibits bank holding companies from engaging in non-financial actions and acquiring nonbank companies in an effort to prevent concentration in the banking industry. It also grants the Fed power to oversee bank mergers.

1958
The FTC launches a case against **American Cyanamid** and **Pfizer**, among other companies, alleging that they had colluded to limit the production and sale of the antibiotic tetracycline and fix its prices.

1969
The DOJ files a lawsuit against **IBM**, alleging that the company is suppressing competition for general-purpose digital computers. The lawsuit is ultimately dropped in 1982.

1974
The DOJ files a lawsuit against **AT&T** alleging that the company is monopolizing telecommunication services and equipment in the US, and therefore should be broken up.

1976
The **Hart-Scott-Rodino Antitrust Improvements Act** requires companies planning large mergers or acquisitions to notify the government beforehand.

1984
The DOJ's lawsuit against **AT&T** results in the forced breakup of the company into seven separate companies nicknamed the "Baby Bells."

1998
The DOJ, together with 20 state attorney generals, sue **Microsoft** for suppressing competition. Courts ultimately find that Microsoft held monopoly power, using it to harm consumers and competitors.

2000
Courts order **Microsoft** to split into two companies, but the decision is reversed the following year on appeal. This leads to a settlement that includes a consent decree under which Microsoft changes some of its business practices.

2010
The DOJ sues several Silicon Valley companies, including **Adobe, Apple, Google,** and **Intel**, alleging that they colluded to restrain the recruitment of high-tech employees.

September 2020
The FTC files a lawsuit against **Facebook** (now under parent company **Meta**) alleging that the company is illegally maintaining a social networking monopoly through anticompetitive conduct, including the acquisition of potential competitors (i.e. Instagram and WhatsApp). Case is ongoing.

October 2020
The DOJ files a lawsuit against **Google** alleging that the company violated the Sherman Antitrust Act by monopolizing the search engine market.

2021
Lina Khan takes office as Chair of the FTC, vowing to tighten antitrust enforcement.

January 2023
The DOJ files a new lawsuit against **Google**, accusing the company of illegally monopolizing the advertising technology market. Case is ongoing.

June 2023
The FTC seeks an injunction to prevent **Microsoft** from acquiring Activision Blizzard, but courts ultimately rule in Microsoft's favor.

September 2023
The FTC sues **Amazon**, alleging that the company is a monopolist and uses anticompetitive strategies to maintain its monopoly power to inflate prices. Case is ongoing.

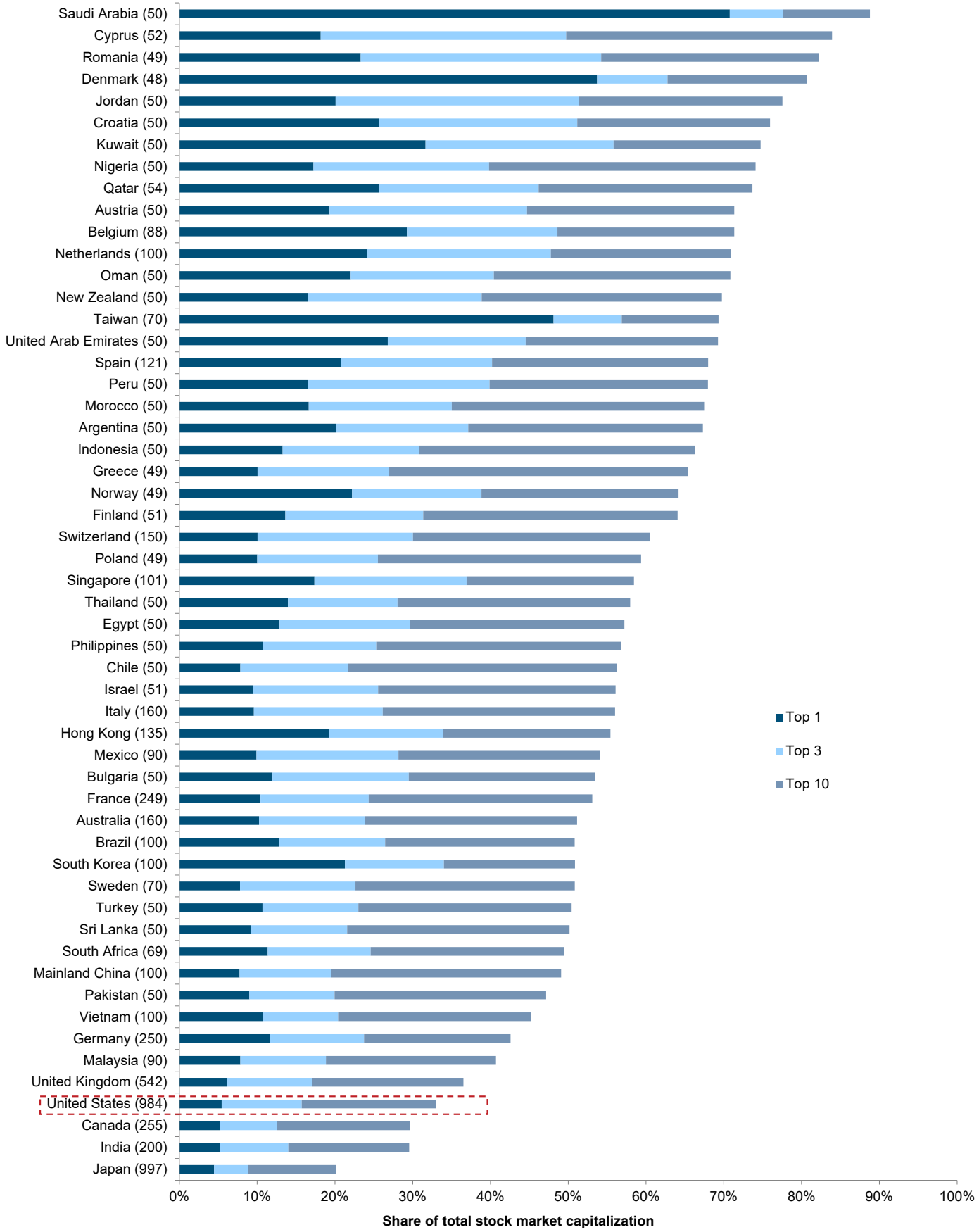
March 2024
The DOJ sues **Apple** alleging that it has a monopoly over the phone market that has harmed consumers, developers, and competitors. Case is ongoing.

August 2024
Courts rule that **Google** violated antitrust laws and acted illegally to maintain its monopoly in the search engine market. In **November**, the DOJ says Google should be forced to sell off Chrome as a remedy.

October 2024
Courts block the merger of handbag makers **Tapestry** and **Capri**, arguing that the merger would significantly lessen competition in the handbag market.

Note: This does not constitute an exhaustive list of all antitrust-related developments.
Source: US Department of Justice, Federal Trade Commission, WSJ, NY Times; various news sources; complied by Goldman Sachs GIR.

A look at market concentration, globally



Note: Market concentration measured by share of total market capitalization of the top 1, 3, and 10 stocks within each economy's equity market; only includes economies with at least 45 listed companies; figures in parentheticals represent the number of listed companies in that economy.

Source: Datastream, Worldscope, Goldman Sachs GIR.

Special thanks to Senior European Portfolio Strategist Guillaume Jaisson for chart.

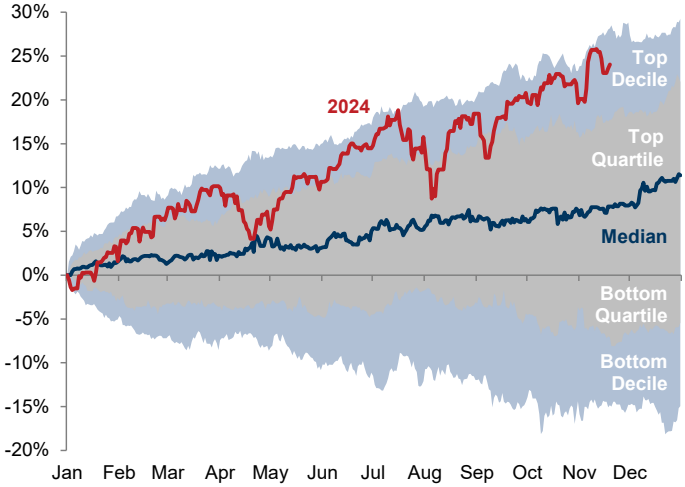
Diversify to amplify

Peter Oppenheimer argues that equity investors should look to diversify across regions and strategies given the US equity market's high concentration and valuation

The rise in the S&P 500 in 2024 has been one of the strongest since 1928. Even more strikingly, since the current equity upswing began in October 2023 on optimism about peak inflation and the prospect of a Fed pivot, the MSCI World index is up nearly 40% in price terms alone (and around 60% since the trough triggered by rising interest rates in 2022), the NASDAQ has climbed over 50%, and the world's biggest company, Nvidia, has surged over 250%.

The S&P's rise this year has been one of the strongest since 1928

Calendarized S&P 500 performance since 1928



Source: Bloomberg, Datastream, Goldman Sachs GIR.

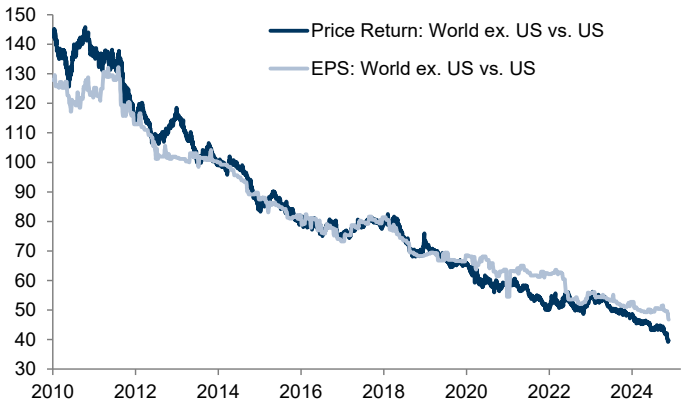
Profit growth has been a key driver of these spectacular returns, as has valuation expansion; around half of the equity return globally in 2024 owes to rising valuation, driven by growing optimism in lower inflation and interest rates. But another factor has been an increasingly concentrated equity market, which raises risk to investors.

Concentration comes in 3s, none of them speculative

This concentration has taken three forms, which are all linked by and to profitability. First, since 2010, the US equity market has become bigger relative to the rest of the world's stock markets, which have experienced less profit growth. Second, technology has dominated equity market returns because the profitability of the sector has far outstripped other sectors over the same period. And third, stock concentration has increased, particularly in the US, in large part due to the preponderance of highly profitable US technology companies, which have become bigger and a larger share of the market, in large part owing to this strong profitability.

The US stock market has outgrown the rest of the world in terms of earnings

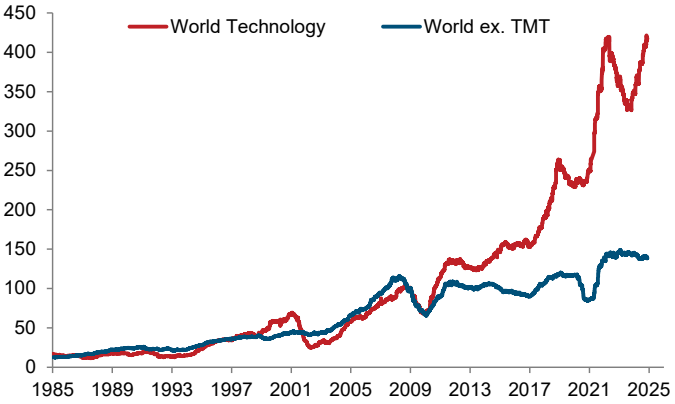
Price return and 12m forward EPS in local currency, index. Jan 2014=100



Source: Datastream, STOXX, Goldman Sachs GIR.

Tech earnings have outstripped those of the global market

12m Trailing EPS (USD), index. Jan 2009=100

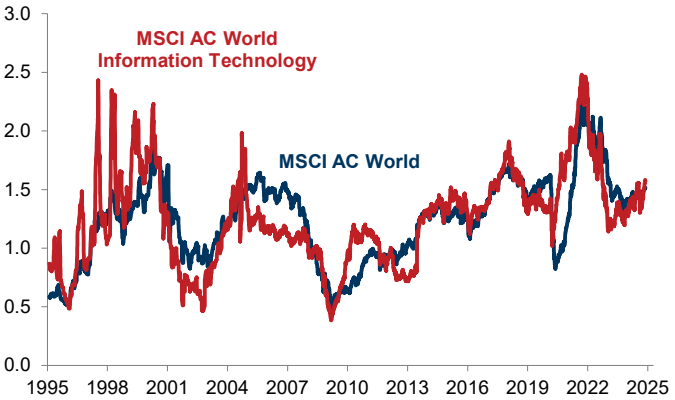


Source: Datastream, Worldscope, Goldman Sachs GIR.

Importantly, these forms of concentration are not speculative, but are instead backed by fundamentals. This is especially true of large US technology companies, whose market prominence reflects premium fundamentals, not excessive valuation. In numbers, the PEG ratio (valuation relative to expected growth) for the technology sector is in line with the rest of the equity complex.

The technology sector's PEG ratio is in line with the rest of the equity complex

PEG ratio (12m forward P/E divided by second 12m forward EPS growth)

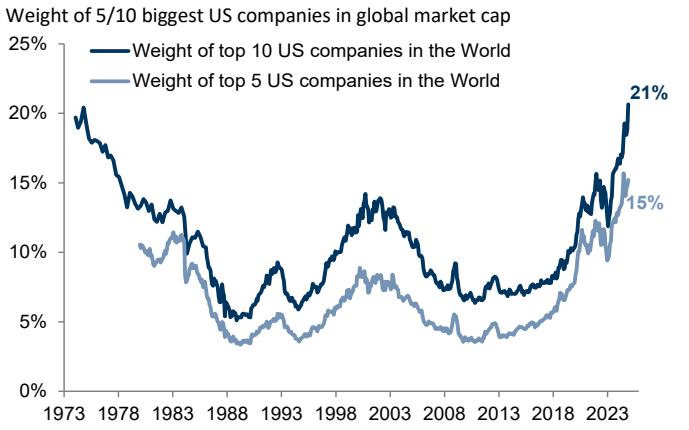


Source: Datastream, Goldman Sachs GIR.

The valuation of the largest technology companies, while high relative to the rest of the equity market's, is also much lower than was the case for dominant companies during previous bubbles. For example, valuations of the dominant companies during the technology bubble were roughly twice the average of the Magnificent 7 today. The valuations of the biggest companies in Japan during the late 1980s bubble (when Japan's equity market was bigger than that of the US) were much higher than the current valuations of the Magnificent 7.

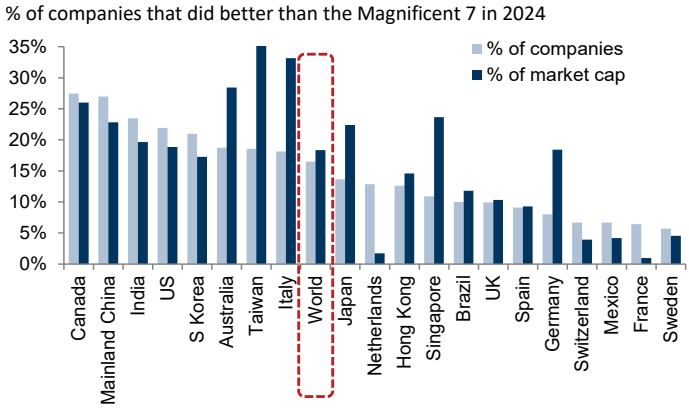
Nonetheless, this relentless rise in relative size has left the US equity market accounting for around 70% of the MSCI AC World index and the 10 biggest US stocks accounting for over 20% of the entire value of the global index.

The 10 biggest US stocks account for >20% of global index value



Source: Datastream, Goldman Sachs GIR.

17% of companies globally have outperformed the Mag 7



Source: Datastream, Goldman Sachs GIR.

Concentration risks

While these companies may continue to be strong performers, there are risks that their relative growth rates may slow, undermining their and the broader index's performance. Mega cap tech has increasingly shifted from being a relatively capital-light sector to a capital-intensive one. The prospective return on this invested capital will likely fade over time, particularly as other companies are able to piggyback off of this capital spend to scale new products and services at a lower cost. Historically at least, it has been difficult for any firm to maintain high sales growth and profit margins over sustained periods. During the past 40 years, the share of companies that have been able to grow sales at a rate of 20% faded sharply over a decade, and only 3% of firms maintained this pace of growth for 10 years (see pgs. 4-5). Our US strategists also note that <1% of firms maintained EBIT margins of >50% for 10 consecutive years. Despite this historical context, consensus long-term growth expectations for the 10 largest S&P 500 stocks are currently in the 99th percentile relative to the past two decades.

Diversify across strategies and regions to amplify

We don't believe these high growth expectations are a reason to underweight large cap tech, as we don't think these firms are in a valuation bubble. But we do think this high valuation, coupled with unusually concentrated markets, makes a compelling case for diversifying exposure to a greater extent in 2025 than in recent years to enhance risk-adjusted returns.

Within technology, this diversification may be achieved by adding exposure beyond the dominant hyperscalers, and our US strategists emphasize the opportunity in Phase 3 AI beneficiaries. Outside of technology, diversification could take the form of broadening participation, for example, via the equal-weight S&P 500 (SPW) and the S&P 400 (MID). The long-term outperformance of these alternatives suggests that the strength of the US economy and the earnings and innovative capacity of US corporates can be captured outside of large-cap and capitalization-weighted indices. These alternative indices are also likely to benefit more than mega cap tech from falling interest rates given that the largest companies (often with strong balance sheets) disproportionately boosted returns during the period of rising interest rates. So, expectations of lower interest rates suggest that the contribution of index returns should widen. Outside of the US, barbell strategies that offer a balance between quality growth and deep value (such as telecoms or real estate in Europe) also provide diversification opportunities.

Another means of diversifying and broadening participation is through growth companies across a diverse group of sectors and markets outside of the technology sector. Such "Ex Tech Compounders" (ETCs), which have a solid track record of high and stable revenues, margins, and cash flows, underperformed the MSCI AC World index in the recent period of rising interest rates and have de-rated much more than large cap technology. The realized volatility of the ETCs is notably lower, at 2x less than that of the Magnificent 7. So, from a portfolio construction perspective, the ETCs can help boost the Sharpe ratio of a portfolio and mitigate risks if volatility increases.

Broadening exposure geographically also offers select diversification opportunities despite our confidence in the continued solid performance of the US economy and equity market. Our equity market forecasts are relatively similar across regions, with our highest return forecasts in Japan (where we are overweight), driven by EPS growth rather than multiple expansion and the tailwind of a weak Yen. And some pockets of deep value exist globally, with the UK, selected EMs, and China all having particularly low PEG ratios. Again, we do not view this as a reason to overweight these markets at the expense of US exposure. But we do see opportunities to find selective undervalued companies in these and other markets.

Peter Oppenheimer, Chief Global Equity Strategist

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Optimal portfolios amid high concentration

Christian Mueller-Glissmann makes the case that, despite high concentration arguing for lower equity allocations, the optimal portfolio could remain the 60/40, with some tweaks

Potential headwinds to S&P 500 long-term returns from high levels of market concentration have raised the question of what the optimal portfolio will look like over the coming decade. Historically, roughly 60% equities/40% bonds has been the optimal asset mix, though that has varied significantly over time, with the optimal mix shifting to 100% equities following the Covid pandemic. High concentration and the resulting lower long-term equity returns (see pgs. 4-5) argue for reducing the weight of equities in multi-asset portfolios ahead. However, the optimal portfolio could remain the tried-and-true 60/40, though with a different mix of equities and bonds below the surface.

A shifting optimal asset mix

Structural macro conditions have historically been a key driver of the optimal asset mix. Periods in which the optimal mix consisted of low equity allocations usually owed to low inflation or stagnation boosting risk-adjusted bond returns, such as during the Great Depression, WWII, the Tech Bubble burst, and the Global Financial Crisis (GFC). Conversely, periods in which the optimal mix consisted of *high* equity allocations owed to elevated inflation weighing on bonds, such as in the 1970s and 2022, or favorable macro conditions boosting equities, including the productivity growth years of the 1950s, 1960s, and 1990s. Equity-only investors achieved similar or better risk-adjusted returns—as measured by Sharpe ratios—than 60/40 investors during 1908-1922 and 1955-1990. Strong equity returns vs. bonds, more positive equity/bond correlations, and higher rates volatility have also heavily skewed the optimal asset mix toward equities since the Covid crisis.

In the last 10 years, the S&P 500 has posted returns above the long-run average owing to tailwinds from rising corporate profitability and valuation expansion. While the US experienced relatively low growth post the GFC, the corporate sector materially outgrew the economy as the fast-growing US tech sector, falling interest costs, low labor cost inflation, tax cuts, and share buybacks fueled an increase in corporate profitability. Rising corporate profitability, coupled with the generally low and anchored inflation regime of the last several decades, in turn boosted equity valuations, with S&P 500 Shiller P/Es reaching fresh highs in recent years.

A higher return on equity (ROE), boosted by higher profit margins, helps explain the uptrend of the S&P 500 Shiller P/E since the 1990s. But one of the side effects of rising ROEs has been higher market concentration—the two are linked, with the Mag 7 responsible for a large part of the corporate profitability uplift.

High concentration argues for lower equity allocations...

The question for investors today is whether that will remain the case over the next decade in light of the high degree of equity market concentration. High concentration increases portfolio risk, with the top 10 stocks in the S&P 500 currently accounting for nearly half of the index's volatility. And beyond the higher volatility, high concentration, should it reverse, could weigh on the S&P 500 ROE and, in turn, longer-term returns. Unsurprisingly, we find[1] that the optimal weight of equities in multi-asset portfolios is lower when expected S&P 500 ROE is lower. And in cases when ROE declines, the optimal equity allocation falls well below long-run averages, with bonds making up the bulk of the optimal portfolio.

...but bonds aren't necessarily the answer

However, the solution to high market concentration isn't as simple as lowering equity allocations and increasing bond allocations. While bonds would provide protection in the event of weaker equity returns, larger bond allocations increase a portfolio's vulnerability to inflation and fiscal risks. We see more value in increasing exposure to growth equity—stocks exposed to productivity growth—and, at the same time, to real assets, both of which can provide diversification benefits for portfolios in extreme structural cycle scenarios, such as periods of high productivity growth fueled by technological revolutions (when growth equity would likely outperform) or stagflation/stagnation (when real assets would likely become a key diversifier).

That said, even if the structural cycle is favorable to equities, a key challenge is that equities tend to anticipate higher productivity growth before it materializes, resulting in increased risk of overpaying. And with US growth and tech stock valuations already elevated, investors will need to be selective in their hunt for the beneficiaries of future technological revolutions. The opposite is true for real assets as markets have faded inflation risks across assets in the past two years. Assets such as inflation-indexed bonds (TIPS) are pricing relatively little inflation risk for the next decade, and real estate/infrastructure stocks trade at relatively discounted valuations.

The road leads back to 60/40, but with some tweaks

As a result, the optimal asset mix for the next decade could well be one-third growth equity, one-third bonds, and one-third real assets. Real assets might include stocks with pricing power in areas such as infrastructure, real estate, and commodities, meaning that multi-asset investors could allocate an additional 20% of their portfolios toward stocks on top of the growth equity investments, with the balance of real assets potentially allocated toward TIPS or gold. This would lead back to a roughly 60/40 portfolio, though such portfolios would look different below the surface than they have historically as investors tailor their equity and bond exposures to account for the two trends likely to shape the world economy ahead: higher inflation risk on the back of deglobalization, decarbonization, and demographic changes and the potential for AI or other innovations to drive a productivity revolution.

Christian Mueller-Glissmann, Head of Asset Allocation Research

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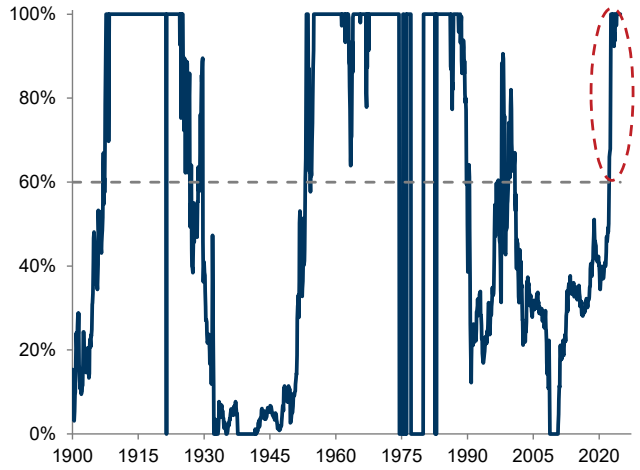
[1] Using our macro-based strategic tilting framework, which estimates the optimal asset mix in a balanced portfolio based on the structural growth-inflation mix and ROE and incorporates relative return, relative risk, correlations, and the return of cash.

The optimal asset mix has shifted significantly over time

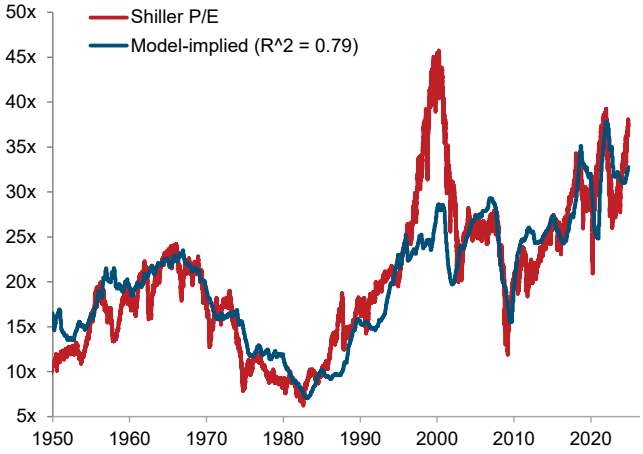
Optimal portfolio weight of S&P 500 in a balanced portfolio over a 10y rolling horizon, %



Source: Haver Analytics, Goldman Sachs GIR.

S&P 500 Shiller P/Es have trended up over the last 35 years due to favorable inflation regimes and rising corporate profitability

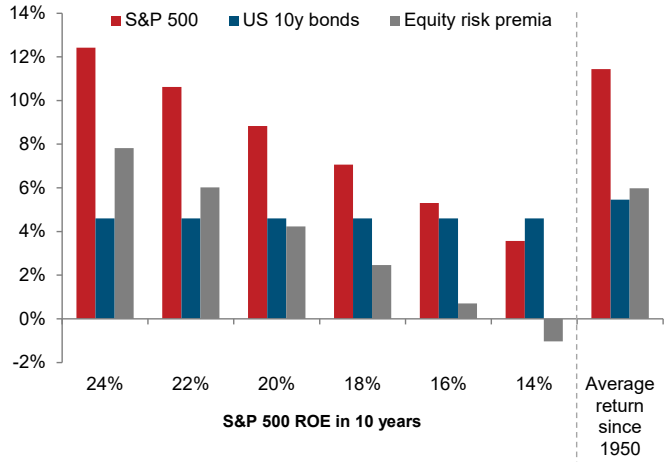
S&P 500 Shiller P/E fair value model based on 10y average inflation and LTM ROE



Source: Haver Analytics, Kenneth French, Robert Shiller, Goldman Sachs GIR.

Lower ROEs would be a major drag on long-term S&P 500 returns

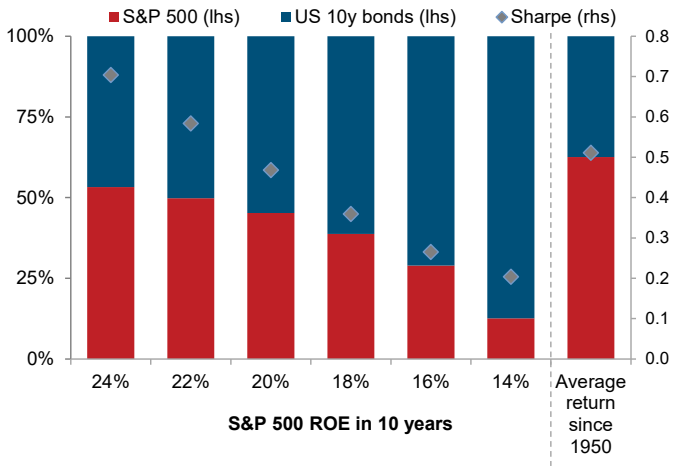
10y total return forecasts



Source: Haver Analytics, Goldman Sachs GIR.

The optimal equity allocation in most forward scenarios is much lower than over the last decade, especially if ROE is lower

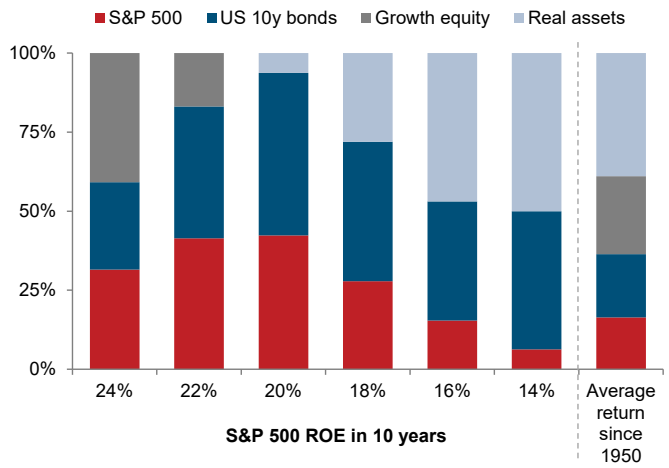
Optimal asset mix for the next 10 years



Source: Haver Analytics, Goldman Sachs GIR.

Higher allocations to real assets can help manage inflation risk and create more balance in multi-asset portfolios

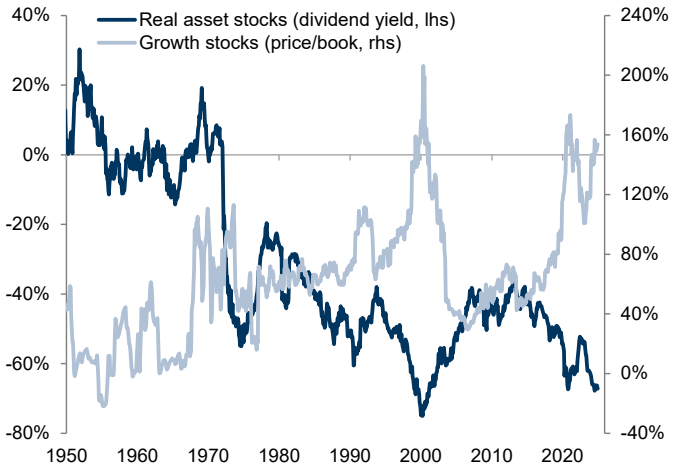
Optimal asset mix including growth equity and real assets



Source: Haver Analytics, Goldman Sachs GIR.

Growth stocks trade at a premium to the market, while real asset stocks look inexpensive

%



Source: Haver Analytics, Kenneth French, FactSet, Goldman Sachs GIR.

Summary of our key forecasts

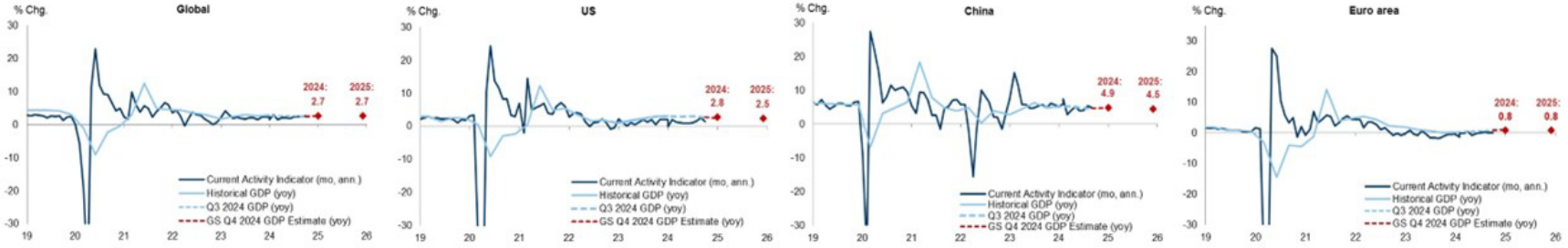
GS GIR: Macro at a glance

Watching

- **Globally,** we expect solid real GDP growth of 2.7% yoy in 2025, reflecting tailwinds from real disposable household income growth and easing financial conditions amid continued rate cuts, with US growth likely to continue outpacing its DM peers given its significantly stronger productivity growth. We expect global core inflation to converge toward 2% by end-2025 on the back of subdued core goods inflation, a further decline in shelter inflation, and steady wage disinflation.
- **In the US,** we expect above-consensus real GDP growth of 2.5% yoy in 2025, reflecting robust real income growth, easing financial conditions, and strong productivity growth. We expect core PCE inflation to slow to 2.4% by December 2025, reflecting further cooling in shelter inflation and easing wage pressures but a moderate boost from higher tariffs. We expect the unemployment rate to decline gradually to 3.9% by end-2025.
- **We expect the Fed** to deliver consecutive 25bp cuts in December, January, and March before slowing the pace of cuts to every other meeting, for two final 25bp cuts in June and September 2025 to a terminal rate range of 3.25-3.5%, although we see some risk that the FOMC could slow the pace sooner.
- **In the Euro area,** we expect below-consensus real GDP growth of 0.8% yoy in 2025, reflecting continued structural headwinds in the manufacturing sector—including high energy prices and competitive pressures from China—higher trade policy uncertainty, and ongoing fiscal consolidation. We expect headline and core inflation to return to 2% sustainably by end-2025, driven by a further cooling in services inflation.
- **We expect the ECB** to deliver a 25bp cut in December, followed by continued sequential 25bp cuts until the policy rate reaches 1.75% in July 2025, although we see a low hurdle for a step-up to 50bp cuts in December if Euro area growth and inflation data disappoint notably.
- **In China,** we expect real GDP growth to slow to 4.5% yoy in 2025 as the recent significant step-up in policy easing measures only partially offsets weak domestic consumption, the ongoing property market downturn, and likely higher US tariffs. Over the longer term, we remain cautious on China's growth outlook given several structural challenges, including deteriorating demographics, a multi-year debt deleveraging trend, and global supply chain de-risking.
- **WATCH US POLICY AND CONFLICT IN THE MIDDLE EAST.** Trump's second term will likely bring important policy shifts, including higher China and auto tariffs, lower immigration, some fresh tax cuts, and regulatory easing. In the US, we expect the growth boost from lower taxes to be roughly offset by the drag from higher tariffs, but we expect larger growth drags from tariffs in Europe and China, especially in the case of an across-the-board tariff. The conflict in the Middle East also remains highly uncertain and further escalation could send oil prices substantially higher.

Goldman Sachs Global Investment Research.

Growth



Source: Haver Analytics, Goldman Sachs Global Investment Research.
Note: GS CAI is a measure of current growth. For more information on the methodology of the CAI please see "Improving Our Within-Month CAI Forecasts," Global Economics Comment, Mar. 06, 2023.

Forecasts

Economics

GDP growth (%)	2024		2025			
	GS (Q4/Q4)	Cons. (Q4/Q4)	GS (CY)	Cons. (CY)	GS (CY)	Cons. (CY)
Global	2.7	--	2.7	2.6	2.7	2.6
US	2.5	2.4	2.8	2.7	2.5	2.1
China	4.9	4.9	4.9	4.8	4.5	4.5
Euro area	1.1	1.1	0.8	0.8	0.8	1.2

Policy rates (%)	2024		2025	
	GS	Mkt.	GS	Mkt.
US	4.38	4.45	3.38	3.89
Euro area	3.00	2.87	1.75	1.78
China	1.50	1.24	1.10	--
Japan	0.25	0.37	0.75	0.73

Markets

Interest rates 10Yr (%)	Last	E2024	E2025
US	4.41	4.30	4.25
Germany	2.25	2.20	1.90
Japan	1.08	1.10	1.60
UK	4.33	4.25	4.00

Commodities	Last	3m	12m
Crude Oil, Brent ($/bbl)	75	75	74
Nat Gas, NYMEX ($/mmBtu)	3.13	3.00	3.25
Nat Gas, TTF (EUR/MWh)	46.90	42	38
Copper ($/mt)	8,848	9,600	10,650
Gold ($/troy oz)	2,695	2,670	2,930

FX	Last	3m	12m
EUR/$	1.04	1.06	1.03
GBP/$	1.25	1.32	1.30
$/JPY	155	155	159
$/CNY	7.22	7.40	7.50

Credit (bp)		Last	2Q25	4Q25
USD	IG	78	83	85
	HY	258	290	300
EUR	IG	120	121	125
	HY	333	338	350

Equities

S&P 500	E2024		E2025	
	GS	Cons.	GS	Cons.
Price	6,000		6,500	
EPS	$241	$242	$268	$275
Growth	8%	9%	11%	14%

Consumer	2024		2025	
	CPI (%, yoy)	Unemp. Rate	CPI (%, yoy)	Unemp. Rate
US	2.6	4.1	2.5	3.9
Euro area	2.3	6.5	2.0	6.7
China	0.4	--	0.8	--

Returns (%)	12m	YTD	E2024 P/E
S&P 500	9	25.1	25.3x
MXAPJ	9	9.2	14.8x
Topix	15	14.0	15.8x
STOXX 600	4	6.2	14.2x

Wage Tracker 2024 (%)			
Q1	Q2	Q3	Q4
4.5	4.5	4.3	--
--	--	--	--
--	--	--	--

Source: Bloomberg, Goldman Sachs Global Investment Research. For important disclosures, see the Disclosure Appendix or go to www.gs.com/research/hedge.html.

Market pricing as of November 22, 2024

Glossary of GS proprietary indices

Current Activity Indicator (CAI)

GS CAIs measure the growth signal in a broad range of weekly and monthly indicators, offering an alternative to Gross Domestic Product (GDP). GDP is an imperfect guide to current activity: In most countries, it is only available quarterly and is released with a substantial delay, and its initial estimates are often heavily revised. GDP also ignores important measures of real activity, such as employment and the purchasing managers' indexes (PMIs). All of these problems reduce the effectiveness of GDP for investment and policy decisions. Our CAIs aim to address GDP's shortcomings and provide a timelier read on the pace of growth.

For more, see our CAI page and Global Economics Analyst: Trackin' All Over the World – Our New Global CAI, 25 February 2017.

Dynamic Equilibrium Exchange Rates (DEER)

The GSDEER framework establishes an equilibrium (or "fair") value of the real exchange rate based on relative productivity and terms-of-trade differentials.

For more, see our GSDEER page, Global Economics Paper No. 227: Finding Fair Value in EM FX, 26 January 2016, and Global Markets Analyst: A Look at Valuation Across G10 FX, 29 June 2017.

Financial Conditions Index (FCI)

GS FCIs gauge the "looseness" or "tightness" of financial conditions across the world's major economies, incorporating variables that directly affect spending on domestically produced goods and services. FCIs can provide valuable information about the economic growth outlook and the direct and indirect effects of monetary policy on real economic activity.

FCIs for the G10 economies are calculated as a weighted average of a policy rate, a long-term risk-free bond yield, a corporate credit spread, an equity price variable, and a trade-weighted exchange rate; the Euro area FCI also includes a sovereign credit spread. The weights mirror the effects of the financial variables on real GDP growth in our models over a one-year horizon. FCIs for emerging markets are calculated as a weighted average of a short-term interest rate, a long-term swap rate, a CDS spread, an equity price variable, a trade-weighted exchange rate, and—in economies with large foreign-currency-denominated debt stocks—a debt-weighted exchange rate index.

For more, see our FCI page, Global Economics Analyst: Our New G10 Financial Conditions Indices, 20 April 2017, and Global Economics Analyst: Tracking EM Financial Conditions – Our New FCIs, 6 October 2017.

Goldman Sachs Analyst Index (GSAI)

The US GSAI is based on a monthly survey of GS equity analysts to obtain their assessments of business conditions in the industries they follow. The results provide timely "bottom-up" information about US economic activity to supplement and cross-check our analysis of "top-down" data. Based on analysts' responses, we create a diffusion index for economic activity comparable to the ISM's indexes for activity in the manufacturing and nonmanufacturing sectors.

Macro-Data Assessment Platform (MAP)

GS MAP scores facilitate rapid interpretation of new data releases for economic indicators worldwide. MAP summarizes the importance of a specific data release (i.e., its historical correlation with GDP) and the degree of surprise relative to the consensus forecast. The sign on the degree of surprise characterizes underperformance with a negative number and outperformance with a positive number. Each of these two components is ranked on a scale from 0 to 5, with the MAP score being the product of the two, i.e., from -25 to +25. For example, a MAP score of +20 (5;+4) would indicate that the data has a very high correlation to GDP (5) and that it came out well above consensus expectations (+4), for a total MAP value of +20.

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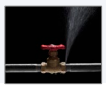

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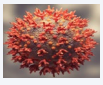

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Comprehensive Guide to Effective Stock Trading

This guide provides an in-depth overview of various stock trading strategies and the essential data

needed to build a systematic, data-driven trading model. It covers fundamental and technical

strategies, risk management, regulatory issues, educational resources, and insights from trader

communities.

1. Introduction to Profitable Stock Trading

Defining "Correct" Stock Trading

Subjective Approach: "Correct" trading depends on individual goals, risk tolerance, and timeframes.

Systematic Strategy: Emphasizes research, strategy, and risk management versus emotional or

speculative decisions.

Data-Driven: Effectiveness is measurable through historical data and backtesting.

Overview of Trading Styles & Strategies

Active Trading:

Scalping, day trading, swing trading, position trading.

Passive Investment:

Buy and hold, long-term focus.

Fundamental Analysis:

Value investing, growth investing, dividend investing.

Technical Analysis:

Trend following, momentum trading, pattern recognition.

News-Based Trading:

Reacting to market-moving events and economic data.

Importance of a Data-Driven Approach

Backtesting: Using historical data (price, volume, financial reports, news sentiment) to test

strategies.

Model Fine-Tuning: Feeding data into models helps improve prediction and execution.

2. Fundamental Stock Trading Strategies

Value Investing

Principles:

Identify undervalued companies with strong fundamentals.

Focus on intrinsic value and margin of safety.

Key Metrics:

Price-to-Earnings (P/E) ratio, Price-to-Book (P/B) ratio, dividend yield.

Resources:

Books like The Intelligent Investor, Investopedia, and SEC materials.

Growth Investing

Principles:

Look for companies with high potential for revenue and earnings growth.

Emphasis on innovation and market leadership.

Key Focus:

New products, strong management, favorable industry conditions.

Dividend Stock Investing

Principles:

Invest in companies with a history of paying dividends.

Focus on income generation and sustainability.

Coffee Can Investing

Principles:

Buy and hold quality stocks with low turnover.

Emphasizes the power of compounding and long-term capital appreciation.

Key Points:

"Magic Formula" investing focuses on high return on capital and low P/E ratios.

Consistency and diversification are crucial.

3. Technical Stock Trading Strategies

Trend Following

Concept:

"The trend is your friend."

Tools:

Moving averages, trendlines.

Risk Management:

Use stop-loss orders.

Momentum Trading

Concept:

Capitalize on strong upward or downward price movements.

Indicators:

RSI, stochastic oscillator.

Strategy:

Buy high and sell higher, or short sell and cover lower.

Support & Resistance Trading

Concept:

Identify price levels where stock prices tend to reverse.

Approach:

Buy near support and sell near resistance.

Breakouts/Breakdowns:

Look for volume confirmation when prices break key levels.

Reversal and Swing Trading

Reversal Strategies:

Spot chart patterns (double tops/bottoms, head and shoulders) and indicator divergences.

Swing Trading:

Hold positions for days or weeks to capture short-term price swings.

Day Trading & Scalping

Day Trading:

Buy and sell within the same day; high frequency and quick decisions.

Scalping:

Focus on very small price movements with very short holding periods.

Indicator-Based Strategies

Moving Averages (MA):

Smoothing price data and identifying trend crossovers.

Relative Strength Index (RSI):

Measuring overbought or oversold conditions.

MACD:

Tracking momentum through moving averages.

Bollinger Bands:

Monitoring volatility and potential reversal signals.

4. News-Based Trading Strategies

Trading on Scheduled Releases

Economic Data:

GDP, inflation, employment, interest rates.

Corporate News:

Earnings, mergers, product launches.

Strategies:

Plan trades in advance to capture initial market reactions.

Responding to Unexpected News

Corporate Events:

Sudden management changes or announcements.

Geopolitical Events:

Political instability, wars, elections.

Risk Management:

Use stop-loss orders and avoid overnight positions during volatile events.

5. Best Practices and Tips for Stock Trading

Developing a Comprehensive Trading Plan

Goal Setting:

Define realistic trading goals and risk tolerance.

Entry & Exit Rules:

Establish clear rules based on technical and fundamental analysis.

Position Sizing:

Determine risk per trade and adjust portfolio allocation accordingly.

Risk Management

Stop-Loss & Take-Profit Orders:

Protect profits and minimize losses.

Diversification:

Spread risk across different stocks and sectors.

Hedging:

Use derivatives or other strategies to manage exposure.

Trading Psychology

Emotional Control:

Avoid decisions driven by fear or greed.

Trading Journal:

Record trades and emotional responses to improve future decisions.

Practice & Continuous Learning

Simulators:

Use paper trading to test strategies without risk.

Continuous Improvement:

Analyze past trades, review mistakes, and adapt strategies.

6. Stock Market Data Analysis

Types of Analysis

Fundamental Analysis:

Evaluate intrinsic value based on financial data.

Technical Analysis:

Use historical price and volume data to predict trends.

Quantitative Analysis:

Apply mathematical models and statistical techniques.

Sentiment Analysis:

Gauge market mood from news and social media.

Data Providers and APIs

Financial Data Providers:

Yahoo! Finance, Google Finance, Bloomberg, FactSet.

APIs:

Free: Alpha Vantage, Finnhub, Marketstack;

Paid: Polygon.io, Intrinio.

Market Trend Reports

Sources:

Reports from institutions like BlackRock, Bank of America, Nasdaq, and NYSE.

7. Educational Resources for Stock Trading

Online Courses & Platforms

Platforms:

Investopedia, Udemy, Coursera, edX.

Course Content:

Options for beginners to advanced traders covering technical, fundamental, and algorithmic trading.

Foundational Books

Key Titles:

The Intelligent Investor, Technical Analysis of Financial Markets, Market Wizards, The Little Book

That Beats the Market.

Additional Educational Materials

Resources:

SEC, FINRA, Schwab MoneyWise, NerdWallet.

8. Role of Regulation and Investor Protection

Regulatory Bodies

SEC:

U.S. securities industry oversight.

FINRA:

Ensures fair operations in the securities industry.

CFTC:

Regulates futures and certain derivatives.

Key Laws and Best Practices

Key Legislation:

Securities Act of 1933, Securities Exchange Act of 1934, Dodd-Frank Act.

Responsible Trading:

Avoid insider trading, market manipulation, and follow ethical practices.

Investor Protection:

SIPC coverage, adherence to ESG and socially responsible investing guidelines.

9. Insights from Stock Trader Forums and Communities

Benefits of Online Communities

Real-Time Insights:

Access to expert analysis, market sentiment, and peer discussions.

Risk of Misinformation:

Verify sources and be cautious of "pump and dump" schemes.

Popular Platforms

Examples:

getquin, FYERS Community, TraderForum, StockGro.

10. Conclusion

Synthesis of Key Insights:

Successful stock trading combines a clear strategy, rigorous data analysis, risk management, and

ongoing learning.

Iterative Improvement:

Continuously refine trading models and strategies based on market feedback and performance

analysis.

Additional Data: Why to Buy Certain Stocks

Below is an example breakdown of why some leading stocks might be considered for a portfolio,

including key trading tips:

Example Stock Breakdowns

Apple (AAPL)

Why to buy apple?

Strong brand, continuous innovation (AI, AR, and services), high cash reserves.

Trading Tip:

Consider buying on dips before major product launches or earnings reports.

Microsoft (MSFT)

Why to buy microsoft?

Dominance in cloud computing (Azure), AI investments, strong enterprise software.

Trading Tip:

Look for opportunities following market corrections.

Tesla (TSLA)

Why to buy tesla?

EV market leadership, expanding energy business, autonomous driving potential.

Trading Tip:

Monitor news-driven volatility and production updates.

NVIDIA (NVDA)

Why to buy nvidia?

AI and GPU leadership, growth in data centers and gaming.

Trading Tip:

Watch for key AI-related announcements and earnings.

Amazon (AMZN)

Why to buy amazon?

E-commerce and AWS dominance, robust logistics network.

Trading Tip:

Consider entry points before major shopping events.

Alphabet (GOOGL)

Why to buy google?

Leading search engine, YouTube, and cloud services; strong AI initiatives.

Trading Tip:

Buy on long-term dips related to regulatory concerns.

Meta Platforms (META)

Why to buy meta?

Social media leadership, strong ad revenue, investments in VR and AI.

Trading Tip:

Monitor user growth and changes in ad spending trends.

AMD (AMD)

Why to buy amd?

Competitive edge in semiconductors, strong presence in gaming and data centers.

Trading Tip:

Consider buying during market dips when semiconductor demand softens.

Palantir (PLTR)

Why to buy palantir?

Big data and AI analytics, government and corporate contracts.

Trading Tip:

Look for earnings dips and long-term government deal confirmations.

Intel (INTC)

Why to buy intel?

