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Questions or Comments?

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"Why am I muted?"

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1

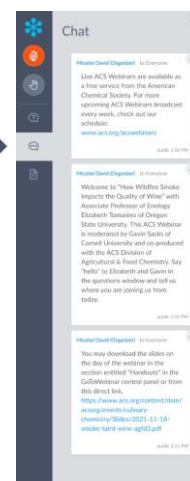
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Chat
Announcements and hyperlinks from our team



2

2

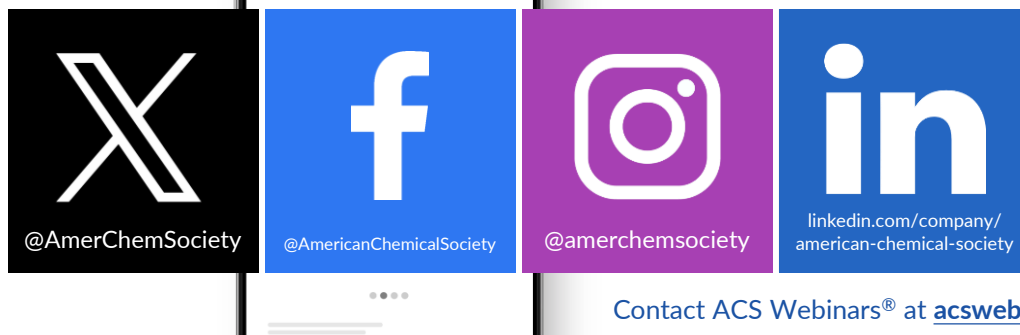


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A Career Planning Tool For Chemical Scientists



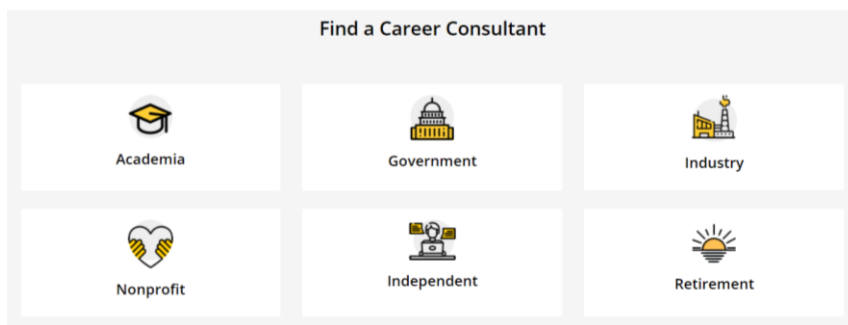
ChemIDP is an Individual Development Plan designed specifically for graduate students and postdoctoral scholars in the chemical sciences. Through immersive, self-paced activities, users explore potential careers, determine specific skills needed for success, and develop plans to achieve professional goals. **ChemIDP** tracks user progress and input, providing tips and strategies to complete goals and guide career exploration.

<https://chemidp.acs.org>

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Career Consultant Directory



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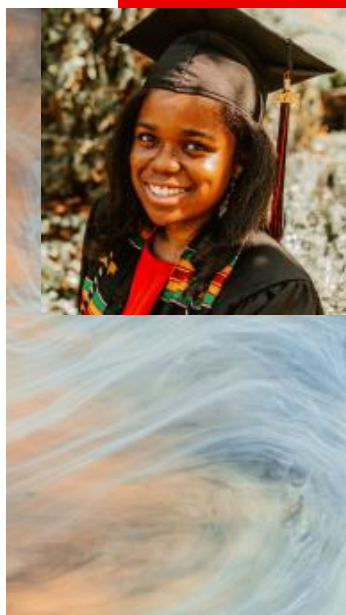
Email us at bridge@acs.org

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ACS Scholar Adunoluwa Obisesan

BS, Massachusetts Institute of Technology, June 2021
(Chemical-biological Engineering, Computer Science & Molecular Biology)



“The ACS Scholars Program provided me with monetary support as well as a valuable network of peers and mentors who have transformed my life and will help me in my future endeavors. The program enabled me to achieve more than I could have ever dreamed. Thank you so much!”

