

# Technology Hardware, Storage & Peripherals

February 8, 2023

## Information Technology

Industry Rating

**Underweight**

### Investment Thesis

The Technology Hardware, Storage & Peripherals industry faces strong economic headwinds and stabilizing demand down from the post-pandemic highs. Supply-chain issues have begun to normalize. However, recessionary fears and global inflation have soured consumer spending and Q4 shipments across key product segments were down significantly year over year. As a result, we recommend an underweight rating on the industry.

### Drivers of Thesis

- Limited growth potential for many product segments as they approach the mature stage of their life cycle. Shipments for tablets and PCs have already reached their peak.
- Recession fears and high inflation continue to put downward pressure on consumer spending, especially at the lower end of the market. The Henry Fund predicts a 53.6% chance of recession in the next 12 months.
- Escalating tensions between the China and the US and Taiwan pose significant risks to industry participants who are reliant Chinese manufacturing and consumption as well as Taiwan chip production.

### Risks to Thesis

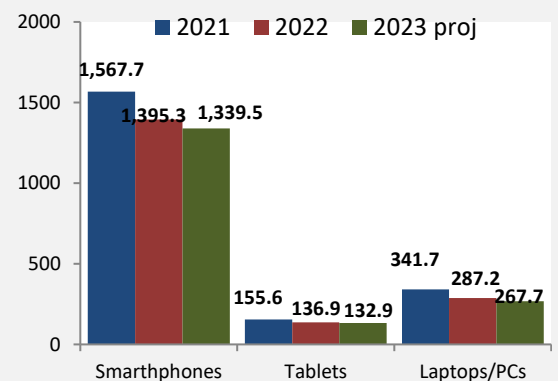
- Increased adoption rates and product innovation for wearables spark higher growth rates for the category.
- Cycle upgrade to 5G capable smartphones and inelastic demand for premium phones help prop up mobile phones revenues.
- Sustained low unemployment and reduced inflation lead to increased demand for discretionary tech products.

### Key Metrics

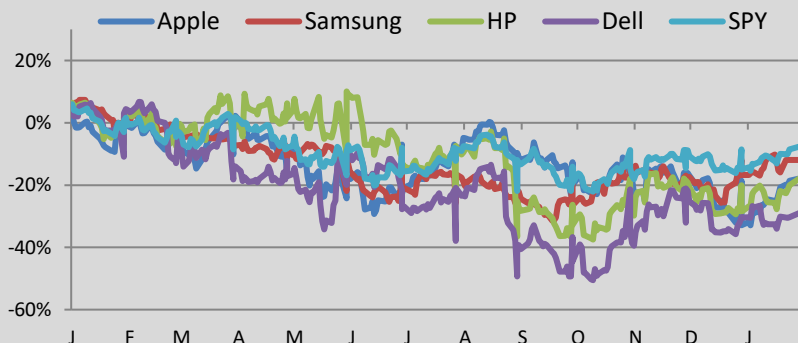
Market Cap	(In \$ Billions)
Apple	\$2444.5
Samsung	\$305.2
Dell Technologies	\$30.2
HP Inc.	\$29.9
P/E Ratio (NTM)	
Apple	24.7
Samsung	23.5
Dell Technologies	6.9
HP Inc.	8.9
P/Sales	
Apple	6.4
Samsung	1.4
Dell Technologies	0.3
HP Inc.	0.5
Gross Margin	
Apple	43.1%
Samsung	21.6%
Dell Technologies	20.0%
HP Inc.	18.2%

Factset data

### Global Shipments by Device



### 12 Month Performance



### Industry Description

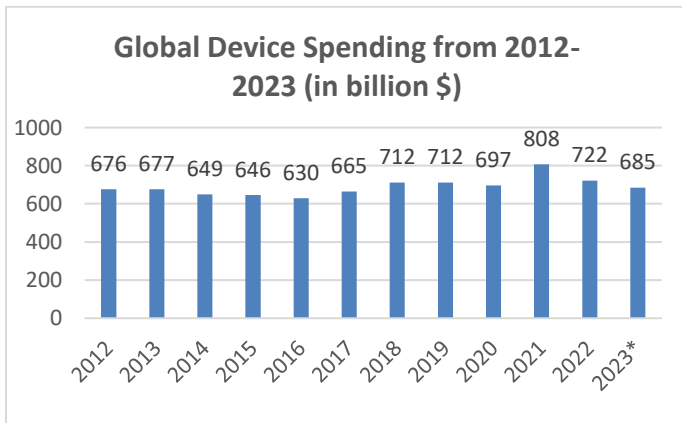
The Technology Hardware, Storage & Peripherals is a sub-industry within the Information Technology sector. Industry sales are dominated by four key product segments including mobile phones, PCs, tablets, and wearables. There are two global industry leaders, Apple and Samsung who compete among all major product segments and hold significant market share in mobile phones & wearables. Several firms compete in the more highly fragmented markets for PCs and tablets.