Investment in chip manufacturing, dividend payer.

Trading Tip:

Buy when Intel expands its foundry or enters new markets.

Ford (F)

Why to buy ford?

Expanding EV lineup, robust truck and SUV market.

Trading Tip:

Consider buying before key EV announcements or economic recoveries.

Lucid (LCID)

Why to buy lucid?

Niche luxury EV, advanced technology, strategic investments.

Trading Tip:

Monitor cash burn and production milestones closely.

SoFi (SOFI)

Why to buy sofi?

Growing fintech platform with expanding banking and loan services.

Trading Tip:

Look for consistency in profitability and product expansion.

Expanded Analysis for TSLA, AAPL, and MNFT

This section further details each asset's market data, technical indicators, and strategic outlook for

use in a data-driven trading model.

Tesla, Inc. (TSLA)

Expanded Financial & Market Data

Market Cap & Liquidity:

Among the highest-valued auto manufacturers; market cap in the high hundreds of billions.

High trading volumes and broad analyst coverage.

Key Metrics:

High P/E ratio reflecting growth expectations.

Consistent revenue and earnings growth, with expanding margins.

Technical Analysis:

Use moving averages, RSI, and support/resistance levels.

Monitor volatility and 52-week price range.

Strategic Outlook & Risks

Innovation:

Full Self-Driving (FSD), battery technology improvements, energy storage.

Expansion:

New gigafactories and emerging market diversification.

Risks:

Valuation concerns, competitive pressures, supply chain and regulatory issues.

Apple Inc. (AAPL)

Expanded Financial & Market Data

Market Cap & Liquidity:

Trillion-dollar valuation, highly liquid and stable.

Key Metrics:

Moderate P/E ratio and attractive dividend yield.

Diversified revenue: iPhone, Mac, iPad, wearables, and services.

Technical Analysis:

Smooth price action with established technical support levels.

Financial Health:

Robust balance sheet, significant cash reserves, consistent free cash flow.

Strategic Outlook & Risks

Ecosystem:

Integration across hardware, software, and services.

Global Presence:

Significant international revenue but exposed to currency and geopolitical risks.

Risks:

Market saturation, supply chain vulnerabilities, and regulatory scrutiny.

MNFT (Emerging Digital Asset / NFT-Related Company)

Expanded Financial & Market Data

Market Position:

Less established; data (market cap, volume) is more volatile.

Key Metrics:

Traditional metrics (e.g., P/E) are less applicable.

Focus on user growth, platform transaction volumes, and network effects.

Technical Analysis:

High volatility with daily percentage swings.

Indicators like moving averages and volume spikes are useful.

Strategic Outlook & Risks

Business Model:

Focus on NFT marketplaces, digital collectibles, or blockchain infrastructure.

May include gaming, digital art, or metaverse integration.

Innovation & Trends:

Part of the broader digital asset trend; growing interest in decentralized finance.

Risks:

Regulatory uncertainties, speculative nature, limited historical data, and competition.

Final Considerations for a Chat Advisor Model

Macro & Sector Trends

Economic Indicators:

Monitor interest rates, inflation, GDP growth.

Industry Dynamics:

TSLA: Renewable energy and environmental regulations.

AAPL: Consumer tech preferences and competitive pressures.

MNFT: Blockchain adoption and digital asset sentiment.

Technical & Sentiment Analysis

Indicators:

Track volume, volatility, support/resistance, RSI, MACD.

Sentiment:

Monitor news headlines, social media trends, and analyst ratings.

Risk Management Strategies

Diversification:

Balance blue-chip stocks (TSLA, AAPL) with speculative assets (MNFT).

Stop-Loss/Take-Profit:

Use technical levels to manage entry and exit points.

Ongoing Monitoring:

Regularly update the model with earnings reports, macroeconomic data, and regulatory news.

Conversation-Ready Pointers

Key Questions:

"How do recent earnings compare to previous quarters?"

"What are the catalysts for growth over the next 6-12 months?"

"Which technical levels are critical right now?"

Comparative Analysis:

Compare market stability, innovation pipelines, and risk profiles across TSLA, AAPL, and MNFT.

Case Studies & Real-World Examples

Successful Trade Examples:

Detailed case studies of profitable trades that highlight key decision points, technical analysis setups, and risk management techniques.

Lessons from Losses:

Analysis of trades that didn't work out, including the factors that led to losses and the lessons learned for future decision-making.

Market Scenarios:

Real-world market scenarios, such as high volatility periods, earnings surprises, or regulatory changes, and how traders adapted their strategies.

Interactive Elements & FAQs

Common Questions and Answers:

Develop a FAQ section covering topics like "How do I determine my risk tolerance?", "What are the

key technical indicators for day trading?", and "How do macroeconomic events impact trading strategies?"

Dialogue Examples:

Include sample chat conversations that simulate interactions between a chat advisor and a trader.

These can illustrate how to answer queries about market conditions, technical setups, or trade

execution.

Interactive Flowcharts:

Visual guides or decision trees that help explain the steps of different trading strategies, from

identifying entry points to setting stop-loss orders.

Updated Regulatory and Market Data

Dynamic Regulatory Environment:

Regularly updated summaries of key regulatory changes affecting stock trading (e.g., updates on

SEC rules, global market reforms, or data protection laws).

Emerging Market Trends:

Incorporate real-time or frequently updated data on emerging market trends, new financial

instruments, and technological advancements (like blockchain integration).

Data Sources & APIs:

Highlight reliable sources for live data feeds, market reports, and economic indicators that can keep

the model's recommendations current.

User-Defined Scenarios & Hypothetical Simulations

Custom Trading Scenarios:

Provide hypothetical scenarios that users can define (e.g., "What if the Federal Reserve raises

interest rates by 0.5%?" or "How would a major earnings miss affect TSLA's stock?").

Simulation Models:

Develop simulation examples where the model walks through a trade-from research to

execution-and explains the reasoning behind each decision.

Risk Management Exercises:

Include exercises that help users understand how to set stop-loss orders, calculate position sizes,

and manage exposure during volatile periods.

A Comparative Analysis of Amazon, Microsoft, and Apple's Stock Investment Value

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Abstract. This paper provides a comparative analysis of the stock investment value of Amazon, Microsoft, and Apple, three global companies that investors may consider when investing in stocks. The author analyzes each company's business diversity, financial situation, and industry competition. Amazon is a leading e-commerce company with strong domestic and international competitors in the field of e-commerce and cloud computing. Microsoft is a stable company with a dominant position in the personal computer operating system market and a growing market share in the field of cloud computing. Apple has a diverse product line, including hardware and software products, and faces competition from many competitors, but maintains its competitiveness in the market by investing in technological innovation. The paper concludes that the stock market is full of opportunities and challenges. And investors need to have a certain risk awareness and long-term investment vision. The analysis provided in this paper can help different investors to select stocks that suit their preferences and investment objectives. The paper uses data from Yahoo Finance and company websites to provide an overview of each company's performance, net sales, and stock prices. And compare the calculation results. Then select the stocks that investors with different preferences prefer.

Keywords: Investment value, risk, profitability ratios, benefit.

1. Introduction

As Tamplin said, an investment is a possession that will someday be worth more than it cost. Almost any asset, including intangible assets like education, can be considered an investment. Investing often refers to the purchase of stocks or bonds when discussing the stock market [1]. The significance of investment is that it can create wealth growth and value for individuals or enterprises and achieve long-term financial goals. Investing allows people to acquire more assets and increase sources of income.

At present, the global economy is still recovering, but due to the continuous impact of the new crown epidemic, the global supply chain and production activities have been hit to a certain extent. In addition, inflationary pressures have increased, and many central banks have adopted measures to raise interest rates. These factors may have a certain negative impact on the stock market. However, there are also some positive factors: first, the global economy is recovering, and market demand is expected to increase; second, many governments and central banks are taking measures to support economic recovery, which is also expected to boost market confidence; third, the development of some emerging industries and technology companies Rapidly, it is expected to become a new growth point of the market in the future. Generally speaking, the stock market is a market full of opportunities and challenges. Investors need to have a certain risk awareness and long-term investment vision.

In this paper, I will analyze each company's business diversity, financial situation, and industry competition of Amazon, Microsoft, and Apple. Besides this, I will also analyze the stock of each company and compare their risks from different aspects by using the data from Yahoo Finance and company websites.

2. First Description

2.1. Amazon (AMZN)

Amazon was founded in 1994 and is headquartered in Seattle, Washington, USA. The business began as an online bookstore and has since grown to become one of the biggest online merchants in the world. Among other things, Amazon generates revenue through its web services, subscriptions, and retail businesses [2].

With the development of technology, online business competition is becoming more and more fierce. In the field of e-commerce, Amazon faces strong domestic competitors such as Alibaba and JD.com, as well as challenges from international competitors such as eBay and Wal-Mart. In the field of cloud computing, Amazon's AWS faces competition from rivals such as Microsoft and Google. However, Amazon has maintained its leading position in the market by continuously investing in R&D and technological innovation to continuously improve the quality of its products and services.

As one of the largest e-commerce companies in the world, the shares of Amazon have been strong. As of February 28th, 2023, Amazon's stock price is $93.76 per share. Amazon stock has performed well over the past year, with shares up about 35.53% in the third quarter. But the company's performance is not very good, with net sales reaching approximately $514 billion in 2022, a year-on-year increase of 9%. Amazon posted a net loss of $2.7 billion (Fig 1).

Fig. 1 Stock Price of Amazon https://finance.yahoo.com/quote/AMZN?p=AMZN&.tsrc=fin-srch

2.2. Microsoft (MSFT)

Microsoft Corporation is headquartered in Redmond, Washington, USA, and was founded in 1975. It sells computing devices, cloud systems and services, software, and other products to consumers and businesses. The company's intelligent cloud segment is the largest source of profit, as well as the fastest growing [3-4].

Microsoft's playing field is relatively stable. In the personal computer operating system market, Microsoft's Windows operating system has always occupied a dominant position; in the field of cloud computing, the market share of the Azure cloud platform is also growing. Microsoft has also expanded its developer community and ecosystem through initiatives such as the acquisition of GitHub. In the past five years, Microsoft's stock price has risen steadily, and it has declined for a period of time due to the impact of the epidemic, but it rebounded quickly and continued to rise.

Until December 31st, 2022, Microsoft's revenue was $168.9 billion and its net profit was $16.4 billion in the second quarter of 2022. As of February 28th, 2023, Microsoft's stock price is $93.76 per share. In the past five years, Microsoft's stock has performed very well, and its stock price has risen by about 225% (Fig 2).

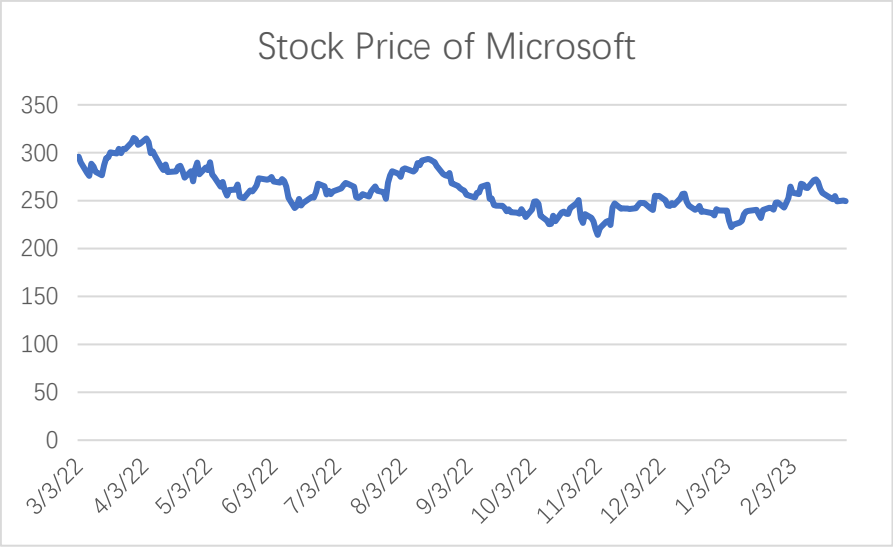

Fig. 2 Stock Price of Microsoft https://finance.yahoo.com/quote/MSFT?p=MSFT&.tsrc=fin-srch

2.3. Apple (AAPL)

As a world-renowned technology company, Apple has a strong diversity of product lines. It mainly includes iPhone, iPad, MacBook, Apple Watch, AirPods, and other hardware devices, as well as iOS, macOS, watchOS, and other software products. At the same time, Apple has also set foot in fields such as cloud services, digital content, and payment services. Therefore, product diversity is a major advantage of Apple. This diversity reduces Apple's product risk because if one product or service does not perform well in the market, others can still support the company's profitability.

Apple is highly competitive in the market, facing pressure from many competitors such as Samsung, Huawei, and Xiaomi. However, Apple maintains its competitiveness in the market by continuously launching new products, improving product performance and quality, increasing brand value, and expanding its service business. In addition, Apple's customer loyalty is also very high, because the quality of its products and user experience has been widely recognized [5].

Apple's stock has always been one of the leaders in the global stock market, and its market value has always been among the top in the world. Since 2000, Apple's stock market value has increased more than 20 times, once becoming the most valuable company in history. While Apple's stock price can be affected by market volatility, its performance has been strong. Until September 1st, Apple’s revenue was $117.2 billion. And its net profit was $20.7 billion according to the fourth quarter financial report of 2022. As of February 28th, 2023, Apple’s stock price is $128.03 per share (Fig 3).

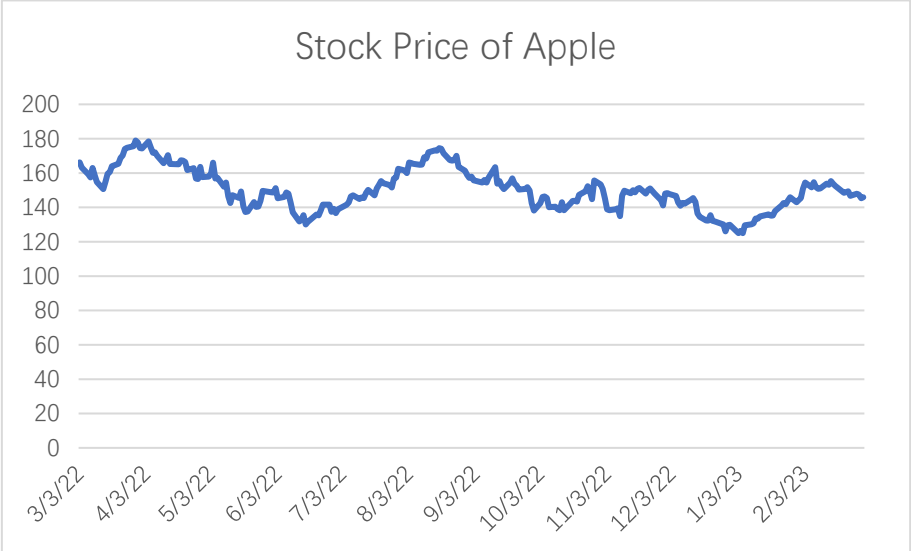

Fig. 3 Stock Price of Apple https://finance.yahoo.com/quote/AAPL?p=AAPL&.tsrc=fin-srch

3. Marketing Analysis

3.1. Risk

Table 1. Risk Ratios comparing

	Amazon (AMZN)	Microsoft (MSFT)	Apple (AAPL)
Market Cap	1.043T	1.847T	2.311T
Beta	1.17	0.93	1.27
Total Debt Ratio	2.12	0.24	2.37
Current/Quick Ratio	0.94/0.68	1.93/1.89	0.88/0.85

The market capitalization of these three stocks is not much different. We can judge that these three companies are all big companies (Table 1). But their beta values are quite different.

Beta in a stock is a measure of a stock's volatility relative to the overall market or a stock's systematic risk. Investors can use beta to help decide which stocks to include in their portfolios. According to the data of Yahoo Finance, compared with the other two corporations, Microsoft has the lowest beta in February 2023. Microsoft's stock with a lower beta than the market average is generally considered a low-risk stock because its price will fluctuate less. If an investor wants to construct a more conservative portfolio, they may choose Microsoft to reduce the systematic risk of the overall portfolio. According to the value of beta, we can judge the risk ranking of the three stocks as Apple>Amazon>Microsoft.

The total debt ratio in the stock is an indicator to measure the debt level of the company, indicating the ratio of the company's total liabilities to its total assets [6]. This ratio can tell investors about the financial risk of the company because a high Total Debt Ratio means that the company has high debt levels and may face difficulties in repaying debts, thereby reducing the company's solvency and profitability. Compared with the other two corporations, Apple has the highest total debt ratio. This means that Apple has a high debt level and may face difficulties in repaying debts, thereby reducing the company's solvency and profitability. Microsoft has the lowest total debt ratio. This shows that Microsoft Corporation has stronger solvency and financial stability. The total Debt Ratio is an important metric for investors because it can help assess a company's financial stability and debt-servicing ability.

Besides this, Microsoft has the highest current ratio and quick ratio. Comprehensive consideration, Microsoft's stock has the least risk. Microsoft is the most stable company compared to the other two companies.

3.2. Profitability Ratios

Table 2. Profitability Ratios comparing

	Amazon (AMZN)	Microsoft (MSFT)	Apple (AAPL)
Total Asset Ratio	0.3	0.15	0.26
Profit Margin	2.26%	33.05%	24.56%
ROA and ROE	2.71%&14.44%	18.14%&39.87%	24.06%&169.90%

The total assets ratio refers to the ratio of a company's total assets to its shareholders' equity. It is a financial metric that measures how a company's assets are financed and capitalized (Table 2). The higher the ratio of the total assets, the higher the debt ratio of the company. And the capital structure is biased towards debt financing which has higher risks. A lower total asset ratio indicates that the company's debt ratio is relatively low, and the capital structure is biased towards equity financing, with less risk. Microsoft has the lowest total asset ratio. This means that Microsoft has the least financial risk compared to the other two companies.

Profit margins are one of the key indicators of a company's business health and profitability. Microsoft has the highest profit margin. It usually indicates that this company is well-run, managed effectively, and has the ability to resist the impact of market changes.

ROA means “Return on Asset” and ROE means “Return on Equity”. The higher the ROA, the more effectively the company can use its assets to make more profits [7-9]. The higher the ROE, it means that the company can use shareholders' investment funds more effectively and bring higher returns to shareholders. Apple has the highest ROA and ROE [10]. This means Apple has the highest profitability and capital utilization compared with the other two companies.

From a profitability ratio point of view, Apple's stock could bring big gains to shareholders. But it also comes with greater risks.

4. Conclusion

In this article, I compare the stocks of the three companies from the perspective of risk and profit. And I also evaluate the investment risk and value of stocks by collecting and calculating data. All things considered, Microsoft is the most stable stock, followed by Amazon. Investing in Apple is riskiest but correspondingly potentially more profitable. Investors are biased differently. The greater the risk in the stock market, the greater the return. But some investors will invest in Microsoft for safety reasons, while some investors will invest in Apple for greater benefits.

Most of the data in this paper are as of February 2023 and are not complete. And the stock market fluctuates quickly, my calculation results are for reference only. In the future, I may use updated data to calculate and compare from more aspects.

References

[1] D. B. (2023, February 1). From A to Z the complete history of Amazon [25 Years review]. EcomCrew. Retrieved February 28, 2023, from https://www.ecomcrew.com/from-a-to-z-the-complete-history-of-amazon-com/

[2] True Tamplin, B. S. (2023, February 17). Investments: Definition: Types: Finance strategists. Finance Strategist. Retrieved February 28, 2023, from https://www.financestrategists.com/wealth-management/investments/?gclid=EAIaIQobChMIqcKW1_e2_QIVsTWtBh2v1wx0EAAYASAAEgKqMPD_BwE

[3] Encyclopædia Britannica, inc. (2023, February 22). Microsoft Corporation. Encyclopædia Britannica. Retrieved February 28, 2023, from https://www.britannica.com/topic/Microsoft-Corporation

[4] Interaction Design Foundation. (2023, February 28). Apple's product development process – inside the world's Greatest Design Organization. The Interaction Design Foundation. Retrieved February 28, 2023, from https://www.interaction-design.org/literature/article/apple-s-product-development-process-inside-the-world-s-greatest-design-organization

[5] Hayes, A. (2023). What is the debt ratio? Investopedia. Retrieved February 28, 2023, from https://www.investopedia.com/terms/d/debtratio.asp

[6] Furhmann, R. (2022, November 10). Return on equity (ROE) vs. return on assets (ROA): What's the difference?Investopedia. Retrieved February 28, 2023, from https://www.investopedia.com/ask/answers/070914/what-are-main-differences-between-return-equity-roe-and-return-assets-roa.asp

[7] Qian Lei. (2012). Analysis of the provincial differences and changes of tourism development in China [D]. East China Normal University.

[8] Mohammad Reza Farzanegan et al. (2020). International Tourism and Outbreak of Coronavirus (COVID-19): A Cross-Country Analysis. Journal of Travel Research, 60(3), pp. 004728752093159.

[9] Zhao Xin et al. (2022). Impact of Economic Policy Uncertainty and Pandemic Uncertainty on International Tourism: What do We Learn From COVID-19?. Evaluation review, pp. 193841X221132125-193841X221132125.

[10] Liu Xinyang and Zhang Chunping. (2022). The development path and future prospects of China's tourism industry in the post-epidemic era [J]. Economist, pp.115-117.

Financial Analysis of the Stock and Company Performance of the Technology Industry

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Abstract. Rapid advancements in artificial intelligence (AI) and big data fuel the technology industry's growth. Many technology companies fund new opportunities to create groundbreaking technological innovations through AI. This paper offers a comprehensive financial analysis of three major technology companies- Meta Platforms Inc., Nvidia Corp., and Alphabet Inc. - to evaluate the best investment opportunities within the industry by interpreting company data and growth potential. These companies' growth potential and financial health are evaluated through ratio analysis, such as market, profitability, and risk ratios, and technical analysis, through momentum analysis. The findings highlight Meta's initiative of the Metaverse and the integration of its AI, Nvidia's dominance in AI-driven hardware and chips, and Alphabet's AI products and diverse revenue streams. The overall conclusion highlighted all three companies' long-term value, but Nvidia stood out among the three companies as it has shown expansive company growth and extensive future outlooks in a vastly AI-driven industry. This analysis aims to illustrate the changing technological landscape and to provide investors with informed investment decisions.

Keywords: Technology Industry, Stock Performance Analysis, Growth Analysis, Ratio Analysis, Artificial Intelligence.

1. Introduction

The technology industry is one of the fastest-growing industries [1]. With the new potential of artificial intelligence, many companies in the industry are finding new ways to push the limits and capitalize on initiatives and expansions [2]. This paper aims to evaluate and analyze the stock performance of three companies in the technology industry: Meta Platforms Inc., Nvidia Corp., and Alphabet Inc., three of the largest technology companies, to conclude the best investment decision based on various financial analysis methods. The methods used in this analysis include ratio analysis by analyzing the market ratios, profitability ratios, and risk ratios, as well as technical analysis using momentum investing. This analysis is important to help better understand the stock landscape of the technology industry.

2. Overview of Methodology

2.1. Ratio Analysis

Ratio analysis uses market, profitability, and risk ratios, such as the price-to-earnings ratio (P/E Ratio) or price/earnings-to-growth ratio (PEG Ratio), to determine a company's financial health and overall performance. By comparing financial data, a company's growth becomes clearer [3]. Investors can better understand the company's various aspects, such as its liquidity, solvency, profitability, and competition.

2.1.1. Market Ratios

Market ratios, such as the P/E Ratio and the price-to-book ratio (P/B Ratio), are used and analyzed by value investors who strive to find different stocks that are undervalued according to specific metrics [4]. Stocks with a P/E Ratio of less than ten or a P/B Ratio of less than 1 to 2 would be attractive to value investors. The P/E Ratio of a company is found by dividing the market price of a

stock by its earnings per stock, while the P/B Ratio is found by dividing the stock price by its book value of equity.

An income investor, a type of investor focused on generating regular income, would look at a company's dividend yield. For any stock, income investors generally look at those with around 3-4%, as the 10-year treasury yield is stagnant at around 4%, which, if greater than the dividend yield, would be more reliable.

Growth investors are interested in a company's PEG ratio. Growth investors invest in stocks expected to grow above the industry average and can gauge this growth to an extent if the PEG Ratio is less than 1 [5].

2.1.2. Profitability Ratios

Profitability ratios evaluate a company's ability to profit from certain aspects of its model. For instance, the Return on Assets (ROA) calculates the percent of profit a company makes based on its assets. In contrast, the Return on Equity (ROE) calculates the profit percent of a company based on its shareholders' equity. Typically, the market average for the ROA of a company is around 5%, and the market average for the ROE is around 10%. Thus, a ratio investor usually invests in a company with a higher ROA than 5% and a higher ROE than 10%.

The Asset Turnover Ratio of a company is another good indicator of its profitability. The Asset Turnover Ratio indicates the ability and effectiveness of a company to generate revenue using its assets. This ratio is calculated by dividing the total sales by the total assets. This calculation lets investors see how easily an asset can be converted into a sale.

A company's Profit Margin measures profitability by dividing the Net Income by the Net Sales. Thus, this calculates the profit a company maintains per dollar of revenue. A frequently used metric is to consider a Profit Margin of around 10% as usual and healthy, while 5% is considered low and 20% is considered high.

2.1.3. Risk Ratios

Risk ratios calculate a company's risk relative to the market. A company's market capitalization measures its total stock value and compares its size with others in the same industry. Those with a higher market cap have more market weight and thus have more influence on the market.

Another metric used in calculating the risk of a company is its debt ratio. A high debt ratio indicates that a company has financial risk and high leverage. The comparison between the debt and assets of a company illustrates the amount of debt a company owes, which increases the risk factor investors take into account.

The beta of a company measures its volatility in comparison to the market. A base value of 1 means that a company changes in price at the same rate as the market, while anything above 1 means it is more volatile and likely to change compared to the market. As a result, those with high beta values are more prone to market fluctuations.

2.2. Technical Analysis

Technical analysis evaluates stocks by considering a company's market trends, patterns, and signals to predict future prices [6]. One such method used is momentum investing, where investors compare the simple moving averages of a company, which is essentially the average price of a stock over a specific period. In particular, momentum investors compare the stock price or its 50-day moving average to the 200-day moving average. If either is more significant than the 200-day moving average, the stock is bullish or on an uptrend. On the other hand, if those values are lower than the 200-day moving average, the stock is in a bearish or downtrend.

3. Fundamental Analysis

3.1. Global Macroeconomic Environment

The global macroeconomic environment is critical in shaping financial markets [7]. During the 2020 pandemic, many families could save money and make large purchases through the aid of the U.S. government and limited spending opportunities. However, due to the ongoing political conflicts in Europe and the Middle East generating uncertainty, economic growth is hindered, and global food and fuel supplies are disrupted [8]. Additionally, the lockdowns in China are causing supply chain issues [9]. Along with economic disparities across different regions, the mismatch between the high consumer demand and constrained supply has caused increased inflation and a higher consumer price index.

3.2. Financial Industry Environment

The finance industry creates thousands of data daily from many financial businesses, such as crowdfunding platforms, wealth management and asset management platforms, and mobile payment platforms [10]. With more data every day, management and efficiency of finances are becoming a requirement. As a result, big data and AI improvements have allowed for improvements in financial data storage, management, and analytics [11]. Through the increased use of big data, insights and conclusions can be drawn from data models at an unprecedented rate, and the risks of such rewards have decreased [12]. Big data can improve the risk of financial models such as return predictions, volatility forecasts, and market valuations [10]. As a result, implementing big data has allowed for more accurate, informed, and data-driven results in financial markets and increased efficiency and robustness [13].

4. Company Overview

4.1. Meta Platforms Inc.

Meta Platforms, Inc. is a corporation that develops social media apps like Facebook, Instagram, and WhatsApp. Meta makes money by selling advertisement space on its platforms and products, such as Meta Quest. Like other technology companies, Meta has also become involved in the AI market by developing its own AI language model, LLaMA (Large Language Model Meta AI) [14]. From this model, they created an open-sourced AI called Meta AI. Meta has also implemented AI in its social media apps, such as Instagram, providing a better user experience. In terms of outlook, Meta has a vision to grow its Metaverse and create a virtual reality of the world. By blending virtual and augmented realities, users of the Oculus Quest can enter an immersive virtual world. A big-picture goal of Meta would be for everything to convert to the Metaverse, such as virtual workspaces. The vision of Meta creates an outlook that appears to have big things in store for the future.

4.2. NVIDIA Corp.

Nvidia Corporation has capitalized on the growing demand for artificial intelligence by leveraging its advanced GPU technology and becoming a leading force in the AI market. The company has reached over $2 trillion market capitalization and is among the world's most valuable companies. Nvidia used to market to the video gaming industry, where they developed highly sophisticated and durable GPU chips needed for high-performance and smooth gaming. However, in the wake of the growing need for AI in most industries, Nvidia GPUs proved highly suitable for AI training and inference. Taking advantage of this, Nvidia expanded its data centre operations. By supplying GPUs to multiple data centres that house invaluable data, they were able to address the growing demand for its products. By doing this, Nvidia broadened its market reach and inserted itself into the evolving AI industry.

4.3. Alphabet Inc.

Alphabet Inc. has taken the initiative in the growing AI market as well. Through AI, they are trying to grow their revenue in three main areas: advertising, cloud services, and subscriptions. Alphabet is investing much money into AI infrastructure to support its plan. Due to their company size, they can secure Nvidia GPUs, which gives them a competitive edge in the AI market. Furthermore, they can utilize AI to improve existing products and services, such as Google Cloud, which now supports most generative AI startups and unicorns. Alphabet has also launched its AI model, Gemini, and a new AI premium plan with Gemini Advanced, a high-margin subscription-based initiative. Alphabet also purchased the right to data owned by Reddit to use this data to improve their AI technology. Through these opportunities, Alphabet is increasing its market share, improving customer service, and expanding profitability through AI-powered innovations.

5. Comparative Analysis

5.1. Market Ratios

Table 1. Market Ratios of the Three Companies

Company	P/E Ratio	P/B Ratio	Dividend Yield	PEG Ratio
META (Meta Platforms Inc.)	24.94	8.03	0.20%	1.18
NVDA (Nvidia Inc.)	48.28	43.38	0.02%	1.11
GOOGL (Alphabet Inc.)	21.65	6.17	0.13%	1.02

A value investor finds stocks that appear to be undervalued in price: they invest in a stock if the price-to-earnings (P/E) ratio is less than 10. According to the data in Table 1, all three companies have a P/E ratio way above 10. Thus, these stocks would not attract the value investor. Similarly, a value investor uses a price-to-book (P/B) ratio of less than 1 or 2. All three companies would not meet this criterion as they have a P/B ratio that is way larger than 2.

An income investor looks at the dividend yield to provide constant income through a company's dividends. However, looking at the current 10-year treasury yield, which is around 4% for the U.S., income investors would not be interested in all three companies as their dividend yields are minimal compared to the 10-year treasury yield.

A growth investor looks at a company's P/E-to-earnings per share growth (PEG) ratio, which shows a company's growth. Usually, a growth investor only invests in a stock with a PEG ratio lower than 1, and thus Meta and Nvidia would not attract the growth investor, but since Alphabet's PEG ratio is extremely close to 1, a growth investor would potentially look to invest in it.

5.2. Profitability Ratios

Table 2. Profitability Ratios of the Three Companies

Company	ROA (Return on Assets)	ROE (Return on Equity)	Asset Turnover Ratio	Profit Margin
META (Meta Platforms Inc.)	22.34%	33.58%	0.65	34.34%
NVDA (Nvidia Inc.)	55.26%	123.77%	0.93	55.04%
GOOGL (Alphabet Inc.)	15.96%	30.87%	0.76	26.70%

A company's return on assets (ROA) measures its profitability based on its assets. Typically, ratio investors are looking for companies with an ROA greater than 20%, considered phenomenal, while a 5% ROA is considered good. Thus, according to the data provided in Table 2, while Alphabet has a good ROA, Meta and Nvidia have outstanding ROAs.

Similarly, the return on equity (ROE) of a company calculates the efficiency of a company in generating profits through shareholders' equity. The market average for ROE is around 10%, and ratio investors look for companies with ROEs above 15%. Table 2 points out that all three companies have an ROE above 15%, so a ratio investor would be attracted to all three stocks.

The asset turnover ratio indicates the ability and effectiveness of a company to generate revenue using its assets. Table 2 concludes that Nvidia has the highest asset turnover ratio of the three companies, indicating its ability to generate sales using its resources. Meta and Alphabet have asset turnover ratios similar to their industry averages.

The profit margin represents a company's profitability by calculating the percent of profit it keeps per dollar of revenue. By noting the profit margins from Table 2, Nvidia has a high-profit margin of around 55%, meaning that they keep around half of their revenue as profit. Meta and Alphabet also have good profit margins at around 34% and 27%, respectively.

5.3. Risk Ratios

5.3.1. Market Cap Analysis (Meta)

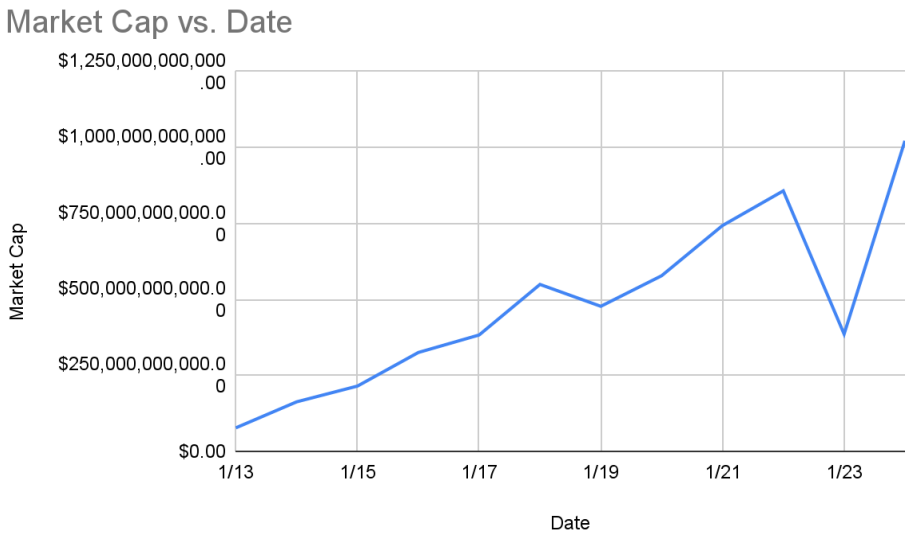

Figure 1. Market Cap of Meta Platforms Inc.

As shown in Fig. 1, Meta's market cap has grown extensively from 2013 to 2024. It has solidified itself as one of the world's biggest and, thus, least risky stocks, crossing the $1T market cap range early in 2024. Other than a big drop in 2022, Meta's market cap has grown steadily due to the good management of its resources and constant growth. Meta's growth has also been due to its involvement in AI. Implementing open-source AI in its social media platforms adds a new level to the possibilities it can implement into its apps—the growth potential of Meta as a company has allowed it to expand continually.

5.3.2. Market Cap Analysis (Nvidia)

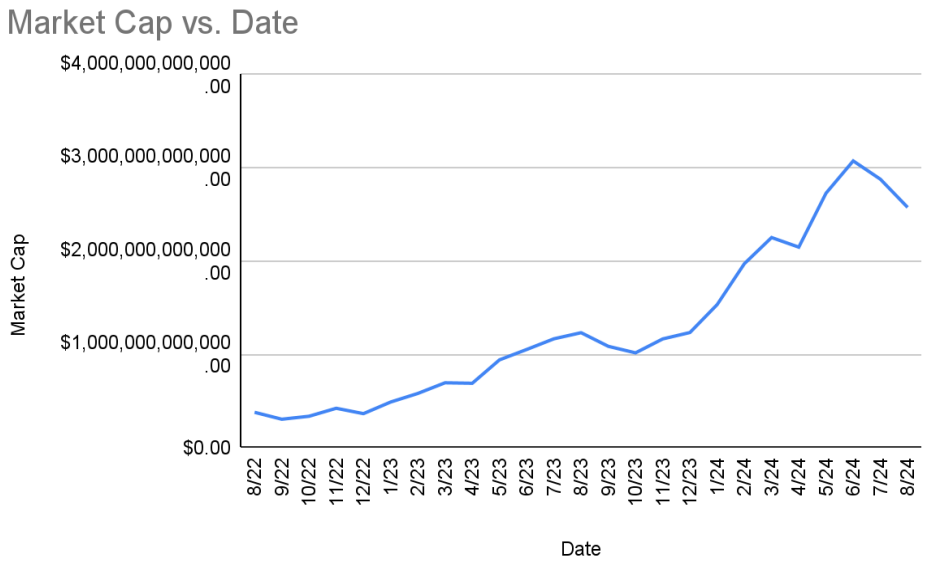

Figure 2. Market Cap of Nvidia Corp.

As illustrated by Fig. 2, over two years, Nvidia's market cap has grown from around $380 billion to over $2.5 billion, totalling a compound annual growth rate of approximately 160.3%. Furthermore, their year-over-year (YoY) revenue growth is over 200%, and many of their financial reports have grown immensely compared to their industry average. Nvidia's continuing investments in research and development (R&D) have allowed the company to grow and innovate in AI, deep learning, and GPU architecture.

5.3.3. Market Cap Analysis (Alphabet)

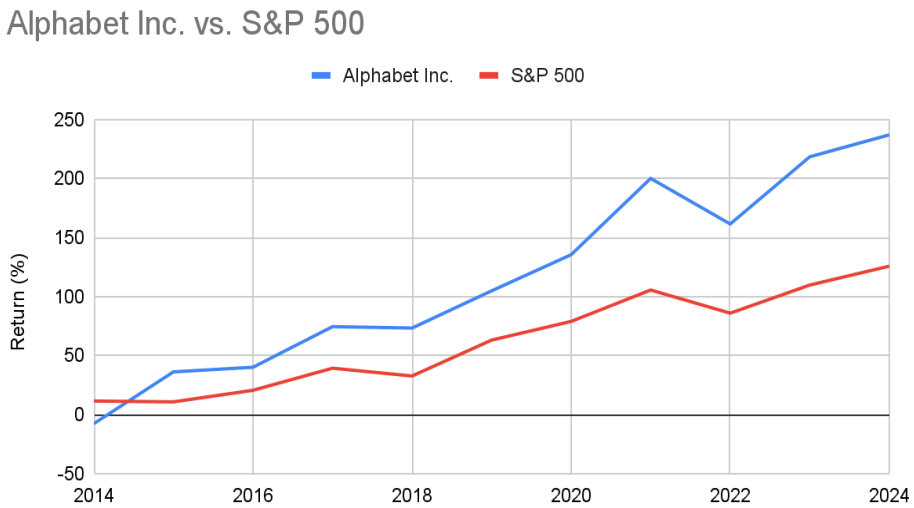

Figure 3. Alphabet Inc. vs. S&P 500 Return Comparison

In Figure 3, the stock return rate of Alphabet is compared to the S&P 500 return rate. By 2024, the return rate of Alphabet's stock is almost double that of the S&P 500, showing immense growth. Especially since 2022, when the AI market began to grow exponentially, did Alphabet show growth? Alphabet shows enormous investments in the AI market, such as the highlighted acquisition of Reddit's data to bolster its data capabilities for AI. Alphabet's future shows promise, as not only is its market share in the AI market expanding, but it also shows massive potential with Google Cloud, which has amassed a good portion of the market share within this initiative.

5.3.4. Debt Ratio Analysis

Table 3. Debt Ratios of the Three Companies

Company	Debt Ratio
META (Meta Platforms Inc.)	0.165
NVDA (Nvidia Inc.)	0.168
GOOGL (Alphabet Inc.)	0.071

All three of these companies have low debt ratios. A debt ratio is considered good if it is below 0.4, and all three of these companies have extremely low debt ratios, signifying low leverage and financial risk. Thus, analyzing the data in Table 3, there is little risk involved when investing in each of these three companies.

5.3.5. Beta Analysis

Table 4. Betas of the Three Companies

Company	Beta
META (Meta Platforms Inc.)	1.21
NVDA (Nvidia Inc.)	1.67
GOOGL (Alphabet Inc.)	1.04

All three companies have a higher beta than 1, indicating their stock price is more volatile than the market average. Table 4 illustrates that while Meta and Google have betas slightly above the market average, Nvidia's beta is much larger, raising concerns about its volatility.

5.4. Market Position and Growth Drivers

Meta Platforms Inc. has grown its social media presence immensely. By implementing AI in its apps, Meta increases its dominance in the social media landscape. Furthermore, with the increase in the popularity of many of its products, such as Instagram, Meta can generate and grow its advertisement revenue [15].

Nvidia Corporation has established itself as an AI and data centre market leader [16]. As one of the most suitable and durable GPUs, many large companies, including Alphabet, rely on Nvidia as a supplier. With the AI outlook limitless, Nvidia's potential as a company seems to continue to grow.

Alphabet has also positioned itself well in the growing market of AI through advertising, cloud services, and subscriptions. Using Nvidia GPUs, Alphabet has a competitive edge over other companies trying to gain market share in the AI market. Gemini, Google's own generative AI model, is used by millions globally, as Google already has a large audience of users using its search engine.

5.5. Stock Performance

Meta has shown its ability to rebound from lows and capitalize on opportunities. Since its low in 2022, Meta has been able to recover from its low and grow its business by starting new initiatives. Now, it is at a high once again and has solidified itself as a top technology company. Its initiatives in creating a Metaverse have allowed unlimited potential in the coming years. By analyzing Meta's 200-day and 50-day moving averages and its current stock price, a momentum investor would conclude that Meta's stock price is bullish because both its 50-day moving average and current price are above the 200-day moving average price.

Nvidia's stock and financial growth over the last few years heavily outnumber the market average. The company's investments in research and development further highlight its willingness to continuously innovate and improve its GPU architecture and capabilities, instilling confidence in insiders and institutional investors. While the lofty expectations set by investors may become risky, the continuous demand for their products will likely aid in its strong financial results. Like Meta, Nvidia's 200-day moving average is less than the 50-day moving average and current price, indicating that Nvidia's stock price is bullish according to a momentum investor.

Alphabet's stock has also shown growth. It has a highly diverse revenue model with multiple revenue streams, so Alphabet's ability to generate high-margin revenue sustains its growth. This can be highlighted by institutional holders, which have increased their positions in the company more than decreased, showing their confidence in the outlook of Alphabet. Alphabet's investments in the AI market set up its future and continue improving its products for more users. The resources and data available to the company will allow it to continue to grow its market share. While its 50-day moving average is above the 200-day moving average, Alphabet's current price is below the 200-day moving average. Thus, a momentum investor would have to decide whether Alphabet's stock is a buy. Usually, Alphabet's stock is still a buy for momentum investors.

5. Conclusion

This paper has analyzed the financial health and stock performance of three big technology companies - Meta Platforms Inc., Nvidia Corp., and Alphabet Inc. While all three have faced challenges in the past, they have shown their resilience and growth despite these hardships. The purpose of this paper is to provide data-driven and informed investment decisions through the use of ratio and technical analysis. As a result, if we consider all things evaluated in this paper, Nvidia's immense growth in the past two years and its superiority in the AI market have backed up its stock performance and given it the edge in terms of growth outlook, although both Meta and Alphabet also offer considerable long-term value.

References

[1] Setar, Lauren, and Matthew MacFarland. 2012. "Top 10 fastest-growing industries." Special Report IbisWorld.com. Available at: http: //www.drugstorenews.com/sites/drugstorenews.com/files/Fastest%20Growing%20Industries-1.pdf.

[2] Makridakis, Spyros. 2017. "The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms." Futures 90: 46 - 60.

[3] Roos, Göran, and Johan Roos. 1997. "Measuring your company's intellectual performance." Long Range Planning 30 (3): 413 - 426.

[4] Coulon, Yannick. 2019. Rational investing with ratios: Implementing ratios with enterprise value and behavioral finance. Springer Nature.

[5] Damodaran, Aswath. 2012. "Growth Investing: Betting on the future?" Available at SSRN 2118966.

[6] Larsen, Jan Ivar. 2010. Predicting stock prices using technical analysis and machine learning. MS thesis. Institutt for datateknikk og informasjonsvitenskap.

[7] Aman, Ameenullah, Mohamad Yazid Isa, and Asmadi Mohamed Naim. 2023. "The role of macroeconomic and financial factors in bond market development in selected countries." Global Business Review 24 (4): 626 - 641.

[8] Zakeri, Behnam, et al. 2022. "Pandemic, war, and global energy transitions." Energies 15 (17): 6114.

[9] Wang, Zihao, and Yang Yang. 2023. "Analyzing U.S. Macroeconomic." Proceedings of the 2023 International Conference on Management Research and Economic Development (part 3): 240 - 245.

[10] Hasan, Md. Morshadul, et al. 2020. "Current landscape and influence of big data on finance." Journal of Big Data 7 (3). doi: 10.1186/s40537 - 020 - 00291 - z.

[11] Sun, et al. 2019. "Finance Big Data: Management, Analysis, and Applications." International Journal of Electronic Commerce 23 (1). doi: 10.1080/10864415.2018.1512270.

[12] Paris, Simon. 2024. "Revolutionizing Finance: Exploring the Synergy of Big Data and AI in Creating New Opportunities."

[13] Al-Okaily, Manaf, and Aws Al-Okaily. 2024. "Financial data modeling: an analysis of factors influencing big data analytics-driven financial decision quality." Journal of Modelling in Management.

[14] Roumeliotis, Konstantinos I., Nikolaos D. Tselikas, and Dimitrios K. Nasiopoulos. 2023. "Llama 2: Early Adopters' Utilization of Meta's New Open-Source Pretrained Model."

[15] Sulkala, Kristiina. 2023. "Improving social media marketing in Meta platforms by developing an industry-independent tool: A research-based development study for a digital advertising agency."

[16] Gong, Chuanzhi. 2024. "Analysis of NVIDIA's Strategic Business Philosophy." Highlights in Business, Economics and Management 39: 928 - 933.

INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ACCOUNTING, FINANCE AND MANAGEMENT SCIENCES

OPEN ACCESS JOURNAL

Vol 14, Issue 3, (2024) E-ISSN: 2225-8329

Determinants of Financial Performance Evidence from the Leading US Technology Companies

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To Link this Article: http://dx.doi.org/10.6007/IJARAFMS/v14-i3/21877 DOI:10.6007/IJARAFMS/v14-i3/21877

Published Online: 07 July 2024

Abstract

The technology sector's dynamic nature highlights its critical role in promoting innovation and economic progress. This article seeks to provide stakeholders with important insights by carefully examining and identifying the critical elements affecting the prosperity and profitability of top technology companies in the United States. For investors, legislators, and corporate executives looking to improve organizational performance and maintain competitive advantages in a market that is changing quickly, understanding these aspects is crucial. Using extensive information from Thomson Reuters and Morningstar, our research centers on 20 leading US IT businesses between 2013 and 2022. We investigate the financial standing, research approaches, and performance measures that characterize business success in this industry through an empirical analysis. We evaluated different influences on return on assets, equity, and other variables using nine econometric models. The results show that competitive advantages, creative goods or services, and successful marketing tactics have a greater influence on financial performance than supplier payment timelines. More specifically, technology companies' financial results are not much impacted by the pace at which suppliers pay. These revelations emphasize how crucial marketing and strategic innovation are to attaining better results. All things considered, our study highlights the crucial factors that propel success in the technology industry and provides useful advice for raising profitability and maintaining expansion. Policymakers, investors, and industry experts gain from this study's improved understanding of the elements that support technology businesses' strong performance.

Keywords: Performance, Profitability, Technology, ROA, ROE

Introduction

Performance is a fundamental concept in evaluating and measuring an organization's success in achieving its goals. Regardless of the field of activity, performance is a key indicator of efficiency and effectiveness. In a world dominated by innovation, the technology sector is a vital component of economic development and sustainable growth. The technological sector ofThe United States of America is recognized worldwide as one of the most dynamic

and innovative sectors. Because of its ability to generate innovation and rapidly adapt to technological change, the US technology sector continues to be a driver of economic progress and development. Being at the center of digital transformation and new technological paradigms, this sector has a crucial role in the creation and development of innovative products and services that shape the future of our society.

The purpose of this paper is to analyze the performance of companies in the technology sector and the determinants of profitability in this field. In this regard, we selected 20 leading US companies in this sector, which had a significant influence on the industry and which had a strong presence in the market. The analysis period covered 10 years, namely 2013-2022, and the data used in the study were collected from the Morningstar and Thomson Reuters platforms.

The concept of performance has a multitude of definitions and interpretations found in the specialized literature, so we will present below some of the most popular approaches.

Drucker (1993), argues that "enterprise performance is the result of its ability to transform resources into economic results", in his work "Post-Capitalist Society". Another definition of the term performance is given by Neely (2002), who believes that "enterprise performance is the result of achieving and exceeding the objectives and expectations set by the organization and its stakeholders".

In the view of Eccles (1991), "enterprise performance is its ability to achieve a sustainable competitive advantage while satisfying the needs and expectations of customers, employees, shareholders and the community in which it operates."

The specialized literature classified the determining factors of a company's profitability into two distinct categories. The first category includes internal factors, such as company size, liquidity, financial leverage, growth rate, financial solvency, company age, capital structure, and other management decisions (Anbar and Alper, 2011). The second category includes external factors, which can be expressed either at the industry level, such as sector growth rate, market concentration and import growth rate, or at the macro level, such as interest rate, inflation, growth rate of GDP, the return on the financial market (Grau and Reig, 2018).

