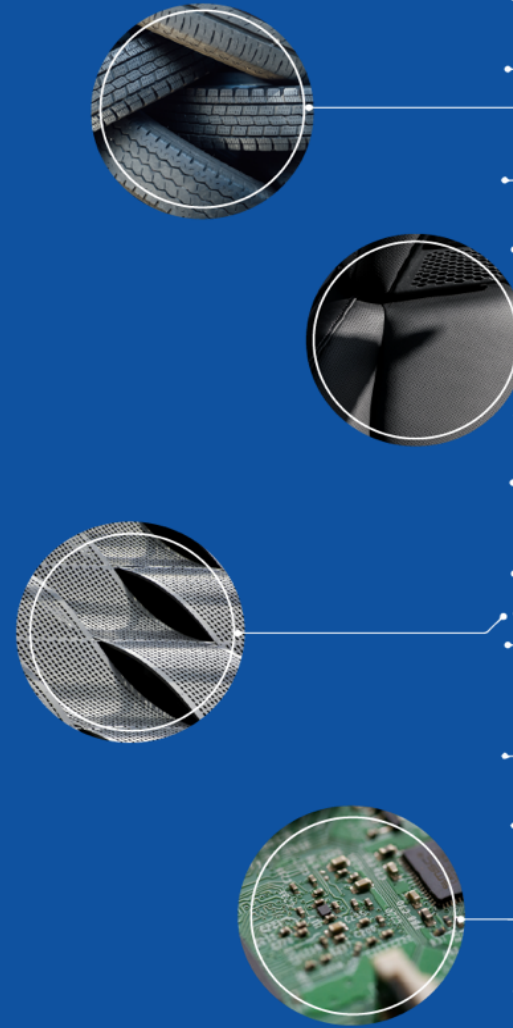




Material shortages disrupt automotive supply chains

How OEMs are mitigating Covid-19 and bullwhip effects



Introduction

Slide 03

- Covid uncertainty wreaks supply chain havoc
- Bullwhip effect on supply chain logistics
- Covid-19 forces OEMs to build supply resilience
- Materials prices hit the roof

Part 1: Chip shortage

Slide 08

- Chip shortage drives up prices
- European overdependence on Asia
- OEMs push prioritised, profitable production
- Estimating impact to European production

Part 2: Metals price rise

Slide 17

- Metals indicators soar
- Iron ore up, steel up
- Steel price hike affects automotive industry
- EU steel import restrictions to harm industry

Part 3: Upholstery Bottlenecks

Slide 23

- Hides, skins, leather Soar
- Leather hike hits industry
- Seat foam prices soars

Part 4: Rubber Diverted

Slide 28

- Rubber prices soar
- Story behind rubber price hike

Part 5: Container Crisis

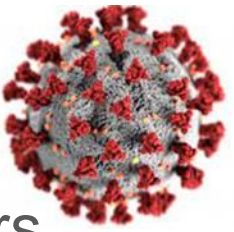
Slide 31

- Container rates soar
- Industry reactions

Part 6: OEMs mitigate disruption

Slide 35

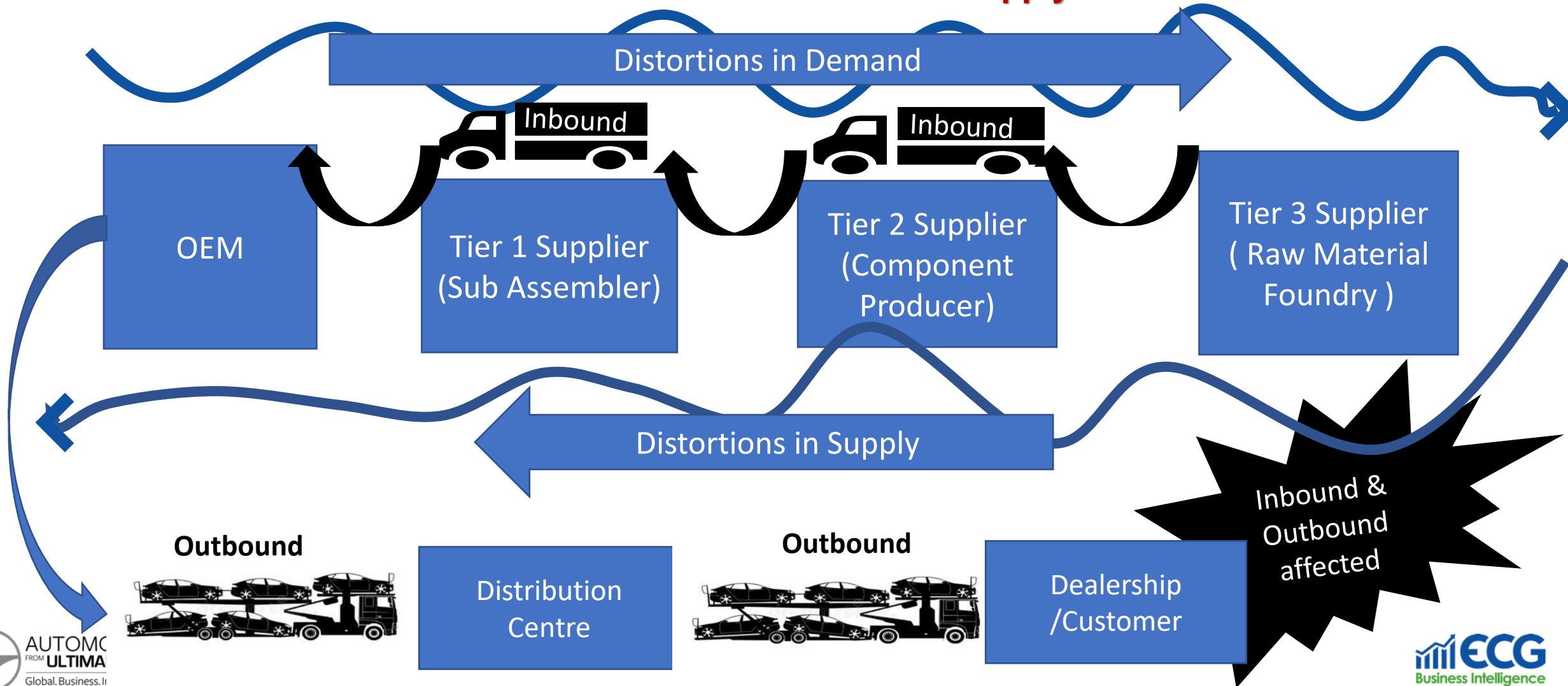
- OEMs push value over volume
- 2021 Q1 European exports rise by value
- OEMs push SKU Strategy: the 'new normal'?
- Estimating delayed production
- Value-based production will benefit logistics



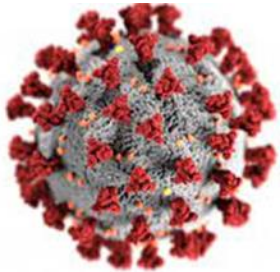
How uncertainty affects logistics

Incorrect forecasts, unknown projections cause havoc for logistics providers

- **BULLWHIP EFFECT: Incorrect demand forecasts** cause **supply chain inefficiencies**



Impacts of uncertainty on FVL



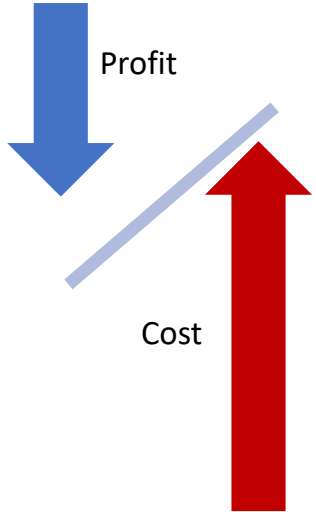
Incorrect & Uncertain projections lead to supply chain havoc

