Seraph.

NOVEMBER 2023

NORTH AMERICA & EUROPE AUTO INDUSTRY REPORT

Resilience and Revolution

Navigating Financial, Technological and Political Landscapes in Manufacturing

Inside Our Automotive Report

*We write the quarterly reports for our clients and other automotive OEM and supplier leaders. If you would like to participate in the survey that we conduct each quarter, learn more about our methodology, or have a suggested topic for a future report, please email **research@seraph.com**.*

Executive Summary

Our view of the industry

Since Seraph's Q2 Report, the automotive industry and the world at large **have faced unexpected disruptions**. Events like **the UAW strike** and the Israel-Hamas war serve as reminders of how **circumstances and risks can suddenly change**. The impacts of these events, and others yet to come, will continue to grow **requiring careful monitoring**.

At the same time, the overall picture has remained relatively steady. **Interest rates, inflation levels, employment and consumer spending have all stayed relatively flat.** The slow-moving trends we've been seeing are continuing, including a **decline in enthusiasm for electric vehicles** (from both consumers and governments), the ongoing **growth of Chinese automakers**, persistent manufacturing **labor shortages**, and the rise of increasingly **protectionist trade policies**. Thus, while the fundamentals of this era are remarkably different than just a few years ago, we may be **witnessing a new normal**. This new normal is defined by flat volumes, increased uncertainty in program launches and volumes, as well as **reduced supplier payment terms** and **increased bankruptcies**. We look forward to delving deeper into these topics in the following report and are available for direct discussions.

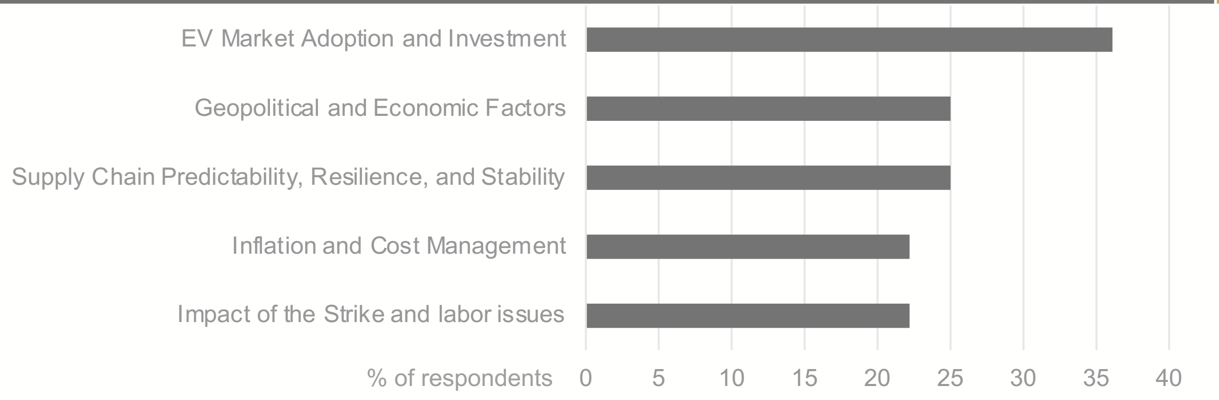
Similar to last quarter, Seraph has also conducted a significant survey of automotive industry leaders, including both OEMs and suppliers. The results are always eye-opening, and we encourage your participation in the next survey.

EV delays and inflation remain pressing issues, while increased competition and unsustainable pricing loom on the horizon

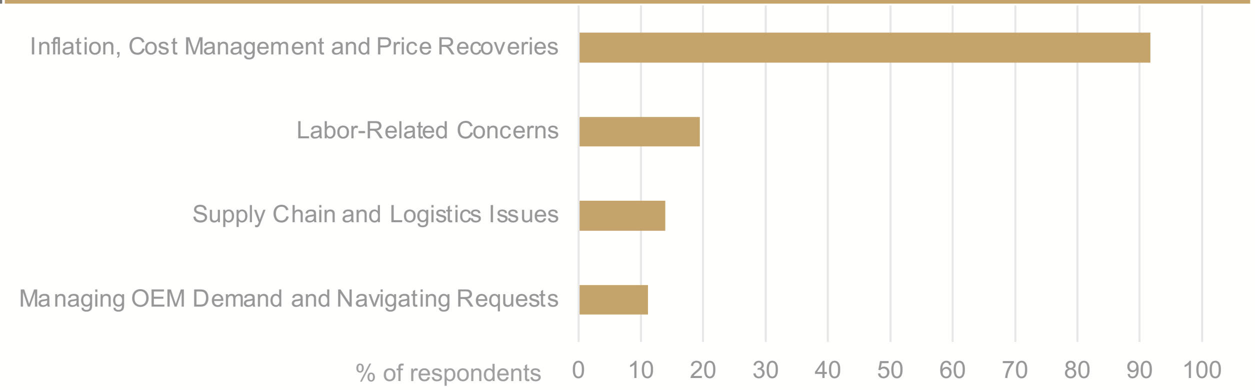
Themes	Topics	Slides	Recommended Actions
Demand	Pushed Out EV Targets & Launch Delays Can Higher Prices & Lower Volumes Continue? Uncertain Consumer & Economic Health	10-14 15-21 22-23	• Suppliers should manage program delays through close coordination with OEMs, leveraging stepped pricing and volume commitments • OEMs should consider the limitations of consumers to continue purchase high-priced vehicles, with a plan for economic headwinds
Supply	Commodity Prices Off Peak But Still Elevated Logistics Costs Decreasing But Some Delays Labor Cost Increases & Constraints M&A Pullback In High Interest Environments Opportunities For Cost Reduction	26-27 28-29 30-33 34-35 36-37	• Suppliers should continue to push for price increases reflecting increased labor and material costs • Stabilize workforce through reliable leadership, operational excellence, and competitive employee benefits • Focus on OEE improvement, many plants are still ~20% below 2019 levels, this cannot become a new normal • Embrace automation, as well as manufacturing techniques to reduce part and manufacturing complexity
Evolving Risks	Chinese EV Competition & Expansion Nearshoring & De-risking Challenges Supply Chain Sustainability & Traceability	40-41 42-49 50-52	• Plan for new entrants, the pie is unlikely to grow, and competition is heating up, typical forecasting approaches will not be adequate • Invest in lower-cost regions with favorable demographics and infrastructure, as it takes years to achieve a stable productivity • Map sub-suppliers, while standardizing data collection for both risk mitigation and new reporting requirements

From our survey of automotive industry leaders, top issues include EV concerns, inflation, and follow-on labor impacts from the UAW strike

Top Concerns For OEMs



Top Concerns For Suppliers



What are your top challenges for the next 6 months?

"EV production will be a challenge, but the real issue will be demand."
-OEM Operations Leader

"Managing the continued effects of inflation and cost pressures."
- North American Tier 1 Leader

"1. Supply security: ensuring the ongoing stability of our suppliers
2. Cost reduction
3. Innovation, technology, and agility to pivot."
-OEM Supply Chain Executive

"We're facing volatile order volumes, fluctuating raw material prices, and unstable energy costs… all with difficult customer recoveries."
- European Tier 1 Operations Executive

"Strikes and UAW deals are causing destabilizing ripples across the supply chain short-term but will also lead to wage increases."
- North American OEM Operations Leader

Financial stability and order book resilience, interconnected with the geopolitical situation, including a contracting Chinese market."
-Global Tier 1 Supply Chain Leader

Source: Seraph Q3 Survey

From industry leaders …

"OEM strategy is horrid. They need strategy for ICE/EV and they're running into a brick wall; Toyota is running well (went hybrid), but **strategy is driven by politics and bonuses."**

- NA Tier 1 Operations

"Traditional OEMs are playing catch up with Tesla's architecture. Their first EVs were just slammed together with traditional components, but they have realized that they need to do a **greenfield and build it from scratch**. This takes time and the right resources, which they are short of."

- Tier 1 Engineering Director

"Market contraction especially Europe and Asia where we have experienced a 15-20%. Combustion and EV have both been affected (EV hit in Q3). **Inflation and its impact on salaries has not yet stabilized which will continue to have lingering effects on overall manufacturing costs and hence profitability."**

- EU/Global Tier 1 Executive

"**Inflation, exchange rate fluctuations (Mexico),** supply chain issues due to border closing, and supplier financial constraints/bankruptcy will be our focus."

- OEM Purchasing Executive

Instability, geopolitics, variable demand, launch delays, inflation, and operational inefficiency are causing companies to go back to basics and adding buffers. Executives are taking action to streamline operations and reduce cost structure.

Demand

Volume Impacts and Mix

Since our Q2 report

Some big things have changed…

- OEMs in both NA & EU are now hinting at a slower “all in on EV” market penetration compared to two years ago
- OEMs built up extra inventory to prepare for the UAW strike, and as all was not consumed, we anticipate a less aggressive re-launch than originally anticipated
- US Student loan payments are now due after a nearly 3-year pause, which represents >$70B/yr. that consumers will not have to spend

… But a lot has stayed the same

- Overall vehicle affordability continues to improve, but remains elevated pre-COVID
- EV infrastructure is lacking in many markets, slowing adoption, EV inventories are increasing
- EVs remain higher-cost than ICE vehicles
- EV launches still face delays in EU & NA
- Uncertainty in launch plans and volume is putting stress on suppliers and OEMs

The highly optimistic outlook for electric vehicles has shifted to a more moderate stance, pushing back ramp-up plans

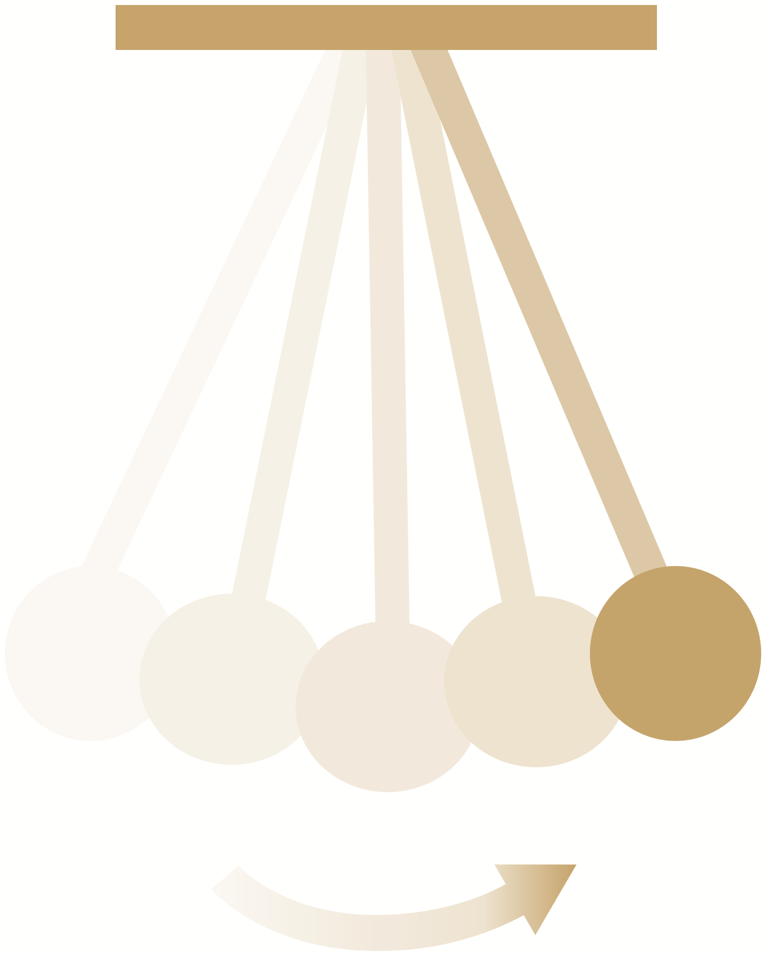
All-in on EV

BMW
"By 2021, we will have doubled our sales of electrified vehicles compared with 2019. We will offer 25 electrified vehicles already in 2023 – two years earlier than originally planned."
(June 2019)

Ford
"Ford plans to increase its production capacity of electric vehicles to 600,000 units globally by 2023." – CEO, Jim Farley
(November 2021)

Volkswagen
"For BEV Share of total vehicle sales, targeting 11% in 2023 and 20% in 2025."
(June 2022)

GM
"GM expects to build 400,000 EVs in North America from 2022 through the first half of 2024 and grow capacity to 1 million units annually in North America in 2025."
(November 2022)



Moderation

BMW
"When you look at the technology coming out, the EV push, we must be careful because at the same time, you increase dependency on very few countries."
(April 2022)

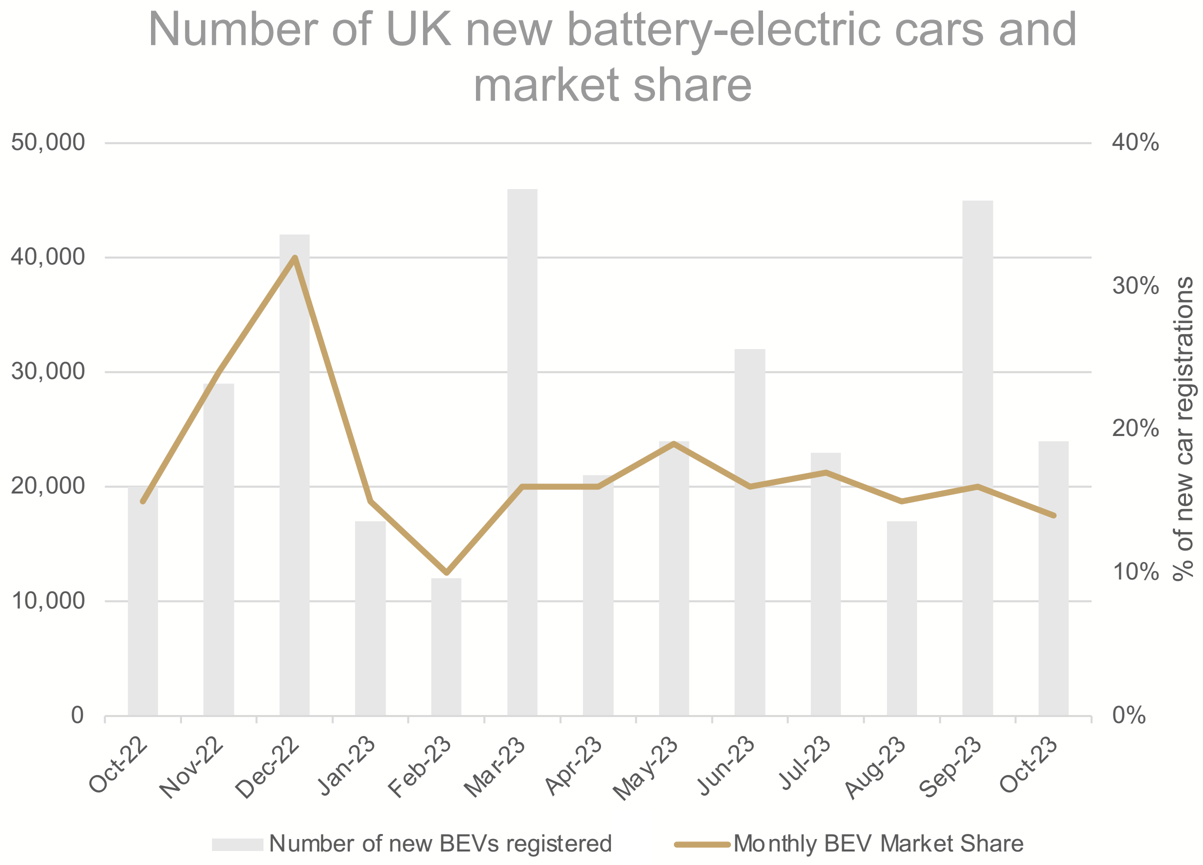
Ford
"We are now targeting to reach 600,000 annual production units of EVs by next year…we are balancing growth, profitability and returns."
(July 2023)

Volkswagen
"8% to 10% BEV share in 2023... for 2025 we still aim for 20%, but yes this might be challenging, given the current environment."
(October 2023)

GM
"We are not providing new targets but are moving to a more agile approach to continually evaluate EV demand and adjust production schedules to maximize profitability."
(October 2023)

Case Study: the UK pushed back it's ICE ban timeline due to a slower than expected adoption, it's likely other governments will also delay

- On September 20th, Rishi Sunak delayed the 2030 ban on new ICE vehicles to 2035 due to charging infrastructure shortages and high EV costs, hindering the transition from ICE vehicles
- UK EV sales nearly halved the following month due to this U-turn, prompting warnings from the automotive industry about destabilizing investment certainty
    - Similar efforts across the EU signal broad changes in environmental policies and political arenas potentially impacting energy markets and sustainability efforts throughout Europe
- EU environment ministers recently abandoned stricter goals for reducing greenhouse gas emissions following objections from Italy, Poland, and Hungary



BEV market share has been flat, not increasing as expected

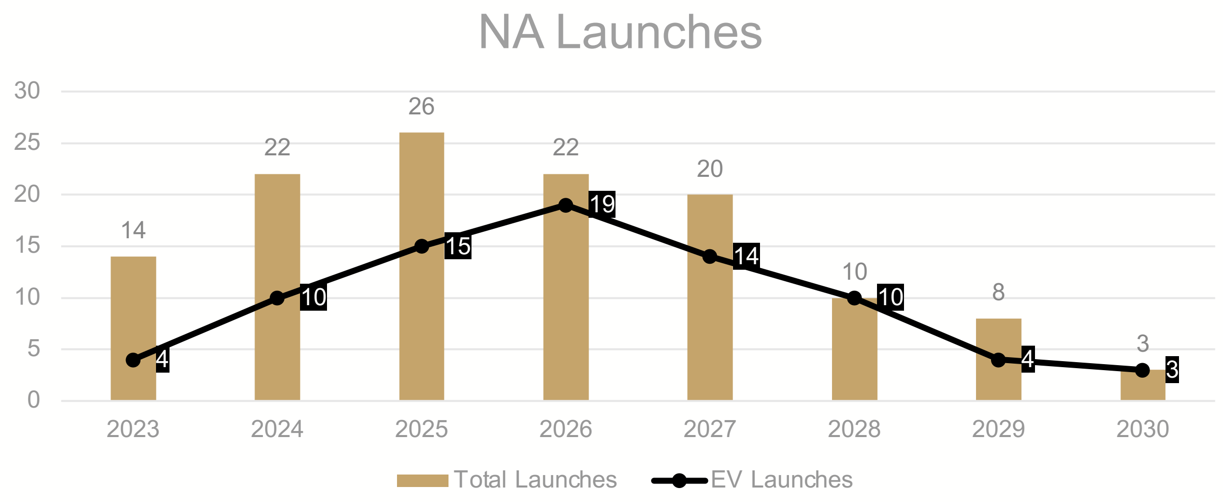
Source: SMMT, October 2023

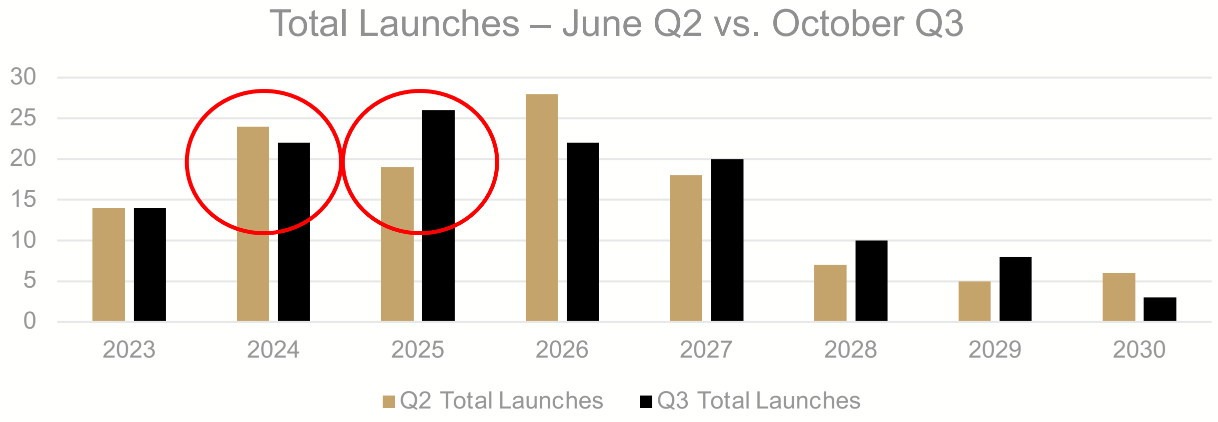
Launch delays and EV production volume uncertainty in North America has become more prevalent since Q2 2023

