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Macroeconomy and Market Overview

August 14, 2023

Global Macroeconomy: Biweekly Update

- **Global PMIs Soft in July / Composite Still Above Critical 50 Threshold**
  - Consistent with modest global growth
- **Inflation Continuing to Moderate**
  - DMs core inflation (ex. Japan) still considerably above central banks' targets
- **Latest Productivity Growth: Improving in the US / Weak in Western Europe**
  - Widespread AI adoption could give some significant lift to future growth
- **Global Economy: Growth About in line with Potential During First Half of 2023**
  - Factors in place for solid, albeit slightly slower, 2nd half growth
- **Fitch's US Downgrade Not Expected to be Material Market Event**
  - My opinion re absence of meaningful sovereign-debt risk premium

Global PMIs Softened in July

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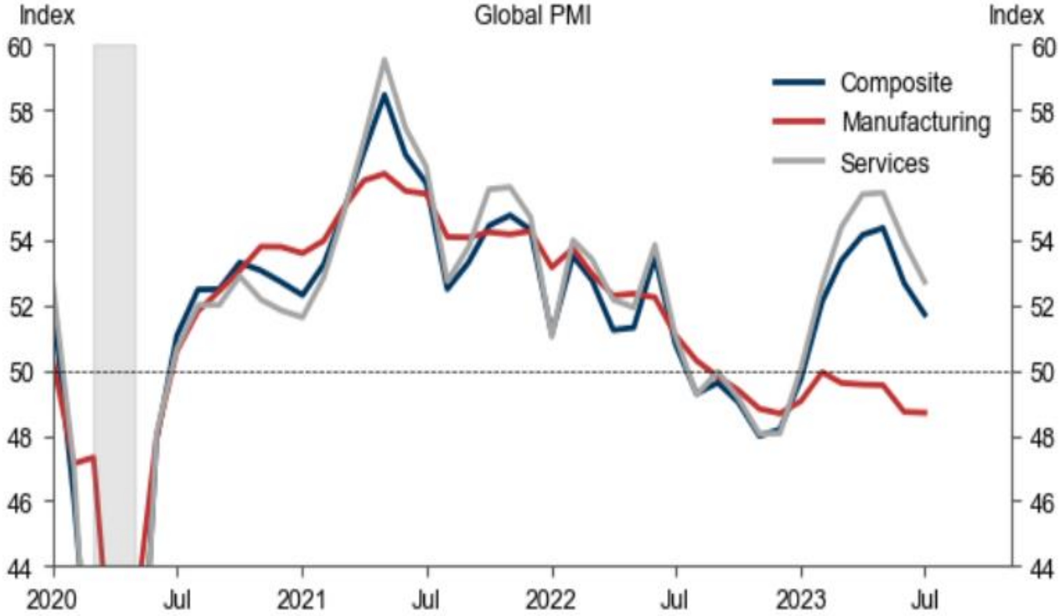
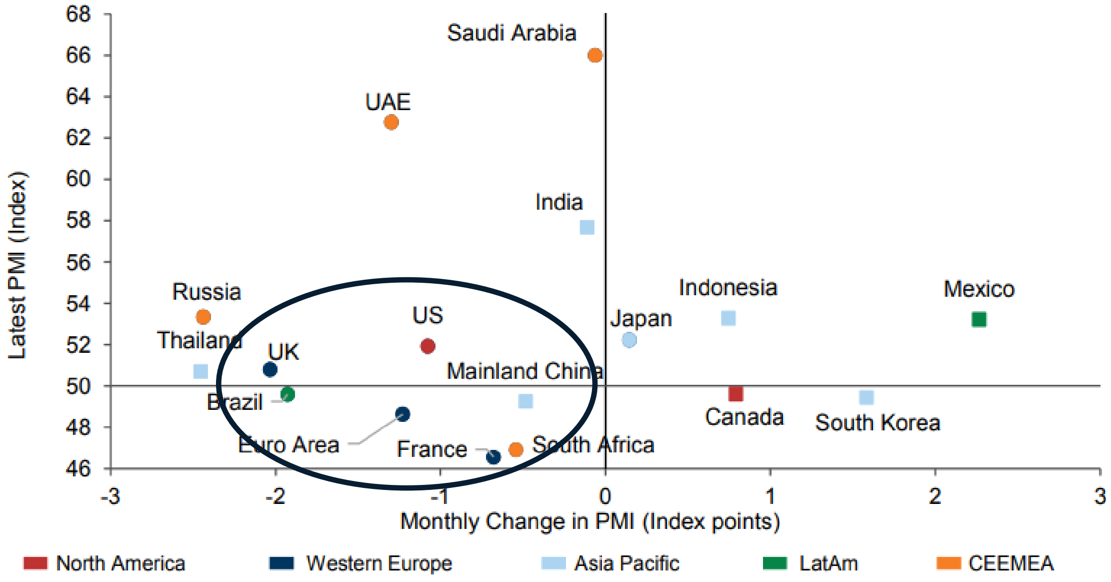
Global PMIs



Country/Regional PMIs



- Global composite PMI at 51.7 consistent with modest expansion (dark blue line)
- Services PMI edged down to 52.7 (light blue line)
- Manufacturing flat at 48.7 (red line)

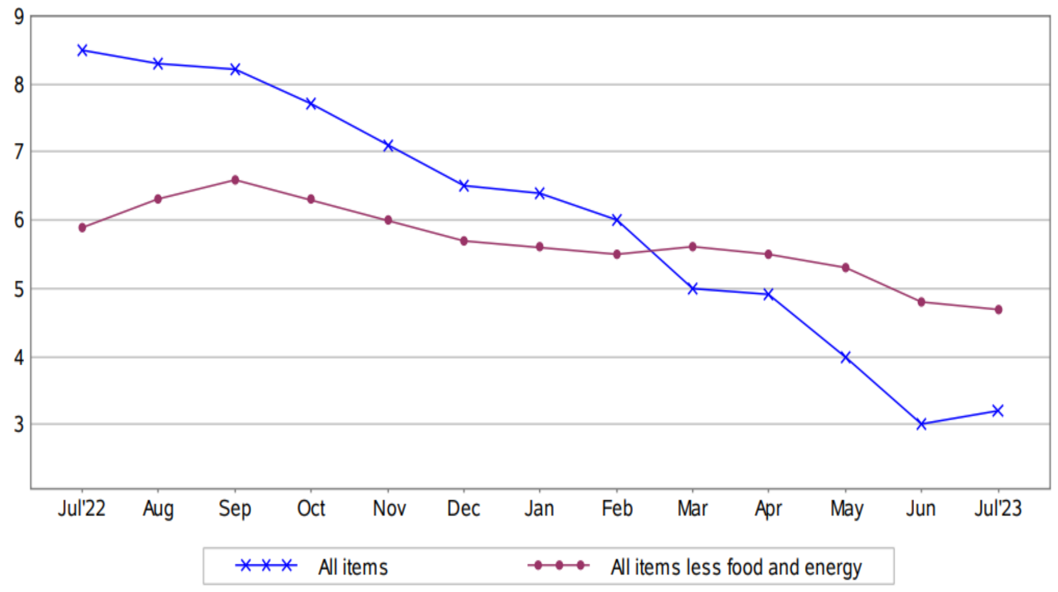
- Softening widespread across countries & regions (left side of chart)
- US and UK composites still above 50 (horizonal line)
- Euro area and China below 50 expansionary threshold

Source: S&P Global, Haver[1]

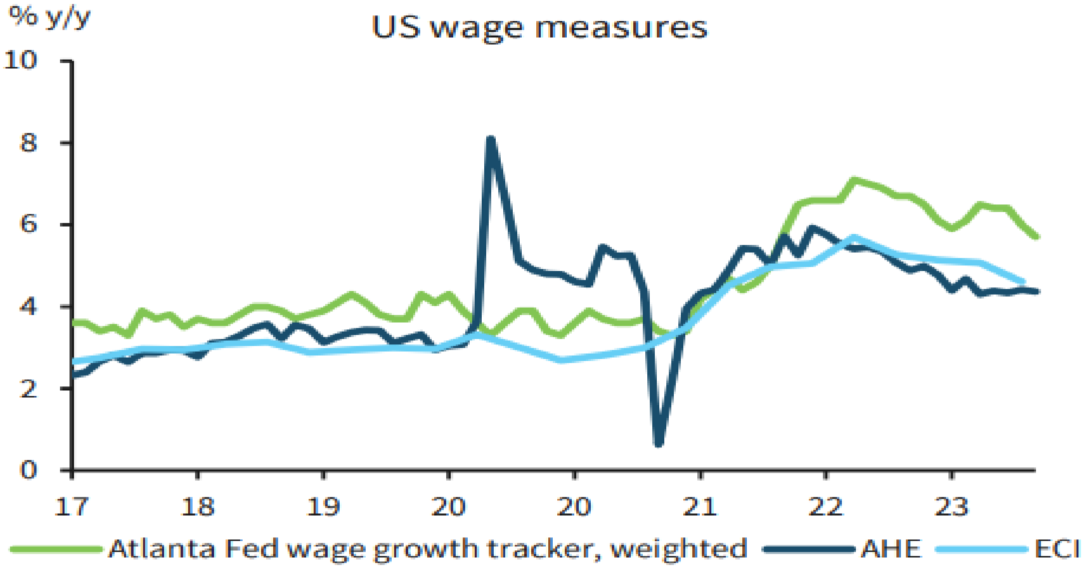
1. Round markers are composite PMIs, square markers are manufacturing PMIs