## INDUSTRY DESCRIPTION

The Technology Hardware, Storage and Peripherals industry includes manufacturers of mobile phones, PCs, tablets, wearables, data storage devices, and computer accessories. The participants within each specific market segment vary significantly, as does the level of competition and overall revenues. Apple and Samsung dominate the industry by total revenue and shipments and compete directly in the substantial smartphone market. The market breakup for PCs, tablets, and wearables is more fragmented.

Demand among all four major categories is cyclical in nature with regards to both economic conditions and product development and innovation cycles. Products at the lower end of price ranges are highly susceptible to macroeconomic conditions as lower income earners are the most impacted. At the high end of the market, premium products have more inelastic demand with regards to the macro environment. Demand for premium products is much more innovation driven and reliant on new product releases and feature upgrades.

Total spending across the industry (excluding wearables and storage) peaked at \$808.58b in 2021 and is forecasted to see continued declines in 2023 down to \$685b.<sup>4</sup>

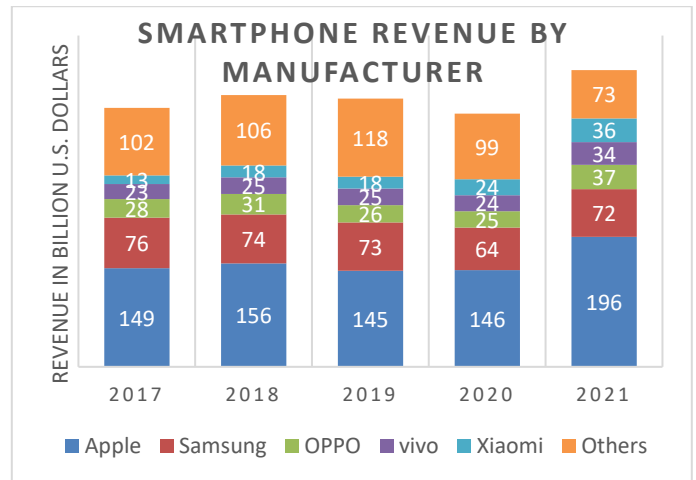


Source: Gartner

### Smartphones

The Smartphone market accounts for the largest share of total industry revenues with \$409b in sales in 2022.<sup>5</sup> The market has largely been controlled by Apple and Samsung for the past decade plus. Apple is the market leader in total revenue by a wide margin. Samsung still leads in terms of annual device shipments with a narrow lead over Apple.

Combined, the two companies account for approximately 60% of total revenues and 41% of shipments. 4,6



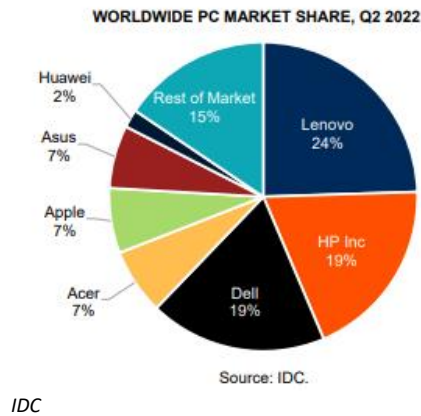
source: Statista

The overall number of annual smartphone sales has been in decline since a peak in 2018. Global demand has fallen as replacement rates are extending and penetration into Emerging Markets plateaus. In 2022, shipments fell to a 10-year low at 1.21billion, and 2023 is projected to see only a moderate recovery per IDC. Key trends include higher average sales prices driven by sustained demand for premium phones, and increased adoption of 5G capable devices contributing to higher ASPs. Finally, newer entrants into the market including China based companies Xiaomi, Oppo, and Vivo have begun to gain market share. These companies largely compete at the lower end of the price range within China, India, and smaller Asian markets.

### PCs

The market for PCs covers desktops, laptops and 2in1s. Relative to smartphones, the PC market is more mature and characterized by fierce competition and lower margins. No single company has greater than a 25% market share. Dell, Lenovo, & HP inc. each maintain market share between 19-24% as of Q2 2022. These three players, especially Dell, dominate the enterprise or business segment. Other manufacturers including Apple and Microsoft compete with the market leaders for retail and education-based spending. A move away from desktops and towards portable devices has reshaped the

market over the past decade. Sales of tablets have also cannibalized PC sales over the years.



