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US Autos & Industrial Tech

Platforms & Power: driving more sustainable profitability; Upgrade F to Buy

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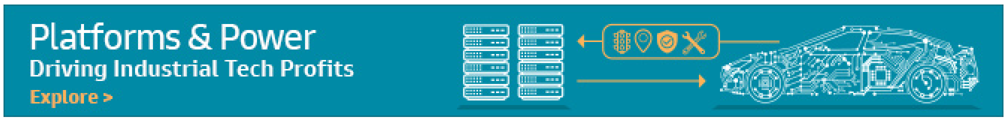

We believe that the key to success in the automotive industry will increasingly come from mastering both the platform and power aspects of vehicles, including for electric and hybrid vehicles. And this platform and power theme extends beyond autos to broadly incorporate industrial and technology infrastructure. What do we mean by platforms & power?

- **Platforms**: By platforms, we are referring to the underlying hardware (e.g. the electrical and electronic architecture and powertrain) that underpins the vehicles (and can be common building blocks across multiple car models), and also the vehicles being a platform to sell higher margin software and services. As the auto OEMs expand their fleet of connected vehicles with shared software, we believe there is the potential for this ecosystem to be a platform for new digital products which could include those from third parties.
- **Power**: By power, we are referring to the power efficiency that is key for electric (and even hybrid) vehicle cost and range, and also to the products used to power the hardware (e.g. datacenters, grid, and EV chargers).

We see the platform opportunity for our autos & industrial tech coverage as similar to the transition tech hardware companies including Apple and Microsoft underwent as the consumer electronics industry went from being tied to PC and handset unit volumes to one more driven by cloud datacenters and an ecosystem of services. This transition has led companies including Apple, Amazon, and Microsoft to become platform providers with less cyclical profit streams. As our case studies of Microsoft, Apple and Amazon show, even when these newer businesses (e.g. Azure and AWS) accounted for only a small part of revenue there was at times a positive correlation to valuations, and as revenue and profits grew to ~10-20%+ and 25-30%+ of the total, respectively, there was more meaningful multiple expansion.

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By providing a set of more valuable software and services for the vehicle ecosystem, we believe that auto OEMs can not only build higher-margin revenue streams, but also benefit from stickier customer relationships.

We believe this profit opportunity helps to explain why Tesla has a >$800 bn market cap, but we ultimately see this transition as an opportunity (and risk) for a wider set of our coverage including OEMs and suppliers. **We're upgrading Ford to Buy from Neutral, in part driven by its opportunity in software and services including to commercial customers.** However, we believe the platform transition will be a challenge for suppliers in some categories (e.g. Magna's relatively small share in areas like active safety where there is likely to be a higher degree of OEM vertical integration).

Importantly, we still think analyzing cycles is critical for stock performance. We expect a volatile auto market with volumes in total to trend modestly higher over the next few years. While global fundamentals have multiple headwinds (weaker demand in particular among lower-income consumers, slower EV demand in North America and in Europe, competition in/from China), we also note several offsetting factors including that US SAAR is still below the historical average of 16-16.5 mn, and the interest rate cuts the GS Economics team is forecasting over the next year should be a modest tailwind for volumes and pricing (and more importantly lower rates could help to support housing starts and consumer sentiment, factors that are well correlated with auto demand). We're adjusting our US SAAR forecast for 2024/2025/2026 to 15.85 mn/16.00 mn/16.25 mn from 16.25 mn/16.75 mn/16.75 mn reflecting slower YTD sales (SAAR YTD has averaged ~15.5 mn) and pressure on lower-income consumers (consistent with HundredX survey data), but still implying modest growth. While the Chinese domestic auto OEMs are taking share, tariffs and trade policy in the US and to a lesser extent in Europe can mitigate competitive pressure in those markets in the near to intermediate term in our opinion.

Stellantis recently announced a plan to reduce inventory with incremental production cuts and added incentives on prior model year vehicles. We believe the incentives could put pressure on near-term industry fundamentals for OEMs, although reduced inventory should help mitigate pricing headwinds next year all else equal. We believe the production cuts are an incremental negative for suppliers.

While the market is now pricing in a more meaningful decline in profits over the next 12-24 months for the traditional US auto OEMs, in our opinion, with SAAR not even back at the long-term average and the potential for rate cuts to support the broader economy and auto industry, we believe the stocks can outperform by generating relatively stable EBIT/FCF over the next 12-24 months (and with longer-term growth tied to software and services). Our economics team only assigns a 20% probability of a recession over the next 12 months (but if there were to be a recession, then auto OEMs would likely underperform). **We recognize that stock returns in cyclical industries like autos are typically strongest as volumes recover from trough to mid-cycle levels, but we still expect the traditional OEM stocks we cover to trend higher over the coming year.**

For Ford, we believe there is a margin opportunity driven by the company's more profitable commercial business (Ford Pro, with mid teens EBIT margins) and growing software and services mix (with the company targeting $1 bn of software revenue in 2025, and for software and physical services to be 20% of Pro segment EBIT in 2026). Paid subscriptions have been growing at a 35-40%+ CAGR, and we expect this business to continue to grow (aided by improved offerings such as in fleet services and ADAS). In addition, we believe cost improvements (in ICE and EVs) can help to offset industry headwinds. With the stock down 13% YTD (vs. the S&P 500 up 21%) driven by cyclical concerns and higher than expected warranty costs in 1H, it is now trading at just 5X our NTM EPS estimate, and at the lower-end of the historical range. We see 23% upside to our new 12-month price target of $13 (and a ~30% total return including the 6% dividend yield). While we lower our estimates for 2024/2025/2026 to better reflect increased industry headwinds, our estimates are above consensus.

For GM, we're raising our 12-month price target to $61 with a higher target multiple to reflect the longer-term profit opportunity, and maintain our Buy rating. Recall that GM stated at its 2021 investor day that its digital services business was ~$2 bn with high margins (e.g. OnStar). GM is one of the few auto stocks to outperform this year (up 25%), driven by solid price-cost and capital allocation. While we lower our estimates for 2024/2025/2026 to better reflect incremental industry headwinds, our estimates remain above consensus for all three years.

For Neutral-rated TSLA, while the company is in a leading position in the domains of platforms & power in our opinion, we believe headwinds in the auto business (e.g. a high degree of competition and pricing pressure in EVs) will limit the rate of its EPS growth in the near to intermediate term, we expect it will take time to grow its FSD/software business to a more meaningful level, and we believe valuation is full. If we had a more positive view of near to intermediate term fundamentals, or if we were more positive on the magnitude and/or timing of its opportunities in areas such as robotics or autonomy, then we could be more positive on the stock.

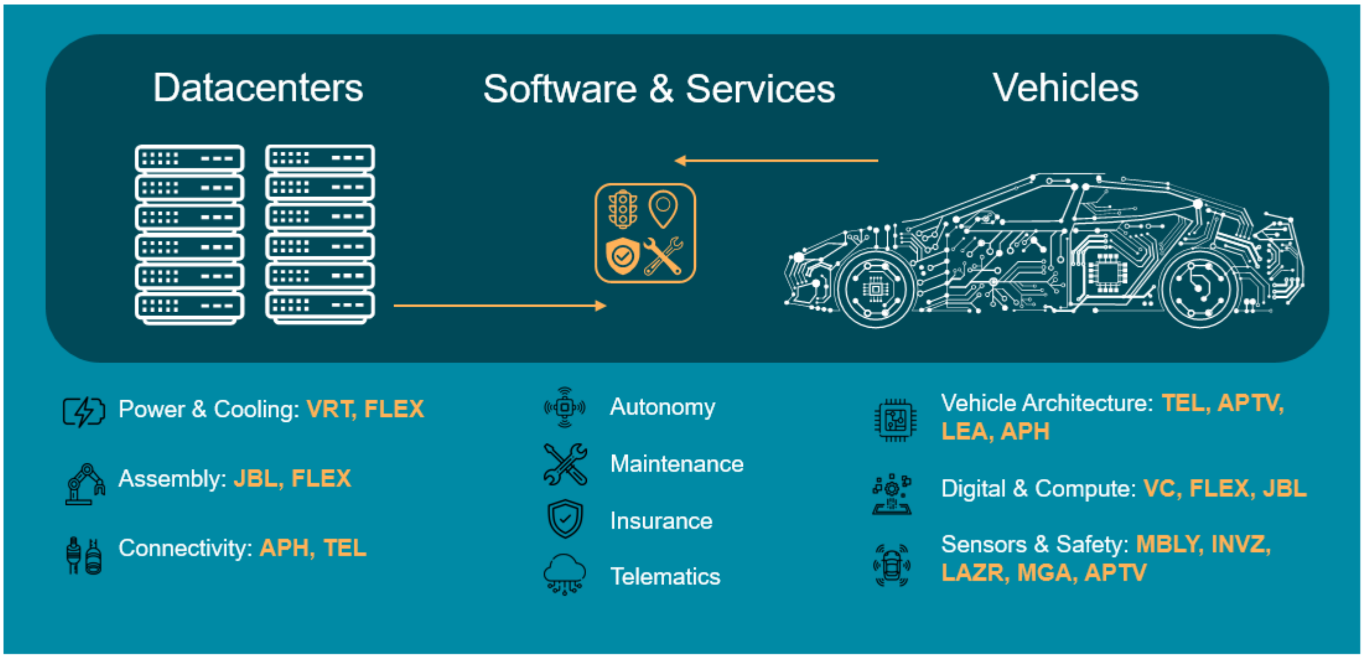
We see some of the most attractive investing opportunities within our electronics components and EMS coverage (e.g. FLEX, TEL, and APH) given the growth and profit potential in applications across the auto, industrial, and datacenter markets tied to platforms and power (including powering and connecting the AI datacenters that are used to develop ADAS and AV software, and enabling the high speed vehicle compute and electrical & electronic architectures in vehicles).

The Buy-rated auto tier 1s in our coverage (APTV, VC, LEA) all have solid content per vehicle growth (which we think is key in a muted production backdrop), category leadership in select areas (e.g. in high voltage and seating), and limited obsolescence risk (e.g. no material ICE specific products). For tier 1s that have business lines with somewhat limited market share, we believe a greater use of partnerships and/or strategic actions could help improve longer-term profitability, as we think there will be a reduced opportunity set for tier 1s with less differentiated products in a world with greater use of platforms and at times OEM vertical integration.

We're lowering our EPS estimates for most auto exposed companies in our coverage reflecting recent company commentary and our revised industry forecast. For Magna, we see downside risk to Street consensus estimates (FactSet) given its above average exposure to Western auto OEMs, and also relative downside in the stock based on our new 12-month price target. We adjust estimates and price targets for F, GM, APTV, BWA, LEA, VC, GNTX, MBLY, CRNC, TEL, and ST.

Platforms & Power are increasingly key

Illustrative Ecosystem of Platforms & Power
Illustrative but not exhaustive list of companies



Source: Goldman Sachs Global Investment Research

We see platforms as key from two dimensions. One is the hardware platforms underlying the vehicles that are increasingly software-defined and utilize common electrical and electronic architectures. These hardware platforms are typically more modular and can thus be scaled globally and across models. And second, the connected vehicles can be a platform for software and services, with auto OEMs providing products such as ADAS, insurance, and predictive maintenance. Moreover, as the auto OEMs expand their fleet of connected vehicles with shared software, we believe there is the potential for this ecosystem to be a platform for new digital products which could include those from third parties.

We also believe that power is an important consideration. Not only are the most efficient EVs designed at a system level with power efficiency in mind to maximize range, but power management is increasingly critical for grids and datacenters especially with the demand created by generative AI. Auto tier 1s, electric & electronic components providers, and EMS companies all need to adjust to these trends. It's important for these suppliers to adapt to how their products will work at a system and platform level. For auto tier 1s, we believe product leadership will be even more important for connected and electrified vehicles than in more traditional vehicles.

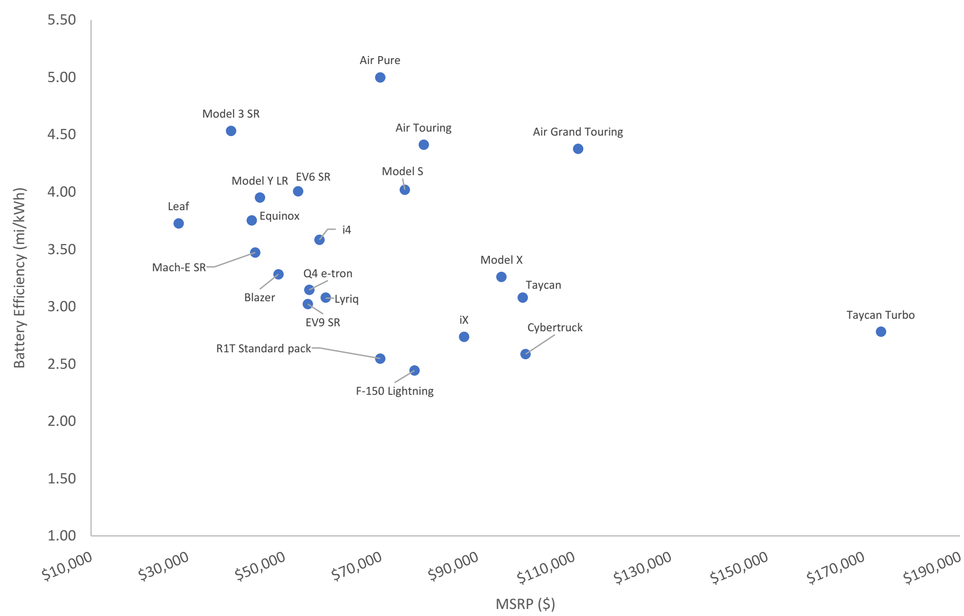
For example in autos, rather than the multiple dozens of electronic control units (ECUs) to manage one or a small number of car parts (e.g. seats, doors, etc.), vehicles in the future will increasingly utilize more centralized compute. Rivian highlighted that its new compute platform in the refreshed R1 uses 7 in-house ECUs, down from 17 in the first gen R1 (and compared to the 30-40 or even 100+ ECUs that has been traditional in the industry). As new features gain scale and importance, OEMs are more likely to in-source some items that were historically left to suppliers (e.g. software integration and parts of the powertrain).