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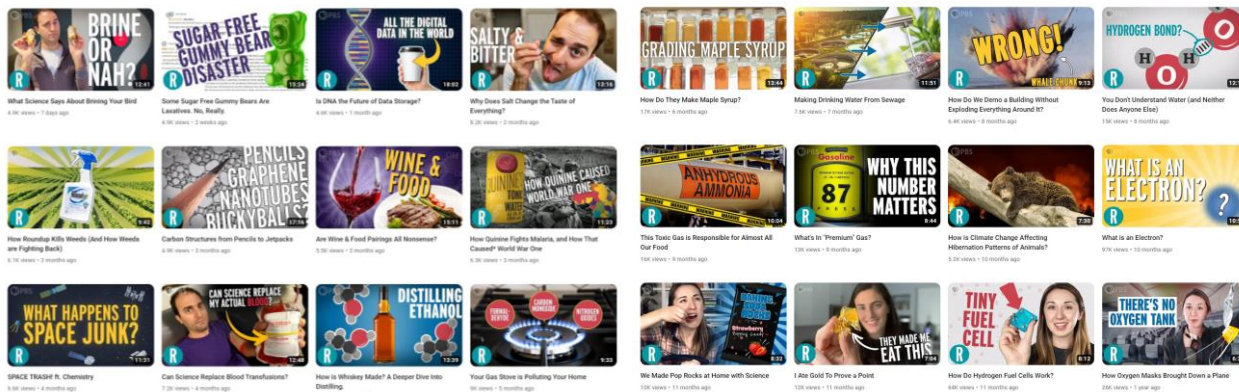
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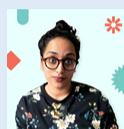
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c&en's STEREO CHEMISTRY



Bonus Episode
By Gina Viale and Kent Jansen
Carolyn Bertozzi and K. Barry Sharpless chat about sharing the 2022 Nobel Prize in Chemistry
December 6, 2022



Bonus Episode
By Ariana Marshall and Gina Viale
Bioorthogonal, click chemistry clinch the Nobel Prize
October 9, 2022



Episode #40
By Matt Blum and Kent Jansen
Lithium mining's water use sparks bitter conflicts and novel chemistry
September 13, 2022



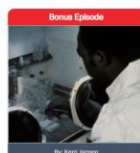
Bonus Episode
By Kent Jansen and Misha Joshi
Happy 100th birthday, John Goodenough!
For John Goodenough's 100th birthday, Stereo Chemistry revisits a fan-favorite interview with the renowned scientist
July 25, 2022



Bonus Episode
By Kent Jansen
Jess Wade on Wikipedia and work-life balance
June 21, 2022



Bonus Episode
By Kent Jansen
The sticky science of why we eat so much sugar
May 31, 2022



Bonus Episode
By Kent Jansen
There's more to James Harris's story
April 27, 2022



Bonus Episode
By Craig Bonbrunson, Kent Jansen
The helium shortage that wasn't supposed to be
March 24, 2022

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ACS Career Resources



Virtual Office Hours



<https://www.acs.org/careerconsulting.html>

Personal Career Consultations

Jim Tung
 Assistant
 Lacamas Laboratories
 S.L. Biochemistry, University of Oregon
 Ph.D., Organic Chemistry, University of Notre Dame

Jim Tung works at Lacamas Laboratories in Portland, OR, currently as a business development manager. He has been with Lacamas for 10 years, working on developing new chemical manufacturing projects. Before that, he was a senior research chemist at Orlite Research in Champaign, IL, performing kilo-scale organic chemistry.

An Oregon native, Jim got his B.S. in biochemistry from the University of Oregon, his Ph.D. in organic chemistry from the University of Notre Dame, with postdoctoral experience at Pfizer's laboratories in La Jolla, CA. He is past chair of the Portland Section of the American Chemical Society and was 2019 general co-chair of NORM 2019. He has interests in process chemistry, labor economics, social media outreach and encouraging career exploration and development for younger chemists.

Ask me about:
 Working in industry
 Applying for academic jobs
 Getting your first job

Contact With Jim

<https://www.acs.org/careerconsulting.html>

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<https://www.acs.org/linkedinlearning>

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Advancing ACS' Core Value of Diversity, Equity, Inclusion and Respect



Resources

| | |
|---|---|
| Inclusivity Style Guide Designed to help staff and members use language and images that respect diversity in all its forms. → | ACS Webinars on Diversity Covering diversity and inclusion at the workplace → |
| ACS Publications DEIR Hub See what ACS Publications is doing for fostering inclusivity in scholarly publishing → | ACS Volunteer and ACS Meetings Code of Conduct Fostering a positive and welcoming environment for attendees, volunteers and staff. → |
| C&EN Trailblazers C&EN highlights scientists from different backgrounds who are making an impact in chemistry. → | NEW! Download DEIR Educational Resources Download this educational guide for additional recommendations on videos, articles, books, podcasts, and more on diversity, inclusion, and related topics. → |
| Quick Guide: Inclusion Moments Learn more about what Inclusion Moments are and see ideas to host them during your meetings. → | Quick Guide: How to host inclusive in-person events Recommendations and best practices to ensure that your events can accommodate everyone. → |

Diversity, Equity, Inclusion, and Respect

**Adapted from definitions from the Ford Foundation Center for Social Justice:

Equity**

Seeks to ensure fair treatment, equality of opportunity, and fairness in access to information and resources for all. We believe this is only possible in an environment built on respect and dignity. Equity requires the identification and elimination of barriers that have prevented the full participation of some groups.