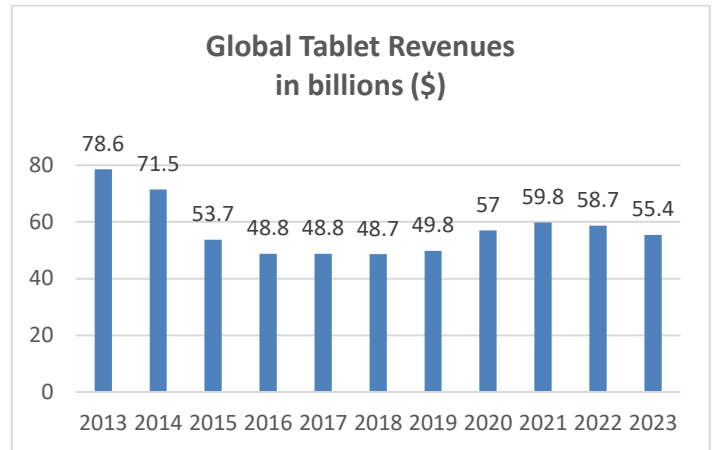
The PC market is in the mature stage of its life cycle. Global shipments peaked in 2011 at 365mm units and have trended downward until a recent covid driven demand spike in 2021. In 2022 total purchases are estimated to have dropped from 342mm in 2021 to 286mm.<sup>1</sup> The downward trend is forecasted to continue through 2023, largely driven by deteriorating macroeconomic conditions and the end of a covid driven replacement cycle. Both the enterprise and consumer sides of the market continue to be affected by the demand decay.

## Tablets

Dynamics within the tablet market largely mirror those of the smartphone and PC markets. Market share is dominated by Apple's iPad, while Samsung trails in a distant second. Similar to other product segments, it saw robust growth during the early 2010s. Total revenues, shipments, and average sales prices all peaked between 2013-14. Continuing with the industry wide theme, the tablet market saw a covid demand spike in 2021 followed by regression to the mean in 2022. Industry forecasts call for continual decline going forward.<sup>4</sup>

Despite Apple's dominance, there are a large number of players in the space. Amazon, Samsung, Microsoft, and many PC manufacturers compete for the remaining market share. A wide range of product offerings and market participants has helped bring down average prices over the years.

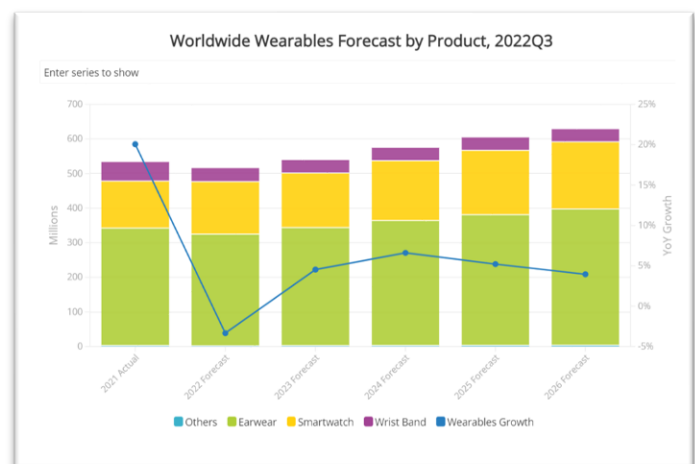
Similar to how tablets have cannibalized PC sales, larger screen sizes for smartphones and the foldable phone trend threatens to further dampen tablet sales. Due to the decreasing level of product differentiation, we should expect to see the tablet market resume its declining trend that started a decade ago.



Statista

## Wearables

The wearables market is the newest and fastest growing product segment within the industry. It's primarily broken down between smartwatches and wireless headphones. Overall, IDC projects wearable shipments to grow at a 5.1% CAGR over the next 5 years with earwear accounting for more than 50% of product shipments.<sup>6</sup>



Source: IDC

Once again Apple dominates the space and accounted for 29% of all shipments in Q3 of 2022. The Apple Watch and Apple Air Pods each rank as the number one product

globally in their respective categories.<sup>6</sup> The rest of the market is highly fragmented. Samsung, Fitbit, Garmin, and newer Chinese OEMs compete in the smartwatch segment. Traditional audio equipment manufacturers including Bose, Sony, & JBL have each carved out a stake

Trends to monitor in wearables include new offerings around health and wellness, which could continue to disrupt the industry. New smartwatch features such as heartrate monitoring and sleep tracking have been introduced in recent years. Chronic illness monitoring devices present another significant opportunity as device capabilities continue to expand rapidly. Additionally, augmented reality (AR) glasses are widely believed to be the next product that will reshape the industry.

## RECENT DEVELOPMENTS

### Earnings Regression

Major industry participants across the board have had earnings and revenue surprises to the downside. Common themes cited throughout earnings calls have been slowing demand, a challenging macroenvironment, and FX headwinds. Quarterly operating profit and revenue compared to prior year is outlined below.