Moreover, this is driving convergence in what were historically separate industries, with companies like Flex, Jabil, and Foxconn that in the past mostly supplied manufacturing services and parts for consumer devices and commtech customers increasingly competing with companies such as Bosch and Vertiv for power electronics, high-speed compute, and power supplies in the hyperscale datacenter and automotive markets. Similarly, historical auto tier 1s like Aptiv have seen growth selling electric and electronic components into the industrial, renewable and A&D markets.

Executing on these key transitions is easier said than done, and in many cases it’s not just a matter of dollars deployed. Big automotive software endeavors (e.g. Cariad) have often struggled, and overcoming historical organizational structures, processes, and model line-up complexity can complicate efficient product development for even well funded teams. We believe this is a key part of what led Ford to split into different segments (and ultimately rely on a small and independent team for its next low-cost EV platform, which it refers to as skunkworks). Ford has brought in leaders, including Doug Field (previously with Tesla and Apple), Alan Clarke (previously at Tesla) and Peter Stern (previously at Apple), to help it execute on the platforms & power transition. We also consider this a part of why OEMs like VW and Stellantis have sought licensing deals and/or partnerships with companies including XPeng and Leapmotor. The fact that OEMs can more easily share an electrical and electronic architecture, or even a full vehicle platform, underscores the importance of platforms.

Analyzing powertrain efficiency (in terms of miles per kWh) shows that traditional OEMs including Ford and GM are still trailing in the power domain (Exhibit 1). Traditional OEMs will need to improve with their second generation EV products in order to achieve better EV profitability, in our view.

Exhibit 1: Battery efficiency compared to MSRP for several EV models across OEMs



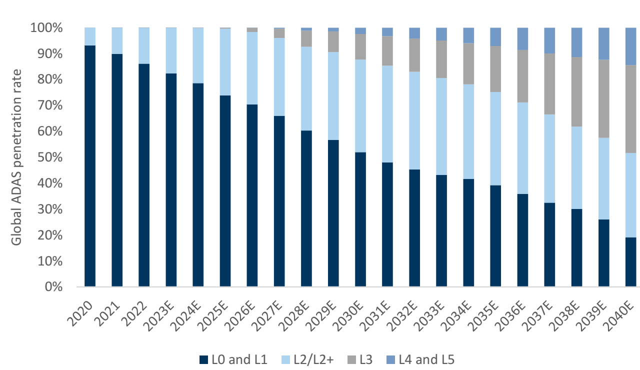
Source: EPA, Company data, Goldman Sachs Global Investment Research

Platforms are an opportunity for services and aftermarket sales, including ADAS

We believe our auto OEMs in particular can increasingly grow software and services revenue as platform providers, especially as their installed base of connected vehicles grows. To this end, Ford and GM each have >45 mn vehicles on the road in the US.

As detailed in our July 2024 report, "Can new AI technology help accelerate AV deployments? Updating our global ADAS and AV forecast," one of the largest monetization opportunities in our opinion is in ADAS, especially as the industry rolls out situationally eyes-off capability (L3) and in the longer-term consumer L4 (perhaps with users paying a subscription to access human remote assistance). We estimate that L3 mix will reach ~10% of new vehicle sales globally in 2030 (Exhibit 2).

Exhibit 2: We expect ~10% of vehicle sales globally to be L3 in 2030



Source: Goldman Sachs Global Investment Research, IHS , Wards

We also believe that telematics and connectivity, predictive maintenance, and insurance are growing opportunities. For telematics, Ford recently commented at our Communacopia + Technology conference that industry ARPU in commercial is ~$20 per month for telematics dashboards and starts at $5 per month for data services. For insurance, auto OEMs benefit from a deeper look at how drivers engage with the safety functions embedded into the car, and insurance (either as a broker or underwriting) has been a rising focus for Tesla, Rivian and GM.

Several OEMs have already started to build on the opportunity in software and services.

- **GM:** GM already has a meaningful software and services business, and at its 2021 analyst day the company sized this at ~$2 bn with a >70% EBIT margin. OnStar is a key component of this. GM said that it had ~4 mn paying customers for its subscription services at that event.
- **Tesla:** We estimate that Tesla's FSD business generates $1-$3 bn of revenue per year, and we believe Tesla's software business can reach $20 bn+ by 2030 largely driven by improved FSD functionality for its own fleet (at least L3 and eventually L4).
- **Ford:** Ford is targeting $1 bn of software revenue in 2025, and we estimate that it will have ~$100 mn of revenue tied to monthly subscriptions in software and digital services in 2025. The number of paid subscribers has been growing at a 35-40%+ rate, and reached over 765k in total (with ~610k in Pro) as of 2Q24. Moreover, Ford has been focused on its high-margin parts business, with a greater than 30% EBIT margin. We estimate that Ford's physical parts business for Pro is ~$3 bn of revenue. Ford is targeting 20% of its EBIT in Pro to come from software, digital services and physical services in 2026.
- **Stellantis:** At the Stellantis capital markets day in 2022, the company outlined its plan to grow software from a negligible amount of revenue in 2021 to ~7% of 2030 revenues (about €20 bn) at a 40% gross margin. Moreover, Stellantis expected that its software and services businesses together will grow more than 800 basis points to 20% of total revenues in 2030. Stellantis discussed the opportunity with a data business that can leverage its 34 mn connected vehicles, which it expected to contribute €9 bn of the €20 bn in global revenues, with up to a 70% margin.
- **Mercedes:** At a strategy update event in February 2023, Mercedes gave more details around its software strategy. Specifically, the embedded revenue for MB.CONNECT was around €1 bn in 2022. The company expects MB.CONNECT and MB.DRIVE together to generate roughly a low- to mid-single digit billion euro figure by the middle of the decade and grow to a high-single digit billion figure by the end of the decade. On EBIT, the company expects more than €1 billion of EBIT in 2025 from these areas all together.

Our illustrative sensitivity analysis in Exhibit 3 shows what annual revenue from software and digital services could look like for an OEM with 20-30 mn vehicles on the road with advanced connectivity. We acknowledge that there are potential scenarios beyond what we show in this analysis.

Exhibit 3: Annual revenue from software & digital services for fleets with advanced connectivity

Annual revenue in mns from monthly subscrptions							
		Fleet with advanced connectivity					
Monthly ASP	Attach Rate	20	22	24	26	28	30
$10.0	10%	240	264	288	312	336	360
	25%	600	660	720	780	840	900
	40%	960	1,056	1,152	1,248	1,344	1,440
	50%	1,200	1,320	1,440	1,560	1,680	1,800
	75%	1,800	1,980	2,160	2,340	2,520	2,700
$20.0	10%	480	528	576	624	672	720
	25%	1,200	1,320	1,440	1,560	1,680	1,800
	40%	1,920	2,112	2,304	2,496	2,688	2,880
	50%	2,400	2,640	2,880	3,120	3,360	3,600
	75%	3,600	3,960	4,320	4,680	5,040	5,400
$30.0	10%	720	792	864	936	1,008	1,080
	25%	1,800	1,980	2,160	2,340	2,520	2,700
	40%	2,880	3,168	3,456	3,744	4,032	4,320
	50%	3,600	3,960	4,320	4,680	5,040	5,400
	75%	5,400	5,940	6,480	7,020	7,560	8,100
$40.0	10%	960	1,056	1,152	1,248	1,344	1,440
	25%	2,400	2,640	2,880	3,120	3,360	3,600
	40%	3,840	4,224	4,608	4,992	5,376	5,760
	50%	4,800	5,280	5,760	6,240	6,720	7,200
	75%	7,200	7,920	8,640	9,360	10,080	10,800
$50.0	10%	1,200	1,320	1,440	1,560	1,680	1,800
	25%	3,000	3,300	3,600	3,900	4,200	4,500
	40%	4,800	5,280	5,760	6,240	6,720	7,200
	50%	6,000	6,600	7,200	7,800	8,400	9,000
	75%	9,000	9,900	10,800	11,700	12,600	13,500

Source: Goldman Sachs Global Investment Research

Powering industrial is also a key opportunity, including the electric vehicles and datacenters developing the AI

As detailed by Carly Davenport and team in the report, "AI, data centers and the coming US power demand surge", US energy growth is poised to grow at a 2.4% CAGR from 2022-2030 (after having been flat over the last decade), with transportation driving 60 bps (effectively attributable to EVs) and datacenters (in part to power AI) 90 bps of the 2.4% CAGR.

This surge is shaping large fundamental opportunities for many companies in our supply chain coverage, from cars to grid to datacenters.

- **Flex** - Flex's datacenter business had $3 bn of revenue in FY24, of which power was ~$1 bn and assembly/EMS was $2 bn. For its power business, Flex's products span from grid to chip including embedded power (power products within the rack and server such as power modules, power supplies and power shelves), critical power (datacenter level power products like switchgear and busways), assembly, and services. Flex's datacenter business has seen strong growth, with about 40% growth the last few years, and management expecting a 20% CAGR through FY29.

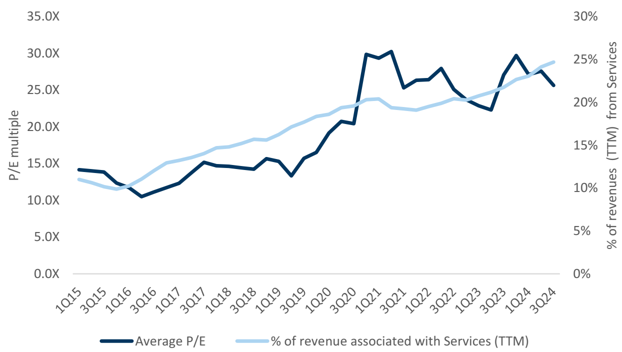
- **Vertiv** - Vertiv is a leading provider of power and thermal management products for datacenters. About 80% of its revenue is tied to datacenters, with ~50% of that tied to hyperscale and colocation customers, and 50% tied to enterprise. Vertiv's portfolio includes power (e.g. switchgear, UPS, and busways), cooling (e.g. liquid cooling, chillers, air handlers) and services. At its November 2023 investor day, the company guided the cloud & colocation market to grow at a 14-17% CAGR.
- **TE Connectivity** - While TE is the largest automotive connector company globally, its portfolio addresses several key areas that relate to the platforms & power theme, including energy and datacenter. Energy accounts for a mid single digit percent of TE's total revenue, driven by sales into utility, grid, and renewable applications. For datacenter, TE expects its revenue in FY24 for AI infrastructure to be >$250 mn, for that to more than double in FY25, and for revenue tied to AI to reach ~$1 bn a few years after that.

Case studies from tech - the effect of software and subscriptions on valuations: Apple, Microsoft, and Amazon

We see the platform opportunity for our autos & industrial tech coverage as similar to the transition tech hardware companies including Apple and Microsoft underwent as the consumer electronics industry went from being tied to PC and handset unit volumes to one more driven by cloud datacenters and an ecosystem of services. This transition has led companies including Apple, Amazon, and Microsoft to become platform providers with less cyclical profit streams. As our case studies of Microsoft, Apple and Amazon show, even when these newer businesses (e.g. Azure and AWS) accounted for only a small part of revenue there was at times a positive correlation to valuations, and as revenue and profits grew to ~10-20%+ and 25-30%+ of the total, respectively, there was more meaningful multiple expansion.

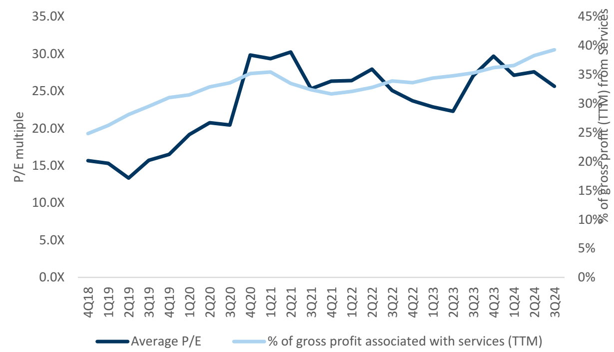
Apple: P/E multiple for Apple (covered by Michael Ng) has expanded as its revenue and profit tied to services increased. Services for Apple include App Store, Apple Care, iCloud, Apple subscriptions (e.g. TV and Music), advertising, and Apple Pay. Some factors that could have contributed to this growth include the acquisition of Beats and launch of Apple Music in 2014/15, as well as Apple TV+ (launched in 2019). Services gross margins are in the mid 70% range, compared to Products in the mid 30% range. As Services increased to >10% of revenue and 25-30%+ of gross profit, it coincided with an increased P/E multiple (as shown in Exhibit 4 and Exhibit 5).

