BofA SECURITIES

Automotive Industry

Year Ahead 2024: Five Auto themes & top stock picks as volatility remains

Industry Overview

Cycle in US still positive, but blurred visibility

The Auto industry remains well positioned to benefit from the volume recovery and the beginning of a new cycle, especially in North America. However, the visibility on other trends has become blurred given the upcoming elections and the changing reality and sentiment on electrification. Declining pressure on input costs (ex-labor), are a plus for suppliers and OEMs, while dealers continue to benefit from pent-up demand/parts & service/string free cash flow. The credit market appears robust, but for participants exposed to subprime (Used dealers), the outlook appears more challenging.

Top stock picks for 2024: RACE, ABG, AN

Our top stock picks for 2024 are: **RACE** (unique asset, pricing power, resilient performance, and conservative outlook), **ABG** and **AN** (strong free cash flow that allows for capital allocation to buybacks, acquisitions, and other initiatives).

Five auto themes to watch for in 2024

1. **Volumes still strong:** Volumes in North America are likely to continue to grow given pent-up demand from production constraints during Covid. Fleet sales and a return of mass market are likely drivers of incremental volume, which may have a negative effect on mix. ATPs are set to decline slightly, but are more a function of negative mix as opposed to like-for-like price cuts. Our US SAAR projections for 2024+ are unchanged at 16.1mm (+4% YoY) with the next US cycle to peak in 2028.
2. **Electrification slows:** In late 2023 sentiment on EVs soured. Commentary from dealers and OEMs coincided with stalling velocity of EV sales. Upon further review, our analysis indicates a dichotomy in the EV market: the premium market has moved towards electrification while mass market adoption lags. We think this divergence is mostly driven by pricing, but we don't see EV prices converging with ICE's in the near-term. Therefore, we lowered our EV adoption forecast, which essentially pushes our penetration estimates forward by 1 year ('24 10% Vs prior 12%, '25 15% Vs prior 17%, '30 33% Vs prior 36%), but there is still downside risk.
3. **Elections = Uncertainty:** 2024 is a new election cycle in the US that will be particularly impactful for the Auto industry. The Democrat and Republican parties have different views on environmental policies. We expect that a Democrat victory would accelerate a transition to clean vehicles, while a Republican win would delay the transition. Although there is already some visibility on policies, at least from democrats, it is early to determine all of the implications for the industry.
4. **Inflation headwinds & tailwinds:** As supply chains recovered and central banks adopted more restrictive monetary policy, input cost inflation was partially tamed. We expect lower raw materials and transportation costs to continue to benefit P&Ls, especially for suppliers, but labor costs remain a challenge. The UAW strike brought significant increases in labor costs. This may spread as non-unionized companies will likely have to maintain compensation that is competitive.
5. **Subprime normalizing, but monitor closely**: After 3 years of historically low delinquencies, the auto credit market has largely returned to pre-pandemic levels. Although the rapid rise in delinquencies may raise some concerns, we note that the market remains solid and credit metrics are relatively robust. Where we see and expect some issues is the used market, which relies relatively more on subprime.

Refer to important disclosures on page 28 to 30.
12643118

Timestamp: 09 January 2024 05:00AM EST

09 January 2024

Equity
Global
Autos/Car Manufacturers

John Murphy, CFA
Research Analyst
BofAS
+1 646 855 2025
johnj.murphy@bofa.com

John P. Babcock
Research Analyst
BofAS
+1 646 743 0046
john.p.babcock@bofa.com

Federico Merendi
Research Analyst
BofAS
+1 646 556 2798
federico.merendi@bofa.com

William Healey
Research Analyst
BofAS
+1 646 855 5747
william.healey2@bofa.com

ABG: Asbury

AN: AutoNation

ATP: Average Transaction Price

CAFE: Corporate Average Fuel Economy

CARB: California Air Resources Board

COLA: Cost of Living Adjustment

EPA: Environmental Protection Agency

EV: Electric Vehicle

GPU: Gross Profit per Unit

ICE: Internal Combustion Engine

IRA: Inflation Reduction Act

MSRP: Manufacturer's Suggested Retail Price

NHTSA: National Highway Traffic Safety Administration

OEM: Original Equipment Manufacturer

RACE: Ferrari

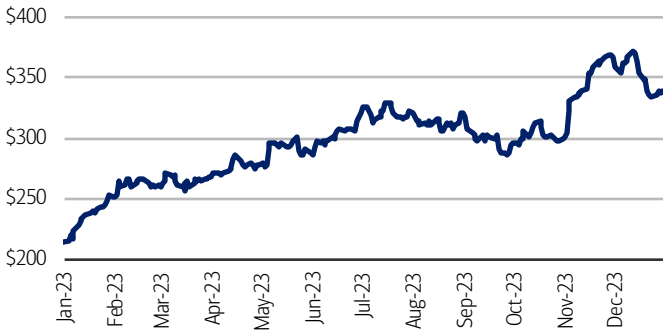
SAAR: Seasonally Adjusted Annualized Rate

UAW: United Auto Workers

Top stock picks for 2024

We highlight stocks among the OEMs, suppliers and dealers that we believe are best positioned to outperform in 2024: Ferrari (RACE), Asbury (ABG), and AutoNation (AN).

Exhibit 1: Ferrari (RACE) 2023 stock price performance $
RACE stock increased 58% from $214 at YE2022 to $338 at YE2023



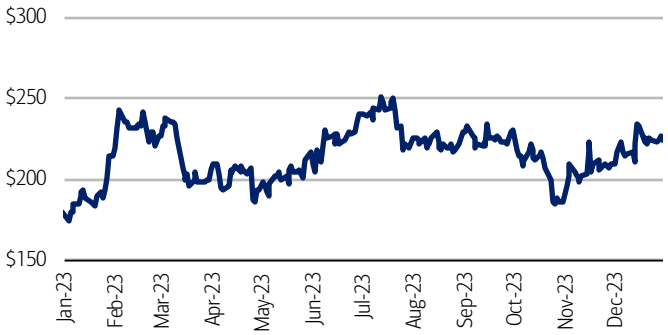
Source: Bloomberg

BofA GLOBAL RESEARCH

We have a Buy rating on RACE, which is a unique asset with significant intangible brand value and a true luxury status. We believe the company's balanced strategy of restrained volume growth, strong price increases, and new model introductions over our forecast period should drive strong consistent revenue and earnings growth.

In our view, the stock should outperform in 2024 given the resiliency of its financial performance in periods of macro uncertainty. Additionally, its outlook will likely remain conservative, with the majority of benefits expected to be driven by mix and price, as well as some easing of raw material costs and supply chain issues. Further, RACE seems increasingly focused on differentiating its vehicles and improving operations, including through increasing employee engagement.

Exhibit 2: Asbury (ABG) 2023 stock price performance $
ABG stock increased 26% from $179 at YE2022 to $225 at YE2023



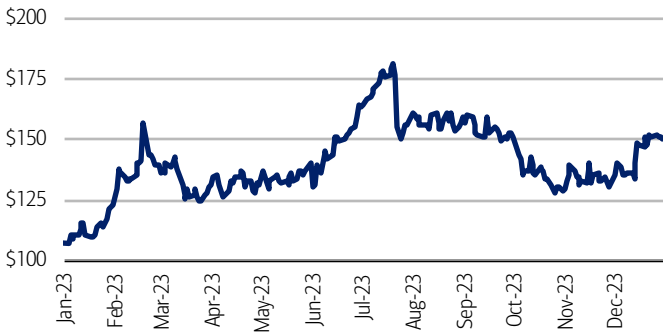
Source: Bloomberg

BofA GLOBAL RESEARCH

The public dealer groups remained battleground stocks in 2023 and this will likely continue to be in 2024. We hold a more constructive view on the group than consensus. Our Buy rating on ABG is predicated on our view that ABG is a structurally better business than it was pre-pandemic, and continued strong FCF allows for acquisitions including the recently closed $3bn Koons deal and buybacks that should yield earnings upside.

Despite fears that New Vehicle GPUs could decline significantly (already priced in), we expect GPUs to fade and that ABG will be able to maintain strong SG&A leverage as a best-in-class operator. ABG is trading at a material discount to both historical and private acquisition multiples (ABG P/E at ~6.5x vs. average dealer through-cycle multiple of ~10x+ on 2024 estimates), and we believe as long as valuations remain depressed, share repurchases will remain a priority for excess cash.

Exhibit 3: AutoNation (AN) 2023 stock price performance $
ABG stock increased 40% from $107 at YE2022 to $150 at YE2023



Source: Bloomberg

BofA GLOBAL RESEARCH

The public dealer groups remained battleground stocks in 2023 and this will likely continue to be in 2024. We hold a more constructive view on the group than consensus. Our Buy rating on AN is predicated on our view that AN is a structurally better business than it was pre-pandemic, and continued strong FCF will allow for capital allocation towards accretive business initiatives and share buybacks that should yield earnings upside.

Despite fears that New Vehicle GPUs could decline significantly (already priced in), we expect GPUs to fade and that AN will be able to maintain stronger SG&A leverage than pre-pandemic. AN is trading at a material discount to both historical and private acquisition multiples (AN P/E at ~6.2x vs. average dealer through-cycle multiple of ~10x+ on 2024 estimates), and we believe as long as valuations remain depressed, share repurchases will remain a priority for excess cash.

Five Auto themes to watch for in 2024

1. Volumes still strong

Like every year, we believe the first, and perhaps most important, theme of 2024 is the state and trajectory of volume and market dynamics, as well as underlying macroeconomic conditions, which combined constitute the largest determinant of revenue, earnings, and free cash flow for the automotive value chain.

Expect more growth in US auto sales in 2024

After a seemingly V-shaped recovery in the US automotive cycle through mid-2021, supply chain challenges served as a key impediment to US automotive sales and production throughout 2022, keeping the US seasonally adjusted annualized rate (SAAR) near recessionary levels. At 13.8mm, the US SAAR was down 8% in 2022. However, in 2023, as supply chains unlocked and consumer economy remained robust, US sales meaningfully grew and closed the year at 15.5m, exceeding BofA's original estimate of 14.3mm driven by strength in fleet sales. As we enter 2024, we keep our forward estimates largely unchanged given that we continue to see pent-up demand from the COVID years that will sustain and expand total sales.

Past constrained supply enables future US auto cycle

Historically, we have viewed the US automotive cycle as a capital goods replacement cycle with a consumer overlay. With this in mind, we think that years of constrained supply created enough unfulfilled demand to drive a robust capital goods replacement cycle to be unleashed until the end of the decade. As we show in **Exhibit 4** below, which outlines our old versus new forecasts for US sales, inventory and North America production through 2030, we leave US auto sales largely unchanged from our prior estimate and continue to expect the next peak in the US auto cycle to occur in 2028 with a SAAR in the range of 17mm-18mm.

Exhibit 4: BofA light vehicle forecasts for US sales & NA production
Our latest forecast continues to assume improvement in US auto sales and production in 2024, followed by a consistent gradual increase in 2025+

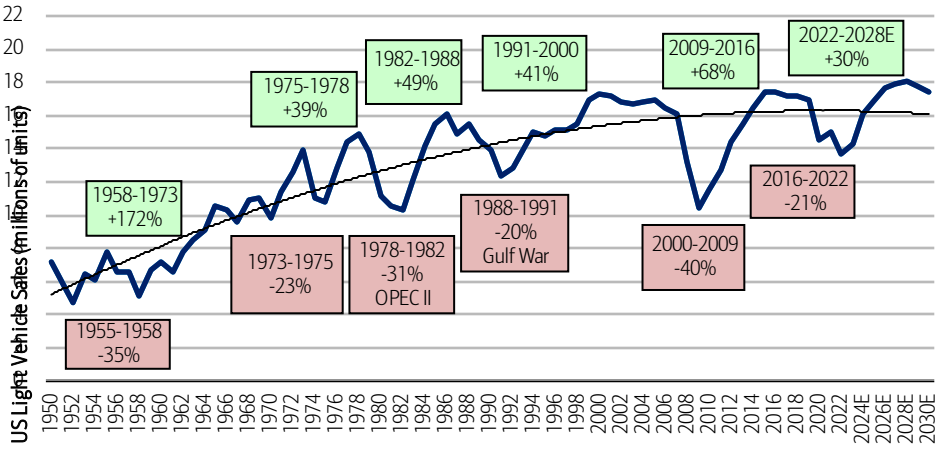
	New Estimates					Previous Estimates				
	US Sales		US Inventory	NA Production		US Sales		US Inventory	NA Production	
	Units	YoY Δ	Units	Units	YoY Δ	Units	YoY Δ	Units	Units	YoY Δ
2009	10,402,357	(21.2%)	1,939,005	8,559,084	(32.0%)	10,402,357	(21.2%)	1,939,005	8,559,084	(32.0%)
2010	11,554,824	11.1%	2,334,473	11,910,873	39.2%	11,554,824	11.1%	2,334,473	11,910,873	39.2%
2011	12,741,816	10.3%	2,353,671	13,087,807	9.9%	12,741,816	10.3%	2,353,671	13,087,807	9.9%
2012	14,433,203	13.3%	3,033,904	15,381,823	17.5%	14,433,203	13.3%	3,033,904	15,381,823	17.5%
2013	15,530,101	7.6%	3,447,825	16,098,005	4.7%	15,530,101	7.6%	3,447,825	16,098,005	4.7%
2014	16,452,190	5.9%	3,487,038	16,953,945	5.3%	16,452,190	5.9%	3,487,038	16,953,945	5.3%
2015	17,407,991	5.8%	3,549,652	17,446,430	2.9%	17,407,991	5.8%	3,549,652	17,446,430	2.9%
2016	17,477,311	0.4%	3,873,325	17,732,465	1.6%	17,477,311	0.4%	3,873,325	17,732,465	1.6%
2017	17,150,085	(1.9%)	3,734,668	16,989,125	(4.2%)	17,150,085	(1.9%)	3,734,668	16,989,125	(4.2%)
2018	17,224,948	0.4%	3,808,233	16,880,336	(0.6%)	17,224,948	0.4%	3,808,233	16,880,336	(0.6%)
2019	16,961,062	(1.5%)	3,457,820	16,215,777	(3.9%)	16,961,062	(1.5%)	3,457,820	16,215,777	(3.9%)
2020	14,471,848	(14.7%)	2,747,029	12,949,897	(20.1%)	14,471,848	(14.7%)	2,747,029	12,950,563	(20.1%)
2021	14,946,923	3.3%	1,124,136	12,922,502	(0.2%)	14,946,973	3.3%	1,124,210	12,919,071	(0.2%)
2022	13,754,339	(8.0%)	1,670,607	14,218,601	10.0%	13,734,203	(8.1%)	1,672,686	14,334,135	11.0%
2023	15,469,374	12.5%	2,301,356	15,650,000	10.1%	14,279,726	4.0%	2,386,672	14,993,712	4.6%
2024E	16,086,738	4.0%	2,783,958	16,569,340	5.9%	16,064,691	12.5%	2,868,613	16,546,632	10.4%
2025E	16,891,075	5.0%	3,121,780	17,228,897	4.0%	16,867,926	5.0%	3,033,919	17,205,284	4.0%
2026E	17,735,629	5.0%	3,387,814	18,001,663	4.5%	17,711,322	5.0%	3,026,834	18,065,549	5.0%
2027E	17,912,985	1.0%	3,566,944	18,092,115	0.5%	17,888,435	1.0%	3,025,045	18,067,320	0.0%
2028E	18,092,115	1.0%	3,747,865	18,273,036	1.0%	18,067,320	1.0%	3,025,045	18,067,320	0.0%
2029E	17,820,733	(1.5%)	3,721,134	17,794,002	(2.6%)	17,796,310	(1.5%)	3,023,266	17,618,347	(2.5%)
2030E	17,464,319	(2.0%)	3,694,938	17,438,122	(2.0%)	17,440,384	(2.0%)	3,016,290	17,091,576	(3.0%)

Source: WardsAuto InfoBank, BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 5 below illustrates our latest US sales forecasts compared to the longer-term cyclical trend.