Most Recent Quarterly Results (YoY)		
Company	Operating Profit	Revenues
Apple	-13.2%	-5.5%
Samsung	-69.0%	-8.0%
Dell	-9.4%	-13.9%
HP Inc.	-35.3%	-13.0%

Statista

Samsung posted its lowest quarterly profit since 2014, with margins dropping 69% yoy.<sup>7</sup> Declining demand for memory chips and mobile were cited as primary drivers.<sup>11</sup> Similarly, Apple’s Q1FY23 results included both revenue and earnings declines for the first time since 2019. In the PC market, both HP and Dell recorded lower EPS than expected for FY22 and cited degrading demand from both consumer and enterprise business alike.<sup>9,10</sup>

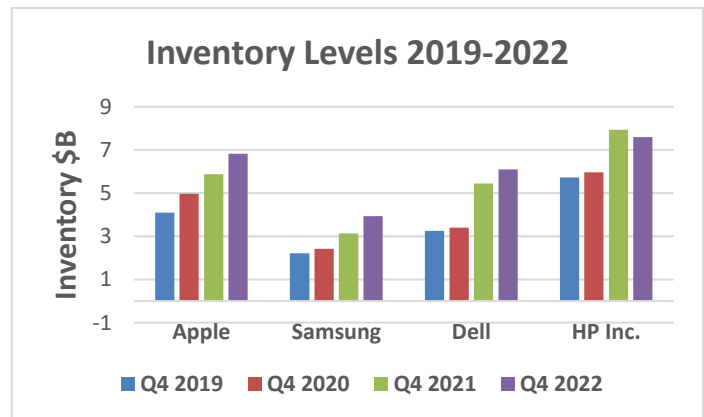
The prevailing macro conditions are now being reflected within the financial statements. Consensus from industry

managers seems to be that a return to growth most likely won’t happen until the second half of 2023 at the earliest.

### Supply Chain Easing

Supply chain issues have plagued the industry since 2020 and issues persisted through most of 2022. Recent earnings calls from Apple, Samsung, and Dell suggest that these issues have largely been resolved in 2023. Apple’s Tim Cook stated, “from a supply chain point of view, we’re now at a point where production is what we need it to be. And so, the problem is behind us.”<sup>8</sup> Samsung mentioned “smooth supply” for their Galaxy S23 phone. Finally, in their Q3 report Dell referenced “standard lead times for supply, what we sell is what we ship, no delays”.

The end of the supply chain crisis is undoubtedly a positive for the industry. However, it coincides with untimely declines in demand. Inventory management will be a key factor to monitor through the first half of 2023. Change in year end inventory levels by company is detailed below.



FactSet

If companies have overestimated demand, they will be stuck with excess inventory and potentially forced to cut prices. This issue has already played out for Samsung in its chip manufacturing business.<sup>12</sup>

## INDUSTRY TRENDS

### AR/VR

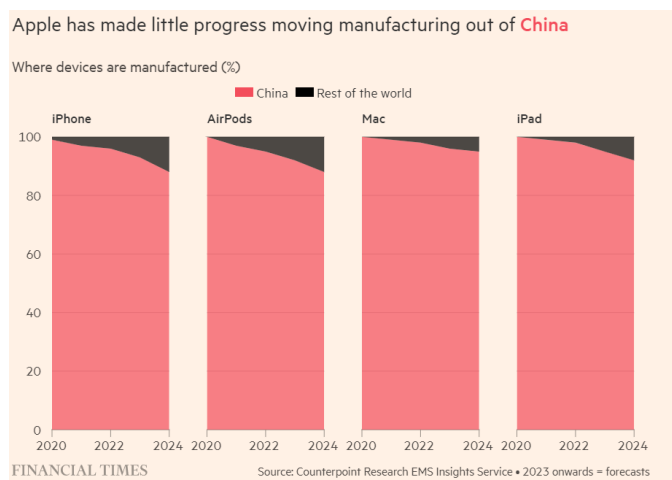
The next major disruption within the tech hardware industry will likely come from Immersive-reality technology. This includes both Augmented and Virtual reality devices (AR & VR). VR tech has already carved out a small place in the market with products like Meta’s Oculus.

Full commercialization of AR tech is still further away, but its bound to re-shape the entire industry.

Augmented Reality is defined as a partly immersive experience where users interact with a 3D overlay onto the external reality in real time.<sup>13</sup> Use examples include projections from smartphones as well as AR glasses and windshields. Large tech companies including Google and Microsoft have already experimented with AR devices. Headsets are likely to be introduced as extensions of smartphones and eventually potential replacements. McKinsey is forecasting the immersive reality market to grow at 24% CAGR through 2035.<sup>13</sup> The company that successfully brings this new technology to the masses will become an industry leader for years to come.

### De-risking of the Supply Chain

The global supply chain crisis that arose from the Covid-19 pandemic has companies re-thinking the manufacturing and distribution of their products. Rising geo-political tensions between the US and China is further forcing the issue. Many companies producing smartphones, laptops, and other devices have significant exposure to Chinese manufacturing. But trade wars, potential military conflict, and a rapidly aging population, all threaten further disruptions to production. Apple in particular has significant exposure. The company relies almost exclusively on China for its manufacturing and has started the process of trying to diversify geographically. The below graphic from the Financial Times outlines Apple’s lack of progress in moving production thus far.