Exhibit 4: Apple's P/E multiple increased as services revenue mix rose



Source: Company data, FactSet, Goldman Sachs Global Investment Research

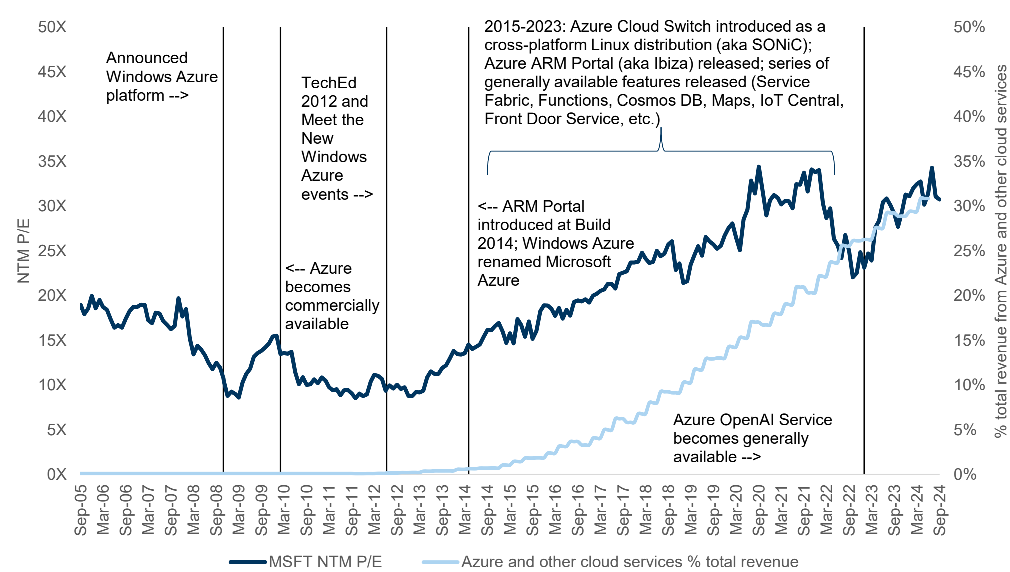
Exhibit 5: Apple's P/E multiple increased as services has become a larger percent of gross profit



Source: Company data, FactSet, Goldman Sachs Global Investment Research

Microsoft: We also looked at Microsoft (covered by Kash Rangan) as a case study to better understand how investors ascribe value to companies with increasing services and subscription mix. We observed that MSFT's NTM P/E multiple expanded throughout the 2015-2023 period, in part as Azure became a larger part of the business (which could have supported multiple expansion for Microsoft). In addition, Microsoft transitioned Office from a license to a subscription model (Office 365).

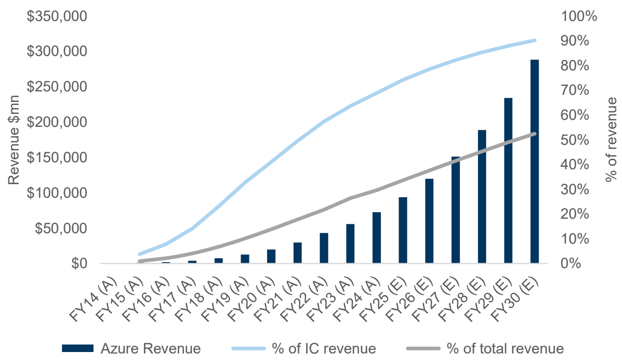
Exhibit 6: MSFT NTM P/E multiple, key Azure events, and Azure/other cloud services as % of total company revenue



Source: FactSet, Company data

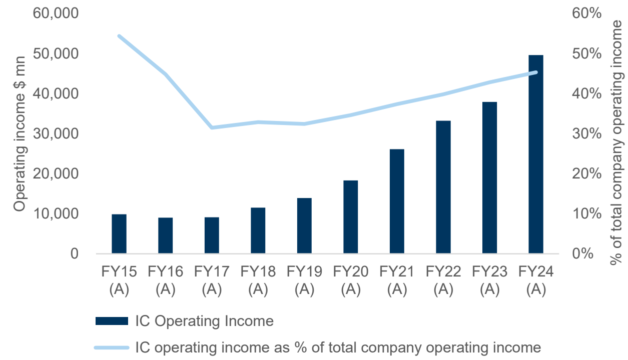
In the most recent fiscal year, Rangan's team estimates that Azure revenue was almost 70% of the Intelligent Cloud segment and ~30% of total company revenue compared to about 4%/1% of Intelligent Cloud/total revenue in FY15. The Intelligent Cloud segment has a mid to high 40% range operating margin (which is in line to slightly above the total company operating margin).

Exhibit 7: Azure revenue has become a more meaningful contributor to Intelligent Cloud revenue and total company revenue over time



Source: Company data, Goldman Sachs Global Investment Research

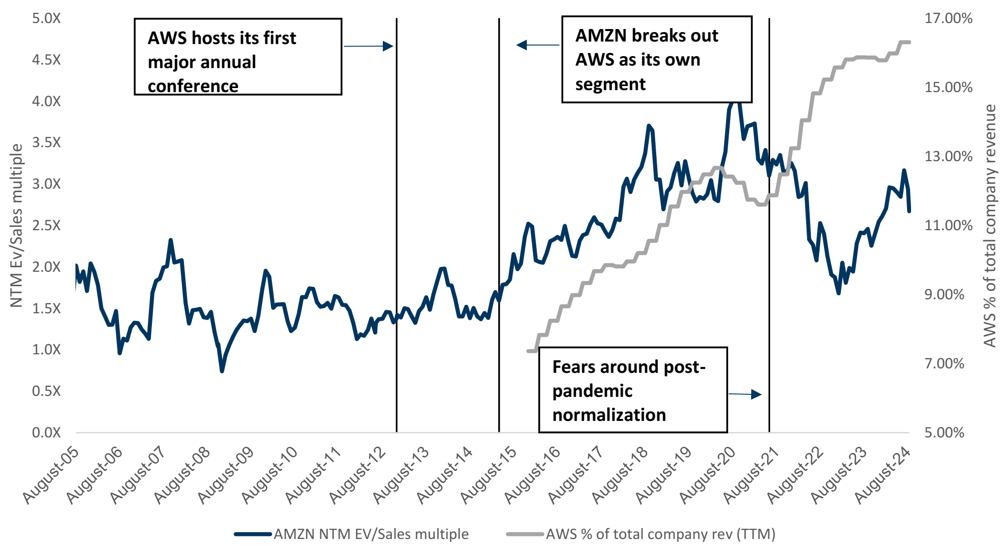
Exhibit 8: Intelligent Cloud operating income is a meaningful driver of overall company profitability



Source: Company data, Goldman Sachs Global Investment Research

Amazon: Similarly, we looked at Amazon (covered by Eric Sheridan) and the effect from AWS. At the time Amazon began breaking out AWS as its own segment in 1Q15, AWS was a high single digit percent of total company revenue. As AWS has increased as a percent of total revenue, it has coincided with a trend higher in the multiple.

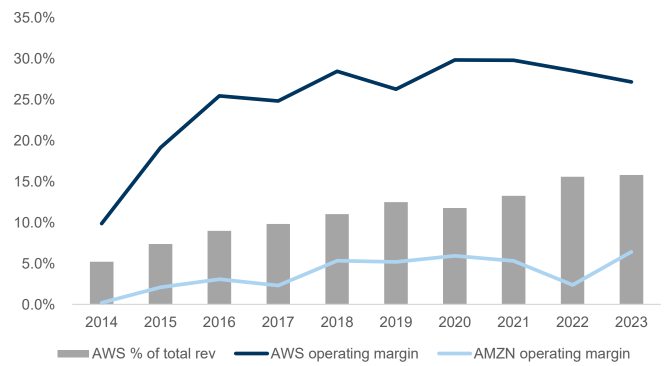
Exhibit 9: AMZN NTM EV/sales multiple over time



Source: FactSet, Goldman Sachs Global Investment Research

Total company revenue coming from AWS increased from ~5% in 2014 to a mid teens percent in 2023. The company has also improved its operating margins in AWS, from roughly ~10% in 2014 to ~27% in 2023.

Exhibit 10: Amazon has seen its total company operating margins expand as AWS has become a larger part of the revenue mix



Source: Company data, Goldman Sachs Global Investment Research

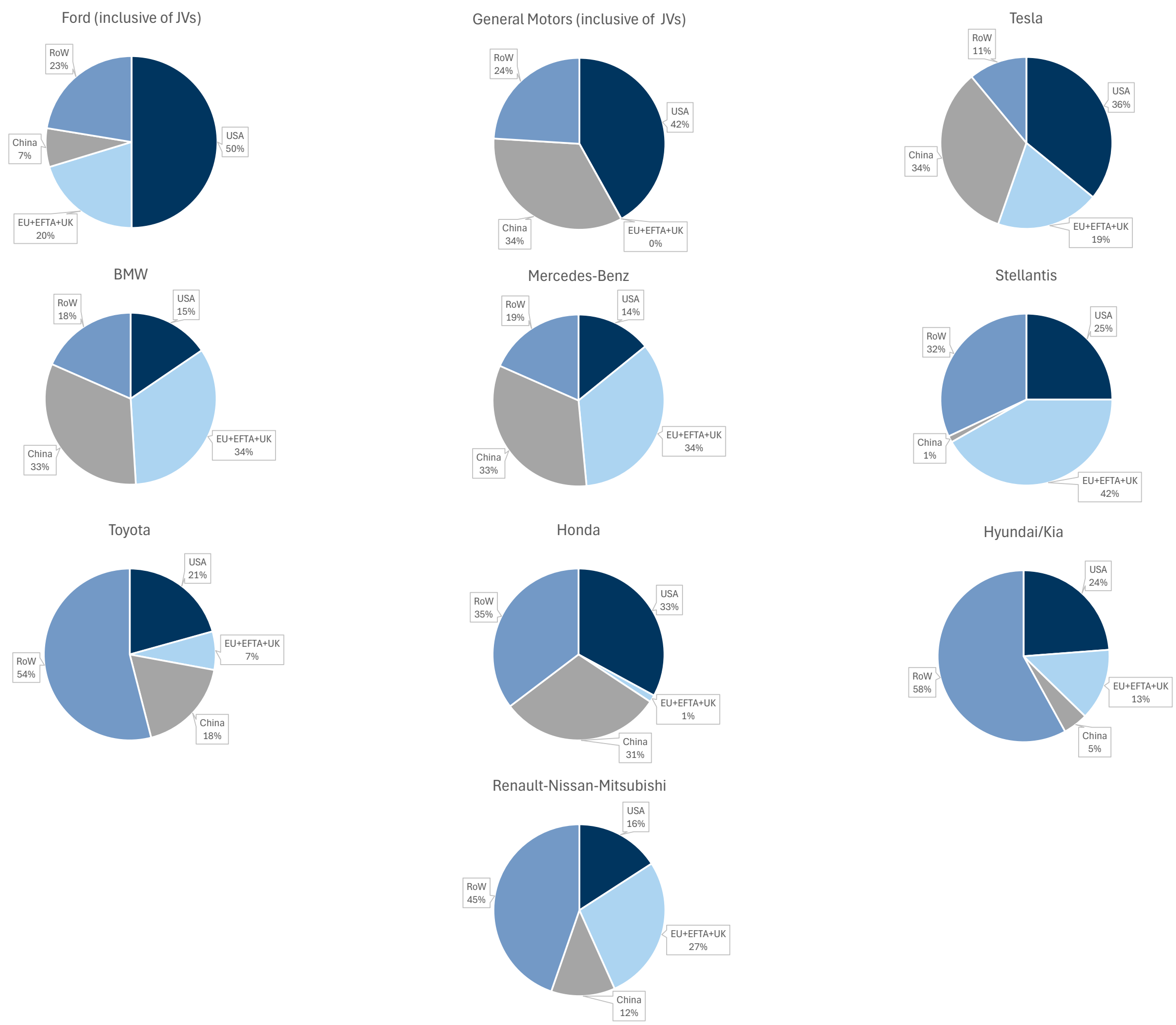
Deep dive on customer and regional exposure for OEMs and auto tier 1s

Given the dispersion in growth among auto OEMs, especially within the China market, as well as ongoing supply chain and tariff considerations for the sector, we detail regional and customer exposure for select auto OEMs and suppliers in this section. Specifically: 1) Within China, domestic OEMs (e.g. BYD, Li Auto, NIO have all grown unit sales >10% YTD, while many Western OEMs have seen double digit declines; 2) The US has put an incremental 100% import tariff on vehicles made in China, and is evaluating restrictions on software and hardware from China from being used in connected and autonomous vehicles per the White House. Moreover, Europe has proposed incremental tariffs on EV imports from China from 2H24 (on top of the prior 10% tariff); 3) Given uncertainty on trade and tariff policy with Mexico, we show exposure by OEM.

Auto OEMs have varying degrees of exposure to China, either directly and/or through JVs, where domestics are taking share from multinationals

OEMs in our coverage have varying degrees of exposure to China, where several Western OEMs have discussed pricing pressure and share loss. We show sales by region/country for 2023 in Exhibit 11, with China including 100% of sales made by JVs (e.g. China would have been a high teens percent of GM's total volume in 2023 if adjusting total JV sales for its proportional share).

Exhibit 11: 2023 Sales, including by JVs, to key regions/countries for select OEMs



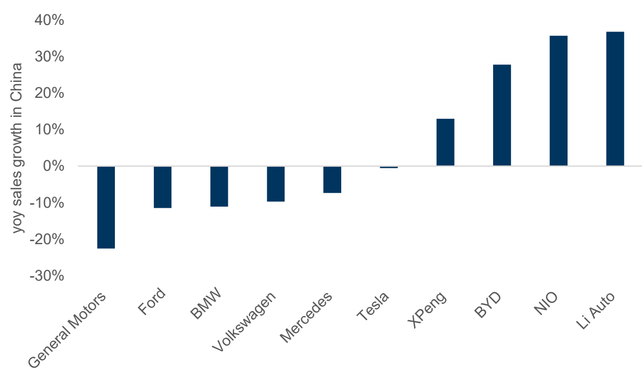
Source: IHS

Notably, domestic Chinese OEMs are expected to grow from ~50% of the China market in 2023 to ~60% in 2024, taking share from multinationals/JVs, per IHS (Exhibit 12).

