

IMF Annual Meetings

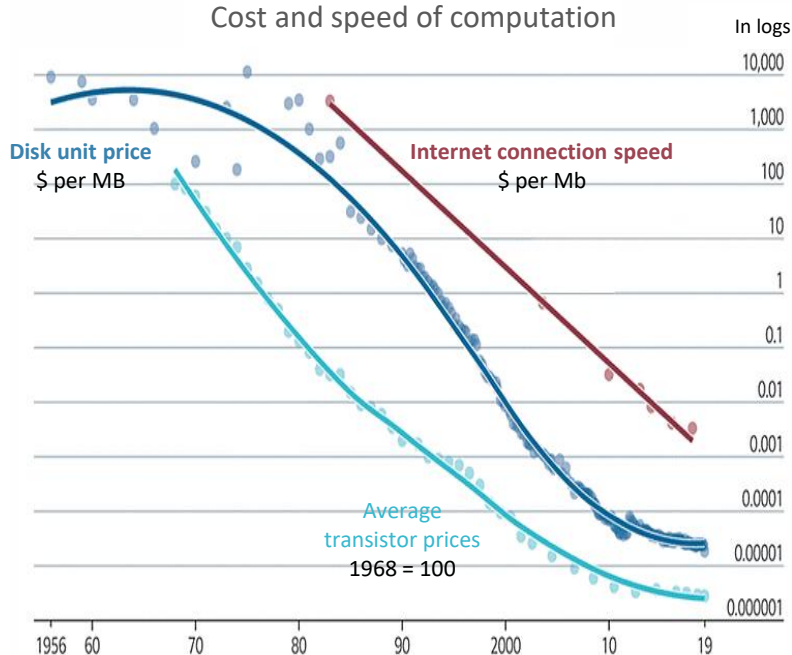
Economic Outlook and Agenda BC#

Roberto Campos Neto
Governor of Banco Central do Brasil

- Long period of stable **geopolitical environment, technology advances, globalization** and **favorable demographics** produced a “golden age” for supply chains.
 - Free markets, cooperation, and trade agreements.
 - Globalized markets served to discipline policies.
- Belief that global chains were completely adaptable, and inflation would be low for long.

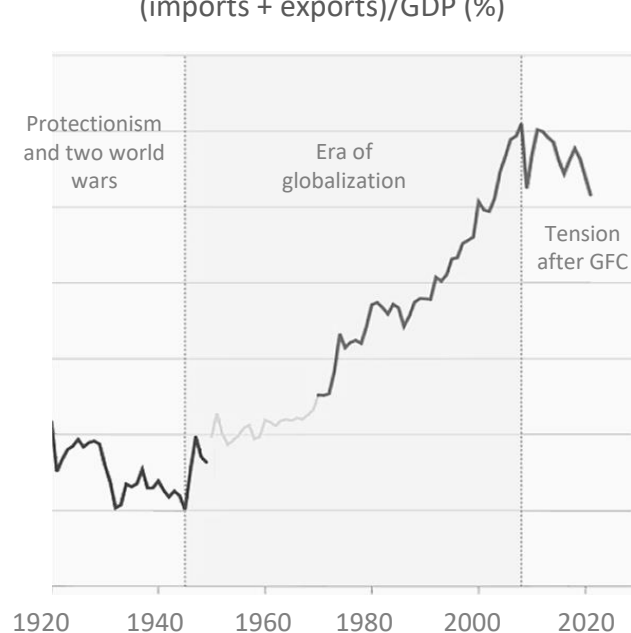
Technology advances

Cost and speed of computation



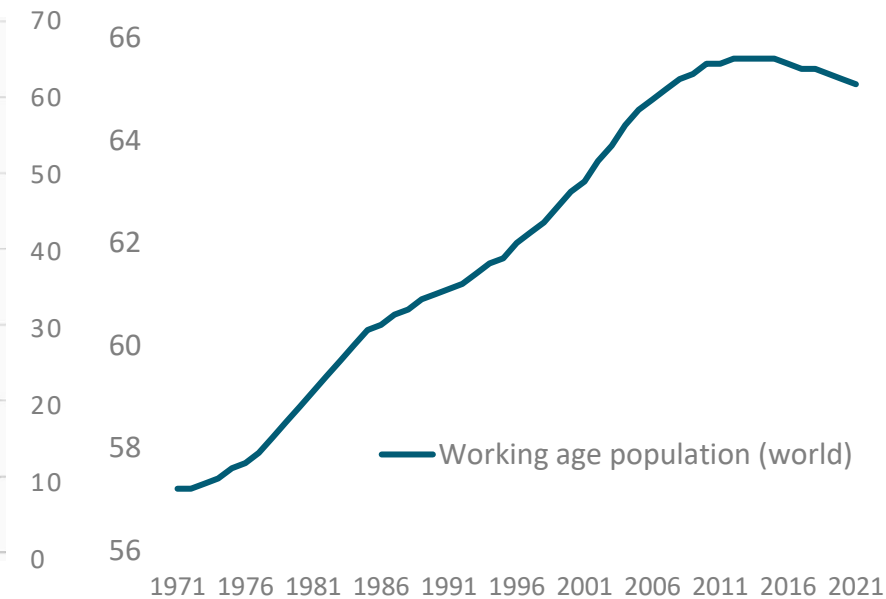
Global trade

(imports + exports)/GDP (%)



Demographic dividends

% of population



- Low productivity was a sign.
 - Governments lost appetite for difficult structural reforms.
- Low interest rates, high leverage and low bargaining power of workers compensated low productivity.