Misguided Capacity Allocation

Ineffective Transport Management

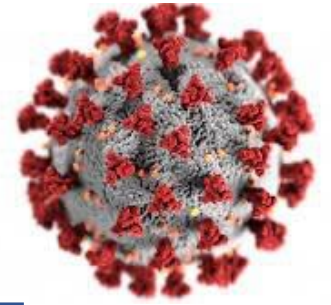
Skewed Planned Projections

Loss of Network Efficiency

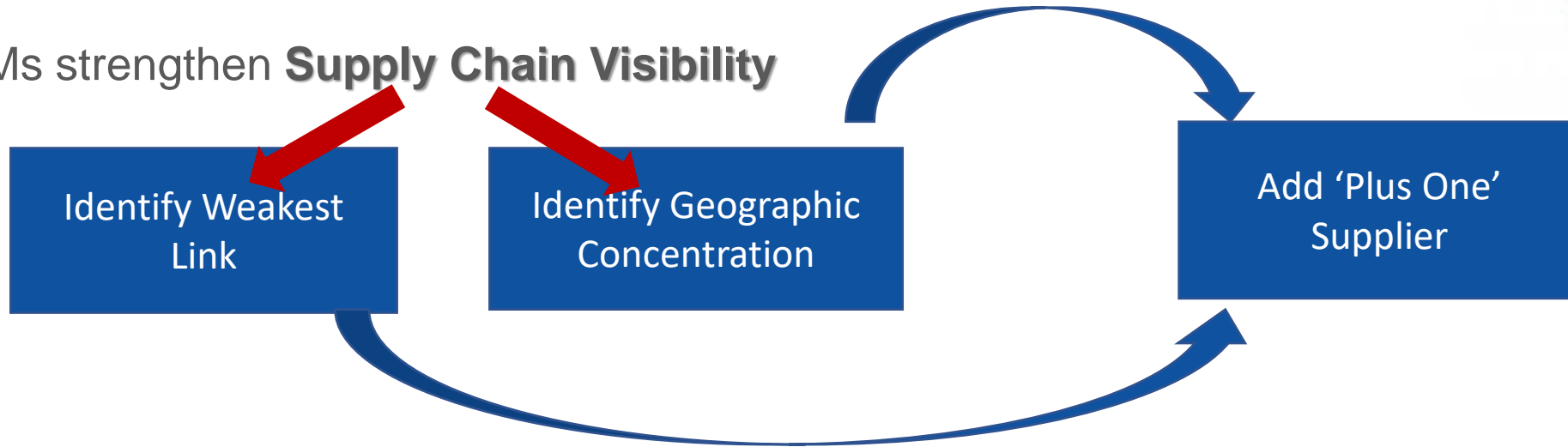


Decline in Profit

Covid-19 forces OEMs to shift strategy

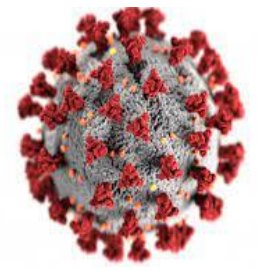


- OEMs strengthen **Supply Chain Visibility**

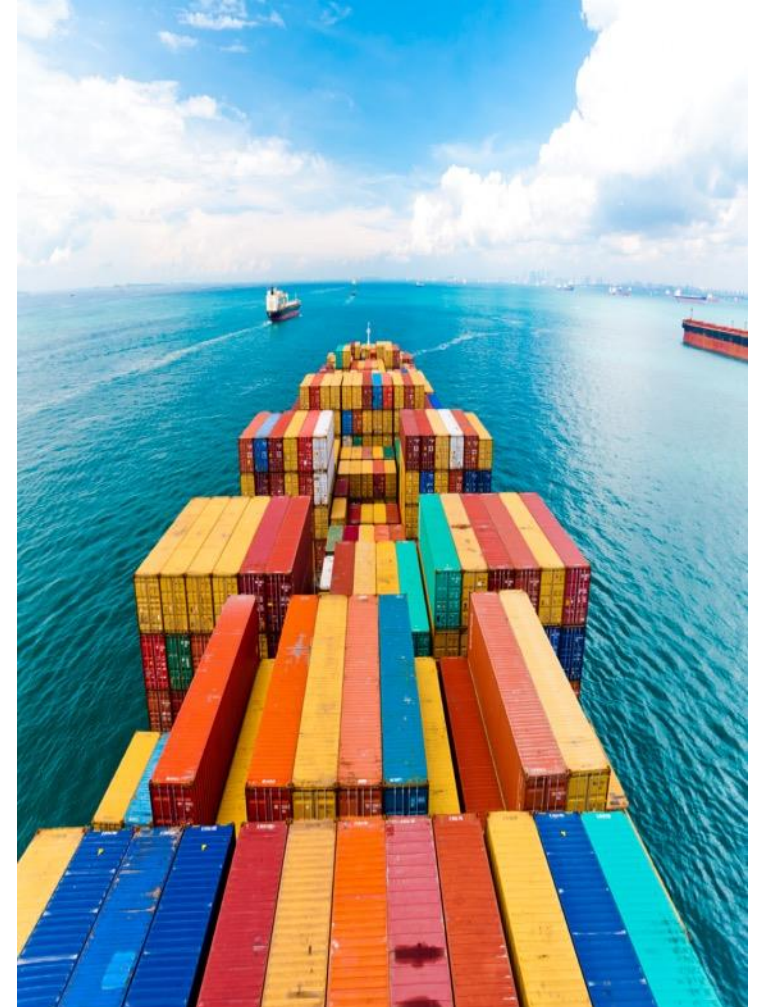


- OEMs enhance use of **Digital & Autonomous** systems
 - Reimagine strategic architecture of supply chain
 - OEMs push for digital systems to enhance agility and efficiency
- OEMs prioritise **SKU Rationalisation**
 - Optimise profitable production using Stock Keeping Unit (SKU) Rationalisation
 - Pause or stop output of low profit models, prioritise higher margin models

Materials prices, container rates soar



- Iron Ore prices up 101.1% y/y, Steel prices rise 41.37% y/y
- Leather, hides up 30.53% y/y
- Tyres & Rubber index up 104.2% y/y
- Chip prices up 25% y/y
- Container rates soar 300% y/y



Industry Reactions

Volkswagen Group

“The supply chain of many industries is interrupted.
Price increases will be considered.”



01

Chip Shortage Continues

Semiconductor prices surge, OEMs prioritise production

Chip Shortage Drives up Prices

Bloomberg

TSMC Lifts Targets After Warning Chip Crunch May Hit 2022

Seeking Alpha ^α

TSMC reportedly raising consumer electronics wafer prices by 25%

NIKKEI Asia

SEMICONDUCTORS

TSMC cancels chip price cuts and promises \$100bn investment surge

TSMC rumored to increase price by 25 percent; could lead to increased smartphone pricing

TAIPEI -- Taiwan Semiconductor Manufacturing Co. is asking clients to accept higher prices as it ramps up investment to deal with a "structural and fundamental increase" in chip demand.

NIKKEI Asia

Chipmakers hike prices as global semiconductor shortage continues

 Windows Central

Chipmakers are upping prices at a time when demand is at an all-time high.

Rising new and used car prices

Autotrader

As new car inventory dries up, here are the ones that are almost impossible to get

One popular Toyota is down to just 9 days' supply

Preisentwicklung

Gebrauchtwagen werden durch Corona teurer

Lange litt der Autoverkauf unter der Pandemie. In jüngster Zeit zogen Preise für Gebrauchtwagen aber an. Schuld sind ein knappes Angebot und Sorgen vor einer Infektion.

Edmunds: Less choice, higher car prices in chip shortage AP

**'We've never seen anything like this':
Computer chip shortage continues to impact
car dealerships**

FEATURED

Chip shortage explained: Low inventory, skyrocketing used car prices and no end in sight

Käufer weichen auf Gebrauchtwagen aus

Um 90 Prozent! Autopreise steigen viel schneller als Einkommen

WIRTSCHAFT DAT-REPORT

WELT

Die Deutschen zahlen für ihr neues Auto so viel wie nie

Crisis to Extend to 2022

Published on 17.06.2021

Automotive suppliers highlight strategic role in EU semiconductor policy; shortages may be felt well into 2022



Autos & Transportation

Volkswagen warns of worsening output hit from chip shortage - FT



AUTO • SEMICONDUCTOR

Mercedes braces for big Q2 shortfall as global chip crisis roils the luxury car market

FORTUNE

Ford details new production cuts due to global chip shortage

Stellantis says carmakers' chip shortage will worsen

FINANCIAL TIMES

Chip shortage to last until at least mid-2022, warns manufacturer

myFT

GT Global Times

Auto chip supply crunch worsens, probably to last till 2022

Vehicle sector to face tougher supply in Q3, experts warn

AUTOS

Chip shortage expected to cost auto industry \$110 billion in revenue in 2021



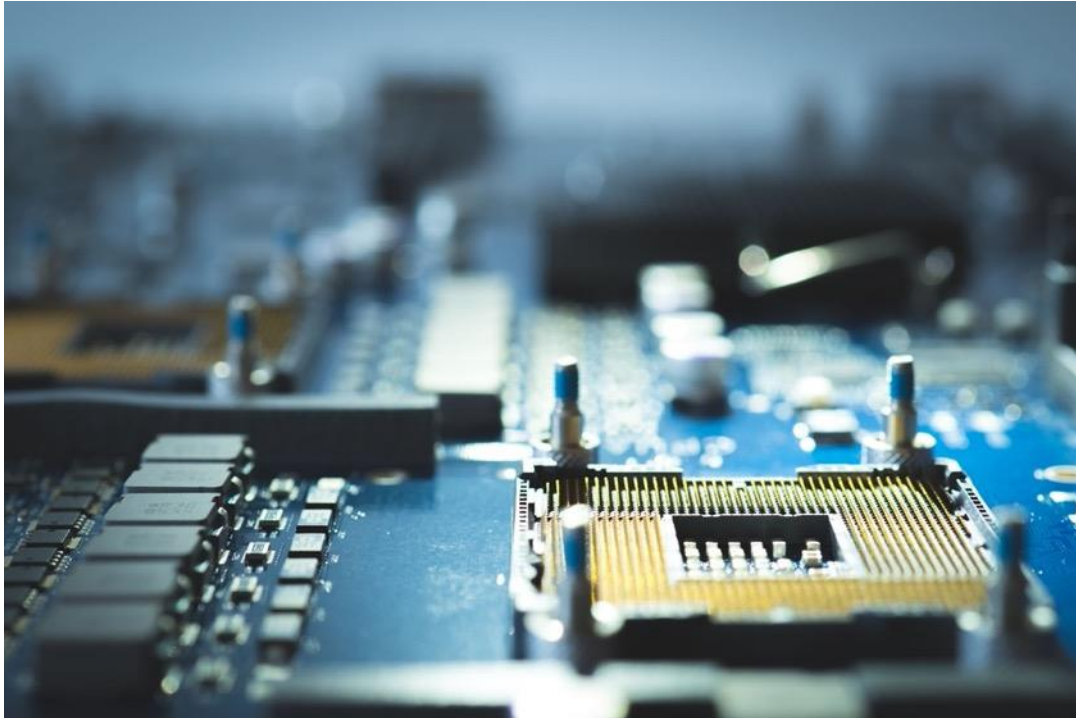
Stellantis scraps digital speedometers for Peugeot car in chips shortage



Auto Industry Production Wilts Under Pressure From Chip Shortages, But There Are Plusses

Forbes

European overdependence on Asia



Automotive responsible for 37% of demand for semiconductors in Europe (globally 10%)

Europe sources 60-70% of chips from Taiwan and China

Electronics and semiconductors now account for 35% of car cost, and will rise to 50% for electric and autonomous technologies (CLEPA)

Production of 500,000-700,000 units disrupted in Europe in first half of 2021

OEMs push prioritised, profitable production

Mercedes-Benz Strategy

We will focus on profitable growth

Profit
Rethink volume ambitions – profitability first

Price
Reorientate pricing and channel mix

Portfolio
Reshape future product portfolio to optimize returns

Rethink volume ambitions: Profitability first

Reinforce our **contribution margins** with current portfolio – **shifting upwards** over time

Ensure volume targets focus on the **most profitable** models and regions

The slide features a dark background with a grid of small white dots. On the left, a bar chart shows three bars labeled 'Profit', 'Price', and 'Volume'. The 'Profit' bar is the tallest and is labeled '#1'. In the center, there is an image of a modern, glass-walled building. On the right, there is an image of several Mercedes-Benz cars. A world map is visible in the background on the right side of the slide. At the bottom, there is a video player interface with a play button, a progress bar, and a timestamp of 11:08.