Exhibit 12: China sales by OEM type in 2023 and 2024E

Source: IHS

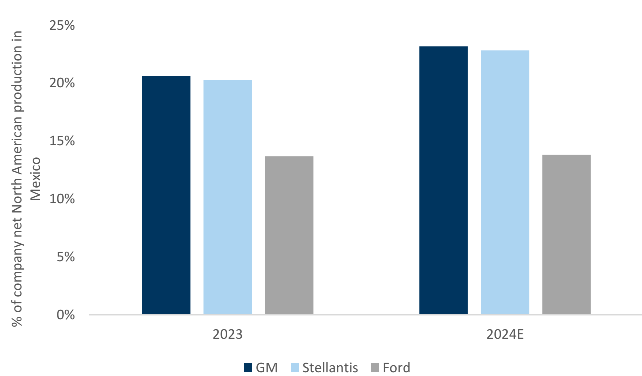
Exhibit 13: 2024 YTD sales growth in China for select OEMs (through August)



Source: CPCA

We also show exposure to Mexico exports as a percentage of total North American production for the Detroit 3 in Exhibit 14, using the difference in sales to Mexico and production in Mexico as a proxy for exports.

Exhibit 14: % of North American net production from Mexico for the Detroit 3



Source: IHS , Goldman Sachs Global Investment Research

Customer exposure is a headwind for many tier 1 suppliers in our coverage that are more tied into the traditional Western OEMs that are growing slower than the overall market

Exhibit 15: % of revenue by OEM for tier 1 suppliers in our coverage

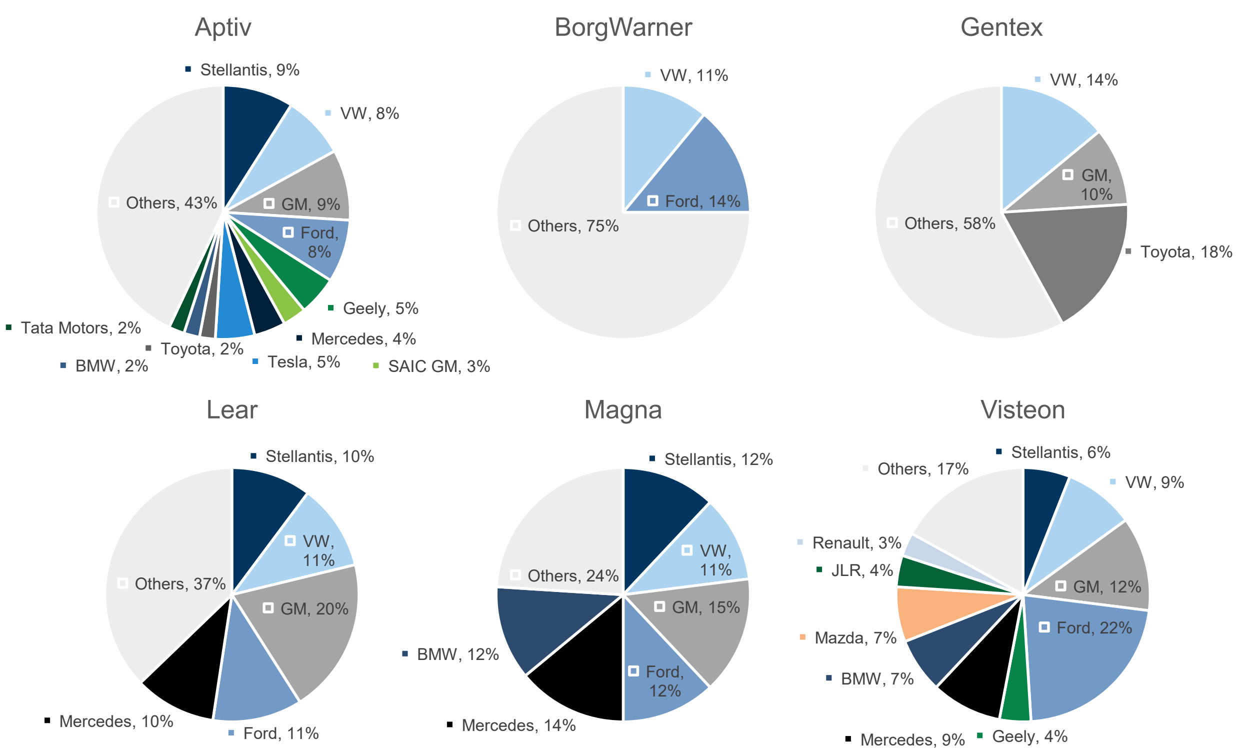
	% of Revenues by OEM													
	Stellantis	VW	GM	Ford	Geely	SAIC GM	Mercedes	Tesla	Toyota	BMW	Tata Motors	Mazda	JLR	Renault
Aptiv	9%	8%	9%	8%	5%	3%	4%	5%	2%	2%	2%			
* BorgWarner		11%		14%										
Gentex		*14%*	*10%*						*18%*					
Lear	10%	11%	20%	11%			10%							
Magna	12%	11%	15%	12%			14%			12%				
Visteon	6%	9%	12%	22%	4%		9%			7%		7%	4%	3%

Aptiv as of FY2022; other companies as of FY2023

**No other single customer accounted for more than 10% of the Company's consolidated net sales. Sales to the Company's top ten customers represented 68% of sales for the year ended December 31, 2023, per BWA's 10-K*

Source: Company 10-K filings

Exhibit 16: Top customers for tier 1 suppliers



Aptiv as of FY22; all other companies as of FY23

Source: Company 10-K filings

We show 2023 sales by region for the tier 1 suppliers in our coverage in Exhibit 17. Magna has the most North America and European exposure out of the tier 1s shown below (consistent with the company's exposure to Western auto OEMs like Stellantis, GM, Ford, Mercedes, BMW, and VW).

Exhibit 17: 2023 net sales by region for tier 1 suppliers

	2023 net sales					
	North America	Europe, Middle East & Africa	China	Other Asia	South America	Other
Aptiv	36%	34%	20%	8%	2%	
BorgWarner	29%	36%	21%	13%		2%
* Gentex	36%	13%	10%	21%		20%
** Lear	40%	37%	13%	6%	4%	
** Magna	48%	38%	11%	1%		1%
**** Visteon	25%	32%	15%	25%	4%	

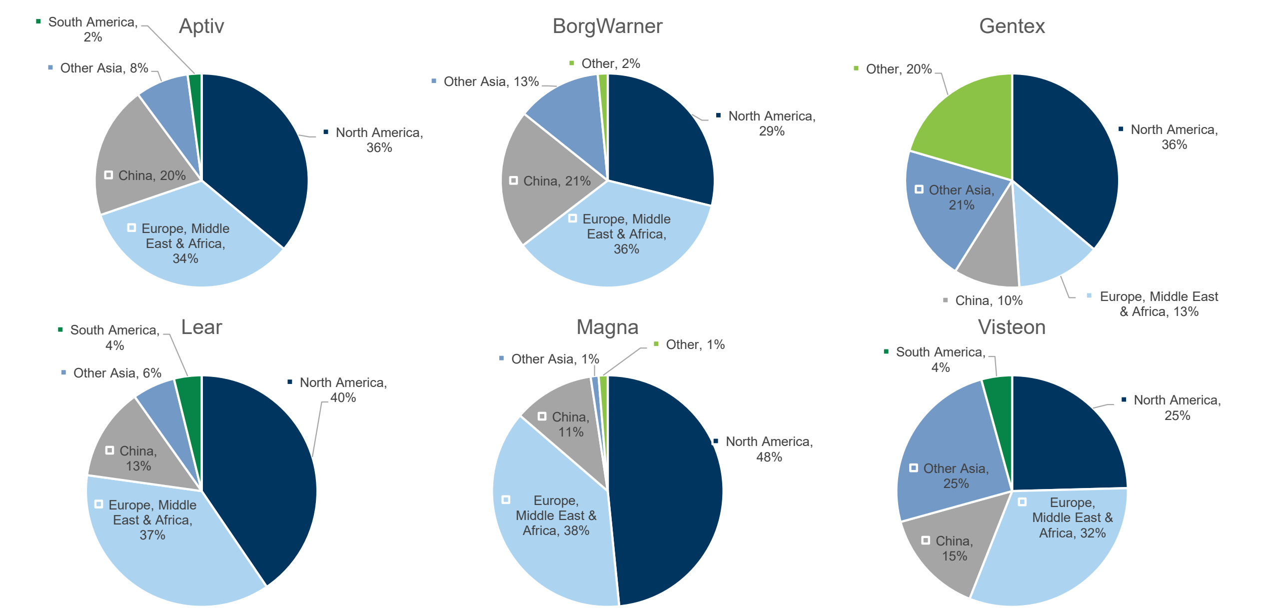
* Gentex discloses automotive revenue for Germany in Europe, Japan and Korea for Asia, Mexico for other North America; Other includes non-automotive sales

** Consolidated China revenue shown for Lear and Magna

*** Other Asia includes China export sales where parts are produced in China but shipped to other Asian markets (~8% total sales); percentages may not add to 100% due to inter-regional eliminations

Source: Company 10-K filings

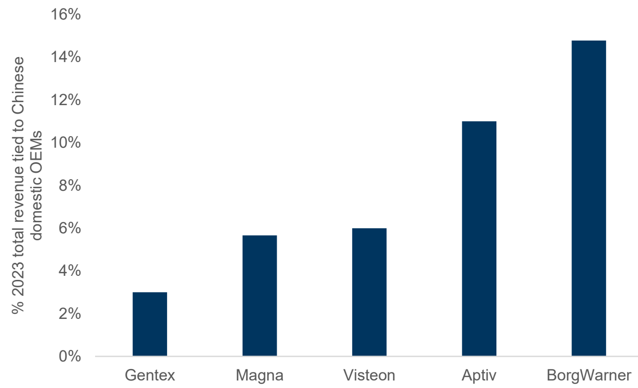
Exhibit 18: Regional revenue exposure for tier 1 suppliers



Source: Company data, Company 10-K filings

Given the pace at which the Chinese domestic OEMs are taking share and outgrowing the overall market, we analyze the exposure to Chinese domestic OEMs for select tier 1 suppliers in our coverage in Exhibit 19. Our analysis shows that Aptiv and BorgWarner each had >10% of total revenue tied to Chinese domestic OEMs in 2023 respectively while Magna and Visteon have a mid single digit percent of total revenue tied to domestic Chinese OEMs. We believe Gentex has a low to mid single digit percent of revenue tied to the Chinese domestic OEMs.

Exhibit 19: % of total company revenue tied to Chinese domestic OEMs



Source: Company data, Goldman Sachs Global Investment Research

Magna: Magna's consolidated China business was ~$4.8 bn in 2023, and the company commented at a conference earlier this year that its unconsolidated (JV) operations make up another $2 bn of China business. Moreover, Magna commented that its presence in China is about evenly split between domestic Chinese OEMs and multinationals.

Aptiv: At our Communacopia + Technology conference in September, Aptiv noted that it has made progress with bookings with both Japanese and domestic Chinese OEMs. The domestic Chinese OEMs make up roughly 55% of its China revenues currently, and they are tracking to 65-70% of bookings this year. Given that the timeframes for conversion of awards to revenue in China is relatively shorter, Aptiv expects that roughly 70% of China revenue will come from domestic Chinese OEMs relatively soon. Aptiv noted that it is focused on the top 15 local OEMs in China and is working with 5 Chinese domestic OEMs that are looking to set up production outside of China.

BorgWarner: The company commented at an August investor conference that revenue from China has grown over the past few years, and China makes up ~20% of the company's revenue currently. Within that mix of revenue, about 70% of it is with domestic Chinese OEMs (of which the top six customers are about two-thirds of that revenue), and BorgWarner noted that it is pretty diversified amongst the domestic OEMs. In eProducts for 2024, excluding commercial battery packs, the company expects about 45% of the business to come from China (and about 90% of those sales are with the locals).

Lear: At a competitor conference in September, Lear commented that it continues to see a market shift in China from the multinational OEMs to the Chinese domestic OEMs. However, Lear noted that it has a pretty good portfolio of new customers that are benefiting from that shift, particularly on the Seating side including with BYD, Xiaomi, and Leapmotors. Lear noted that for the China region in general, the company has strong relationships that it has developed over the 30+ years of operating in the region as well as vertically-integrated capabilities across design, engineering, and manufacturing. Lear said that it is doing particularly well in the higher ends of the China market with domestic OEMs in Seating.

Importantly, Lear spoke to the progress it is making with the Chinese domestic OEMs as Lear has decreased its China revenue from Western OEMs to ~70% currently from ~80% about a year ago. Moreover, Lear commented on its 2Q EPS call that about 2/3 of its three-year backlog in China was driven by new business wins with Chinese domestic automakers, some of which is captured in the company's growing non-consolidated backlog. Additionally, in the next couple of years, Lear thinks it will have about 30% of BYD's seating business in China from ~10-15% today.

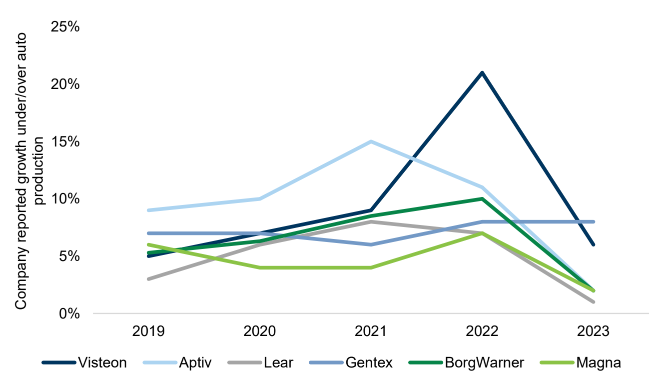
In E-Systems, Lear has business with Geely and all the brands under the Volvo/Geely family, with Great Wall, and with FAW.

Visteon: The company noted on its 2Q24 EPS call that China was a weak spot for the company on account of the ongoing decline of market share for global OEMs and the unfavorable vehicle mix with its largest domestic customer, Geely. Visteon has the majority of its Geely business on premium, high-end brands that are not doing as well in the market this year. However, Visteon noted that it has been gradually and selectively increasing its portfolio of domestic OEM customers within the China market. Visteon called out that it is trying to expand to other top five domestic OEMs in China by leveraging its technology capability. Per the most recent 10-K, 15% of Visteon revenue in 2023 was tied to China, and 8% of total revenue was for China export (i.e. parts produced in China but exported to other Asia markets for vehicle assembly) excluding inter-regional eliminations.