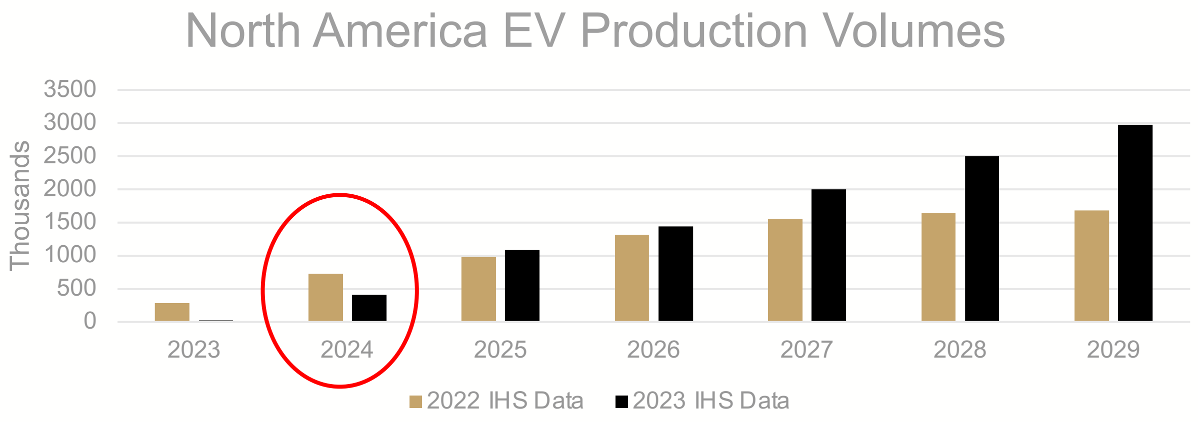
- There has been a move in the launch schedule
  - 2024 – 2025: Launches have been pushed
  - 2026 – 2029: Launches now span over following years

- The amount of EV launches is projected to increase over the next 3 years, and will decrease as the EV production volume increases

- EV production volumes have increased
  - 2022 IHS Data: Volume levels out
  - 2023 IHS Data: Linear trend continues





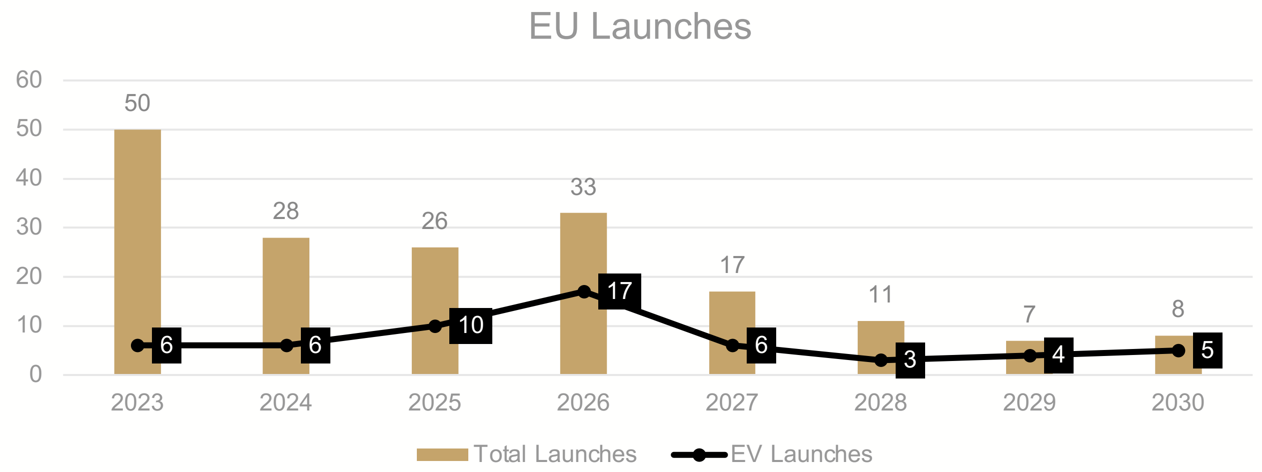


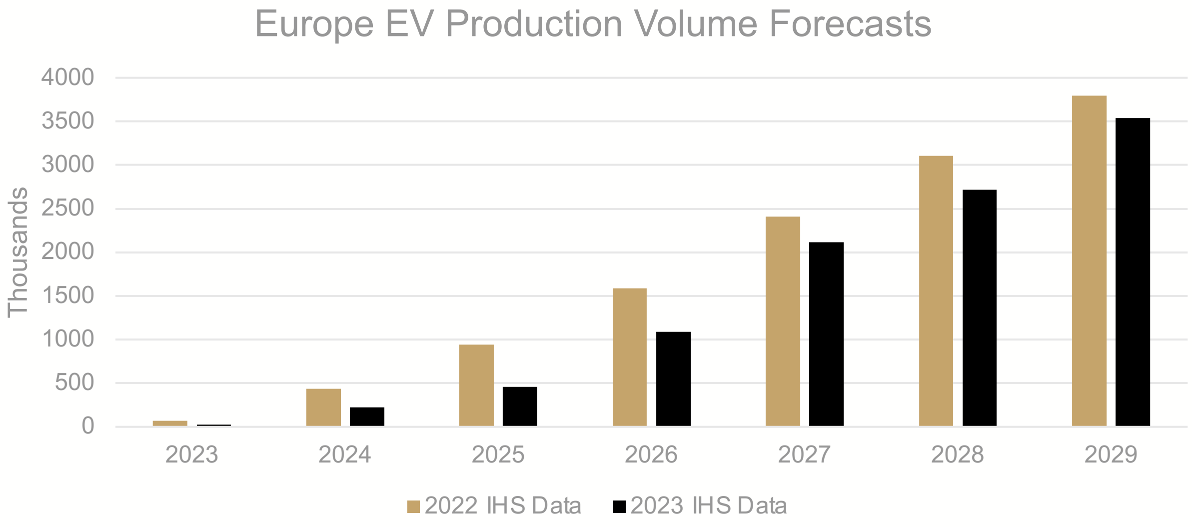
Volume forecasts are still uncertain, hopeful expectation that 2024 plan will be made up in 2025 & 2026

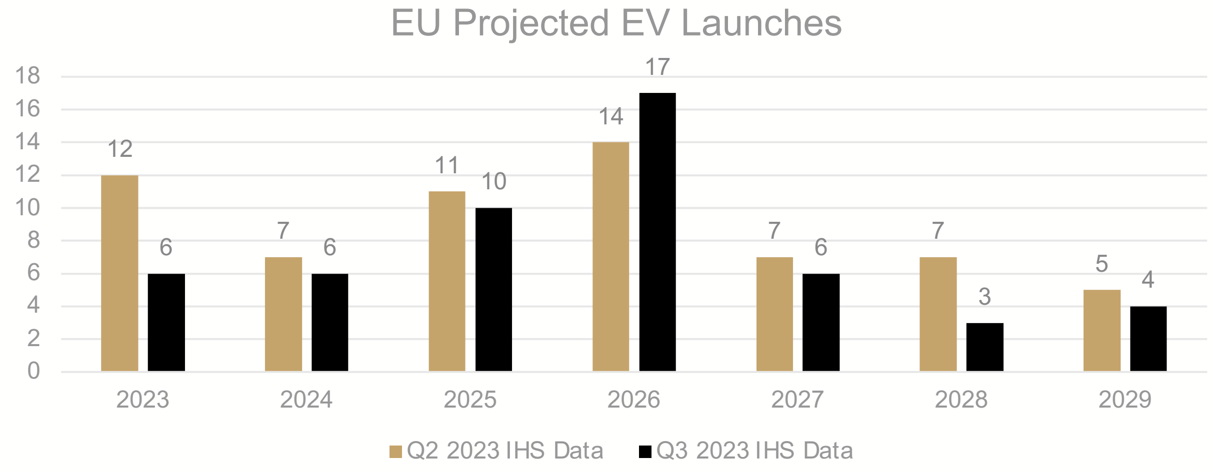
Source: S&P Global, Seraph Analysis

Forecasts for production volumes in Europe have declined, and as it stands now, EV launches will not be the majority until at least 2026

- The amount of EV launches will stay low, until 2026, when over half of launches will be EV
- EV production volumes have slightly decreased
  - Both data sets have a linear trend, but 2022 IHS Data has an elevated production volume for each year
- Compared to Q2, there has been a slight pushback in the projected amount of EV launches per year, with the exception of 2026



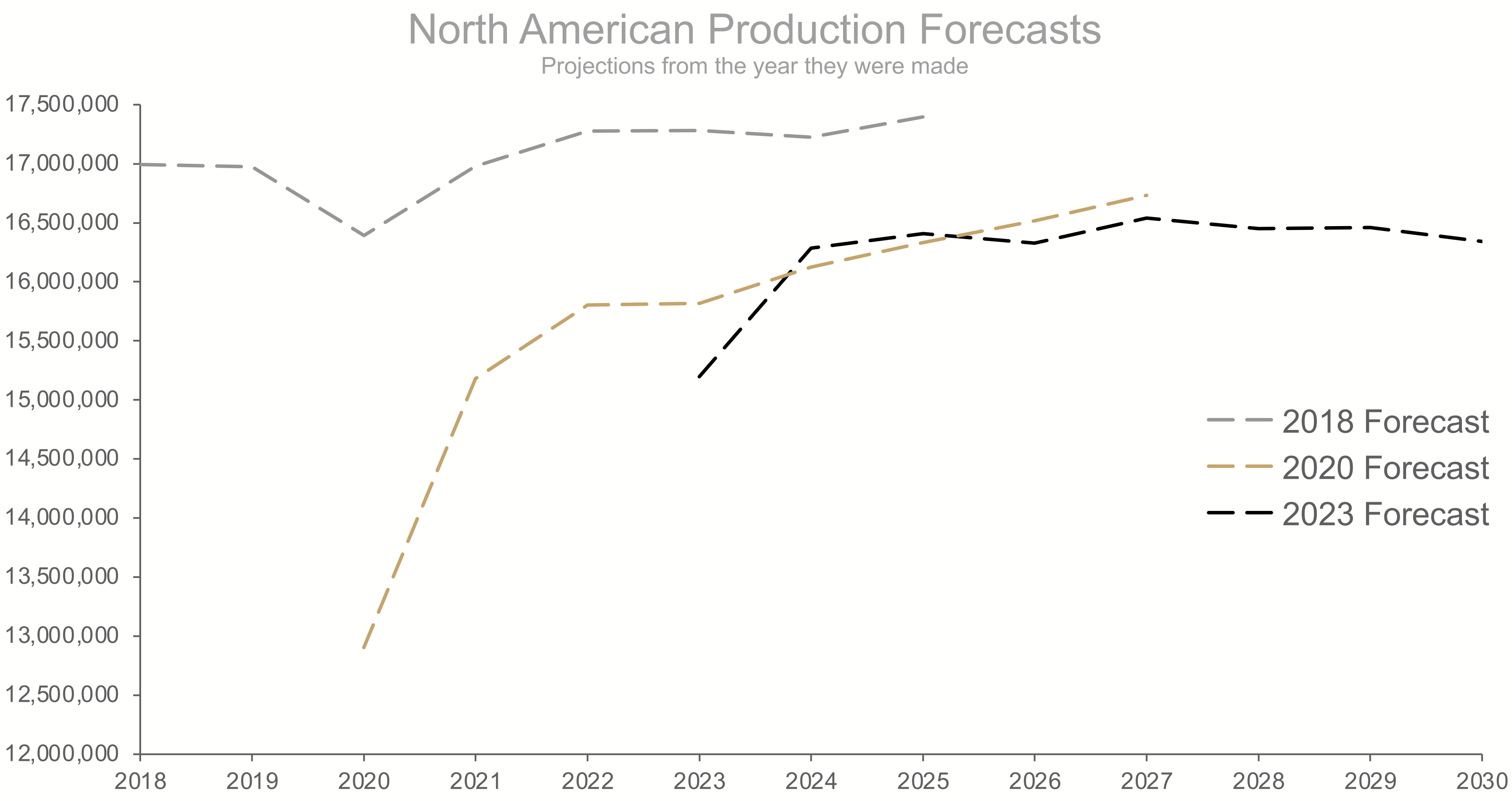




Source: S&P Global, Seraph Analysis

OEMs "don't guarantee volumes," but pressure will come from suppliers to allocate new programs and/or price increases for missing volume

- Comparing NA 2018, 2020 production forecasts to 2023, there are ~1M fewer vehicles forecasted per year
- The total vehicle volume production loss in NA:
  - 2020 to 2025 = 10.7M
- If you have components on vehicles launched in 2019 - 2021, your return on investment into equipment, workforce, and other development costs has likely fallen critically short of expectations
- OEMs are not guaranteeing volumes *and* are asking tiered suppliers to add buffers



Source: S&P IHS, Seraph Analysis

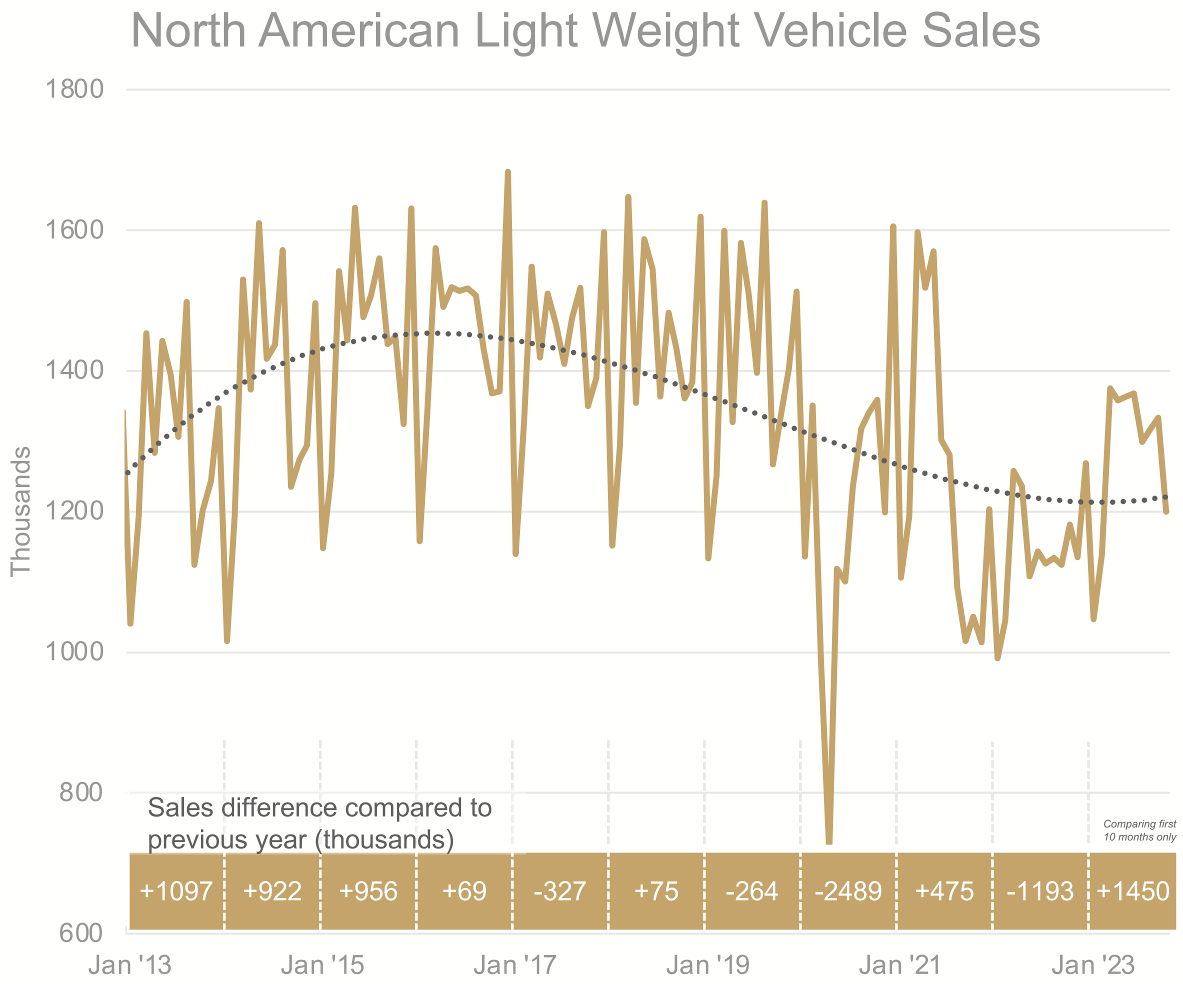
The industry is facing several challenges, such as evolving customer behavior, labor shortages, and ongoing supply chain issues

Sales

- Evolving customer behavior impacting large purchase decisions
  - People are rethinking finances and pushing back unnecessary purchases
- Strategic shift towards online vehicle purchasing models
  - Increases buying efficiency, reduces time spent in dealerships
- Declining vehicle sales attributed to shifting transportation preferences
  - Increased reliance on ridesharing platforms like Uber and Lyft, and other means of transportation (electric scooters, rental bikes, etc.)

Production

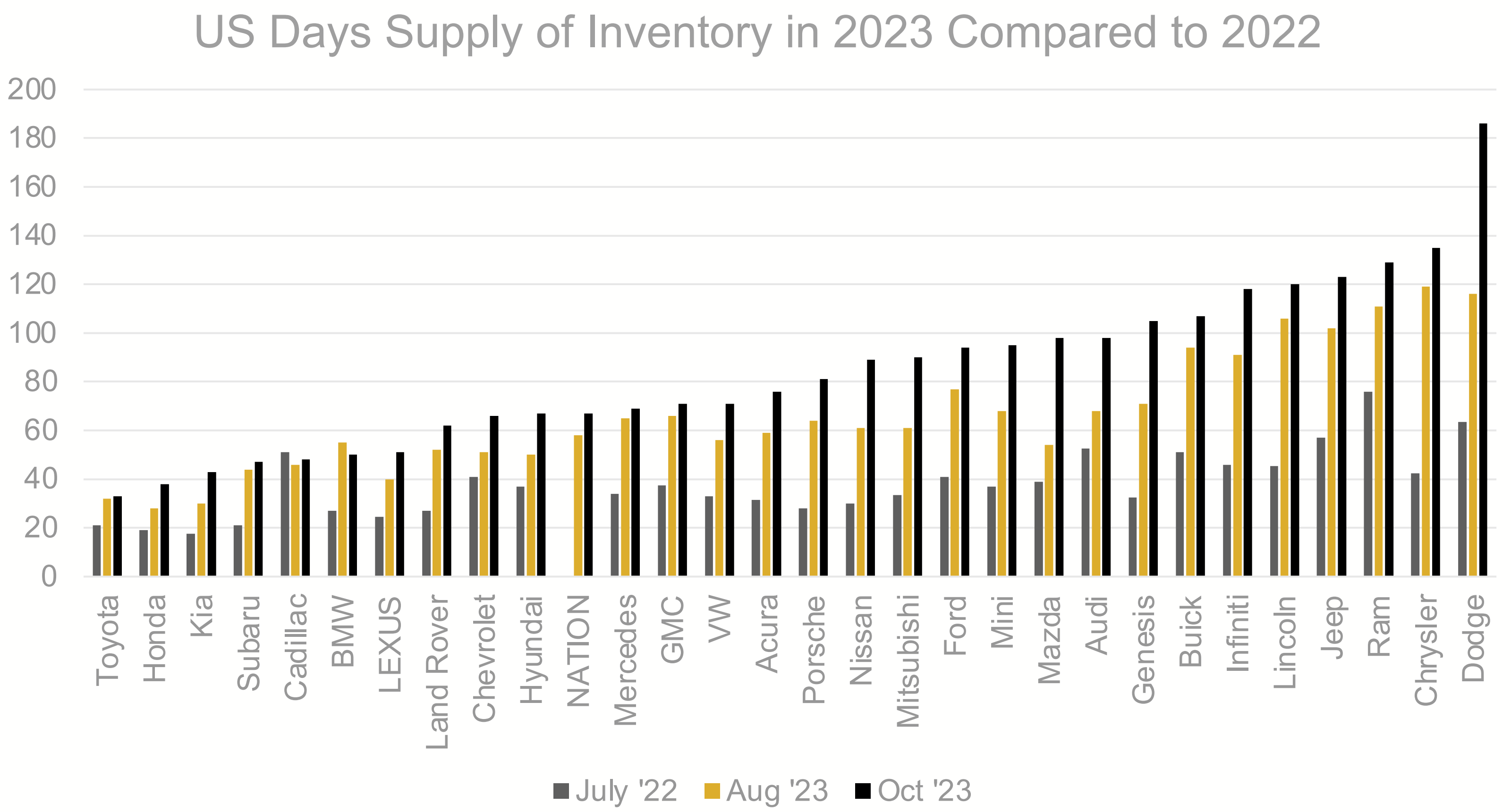
- Labor shortages
- Ongoing challenges in the supply chain
  - Chip shortages lead to extended production timelines
  - Smartphone and computer manufacturers are prioritized
- As electric vehicle popularity increases, resource demand increases
  - Lithium, nickel, and cobalt
  - Recycling batteries can decrease environmental impacts