Profit

Rethink volume ambitions: profitability first

Price

Reorientate pricing and channel mix

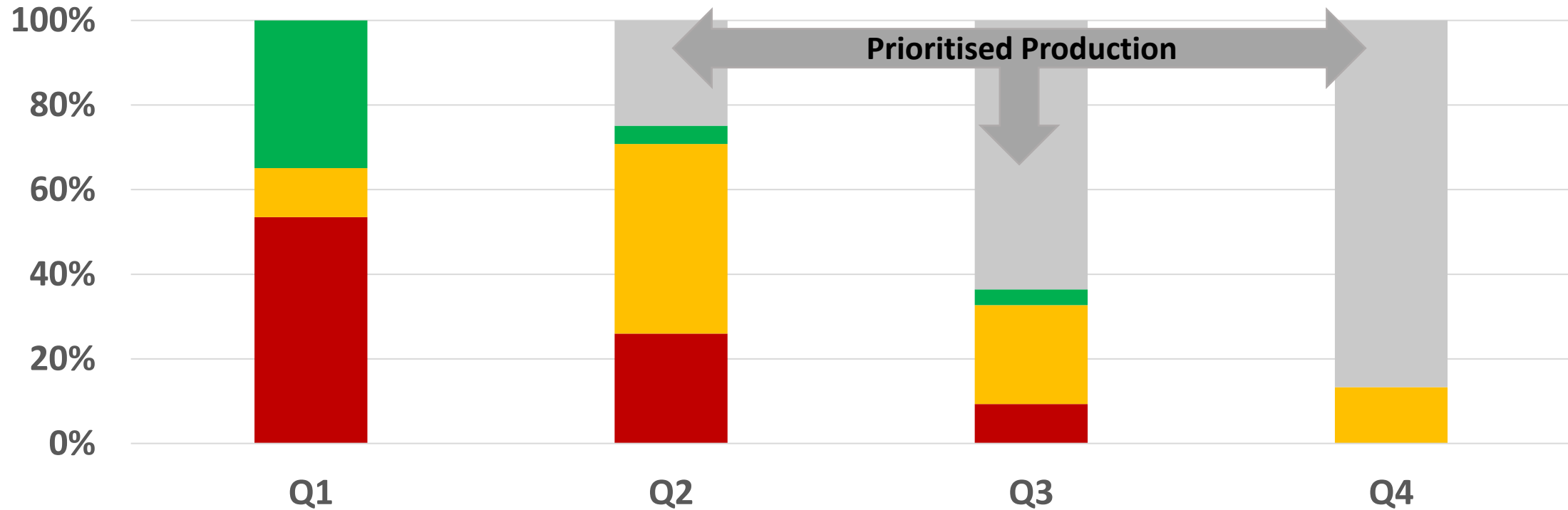
Portfolio

Reshape future product portfolio to optimise returns

Mercedes-Benz will take actions to improve and recalibrate its market strategy. These will focus on **optimising the balance between volume, price and channel mix to ensure improved contribution margins** from the current and future portfolio.

October 2020, Mercedes-Benz Strategy Update

Impact to European Vehicle Production 2021

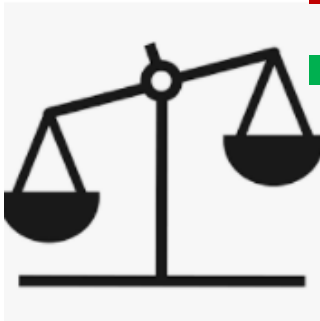


■ Red-Major Disruption

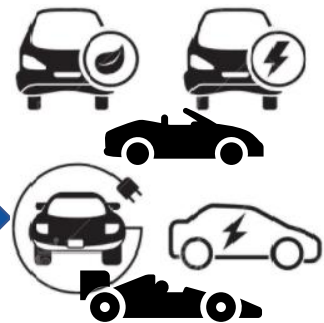
■ Orange-Disruption

■ Green-Production as Normal

■ New Normal-Prioritised Production

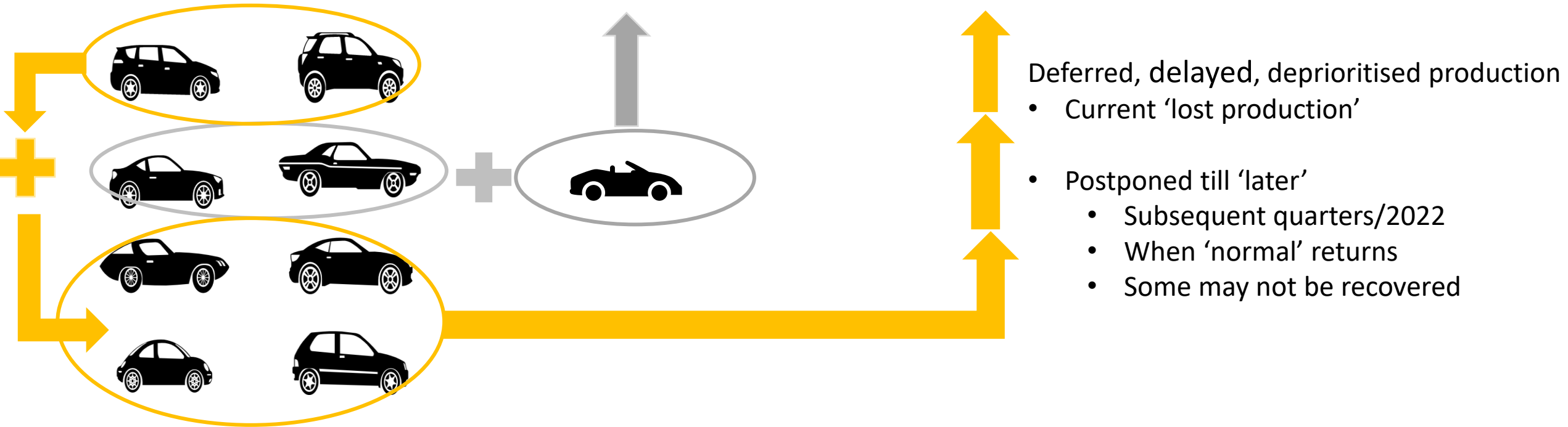


By year end, European production has shifted mainly to prioritised profitable production



What is deferred production?

Planned Production – Prioritised Production = Deferred Production



De-prioritised production likely to be deferred to 2022

Estimating 'lost production'

- **IHS Markit**

- 2021: **84.6m** units annual global LV production forecast
 - H1 2021 **-628K**, recovery H2

- **LMC Automotive**

- 2021: **85.3m** units annual global LV production forecast
 - H1 2021 **-653K** (Europe)
 - H2 2021 **+100K** (Europe to grow 4%)
 - Europe production to hit 19.3m in 2021, up 16% Y/Y

- **Lost production is delayed, deprioritised**
- European Production will see reduction compared to pre-Covid plans
- European production has re-focused on higher value products
- Some 'delayed' production may be recovered in 2022 – some may be 'lost'



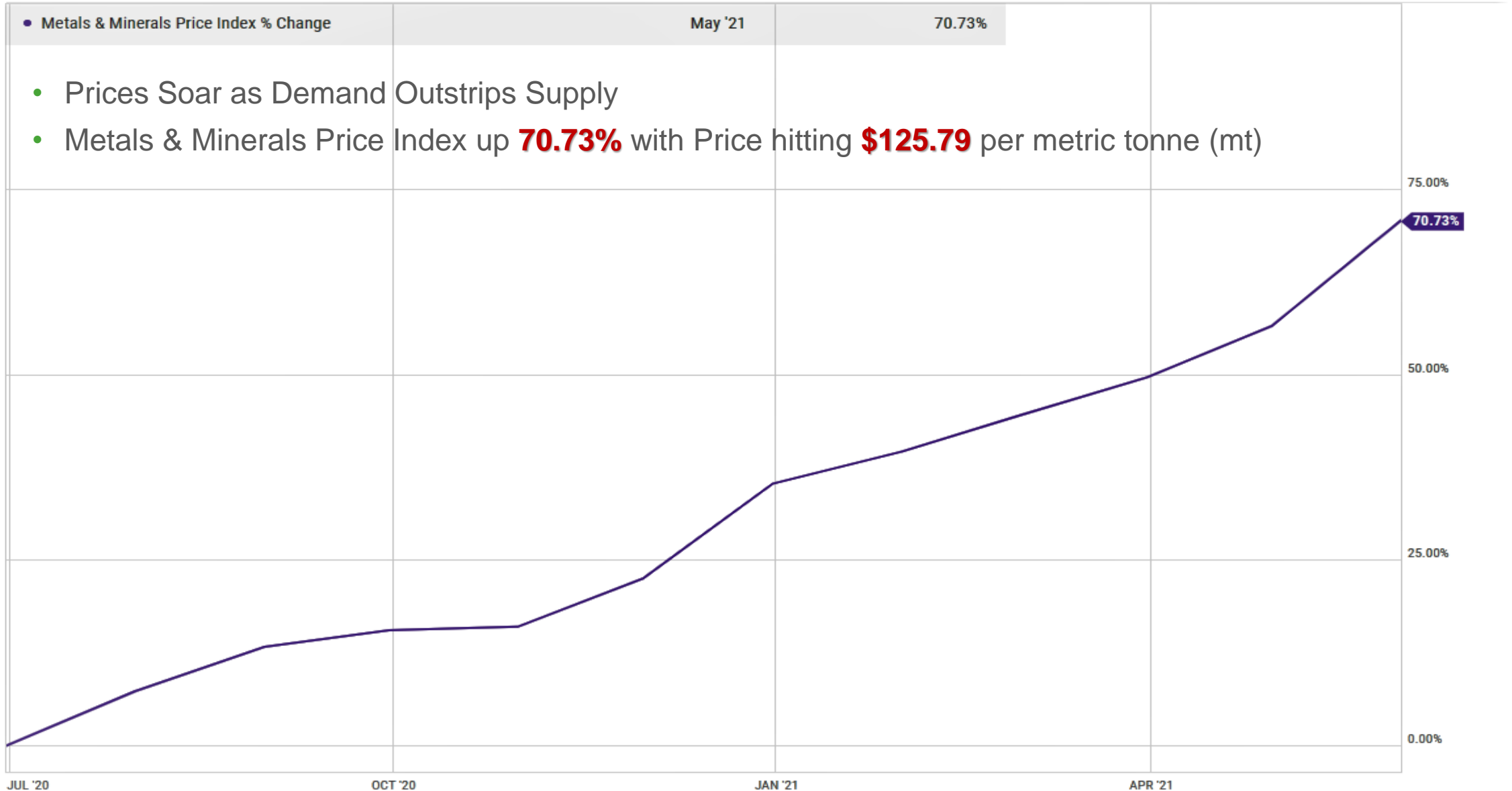
Can OEMs recapture volume in 2022?