Exhibit 5: US light vehicle sales long-term trend – 1950-2030E
Following years of a challenging volume environment, BofAe forecasts a multi-year cyclical recovery back to a 17-18mm unit peak in the late 2020s



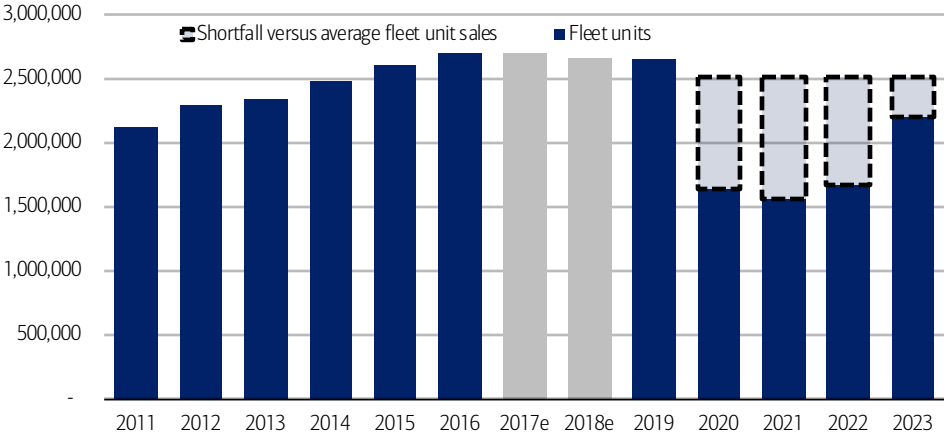
Source: WardsAuto InfoBank, BofA Global Research estimates

BofA GLOBAL RESEARCH

Fleet to drive 2024, retail customers to kick in more significantly in 2025+

As production came back in 2023, sales followed suit. In particular, fleet sales were an important contributor to US sales growth (**Exhibit 6**), which accounted for roughly 1/3 of the incremental 1.7mm unit sales. We expect to register a similar trend in 2024 since fleet sales are still ~400-500k unit shy off 2018-2019 volumes. We expect fleet sales to make up roughly for 50% of the incremental units from 2023-2024. Nevertheless, as fleet sales approach pre-COVID levels, retail will become the main engine of growth from 2025 onward. We highlight that fleet sales, contrary to the past, have been a positive to mix as similar dynamics that retail customers experienced also apply to fleet customers. However, we think that it is likely that going forward mix for fleet sales will degrade and approach the historical norm.

Exhibit 6: US Fleet sales
Fleet sales, meaningfully declined during COVID pandemic, which implies that fleet customers underinvested in their car parc. This created pent-up demand from fleet customers, which will translate into strong demand in the next few years.



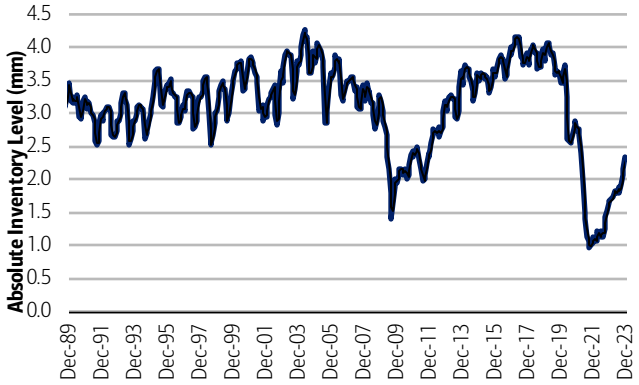
Source: TrueCar, Cox Automotive, BofA Global Research
Note: 2017 and 2018 are estimates

BofA GLOBAL RESEARCH

Expect inventories to continue to increase, and price pressure creeps in

As supply chain pressures eased, inventories bounced back, ending 2023 at 2.3mm units (**Exhibit 7**). Our latest forecast assumes inventories rise to 2.7-2.8mm units by the end of 2024, which is somewhat lower than the typical levels of 3mm+. Beyond 2024, we expect inventories to gradually increase on an absolute basis as sales increase, which indicates that OEMs will be able to remain somewhat disciplined with their inventory management. This implies inventory days supply (DS) in the range of 50-60, but breaching 60+ DS in 2027+.

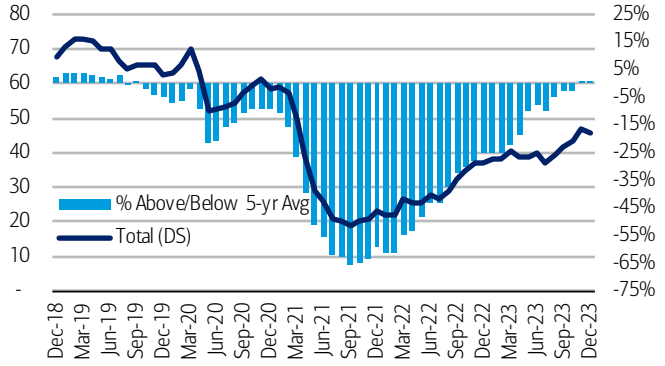
Exhibit 7: US absolute auto inventory level (mm)
Inventory levels bottomed in September 2021 and have increased by about 140% since then, to 2.3mm, gradually approaching more "normal" levels.



Source: WardsAuto InfoBank

BofA GLOBAL RESEARCH

Exhibit 8: US auto inventory – Total (DS)
Total industry days' supply rose above the 5-year historical average and was 46 DS in December.

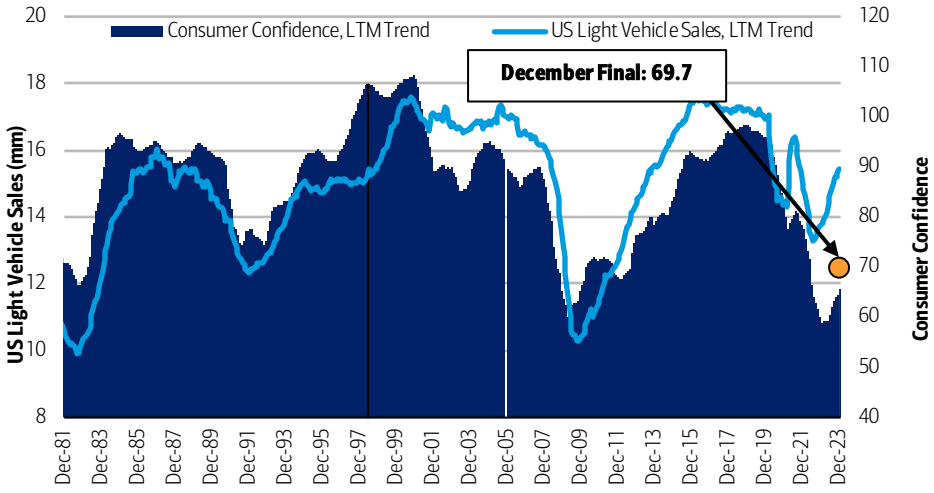


Source: WardsAuto InfoBank

BofA GLOBAL RESEARCH

Reviewing the macro backdrop, the consumer economy remains solid with a strong labor market and relatively robust retail sales. Recall that the unemployment rate remains close to its lows and real disposable income increased in 2023, but consumer confidence remains challenged (**Exhibit 9**).

Exhibit 9: Consumer confidence versus US auto sales
On an LTM basis, consumer confidence has troughed but remains low relative to history. Despite this US auto sales recovered in 2023, growing 12.5% YoY.



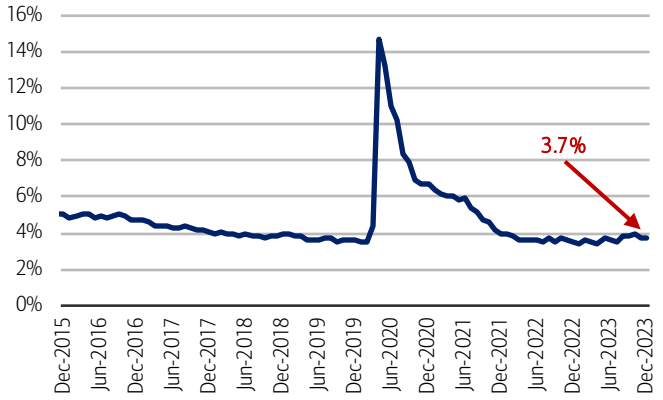
Source: University of Michigan, Wards AutoInfoBank

BofA GLOBAL RESEARCH

Rates remain high but expectations on their near-term direction changed in December 2023. A series of rate cuts in 2024 represents a potential catalyst to US auto sales,

especially for more affordable mainstream vehicles. Although the Federal Reserve has not explicitly committed to cut rates in 2024, and Fed Officials have pushed back on the rate cut narrative, markets expect monetary policy to pivot to easing in 2024.

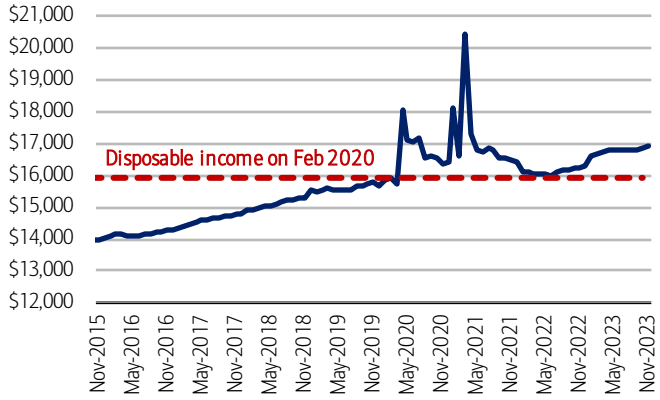
Exhibit 10: US Unemployment Rate
Supply of labor remains constrained as demonstrated by the unemployment rate remaining at or below 4% for the duration of 2023



Source: U.S. Bureau of Economic Analysis

BofA GLOBAL RESEARCH

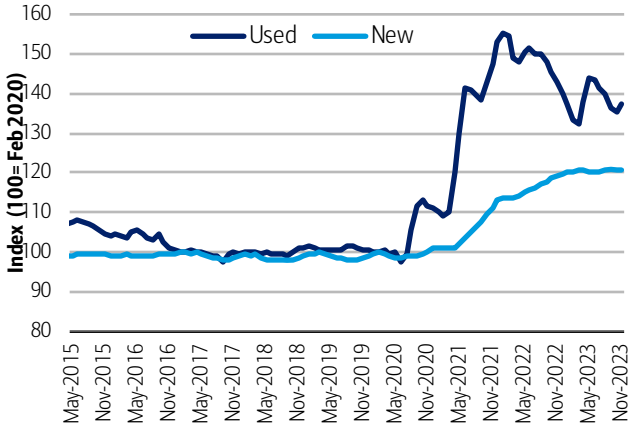
Exhibit 11: Real Disposable Income
Real disposable income (RDI) spiked during the pandemic. As inflation picked up, RDI started to decline, and is closer to pre-pandemic levels.



Source: U.S. Bureau of Economic Analysis

BofA GLOBAL RESEARCH

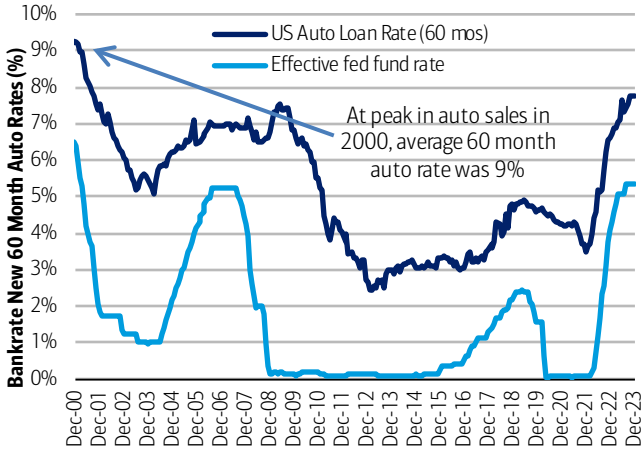
Exhibit 12: Consumer Price index: New and Used Vehicles
New and Used vehicle prices meaningfully increased since the pandemic as a result of the supply-demand imbalances.