Exploring market growth for auto tier 1s

The degree to which auto tier 1s have grown revenue faster than auto production driven by content has generally compressed over the last 12 months, which we attribute in part to customer exposure dynamics (e.g. the Western OEMs that are typically larger customers and are generally losing share in the market especially in China) and delayed EV launches (which typically had newer content not only in powertrain but vehicle features and parts more broadly). We believe that customer mix will be a headwind over the next year compared to global production growth for most of our tier 1 coverage.

Exhibit 20: Growth over market by tier 1 supplier

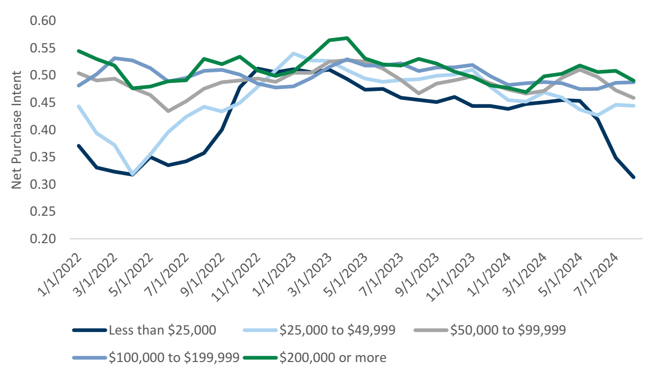


Source: Company data

Updating auto industry forecast to reflect more measured volume growth

We're lowering our forecast for US SAAR to reflect weaker sales YTD (SAAR has averaged ~15.5 mn, which is up low single digits YTD but below the mid single digit growth outlook our prior forecast implied), and a decline in vehicle purchase intentions among lower-income consumers per surveys from HundredX (sub $50K of annual income, and especially less than $25K of annual income).

Exhibit 21: Net vehicle purchase intent for lower income consumers has declined, but is stable for higher income brackets



Source: HundredX

How much will lower rates help?

The GS Economics team's latest forecast is for 100 bps of rate cuts (inclusive of the 50 bps cut in September) in 2024, and a total of 200 bps by mid-2025. In terms of what this would mean for monthly payments, 200 bps of rate cuts would be equivalent to ~$2.5k off the sticker price. We believe that this type of increase in affordability could correlate to a low to mid single digit increase in demand all else equal. Lower rates wouldn't solve for the down payment needed though, and some consumers have depleted savings that had accrued from pandemic stimulus measures.

Exhibit 22: A 200 bp change in borrowing costs has a similar effect on monthly payments as ~$2.5k off of the sticker price

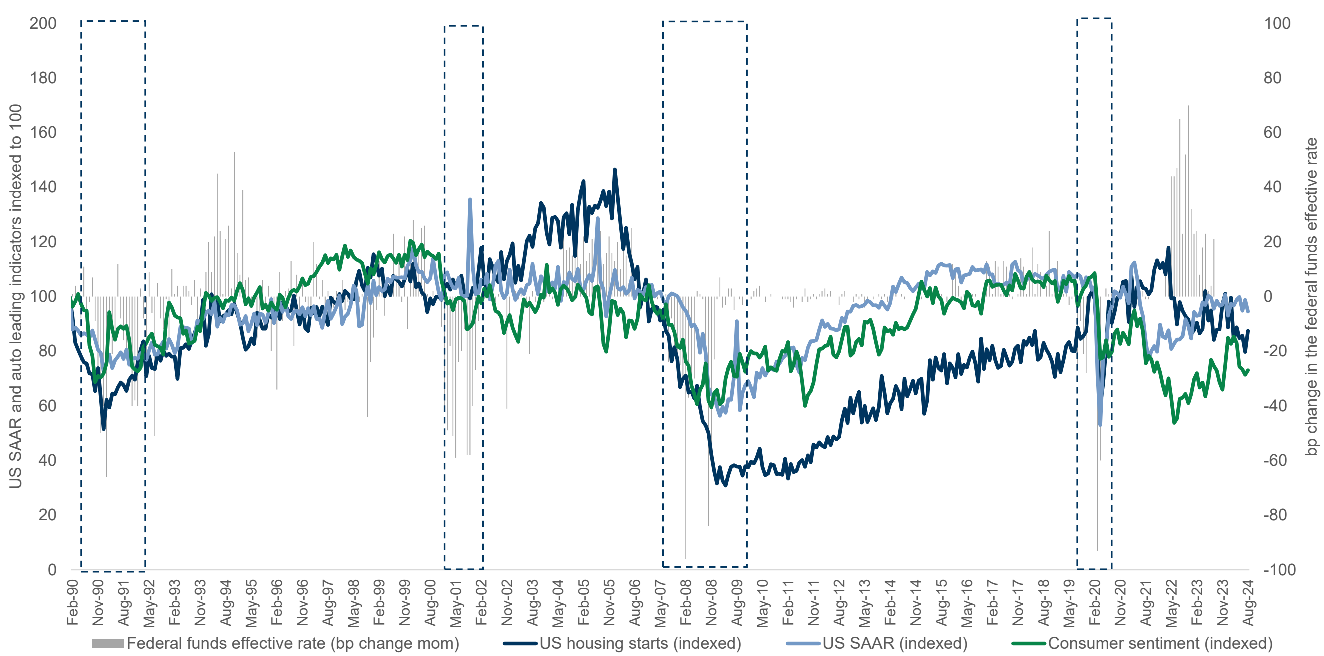
Total vehicle loan cost	Financing environment before first rate cut	200 bp lower APR	If rates hold what would pricing need to do to get similar rate cut payment
Vehicle Cost	$45,000	$45,000	$42,502
10% down payment	$4,500	$4,500	$4,250
Financed amount	$40,500	$40,500	$38,252
Loan Term (months)	72	72	72
Interest rate	6.75%	4.75%	6.75%
Monthly payments	$686	$648	$648

Source: Experian, Goldman Sachs Global Investment Research

More importantly, we believe it will be key to monitor if lower rates help to support the broader economy, with housing starts and consumer sentiment historically well correlated with auto demand.

We chart how all three of these factors correspond to US SAAR in Exhibit 23 with recessionary periods denoted by the dashed boxes. While interest rates and auto demand have typically both contracted during past recessions, when rates are reduced and there isn't a recession (e.g. mid 1990s) auto demand (as well as housing starts and consumer sentiment) tends to improve.

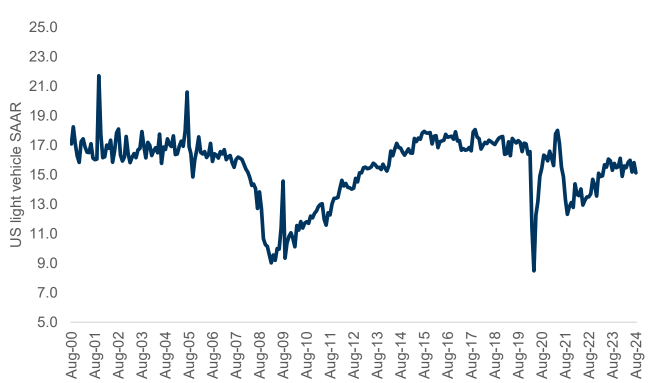
Exhibit 23: US SAAR, housing starts, and consumer sentiment indexed to 100 and changes in the effective federal funds rate since 1990 (dashed boxes are for past recessionary periods)



Source: Wards, FRED, University of Michigan

We now expect the US light vehicle SAAR in 2024/2025/2026 to be 15.85 mn/16.00 mn/16.25 mn, compared to 16.25 mn/16.75 mn/16.75 mn prior, implying modest growth over the next few years. Note that YTD SAAR has averaged ~15.5 mn, and our forecast for 2025/2026 implies low single digit growth (and is in-line with the historical average of 16-16.5 mn).

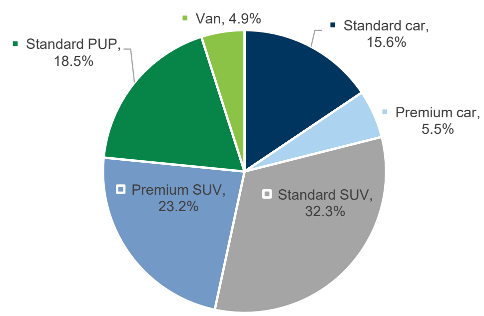
Exhibit 24: US LV SAAR has historically averaged in the 16-16.5 mn range



Source: US Bureau of Economic Analysis (BEA), Wards

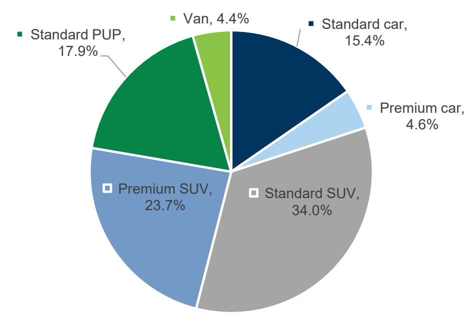
There has been some mix shift YTD toward small/medium sized SUVs (i.e. standard SUVs) and away from pickups and premium sedans.

Exhibit 25: January-August 2023 US vehicle deliveries mix



Source: Motor Intelligence

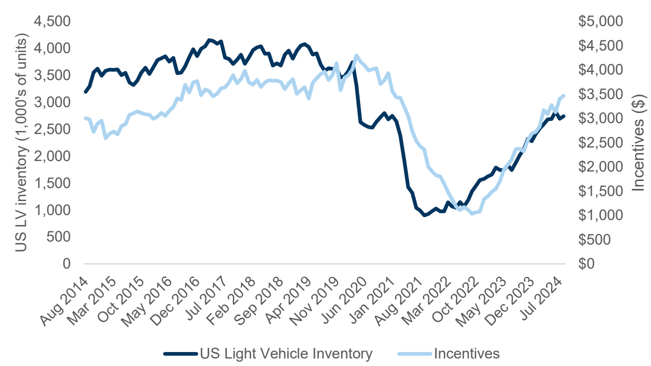
Exhibit 26: 2024 YTD through August US vehicle deliveries mix



Source: Motor Intelligence

Vehicle inventory and incentives have been normalizing, but remain somewhat below historical levels in aggregate. We expect net pricing to continue to moderate, and we assume low single digit ASP declines for Ford and GM in 2H24 and 2025.

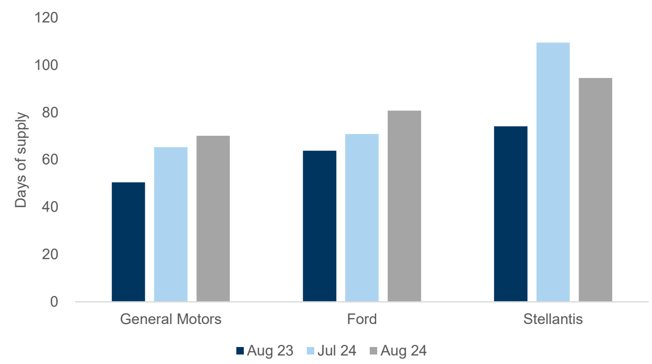
Exhibit 27: US light vehicle inventory and incentives remain modestly below historical levels



Source: Autodata

However, certain OEMs such as Stellantis have excess inventory.

Exhibit 28: Days of supply for Stellantis, GM, and Ford in the US

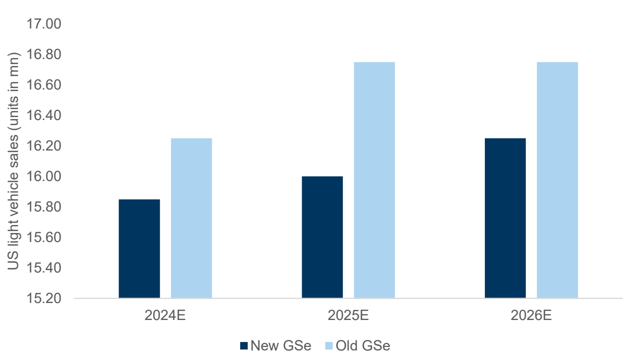


Source: Motor Intelligence

With the reduced sales volumes, as well as high inventory for certain OEMs and vehicle models, we lower our production estimates for North America.

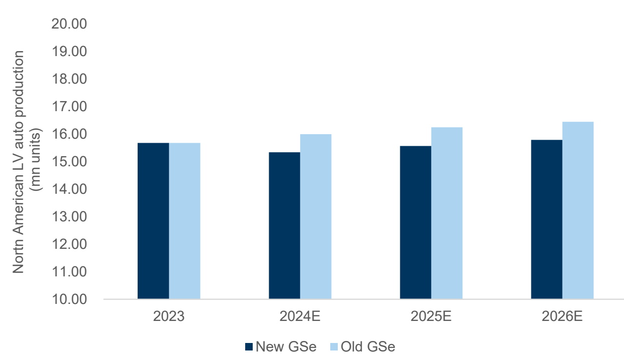
Overall, we now expect North America production for 2024/2025/2026 of 15.3 mn/15.6 mn/15.8 mn from 16.0 mn/16.3 mn/16.5 mn prior. Our estimates imply a mid to high single digit yoy decline in production in 3Q, and low single digit decline in 4Q24.