02

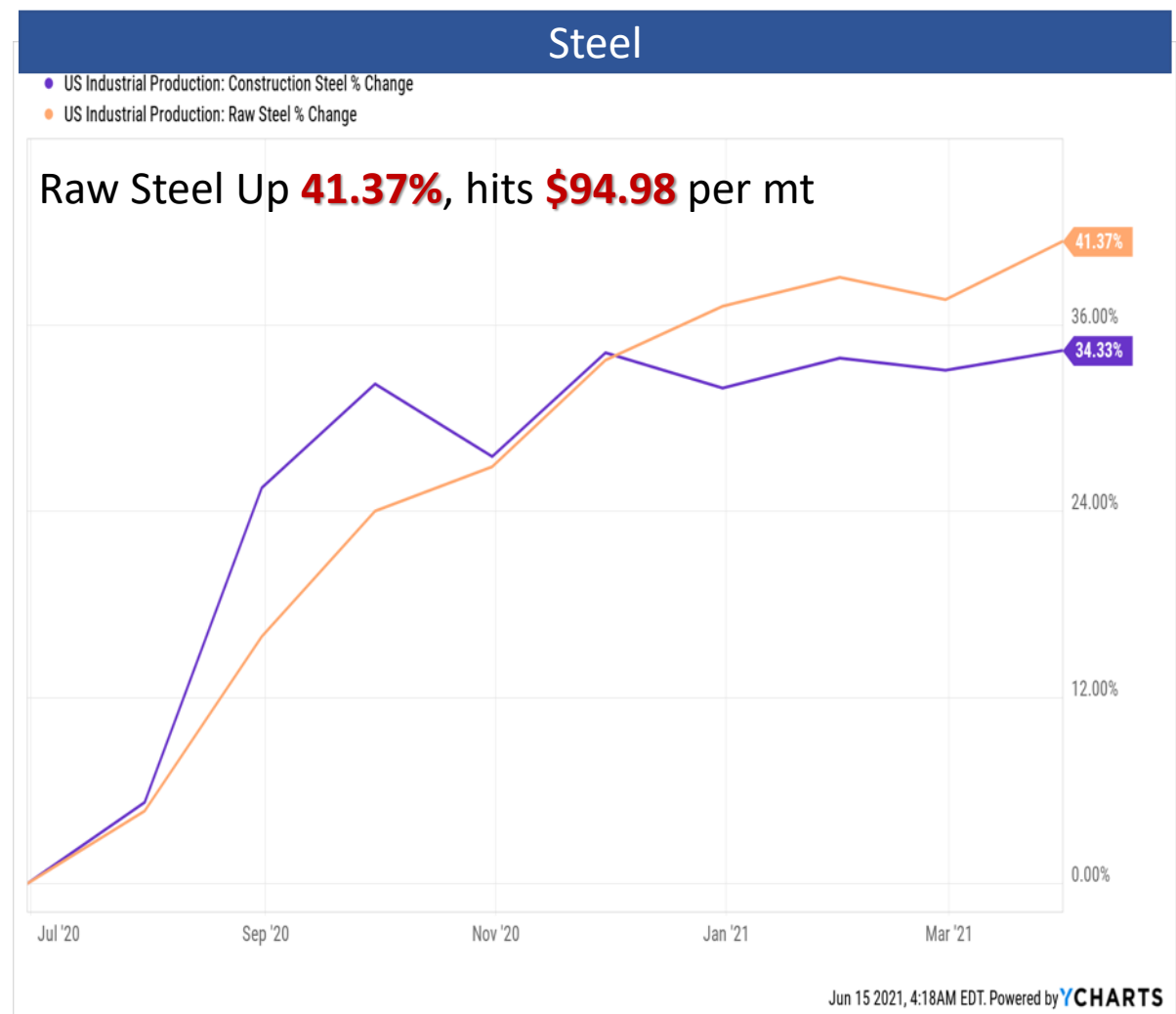
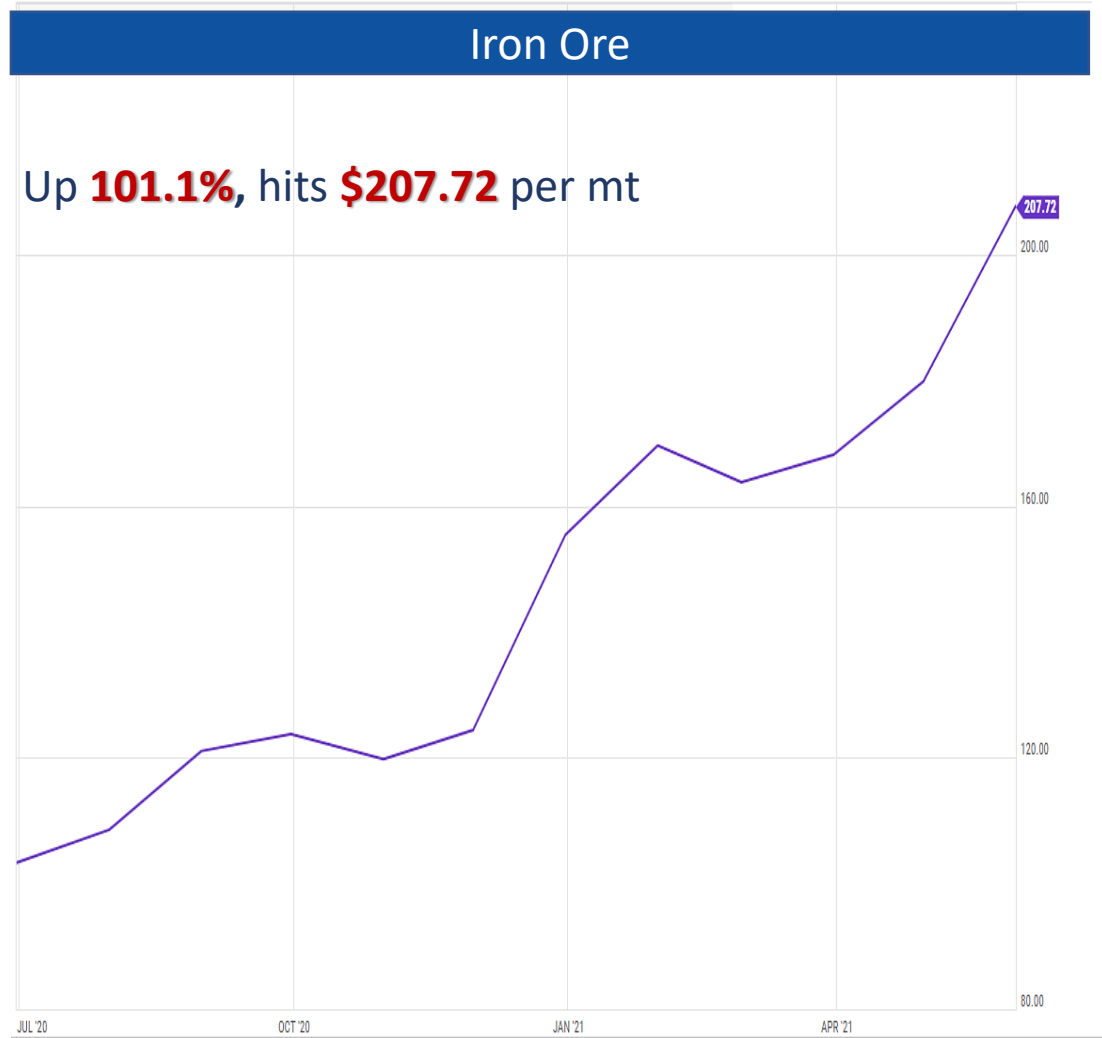
Metals Industry

Price Hikes Across Metals Indicators

Major Industrial Metals Indicators



Iron Ore up, Steel up

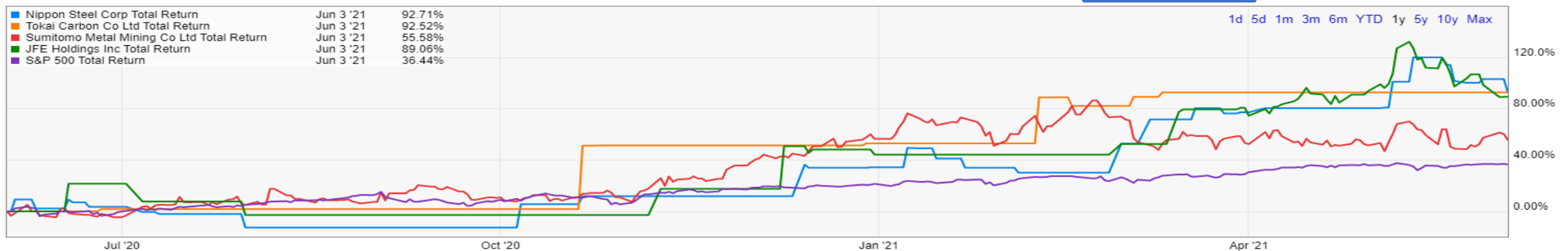
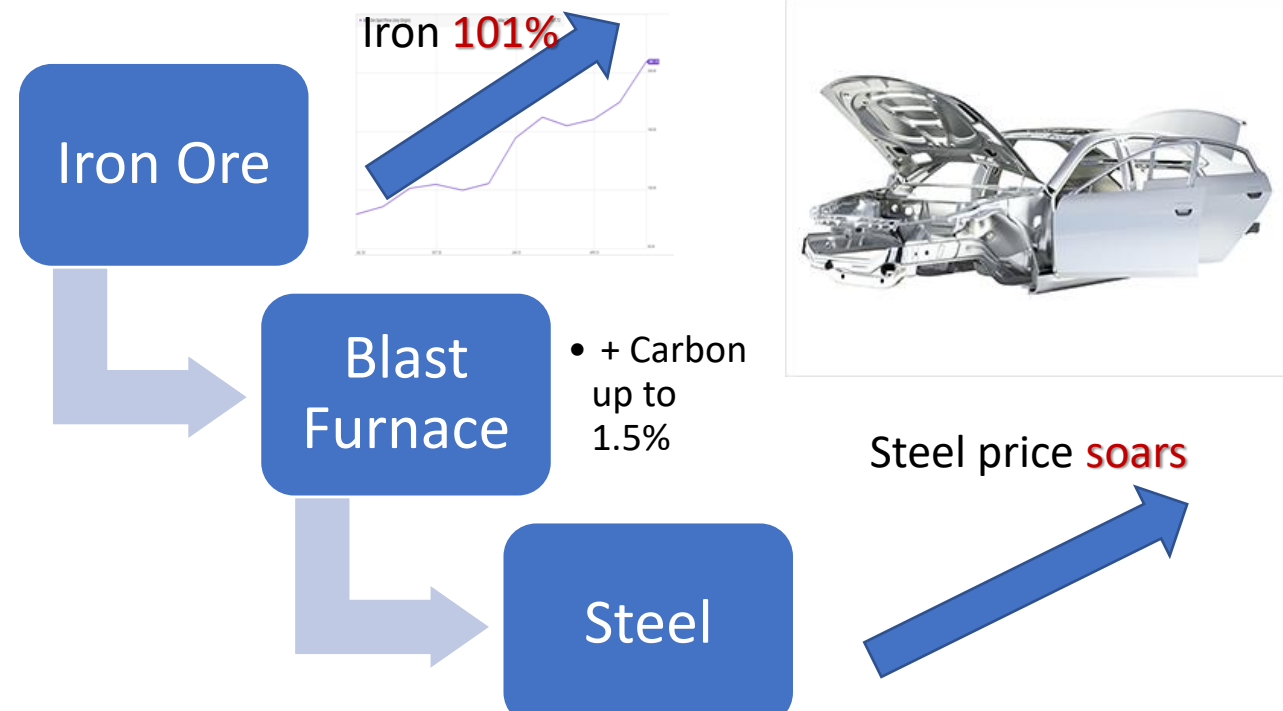


Jun 15 2021, 4:18AM EDT. Powered by YCHARTS

Source: World Bank, Y Charts

Steel Price Soars, Affects Automotive Industry

- **900kg** of steel used per vehicle
 - **40%** used in body structure, panels, doors, boot
 - **23%** used in drivetrain, including cast iron for engine block
 - **12%** used in suspension
 - Remainder used in wheels, tyres, fuel tank, steering and braking systems



Steel producers stock see surging prices

Suppliers Raise Steel Prices...