Source: U.S. Bureau of Labor Statistics

BofA GLOBAL RESEARCH

Exhibit 13: US auto loan rate (60 months) vs. Effective Fed Fund Rate
Interest rates on auto loans increased significantly as the Federal Reserve raised increase rates. Currently, rates are at the highest level since 2001.

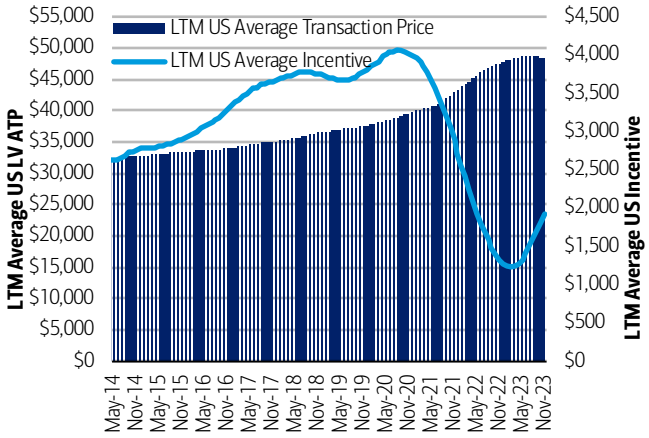


Source: Bloomberg, Board of Governors of the Federal Reserve System

BofA GLOBAL RESEARCH

Following strong price increases for both new and used vehicles caused by supply-demand imbalances, new vehicle pricing was largely flat in 2023 (albeit with rising incentives), while used vehicle pricing declined ~7% YoY. As inventories rise and mix degrades, the average transaction price for new vehicles is likely to optically decline, although we don't expect vehicle prices to be under pressure on a like-for-like basis.

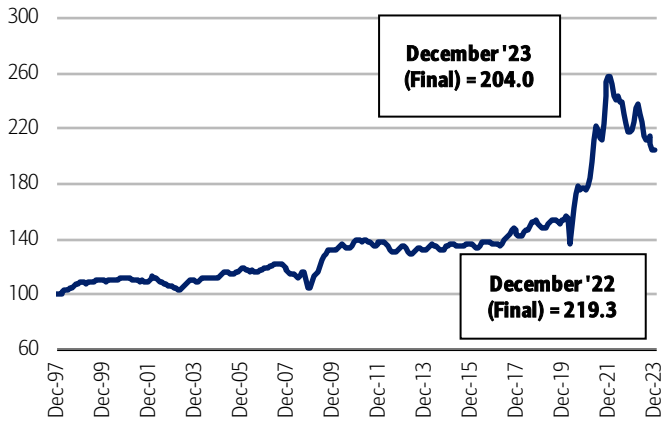
Exhibit 14: Industry average transaction price & average incentive
US average ATPs fall from record highs in November, Incentives climb



Source: Kelley Blue Book (ATPs do not include applied incentives), AutoData

BofA GLOBAL RESEARCH

Exhibit 15: Manheim Used Vehicle Value Index
Manheim Used Vehicle Value Index was down 7.0% YoY in December 2023

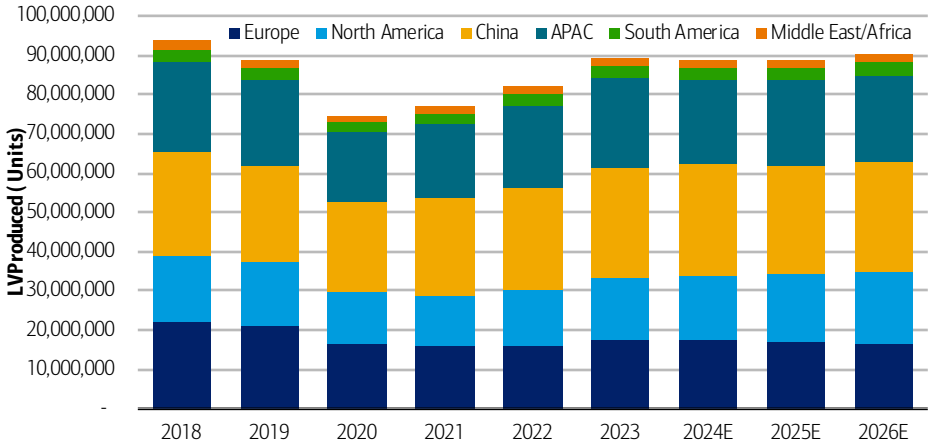


Source: Manheim

BofA GLOBAL RESEARCH

With a relatively positive outlook for US/NA volumes, our global team's forecasts are more conservative and point to flattish production volume growth in 2024 and 2025 (**Exhibit 16** & **Exhibit 17**). This relative stagnation in volumes at ~90mm units would lead to total levels well below pre-pandemic hopes of a ~100mm unit global market.

Exhibit 16: Global Light Vehicle Production
Global production volumes troughed in 2020 and recovered to 2019 levels of nearly 90mm units in 2023. 2024 volumes are expected to remain flattish YoY and volume growth is expected to stagnate through 2026.



Source: BofA Global Research, S&P Global, Wards Auto

BofA GLOBAL RESEARCH

Exhibit 17: Global Light Vehicle Production Growth YoY
2024 global production estimates call for a year of weak volume growth, with Europe, APAC and Middle East/Africa down YoY. On the other end, our global team's estimates call for modest growth in China and South America, while North America is expected to continue a robust production recovery.

Regional YoY volume change	2018	2019	2020	2021	2022	2023	2024E	2025E	2026E
Europe	-1.0%	-3.8%	-21.7%	-4.1%	-0.4%	11.7%	-2.2%	-2.1%	-1.4%
North America	-0.6%	-3.9%	-20.1%	-0.2%	10.0%	10.1%	5.9%	4.0%	4.5%
China	-4.0%	-8.2%	-4.4%	5.3%	6.4%	7.1%	1.0%	-2.5%	2.8%
APAC	1.8%	-3.8%	-19.1%	7.9%	10.5%	8.4%	-5.5%	0.9%	-0.3%
South America	4.3%	-4.7%	-31.4%	16.1%	8.4%	3.4%	2.5%	7.8%	3.7%
Middle East/Africa	-2.0%	-21.4%	-11.5%	15.3%	9.2%	3.4%	-4.3%	5.4%	7.7%
Global	**-1.0%**	**-5.6%**	**-16.1%**	**3.4%**	**6.7%**	**8.6%**	**-0.5%**	**0.1%**	**1.7%**

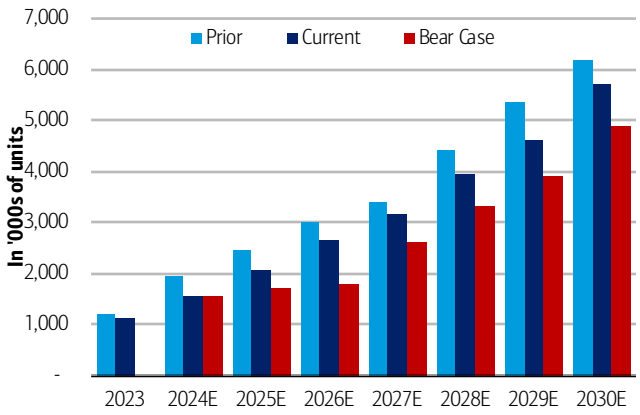
Source: BofA Global Research, S&P Global, Wards Auto

BofA GLOBAL RESEARCH

2. Electrification a slow charge for now

Following a wave of excitement about the electrification of the automotive industry, investors came to realize in late 2023 that the transition may not be as smooth and quick as initially thought. Several obstacles remain, which are not easily solvable, including: affordability, charging infrastructure, range anxiety, maintenance, and residual concerns. Although all of these concerns are legitimate and important for wider EV adoption, we have historically focused on affordability as the key driver of EV adoption. Starting in 2H23, signs of softer demand for electric vehicles materialized despite more EV models coming to market and improved government incentives (IRA). This has resulted in slower production ramps and delayed capital investments. As a result, we have lowered our EV penetration forecast from 12.2% to 9.8% for 2024, as well as the out years culminating in a 2030 rate of ~33% from prior ~36% (**Exhibit 18**).

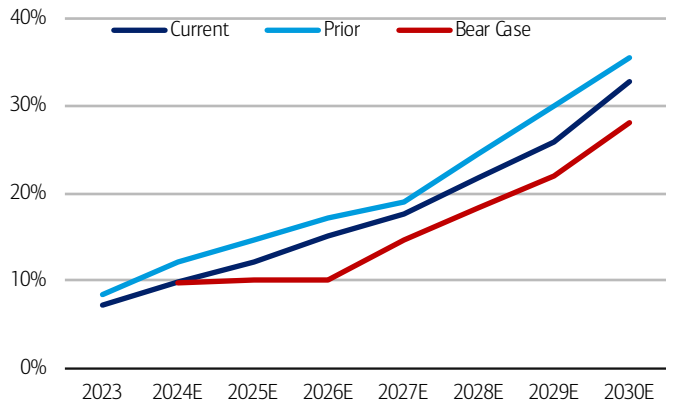
Exhibit 18: EV volumes forecast: Current vs Prior vs Bear Case
Our new EV volume estimates account for weaker demand growth



Source: Wards, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 19: EV Penetration Rate Forecast: Current vs Prior vs Bear Case
Our new EV penetration estimates reflect lower market share gain for EVs



Source: Wards, BofA Global Research

BofA GLOBAL RESEARCH

In addition to our estimate revision, we project the potential implications of clean vehicle incentives (IRA) to disappear due to a combination of more stringent requirements and the extension of these requirements to leased vehicles. We named this scenario "Bear Case" (**Exhibit 19**). In this projection, EV prices will struggle to converge with ICE prices given that incentives are not there to bridge the price gap. Yet, we assume that starting in late 2026 a large number of new EV models targeting the lower end of the market will come online. Therefore, we forecast an acceleration of EV volumes starting in 2027.

EV penetration in North America

We observe that in North America the EV penetration rate fell behind our projections (7.2% versus BofA 8.4%) for 2023, which was already more conservative than the consensus. These results have concerned investors as the general perception of a slower EV adoption translates into a longer time frame to generate adequate profits and returns on the capital invested. We think that the primary reason for lower EV penetration is attributable to the lack of affordable vehicles in the market.

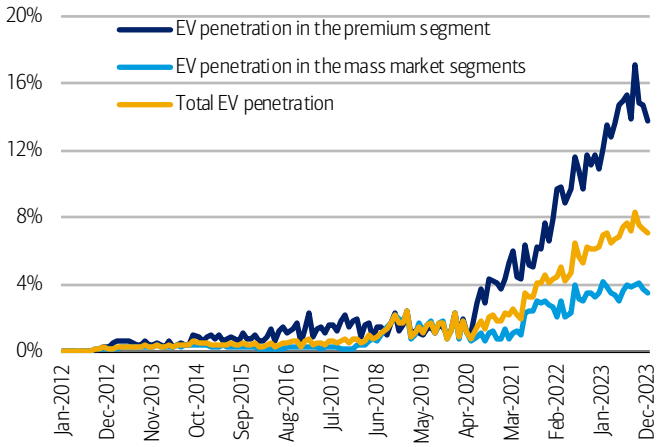
Electric vehicles: a new "luxury" segment for wealthier consumers

From a demand standpoint, we think that consumers are largely agnostic to the powertrain choice. However, we acknowledge that range anxiety, or better said, the fear of not being able to find a fueling source, is real and is an obstacle to sales. If we exclude this factor, the demand for EVs is not particularly challenged by consumers' opposition to alternative powertrains. However, we believe that high prices for electric vehicles are a major impediment to achieving a higher penetration in the market. In fact,

the US market is moving towards a sort of dualism when looking at alternative powertrain sales. The premium market is moving at an accelerated pace to EV while the mass market is moving slower and appears to be adopting a potentially more practical intermediate solution, which is hybrid vehicles.

As we presented in June 2023 (see note: Who Makes the Car of the Future – 2023), we think that the EV penetration rate is highly dependent on the price of the vehicles. In other words, the number of EVs sold grows as their price approximates their comparable ICE peers. In the North American market, electric vehicles have shown strong growth for those segments priced above the industry average transaction price of $48,000. However, the picture is different when looking at the mass market segment. There are few EV models available that target the mass market. Out of 62 EV models currently sold in the US, we counted only 20 that have a starting MSRP below $45k (excluding incentives), many of which are very close to the threshold. The average transaction price for EVs reported by Kelly Blue Book (ATP over the last twelve months is at $56,352) reinforces the argument that the mass market is currently priced out of electric vehicles in North America.

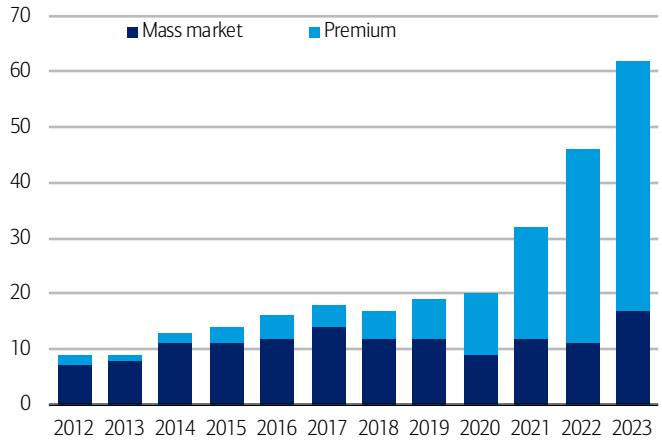
Exhibit 20: EV penetration rate for vehicles in different price points
Customers who bought premium* vehicles have been more receptive to the electrification trend, while the mass market has lagged



Source: Wards, BofA Global Research
*Break point defined at $50k price

BofA GLOBAL RESEARCH

Exhibit 21: EV Models on the market: Premium versus mass market
Since 2020, the number of EV models in the premium segment has increased by 4 times, while the number of mass market models stagnated



Source: Wards, BofA Global Research

BofA GLOBAL RESEARCH

To support this view, we isolated the high-priced vehicles (as defined as luxury vehicles, large SUVs & pickups, and vans, which largely encompass vehicles prices above $50,000) from the rest of the market, and we observe that in this segment EV penetration is meaningfully higher than the overall market (~14% versus ~7%). Conversely, when we look at the market excluding highly priced vehicles, the penetration rate is well below the market penetration rate (~4%) (**Exhibit 20**). We also think that model availability plays a role in the EV penetration rate. The number of EV models that falls into the higher price categories has quadrupled since 2019 while the number of mass market models has remained largely constant over the last decade (**Exhibit 21**). This discrepancy leads to the argument that OEMs will have to invest more resources to develop products for the mass market.