US: Latest CPI/Wage Reports Disinflationary but Still Above Fed's Targets

CPI: Y/Y Percent Increase



Wage Trends



- Headline CPI rose 3.2% y/y in July, up from 3% in June due to higher food and energy prices
- Core inflation: slight downside surprise, +4.7% y/y/ vs. 4.8% in June as goods prices slowed more than expected
- Some economists concerned August increase could be higher[1]

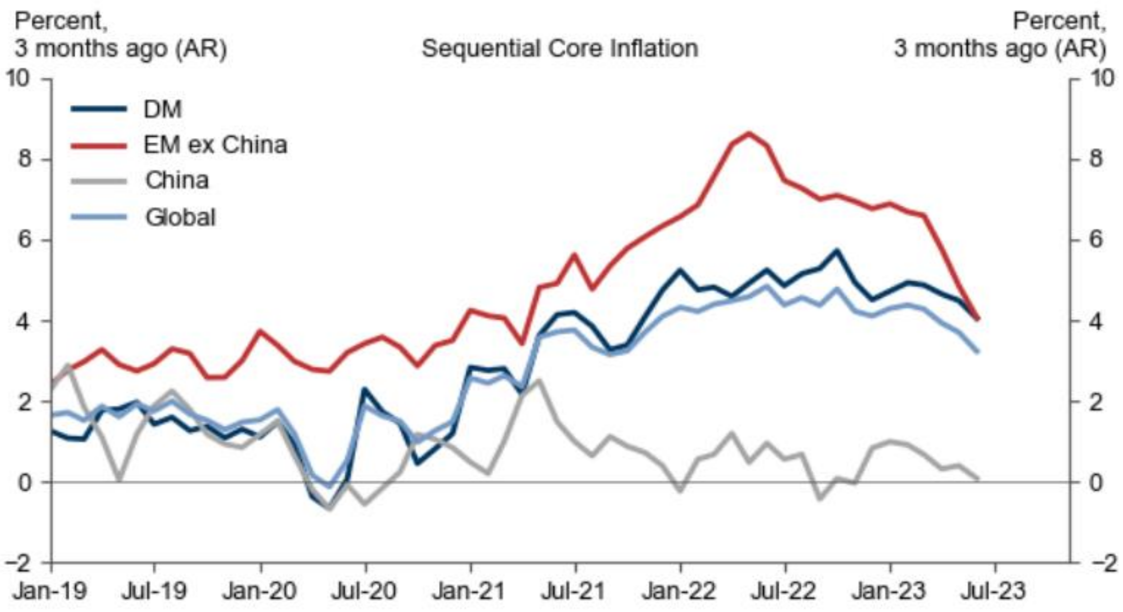
- Atlanta Fed's overall workforce wage tracker decelerated 0.3pp to 5.7% in July, now on downward path since March
- BLS average hourly earnings and employment cost index up ~4.5% y/y
- Wage growth rate still 1pp or more above Fed's comfort zone

Source: Atlanta Fed, BLS, Haver

1. Citi economists: rising energy prices, owners equivalent rent and August seasonals are upside risks. Barclays economist: July disinflation was narrowly spread and looking beyond these categories, progress in raising in price pressures is less impressive

Core Inflation: Global, DM, EM and China

Global Core Inflation



China Core Inflation

- Global core inflation down from recent peaks of ~8% for EMs and ~ 6% for DMs
- DM core inflation ex. Japan, however, still considerably above central banks' 2% target

- China's CPI slipped into deflation in July (-0.3% y/y)[1]
- Core prices, however, were up 0.8% y/y in July vs. 0.4% in June, driven largely by service prices which received a lift from summer travel

Source: Haver, GS, NBS, Wind, Citi

1. China largely due to its exceptionally high saving and investment traditional runs relatively low inflation rate.

Productivity: Recent DM Divergence / AIs Potential Significant Global Lift

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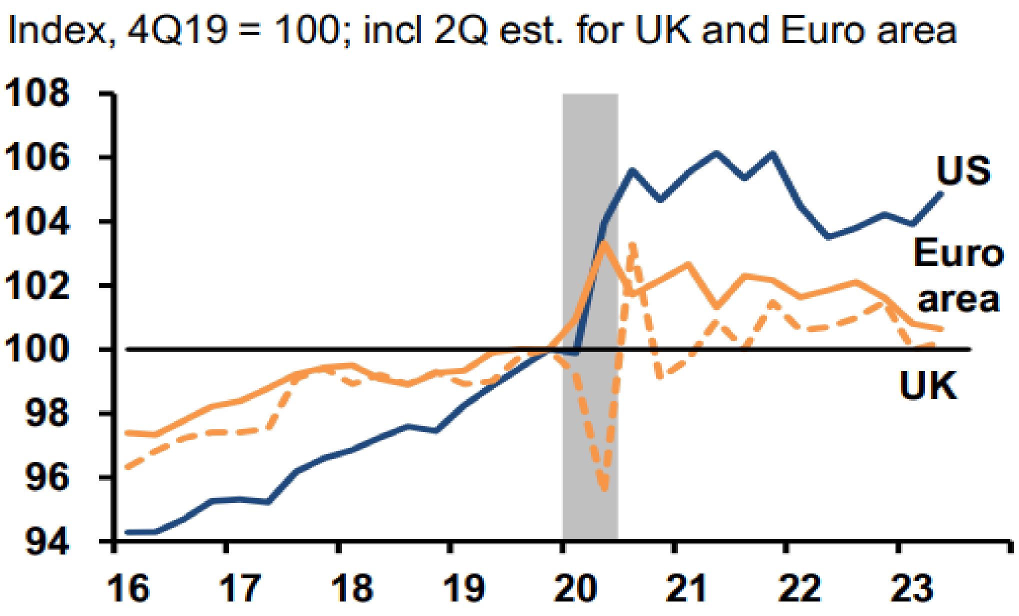
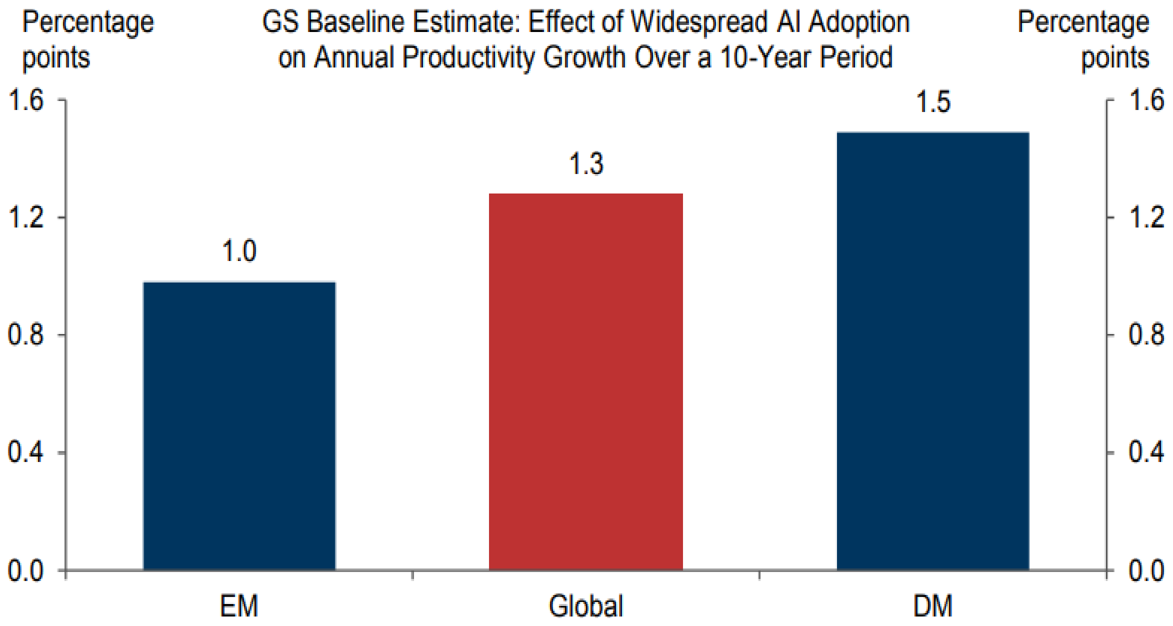
Latest DM Labor Productivity