Source: St. Louis Fed, GMInsights, Seraph Q3 Survey

High inventory, slowing sales, and the post-UAW strike ramp-up will cause additional stress to financially strained suppliers

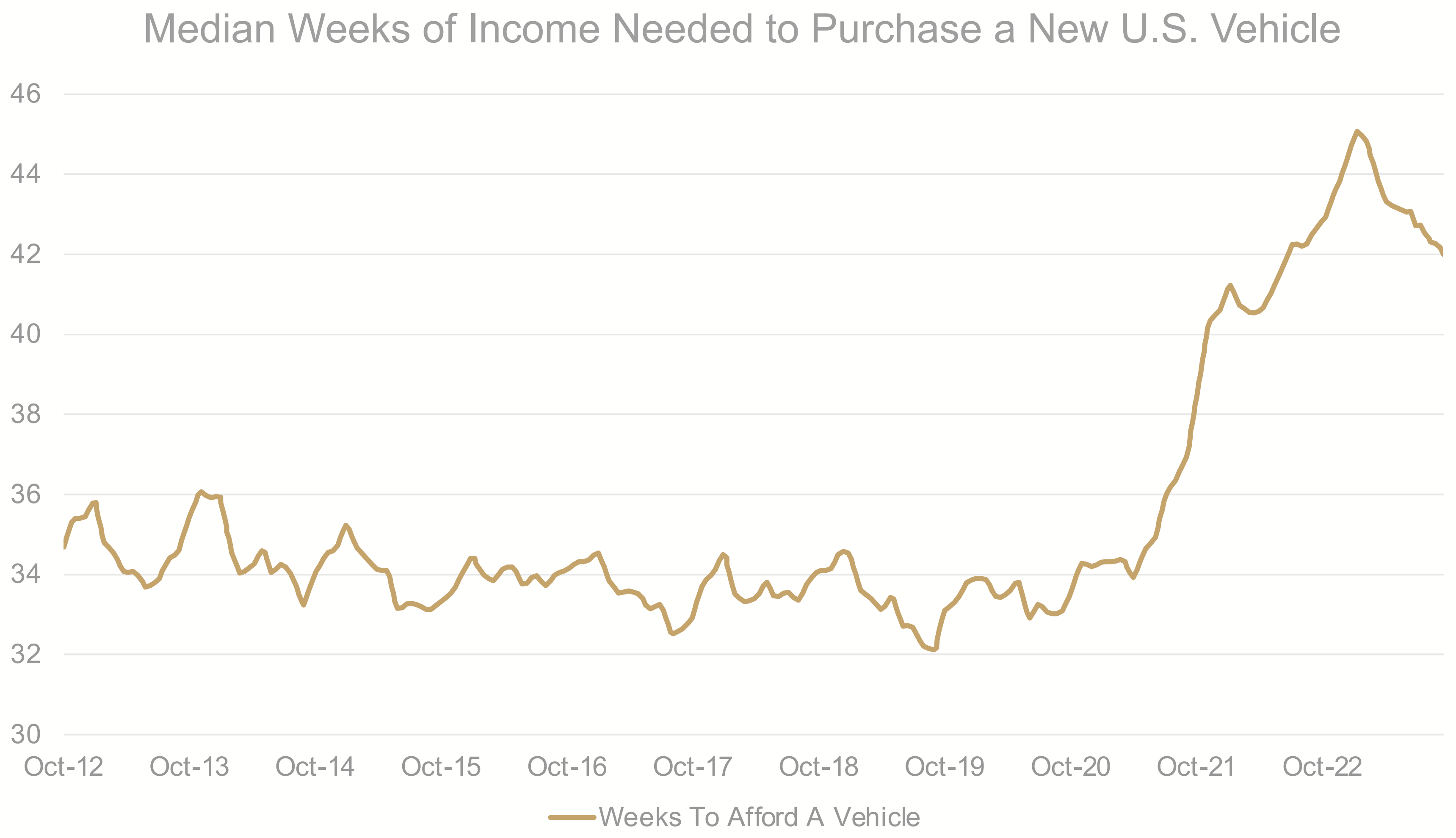
- In preparation for the UAW strikes, the Detroit 3 focused on increasing inventories considerably higher than they were in 2022
- During the strike, the rate of sales decreased, further increasing days supply, despite reduced production volumes at the Detroit 3
- This increased inventory will likely lead to OEMs lowering demand from suppliers to avoid stale surplus inventories
- A slower ramp up will be challenging for suppliers on the edge, lower volumes mean less revenue, delaying cash for hurting suppliers
- The recovery period for OEMs is proving challenging due to heightened lead times



EV spotlight: at the beginning of October, the supply of electric vehicles stood at 97 days. EV dealer inventories peaked in early July at 111 days.

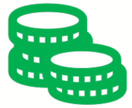
Source: Cox Automotive

New vehicle affordability in the U.S. improved year-over-year for the first time since 2019, but prices remain far above pre-covid norms



Factors impacting recent affordability improvement:

Slightly declining new-vehicle prices -0.5% y/y



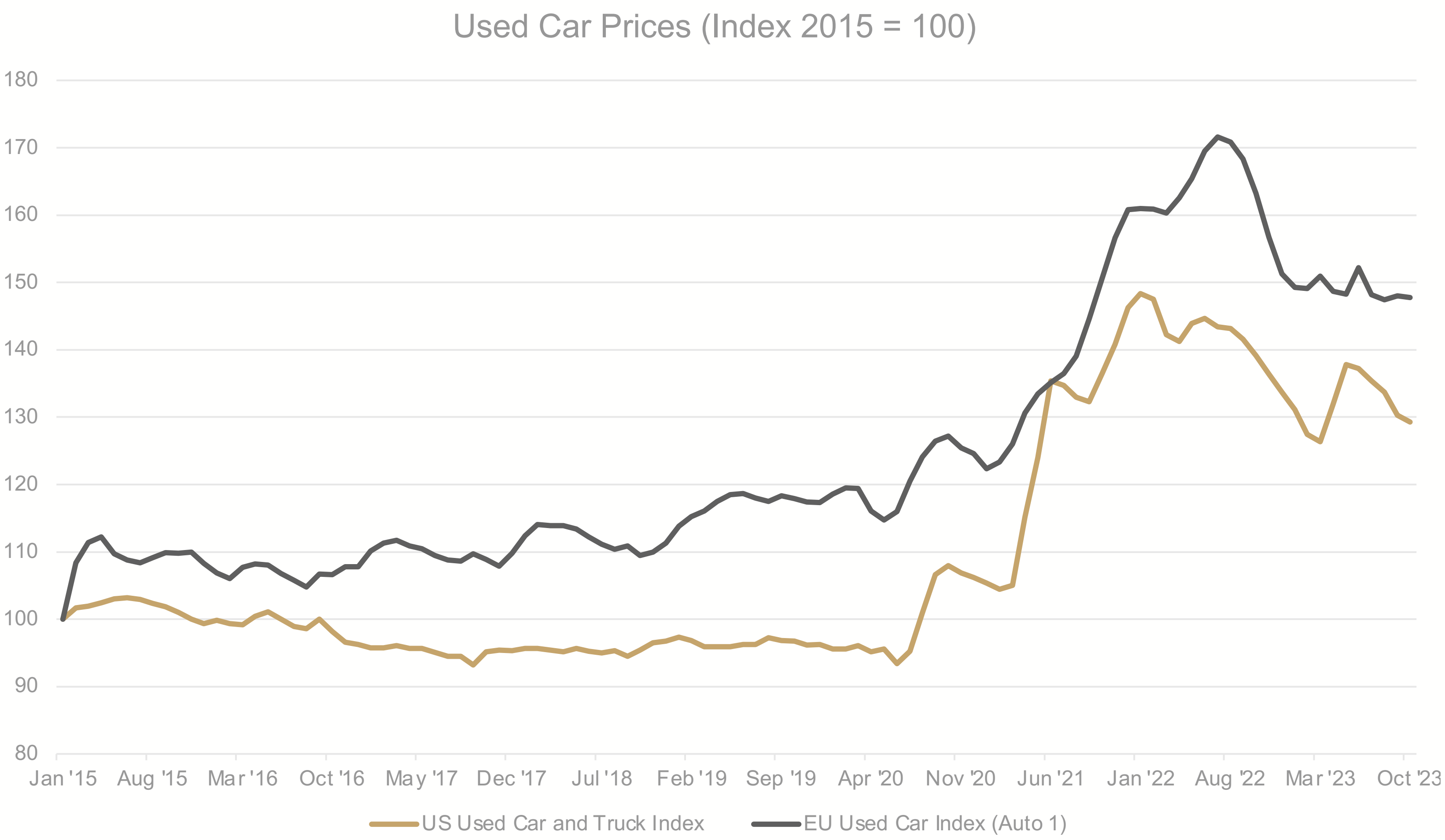
Incentives mostly flat

Growing incomes offsetting rising prices

Increase in interest rates, avg. new car rates now peaking at 10.48%

Source: COX Automotive/Moody's Analytics Vehicle Affordability Index

With limited entry-level new models, consumers continue to turn to used vehicles, keeping used prices high



Detroit 3 US New Car Prices Cheapest vs. Average

Ford
- Maverick: $23,400*
- Mean: $54,174

General Motors
- Chevy Trax: $20,400
- Mean: $47,152

Stellantis
- Jeep Compass: $28,400
- Mean: $57,771

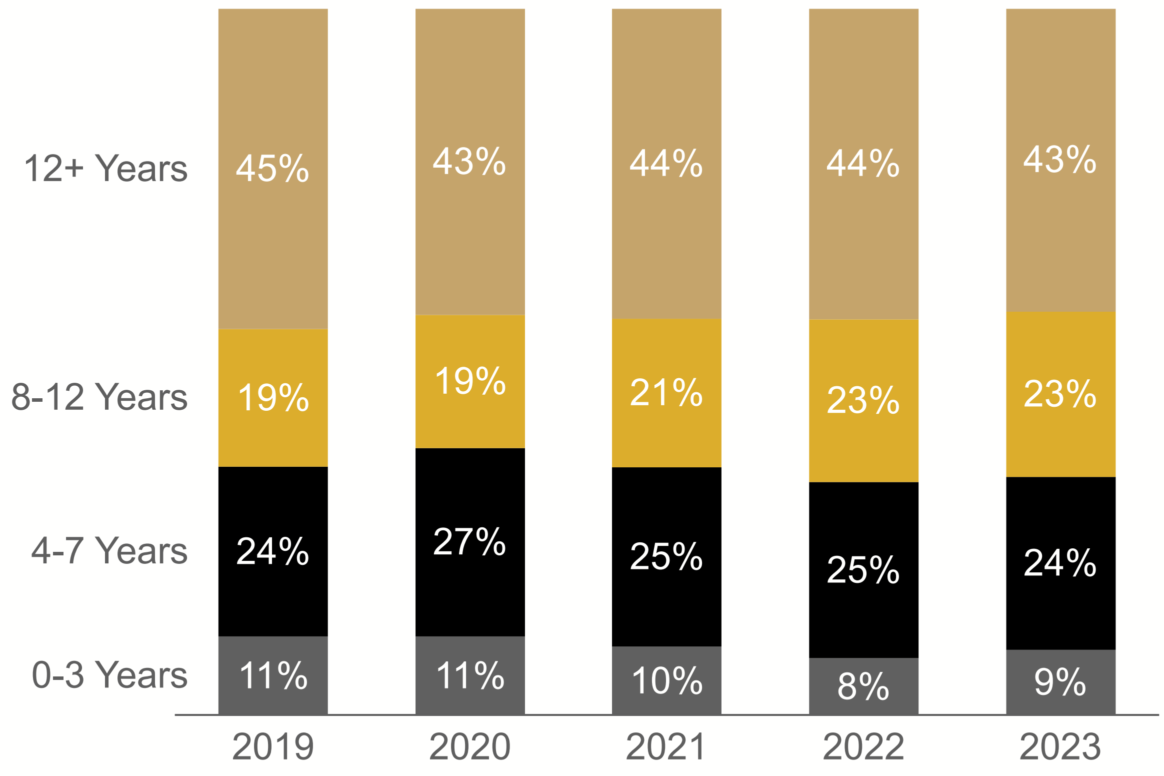
*Ford Maverick production ended October 2023

Source: FRED, Auto 1, Money Geek

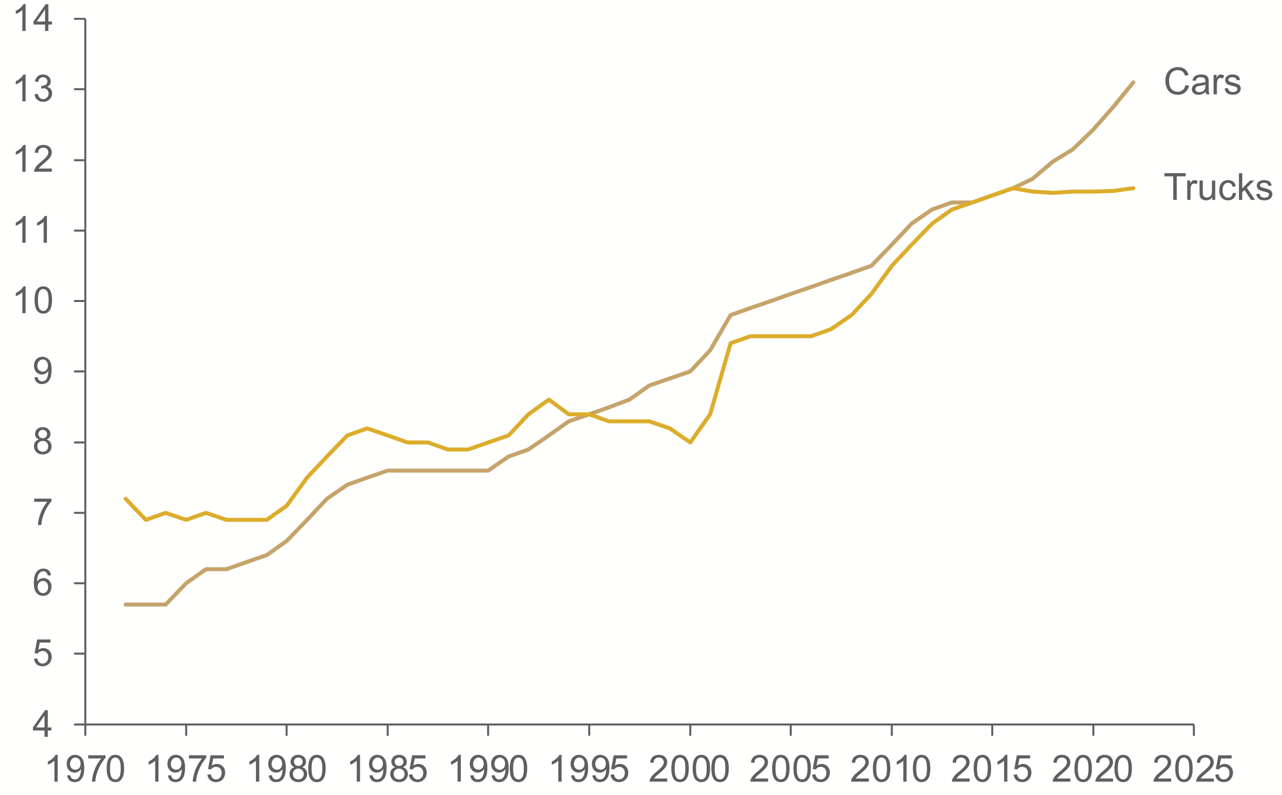
With elevated used car prices, buyers are increasingly hanging on to their vehicles for longer, driving up the average age of cars on the road

Older used vehicles continue to take share of transactions… and consumers are keeping them for longer

US Used Car Transaction Volumes By Vehicle Age



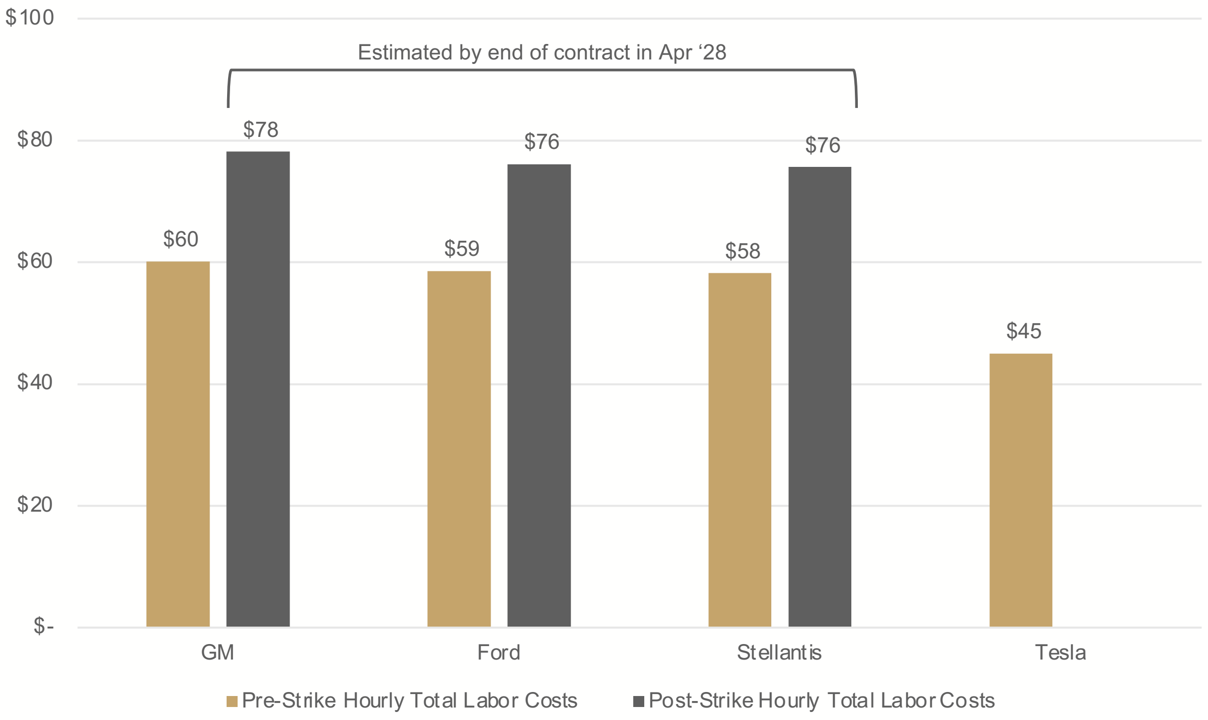
US Average Age Of Vehicles On The Road



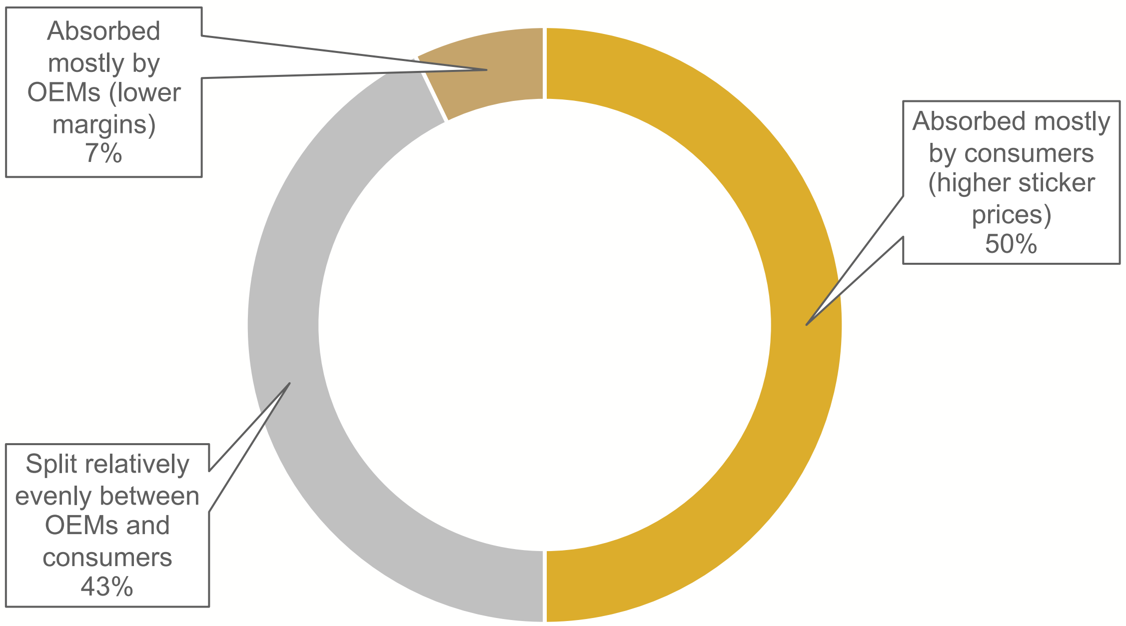
Source: Experian Data Q1, BLS

UAW contracts are expected to increase labor costs at the Detroit 3, and auto execs expect consumers to pay for some or most of the increase