The Current State of Scientific Research in the Field

The financial performance of companies is a hotly debated topic in the specialized literature. Kant (2018) aimed to investigate the relationship between the profitability of US companies in the manufacturing industry and several indicators, including company size, R&D intensity, productivity, growth, seniority, net asset turnover, debt ratio and current. To conduct this research, the author used a sample of 221 manufacturing companies active in the United States during the period 2012-2017. The results obtained from this study indicated the existence of a significant positive relationship between investment in research and development, company growth, productivity, debt ratio, current ratio and profitability of companies. In contrast, no significant relationship was found between the age and size of firms and their profitability. This may indicate that the age and size of companies are not determinants of profitability in the manufacturing industry. Also, a negative relationship was found between the turnover rate of net assets and profitability. This suggests that a high net asset turnover rate can negatively affect profitability, and the costs associated with replacing assets or using them inefficiently may be one reason.

Weidmann et al (2019) compared the importance of net profit margin and asset turnover ratio as determinants of ROE in US, German and Japanese manufacturing companies. Based on data for all companies in the manufacturing industry, net profit margin

was found to be the most important determinant of ROE in all three countries. Since the electronics industry is the most important manufacturing industry in all three countries, the authors applied the empirical tests to data on electronics manufacturing firms. Net profit margin is the most important determinant of ROE in electronics firms in all three countries, so in Germany a 10% increase in NPM leads to about a 9.8% increase in ROE, in the US an increase of of approximately 8.3% in ROE, and in Japan an increase of approximately 6.9% in ROE. At the same time, in Germany a 10% increase in asset turnover leads to an increase of about 2.2% in ROE, while in Japan an increase of about 1.5% in ROE.

The study conducted by Saleem and Rehman (2011) aimed to reveal the relationship between liquidity and profitability using data of 26 oil and gas companies listed on the Karachi Stock Exchange (KSE) in Pakistan, taking into consideration a period of 5 years (2004-2009). In this study, the relationships between return on assets, return on equity and return on invested capital were investigated, with current liquidity, immediate liquidity and solvency ratios as independent variables. They found that there is a significant influence of liquidity rates on the return on invested capital. This suggests that the level of liquidity of companies in the oil and gas industry in Pakistan has a significant impact on the efficiency with which they use their invested capital to generate profit. Regarding the return on assets, the study reveals that it is significantly influenced only by the solvency rate. Thus, the ability of businesses to honor their financial obligations and meet payment requirements plays an important role in achieving a high return on assets. In contrast, return on equity was not significantly influenced by any of the three liquidity variables analyzed.

Lee (2009) analyzed the determinants of a company's performance, focusing specifically on the role of firm size for profitability. In this regard, a panel data model was used, applied to a sample of more than 7,000 public companies in the United States, in a time span between the years 1987-2006. Industry-level factors such as market concentration and barriers to entry and their impact on firm profitability were also analyzed. The results obtained indicate that these industry factors have a significant role in explaining the profitability of firms. An important aspect highlighted in the paper is that the United States market is characterized by strong competition, as approximately 45% of the companies in the sample experience average losses over a 20-year period. This suggests that the competitive environment can significantly influence the financial performance of firms. Furthermore, the results of economic analysis indicate that firms' profits are short-lived instead of persistent over time. This aspect suggests that factors such as changes in the market, technological innovations or other external influences can have a significant impact on the profitability of firms in a relatively short period of time. As for the size of the firm, together with its market share, they play a dominant role in explaining variations in profitability. The estimation results support the conventional theory of a positive relationship between firm size and profit. However, it has been observed that this relationship is non-linear, i.e. profitability decreases as the size of the company increases.

Pervan (2019) proposed a model that incorporated three types of determinants of firm profitability: firm-specific (age, liquidity and labor costs), industry-specific (industry concentration and capital intensity) and macroeconomic variables (inflation rate and GDP growth). The research sample consisted of companies operating in the manufacturing industry in Croatia, in the period 2006-2015. According to the evaluated model, the firm age variable had a positive sign, suggesting that older manufacturing firms operate with a higher level of profitability, as older firms exploit the benefits of accumulated knowledge and business reputation through cost savings and higher profitability big. The labor cost variable

was found to negatively influence the performance of firms in the manufacturing industry, indicating that an increase in unit labor cost leads to lower firm profitability. Another finding of the study was that the market concentration variable negatively affects profitability, suggesting that firms operating in the Croatian economy are unlikely to collaborate and increase the price of their products based on their market power. Although capital intensity may represent an entry barrier and different capital investments may ensure the implementation of advanced technology, the inclusion of which may affect firms' productivity and profitability, this variable was not considered statistically significant. At the same time, the estimated model confirmed the importance of the macroeconomic environment for the production companies in Croatia, and the economic growth positively influenced the companies' profitability. Given favorable economic conditions, demand for a firm's goods increases, contributing to increased sales and ultimately higher profitability. The opposite was true in the case of the downward trend of the economy. Inflation rates had a positive impact on firm performance because a firm's costs fell more with inflation than revenues, resulting in higher profitability.

The research conducted by Dogan (2013), with the aim of examining the impact of firm size on profitability, 200 companies listed on the Istanbul Stock Exchange, Turkey, for the period 2008-2011 were analyzed. ROA (return on assets) was used as a performance indicator along with several independent variables including total assets, total sales, number of employees, degree of liquidity, degree of indebtedness and age of firms. To analyze the influence of these variables on financial performance, three multiple regression models were built. The research results showed that there is a positive relationship between size indicators, such as total assets, total sales and number of employees, and firm profitability in all three analyzed models. In other words, larger companies in terms of these variables generally recorded superior financial performance. At the same time, it was found that the age of the company and the leverage effect (the degree of indebtedness) had a negative effect on profitability. This suggests that firms with longer tenure or higher levels of debt have experienced lower profitability. It was also observed that liquidity had a positive effect on profitability. This means that firms with a greater ability to convert their assets into cash and meet their financial obligations experienced higher profitability.

Korkmaz and Karaca (2014) examined the relationship between financial indicators and profitability variables, as well as to investigate the influence of financial indicators on the level of profitability. The analysis was carried out on the basis of the financial data of 78 companies listed in the BIST-Index of the manufacturing industry, in an extended period, covering the years 2000-2011. To assess the relationship between the variables, the researchers used three distinct regression models. Dependent variables included earnings per share, return on equity and return on assets, while independent variables included the following indicators: net sales/assets ratio, product/inventory cost ratio, net sales/trade receivables ratio, property, plant and equipment/term liabilities long and leverage ratio. The empirical analysis led to the following important conclusions: first, it was found that earnings per share decrease significantly as the leverage ratio of companies increases. This result indicates that a high level of debt can negatively affect the financial performance of companies, reducing the profitability per share. Second, it has been observed that an increase in the level of debt of companies leads to a decrease in the return on equity. This result suggests that a balanced capital structure and an adequate level of debt can positively influence the return on equity of companies in the manufacturing industry. These conclusions highlight the importance of properly managing debt levels and capital structure in achieving optimal financial

performance. Companies need to consider the impact leverage has on earnings per share and find a balance between the use of borrowed resources and equity capital.

The study by Asimakopoulos et al (2009) looked over the determinants of profitability by means of a panel regression, using data from the period 1995-2003, for companies listed on the Athens Stock Exchange. Conducting an empirical analysis, they examined several factors that can influence the profitability of companies, and their results revealed important findings. First of all, it was found that the size of the companies has a positive impact on their profitability. This suggests that larger firms, which have a greater volume of resources and activities, tend to achieve higher returns. Second, the researchers observed that an increase in sales also has a positive impact on profitability. This result indicates that firms that succeed in expanding their sales volume can achieve higher profitability. Regarding investments, it was found that they have a positive impact on profitability. On the other hand, leverage and current assets have been observed to have a negative impact on profitability. This result may indicate that firms that rely too much on debt and have a high level of current assets relative to their revenues may have lower profitability. Another important aspect highlighted in the study is the negative relationship between participation in the European Union (EU) and the adoption of the euro as a single currency and the profitability of firms. This finding can be interpreted to mean that EU integration and the adoption of the euro may bring general economic benefits, but may have a negative impact on firm profitability due to specific factors such as increased competition and changes in the economic environment.

Focusing on determining the influence of indebtedness on the financial performance of pharmaceutical companies in Nigeria Enekwe et al. (2014) analyzed data from three pharmaceutical companies over a 12-year period (2001-2012). They sought to examine the relationship between debt levels and return on assets. The independent variables used were debt ratio, debt-equity ratio and interest coverage ratio, and return on assets represented as the dependent variable of the model. The results of the study indicated a significant negative relationship between the level of indebtedness and the financial performance of the analyzed pharmaceutical companies. This means that an increase in the level of indebtedness of companies has led to a decrease in the return on assets. These findings are consistent with existing literature suggesting that high levels of debt can put pressure on companies' cash flows, which can negatively affect financial performance.

A recent study conducted by Mansour (2023) evaluated the impact of capital structure on the performance of Jordanian firms. The analysis was based on financial data collected over an extended period of time, covering the period 2010-2018. Another aspect investigated in this paper was the extent to which firm size influences the relationship between capital structure and performance. The dependent variable used in the study was the firms' market share, while the main independent variables included the total book value of debt and firm-specific factors such as firm size, firm age, firm growth, and market value to book value of own capital. The results obtained from the analysis revealed a significantly positive relationship between the accounting value of the capital and the market share of the companies. This result suggests that a balanced capital structure and a higher value of invested capital can contribute to a higher market share for Jordanian firms. An appropriate capital structure can influence investor confidence and secure the financial resources needed for business expansion and development. It was also found that firm size, sales growth, and market value of equity have a significantly positive relationship with firms' market share. These results indicate that larger firms, which experience growth in sales and have a higher market value of equity capital, are more likely to achieve a higher market share. These aspects

can be interpreted as indicators of the success and financial soundness of the companies, thus attracting the trust of investors and consumers. In contrast, firm age did not significantly contribute to financial performance. This result may indicate that, in the specific context of the Jordanian market, factors such as firm size and sales growth have a greater influence on financial performance than the sheer age of the firm.

In terms of liquidity, debt and profitability ratios' impact on the financial performance of a company Borhan et al (2013) analysed a dataset of companies activating in the chemical industry. This research was based on quarterly data recorded over an extended time period (2004-2011). The results obtained from this study provided significant information regarding the relationship between the analyzed financial indicators and the financial performance of the company. First, a significant positive correlation was found between current liquidity and the company's financial performance. This indicates that a higher current ratio is associated with better financial performance. Current liquidity represents a company's ability to meet its short-term obligations and can be considered a measure of solvency and ability to pay. Thus, greater liquidity can provide the necessary resources to support and develop the business, which contributes to improving financial performance. Second, a significant positive relationship was observed between net profit margin and financial performance. This result suggests that a higher net profit margin is associated with better financial performance. Net profit margin represents the company's efficiency in generating profits, taking into account total costs and expenses. A higher net profit margin may indicate higher operational efficiency and a better ability to capitalize on market resources and opportunities. At the same time, a significant negative correlation was identified between financial leverage and financial performance. This result indicates that a higher level of debt can have a negative impact on financial performance. Financial leverage represents the proportion of borrowed capital in the financial structure of the company and involves costs associated with debt service and risks related to their payment. An excessive level of indebtedness can impose a financial burden on the company and affect its ability to achieve solid financial results.

Rahman and Liu (2021) investigated the relationship between firm size, firm age and profitability in the Chinese stock market. For this, they analyzed a sample consisting of the data of all public companies listed on the Chinese stock market, for the period 2008-2018. The results of the study demonstrated the existence of a positive relationship between firm size and profitability. In other words, larger firms, in terms of assets or revenue, generally have higher returns. This finding is consistent with previous studies conducted in other countries, suggesting that there is a general trend globally regarding the influence of size on the financial performance of firms. The researchers also observed a negative relationship between firm age and profitability. This result indicates that older firms with a longer existence in the market experienced lower profitability compared to newer firms. These findings may be relevant to investors, managers and business decision-makers, giving them a deeper understanding of the relationship between a firm's characteristics and its financial performance in the Chinese stock market.

The impact of firm-specific determinants on financial performance in the energy industry was examined by (Mafumbate et al., 2017). The firm-specific determinants used in this study as independent variables were: capital structure, firm size and liquidity. The results showed a negative but significant relationship between capital structure and financial performance and support the pecking order theory suggesting that capital and firm size and financial performance were also negatively correlated. However, a significant positive relationship was established between liquidity and financial performance.

Banchuenvijit (2012) aimed to investigate the effects of employee compensation, firm age, firm size, capital intensity and export factor on the financial performance of listed companies in Vietnam. To achieve this, the author analyzed the relationships between these variables and financial performance, quantified by the rate of return on assets and the rate of return on equity. The results of the study indicated that there is a significant positive correlation between employee compensation and ROA, suggesting that providing higher compensation to employees can contribute to better financial performance of companies. Also, a positive correlation was found between firm age and ROA, which may indicate a relationship of trust and experience accumulated over time, which may support financial performance. At the same time, a positive correlation was found between the export factor and ROA, indicating that companies with a greater export orientation can register a better financial performance. However, a negative correlation between total assets and ROA was identified, suggesting that an excessive increase in firm size may negatively affect return on assets. In terms of ROE, a positive correlation with net sales was noted, suggesting that an increase in sales can contribute to a higher return on equity. In contrast, a negative correlation was found between the number of employees and ROE, which may suggest higher labor costs and lower efficiency.

Empirical study on the determinants of performance in the technology sector

The second chapter provides an empirical perspective on the determinants of performance in the technology sector, for the case of firmsApple, Microsoft, Alphabet (Google), Meta Platforms (Facebook), NVIDIA, Broadcom, Adobe, Cisco Systems, Salesforce, Oracle, Paypal, Intel, Qualcomm, Intuit, Texas Instruments, Advanced Micro Devices, Applied Materials, ServiceNow, Micron Technology and Automatic Data Processing. The results obtained and related discussions contribute to the development of knowledge in the field and can provide valuable guidance and information for managers and decision-makers in the technology sector. The chapter is structured in three sub-chapters covering aspects related to the analysis of the companies' financial statements, the research methodology used and the presentation of the main results.

Research Methodology

We analyzed the performance and its drivers for selected companies, namely Apple, Microsoft, Alphabet (Google), Meta Platforms (Facebook), NVIDIA, Broadcom, Adobe, Cisco Systems, Salesforce, Oracle, Paypal, Intel, Qualcomm, Intuit, Texas Instruments, Advanced Micro Devices, Applied Materials, ServiceNow, Micron Technology and Automatic Data Processing. Thus, we analyzed the following factors from the perspective of the possibility of determining the ROA, ROE, ROIC profitability.

The independent variables that were included in the econometric model for the analysis and evaluation of the determining factors of the financial performance of companies in the technology sector can be found in the table below.

Table 1
Independent Variables

Symbol	Variable	Description	Formula
LEV	Financial leverage	Financial leverage is an indicator that reflects the extent to which a company's assets are financed by debt	Total liabilities/Equity
MPB	Gross profit margin	Gross profit margin highlights the amount a company makes from the sale of its products and services before deducting any selling and administrative expenses	Gross Profit/CA
MPN	Net profit margin	The net profit margin shows the net profitability of the company's activities	Net Profit/Turnover
EBIT/CA	EBIT margin	This margin is a measure of a company's profitability and is calculated excluding the influence of interest and taxes	(Net Profit + Interest Expenses + Tax Expenses)/Turnover
Vt fz	Turnover speed of suppliers	Supplier turnover is a financial indicator that measures how quickly a company pays its suppliers as part of its business operations	Balance of suppliers/Turnover*365
R at	Asset turnover rate	The asset turnover ratio is a financial indicator that highlights the efficiency of using a company's assets in generating revenue	Turnover/Total assets
EBITDA/CA	EBITDA margin	EBITDA margin is a measure used to evaluate a company's operating efficiency and refers to operating profit relative to total revenue.	(Net Profit + Interest Expenses + Tax Expenses + Depreciation and Depreciation Expenses)/Turnover
P/S	Price/sales ratio	This ratio reflects how much investors are willing to pay for each dollar of a company's sales.	Share price/(Turnover/No. of shares)
EBITDA	EBITDA	EBITDA is a financial measure used to evaluate a company's performance and represents operating profit before interest, taxes, depreciation and amortization.	Net Profit + Interest Expenses + Tax Expenses + Depreciation and Depreciation Expenses

Source: Author's analysis

Table 2
Matrix of correlation coefficients

Variables	LEV	MPB	MPN	EBIT/CA	Vt fz	R at	EBITDA/ THAT	P/S	EBITDA
LEV	1.00								
MPB	-0.21	1.00							
MPN	-0.27	0.18	1.00						
EBIT/CA	-0.20	0.26	0.89	1.00					
Vt fz	-0.02	-0.04	-0.07	-0.09	1.00				
R at	-0.05	0.30	0.03	0.06	-0.02	1.00			
EBITDA/CA	-0.23	0.17	0.86	0.92	-0.11	-0.01	1.00		
P/S	-0.12	0.49	0.04	-0.01	-0.02	0.10	-0.06	1.00	
EBITDA	-0.05	-0.13	0.34	0.36	-0.08	-0.13	0.35	-0.11	1.00

Source: Author's analysis based on data from Morningstar

After analyzing the correlation matrix, we can see the existence of strong correlations between the variables P/S and MPB (0.49), EBIT/CA and MPN (0.89), EBITDA/CA and MPN (0.86), as well as EBITDA /CA and EBIT/CA (0.92). For this reason, these variables will not be used in the same regression model.

Results and Discussion

In order to analyze the determinants of the performance of companies in the technology sector, we used panel data, collected over a period of 10 years, for a sample of 20 companies in the US. Given the relationships observed from the correlation matrix, we built three regression models for each dependent variable, which are detailed in the tables below. These models will allow us to further examine the impact of independent variables on companies' performance, providing a deeper understanding of the relationships and influences within the technology sector.

In order to provide a more detailed and precise analysis of the regression models and the statistical significance of the independent variables, in the tables presented below we will find the coefficient of each variable, accompanied by the t-statistic, and the significance levels of 10%, 5% and 1 % are represented by the symbols *, **, ***.

ROA Regression Models

Table 3

ROA regression models

	ROA	ROA	ROA
R SQUARED	0.91	0.63	0.68
CONSTANT	-13.07 *** (-2.61)	-3.89*** (-2.58)	-1.52 (-1.78)
LEV	-0.12 (-1.27)	-0.31** (-2.49)	-0.34*** (-3.18)
MPB	0.21** (2.22)		
PMPN	0.59*** (10.83)		
EBIT/CA			0.53*** (16.04)
VT FZ	-0.005 (-1.13)	-0.001 (-0.73)	-0.002 (-1.10)
R AT	0.26*** (4.45)	0.19*** (4.48)	0.15*** (3.86)
EBITDA/CA		0.43*** (12.38)	
P/S		0.20** (2.13)	0.14* (1.66)
EBITDA	0.06*** (3.15)	0.06*** (2.83)	0.53** (2.06)
NO. REMARKS	two hundred	two hundred	two hundred

Source: Author's analysis in EViews

We observe that financial leverage is statistically significant for two of the three regression models with ROA as the dependent variable. Across the 20 companies analyzed, financial leverage has a negative impact on return on assets, as companies that take on more debt have larger assets. It is therefore essential that companies carefully manage their debt levels and identify an optimal balance between debt utilization and return on assets.

In addition, gross profit margin positively influences ROA, in the case of companies in the technology sector analyzed. Since this margin reflects a company's ability to generate more revenue than the direct costs associated with producing or providing goods and services, a high value can indicate that the company is using its resources and production processes efficiently, leading to higher profitability of assets. At the same time, the net profit margin ratio is positively correlated with financial performance as quantified by return on assets, because a high net profit margin ratio indicates that the firm is managing its costs efficiently and that it has opportunities for reinvestment and development. At the same time, it can attract more investors, signaling the fact that a company is efficient, competitive and capable of generating sustainable profits, which will positively impact the share price and market value of the company.

EBIT and EBITDA margins have a positive impact on performance quantified by the rate of return on assets,because a high value of these indicators reveals a high level of income and operational efficiency in generating profit from the main activities of the companies. On the other hand, supplier turnover rate was not statistically significant in any of the three models.

Moreover, asset turnover rate is directly related to ROA and is significant in all three regression models. A high asset turnover ratio indicates that a company is efficiently using its assets to generate revenue, and by using assets efficiently, the company can achieve a higher level of revenue relative to the value of its assets, which can contribute to a their higher profitability.

We can see that the price/sales ratio exerts a positive influence on ROA. This finding suggests that shareholders have a strong interest in each unit of revenue generated by the company, being willing to pay a higher price. Thus, a positive influence of price/sales ratio on ROA suggests that investors and shareholders perceive the company as capable of generating solid earnings relative to market value.

The EBITDA indicator has a strong positive influence on the performance quantified by ROA. This link was expected because, by directly measuring operating income and expenses, EBITDA can indicate how efficiently the company is using its assets to generate profits.

ROE Regression Models

Table 4

ROE regression models

	ROE	**ROE**	**ROE**
R SQUARED	0.64	0.67	0.65
CONSTANT	-64.85** (-2.05)	-30.93*** (-4.78)	-22.19*** (-4.05)
LEV	1.76 (1.20)	1.95*** (3.69)	1.80*** (3.52)
MPB	0.78 (1.34)		
MPN	1.68*** (5.04)		
EBIT/CA			1.39*** (8.85)
VT FZ	-0.02 (-1.02)	0.01 (0.65)	0.004 (0.47)
R AT	0.68** (2.43)	0.55*** (2.87)	0.43** (2.27)
EBITDA/CA		1.21*** (8.15)	
P/S		0.64 (1.56)	0.46 (1.14)
EBITDA	0.42* (1.82)	0.34*** (3.80)	0.29*** (3.40)
NO. REMARKS	two hundred	two hundred	two hundred

Source: Author's analysis in EViews

In terms of ROE, financial leverage was found to have a positive influence. Financial leverage can help increase the return on equity. When a company uses debt to finance part of its assets, the interest costs paid on that debt are deducted from net profit. Thus, the analyzed companies used their debt efficiently and generated more profit for shareholders

Net profit margin, which is the difference between total revenues and total costs expressed as a percentage of total revenues, plays an important role in determining financial performance as measured by ROE. This has a positive impact on the return on capital of the 20 companies in the technology sector. A higher net profit margin indicates better efficiency in cost management and revenue generation, which can lead to a higher ROE.

Also, EBIT and EBITDA margins, asset turnover ratio and EBITDA have a positive impact on financial performance measured by ROE, just like ROA. EBIT margin and EBITDA margin reflect the company's operational efficiency in generating revenue and managing costs. A higher EBIT and EBITDA margin indicates higher operational efficiency, which contributes to better financial performance as measured by ROE. At the same time, the asset turnover ratio represents a company's ability to efficiently use its assets to generate revenue. A higher asset turnover ratio indicates greater efficiency in the use of assets, which can contribute to superior financial performance as measured by ROE.

Additionally, EBITDA, which strips out the influence of interest, tax, depreciation and amortization costs, provides a clearer picture of a company's operating performance. Thus, a higher EBITDA value indicates better operational performance and can contribute to a higher return on equity.

On the other hand, gross profit margin, which is the difference between total revenues and direct costs expressed as a percentage of total revenues, supplier turnover and P/S ratio are not significant in terms of ROE. These measures can provide relevant information about operating efficiency and market valuation, but do not have a direct and meaningful relationship to ROE.

In essence, financial leverage, net profit margin, EBIT and EBITDA margins, asset turnover ratio and EBITDA are factors that can positively influence financial performance as measured by ROE, marking the importance of effective cost management, revenue generation and appropriate asset utilization in achieving superior returns for shareholders.

ROIC Regression Models

Table 5

ROIC regression models

	ROIC	ROIC	ROIC
R SQUARED	0.75	0.69	0.73
CONSTANT	10.33*** (4.52)	-4.39** (-2.87)	-3.85** (-2.43)
LEV	0.19 (1.47)	-0.12 (-1.08)	0.04 (0.25)
MPB	-0.15 (-1.16)		
MPN	0.86*** (20.09)		
EBIT/CA			0.64*** (11.81)
VT FZ	-0.0004 (-0.20)	0.001 (0.28)	0.0004 (0.14)
R AT	0.42*** (8.41)	0.39*** (5.46)	0.33*** (5.02)
EBITDA/CA		0.51*** (9.33)	
P/S		0.15 (0.99)	0.07 (0.53)
EBITDA	0.05** (2.04)	0.11*** (3.46)	0.09*** (2.82)
NO. REMARKS	two hundred	two hundred	two hundred

Source: Author's analysis in EViews

Analysing the table above, we can see that financial leverage does not have a significant impact on the return on invested capital. This means that the use of debt to finance a company's activities does not have a significant effect on ROIC. In addition, net profit margin, EBIT and EBITDA margins, asset turnover ratio and EBITDA have a positive influence on financial performance as measured by ROIC.

On the other hand, gross profit margin, supplier turnover speed, and price/sales ratio do not have a statistically significant influence on ROIC. These measures can provide important information about profitability, operational efficiency and the structure of prices in relation to sales, but they are not decisive factors in determining the return on invested capital, in the case of the analyzed companies. Thus, understanding the interaction between these financial indicators can provide a more complete picture of a company's performance and return on invested capital. Gross profit margin and net profit margin, EBIT and EBITDA margins, asset turnover and EBITDA are factors that can positively influence financial performance as measured by ROIC, while financial leverage, supplier turnover and price/sales ratio do not a significant impact in this regard.

Following the 9 econometric models analyzed, it could be observed that the speed of rotation of suppliers does not have a significant influence on the financial performance of companies in the technology sector. This suggests that whether businesses pay their debts to

suppliers at a faster or slower rate does not have a significant impact on return on assets, equity or invested capital. Thus, in the technology industry, aspects such as innovation, developing high-quality products or services, effective marketing, or creating competitive advantages can have a greater influence on financial performance than the speed of supplier turnover.

Conclusions

Performance and profitability are critical to a company's success. They ensure market survival and attract investors, facilitating access to finance and opening doors for expansion. A high-performing company can invest in innovation and development, motivating and retaining employees. Performance and profitability also contribute to building a solid reputation and trust among customers and business partners.

The performance of a company is affected by a multitude of factors, and their importance can vary depending on the activity sector and even on each individual company. Identifying the determinants of performance is particularly important for a company, as it allows improving performance, prioritizing resources, adapting to change, setting realistic goals and gaining a competitive advantage. By understanding the key factors that influence performance, a company can focus on the essentials and allocate resources efficiently, achieving superior results, adaptability to the business environment and competitive advantage in the market.

References

Anbar, A., & Alper, D. (2011). Bank specific and macroeconomic determinants of commercial bank profitability: Empirical evidence from Turkey. *Business and Economics Research Journal, 2*(2), 139-152.

Asimakopoulos, I., Samitas, A., & Papadogonas, T. (2009). Firm-specific and economy-wide determinants of firm profitability: Greek evidence using panel data. *Managerial Finance, 35*(11), 930-939.

Banchuenvijit, W. (2012). Determinants of firm performance of Vietnam listed companies. *Academic and Business Research Institute*.

Borhan, H., Mohamed, R. N., & Azmi, N. (2014). The impact of financial ratios on the financial performance of a chemical company. *World Journal of Entrepreneurship, Management and Sustainable Development, 10*(2), 154-160.

Dogan, M. (2013). Does firm size affect the firm profitability? Evidence from Turkey. *Research Journal of Finance and Accounting, 4*(4).

Drucker, P. (1993). *Post-capitalist society*. New York: HarperBusiness.

Eccles, R. G. (1991). The performance measurement manifesto. *Harvard Business Review, 69*, 131-137.

Enekwe, C. I., Agu, C. I., & Eziedo, K. N. (2014). The effect of financial leverage on financial performance: Evidence of quoted pharmaceutical companies in Nigeria. *IOSR Journal of Economics and Finance, 5*(3), 17-25.

Grau, A. J., & Reig, A. (2018). Trade credit and determinants of profitability in Europe: The case of the agri-food industry. *International Business Review, 27*(5), 947-957.

Kant, M. (2018). Factors influencing the profitability of manufacturing firms listed on the New York Stock Exchange [Bachelor's thesis, University of Twente]. The Faculty of Behavioral, Management and Social Sciences.

Korkmaz, Ö., & Karaca, S. S. (2014). Financial determinants of firm profitability in manufacturing firms and an application on BIST manufacturing firms. *Ege Academic Review, 14*(1), 21-29.

Lee, J. (2009). Does size matter in firm performance? Evidence from US public firms. *International Journal of the Economics of Business, 16*(2), 189-203.

Mafumbate, J., Ndlovu, U., Mafuka, A., & Gavhure, P. (2017). The influence of firm specific determinants on financial performance in the power industry. *Journal of Economics and Behavioral Studies, 9*(1), 18-28.

Mansour, M. (2023). The connection between capital structure and performance: Does firm size matter? *Investment Management and Financial Innovations, 20*, 195-206.

Morningstar. (2023). Morningstar. Available at: https://www.morningstar.com/

Neely, A. (2002). *Business performance measurement: Theory and practice*. Cambridge: Cambridge University Press.

Pervan, M., Pervan, I., & Ćurak, M. (2019). Determinants of firm profitability in the Croatian manufacturing industry: Evidence from dynamic panel analysis. *Economic Research-Ekonomska Istraživanja, 32*(1), 968-981.

Rahman, M., & Liu, Y. (2021). Firm size, firm age and firm profitability: Evidence from China. *Journal of Accounting, Business and Management (JABM), 28*(1), 101-115.

Saleem, Q., & Rehman, R. (2011). Impacts of liquidity ratios on profitability: Case of oil and gas companies of Pakistan. *Interdisciplinary Journal of Research in Business, 1*(7), 95-98.

Thomson Reuters. (2023). Thomson Reuters. Available at: https://eikon.thomsonreuters.com/

Weidman, S. M., McFarland, D. J., Meric, G., & Meric, I. (2019). Determinants of return-on-equity in USA, German and Japanese manufacturing firms.

Proceedings of the 8th International Conference on Economic Management and Green Development
DOI: 10.54254/2754-1169/116/20242490

A Financial Analysis and Valuation of Apple, Inc.

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Abstract: This paper will take an in-depth look at Apple's financial performance and provide a detailed comparative analysis with its main competitors. Apple, as the world's leading technology giant, has always been known for its innovative products and strong market influence. However, in an increasingly competitive tech industry, continued financial health is key to its success. This paper first compares the performance of Apple and its competitors in key financial indicators such as liquidity, debt repayment ability and profitability. This comparison not only reveals Apple's financial position in the industry, but also helps us understand its robustness in responding to market movements. Next, this paper analyzes Apple's financial report of the latest year in detail, and deeply discusses the change trend of its revenue, expenditure, profit and other key financial data. This analysis is able to capture Apple's financial performance and strategy in the face of global economic fluctuations and changes in market demand. Finally, this paper will discuss Apple's business strategy and the business risks it faces. This includes its product innovation strategy, market expansion plans and potential risks due to factors such as technological change, market competition and global policy changes. Through a comprehensive analysis of Apple's business model and go-to-market strategy, this paper aims to provide a comprehensive perspective on how Apple can maintain its leadership position in a dynamic market.

Keywords: Financial Analysis, Company Valuation, Strategy and Risks

1. Introduction

Apple is the quintessential symbol of innovation, financial acumen and market dominance in the tech industry. Since its founding in 1976, Apple has been reshaping the landscape of consumer electronics, software development and digital services. The company's relentless pursuit of excellence, coupled with its strategic financial management, has propelled it to the forefront of the global market, attracting consumers and investors alike.

At the heart of Apple's financial narrative lies its unparalleled ability to align innovation with consumer needs, resulting in a product portfolio that transcends today's practicalities. From the revolutionary launch of the Macintosh computer in 1984, to the groundbreaking launch of the iPhone in 2007, and now with epochal products like the Apple Vision Pro, Apple has consistently demonstrated its amazing ability to predict and shape consumer preferences, thus ensuring its strong market position.

Apple owes its financial success not only to its innovative products, but also to its smart financial management [1]. The company's careful allocation of capital has allowed it to fund business activities

DOI: 10.54254/2754-1169/116/20242490

such as innovative research and development, strategic acquisitions and global expansion, while maintaining its financial flexibility [2]. In addition, Apple's emphasis on returning value to shareholders through dividends and share buybacks underscores its confidence in its profitability for long-term sustainable growth.

In addition to operational excellence and financial prudence, Apple's market valuation is a testament to investor confidence and market sentiment. The company's continued revenue growth, high gross margins and strong cash flow have attracted the attention of global investors. In addition, Apple's efforts in emerging areas such as digital services, wearables and healthcare technology have raised expectations for its future growth prospects and diversification of revenue.

In an ever-changing technology and global marketplace, Apple's financial performance is a barometer of industry trends and macroeconomic conditions. By analyzing key financial metrics such as revenue growth, profitability, and cash flow generation, it can assess a company's ability to adapt to changing market dynamics and take advantage of emerging opportunities. In addition, assessing Apple's market valuation metrics provides insight into investor sentiment, market expectations, and views on future growth prospects.

In short, this paper tries to reveal the various aspects of Apple's financial strength, and tries to reveal the complexity of Apple's financial strategy through a comprehensive analysis of Apple's financial statements and market performance. This paper attempts to delve into Apple's intricate financial ecosystem, exploring its financial performance, investment strategy, capital structure, and market valuation, in order to gather valuable lessons for scholars and investors in the field of corporate finance and strategic management.

2. Performance Evaluation

2.1. Liquidity

Table 1: Liquidity ratios of Apple Inc., and its competitors.

Company Name	Current ratio	Quick ratio	Beta	Cash ratio	Debt/Equity
Apple lnc.	1.07	1.02	1.14	0.5	145.8%
NVIDIA	4.17	3.38	1.95	2.4	25.7%
Microsoft	1.22	1.20	0.97	0.7	46.7%

Data source: Yahoo Finance.

Table 1 above shows the liquidity data of Apple and its competitors. Apple's current ratio is just over 1, indicating that its current assets are able to roughly cover its current liabilities. However, this ratio is relatively low and may indicate a situation where its current assets are not sufficient to fully cover its current liabilities. Apple's Quick Ratio is also slightly above 1, indicating that current assets other than inventory cover its current liabilities. However, this rate is still not very high and may require further attention. Apple has a Cash Ratio of 0.5, meaning that its cash and cash equivalents cover only half of its current liabilities. This ratio is relatively low and may require an increase in cash reserves to improve the ability to pay. Apple's debt/equity ratio is as high as 145.8%, indicating a relatively high level of debt. This may mean that the company is taking on greater financial risk and needs more attention.

Nvidia Corporation's current ratio is very high, showing that its current assets far exceed current liabilities, with strong ability to pay and repay debt. Nvidia's quick ratio is also very high, indicating that its current assets excluding inventory can cover its current liabilities and it has high solvency. Nvidia has a cash ratio of 2.4, showing that it has sufficient cash reserves to cover a portion of its current liabilities. Nvidia Corporation's relatively low debt/equity ratio indicates that it has relatively little financial leverage and low risk.

DOI: 10.54254/2754-1169/116/20242490

Microsoft's current ratio is just over 1, showing that its current assets can basically cover its current liabilities and it has reasonable ability to pay. Microsoft's quick ratio is also slightly above 1, indicating that current assets other than inventory can cover its current liabilities. Microsoft's cash ratio is 0.7, indicating that it has low cash reserves and may need to increase cash reserves to improve its ability to pay. Microsoft's debt/equity ratio is high, showing its relatively large financial leverage, but it is still within acceptable limits.

Through the comparison of the above data, the following conclusion can be drawn: NVIDIA company performs best in terms of liquidity and solvency, and its current ratio, quick ratio and cash ratio are much higher than Apple and Microsoft. Apple is the worst performer in terms of solvency, with a much higher debt-to-equity ratio than NVIDIA and Microsoft, indicating greater financial risk. Microsoft is a bit weaker than NVIDIA in terms of ability to pay, but better than Apple in terms of ability to pay, with a high but still acceptable debt-to-equity ratio. To sum up, NVIDIA may be the most financially sound and solvent option in the current situation, while investors should carefully evaluate the financial risk of Apple and Microsoft.

2.2. Profitability

Table 2: Profitability ratios of Apple Inc., and its competitors.

Company name	ROA	ROE	ROI	EPS
Apple lnc.	29.39	156.04	57.94	6.43
NVIDIA	55.65	92.81	70.71	11.93
Microsoft	19.33	38.4	28.2	11.06

Data source: Yahoo Finance.

In terms of profitability, Apple, NVIDIA and Microsoft all showed impressive results in Table 2. The return on total assets (ROA), return on equity (ROE), return on investment (ROI) and earnings per share of these companies all reflect their excellent performance in financial management and operational efficiency.

First of all, Apple's ROA is as high as 29.39%, and its ROE is as high as 156.04%. These numbers underscore not only Apple's remarkable ability to generate returns on assets and equity, but also its financial soundness and operational efficiency. In addition, Apple's return on investment of 57.94% and EPS of 6.43 are further evidence that it provides strong returns for investors. Behind these results, Apple's premium pricing strategy, strong brand loyalty and global market presence have combined to enable the company to maintain high profit margins and thus achieve great financial success.

Nvidia also did well in terms of profitability metrics, with an ROA of 55.65%, an ROE of 92.81%, and an ROI of up to 70.71%. The numbers demonstrate NVIDIA's operational and financial acumen on full display. Moreover, NVIDIA's EPS came in at 11.93, which not only proves its profitability, but also shows that it's a powerful attraction for equity investors looking for big growth and returns. The key to NVIDIA's ability to stand out in the highly competitive and capital-intensive technology space is its efficient utilization of assets and investments. Especially when it comes to research and development, NVIDIA's focus on areas like deep learning, autonomous vehicles, and more has paved the way for breakthrough products and services that have driven consistent growth in its financial results.

Microsoft is no less impressive when it comes to profitability, with an ROA of 19.33%, ROE of 38.4%, and ROI of 28.2%. These figures show that Microsoft has a strong financial base and effective resource utilization ability. Moreover, Microsoft's EPS came in at 11.06, illustrating its ability to maintain profitable operations and deliver reliable returns to shareholders. Microsoft has been able to consistently generate revenue across market cycles and industries largely because of its diversified

DOI: 10.54254/2754-1169/116/20242490

business model, which includes software, hardware and cloud services. At the same time, Microsoft's successful transition to cloud computing and subscription-based services has become one of its important revenue sources, further driving the solid growth of its financial results.

Overall, Apple, NVIDIA, and Microsoft have been able to achieve such excellent results in terms of profitability because of their unique strategic planning and operational execution. These companies not only possess superior financial management capabilities, but also achieve sustained growth with high margins by continuously innovating and expanding their business areas. For investors, these companies undoubtedly have high investment value and attractiveness. Of course, it can explore the profitability of these companies and the reasons behind them in further depth.

For Apple, another important factor in its high profitability is its strong brand influence and high-end market positioning worldwide. Apple's product line covers mobile phones, computers, tablets, headphones and other fields. Each product pays attention to design and user experience, which has won wide recognition and love from consumers. This brand loyalty and market position gives Apple a greater say in pricing, resulting in high-margin growth.

As a company focused on graphics processing units (GPUs) and artificial intelligence technologies, NVIDIA's high profitability is behind its continuous investment in technological innovation and keen insight into market demand. With the rapid development of artificial intelligence and deep learning technologies, NVIDIA's products are widely used in cloud computing, autonomous driving, gaming and other fields. This diversified application scenario has led to continued growth in demand for NVIDIA's products, which has driven its profitability.

As a company with rich product lines and technology reserves, Microsoft's profitability growth benefits from its constantly innovative business model and strategic layout. Microsoft has not only maintained its leading position in the traditional software sector, but also diversified its business and achieved profit growth through its layout in cloud computing, Internet of Things, artificial intelligence and other areas. Its Azure cloud service platform, in particular, has become one of the world's leading cloud service providers, generating lucrative profits for Microsoft.

In addition to the above factors, the high profitability of these companies is also due to their superior management teams, efficient operating models, and strict cost control. These companies have invested a lot of resources in personnel recruitment, training, and motivation to build an efficient and professional team. At the same time, they have also achieved cost control and efficiency improvement by optimizing production processes, reducing procurement costs and improving product quality.

In conclusion, the reason why Apple, NVIDIA and Microsoft can achieve such excellent results in terms of profitability is not only because of their excellent brand power, technological strength and innovation ability, but also because of their efficient management teams, operating models and cost control ability. Together, these factors form a solid foundation for the profitability of these companies and also provide investors with a reliable guarantee of returns.

3. Valuation

3.1. Forecast

Apple's financial performance has exhibited some volatility and fluctuations in recent years. In the first quarter of fiscal 2023, Apple reported a revenue of $117.15 billion, representing a year-over-year decline of 5.5%. This quarter was regarded as one of Apple's weakest performances in the past four years. Moving into the second quarter, Apple recorded a revenue of $94.8 billion, down 3% compared to the previous year. Although iPhone revenue experienced a modest increase of 2% year over year, overall services revenue fell slightly below expectations. In the third quarter, Apple generated a revenue of $81.8 billion, marking a 1% decrease from the corresponding period last year. These quarterly results signify four consecutive quarters with declining revenues for Apple – its

DOI: 10.54254/2754-1169/116/20242490

longest such streak in 22 years. As for the fourth quarter, Apple reported net income ranging between $22.9 billion and $23 billion on a revenue of $89.5 billion – reflecting an approximate decline of 1% to 4% compared to the previous year but still showing an impressive growth rate of about 11%.

For the entire fiscal year, Apple faced certain challenges in terms of its overall performance in fiscal 2023. Moreover, Apple's services revenue has the potential to sustain growth in the upcoming years and is projected to reach an estimated $100 billion by fiscal 2025, reflecting an increase from $85 billion in fiscal 2023.

Apple has faced some challenges in its financial performance in recent years, particularly with revenue falling for several quarters. However, the company partially offset those declines with higher net income, and growth in the services business offers hope for future revenue growth.

The performance of Apple's services business in fiscal 2023 was remarkable, recording significant growth compared to the previous year. In the fourth quarter of fiscal 2023, revenue from Apple's services segment reached $22.3 billion, up 16.3% year over year, a record growth rate. Not only did that beat Wall Street's estimates for services revenue, it actually beat it by nearly $1 billion. And services already account for nearly 25% of total revenue, making it the second-largest business after iPhone sales.

Apple's services revenue rose 14% to $78.1 billion in fiscal 2023 compared with fiscal 2022. That suggests an acceleration in the pace and magnitude of growth in Apple's services business from fiscal 2022 to fiscal 2023. While Apple's overall revenue and net income grew in fiscal 2023, the growth in services stood out, showing its importance and growth potential in Apple's overall business mix.

Apple Inc. has adopted a series of innovative marketing strategies, such as "hunger marketing" [3]. Apple Inc. 's business model innovation is one of the key factors for its success, including the innovation of customer value proposition, profit model, key resources and key processes [4].

In Apple's marketing strategy, the specific implementation and effect evaluation of "hunger marketing" can be analyzed from multiple dimensions. First of all, the core of "hunger marketing" is to influence the terminal price by adjusting the quantity at both ends of supply and demand, so as to achieve the purpose of high profit by selling at a high price [5]. This strategy is not simply to control the supply of products, but more reflected in the control of new product information, creating a sense of mystery, and mobilizing consumers' desire to buy [6].

Specific to the implementation of Apple, it can be summarized from the following aspects.

Control of product release cycle: Apple maintains brand heat and market attention by releasing new products regularly, such as iPhone and iPad. Every new product release will arouse great interest of consumers, resulting in the situation of short supply in the initial stage of new product launch [7].

Limited sale: Although Apple does not deliberately control the output of products to create the illusion that the market is in short supply, it increases the scarcity of products through limited sale, thus improving the value perception of products [8].

Information confidentiality system: Apple Inc. will strictly control the disclosure of information before the release of new products. This strict information confidentiality system creates a sense of mystery for iPhone and further stimulates consumers' purchase desire [9].

Apple's success can be attributed to its deep understanding of consumer needs, application of disruptive innovations, innovative marketing strategies, and unique business model [10]. However, in the face of fierce market competition, changing economic environment, potential legal risks and continuous pressure of technological innovation, Apple Company needs to constantly adjust and optimize its business strategy and operation model to maintain its leading position in the global technology industry. At the same time, Apple also needs to pay attention to the competition situation in emerging markets and timely adjust its market strategy to cope with the challenges from different competitors.

DOI: 10.54254/2754-1169/116/20242490

3.2. Risks

U.S. Department of Justice and Multi-State Antitrust lawsuit against Apple: In March 2024, the U.S. Department of Justice, together with attorneys general from 15 states and the District of Columbia, filed a lawsuit against Apple, alleging violations of Section 2 of the Sherman Antitrust Act, primarily related to monopolistic market issues. The lawsuit could force Apple to change its policies, business strategies, products and applications, and may even require it to divest some of its assets. If the lawsuit is successful, Apple could face fines and other penalties that could have a significant impact on its business model and global standing, especially as its closed ecosystem could be forced to adjust. In addition, the lawsuit aims to break the monopoly created by the iPhone and give an advantage to smaller Internet companies, potentially restoring competition to the market.

EU antitrust penalty against Apple: In February 2024, it was announced that Apple would receive a fine worth 500 million euros for antitrust conduct in the field of music subscription services. The penalty, which could be announced as soon as early next month, shows the EU's concern about the tech giants' antitrust practices under the Digital Markets Act.

4. Conclusion

Apple's brand value has been widely recognized around the world and has been the world's most valuable brand for many times, which indicates that Apple has significant advantages in brand building and market value management. Apple's financial health and profitability have always been highly valued by the market. Despite external challenges such as the epidemic, Apple's stock still shows a strong growth trend and high profitability. In addition, Apple's inventory turnover and ROE are in a leading position in the industry. Apple's continuous technological innovation is one of the key factors in its success. From the iMac to the iPod to the iPhone, Apple continues to come up with market-leading products. This pursuit of innovation not only enhances Apple's core competitiveness, but also provides investors with a stable return on investment. Given Apple's continued strength in technological innovation, brand building, and market capitalization management, Apple remains a worthy investment for investors looking for long-term, stable growth. However, investors should also pay close attention to Apple's financial reports and market dynamics in order to timely adjust their investment strategies.

To sum up, Apple, with its strong brand value, innovation ability and good financial performance, provides investors with a relatively sound investment choice. However, investors should also pay attention to the volatility of the market and potential risks, and adopt reasonable investment strategies to achieve the preservation and appreciation of assets. When assessing Apple's market risk and investment strategy, investors should consider the company's financial metrics, market performance, product innovation capabilities, and the impact of the external economic and political environment. At the same time, it is also necessary to pay attention to potential conflicts of interest between management and shareholders, and consider how to manage the risks of these conflicts through means such as debt.

References

[1] *Wu, S. (2016). Analysis of Apple's marketing mode from the perspective of Economics [J]. Mall Modernization, 829(22), 42-43.*

[2] *Li, G. (2023). Analysis of Apples marketing strategies in China. Advances in Economics, Management and Political Sciences, 8(1), 121–125.*

[3] *Sheng-Bing, T., & Chen, D. (2016). "Hunger Marketing" Strategy and its Application Research—Based on Apple Products. DEStech Transactions on Economics, Business and Management, icem.*

[4] *Zhang, D., Chen, X., Huang, C. (2014). iPhone and Xiaomi: Different hunger marketing. Enterprise Management, 393(05), 44-47.*

DOI: 10.54254/2754-1169/116/20242490

[5] *Lu, J. (2019). Is "Apple" really just a mobile phone? -- Analysis of the operation logic and psychological mechanism of "hunger marketing" strategy. Shanghai Commerce, 488(10), 23-24.*
[6] *Li, M., and Sun, Y. (2023). An Overall Analyses of Apple Company. BCP Business & Management.*
[7] *Yin, R. (2023). Research on Financial Position of Apple. Advances in Economics, Management and Political Sciences.*
[8] *He, Y., Wang, Y. et al. (2022). Analysis of the Financial Potential of Apple, Xiaomi, and Nokia: Recommendations for Potential Investors. BCP Business & Management.*
[9] *Bai, M. (2022). Macro Analysis on Apple Stock In order to determine investment value of Apple. SHS Web of Conferences.*
[10] *Chen, B., Lu, W. et al. (2021). The Valuation and Analysis of Apple Inc., BCP Business & Management.*

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Financial Performance Analysis of Apple and Microsoft: A Comparative Study (2014–2023)

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Abstract:

In this report, we will compare two well-known companies, Apple and Microsoft, with the goal of interpreting and analyzing their performance from 2014 to 2023 by using different ratios like dynamic ratios, liquidity ratios, profitability ratios and cash flow ratios. Moreover, the use of common size analysis, horizontal and panel analysis to calculate and have a full insight and a vision of the financial positions and performance of Apple's and Microsoft companies and give some recommendation for both companies.

Keywords: Apple, Microsoft, financial ratios, performance analysis, common size analysis.

Introduction:

Two of the most significant businesses in the technology sector are Apple Inc. and Microsoft Corporation, both of which have a strong record of accomplishment of invention and market dominance.