North American market characteristics present challenge to EV affordability

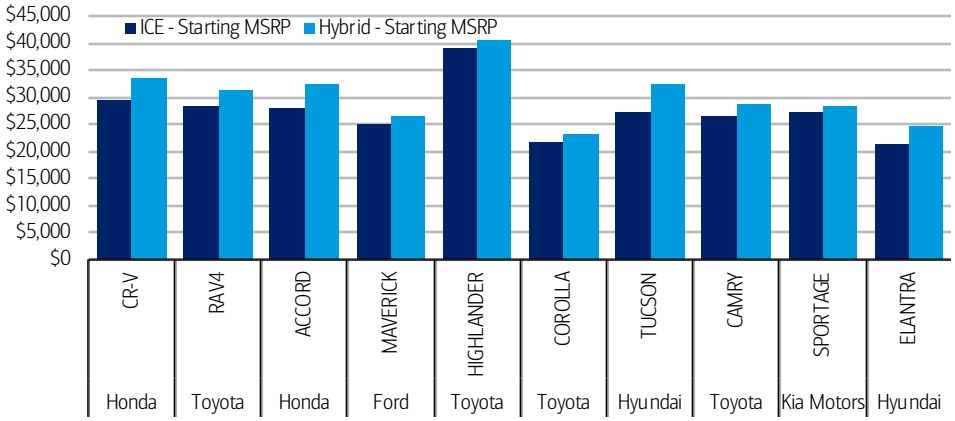
We think that North America struggled more with the introduction of mass market EVs due to the characteristics of the market. First, as geographical distances are larger and public transportation lacks, consumers tend to demand high ranges for their vehicles, even though the average commute per day is just 37 miles. Extended ranges require larger batteries, which are the most significant cost for an EV. Secondly, North American

consumers typically prefer larger vehicles than consumers in other geographies. Larger vehicles weigh more and require more energy to power them, which further magnifies the demand for larger batteries. While highly priced vehicles have enough margin cushion to absorb extra costs, mass market products have no margin room. Obviously, the first characteristic of the North American market compounds the second issue.

Hybrids appear to be the bridge between ICEs an EVs for the mass market

We note that adoption for the alternative powertrain market has shown a divergence between electric and hybrid. The premium market, as we already illustrated, has moved towards electric powertrains. Instead, the mass market is more quickly adopting hybrid powertrains, an intermediate solution. In the mass market (below $50k), hybrids represent ~10% of total sales while EV account for only ~4%. Although we do not yet have an exact estimate of the cost differential between an ICE vehicle and a hybrid version, we observe that in a selected group of vehicles the starting MSRP of the hybrid version compared to equivalent ICE model is relatively close. From an analysis of the top selling vehicles that offer both the ICE and hybrid versions, hybrids are on average 10% more expensive than their ICE equivalent (**Exhibit 22**).

Exhibit 22: Starting MSRP for top 10 selling mass market hybrid vehicles: ICEs versus Hybrids
We compare the starting MSRP for the top 10 selling mass market vehicles that offer both ICE & hybrid versions



Source: Company websites, Wards

BofA GLOBAL RESEARCH

We did a similar analysis for the EV mass market. Although the comparison is not as clean given that different models are being compared, we think that looking at the top 10 selling mass market vehicles is a reliable proxy to gauge the price differential. Our analysis suggests that EVs come at an average ~30% premium to ICEs (**Exhibit 23**). We think this demonstrates why EV penetration struggles in the mass market segment.

Exhibit 23: Top 10 selling mass market vehicles – ICE versus EVs
We note that looking at the top 10 selling mass market vehicles the weighted average starting price of EVs is ~30% higher than ICEs.

Top 10 selling mass market ICEs			Top 10 selling mass market EVs		
Brand	Model	Starting MSRP	Brand	Model	Starting MSRP
Nissan	ROGUE	$27,910	Tesla	MODEL 3	$38,990
Toyota	CAMRY	$26,420	Chevrolet	BOLT EUV	$27,800
Toyota	RAV4	$28,475	VW	ID.4	$38,995
Toyota	TACOMA	$31,500	Chevrolet	BOLT	$26,500
Chevrolet	EQUINOX	$26,600	Nissan	ARIYA	$43,190
Jeep	GRAND CHEROKEE	$36,495	Kia	NIRO	$39,600
Honda	CIVIC	$23,950	Hyundai	IONIQ 6	$42,450
Toyota	COROLLA	$21,900	Hyundai	KONA	$33,550
Ford	EXPLORER	$36,760	Nissan	LEAF	$28,140
Hyundai	TUCSON	$27,250	Hyundai	IONIQ 5	$41,650
Weighted Average starting MSRP		**$28,658**	**Weighted Average starting MSRP**		**$36,969**

Source: Company websites, Wards

BofA GLOBAL RESEARCH

Regulatory environment and lower penetration

Governments around the world have been pushing for electrification of their respective markets, although at different paces. Governments have used a mixture of incentives, sanctions, and regulations to drive EV adoption higher. However, the regulatory architecture is currently facing increasing uncertainties across the various geographies, which will likely result in a deceleration of the rate of EV adoption.

North America

In North America, the main risk to the current regulatory body comes from the US, which will hold general elections in November 2024. Although it is still early, it appears that Democrats and Republicans have opposing views when it comes to the government's role in electrification. To summarize their positions, Democrats push for a faster adoption of electric vehicles through regulation, while Republicans seem more inclined to let EV adoption be driven by market dynamics. The current situation implies a highly uncertain regulatory environment for EVs. The volatility around expectations is further compounded by a step up of the requirements related to the Inflation Reduction Act. Starting in January 2024, vehicles will need to have a minimum of raw material and component manufactured in the US or a free trade agreement country. This incremental provision has cut the number of eligible models in half (**Exhibit 26**).

Exhibit 24: IRA eligible vehicles 2023 vs. 2024
Following the implantation of the new Foreign Entity of Concern rules, many vehicles that qualified for the IRA credits in 2023 no longer qualify in 2024

As of December 2023				As of January 2024			
Model	**Model year**	**Vehicle type**	**Credit amount**	**Model**	**Model year**	**Vehicle type**	**Credit amount**
BMW				**BMW**			
X5 xDrive50e	2024	PHEV	$3,750	~~X5 xDrive50e~~	2024	PHEV	$0
Ford				**Ford**			
E-Transit	2022-2023	EV	$3,750	~~E-Transit~~	2022-2023	EV	$0
Escape PHEV	2022-2023	PHEV	$3,750	Escape PHEV	2022-2024	PHEV	$3,750
F-150 Lightning	2022-2023	EV	$7,500	F-150 Lightning	2022-2024	EV	$7,500
Mustang Mach-E	2022-2023	EV	$3,750	~~Mustang Mach-E~~	2022-2023	EV	$0
Lincoln Aviator Grand Touring	2022-2023	PHEV	$7,500	~~Lincoln Aviator Grand Touring~~	2022-2023	PHEV	$0
Lincoln Corsair Grand Touring	2022-2023	PHEV	$3,750	Lincoln Corsair Grand Touring	2022-2024	PHEV	$3,750
GM				**GM**			
Cadillac Lyriq	2023-2024	EV	$7,500	~~Cadillac Lyriq~~	2023-2024	EV	$0
Chevy Blazer	2024	EV	$7,500	~~Chevy Blazer~~	2024	EV	$0
Chevy Bolt	2022-2023	EV	$7,500	Chevy Bolt	2022-2023	EV	$7,500
Chevy Bolt EUV	2022-2023	EV	$7,500	Chevy Bolt EUV	2022-2023	EV	$7,500
Chevy Equinox	2024	EV	$7,500	~~Chevy Equinox~~	2024	EV	$0
Chevy Silverado	2024	EV	$7,500	~~Chevy Silverado~~	2024	EV	$0
Nissan				**Nissan**			
Leaf S	2024	EV	$3,750	~~Leaf S~~	2024	EV	$0
Leaf SV Plus	2024	EV	$3,750	~~Leaf SV Plus~~	2024	EV	$0
Rivian				**Rivian**			
R1S	2022-2023	EV	$3,750	R1S	2023-2024	EV	$3,750
R1T	2022-2023	EV	$3,750	R1T	2023-2024	EV	$3,750
Stellantis				**Stellantis**			
Chrysler Pacifica PHEV	2022-2024	PHEV	$7,500	Chrysler Pacifica PHEV	2022-2024	PHEV	$7,500
Jeep Grand Cherokee PHEV 4xe	2022-2024	PHEV	$3,750	Jeep Grand Cherokee PHEV 4xe	2022-2024	PHEV	$3,750
Jeep Wrangler PHEV 4xe	2022-2024	PHEV	$3,750	Jeep Wrangler PHEV 4xe	2022-2024	PHEV	$3,750
Tesla				**Tesla**			
Cybertruck	2024	EV	$7,500	~~Cybertruck~~	2024	EV	$0
Model 3 (Performance, Standard & Long Range)	2022-2023	EV	$7,500	Model 3 (Performance)	2023-2024	EV	$7,500
Model Y	2022-2023	EV	$7,500	Model Y	2023-2024	EV	$7,500
Model X (Long Range)	2023	EV	$7,500	Model X (Long Range)	2023-2024	EV	$7,500
Volkswagen				**Volkswagen**			
Audi Q5 PHEV 55 TFSI e quattro	2023-2024	PHEV	$3,750	~~Audi Q5 PHEV 55 TFSI e quattro~~	2023-2024	PHEV	$0
VW ID.4	2023	EV	$7,500	~~VW ID.4~~	2023	EV	$0

Source: US Department of Energy

BofA GLOBAL RESEARCH

Europe

Europe is in a somewhat similar position as the US. 2024 is an election year and politically there are several divergent stances on electrification across the members of the European union. At a high level, it is fair to say that incentives in Europe are declining across the board, except for France. This is likely to put pressure on EV adoption as the convergence of price between ICEs and EVs, is pushed further into the future. BofA estimates and IHS forecast expect EV adoption growth to decelerate as they reflect the different incentive environment.

China

China instituted a policy particularly favorable to the electrification of the industry since the early 2010s. One of the major components of this policy was to give generous tax breaks to consumers to incentivize the purchase of alternative powertrain vehicles. Lately, the policy around EV incentives has been more volatile since part of the subsidies that were supposed to be phased out by 2022 were later postponed to the end of 2023. In the summer of 2023, subsidies phaseout was pushed out further to 2027. This is expected to help sustain EV sales growth throughout this period.

Softer demand

Since mid-2023 growth in electric vehicle sales in the US has slowed, casting doubt on how quickly the powertrain transition will take place. Over the last few months, OEMs have discussed delaying capital investments for EVs as they look to match capacity with demand while dealers have lamented how certain EV models are piling up on their lots.

Exhibit 25: OEMs' commentary on EV demand
During 3Q:23 earnings OEMs discussed slowing EV demand growth and delaying capital investments

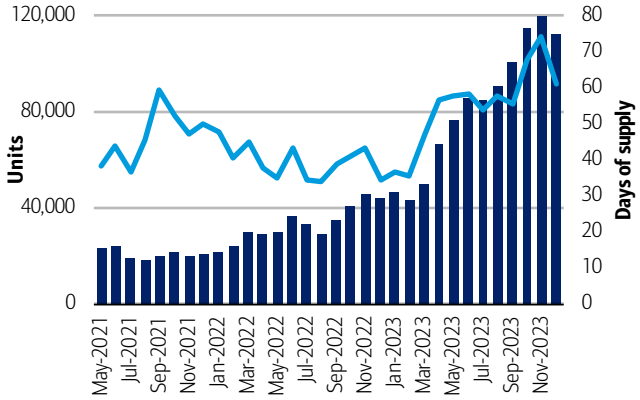
Company	Commentary
General Motors	"We are differing or slowing other investments to optimize capital spending as the EV market continues to evolve. This includes our decision to push back the reopening of the Orion Assembly plant, which will significantly expand our EV truck capacity to late 2025." - CEO Mary Barra
Ford	"EVs are up 50% this year, volume growth, right? So they're going to be here. It's just how quickly EVs grow as a percentage of the total industry. And so that's why you saw us adjust, not changing our strategy, but changing our tactics and pulling back on some of the capital investment around the capacity that we're putting in place, so that we can better match capacity with demand." – CFO John Lawler
Stellanis	"Because the key question is, is the destination changing or not? And at this stage, we did not plan on a destination change on the electrification path. We are just accommodating on what kind of bump could we have on the road and how do we make sure that we don't put cash in capacity that we don't use." – CEO Carlos Tavares
Tesla	"We have to make our cars more affordable. The people can buy it and I keep harping on this interest thing, but I mean, it's just raises the cost of the car. I mean, we're looking at an internal analysis, which. I know we feel like we think is more or less on track that when you look at the cost or the price reductions we've made in, say, the Model Y, and you compare that to how much people's monthly payment has risen due to interest rates, the price of the Model Y is almost unchanged." – CEO Elon Musk

Source: Companies earnings calls

BofA GLOBAL RESEARCH

Another datapoint that suggests softer demand of EVs is inventory. Since troughing in mid-2021, inventory on dealer lots have climbed. Part of this is driven by the fact that inventories were at historical lows and as soon as production came back, OEMs partially replenished dealer lots. We note that supply of EVs significantly outpaced ICE's and hybrids (**Exhibit 26** & **Exhibit 27**). We believe this is incremental evidence of the relative weakening demand for EVs, which was confirmed by dealers during 3Q23 earnings and our dealers conference in December (See: '23 Auto Dealer Day takeaways).