Exhibit 29: We revise our US LV sales estimates to 15.85 mn/16.00 mn/16.25 mn for 2024/25/26



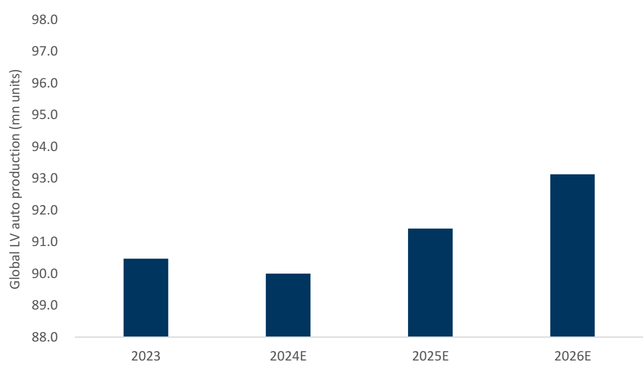
Source: Goldman Sachs Global Investment Research

Exhibit 30: We now expect North American production of 15.3 mn/15.6 mn/15.8 mn for 2024/25/26



Source: IHS , Goldman Sachs Global Investment Research

Exhibit 31: Our updated global production forecast now sees a yoy decline in 2024 before returning to low single digit growth in 2025/26



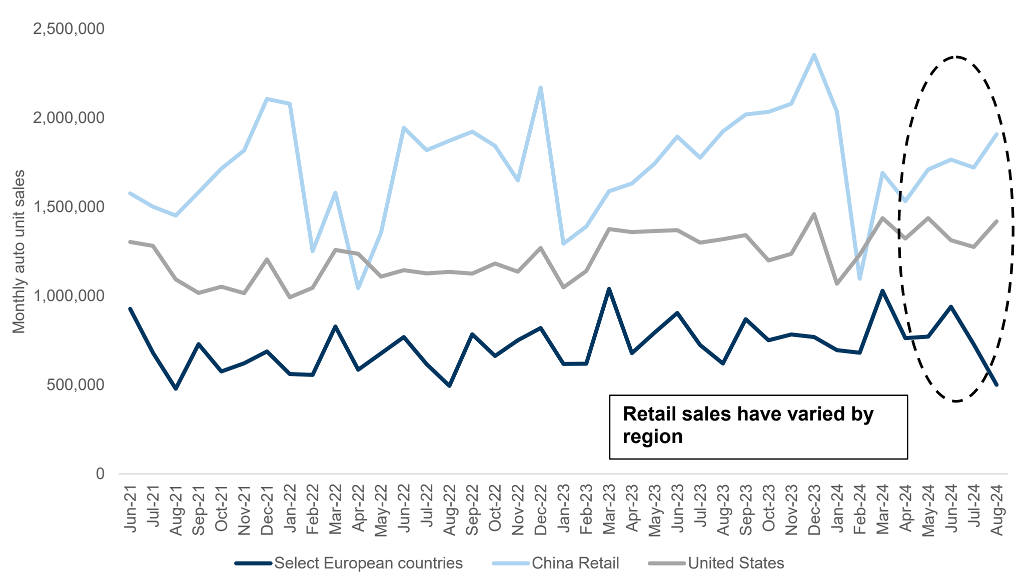
Source: IHS, Goldman Sachs Global Investment Research

Update on global demand trends

European auto sales in key geographies are down 9% QTD and up 2% YTD, and sales in China are down 2% QTD and up 2% YTD through August. In Europe, PHEV volumes are down 12% QTD and about flat YTD, and BEVs are down 32% QTD and down 9% YTD. In China, through August, PHEV sales are up 82% QTD and up 86% YTD with BEVs up 5% QTD and up 9% YTD.

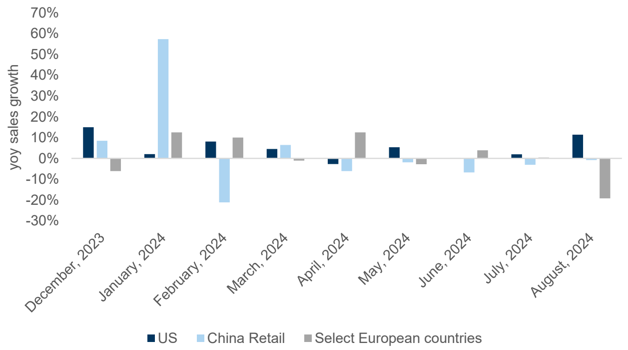
Similarly, BEV adoption remains regionally dependent, with the US tracking in the 7-9% range YTD, Europe in the low to mid teens, and China at >25% (Exhibit 34).

Exhibit 32: Vehicle sales by region



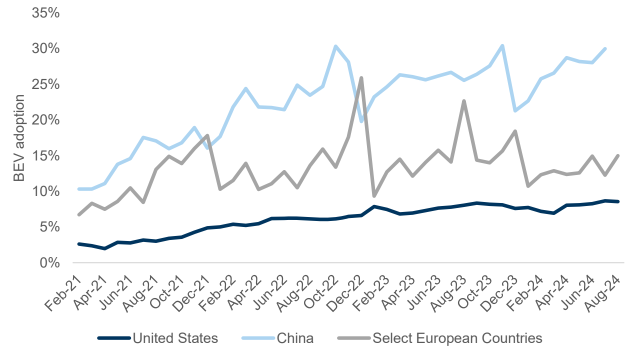
Source: CPCA, ACEA, Autodata

Exhibit 33: Regional sales yoy growth by month



Source: CPCA, ACEA, Autodata

Exhibit 34: BEV adoption by region



Source: CPCA, ACEA, Autodata

Considering product leadership for tier 1s

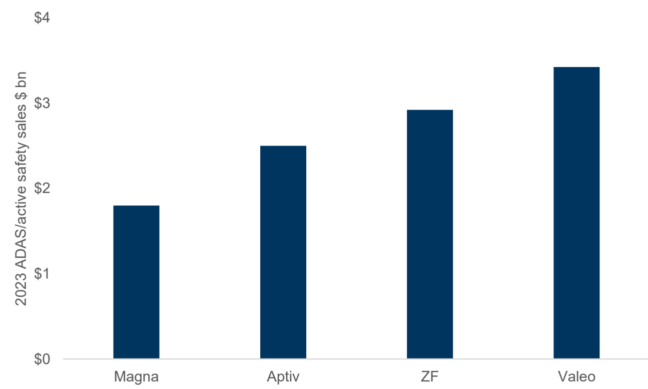
We believe that product leadership will be increasingly important for tier 1s as the use of platforms rises, at least for products that are more likely to be in-sourced by OEMs (e.g. powertrain, electrical & electronic architecture, and ADAS). We highlight a few areas including active safety and seating with respect to product leadership (which isn't just measured in volume).

We think it will be interesting to monitor how category share evolves in the future. The case for having a wider product set is that it increases the opportunity to collaborate and cross-sell, and leverage shared costs.

We believe that tier 1s with product leadership are more likely to succeed as the use of platforms increases.

One market we examined was active safety. While Magna is one of the largest tier 1 suppliers globally in total (and has a leadership position in categories like metals/body), its active safety revenue is behind others in the sector (e.g. Aptiv, ZF, Valeo; Exhibit 35). Recall that Magna commented on its most recent earnings call that active safety sales are expected to be ~$600 mn lower in 2026 compared to the company's February expectations driven by volume shortfalls, in-sourcing by OEMs, and its updated view of expected win-rates. Magna cited particular headwinds in China. While China share loss may be due in part to geopolitical factors (and Mobileye has lost share as well in China due to in-sourcing), with less scale in active safety it may be harder to effectively compete (or to compete with attractive margins/returns).

Exhibit 35: Magna's active safety business is smaller than its competitors

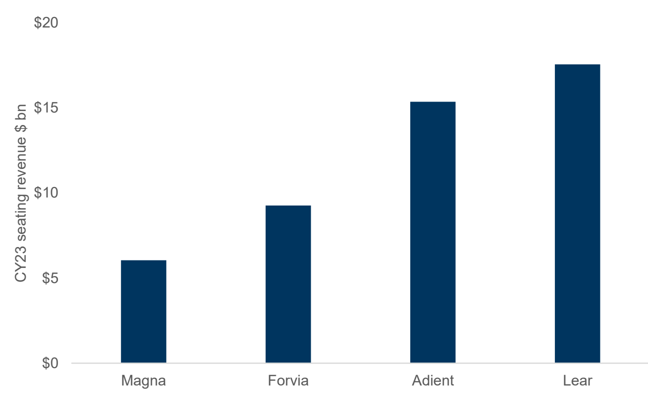


Shows ZF's Electronics and ADAS segment

Source: Company data, Compiled by Goldman Sachs Global Investment Research

Another segment we analyzed was Seating, and Magna's seating revenue is smaller than competitors (Forvia, Adient, Lear). Lear is increasingly offering a full solution (e.g. vertical integration on materials and components), which can help OEMs save cost and Lear to expand margins. Lower scale and integration could be hampering returns. Magna's seating segment margins (in the mid 3% range) are lower than Lear's total corporate EBIT margins in the ~5% range (Lear's seating margins are 6-7% but Lear doesn't include corporate overhead to the same extent that Magna does).

Exhibit 36: Magna's seating business compared to Forvia, Adient, and Lear in CY23

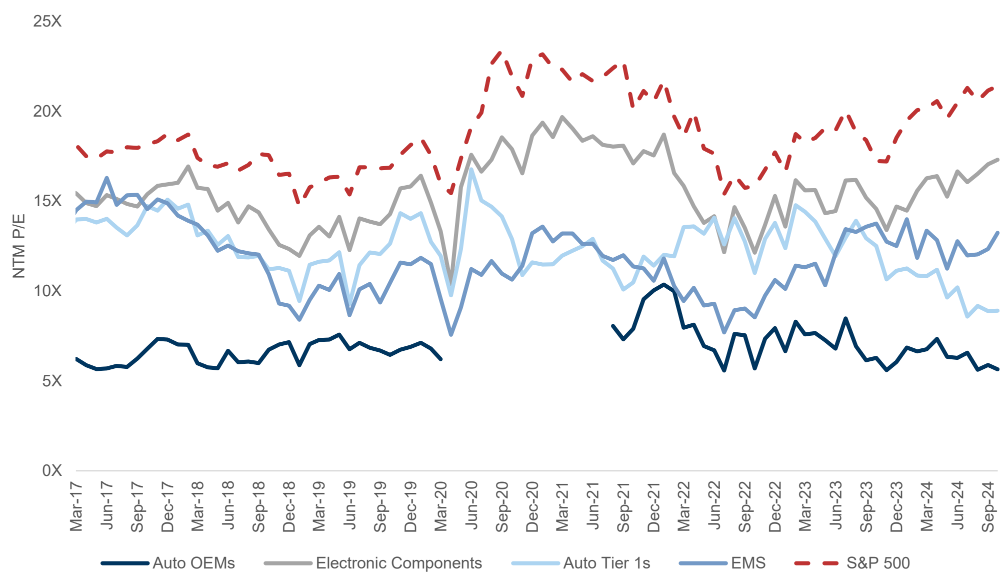


Source: Company data, Goldman Sachs Global Investment Research

Valuation - multiples for auto exposed companies have compressed

Valuations for our coverage have diverged by segment YTD. While multiples have expanded for electronic components and EMS companies, they have contracted for OEMs and tier 1s. We attribute this to positive investor views on datacenter demand, but an expectation for weakness in autos.

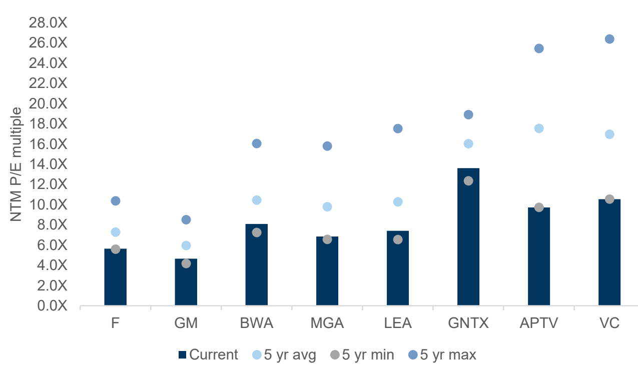
Exhibit 37: NTM P/E multiples by subsector



Source: FactSet

Ford, GM, and the auto tier 1 suppliers in our coverage are currently trading at or near trough valuations on consensus NTM EPS estimates.

Exhibit 38: Ford, GM, and our tier 1 supplier coverage are currently trading at or near historical trough valuations



Source: FactSet

Upgrade F to Buy from Neutral on margin opportunity from growing software and services mix, and cost reduction potential

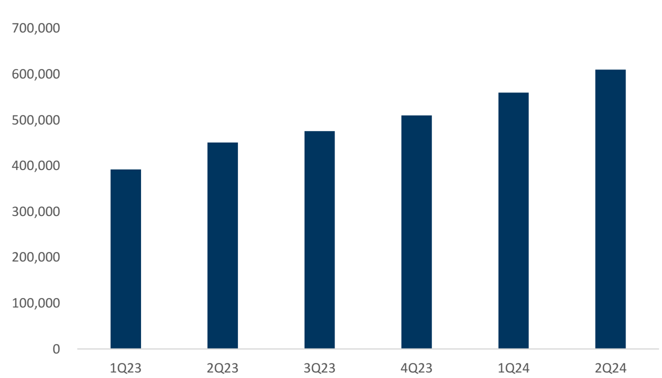
We upgrade Ford shares to Buy from Neutral. We believe there is a margin opportunity driven by the company's more profitable commercial business (Ford Pro, with mid teens EBIT margins) and growing software and services mix. The company is targeting $1 bn of software revenue in 2025, and for software and physical services to be 20% of Pro EBIT in 2026. Paid subscriptions have been growing at a 35-40%+ CAGR, and we believe there is a longer-term opportunity in areas such as fleet services and ADAS. In addition, we believe cost actions (in ICE and EVs) can help to offset industry headwinds (competition internationally, and some degree of price-mix headwinds). With the stock down 13% YTD (vs. the S&P 500 up 21%) driven by cyclical concerns and higher than expected warranty costs in 1H, it is now trading at just 5X our NTM EPS estimate and at the lower-end of the historical range of 5-10X. We see 23% upside to our new 12-month price target of $13 (and a ~30% total return including the 6% dividend yield).

Software and Services opportunity to support margins

We believe there is a margin opportunity driven by growing software and services mix.