Diversity**

The representation of varied identities and differences (race, ethnicity, gender, disability, sexual orientation, gender identity, national origin, tribe, caste, socioeconomic status, thinking and communication styles, etc.) collectively and as individuals. ACS seeks to proactively engage, understand, and draw on a variety of perspectives.

Inclusion**

Builds a culture of belonging by actively inviting the contribution and participation of all people. Every person's voice adds value, and ACS strives to create balance in the face of power differences. In addition, no one person can or should be called upon to represent an entire community.

Respect

Ensures that each person is treated with professionalism, integrity, and ethics underpinning all interpersonal interactions.

<https://www.acs.org/diversity>

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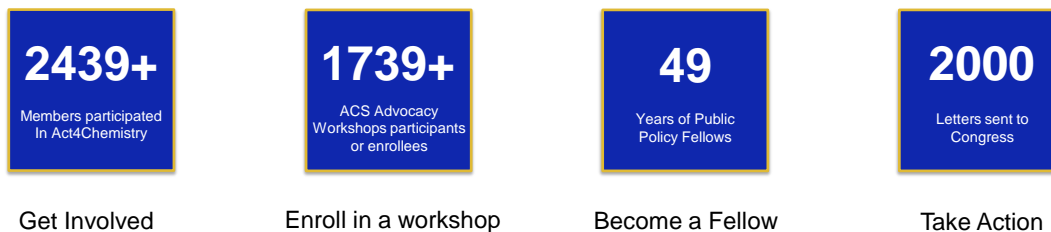
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ACS Advocacy
 See your influence in action!



The impact and results of **ACS member advocacy** outreach and efforts by the numbers!



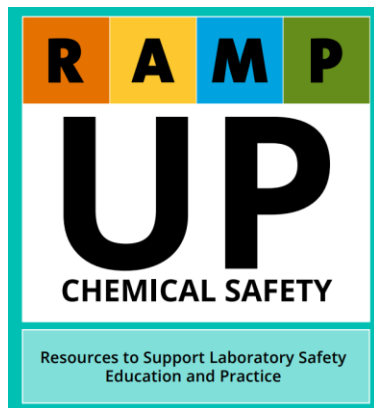
American Chemical Society

<https://www.acs.org/policy>

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A complete listing of ACS Safety Programs and Resources



Download it for free in the “Projects & Announcements” Section! www.acs.org/ccs

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ACS Industry Member Programs

- **ACS Industry Matters**

ACS member only content with exclusive insights from industry leaders to help you succeed in your career. #ACSIndustryMatters

Preview Content: acs.org/indnl

- **ACS Innovation Hub LinkedIn Group**

Connect, collaborate and stay informed about the trends leading chemical innovation.

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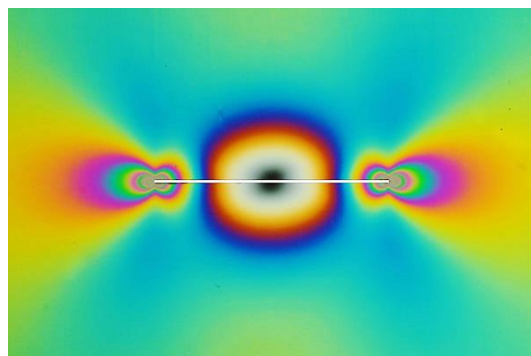
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Breaking Down the Mechanics of Polymers: From Networks to Viscoelasticity

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Chemistry and the Economy: Looking forward to 2024?



PAUL HODGES

Chairman,
New Normal Consulting



MARK JONES, PHD

Creative Director,
MJPhD, LLC

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Helping you navigate the New Normal

Looking forward to 2024?



3 December 2023

Paul Hodges, phodges@new-normal.com, +44 7785 354809



New Normal is a Swiss-based strategy consultancy advising Fortune 500 companies, investment banks and fund managers. **Paul Hodges** publishes *The pH Report*, and chairs the Advisory Board of Infinity Recycling. He is a Global Expert with the [World Economic Forum](#) and a regular speaker at international conferences

| Looking ahead to 2024?

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What we said in July: Major paradigm shifts are now reshaping the business world



DEMAND PATTERNS

The lockdowns have broken down the inertia surrounding work and home-based routines. Travel, leisure, construction, real estate and other industries are already seeing major change.



ADVANCED MANUFACTURING

Many manufacturing operations still operate as they would have done 50 years ago, or even 500 years ago. Shakespeare might well feel at home if he visited many sites today.



RESHORING SUPPLY CHAINS

Global supply chains have collapsed following the uncoordinated nature of the lockdowns around the world, and the rising volatility in demand patterns.



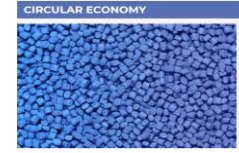
RENEWABLE ENERGY

The war in Ukraine is accelerating plans to increase energy security. The aim is to replace fossil fuel-based infrastructure with modern renewable-based power sources.



FINANCIAL MARKETS

Governments are refocusing on fiscal policy. They are finally realising that 2 decades of central bank stimulus policies have created major asset bubbles.