Productivity growth

Advanced economies

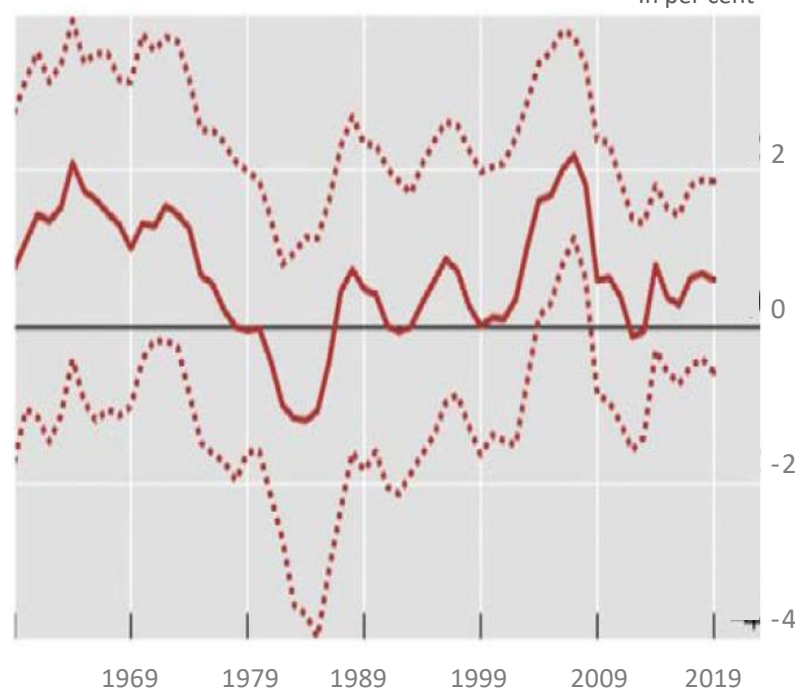
In per cent



Productivity growth

Emerging market economies

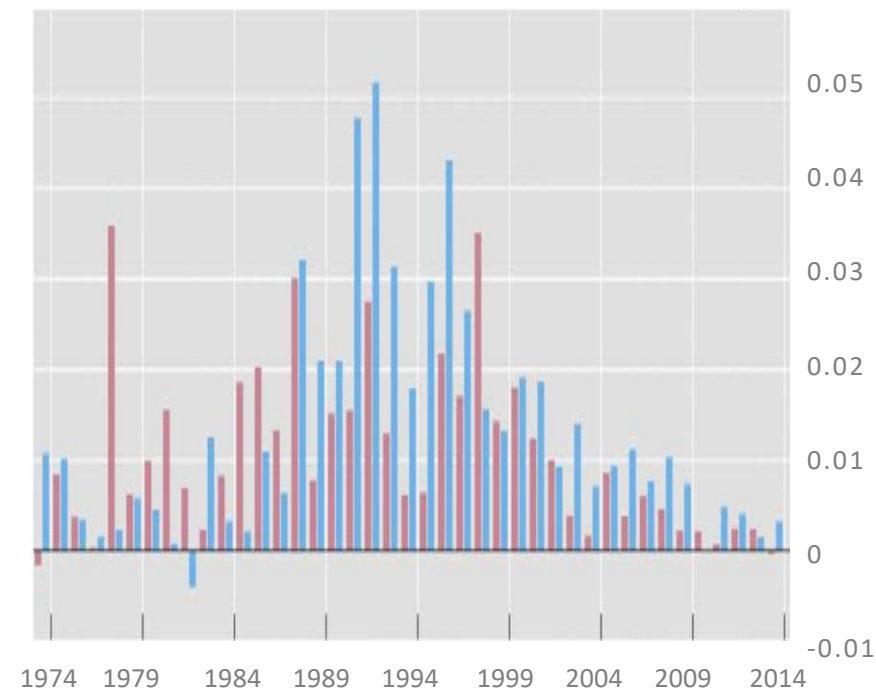
In per cent



Structural reforms

Change in index

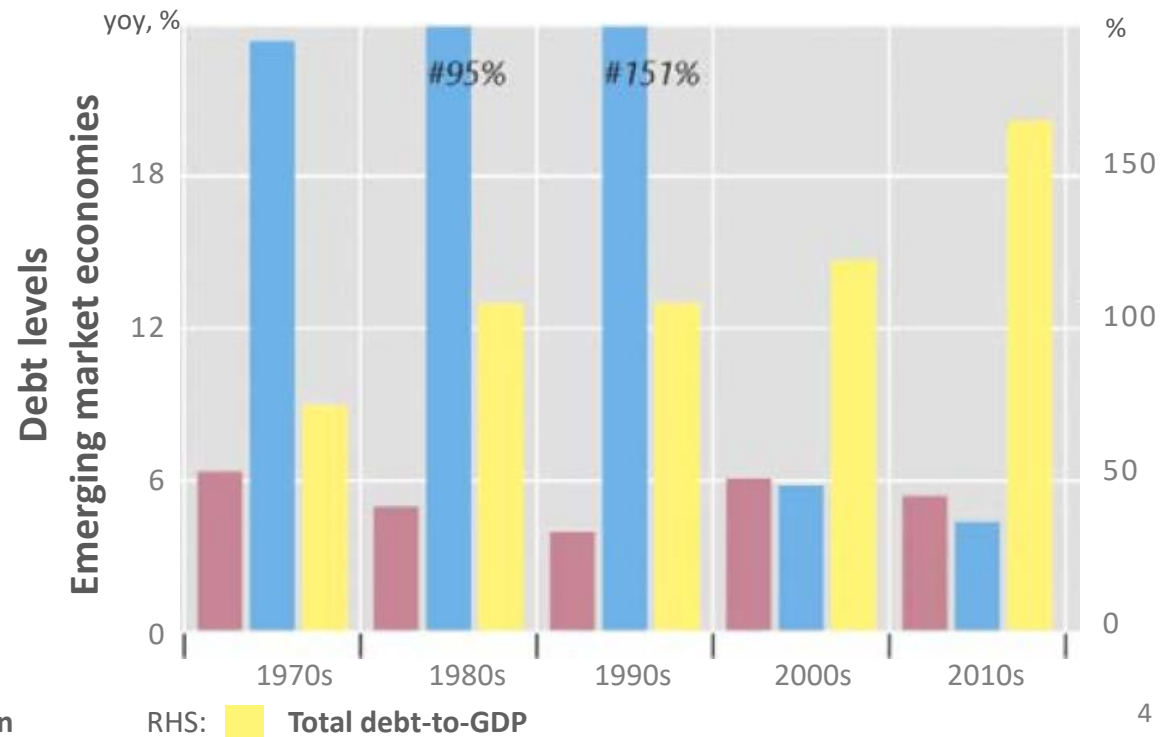
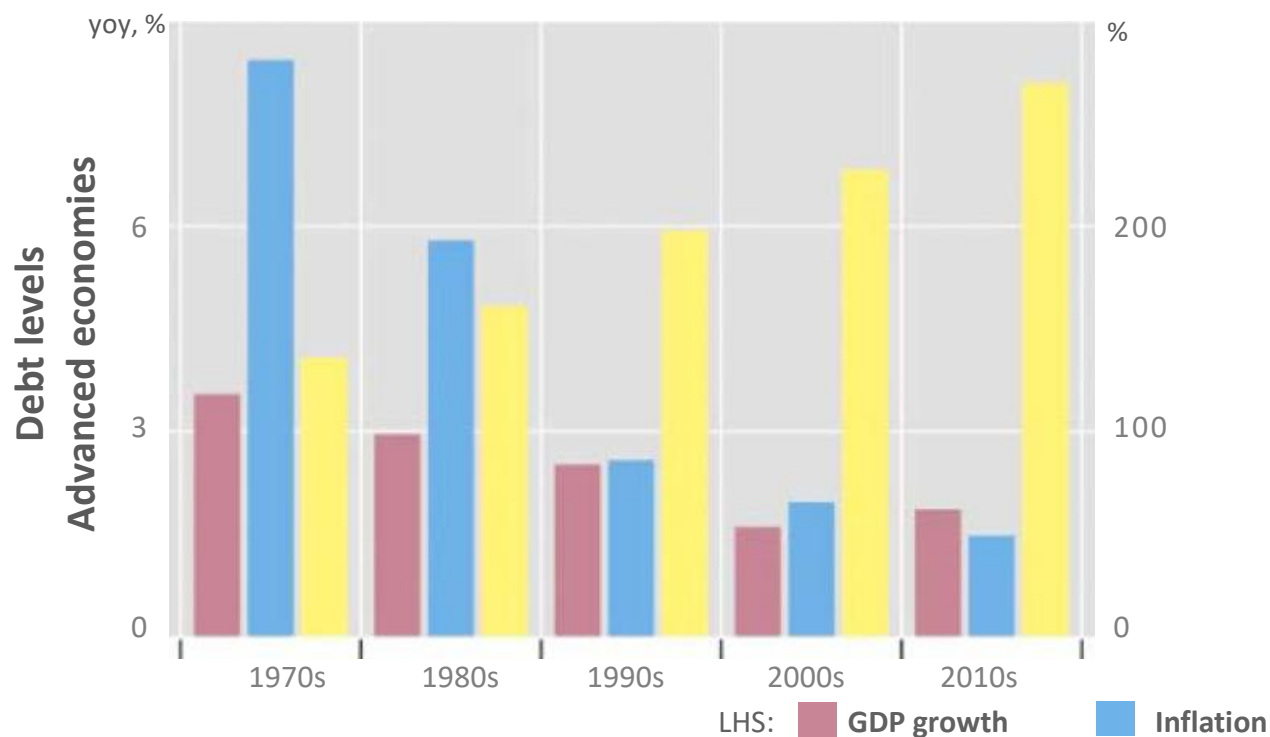
0.06