AIs Significant Global Productivity Lift



- Latest US productivity provided an upside surprise, while …
- Recent productivity growth remains lackluster in the Euro area and UK

- Market participants and many economists starting to focus on generative AIs significant potential
- GS economists[1]: Widespread adaptation could create a productivity boom that would drive a 7% or ~$7tn, increase in global GDP over 10 years

Source: BLS, ECB, UNS, JPM, GS estimates based on stylized scenarios

1. "The Magnitude end Timing of the AI Investment Cycle", GS, 20 July 2023

Global Economy: 1st Half Growth Diverse, Albeit in Line With Potential[1]

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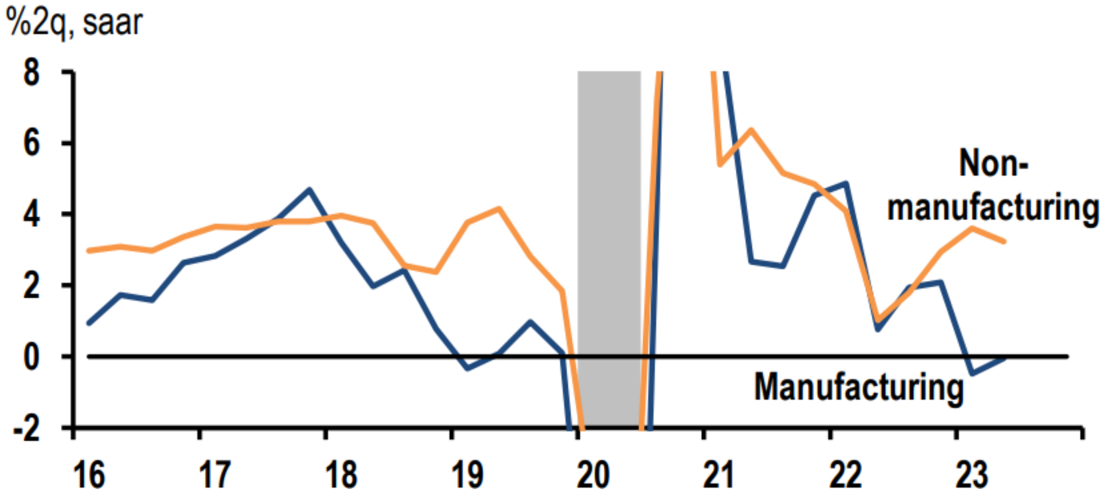
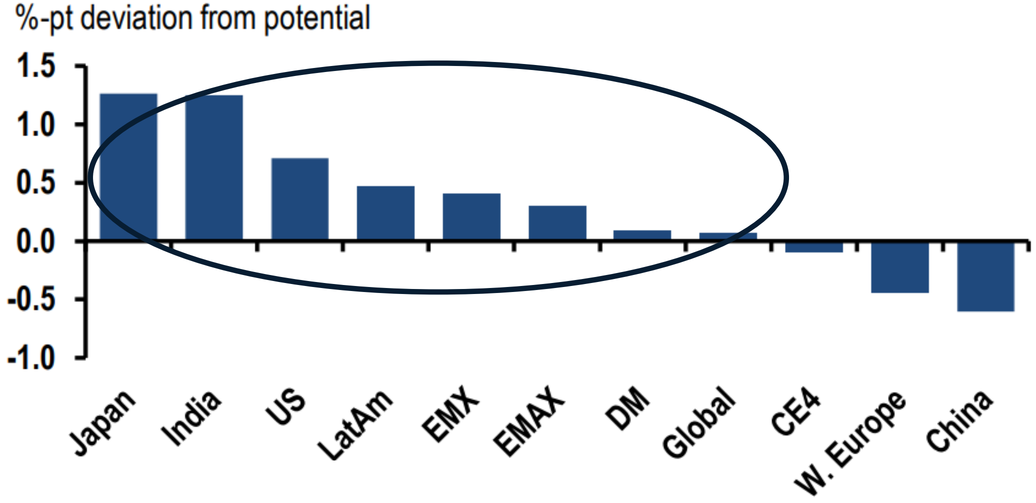
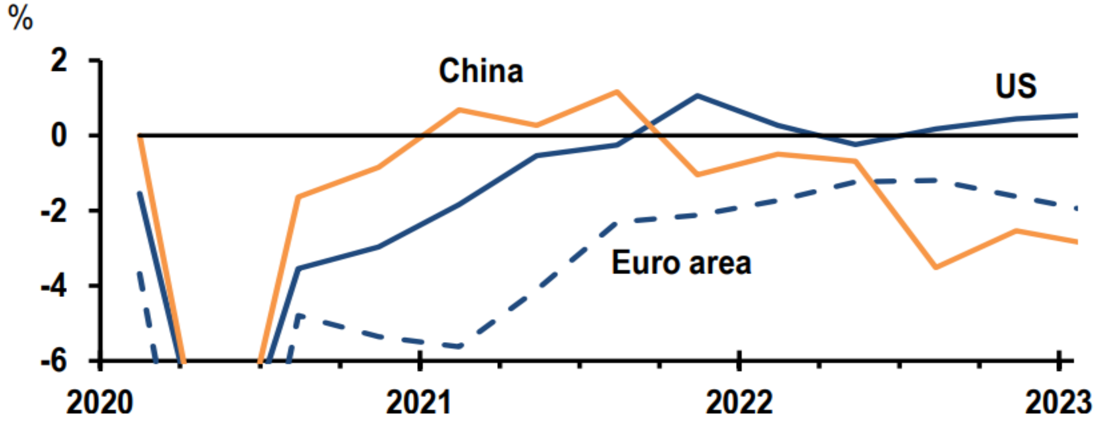
Global GDP by Sector



GDP 1st H 23: Major Countries/Regions



Real GDP vs Pre-Pandemic Path



- First half of year monetary tightening slowed factory output, while non- manufacturing or service sector benefitted from fading Covid restrictions
- Significant regional differences; however
- Major DMs ex Western Europe and major EMs ex China above potential in 1st half of year

Source: National sources, JPM

1. Global GDP expanded at 2.7% annual rate in 1st half 2023

Factors Expected to Support Consumer in 2nd Half 2023

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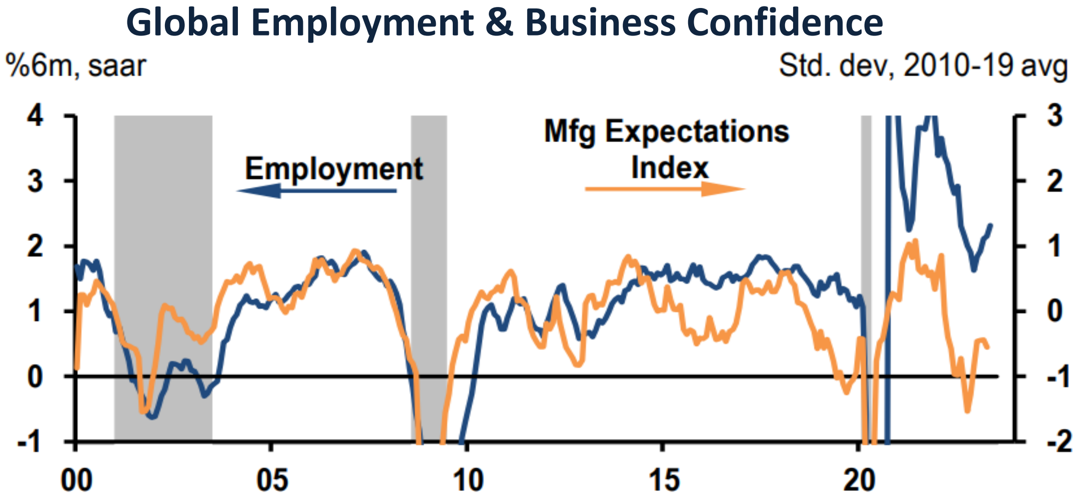
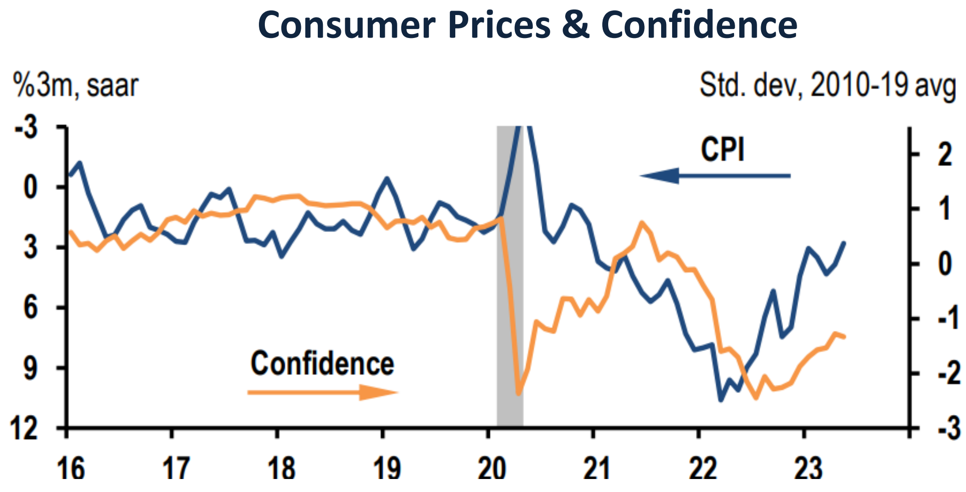
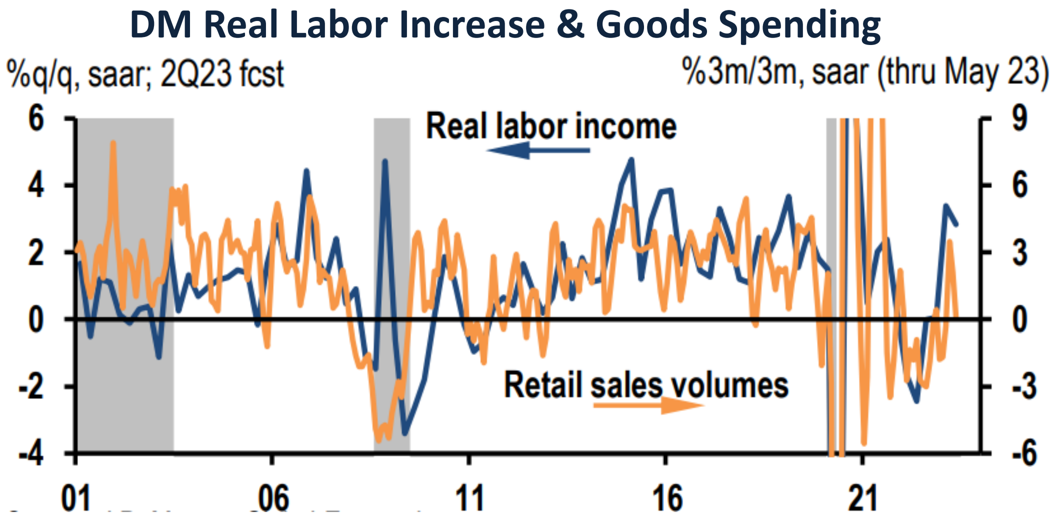