CIRCULAR ECONOMY

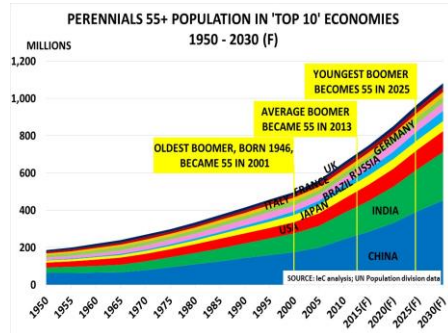
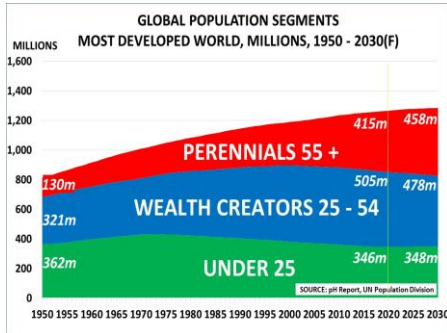
Moves towards a circular economy are accelerating, with negotiations underway for a UN Treaty on Plastic Waste, and for new EU Regulations to restrict single use plastics in Packaging.

Looking forward to 2024?

- ❖ *Chemical industry results highlight the risks ahead*
- ❖ *Auto industry is seeing Winners & Losers emerge*
 - *Existing supply chains may disappear as new ones appear*
 - *Companies have to invest in EVs to survive*
 - *Autonomous Vehicles are a 'wild card' in terms of demand*
- ❖ *Japan is the epicentre of a potential 'Ring of Fire'*



The BabyBoomer SuperCycle has come to an end The low-spending Perennials 55+ are the only growth segment



New business models need to focus on sustainability and "the value of services" rather than volume

Q3 chemical company reports are worrying – to say the least



Europe's Petrochemical Industry Is Heading for Death Row - Bloomberg

Opinion | Javier Blas, Columnist

Europe's Petrochemical Industry Is Heading for Death Row



| | Q3 | | | January - September | | |
|------------|--------|--------|--------|---------------------|--------|--------|
| | 2023 | 2022 | +/- | 2023 | 2022 | +/- |
| Sales | 15,735 | 21,946 | -28.3% | 53,031 | 68,003 | -22.0% |
| Net income | -249 | 909 | | 1,812 | 4,220 | -57.1% |

Bayer Group Key Data

| € million | Q3 2022 | Q3 2023 | Change (%) | | | |
|---------------------|---------|---------|------------|-------------|---------|---------|
| | | | Reported | Fx & p adj. | 9M 2022 | 9M 2023 |
| Sales | 11,281 | 10,342 | -8.3 | -0.2 | 98,739 | 98,775 |
| EBITDA ¹ | 2,296 | 1,337 | -41.8 | | 10,239 | 7,986 |



| In millions, except per share amounts (Unaudited) | Three Months Ended | | Nine Months Ended | |
|---|--------------------|--------------|-------------------|--------------|
| | Sep 30, 2023 | Sep 30, 2022 | Sep 30, 2023 | Sep 30, 2022 |
| Net sales | \$ 10,730 | \$ 14,115 | \$ 34,001 | \$ 45,043 |
| Net income | 327 | 760 | 755 | 3,993 |

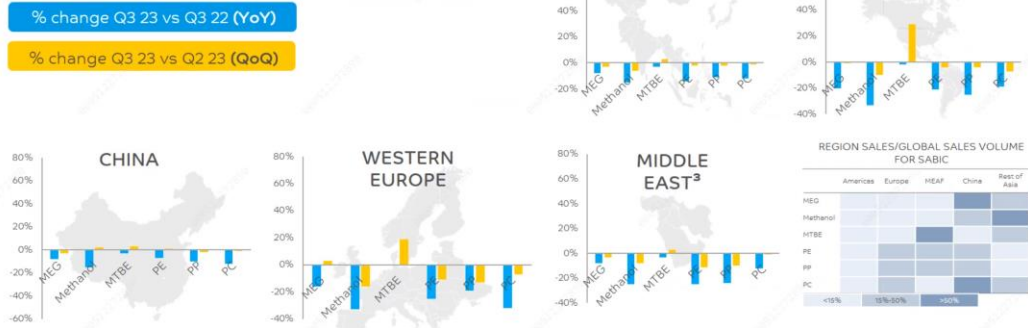


| USD BILLION | Q3 23 | Q2 23 | % Var | Q3 22 | % Var | 9M 23 | 9M 22 | % Var |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Revenue | 9.59 | 9.09 | 6% | 11.55 | -17% | 28.40 | 38.28 | -26% |
| Net income | -0.77 | 0.31 | - | 0.49 | - | 0.28 | 4.33 | - |