— Median Interquartile range

— Advanced economies — Emerging market economies

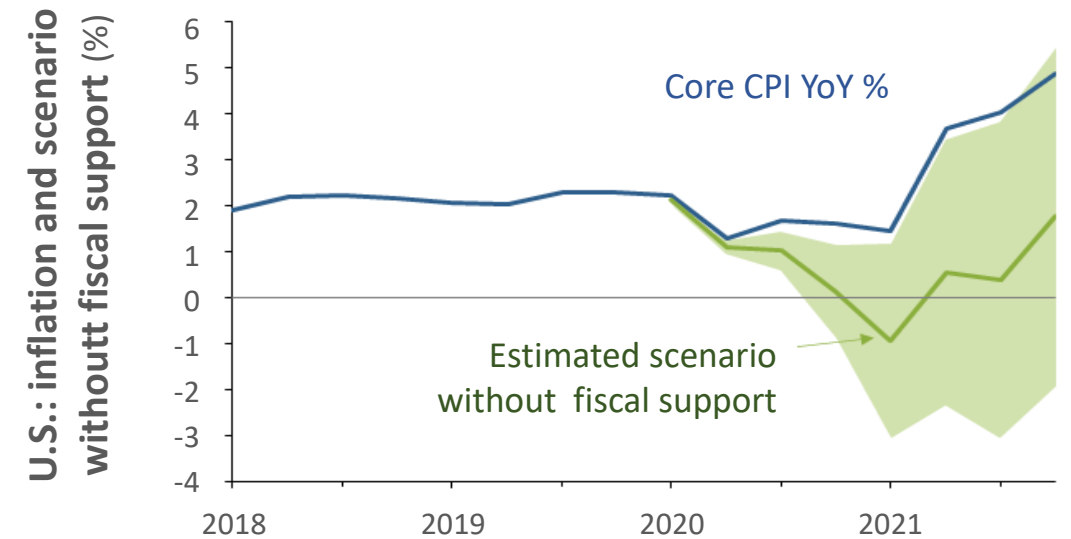
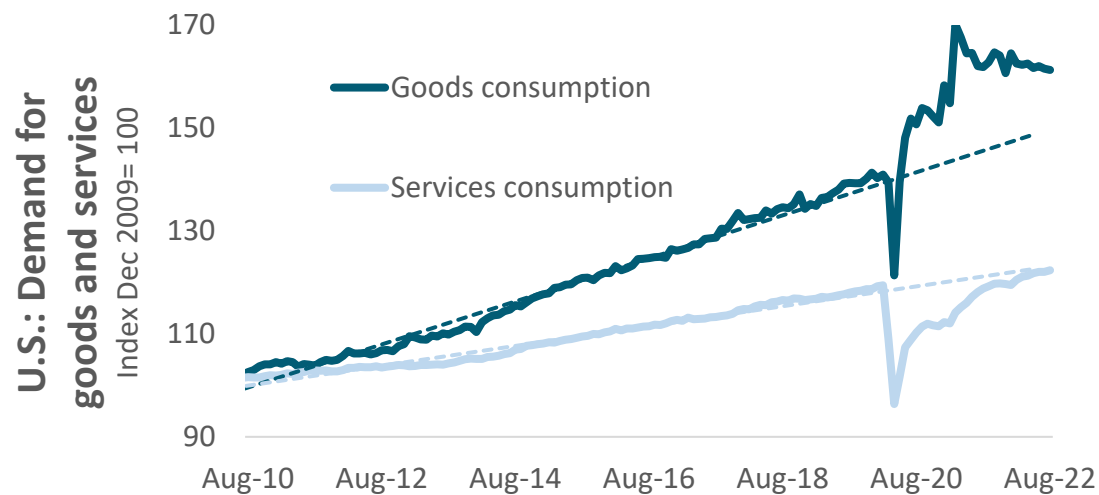
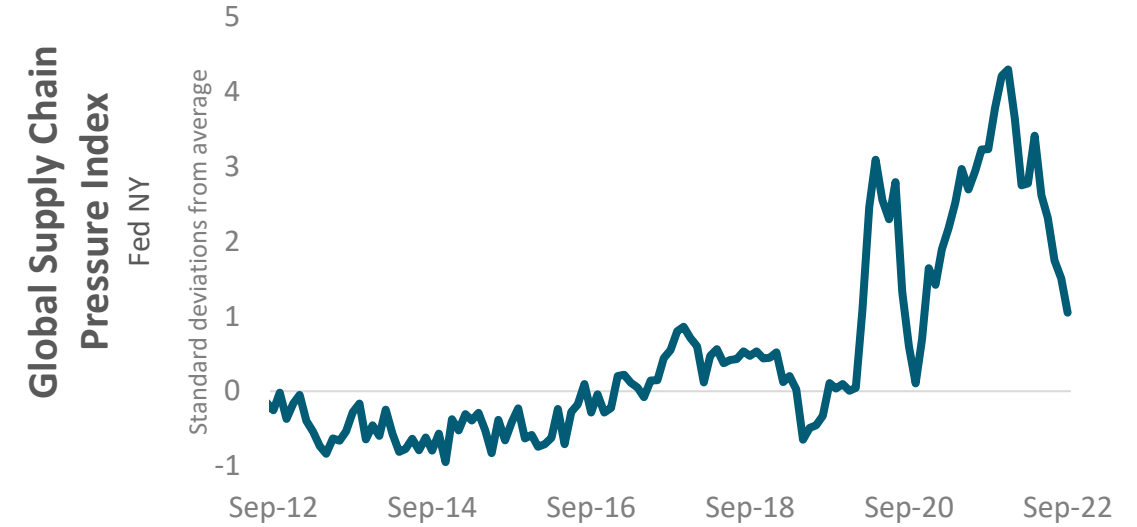
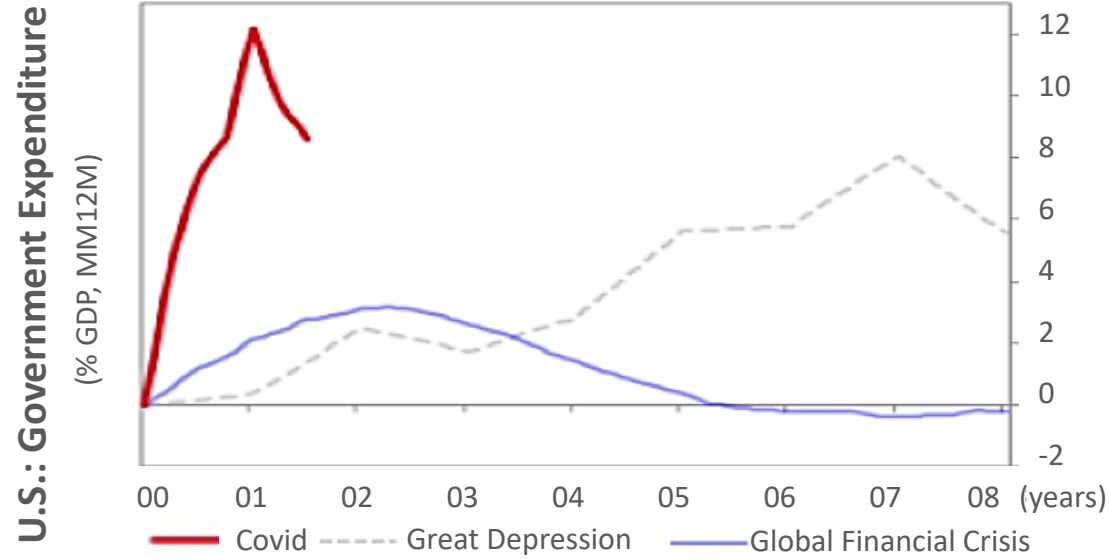
- Without growth drivers, economies had to rely on other sources of growth.
 - Expanding financial markets -> 2007-2009 crisis.
 - Technology -> productivity did not show up in metrics
- Monetary and fiscal policy were called more often to sustain the economy.
 - Policy room was eroding.
 - Debt levels climbed.



Source: Carstens, Agustín. A story of tailwinds and headwinds: aggregate supply and macroeconomic stabilization, 2022.

- Sequence of shocks: Covid-19 and the war in Ukraine.
 - Policy makers were not able to properly assess the effects of virus and geopolitical risks.
- The huge increase in demand coupled with other factors made adaptable supply to fail for the first time.
- The availability of aggregate supply was not there.
- The responsiveness of supply curve was grossly miscalculated.
 - This meant a lack of capacity in anticipating the increase in inflation.