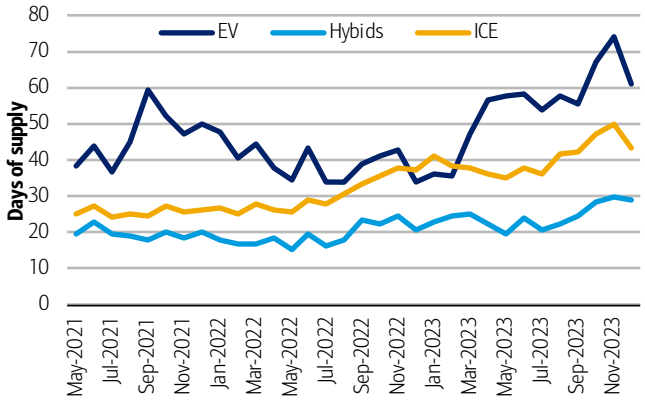
Exhibit 26: EV inventory and inventory days of supply
EV demand appears to have slowed down, which is reflected in the fast increase of units on dealers' lots and high days of supply



Source: Wards, BofA Global Research
Note: Data excludes Tesla, Rivian and Lucid

BofA GLOBAL RESEARCH

Exhibit 27: Inventory days of supply – ICE vs EV vs Hybrids
Demand softness for EVs is clearer when we compare days of supply across powertrains. EVs have higher days of supply than ICEs and Hybrids.



Source: Wards, BofA Global Research
Note: Data excludes Tesla, Rivian and Lucid

BofA GLOBAL RESEARCH

Adjusting EV penetration estimates for North America

In light of this sluggishness, we are lowering our EV penetration forecast for 2024 and beyond. We revise our EV penetration rate estimate for 2024 downward due to restrictions on IRA incentives, lack of mass market models, and softer EV demand. This is partially mitigated by lower input costs for battery manufacturing. Although we expect EV penetration rate to trend lower compared to our prior estimates, we project that EV sales on an absolute level will continue to grow in 2024. The drivers of our revision are:

1) **Higher restrictions to the IRA:** In 2024, the IRA qualifying criteria have become more restrictive. Specifically, the percentage of the value of the battery critical minerals employed in manufacturing a battery that has to be extracted or processed in the US, or a free trade agreement country, moved higher (from 40% to 50%). In addition, percentage of the value of battery components that must be produced or assembled in North America for the vehicle to be eligible to receive the tax credit, stepped up as well (from 50% to 60%). Further, the requirement to exclude all content from a Foreign Entity of Concern (FEOC) took effect on January 1, 2024. The net result is that vehicles have become more expensive for consumers across the board. This naturally drags EV penetration lower.

2) **Fewer Mass market models**: Based on our annual Car Wars Analysis, 2024 is not going to be a year rich with EV model launches for the mass market, which are mostly expected to come online in 2025+. The only new mass market vehicle that we expect to come to market in 2024 is the Chevrolet Equinox. However, the entry level model (~$35k) is not projected to be available until mid-year. This implies that it will be more of a 2025 story as production ramps will require some time. In addition, the production of one of the best-selling EVs, the Chevrolet Bolt, was discontinued in December 2023 (a Bolt EUV is expected to return in 2025). We think that this factor will not be supportive of an increase in EV penetration.

3) **Commodities:** Following a spike in commodity costs related to EV batteries in 2022-early 2023, we observed a drop of these prices. This is positive for the industry as the cost of batteries decreases. However, we note that the volatility in commodity prices does not automatically translate to OEMs' P&L. Typically, the agreements that regulate raw material supply are long-term so the benefit from commodities deflation may take longer to trickle down to vehicle prices.

Therefore, we don't expect a meaningfully positive contribution to EV penetration in the near-term.

4) **Growth of mass market vehicle sales:** We expect the auto industry to continue to recover in 2024, with sales reaching 16.1mm. However, we assume that most of the incremental volume is likely to come from mass market vehicles (Japanese and Korean OEMs). Given what we discussed earlier, the mass market vehicle growth is likely to be mainly composed of ICE and hybrid vehicle sales. As a result, we forecast EV penetration to be under pressure although on an absolute volume basis we still expect EV sales to grow.

5) **Softer demand for EVs:** Since mid-2023, news of weakening demand for EVs started to surface. The trend has become more evident during 3Q23 earnings season when companies explicitly commented on the EV market and data began to show early signs of fatigue. We think that pent-up demand in the premium market, which has so far driven most of the growth of EVs, might be largely satiated and therefore a further expansion of sales, both for ICEs and EVs, is low. Consumers may still opt for EVs rather than ICEs but the concerns around charging points and range anxiety work against fast demand growth.

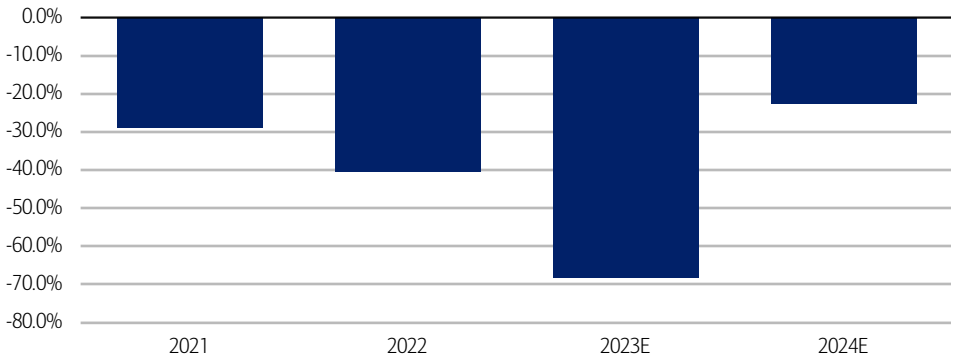
Ramifications for the industry

Automakers

We expect 2024 to be a challenging year on the electrification front for automakers. As profitability for electric vehicles comes from leveraging fixed cost, such as depreciation and amortization, production ramp is key to getting margins in the black. However, high volume/mass market EV models will come to market only after 2024 as we forecast in Car Wars. As a result, we expect the industry as a whole to remain deeply unprofitable with EV production. There are, however, considerable differences across automakers.

Incumbents have invested a lot of resources to build an infrastructure that can be functional in stepping up EV production and potentially replace a considerable portion of the ICE business. Therefore, legacy OEMs need high volumes to fill production capacity and generate profits. However, model launches with high volume potential are few. As a result, we expect 2024 to remain deeply unprofitable for legacy OEMs on the EV front. Specifically at Ford, we expect margins to partially improve in 2024 but remaining meaningfully negative (**Exhibit 28**). GM has not disclosed its EV business margins, but unsurprisingly commented that they are negative. We would assume that GM profitability is somewhat close to Ford's.

Exhibit 28: Ford Model e – Operating margin
We expect Ford to continue to deliver strongly negative margin for its electric segment Model e



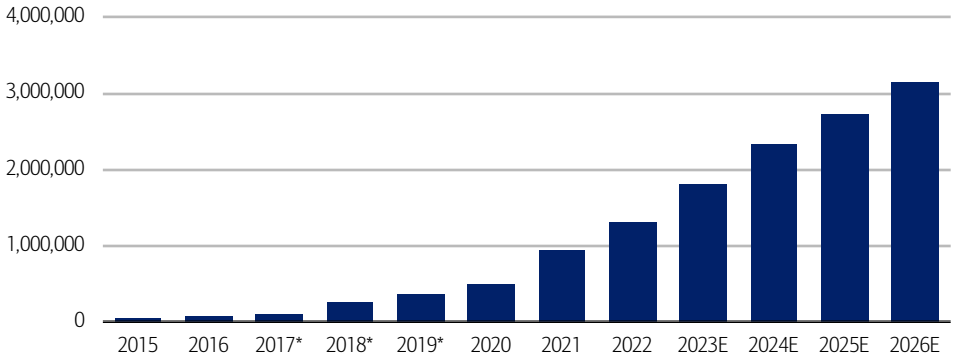
Source: Company filings, BofA Global Research

BofA GLOBAL RESEARCH

New entrants, on the other end, have a much smaller footprint and fewer models in production. This makes the ramp story relatively easier and clearer to monitor, if the right product is on sale. At Rivian and Lucid, we expect a general improvement in

profitability particularly at Rivian, which is projected to reach positive gross margin in 2024, while Lucid may struggle for longer as the Gravity will come into production later in 2024. Meanwhile, Tesla will be focused on continuing to ramp production at the Austin and Berlin facilities to maintain its growth trajectory (**Exhibit 29**).

Exhibit 29: Tesla units delivered
We expect Tesla to continue to increase their volumes globally.



Source: Company filings, BofA Global Research

BofA GLOBAL RESEARCH

Overall, entering 2024 with softer demand prospects, we think that capital investments could be delayed further, as OEMs look to conserve cash, and pace electrification initiatives to demand strength. This could also translate into a more disciplined volume ramp in order to have a tighter control of inventory and therefore pricing. In 2023 pricing was under pressure as Tesla aggressively cut MSRP of its product portfolio at the beginning of the year. However, we think that in 2024 there are fewer opportunities for price reductions. In fact, Tesla, the market leader, has almost already reached traditional auto business margins for the automotive segment after its many price cuts. On top of that, capital commitments are likely on the rise (Mexican plant, old model revamp, Model 2 development, and Cybertruck production ramp), which means that a further deterioration in cash flow generation through pricing actions should be off the table. Deflation of some key raw materials may provide leeway for minor price adjustments, but we don't foresee major pricing revisions from raws. What is more realistic is the introduction of decontened vehicles, similar to what Tesla and Lucid did in 2H23.

Suppliers

We do not expect major consequences for traditional suppliers due to a slower EV ramp in 2024. Excluding suppliers that are largely agnostic to powertrains (Adient:ADNT, American Axle:AXL, Gentex:GNTX, Lear Corp:LEA), we think that most suppliers are able to hedge their strategies on electrification. In fact, lower volumes on EV components should be offset by stronger volumes from legacy components. The risk to estimates come from the fact that the value of component per vehicle on ICE is lower and therefore growth for these businesses could be weaker. We also add that compared to OEMs, suppliers' capital commitments are marginal and investments are typically linked to some form of volume commitment from OEMs, volume that if not realized, should translate into compensation. Of the most exposed names under coverage to electrification (BorgWamer:BWA, Aptiv:APTV, Magna:MGA), we think BWA is the supplier most at risk from a slowdown in the electrification pace as post PHINIA spin-off has fewer offsets to weaker EV volumes. APTV, instead, remains well positioned since most of the components supplied to EVs are also supplied to an eventual ICE vehicle, although at a lower value per component. MGA is kind of in between APTV and BWA.

3. Elections = uncertainty

2024 Elections have the potential to be extremely consequential for the Auto industry as the political parties have materially different views on the electrification of the industry. At a high level, we believe it is fair to summarize the opposing views by saying that the Democrat party is pushing for electrification while the Republican party has a more conservative approach towards it. We think that the outcome of this round of elections is particularly important because it could have a significant impact over the regulatory body, either already enacted or merely proposed, that governs the transition to EVs. Given the uncertain nature of elections we draft two scenarios where we present the potential developments: one in which the Democrat party takes control and the other in which the Republican party wins control. A third scenario could be a half victory from one of the two parties, which would result in a political impasse. However, we won't dedicate a section to such a scenario because we think that any change from the current state of play would be unpredictable. Before reviewing the two scenarios, we first go over the key regulations that affect the industry:

Inflation Reduction Act (IRA):

- In August 2022, the US Congress passed the Inflation Reduction Act. The legislation includes several provisions that address a wide range of issues. For the auto industry, the key section of the bill is the clean vehicles regulation. Specifically, the IRA incentivizes the adoption of clean vehicles, primarily electric vehicles, through the use of subsidies.
- The legislation aims to reduce the purchase price of clean vehicles at the consumer level by giving tax credits to the buyers, both of new and used vehicles. In addition, the law grants subsidies for the production of certain electrical equipment, such as inverters, and batteries.
- These incentives have been designed to favor the growth of production related to the alternative powertrain industry in the US, such as battery manufacturing. In fact, the IRA includes a series of restrictions in order to access tax credits and subsidies, including the origin of the raw materials and components used for the manufacturing processes and the location of the production itself.

Corporate Average Fuel Economy (CAFE):

- CAFE standard, enacted for the first time in 1975, is a regulation designed to push OEMs to improve the average fuel economy of vehicles produced for sale in the United States.
- To press automakers to comply to the legislation, the regulation draft includes substantial fines. These fines are calculated for each OEM as the number of new non-compliant vehicles produced multiplied by the value resulting from the difference between the observed CAFE and the CAFE established by the regulation.
- According to the latest estimate released by the National Highway Traffic Safety Administration (NHTSA), CAFE requirements may meaningfully increase costs for OEMs, both for compliant and non-compliant, by billions of dollars.
- The future of this regulation remains uncertain as it is currently under discussion and could be subjected to amendments. In addition, we highlight that the effective costs attached to this regulation are unclear as the costs estimated by NHTSA are constrained by assumptions that may not reflect the current state of play.

EPA regulation:

- On April 12, 2023, the EPA announced a new proposal that aims to cut polluting emissions from light duty vehicles. The proposal focuses on the reduction of GHG emissions (greenhouse gasses), NMOG (non-methane organic gasses), and NOX (nitrogen oxide) for MY2027-2032.
- The EPA envisions GHG emissions to decline 56% by MY 2032 from MY 2026, and NMOG and NOX to decline 60% by 2032 from MY 2025. The more aggressive standards proposed by EPA account for an increased adoption of new technologies, such as Zero Emission Vehicles (ZEV), that theoretically could allow for a steep reduction of pollutants.
- Although the EPA does not mandate the adoption of electric vehicles, the agency expects sales of EVs to account for 67% of the total US sales by MY 2032, which based on our forecasts is unrealistic.
- An additional feature of the proposed regulation includes the convergence of emission standards between cars and trucks to remove the incentive for the OEMs to switch their fleet to the category with less restrictive standards.