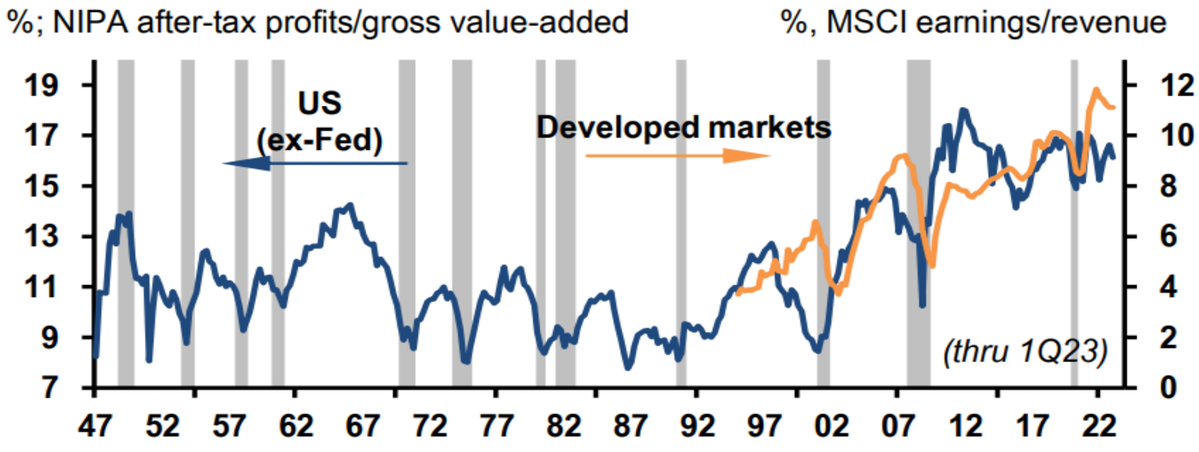


- Job growth has moderated but hiring is currently expanding roughly 1%-point faster than pre-pandemic pace
- Consumer confidence is rebounding from recent trough as inflation slows
- Real labor income is rising and spending started to ramp up in June

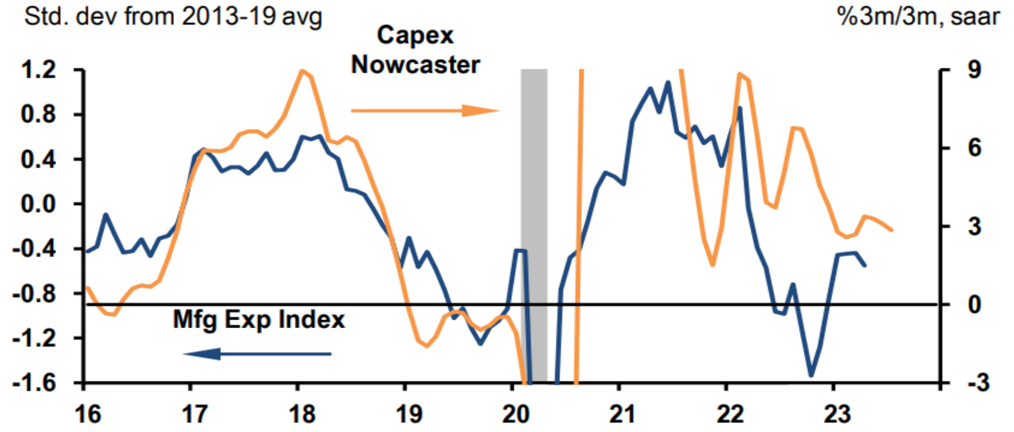
Source: National sources, JPM

Global Business: Relatively Solid Position Also Underpins 2^{nd} H Outlook

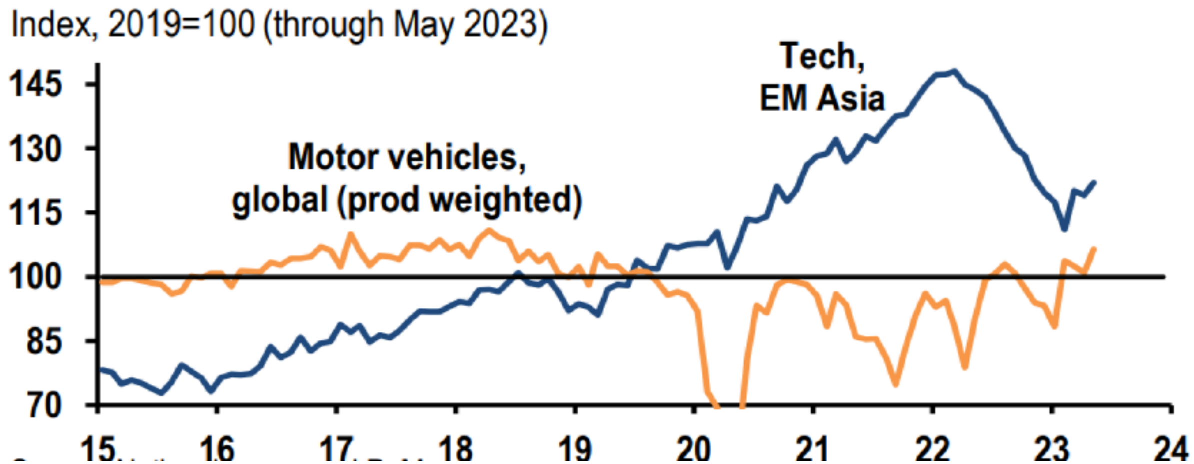
Corporate Profit Margin, DM & US



Global Manufacturing Confidence & Capex



Global Manufacturing, Tech and Autos



- DM profit margins slightly below recent peaks but well above pre-pandemic levels
- JPM's "Nowcaster" points to 3% annual rate of capex growth in 2^{nd} H ex. China
- Tech and auto production recovering following post-pandemic distortions

Source: MSCI, DM GDP weighted avg, National sources, JPM

China & Europe, However, Expected to Moderate 2nd H Global Growth[1]