Paid subscriptions increased to over 765K in 2Q24, with Pro at about 610K. Ford's subscriptions have been growing at a 35-40%+ CAGR, driven by an increasing number of vehicles with modems (the company expects its mix of connected vehicles to expand from 30% to 60% of the fleet in Pro by 2026), and higher attach rates (from 12% with a target to reach 36% in Pro by 2026). With a total installed based of vehicles in the US at ~46 mn per Experian, annual vehicle shipments of 3-4+ mn in North America and Europe, and what we believe will be an increasing set of digital and software product offerings in the coming years (e.g. around fleet uptime, L3 ADAS), we estimate that connected subscriptions could rise to 3 mn or more by 2030.

Exhibit 39: Ford Pro subscribers has continued to grow, and reached >600k in 2Q24



Source: Company data, Goldman Sachs Global Investment Research

Relative to Ford's $1 bn software target in 2025, we believe that most will be from upfront software sales (e.g. BlueCruise at the time the vehicle is sold) and growth out of deferred revenue. We estimate that Ford will have ~$100 mn of revenue tied to monthly subscriptions in software and digital services in 2025 (given its comments on paid subscribers, and monthly ARPU of ~$8 in Pro).

By 2030, we believe Ford can generate ~$3 bn dollars or more in annual revenue in total from software and digital services, including both software sales at the time of vehicle purchase (Exhibit 41) and connected subscription revenue (Exhibit 40).

Exhibit 40: Sensitivity analysis of Ford's potential annual connected subscription revenue

2030 Annual connected subs revenue in $mns		Monthly subscribers (in Ks)					
		2500	2750	3000	3250	3500	4000
Monthly subscription pricing	$8.0	$240.0	$264.0	$288.0	$312.0	$336.0	$384.0
	$10.0	$300.0	$330.0	$360.0	$390.0	$420.0	$480.0
	$12.0	$360.0	$396.0	$432.0	$468.0	$504.0	$576.0
	$14.0	$420.0	$462.0	$504.0	$546.0	$588.0	$672.0
	$15.0	$450.0	$495.0	$540.0	$585.0	$630.0	$720.0
	$16.0	$480.0	$528.0	$576.0	$624.0	$672.0	$768.0
	$18.0	$540.0	$594.0	$648.0	$702.0	$756.0	$864.0
	$20.0	$600.0	$660.0	$720.0	$780.0	$840.0	$960.0

Source: Company data, Goldman Sachs Global Investment Research

Exhibit 41: Sensitivity analysis of Ford's annual revenue potential from upfront software sales for NA and Europe

2030 Upfront software revenue		Vehicles with embedded software (in Ks)						
		2500	2750	3000	3250	3500	3750	4000
Upfront pricing	$500	$375	$425	$500	$1,625	$1,750	$1,875	$2,000
	$750	$563	$638	$750	$2,438	$2,625	$2,813	$3,000
	$1,000	$750	$850	$1,000	$3,250	$3,500	$3,750	$4,000
	$1,250	$938	$1,063	$1,250	$4,063	$4,375	$4,688	$5,000
	$1,500	$1,125	$1,275	$1,500	$4,875	$5,250	$5,625	$6,000
	$1,750	$1,313	$1,488	$1,750	$5,688	$6,125	$6,563	$7,000
	$2,000	$1,500	$1,700	$2,000	$6,500	$7,000	$7,500	$8,000

Source: Goldman Sachs Global Investment Research

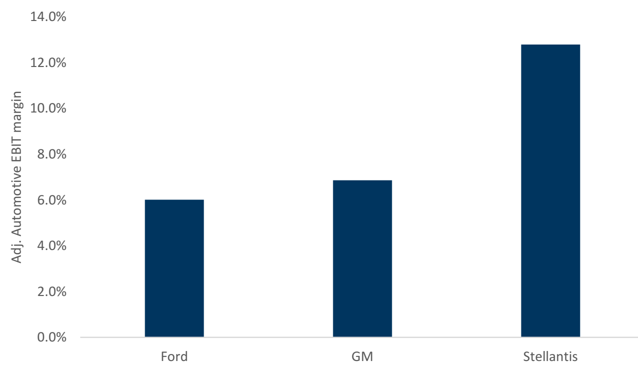
Moreover, we estimate that Ford's high margin parts business accounts for at least $5-$10 bn if not $10+ bn of annual revenue with attractive EBIT margins (given that Ford said software and physical services are ~12% of Pro EBIT this year and tracking to ~20% of Pro EBIT in 2026, parts has >30% EBIT margins, and Pro is about a quarter of total company aftermarket sales).

Overall, we believe this implies that software & physical services for the whole company could account for >$2 bn of EBIT in 2025 and >$4 bn in 2030 (with scenarios that are higher than this). While calculating the effect on total company EBIT can be somewhat difficult with the EV business currently negative, we see these levels of profit and profit contribution as consistent with multiple expansion from our tech industry case studies.

Cost reduction potential in EVs and ICE

Ford's EBIT margin has historically trailed key peers, and at the 2023 investor day the company pointed to a $7 bn cost gap. The company articulated opportunities for improvement in areas including warranty, operational efficiencies, and procurement.

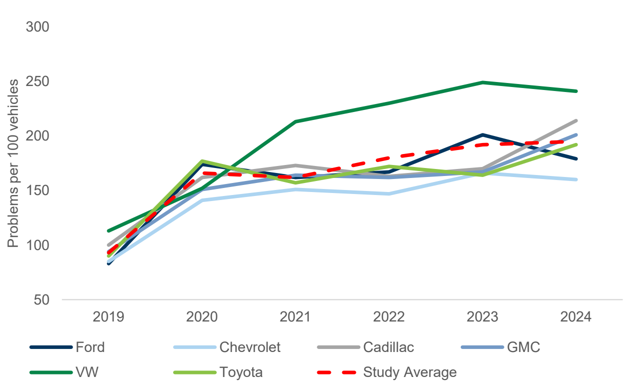
Exhibit 42: Automotive adjusted EBIT margin for the Detroit 3 in 2023



Source: Company data, Goldman Sachs Global Investment Research

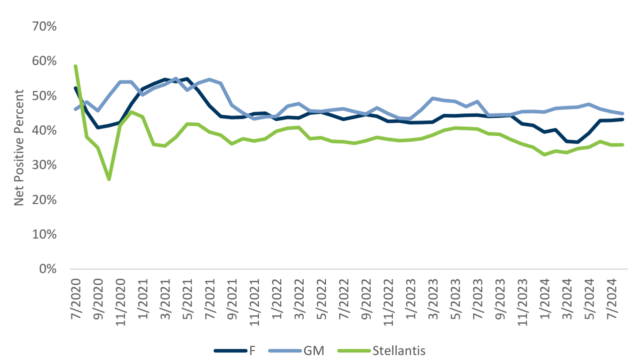
While the company is targeting (and believes it is on track for) $2 bn of cost efficiencies in 2024, on the 2Q24 call Ford pointed to an incremental ~$1 bn headwind driven by warranty due to field service actions. We do not expect improved warranty to be a near-term tailwind, but in 2026/2027 there is the potential for Ford to improve upon the warranty portion of the cost gap. This will ultimately stem from better build quality, which can take a few years to affect warranty accruals. Ford highlighted on its 2Q24 call that it had seen improvements in JD Power quality scores and that warranty lags improvements in quality by 12-18 months. We show JD Power data in Exhibit 43. We also leveraged HundredX data on customer net positivity scores on quality and reliability which we show in Exhibit 44 relative to GM and Stellantis. Overall this suggests in our view that warranty costs could moderate going forward.

Exhibit 43: Ford has improved its initial quality per JD Power
Problem per 100 vehicles by JD Power Initial Quality Survery (IQS) - lower is better



Source: JD Power, Data compiled by Goldman Sachs Global Investment Research

Exhibit 44: HundredX data on net positive percent on Quality/Reliability shows improvement in recent months



Source: HundredX

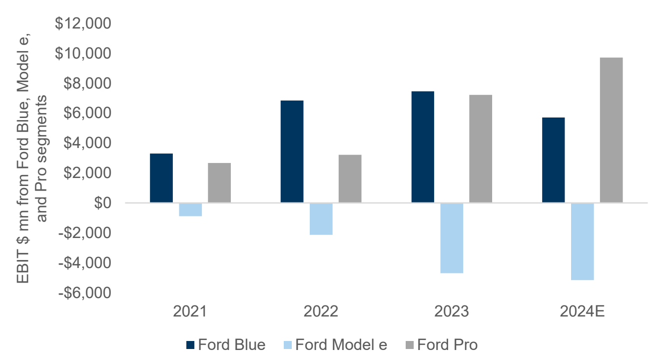
We also believe there is an opportunity for Ford to reduce its losses over time in its Model e segment (which the company expects to have EBIT losses of $5-$5.5 bn in 2024E). The company announced a restructuring plan in August 2024 that included delaying new pickup truck EV launches from 2026 to 2027, and a plan to now use hybrid rather than BEV technology in the three-row SUV segment. While this will result in restructuring charges, we believe it can help position Ford for better profits in the intermediate term. In addition, as Ford shifts to domestically produced batteries for its EVs in 2025/2026 (and captures IRA credits), we believe it can help reduce Model e losses. Stricter CO_2 compliance requirements from 2025 in Europe will likely be a headwind. Overall, **we assume Model e losses moderate to ~$4.7 bn in 2026 from >$5 bn in 2024**.

Longer-term, we believe Ford will need to ramp more cost effective EVs using the platform that Doug Field/Alan Clarke (both previously from Tesla) are developing, especially as current EPA and CARB rules require increased long-term BEV mix. However, in the intermediate term with hybrids a high single digit percent of Ford's total volume in North America and with margins that are comparable to ICE, we believe mix shift to hybrids will be a tailwind.

We expect Ford Pro to drive revenue and profits for the company in 2024 and beyond

Recall that Ford's CY24 financial guidance is for adjusted EBIT of $10 bn to $12 bn. At a segment level, Ford expects full-year 2024 EBIT of: 1) $9-$10 bn from Ford Pro; 2) about $6-$6.5 bn from Ford Blue; 3) an EBIT loss of $5.0 bn to $5.5 bn for Ford Model e; and 4) earnings before taxes of about $1.5 bn from Ford Credit.

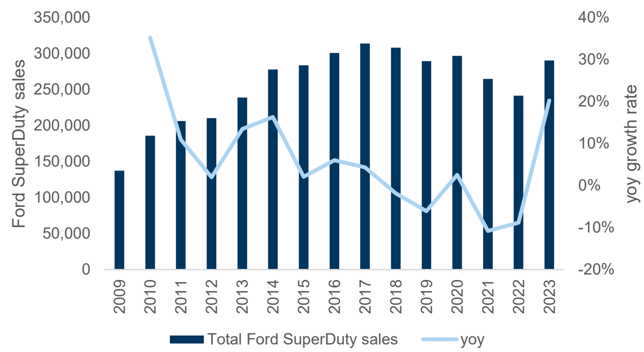
Exhibit 45: Ford adjusted automotive EBIT by segment (2024 is GSe)



Source: Company data, Goldman Sachs Global Investment Research

We expect the new Super Duty to help drive volumes and strength in Pro in 2025. Moreover, as Ford announced in July 2024, it plans to add up to 100K units of SuperDuty capacity in Oakville starting in 2026. At our September Communacopia + Technology conference, the company said it was confident in adding capacity given the pent-up demand in chassis cabs, demand due to infrastructure needs (to support customers engaged in infrastructure, utilities, energy and telecom projects), and with replacement needs given the average age of the over 4 mn Super Duty vehicles on the road being about 11 years. The company believes its Super Duty portfolio (which spans across vehicles, chassis cabs, and trucks; and both gas and diesel engines) offers best-in-class payload towing and horsepower torque that sets it apart from the competition. Ford also believes that its comprehensive supply chain and portfolio (e.g. its upfitting, dealer and repair network; software and services; and full range of vehicle types and powertrains) are a competitive advantage. Ford has >40% commercial share in North America and mid teens share in Europe.

Exhibit 46: Ford F-250/350 Super Duty sales volumes since 2009



Source: IHS

Updating estimates, and risk/reward

We lower our 2024/25/26 EPS estimates to $1.95/$2.00/$2.15 from $2.00/$2.15/$2.45 prior, to reflect the competitive landscape and industry environment. We assume pricing continues to moderate in 2H24/2025/2026 in our forecast by low single digits annually. We expect Blue EBIT margins of ~6% in 2025/2026, Pro at ~14%, and Model e losses moderating from $5.2 bn in 2024 to $4.7 bn in 2026. Importantly, our estimates are above FactSet consensus for both EBIT and EPS in all three years.

We raise our 12-month price target to $13 from $12 prior, based on 6X (from 5X prior reflecting better through-cycle opportunities) our normalized EPS estimate of $2.10 (from $2.30 reflecting our updated estimates).

We note $8 as a downside case, either assuming multiple compression to ~4X, or if 2025 EPS were to contract by ~20% vs. our base case view (which could occur if Blue margins compressed to 4-5% and Model e losses do not improve or even weaken in 2025 vs. 2024). We see a bull case scenario of $15 (which could occur if 2026 EPS were to reach $2.40-$2.50 assuming Pro margins at ~15-16%, Blue margins are in the mid to high 6% range from better cost/mix, and/or Model e losses are less than we expect).

Key downside risks to our Buy rating relate to the auto cycle (demand and/or price-mix could be weaker than we expect), market share, and margins (both from margin and pricing pressure in a downturn, the degree of success with company specific initiatives such as the transition to hybrids/EVs, and its ability to grow in software & services).