Source – Financial Times

India and Vietnam represent logical alternatives. They offer a better demographic mix, with younger populations

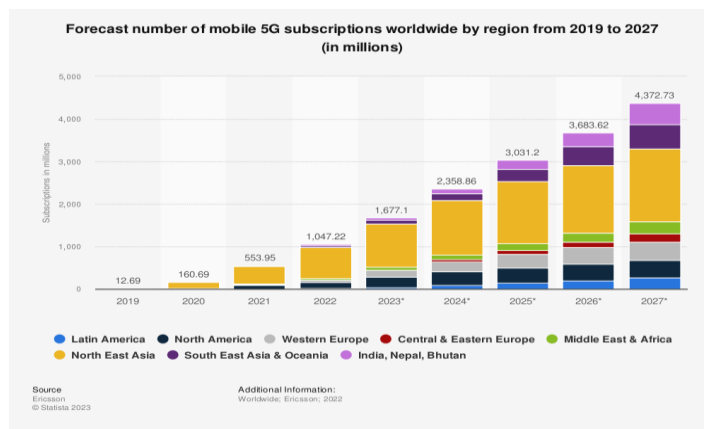
ensuring continued low cost of labor. However, the infrastructure and specialized labor force in China is nearly impossible to replicate, especially in the short-term.<sup>3</sup>

HP and Dell face similar challenges, albeit on a much smaller scale. Both rely heavily on China for assembly of their laptops and had started moving some production out of China in 2019 in response to trade wars. Dell has recently announced plans to phase out all Chinese manufactured chips from its products by 2024<sup>14</sup>

An overarching trend of de-globalization is just beginning to take root. As tensions mount, further fragmentation can be expected. The industry’s heavy reliance on Chinese manufacturing presents a significant threat in the coming years. Any further escalation could lead to another in reduction output and a resulting loss of market share. The companies who best manage their geographic risk will come out ahead in the long term.

### 5G Adoption

5g enabled smartphones and tablets are increasingly capturing market share. Adoption rates in developed economies are already quite high. Market penetration in a number of emerging is also rising significantly. As of 2022 year end an estimated 75 countries have developed 5G connectivity and over 1.1 billion devices connected.<sup>16</sup> 5G enabled devices often sell at a higher average price point. This can help subsidize revenues for smartphone manufacturers facing a decline in overall unit sales. The shift is also expediting replacement rates for some customers as they look to make the upgrade to faster and broader bandwidth. The below chart shows the geographic breakdown of 5g subscriptions. It highlights the tremendous market opportunity in certain regions over the coming years.



Statista/Ericsson

## MARKETS AND COMPETITION

### Threat of New Entrants

Threats of new entrants in the industry are fairly low. Within each product segment there are well-developed industry leaders with established products and strong brand recognition. The cost of entry is significant due to the capital-intensive nature of product development, marketing, and supply chain build-out. As mentioned previously, many products have already reached or are fast approaching the mature stage.

The wearables market is likely most susceptible to new competition. The product range is more diverse and can attract companies from different industries including fitness, health, & consumer electronics. This segment also projects to see the highest growth and will likely draw new entrants in the AR/VR space.

### Intensity of Competition

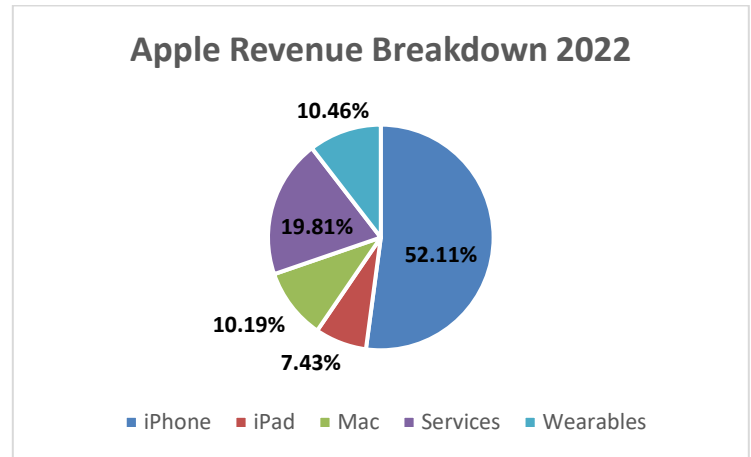
Competition varies to a degree but is fairly high among all product categories. The smartphone market largely resembles a duopoly as no company has been able to dethrone Apple and Samsung. Chinese manufacturers have entered the market and are beginning to capture market share throughout Asia at lower price points. The PC and tablet markets are well established. Numerous firms compete on price and commit to significant R&D spend to gain a temporary edge.