Founded in 1975 by Bill Gates and Paul Allen, Microsoft Corporation is a multinational technological giant with its headquarters located in Redmond, Washington. Internet Explorer, the Microsoft Office suite, and the Windows operating system are just a few of the well-known software products produced by Microsoft. Microsoft produces hardware, such as Xbox gaming consoles and Surface tablets, in addition to software. It also offers a variety of services, such as enterprise services, cloud computing solutions through Microsoft Azure, and artificial intelligence (About - Microsoft, n.d.).

Microsoft focuses on cloud services, productivity apps, and personal computers while providing a broad range of goods for both business and consumer use. Business has continuously changed, including cutting-edge innovations like quantum computing, machine learning, and artificial intelligence. Microsoft has kept its position of power in the tech industry by calculated acquisitions and a dedication to innovation (Britannica Money, 2024). Additionally, Microsoft has implemented programs to increase digital inclusiveness and lower carbon emissions as part of its commitment to sustainability and corporate social responsibility. The business has won various awards, including top spots in lists of employers with a positive reputation and worldwide brands. Microsoft was able to maintain rapid growth and substantial income generation as of 2021 because of its wide range of product and service offerings (Microsoft 2021 Annual Report, n.d.). Using ratio analysis, this research will look at Microsoft's financial statements from 2014 to 2023 to pinpoint important performance areas and provide a more comprehensive picture of the company's financial situation.

The headquarters of Apple Inc. are in Cupertino, California. Steve Jobs, Steve Wozniak, and Ronald Wayne formed the company in 1976. The iPhone, iPad, Mac laptops, Apple Watch, and Apple TV are just a few of the cutting-edge hardware devices that have made Apple famous. In addition, the firm provides a range of software services, such as iCloud, Apple Music, iTunes Store, and the iOS and macOS operating systems (Apple Inc., n.d.).

Apple has established a reputation for creating products that are both aesthetically beautiful and easy to use, and that smoothly interact with its network of services. With developments in fields like augmented reality, artificial intelligence, and health technology, the corporation is pushing the limits of technology. Apple's leadership in the IT industry has been solidified by its dedication to innovation and quality (Isaacson, 2011). The business also places a strong emphasis on sustainability, supporting the usage of renewable energy sources and lowering its carbon footprint through various programs. Apple's environmental initiatives and corporate social responsibility have garnered significant recognition. Strong sales of Apple's goods and services in 2021 contributed to the company's significant revenue growth (Apple Annual Report 2021, n.d.). Ratio analysis will be used in this report's study of Apple's financial statements from 2014 to 2023 to highlight important performance indicators and offer financial status updates.

This paper attempts to give a thorough picture of the financial performance of these two major technological businesses by combining the analysis of Apple and Microsoft. We will provide investors and stakeholders with insights by identifying key areas for improvement through in-depth financial statement research.

Literature review:

In this paper we are attempting to conduct a thorough financial analysis on both Microsoft and Apple, hence comparing the two companies based on their financial importance. Before commencing the process of financial statement and ratio analysis, we looked into the literature surrounding the purpose and benefits of financial statement analysis as well as scholars and researchers who previously analyzed each of the two companies.

According to Daryanto, Dewanti, & Farras (2020) in the world of enterprise, financial success matters greatly given that a company's finances set the standard for its ability to operate over the long term. The financial statements that are routinely provided each year can be used to evaluate the performance of the organization. Financial data derived from the company's current financial statements is typically used as the basis for measuring a company's performance. One possible method is to use financial ratio analysis. Considering a firm will receive a breakdown of its excellent and negative financial conditions at the time of analysis, financial ratio analysis plays a

significant role in the operation of the business. Financial ratio analysis also proves crucial in order for outside parties to understand the financial progress of a company. Shareholders can determine whether or not to continue investing their capital in the company based on its financial growth. (Daryanto, Dewanti, & Farras, 2020)

One of the most prominent studies done on the financial health of Apple was the study conducted by Lu (2023) from the University of Birmingham, U.K. In which Lu conducted common size and ratio analysis on Apple for the past years. At the end of the study the researcher concluded that Apple Inc. is proficient at using a variety of tactics to support operations. Nonetheless Financial ratios still have a lot of room for improvement, though. More technological advancements and innovative marketing techniques are required to boost sales revenue and increase profitability. Additionally, prudent debt management and a decrease in inventory stock contribute to increased liquidity. When evaluating financial performance, efficiency and solvency are two crucial factors in addition to profitability and liquidity. Apple Inc is one of the high-tech corporations, and there is no doubting that cutting-edge technology will have a significant impact on our future. (Lu,2023)

Moving on, a study done by Zhang (2024) examines the impact of Microsoft's financial strategy's implementation using its financial data and statistics. Furthermore, Microsoft’s liquidity, profitability and solvency were analyzed by ratio analysis. Overall, Microsoft’s research and development (R&D) investment is robust, and it possesses the capacity to strategically arrange information to present a great return to investors. Moreover, the strong financial performance and an effective strategy of Microsoft point to a future with diversified development being strongly driven. In order to improve its potential for growth, Microsoft should continue to expand its research and development resources and give investors' dividend income more consideration. This has enabled them to enhance their financial plan even further. Still, there are certain gaps in the comparison of the financial capacity of the same business that will hopefully be filled in the future. (Zhang, 2024)

Data and Methodology:

This report presents a comprehensive financial analysis of Apple and Microsoft, two leading global technology companies. In addition to evaluating their financial performance, the study offers details on their cash flow, profitability, liquidity, and debt management. The information used in this analysis was taken from annual reports. Access was granted to financial reports for the years 2014–2023, which included the cash flow statement, income statement, and balance sheet. This analysis provides useful insights into Apple and Microsoft's financial health and aids in evaluating their capacity to turn a profit, manage debt, and sustain long-term operations by looking at important financial ratios.

Methodology

To conduct a thorough financial analysis of Apple and Microsoft, the following financial statement items were extracted and analyzed:

Balance Sheet: A balance sheet displays the assets, liabilities, and equity of a corporation, giving a quick overview of its financial situation. The following essential items must be extracted: current liabilities, total assets, payables, long-term debt, total liabilities, total equity, and current assets (such as cash, receivables, and inventory).

Income Statement: The revenue, costs, and profitability of every business are disclosed in the income statement. Sales, cost of goods sold, depreciation expense, net income, interest, tax, and EBIT (profits before interest and taxes) are among the data that have been retrieved. These numbers enable a thorough examination of the revenue generating, cost control, and overall profitability of Apple and Microsoft.

Cash Flow Statement: Each company's cash inflows and outflows from financing, investing, and operating operations are shown in the cash flow statement. The operating cash flow, which shows the cash created or utilized in their daily activities, is of special significance. This number aids in evaluating Apple and Microsoft's capacity to turn a profit from their main lines of business.

Based on the gathered financial data, several financial ratios will be used in order to analyze the performance across various dimensions of the two big IT companies:

1. ***Static Ratios:*** These ratios evaluate the liquidity and short-term debt-fulfillment capacity of Apple and Microsoft. The quick ratio (current assets minus inventories divided by current liabilities), cash ratio (cash divided by current liabilities), and current ratio (current assets divided by current liabilities) are among the important ratios that are calculated.
2. ***Dynamic Ratios:*** These ratios shed light on the working capital management, efficiency, and operating cycles of Apple and Microsoft. Ratios from pertinent financial statement components were used to calculate inventory, receivable, payable, operating, cash conversion, and net trade cycle ratios.
3. ***Profitability Ratios:*** These ratios assess the profitability of Apple and Microsoft's business activities. Return on investment (EBIT divided by total assets), operational return on investment (operating income divided by total assets), operating income to total assets, operating income to total equity, and operating income to sales are among the calculated ratios. The other ratios are profiting margin (net income divided by sales) and return on equity (net income divided by total equity).
4. ***Cash Flow Ratios:*** These ratios assess Apple and Microsoft's cash flow generation and its relationship to sales and total assets. Ratios calculated include operating cash flow to total assets (operating cash flow divided by total assets) and operating cash flow to sales (operating cash flow divided by sales).
5. ***Debt Ratios:*** These ratios assess the financial leverage and debt management of Apple and Microsoft. The following ratios are calculated: debt ratio (total debt divided by total assets), debt to equity ratio (total debt divided by total equity), cash coverage (EBIT plus depreciation divided by interest), times interest earned ratio (EBIT divided by interest), and long-term debt to total assets and long-term debt to total equity.
6. ***Common Year Calculation:*** By designating one year as the basis year and representing subsequent years as a percentage of the base year, the common year concept enables insightful comparisons. For instance, 2012 was selected as the common year in Apple and Microsoft's financial analysis. The financial data for each year after 2012 is divided by the corresponding value from the base year and multiplied by 100 to arrive at common-year figures.

7. ***Common Base Year Calculation:*** In order to calculate the common base year, one year is chosen to be the base year, and the numbers from subsequent years are expressed as a percentage change from the base year. 2022 was selected as the common base year in this research. The financial data for each year is divided by the appropriate amount from the base year (2022), deducted by 1, and then multiplied by 100 to determine the common base year.

Below is the financial data extracted from the annual reports of Apple from 2014-2023:

Analysis for Apple.xlsx

Table 1a: Financial Data (Apple)

Item/Year	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Current Assets	143,566	135,405	134,836	143,713	162,819	131,339	128,645	106,869	89,378	68,531
Current Liabilities	145,308	153,982	125,481	105,392	105,718	115,929	100,814	79,006	80,610	63,448
Inventories	6,331	4,946	6,580	4,061	4,106	3,956	4,855	2,132	2,349	2,111
Cash	29,965	23,646	34,940	38,016	48,844	25,913	20,289	20,484	21,120	13,844

Receivables	29,508	28,184	26,278	16,120	22,926	23,186	17,874	15,754	16,849	17,460
Total Assets	352,583	352,755	351,002	323,888	338,516	365,725	375,319	321,686	290,345	231,839
Payables	62,611	64,115	54,763	42,296	46,236	55,888	44,242	37,294	35,490	30,196
Long Term Debt ***(Term debt)***	95,281	98,959	109,106	98,667	91,807	93,735	97,207	75,427	53,329	28,987
Total Liabilities	290,437	302,083	287,912	258,549	248,028	258,578	241,272	193,437	170,990	120,292
Total Equity ***(Total shareholders' equity)***	62,146	50,672	63,090	65,339	90,488	107,147	134,047	128,249	119,355	111,547
Sales ***(Net sales)***	383,285	394,328	365,817	274,515	260,174	265,595	229,234	215,639	233,715	182,795
Cost of Goods Sold ***(total cost of sales)***	214,137	223,546	212,981	169,559	161,782	163,756	141,048	131,376	140,089	112,258
EBIT ***(Operating income)***	114,301	119,437	108,949	66,288	63,930	70,898	61,344	60,024	71,230	52,503
Interest	3,933	2,931	2,645	2,873	3,576	3,240	2,323	1,456	733	384
Net Income	96,995	99,803	94,680	57,411	55,256	59,531	48,351	45,687	53,394	39,510
Operating Cash Flow ***(operating activities)***	110,543	122,151	104,038	80,674	69,391	77,434	64,225	66,231	81,266	59,713

All numbers in thousands, Source: Annual Reports (Apple)

Apple Common size analysis (vertical):

The common size for Apple company was made from 2014 to 2023 and conducted on the balance sheet and income statement. Furthermore, the base for the balance sheet was total assets, so all the items from current assets to total assets were divided by total assets, and for the income statement, its base item was Sale/Net sales. Also, all items from Account payables to Net income were divided by Sale/Net sales.

Apple vertical analysis:

Vertical analysis doc.xlsx

Apple Vertical analysis interpretation 2014 – 2023:

Firstly, this vertical analysis table shows apple company's financial data from the year 2014 to 2023, which shows an important financial statement item, and each single item is identified as a percentage, showing a clear view and interpretation of Apple's company's structure and presentation in the last past 10 years. To start with, in the current asset it shows a significant increase from 29.56% 2014 to 48.10% in 2019 which indicates that the company is growing and has strong liquidity. For the current liability, in each single year it differs it, and when it becomes higher it indicates a possible liquidity problem and when it declines, it means that they have more controllable short-term responsibilities/obligation. For the inventory we can see that for the last 10 years, it increased from 0.91% in 2014 to 1.80% in 2023 which is a slight increase but that means

Item/Year	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Current Assets	29.56%	30.78%	33.22%	34.28%	35.91%	48.10%	44.37%	38.41%	38.38%	40.72%
Current Liabilities	27.37%	27.76%	24.56%	26.86%	31.70%	31.23%	32.54%	35.75%	43.65%	41.21%
Inventories	0.91%	0.81%	0.66%	1.29%	1.08%	1.21%	1.25%	1.87%	1.40%	1.80%
Cash	5.97%	7.27%	6.37%	5.41%	7.09%	14.43%	11.74%	9.95%	6.70%	8.50%
Receivables	7.53%	5.80%	4.90%	4.76%	6.34%	6.77%	4.98%	7.49%	7.99%	8.37%
Total Assets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Payables	13.02%	12.22%	11.59%	11.79%	15.28%	17.77%	15.41%	14.97%	16.26%	16.34%
Long Term Debt (Term debt)	12.50%	18.37%	23.45%	25.90%	25.63%	35.29%	35.94%	29.83%	25.10%	24.86%
Total Liabilities	51.89%	58.89%	60.13%	64.28%	70.70%	95.33%	94.18%	78.70%	76.61%	75.78%
Total Equity (Total shareholders' equity)	48.11%	41.11%	39.87%	35.72%	29.30%	34.78%	23.80%	17.25%	12.85%	16.21%
Sales (Net sales)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of Goods Sold (total cost of sales)	61.41%	59.94%	60.92%	61.53%	61.66%	62.18%	61.77%	58.22%	56.69%	55.87%
EBIT (Operating income)	28.72%	30.48%	27.84%	26.76%	26.69%	24.57%	24.15%	29.78%	30.29%	29.82%
Interest	0.21%	0.31%	0.68%	1.01%	1.22%	1.37%	1.05%	0.72%	0.74%	1.03%
Net Income	21.61%	22.85%	21.19%	21.09%	22.56%	21.24%	20.91%	25.88%	25.31%	25.31%
Operating Cash Flow *(operating activities)*										

a growth in the stock level in apple companies. Furthermore, for the cash in 2018 it was 14.43% and it was the highest and it means that company at that time had a strong liquidity, and the company is healthy and ready for any uncertainty but on the hand, in 2017 it was at its lowest 5.41% and this shows that there are liquidity risks. And for the receivables, in 2023 it was 8.37% and the highest which indicates growth revenue. Moreover, payables in 2019 were 17.77% and it indicates that the company is mostly reliant on dealer credit, which assists to protect cash but also could have liquidity problem. For the long-term debt in general, in 2020 it was 35.94% and was the highest in all of the 10 years that shows an important dependance on borrowing but also there could be a high financial risk and in 2023 it was reduced to 24.86% which means that apple's company is willing to be more financially stable and also better cash flow management which will attracts more investors to the company. For the total liability from 2014 till 2019 it was increasing and in 2019 it was the highest and was 95.33% and this indicates that the company was relying the most on debt financing and could lead to higher financial risk but from 2020 it started to decrease and in 2023 it was 75.78% which is a good sign and reduced the reliance on debt financing and enhanced financial stability.

Besides, there is a noticeable decrease in the total equity from 48.11% in 2014 to 16.21% in 2023 that indicates a failure in apple's ownership stake. And for the cost of goods sold its stable and it is all ranging between 55% to 62% and the highest of all of them was 61.77% in 2020 and this indicates a high production cost compared to the sales and it is mostly and negative sign and comparing it to 2023 it declines which a good sign. Furthermore, EBIT or what is called as Operating income in 2015 it was the 30.48% and it is the highest but mostly in all of the 10 years it has the same range, and it didn't increase or decrease a lot, which shows that the company is profitable and most of it sales is converted into operating income. For the interest rate, in all of the years its ranging between 0.2% to 1.4% and when it below one it shows low debt level which is a positive sign and maintains more earning and when its above 1% it could be a concern as it shows a higher debt level which can lead to a reduction in profitability and higher financial risk. Lastly, the net income in 2014 was 21.61% and it increased to 25.31% in 2023 which indicates that the apple company is growing and is generating revenue. It could be due to improved efficiency and good cost management.

Apple common base year analysis (horizontal):

With the base year of 2014, all items from different years were divided by the base year for each row, respectively.

Apple Horizantal Analysis.xlsx

Apple horizontal analysis

Item/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current Assets	100.00%	130.42%	155.94%	187.72%	191.65%	237.58%	209.71%	196.75%	197.58%	209.49%
Current Liabilities	100.00%	127.05%	124.52%	158.89%	182.71%	166.62%	166.11%	197.77%	242.69%	229.02%
Inventories	100.00%	111.27%	100.99%	229.99%	187.40%	194.50%	192.37%	311.70%	234.30%	299.91%
Cash	100.00%	152.56%	147.96%	146.55%	187.18%	352.82%	274.60%	252.38%	170.80%	216.45%
Receivables	100.00%	96.50%	90.23%	102.37%	132.79%	131.31%	92.33%	150.50%	161.42%	169.00%
Total Assets	100.00%	125.24%	138.75%	161.89%	157.75%	146.01%	139.70%	151.40%	152.16%	152.08%
Payables	100.00%	117.53%	123.51%	146.52%	185.08%	153.12%	140.07%	181.36%	212.33%	207.35%
Long Term Debt (Term debt)	100.00%	183.98%	260.21%	335.35%	323.37%	316.72%	340.38%	376.40%	341.39%	328.70%
Total Liabilities	100.00%	142.15%	160.81%	200.57%	214.96%	206.19%	214.93%	239.34%	251.12%	241.44%
Total Equity (Total shareholders' equity)	100.00%	107.00%	114.97%	120.17%	96.06%	81.12%	58.58%	56.56%	45.43%	55.71%
Sales (Net sales)	100.00%	127.86%	117.97%	125.40%	145.30%	142.33%	150.18%	200.12%	215.72%	209.68%
Cost of Goods Sold (total cost of sales)	100.00%	124.79%	117.03%	125.65%	145.87%	144.12%	151.04%	189.72%	199.14%	190.75%
EBIT (Operating income)	100.00%	135.67%	114.32%	116.84%	135.04%	121.76%	126.26%	207.51%	227.49%	217.70%
Interest	100.00%	190.89%	379.17%	604.95%	843.75%	931.25%	748.18%	688.80%	763.28%	1024.22%
Net Income	100.00%	135.14%	115.63%	122.38%	150.67%	139.85%	145.31%	239.64%	252.60%	245.49%
Operating Cash Flow *(operating activities)*										

Apple horizontal analysis interpretation 2014 – 2023:

The financial data of Apple from 2014 to 2023 can be analyzed horizontally to identify numerous important trends and insights. Beginning with current assets, there has been a notable rise throughout time, peaking in 2019 at 237.58% of the value from 2014. This significant increase suggests that Apple's short-term assets have strengthened, supporting the company's liquidity situation.

In a similar vein, current liabilities have grown over time as well, reaching a noteworthy peak in 2023 at 229.02% of the value in 2014. It appears that Apple has taken on more short-term debts based on the increase in current liabilities. Liquidity may be at risk, but it may also be an indication of the company's operational and strategic growth and investments.

There have been significant swings in inventories. The inventory levels peaked in 2021 at 311.7% of the 2014 value, which may have been the result of overstocking or an expectation of stronger sales during that time. The ensuing decrease in inventory levels, however, may be the result of better inventory management techniques meant to maximize stock levels.

Cash reserves have exhibited tremendous growth, especially in 2019, when they reached 352.82% of the 2014 amount. This rise in cash reserves gives Apple more operational flexibility and improves its financial stability, allowing it to invest in new ventures and more skillfully handle unforeseen costs.

With just little variations, receivables have stayed largely steady, reaching a peak of 169.00% in 2023 relative to the 2014 figure. This consistency shows that neither Apple's credit practices nor its customers' payment habits have altered significantly throughout the years.

The company's asset base has grown overall, as seen by the steady increase in total assets. Payables, on the other hand, have increased more dramatically, reaching a peak of 207.35% in 2023 as a result of increased short-term obligations to creditors and suppliers.

Particularly after 2016, long-term debt increased significantly, reaching a peak of 328.70% in 2023. This suggests that Apple has depended increasingly on long-term borrowing, possibly to fund significant purchases or important activities.

The increase in both short- and long-term obligations is reflected in the comparable upward trend seen in total liabilities. The overall equity, on the other hand, has fluctuated throughout time, reaching a peak in 2017 at 120.17% before falling, indicating shifts in retained earnings and shareholder investments.

Sales have been increasing steadily, with a significant increase in 2022 at 215.72% of 2014 value, which suggests that revenue-generating is working well. With rising sales volumes, it is also expected that the cost of goods sold (COGS) will increase. The same thing goes for interest which

has shown an increase in each year compared to 2014. The increased amounts of long-term debt taken on during the time period are consistent with this increase in interest costs.

Net income and EBIT (operating income) have both generally increased, indicating more profitability. EBIT and net income growth, however, have fluctuated. Net income peaked in 2022 at 252.60%, indicating efficient operations and good cost control.

To sum up, operating cash flow has increased significantly, particularly in the last few years, and it will reach a peak of 245.49% in 2023. Apple's excellent capacity to generate cash from its major business activities is demonstrated by this solid operating cash flow, which ensures sufficient liquidity for ongoing operations and investments.

The company is well-positioned for long-term success, according to the horizontal analysis of Apple's financial data, which also shows a robust growth trajectory, improved liquidity, and efficient financial management.

Apple Combined analysis:

The combined analysis for apple company was made from year 2014 to year 2023 and made both on the balance sheet and income statement. Furthermore, it is basically a mix of vertical analysis and horizontal analysis.

Apple Panel Analysis.xlsx

Apple panel analysis

Item/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current Assets	100.00%	104.14%	112.39%	115.96%	121.49%	162.71%	150.11%	129.96%	129.86%	137.75%
Current Liabilities	100.00%	101.45%	89.74%	98.15%	115.83%	114.11%	118.90%	130.63%	159.50%	150.59%
Inventories	100.00%	88.85%	72.79%	142.06%	118.80%	133.21%	137.70%	205.88%	153.99%	197.20%
Cash	100.00%	121.82%	106.64%	90.53%	118.66%	241.63%	196.56%	166.70%	112.26%	142.32%
Receivables	100.00%	77.06%	65.03%	63.24%	84.18%	89.93%	66.09%	99.41%	106.09%	111.13%
Total Assets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Payables	100.00%	93.85%	89.01%	90.50%	117.33%	136.44%	118.30%	114.94%	124.84%	125.42%
Long Term Debt (Term debt)	100.00%	146.90%	187.53%	207.15%	204.99%	282.22%	287.47%	238.54%	200.72%	198.82%
Total Liabilities	100.00%	113.50%	115.89%	123.90%	136.27%	183.73%	181.52%	151.69%	147.64%	146.04%
Total Equity (Total shareholders' equity)	100.00%	85.44%	82.86%	74.23%	60.89%	72.29%	49.47%	35.84%	26.71%	33.70%
Sales (Net sales)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of Goods Sold (total cost of sales)	100.00%	97.60%	99.21%	100.19%	100.40%	101.25%	100.58%	94.80%	92.31%	90.97%
EBIT (Operating income)	100.00%	106.11%	96.91%	93.17%	92.94%	85.55%	84.07%	103.69%	105.45%	103.83%
Interest	100.00%	1.09%	2.35%	3.53%	4.25%	4.79%	3.64%	2.52%	2.59%	3.57%
Net Income	100.00%	105.70%	98.02%	97.59%	104.40%	98.26%	96.76%	119.74%	117.10%	117.08%
Operating Cash Flow *(operating activities)*										

Apple combined analysis interpretation 2014 – 2023:

This combined analysis table presents apple company's financial data from 2014 to 2023, which uses the vertical analysis value and in the horizonal method. To begin, overall, the year 2014 all of the items above are 100% because it's the base year, and this table as well represents that apple company is managing their liquidity well and they financially stabilized, but except here for the interest rate from the year 2014 till the year 2023 there was a significant increase in 2015 it was 1.09% which was the lowest time and in 2019 it was 4.79% which is above 1 % and this indicates that the company borrowing cost have increased which can affect the company profitability and stability. Moreover, in the current asset for example we can notice that there an increase from 104.14% in 2015 to 162.71% 2019 which is a big increase which indicates that the company is growing, and sales is increasing and then there was a drop to 137.75% in 2023 and this indicates that apple sales could be declining and decreasing and especially in 2020 when it started decrease because of covid-19. And for the current liability we can see that its increasing and decreasing and it's not constant and when there is an increase it could be indicating that apple's company could be expanding its operations or it could be facing an increased operational charge and when it is decreasing it could be that apple started to manage their cash flow, and is willing to

be more efficient. Furthermore, the cash in 2015 was 121.82% grew a lot to 241.63% to 2019 which highlights that Apple is generating positive cash from its financing activities and this show a good business performance and then when it decreased to 142.32% in 2023 and this indicates that the company could be facing financial stress. And for the receivables it was 77.06% in 2015 and increased to 111.13% in 2023 which is indicating that they are growing but also could a risk that they will delay in collecting them. Additionally, for the payables, we can notice that there is a that it decreased in 2016 and then increased in 2017 and then is reduced in 2018 and then kept on increasing for two years and in 2020 & 2021 it decreased again during the Covid-19 period, and then it increased in 2023 to 125.42% so in all of the 10 years it wasn't really stable it kept on going up and down, and this shows that Apple's company is not really constant with the payment practices between them and the suppliers. And for the total shareholder's equity it decreased significantly from 113.50% in 2015 till 33.70% in 2023 and this means that apple might could have high dividend expenses and payments.

Apple Profitability Analysis.xlsx

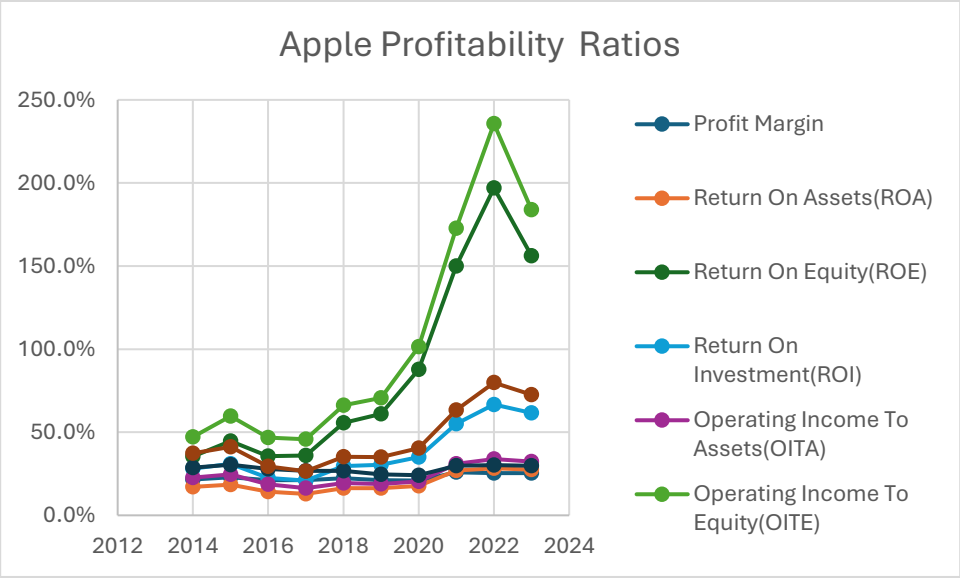
Apple profitability analysis

Ratio/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Profit Margin	21.6%	22.8%	21.2%	21.1%	22.4%	21.2%	20.9%	25.9%	25.3%	25.3%
Return On Assets (ROA)	17.0%	18.4%	14.2%	12.9%	16.3%	16.3%	17.7%	27.0%	28.3%	27.5%
Return On Equity (ROE)	35.4%	44.7%	35.6%	36.1%	55.6%	61.1%	87.9%	150.1%	197.0%	156.1%
Return On Investment (ROI)	28.1%	30.9%	22.4%	20.9%	29.6%	30.3%	35.0%	55.0%	66.7%	61.6%

Operating Income To Assets (OITA)	22.6%	24.5%	18.7%	16.3%	19.4%	18.9%	20.5%	31.0%	33.9%	32.4%
Operating Income To Equity (OITE)	47.1%	59.7%	46.8%	45.8%	66.2%	70.7%	101.5%	172.7%	235.7%	183.9%
Operating Income To Sales (OITS)	28.7%	30.5%	27.8%	26.8%	26.7%	24.6%	24.1%	29.8%	30.3%	29.8%
Operating Return On investments (OROI)	37.4%	41.2%	29.5%	26.5%	35.3%	35.1%	40.4%	63.3%	79.8%	72.6%

Companies assess their ability to generate profit in relation to its revenue, assets equity, and investments using key financial metrics known as profitability ratios, which give an indication of the company's financial performance, which include profit margins, asset efficiency, equity returns, and overall investment effectiveness. The profitability ratios that businesses typically analyze include the Profit Margin, which shows the percentage of revenue that remains as profit after expenses, Return on Assets (ROA), which measures how well a business uses its assets to turn into a profit, Return on Equity (ROE), which shows the return on shareholders' equity, and Return on Investment (ROI), which assesses the gain or loss on investments in relation to the amount invested.

Other indicators of a company's operational effectiveness and financial health include Operating Income to Sales (OITS), Operating Income to Equity (OITE), Operating Income to Assets (OITA), and Operating Return on Investments (OROI). In general, the ratios provide information to stakeholders about the profitability, operational effectiveness, and capacity of the business to produce equity and return on investment.



From 2014 to 2023, Apple Inc.'s profitability ratios exhibit a consistent rise in financial performance. To start with, from 2014 to 2016, Apple Inc.'s gross margin was between 21% and 23%. The position of its profit margin reversed in 2018, rising to 22.4% after dropping somewhat to as low as 21.1% in 2017. It has since remained in the range of 20.9–25.3% in 2023.

Apple's profit margin has been stable from 2014 to 2016, in the range of 21% to 23%. In 2017, it declined slightly to 21.1%, again increased to 22.4% in 2018, and then fell to 20.9% in 2019, after which it remains in the range of 20.9% to 25.3% until 2023. As such, this means that Apple has successfully controlled its expenses about the revenues, whereby most of the sales result in profit.

Return on Assets (ROA), which measures how efficiently a company uses its assets to generate profit, shows a noteworthy trend. ROA, which peaked at 17.0% in 2014, dropped to 12.9% in 2017, indicating a temporary decline in asset efficiency. From 2018, ROA increased significantly, peaking at 28.3% in 2022 then slightly decreased in 2023 to 27.5%. This trend shows that in recent years, Apple has been more effective in using its assets to generate profit.

The Return on Equity (ROE) has also been elevated substantially. From 35.4% in 2014, ROE significantly grew to 61.1% by 2019, showing improved returns on shareholders' equity. From 2020 to 2023, the company had its ROE rise to a record 197.0% in 2022, after which it dropped to a still high 156.1% in 2023. The same indicates the company's ability to provide substantial returns to the entities holding its equity investments, as well as excellent financial performance and profitability.

The Return on Investment (ROI) decreased from 28.1% in 2014 to 20.9% in 2017, indicative of a lower return on investments made for this period. However, from the year 2018, ROI improved significantly and then reached its peak of 66.7% in the year 2022 and slightly decreased to 61.6% in 2023. It only means that the investment strategies by Apple have been very effective for the last few years as they return great value of returns.

The Operating Income to Total Assets (OITA), which measures operating income relative to total assets, dropped from 22.6% in 2014 to 16.3% in 2017. It has been on an improving trend reaching 33.9% in 2022, indicating that Apple has become more efficient using its assets to generate operating income. Similarly, the Operating Income to Equity ratio (OITE) increased from 47.1%

in 2014 to 70.7% in 2019, then saw a remarkable rise to 235.7% in 2022 slightly decreasing to 183.9% in 2023. This ratio highlights Apple's ability to generate substantial operating income relative to shareholders' equity, particularly in recent years. The higher the values the better and all these values are remarkably high even in the least effective years. Indicating a high income generated from operations in relation to the use of assets and equity funds.

Operating Income to Sales (OITS) remained relatively stable, fluctuating between 24.1% and 30.5% over the period. This suggests that Apple has consistently generated sales through its operational efficiency. Finally, the operating income to investment ratio, or Operating Return on Investments (OROI) ratio, decreased from 37.4% in 2014 to 26.5% in 2017. Nevertheless, it showed strong returns on investments in the recent years, improving significantly to 79.8% in 2022 and slightly declining to 72.6% in 2023.

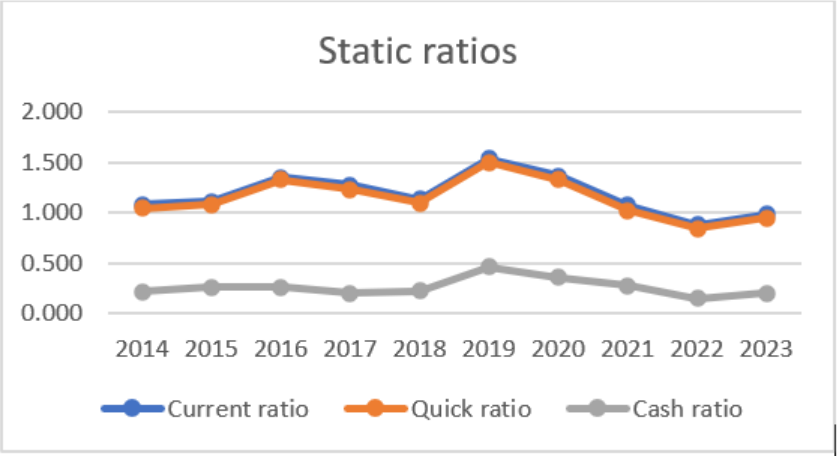
Generally, the profitability ratios show Apple Inc. to be a profitable and well-managed company. But consistent high-profit margins, along with significant improvement in ROA and ROE, and consequently strong returns on overall investments, build up from this fact the solid financial health and operational efficiency of Apple. Taken collectively, these ratios are said to be indicative of the massive propensity of Apple Inc. to manage the resources at its disposal effectively, yielding huge profits and delivering high returns for investors, hence the financial performance over these years.

Apple Static ratios.xlsx

Apple static ratios

Ratio/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Current ratio	1.080113	1.108771	1.352669	1.276063	1.132926	1.540126	1.363604	1.074553	0.879356	0.988012
Quick ratio	1.046842	1.07963	1.325684	1.227905	1.098802	1.501286	1.325072	1.022115	0.847235	0.944442
Cash ratio	0.218194	0.262002	0.259271	0.201252	0.223525	0.462022	0.36071	0.278449	0.153563	0.206217

Generally, when assessing a company's capacity to settle its short-term debt, a specific type of financial ratio called liquidity ratio is used; furthermore, a firm's ability to utilize its liquid, or current, assets for settling its current liabilities can be ascertained using this measure (CFI, n.d.). There are two types of liquidity ratio, Static and Dynamic. Static liquidity ratios are made up of three primary ratios which are Current ratio, quick ratio, and cash ratio. On the other hand, dynamic liquidity ratios are primarily made up of these six measures or ratios: Receivable Cycle (DSR), Inventory Cycle (ICP), Payable Cycle (PDP), Operating Cycle (OC), Cash conversion Cycle (CCC), Net Trade Cycle (NTC). The main difference between the Static and Dynamic is the time aspect. Static liquidity ratios look more into the present capability of the company to meet its short term debts with its current assets; on the contrary the dynamic liquidity ratios focus on the future and look into the ratio of incoming and outgoing cashflows which thus determine whether the firm will be able to settle its future short term obligations (factris, 2023).



Current ratio: As previously mentioned the current ratio is one of the tools used to measure a firm's ability to settle its short-term debt obligations utilizing its current assets. It achieves this by comparing the current assets against the current liabilities of the company. Whenever the ratio falls below than 1.00, the company's assets, consisting of cash along with other short-term assets that are anticipated to be transformed to cash within no more than twelve months, are less than its debts that are due in that period of time. Additionally, the higher the current ratio the more competent the firm is in paying its debts as it has a greater short-term asset value compared to its short-term debt value. (Fernando, 2024)

As we can see, the graph above summarizes Apple's Static liquidity ratios from 2014 up to 2023. Generally, the average current ratio of firms in the information technology industry is 1.83

(fullratio, n.d.). From 2014 up to 2019 Apple's current ratio has been well above 1 and has been increasing steadily from 1.08 up to 1.54. Given it was substantially over 1 and not significantly different from the industry norm, this value was seen to be excellent for Apple. This indicates that in between 2014 and 2019 Apple was admirably adapted to settling its short-term debt obligations with its current assets. This is most likely due to the increasing net sales, good management of accounts receivable and efficient inventory management. However, from 2020 up to 2023, Apple's current ratio has sharply decreased to 0.988 in 2023. This indicates that Apple's current assets are not adequate to settle its short-term obligations; this has likely resulted from an unexpected decrease in current assets or a sudden increase in current liabilities or a combination of both. However, since Apple is one of the world's largest cash machines, it can easily use its cash and cash equivalents to settle those current debts.

Quick ratio: The quick ratio, also known as the acid-test ratio, determines if an organization has enough liquid assets (cash, cash equivalents, accounts receivable, marketable securities etc.) to pay its immediate obligations, namely short-term debt, by comparing its most liquid assets to its most short-term liabilities. Current assets like inventory that are challenging to swiftly liquidate are not taken into account by the quick ratio. Businesses that have an acid-test ratio below 1.0 should be managed mindfully considering that they do not have sufficient liquid assets to cover their current liabilities. Moreover, the current assets of an organization are heavily reliant on inventory if the quick ratio is substantially lower than the current ratio. (Hayes, 2024)

As illustrated in the graph above, the quick ratio of Apple has been increasing from 2014 up to 2019, from 1.04 until it peaked at 1.50. Evidently these quick ratio values are not significantly different from the current ratio values from 2014-2019 indicating that Apple current assets are not fully dependent on inventory. What is more, the average quick ratio value of the industry is 1.46 (fullratio, n.d.). Apple's quick ratio from 2014 to 2019 was close to the average value and most importantly was above 1, entailing that the company has adequate liquid assets to cover its short-term obligations. On the other hand, from 2020 onwards the quick ratio has been declining until it was 0.94 in 2023. Again, this trend of decline is almost identical to the current ratio decline from 2020 to 2023. This reveals that Apple did not have sufficient liquid assets to settle all its short-term obligation debts. The possible reasons for this could be that Apple's sales were declining, that

there was slower collection of accounts receivables or that Apple has taken on more debts than usual.

Cash ratio: The cash ratio measures a company's capability to pay off its short-term debt obligations with its cash and cash equivalents; it does this by calculating the percentage of current liabilities that will be covered by its cash and cash equivalents only. A high cash ratio, approximately from 0.5 to 1, is preferred by creditors since it demonstrates that the business can pay off its debt with ease. (CFI, n.d.)

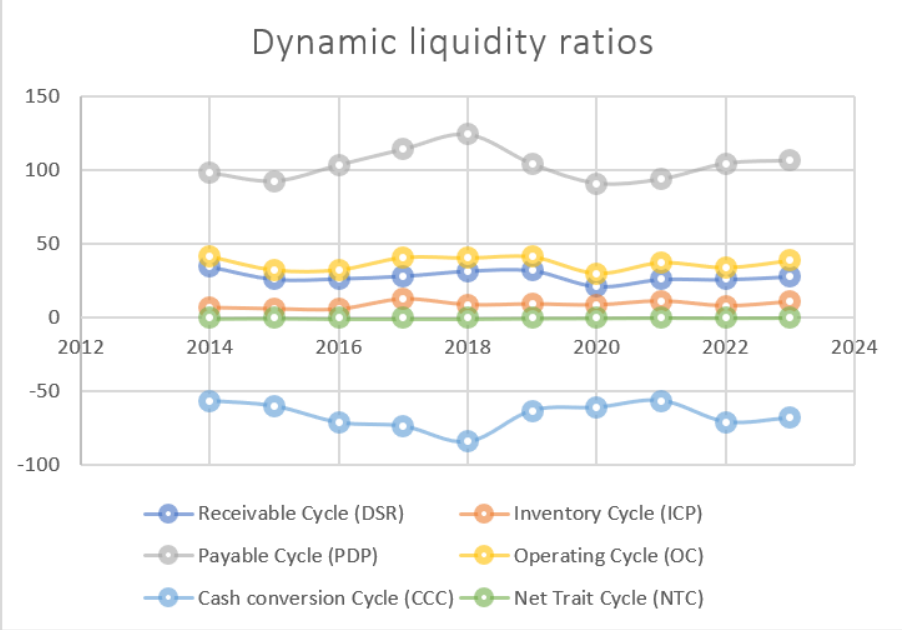
According to the graph, it is apparent that the cash ratio of Apple has been rather low in 2014 at 0.21 but has steadily increased until 2019 peaking at 0.46. The average industry value of cash ratio is 0.55 (readyratios, n.d.). This indicates that as long as Apple's cash ratio was below 0.5, which was the case from 2014 to 2018, the company was not capable of paying off its short-term debt obligations using its cash and cash equivalents only. At 2019 Apple's cash ratio was 0.46 which is significantly close to 0.5, which means the company was somewhat capable of settling its debts using cash and cash equivalents. After 2019, the cash ratio started to decline again from 0.46 to 0.206 which was approximately its initial value in 2014. Indicating that Apple's current liabilities exceed its cash and cash equivalents.

Apple Dynamic Liquidity Ratios..xlsx

Apple dynamic liquidity ratios

Item/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Receivable Cycle (DSR)	34.9	26.3	26.7	28.5	31.9	32.2	21.4	26.2	26.1	28.1
Inventory Cycle (ICP)	6.9	6.1	5.9	12.6	8.8	9.3	8.7	11.3	8.1	10.8
Payable Cycle (PDP)	98.2	92.5	103.6	114.5	124.6	104.3	91.0	93.9	104.7	106.7
Operating Cycle (OC)	41.73	32.43	32.59	41.02	40.68	41.43	30.18	37.50	34.16	38.89
Cash conversion Cycle (CCC)	-56.45	-60.03	-71.02	-73.46	-83.89	-62.89	-60.87	-56.36	-70.52	-67.83

Net Trait Cycle (NTC)	(0.11)	(0.09)	(0.12)	(0.12)	(0.12)	(0.09)	(0.08)	(0.06)	(0.07)	(0.06)



Receivable Cycle (DSR): This ratio calculates the average amount of days that receivables remain outstanding for a business. It is more desirable to have fewer number of days sales in receivables. The likelihood that customers may make their payments late is indicated by an increase in the number of days receivables remain outstanding. Businesses should try to lower the number of days of sales in accounts receivable to improve liquidity. (Parnes, Velano & Martinez, 2008)

As apparent from the graph above, the days sales in accounts receivable remained quite steady throughout the years as the line is almost constant. It has slightly fluctuated throughout the years (2014-2023) peaking 34.9 days (about 1 month 4 and a half days) in 2014 and its lowest 21.4 days (about 3 weeks) in 2020. Overall, the average DSR for this industry is around 30 days (about 4 and a half weeks). This indicates that Apple is generally effective in collecting outstanding receivables.

Inventory cycle (ICP): The amount of time spent by a firm to buy inventory, sell it, and transform the proceeds into cash is known as the inventory conversion period (ICP). It is a gauge of an organization's effectiveness in inventory management. A shorter ICP suggests that a business is capable of shifting its inventory fast, which helps free up funds and lower the potential risks of spoiling and obsolescence that come with keeping inventory. An extremely short ICP, nevertheless, can also mean that a business regularly runs out of inventory, therefore could result in missed revenues. (cfblog, 2023)

The changes in ICP for Apple are demonstrated in the graph above. From 2014 to 2017 the ICP of the company has risen from 6.9 to 12.6 days (about 2 weeks). Although the ICP of 12.6 is a good figure compared to its competitors. It shows that Apple was finding difficulty in moving and liquidizing its inventory across 2014-2017; due to various possible reasons such as an increased level in inventory, reduced sales, or longer production process. However, after 2017, Apple's ICP decreased again to 8.7 in 2020 then experienced an increase and decrease towards the end. Overall, the ICP of Apple was stable and at a very suitable number of days for its industry, entailing that it succeeds in shifting its inventory and converting to cash in a short period.

Payable cycle (PDP): This financial ratio illustrates how long it typically takes a company to pay its suppliers over a given period of time; it is computed to assess the accounts payable process's overall efficacy (Blaney, n.d.). Firms with a high PDP are able to postpone payments and utilize the cash they have left over to boost their working capital and free cash flow and make short-term investments; while a high PDP is considered desirable, it could not always be advantageous for the company because they might point to a lack of funds and an inability to fulfil payments (Hayes, 2023). The average PDP for the industry is around 80. Throughout 2014 to 2023 Apple's PDP was quite high and above average ranging from 92 to 124 days (about 4 months). From 2014 to 2018 the PDP has risen from 98.2 to 124.6. This indicates that Apple has postponed more of their payments and utilized cash for other purposes like boosting working capital. However, it does not come out as a good sign to Apple's suppliers as it hints to the possibility that Apple could fail to meet some of these payments and risk losing its relationship with its suppliers. Nonetheless, after 2018, the PDP started to decrease again until it was at 91 days (about 3 months) in 2020, which is

most likely a result of Apple increasing the efficiency of the AP process by balancing its cash inflows and outflows as well as using technology to automate the accounts payable process.

Operating cycle: The number of days taken by a business to acquire inventory, sell inventory, and receive the payment paid for that sale is known as an operating cycle (OC). This cycle is a key factor in assessing a company's efficiency. Ideally, a shorter cycle denotes a more profitable and efficient company. A firm with a shorter cycle can return its inventory investment more rapidly and have sufficient cash on hand to pay its debts. (CFI, n.d.)

Across 2014 to 2023 Apple's operating cycle remains steady with minor fluctuations, ranging from 40 to 30 days (about 4 and a half weeks) approximately. This is a very ideal amount for Apple considering its industry average operating cycle which is around 90. This indicates that Apple succeeds in obtaining the earnings of its inventory investments quicker thus enjoying cash on hand more frequently.

Cash conversion cycle (CCC): This measure takes into account the amount of time the business requires to sell its merchandise, collect outstanding payments, and settle its liabilities; the shorter the cash cycle, the better, since it entails that cash is not tied to inventories or accounts receivable for as long (Hayes, 2024). As apparent from the data above Apple's CCC has always been well below zero, in 2014 it was at -56 days (about 2 months), and it continued to decrease until it was -86 days (about 3 months) in 2018. A negative cash conversion cycle is a result of inventory that is sold before it is paid for; in other words, your suppliers are funding the operations of your company (cashanalytics, n.d.). For numerous companies, a negative cash conversion cycle is the ideal scenario. Consequently, from 2019 up to 2023 the CCC increases, decreases, then increases until it is at -67 days (about 2 months) in 2023. Overall Apple has an ideal CCC due to healthy and stable relationships with its vendors as well as reliable customers who pay their outstanding balances on time.

Net trade cycle (NTC): The time it takes for a company to turn its investments in raw materials and other inputs into cash from sales is known as the net trade cycle (NTC), which is a measure of a business's cash conversion cycle. The cash conversion cycle along with the days of credit extended to customers are taken into account by the net trade cycle. It offers perceptions into the

effectiveness of a business's working capital and credit policy management. A shorter net trade cycle is a sign of effective working capital and credit policy management, which improves cash flow and liquidity. Apple's NTC has remained almost constant throughout the years 2014-2023, approximately around – 0.1 days. This indicates that inventory is sold at the same time as the inventory and raw materials are paid for. Generally, Apple's NTC is adequate and up to standard and it shows that its working capital and credit policy management is effective.