UAW Contracts Further Cut Competitiveness of Detroit 3



Percent of auto execs that expect increased labor costs to be:

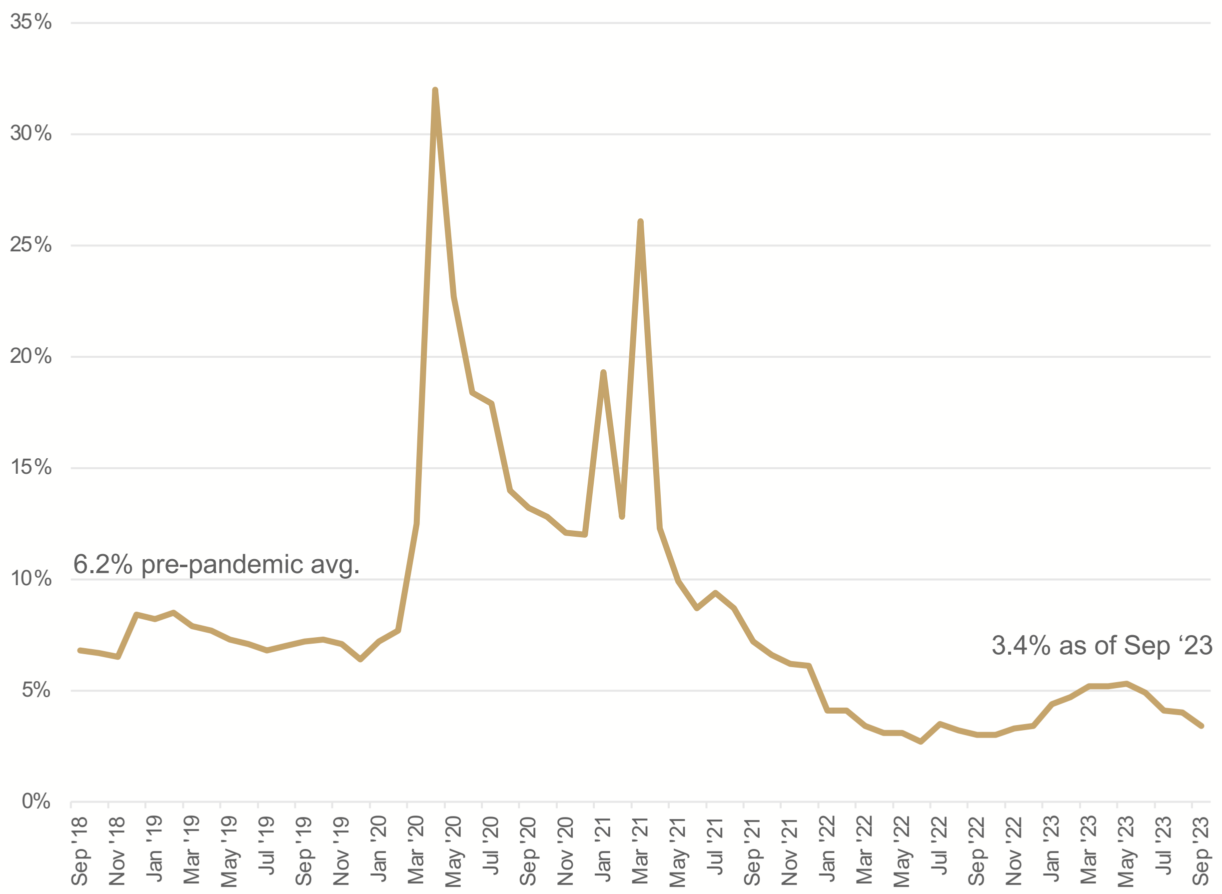


If consumers can't absorb higher labor costs, the Detroit 3 may relocate operations to Mexico to stay competitive

Source: Moody's, Reuters, Wells Fargo, Seraph Q3 Survey

Resilient consumer spending can support a bump in vehicle prices in the short-term, but the Detroit 3 will eventually have to cut costs

Personal Savings Rates Yet to Rebound



*"**Consumers will bear some of the cost burden** over time, but given that affordability is already a challenge…the automakers will **not have an easy time passing along all of the costs** to buyers"*

- Jonathan Smoke, Cox Chief Economist

*"That is not the end of our activities…That's an issue for all of our business and something we are working very, very consciously on to see **how do we mitigate those costs**."*

- Natalie Knight, CFO Stellantis

*"**If this is what my cost per unit is here in the US** — including labor — and it's uncompetitive, **I'm going to have to move** it to where it's more competitive, like Mexico"*

- Mark Fields, Former Ford CEO

Source: US Bureau of Economic Analysis, Federal Reserve Bank of Boston

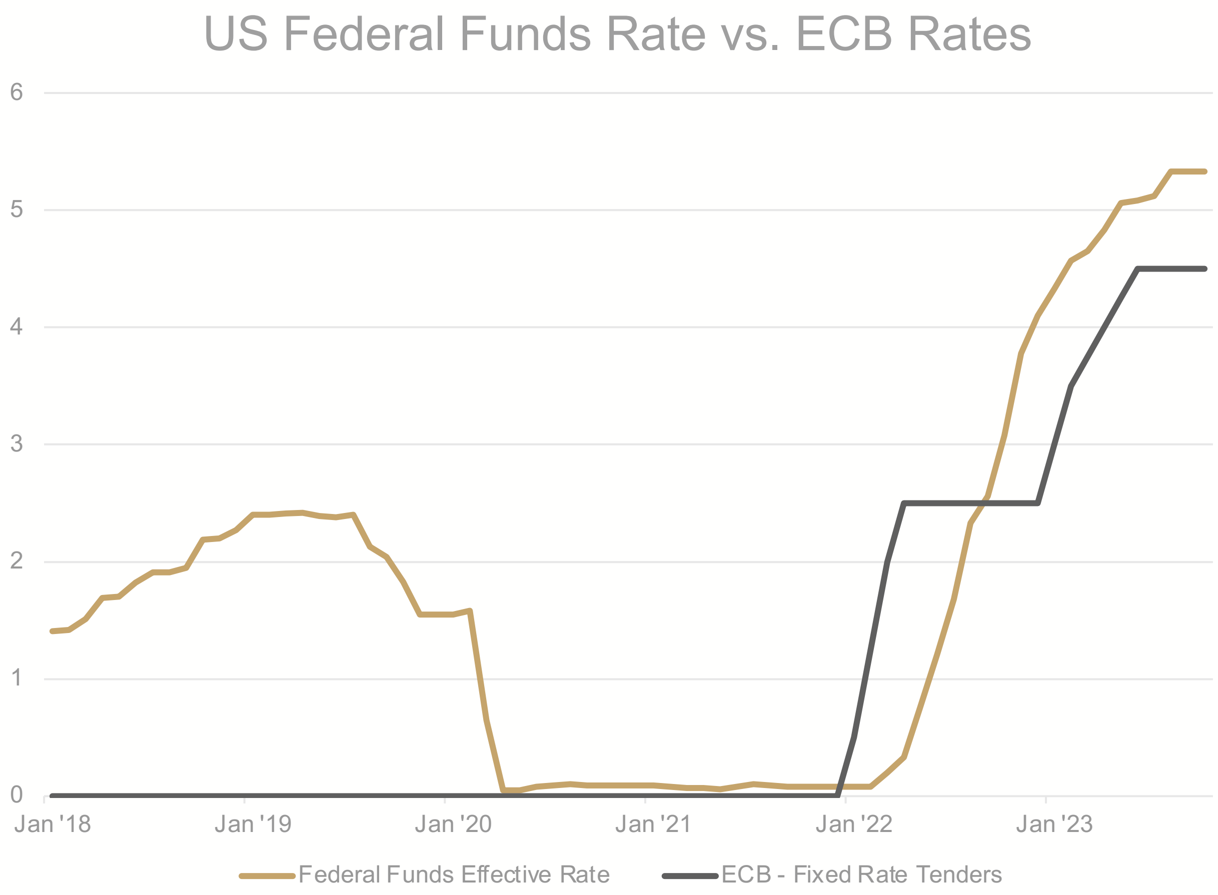
Central banks' aggressive interest rate hikes raise risks of defaults, strained finances, and potential global economic downturn

- People are facing increased expenses on variable-rate debt, including credit cards and auto loans, due to elevated interest rates
- Home mortgages, a key component of household borrowing, are subject to increased interest rates and eroding savings

> *"Year-to-date September, the number of new financing and leasing contracts concluded with retail customers **decreased by 5.6%.** This is **partly due to higher interest rates,** which have substantially increased financing costs for consumers."*
>
> *- BMW AG*

> *"The global economy continues to face some interlocking challenges, including continuing elevated labor inflation, **higher interest rates**, geopolitical risks and slowing economic growth. These challenges are **impacting our entire industry**."*
>
> *-Magna International Inc*

> *"I do believe that today some people are **holding off on auto purchases because of higher interest rates**, not to mention higher auto prices. But the reality is that people get used to paying interest and the market adjusts."*
>
> *-Martinrea International Inc*



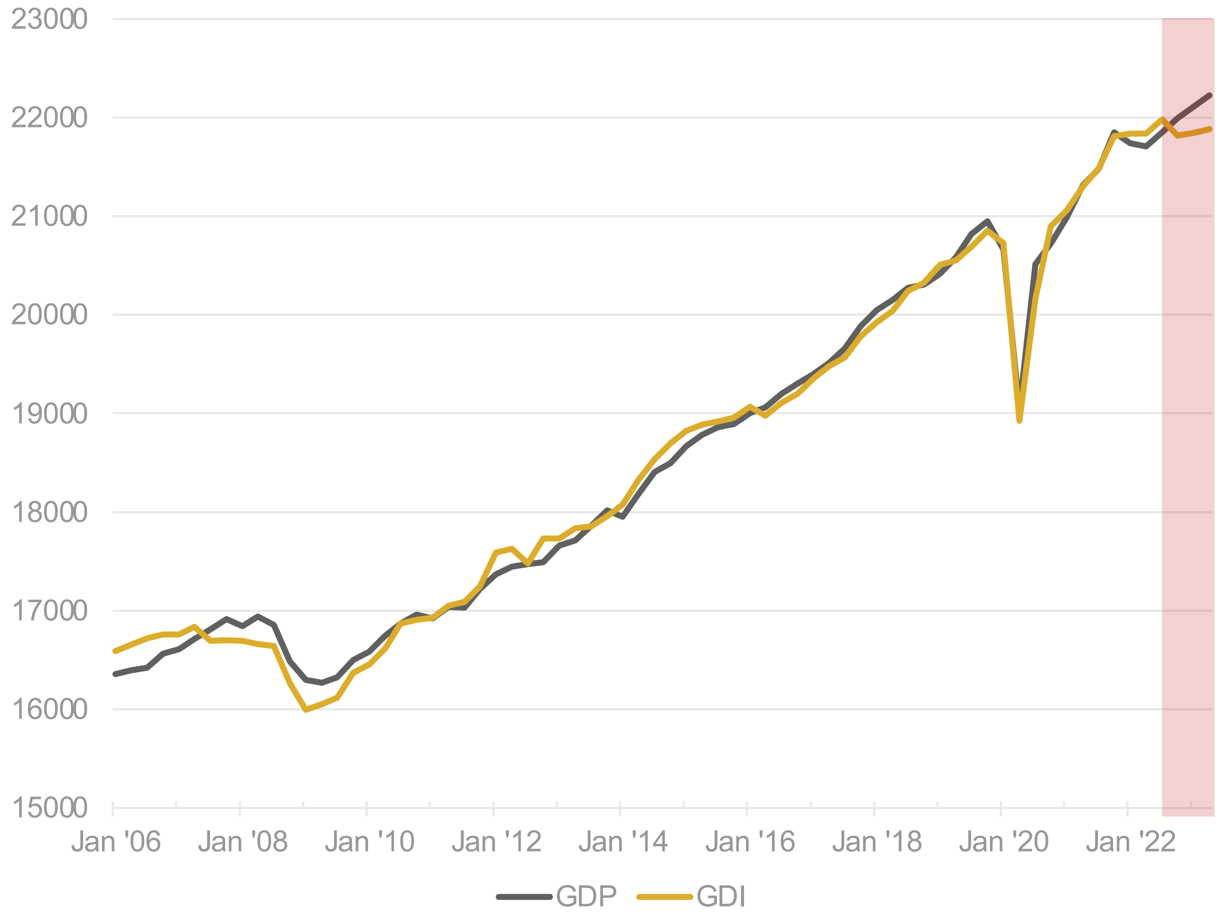
Source: St. Louis Fed, ECB, IMF

GDP and GDI disparities suggest pending revisions, the Federal Reserve is relying on conflicting data to facilitate economic soft landing

- GDP (Gross Domestic Product) and GDI (Gross Domestic Income) move together in relation to economic performance, but **discrepancies are not uncommon and are later revised, often downwards**
- Recently, these indicators began to diverge strongly with a **difference of 1.9%.** GDP growth may have stalled during the last 12 months
- Similarly, the yield curve between short and long-term government bonds is turning upwards again
- The Federal Reserve is watching these metrics to time interest rate changes to control inflation

10-Year Treasury Constant Maturity Minus 2-Year Treasury Constant Maturity

GDP vs. GDI



Source: Marketplace, St. Louis Fed

Supply

Input Availability and Cost

Since our Q2 report

Some big things have changed…

- The UAW secured an 11% immediate wage increase from Detroit 3 automakers with substantial raises over the next 4 years, cumulatively increasing wages >30% from the previous contract
- Increased US-Mex border security procedures has delayed some cross-border shipments

… But a lot has stayed the same

- Mexico's manufacturing sector is growing, but labor availability is low, and costs are rising
- Despite some stabilization, commodity and manufacturing prices remain high
- Energy prices remain historically elevated
- Input costs have increased as more suppliers recovered
- Labor costs are increasing in EU and NA
- Trucking freight rates mostly flat in EU, slightly down in parts of US
- Global sea container rates are flat

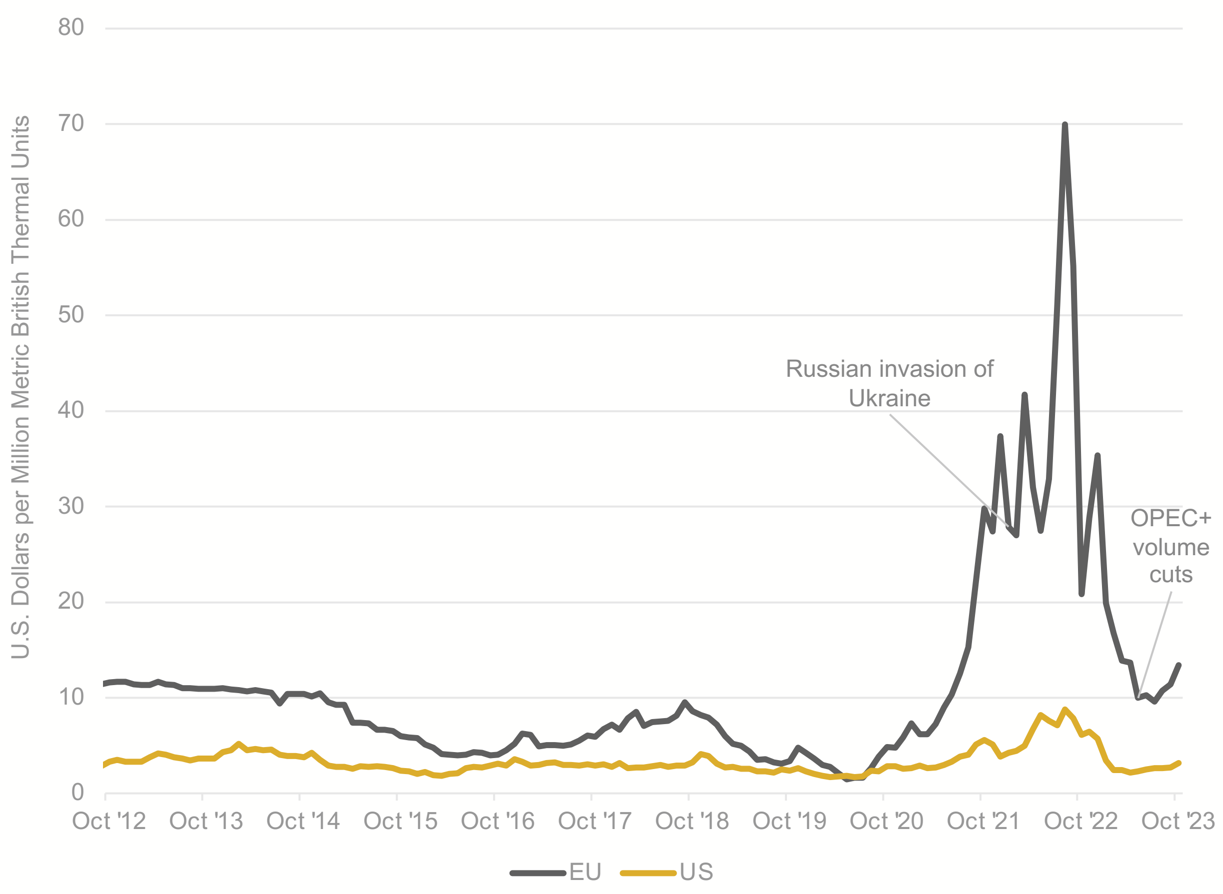
Reduced reliance on Russian gas has brought down energy costs for manufacturers but they remain historically elevated and geopolitically vulnerable

> *“The worst effects of the crisis may now be behind us, but there is no room for complacency.”* – European Commission

- The EU reduced reliance on Russian gas by an estimated 40-45 billion cubic meters (bcm) in 2023, compared with 155 bcm in 2021
- Reductions have been achieved by boosting imports LNG, increased efficiency and some renewables
- Geopolitical events, like the Hamas-Israel conflict, contributed to a spike in European gas prices
- Current 2023 inventories of natural gas exceed storage peaks of last 5 years
- Europe has been working on multiple projects to increase LNG supply, potentially lowering gas prices by next year