The wearables market is relatively nascent, but still has a significant number of competitors offering a diverse product mix. In general companies throughout the industry face high competition. Most industry participants have limited pricing power and are under constant pressure to stay ahead of the technological curve.

### Apple

Apple is the largest company in the world by market cap and without a doubt the dominant player in the technology hardware sector. The company has a diverse product mix and holds the largest market share in smartphones, tablets, and wearables by total revenues.<sup>4</sup> Apple's annual revenues are comprised of two segments, products, and services. iPhone sales continue to dominate the revenue share accounting for over 52% of company sales. Total product sales account for 80% of Apple's

revenue. The smaller services segment includes the Appstore and subscription revenues from things like Apple TV+ and Apple Music. Services is Apple's fastest growing segment over the past five years.<sup>8</sup> Each new product sold means a new Appstore user and the potential for multiple new subscriptions.



Factset

The integration of its app store represents a significant advantage Apple has over the traditional hardware companies. It has the opportunity to gain new recurring revenue streams with each product sold. The services revenue also come at a much higher margin of 74% vs 39.5% for products.<sup>8</sup>

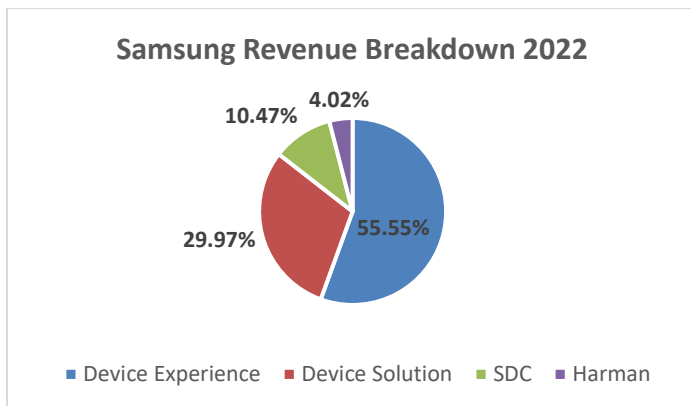
Apple has developed strong brand loyalty and created relatively high switching costs for its customers. The integration between different products and expanded service offerings make it difficult for customers to jump to different operating systems. Apple has built a sizeable moat around its hardware business. As a result, its operating margin is 43%, more than double its competitors. Because it holds such substantial market share, it's less subject to pricing limits compared to other market participants. Operating on the high end of the market, there's a strong fraction of loyal customers willing to buy new iPhones, iPads, and mac books somewhat regardless of price and alternatives.

Apple gained its power primarily through innovation. It wasn't necessarily always first to the market, but it consistently developed revolutionary products that reshaped the industry. In order to maintain its crown Apple will need to continue to be at the forefront of innovation when the next wave of tech (likely AR) comes to the market.

## Samsung

Samsung is based in South Korea and represents the closest thing Apple has to a direct competitor in the hardware space. It consistently leads the industry in mobile phone shipments and its market share by volume has remained steady.<sup>4</sup> It has a large and diversified product range with multiple price points. This has allowed Samsung to penetrate developing and emerging markets with lower priced products. Nearly 35% of sales come from outside of the US, Europe, and China, compared to just 20% for Apple.<sup>8,11</sup>

Samsung's revenues are broken into four distinct operating segments. The device experience category accounts for 55.55% of total revenues.<sup>4</sup> Device Experience revenues include all tech hardware products as well as Samsung's large home appliances and consumer electronics such as refrigerators and TVs. Samsung also generates 30% of its sales from memory and foundry business lines categorized as Device Solutions.



FactSet

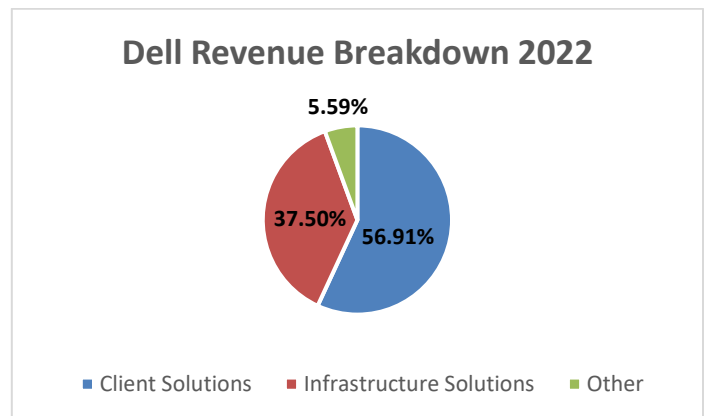
A key strategic advantage Samsung has over Apple is it isn't reliant on China for manufacturing and assembly. As mentioned, nearly all of Apple's manufacturing and a large chunk of its consumers are based in China. Samsung has built out most of its supply chain in Vietnam, with smaller plants in Brazil, India, and South Korea.<sup>8</sup>

Samsung also hasn't suffered from the strengthening dollar and FX headwinds that US based competitors have faced. Despite this, the company did post its worst quarterly profit decline since 2014.<sup>11</sup> Issues remain from an inventory management perspective as it continued to ramp up its chip manufacturing despite deteriorating demand conditions. Overall, Samsung is positioned well to

maintain its industry position, but it still remains a distant second behind Apple in the hardware industry.