Sequence of shocks: policy responses generated increases in income, supply-demand imbalances and the beginning of a rise in inflation.



P.S.: Shaded area represents the interquartile range for the OECD sample.

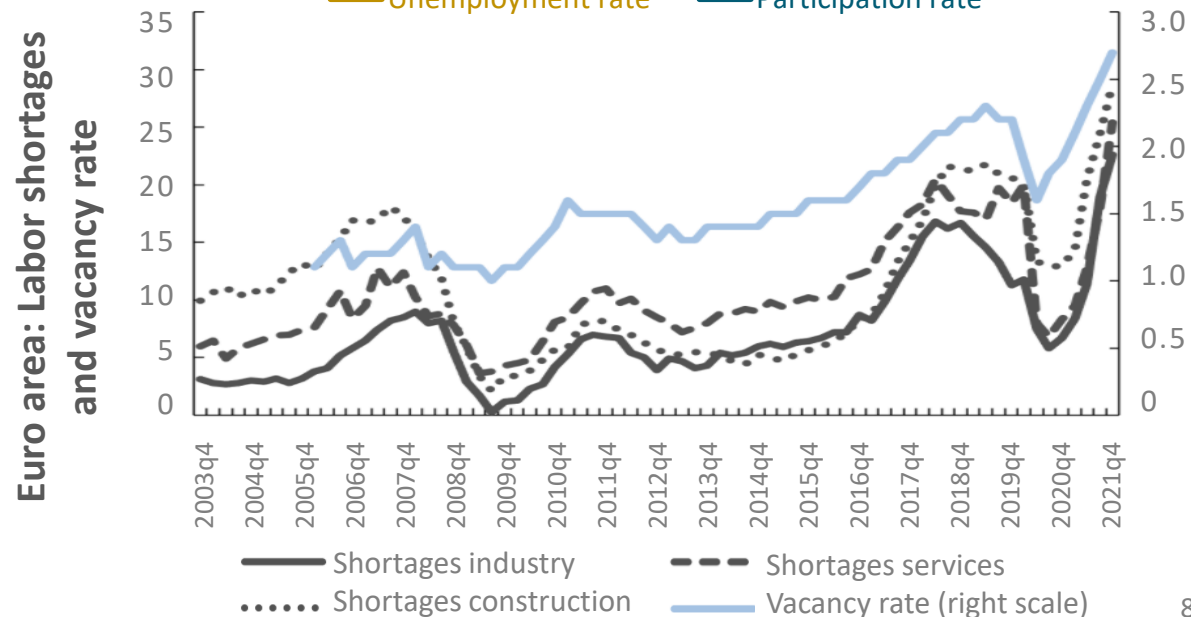
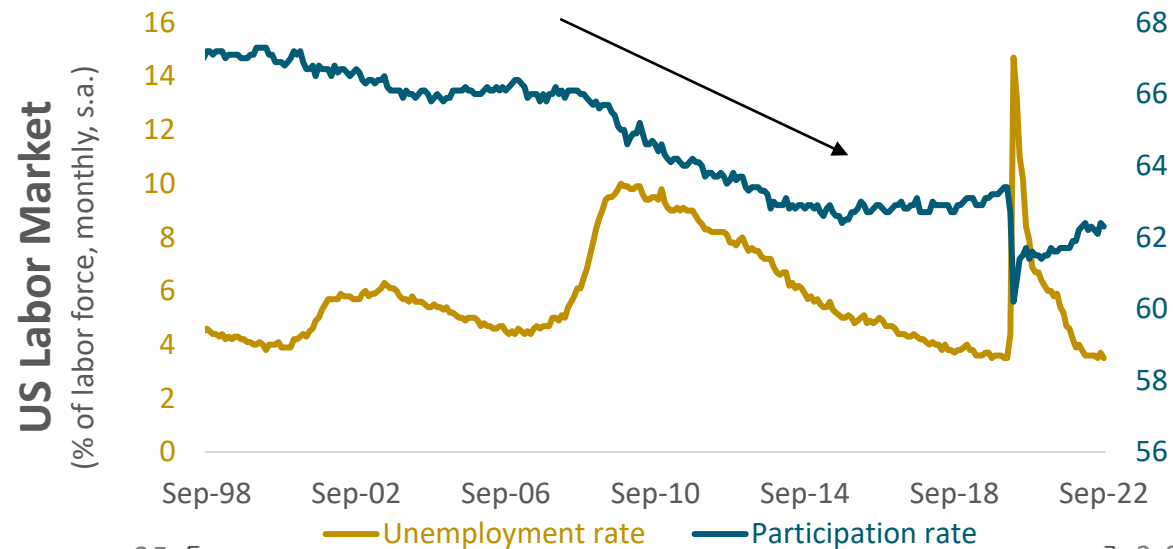
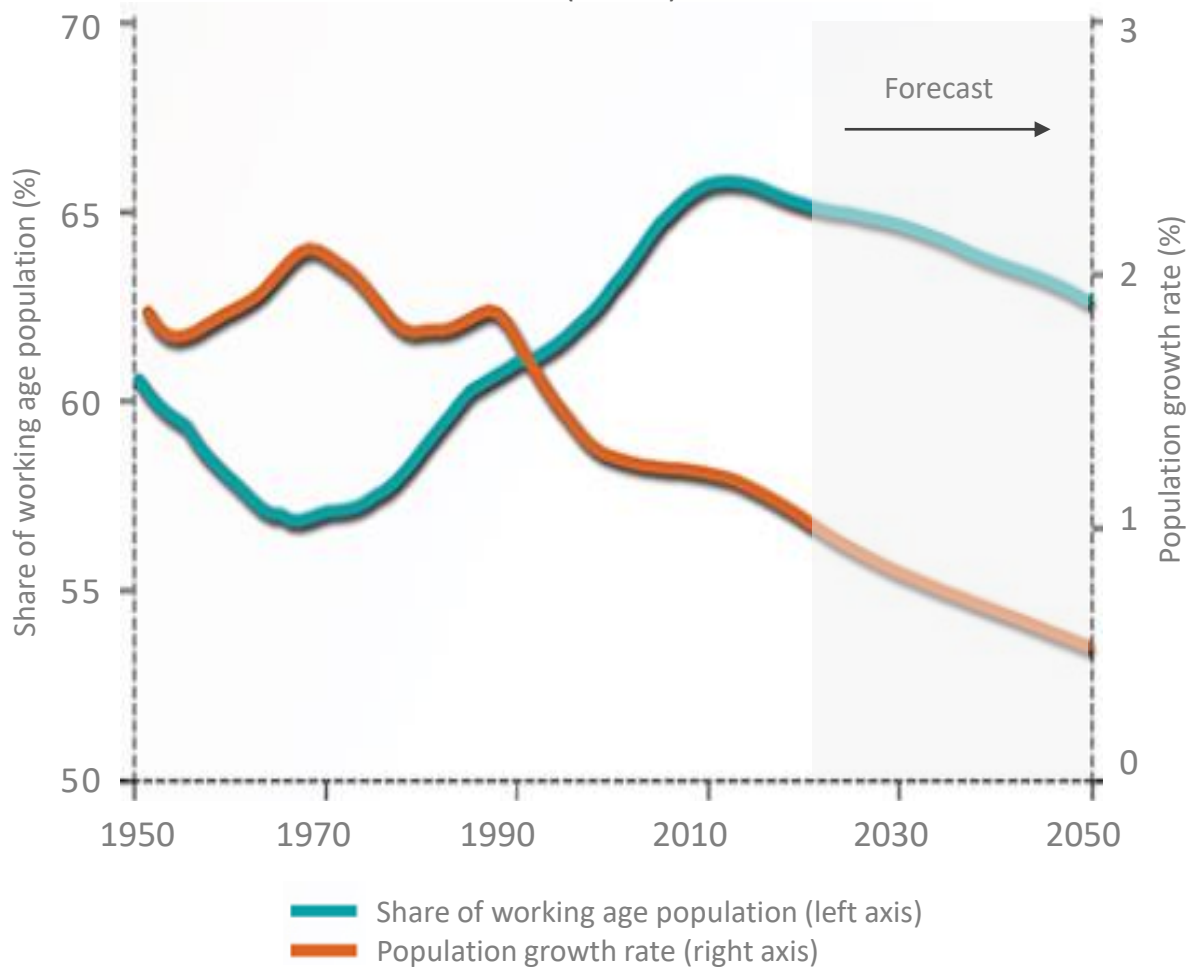
- Some factors that made supply adaptable were gone.