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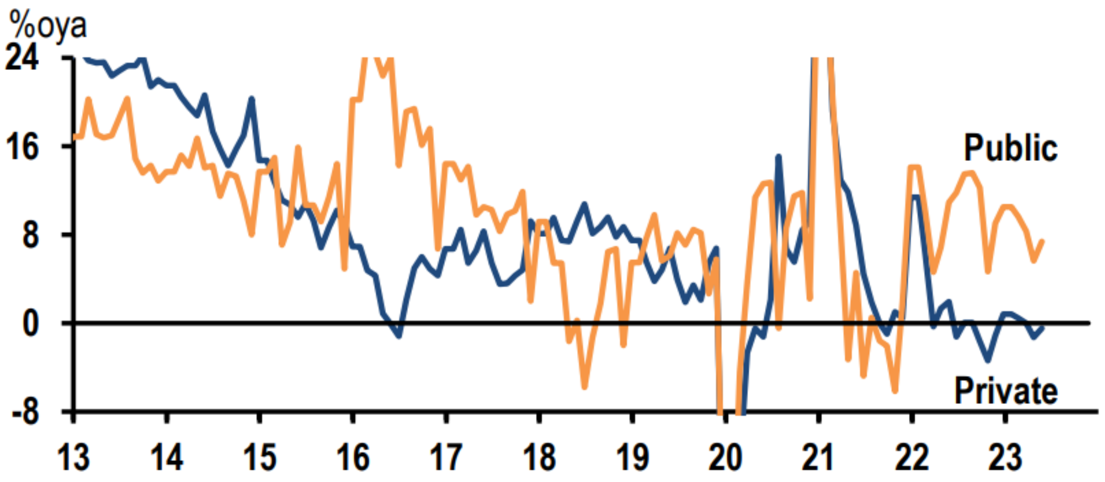
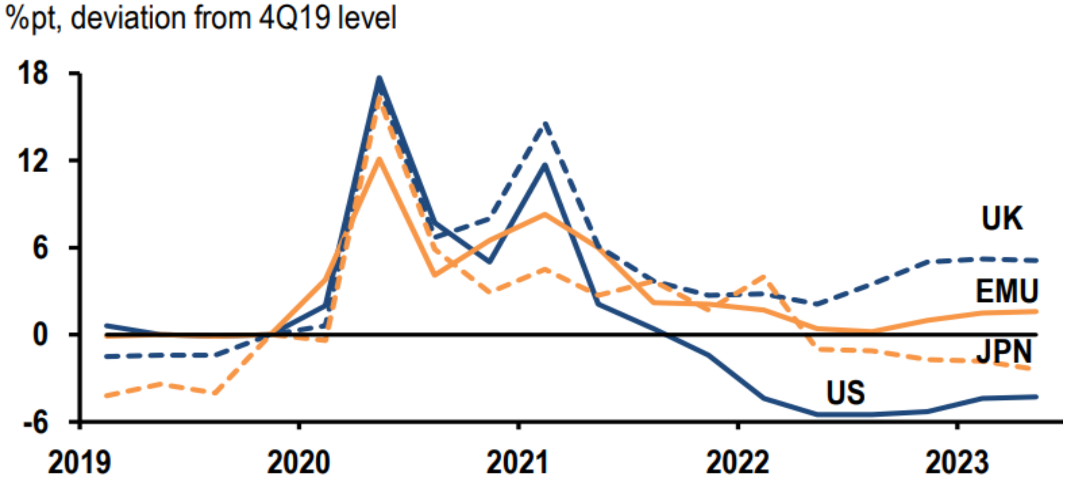
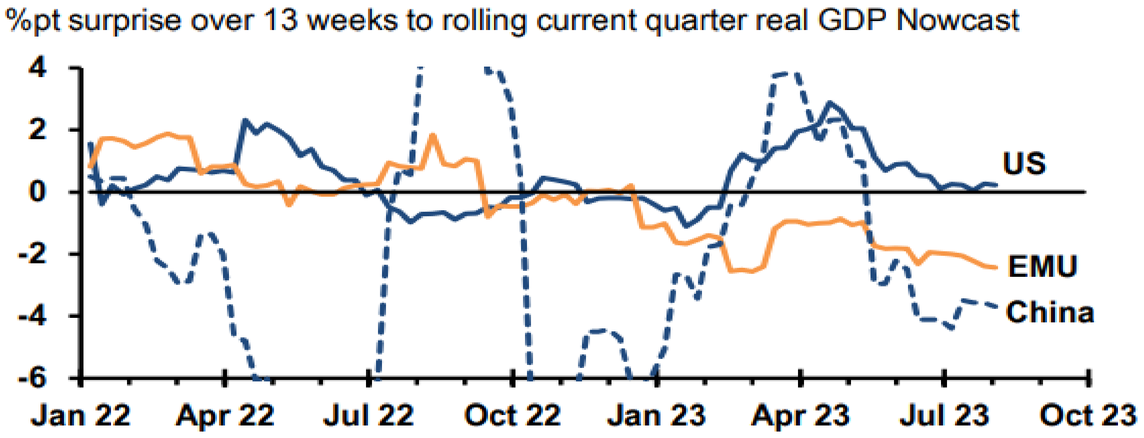
China's Fixed Asset Investment



Household Saving Rate



Real GDP Revision Index[2]



- China's depressed private sector headwind for global growth
- Saving rates imply European consumers cautious, while US and Japanese consumers more sanguine
- Latest data surprises negative for China and for Europe to lesser extent

Source: NBS, National Statistics, JPM

1. Due to slowing in China and Europe 2nd H GDP growth expected to be ~0.5%-pt. below 1st H pace
2. JPM's revision index tracks broad sweep of data to forecast changes in GDP outlook in current quarter

Fitch's US Downgrade Not Expected to be Material Market Event[1]

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- **Fitch Downgraded US Sovereign Credit to AA⁺ from AAA Citing:**
  - Expected fiscal deterioration over next 3 years/erosion of governance/growing debt burdens

- **Reasons Cited by Market Strategists for Expected Muted Market Impact of Downgrade**

  I. *Fitch's commentary did not include any new information for rate investors*
  - Debt statistics cited by Fitch well publicized
    - Consistent with data published by CBO – a respected non-partisan body
  - Investors already accustomed to last-minute resolutions of debt limit
    - Arguably recent debt-limit deal upside surprise

  II. *Downgrade not likely to precipitate forced selling*
  - Investment mandates usually refer to Treasuries as an asset class without reference to rating
    - One-notch downgrade should not have impact
  - For collateral purposes downgrade to AA+ should not have an effect
    - Rating action does affect other government securities[2]
  - No precedent for forced selling, it was not evident at the time of S&P downgrade in 2011

  III. *Sovereign debt does not necessarily trade in line with ratings*
  - Significant spread between sovereign debt of the Netherlands and Germany, although both rated AAA[3]
  - Sovereign debt of Austria and Finland trades cheaper than France's , even though it is rated higher

1. Goldman Sachs, "Fitch Downgrades US Sovereign Rating", August 1, 2023; Barclays, "US Rating Downgrade, Déjà Vu' ", 2 August 2023; Citi Velocity Daily, "US Downgrade to have limited impact on UST yields", August 2, 2023
2. The rating action does not appear to have any implications for securities issued by government-sponsored entities (GSEs), nor for municipal issuers
3. Netherlands AAA 10-year currently trades at + 34 bp premium vs. Germany's sovereign credit (2 August 2023)

Recent Treasury Selloff / Why Are Markets Ignoring Debt Concerns?

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- **US 10-Year Treasury Yields Recently Edged Above Top of 3.5%- 4% Range They have Been in Since Start of The Year**

- **Selloff Largely Attributed to Stronger-Than-Expected Economy/Tail Risks of Hard Landing Diminishing**[1]
  - Surprisingly strong Q2GDP / Recession forecasts eliminated or deferred
  - Prospects for faster rate cuts and lower terminal rate decreasing
  - Increasing supply of Treasuries / Powell signaling more QT to come

- **Concerns re US Deficits Are, of Course, Not Unwarranted**[2] **/ But Why Aren't They Reflected in Market Prices?**
  - Treasury yields near historical lows /benign pricing for Treasury credit default swaps[3]

- **In My Opinion, Current Absence of Meaningful US Sovereign-Debt, Market-Risk Premium Largely Reflects**
  - Recognition that US can always repay its sovereign debts, if it chooses
  - US debt-to-GDP ratio currently below extremely high-level that might call for surge in sovereign yields [4]
  - Markets implicitly expect Washington to act when problems become more acute[5]
  - Non-US holders of US debt largely motivated by their trade policies[6]