- Hyundai Steel
 - Annual production 5.5m tonnes of automotive steel sheets
 - 90% of auto sheet output to Hyundai Motor and Kia
- **Posco Steel, Hyundai Steel & Others**
 - RAISE steel prices by **\$44.93** per ton (May 2021)



Bloomberg
Posco Raises Steel Prices as Much as 25% on Costs

Sungwoo Park and Kyunghee Park
April 23, 2010, 8:26 AM GMT+1

The Korea Times

steelmakers, automakers agree to price hike of steel sheets

Korean steel makers to make first price hike in steel plates for auto in 4 years **pulse** by Maeil Business News Korea



Images courtesy Hyundai Steel, Posco

Steel Import Restrictions in Europe...extended

- 2018 EU introduced 'tariff-rate quota' with **25% duty**
- Quota system to be **EXTENDED for 3 years**
- UK extends tariffs on most steel for at least 1 year
- Steel shortages have led to €1,300 per tonne for automotive grade steel
- Only 10% of automotive steel imported
 - BUT lockdowns in 2020 led to reduced production
 - Pandemic caused global reduction in production
 - Europe imports increase to offset local shortage

Steel-import restrictions could have manufacturing consequences **Autovista Group**...
14 June 2021

Steel: EU final measures to restrict imports will harm auto industry

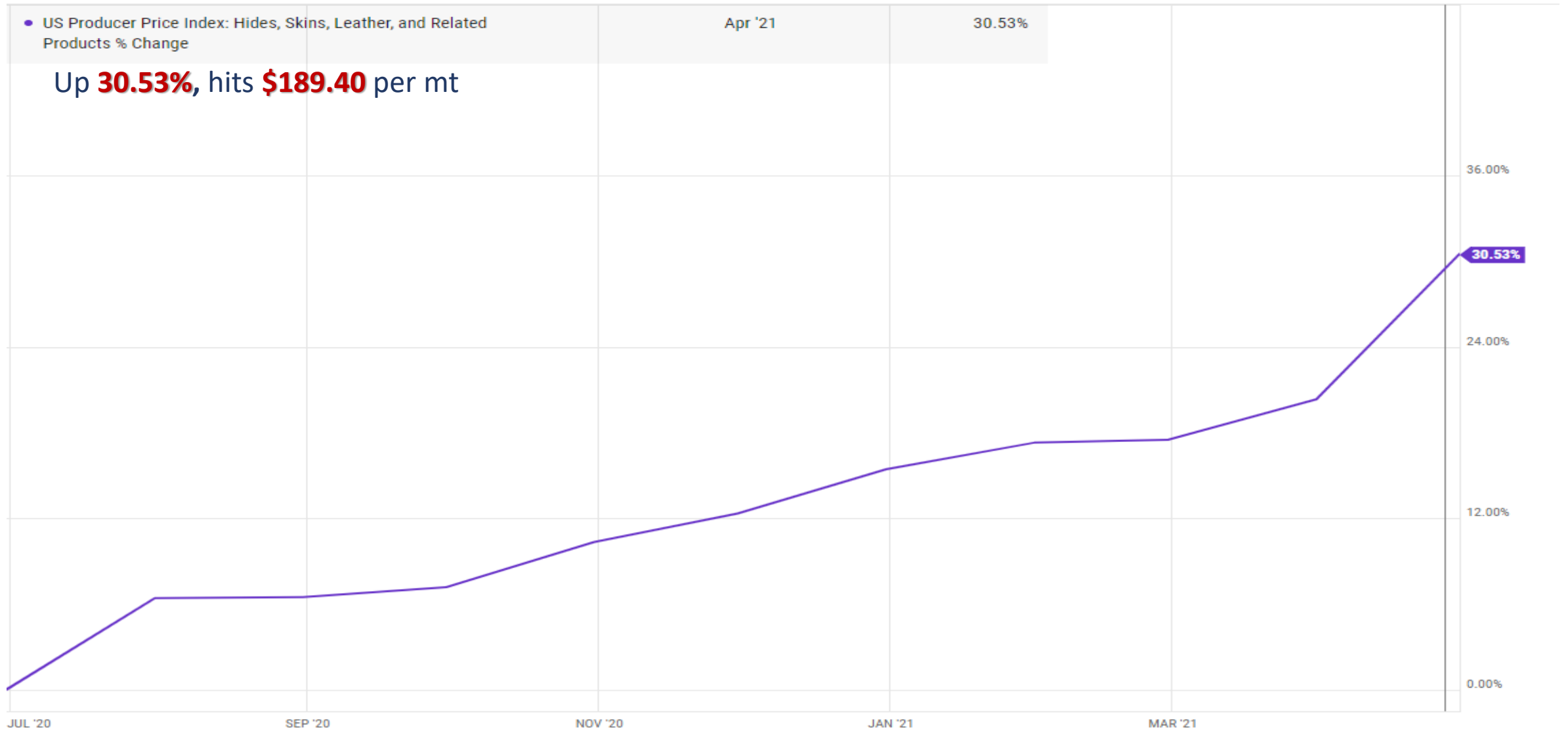


03

Upholstery Industry

Price Hikes Across Materials

Hides, skins, leather materials soar



Leather prices hit auto industry...



theSauerReport
established 1985

Bulletin

Automotive industry woes

Published: 26 May, 2021

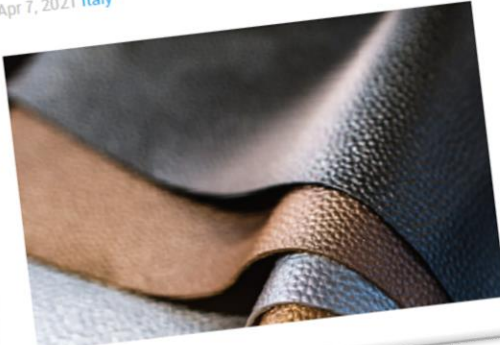
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Issue

UNIC issues warning over raw materials price increases

Apr 7, 2021 Italy



According to publication ILM, the Italian Tanners Association (UNIC) is concerned over the potential increases in the prices of materials for the industry

The Italian Tanners Association, UNIC, has warned that raw materials and leather chemical prices have entered what it calls "a phase of high pressure", calling recent price hikes "excessive and destabilizing" as ILM reported.

Higher hide prices could play into the hands of alternative materials

Worldwide
Published: 18 March, 2021



Credit: Simona Tanning

With hide prices climbing steadily since autumn 2020 for some selections/origins, and many now at the highest levels for a few years, the price of finished leather is set to increase, too, which may place it at a disadvantage over cheaper, alternative materials, according to raw materials pricing and analysis website theSauerReport.

Seat foam price soars....

NEWS

Polar storm paralyses US Gulf Coast petrochemical sector

CHEMISTRY

Seat Foam Shortage Could Cut Car Production, and Texas Grid Failure Is Blamed

Sebastian Blanco
7 March 2021 · 3-min read



Photo credit: Cadillac

TRENDING

1. 4 UK dividend-paying penny stocks I'd buy for my Stocks and Shares ISA
2. BIG dividends! 3 UK shares I'd buy and hold for 10 years
3. Buy-to-let boom on way as Brits bet on soaring house prices
4. How I'm investing in dividend stocks to aim for £100 a week in passive income
5. The 2 best dividend stocks paying 7% today

Foam Shortages, Price Hikes Rock Furniture and Bedding Biz

March 3, 2021 · Alan Wolf



...the raw materials cut-off compelled chemical producers and foam suppliers to invoke **force majeure**, which allows companies to temporarily suspend contractual obligations due to unforeseeable circumstances, in this case the weather.

Wednesday, June 9, 2021

YOURSOURCE
NEWS

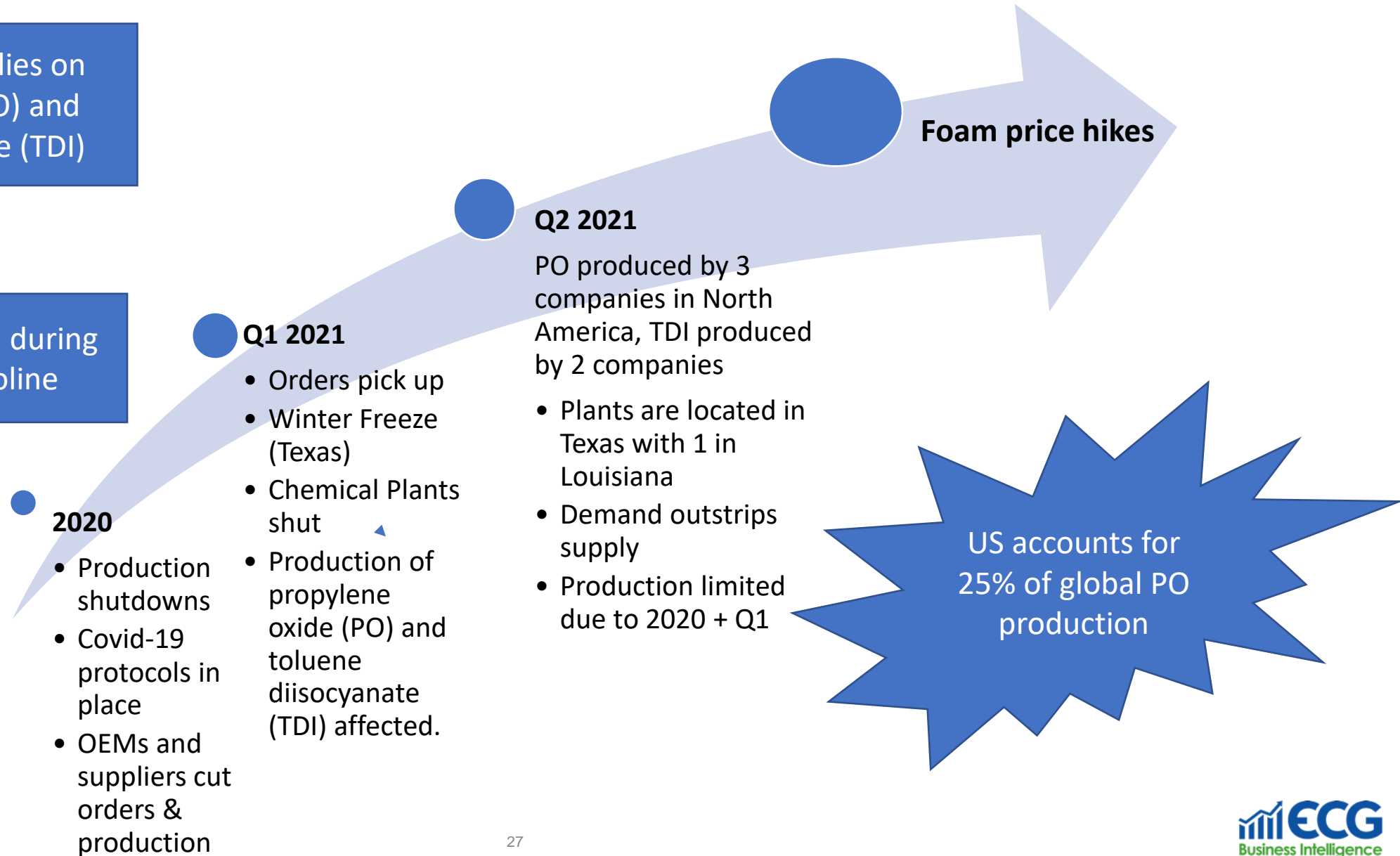
LIFESTYLE // HOME DESIGN

A foam shortage has led to a furniture backlog. You can blame it on the Texas freeze.