Prices are falling around the world due to lack of demand

MARKET MAJOR PETROCHEMICALS PRICES

Major Petrochemicals Prices¹ Changes Across the Key Regions in Q3 2023

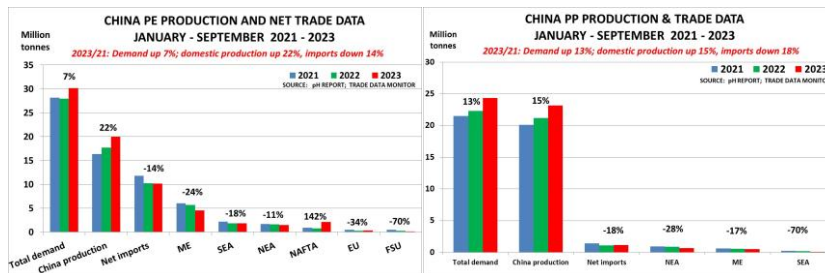


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Chemicals highlight the risk of major over-capacity and margin pressure

Cheap money and Trump's trade war has created major over-capacity

How did we end up in this situation?

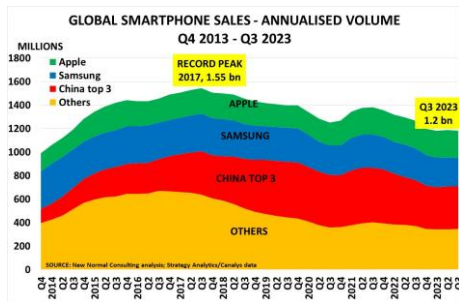


China's PE production rose 22% between Q3 2021 – Q3 2023.
 China's PP production rose 15%

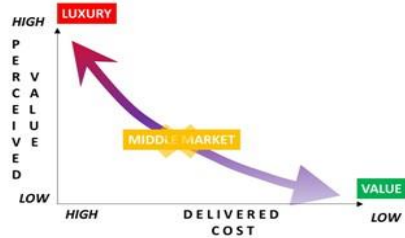
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Smartphone developments highlight how markets are now changing Apple's business model is now increasingly focused on Services

- Apple's strategy is no longer just focused on the Luxury and top-end of the Middle Market
- It now has 49% of the second-hand market for iPhones (138M in 2022)
- These sales are lower-margin – but they allow Apple to sell more services via its App Store



Markets are polarising as the Boomer SuperCycle ends - the highly profitable Middle Market is disappearing



- In 2013, Apple focused on selling Luxury high-priced iPhones and had a 17% share
- But by 2017, Apple was down to 14%, Samsung to 21% – and Value was 65%
- Since then, Apple has changed strategy to maintain market share and profits

Looking forward to 2024?

- ❖ Chemical industry results highlight the risks ahead
- ❖ Auto industry is seeing Winners & Losers emerge
 - Existing supply chains may disappear as new ones appear
 - Companies have to invest in EVs to survive
 - Autonomous Vehicles are a 'wild card' in terms of demand
- ❖ Japan is the epicentre of a potential 'Ring of Fire'



Audience Survey Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT



What type of car will most likely be your next purchase?

- Electric vehicle
- Hybrid vehicle (gas and electric combo)
- Gas vehicle
- I would rather walk or bike

33

33

The revolution now underway in transportation will change society

- ❖ Oil demand will peak relatively soon, but the pace of decline is uncertain
- ❖ Chemicals highlight the risk of major over-capacity and margin pressure
- ❖ Existing supply chains will often disappear; new ones will be created
- ❖ Cities may return to the pre-ICE era - more compact, with fewer suburbs

Transitions can happen very quickly - Easter Parade, New York

1900 Spot the car?



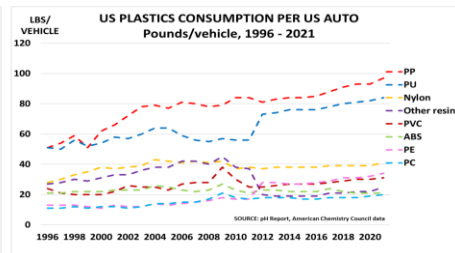
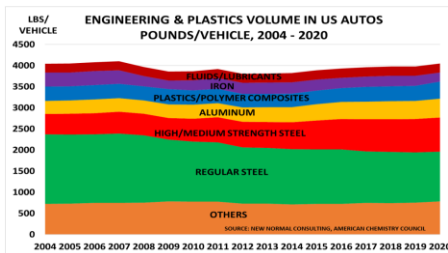
1913 Spot the horse?