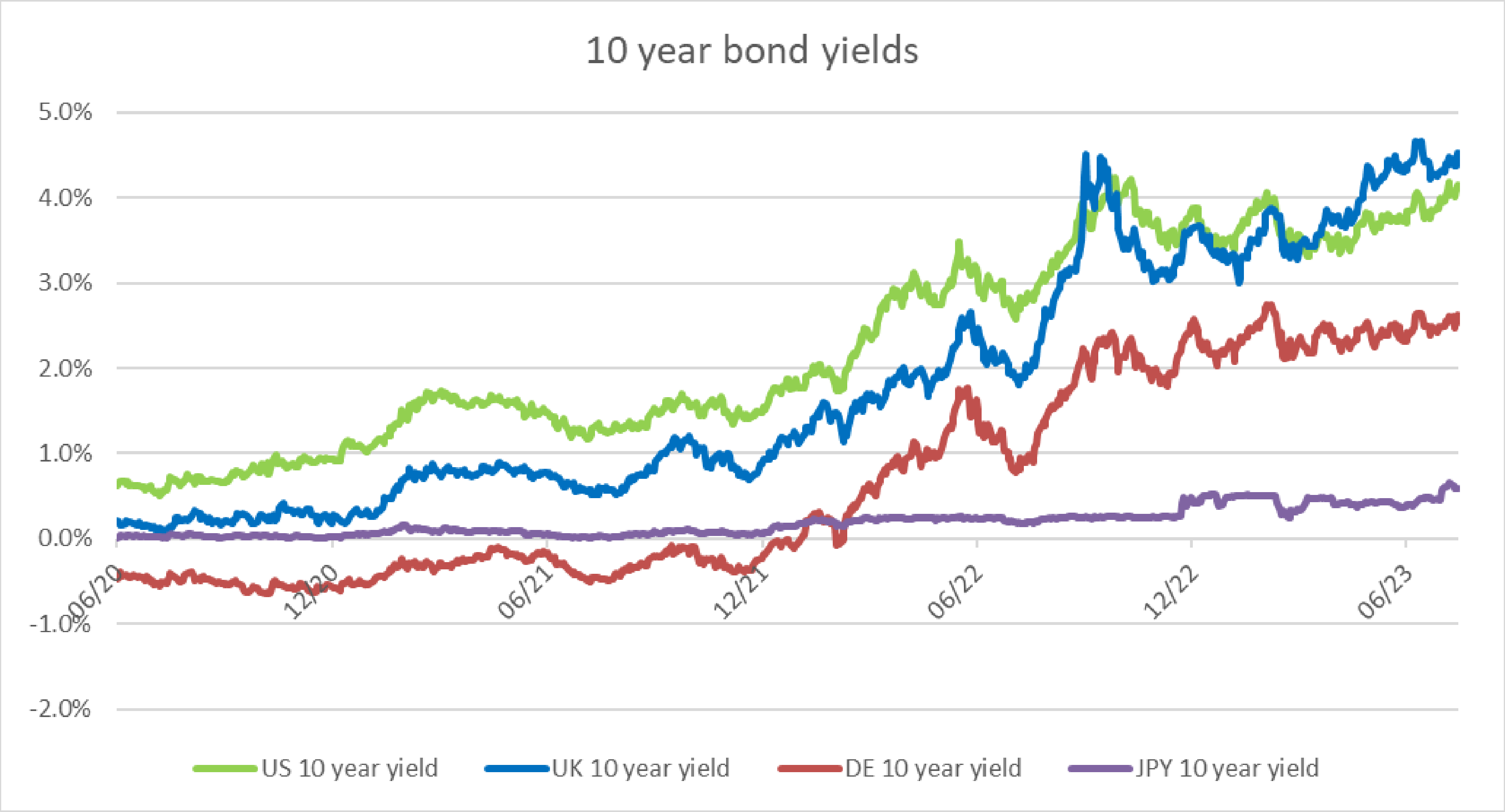
1. Other possible causes of selloff cited by Citi include worries about Japanese demand BoJ's YCC tweak and momentum players chasing yields higher with 4% breakout. Citi: US Rates Strategy, 4 August 2023
2. Despite an expanding economy, US deficit has jumped to $1.6tr. In first 10 months of this fiscal year, up from $726 bn. a year ago. Social Security and Medicare Trust Funds are likely to be depleted by 2033 and 2035, respectively
3. US 5-year CDS current value (8 August 2023) reflects a 0.34% implied probability of default with 40% recovery rate
4. CBO estimates of sovereign debt held by public as percent of GDP: 98% (2023), 107% (2029), 181% (2053). Japan's current government debt to GDP ratio is 263% (150% if BoJ holdings are excluded)
5. Volker's monetary policies and Greenspan's Social Security Commission in the early 1980s are examples of US addressing serious problems. In contrast, failure to respond to Simpson-Bowles recommendations in 2010 is an example of "kicking the can down the road"
6. Countries such as China and Japan that have achieved large trade surpluses vis-à-vis US have invested much of their surpluses in US Treasuries

Market Performance

(USD)	MTD	YTD	2022	2021	2020
Equities					
MSCI ACWI	-3.11%	14.44%	-18.36%	18.54%	16.26%
MSCI EAFE	-3.06%	11.75%	-14.45%	11.26%	7.82%
MSCI EM	-4.60%	6.29%	-20.09%	-2.54%	18.31%
MSCI US	-2.87%	17.37%	-19.85%	26.45%	20.73%
Fixed Income					
BarCap Global Agg Total Return (Hedged)	-0.78%	2.20%	-11.22%	-1.39%	5.58%
Citi US 10+ Govt Bond Index	-3.95%	-1.91%	-29.75%	-4.63%	17.72%
BarCap US High Yield Total Return (Unhedged)	-0.24%	6.58%	-11.18%	5.26%	7.05%
Oil					
WTI Crude	1.70%	3.41%	19.33%	47.21%	-10.72%
Brent Crude	1.62%	2.42%	19.26%	43.03%	-12.36%
Currency					
USD/EUR	0.50%	-2.78%	6.62%	7.57%	-8.25%
USD/GBP	1.21%	-5.40%	12.64%	0.86%	-3.07%
USD/JPY	1.87%	9.62%	14.68%	11.52%	-4.99%
USD/CNH	1.53%	4.83%	8.79%	-2.11%	-6.73%
USD/TRY	0.46%	44.51%	40.75%	78.97%	24.88%
USD/ARS	4.37%	62.23%	72.38%	22.11%	40.55%
USD/RUB	7.74%	36.83%	-3.41%	1.35%	19.10%
Returns to 08/11					

Source: Bloomberg

Sovereign Bond Yields



Source: Bloomberg

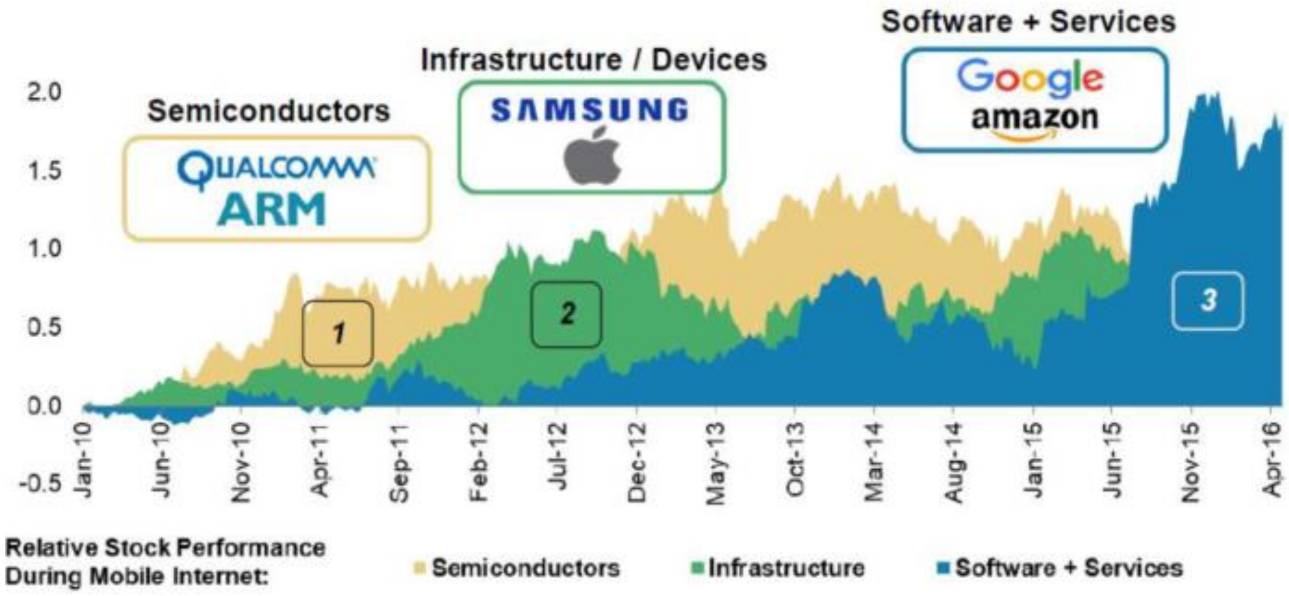
Equity Update

August 14, 2023

Special Topic: Artificial Intelligence and Semiconductors

- Global revenue for the AI market (inclusive of software, hardware, and services) is estimated to grow from $500bn today to $1.8tr by 2030
- If the adoption cycle for AI follows a similar pattern as mobile adoption, we can expect the value to accrue to semiconductors in the early years followed by hardware and software/services

VALUE ACCRETION ACROSS NEW PRODUCT CYCLE – MOBILE WAVE EXAMPLE



Source: Morgan Stanley

What’s required to power AI adoption?