The Story Behind Foam Price Hike...

Foam production relies on propylene oxide (PO) and toluene diisocyanate (TDI)

Propylene is obtained during the refining of gasoline



04

Rubber Industry

Price Hikes Across Rubber

Rubber prices soar



ET Auto.com
From The Economic Times

Asian rubber prices soar on supply woes, COVID glove shortage and China tyre demand

Output across Southeast Asia - which accounts for more than two-thirds of natural rubber supplies - has been hit by coronavirus-related labour shortages as well as floods and unfavourable weather in Thailand and Vietnam.

BBC

The wonder material we all need but is running out

FleetOwner.

Natural rubber prices are rising

RE
The Rubber Economist

Malaysian rubber glove group says demand to outstrip supply until 2023

The Story Behind Rubber Price Hike...



Extreme weather,
fungal leaf disease
'White Root Disease',
Labour shortage

Demand for GLOVES
soars

Automotive Demand bounces
back...

BUT glove demand continues
Shortage of Natural Rubber,
PRICE SOARS

Supply diverted from
tyre industry

Covid-19
Lockdowns

Rubber Demand
forecast to DROP
4.3% in 2020



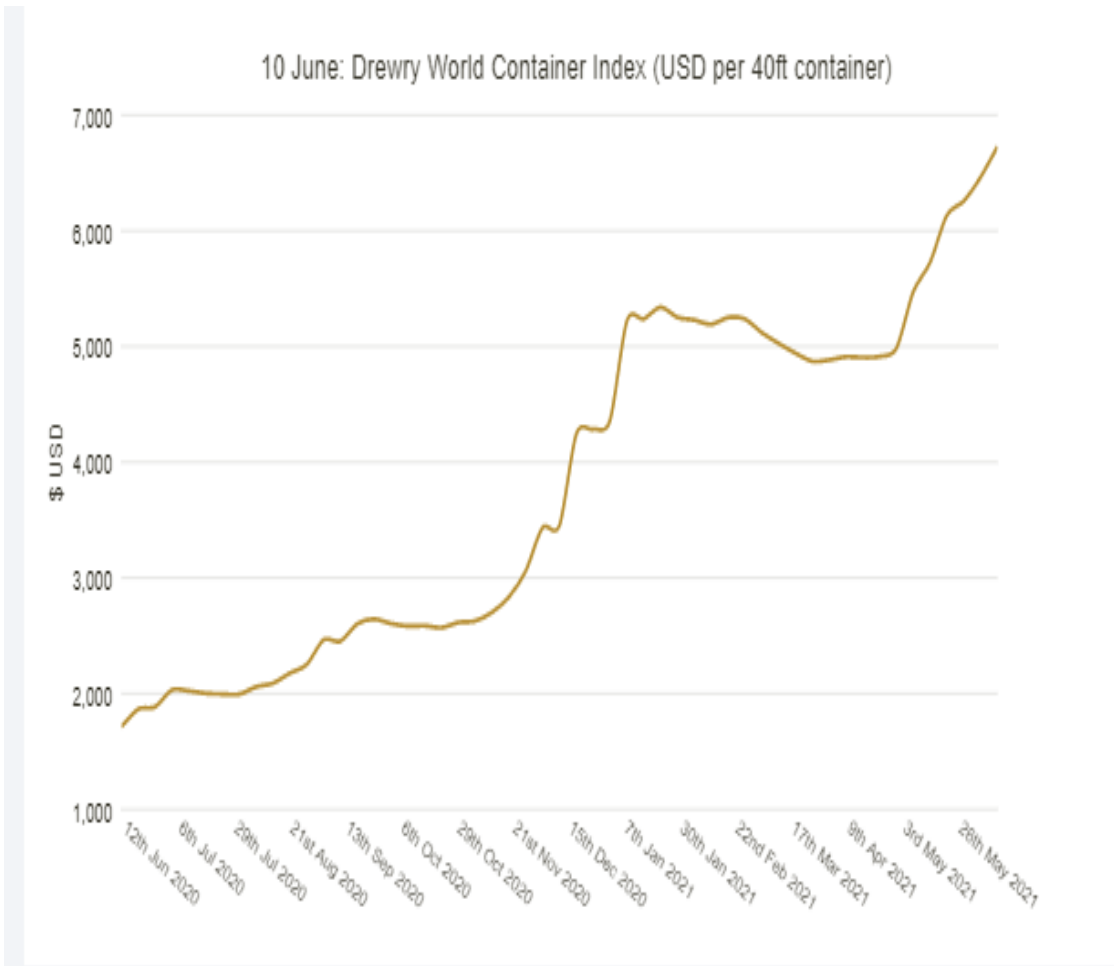
Lead time for rubber gloves now seven months , March 2021

05

Container Shipping Crisis

Soaring Container Prices Hit Suppliers

Container Spot Freight Rates Soar 300%



Spot freight rates by major route

Our assessment across eight major East-West trades:

Route	27-May-21	03-Jun-21	10-Jun-21	Weekly change (%)	Annual change (%)
Composite Index	\$6,257	\$6,464	\$6,727	4% ▲	299% ▲
Shanghai - Rotterdam	\$10,174	\$10,462	\$10,522	1% ▲	524% ▲
Rotterdam - Shanghai	\$1,546	\$1,629	\$1,715	5% ▲	70% ▲
Shanghai - Genoa	\$9,662	\$9,900	\$10,472	6% ▲	449% ▲
Shanghai - Los Angeles	\$5,742	\$5,952	\$6,313	6% ▲	199% ▲
Los Angeles - Shanghai	\$744	\$779	\$808	4% ▲	61% ▲
Shanghai - New York	\$7,147	\$7,559	\$8,251	9% ▲	203% ▲
New York - Rotterdam	\$946	\$991	\$1,012	2% ▲	98% ▲
Rotterdam - New York	\$3,670	\$3,720	\$3,988	7% ▲	66% ▲

Source: [Drewry Supply Chain Advisors](#)

Covid-19 Shipping Shockwaves

Bloomberg

Business

Out-of-Control Shipping Costs Fire Up Prices From Coffee to Toys

Why are shipping containers so expensive right now?



UNCTAD

Shipping during COVID-19: Why container freight rates have surged

Unprecedented shortage

Contrary to expectations, demand for container shipping has grown during the pandemic, bouncing back quickly from an initial slowdown.

Coronavirus pandemic triggers shipping container crisis



- Sudden soaring demand
- Shortage of containers
- Saturated ports
- Shortage of ship space
- Ship delays due to Covid-19 lockdowns, Suez canal blockage, China ports...
- Import Container delayed = Export container delayed
- Producer prices could rise 2% following 205% rise in shipping costs – HSBC

Industry Reactions

Continental Group



“The challenges in the international transport and logistics market remain critical.

Containers still regularly come to a standstill in ports because there is simply not enough shipping capacity available.

Demand currently significantly exceeds the supply here. In addition, there is a massive shortage of available containers for loading raw materials, as well as a significant delay in ship departures from the ports of origin.”

06

OEMs mitigate disruption

Prioritise 'Value over Volume' Production

EV production gains

OEMs prioritise profitable production

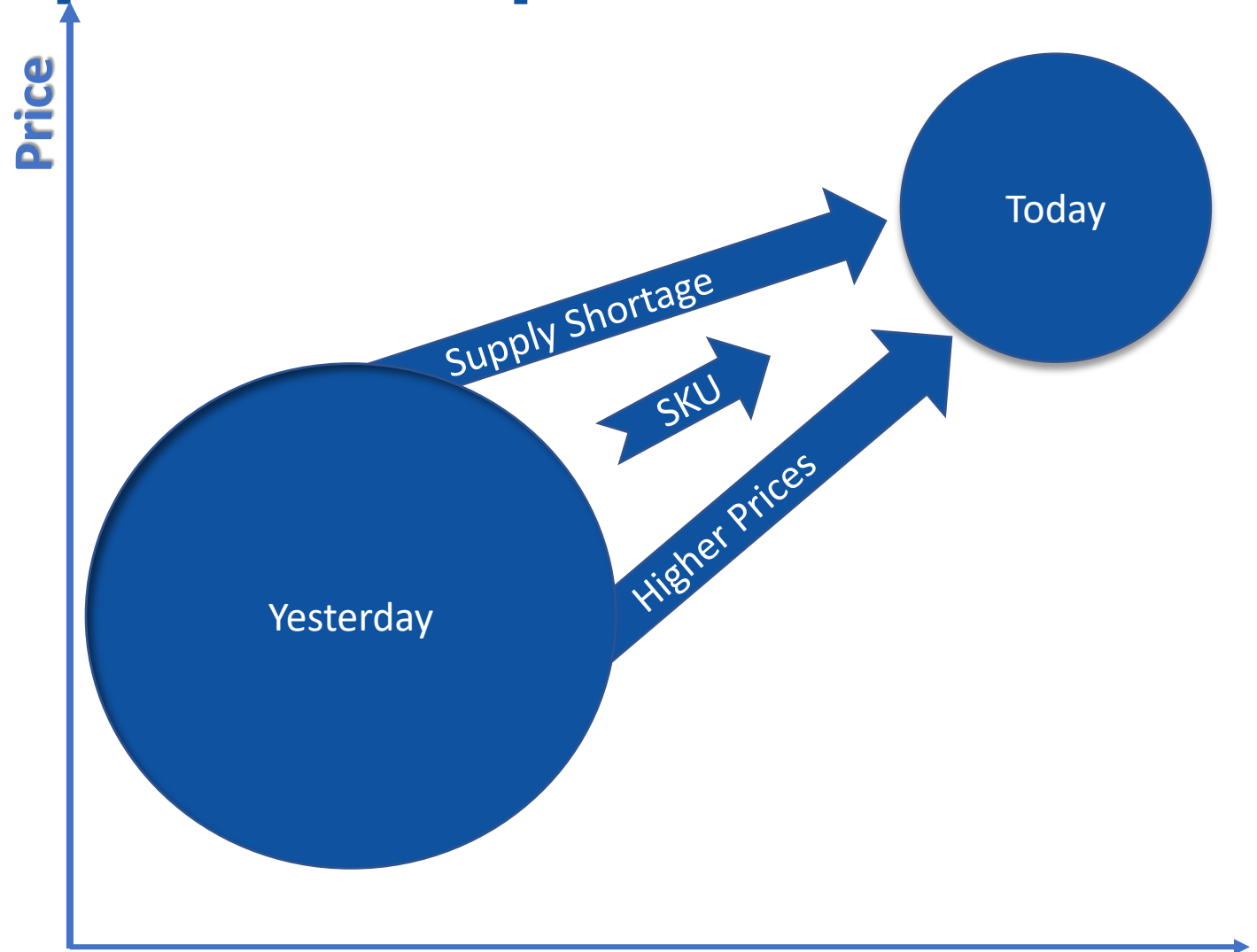
Stock Keeping Unit (SKU)
Rationalisation identifies products
based on profitability