34

Existing supply chains will often disappear, whilst new ones have to be created

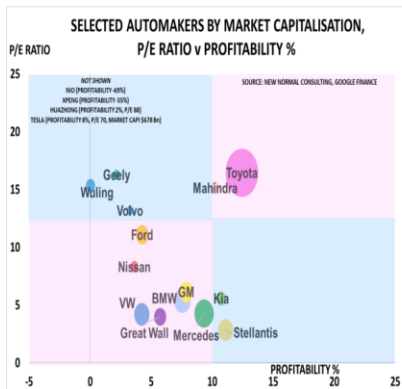
Michelin is testing airless tires for commercial light-truck fleets, particularly delivery fleets



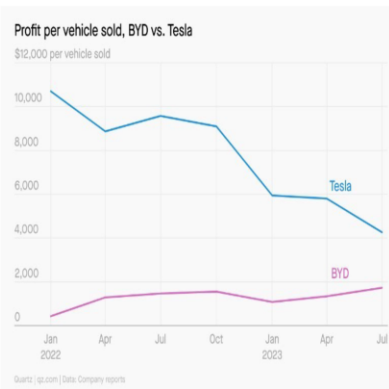
A wide range of raw materials are needed to make ICEs. Autos are a large market for plastics

35

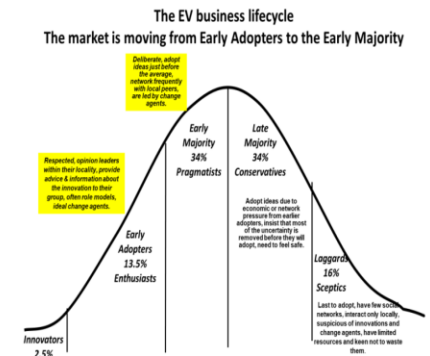
Winners & Losers are starting to emerge in the global auto market



Many auto companies have low profits



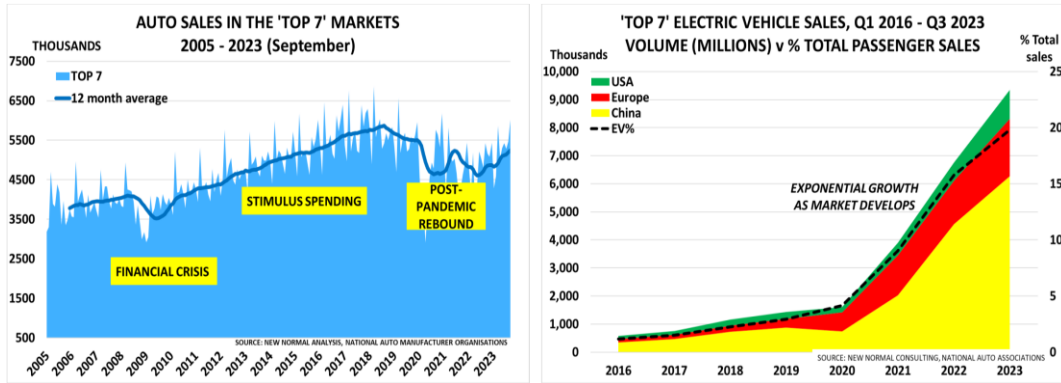
Tesla's profits have been falling



EVs now have to be sold to a more practical market

36

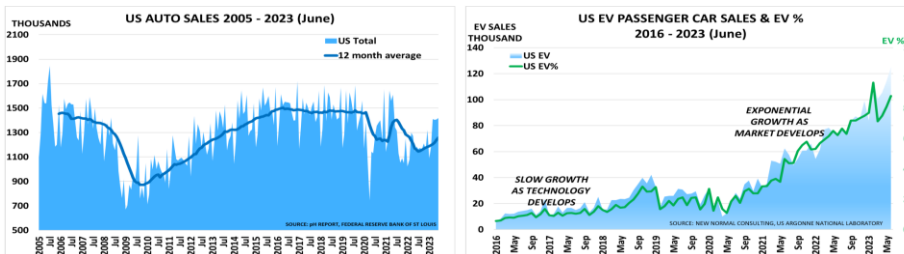
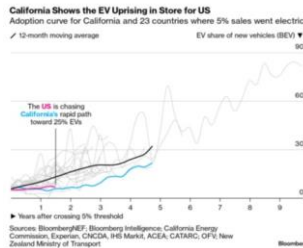
Global sales are continuing their slow decline, whilst EVs see exponential growth



37

US ICE sales are continuing their slow decline, whilst EV volumes take-off

California's EV volumes hit 5% of new-car sales in 2018. This is the point at which exponential growth begins – so far 23 countries have been added to the list.