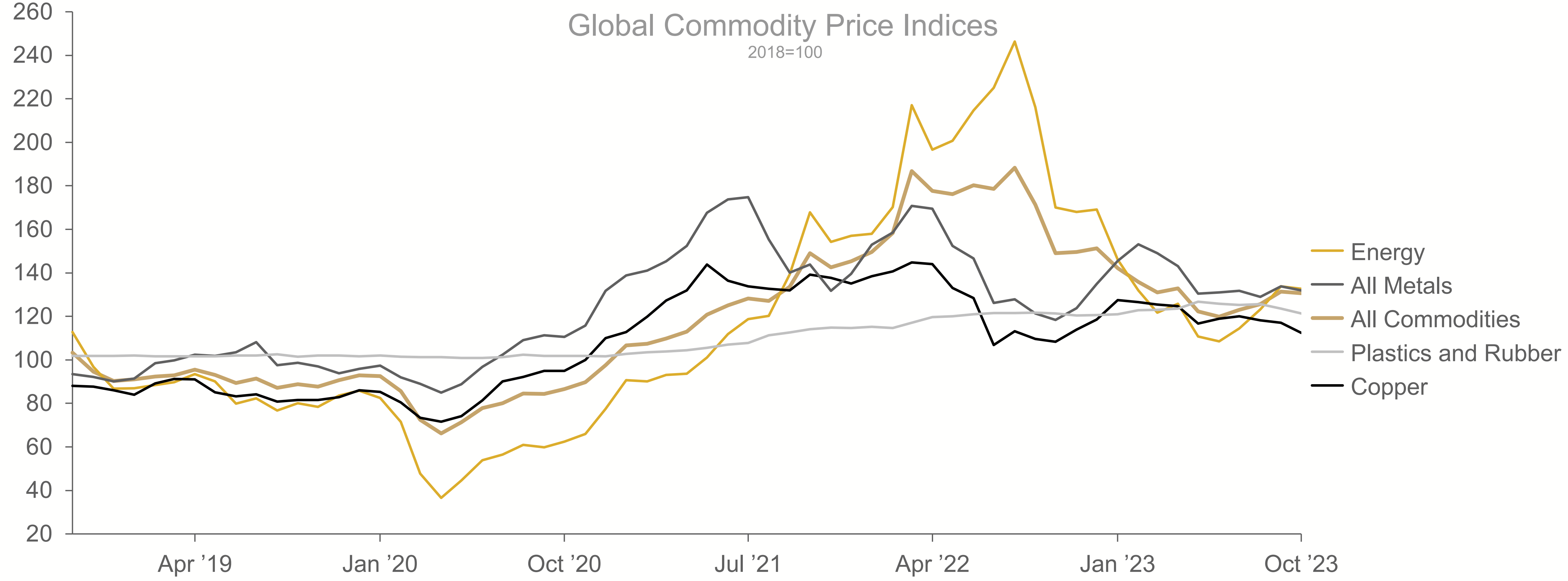
> *"Higher costs for materials, wages and salaries as well as energy and logistics – amounting to around €1.4 billion – are expected to weigh heavily on our earnings position in fiscal 2023.”*
> – Continental Q3

EU vs US, Natural Gas Prices



Source: St. Louis Fed, EU commission, GIE

Commodity prices declined in late ’22 and early ’23, but remain elevated, recent energy increases driven by OPEC+ supply cuts



Despite OEM desire to return to bi-annual price recovery conversations, swings in input costs will drive suppliers to request them more frequently

Source: International Monetary Fund (IMF)

While container and trucking costs have begun to normalize, congestion at the Mexico-US border is causing major delays

Decrease in container and trucking costs

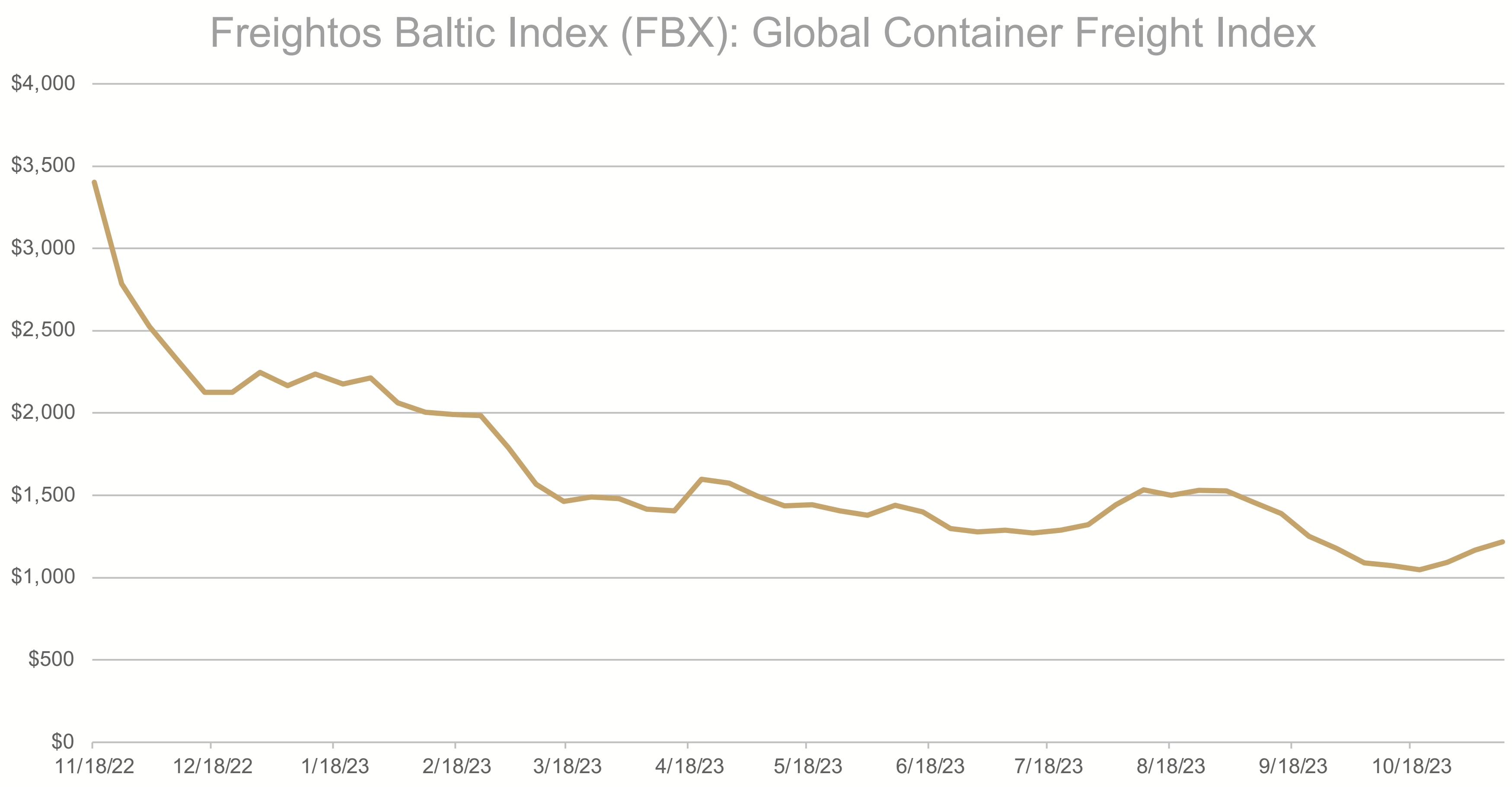
- Shipping rates for **40-ft containers** from **Asia to the US West Coast have dropped over 80%** since April 2022, and by **nearly two-thirds to the East Coast**
- The decline in cost can be attributed mainly to a **decrease in consumer demand**, **rising inventory levels**, and **increasing tensions** between the US and China
- Various global shipping companies have reported **huge hits to their annual revenues** year over year due to the decrease in demand:
  - Maersk - **40% decrease**
  - CMA CGM - **51.8% decrease**
  - HMM - **60% decrease**

Shipping delays at the Mexico border

- Railway cars carrying assembled vehicles from Mexico to the US are being used by migrants to cross the border, prompting a temporary border closure, compelling Ferromex, Mexico's largest railroad, to halt train operations
  - **US border authority paused cargo processing** at El Paso, Texas **to process more migrant arrivals**
- This allocation of resources has resulted in **19,000 trucks**, carrying **$1.9B worth of goods**, standing idle in Mexico, leading to wait times of up **to 24 hours** and a line stretching **14 miles**
- **This is not a favorable sign for America as it strives to disengage from China and turn to Mexico for sourcing**

Sources: Freightos, The Maritime Executive, Automotive News

Container shipping rates have stabilized in 2023, returning to levels consistent with 2018 through early 2020



Sources: Freightos, The Maritime Executive, Automotive News

Amid the industry's pandemic recovery, the current UAW strike has surpassed the impact of the 2019 GM strike, further amplifying pandemic repercussions

2008 Financial Crisis

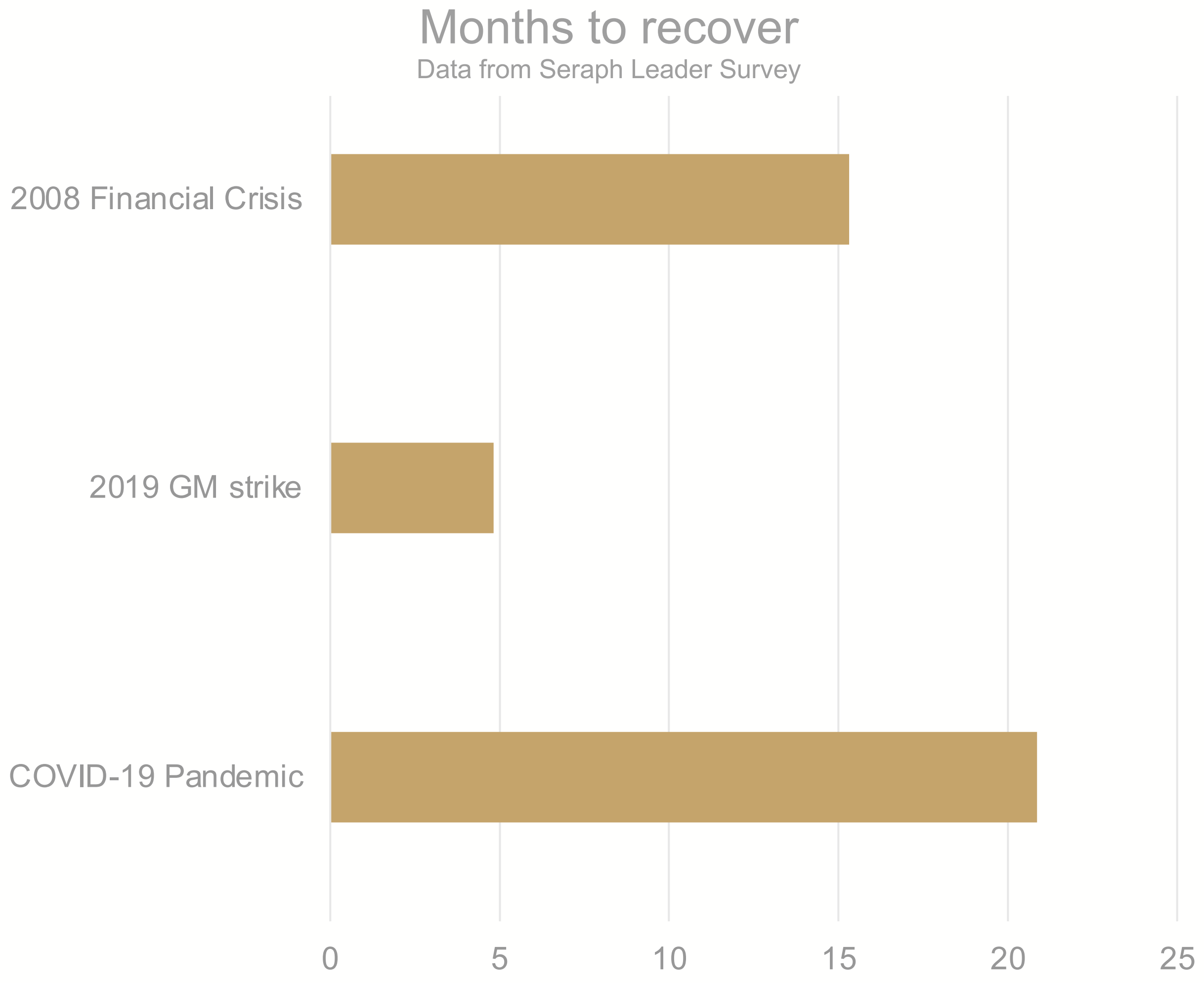
- Chrysler declared bankruptcy – it took until May 2011 to settle all outstanding debts
- Q1 2011, all Detroit 3 automakers showed positive trends for the first time since the financial crisis
- Despite the recession ending in 2009, unemployment rates did not normalize until 2014, and median household incomes didn't recover until 2016

2019 GM Strike

- The strike didn't initially single out one of the Detroit 3 but established "pattern bargaining" for the other two OEMs
- This strike lasted 6 weeks, idling 34 plants
- GM lost $3.6 billion
- Lower inventory now means higher profits (effect from the pandemic)
- This protracted strike might extend for months, delaying the recovery and further impacting the industry's supply chain
- "We ended up having a single-quarter, one-state recession in Michigan" – VP of Anderson Economic Group

COVID-19 Pandemic

- The pandemic had a broad impact on the automotive industry, effecting dealers, suppliers, finance companies, and sales
- Chip shortages could remain an issue **through 2024**
- The supply chain has still not fully recovered



As a result of the UAW strike, labor inflation across the industry will accelerate for UAW and non-UAW OEMs, and suppliers

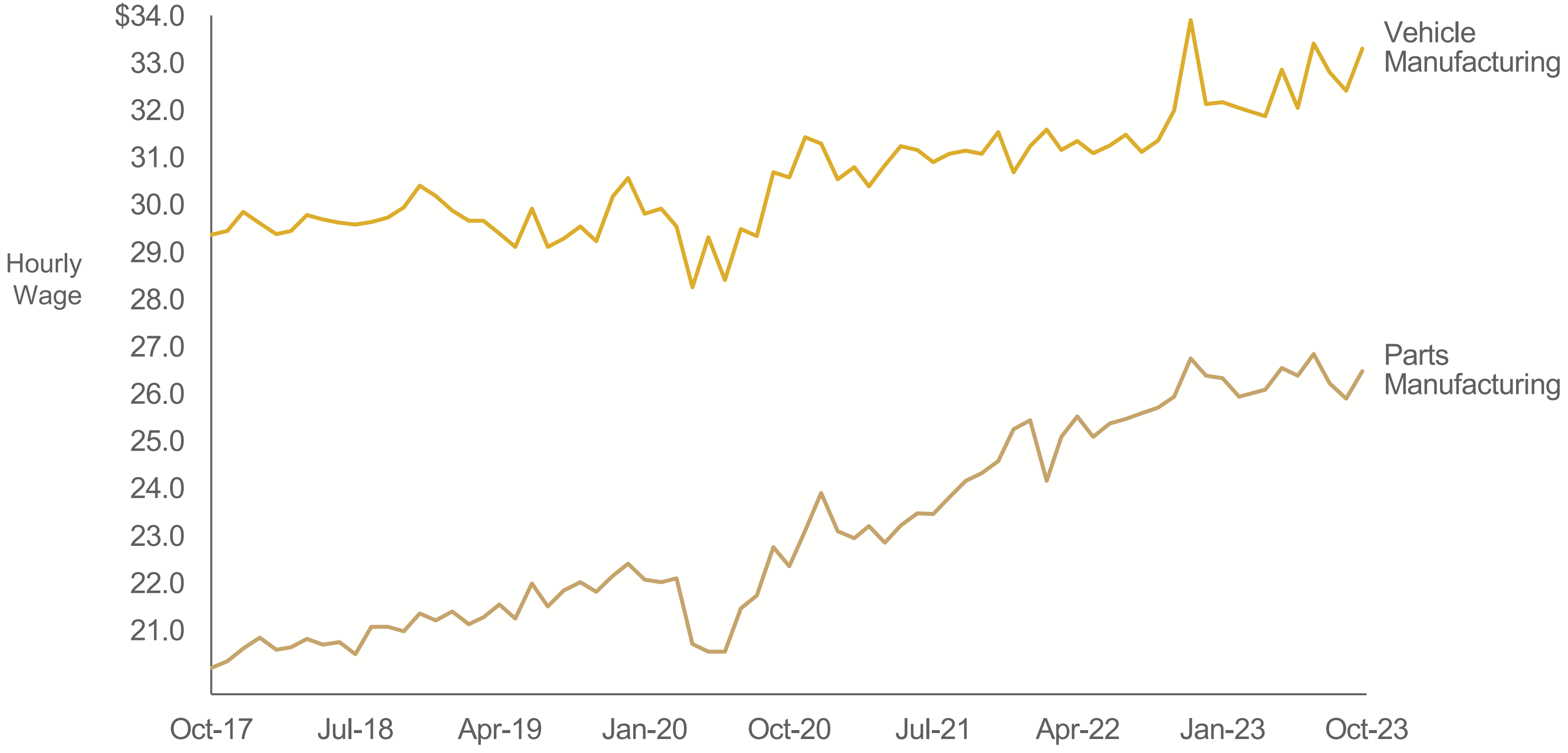
Key Contract Details

- UAW negotiations with the Detroit 3 secured an 11% immediate wage increase, with an additional 12% over the next 5 years
- UAW workers in US will now get inflation protection, in “cost of living adjustments”

Reactions From Other OEMs

- Toyota proactively i**ncreased wages by 9.2%** and **decreased time to top pay by 4 years**
- **VW and Honda** are raising wages by 11% for U.S. workers, Nissan is raising by 10%
- **Hyundai committed to 25% increase from 2023-2028**

Average Hourly Earnings Of Production And Nonsupervisory Employees Motor Vehicle & Parts Manufacturing (Not Seasonally Adjusted)



Source: U.S. Bureau of Labor Statistics. BLS.gov

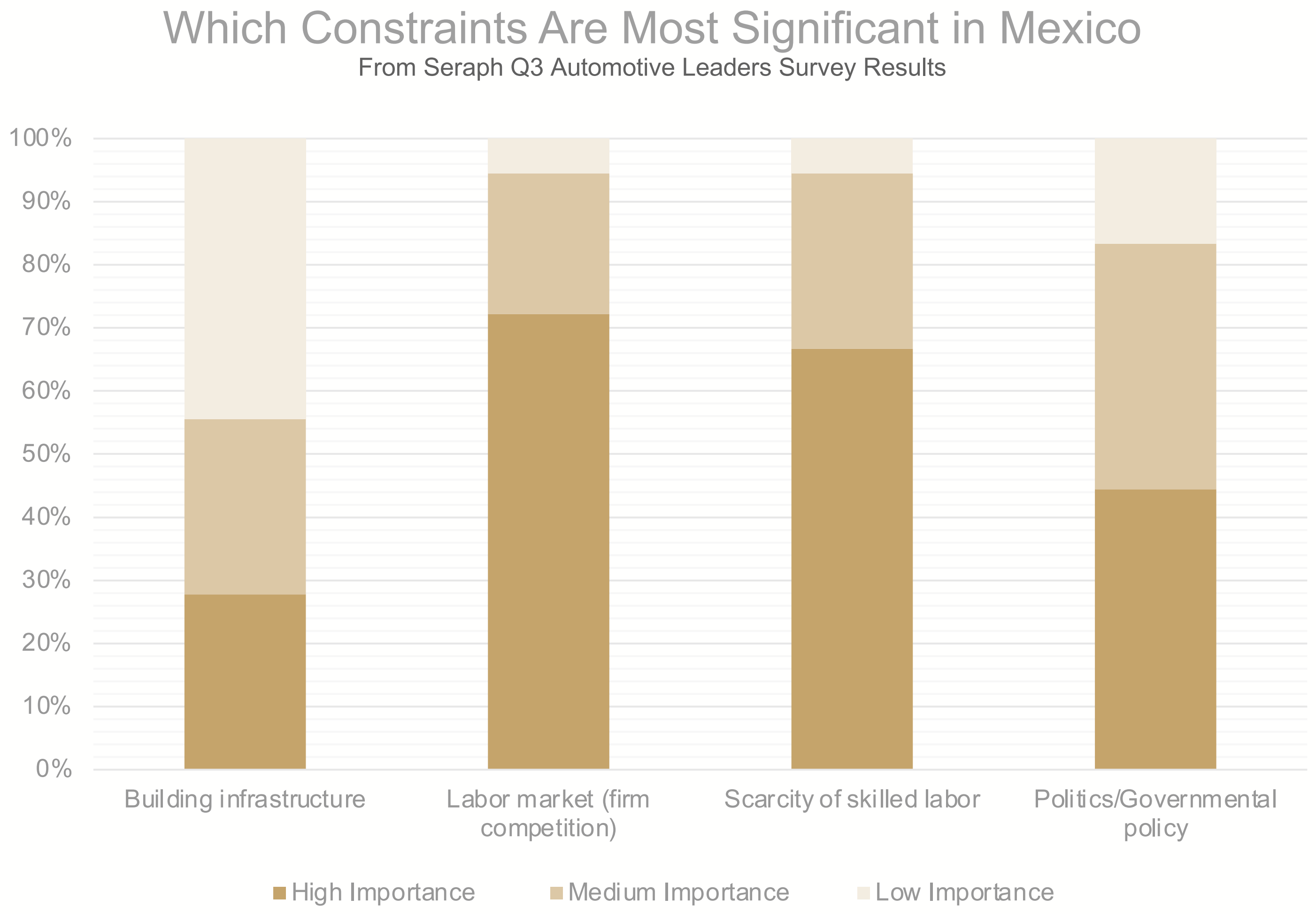
Mexico's labor market is experiencing a 20% minimum wage increase and a possible reduction in work hours, while companies are expanding facilities