Adjusting estimates and price targets on tier 1s and auto exposed stocks in our coverage to reflect more measured autos growth and recent company commentary

We lower price targets and estimates for APTV, BWA, GNTX, LEA, MGA, MBLY, ST, TEL, and VC reflecting the lower auto industry growth we now expect. We lower estimates for GM on softer auto fundamentals but increase our price target/multiple reflecting the improved through-cycle opportunity we see from software and services, similar to our expectation for Ford. We lower our price target and revenue estimates for CRNC reflecting slower auto growth but increase our EPS estimates to reflect the impact of lower opex related to previously announced restructuring. We also reflected the announced exit from FMCW lidar development in our updated Mobileye estimates. We show updated estimates in Exhibit 47, price targets in Exhibit 48 and key risks in Exhibit 49.

Exhibit 47: Updated revenue and EPS forecasts for auto exposed companies and tier 1s in our coverage; revenue in $ mn

	2024		2025		2026	
Ticker	Old Revs	New Revs	Old Revs	New Revs	Old Revs	New Revs
GM	$181,238	$180,420	$182,854	$179,259	$185,980	$180,746
APTV	$20,283	$20,130	$21,488	$21,072	$22,819	$22,377
BWA	$14,280	$14,189	$15,239	$14,957	$15,971	$15,617
CRNC	$325	$323	$235	$214	$246	$224
GNTX	$2,445	$2,385	$2,650	$2,608	$2,808	$2,776
LEA	$23,458	$23,263	$24,430	$24,158	$25,515	$25,239
MBLY	$1,641	$1,608	$2,048	$1,953	$2,316	$2,184
ST	$4,019	$4,010	$4,235	$4,130	$4,482	$4,355
TEL	$15,784	$15,749	$16,683	$16,419	$17,821	$17,575
VC	$3,914	$3,856	$4,233	$4,051	$4,628	$4,340
MGA	$43,245	$42,783	$43,852	$43,146	$44,935	$44,206

		2024		2025		2026	
	Ticker	Old EPS	New EPS	Old EPS	New EPS	Old EPS	New EPS
	GM	$10.30	$10.15	$10.30	$10.05	$10.90	$10.30
	APTV	$6.30	$6.20	$7.85	$7.65	$8.90	$8.75
	BWA	$4.05	$4.00	$4.60	$4.55	$5.10	$5.00
*	CRNC	$0.91	$0.91	($0.40)	($0.25)	($0.50)	($0.05)
	GNTX	$1.90	$1.83	$2.25	$2.20	$2.40	$2.40
	LEA	$13.00	$12.90	$15.50	$14.95	$19.00	$17.75
*	MBLY	$0.25	$0.25	$0.55	$0.55	$0.65	$0.60
	ST	$3.60	$3.55	$4.10	$3.90	$4.65	$4.45
	TEL	$7.56	$7.56	$8.20	$8.00	$9.25	$9.00
	VC	$8.00	$7.85	$9.75	$9.00	$11.90	$10.50
	MGA	$5.50	$5.30	$6.35	$5.85	$7.50	$6.70

** Uses EPS excl. SBC*

Source: Goldman Sachs Global Investment Research

Exhibit 48: Updated 12-month price targets for auto exposed stocks and tier 1s in our coverage

	Ticker	Old Multiple	New Multiple	Old Normalized EPS	New Normalized EPS	Old Price Target	New Price Target
	APTV	12X	12X	$8.00	$7.65	$96	$92
	BWA	8X	8X	$4.75	$4.55	$38	$36
	GM	5X	6X	$10.50	$10.15	$53	$61
	GNTX	14X	14X	$2.35	$2.20	$33	$31
	ST	10X	10X	$4.10	$3.90	$41	$39
	TEL	21X	21X	$9.00	$8.50	$189	$179
	VC	13X	13X	$10.00	$9.00	$130	$117
	LEA	9X	9X	$16.00	$14.95	$144	$135
*	MGA	7X	7X	$6.35	$5.85	$44	$41

Ticker	Old Multiple	New Multiple	Old Q5-8 Sales	New Q5-8 Sales	Old Price Target	New Price Target
CRNC	1.25X	1.25X	$243	$221	$3.00	$2.75

Ticker	Old Multiple	New Multiple	Old Q5-8 EBITDA	New Q5-8 EBITDA	Old Price Target	New Price Target
MBLY	30X	25X	$598	$582	$24	$20

** Our MG.TO price target shifts to CAD 55 based on current exchange rates*

MBLY uses EBITDA excl. SBC

Source: Goldman Sachs Global Investment Research

Exhibit 49: Key risks for companies with updated price targets/estimates

Company	Ticker	GS Rating	Key upside/downside risks
Auto OEMs			
General Motors	GM	Buy	The auto cycle, market share, margins, FCF, and the ability to pivot to growth areas such as EVs and AVs
Tier 1 Suppliers			
BorgWarner	BWA	Neutral	Revenue growth including ability to outgrow market due to EV portfolio, diesel exposure, the auto cycle, margins, and market share
Gentex	GNTX	Neutral	Revenue growth, margins, and multiple expansion
Lear	LEA	Buy	The auto cycle, ability to benefit from increasing EV industry mix, margins, market share
Magna	MGA	Neutral	The auto cycle, market share, ability to outgrow production and capitalize on secular growth themes, capital allocation, and FCF
Visteon	VC	Buy	Ability to capitalize on EVs and AVs, margins, revenue, market share, general macroeconomic risk, multiple expansion/contraction
Aptiv	APTV	Buy	Ability to grow CPV, the auto cycle, market share, margins, debt
Electronic Components			
TE Connectivity	TEL	Buy	Revenue growth and auto demand, margins, and M&A
Sensata	ST	Neutral	Auto production, margins, leverage, tax rate, FX, and ability to increase CPV in EVs and hybrids
Autonomy			
Mobileye	MBLY	Buy	ADAS/AV adoption, competition, geopolitics, market share, supply constraints and supplier/partner readiness
Voice Technology			
Cerence	CRNC	Neutral	Industry and macro environment, competition, margins, natural ASP degradation

Source: Goldman Sachs Global Investment Research

Updated coverage snapshot and risk reward screen

We show our coverage snapshot in Exhibit 50.

Exhibit 50: US Autos & Industrial Tech coverage snapshot

					CY2025E					
	Rating	12-month Price Target	Price	Upside/ Downside	Mkt Cap ($US mn)	ROE	P/E	EV/EBITDA	EV/Sales	EV/FCFF
Auto OEMs										
F	Buy	$13	$10.56	23%	$42,472	11%	5.3x	1.8x	0.2x	4.0x
GM	Buy	$61	$44.84	36%	$51,431	11%	4.5x	2.3x	0.2x	3.3x
TSLA	Neutral	$230	$261.63	-12%	$910,734	20%	88.6x	41.0x	7.6x	--
RIVN	Neutral	$13	$11.22	16%	$11,231	--	--	--	1.6x	--
Median						18%	5.3x	2.3x	0.9x	3.7x
Tier 1 Suppliers										
BWA	Neutral	$36	$36.29	-1%	$8,245	15%	8.0x	5.0x	0.7x	16.5x
MGA	Neutral	$41	$41.04	0%	$11,791	11%	7.0x	4.0x	0.4x	10.5x
LEA	Buy	$135	$109.15	24%	$6,248	14%	7.3x	4.4x	0.3x	8.4x
GNTX	Neutral	$31	$29.69	4%	$6,889	18%	13.5x	9.5x	2.5x	20.8x
VC	Buy	$117	$95.24	23%	$2,657	25%	10.6x	5.0x	0.6x	14.6x
APTV	Buy	$92	$72.01	28%	$19,474	17%	9.4x	7.0x	1.2x	11.3x
Median						16%	8.7x	5.0x	0.7x	12.9x
Components and Systems										
APH	Buy	$75	$65.16	15%	$82,421	26%	31.7x	21.5x	5.3x	33.6x
TEL	Buy	$179	$150.99	19%	$46,505	19%	18.9x	12.3x	3.0x	19.7x
BDC	Buy	$124	$117.13	6%	$4,826	25%	14.8x	11.0x	2.0x	18.2x
ST	Neutral	$39	$35.86	9%	$5,419	19%	9.2x	8.7x	2.0x	14.3x
Median						22%	16.8x	11.7x	2.5x	18.9x
Lidar and Autonomy										
AUR	Sell	$2.00	$5.92	-66%	$9,200	--	--	--	22.2x	--
INVZ	Neutral	$1.00	$0.83	21%	$138	--	--	--	0.2x	--
LAZR	Sell	$0.75	$0.90	-17%	$408	--	--	--	3.3x	--
MBLY	Buy	$20	$13.70	46%	$11,042	--	70.2x	42.7x	5.0x	20.9x
Median						--	--	--	4.2x	--
EMS										
FLEX	Buy	$39	$33.43	17%	$13,740	21%	15.9x	8.6x	0.6x	16.2x
JBL	Buy	$136	$119.83	13%	$13,984	36%	15.8x	7.1x	0.5x	12.9x
Median						29%	15.8x	7.9x	0.6x	14.5x
Test and Measurement										
KEYS	Buy	$181	$158.93	14%	$27,813	27%	26.1x	20.8x	5.5x	23.7x
Power and Thermal Management										
VRT	Buy	$104	$99.49	5%	$38,253	28%	29.7x	21.0x	4.5x	36.7x
Voice Technology										
CRNC	Neutral	$2.75	$3.15	-13%	$148	5%	--	-15.9x	1.5x	35.2x
EV Battery										
QS	Sell	$4.50	$5.75	-22%	$2,884	--	--	--	31.0x	--
Charging Infrastructure										
CHPT	Sell	$1.25	$1.37	-9%	$586	--	--	--	1.1x	--
Warehouse Automation										
SYM	Neutral	$30	$24.39	23%	$14,266	--	--	--	125.0x	92.2x
Coverage Median						19%	13.5x	8.6x	1.8x	16.3x

*All price targets are for a 12-month time frame.
Forward Revenue & EBITDA take 2026 GSe for INVZ and LAZR
2026 for CHPT; 2027 GSe for AUR; 2028 GSe for QS; all discounted back to 2025

Source: FactSet, Goldman Sachs Global Investment Research

For illustrative purposes, we show an upside/downside scenario analysis for select companies in our coverage below (with downside/upside multiples using the low/higher-end of historical ranges and/or peer levels).

Exhibit 51: Upside/downside scenarios for select companies in our coverage

Upside/Downside Scenario	Current Price (9/30/2024)	Downside Multiple (NTM P/E)	NTM EPS (GSe)	Downside Valuation (Downside Multiple on NTM	Downside %	Upside Multiple (NTM P/E)	FY2026 EPS (GSe)	Upside Valuation (Upside Multiple on FY26 EPS)	Upside %
Tier-1 Suppliers									
BWA	$36	6X	$3.95	$24	**(35%)**	12X	$5.00	$60	**65%**
GNTX	$30	12X	$2.05	$25	**(17%)**	18X	$2.40	$43	**45%**
LEA	$109	6X	$13.40	$80	**(26%)**	10X	$17.75	$178	**63%**
MGA	$41	6X	$5.70	$34	**(17%)**	10X	$6.70	$67	**63%**
VC	$95	8X	$7.50	$60	**(37%)**	15X	$10.50	$157	**65%**
APTV	$72	8X	$7.05	$56	**(22%)**	15X	$8.75	$131	**82%**
Component Suppliers									
APH	$65	19X	$1.90	$36	**(45%)**	40X	$2.25	$90	**38%**
BDC	$117	9X	$7.10	$64	**(45%)**	16X	$8.70	$139	**19%**
ST	$36	8X	$3.65	$29	**(19%)**	13X	$4.45	$58	**61%**
TEL	$151	14X	$7.80	$109	**(28%)**	25X	$9.00	$225	**49%**
EMS									
* FLEX	$33	9X	$2.55	$23	**(31%)**	17X	$2.80	$48	**43%**
* JBL	$120	9X	$8.65	$78	**(35%)**	17X	$10.15	$172	**44%**
Test & Measurement									
* KEYS	$159	15X	$6.60	$99	**(38%)**	25X	$8.20	$205	**29%**
Power & Thermal Management									
VRT	$99	17X	$2.80	$48	**(52%)**	30X	$4.20	$126	**27%**

* EPS estimates exclude SBC

Upside/Downside Scenario	Current Price (9/30/2024)	Downside Multiple	NTM GSe	Downside Valuation	Downside %	Upside Multiple	2026 GSe	Upside Valuation	Upside %
Auto OEMs		**Downside NTM P/E**	**NTM EPS**	**Downside Multiple on NTM**		**Upside P/E View**	**2026 EPS**	**Upside Multiple on 2026 EPS**	
F	$11	4X	$2.05	$8	**(22%)**	7X	$2.15	$15	**42%**
GM	$45	4X	$9.30	$37	**(17%)**	7X	$10.30	$72	**61%**
TSLA	$262	30X	~$2.30-$2.70	~$70-$85	**~(75%)-(65%)**	65-70X	~$4.20-$4.60	~$270-$325	**~5-25%**

TSLA shows range for EPS including and excluding SBC

Source: FactSet, Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Mark Delaney, CFA, Will Bryant, Morgan Leung and Aman Gupta, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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Growth is based on a stock's forward-looking sales growth, EBITDA growth and EPS growth (for financial stocks, only EPS and sales growth), with a higher percentile indicating a higher growth company. **Financial Returns** is based on a stock's forward-looking ROE, ROCE and CROCI (for financial stocks, only ROE), with a higher percentile indicating a company with higher financial returns. **Multiple** is based on a stock's forward-looking P/E, P/B, price/dividend (P/D), EV/EBITDA, EV/FCF and EV/Debt Adjusted Cash Flow (DACF) (for financial stocks, only P/E, P/B and P/D), with a higher percentile indicating a stock trading at a higher multiple. The **Integrated** percentile is calculated as the average of the Growth percentile, Financial Returns percentile and (100% - Multiple percentile).

Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

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Goldman Sachs Investment Research global Equity coverage universe

	Rating Distribution			Investment Banking Relationships		
	Buy	Hold	Sell	Buy	Hold	Sell
Global	48%	35%	17%	64%	57%	41%

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Price target and rating history chart(s)

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