38

US auto loans are an area of major risk

Experian report average US Q2 loan payments were \$729/month v \$582/month in 2021

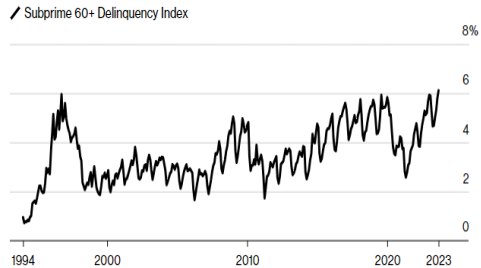
The AAA report average cost of ownership is now just over \$1000/month, up 13% v 2022

Cox note it takes 42 weeks average income to buy a new car, 25% more than in 2021

The delinquency rate of US borrowers who are 60+ days late is the highest on record

Americans Struggle to Afford Car Payments

The percent of borrowers at least 60 days late on their car loans is at the highest on record



Source: Fitch Ratings

VW and Toyota are under major pressure



VW is Europe's leading auto company, and its current crisis highlights the risks ahead. As new CEO, Thomas Schäfer, warned in July "the future of the VW brand is at stake - the roof is on fire". And the list of problems that he cited clearly justified his warning - EV sales were 30%-70% below budget, the software issues at the Cariad digital unit were still unsolved and VW's share in the key China EV market was just 3%. As [The Economist](#) commented, "disaster is no longer inconceivable."

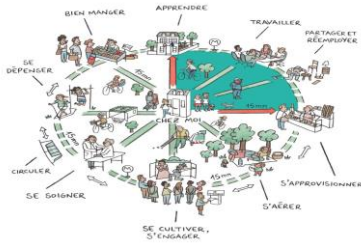


Toyota, is challenged by the same issues as the [Wall Street Journal](#) reports:

"VW and Toyota have lost ground to industry newcomers in building vehicles that resemble computers on wheels. Tesla, China's BYD and others use software extensively to control vehicle functions, meaning that everything from battery range to autonomous-driving features can be improved via over-the-air updates, like apps on a phone.....Last year, then-CEO Toyoda erupted after hearing from management that many of the software updates Toyota was aiming to release in 2025 wouldn't be completed in time."

Cities may well return to the pre-ICE era - more compact, with fewer suburbs

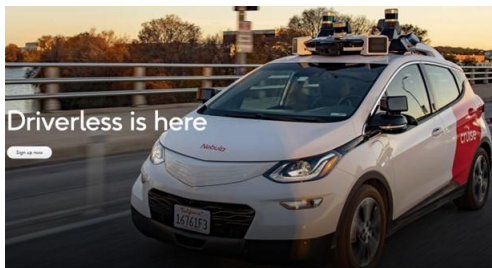
The C40 group of cities now has 96 members making up 20% of the global economy



“The idea is to enhance the positive aspects of urban life by making work, education, grocery, health, and culture accessible within a 15-minute walking or cycling distance from home.”

Autonomous Vehicles are a ‘wild card’ in terms of demand

“AV fleets covered over 80m km in 2022 and operators are expanding services to new cities. The rollout of AVs could have big impacts on the size and distribution of the passenger vehicle fleet.... Depending on the region in which they operate, robotaxis can cover three to five times the annual distance compared to private passenger vehicles, meaning that in a high AV adoption scenario, fewer vehicles are required to offer the same level of mobility to consumers.” Bloomberg



AVs are being trialed in a number of major US cities



Robotaxis are now operating commercially in Beijing

Looking forward to 2024?

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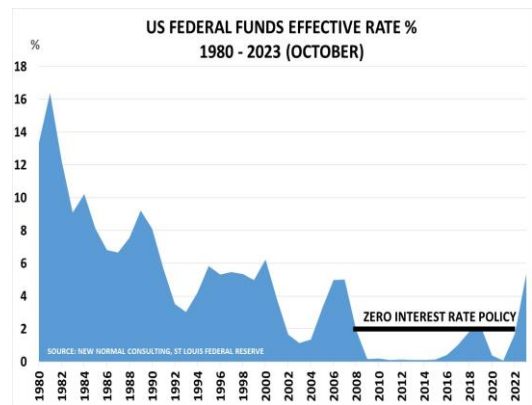
Japan pioneered ZIRP in 1999 under pressure from Ben Bernanke Other central banks followed, with major adoption from 2009



In 2000, Ben Bernanke, then a Princeton professor:

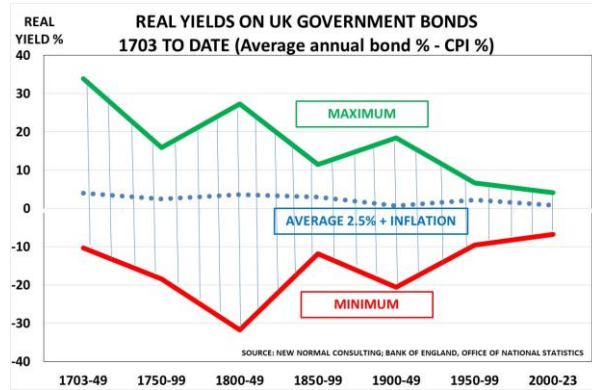
“Fired a broadside at the Bank of Japan asking whether Japanese officials were suffering from self-induced paralysis and criticized them for confused or inconsistent responses to helpful suggestions from academics such as himself.”