Factors Influencing Mexican Labor

- Mexico increased their minimum wage by 20% in 2023
- Mexican Congress discussed lowering the working week from 48 to 40 hours per week, which could decrease labor availability or raise costs
- New facilities and footprint expansion are absorbing more labor, increasing competition for workers

Actions to attract and retain workers

- Transport to and from work
- Cafeteria with high-quality food and vouchers
- Investment in education for worker and family
- Reduce last minute overtime weekend and holiday work

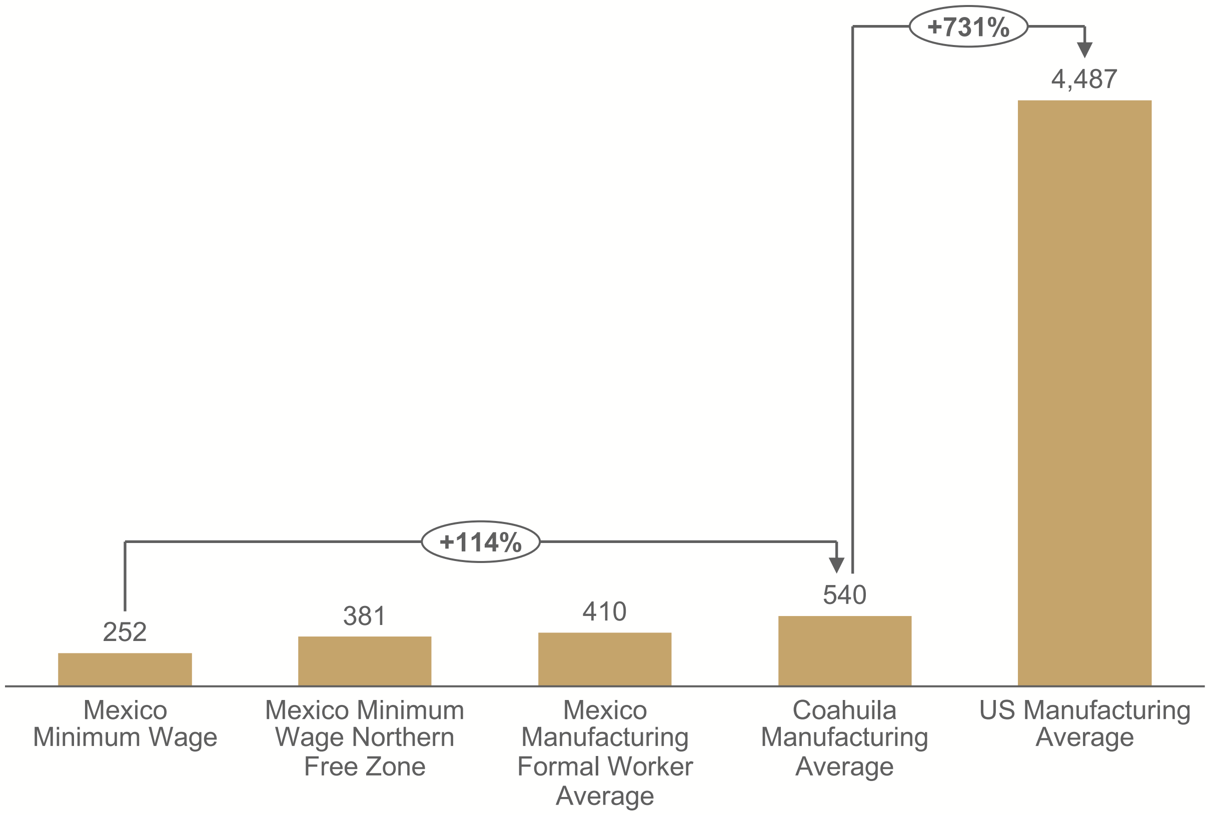


Source: Seraph Q3 survey

Despite rising labor costs in Mexico, it still remains magnitudes cheaper than US

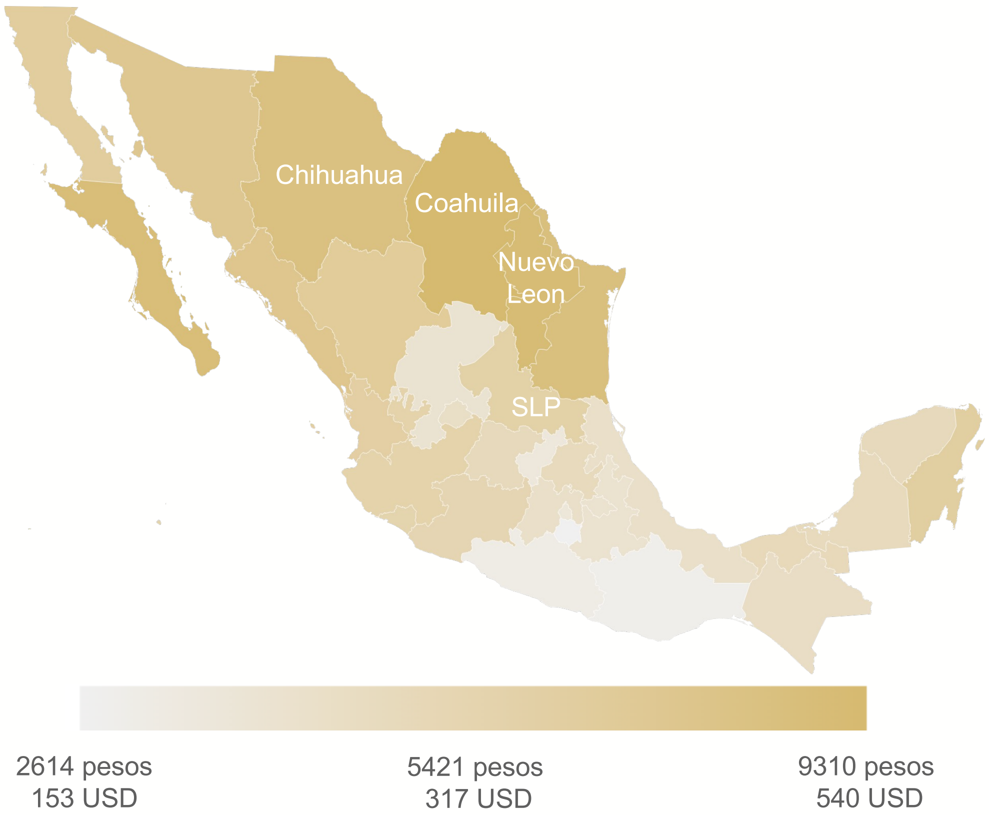
Monthly Labor Wages

USD, assuming 21 working days per month



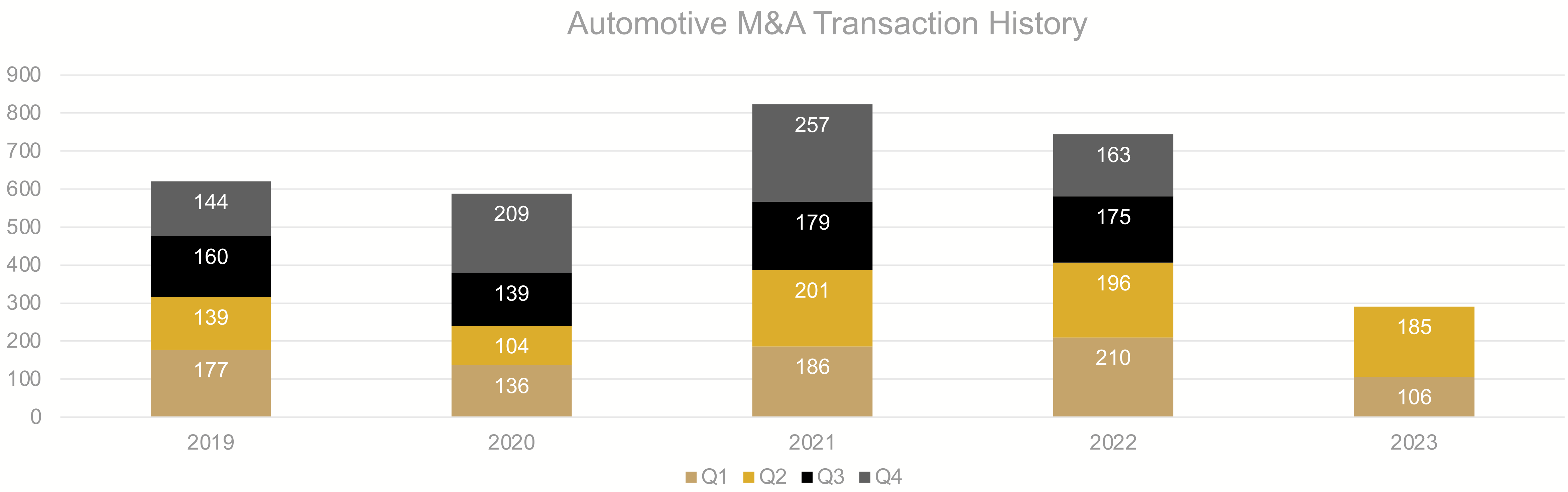
Monthly Manufacturing Labor Earnings

By state



Source: Seraph Q3 survey, Mexico Secretaría de Economía

Higher cost of capital and lower volumes are deterring automotive M&A; strategic EV, autonomous, and consolidation deals will still get done



- The **decreasing volume of M&A transactions** in the automotive industry since 2021 can be largely attributed to **rising interest rates**
- From March 2022 to July 2023, the Federal Reserve consistently **raised interest rates in 11 consecutive sessions**, pushing benchmark rates to their highest in 22 years
- The Fed did not raise rates in the September and November 2023 sessions

Source: S&P Capital IQ, Stout

Some recent examples of strategic EV related deals still getting done under difficult financial conditions

November 2023

PROTERRA

Acquired by

VOLVO

For $210 Million

- Proterra: Developer of battery systems for buses and other heavy duty EV's
- Volvo Group: "The acquisition will complement its current battery-electric business and accelerate the unit's future" (Volvo Group)

October 2023

LEAPMOTOR

20% Acquired by

STELLANTIS

For $1.6 Billion

- The establishment of a Dutch-based joint venture named Leapmotor International is underway, facilitated by the collaboration of the two companies. Stellantis will exercise control over this venture, holding a majority stake of 51 percent.

August 2023

PLASTIKON

Acquired by

ABC TECHNOLOGIES

For $130 Million

- "It amplifies our position as an industry leader in lightweight and plastic injection molding, gives ABC a stronger foothold in the EV space" (CEO of ABC Technologies)

Fierce competition among OEMs actively pursuing resources and expertise in unique casting technologies, intensifying the quest for a competitive edge

Streamlining Production / Part Reduction:
- Ongoing effort to simplify the manufacturing process
- Decreasing the number of vehicle components to reduce complexity and costs

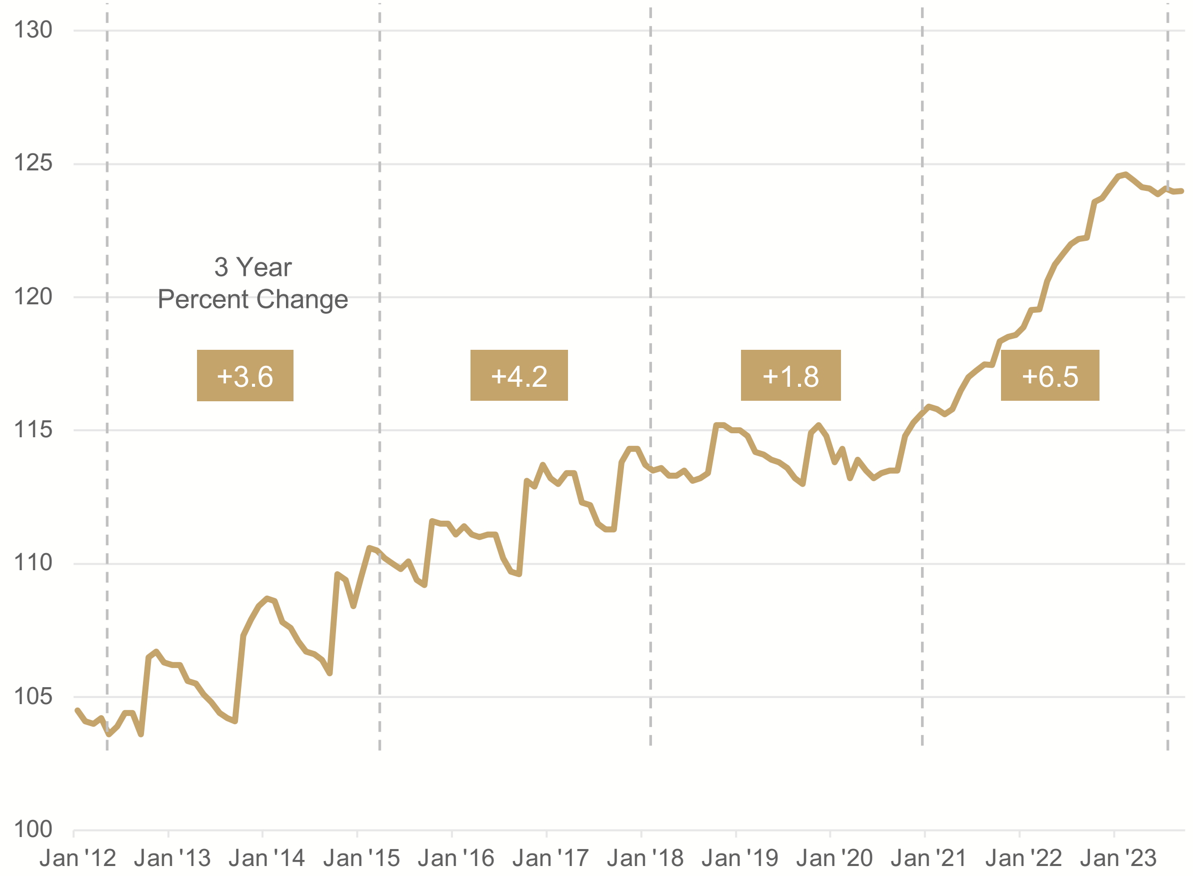
Gigapress Technology:
- Used by Tesla, Ford and Volvo are testing
- Gigapress machines reduce the number of parts and production time
- There is a battle between the OEMs for resources and knowledge around unique casting technologies

Engineering Efficiency / Modular Designs:
- Implementing engineering changes to lower production expenses
- Using modular designs for flexible component combination

Platform Sharing and Standardization:
- Promoting shared platforms and standardization for simplicity

AI Optimization:
- Employing AI for enhanced process optimization and efficiency

Producer Price Index:
Motor Vehicle Manufacturing



Source: St. Louis Fed, Autoblog, Nikkei, Inspekt Labs, Bead Electronics, Reuters, Seraph Q3 Survey

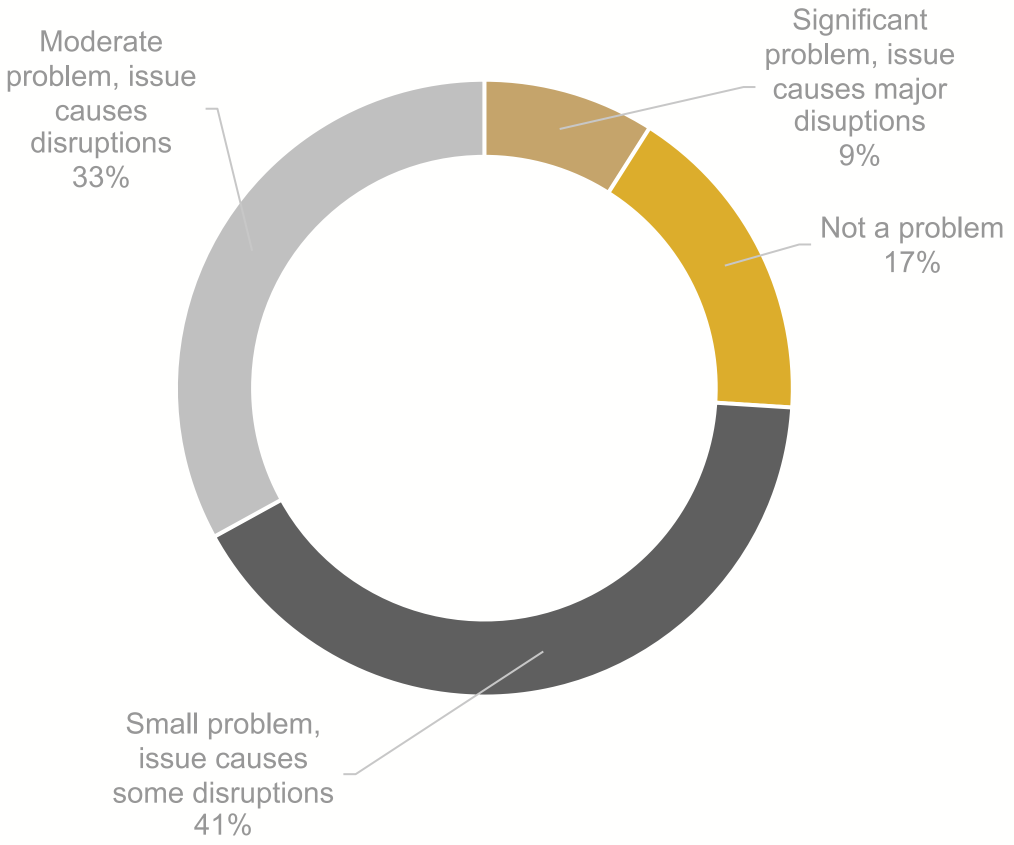
Ensuring successful and timely launches hinges on capable Program Managers, a concern echoed by supplier executives

- **COVID-induced turnover and remote work** disrupted **communication and collaboration** methods that program management relies heavily on:

  1. Meticulous **planning**, **testing**, and **corrections** are required for a successful launch
  2. Seamless coordination of testing and the **use of adequate processes** are all vital for **on-time product launches**
  3. PMs ensure the **establishment and maintenance** of vital **processes** during **green field** plant launches

- **Standards could be compromised**, **outdated processes** used, and **corners cut** to meet deadlines **increasing costs and quality issues**
- Inadequate Program Managers might push OEMs to compromise with engineering changes, potentially contributing to recent **spikes in recalls** and **quality issues**
- Good Program Managers are essential in **preventing risk** associated with compromised standards and **decision-making** ultimately saving money and time on the back end