## Dell

Dell is an American based company and splits its revenues into two distinct categories. The ISG (infrastructure solutions group) provides servers, networking, and storage. Its CSG (client solutions group) focuses on commercial and consumer computers, notebooks, and desktops. CSG revenues make up 57% of total sales for the company.



Factset

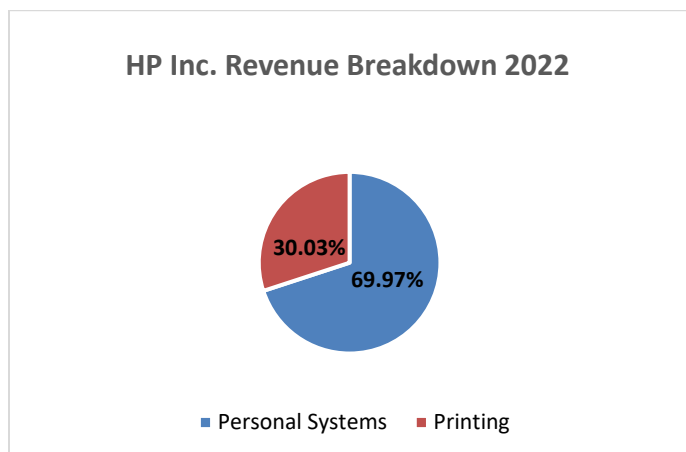
Dell maintains approx. 19% market share in PCs per IDC and is the industry leader in commercial sales.<sup>6</sup> It specializes in higher end laptops and desktops designed for business use. Its commercial PC business has gained market share in 35 of the last 40 quarters.<sup>9</sup>

Dell has a well-established customer base and a long history within the industry. Yet it still faces strong competition and constant pricing pressures. Management cited more stable demand at the higher end of its range, singling out gaming products in particular.<sup>9</sup> But the overarching industry trend remains as global PC shipments dropped significantly in Q4.<sup>6</sup>

## HP Inc.

HP Inc. operates in the same market as Dell. Offering all types of computers and attracting both enterprise and retail customers alike. HP also has a sizeable peripherals business, selling printers, monitors, and other accessories. HP's revenues are split into two operating segments.

Personal systems includes all PC revenues while the printing segment covers printers and all other peripherals.



FactSet

The demand conditions impacting Dell are largely the same for HP. The market is well developed, saturated, and susceptible to negative economic conditions. Due to intense competition, reductions in demand can lead to industry wide markdowns. Efficient inventory management for HP and Dell alike will be critical to maintain margins through 2023.

### Profitability and Ratio Analysis

2022 Margin Analysis			
Company	Gross Margin	Operating Margin	Net Margin
Apple	43.3%	30.3%	25.3%
Samsung	36.4%	14.4%	18.1%
Dell	21.2%	5.5%	2.4%
HP	18.2%	7.2%	5.2%

FactSet

Apple dominates the industry in terms of gross, operating, and net margin. The scale at which the company operates and the premium prices they charge enable them to convert sales into profits at a much higher rate than the industry as a whole. There is a clear distinction between the PC and smartphone manufacturers. Net margin for Dell and HP is significantly lower compared to Apple and Samsung. This further reflects the level of competition in the market for PCs and lack of pricing power that the manufacturers have.

Looking at growth, Apple’s five-year sales growth is more than double that of their competitors. Samsung’s growth and multiples are more comparable to the PC companies

than with Apple. The higher multiples for Apple are likely justified given its favorable mix of growth and profitability.

We believe that Apple represents the most attractive investment of the peer group. The PC companies trade at much lower multiples but offer extremely limited upside potential. Additionally, Samsung’s lack of growth despite its diverse product mix and strong margins is concerning.