- **The main hardware difference between a normal vs AI semiconductor is the processor – CPUs are used in normal servers while AI applications generally require GPUs**

- The processor is the “brain” of the semiconductor chip
- CPUs (Central Processing Units) can handle a broader scope of tasks and is better at performing one task at a time
- GPUs (Graphic Processing Units) can handle multiple tasks of a limited category at once
  - GPUs were originally designed to power high resolution graphics
  - It turns out that they are also suitable for AI applications that require greater processing power

- Think of an F1 car vs an F-150!

More on GPU adoption

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- **Utilizing artificial intelligence capabilities require upgrading to AI-compatible servers, which contain GPUs/ASICs**
  - Currently, GPUs are the favorite (broad-based vs specific applications)
  - AI servers currently make up ~1-2% of total server market
  - Spend on upgrading to AI servers and GPUs expected to grow dramatically
  - Annual server spend is ~$85bn

- **So, what's the big deal about Nvidia?**
  - Nvidia started in 1993 as a graphics card specialist, designing chips for graphics processing, a niche market
  - They started their business powering graphics for gaming expanded into high-power computing, which is applicable for current AI, cloud, and crypto applications
  - They are a pure play GPU firm vs Intel and AMD, which are active across other business lines
  - Being an early investor into high-power computing hardware, they built a software ecosystem, CUDA, around their chips – which so far seems to be the most comprehensive environment for AI developers
  - They currently hold 82% of the discrete GPU market and have 66% gross margin on the product, accruing the lion's share of value
  - Looking forward, AMD will also release similar GPU products and many large companies (Google, Tesla etc) will seek to build their own chips and ecosystems

Source: Grand Alliance Asset Management

Value by components in an AI server

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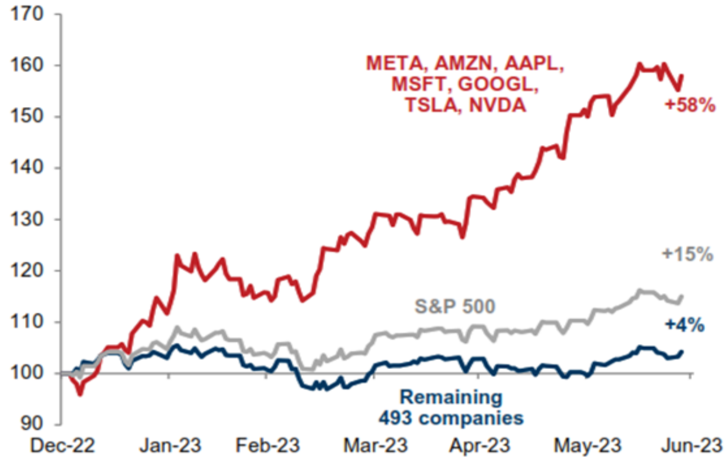
SERVER COST ANALYSIS BY KEY PARTS (USD)

	Regular Server	GPU/AI Server (A100*8)	GPU/AI Server vs. Regular Server	AI Server (H100*8)
CPU	2,166	13,900	**5.4x**	21,420 (1.5x vs. A100)
GPU	-	80,000	/	200,000 (2.5x vs. A100)
CPU DIMM (DDR5)	1,380	4,600	**3.3x**	4,600
Storage SSD	1,365	6,825	**5.0x**	6,825
Network Cards (NIC)	155	1,000	**6.5x**	1,000
Power Supply	300	1,800	**6.0x**	1,800
Fans & Heat Dissipation Module	80	800	**10.0x**	800
PCB	200	1200	**6.0x**	1200
Assembly Labor and Test	495	1,485	**3.0x**	1,485
Total Cost	~7,500	~120,000	**~16x**	~250,000 (~**33x** vs. regular)

Source: Grand Alliance Asset Management

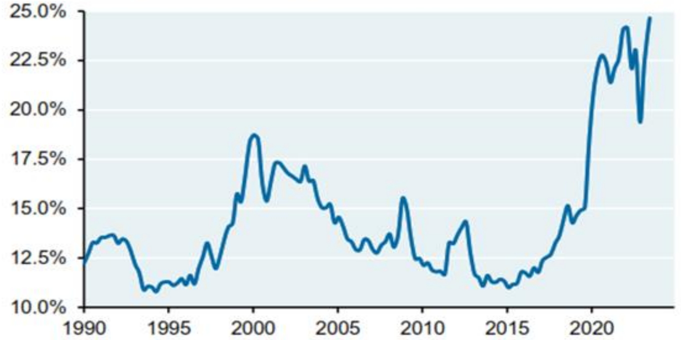
AI – The Big Get Bigger

- **Unlike the TMT bubble when a transformative technology was expected to disrupt the incumbent market leaders, today's mega-cap tech stocks are expected to be big beneficiaries of the emerging technology.**
  - The 7 largest companies were up 58% in the first half of 2023 versus just 4% for the remainder of the S&P 500.



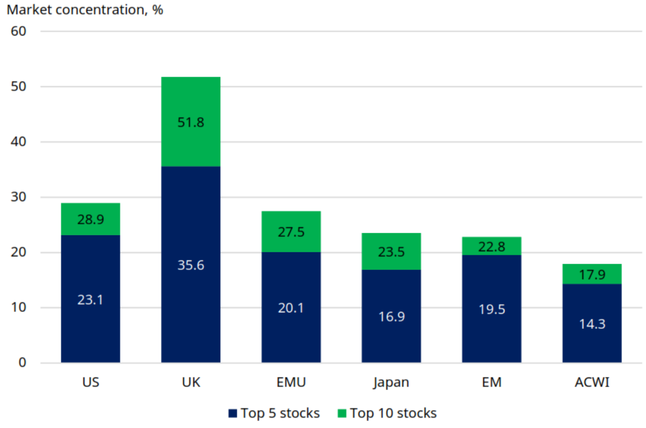
- **The mega-cap rally has caused the US market to become even more concentrated with the 7 largest companies now accounting for one quarter of the US market capitalization.**

Market cap of largest 7 companies
% of total large-cap market cap



Source: Factset, JPMAM. Q2 2023.

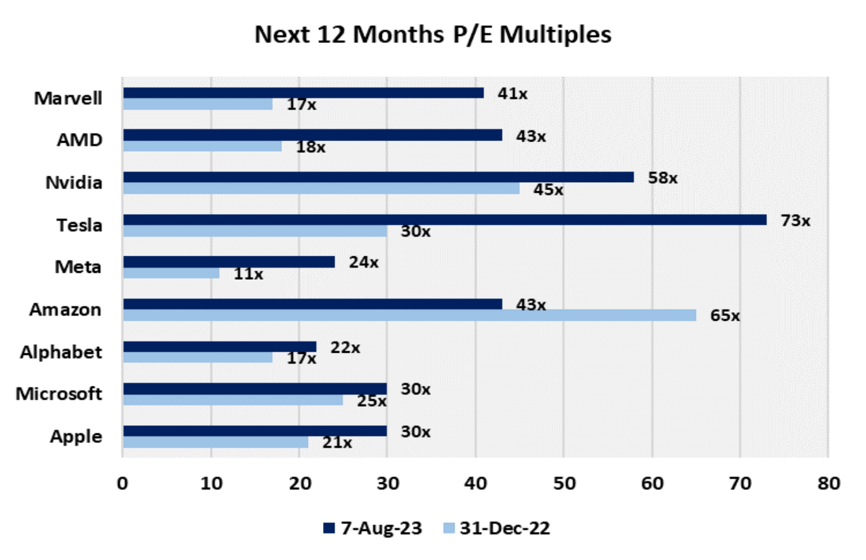
- **But market concentration is the norm globally with the US market only recently becoming as concentrated as Continental Europe and still far less so than in the UK.**

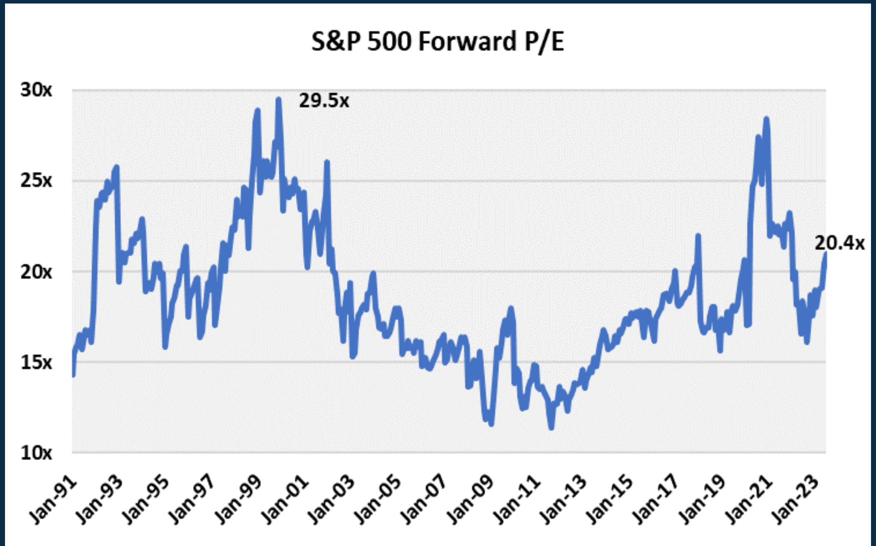


AI – Valuations

- **Forward P/E multiples for AI beneficiaries, particularly semiconductor companies, now reflect very high expectations.**

- **Compared to the TMT Bubble, the Forward P/E of the S&P 500 is still well below late 1999 levels.**
  - Current Forward P/E of 20.4x compares to 29.5x at the peak of the TMT bubble.