Missed Errors that Result in Downstream Disruptions



Source: Automotive News Industry Research Study and Survey

Evolving Risks

Geopolitics and Competition

Since our Q2 report

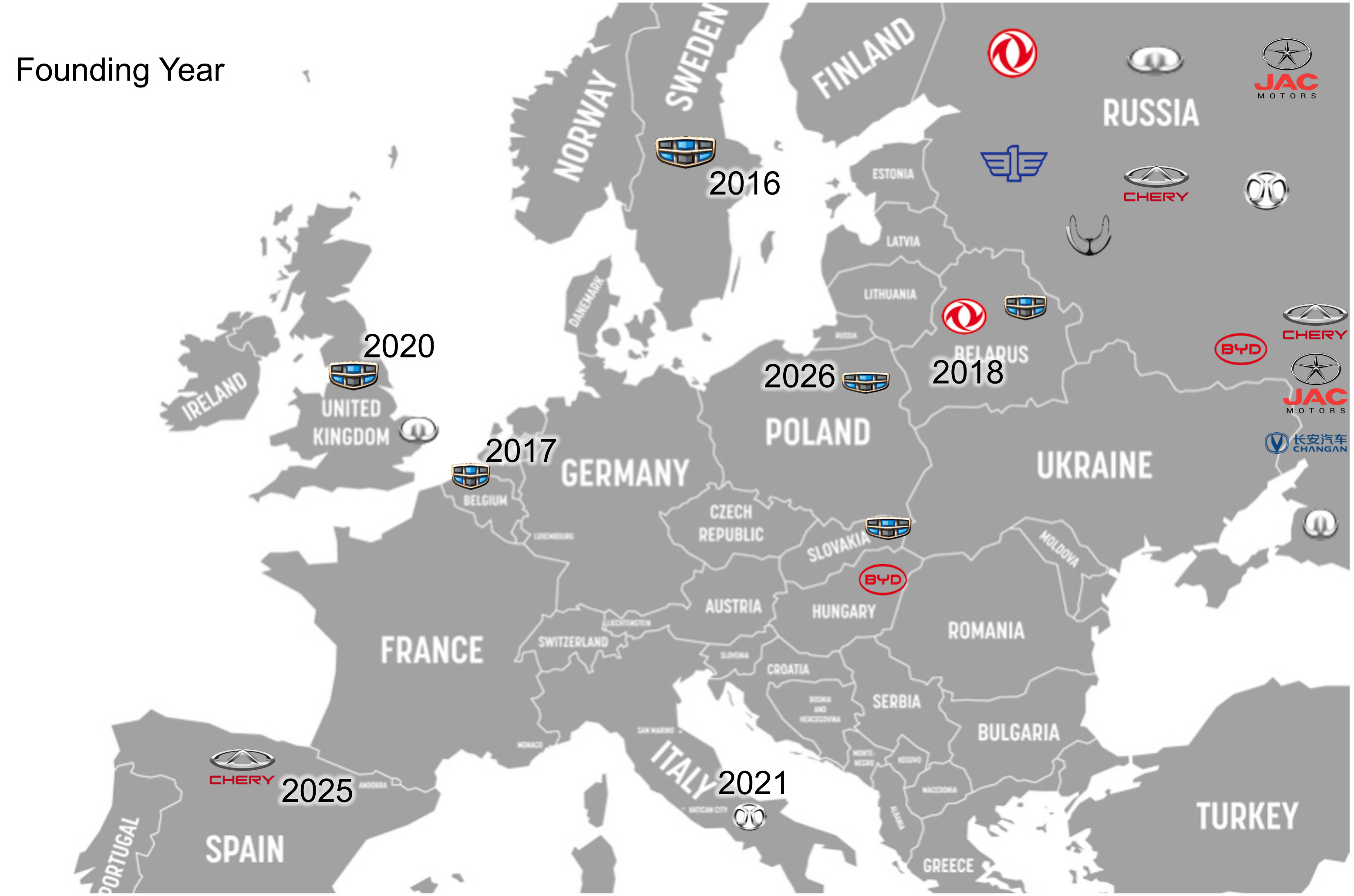
Some big things have changed…

- Conflict in Israel has increased tension in the Middle East
- We anticipate an announcement by a Chinese OEM that they are launching a new manufacturing location in NA 2024

… But a lot has stayed the same

- Battery and critical mineral supply chains owned by US and EU are slow to develop, need to dramatically reduce red-tape and compress timelines
- EU and NA supply chains remain highly reliant on Chinese manufacturing, and tensions remain high
- Ukraine and Russia war continues, reducing economic output and prolonging sanctions
- China's EV production capacity grows
- The European Commission progresses down the preparatory path to climate and sustainability regulation
- OPEC+ continued to reduce crude oil production

Chinese manufacturers have expanded into Europe, adding production capacity and increased market share



Selected Chinese OEM Volumes

Country	Jan-Oct ’22	Market Share	Jan-Oct ’23	Market Share
GER	7,641	0.4%	16,075	0.7%
UK	4,994	0.4%	11,490	0.7%
FRA	15,011	1.2%	17,866	1.2%
SWE	5,023	2.2%	7,507	3.2%

*Chinese OEM registered cars included in above data are: Great Wall, Nio, BYD, Polestar, Lynk & Co., Xpeng

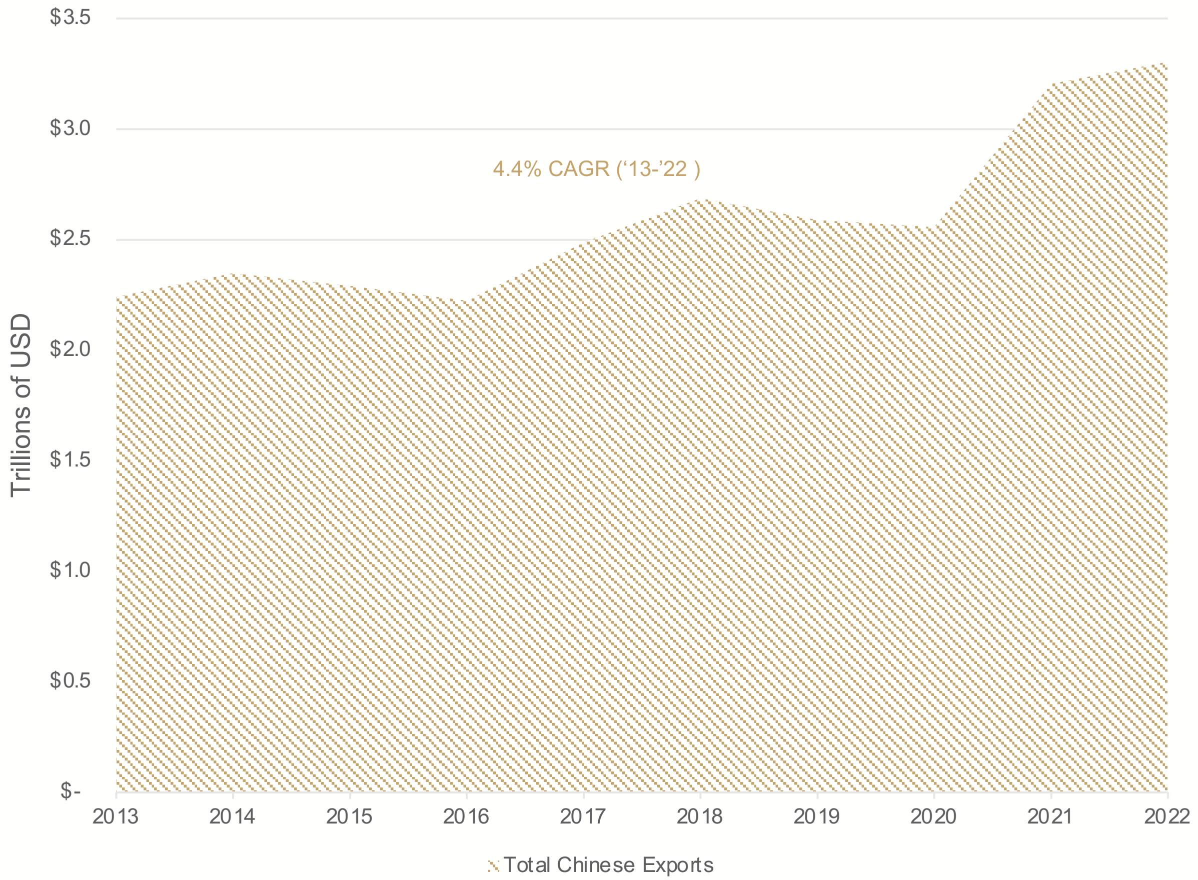
As the North American market evolves, Seraph expects a Chinese OEM to announce a new plant in North America in 2024

1970 → 2030

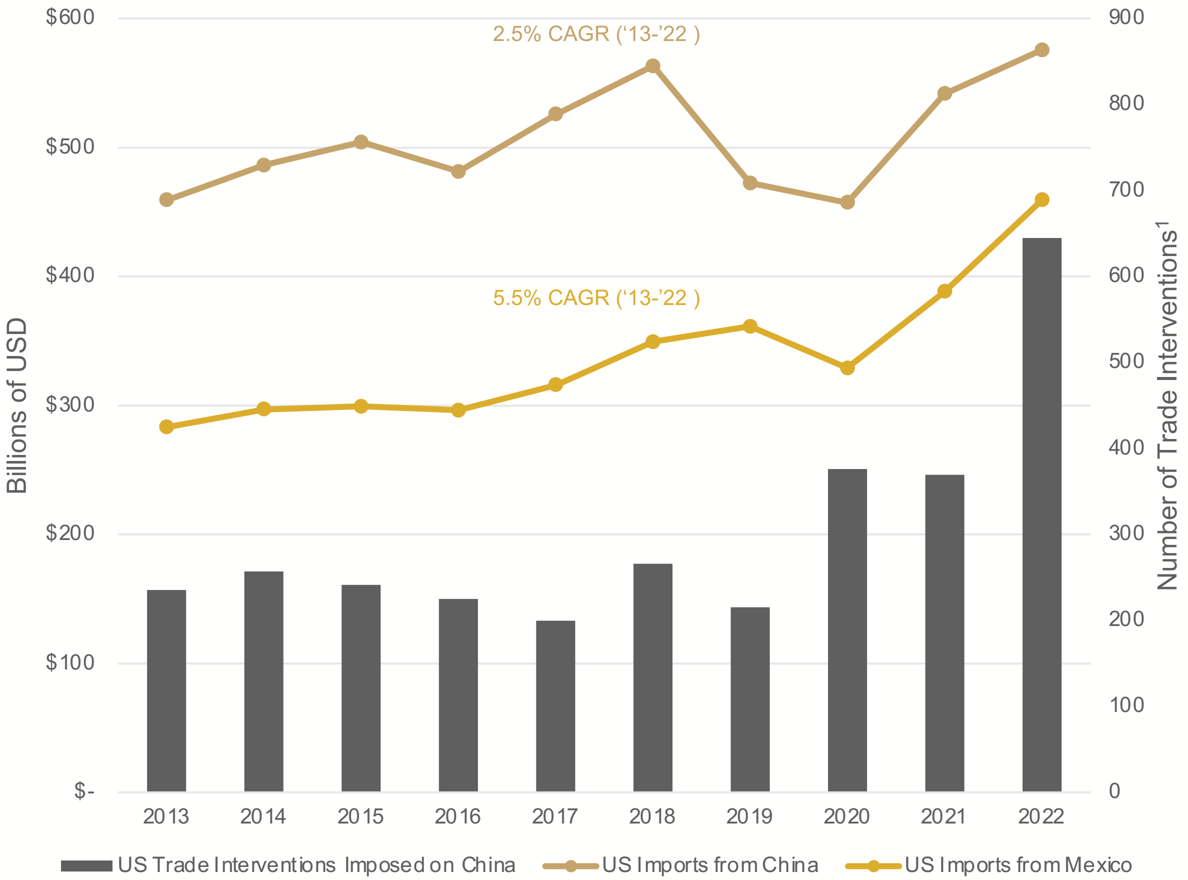
DETROIT 3	OEMs	EV OEMs	CHINESE OEMs
Ford, GM, Chrysler / Stellantis	Nissan, Toyota, Honda, Subaru, Mercedes, Audi, BMW, Volvo, VW, Kia, Hyundai	Tesla, Rivian, Lucid, Fisker, Karma	Polestar, JAC Motors (Already here); NIO, XPENG, BYD, Li, Geely, Foxconn

While China continues to lead global manufacturing, aggressive US trade policy has accelerated nearshoring to Mexico

Steady Increase in Chinese Exports Globally



US Trade Reliance Slowly Shifting to Mexico

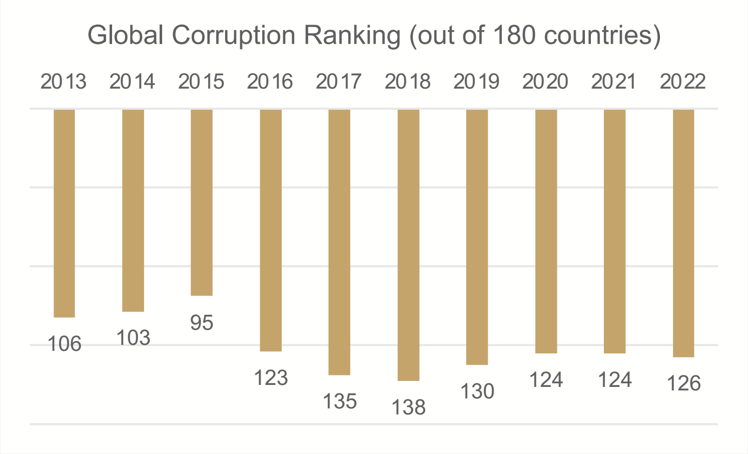


1) Trade interventions include tariffs, subsidies, import restrictions, and any other state-sanctioned interventions that are likely to affect foreign commerce
Source: UN Comtrade Database, Global Trade Alert

Mexico has struggled to keep up with this surge in demand, hindered by political instability, poor infrastructure, and insufficient human capital

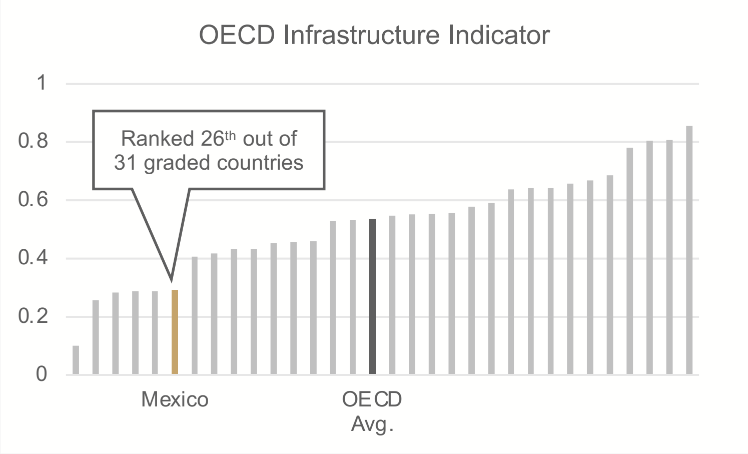
Political Instability

- Corruption and crime remain significant risks to setting up operations in Mexico
- In Mexico:
  - 44% of people believe corruption has gotten worse in the last 12 months
  - 36% of public service users paid a bribe in the previous 12 months
- According to the Global Organized Crime Index, Mexico ranks 3rd in global criminality



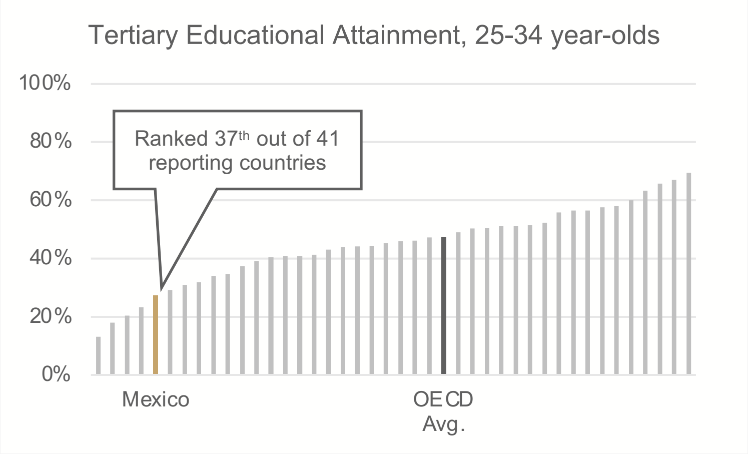
Infrastructure

- Mexico's infrastructure has struggled to keep up with demand due to 2 main deficiencies
  - Logistics – Ports and railways can't support current import/export volumes
  - Energy – Pemex natural gas production down ~33% from 2009 highs, forcing reliance on US
- These deficiencies are amplified in border areas



Human Capital

- Mexico has made progress in educating its workforce, but it has been slow
  - 18th fastest growth in young adult educational attainment, from '18-'22, out of 41 reporting countries
- Lack of education has caused a skilled labor crunch
  - 75% of employers in Mexico report difficulty finding employees



Source: Global Corruption Barometer, Corruption Perceptions Index, Global Organized Crime Index, Mexico Business News, OECD, S&P Global Commodity Insights, Employers' Confederation of the Mexican Republic

Nearshoring from Mexico has not proven to be a definitive solution for the US to reduce reliance on China

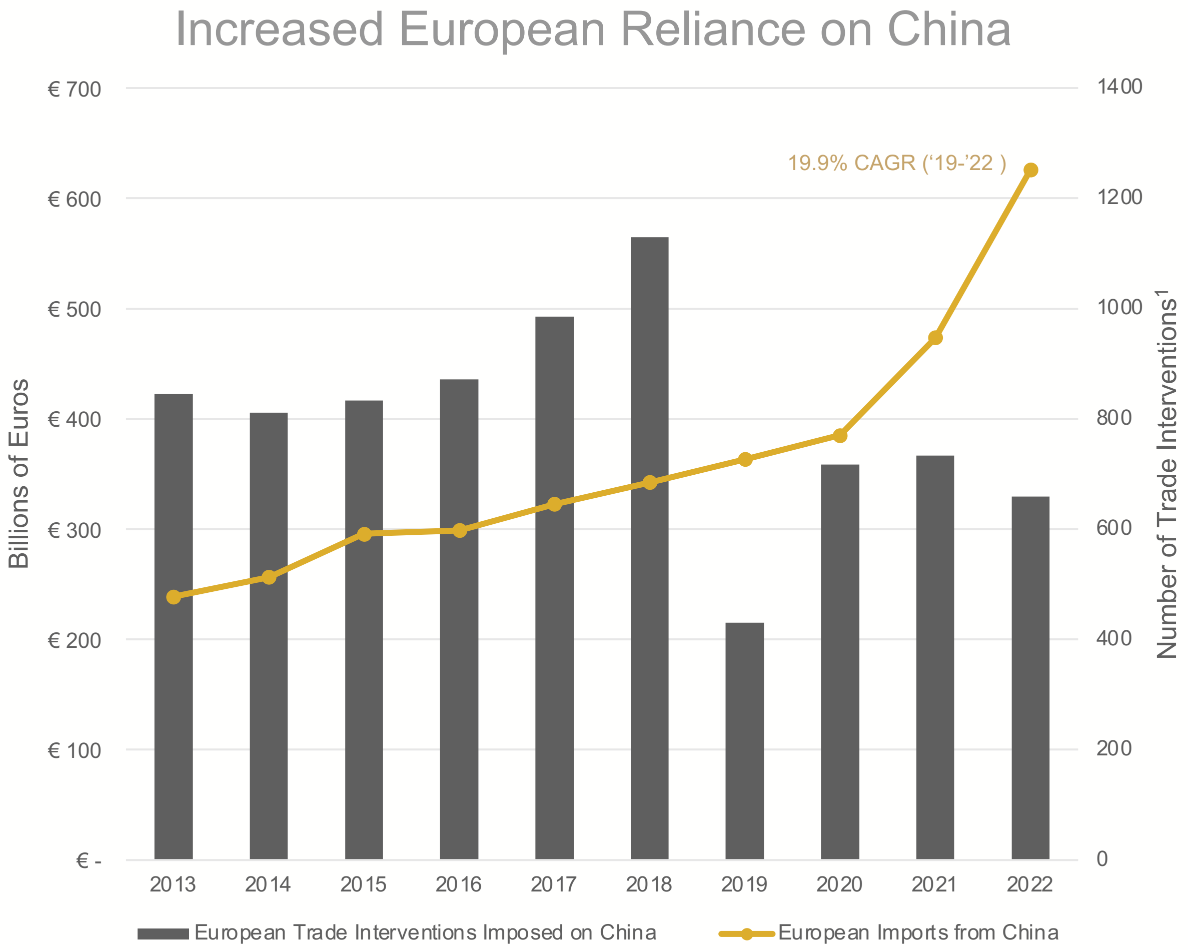
In Q3 2023, China's GDP grew 4.9% year-on-year, up 1.3% quarter-on-quarter from Q2. This represents a moderation compared to China's long-term average growth rate, which historically hovered around 6-7% annually.

Chinese companies are investing heavily in factories in Mexico to secure favorable import terms via the USMCA and de-risk losing access to the US market.

This shift underscores the enduring strength of commercial ties between the US and China, despite political strains.