SKU rationalisation increases
optimisation of higher profitable
products in production

Increase
production of
higher ranked
SKU products

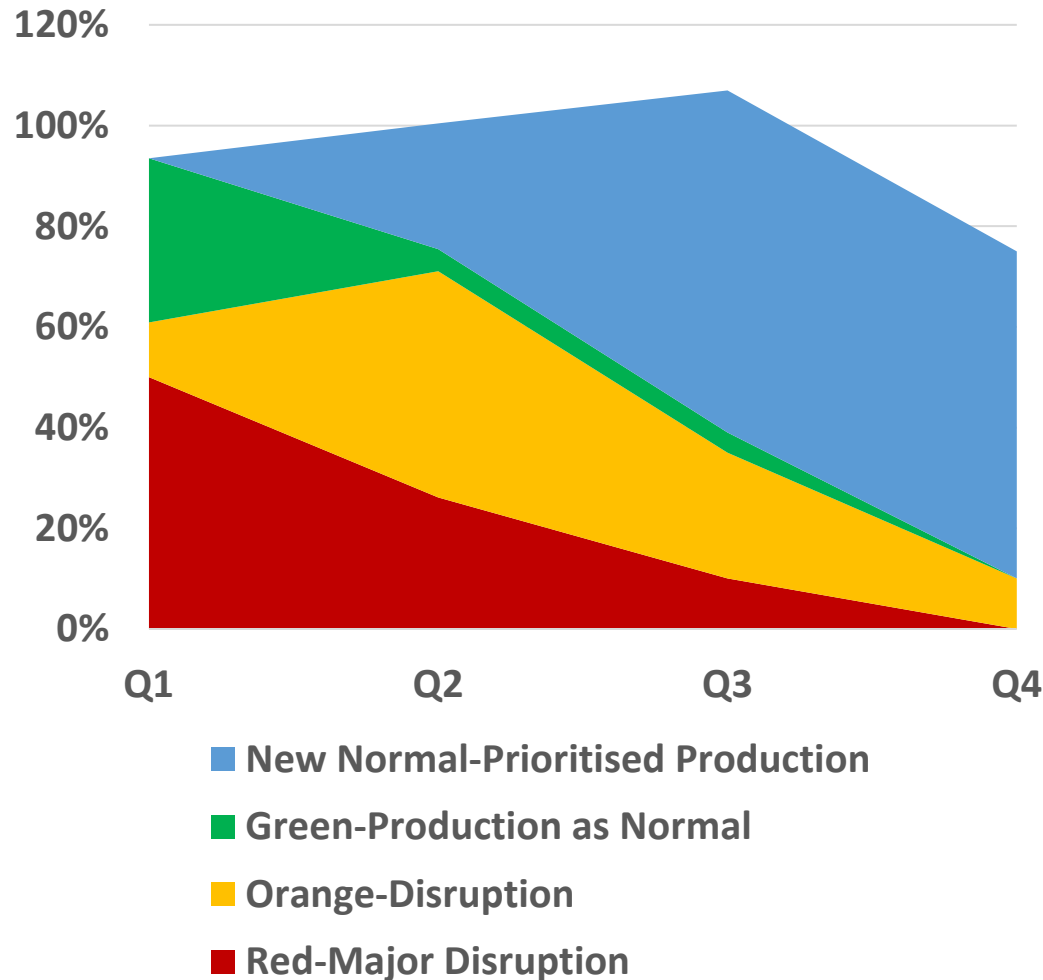
Deprioritise,
discontinue low
ranked SKU
products

Value
over
Volume



OEMs prioritise Production: A New Normal?

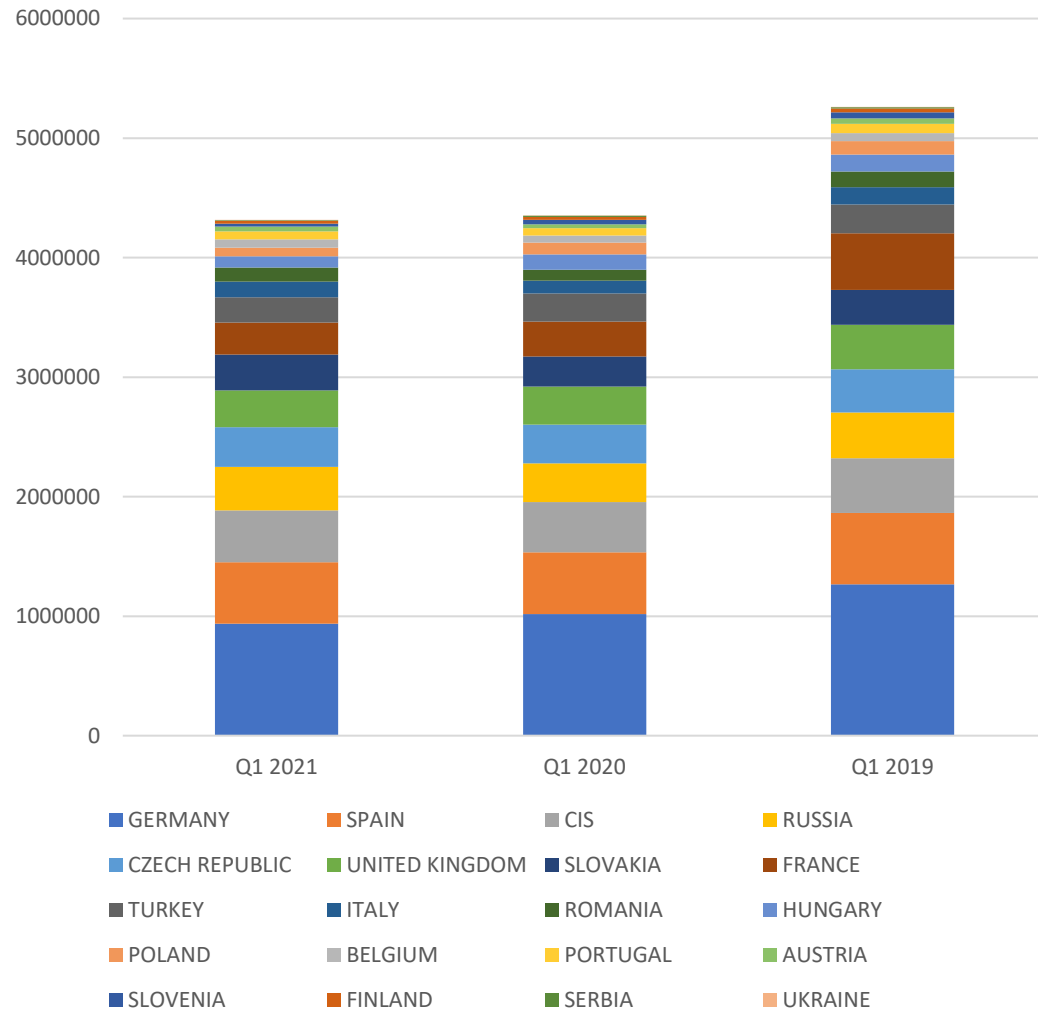
European Light Vehicle Production 2021



- **Q1** Impact of chip shortage hits European production, 50% of plants face some disruption
- **Q2** OEMs push production under reduced working times, move to prioritise higher profit models, introduce retrofitting components. Prioritised production gains momentum
- **Q3** prioritised model production takes over, covering 70% of production, stabilising supply chains
- **Q4** OEMs have mitigated shock by pushing higher value models to offset reduction in volume

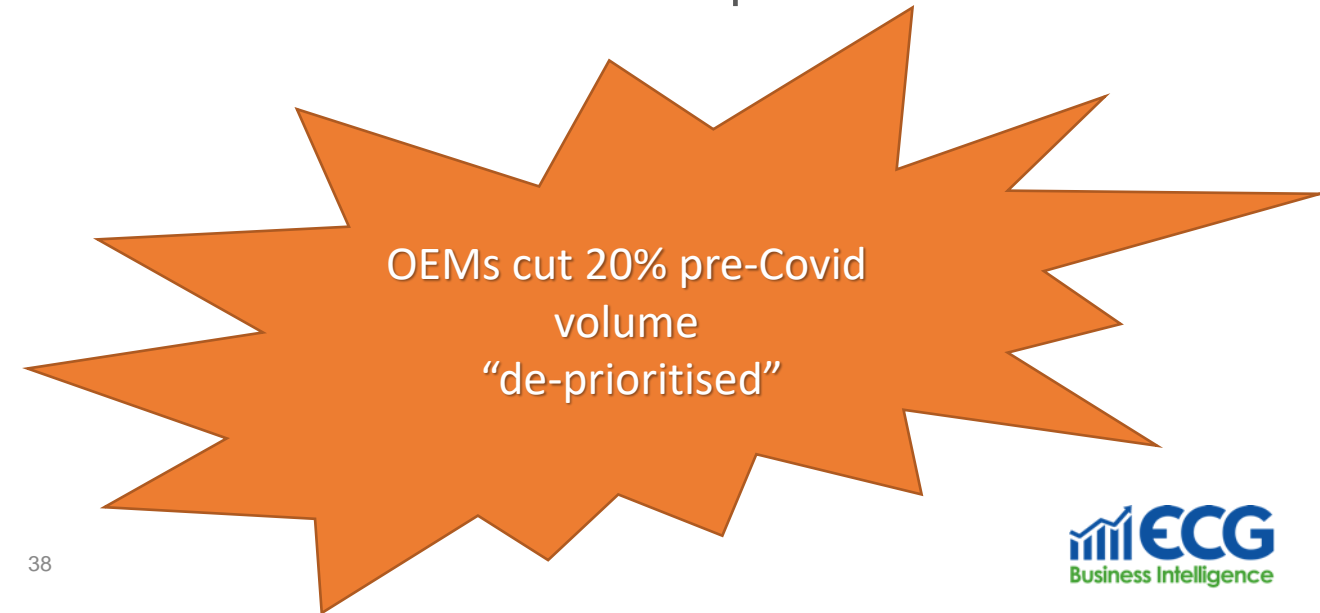
Estimating 'de-prioritised' production

Passenger Car Production Q1



- Q1 2021 Europe Production down 1.8% y/y but down 20.9% compared to 2019 (pre-Covid)
- De-prioritised Production in Jan-May 2021 estimated at:
 - 1.7m units
 - 20-25% of 2019 production volume de-prioritised