Advanced Clean Cars II:

- Soon after the Clean Air Act became law in 1963, the state of California has been granted the faculty to set stricter environmental standards than federal standards. This option can be exercised by California, through the California Air Resources Board (CARB) by submitting a waiver request to the EPA.
- According to the law, other states cannot set stricter standards, but they can follow California policy, once the state is granted a waiver. Currently, California has set up a much stricter regulation, the Advanced Clean Cars II, which is expected to go in force by MY2026. The regulation mandates that vehicle sales will have to be 100% zero emission by 2035, with a gradual ramp starting from 2026.
- Although the regulation may be subjected to amendments, 12 states, which account for ~30% of light vehicle sales, have already decided to adopt the regulation and additional states are considering adoption. The main implication of this law is that for OEMs it would be very costly to run multiple production chains for North America. Hence, theoretically the industry would move much faster towards EVs.

Tariffs:

- The auto industry is deemed as a key industry in countries that maintain vehicle production. As a result, governments in every geography tend to protect their industry and market with ad hoc regulation or tariffs.
- The US has a large body of regulations involving cars that can be traced back decades, such as the chicken tax. The latest development on tariffs came in mid-December. It seems that the Biden administration is considering adding new levies on Chinese products, specifically EVs and batteries.
- Although the details are unknown, a move in this direction may have significant repercussions on how the North American market develops over time. Such a decision would likely incentivize Chinese OEMs to manufacture vehicles in North America to avoid tariffs. This could drive EV costs up short-term but down mid-to-long term.

Scenarios

Democrats win and take control

As mentioned earlier, the democrat party is generally pushing for the auto industry to transition to electric. We would expect that if both congress and presidency were controlled by democrats, electrification efforts could step up, although government intervention would likely be geared towards the stick rather than the carrot (see EPA proposal note) this time. We lay out our expectations below in **Exhibit 30**:

Exhibit 30: Possible effect on EV new entrants and incumbents of a Democrat victory
A Democrat administration is likely to take a stronger stance towards electrification given the proposed legislation. This would be beneficial to EV new entrants

Democrats	BofA's Expectations	EV New Entrants	Incumbents
IRA	Although the IRA has been one of the key acts of the Biden administration, demand for an adjustment to the bill rose across the political spectrum, including in the democrat party. We think there is room for a more restrictive application of the law, especially around the rule allowing commercial vehicles (and thereby leases) to avoid the stringent requirements required to qualify for the credit.	Uncertain	Uncertain
CAFE	Democrats may seek a further tightening of CAFE and EPA standards, which would be particularly punitive for lower fuel efficiency and polluting vehicle manufacturers.	Positive	Negative
EPA		Positive	Negative
Advanced Clean Cars II	We wouldn't expect any change from current trajectory but possibly a wider adoption beyond CA, at least in those states led by a Democrat majority.	Positive	Negative
Tariffs	We believe that both political parties agree on stronger import duties.	Positive	Positive

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

How would this translate to OEMs?

New Entrants: We would not see major disruptions for new entrants. The main negative outcome for this group is a more restrictive application of the IRA and potentially higher input costs due to import duties from China.

Incumbents: We expect incumbents to be challenged under a democrat administration. If CAFE and EPA standards were to increase and Advance Clean Cars II were to become operative, legacy OEMs could be subjected to large fines over the next few years. Like new entrants, incumbents likely bear the risk of a more restrictive application of the IRA and potentially higher input costs due to import duties from China.

EV penetration: In this scenario, we expect EV adoption to continue on its trajectory as we previously outlined, with potential upside if the new CAFE and EPA standards were to be implemented. In addition, if the Advanced Clean Cars II doesn't meet any challenge from the administration, a further acceleration of EV adoption would be likely as incumbents will be incentivized to phase out ICE models to avoid extra penalties.

Republicans win and take control

Republicans have showed more skepticism towards the transition to EVs. Although the republican party has not disclosed a specific plan for the electrification of the industry, messaging suggests to us that the legislative and regulatory efforts to stimulate EV adoption could be tempered or even repealed. We lay out our expectations below in **Exhibit 31**:

Exhibit 31: Possible effect on EV new entrants and incumbents of a Republican victory
A Republican administration is likely to take a more prudent approach towards electrification and, given the latest commentary, most of the key proposed legislation may get dismissed, which would be beneficial to incumbents at least in the short term

Republicans	BofA's Expectations	EV New Entrants	Incumbents
IRA	It appears likely that Republicans will try to curtail the government funding of consumer incentives, but the procedure to do so is a unclear. A less extreme approach could call for a more restrictive set of requirements related to accessibility of incentives.	Negative	Negative
CAFE	We would expect a republican administration is likely to block the proposed new CAFE and EPA parameters that Democrats have been pushing for.	No Change	Positive
EPA		No Change	Positive
Advanced Clean Cars II	On the Californian Advanced Clean Cars II, we expect political turmoil. In 2019, the Trump administration revoked California's waiver on emissions, which set up a precedent that it may repeat during a Republican administration. In this case, regulation of emissions at the federal level would be governed by current EPA standards.	Negative	Positive
Tariffs	We believe that both political parties agree on stronger import duties.	Positive	Positive

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

How would this translate to OEMs and EV penetration?

New Entrants: New entrants may be more challenged under a Republican administration given that the amount of available incentives would likely be reduced. In our view. This would translate in higher effective EV prices for consumers and potentially heavier losses for OEMs. On a relative basis, the costs of EVs would be even higher given that prices for ICE vehicles wouldn't include the cost of penalties and/or the additional investment to comply to strict regulations.

Incumbents: A Republican victory would be favorable for incumbent OEMs in the short term. If a republican presidency revokes California's waiver and stops new CAFE and EPA standards, incumbent OEMs would save potentially billions of dollars in fines and development costs for low emission technology. Specifically, companies more levered towards large trucks, such as Ford and GM, would benefit from this scenario. Admittedly, in the long-term such an outcome might turn out to be negative as incumbents would delay investments in new technologies. A potential modification of the IRA, which would lower the incentive to go electric for the OEMs, would have a compounding effect.

EV penetration: In this scenario, we expect EV adoption growth to dwindle. Since incumbents would have fewer negative incentives to adopt alternative technologies and consumers would have no support to purchase alternative powertrain vehicles, the market for EVs would slow down in the short-term, in our view.

4. Inflation/Pricing tailwinds & headwinds

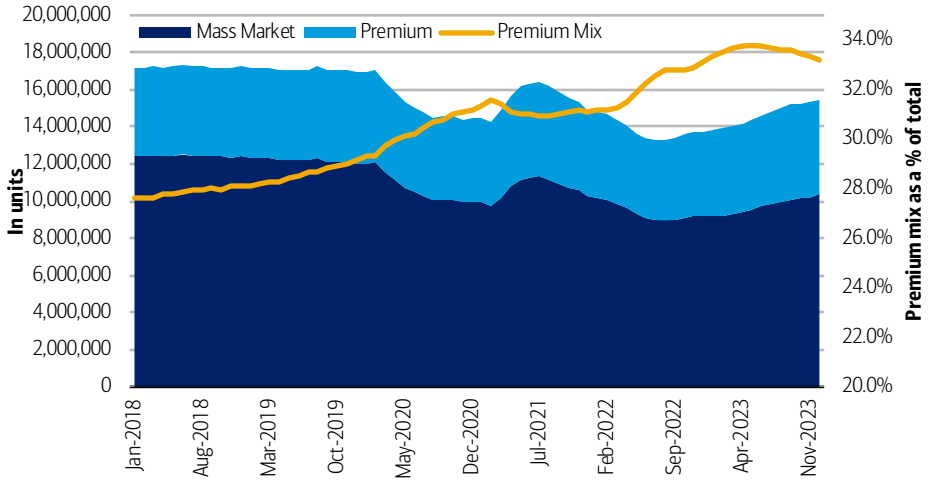
The auto industry has been heavily impacted by inflationary pressures over the last three years. Supply chain disruptions and strong demand drove prices to record levels in both the new and used market. However, price growth stalled in 2023 given the factor that drove prices dissipated. We expect 2024 prices to remain largely flat for new vehicles but optically declining due to mix. Used prices could fade as new vehicle supply has recovered but due to structural shortage of some model year cohorts, we expect declines much less pronounced than 2023.

New Vehicle Prices

Vehicle pricing is one of the hot topics for the industry due to years of strong price growth. Pricing increases during COVID were driven by a combination of limited supply as well as government subsidies and high personal saving rates that fueled demand. As OEMs struggled with supply chains, the production of richer mix vehicles was prioritized (**Exhibit 32**). This further exacerbated the price increases in the market. As supply came back online in 2023 and consumers' disposable income stagnated, the growth of vehicle prices stalled. Yet, we note that, although prices haven't changed nominally, much higher interest rates made vehicles meaningfully more expensive for consumers.

We expect 2024 to play out similarly to 2023 with some differences. We don't see significant MSRP changes but rather incentives to continue to creep up to support demand. We think mix will have a more relevant tole on average transaction prices. Mix has been very strong since 2020 and we believe that pent-up demand for higher content vehicles is easing. We think that there is still a long runway of pent-up demand for affordable vehicles, which we expect to drive the largest portion of incremental sales.

Exhibit 32: LTM sales of Mass Market and Premium and Mix
With COVID related disruptions, OEMs prioritized the production of high content, better mix vehicles



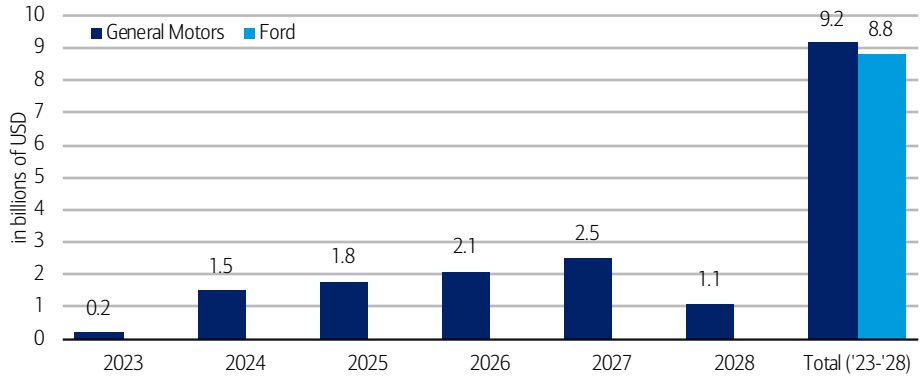
Source: Wards, BofA Global Research

BofA GLOBAL RESEARCH

Labor costs inflate

Post UAW contract ratification labor costs are on the rise for the US auto industry. The UAW contract will increase auto workers' base salary by 25% by 2028, which could be marginally higher or lower depending on inflation because of the reinstatement of COLA in 2023 negotiations. GM and Ford expect $9.2bn and $8.8bn respectively of cumulative incremental costs from the contract (**Exhibit 33**). Recall that while the Detroit automakers were in the process of ratifying the UAW contract, non-unionized OEMs such as Toyota and Nissan increased wages to remain competitive with compensation offered at the D3. We expect the UAW contract effect to spillover across the US value chain over time. In summary, we project wages to be mildly on the rise.

Exhibit 33: Incremental labor costs post UAW contract ratification
Post UAW contract ratification, GM and Ford expect $9.2bn and $8.8bn of incremental costs over the life of the contract, which will expire in 2028.

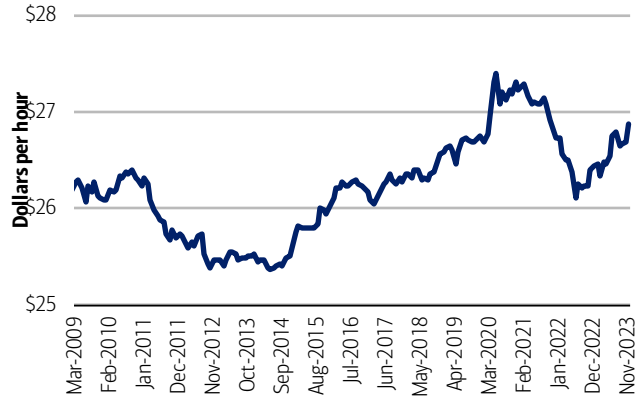


Source: Company filings

BofA GLOBAL RESEARCH

Yet, we don't forecast major incremental increases. Wages in manufacturing jobs have largely caught up with the pre-inflationary values on a real basis (**Exhibit 34**). In addition, job openings in manufacturing durable goods are well off the peak, indicating that demand for labor is weaker and consequently wage pressures are lower than what we have seen over the last two years (**Exhibit 35**). Regardless, we expect some of the incremental labor cost to trickle down to vehicle prices.

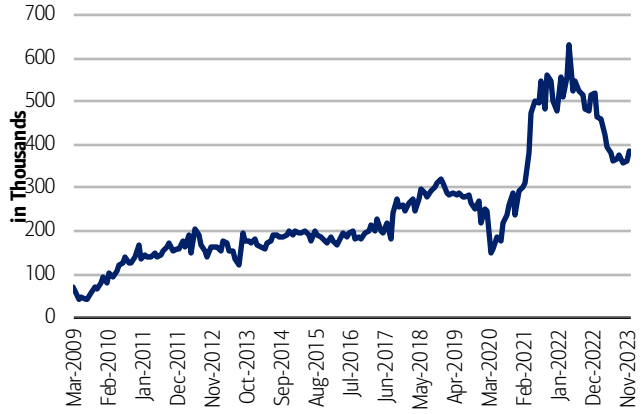
Exhibit 34: Real average hourly earnings of production and non-supervisory employees (manufacturing)
Real wages in manufacturing have largely recovered since inflation spiked



Source: US Bureau of Labor Statistics, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 35: Job openings in durable manufacturing
Job openings in durable manufacturing remain higher than pre-COVID levels. Yet, the job market is gradually cooling off

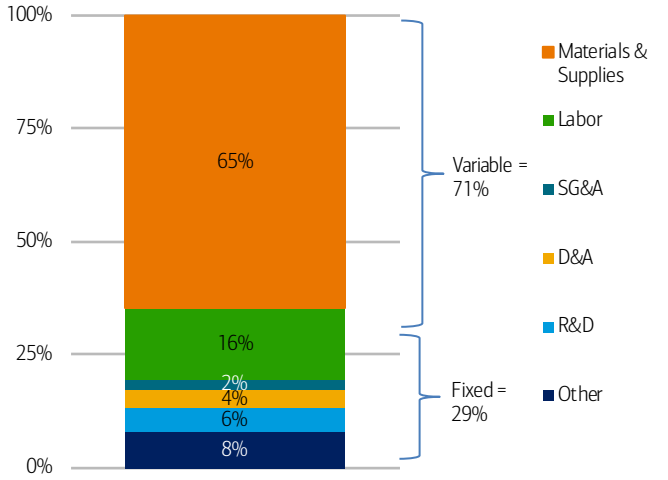


Source: US Bureau of Labor Statistics

BofA GLOBAL RESEARCH

2023 UAW negotiations followed an unusual path given the new union leadership and the renewed strength of the labor movement. The union, led by the newly elected president Shawn Fain, has already announced that the next step for the organization is to expand its membership base. According to the public commentary of President Shawn Fain, the UAW will concentrate its effort on organizing non-unionized automakers' plants in the United States, including Tesla, Toyota, and VW. Particularly on Tesla, we expect the company to fight back unionization efforts given the initial skirmishes between the labor organization and CEO Elon Musk. In addition, late in 2023 Tesla had issues with unions in Sweden, Norway, and Denmark and to date the company is not showing any sign of backing off to its stance. To help gauge the impact of labor cost inflation, we include cost structure breakdowns for OEMs (**Exhibit 36**) and suppliers (**Exhibit 37**).