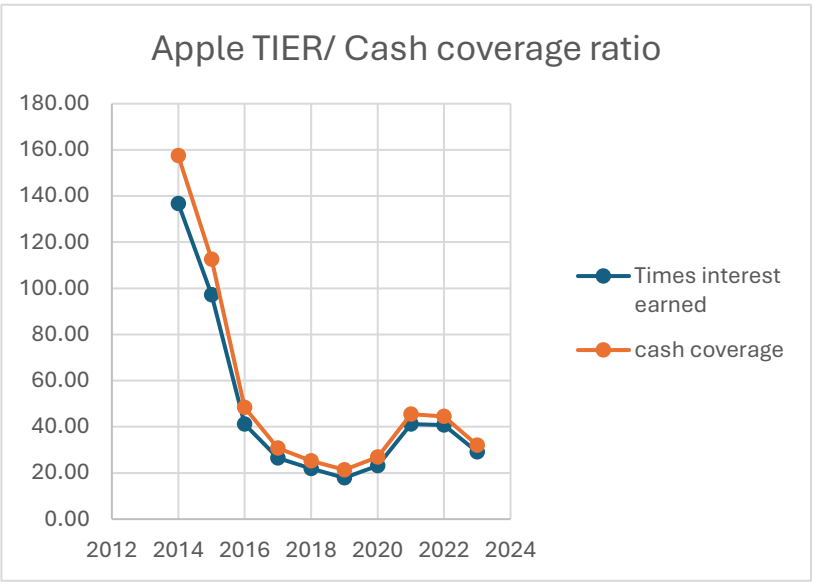
Apple long term debt ratios.xlsx

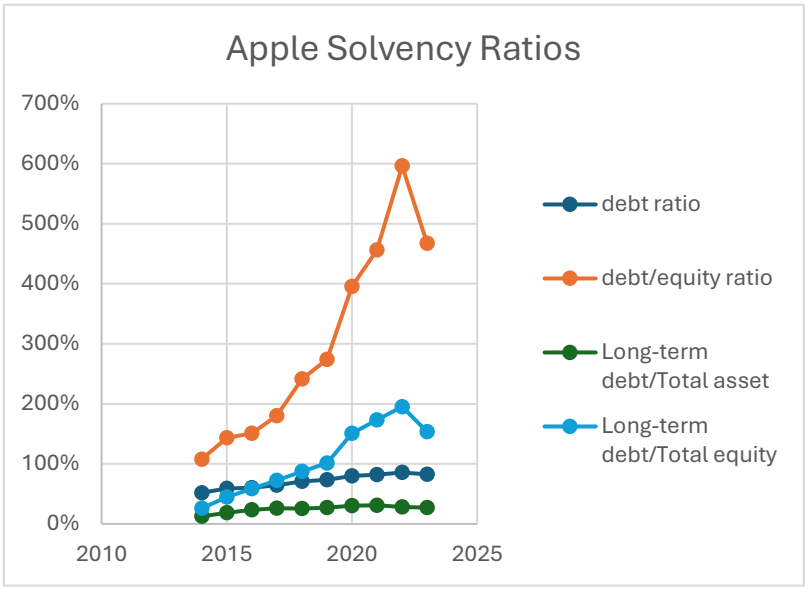
Apple long term debt paying ability ratios

item/year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Times interest earned (times)	136.73	97.18	41.23	26.41	21.88	17.88	23.07	41.19	40.75	29.06
cash coverage (times)	157.42	112.53	48.44	30.78	25.25	21.39	26.92	45.46	44.54	31.99
debt ratio	52%	59%	60%	64%	71%	73%	80%	82%	86%	82%
debt/equity ratio	108%	143%	151%	180%	241%	274%	396%	456%	596%	467%
Long-term debt/Total asset	13%	18%	23%	26%	26%	27%	30%	31%	28%	27%
Long-term debt/Total equity	26%	45%	59%	73%	87%	101%	151%	173%	195%	153%

Solvency Ratios:

Solvency ratios are critical financial parameters to evaluate the ability of the firm to meet its long-term debt obligations and its overall health. These ratios, which include Times Interest Earned (TIE), Cash Coverage Ratio, Debt Ratio, Debt-to-Equity Ratio, Long-term Debt to Total Assets, and Long-term Debt to Equity, show how well a company handled its debt compared with earnings, cash flow, assets, and equity. By analyzing these ratios, all stakeholders will be able to determine the leverage and financial stability of the company and the ability of the organization to be maintained in the long run, making its commitments in debt and maintaining financial stability and resilience.





Analysis of Solvency Ratios for Apple Inc. (2014-2023):

From 2014 to 2023, Apple Inc.'s solvency ratios provide significant insight on the company's financial health and capacity to fulfill its long-term obligations. Starting with the Times Interest Earned (TIE) ratio, which shows how many times Apple's earnings before interest and taxes (EBIT) can be used to pay interest on its outstanding debts, we can see that it decreased significantly from 136.73% in 2014 to 41.23% in 2016. The considerable drop implies a decline in profits in comparison to interest expenses, even though the coverage remained strong. The TIE ratio dropped further to 17.88% in 2019, indicating an increasing difficulty in meeting interest payments. That ratio, however, began to rise in 2020 and reached 41.19% in 2021 before falling

once again to 29.06% in 2023. This variation shows that over these years, earnings and interest expenses have varied.

The Cash Coverage ratio, which measures Apple's ability to cover its interest expenses with its cash flow from operations, mirrors the TIE ratio's trend. It declined from 157.42% in 2014 to 48.44% in 2016, indicating a reduced capacity to cover interest expenses with cash flow. In 2019, the ratio dropped even further to 21.39%, indicating a growing reliance on earnings as opposed to cash flow to pay interest. Following 2020, the Cash Coverage ratio increased to 45.46% in 2021 but dropped to 31.99% in 2023, demonstrating unstable cash flow relative to interest obligations.

The Debt Ratio, which measures the proportion of Apple's assets financed by debt, increased gradually from 52% in 2014 to 60% in 2016, suggesting a growing dependence on debt to finance assets. This upward trend continued, reaching 73% in 2019, indicating a notable increase in debt levels relative to assets. The ratio peaked at 86% in 2022 before slightly declining to 82% in 2023. This high ratio suggests that a substantial portion of Apple’s assets is financed by debt, potentially increasing financial risk.

The Debt-to-Equity Ratio, which compares the company's total debt to its shareholders' equity, indicates financial leverage. It increased from 108% in 2014 to 151% in 2016, reflecting growing leverage. The ratio rose sharply to 274% in 2019, indicating a significant increase in debt relative to equity. From 2020 to 2023, the ratio peaked at an extremely high 596% in 2022 before declining to 467% in 2023. This very high ratio suggests that Apple is heavily leveraged, with debt vastly exceeding equity, heightening financial risk.

The Long-term Debt to Total Assets ratio, which measures the proportion of Apple’s assets financed by long-term debt, increased from 13% in 2014 to 23% in 2016, indicating a growing proportion of long-term debt in the asset base. From 2017 to 2019, the ratio remained stable at 26-27%, indicating a stable level of long-term debt financing relative to assets. From 2020 forward, the ratio showed a slight decline in long-term debt in relation to assets, peaking at 31% in 2021 and falling to 27% in 2023.

The Long-term Debt to Equity ratio, which compares long-term debt to shareholders' equity, grew from 26% in 2014 to 59% in 2016, showing an increasing reliance on long-term debt. The ratio increased further, reaching 101% in 2019, which means that long-term debt is either equal to or greater than equity. From 2020 to 2023, the ratio increased to a maximum of 195% in 2022 and then decreased to 153% in 2023, indicating a significant amount of long-term debt relative to equity, although this leverage has recently decreased.

In summary, Apple Inc.'s solvency ratios from 2014 to 2023 show that it has become more and more dependent on debt financing, with significant fluctuations in its ability to pay interest expenses out of cash flow and earnings. The ratios of cash coverage and times interest earned show variability, with noticeable increases and decreases indicating fluctuating earnings and interest obligations. Both the debt ratio and the debt-to-equity ratio show a significant rise in leverage over time, with the debt-to-equity ratio peaking at an exceptionally high level in 2022, a sign of a significant reliance on debt. The Long-term Debt to Total Assets and Long-term Debt to Equity ratios also reflect increased use of long-term debt, though there has been a slight reduction in recent years. Based on the combined analysis of these ratios, these ratios indicate that although Apple has used leveraged debt to support its growth, the company also faces higher financial risk as a result of its high leverage, which calls for cautious management to maintain financial stability.

Graphs.xlsx

Apple Graphs

microsft analysis.xlsx

Table 1b: Financial Data (Microsoft)

Item/Year	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Current Assets	184,257	169,684	184,406	181,915	175,552	169,662	159,851	139,660	124,712	114,246
Current Liabilities	104,149	95,082	88,657	72,310	69,420	58,488	64,527	59,357	49,858	45,625
Inventories	2,500	3,742	2,636	**1,895**	2,063	2,662	2,181	2,251	2,902	2,660
Cash	111,262	104,757	130,334	136,527	133,819	133,768	132,981	113,240	96,526	85,709
Receivables	48,688	44,261	38,043	32,011	29,524	26,481	19,792	18,277	17,908	19,544
Total Assets	411,976	364,840	333,779	301,311	286,556	258,848	241,086	193,694	176,223	172,384
Payables	18,095	19,000	15,163	12,530	9,382	8,617	7,390	6,898	6,591	7,432
Long Term Debt	41,990	47,032	50,074	59,578	66,662	72,242	76,073	40,783	27,808	20,645
Total Liabilities	205,753	198,298	191,791	183,007	184,226	176,130	168,692	121,697	96,140	82,600
Total Equity	206,223	166,542	141,988	118,304	102,330	82,718	72,394	71,997	80,083	89,784
Sales	211,915	198,270	168,088	143,015	125,843	110,360	89,950	85,320	93,580	86,833
Cost of Goods Sold	65,863	62,650	52,232	46,078	42,910	38,353	34,261	32,780	33,038	26,934
EBIT (operating income)	88,523	83,383	69,916	52,959	42,959	35,058	29,025	20,182	18,161	27,759
Interest	1,968	2,063	**2,346**	2,591	2,686	2,733	2,222	1,243	781	597
Net Income	72,361	72,738	**61,271**	44,281	39,240	16,571	21,204	16,798	12,193	22,074
Operating Cash Flow	87,582	89,035	76,740	60,675	52,185	43,884	39,507	33,325	29,080	32,231

All numbers in thousands, Source: Annual Reports (Microsoft)

Microsoft Common size analysis:

The common size for Microsoft was from the year 2014 to year 2023 and shown on both the balance sheet and income statement.

Vertical Analysis doc..xlsx

Microsoft vertical analysis

Item/Year	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Current Assets	44.73%	46.51%	55.25%	60.37%	61.26%	65.55%	66.30%	72.10%	70.77%	66.27%
Current Liabilities	25.28%	26.06%	26.56%	24.00%	24.23%	22.60%	26.77%	30.64%	28.29%	26.47%
Inventories	0.61%	1.03%	0.79%	0.63%	0.72%	1.03%	0.90%	1.16%	1.65%	1.54%
Cash	27.01%	28.71%	39.05%	45.31%	46.70%	51.68%	55.16%	58.46%	54.77%	49.72%
Receivables	11.82%	12.13%	11.40%	10.62%	10.30%	10.23%	8.21%	9.44%	10.16%	11.34%
Total Assets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Payables	4.39%	5.21%	4.54%	4.16%	3.27%	3.33%	3.07%	3.56%	3.74%	4.31%
Long Term Debt	10.19%	12.89%	15.00%	19.77%	23.26%	27.91%	31.55%	21.06%	15.78%	11.98%
Total Liabilities	49.94%	54.35%	57.46%	60.74%	64.29%	68.04%	69.97%	62.83%	54.56%	47.92%
Total Equity	50.06%	45.65%	42.54%	39.26%	35.71%	31.96%	30.03%	37.17%	45.44%	52.08%
Sales	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of Goods Sold	31.08%	31.60%	31.07%	32.22%	34.10%	34.75%	38.09%	38.42%	35.30%	31.02%
EBIT (operating income)	41.77%	42.06%	41.59%	37.03%	34.14%	31.77%	32.27%	23.65%	19.41%	31.97%
Interest	0.93%	1.04%	1.40%	1.81%	2.13%	2.48%	2.47%	1.46%	0.83%	0.69%
Net Income	34.15%	36.69%	36.45%	30.96%	31.18%	15.02%	23.57%	19.69%	13.03%	25.42%
Operating Cash Flow										

Microsoft Vertical analysis interpretation 2014 – 2023:

Microsoft vertical analysis table represents the company's financial data from the year 2014 to 2023. Additionally, this analysis contains main financial statement items such as current assets, current liabilities, inventories, cash, receivables, total assets, payables, long-term debt, total liabilities, total shareholder's equity, net sales, COGS, (EBIT), interest, net income, and operating cash flow. Also, each item is identified as a percentage and offers a clear interpretation of Apple's company's financial structure and presentation over the last 10 years. To start with, in the current asset the highest percentage was 72.10% in 2016 and the lowest was in 2023 which indicates that Microsoft company liquidity decreased. For current liability it is stable and decreased from 2014 to 2023 which is from 26.47% to 25.27% like it is not a lot but it is a good sign and shows that they have more control over their current liability. And for the inventory in 2023 it was the lowest at 0.61% which reveals that efficient inventory management. Furthermore, the cash have decreased significantly which indicates a weak liquidity as it was 27.01% at its lowest in 2023 and for the account receivables in 2023 it was at highest 11.82% that means that the company is improving

and growing and is ready for unexpected situations. And for the accounts payable, in 2022 it was 5.21% at its highest, which is considered bad and leads to liquidity problems. And for the long-term debt, in 2023 it was 10.19% that means that Microsoft reduced it long term debt and was able to manage better their debt. In addition, total liabilities were 69.97% in 2017 which was at its maximum, and this led to higher financial risk. For the total shareholders' equity, it was at its highest in 2014 and was 52.08% which shows that Microsoft company was at its strongest financial place and lower leverage and was at its lowest in 2017 which was 30.03%. For the COGS, the more increase in the percentage means that a higher production cost and it is a bad sign for the company. Likewise, the EBIT was 42.06 % at its utmost in 2022. Interest expense was 0.93% in 2023 which is below 1 % and that is a good sign in Microsoft case and shows that the company's is efficient. Overall, for the net income, Microsoft is growing and stable.

Microsoft base year analysis (horizontal):

With the base year of 2014, all items from different years were divided by the base year for each row, respectively.

Microsoft Horizantal Analysis doc..xlsx

Microsoft horizontal analysis

Item/Year	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Current Assets	161.3%	148.5%	161.4%	159.2%	153.7%	148.5%	139.9%	122.2%	109.2%	100.0%
Current Liabilities	228.3%	208.4%	194.3%	158.5%	152.2%	128.2%	141.4%	130.1%	109.3%	100.0%
Inventories	94.0%	140.7%	99.1%	71.2%	77.6%	100.1%	82.0%	84.6%	109.1%	100.0%
Cash	129.8%	122.2%	152.1%	159.3%	156.1%	156.1%	155.2%	132.1%	112.6%	100.0%
Receivables	249.1%	226.5%	194.7%	163.8%	151.1%	135.5%	101.3%	93.5%	91.6%	100.0%
Total Assets	239.0%	211.6%	193.6%	174.8%	166.2%	150.2%	139.9%	112.4%	102.2%	100.0%
Payables	243.5%	255.7%	204.0%	168.6%	126.2%	115.9%	99.4%	92.8%	88.7%	100.0%
Long Term Debt	203.4%	227.8%	242.5%	288.6%	322.9%	349.9%	368.5%	197.5%	134.7%	100.0%
Total Liabilities	249.1%	240.1%	232.2%	221.6%	223.0%	213.2%	204.2%	147.3%	116.4%	100.0%
Total Equity	229.7%	185.5%	158.1%	131.8%	114.0%	92.1%	80.6%	80.2%	89.2%	100.0%
Sales	244.0%	228.3%	193.6%	164.7%	144.9%	127.1%	103.6%	98.3%	107.8%	100.0%
Cost of Goods Sold	244.5%	232.6%	193.9%	171.1%	159.3%	142.4%	127.2%	121.7%	122.7%	100.0%
EBIT (operating income)	318.9%	300.4%	251.9%	190.8%	154.8%	126.3%	104.6%	72.7%	65.4%	100.0%
Interest	329.6%	345.6%	393.0%	434.0%	449.9%	457.8%	372.2%	208.2%	130.8%	100.0%
Net Income	327.8%	329.5%	277.6%	200.6%	177.8%	75.1%	96.1%	76.1%	55.2%	100.0%
Operating Cash Flow										

Microsoft horizontal analysis interpretation 2014 – 2023:

Microsoft's financial data from 2014 to 2023 can be horizontally analyzed to gain important insights into the company's financial performance and patterns throughout this time.

The percentage of current assets increased steadily. This consistent rise is a reflection of Microsoft's increasing liquidity and its capacity to use its assets to pay short-term obligations. In a similar vein, current liabilities have ballooned as well, amounting to 228.3% of their 2014 value in 2023. This increase suggests that although Microsoft has committed to more short-term projects, it did so probably to fund its expansion and operating requirements.

The percentage of inventory has varied over time, reaching a remarkable peak of 140.7% in 2022 and then falling to 71.2% in 2020. Although this fluctuation indicates differences in demand forecasting and inventory management, overall, it is still very steady when compared to other items. Despite notable peaks in some years, such as 2020 (159.3%), cash reserves have typically improved, reaching 129.8% in 2023. Microsoft's operational flexibility and financial stability are improved by this rise in cash reserves.

Receivables have increased significantly, especially starting in 2018 and reaching 249.1% in 2023. This trend suggests that credit sales are rising, and that the client base may be growing. The total assets have been rising steadily, and in 2023 they will be 239.0% of their 2014 worth. The considerable increase in assets highlights Microsoft's efforts towards long-term growth and overall expansion.

Payables have likewise grown significantly, reaching a peak of 255.7% in 2022 and then dipping slightly to 243.5% in 2023. This difference reflects greater business operations and larger short-term obligations to creditors and suppliers. The amount of long-term debt increased significantly, reaching especially after 2016 reaching a noteworthy peak of 368.5% in 2017, before gradually declining to 203.4% in 2023. This pattern points to the use of strategic borrowing for significant purchases or investments.

Liability as a whole has been steadily increasing, reaching 249.1% in 2023. This steady rise reflects expanding responsibilities as well as the company's general growth and enlarged operational scope. The total equity has varied, reaching a peak of 229.7% in 2023. Strong financial performance and investor confidence are reflected in the overall growth in retained earnings and shareholder investments.

Sales have increased significantly, reaching 244.0% in 2023, demonstrating the period's strong revenue generation and market expansion. The surge in sales volumes has also been reflected in the cost of goods sold (COGS), which peaked in 2023 at 244.5%. Given that increased sales typically translate into greater production costs, this tendency is predicted.

EBIT has increased dramatically, reaching a peak of 318.9% in 2023, which suggests increased profitability and operational efficiency. Interest costs have increased significantly; they peaked in 2020 at 434.0% and then moderated to 329.6% in 2023. The increased amounts of long-term debt taken on during the time period are consistent with this increase in interest costs.

With a sharp rise in net income to 327.8% in 2023, this indicates robust profitability and efficient cost control. Operating cash flow has increased significantly, reaching a high of 329.5% in 2022 and then dipping slightly to 327.8% in 2023. This steady expansion demonstrates Microsoft's potent cash-generating capacity from its main commercial operations, guaranteeing enough liquidity for continuing operations and capital expenditures.

Overall, a strong growth trajectory, improved liquidity, and efficient financial management are shown by the horizontal examination of Microsoft's financial data, setting the corporation up for long-term success.

Microsoft Panel Analysis doc..xlsx

Microsoft Combined analysis:

The combined analysis for Microsoft company was made from year 2014 to year 2023. It is mainly a combination of both vertical analysis and horizontal analysis.

Microsoft panel analysis

Item/Year	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Current Assets	67.49%	70.18%	83.36%	91.10%	92.44%	98.90%	100.05%	108.80%	106.78%	100.00%
Current Liabilities	95.52%	98.47%	100.36%	90.67%	91.53%	85.37%	101.13%	115.78%	106.90%	100.00%
Inventories	39.33%	66.47%	51.18%	40.76%	46.66%	66.65%	58.63%	75.31%	106.72%	100.00%
Cash	54.32%	57.75%	78.54%	91.13%	93.92%	103.94%	110.94%	117.59%	110.17%	100.00%
Receivables	104.24%	107.00%	100.53%	93.71%	90.88%	90.23%	72.41%	83.23%	89.63%	100.00%
Total Assets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Payables	101.88%	120.79%	105.37%	96.46%	75.94%	77.22%	71.10%	82.60%	86.75%	100.00%
Long Term Debt	85.11%	107.64%	125.27%	165.10%	194.25%	233.04%	263.48%	175.81%	131.76%	100.00%
Total Liabilities	104.23%	113.43%	119.92%	126.76%	134.17%	142.01%	146.03%	131.12%	113.86%	100.00%
Total Equity	96.11%	87.64%	81.68%	75.38%	68.56%	61.36%	57.65%	71.37%	87.25%	100.00%

Sales	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of Goods Sold	100.20%	101.87%	100.18%	103.87%	109.93%	112.04%	122.80%	123.86%	113.82%	100.00%
EBIT (operating income)	130.67%	131.55%	130.11%	115.83%	106.78%	99.37%	100.94%	73.99%	60.71%	100.00%
Interest	135.07%	151.34%	203.00%	263.51%	310.45%	360.20%	359.30%	211.90%	121.39%	100.00%
Net Income	134.32%	144.31%	143.39%	121.80%	122.66%	59.07%	92.73%	77.45%	51.25%	100.00%
Operating Cash Flow										

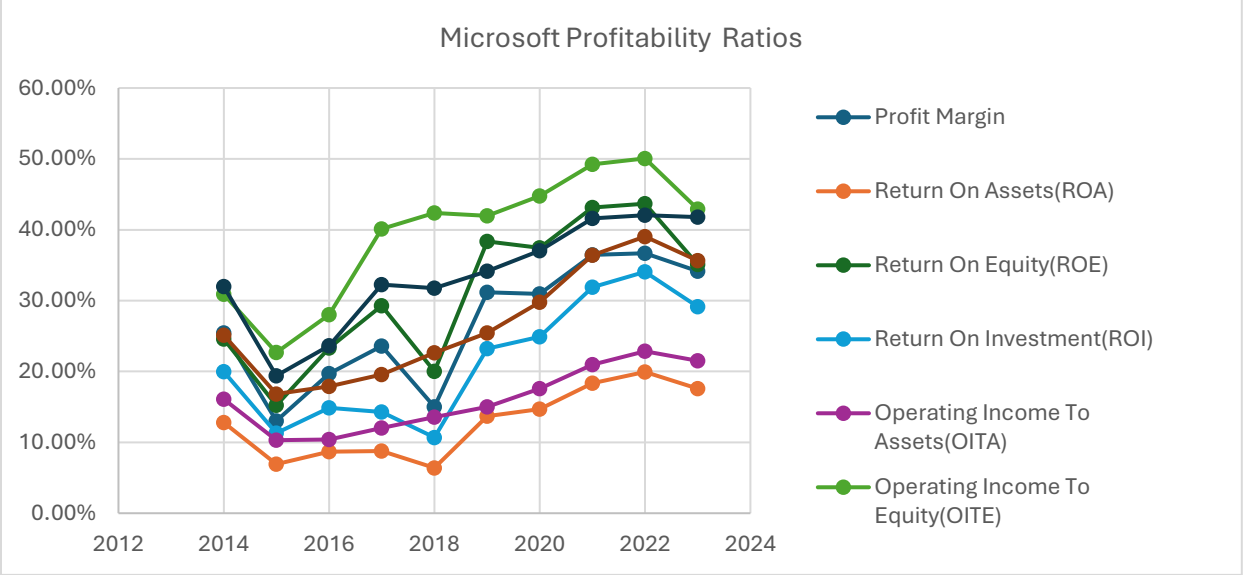
Microsoft combined analysis interpretation 2014 – 2023:

In Microsoft combined analysis it shows that the current assets decreased significantly from 2014 till 2023 its shows that it could have some financial and operational risks. For the current liabilities it increased and then decreased so it is not that stable and its always changing and in 2016 it was at its highest and it in 2018 it was at its lowest, for the inventories in 2023 it decreased to 39.33% which is a good sign as I mentioned previously in the vertical analysis. And for the cash there is a noticeable decrease which was 54.34% in 2023 which is shown to be a bad sign comparing to apple company. And for the receivables it increased in 2022 and 2023 to 107% and 104.24% which means growth in sales. In addition, the total assets are 100%. And the payables varied each single year and in 2022 it was 120.79% which is a negative sign and will result in liquidity problems. Furthermore, the long-term debt was 85.11% in 2023 which is the lowest and it means that the company is financially stable. Additionally, for the total liabilities it decreases to 104.23% in 2023 which leads to reduced risk and more stabilized company. And for the total equity, it increased to 96.11% in 2023 which is a good indicator for investors. And for the cost of goods sold it was at its highest in 2016 and lowest in 2021. Also, EBIT in 2022 was the highest, it shows that it has a strong profitability. For the interest rate it was 360.20% in 2018 which could be seen as an extremely high number, and it is a sign that the company must observe their financial leverage. And lastly regarding the net income, there is clear growth and improvement in their sales and revenues.

Microsoft Profitability Analysis doc..xlsx

Microsoft profitability analysis:

Ratio/Year	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Profit Margin	34.15%	36.69%	36.45%	30.96%	31.18%	15.02%	23.57%	19.69%	13.03%	25.42%
Return On Assets (ROA)	17.56%	19.94%	18.36%	14.70%	13.69%	6.40%	8.80%	8.67%	6.92%	12.81%
Return On Equity (ROE)	35.09%	43.68%	43.15%	37.43%	38.35%	20.03%	29.29%	23.33%	15.23%	24.59%
Return On Investment (ROI)	29.15%	34.06%	31.90%	24.89%	23.22%	10.69%	14.28%	14.89%	11.30%	19.99%
Operating Income To Assets (OITA)	21.49%	22.85%	20.95%	17.58%	14.99%	13.54%	12.04%	10.42%	10.31%	16.10%
Operating Income To Equity (OITE)	42.93%	50.07%	49.24%	44.77%	41.98%	42.38%	40.09%	28.03%	22.68%	30.92%
Operating Income To Sales (OITS)	41.77%	42.06%	41.59%	37.03%	34.14%	31.77%	32.27%	23.65%	19.41%	31.97%
Operating Return On Investments (OROI)	35.66%	39.04%	36.40%	29.77%	25.42%	22.62%	19.55%	17.90%	16.83%	25.14%



Microsoft Corporation's profitability ratios from 2014 to 2023 show that the corporation has made tremendous progress in terms of both efficiency and financial performance over the years. Starting with the profit margin, Microsoft's performance in the previous years has been very variable. It started at 25.42% in 2014, dropped to 13.03% in 2015, and then increased to over 31% by 2019. The profit margin shows a discernible increase starting in 2020 and reaching a peak of 36.69% in 2022 before falling slightly to 34.15% in 2023. This suggests that cost management and

profitability have significantly improved, enabling Microsoft to keep a greater portion of revenue as profit.

Return on Assets (ROA), which measures how efficiently Microsoft uses its assets to generate profit, shows a notable trend. From a high of 12.81% in 2014, ROA declined to 6.40% in 2018, indicating periods of varying asset efficiency. However, from 2020 onwards, ROA has steadily increased, reaching 19.94% in 2022 before a slight drop to 17.56% in 2023. This upward trend highlights Microsoft's enhanced efficiency in asset utilization to generate profit in recent years.

The improvement in **return on equity (ROE)** is indicative of the return on shareholders' equity. In 2014, ROE was 24.59%; in 2015, it dropped to 15.23%; however, in 2019, it increased to 38.35%. Microsoft's ROE increased from 2020 to 2023, reaching a remarkable 43.68% in 2022 and a still-high 35.09% in 2023. These values highlight Microsoft's ability to deliver substantial returns to its equity investors, reflecting remarkable financial performance and profitability.

Return on Investment (ROI) experienced fluctuations in the earlier years, starting at 19.99% in 2014, dropping to 11.30% in 2015, and then rising to 23.22% in 2019. From 2020 onwards, ROI showed consistent improvement, reaching 34.06% in 2022 before a slight decline to 29.15% in 2023. This indicates that Microsoft's investment strategies have been highly effective in recent years, yielding strong returns.

Operating Income to Assets (OITA), measuring operating income relative to total assets, showed variability in the earlier years, ranging from 16.10% in 2014 to a low of 10.31% in 2015, then gradually improving to 14.99% in 2019. OITA increased steadily starting in 2020, peaking at 22.85% in 2022 and slightly declining to 21.49% in 2023. This shows that operating income is generated more efficiently by using assets.

Operating Income to Equity (OITE) measures operating income relative to shareholders' equity. This ratio increased from 30.92% in 2014 to 42.38% in 2019, which indicates rising operational returns on equity. OITE showed strong operational efficiency in producing returns on equity from 2020 to 2023, peaking at 50.07% in 2022 and then declining slightly to 42.93% in 2023.

Operating Income to Sales (OITS) fluctuated slightly, starting at 31.97% in 2014, decreasing to 19.41% in 2015, and recovering to 34.14% in 2019. OITS began to rise in 2020 and peaked at

42.06% in 2022 before slightly declining to 41.77% in 2023, demonstrating excellent performance in terms of sales.

Lastly, the **Operating Return on Investments (OROI) ratio**, which calculates operating income relative to investments, decreased from 25.14% in 2014 to 16.83% in 2015 before progressively increasing to 25.42% in 2019. OROI showed strong investment returns starting in 2020 and reaching a peak of 39.04% in 2022 before slightly dropping to 35.66% in 2023.

In summary, Microsoft Corporation has demonstrated strong and improved profitability. The profit margin has increased significantly, which is indicative of effective cost management. Particularly in the most recent years, ROA and ROE have significantly improved, demonstrating effective utilization of equity and assets. Effective strategies for investment are shown by the steady improvement in ROI and OROI. Increased operational efficiency in producing revenue in relation to assets and equity is demonstrated by the OITA and OITE ratios. The OITS ratio has remained stable, indicating consistent operational efficiency in terms of increasing sales. By generating significant profits, maintaining high returns on equity and investments, and enhancing operational efficiency, Microsoft appeared to have managed its resources well, as seen by these ratios, which also demonstrate strong financial health and performance.

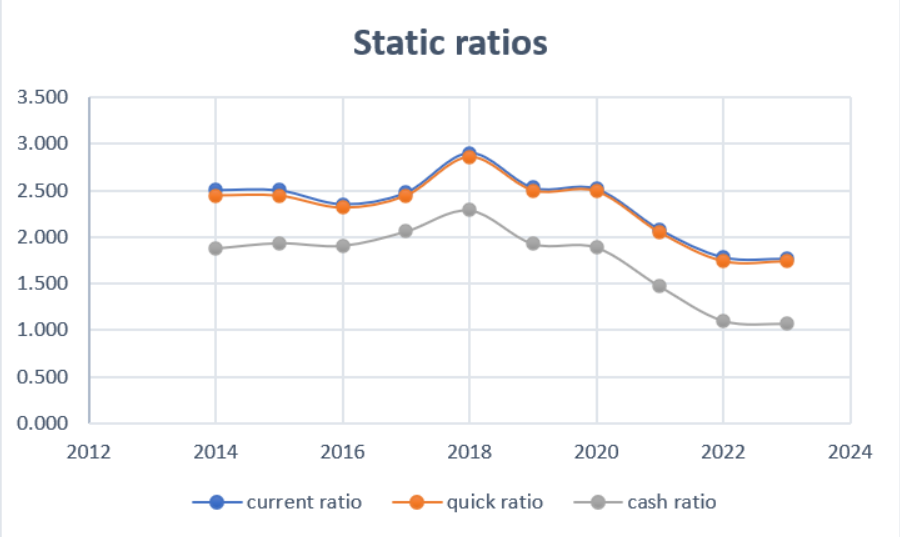
Microsoft Static Ratios Doc..xlsx

Microsoft static ratios

ratio/year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
current ratio	2.504	2.501	2.353	2.477	2.901	2.529	2.516	2.080	1.785	1.769
quick ratio	2.446	2.443	2.315	2.443	2.855	2.499	2.490	2.050	1.745	1.745
cash ratio	1.879	1.936	1.908	2.061	2.287	1.928	1.888	1.470	1.102	1.068

Current ratio: This ratio is used to measure the capability of a company in settling its short-term obligations using its current assets. It is done by comparing the firm's current assets to its current liabilities. Any value above 1 is preferred, as it indicates the firm's current assets exceed its current liabilities. From 2014 to 2020 Microsoft's current ratio moving slightly in between 2.5 and 2.9 approximately, this indicates that Microsoft's current assets were more than double of its current liabilities, therefore Microsoft was able to pay its short-term obligations with ease and having assets leftover to use for other purposes. This is most likely a result of a high increase in accounts receivable, and net sales and also effective inventory management. However, the current ratio started to significantly decrease after 2020, from 2.51 to 1.76 in 2023. This is still acceptable considering the average current ratio of the industry which is 1.83. Nonetheless it seems that the current ratio has decreased that much mostly because there has been a drastic increase in Microsoft's current liabilities combined with a slight decrease in its current assets.

Quick ratio: This ratio determines whether the company has enough liquid assets to repay its



short-term obligations; however, it does not consider inventory in the formula. To calculate the quick ratio of a company, its liquid assets (cash, cash equivalents, accounts receivable etc.) are compared to its current liabilities. A company with a quick ratio of less than 1, is unable to settle its short-term obligations with its current assets. As apparent from the graph above, Microsoft's quick ratio is almost equal to its current ratio throughout all the years (2014-2023), this indicates

that Microsoft does not rely on inventory to meet its short-term obligations at all. From 2014 to 2018 the quick ratio of Microsoft has risen from 2.44 to 2.85, any ratio above 1 is adequate for a company. Furthermore, the average industry for the quick ratio is 1.46, Microsoft's quick ratio is well above 2 and that indicates that the company has twice as many current assets as current liabilities. This is most likely as a result of efficient collection of accounts receivable or an increase in sales. After 2018 the quick ratio of the company has been declining until it has reached 1.74 in 2023. This value is still acceptable considering the average quick ratio of the industry; nonetheless, this decline has occurred because there was a decline in the current assets of Microsoft after 2018.

Cash ratio: This ratio measures the ability of a firm to pay its short-term debt obligations with the cash and cash equivalents of the company. Typically, the cash ratio should be at least above 0.5, with the industry average being 0.55. Initially, Microsoft's cash ratio was 1.87 in 2014 and gradually increased to 2.28 in 2018, these values are well above 1 as well as the industry average. This indicates that Microsoft had a strong ability to cover its short-term debts with its cash and cash equivalents and had an excellent liquidity position. From 2018 onwards the cash ratio started to decrease until it was 1.06 in 2023. This is still fair value since it demonstrates that the cash and cash equivalents are almost equal or slightly more than the company's current liabilities. The decline in the cash ratio was a result of a decrease in the total cash of Microsoft from 2018 to 2023.

Microsoft Dynamic liquidity ratios fin302.

Microsoft dynamic liquidity ratios

Item/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Receivable Cycle (DSR)	82.2	69.8	78.2	80.3	87.6	85.6	81.7	82.6	81.5	83.9
Inventory Cycle (ICP)	36.0	32.1	25.1	23.2	25.3	17.5	15.0	18.4	21.8	13.9
Payable Cycle (PDP)	100.7	72.8	76.8	78.7	82.0	79.8	99.3	106.0	110.7	100.3
Operating Cycle (OC)	118.2	101.9	103.3	103.5	112.9	103.2	96.7	101.0	103.3	97.7
Cash conversion Cycle (CCC)	17.5	29.1	26.4	24.8	30.9	23.4	-2.5	-4.9	-7.4	-2.6

Net Trait Cycle (NTC)	0.0735	0.1135	0.1131	0.1007	0.1022	0.0678	0.0065	-0.0107	-0.0136	-0.0044

Receivable cycle (DSR): This ratio measures the average number of days that the accounts receivable remains outstanding for a business. The less days it takes to collect the payments, the more reliable the customers are and the company's cashflow will remain stable. The average DSR of the industry is around 30 days (about 4 and a half weeks). Overall, Microsoft's DSR is quite large ranging from 87.6 to 69.8 across the years 2014 to 2023. Compared to its competitors its overall DSR is significantly larger, this indicates that there is a delay in the collection of outstanding balances from the customers, which eventually might affect the cash flow and the liquidity of Microsoft.

Inventory cycle (ICP): the time spent by the company buying inventory, selling it, and converting the sales into cash is measured by this ratio. A shorter ICP is preferred as it means the company is more efficient in converting the inventory into cash. From 2014 up to 2018 Microsoft's days inventory outstanding was extremely high and above average, in 2014 it was 36 then it gradually yet insignificantly decreased to 25.3 by 2018. This indicates that in that period Microsoft was facing difficulties in liquidating their inventory fast enough to keep the cashflow continuous, meaning that there seemed to be a drop in sales and inefficient collection of accounts receivable. However, after effective inventory management and increased sales, the ICP started to decrease further since 2018 until it reached a promising 13.9 in 2023.

Payable cycle (PDP): This ratio measures the average time it takes a firm to repay its debts to its suppliers. Typically, the industry average of this ratio is around 80 days (about 2 and a half months). In 2014 the days payable outstanding was 100, this value is quite high compared to its competitors, it indicates that Microsoft was able to delay its payments to its suppliers; but overall, this does not serve as a good image to future suppliers who might consider the company unreliable. Fortunately, after 2014 the PDP starts to decrease until it reached 78.7 in 2017, which is ideal considering the industry norm. However, it started to increase again across the years until it was back to its original PDP in 2023.

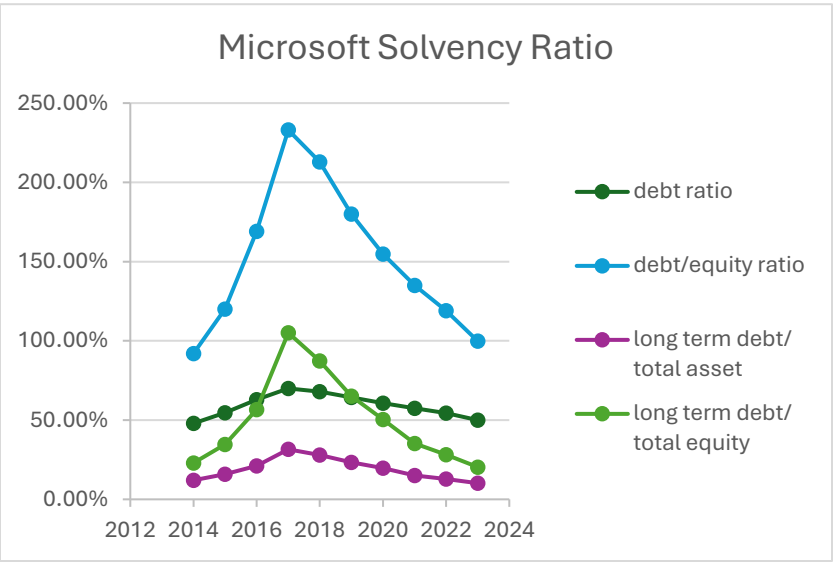
Operating cycle (OC): This ratio measures the number of days it takes a company to buy its inventory, sell it and receive the payments of those sales in cash. Generally, the average operating cycle of the industry is around 90 days (about 3 months). In 2014, Microsoft's operating cycle was 118 days (about 4 months) long, then it has continued to fluctuate over the years until it was 112 days (about 3 and a half months) long in 2018. An operating cycle above 100 indicates that Microsoft's OC was too long, meaning that Microsoft was not efficient in recovering its inventory investments or in collecting its accounts receivable. Fortunately, after 2018 the operating cycle of Microsoft started to decrease until it was 97 days (about 3 months) long in 2023; there is still room for improvement as it is still significantly above the industry norm.

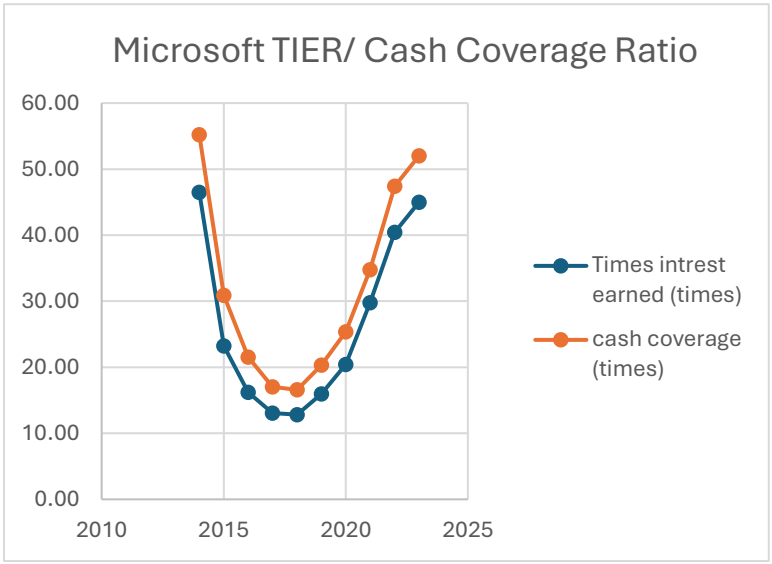
Cash Conversion Cycle (CCC): In this ratio the amount of time the company consumes in order to sell its inventory, collect its accounts receivable and pay its debts is measured. Ideally, a shorter cash cycle is always desired. Microsoft's CCC was 17 days (about 2 and a half weeks) in 2014, then it kept increasing until it was 30 days (about 4 and a half weeks) long in 2018. Compared to its competitors, Microsoft's CCC is too long, it indicates that the firm most likely has longer inventory holding period, delays in receiving payments from customers, and in paying its suppliers. After 2018 the CCC significantly dropped until it was -2.6 days long in 2023; this duration is ideal it means that the company's inventory is sold before it is paid for, and that the suppliers are funding the operations of the firm.

Net trade cycle (NTC): This ratio determines the number of days it takes a firm to convert its investments into raw materials, finished goods and other inputs into cash from sales. It also takes into consideration the days of credit extended to customers. Generally, firms in the industry have negative net trade cycle days. Throughout the years 2014 to 2023 Microsoft's NTC was approximately zero days long. This shows that the investments put into raw material, inventory and other inputs are received before the company had to pay for them. Thos indicates that Microsoft has effective working capital and credit policy management.

Microsoft long term debt paying ability ratios

microsoft long term debt ratios xlsx.xlsx





Analysis of Solvency Ratios for Microsoft Corporation (2014-2023)

	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Times interest earned (times)	44.98	40.42	29.80	20.44	15.99	12.83	13.06	16.24	23.25	46.50
cash coverage (times)	52.02	47.43	34.78	25.38	20.34	16.58	17.01	21.56	30.88	55.23
debt ratio	49.94%	54.35%	57.46%	60.74%	64.29%	68.04%	69.97%	62.83%	54.56%	47.92%
debt/equity ratio	99.77%	119.07%	135.08%	154.69%	180.03%	212.93%	233.02%	169.03%	120.05%	92.00%
long term debt/ total asset	10.19%	12.89%	15.00%	19.77%	23.26%	27.91%	31.55%	21.06%	15.78%	11.98%
long term debt/ total equity	20.36%	28.24%	35.27%	50.36%	65.14%	87.34%	105.08%	56.65%	34.72%	22.99%

Times Interest Earned Ratio (TIER)

The TIER ratio shows the extent to which Microsoft can use its earnings before interest and taxes (EBIT) to pay its interest obligations. Between 2014 and 2016, the TIE ratio dropped rapidly from 46.50% to 16.24%, indicating an abrupt decrease in EBIT in comparison to interest expenses. Such a trend would show increasing financial stress during this period. However, from 2017, there was

a wavering but generally positive trend. The ratio declined to 12.83% in 2018 but increased to 15.99% in 2019. There was a continual increase from 2020. The ratio reached 44.98% in 2023. This comeback implies that the ability of Microsoft to pay its interest expenses improved due to increased earnings of the company or because their interest expenses came down.

Cash Coverage Ratio

The Cash Coverage Ratio, which shows how many times Microsoft was able to pay interest expenses through its operating cash flows, was more or less the same. It decreased from 55.23% in 2014 to 21.56% in 2016, signaling a drop in the capacity to meet interest obligations from cash flow. From 2017 to 2019, the ratio showed a declining trend but improved slightly to 20.34% in 2019. The ratio saw significant improvement from 2020 onwards, peaking at 52.02% in 2023. This increase demonstrates stronger cash flow management and an enhanced ability to cover interest expenses, bolstering Microsoft’s financial stability.

Debt Ratio

A growing reliance on debt can be observed in the Debt Ratio, which shows the proportion of Microsoft's assets financed by debt. It went from 47.92% in 2014 to 62.83% in 2016. The ratio continued this trend, peaking at 69.97% in 2017 before stabilizing around 64.29% in 2019. The ratio began declining in 2020 and reached 49.94% in 2023. This decrease implies that Microsoft has been reducing its debt in relation to its assets, improving its financial leverage and lowering financial risk.

Debt-to-Equity Ratio

The Debt-to-Equity Ratio, which compares total debt to shareholders' equity, showed a marked increase from 92.00% in 2014 to 169.03% in 2016, indicating growing leverage. In 2017, the ratio reached its highest point of 233.02%, indicating a high level of debt to equity. However, there was a gradual decline starting in 2018, and by 2023, the ratio had dropped to 99.77%. This trend suggests that Microsoft's equity base has improved in relation to its debt, reducing financial risk and enhancing financial stability.

Long-term Debt to Total Assets

The proportion of assets financed by long-term debt is shown by the Long-term Debt to Total Assets ratio, which increased from 11.98% in 2014 to 21.06% in 2016. As a result of an increasing reliance on long-term debt financing, this trend persisted and peaked in 2017 at 31.55%. From 2018 onwards, the ratio began to decline, reaching 10.19% in 2023. This reduction indicates a significant decrease in long-term debt relative to assets, improving Microsoft's overall debt structure and reducing long-term financial obligations.

Long-term Debt to Equity

The Long-term Debt to Equity ratio, which compares long-term debt to shareholders' equity, also showed an increasing trend from 22.99% in 2014 to 56.65% in 2016. Long-term debt exceeded equity when the ratio reached its peak in 2017 at 105.08%. The ratio started to decrease in 2018 and reached 20.36% in 2023. This decline indicates better financial management along with reduced leverage as there has been a substantial decrease in long-term debt relative to equity.

Summary

Overall, Microsoft's solvency ratios from 2014 to 2023 indicate that the company's financial stability experienced significant fluctuations. From 2020 forward, there was a notable improvement in the TIE and Cash Coverage ratios, which originally indicated a decline due to increasing financial stress. This recovery has been attributed to improved cash flow management and earnings. The debt ratio and the debt-to-equity ratio show that there was an increase in leverage up to 2017 and then a steady decline in debt levels in relation to equity and assets starting in 2020. Both the long-term debt to equity and long-term debt to total assets ratios show an increase in long-term debt up to 2017 but a noticeable decline in subsequent years, indicating improved financial management and reduced leverage.

Microsoft graphs

Benchmarking

Comparing various aspects of Apple and Microsoft's operations, offerings, and approaches allows us to identify their advantages and disadvantages. This can encompass things like customer satisfaction, product innovation, market share, and financial performance, among other things. This is a summary of the comparisons between these two massive IT companies in various areas:

Financial Performance

Revenue and Profitability*:*

Apple: Sales of iPhones provide a substantial portion of Apple's revenue, which is also supported by its other goods (Mac, iPad, Apple Watch), services (App Store, iCloud, Apple Music), and other products. Apple's premium pricing approach is reflected in its generally high gross margins.

Microsoft: With the help of its Office program, Windows operating system, Azure cloud services, and LinkedIn, Microsoft has a variety of revenue streams. The shift in the company's software business to a subscription model and the expansion of its cloud business have greatly increased profitability.

Market Capitalization:

These businesses, which frequently vie for the top spot in terms of market capitalization, are among the most valuable in the entire globe. Investor confidence in their long-term growth prospects is shown in this.

Product Innovation

Hardware:

Apple: Apple is well-known for its inventive hardware design, and devices like the iPhone, MacBook, and Apple Watch establish industry norms. The hardware performance of its M1, M1 Pro, M1 Max, and M2 chips has been significantly improved by their integration.

Microsoft: Microsoft's Surface range of laptops and tablets has garnered excellent reviews for its appearance and functionality, despite having a stronger software history. In terms of consumer hardware, it does not, however, have the same level of market power as Apple.

Software:

Apple: The tight integration of Apple's hardware and software ecosystem, which includes watchOS, macOS, iOS, and services like iCloud, results in a smooth user experience. One important source of income is the App Store.

Microsoft: leads the software industry with its enterprise solutions, Office 365, and Windows. With offerings like Microsoft 365 Copilot, the company's commitment to AI (Artificial Intelligence) and machine intelligence is particularly noteworthy.

Cloud Services:

Apple: iCloud is more consumer-focused, providing storage and synchronization services. While important, it does not compete directly with major cloud infrastructure providers.

Microsoft: Azure is a top cloud platform that directly competes with Google Cloud and Amazon Web Services (AWS). With a vast array of services ranging from computer power to artificial intelligence and machine learning, it serves as a vital growth engine for Microsoft.

Market Share and Influence

Operating Systems:

Apple: macOS holds a smaller market share compared to Windows in desktops and laptops but is preferred by certain professional sectors, like creative industries.

Microsoft: Windows dominates the desktop OS market. Windows' ubiquity in enterprises and educational institutions solidifies its market position.

Mobile OS:

Apple: In the mobile operating system market, iOS is a significant participant that is especially popular in industrialized nations like North America.

Microsoft: Microsoft's mobile strategy has changed towards integrating its services with Android and iOS, following the discontinuation of Windows Phone.

Customer Satisfaction and Brand Loyalty

Apple: Because of its emphasis on ecosystem integration, design, and user experience, it frequently receives excellent customer satisfaction ratings. Brand loyalty is a well-known trait among Apple users.

Microsoft: Because of its emphasis on ecosystem integration, design, and user experience, it frequently receives excellent customer satisfaction ratings. Brand loyalty is a well-known trait among Apple users.

Strategic Initiatives

Apple: keeps making significant investments in augmented reality (AR), health technology, innovation, and broadening its range of services. Another key area of attention is sustainability, with initiatives to lessen its environmental impact.

Microsoft: focuses on growing its enterprise solutions, AI, and cloud computing. The goal of the acquisition strategy (e.g., Activision Blizzard, GitHub, LinkedIn) is to fortify and diversify its position in the market.

Overall Discussion

When comparing Apple and Microsoft's operations and strategic goals with a thorough financial analysis, it becomes clear that the two computer giants are following different but similar routes to long-term success. Over the years under review, both organizations have demonstrated outstanding financial records, with steady revenue growth, profitability, and effective financial management. Apple's many revenue streams, which include its shift to subscription-based software models and the growth of its cloud business, contrast with Microsoft's reliance on hardware innovation, premium pricing, and a broad ecosystem of products and services. Both businesses exhibit resilience and adaptation despite having different market priorities, utilizing their unique advantages to keep a competitive edge in their respective fields.