- Changes were in course and accelerated.
 - Uneven distribution of benefits from globalization
 - Shift in the framework of comparative advantages
 - Headwinds in demographics and structural changes in labor supply
 - Climate change and green transition

- Inflation pressures will be more persistent.

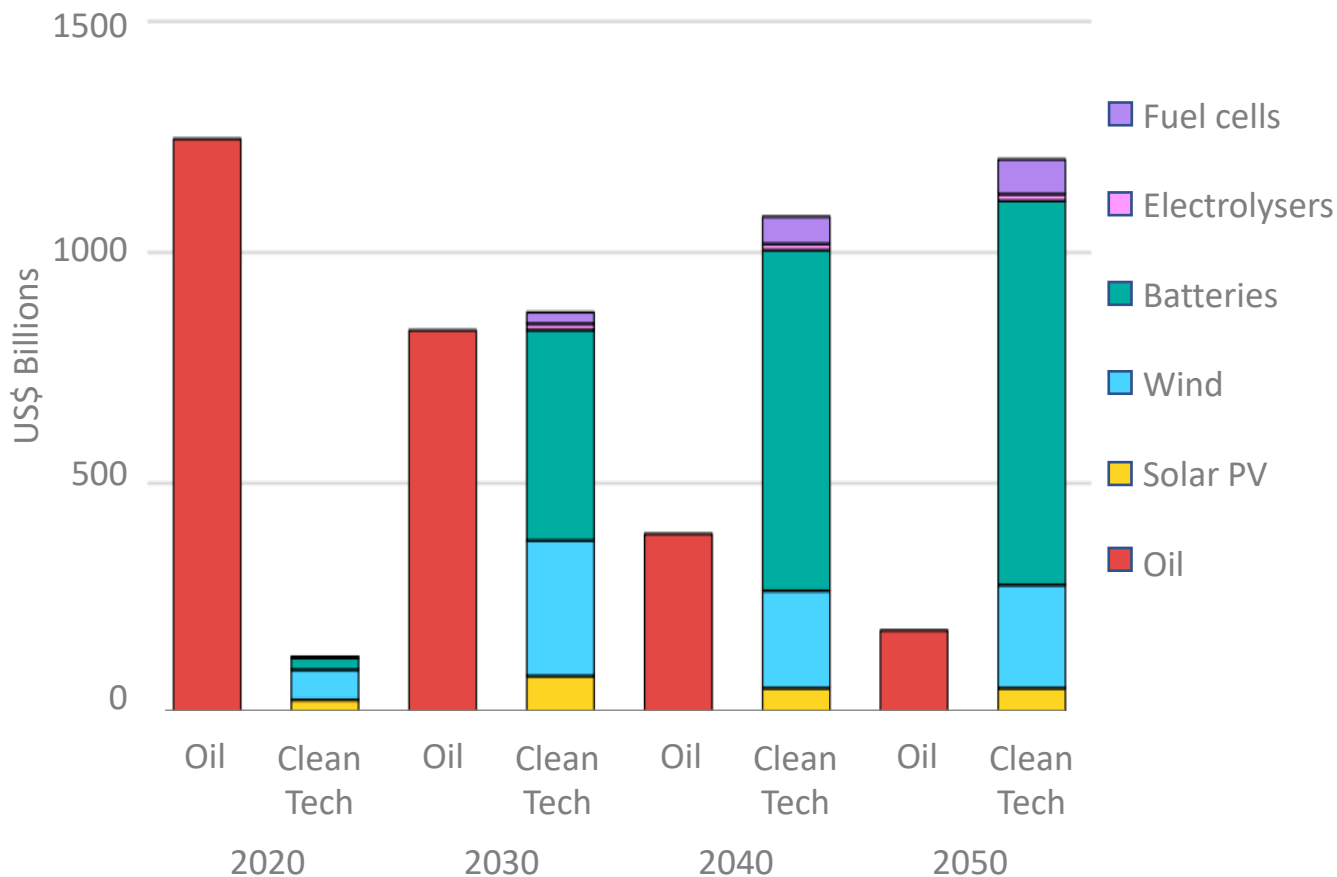
- The path for reducing inflation is nonlinear.

Demographic change (World)

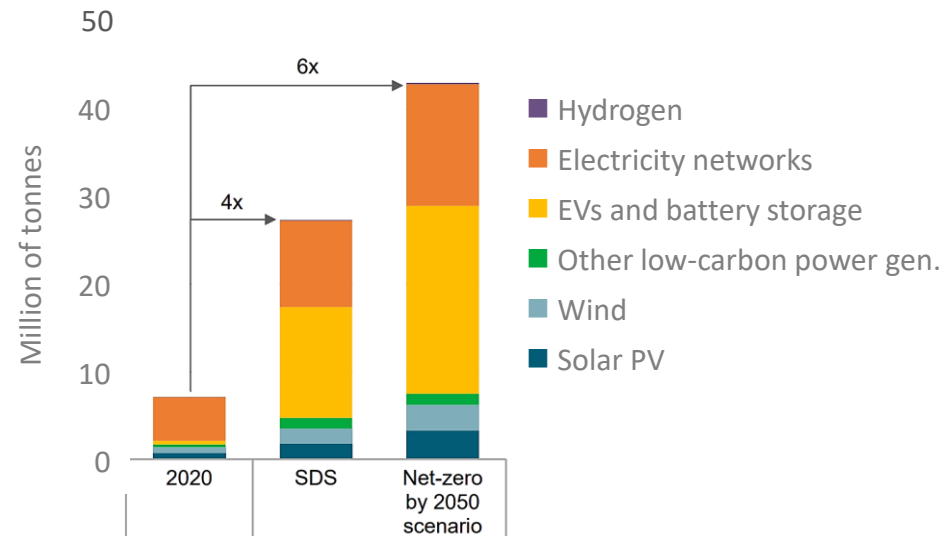


Increasing demand for materials used in clean energy. The transition for a greener economy poses important trade-offs.

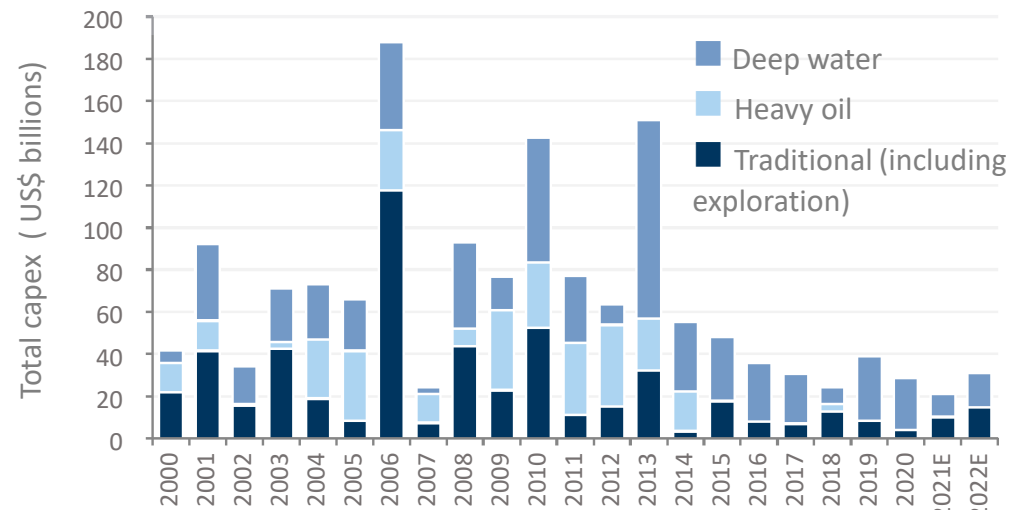
Estimated market size in the Net Zero Emissions by 2050 Scenario