Sources: Bloomberg, SECOR.

Q2 Earnings Update – S&P 500

- **Expectations for Q2 earnings were adjusted down more aggressively than average leading into earnings season; they have since reverted to near historical trend with stronger-than-expected earnings.**
  - With 89% of the S&P 500's market cap reporting, Q2 EPS is on pace to decline 3.9% YoY, compared to an expected decrease of 6.0% at the outset of earnings season.

- **Similar to Q1, there was a higher-than-average incidence of positive earnings surprises.**
  - However, unlike Q1, there has been little reward for topping estimates with positive-surprisers outperforming the market by just 1% on their announcement date.

Figure 10: Path of 2Q23 Bottom-Up S&P 500 Consensus EPS

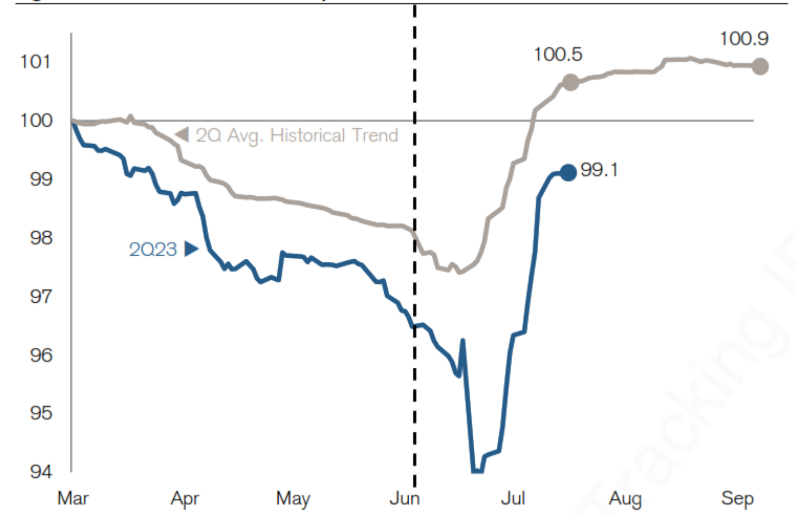
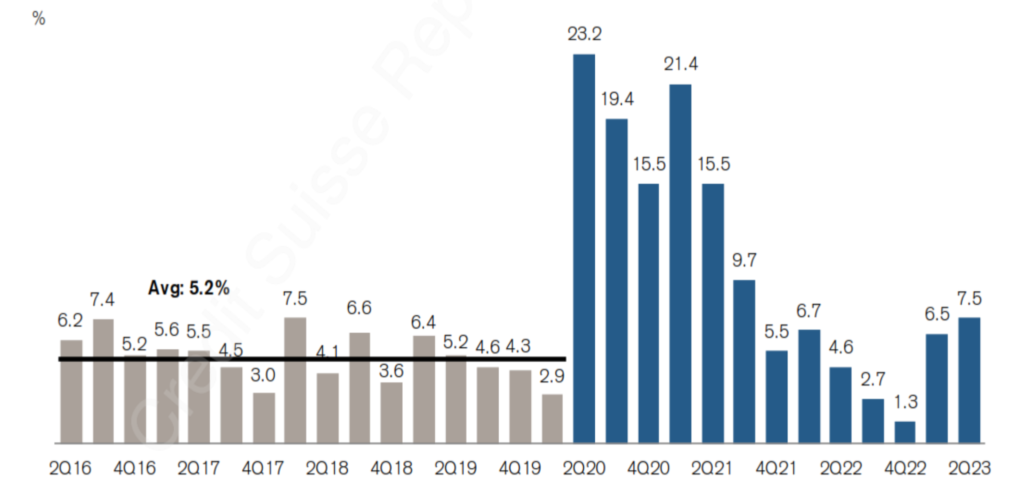


Figure 15: S&P 500 Earnings Surprise

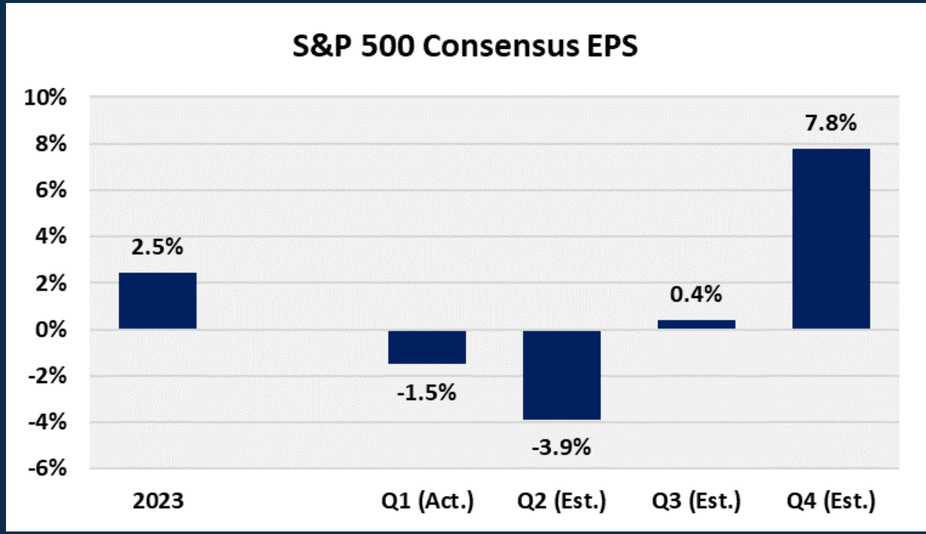


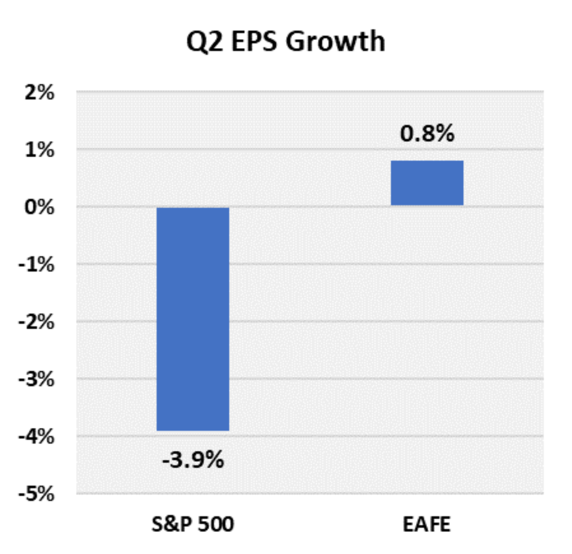
Sources: Credit Suisse, Standard & Poor's, Refinitiv, FactSet. Data as of 11 Aug 2023.

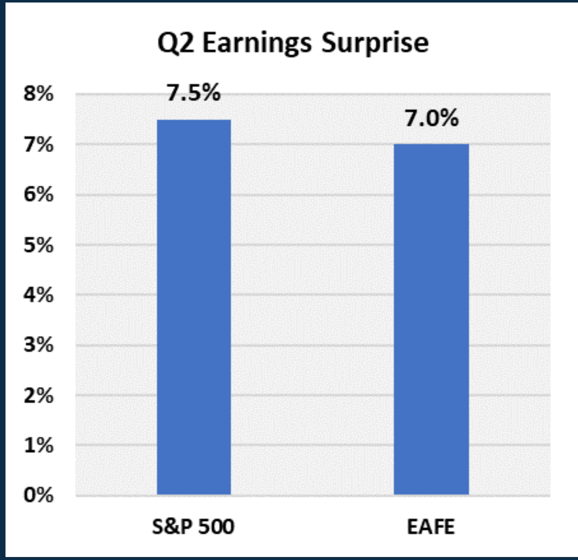
Earnings Update

- **CY 2023 are now expected to increase 2.5% YoY, although this anticipates a strong Q4.**
  - Q3 expectations have been raised by ~2% during Q2 reporting season.

- **EAFE EPS growth has outpaced the US in Q2, +0.8% vs -3.9%.**
  - The US has experienced a slightly higher incidence of positive earnings surprise, 7.5% vs 7.0%.







Sources: Credit Suisse, Standard & Poor's, Refinitiv, FactSet. Data as of 11 Aug 2023.

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