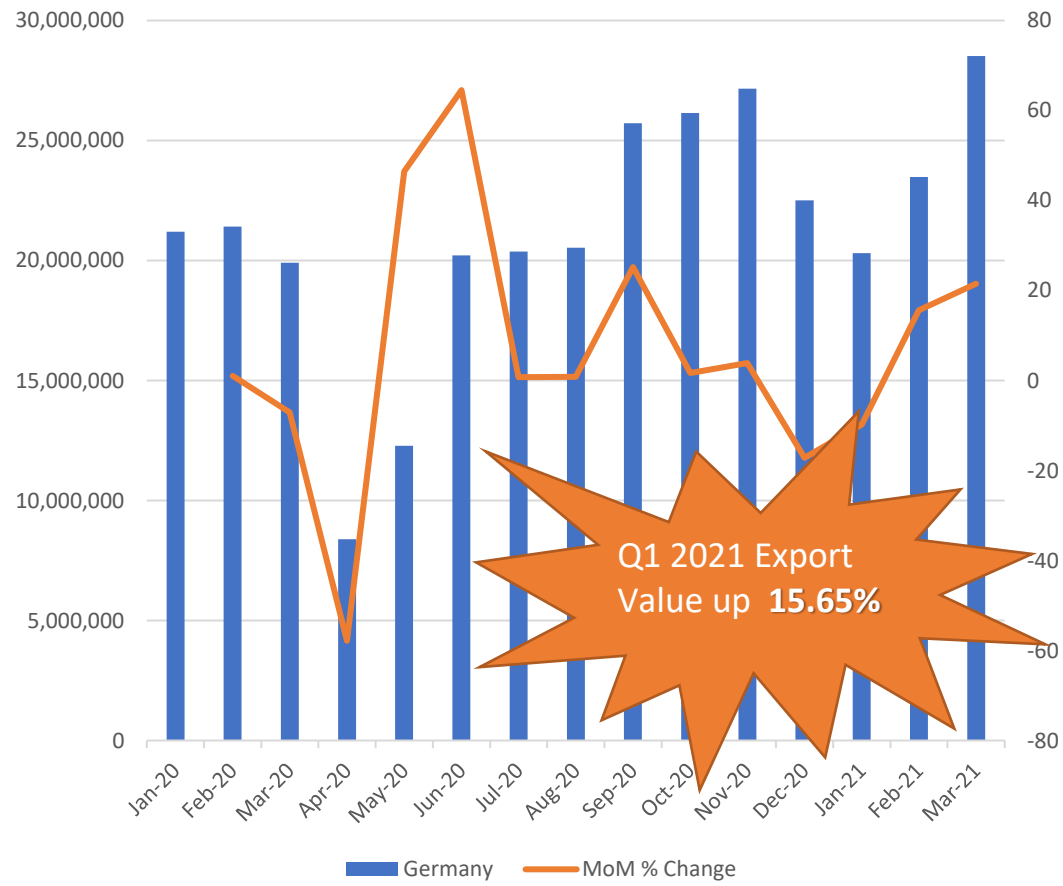
By year end 2021, around 20% of pre-Covid volume to be de-prioritised



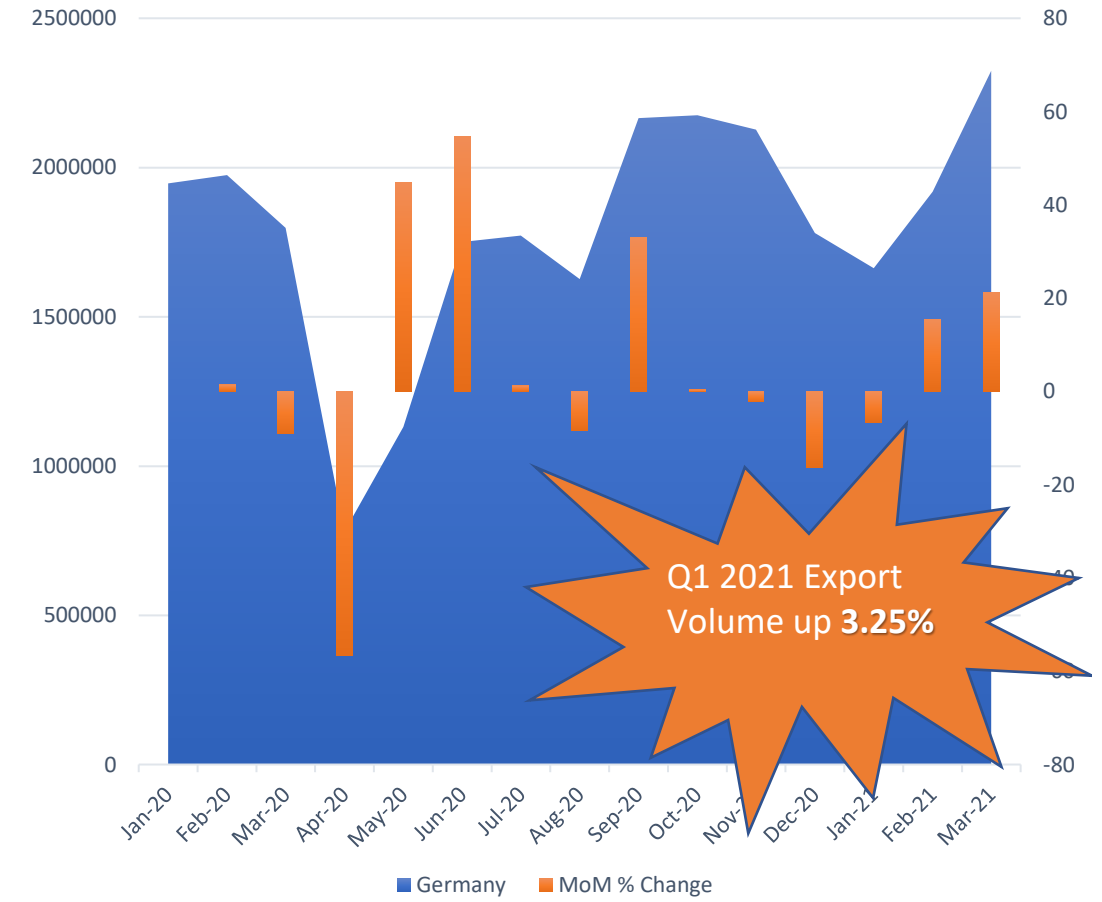
Source: OICA

Value over volume

Germany: Vehicle & Components
Export by VALUE (USD)



Germany: Vehicle & Components
Export by VOLUME



OEMs also prioritise EVs

- OEMs prioritise EVs over ICEs
 - Regulations push EVs
 - EVs are on average 20% more expensive
 - Despite higher costs, regulations and consumer demand push OEMs to prioritise
 - EVs do not always offer a higher profit margin, but play strategic role in meeting current regulations
 - Consumer demand jumps for EVs
- Renault ElectriCity
 - SOP 2025
 - 400,000 UPA
 - Renault to produce fewer, more profitable cars under Luca de Meo
- Stellantis
 - Focusing on high-margin vehicles, as lean inventories drive up prices
 - SOP 2024 at Melfi Plant
 - 4 EVs
 - 400,000 UPA
- Volkswagen Group
 - EV line up prioritised

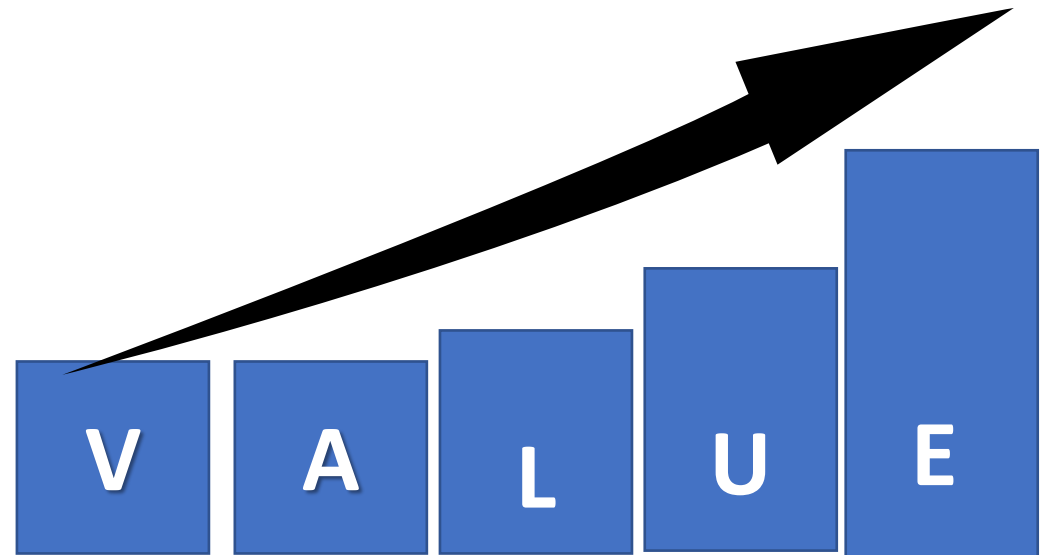
INSIDEEVs

EVs Are Still 45% More Expensive To Make Than Combustion-Engined Cars

Stellantis to Produce Four Electric Vehicles at Italy's Melfi Plant From 2024 - UILM Union

Value-Over-Volume Benefits Supply Chain

- OEMs prioritise high value production models, cut low margin production
- Production volume lower but more profitable and stable
- Reliable forecasting and production stability to benefit supply chain and vehicle logistics



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More research can be found at: ecgassociation.eu/ecg-business-intelligence