Masaaki Shirakawa, BoJ Governor 2008-12



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**Central banks have lost control of inflation and interest rates
They preferred to believe their models, and didn't 'look out of the window'**



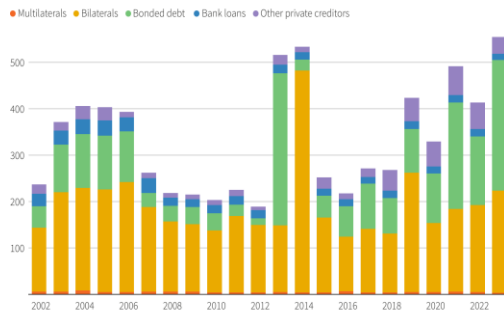
*A whole generation grew up believing interest rates are always close to zero
In reality, they average 2.5% + Inflation over the longer-term*

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Unwinding ultra-loose monetary policy is a "serious challenge"

Kazuo Ueda, BOJ Governor, November 2023

Sovereign debt in default by creditor type



Debt's main function is to bring forward demand from the future

NE Asia is the epicentre of the crisis:

- ❖ Japan & China have ageing and declining populations
- ❖ Japan's currency has fallen 50% v US\$ in the past 2 year
- ❖ IIF calculate Japan debt at 266% of GDP, China debt at 282% of GDP
- ❖ Global debt was \$307tn in Q3, 333% of GDP
- ❖ \$554bn of sovereign debt is already in default

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A deflationary cycle is now starting to appear

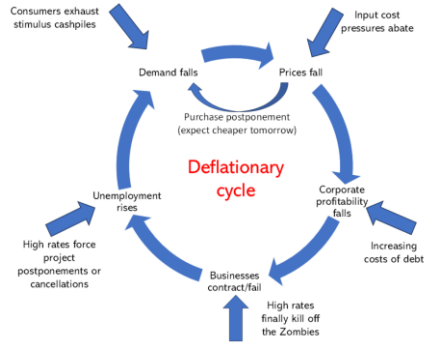
❖ *Stage 1 requires consumers to exhaust their stimulus cash piles, causing demand to reduce to lower levels*

❖ *Stage 2 then sees a reduction in input cost pressures - slowing demand leads to a focus on cutting prices to hold market share*

❖ *Stage 3 sees a rise in debt service costs as interest rates rise and lenders start to worry about "return of capital"*

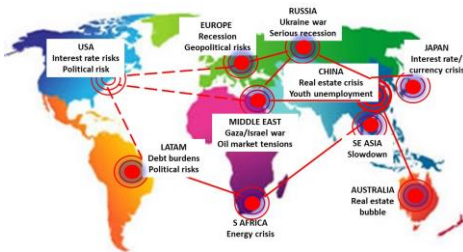
❖ *Stage 4 sees the zombie companies who rely on rolling over debt at risk of bankruptcy*

❖ *Stage 5 sees their collapse impact customers/suppliers along the value chain, and lead even well-funded companies to cut back*



The pH Report, July 2023

The landscape of the global economy is becoming a 'Ring of Fire'



- ❖ *Large cap equities normally have stronger balance sheets, and so show fewer initial signs of stress*
- ❖ *SMEs are more vulnerable as their business is necessarily more focused – but they are less visible*
- ❖ *Sovereign debt may appear more stable, but as Turkey/Argentina confirm, a major crisis is now developing in the Global South*
- ❖ *Investment Grade corporate bonds benefit from the same support as large equities - unless/until the numbers no longer add up*
- ❖ *High-Yield corporate bonds are essentially "accidents waiting to happen"*
- ❖ *Soft commodities will normally be less vulnerable as food is a global essential - but when times get tough, they can also suffer*
- ❖ *Industrial commodities are the opposite, as any slowdown in demand immediately puts pressure on margins and cash-flow*

Risk management will be key to survival, and future success

- ❖ **Scenario planning**, based on a wide range of potential outcomes, will be key to success given today's levels of volatility.
- ❖ **Recession till 2025**. We need to be realistic as today's deep-seated problems are unlikely to be over by Christmas.
- ❖ **China is changing**. Its real estate bubble has been 'subprime on steroids' and its bursting will have far-reaching impacts.
- ❖ **Debt risks are rising**. Social unrest will continue to rise around the world as Deflation makes it very difficult to repay debt.
- ❖ **Invest for the future**. Russia's invasion is accelerating the transition to a Net Zero economy as fossil fuel demand reduces.



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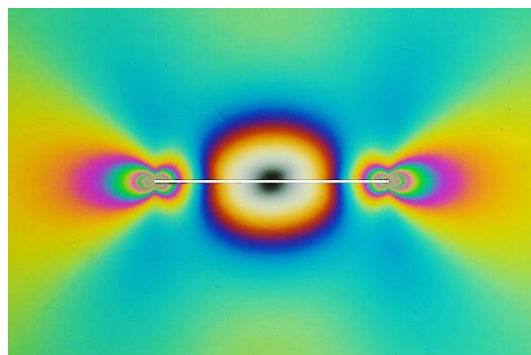
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