Minerals demand for clean energy technologies by scenario



Oil projects capex

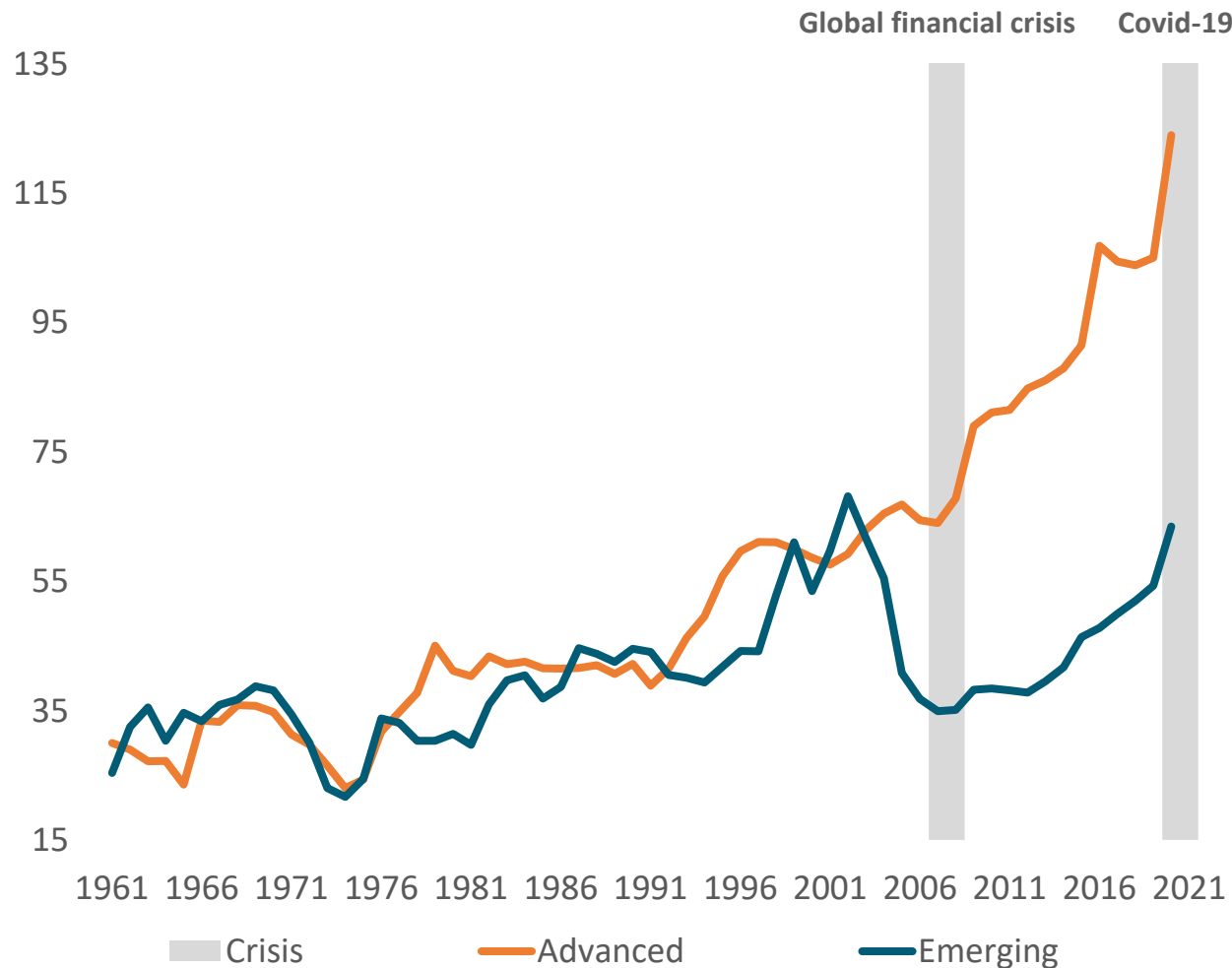


SDS = Sustainable Development Scenario, indicating what would be required in a path consistent with meeting the Paris Agreement goals.

Source: International Energy Agency (IEA), Goldman Sachs, Top Projects 2021 Report.

- We need to be cautious about inflation.
- Fiscal frameworks should have limits.
 - Demand policies need to recognize that supply is less adaptable.
 - Ensuring credibility in fiscal frameworks is crucial.
 - Structural reforms are needed to increase productivity.
- Policies to strengthen the supply side.
 - We need to sustain international cooperation.
 - Better globalization tools.

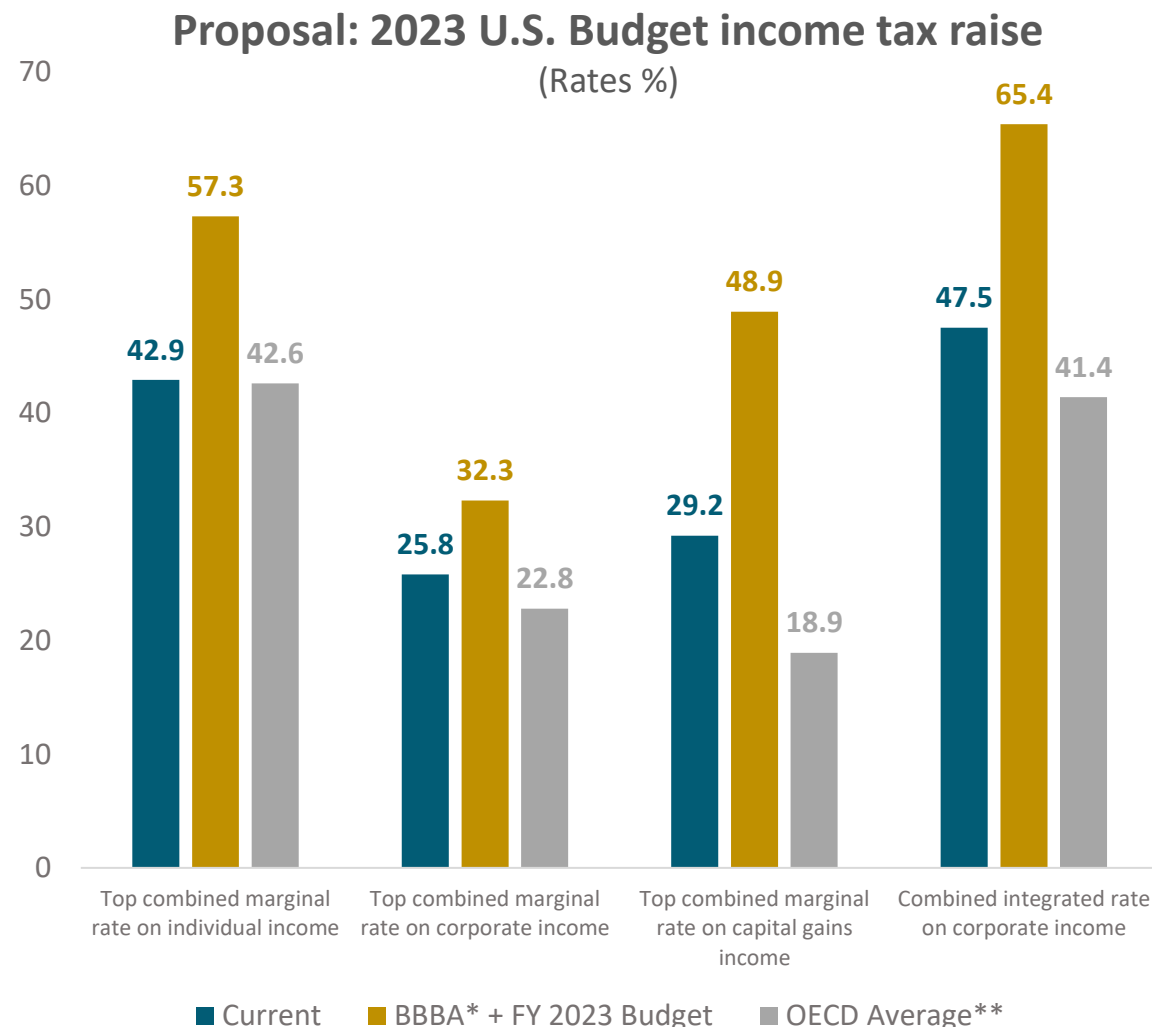
Public debt levels (Percent of GDP)