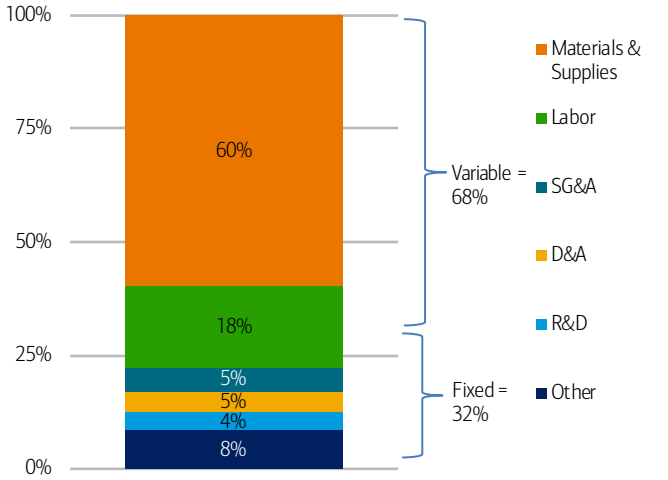
Exhibit 36: Estimated breakdown of average OEM operating costs as % of total operating costs
For OEMs, variable costs represent ~71% of total operating costs



Source: Company filings, BofA Global Research. (1) Average includes F, GM; Cost estimation reflects only Automotive business; Note: BofA cost approximation for COGS and SG&A differs slightly from disclosed company financials due to explicit breakout of labor cost.

BofA GLOBAL RESEARCH

Exhibit 37: Estimated breakdown of average supplier operating costs as % of total operating costs
For suppliers, variable costs represent ~68% of total operating costs



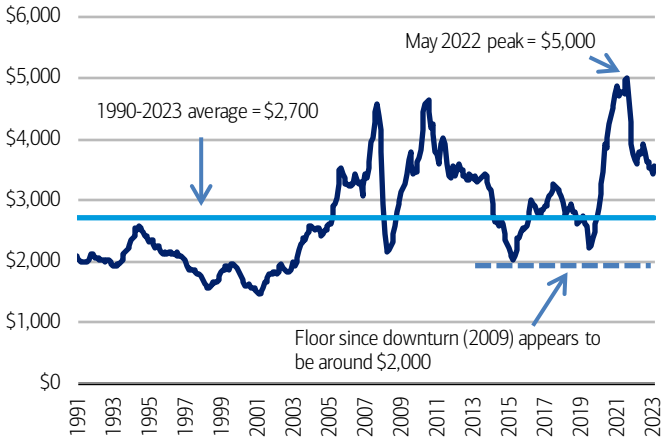
Source: Company filings, BofA Global Research. (1) Average includes ADNT, APTV, AXL, BWA, DAN, GNTX, LEA, MGA; Note: BofA cost approximation for COGS and SG&A differs slightly from disclosed company financials due to explicit breakout of labor cost.

BofA GLOBAL RESEARCH

Raw material prices decline

During COVID, raw material prices meaningfully ran up. This translated into extra material cost for suppliers and OEMs, which passed the costs on to their respective customers. According to our tracker for the $ raw material cost per average US vehicle (**Exhibit 38**), raw materials peaked in mid-2022 and since then have declined (but are still above the average). Despite the ratio of raw material costs to average transaction prices falling below the historical average (**Exhibit 39**), deflationary raw materials did not necessarily translate into large tailwinds for suppliers and OEMs given the long-term structure of supply contracts. Although raw material prices are well off the 2022 peak, we think that there are still some opportunities for input costs to decline in 2024.

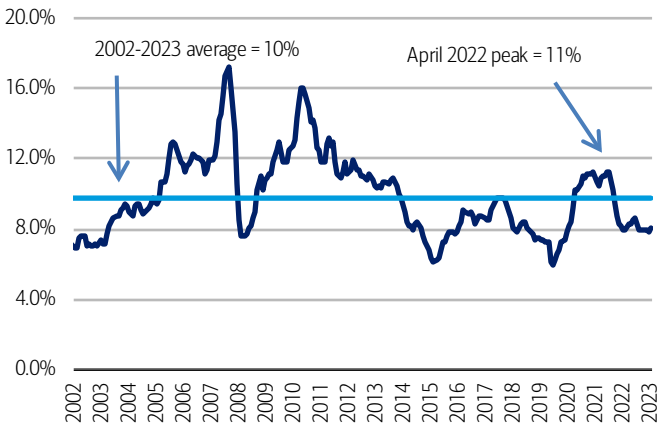
Exhibit 38: Estimated total raw material $ cost per average vehicle
Raw material $ cost per avg vehicle has declined ~28% from May 2022 peak



Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 39: $ raw material cost in average vehicle as a % of ATP
Raw materials cost as a % of ATP of about 8% is below the historical average



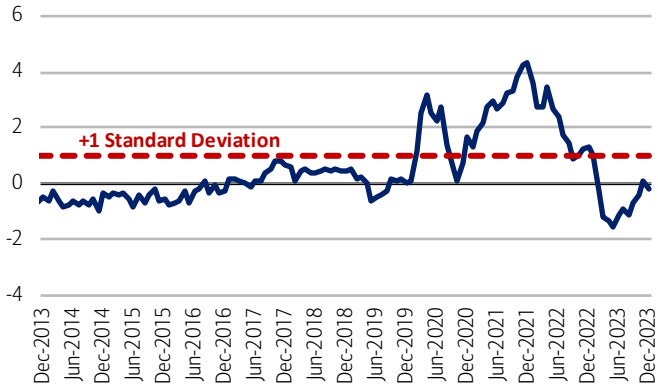
Source: TrueCar, Kelley Blue Book. BofA Global Research estimates

BofA GLOBAL RESEARCH

Supply chain snarls ease for now

After two years of heavy disruptions, supply chains normalized throughout 2023. The normalization of supply chain has brought along a decline of transportation costs due to lower freight rates, which benefitted companies' P&Ls. Although macro issues of the supply chain are largely resolved, we still note that some minor hiccups remain, at least among the smaller suppliers. We don't expect major changes in the state of logistical chains; however, we note that the situation at the Suez Canal, together with troubles at the Panama Canal, may trigger a slowdown of components deliveries and could generate some disruptions, which need to be monitored.

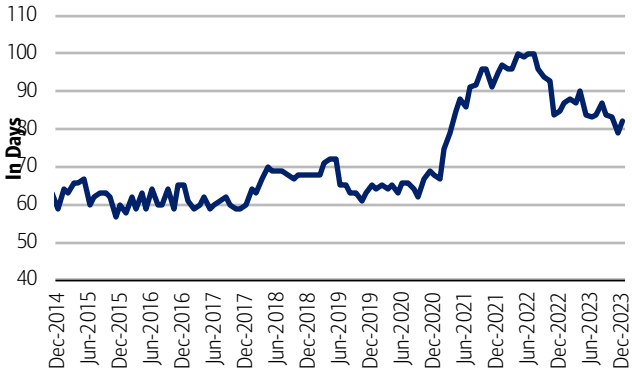
Exhibit 40: Global Supply Chain Pressure Index
Supply chain has normalized since the pandemic (currently at the average after being several standard deviations above)



Source: Federal Reserve Bank of New York

BofA GLOBAL RESEARCH

Exhibit 41: Lead Times: Production Materials
Despite some significant supply chain normalization, lead times for production materials remain elevated relative to more normal levels



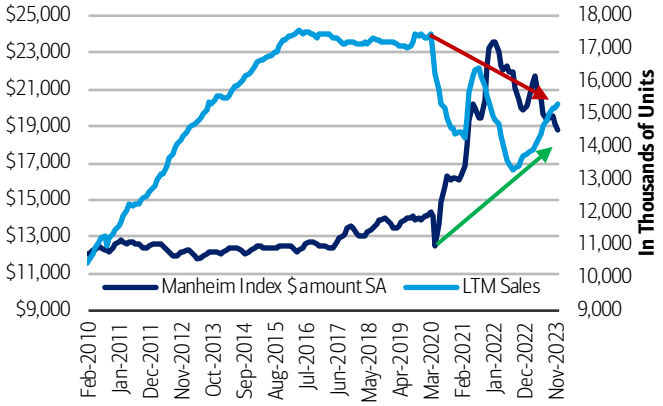
Source: Institute for Supply Management

BofA GLOBAL RESEARCH

Used vehicle prices fade, but don't collapse

On the used car price front, we'd note that since peaking in early 2022, prices have declined ~20%. This decline appears reasonable especially after new vehicle production came back online. We anticipate that used vehicle prices are likely to fade in 2024. However, we don't expect another period of steep pricing declines. The used vehicle market is facing a structural shortage of vehicles. New vehicle cohorts produced during COVID are now flowing into the used market. However, due to the low production volumes in that time fame, the amount of vehicles available for the used market is constrained. In addition, the lease market, which primarily feeds the used wholesale market, dried up during Covid. This exacerbates the structural supply issue of used vehicles. Therefore, we think that prices in the used market will fade, but the structural shortage of vehicles should work at least as a partial offset.

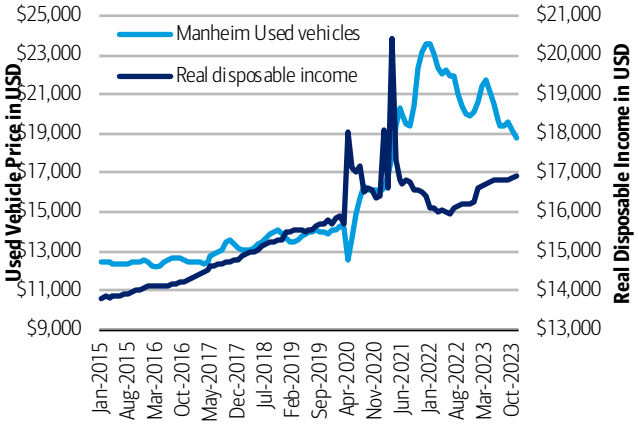
Exhibit 42: Used vehicle prices and new vehicles sales
Used vehicle prices started to climb as supply of new vehicles became impaired due to disruptions in the value chain



Source: Manheim, Wards

BofA GLOBAL RESEARCH

Exhibit 43: Used vehicle prices and real disposable income
As real disposable income spiked during COVID, partially due to government programs, demand for vehicles remained robust



Source: Manheim, FRED

BofA GLOBAL RESEARCH

5. Subprime normalization for now, but monitor closely

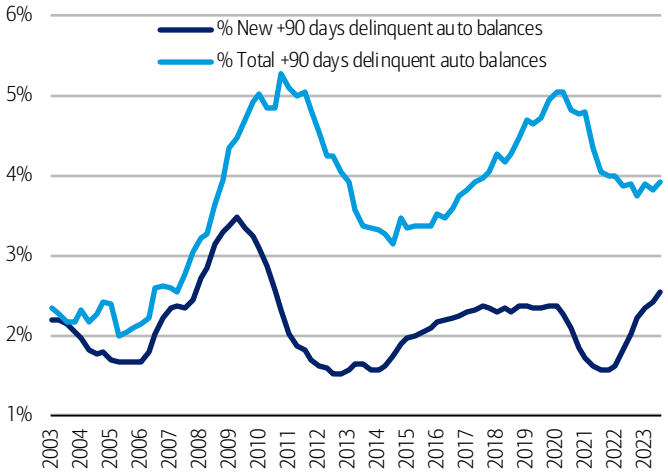
As the Federal Reserve started raising rates to fight inflation, auto loan rates increased, lending standards began to tighten and credit metrics started to worsen. So far, the trend is not particularly worrisome but rather a return to pre-covid levels after two years of unusually low credit delinquencies. Yet, we believe the used vehicle market may face some challenges as it is more exposed to lower credit consumers and subprime loans.

Delinquency rates are normalizing

In late 2022 and 2023, the favorable conditions that drove extremely low delinquency rates during Covid faded. Despite worsening credit metrics, we haven't observed a troublesome spike in total delinquencies but rather a return to the pre-pandemic levels (**Exhibit 44**). By looking at credit scores, the quality of auto loan origination remained in line with the past in the last few years. This suggests that the deterioration of credit stats is likely driven by factors that do not concern lending standards but rather the exceptional disposable income available to consumers that has disappeared. This implies that delinquencies should continue to deteriorate but not to a point significantly worse than pre-pandemic levels. Yet, there are a few factors to consider. Since the first loans were originated, the pricing has increased significantly, implying that the disposable income available to repay auto loans may have declined. In addition, other variable interest rate debt in the hands of consumers who have an auto loan has become more expensive. These factors may have a negative impact on total auto loan delinquencies.