Along with efforts in augmented reality and health technologies, Apple's well-known hardware design and smooth ecosystem integration continue to set industry standards in terms of product innovation. Conversely, Microsoft strikes a balance between its legacy in software and advances in cloud computing and enterprise solutions. This is demonstrated by the company's deliberate acquisitions and its dedication to artificial intelligence and machine learning. Microsoft's dominance in enterprise solutions highlights its market influence and global reach, whereas Apple's consumer-centric approach places more emphasis on user experience and brand loyalty.

Both businesses' forward-thinking attitudes to sustainability, market expansion, and technical innovation are reflected in the strategic initiatives they have undertaken. Apple's strategy for long-term prosperity and social responsibility is in line with its dedication to environmental stewardship and service diversification. Microsoft, meantime, has demonstrated its flexibility in adapting to changing market demands and industry trends through its focus on strengthening its position in enterprise markets and its strategic acquisitions.

To conclude the overall discussion, despite the fact that Apple and Microsoft are involved in different areas of the technology industry, their ability to weather financial hardship, their inventive spirit, and their strategic vision make them market leaders worldwide. Both businesses have shown they can innovate, adapt, and prosper in a constantly changing technological environment despite confronting particular possibilities and obstacles. This has set the ground for their future success and expansion.

Recommendations:

Recommendations and Discussions for Investing Microsoft or Apple

The purpose of the following interpretations and recommendations is to give investors essential information and guidance about investing in Apple or Microsoft. Based on a thorough and accurate financial analysis done in compliance with generally accepted accounting principles, these suggestions have been made (GAAP). As a result, investors are guaranteed accurate and dependable recommendations based on dependable financial records. Several financial ratios over the previous ten years are included in the research, which provides a thorough picture of the companies' performance and their capacity to sustain profitability and financial stability.

The performance of Apple and Microsoft was examined in this research using a range of statistics, including debt, cash flow, profitability, liquidity, and vertical and horizontal ratios. Apple and Microsoft are both well-known businesses with strong competitive positions and a substantial amount of market influence.

Apple has done very well financially during the last ten years. With notable growth in current assets, the company's liquidity has steadily improved, demonstrating a strong ability to pay short-term obligations. Apple has demonstrated consistent stability in its profitability measures, including return on equity (ROE) and return on assets (ROA), which are indicative of its robust profit production and effective asset usage. In recent years, the corporation has demonstrated efficient debt management as seen by a considerable decrease in both long-term debt and overall liabilities. (*Apple Inc. - DEF 14A*, n.d.)

Despite these advantages, Apple has encountered difficulties like varying stock levels and times when there may be a liquidity concern because of its reliance on dealer credit. Nonetheless, the company's overall financial health is still good, bolstered by consistent sales growth, better cost control, and robust cash flow. (Brown & Brown, 2023)

It is advised that investors think about Apple as a wise investment option. The company is a dependable choice for both short- and long-term investments due to its solid liquidity, steady profitability, and efficient debt management. (Cook, 2024) Apple is able to confidently navigate market changes and economic risks thanks to its strong financial position. Furthermore, the

company's dedication to innovation and ecosystem expansion offers significant development prospects, strengthening its long-term value proposition. Apple is a good option for investors despite the risks involved with inventory management and liquidity, given its overall financial stability and growth potential. Investing in Apple offers investors a stable income stream in addition to the possibility of capital appreciation due to the company's robust dividend policy. (Brown & Brown, 2023).

Microsoft: Financial Results and Suggestions

Microsoft has had remarkable financial performance as well, with notable increases in profitability and liquidity. The company's improved capacity to fulfill short-term obligations is reflected in the steady increase in current assets. Strong profitability ratios for Microsoft have been demonstrated by considerable gains in net income and EBIT, which point to efficient cost and revenue production. Additionally, the business has proven to be adept at managing its debt, as evidenced by a decrease in long-term debt and a steady overall debt ratio. (*Microsoft 2022 Annual Report*, n.d.)

On the other hand, Microsoft has encountered difficulties like declining cash reserves and potential problems with liquidity brought on by a rise in short-term liabilities. Microsoft's overall financial performance is still solid in spite of these difficulties, thanks to improvements in operating cash flow, effective inventory management, and rapid growth in receivables.

It is recommended that investors look to Microsoft as a viable investment opportunity. The company is a safe option for investment because of its increased liquidity, strong profitability, and effective debt management. Microsoft is positioned for sustained growth and market leadership through its strategic initiatives in cloud computing, artificial intelligence, and enterprise solutions. The business model of the company is resilient and well-balanced due to its significant presence in both consumer and enterprise markets and its diverse revenue streams. Microsoft's general financial health and development potential make it a dependable investment for both short-term and long-term returns, despite some concerns about cash reserves and short-term commitments. Microsoft's dedication to providing shareholder returns through share repurchases and dividends

further enhances its appeal as an investment. (*Microsoft Corp (MSFT)*, 2024)

In conclusion, both Apple and Microsoft offer solid investment opportunities given their strong financial performance over the previous ten years. Apple is a good option due to its strong liquidity and steady profitability, while Microsoft is a strong competitor due to its impressive growth in receivables and effective debt management. Investors should carefully weigh the financial health and growth potential of both companies in order to make safe and informed decisions. By investing in these tech giants, investors can take advantage of their market dominance, innovation capabilities, and strategic growth initiatives, which means long-term value and returns.

Conclusion:

To sum up, financial statement analysis is crucial for companies looking to grow and boost sales. Businesses can learn a great deal about their overall financial health and operational efficacy by thoroughly analyzing financial data. While maintaining strengths assures long-term success, identifying weaknesses enables focused modifications. A clear route to accomplishing important goals is to compare performance over time. (Kenton, 2024)

This study used a variety of ratios to analyze the financial data of two of the top technological companies, Apple, and Microsoft. These ratios are strong interpretative instruments that help in the production of a productive analysis report.

The power of financial statement analysis to shed light on critical aspects of a company's financial health, including profitability, liquidity, solvency, and operational effectiveness, makes it significant. By looking at these areas, stakeholders can assess the company's capacity to turn a profit, pay its debts, and make efficient use of its resources. (Gomez, 2024)

A ten-year comparison review of Apple and Microsoft's financial data offers a thorough insight into their financial situation. This analysis includes a wide range of ratios, including those related to profitability (such as profit margin), liquidity (such as current, quick, and cash ratios), debt (such as debt to equity and times interest earned ratios), and many more. Investors and other interested

parties can learn more about the companies' profitability, liquidity situation, debt management, and general financial health by analyzing these figures.

Financial statement analysis also looks beyond just the numbers. It also includes qualitative components including competition analysis, industry trends, and management efficacy. These qualitative metrics offer a comprehensive picture of a business's success and adaptability to shifting market conditions. (Carbon, 2023)

Finally, for stakeholders looking to make wise investment decisions as well as businesses pursuing growth, a thorough financial statement analysis is essential. Financial ratios and other analytical tools can help businesses identify areas for development, capitalize on their strengths, and get a clearer picture of their route to success.

Appendix:

links to all Annual reports of Apple

https://www.apple.com/newsroom/pdfs/fy2023-q4/FY23_Q4_Consolidated_Financial_Statements.pdf Year (2023, 2022)

https://www.apple.com/newsroom/pdfs/FY21_Q4_Consolidated_Financial_Statements.pdf

Year (2020 & 2021)

https://www.apple.com/newsroom/pdfs/Q4%20FY19%20Consolidated%20Financial%20Statements.pdf Year (2019)

https://s2.q4cdn.com/470004039/files/doc_earnings/2023/q4/filing/_10-K-Q4-2023-As-Filed.pdf
PAGE 42 (Interest expense) Year 2023,2022,2021

https://s2.q4cdn.com/470004039/files/doc_financials/2021/q4/_10-K-2021-(As-Filed).pdf

PAGE 44 (Interest expense) Year 2020,2019

10-K 2018, 9.29.2018 (q4cdn.com)

10-K 2016, 9.24.2016 (annualreports.com)

10-K (sec.gov)

links to all Annual reports of Microsoft

https://www.microsoft.com/investor/reports/ar23/index.html

https://www.microsoft.com/investor/reports/ar22/index.html

https://www.microsoft.com/investor/reports/ar21/index.html

https://www.microsoft.com/investor/reports/ar20/index.html

https://www.microsoft.com/investor/reports/ar19/index.html

https://www.microsoft.com/investor/reports/ar18/index.html

https://www.microsoft.com/investor/reports/ar17/index.html

https://www.microsoft.com/investor/reports/ar16/index.html

https://www.microsoft.com/investor/reports/ar15/index.html

https://www.microsoft.com/investor/reports/ar14/index.html

Screenshots for Apple company:

CONSOLIDATED BALANCE SHEETS
(In millions, except number of shares which are reflected in thousands and par value)

	September 27, 2014	September 28, 2013
ASSETS:		
Current assets:		
Cash and cash equivalents	$ 13,844	$ 14,259
Short-term marketable securities	11,233	26,287
Accounts receivable, less allowances of $86 and $99, respectively	17,460	13,102
Inventories	2,111	1,764
Deferred tax assets	4,318	3,453
Vendor non-trade receivables	9,759	7,539
Other current assets	9,806	6,882
Total current assets	68,531	73,286
Long-term marketable securities	130,162	106,215
Property, plant and equipment, net	20,624	16,597
Goodwill	4,616	1,577
Acquired intangible assets, net	4,142	4,179
Other assets	3,764	5,146
Total assets	$ 231,839	$ 207,000
LIABILITIES AND SHAREHOLDERS' EQUITY:		
Current liabilities:		
Accounts payable	$ 30,196	$ 22,367
Accrued expenses	18,453	13,856
Deferred revenue	8,491	7,435
Commercial paper	6,308	0
Total current liabilities	63,448	43,658
Deferred revenue – non-current	3,031	2,625
Long-term debt	28,987	16,960
Other non-current liabilities	24,826	20,208
Total liabilities	120,292	83,451
Commitments and contingencies		
Shareholders' equity:		
Common stock and additional paid-in capital, $0.00001 par value; 12,600,000 shares authorized; 5,866,161 and 6,294,494 shares issued and outstanding, respectively	23,313	19,764
Retained earnings	87,152	104,256
Accumulated other comprehensive income/(loss)	1,082	(471)
Total shareholders' equity	111,547	123,549
Total liabilities and shareholders' equity	$ 231,839	$ 207,000

See accompanying Notes to Consolidated Financial Statements.

Apple Inc. | 2014 Form 10-K | 47

CONSOLIDATED STATEMENTS OF OPERATIONS

(In millions, except number of shares which are reflected in thousands and per share amounts)

	Years ended		
	September 27, 2014	September 28, 2013	September 29, 2012
Net sales	$ 182,795	$ 170,910	$ 156,508
Cost of sales	112,258	106,606	87,846
Gross margin	70,537	64,304	68,662
Operating expenses:			
Research and development	6,041	4,475	3,381
Selling, general and administrative	11,993	10,830	10,040
Total operating expenses	18,034	15,305	13,421
Operating income	52,503	48,999	55,241
Other income/(expense), net	980	1,156	522
Income before provision for income taxes	53,483	50,155	55,763
Provision for income taxes	13,973	13,118	14,030
Net income	$ 39,510	$ 37,037	$ 41,733
Earnings per share:			
Basic	$ 6.49	$ 5.72	$ 6.38
Diluted	$ 6.45	$ 5.68	$ 6.31
Shares used in computing earnings per share:			
Basic	6,085,572	6,477,320	6,543,726
Diluted	6,122,663	6,521,634	6,617,483
Cash dividends declared per common share	$ 1.82	$ 1.64	$ 0.38

See accompanying Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF CASH FLOWS
(In millions)

	Years ended		
	September 27, 2014	September 28, 2013	September 29, 2012
Cash and cash equivalents, beginning of the year	$ 14,259	$ 10,746	$ 9,815
Operating activities:			
Net income	39,510	37,037	41,733
Adjustments to reconcile net income to cash generated by operating activities:			
Depreciation and amortization	7,946	6,757	3,277
Share-based compensation expense	2,863	2,253	1,740
Deferred income tax expense	2,347	1,141	4,405
Changes in operating assets and liabilities:			
Accounts receivable, net	(4,232)	(2,172)	(5,551)
Inventories	(76)	(973)	(15)
Vendor non-trade receivables	(2,220)	223	(1,414)
Other current and non-current assets	167	1,080	(3,162)
Accounts payable	5,938	2,340	4,467
Deferred revenue	1,460	1,459	2,824
Other current and non-current liabilities	6,010	4,521	2,552
Cash generated by operating activities	59,713	53,666	50,856
Investing activities:			
Purchases of marketable securities	(217,128)	(148,489)	(151,232)
Proceeds from maturities of marketable securities	18,810	20,317	13,035
Proceeds from sales of marketable securities	189,301	104,130	99,770
Payments made in connection with business acquisitions, net	(3,765)	(496)	(350)
Payments for acquisition of property, plant and equipment	(9,571)	(8,165)	(8,295)
Payments for acquisition of intangible assets	(242)	(911)	(1,107)
Other	16	(160)	(48)
Cash used in investing activities	(22,579)	(33,774)	(48,227)
Financing activities:			
Proceeds from issuance of common stock	730	530	665
Excess tax benefits from equity awards	739	701	1,351
Taxes paid related to net share settlement of equity awards	(1,158)	(1,082)	(1,226)
Dividends and dividend equivalents paid	(11,126)	(10,564)	(2,488)
Repurchase of common stock	(45,000)	(22,860)	0
Proceeds from issuance of long-term debt, net	11,960	16,896	0
Proceeds from issuance of commercial paper, net	6,306	0	0
Cash used in financing activities	(37,549)	(16,379)	(1,698)
Increase/(decrease) in cash and cash equivalents	(415)	3,513	931
Cash and cash equivalents, end of the year	$ 13,844	$ 14,259	$ 10,746
Supplemental cash flow disclosure:			
Cash paid for income taxes, net	$ 10,026	$ 9,128	$ 7,682
Cash paid for interest	$ 339	$ 0	$ 0

See accompanying Notes to Consolidated Financial Statements.

Other Income/(Expense), Net

The following table shows the detail of other income/(expense), net for 2016, 2015 and 2014 (in millions):

	2016	2015	2014
Interest and dividend income	$ 3,999	$ 2,921	$ 1,795
Interest expense	(1,456)	(733)	(384)
Other expense, net	(1,195)	(903)	(431)
Total other income/(expense), net	$ 1,348	$ 1,285	$ 980

CONSOLIDATED BALANCE SHEETS
(In millions, except number of shares which are reflected in thousands and par value)

	September 24, 2016	September 26, 2015
ASSETS:		
Current assets:		
Cash and cash equivalents	$ 20,484	$ 21,120
Short-term marketable securities	46,671	20,481
Accounts receivable, less allowances of $53 and $63, respectively	15,754	16,849
Inventories	2,132	2,349
Vendor non-trade receivables	13,545	13,494
Other current assets	8,283	15,085
Total current assets	106,869	89,378
Long-term marketable securities	170,430	164,065
Property, plant and equipment, net	27,010	22,471
Goodwill	5,414	5,116
Acquired intangible assets, net	3,206	3,893
Other non-current assets	8,757	5,422
Total assets	$ 321,686	$ 290,345
LIABILITIES AND SHAREHOLDERS' EQUITY:		
Current liabilities:		
Accounts payable	$ 37,294	$ 35,490
Accrued expenses	22,027	25,181
Deferred revenue	8,080	8,940
Commercial paper	8,105	8,499
Current portion of long-term debt	3,500	2,500
Total current liabilities	79,006	80,610
Deferred revenue, non-current	2,930	3,624
Long-term debt	75,427	53,329
Other non-current liabilities	36,074	33,427
Total liabilities	193,437	170,990
Commitments and contingencies		
Shareholders' equity:		
Common stock and additional paid-in capital, $0.00001 par value: 12,600,000 shares authorized; 5,336,166 and 5,578,753 shares issued and outstanding, respectively	31,251	27,416
Retained earnings	96,364	92,284
Accumulated other comprehensive income/(loss)	634	(345)
Total shareholders' equity	128,249	119,355
Total liabilities and shareholders' equity	$ 321,686	$ 290,345

See accompanying Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF OPERATIONS
(In millions, except number of shares which are reflected in thousands and per share amounts)

	Years ended		
	September 24, 2016	September 26, 2015	September 27, 2014
Net sales	$ 215,639	$ 233,715	$ 182,795
Cost of sales	131,376	140,089	112,258
Gross margin	84,263	93,626	70,537
Operating expenses:			
Research and development	10,045	8,067	6,041
Selling, general and administrative	14,194	14,329	11,993
Total operating expenses	24,239	22,396	18,034
Operating income	60,024	71,230	52,503
Other income/(expense), net	1,348	1,285	980
Income before provision for income taxes	61,372	72,515	53,483
Provision for income taxes	15,685	19,121	13,973
Net income	$ 45,687	$ 53,394	$ 39,510
Earnings per share:			
Basic	$ 8.35	$ 9.28	$ 6.49
Diluted	$ 8.31	$ 9.22	$ 6.45
Shares used in computing earnings per share:			
Basic	5,470,820	5,753,421	6,085,572
Diluted	5,500,281	5,793,069	6,122,663
Cash dividends declared per share	$ 2.18	$ 1.98	$ 1.82

See accompanying Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF CASH FLOWS
(In millions)

	Years ended		
	September 24, 2016	September 26, 2015	September 27, 2014
Cash and cash equivalents, beginning of the year	$ 21,120	$ 13,844	$ 14,259
Operating activities:			
Net income	45,687	53,394	39,510
Adjustments to reconcile net income to cash generated by operating activities:			
Depreciation and amortization	10,505	11,257	7,946
Share-based compensation expense	4,210	3,586	2,863
Deferred income tax expense	4,938	1,382	2,347
Changes in operating assets and liabilities:			
Accounts receivable, net	1,095	611	(4,232)
Inventories	217	(238)	(76)
Vendor non-trade receivables	(51)	(3,735)	(2,220)
Other current and non-current assets	1,090	(179)	167
Accounts payable	1,791	5,400	5,938
Deferred revenue	(1,554)	1,042	1,460
Other current and non-current liabilities	(2,104)	8,746	6,010
Cash generated by operating activities	65,824	81,266	59,713
Investing activities:			
Purchases of marketable securities	(142,428)	(166,402)	(217,128)
Proceeds from maturities of marketable securities	21,258	14,538	18,810
Proceeds from sales of marketable securities	90,536	107,447	189,301
Payments made in connection with business acquisitions, net	(297)	(343)	(3,765)
Payments for acquisition of property, plant and equipment	(12,734)	(11,247)	(9,571)
Payments for acquisition of intangible assets	(814)	(241)	(242)
Payments for strategic investments	(1,388)	—	(10)
Other	(110)	(26)	26
Cash used in investing activities	(45,977)	(56,274)	(22,579)
Financing activities:			
Proceeds from issuance of common stock	495	543	730
Excess tax benefits from equity awards	407	749	739
Payments for taxes related to net share settlement of equity awards	(1,570)	(1,499)	(1,158)
Payments for dividends and dividend equivalents	(12,150)	(11,561)	(11,126)
Repurchases of common stock	(29,722)	(35,253)	(45,000)
Proceeds from issuance of term debt, net	24,954	27,114	11,960
Repayments of term debt	(2,500)	—	—
Change in commercial paper, net	(397)	2,191	6,306
Cash used in financing activities	(20,483)	(17,716)	(37,549)
Increase/(Decrease) in cash and cash equivalents	(636)	7,276	(415)
Cash and cash equivalents, end of the year	$ 20,484	$ 21,120	$ 13,844
Supplemental cash flow disclosure:			

Other Income/(Expense), Net

The following table shows the detail of other income/(expense), net for 2016, 2015 and 2014 (in millions):

	2016	2015	2014
Interest and dividend income	$ 3,999	$ 2,921	$ 1,795
Interest expense	(1,456)	(733)	(384)
Other expense, net	(1,195)	(903)	(431)
Total other income/(expense), net	$ 1,348	$ 1,285	$ 980

Apple Inc.

CONSOLIDATED BALANCE SHEETS
(In millions, except number of shares which are reflected in thousands and par value)

	September 29, 2018	September 30, 2017
ASSETS:		
Current assets:		
Cash and cash equivalents	$ 25,913	$ 20,289
Marketable securities	40,388	53,892
Accounts receivable, net	23,186	17,874
Inventories	3,956	4,855
Vendor non-trade receivables	25,809	17,799
Other current assets	12,087	13,936
Total current assets	131,339	128,645
Non-current assets:		
Marketable securities	170,799	194,714
Property, plant and equipment, net	41,304	33,783
Other non-current assets	22,283	18,177
Total non-current assets	234,386	246,674
Total assets	$ 365,725	$ 375,319
LIABILITIES AND SHAREHOLDERS' EQUITY:		
Current liabilities:		
Accounts payable	$ 55,888	$ 44,242
Other current liabilities	32,687	30,551
Deferred revenue	7,543	7,548
Commercial paper	11,964	11,977
Term debt	8,784	6,496
Total current liabilities	116,866	100,814
Non-current liabilities:		
Deferred revenue	2,797	2,836
Term debt	93,735	97,207
Other non-current liabilities	45,180	40,415
Total non-current liabilities	141,712	140,458
Total liabilities	258,578	241,272
Commitments and contingencies		
Shareholders' equity:		
Common stock and additional paid-in capital, $0.00001 par value: 12,600,000 shares authorized; 4,754,986 and 5,126,201 shares issued and outstanding, respectively	40,201	35,867
Retained earnings	70,400	98,330
Accumulated other comprehensive income/(loss)	(3,454)	(150)
Total shareholders' equity	107,147	134,047
Total liabilities and shareholders' equity	$ 365,725	$ 375,319

Apple Inc.

CONSOLIDATED STATEMENTS OF OPERATIONS
(In millions, except number of shares which are reflected in thousands and per share amounts)

	Years ended		
	September 29, 2018	September 30, 2017	September 24, 2016
Net sales	$ 265,595	$ 229,234	$ 215,639
Cost of sales	163,756	141,048	131,376
Gross margin	101,839	88,186	84,263
Operating expenses:			
Research and development	14,236	11,581	10,045
Selling, general and administrative	16,705	15,261	14,194
Total operating expenses	30,941	26,842	24,239
Operating income	70,898	61,344	60,024
Other income/(expense), net	2,005	2,745	1,348
Income before provision for income taxes	72,903	64,089	61,372
Provision for income taxes	13,372	15,738	15,685
Net income	$ 59,531	$ 48,351	$ 45,687
Earnings per share:			
Basic	$ 12.01	$ 9.27	$ 8.35
Diluted	$ 11.91	$ 9.21	$ 8.31
Shares used in computing earnings per share:			
Basic	4,955,377	5,217,242	5,470,820
Diluted	5,000,109	5,251,692	5,500,281

See accompanying Notes to Consolidated Financial Statements.

CONSOLIDATED STATEMENTS OF CASH FLOWS
(In millions)

	Years ended		
	September 29, 2018	September 30, 2017	September 24, 2016
Cash and cash equivalents, beginning of the year	$ 20,289	$ 20,484	$ 21,120
Operating activities:			
Net income	59,531	48,351	45,687
Adjustments to reconcile net income to cash generated by operating activities:			
Depreciation and amortization	10,903	10,157	10,505
Share-based compensation expense	5,340	4,840	4,210
Deferred income tax expense/(benefit)	(32,590)	5,966	4,938
Other	(444)	(166)	486
Changes in operating assets and liabilities:			
Accounts receivable, net	(5,322)	(2,093)	527
Inventories	828	(2,723)	217
Vendor non-trade receivables	(8,010)	(4,254)	(51)
Other current and non-current assets	(423)	(5,318)	1,055
Accounts payable	9,175	8,966	2,117
Deferred revenue	(44)	(626)	(1,554)
Other current and non-current liabilities	38,490	1,125	(1,906)
Cash generated by operating activities	77,434	64,225	66,231
Investing activities:			
Purchases of marketable securities	(71,356)	(159,486)	(142,428)
Proceeds from maturities of marketable securities	55,881	31,775	21,258
Proceeds from sales of marketable securities	47,838	94,564	90,536
Payments for acquisition of property, plant and equipment	(13,313)	(12,451)	(12,734)
Payments made in connection with business acquisitions, net	(721)	(329)	(297)
Purchases of non-marketable securities	(1,871)	(521)	(1,388)
Proceeds from non-marketable securities	353	126	—
Other	(745)	(124)	(924)
Cash generated by/(used in) investing activities	16,066	(46,446)	(45,977)
Financing activities:			
Proceeds from issuance of common stock	669	555	495
Payments for taxes related to net share settlement of equity awards	(2,527)	(1,874)	(1,570)
Payments for dividends and dividend equivalents	(13,712)	(12,769)	(12,150)
Repurchases of common stock	(72,738)	(32,900)	(29,722)
Proceeds from issuance of term debt, net	6,969	28,662	24,954
Repayments of term debt	(6,500)	(3,500)	(2,500)
Change in commercial paper, net	(37)	3,852	(397)
Cash used in financing activities	(87,876)	(17,974)	(20,890)
Increase/(Decrease) in cash and cash equivalents	5,624	(195)	(636)
Cash and cash equivalents, end of the year	$ 25,913	$ 20,289	$ 20,484
Supplemental cash flow disclosure:			
Cash paid for income taxes, net	$ 10,417	$ 11,591	$ 10,444
Cash paid for interest	$ 3,022	$ 2,092	$ 1,316

See accompanying Notes to Consolidated Financial Statements.

Other Income/(Expense), Net

The following table shows the detail of other income/(expense), net for 2018, 2017 and 2016 (in millions):

	2018	2017	2016
Interest and dividend income	$ 5,686	$ 5,201	$ 3,999
Interest expense	(3,240)	(2,323)	(1,456)
Other expense, net	(441)	(133)	(1,195)
Total other income/(expense), net	$ 2,005	$ 2,745	$ 1,348

Apple Inc.

CONDENSED CONSOLIDATED BALANCE SHEETS (Unaudited)

(In millions, except number of shares which are reflected in thousands and par value)

	September 28, 2019	September 29, 2018
ASSETS:		
Current assets:		
Cash and cash equivalents	$ 48,844	$ 25,913
Marketable securities	51,713	40,388
Accounts receivable, net	22,926	23,186
Inventories	4,106	3,956
Vendor non-trade receivables	22,878	25,809
Other current assets	12,352	12,087
Total current assets	162,819	131,339
Non-current assets:		
Marketable securities	105,341	170,799
Property, plant and equipment, net	37,378	41,304
Other non-current assets	32,978	22,283
Total non-current assets	175,697	234,386
Total assets	$ 338,516	$ 365,725
LIABILITIES AND SHAREHOLDERS' EQUITY:		
Current liabilities:		
Accounts payable	$ 46,236	$ 55,888
Other current liabilities	37,720	33,327
Deferred revenue	5,522	5,966
Commercial paper	5,980	11,964
Term debt	10,260	8,784
Total current liabilities	105,718	115,929
Non-current liabilities:		
Term debt	91,807	93,735
Other non-current liabilities	50,503	48,914
Total non-current liabilities	142,310	142,649
Total liabilities	248,028	258,578
Commitments and contingencies		
Shareholders' equity:		
Common stock and additional paid-in capital, $0.00001 par value: 12,600,000 shares authorized; 4,443,236 and 4,754,986 shares issued and outstanding, respectively	45,174	40,201
Retained earnings	45,898	70,400
Accumulated other comprehensive income/(loss)	(584)	(3,454)
Total shareholders' equity	90,488	107,147
Total liabilities and shareholders' equity	$ 338,516	$ 365,725

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS (Unaudited)

(In millions, except number of shares which are reflected in thousands and per share amounts)

	Three Months Ended		Twelve Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Net sales:				
Products	$ 51,529	$ 52,301	$ 213,883	$ 225,847
Services	12,511	10,599	46,291	39,748
Total net sales [1]	64,040	62,900	260,174	265,595
Cost of sales:				
Products	35,238	34,697	144,996	148,164
Services	4,489	4,119	16,786	15,592
Total cost of sales	39,727	38,816	161,782	163,756
Gross margin	24,313	24,084	98,392	101,839
Operating expenses:				
Research and development	4,110	3,750	16,217	14,236
Selling, general and administrative	4,578	4,216	18,245	16,705
Total operating expenses	8,688	7,966	34,462	30,941
Operating income	15,625	16,118	63,930	70,898
Other income/(expense), net	502	303	1,807	2,005
Income before provision for income taxes	16,127	16,421	65,737	72,903
Provision for income taxes	2,441	2,296	10,481	13,372
Net income	$ 13,686	$ 14,125	$ 55,256	$ 59,531
Earnings per share:				
Basic	$ 3.05	$ 2.94	$ 11.97	$ 12.01
Diluted	$ 3.03	$ 2.91	$ 11.89	$ 11.91
Shares used in computing earnings per share:				
Basic	4,490,812	4,801,589	4,617,834	4,955,377
Diluted	4,520,373	4,847,547	4,648,913	5,000,109
[1] Net sales by reportable segment:				
Americas	$ 29,322	$ 27,517	$ 116,914	$ 112,093
Europe	14,946	15,382	60,288	62,420
Greater China	11,134	11,411	43,678	51,942
Japan	4,982	5,161	21,506	21,733
Rest of Asia Pacific	3,656	3,429	17,788	17,407
Total net sales	$ 64,040	$ 62,900	$ 260,174	$ 265,595
[1] Net sales by category:				
iPhone	$ 33,362	$ 36,755	$ 142,381	$ 164,888
Mac	6,991	7,340	25,740	25,198
iPad	4,656	3,983	21,280	18,380
Wearables, Home and Accessories	6,520	4,223	24,482	17,381
Services	12,511	10,599	46,291	39,748
Total net sales	$ 64,040	$ 62,900	$ 260,174	$ 265,595

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS (Unaudited)

(In millions)

	Twelve Months Ended	
	September 28, 2019	September 29, 2018
Cash, cash equivalents and restricted cash, beginning balances	$ 25,913	$ 20,289
Operating activities:		
Net income	55,256	59,531
Adjustments to reconcile net income to cash generated by operating activities:		
Depreciation and amortization	12,547	10,903
Share-based compensation expense	6,068	5,340
Deferred income tax benefit	(340)	(32,590)
Other	(652)	(444)
Changes in operating assets and liabilities:		
Accounts receivable, net	245	(5,322)
Inventories	(289)	828
Vendor non-trade receivables	2,931	(8,010)
Other current and non-current assets	873	(423)
Accounts payable	(1,923)	9,175
Deferred revenue	(625)	(3)
Other current and non-current liabilities	(4,700)	38,449
Cash generated by operating activities	69,391	77,434
Investing activities:		
Purchases of marketable securities	(39,630)	(71,356)
Proceeds from maturities of marketable securities	40,102	55,881
Proceeds from sales of marketable securities	56,988	47,838
Payments for acquisition of property, plant and equipment	(10,495)	(13,313)
Payments made in connection with business acquisitions, net	(624)	(721)
Purchases of non-marketable securities	(1,001)	(1,871)
Proceeds from non-marketable securities	1,634	353
Other	(1,078)	(745)
Cash generated by investing activities	45,896	16,066
Financing activities:		
Proceeds from issuance of common stock	781	669
Payments for taxes related to net share settlement of equity awards	(2,817)	(2,527)
Payments for dividends and dividend equivalents	(14,119)	(13,712)
Repurchases of common stock	(66,897)	(72,738)
Proceeds from issuance of term debt, net	6,963	6,969
Repayments of term debt	(8,805)	(6,500)
Repayments of commercial paper, net	(5,977)	(37)
Other	(105)	—
Cash used in financing activities	(90,976)	(87,876)
Increase in cash, cash equivalents and restricted cash	24,311	5,624
Cash, cash equivalents and restricted cash, ending balances	$ 50,224	$ 25,913
Supplemental cash flow disclosure:		
Cash paid for income taxes, net	$ 15,263	$ 10,417
Cash paid for interest	$ 3,423	$ 3,022

Other Income/(Expense), Net

The following table shows the detail of other income/(expense), net for 2018, 2017 and 2016 (in millions):

	2018	2017	2016
Interest and dividend income	$ 5,686	$ 5,201	$ 3,999
Interest expense	(3,240)	(2,323)	(1,456)
Other expense, net	(441)	(133)	(1,195)
Total other income/(expense), net	$ 2,005	$ 2,745	$ 1,348

Other Income/(Expense), Net

The following table shows the detail of other income/(expense), net for 2016, 2015 and 2014 (in millions):

	2016	2015	2014
Interest and dividend income	$ 3,999	$ 2,921	$ 1,795
Interest expense	(1,456)	(733)	(384)
Other expense, net	(1,195)	(903)	(431)
Total other income/(expense), net	$ 1,348	$ 1,285	$ 980

Apple Inc.

CONDENSED CONSOLIDATED BALANCE SHEETS (Unaudited)
(In millions, except number of shares which are reflected in thousands and par value)

	September 28, 2019	September 29, 2018
ASSETS:		
Current assets:		
Cash and cash equivalents	$ 48,844	$ 25,913
Marketable securities	51,713	40,388
Accounts receivable, net	22,926	23,186
Inventories	4,106	3,956
Vendor non-trade receivables	22,878	25,809
Other current assets	12,352	12,087
Total current assets	162,819	131,339
Non-current assets:		
Marketable securities	105,341	170,799
Property, plant and equipment, net	37,378	41,304
Other non-current assets	32,978	22,283
Total non-current assets	175,697	234,386
Total assets	$ 338,516	$ 365,725
LIABILITIES AND SHAREHOLDERS' EQUITY:		
Current liabilities:		
Accounts payable	$ 46,236	$ 55,888
Other current liabilities	37,720	33,327
Deferred revenue	5,522	5,966
Commercial paper	5,980	11,964
Term debt	10,260	8,784
Total current liabilities	105,718	115,929
Non-current liabilities:		
Term debt	91,807	93,735
Other non-current liabilities	50,503	48,914
Total non-current liabilities	142,310	142,649
Total liabilities	248,028	258,578
Commitments and contingencies		
Shareholders' equity:		
Common stock and additional paid-in capital, $0.00001 par value: 12,600,000 shares authorized; 4,443,236 and 4,754,986 shares issued and outstanding, respectively	45,174	40,201
Retained earnings	45,898	70,400
Accumulated other comprehensive income/(loss)	(584)	(3,454)
Total shareholders' equity	90,488	107,147
Total liabilities and shareholders' equity	$ 338,516	$ 365,725

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS (Unaudited)

(In millions, except number of shares which are reflected in thousands and per share amounts)

	Three Months Ended		Twelve Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Net sales:				
Products	$ 51,529	$ 52,301	$ 213,883	$ 225,847
Services	12,511	10,599	46,291	39,748
Total net sales [1]	64,040	62,900	260,174	265,595
Cost of sales:				
Products	35,238	34,697	144,996	148,164
Services	4,489	4,119	16,786	15,592
Total cost of sales	39,727	38,816	161,782	163,756
Gross margin	24,313	24,084	98,392	101,839
Operating expenses:				
Research and development	4,110	3,750	16,217	14,236
Selling, general and administrative	4,578	4,216	18,245	16,705
Total operating expenses	8,688	7,966	34,462	30,941
Operating income	15,625	16,118	63,930	70,898
Other income/(expense), net	502	303	1,807	2,005
Income before provision for income taxes	16,127	16,421	65,737	72,903
Provision for income taxes	2,441	2,296	10,481	13,372
Net income	$ 13,686	$ 14,125	$ 55,256	$ 59,531
Earnings per share:				
Basic	$ 3.05	$ 2.94	$ 11.97	$ 12.01
Diluted	$ 3.03	$ 2.91	$ 11.89	$ 11.91
Shares used in computing earnings per share:				
Basic	4,490,812	4,801,589	4,617,834	4,955,377
Diluted	4,520,373	4,847,547	4,648,913	5,000,109
[1] Net sales by reportable segment:				
Americas	$ 29,322	$ 27,517	$ 116,914	$ 112,093
Europe	14,946	15,382	60,288	62,420
Greater China	11,134	11,411	43,678	51,942
Japan	4,982	5,161	21,506	21,733
Rest of Asia Pacific	3,656	3,429	17,788	17,407
Total net sales	$ 64,040	$ 62,900	$ 260,174	$ 265,595
[1] Net sales by category:				
iPhone	$ 33,362	$ 36,755	$ 142,381	$ 164,888
Mac	6,991	7,340	25,740	25,198
iPad	4,656	3,983	21,280	18,380
Wearables, Home and Accessories	6,520	4,223	24,482	17,381
Services	12,511	10,599	46,291	39,748
Total net sales	$ 64,040	$ 62,900	$ 260,174	$ 265,595

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS (Unaudited)

(In millions)

	Twelve Months Ended	
	September 28, 2019	September 29, 2018
Cash, cash equivalents and restricted cash, beginning balances	$ 25,913	$ 20,289
Operating activities:		
Net income	55,256	59,531
Adjustments to reconcile net income to cash generated by operating activities:		
Depreciation and amortization	12,547	10,903
Share-based compensation expense	6,068	5,340
Deferred income tax benefit	(340)	(32,590)
Other	(652)	(444)
Changes in operating assets and liabilities:		
Accounts receivable, net	245	(5,322)
Inventories	(289)	828
Vendor non-trade receivables	2,931	(8,010)
Other current and non-current assets	873	(423)
Accounts payable	(1,923)	9,175
Deferred revenue	(625)	(3)
Other current and non-current liabilities	(4,700)	38,449
Cash generated by operating activities	69,391	77,434
Investing activities:		
Purchases of marketable securities	(39,630)	(71,356)
Proceeds from maturities of marketable securities	40,102	55,881
Proceeds from sales of marketable securities	56,988	47,838
Payments for acquisition of property, plant and equipment	(10,495)	(13,313)
Payments made in connection with business acquisitions, net	(624)	(721)
Purchases of non-marketable securities	(1,001)	(1,871)
Proceeds from non-marketable securities	1,634	353
Other	(1,078)	(745)
Cash generated by investing activities	45,896	16,066
Financing activities:		
Proceeds from issuance of common stock	781	669
Payments for taxes related to net share settlement of equity awards	(2,817)	(2,527)
Payments for dividends and dividend equivalents	(14,119)	(13,712)
Repurchases of common stock	(66,897)	(72,738)
Proceeds from issuance of term debt, net	6,963	6,969
Repayments of term debt	(8,805)	(6,500)
Repayments of commercial paper, net	(5,977)	(37)
Other	(105)	—
Cash used in financing activities	(90,976)	(87,876)
Increase in cash, cash equivalents and restricted cash	24,311	5,624
Cash, cash equivalents and restricted cash, ending balances	$ 50,224	$ 25,913
Supplemental cash flow disclosure:		
Cash paid for income taxes, net	$ 15,263	$ 10,417
Cash paid for interest	$ 3,423	$ 3,022

Apple Inc.

CONDENSED CONSOLIDATED BALANCE SHEETS (Unaudited)

(In millions, except number of shares which are reflected in thousands and par value)

	September 25, 2021	September 26, 2020
ASSETS:		
Current assets:		
Cash and cash equivalents	$ 34,940	$ 38,016
Marketable securities	27,699	52,927
Accounts receivable, net	26,278	16,120
Inventories	6,580	4,061
Vendor non-trade receivables	25,228	21,325
Other current assets	14,111	11,264
Total current assets	134,836	143,713
Non-current assets:		
Marketable securities	127,877	100,887
Property, plant and equipment, net	39,440	36,766
Other non-current assets	48,849	42,522
Total non-current assets	216,166	180,175
Total assets	$ 351,002	$ 323,888
LIABILITIES AND SHAREHOLDERS' EQUITY:		
Current liabilities:		
Accounts payable	$ 54,763	$ 42,296
Other current liabilities	47,493	42,684
Deferred revenue	7,612	6,643
Commercial paper	6,000	4,996
Term debt	9,613	8,773
Total current liabilities	125,481	105,392
Non-current liabilities:		
Term debt	109,106	98,667
Other non-current liabilities	53,325	54,490
Total non-current liabilities	162,431	153,157
Total liabilities	287,912	258,549
Commitments and contingencies		
Shareholders' equity:		
Common stock and additional paid-in capital, $0.00001 par value: 50,400,000 shares authorized; 16,426,786 and 16,976,763 shares issued and outstanding, respectively	57,365	50,779
Retained earnings	5,562	14,966
Accumulated other comprehensive income/(loss)	163	(406)
Total shareholders' equity	63,090	65,339
Total liabilities and shareholders' equity	$ 351,002	$ 323,888

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS (Unaudited)

(In millions)

	Twelve Months Ended	
	September 25, 2021	September 26, 2020
Cash, cash equivalents and restricted cash, beginning balances	$ 39,789	$ 50,224
Operating activities:		
Net income	94,680	57,411
Adjustments to reconcile net income to cash generated by operating activities:		
Depreciation and amortization	11,284	11,056
Share-based compensation expense	7,906	6,829
Deferred income tax benefit	(4,774)	(215)
Other	(147)	(97)
Changes in operating assets and liabilities:		
Accounts receivable, net	(10,125)	6,917
Inventories	(2,642)	(127)
Vendor non-trade receivables	(3,903)	1,553
Other current and non-current assets	(8,042)	(9,588)
Accounts payable	12,326	(4,062)
Deferred revenue	1,676	2,081
Other current and non-current liabilities	5,799	8,916
Cash generated by operating activities	104,038	80,674
Investing activities:		
Purchases of marketable securities	(109,558)	(114,938)
Proceeds from maturities of marketable securities	59,023	69,918
Proceeds from sales of marketable securities	47,460	50,473
Payments for acquisition of property, plant and equipment	(11,085)	(7,309)
Payments made in connection with business acquisitions, net	(33)	(1,524)
Other	(352)	(909)
Cash used in investing activities	(14,545)	(4,289)
Financing activities:		
Proceeds from issuance of common stock	1,105	880
Payments for taxes related to net share settlement of equity awards	(6,556)	(3,634)
Payments for dividends and dividend equivalents	(14,467)	(14,081)
Repurchases of common stock	(85,971)	(72,358)
Proceeds from issuance of term debt, net	20,393	16,091
Repayments of term debt	(8,750)	(12,629)
Proceeds from/(Repayments of) commercial paper, net	1,022	(963)
Other	(129)	(126)
Cash used in financing activities	(93,353)	(86,820)
Decrease in cash, cash equivalents and restricted cash	(3,860)	(10,435)
Cash, cash equivalents and restricted cash, ending balances	$ 35,929	$ 39,789
Supplemental cash flow disclosure:		
Cash paid for income taxes, net	$ 25,385	$ 9,501
Cash paid for interest	$ 2,687	$ 3,002

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS (Unaudited)

(In millions, except number of shares which are reflected in thousands and per share amounts)

	Three Months Ended		Twelve Months Ended	
	September 25, 2021	September 26, 2020	September 25, 2021	September 26, 2020
Net sales:				
Products	$ 65,083	$ 50,149	$ 297,392	$ 220,747
Services	18,277	14,549	68,425	53,768
Total net sales [1]	83,360	64,698	365,817	274,515
Cost of sales:				
Products	42,790	35,197	192,266	151,286
Services	5,396	4,812	20,715	18,273
Total cost of sales	48,186	40,009	212,981	169,559
Gross margin	35,174	24,689	152,836	104,956
Operating expenses:				
Research and development	5,772	4,978	21,914	18,752
Selling, general and administrative	5,616	4,936	21,973	19,916
Total operating expenses	11,388	9,914	43,887	38,668
Operating income	23,786	14,775	108,949	66,288
Other income/(expense), net	(538)	126	258	803
Income before provision for income taxes	23,248	14,901	109,207	67,091
Provision for income taxes	2,697	2,228	14,527	9,680
Net income	$ 20,551	$ 12,673	$ 94,680	$ 57,411
Earnings per share:				
Basic	$ 1.25	$ 0.74	$ 5.67	$ 3.31
Diluted	$ 1.24	$ 0.73	$ 5.61	$ 3.28
Shares used in computing earnings per share:				
Basic	16,487,121	17,057,622	16,701,272	17,352,119
Diluted	16,635,097	17,256,521	16,864,919	17,528,214
[1] Net sales by reportable segment:				
Americas	$ 36,820	$ 30,698	$ 153,306	$ 124,556
Europe	20,794	16,900	89,307	68,640
Greater China	14,563	7,946	68,366	40,308
Japan	5,991	5,023	28,482	21,418
Rest of Asia Pacific	5,192	4,131	26,356	19,593
Total net sales	$ 83,360	$ 64,698	$ 365,817	$ 274,515
[1] Net sales by category:				
iPhone	$ 38,868	$ 26,444	$ 191,973	$ 137,781
Mac	9,178	9,032	35,190	28,622
iPad	8,252	6,797	31,862	23,724
Wearables, Home and Accessories	8,785	7,876	38,367	30,620
Services	18,277	14,549	68,425	53,768
Total net sales	$ 83,360	$ 64,698	$ 365,817	$ 274,515

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS (Unaudited)

(In millions, except number of shares, which are reflected in thousands, and per-share amounts)

	Three Months Ended		Twelve Months Ended	
	September 30, 2023	September 24, 2022	September 30, 2023	September 24, 2022
Net sales:				
Products	$ 67,184	$ 70,958	$ 298,085	$ 316,199
Services	22,314	19,188	85,200	78,129
Total net sales [1]	89,498	90,146	383,285	394,328
Cost of sales:				
Products	42,586	46,387	189,282	201,471
Services	6,485	5,664	24,855	22,075
Total cost of sales	49,071	52,051	214,137	223,546
Gross margin	40,427	38,095	169,148	170,782
Operating expenses:				
Research and development	7,307	6,761	29,915	26,251
Selling, general and administrative	6,151	6,440	24,932	25,094
Total operating expenses	13,458	13,201	54,847	51,345
Operating income	26,969	24,894	114,301	119,437
Other income/(expense), net	29	(237)	(565)	(334)
Income before provision for income taxes	26,998	24,657	113,736	119,103
Provision for income taxes	4,042	3,936	16,741	19,300
Net income	$ 22,956	$ 20,721	$ 96,995	$ 99,803
Earnings per share:				
Basic	$ 1.47	$ 1.29	$ 6.16	$ 6.15
Diluted	$ 1.46	$ 1.29	$ 6.13	$ 6.11
Shares used in computing earnings per share:				
Basic	15,599,434	16,030,382	15,744,231	16,215,963
Diluted	15,672,400	16,118,465	15,812,547	16,325,819
[1] Net sales by reportable segment:				
Americas	$ 40,115	$ 39,808	$ 162,560	$ 169,658
Europe	22,463	22,795	94,294	95,118
Greater China	15,084	15,470	72,559	74,200
Japan	5,505	5,700	24,257	25,977
Rest of Asia Pacific	6,331	6,373	29,615	29,375
Total net sales	$ 89,498	$ 90,146	$ 383,285	$ 394,328
[1] Net sales by category:				
iPhone	$ 43,805	$ 42,626	$ 200,583	$ 205,489
Mac	7,614	11,508	29,357	40,177
iPad	6,443	7,174	28,300	29,292
Wearables, Home and Accessories	9,322	9,650	39,845	41,241
Services	22,314	19,188	85,200	78,129
Total net sales	$ 89,498	$ 90,146	$ 383,285	$ 394,328

Apple Inc.

CONDENSED CONSOLIDATED BALANCE SHEETS (Unaudited)
(In millions, except number of shares, which are reflected in thousands, and par value)

	September 30, 2023	September 24, 2022
ASSETS:		
Current assets:		
Cash and cash equivalents	$ 29,965	$ 23,646
Marketable securities	31,590	24,658
Accounts receivable, net	29,508	28,184
Vendor non-trade receivables	31,477	32,748
Inventories	6,331	4,946
Other current assets	14,695	21,223
Total current assets	143,566	135,405
Non-current assets:		
Marketable securities	100,544	120,805
Property, plant and equipment, net	43,715	42,117
Other non-current assets	64,758	54,428
Total non-current assets	209,017	217,350
Total assets	$ 352,583	$ 352,755
LIABILITIES AND SHAREHOLDERS' EQUITY:		
Current liabilities:		
Accounts payable	$ 62,611	$ 64,115
Other current liabilities	58,829	60,845
Deferred revenue	8,061	7,912
Commercial paper	5,985	9,982
Term debt	9,822	11,128
Total current liabilities	145,308	153,982
Non-current liabilities:		
Term debt	95,281	98,959
Other non-current liabilities	49,848	49,142
Total non-current liabilities	145,129	148,101
Total liabilities	290,437	302,083
Commitments and contingencies		
Shareholders' equity:		
Common stock and additional paid-in capital, $0.00001 par value: 50,400,000 shares authorized; 15,550,061 and 15,943,425 shares issued and outstanding, respectively	73,812	64,849
Accumulated deficit	(214)	(3,068)
Accumulated other comprehensive loss	(11,452)	(11,109)
Total shareholders' equity	62,146	50,672
Total liabilities and shareholders' equity	$ 352,583	$ 352,755

Apple Inc.