- Huge increase in debt in advanced and emerging economies.
 - Who will pay the bill?
- Proposals should avoid reducing productivity even further.
 - Example: tax on capital can put additional burden on investments.
- How much of this is in the asset prices?

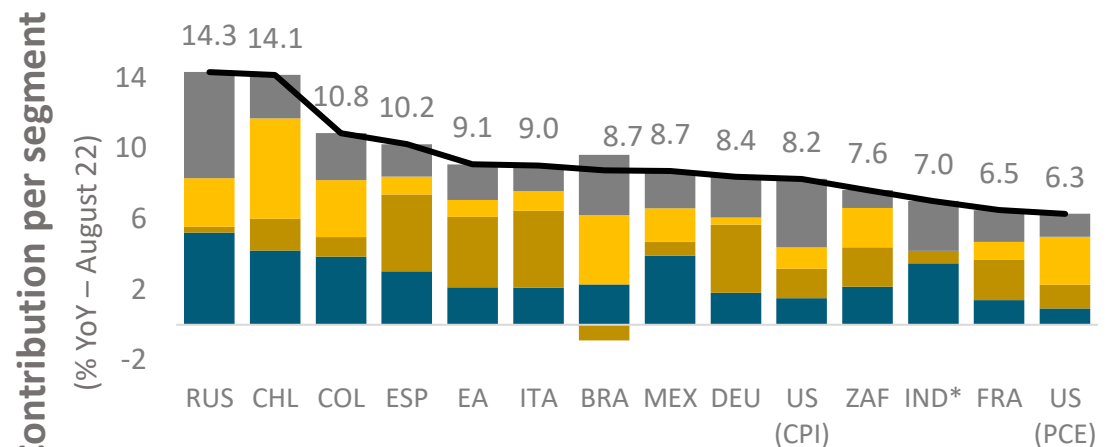
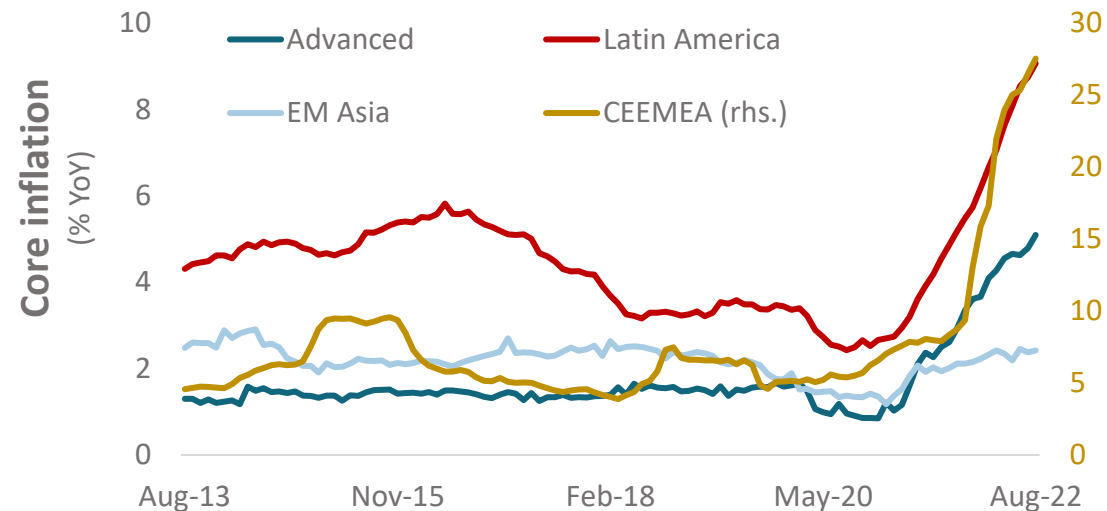
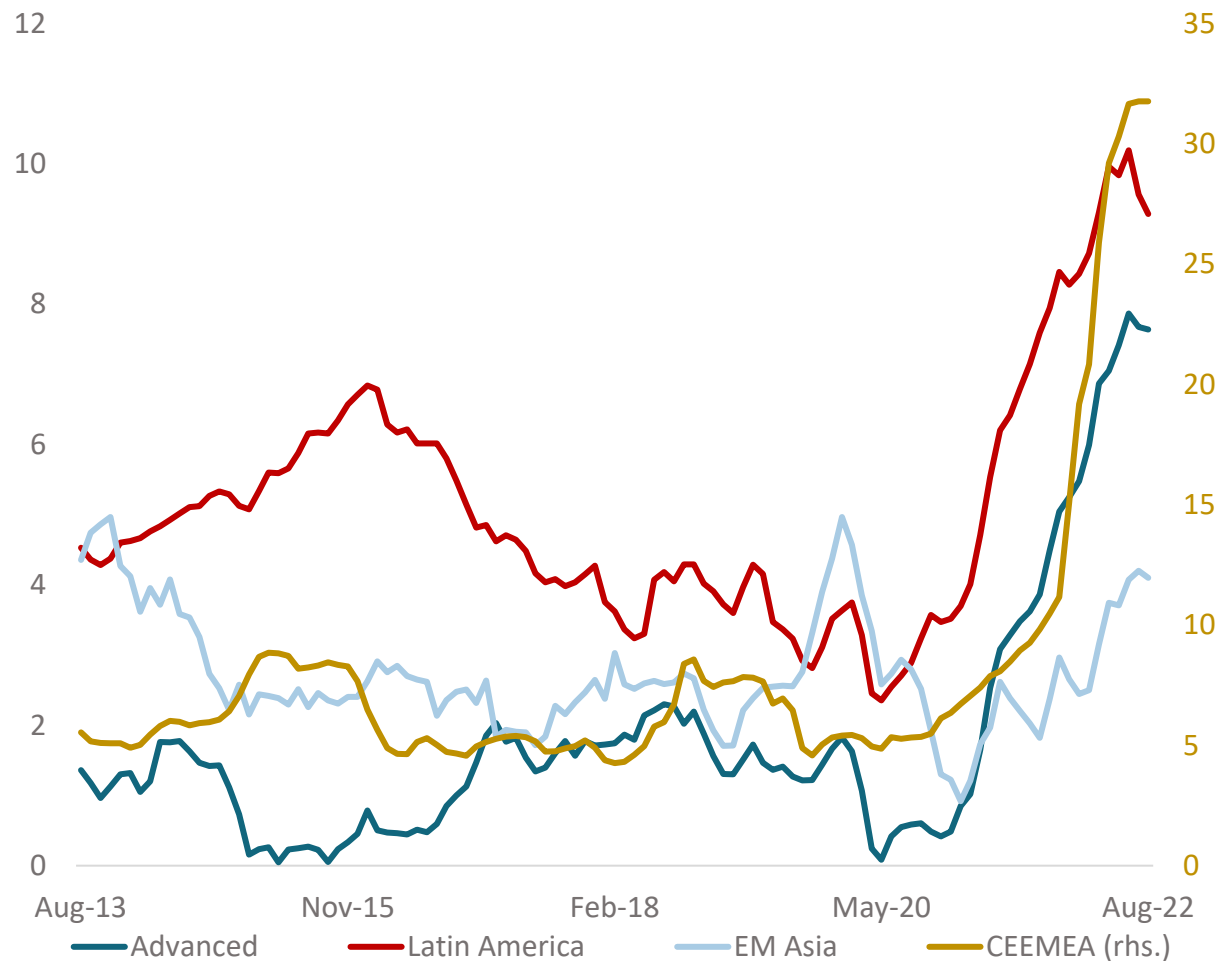
| Europe: Measures to contain energy price impacts | | | | | | |
|--|--------------------------|-------------------------|--------------------------------|-----------------------------------|------------------|-------|
| Country / Policy | Reduced energy tax / VAT | Retail price regulation | Transfers to vulnerable groups | Windfall profits tax / regulation | Business support | Other |
| Austria | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Belgium | ✓ | ✓ | ✓ | ⋮ | ✓ | ✓ |
| Bulgaria | ✓ | ✓ | ✓ | ✓ | ✓ | |
| France | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Germany | ✓ | ⋮ | ✓ | ⋮ | ✓ | ⋮ |
| Greece | ✓ | | ✓ | ⋮ | ✓ | |
| Hungary | | ✓ | | ✓ | ✓ | |
| Italy | ✓ | | ✓ | ✓ | ✓ | |
| Netherlands | ✓ | ⋮ | ✓ | ⋮ | | |
| Norway | ✓ | | ✓ | | ✓ | |
| Poland | ✓ | ✓ | ✓ | | | |
| Romania | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Slovakia | ✓ | ✓ | ✓ | ⚠ | | |
| Slovenia | ✓ | | ✓ | ⚠ | ✓ | |
| Spain | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Sweden | ✓ | | ✓ | | | ✓ |
| UK | ✓ | ✓ | ✓ | ✓ | ✓ | ⚠ |