While prime consumers have been largely insulated, there has been a significant deterioration in the subprime sector, with the % of delinquent subprime auto loans reaching the highest level in 30 years as of November 2023 (**Exhibit 45**).

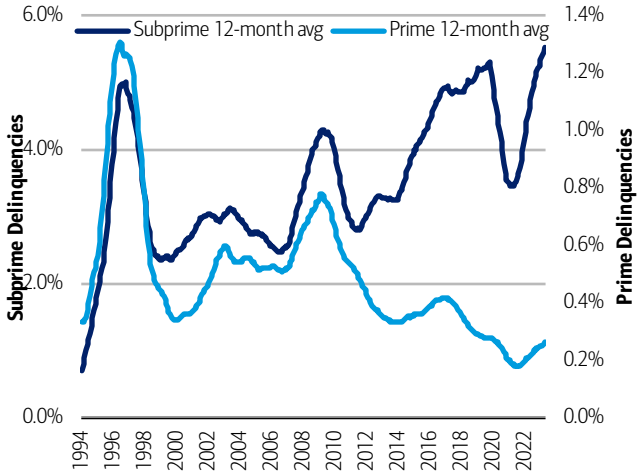
Exhibit 44: Seriously delinquent (+90 days) auto loans as a % of total
The % of auto loans that have newly become seriously delinquent inflected higher beginning in 2022 and as of 3Q:23 is at the highest level since 2010



Source: New York Fed Consumer Credit Panel and Equifax

BofA GLOBAL RESEARCH

Exhibit 45: Auto Loan 60+ Delinquency Index: Subprime versus Prime
The % of subprime auto loans that have become delinquent is now at the highest level in 30 years, while prime loan delinquencies remain low



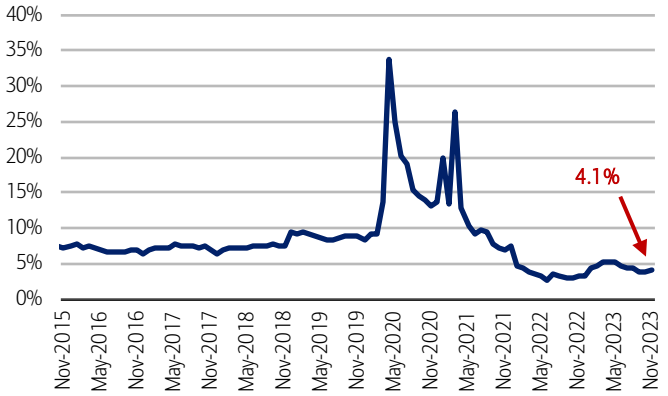
Source: Fitch

BofA GLOBAL RESEARCH

Easy fiscal and monetary policy drove better credit performance

To expand on the exceptional levels of disposable income in consumers' hands, we point out that during the COVID pandemic, the government enacted strong fiscal policies to sustain demand. Along with accommodating monetary policy and fewer opportunities to spend, consumers' disposable income and savings were artificially boosted (Exhibit 46 & Exhibit 47). This translated into a much lower than usual likelihood of delinquent loans.

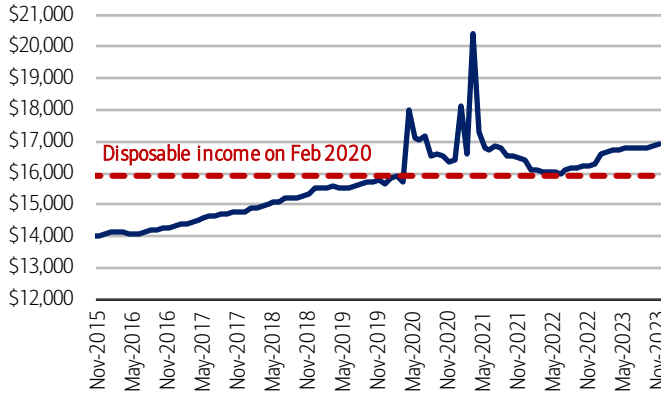
Exhibit 46: Personal Saving Rate
After reaching record high levels during the pandemic, the personal saving rate has fallen to near record lows.



Source: U.S. Bureau of Economic Analysis

BofA GLOBAL RESEARCH

Exhibit 47: Real Disposable Income
Real disposable income (RDI) spiked during the pandemic. As inflation picked up, RDI started to decline, and is closer to pre-pandemic levels.



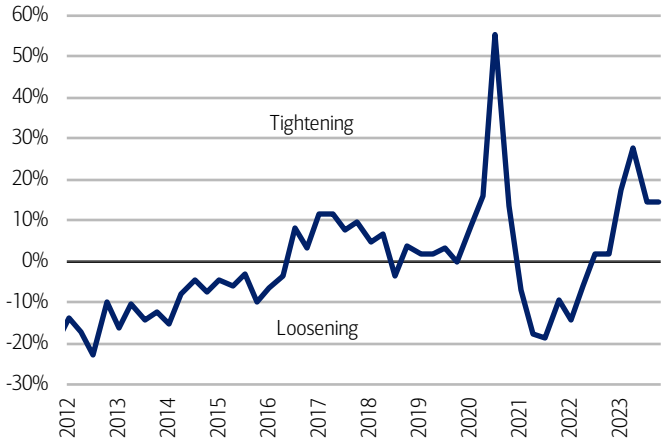
Source: U.S. Bureau of Economic Analysis

BofA GLOBAL RESEARCH

Tighter lending standards

A mitigating factor that has offset some of the deterioration in credit metrics in the subprime sector is the general tightening of lending standards for auto loans. Following the Fed's rate hike cycle, a large number of banks began to tighten standards for auto loans (**Exhibit 48**), while the mix of subprime auto loan origination has continued to decrease and is now at the lowest level in 20+ years (**Exhibit 49**).

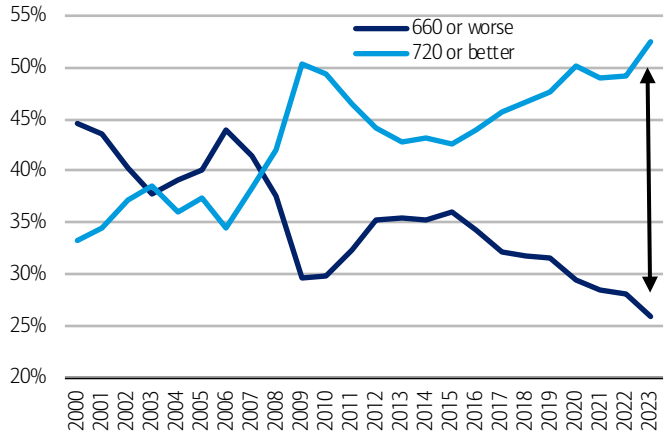
Exhibit 48: Net % of banks tightening standards for auto loans
The number of domestic banks that tightened standards for auto loans remains at some of the highest levels seen over the last decade



Source: Federal Reserve

BofA GLOBAL RESEARCH

Exhibit 49: % of US auto loan originations, by credit score
As of 3Q:23 the mix of subprime auto loan originations reached the lowest levels in 20+ years

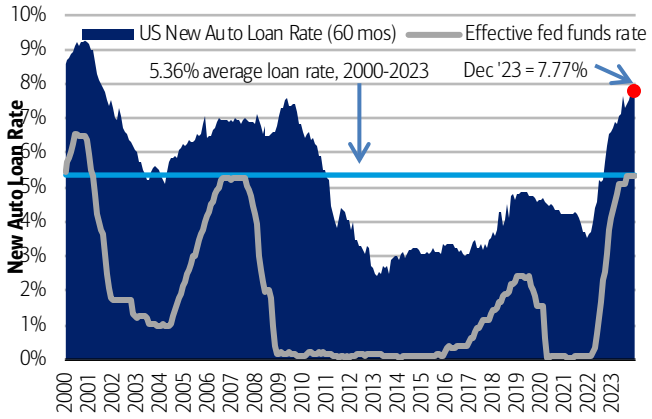


Source: New York Fed Consumer Credit Panel and Equifax

BofA GLOBAL RESEARCH

We don't see major issues with New auto loans. For the weaker part of the consumer spectrum, it is hard to tap into debt given the tighter credit environment. Moreover, given more restrictive monetary policy, lenders have automatically implemented more robust parameters for lending, implying that New auto loans are unlikely to have a high-risk profile. In addition, higher rates combined with more expensive vehicles have likely shut off the market to weaker customer demographics. To put it in context, since the beginning of Federal Reserve's rate hike campaign, auto loan rates have increased to the highest levels seen in a decade+. Since the beginning of 2022, the average 60-month new vehicle loan rate rose ~410bps to 7.8% (**Exhibit 50**), while the used vehicle loan rate increased ~320bps to 7.2% (**Exhibit 51**).

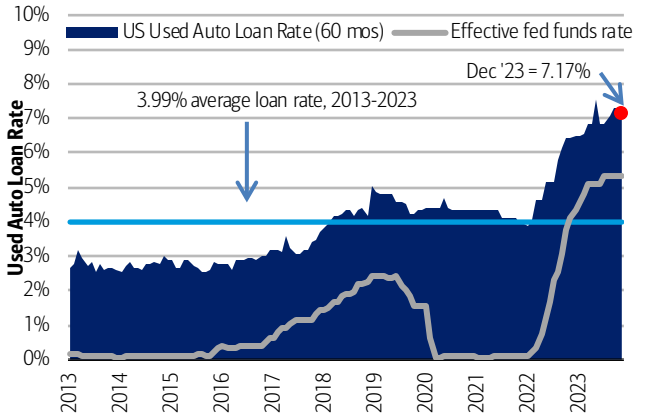
Exhibit 50: US New auto 60-month national avg loan rate ('00-23)
US new auto 60-month national average loan rate is now well above the average over the last 20+ years



Source: Bloomberg, Bankrate.com

BofA GLOBAL RESEARCH

Exhibit 51: US Used auto 60-month national avg loan rate ('13-23)
Although the data are only available back to 2013, the US used auto 60-month national average loan rate is also well above the historical average

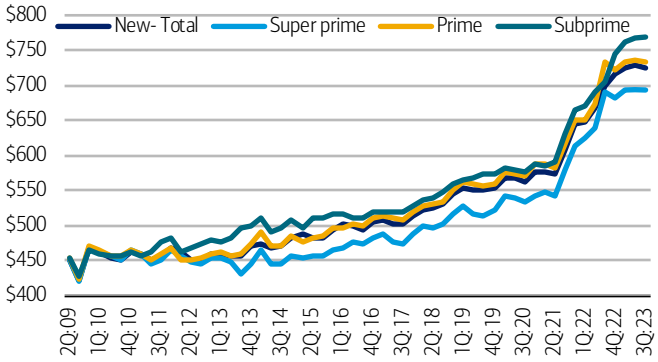


Source: Bloomberg, Bankrate.com

BofA GLOBAL RESEARCH

In addition, the average monthly payment for a vehicle has increased 32% (~$175) for a new vehicle and 34% (~$135) for a used vehicle since 2019. Interestingly, the average monthly payment for a used vehicle today is higher than the average monthly payment for a new vehicle was in 2019, although this is partially mitigated by a growth in wages.

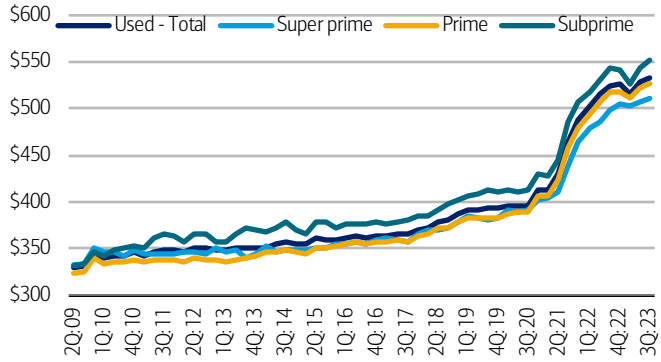
Exhibit 52: Avg. monthly payments on New vehicles, by credit score
Monthly loan payments for New vehicles are up across all loan types, with the average for subprime the highest as of 3Q:23



Source: Experian

BofA GLOBAL RESEARCH

Exhibit 53: Avg. monthly payments on Used vehicles, by credit score
Monthly loan payments for Used vehicles are up across all loan types, with the average for subprime the highest as of 3Q:23



Source: Experian

BofA GLOBAL RESEARCH

Nevertheless, among lower credit score consumers who already have an auto loan there are signs of stress. We highlight that in 2023 some used auto dealers with exposure to subprime consumers have gotten into trouble. America's Car-Mart (CRMT), a used auto dealer focusing on subprime consumers, experienced a large increase in its provision for loan losses in 3Q:23 as more lower credit auto loans became delinquent. This followed the bankruptcies of three other players in the subprime-focused used vehicle market in 2023, including American Car Center, Off Lease Only and U.S. Auto Sales Inc.

Credit market robust but subprime mildly challenged

In conclusion, given the current environment, we don't expect major issues on the credit front for the general auto market. However, we believe that used car dealers that tap into the deeper subprime market may continue to face challenging times. On the financing side we see a similar trend. New auto sales are just marginally impaired from higher rates, but we think that the subprime customers, who typically purchase used cars 5+ years old, may be challenged in accessing financing. Once again, this is not troubling yet, but will be a major theme to monitor in 2024.

Exhibit 54: Stocks mentioned
Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
RACE	RACE US	Ferrari	US$ 344.14	B-1-7
ABG	ABG US	Asbury Auto	US$ 208.75	B-1-9
AN	AN US	AutoNation, Inc.	US$ 143.14	B-1-9

Source: BofA Global Research

BofA GLOBAL RESEARCH

Disclosures

Important Disclosures

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. VOLATILITY RISK RATINGS, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. INVESTMENT RATINGS reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster[R1]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R1] Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. *Coverage Cluster* is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.
Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.
The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.
Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.
Refer to BofA Global Research policies relating to conflicts of interest.
"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.
Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:
BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofaml.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Canadian Investment Regulatory Organization; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.
This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of

its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the Electronic Communications Disclaimers for further information.

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities.

This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

Copyright and General Information:

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.
Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.
In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.
Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.