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS (Unaudited)
(In millions)

	Twelve Months Ended	
	September 30, 2023	September 24, 2022
Cash, cash equivalents and restricted cash, beginning balances	$ 24,977	$ 35,929
Operating activities:		
Net income	96,995	99,803
Adjustments to reconcile net income to cash generated by operating activities:		
Depreciation and amortization	11,519	11,104
Share-based compensation expense	10,833	9,038
Other	(2,227)	1,006
Changes in operating assets and liabilities:		
Accounts receivable, net	(1,688)	(1,823)
Vendor non-trade receivables	1,271	(7,520)
Inventories	(1,618)	1,484
Other current and non-current assets	(5,684)	(6,499)
Accounts payable	(1,889)	9,448
Other current and non-current liabilities	3,031	6,110
Cash generated by operating activities	110,543	122,151
Investing activities:		
Purchases of marketable securities	(29,513)	(76,923)
Proceeds from maturities of marketable securities	39,686	29,917
Proceeds from sales of marketable securities	5,828	37,446
Payments for acquisition of property, plant and equipment	(10,959)	(10,708)
Other	(1,337)	(2,086)
Cash generated by/(used in) investing activities	3,705	(22,354)
Financing activities:		
Payments for taxes related to net share settlement of equity awards	(5,431)	(6,223)
Payments for dividends and dividend equivalents	(15,025)	(14,841)
Repurchases of common stock	(77,550)	(89,402)
Proceeds from issuance of term debt, net	5,228	5,465
Repayments of term debt	(11,151)	(9,543)
Proceeds from/(Repayments of) commercial paper, net	(3,978)	3,955
Other	(581)	(160)
Cash used in financing activities	(108,488)	(110,749)
Increase/(Decrease) in cash, cash equivalents and restricted cash	5,760	(10,952)
Cash, cash equivalents and restricted cash, ending balances	$ 30,737	$ 24,977
Supplemental cash flow disclosure:		
Cash paid for income taxes, net	$ 18,679	$ 19,573
Cash paid for interest	$ 3,803	$ 2,865

Interest expense: 2019 – 2023

Note 6 – Consolidated Financial Statement Details

Other Income/(Expense), Net

The following table shows the detail of other income/(expense), net for 2023, 2022 and 2021 (in millions):

	2023	2022	2021
Interest and dividend income	$ 3,750	$ 2,825	$ 2,843
Interest expense	(3,933)	(2,931)	(2,645)
Other income/(expense), net	(382)	(228)	60
Total other income/(expense), net	$ (565)	$ (334)	$ 258

Note 4 – Consolidated Financial Statement Details

Other Income/(Expense), Net

The following table shows the detail of OI&E for 2021, 2020 and 2019 (in millions):

	2021	2020	2019
Interest and dividend income	$ 2,843	$ 3,763	$ 4,961
Interest expense	(2,645)	(2,873)	(3,576)
Other income/(expense), net	60	(87)	422
Total other income/(expense), net	$ 258	$ 803	$ 1,807

Screenshots for Microsoft company:

2014:

BALANCE SHEETS

(In millions)

June 30,	2015	2014
Assets		
Current assets:		
Cash and cash equivalents	$ 5,595	$ 8,669
Short-term investments (including securities loaned of $75 and $541)	90,931	77,040
Total cash, cash equivalents, and short-term investments	96,526	85,709
Accounts receivable, net of allowance for doubtful accounts of $335 and $301	17,908	19,544
Inventories	2,902	2,660
Deferred income taxes	1,915	1,941
Other	5,461	4,392
Total current assets	124,712	114,246
Property and equipment, net of accumulated depreciation of $17,606 and $14,798	14,731	13,011
Equity and other investments	12,053	14,597
Goodwill	16,939	20,127
Intangible assets, net	4,835	6,981
Other long-term assets	2,953	3,422
Total assets	$ 176,223	$ 172,384
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 6,591	$ 7,432
Short-term debt	4,985	2,000
Current portion of long-term debt	2,499	0
Accrued compensation	5,096	4,797
Income taxes	606	782
Short-term unearned revenue	23,223	23,150
Securities lending payable	92	558
Other	6,766	6,906
Total current liabilities	49,858	45,625
Long-term debt	27,808	20,645
Long-term unearned revenue	2,095	2,008
Deferred income taxes	2,835	2,728
Other long-term liabilities	13,544	11,594
Total liabilities	96,140	82,600
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding 8,027 and 8,239	68,465	68,366
Retained earnings	9,096	17,710
Accumulated other comprehensive income	2,522	3,708
Total stockholders' equity	80,083	89,784
Total liabilities and stockholders' equity	$ 176,223	$ 172,384

See accompanying notes.

CASH FLOWS STATEMENTS

(In millions)

Year Ended June 30,	2016	2015	2014
Operations			
Net income	$ 16,798	$12,193	$22,074
Adjustments to reconcile net income to net cash from operations:			
Goodwill and asset impairments	630	7,498	0
Depreciation, amortization, and other	6,622	5,957	5,212
Stock-based compensation expense	2,668	2,574	2,446
Net recognized gains on investments and derivatives	(223)	(443)	(109)
Deferred income taxes	322	224	(331)
Deferral of unearned revenue	57,072	45,072	44,325
Recognition of unearned revenue	(48,498)	(44,920)	(41,739)
Changes in operating assets and liabilities:			
Accounts receivable	(530)	1,456	(1,120)
Inventories	600	(272)	(161)
Other current assets	(1,167)	62	(29)
Other long-term assets	(41)	346	(628)
Accounts payable	88	(1,054)	473
Other current liabilities	(260)	(624)	1,075
Other long-term liabilities	(766)	1,599	1,014
Net cash from operations	33,325	29,668	32,502
Financing			

INCOME STATEMENTS

(In millions, except per share amounts)

Year Ended June 30,	2015	2014	2013
Revenue	$ 93,580	$ 86,833	$ 77,849
Cost of revenue	33,038	27,078	20,385
Gross margin	60,542	59,755	57,464
Research and development	12,046	11,381	10,411
Sales and marketing	15,713	15,811	15,276
General and administrative	4,611	4,677	5,013
Impairment, integration, and restructuring	10,011	127	0
Operating income	18,161	27,759	26,764
Other income, net	346	61	288
Income before income taxes	18,507	27,820	27,052
Provision for income taxes	6,314	5,746	5,189
Net income	$ 12,193	$ 22,074	$ 21,863
Earnings per share:			
Basic	$ 1.49	$ 2.66	$ 2.61
Diluted	$ 1.48	$ 2.63	$ 2.58
Weighted average shares outstanding:			
Basic	8,177	8,299	8,375
Diluted	8,254	8,399	8,470
Cash dividends declared per common share	$ 1.24	$ 1.12	$ 0.92

See accompanying notes.

(In millions)

Year Ended June 30,	2016	2015	2014
Dividends and interest income	$ 903	$ 766	$ 883
Interest expense	(1,243)	(781)	(597)
Net recognized gains on investments	668	716	437
Net losses on derivatives	(443)	(423)	(328)
Net gains (losses) on foreign currency remeasurements	(121)	335	(165)
Other	(195)	(267)	(169)
Total	$ (431)	$ 346	$ 61

2015:

BALANCE SHEETS

(In millions)

June 30,	2016	2015
Assets		
Current assets:		
Cash and cash equivalents	$ 6,510	$ 5,595
Short-term investments (including securities loaned of $204 and $75)	106,730	90,931
Total cash, cash equivalents, and short-term investments	113,240	96,526
Accounts receivable, net of allowance for doubtful accounts of $426 and $335	18,277	17,908
Inventories	2,251	2,902
Other	5,892	5,461
Total current assets	139,660	122,797
Property and equipment, net of accumulated depreciation of $19,800 and $17,606	18,356	14,731
Equity and other investments	10,431	12,053
Goodwill	17,872	16,939
Intangible assets, net	3,733	4,835
Other long-term assets	3,642	3,117
Total assets	$ 193,694	$ 174,472
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 6,898	$ 6,591
Short-term debt	12,904	4,985
Current portion of long-term debt	0	2,499
Accrued compensation	5,264	5,096
Income taxes	580	606
Short-term unearned revenue	27,468	23,223
Securities lending payable	294	92
Other	5,949	6,555
Total current liabilities	59,357	49,647
Long-term debt	40,783	27,808
Long-term unearned revenue	6,441	2,095
Deferred income taxes	1,476	1,295
Other long-term liabilities	13,640	13,544
Total liabilities	121,697	94,389
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding 7,808 and 8,027	68,178	68,465
Retained earnings	2,282	9,096
Accumulated other comprehensive income	1,537	2,522
Total stockholders' equity	71,997	80,083
Total liabilities and stockholders' equity	$ 193,694	$ 174,472

See accompanying notes.

CASH FLOWS STATEMENTS

(In millions)

Year Ended June 30,	2017	2016	2015
Operations			
Net income	**$ 21,204**	$ 16,798	$ 12,193
Adjustments to reconcile net income to net cash from operations:			
Goodwill and asset impairments	**0**	630	7,498
Depreciation, amortization, and other	**8,778**	6,622	5,957
Stock-based compensation expense	**3,266**	2,668	2,574
Net recognized gains on investments and derivatives	**(2,073)**	(223)	(443)
Deferred income taxes	**(3,296)**	332	224
Deferral of unearned revenue	**67,711**	57,072	45,072
Recognition of unearned revenue	**(57,735)**	(48,498)	(44,920)
Changes in operating assets and liabilities:			
Accounts receivable	**(925)**	(530)	1,456
Inventories	**50**	600	(272)
Other current assets	**1,066**	(1,167)	62
Other long-term assets	**(539)**	(41)	346
Accounts payable	**81**	88	(1,054)
Other current liabilities	**386**	(260)	(624)
Other long-term liabilities	**1,533**	(766)	1,599
Net cash from operations	**39,507**	33,325	29,068
Financing			

INCOME STATEMENTS

(In millions, except per share amounts)

Year Ended June 30,	2015	2014	2013
Revenue	$ 93,580	$ 86,833	$ 77,849
Cost of revenue	33,038	27,078	20,385
Gross margin	60,542	59,755	57,464
Research and development	12,046	11,381	10,411
Sales and marketing	15,713	15,811	15,276
General and administrative	4,611	4,677	5,013
Impairment, integration, and restructuring	10,011	127	0
Operating income	18,161	27,759	26,764
Other income, net	346	61	288
Income before income taxes	18,507	27,820	27,052
Provision for income taxes	6,314	5,746	5,189
Net income	$ 12,193	$ 22,074	$ 21,863
Earnings per share:			
Basic	$ 1.49	$ 2.66	$ 2.61
Diluted	$ 1.48	$ 2.63	$ 2.58
Weighted average shares outstanding:			
Basic	8,177	8,299	8,375
Diluted	8,254	8,399	8,470
Cash dividends declared per common share	$ 1.24	$ 1.12	$ 0.92

See accompanying notes.

(In millions)

Year Ended June 30,	2016	2015	2014
Dividends and interest income	$ 903	$ 766	$ 883
Interest expense	(1,243)	(781)	(597)
Net recognized gains on investments	668	716	437
Net losses on derivatives	(443)	(423)	(328)
Net gains (losses) on foreign currency remeasurements	(121)	335	(165)
Other	(195)	(267)	(169)
Total	$ (431)	$ 346	$ 61

2016:

BALANCE SHEETS

(In millions)		
June 30,	**2017**	**2016**
Assets		
Current assets:		
Cash and cash equivalents	**$ 7,663**	$ 6,510
Short-term investments (including securities loaned of **$3,694** and $204)	**125,318**	106,730
Total cash, cash equivalents, and short-term investments	**132,981**	113,240
Accounts receivable, net of allowance for doubtful accounts of **$405** and $426	**19,792**	18,277
Inventories	**2,181**	2,251
Other	**4,897**	5,892
Total current assets	**159,851**	139,660
Property and equipment, net of accumulated depreciation of **$24,179** and $19,800	**23,734**	18,356
Equity and other investments	**6,023**	10,431
Goodwill	**35,122**	17,872
Intangible assets, net	**10,106**	3,733
Other long-term assets	**6,250**	3,416
Total assets	**$ 241,086**	$ 193,468
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	**$ 7,390**	$ 6,898
Short-term debt	**9,072**	12,904
Current portion of long-term debt	**1,049**	0
Accrued compensation	**5,819**	5,264
Income taxes	**718**	580
Short-term unearned revenue	**34,102**	27,468
Securities lending payable	**97**	294
Other	**6,280**	5,949
Total current liabilities	**64,527**	59,357
Long-term debt	**76,073**	40,557
Long-term unearned revenue	**10,377**	6,441
Deferred income taxes	**531**	1,476
Other long-term liabilities	**17,184**	13,640
Total liabilities	**168,692**	121,471
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding **7,708** and 7,808	**69,315**	68,178
Retained earnings	**2,648**	2,282
Accumulated other comprehensive income	**431**	1,537
Total stockholders' equity	**72,394**	71,997
Total liabilities and stockholders' equity	**$ 241,086**	$ 193,468

CASH FLOWS STATEMENTS

(In millions)			
Year Ended June 30,	**2018**	**2017**	**2016**
Operations			
Net income	**$ 16,571**	$ 25,489	$ 20,539
Adjustments to reconcile net income to net cash from operations:			
Asset impairments	**0**	0	630
Depreciation, amortization, and other	**10,261**	8,778	6,622
Stock-based compensation expense	**3,940**	3,266	2,668
Net recognized gains on investments and derivatives	**(2,212)**	(2,073)	(223)
Deferred income taxes	**(5,143)**	(829)	2,479
Changes in operating assets and liabilities:			
Accounts receivable	**(3,862)**	(1,216)	562
Inventories	**(465)**	50	600
Other current assets	**(952)**	1,028	(1,212)
Other long-term assets	**(285)**	(917)	(1,110)
Accounts payable	**1,148**	81	88
Unearned revenue	**5,922**	3,820	2,565
Income taxes	**(18,183)**	1,792	(298)
Other current liabilities	**798**	356	(179)
Other long-term liabilities	**(20)**	(118)	(406)
Net cash from operations	**43,884**	39,507	33,325
Financing			

INCOME STATEMENTS

(In millions, except per share amounts)

Year Ended June 30,	2016	2015	2014
Revenue:			
Product	$ 61,502	$ 75,956	$ 72,948
Service and other	23,818	17,624	13,885
Total revenue	85,320	93,580	86,833
Cost of revenue:			
Product	17,880	21,410	16,681
Service and other	14,900	11,628	10,397
Total cost of revenue	32,780	33,038	27,078
Gross margin	52,540	60,542	59,755
Research and development	11,988	12,046	11,381
Sales and marketing	14,697	15,713	15,811
General and administrative	4,563	4,611	4,677
Impairment, integration, and restructuring	1,110	10,011	127
Operating income	20,182	18,161	27,759
Other income (expense), net	(431)	346	61
Income before income taxes	19,751	18,507	27,820
Provision for income taxes	2,953	6,314	5,746
Net income	$ 16,798	$ 12,193	$ 22,074

(In millions)

Year Ended June 30,	2016
Dividends and interest income	$ 903
Interest expense	(1,243)
Net recognized gains on investments	668
Net losses on derivatives	(443)
Net gains (losses) on foreign currency remeasurements	(121)
Other	(195)
Total	$ (431)

2017:

BALANCE SHEETS

(In millions)

June 30,	2018	2017
Assets		
Current assets:		
Cash and cash equivalents	$ 11,946	$ 7,663
Short-term investments	121,822	125,318
Total cash, cash equivalents, and short-term investments	133,768	132,981
Accounts receivable, net of allowance for doubtful accounts of $377 and $345	26,481	22,431
Inventories	2,662	2,181
Other	6,751	5,103
Total current assets	169,662	162,696
Property and equipment, net of accumulated depreciation of $29,223 and $24,179	29,460	23,734
Operating lease right-of-use assets	6,686	6,555
Equity and other investments	1,862	6,023
Goodwill	35,683	35,122
Intangible assets, net	8,053	10,106
Other long-term assets	7,442	6,076
Total assets	$ 258,848	$ 250,312
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 8,617	$ 7,390
Short-term debt	0	9,072
Current portion of long-term debt	3,998	1,049
Accrued compensation	6,103	5,819
Short-term income taxes	2,121	718
Short-term unearned revenue	28,905	24,013
Other	8,744	7,684
Total current liabilities	58,488	55,745
Long-term debt	72,242	76,073
Long-term income taxes	30,265	13,485
Long-term unearned revenue	3,815	2,643
Deferred income taxes	541	5,734
Operating lease liabilities	5,568	5,372
Other long-term liabilities	5,211	3,549
Total liabilities	176,130	162,601
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding 7,677 and 7,708	71,223	69,315
Retained earnings	13,682	17,769
Accumulated other comprehensive income (loss)	(2,187)	627
Total stockholders' equity	82,718	87,711
Total liabilities and stockholders' equity	$ 258,848	$ 250,312

Refer to accompanying notes.

CASH FLOWS STATEMENTS

(In millions)

Year Ended June 30,	2019	2018	2017
Operations			
Net income	$ 39,240	$ 16,571	$ 25,489
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	11,682	10,261	8,778
Stock-based compensation expense	4,652	3,940	3,266
Net recognized gains on investments and derivatives	(792)	(2,212)	(2,073)
Deferred income taxes	(6,463)	(5,143)	(829)
Changes in operating assets and liabilities:			
Accounts receivable	(2,812)	(3,862)	(1,216)
Inventories	597	(465)	50
Other current assets	(1,718)	(952)	1,028
Other long-term assets	(1,834)	(285)	(917)
Accounts payable	232	1,148	81
Unearned revenue	4,462	5,922	3,820
Income taxes	2,929	18,183	1,792
Other current liabilities	1,419	798	356
Other long-term liabilities	591	(20)	(118)
Net cash from operations	52,185	43,884	39,507
Financing			

INCOME STATEMENTS

(In millions, except per share amounts)

Year Ended June 30,	2019	2018	2017
Revenue:			
Product	$ 66,069	$ 64,497	$ 63,811
Service and other	59,774	45,863	32,760
Total revenue	125,843	110,360	96,571
Cost of revenue:			
Product	16,273	15,420	15,175
Service and other	26,637	22,933	19,086
Total cost of revenue	42,910	38,353	34,261
Gross margin	82,933	72,007	62,310
Research and development	16,876	14,726	13,037
Sales and marketing	18,213	17,469	15,461
General and administrative	4,885	4,754	4,481
Restructuring	0	0	306
Operating income	42,959	35,058	29,025
Other income, net	729	1,416	876
Income before income taxes	43,688	36,474	29,901
Provision for income taxes	4,448	19,903	4,412
Net income	$ 39,240	$ 16,571	$ 25,489

(In millions)

Year Ended June 30,	2019	2018	2017
Interest and dividends income	$ 2,762	$ 2,214	$ 1,387
Interest expense	(2,686)	(2,733)	(2,222)
Net recognized gains on investments	648	2,399	2,583
Net gains (losses) on derivatives	144	(187)	(510)
Net losses on foreign currency remeasurements	(82)	(218)	(111)
Other, net	(57)	(59)	(251)
Total	$ 729	$ 1,416	$ 876

We use derivative instruments to manage risks related to foreign currencies, equity prices, interest rates, and credit; enhance investment returns;

2018:

BALANCE SHEETS

(In millions)

June 30,	2019	2018
Assets		
Current assets:		
Cash and cash equivalents	$ 11,356	$ 11,946
Short-term investments	122,463	121,822
Total cash, cash equivalents, and short-term investments	133,819	133,768
Accounts receivable, net of allowance for doubtful accounts of $411 and $377	29,524	26,481
Inventories	2,063	2,662
Other	10,146	6,751
Total current assets	175,552	169,662
Property and equipment, net of accumulated depreciation of $35,330 and $29,223	36,477	29,460
Operating lease right-of-use assets	7,379	6,686
Equity investments	2,649	1,862
Goodwill	42,026	35,683
Intangible assets, net	7,750	8,053
Other long-term assets	14,723	7,442
Total assets	$ 286,556	$ 258,848
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 9,382	$ 8,617
Current portion of long-term debt	5,516	3,998
Accrued compensation	6,830	6,103
Short-term income taxes	5,665	2,121
Short-term unearned revenue	32,676	28,905
Other	9,351	8,744
Total current liabilities	69,420	58,488
Long-term debt	66,662	72,242
Long-term income taxes	29,612	30,265
Long-term unearned revenue	4,530	3,815
Deferred income taxes	233	541
Operating lease liabilities	6,188	5,568
Other long-term liabilities	7,581	5,211
Total liabilities	184,226	176,130
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding 7,643 and 7,677	78,520	71,223
Retained earnings	24,150	13,682
Accumulated other comprehensive loss	(340)	(2,187)
Total stockholders' equity	102,330	82,718
Total liabilities and stockholders' equity	$ 286,556	$ 258,848

Refer to accompanying notes.

CASH FLOWS STATEMENTS

(In millions)

Year Ended June 30,	2020	2019	2018
Operations			
Net income	$ 44,281	$ 39,240	$ 16,571
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	12,796	11,682	10,261
Stock-based compensation expense	5,289	4,652	3,940
Net recognized gains on investments and derivatives	(219)	(792)	(2,212)
Deferred income taxes	11	(6,463)	(5,143)
Changes in operating assets and liabilities:			
Accounts receivable	(2,577)	(2,812)	(3,862)
Inventories	168	597	(465)
Other current assets	(2,330)	(1,718)	(952)
Other long-term assets	(1,037)	(1,834)	(285)
Accounts payable	3,018	232	1,148
Unearned revenue	2,212	4,462	5,922
Income taxes	(3,631)	2,929	18,183
Other current liabilities	1,346	1,419	798
Other long-term liabilities	1,348	591	(20)
Net cash from operations	60,675	52,185	43,884

INCOME STATEMENTS

(In millions, except per share amounts)

Year Ended June 30,	2019	2018	2017
Revenue:			
Product	$ 66,069	$ 64,497	$ 63,811
Service and other	59,774	45,863	32,760
Total revenue	125,843	110,360	96,571
Cost of revenue:			
Product	16,273	15,420	15,175
Service and other	26,637	22,933	19,086
Total cost of revenue	42,910	38,353	34,261
Gross margin	82,933	72,007	62,310
Research and development	16,876	14,726	13,037
Sales and marketing	18,213	17,469	15,461
General and administrative	4,885	4,754	4,481
Restructuring	0	0	306
Operating income	42,959	35,058	29,025
Other income, net	729	1,416	876
Income before income taxes	43,688	36,474	29,901
Provision for income taxes	4,448	19,903	4,412
Net income	$ 39,240	$ 16,571	$ 25,489

(In millions)

Year Ended June 30,	2019	2018	2017
Interest and dividends income	$ 2,762	$ 2,214	$ 1,387
Interest expense	(2,686)	(2,733)	(2,222)
Net recognized gains on investments	648	2,399	2,583
Net gains (losses) on derivatives	144	(187)	(510)
Net losses on foreign currency remeasurements	(82)	(218)	(111)
Other, net	(57)	(59)	(251)
Total	$ 729	$ 1,416	$ 876

We use derivative instruments to manage risks related to foreign currencies, equity prices, interest rates, and credit; enhance investment returns;

2019:

BALANCE SHEETS

(In millions)		
June 30,	2019	2018
Assets		
Current assets:		
Cash and cash equivalents	$ 11,356	$ 11,946
Short-term investments	122,463	121,822
Total cash, cash equivalents, and short-term investments	133,819	133,768
Accounts receivable, net of allowance for doubtful accounts of $411 and $377	29,524	26,481
Inventories	2,063	2,662
Other	10,146	6,751
Total current assets	175,552	169,662
Property and equipment, net of accumulated depreciation of $35,330 and $29,223	36,477	29,460
Operating lease right-of-use assets	7,379	6,686
Equity investments	2,649	1,862
Goodwill	42,026	35,683
Intangible assets, net	7,750	8,053
Other long-term assets	14,723	7,442
Total assets	$ 286,556	$ 258,848
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 9,382	$ 8,617
Current portion of long-term debt	5,516	3,998
Accrued compensation	6,830	6,103
Short-term income taxes	5,665	2,121
Short-term unearned revenue	32,676	28,905
Other	9,351	8,744
Total current liabilities	69,420	58,488
Long-term debt	66,662	72,242
Long-term income taxes	29,612	30,265
Long-term unearned revenue	4,530	3,815
Deferred income taxes	233	541
Operating lease liabilities	6,188	5,568
Other long-term liabilities	7,581	5,211
Total liabilities	184,226	176,130
Commitments and contingencies		
Stockholders' equity:		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding 7,643 and 7,677	78,520	71,223
Retained earnings	24,150	13,682
Accumulated other comprehensive loss	(340)	(2,187)
Total stockholders' equity	102,330	82,718
Total liabilities and stockholders' equity	$ 286,556	$ 258,848

Refer to accompanying notes.

CASH FLOWS STATEMENTS

(In millions)

Year Ended June 30,	2019	2018	2017
Operations			
Net income	**$ 39,240**	$ 16,571	$ 25,489
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	**11,682**	10,261	8,778
Stock-based compensation expense	**4,652**	3,940	3,266
Net recognized gains on investments and derivatives	**(792)**	(2,212)	(2,073)
Deferred income taxes	**(6,463)**	(5,143)	(829)
Changes in operating assets and liabilities:			
Accounts receivable	**(2,812)**	(3,862)	(1,216)
Inventories	**597**	(465)	50
Other current assets	**(1,718)**	(952)	1,028
Other long-term assets	**(1,834)**	(285)	(917)
Accounts payable	**232**	1,148	81
Unearned revenue	**4,462**	5,922	3,820
Income taxes	**2,929**	18,183	1,792
Other current liabilities	**1,419**	798	356
Other long-term liabilities	**591**	(20)	(118)
Net cash from operations	**52,185**	43,884	39,507

INCOME STATEMENTS

(In millions, except per share amounts)

Year Ended June 30,	2019	2018	2017
Revenue:			
Product	**$ 66,069**	$ 64,497	$ 63,811
Service and other	**59,774**	45,863	32,760
Total revenue	**125,843**	110,360	96,571
Cost of revenue:			
Product	**16,273**	15,420	15,175
Service and other	**26,637**	22,933	19,086
Total cost of revenue	**42,910**	38,353	34,261
Gross margin	**82,933**	72,007	62,310
Research and development	**16,876**	14,726	13,037
Sales and marketing	**18,213**	17,469	15,461
General and administrative	**4,885**	4,754	4,481
Restructuring	**0**	0	306
Operating income	**42,959**	35,058	29,025
Other income, net	**729**	1,416	876
Income before income taxes	**43,688**	36,474	29,901
Provision for income taxes	**4,448**	19,903	4,412
Net income	**$ 39,240**	$ 16,571	$ 25,489
Earnings per share:			
Basic	**$ 5.11**	$ 2.15	$ 3.29
Diluted	**$ 5.06**	$ 2.13	$ 3.25
Weighted average shares outstanding:			
Basic	**7,673**	7,700	7,746
Diluted	**7,753**	7,794	7,832

Refer to accompanying notes.

NOTE 3 — OTHER INCOME (EXPENSE), NET

The components of other income (expense), net were as follows:

(In millions)

Year Ended June 30,	**2019**	2018	2017
Interest and dividends income	**$ 2,762**	$ 2,214	$ 1,387
Interest expense	**(2,686)**	(2,733)	(2,222)
Net recognized gains on investments	**648**	2,399	2,583
Net gains (losses) on derivatives	**144**	(187)	(510)
Net losses on foreign currency remeasurements	**(82)**	(218)	(111)
Other, net	**(57)**	(59)	(251)
Total	**$ 729**	$ 1,416	$ 876

2020:

BALANCE SHEETS

(In millions)

June 30,	**2020**	2019
Assets		
Current assets:		
Cash and cash equivalents	**$ 13,576**	$ 11,356
Short-term investments	**122,951**	122,463
Total cash, cash equivalents, and short-term investments	**136,527**	133,819
Accounts receivable, net of allowance for doubtful accounts of **$788** and $411	**32,011**	29,524
Inventories	**1,895**	2,063
Other current assets	**11,482**	10,146
Total current assets	**181,915**	175,552
Property and equipment, net of accumulated depreciation of **$43,197** and $35,330	**44,151**	36,477
Operating lease right-of-use assets	**8,753**	7,379
Equity investments	**2,965**	2,649
Goodwill	**43,351**	42,026
Intangible assets, net	**7,038**	7,750
Other long-term assets	**13,138**	14,723
Total assets	**$ 301,311**	$ 286,556
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	**$ 12,530**	$ 9,382
Current portion of long-term debt	**3,749**	5,516
Accrued compensation	**7,874**	6,830
Short-term income taxes	**2,130**	5,665
Short-term unearned revenue	**36,000**	32,676
Other current liabilities	**10,027**	9,351
Total current liabilities	**72,310**	69,420
Long-term debt	**59,578**	66,662
Long-term income taxes	**29,432**	29,612
Long-term unearned revenue	**3,180**	4,530
Deferred income taxes	**204**	233
Operating lease liabilities	**7,671**	6,188
Other long-term liabilities	**10,632**	7,581
Total liabilities	**183,007**	184,226
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding **7,571** and 7,643	**80,552**	78,520
Retained earnings	**34,566**	24,150
Accumulated other comprehensive income (loss)	**3,186**	(340)
Total stockholders' equity	**118,304**	102,330
Total liabilities and stockholders' equity	**$ 301,311**	$ 286,556

CASH FLOWS STATEMENTS

(In millions)

Year Ended June 30,	2020	2019	2018
Operations			
Net income	$ 44,281	$ 39,240	$ 16,571
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	12,796	11,682	10,261
Stock-based compensation expense	5,289	4,652	3,940
Net recognized gains on investments and derivatives	(219)	(792)	(2,212)
Deferred income taxes	11	(6,463)	(5,143)
Changes in operating assets and liabilities:			
Accounts receivable	(2,577)	(2,812)	(3,862)
Inventories	168	597	(465)
Other current assets	(2,330)	(1,718)	(952)
Other long-term assets	(1,037)	(1,834)	(285)
Accounts payable	3,018	232	1,148
Unearned revenue	2,212	4,462	5,922
Income taxes	(3,631)	2,929	18,183
Other current liabilities	1,346	1,419	798
Other long-term liabilities	1,348	591	(20)
Net cash from operations	60,675	52,185	43,884

INCOME STATEMENTS

(In millions, except per share amounts)

Year Ended June 30,	2020	2019	2018
Revenue:			
Product	$ 68,041	$ 66,069	$ 64,497
Service and other	74,974	59,774	45,863
Total revenue	143,015	125,843	110,360
Cost of revenue:			
Product	16,017	16,273	15,420
Service and other	30,061	26,637	22,933
Total cost of revenue	46,078	42,910	38,353
Gross margin	96,937	82,933	72,007
Research and development	19,269	16,876	14,726
Sales and marketing	19,598	18,213	17,469
General and administrative	5,111	4,885	4,754
Operating income	52,959	42,959	35,058
Other income, net	77	729	1,416
Income before income taxes	53,036	43,688	36,474
Provision for income taxes	8,755	4,448	19,903
Net income	$ 44,281	$ 39,240	$ 16,571
Earnings per share:			
Basic	$ 5.82	$ 5.11	$ 2.15
Diluted	$ 5.76	$ 5.06	$ 2.13
Weighted average shares outstanding:			
Basic	7,610	7,673	7,700
Diluted	7,683	7,753	7,794

Scroll to view entire table

NOTE 3 — OTHER INCOME (EXPENSE), NET

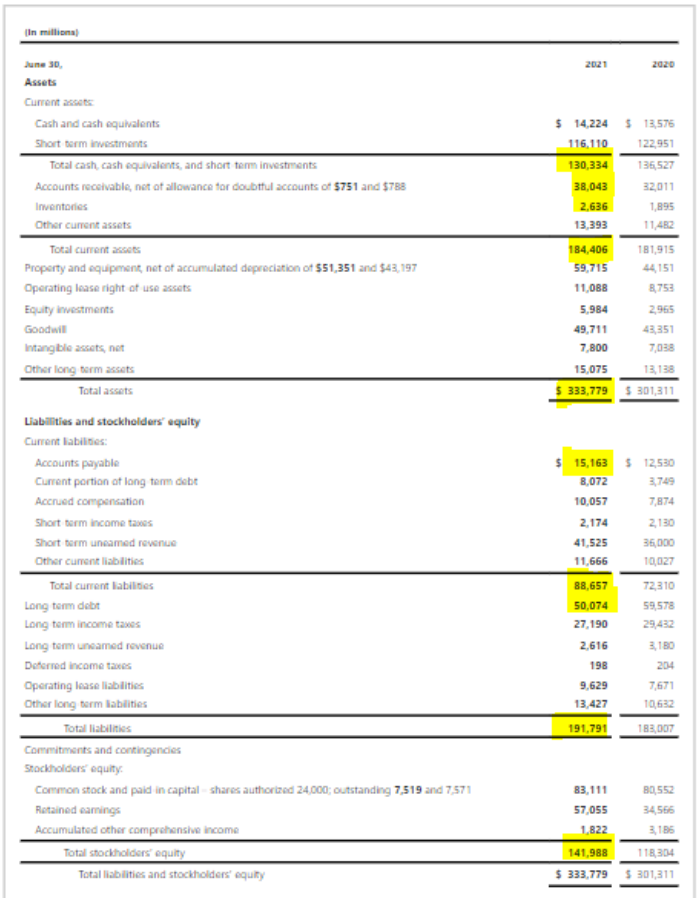
The components of other income (expense), net were as follows:

(In millions)			
Year Ended June 30,	**2020**	**2019**	**2018**
Interest and dividends income	**$ 2,680**	$ 2,762	$ 2,214
Interest expense	**(2,591)**	(2,686)	(2,733)
Net recognized gains on investments	**32**	648	2,399
Net gains (losses) on derivatives	**187**	144	(187)
Net losses on foreign currency remeasurements	**(191)**	(82)	(218)
Other, net	**(40)**	(57)	(59)
Total	**$ 77**	$ 729	$ 1,416

Scroll to view entire table

2021:

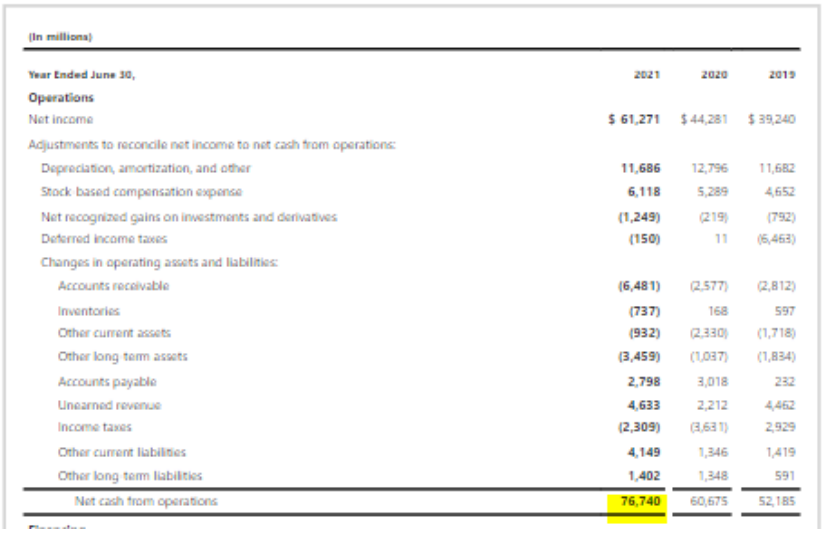
BALANCE SHEETS



(In millions)

June 30,	2021	2020
Assets		
Current assets:		
Cash and cash equivalents	$ 14,224	$ 13,576
Short-term investments	116,110	122,951
Total cash, cash equivalents, and short-term investments	130,334	136,527
Accounts receivable, net of allowance for doubtful accounts of $751 and $788	38,043	32,011
Inventories	2,636	1,895
Other current assets	13,393	11,482
Total current assets	184,406	181,915
Property and equipment, net of accumulated depreciation of $51,351 and $43,197	59,715	44,151
Operating lease right-of-use assets	11,088	8,753
Equity investments	5,984	2,965
Goodwill	49,711	43,351
Intangible assets, net	7,800	7,038
Other long-term assets	15,075	13,138
Total assets	$ 333,779	$ 301,311
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 15,163	$ 12,530
Current portion of long-term debt	8,072	3,749
Accrued compensation	10,057	7,874
Short-term income taxes	2,174	2,130
Short-term unearned revenue	41,525	36,000
Other current liabilities	11,666	10,027
Total current liabilities	88,657	72,310
Long-term debt	50,074	59,578
Long-term income taxes	27,190	29,432
Long-term unearned revenue	2,616	3,180
Deferred income taxes	198	204
Operating lease liabilities	9,629	7,671
Other long-term liabilities	13,427	10,632
Total liabilities	191,791	183,007
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding 7,519 and 7,571	83,111	80,552
Retained earnings	57,055	34,566
Accumulated other comprehensive income	1,822	3,186
Total stockholders' equity	141,988	118,304
Total liabilities and stockholders' equity	$ 333,779	$ 301,311

CASH FLOWS STATEMENTS



(In millions)			
Year Ended June 30,	**2021**	**2020**	**2019**
Operations			
Net income	**$ 61,271**	$ 44,281	$ 39,240
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	**11,686**	12,796	11,682
Stock based compensation expense	**6,118**	5,289	4,652
Net recognized gains on investments and derivatives	**(1,249)**	(219)	(792)
Deferred income taxes	**(150)**	11	(6,463)
Changes in operating assets and liabilities:			
Accounts receivable	**(6,481)**	(2,577)	(2,812)
Inventories	**(737)**	168	597
Other current assets	**(932)**	(2,330)	(1,718)
Other long-term assets	**(3,459)**	(1,037)	(1,834)
Accounts payable	**2,798**	3,018	232
Unearned revenue	**4,633**	2,212	4,462
Income taxes	**(2,309)**	(3,631)	2,929
Other current liabilities	**4,149**	1,346	1,419
Other long-term liabilities	**1,402**	1,348	591
Net cash from operations	**76,740**	60,675	52,185

INCOME STATEMENTS

(In millions, except per share amounts)			
Year Ended June 30,	**2021**	**2020**	**2019**
Revenue:			
Product	**$ 71,074**	$ 68,041	$ 66,069
Service and other	**97,014**	74,974	59,774
Total revenue	**168,088**	143,015	125,843
Cost of revenue:			
Product	**18,219**	16,017	16,273
Service and other	**34,013**	30,061	26,637
Total cost of revenue	**52,232**	46,078	42,910
Gross margin	**115,856**	96,937	82,933
Research and development	**20,716**	19,269	16,876
Sales and marketing	**20,117**	19,598	18,213
General and administrative	**5,107**	5,111	4,885
Operating income	**69,916**	52,959	42,959
Other income, net	**1,186**	77	729
Income before income taxes	**71,102**	53,036	43,688
Provision for income taxes	**9,831**	8,755	4,448
Net income	**$ 61,271**	$ 44,281	$ 39,240

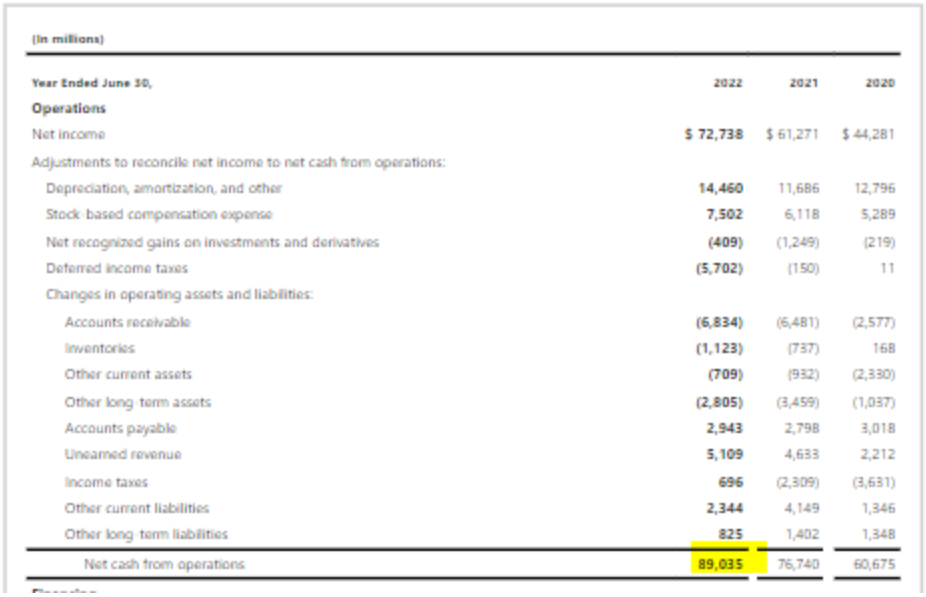
(In millions)		
Year Ended June 30,	**2021**	**2020**
Interest and dividends income	**$ 2,131**	$ 2,680
Interest expense	**(2,346)**	(2,591)
Net recognized gains on investments	**1,232**	32
Net gains on derivatives	**17**	187
Net gains (losses) on foreign currency remeasurements	**54**	(191)
Other, net	**98**	(40)
Total	**$ 1,186**	$ 77

2022:

BALANCE SHEETS

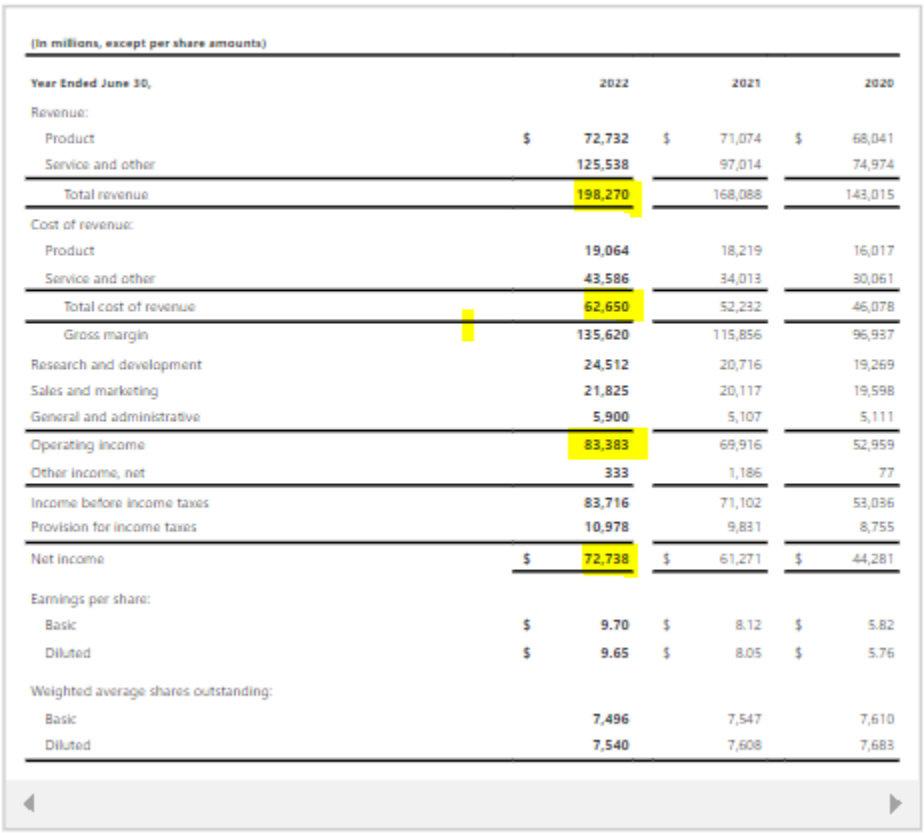
(In millions)		
June 30,	2022	2021
Assets		
Current assets:		
Cash and cash equivalents	$ 13,931	$ 14,224
Short-term investments	90,826	116,110
Total cash, cash equivalents, and short-term investments	104,757	130,334
Accounts receivable, net of allowance for doubtful accounts of **$633** and $751	44,261	38,043
Inventories	3,742	2,636
Other current assets	16,924	13,393
Total current assets	169,684	184,406
Property and equipment, net of accumulated depreciation of **$59,660** and $51,351	74,398	59,715
Operating lease right-of-use assets	13,148	11,088
Equity investments	6,891	5,984
Goodwill	67,524	49,711
Intangible assets, net	11,298	7,800
Other long-term assets	21,897	15,075
Total assets	$ 364,840	$ 333,779
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 19,000	$ 15,163
Current portion of long-term debt	2,749	8,072
Accrued compensation	10,661	10,057
Short-term income taxes	4,067	2,174
Short-term unearned revenue	45,538	41,525
Other current liabilities	13,067	11,666
Total current liabilities	95,082	88,657
Long-term debt	47,032	50,074
Long-term income taxes	26,069	27,190
Long-term unearned revenue	2,870	2,616
Deferred income taxes	230	198
Operating lease liabilities	11,489	9,629
Other long-term liabilities	15,526	13,427
Total liabilities	198,298	191,791
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding **7,464** and 7,519	86,939	83,111
Retained earnings	84,281	57,055
Accumulated other comprehensive income (loss)	(4,678)	1,822
Total stockholders' equity	166,542	141,988
Total liabilities and stockholders' equity	$ 364,840	$ 333,779

CASH FLOWS STATEMENTS



(In millions)			
Year Ended June 30,	**2022**	**2021**	**2020**
Operations			
Net income	**$ 72,738**	$ 61,271	$ 44,281
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	**14,460**	11,686	12,796
Stock-based compensation expense	**7,502**	6,118	5,289
Net recognized gains on investments and derivatives	**(409)**	(1,249)	(219)
Deferred income taxes	**(5,702)**	(150)	11
Changes in operating assets and liabilities:			
Accounts receivable	**(6,834)**	(6,481)	(2,577)
Inventories	**(1,123)**	(737)	168
Other current assets	**(709)**	(932)	(2,330)
Other long-term assets	**(2,805)**	(3,459)	(1,037)
Accounts payable	**2,943**	2,798	3,018
Unearned revenue	**5,109**	4,633	2,212
Income taxes	**696**	(2,309)	(3,631)
Other current liabilities	**2,344**	4,149	1,346
Other long-term liabilities	**825**	1,402	1,348
Net cash from operations	**89,035**	76,740	60,675

INCOME STATEMENTS



(In millions, except per share amounts)			
Year Ended June 30,	**2022**	**2021**	**2020**
Revenue:			
Product	$ **72,732**	$ 71,074	$ 68,041
Service and other	**125,538**	97,014	74,974
Total revenue	**198,270**	168,088	143,015
Cost of revenue:			
Product	**19,064**	18,219	16,017
Service and other	**43,586**	34,013	30,061
Total cost of revenue	**62,650**	52,232	46,078
Gross margin	**135,620**	115,856	96,937
Research and development	**24,512**	20,716	19,269
Sales and marketing	**21,825**	20,117	19,598
General and administrative	**5,900**	5,107	5,111
Operating income	**83,383**	69,916	52,959
Other income, net	**333**	1,186	77
Income before income taxes	**83,716**	71,102	53,036
Provision for income taxes	**10,978**	9,831	8,755
Net income	$ **72,738**	$ 61,271	$ 44,281
Earnings per share:			
Basic	$ **9.70**	$ 8.12	$ 5.82
Diluted	$ **9.65**	$ 8.05	$ 5.76
Weighted average shares outstanding:			
Basic	**7,496**	7,547	7,610
Diluted	**7,540**	7,608	7,683

NOTE 3 — OTHER INCOME (EXPENSE), NET

The components of other income (expense), net were as follows:

(In millions)			
Year Ended June 30,	**2022**	**2021**	**2020**
Interest and dividends income	**$ 2,094**	$ 2,131	$ 2,680
Interest expense	**(2,063)**	(2,346)	(2,591)
Net recognized gains on investments	**461**	1,232	32
Net gains (losses) on derivatives	**(52)**	17	187
Net gains (losses) on foreign currency remeasurements	**(75)**	54	(191)
Other, net	**(32)**	98	(40)
Total	**$ 333**	$ 1,186	$ 77

Scroll to view entire table

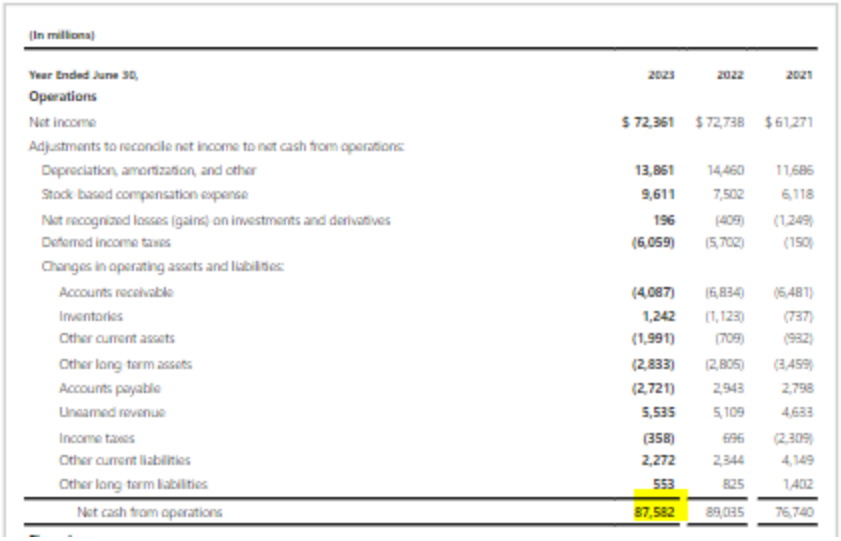
2023:

BALANCE SHEETS

(In millions)		
June 30,	**2023**	**2022**
Assets		
Current assets:		
Cash and cash equivalents	**$ 34,704**	$ 13,931
Short-term investments	**76,558**	90,826
Total cash, cash equivalents, and short-term investments	**111,262**	104,757
Accounts receivable, net of allowance for doubtful accounts of **$650** and $633	**48,688**	44,261
Inventories	**2,500**	3,742
Other current assets	**21,807**	16,924
Total current assets	**184,257**	169,684
Property and equipment, net of accumulated depreciation of **$68,251** and $59,660	**95,641**	74,398
Operating lease right-of-use assets	**14,346**	13,148
Equity investments	**9,879**	6,891
Goodwill	**67,886**	67,524
Intangible assets, net	**9,366**	11,298
Other long-term assets	**30,601**	21,897
Total assets	**$ 411,976**	$ 364,840
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	**$ 18,095**	$ 19,000
Current portion of long-term debt	**5,247**	2,749
Accrued compensation	**11,009**	10,661
Short-term income taxes	**4,152**	4,067
Short-term unearned revenue	**50,901**	45,538
Other current liabilities	**14,745**	13,067
Total current liabilities	**104,149**	95,082
Long-term debt	**41,990**	47,032
Long-term income taxes	**25,560**	26,069
Long-term unearned revenue	**2,912**	2,870
Deferred income taxes	**433**	230
Operating lease liabilities	**12,728**	11,489
Other long-term liabilities	**17,981**	15,526
Total liabilities	**205,753**	198,298
Commitments and contingencies		
Stockholders' equity:		
Common stock and paid-in capital – shares authorized 24,000; outstanding **7,432** and 7,464	**93,718**	86,939
Retained earnings	**118,848**	84,281
Accumulated other comprehensive loss	**(6,343)**	(4,678)
Total stockholders' equity	**206,223**	166,542
Total liabilities and stockholders' equity	**$ 411,976**	$ 364,840

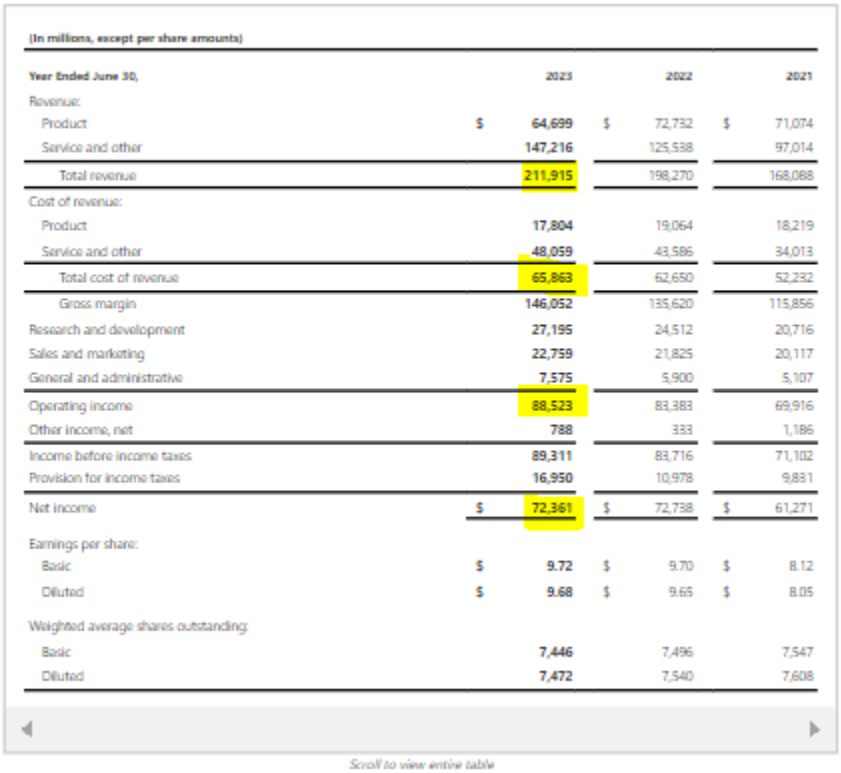
Scroll to view entire table

CASH FLOWS STATEMENTS



(In millions)			
Year Ended June 30,	**2023**	**2022**	**2021**
Operations			
Net income	**$ 72,361**	$ 72,738	$ 61,271
Adjustments to reconcile net income to net cash from operations:			
Depreciation, amortization, and other	**13,861**	14,460	11,686
Stock-based compensation expense	**9,611**	7,502	6,118
Net recognized losses (gains) on investments and derivatives	**196**	(409)	(1,249)
Deferred income taxes	**(6,059)**	(5,702)	(150)
Changes in operating assets and liabilities:			
Accounts receivable	**(4,087)**	(6,834)	(6,481)
Inventories	**1,242**	(1,123)	(737)
Other current assets	**(1,991)**	(709)	(932)
Other long-term assets	**(2,833)**	(2,805)	(3,459)
Accounts payable	**(2,721)**	2,943	2,798
Unearned revenue	**5,535**	5,109	4,633
Income taxes	**(358)**	696	(2,309)
Other current liabilities	**2,272**	2,344	4,149
Other long-term liabilities	**553**	825	1,402
Net cash from operations	**87,582**	89,035	76,740

INCOME STATEMENTS



(In millions, except per share amounts)			
Year Ended June 30,	**2023**	**2022**	**2021**
Revenue:			
Product	**$ 64,699**	$ 72,732	$ 71,074
Service and other	**147,216**	125,538	97,014
Total revenue	**211,915**	198,270	168,088
Cost of revenue:			
Product	**17,804**	19,064	18,219
Service and other	**48,059**	43,586	34,013
Total cost of revenue	**65,863**	62,650	52,232
Gross margin	**146,052**	135,620	115,856
Research and development	**27,195**	24,512	20,716
Sales and marketing	**22,759**	21,825	20,117
General and administrative	**7,575**	5,900	5,107
Operating income	**88,523**	83,383	69,916
Other income, net	**788**	333	1,186
Income before income taxes	**89,311**	83,716	71,102
Provision for income taxes	**16,950**	10,978	9,831
Net income	**$ 72,361**	$ 72,738	$ 61,271
Earnings per share:			
Basic	**$ 9.72**	$ 9.70	$ 8.12
Diluted	**$ 9.68**	$ 9.65	$ 8.05
Weighted average shares outstanding:			
Basic	**7,446**	7,496	7,547
Diluted	**7,472**	7,540	7,608

Scroll to view entire table

NOTE 3 — OTHER INCOME (EXPENSE), NET

The components of other income (expense), net were as follows:

(In millions)			
Year Ended June 30,	**2023**	**2022**	**2021**
Interest and dividends income	$ **2,994**	$ 2,094	$ 2,131
Interest expense	**(1,968)**	(2,063)	(2,346)
Net recognized gains on investments	**260**	461	1,232
Net gains (losses) on derivatives	**(456)**	(52)	17
Net gains (losses) on foreign currency remeasurements	**181**	(75)	54
Other, net	**(223)**	(32)	98
Total	$ **788**	$ 333	$ 1,186

Scroll to view entire table

REFERENCES:

About - Microsoft. (n.d.). https://www.microsoft.com/en-us/about

Britannica money. (2024, May 22). https://www.britannica.com/money/Microsoft-Corporation

Microsoft 2021 Annual Report. (n.d.). https://www.microsoft.com/investor/reports/ar21/index.html

Apple Inc. (2023). **Annual Report 2022**. Retrieved from https://investor.apple.com/investor-relations/default.aspx

Microsoft Corporation. (2023). **Annual Report 2022**. Retrieved from https://www.microsoft.com/investor/reports/ar22/index.html

Statista. (2023). **Apple's revenue by product line from 1st quarter 2012 to 4th quarter 2022**. Retrieved from https://www.statista.com/statistics/382175/quarterly-apple-revenue-by-product/

Statista. (2023). **Microsoft's revenue by segment from fiscal year 2012 to 2022**. Retrieved from https://www.statista.com/statistics/267805/microsofts-revenue-by-business-segment-since-2012/

Gartner. (2023). **Market share analysis: PC, worldwide, 4Q22**. Retrieved from https://www.gartner.com/en/documents/1234567/market-share-analysis-pc-worldwide-4q22

IDC. (2023). **Worldwide public cloud services spending guide**. Retrieved from https://www.idc.com/getdoc.jsp?containerId=IDC_P432

Pew Research Center. (2022). **Mobile fact sheet**. Retrieved from https://www.pewresearch.org/internet/fact-sheet/mobile/

Consumer Reports. (2023). **Laptop and desktop brand reliability and satisfaction**. Retrieved from https://www.consumerreports.org/cro/laptops.htm

Daryanto, W. M., Dewanti, R. W., & Farras, R. (2020). Financial Ratio Analysis Of Unilever Indonesia Tbk To Measure Financial Performance. International Journal of Business, Economics and Law, 23, 1.

Lu, Y. (2024). Financial statement analysis and revenue forecast for Apple Inc. In SHS Web of Conferences (Vol. 181, p. 02020). EDP Sciences.

Zhang, J. (2024). Analysis on the Implementation Effect of Microsoft Corporation's Financial Strategy. Highlights in Business, Economics and Management, 24, 1667-1675.

Investing research made visual. FullRatio. (n.d.). https://fullratio.com/

Fernando, J. (n.d.). Current ratio explained with formula and examples. Investopedia. https://www.investopedia.com/terms/c/currentratio.asp

Hayes, A. (n.d.). Acid-test ratio: Definition, formula, and example. Investopedia. https://www.investopedia.com/terms/a/acidtest.asp

Cash ratio. Corporate Finance Institute. (2024, January 21). https://corporatefinanceinstitute.com/resources/accounting/cash-ratio-formula/#:~:text=The%20cash%20ratio%20indicates%20to,and%20have%20funds%20left%20over.

Electronic Computers: Industry Financial Ratios Benchmarking (SIC code 3571). (n.d.). https://www.readyratios.com/sec/industry/3571/

Financial Analysis Cs sample reports. (n.d.-b). https://cs.thomsonreuters.com/ua/acct_pr/fina/cs_us_en/pdfs/fina_sample_reports.pdf

Deegan, C. (2023, February 21). Cash conversion cycle. CashAnalytics. https://www.cashanalytics.com/cash-conversion-cycle/#:~:text=What%20Does%20a%20Negative%20CCC,desirable%20situation%20for%20many%20businesses.

Cash Flow Inventory. (n.d.). Inventory conversion period: What it is and how to improve it. https://cashflowinventory.com/blog/inventory-conversion-period/#:~:text=The%20ICP%20is%20the%20time,risks%20associated%20with%20holding%20inventory.

Hayes, A. (n.d.-b). Cash conversion cycle (CCC): What is it, and how is it calculated?. Investopedia. https://www.investopedia.com/terms/c/cashconversioncycle.asp

Operating cycle. Corporate Finance Institute. (2023, October 4). https://corporatefinanceinstitute.com/resources/accounting/operating-cycle/

Hayes, A. (n.d.-c). Days payable outstanding (DPO) defined and how it’s calculated. Investopedia. https://www.investopedia.com/terms/d/dpo.asp

Kenton, W. (2024, February 19). Financial Statement Analysis: How it's done, by statement type. Investopedia. https://www.investopedia.com/terms/f/financial-statement-analysis.asp

Gomez, J. (2024, February 20). The power of financial statement analysis for growing businesses. https://www.linkedin.com/pulse/power-financial-statement-analysis-growing-businesses-jorge-gomez-vg8wc?trk=public_post_main-feed-card_feed-article-content

Carbon, T. I. (2023, September 5). Using financial statement analysis to evaluate industry and competitor performance. IRIS CARBON®. https://www.iriscarbon.com/using-financial-statement-analysis-to-evaluate-industry-and-competitor-performance/

Apple Inc. - DEF 14A. (n.d.). https://www.sec.gov/Archives/edgar/data/320193/000130817923000019/laap2023_def14a.htm

Microsoft 2022 Annual Report. (n.d.). https://www.microsoft.com/investor/reports/ar22/index.html

Cook, D. (2024, March 10). 2 Reasons to Buy Apple Stock Like There's No Tomorrow. The Motley Fool. https://www.fool.com/investing/2024/03/10/2-reasons-to-buy-apple-stock-like-theres-no/

Microsoft Corp (MSFT). (2024, May 31). Morningstar, Inc. https://www.morningstar.com/stocks/xnas/msft/quote

Proceedings of the 3rd International Conference on Financial Technology and Business Analysis
DOI: 10.54254/2754-1169/153/2024.19512

Analysis of Tesla's Stock Price Volatility and Driving Factors in the Context of New Energy Vehicle Industry Development from 2019 to 2024

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Abstract: The rapid development of new energy vehicles in the past five years has positioned Tesla as a leading company in the industry sustaining high growth rates in the industry. It's worth noting that during the past few years, Tesla's stock price has also experienced great fluctuations. Therefore, some investors are concerned that Tesla is no longer a worth investing target while others have strong confidence in its robust growth. This research paper examines Tesla's stock price volatility from 2019-2024 by time series methods including technical and fundamental analysis, identifying the key factors driving this volatility. By analyzing stock data and fiscal reports from online databases, this study aims to provide insights to investors, market analysts, policymakers, academics, and those interested in the electric vehicle industry on the investment opportunities of Tesla.

Keywords: Technical analysis, fundamental analysis, stock volatility.

1. Introduction

The rapid development of new energy vehicles in recent years has changed the landscape of the global automobile industry. There will be an estimated 14 million newly registered EVs, which adds up to 40 million in total and takes up 18% of annual sales of all automobiles [1]. The EV industry proliferated, and the aggregate sales revenue had a more than 30% increase on year and was six times larger than it was five years ago. In the competition of the new energy automobile industry, Tesla, as a pioneer and leader, has been at the top of the industry. Tesla's stock has grown rapidly over the past few years, and peak in 2021. Since then, Tesla's stock price does not appear to have fluctuated significantly after the two equity splits. Recently, with the policy changes within the company such as price cuts, the company's stock has experienced fluctuations. However, Tesla remains a robust competitor in the industry despite this minor setback. [2] As a well-established company, Tesla's stock performance attracts countless investors in the global market. Therefore, understanding the volatility of Tesla's stock and the factors that drive this is a valuable research topic to study. In this study, this research uses time series methods like fundamental and technical analysis to identify and quantify the factors affecting the volatility of Tesla's stock price to help readers understand the major factors that drive the volatility of Tesla's stock price globally, especially within its major markets and the role that they have played in the past five years.

DOI: 10.54254/2754-1169/153/2024.19512

2. Literature review

2.1. Introduction

Technical and fundamental analysis is applied to cope with the concerns over the uncertainty of market return due to complex market factors and nonlinear variables. It usually involves the implementation of graphing tools and calculations of the past historical data of stock while fundamental analysis is based on the evaluation of a firm's financial status and the computation and comparison of its values with the market indices [3].

2.2. Technique analysis

Technique analysis is a trading method that identifies the trading decision by predicting future price movement [4]. It can be analyzed using various matrices.

Kline analysis

Kline, known as a candlestick figure, is a technique applied to demonstrate the change in the price of a company in each period. Each candlestick represents four key information, the opening and closing price, the highest and lowest price. Different patterns of candlesticks provide different information on market trends [5].

MACD analysis

MACD (Moving Average Convergent /divergent) is a technique developed in the 1970s, it derives from the EMA. The standard MACD is computed by the EMA of 26 days subtracted from the 12-day EMA [6].

RSI analysis

Relative Strength Index (RSI) is also a key term in technique analysis. The RSI model concerns the differences between the aggregated capital gain and loss, and typically, the magnitude of RSI is positively correlated to the stock price, and it yields greater profits eventually [7].

2.3. Fundamental analysis

2.3.1. Financial analysis

Financial analysis measures the financial status and health of a company, it can be categorized into profitability analysis and debt service capacity, etc. It gives us an insight into a company's profitability, liquidity, and effectiveness.

Profitability analysis

This study measures the profitability analysis by its return on equity (ROE) and return on assets (ROA), then compares the differences between these indices with the industry or market value respectively. ROE is calculated by net income divided by average shareholders' equity, it measures a company's profitability about the shareholders' equity, which indicates how effectively the firm utilizes the investing money from the shareholders to generate profits [8].

Debt service capacity analysis

The ability to repay the debt is evaluated through indices and matrices like debt capacity, EBITDA, and ICR (interest coverage ratio). Debt capacity standard for the maximum amount of debt a company can withhold while maintaining a healthy financial status. It involves the computation of a firm's net income, credit score, existing debt, expenses, assets DTI (Debt-to-income ratio), etc. EBITDA stands for Earnings before interest, taxes, depreciation, and amortization. According to EBITDA (Corporate Finance Institute, n.d.), it is an index applied to rate the overall operating performance of a firm.

Cash flow analysis

DOI: 10.54254/2754-1169/153/2024.19512

The cash flow analysis is an analysis of the cash inflows and expenditures of a company, it is essential in understanding the financial health of a firm. Researchers can implement cash flow statements to examine the firm's liquidity [9].

2.3.2. Valuation analysis

P-E ratio

The price-earnings ratio is an important measurement in valuation analysis. The p-E ratio reflects the per-dollar stock profits that investors are willing to spend. The P/E ratio calculates the current market value of a company's shares about its earnings, and it is used to compare different firms' performance. [10]. Generally, a stock with a higher P/E ratio is more appealing to investors who expect the stock price to grow, while those who expect to spend less on units of earning are more likely to invest in stocks with a low P/E ratio, hence are less optimistic about the company's future growth.

P-B ratio

It's another valuation metric that determines the market capitalization to the book value of a company, it tells us how much an investor is willing to pay for the unit dollar net assets of a company. When the P-B value is smaller than 1 means the market value of a firm is lower than the book value, conversely, if the P-B value is greater than 1, it symbolizes the market value of the firm is higher.

2.4. Summary

This literature review explores the role and significance of technical and fundamental analysis in the study of stock price volatility. Technical analysis methods such as MA, MACD, and RSI help investors identify buy and sell signals through historical price data and market patterns. These tools provide useful information for short-term trading. While Fundamental analysis focuses on evaluating a company's financial health and intrinsic value, including financial ratios such as ROE, ROA, and EBITDA, as well as valuation metrics like P/E and P/B. These analyses help to understand a company's long-term investment value.

3. Methodology

3.1. Research design

Time series analysis is a common method for studying stock volatility, it is observation for a given string of data or phenomena in a consecutive period point [11]. This research paper will analyze and study Tesla's stock for the last five years using a quantitative research methodology with both technical and fundamental analysis. This study will analyze the volatility of Tesla's stock, speculate on the causes of the stock price fluctuations, and give investors relevant investment advice.

3.2. Data collection

Researchers should rely on more than one index and matrices to predict the market performance of the target company. These measurements include the reference to fiscal reports and the visualization of historical data [12]. To assess the historical volatility of Tesla's stock price, this study will use different sources of data and information, such as online databases, fiscal reports, and industrial reports, covering the historical data of Tesla stock from the past five years. Because the data is large enough to include various fluctuations of the stock market like bull market bear market and volatile market, hence gives more diversified historical data. This study will also use the data gathered by Tesla to compare it with the market average, hence evaluating the company's competitiveness.

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3.3. Data analysis

As discussed in the literature review, this research paper will utilize a time series method to conduct technical and fundamental analysis of Tesla's past stock price data.

In terms of technique analysis, this research paper will dive deep into the computation of the three matrices. To begin with, K line analysis gives an overview of the price movement of Tesla in a specific time slot. In practice, when the closing price is higher than the opening, it indicates bullish sentiment, where candlesticks are in green color. Conversely, if the closing price is lower, it represents bearish sentiments, and candlesticks are in red [5]. Consider moving averages, MACD can be measured through two exponential moving averages of the assets' price: a faster 12-period EMA and a slower 26-period EMA. According to Pines, L, the 9-period EMA is called the signal line and the MACD histogram measures the differences between MACD and the signal line [13]. When the 12-day EMA is above the 26-day EMA, the MACD line will be higher than the zero line, conversely, if it crosses below the EMA of the 26 days, the MACD line intercepts beneath the zero line. RSI is a strong indicator that can determine the magnitude of the price change so it can predict if the price of a stock is in a condition of either overbought or oversold. RSI is composed of Relative Strength, Average Gain, and Average Loss, where the quantitative expressions are RSI=100-100/(1+RS) where RS=AG/AL [7].

Fundamental analysis comprised of financial analysis and valuation analysis. The subcategories of financial analysis are profitability, debt service capacity, and cash flow analysis.

To evaluate the profitability of Tesla, this study will search for the ROE and ROA through the fiscal report of Tesla over the past five years and compare these indices with the market or industry average. Normally, a higher ROE indicates higher efficiency in profit generation [14]. Similarly, ROA measures the ability of a company to generate profit concerning its assets, which equals net income/ total assets. For the debt services capacity, this study will refer to Tesla's EBITDA and ICR over the years on its fiscal report 2019-2024. EBITDA provides a general picture of the operating profitability of the company in the absence of taxation and non-cash expenses, while ICR measures Tesla's ability to meet its interests' obligations with its earnings. Finally, this research paper includes cash flow analysis as it can help us understand the firm's financial health and liquidity as well as the ability to maintain its growth. A common approach for measuring the cash flow is the quick ratio, which measures the liquidity of a company and is calculated by current asset-inventory/current liabilities.

For valuation analysis. This study is concerned with two matrices, the PE ratio, and the ratio. PE ratio =Current share price/Earnings per share (EPS). It tells us the relative valuation of the company with others from the same industry, the growth potential for the firm and it also reflects the market sentiment of Tesla towards any other companies from the same industry.

The PB ratio is calculated by market price per share/ book value per share. It reflects the investors' sentiment which is usually used to measure the confidence of the investors. Generally, a higher PB ratio suggests higher confidence of the investors.

3.4. Validity and reliability

To ensure the validity of this research, this research has references to different firsthand and secondhand sources of data, including online sources, Tesla's fiscal report, the reliable third-party databases. Our research is based on two systematic time series methods of fundamental and technical analysis. These two methods involve different matrices and indices like MA, ROE, EBITDA, and P/E ratio, which ensures versatility and accuracy of analytical results. Our data will be presented with different visualizations including MA curves, tables, line figures, and histographies. Most of the

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analyzed data will be compared with the market or industrial average to make sure they are appropriately collected, categorized, and presented.

3.5. Limitation

Since this study only relies on time series methods to analyze Tesla's historical stock price, the research design may have the following limitations. One noticeable limitation is that the study neglected the macro-economic factors. Since technical and fundamental analysis mainly focuses on the company's financial status and market behaviors, this paper won't analyze the impact of some macroeconomic factors, such as changes in interest rates, economic cycles, and policy shifts on the volatility of Tesla's stock price. Another potential flaw in our design is that time series research fails to catch up with the impacts of the breaking events of Tesla. As an emerging energy car manufacturer, Tesla faces many challenges and competition from the same industry such as fierce competition as it enters the Chinese market, and the competitors generally take up its places by applying various strategies [15]. These indicate that factors such as technological breakthroughs, corporate restructuring, stock splits, and management changes could have a significant impact on the company's share price volatility in the near term.

Finally, technical analysis relies too much on historical data, which may not reflect the company's future development and stock price change. The new energy vehicles industry is at the forefront of ever-changing rapid development and change.

4. Results

4.1. Technical analysis

Kline analysis:

According to the candle figure from Figure 1, Tesla's stock has exhibited an upward trend from 2020 to 2021 and reached a peak on Monday, November 1st, 2021, symbolizing bullish engulfing. Then it experienced fluctuation in the following three years and remained stable after all.

Figure 1: Candlestick figure of Tesla from 2019-2024 (Trading View)

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Let's choose the nearest month (August 2024) as an example to do a monthly K-line analysis. As displayed in Figure 2, the opening price was 219.80 USD, and the closing price was around 220.32 USD, the highest price reached 232.10 while the lowest price was 191.76 (Google Finance. n.d.) At the beginning of August, the figure displays a clear bearish engulfing pattern, which signals the reverse from an upward trend to a downward one. It also shows several Doji patterns, meaning market indecision and potential reversal. It's also worth noting Hammer appears several times at both the beginning of the month and the mid of August, which can indicate that interest buying at the low level is strong. At the end of August, the stock prices generally climb up and reach a price level like the opening price.

Figure 2: Trending View of the candlestick figure of Tesla in one month (Trading View).

MACD:

Both Tesla's EMA5(220.30) and EMA20(220.32) are greater than or equal to the share price (220.32) while both EMA100(219.94) and EMA200(219,37) are smaller than the share price, signaling buy instead. The MACD (12,26) is 0.03 indicating EMA12-EMA26 is 0.03 higher than EMA9 (Tip ranks), suggesting the stock price will continue to rise in the future.

RSI:

Till August 2024, Tesla has an RSI (14) =50.20, which is between the interval 30-70, indicating a neutral market sentiment (Tip ranks).

4.2. Fundamental analysis

4.2.1. Financial analysis

Profitability analysis

ROE is calculated by net income/ shareholder's equity. Figure 3 shows that Tesla's ROE has increased sharply for the past five years from -11.55% to 19.89% in the second quarter of 2024. The Lowest ROE occurred in Q3 2019 while the peak was in Q4 2022. According to Figure 3, Tesla's ROE increased drastically and plummeted before it remained steady after Q4 2022. Generally, it remains a high profile and stable trending, indicating Tesla's high efficiency and strong ability to utilize its equity to generate profits (Macrotrends).

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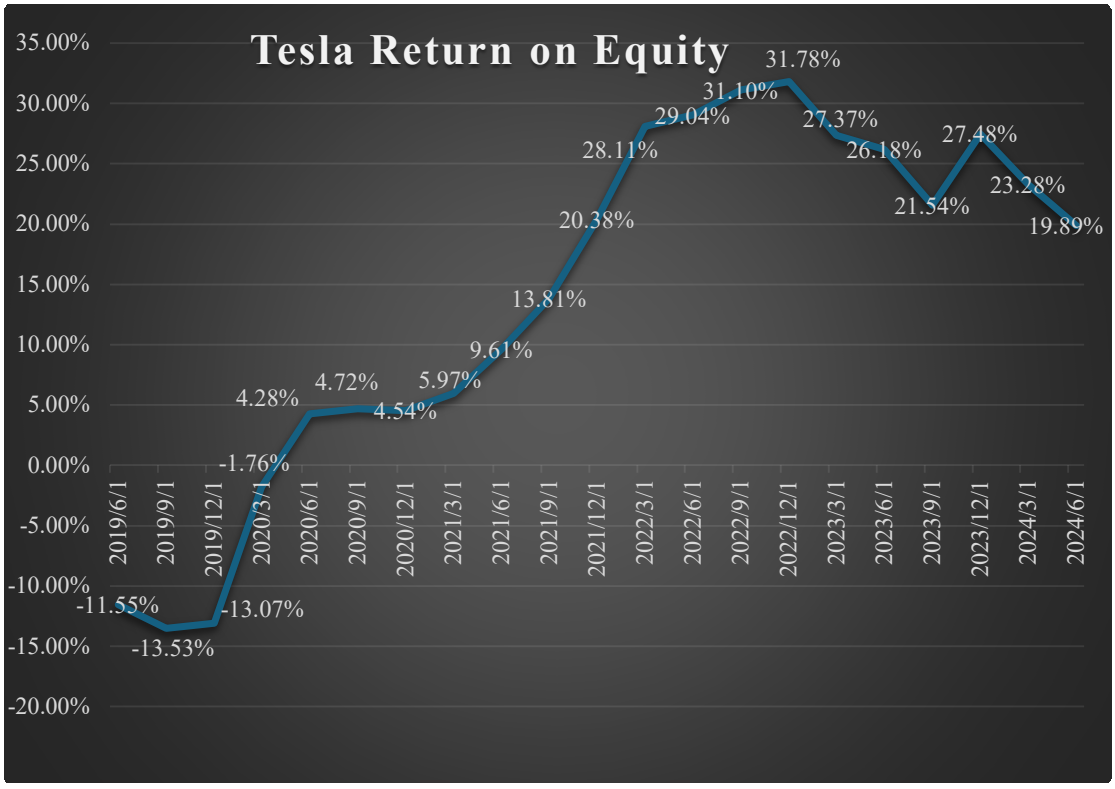

Figure 3: Tesla Return on Equity 2019-2024 (Macrotrends).

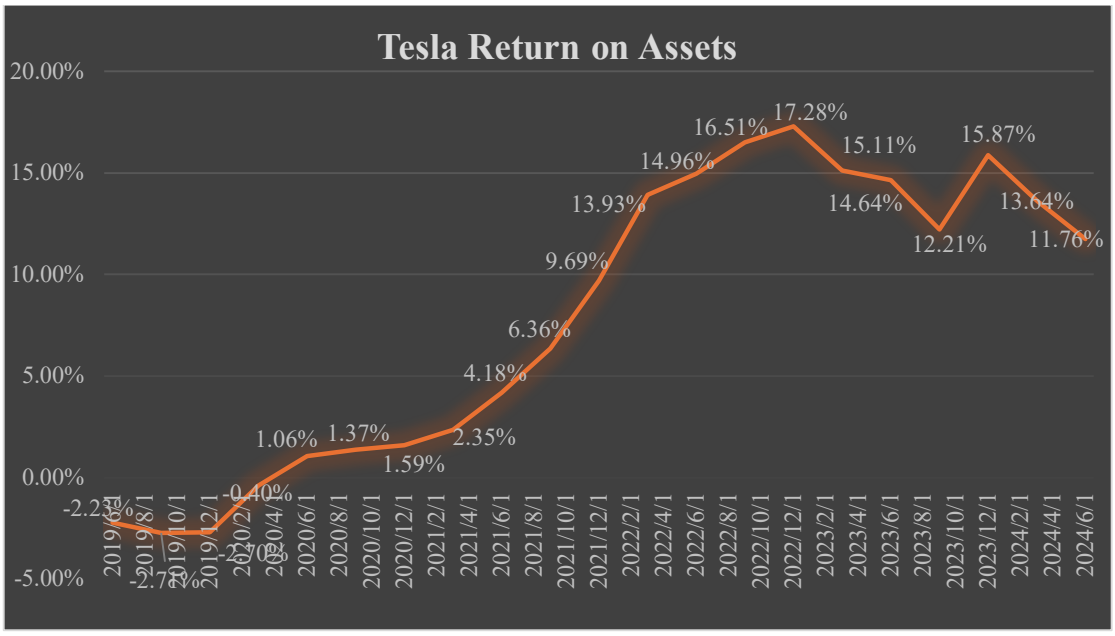

Figure 4: Tesla's Return on Assets (Macrotrends).

As illustrated in Figure 4, Tesla's ROA has a similar pattern to the ROA, it started with -2.24% in Q2 2019 and ended with 11.76% in Q2 2024. The highest ROA was 17.28 in Q4 2022, and the lowest ROA was -2.71% in Q,32019. The ROA has experienced promising growth between 2019 and 2022. Despite minor fluctuations after 2022, Tesla's ROA can remain at a high level above 0, indicating its success in generating earnings from its assets (Macrotrends).

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Debt service capacity:

Table 1: Tesla Annual EBITDA (Millions of USD) (Macrotrends)

Year	Millions of USD
2023	$13,558
2022	$17,403
2021	$9,434
2020	$4,316
2019	$2,085

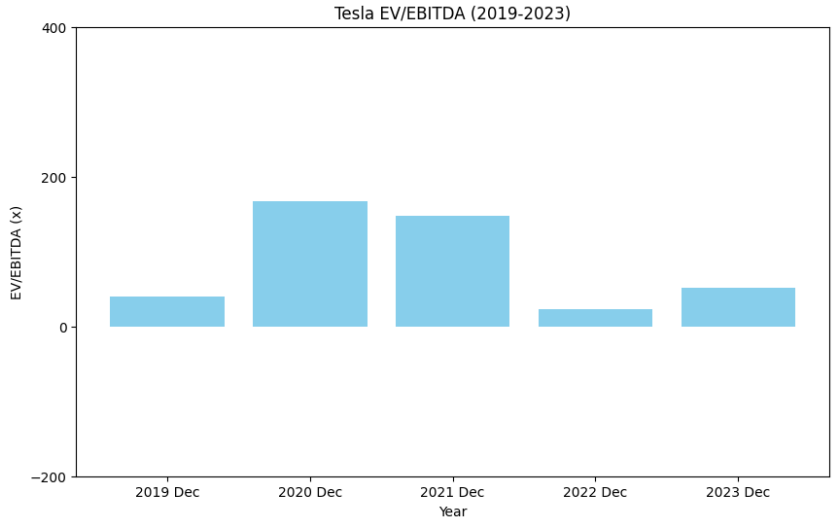

Figure 5: Tesla's Enterprise Value (EV, in billions of USD) (Fin Box)

According to Table 1, In the past five years, Tesla has experienced robust growth for 4 consecutive years from 2019-2022, then it fell back by 22.09% in 2023, but still higher than the previous three years. According to Figure 5, the EBITDA multiples from the end of 2019 to 2024 are 41.31, 155.46,112.2, 21.54, and 57.01 respectively (Fin Box).

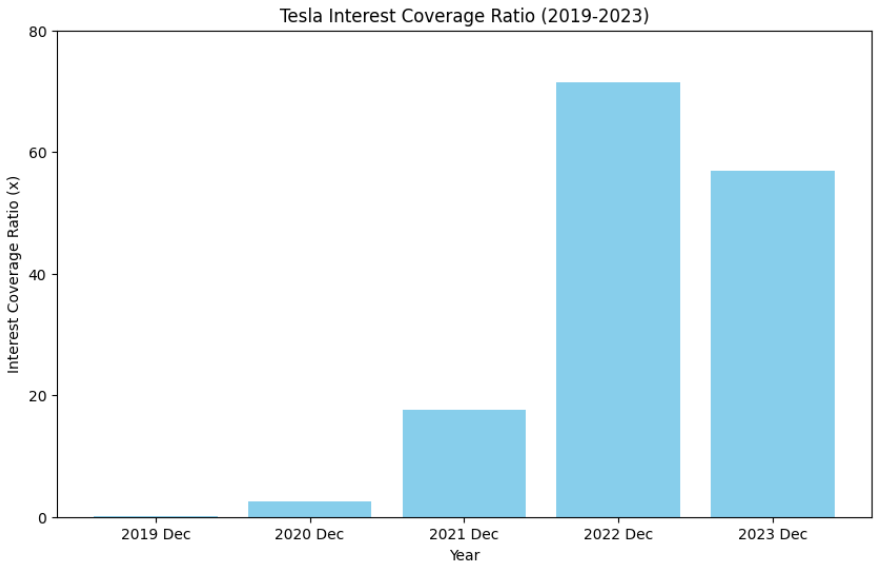

Figure 6: Tesla's Interest Coverage Ratio (Fin Box).

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For ICR, as displayed in Figure 6, the average interest coverage ratio from the end of 2019-2023 is 29.8x. During the past 5 years, the highest ICR was 71.5x at the end of 2022, while the lowest ICR in the past five years was 0.1x at the end of 2019. The highest ICR growth happened at the end of 2020, followed by a +2263.8% increase. According to the latest data, the nearest 12-month ICR of Tesla is 27.5x (Fin Box).

Cash flow analysis:

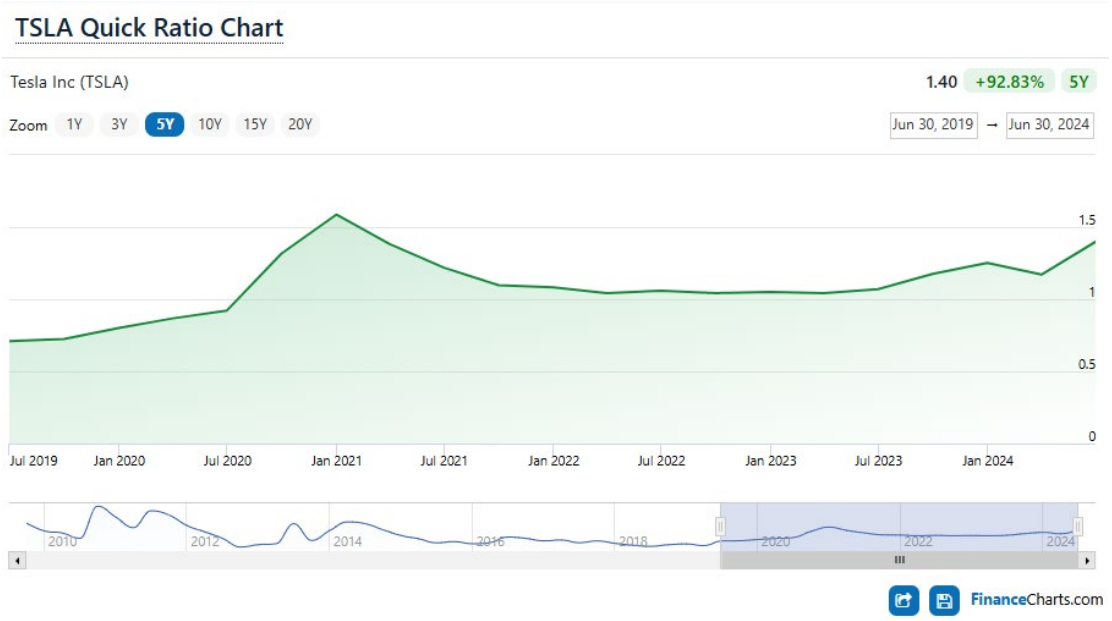

Figure 7: Tesla's Quick Ratio from Jul 2019-2024(Finance Charts).

As demonstrated by Figure 7, over the past five years, Tesla's quick ratio has had minor fluctuations and mostly remained above 1. The highest QR was 1.59 in January 2021, while the lowest was 0.71 in January 2019. As for Q2 2024, Tesla's Quick ratio is 1.40 (Finance Charts).

4.2.2. Evaluation analysis

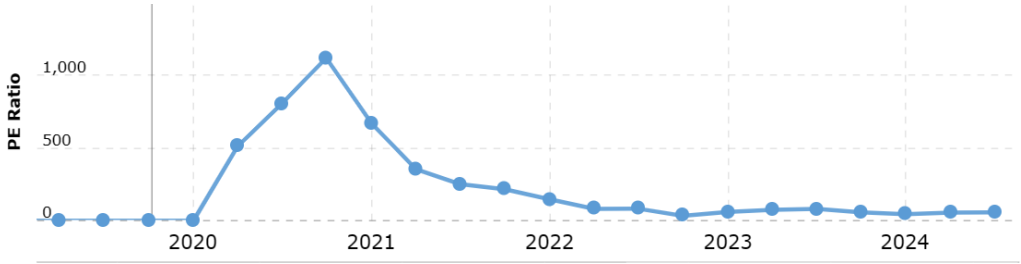

Figure 8: PE ratio of Tesla from 2019-2024 (Macrotrends)

PE ratio:

According to Figure 8, Tesla has a P/E ratio of 57.96 till August 28, 2024, for the past five years, Tesla s P/E ratio has displayed a trend of great ups and downs. Before 2020, the P/E ratio of the company had negative EPS, so their calculated P/E ratio was 0. After 2020, TSLA experienced rapid growth in the short term and achieved 1120.11x at the end of 2020. Then, the P/E ratio falls back in the following two years and the trend becomes stable after all (Macrotrends).

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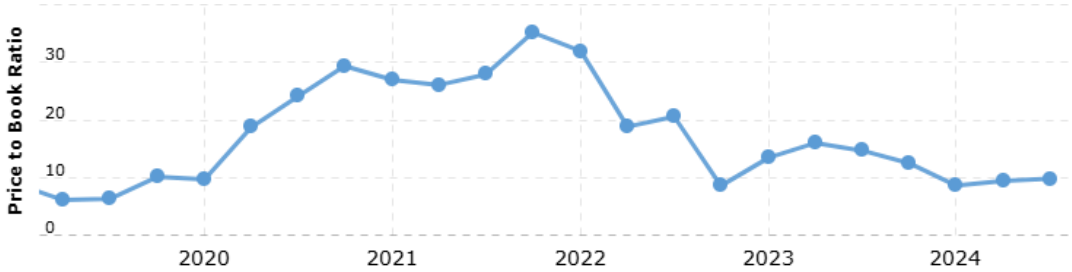

Figure 9: Tesla's PB ratio from 2019-2024 (Macrotrends).

P/B Ratio:

As shown in Figure 9, Tesla's PB ratio has had a more zigzag evolution. The high point was 35.21 at the end of 2021, while the low point was 6.09 in the first half of 2019. As of the end of August 2024, the P/B ratio was 9.78. Generically, Tesla has a relatively higher P/B ratio throughout the period (Macrotrends).

5. Discussion

5.1. Technical analysis

k-line analysis

Based on our Technical analysis of the pattern of the long-term and short-term K-line of Tesla, this study finds that over the past half-decade, Tesla's stock has displayed remarkable growth which encompassed significant fluctuations and rapid appreciation, especially from 2020-2021. Nonetheless, it also witnessed a noticeable decline since then. It can recover and remain stable eventually. Till August 2024, Tesla's stock price also exhibits considerable volatility but closed at a similar level to the opening price, which matches the long-term K-line performance of the company. Therefore, it reflects the market indecision and the strong buying interests at a low level.

MACD & RSI

In terms of MACD, the 12-day EMA is slightly higher than the 26-day EMA by 0.03 (CSI market). The figure is positive suggesting the sign of bullish, signalling the stock price will continue to grow soon. However, the magnitude of MACD is too small suggesting the momentum is not strong. For RSI, since the value reflects a neutral market sentiment, it suggests that there's no strong buying or selling pressure.

5.2. Fundamental analysis

5.2.1. Profitability analysis

ROE and ROA

For the fundamental analysis, this study will compare the relative matrices with the market average. For the EV industry, the market average ROE and ROA are 12.49% and 3.65% respectively. Tesla has relatively higher ROE (19.89%) and ROA (11.76%) in the recent year (CSI market). Higher ROE showcases Tesla is significantly more effective at generating profits from its shareholders' equity, suggesting the company has high management efficiency and the ability to be profitable. Besides, Tesla has a much higher ROA than the market level, indicating that the firm can effectively utilize its assets and operate efficiently. These criteria make the company more attractive to investors compared with its competitors from the same industry.

Debt service capacity

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For EBITDA multiple, the industry average of Auto parts is 9.15 in the recent year and has a 10.11 5-year average (Full Ratio). From the past data, the EBITDA multiple of Tesla is much higher than the market average, reflecting its strong competitiveness and potential for growth. Over the years, Tesla has maintained its EBITDA at a considerably high level, despite its decline in 2023, its EBITDA multiple is still much higher than the market average in the same period, indicating its resilience and competitiveness.

Liquidity

In 2023, ICR for all industries was 2.51x and the auto industry average ranged from 2-10x, Tesla's interest coverage ratio has greatly improved in the past few years. Despite 2019 and 2020, it has far higher ICR compared with the whole market and the industry average (Ready Ratios). It indicates that the company has gained financial stability and can meet most of its interest obligations. Considering the liquidity of the company, the quick ratio ranged from 0.71-1.59x from the 2019-2024 fiscal year. The industry average for car manufacturers is 0.61x, while the figure for Tesla is 1.4, more than two times the industry index (Full Ratio). This emphasizes the company has robust financial health and can effectively manage its liquidity.

5.2.2. Valuation analysis

PE ratio

Finally, for the valuation analysis, this research is concerned with P/E and P/B ratios. According to the given data, the P/E ratio for Tesla was negative before 2020, that's because the company had negative EPS, indicating they were not profitable and in capital loss. However, Tesla has robust growth in the following years and the P/E ratio skyrocketed at the end of 2020. The overall average PE ratio is 242.17. Despite the sharp decline after 2021, it remains relatively high at 57.96 till Q3 2024 (Companies Market Cap).

The industry average, on the other hand, is only 9.97. Tesla has a much greater PE ratio than the border car manufacturers reflecting the investor's strong confidence in its future development. However, Tesla also exhibits a trend toward stabilization. Consequently, the market has begun to evaluate its growth prospects more pragmatically.

PB ratio

Tesla's PB ratio shows more volatility compared with its PE ratio. Until 2024, the PB ratio of the auto industry is 4.62. While the current P/B ratio of Tesla is 9.78. This high value suggests the investors are willing to buy at a premium for the company's stock relative to its book value. The peak performance in 2021 might reflect the optimism of the investors but the subsequent decline signals a more prudent attitude of assessment among investors (Stern NYU).

6. Conclusion

6.1. Technical analysis

Tesla stocks have exhibited significant volatility in the last five years. The general pattern is experiencing short periods of rapid growth early on, then falling back quickly after peaking before maintaining stability at an above-average level. From 2020-2021, it experienced rapid growth. Despite a considerable decline after that, the stock price signals the possibility of recovery and stabilization. The current technical matrices (like MACD and RSI) showcase neutral market sentiments. However, there are slight bullish signals suggesting that further growth may be in store for the future.

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6.2. Fundamental analysis

Tesla's financial indices like ROE and ROA are high above the industry average, indicating that the firm has high efficiency and profitability in utilizing assets and shareholders' equity. Besides, the high EBITDA multiple and ICR underscores the robust competitive advantage and the financial stability of Tesla. The high quick ratio also symbolizes the financial health and liquidity of the management of the firm.

Despite the considerable volatility of the P/E and P/B ratio, Tesla has both indices higher than the industry average, indicating investors have strong confidence in the future development of Tesla. Although investors have a more realistic assessment of Tesla's future growth, the high valuation figures indicate they are still willing to pay a premium for the perspective of the company.

6.3. Investment suggestions

For the long-term investors, Tesla remains an attractive choice. Its strong financial performance and market leadership make it full of potential for growth in the following years.

For short-term investors, despite the volatility of the stock price, our technical analysis suggests a slight bullish sign. In this case, investors need to focus on the market sentiments and find an appropriate buying opportunity.

In terms of risk management. It's worth noting that Tesla has high valuation figures and market volatility. Therefore, investors need to diversify their portfolios and avoid investing excessively in a single stock. Meanwhile, investors need to pay attention to the changes in the market and the company's financial performance, to make timely decisions and adjustments to its investment policies.

6.4. Summary

To conclude, Tesla continues to be a leading company in its industry and a worth investing target. However, investors should be prudent and focus on market sentiments to make the right policies based on their financial goals and risk-bearing capacities.

References

[1] *International Energy Agency. (2024). Trends in electric cars – Global EV Outlook 2024 – Analysis. IEA. https://www.iea.org/reports/global-ev-outlook-2024/trends-in-electric-cars*

[2] *Spilka, D. (2023, October 27). Why Tesla Remains the Star of Automotive Investing https://www.nasdaq.com/articles/why-tesla-remains-the-star-of-automotive-investing-despite-recent-volatility*

[3] *Almeida L, Vieira E. Technical Analysis, Fundamental Analysis, and Ichimoku Dynamics: A Bibliometric Analysis. Risks. 2023;11(8):142.*

[4] *Eugster, P., & Uhl, M. W. (2023). Technical analysis: Novel insights on contrarian trading. European Financial Management: The Journal of the European Financial Management Association, 29(4), 1160–1190. https://doi.org/10.1111/eufm.12389*

[5] *Understanding the Basics of K-Line Pattern | EBC Financial Group. (2023). Ebc.com. https://www.ebc.com/forex/k-line-chart-basic-introductory-knowledge-to-explain*

[6] *Wang, J., & Kim, J. (2018). Predicting Stock Price Trend Using MACD Optimized by Historical Volatility. Mathematical Problems in Engineering, 2018, 1–12. https://doi.org/10.1155/2018/9280590*

[7] *Day, M.-Y., Cheng, Y., Huang, P., & Ni, Y. (2022). The profitability of trading US stocks in Quarter 4 - evidence from trading signals emitted by SOI and RSI. Applied Economics Letters, 1–6. https://doi.org/10.1080/13504851.2022.2041165*

[8] *Buckley, D. (2023, October 18). ROI: ROC vs. ROA vs. ROE. Daytrading.com. https://www.daytrading.com/roc-vs-roa-vs-roe*

[9] *Fletcher, E. S., Jr., & Rose, J. T. (2020). Digging deeper into UCA cash flow analysis: Sustainable versus unsustainable operating cash flows. The RMA Journal, 103(2), 42-55.*

[10] *Freihat, A. R. F. (2019). Factors affecting price-to-earnings ratio (P/E): Evidence from the emerging market. Risk Governance and Control: Financial Markets & Institutions, 9(2), 47-56. DOI: 10.22495/rgcv9i2p4.*

DOI: 10.54254/2754-1169/153/2024.19512

[11] *A new approach of moving average method in time series analysis | IEEE Conference Publication | IEEE Xplore. (n.d.). Ieeexplore.ieee.org. https://ieeexplore.ieee.org/document/6708545*

[12] *Ho, T.-T., & Huang, Y. (2021). Stock Price Movement Prediction Using Sentiment Analysis and CandleStick Figure Representation. Sensors, 21(23), 7957. https://doi.org/10.3390/s21237957*

[13] *Pines, L. (2022, March 27). When To Use And How To Read The MACD Indicator. Commodity.com; Commodity Trading.https://commodity.com/technicalanalysis/macd/#:~:text=The%20primary%20method%20of%20interpreting%20the%20MACD*

[14] *Moro-Visconti R. Augmented Corporate Valuation. 1st ed. Cham: Palgrave Macmillan; 2022. 769 p. Available from: https://doi.org/10.1007/978-3-030-97117-5*

[15] *He, W., & Hao, X. (2023). Competition and welfare effects of introducing new products into the new energy vehicle market: Empirical evidence from Tesla's entry into the Chinese market. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4232784*