Source: US Bank Wealth Management, New York Times, EPS News

Amid mixed messages and talk of "de-risking," Europe has drastically increased its reliance on Chinese manufacturing in recent years



*"Creating an **open market** …was one of the EU's founding principles… The EU has **no intention of decoupling from China**."*

- Valdis Dombrovskis, EVP European Commission

*"**We also need to evolve our approach to China**. Let's be clear, the so-called 'golden era' is over"*

- Rishi Sunak, UK Prime Minister

*"**Diplomatic de-risking is crucial** as we aim to maintain open communication lines with China."*

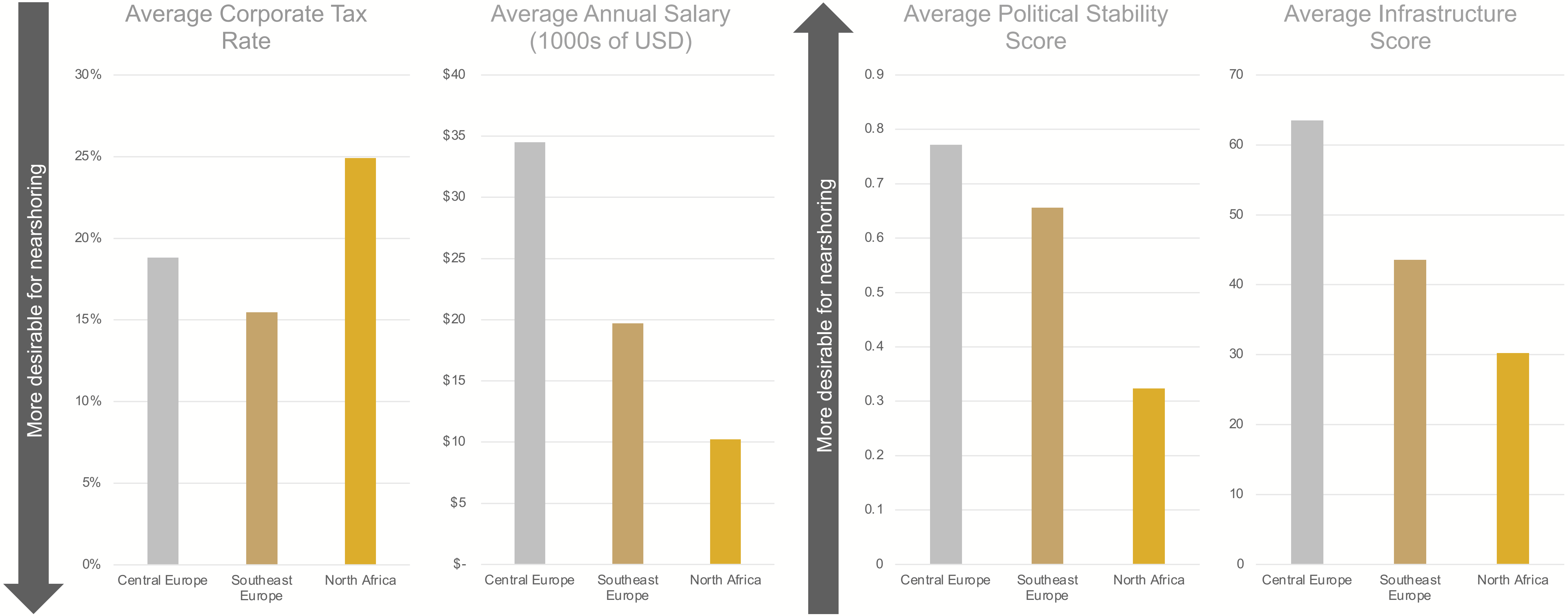
- Ursula Von der Leyen, President European Commission

*"**China remains a partner, a competitor, a systemic rival**. But the aspect of systemic rivalry has become increasingly prominent…"*

- Annalena Baerbock, German Foreign Minister

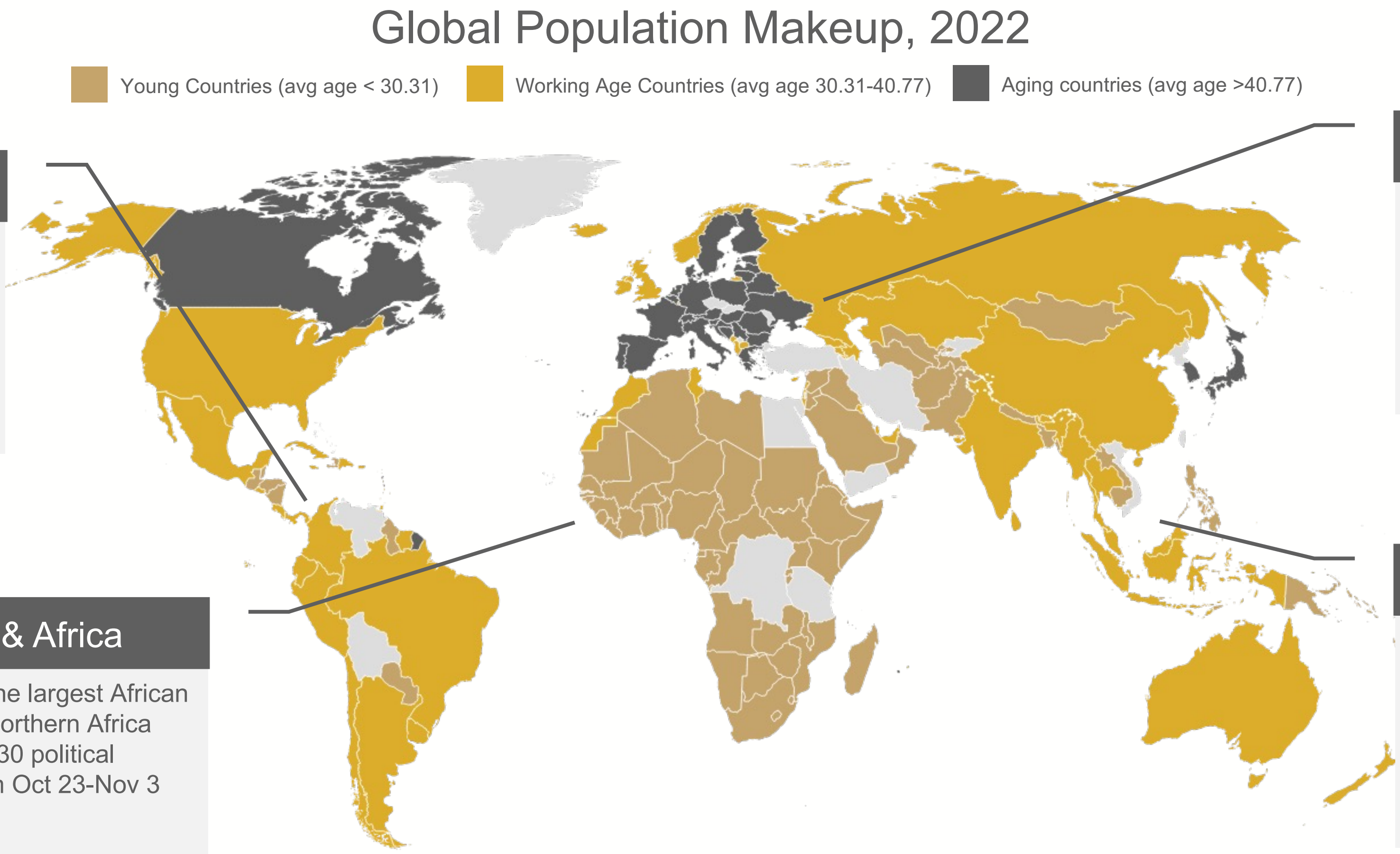
1) Trade interventions include tariffs, subsidies, import restrictions, and any other state-sanctioned interventions that are likely to affect foreign commerce
Source: Global Trade Alert, Eurostat, Reuters, Associated Press

Several regions present opportunities for nearshoring if Europe decides to seriously pursue a de-risking strategy



Source: Tax Foundation, OECD, World Economic Forum, Global Infrastructure Hub

As the the world continues to search for China alternatives, several regions with favorable demographics will vie for manufacturing growth



Mexico & SA

- Mexico has the 2nd highest level of Emigration of any country
- USMCA increased regulation between Mexico and US trade
- SA is currently experiencing the largest exodus in recent history, 7.3M migrants from Venezuela

Middle East & Africa

- Only 2 out of 10 of the largest African ocean ports are in Northern Africa
- Middle East had 1,230 political violence events from Oct 23-Nov 3

Eastern Europe

- Overall declining population rate since the 1990's
- Has the lowest levels of GDP per capita of any region in Europe

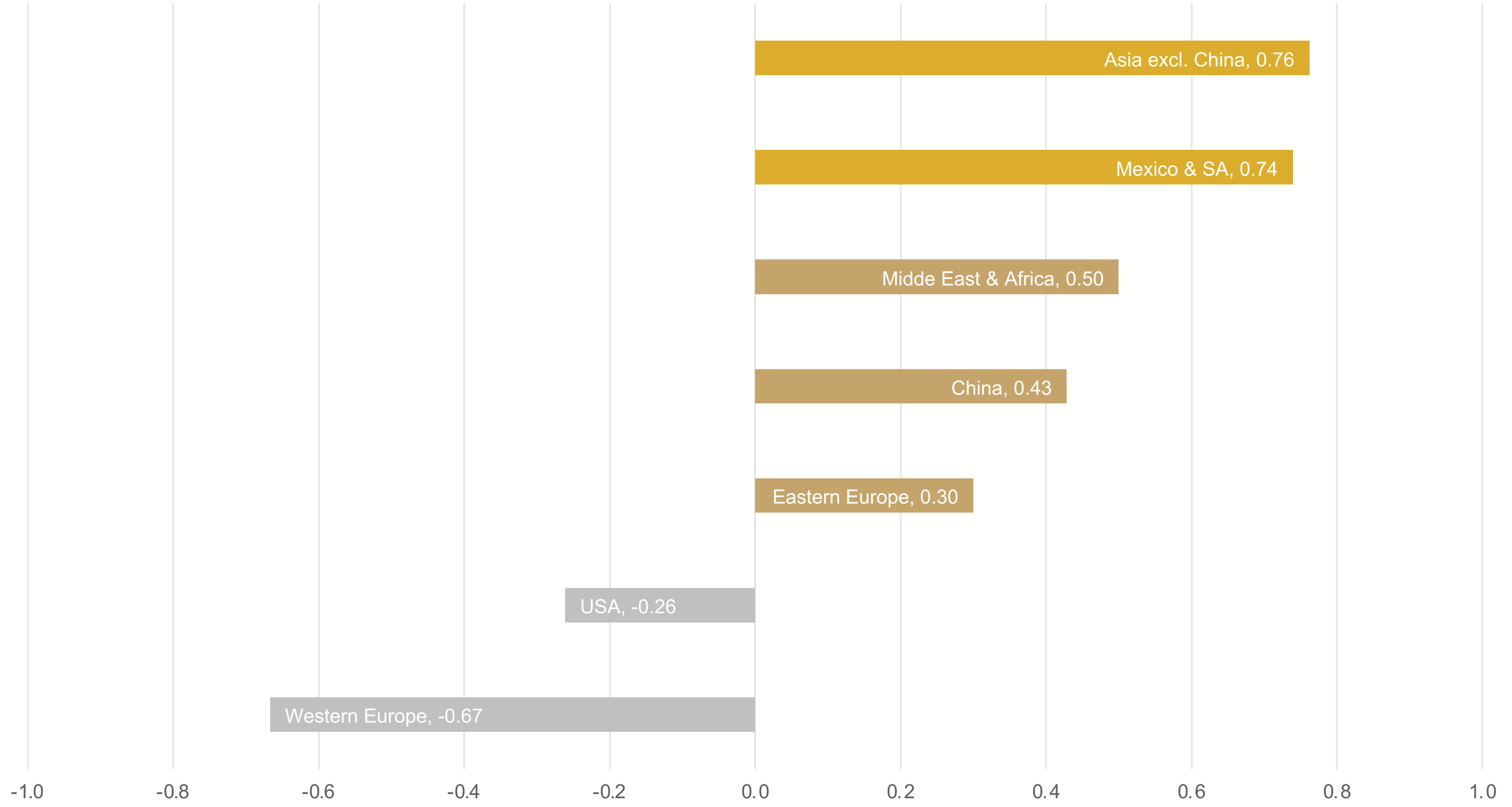
Asia (excl. China)

- Second highest at-risk region for natural disaster (Floods, Earthquakes and Tsunamis)
- Worlds largest source of greenhouse gas due to reliance on fossil fuels

Source: United Nations World Population Prospects 2022

Auto execs see Asia (excl. China) as the region most likely to grow over the next 5-10 years, followed closely by Mexico & SA

Auto Manufacturing Net Growth Score[1] by Region



Rapid Growth

1. **Asia exc. China**: A global effort to reduce reliance on China, stable gov'ts, and strong infrastructure have primed the region for mfg. growth
2. **Mexico and SA**: Strong population growth, improving infrastructure, and proximity to the US are all tailwinds for the region

Moderate Growth

1. **Middle East & Africa**: Population growth makes the region desirable in the long-run
2. **China**: Continued mfg. dominance is threatened by an aging economy & political tensions
3. **Eastern Europe**: Cheap labor and proximity to Western Europe make the region viable

Decline

1. **USA**: Despite efforts to boost domestic mfg., Mexico remains far more cost effective for companies to set up operations
2. **Western Europe**: A rapidly aging economy, high energy & labor costs, and lack of unified mfg. strategy have primed Western Europe for mfg. decline

1) Respondents were asked, for each region shown, if they expected auto mfg. to increase, decrease, or stay the same over the next 5-10 years; net growth score = (# of respondents expecting an increase in auto mfg. – # of respondents expecting a decrease in mfg.) / total # of respondents
Source: Seraph Q3 Survey

Decoupling from China has mixed effects on the global economy

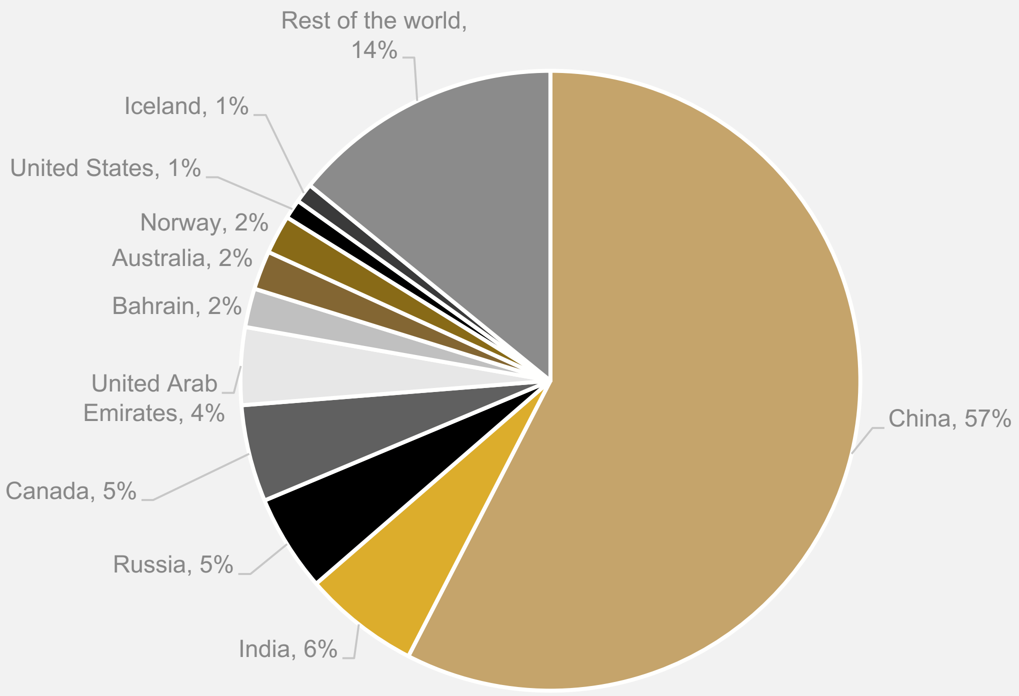
Positive Implications	Negative Implications
Diversification of Supply Chain: Reducing reliance on China boosts global supply chain resilience, mitigating regional disruptions.	**Increased Costs:** Shifting from China may raise production costs, impacting consumers due to higher labor, regulatory, and transportation expenses.
Geopolitical Risk Mitigation: Less dependence on China reduces the impact of geopolitical disputes on supply chains and markets.	**Supply Chain Disruptions:** Diversifying supply chains can reduce risk but pose challenges in establishing reliable supplier relationships, potentially causing disruptions.
Promotion of Local Industries: Encourages growth of domestic and foreign industries, creating jobs and economic development.	**Economic Impact On China:** Global reduced dependence on China can affect its growth, job market, and government revenue.
Reshoring: Bringing production closer to home markets stimulates economic growth and manufacturing employment.	**Impact on Global Trade:** Reducing dependence on China may reshape global trade patterns, necessitating new trade agreements and altering trade balances.

Source: Seraph Consultant Survey, Penn State School of Public Policy, Peterson Institute for International Economics, Reuters

Enhanced supply chain transparency raises concerns about increased risks when sourcing aluminum from China

- In 2022 China produced **40 million metric tons** of aluminum
- The US is the largest importer of Chinese aluminum with **4.04 billion dollars** in 2022
- In 2022, the EU imported **5.61 billion dollars** of Chinese aluminum
- **The Uyghur Forced Labor Prevention Act (US)** went into effect in **June 2022,** banning the import of goods made with forced labor in the **Xinjiang region**
- **51 car manufacturers** have been linked to the region

Global Aluminum Production



Source: US Dept of Homeland Security, Reuters, Harbor Aluminum

OEMs are changing their Terms and Conditions and placing responsibility on Tier 1 suppliers

- The majority of OEMs are revisiting their terms and conditions to enhance **environmental, social**, **and governmental factors (ESG)** coverage
    - “Supplier Code of Conduct”, “**Responsible Material Sourcing**”, “Responsible Purchasing Guidelines”, “Supplier Sustainability”, etc.
- Suppliers must fulfill OEMs' **quality, quantity, social responsibility**, and **cost-saving demands**
- Suppliers reduced costs through cheap labor, but **OEMs now enforce strict anti-forced labor measures**, necessitating a change.
- ESG term violation might lead to OEMs terminating supplier relationships
- Suppliers may still be under contract to produce goods for OEMs until an alternative is found
- In 2024, suppliers should **emphasize the standardization of reporting** and **expedite the classification of materials and processes** to avoid potential violations

ESG

Environmental

- Climate change and greenhouse gas emissions
- Environmental emissions (air, water, land) pollution, and waste
- Biodiversity loss
- Enhancing energy efficiency
- Mitigating resource depletion
- **2030 – 2035** 55% reduction in Co2 emissions
- 2035 – EU law all new cars sold to have zero emissions

Social

- Human rights
- Safety and wellbeing
- Diversity, equity, and inclusion
- Conflict zones and minerals
- Community engagements

Governance

- Executive compensation and board independence
- Conflicts of interest
- Combating money laundering, bribery, and corruption
- Ethical tax practices
- Stakeholder engagement

Source: Butzel

New in 2023, sustainability reporting is mandated in Europe, companies will face a challenge collecting and recording data

- The Corporate Sustainability Reporting Directive (CSRD) requires companies to report on their environmental impact, social responsibility, governance, and how these areas affect and are affected by their business
- **Non-compliance risks:** fines up to €10m or 5% of annual revenue
- **Geographic Impact:** All EU and EEA Countries

CRSD Expansion Timeline, Report to be Filed in Following Year

2024	2025	2026	2028
Large EU-listed entities *500+ employees, listed in EU*	All Large Entities *Meets at Least two criteria: €40M net turnover, €20M in assets, or 250 employees.*	Listed SMEs *Publicly listed small and medium size businesses*	Foreign entities with significant EU ops *Firms headquartered out of the EU, with EY sales over €150M and a subsidiary meeting previous criteria*

Key Actions – Start now

- **Scope Analysis** 12–18-month scope analysis of all stakeholders across the company's global footprint. Early Engagement
- **Risk Management** full assessment of risk factors in sustainability and mitigation steps
- **Double Materiality Assessment –** Review inside-out impact of business on society and outside-in impact of environmental and social factors on business model
- **Voluntary Compliance –** take the initiative and lead peers in your market

2030-2035 Emissions	***Fit for 55***	EU toughening CO2 emission standards for Cars & Vans by reducing greenhouse gas emissions by 55% by 2030
	2030-34	55% lower CO2 emissions from 2030 versus 2021 levels.
	2035 -	EU Fleet-wide target 100% CO2 reduction for cars and vans

Source: European Commission, Latham Watkins

Seraph.

Thank you

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OUR TEAM

We are happy to meet with you and your team, take you through the report and discuss the impacts for your business.

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