Company	5yr Sales CAGR	P/E	P/S	EV/EBITDA
Apple	11.5%	24.48	5.67	17.52
Samsung	4.8%	6.86	1.24	3.26
Dell	5.4%	13.02	0.31	5.79
HP	3.9%	9.05	0.47	6.9

FactSet

## ECONOMIC OUTLOOK

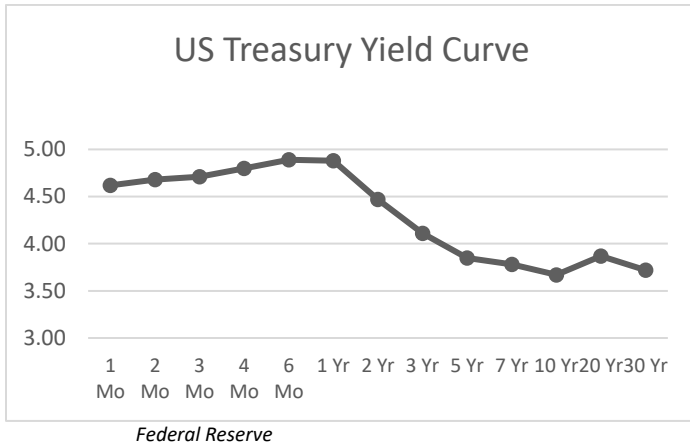
The Tech Hardware industry is cyclical in nature and heavily impacted by prevailing economic conditions. The current macro-outlook presents challenges ahead. With high global inflation, rising rates, and low consumer confidence. The current reduction in demand will likely continue well into 2023.

### Interest Rates & Yield Curve

Despite recent mentions of disinflation, the Federal Reserve remains committed to raising rates and fighting inflation back down to 2%. Chairman Powell reiterated that the Fed does not foresee a situation in which they will begin cutting rates in 2023.<sup>15</sup> The recent jobs report showed continued tightness in the labor market, allowing the Fed to continue to focus on the other half of its dual mandate.

The result is the inverted treasury yield curve we see below. Both the 10y3m and 10y2y spreads have turned negative. The 10y3m inverted over 90 days ago and the 10y2y over 200 days ago.<sup>15</sup> Historically, prolonged inversions of those spreads have always preceded a recession.<sup>15</sup>



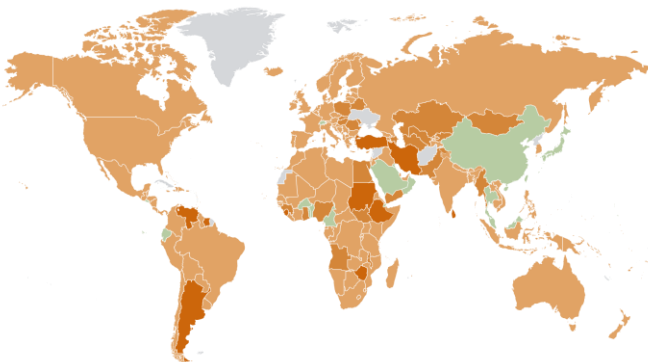


As long as rates remain elevated, tech companies with high R&D costs will struggle to deliver growth. Elevated borrowing costs will also continue to drag down consumer's willingness and ability to spend on premium tech products.

### Inflation

The Federal Reserve is far from the only central bank battling inflation. The map below from the IMF illustrates elevated prices across the globe. The vast majority of countries have seen inflation between 3-10%. As long as prices remain high, demand across the industry will stay capped. Consumers, with lower incomes and in developing markets face rising living costs and lower disposable income for tech products.

● 25% or more ● 10% - 25% ● 3% - 10% ● 0% - 3% ● less than 0% ● no data



Source IMF

Impacts of the war in Ukraine may also continue to put upward pressure on oil and other commodity prices as supplies are diminished. Additionally, the end of zero-

covid policy in China may lead to a post-pandemic spending spree driving up prices in the worlds second largest economy.

### GDP

The Q4 GDP number for 2022 came in at an annual rate of 2.9% vs an expected rate of 2.6%. On the surface this is a positive indicator for the trajectory of the economy. However, some of the underlying numbers show concerning sings. Per the BEAs breakdown, nearly half (1.46) of the 2.9% increase stems from a change in private inventories. This was accompanied by a negative 1.2 contribution from private fixed investment. Further signaling dampening consumer demand and projecting slower growth.

## KEYS TO MONITOR

The Technology Hardware, Storage & Peripherals industry is characterized by cyclical demand with respect to both product innovation and macro-economic conditions. Many products have reached the mature phase of the life cycle and have seen shipment numbers in steady decline. The current macro-economic environment projects continued demand decline in the near term. Peak buying in 2021 means many consumers can wait a few years before upgrading or replacing their tech. Finally, companies within the industry face geo-political threats that could destabilize their supply chains. As a result, we reiterate an underweight rating for the industry as a whole. Continued growth in the wearables segment and stable demand for premium smartphones isn't enough to justify further investment at this stage of the business cycle.

Looking forward we believe companies that position themselves to capitalize on the development of augmented reality technology will present as the best investment opportunities. The industry is driven by innovation, and investment dollars are best allocated to those companies who can successfully bring new technologies to the market at scale.

## REFERENCES

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10. [HP Inc - 10k](#)
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12. [Bloomberg](#)
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