* France and Spain adopted wholesale price regulation too.
 ✓ - Measures already implemented
 ⋮ - Measures announced
 ⚠ - Measures discussed but no formal act to implement it has been taken yet
 Sources: Bruegel, Tax Foundation



* Build Back Better Act
 ** Excluding U.S.

Headline inflation (% YoY)

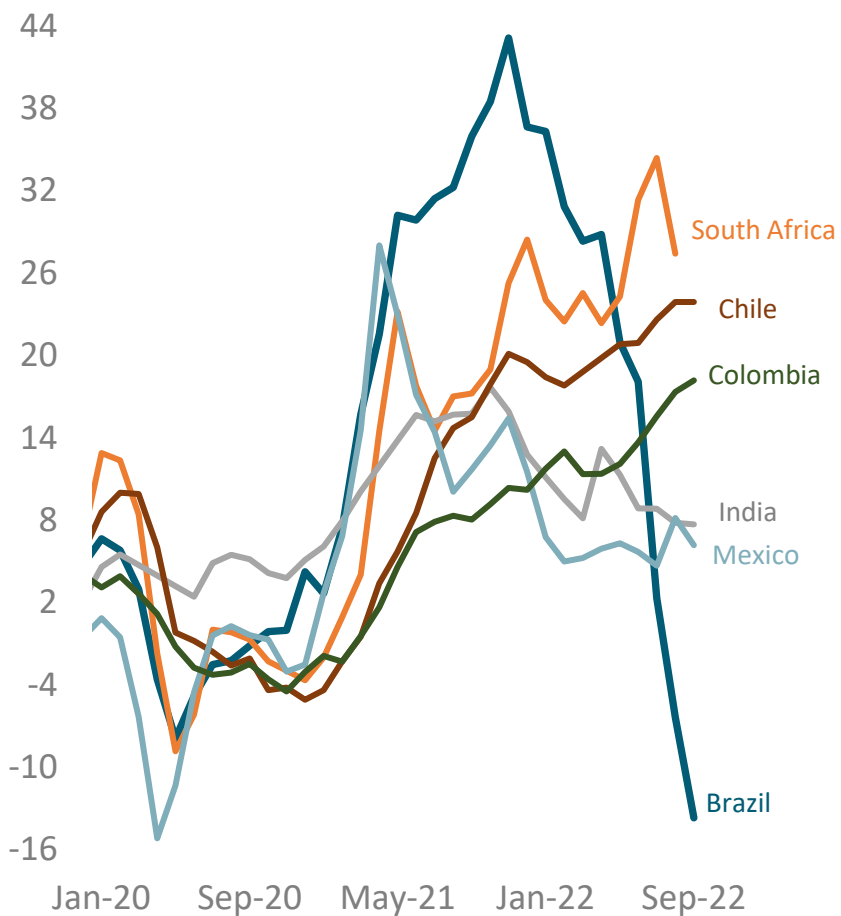


Legend: Food and Beverages, Energy, Services, Others, Headline. * India: Services CPI NA

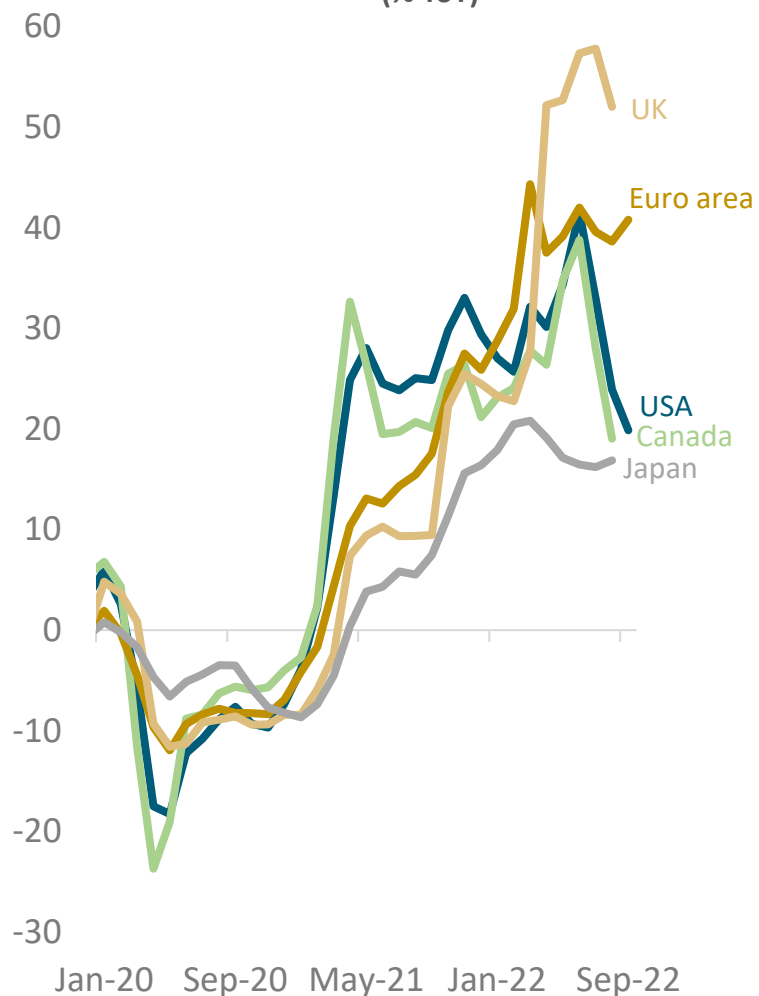
EM Asia: CN, ID, IN, KR, HK, MY, PH, SG, TW, TH; Latin America: BR, MX, CL, CO, PE; Advanced: DE, FR, UK, IT, GR, PT, IE, SP, CH, NO, SE, DK, FI, CA, US, JP, CEEMEA (Central and Eastern Europe, Middle East and Africa): ZA, TR, RU, BG, CZ, HU, PL, RO, SK.

Sources: Bloomberg, central banks and local statistical institutes.

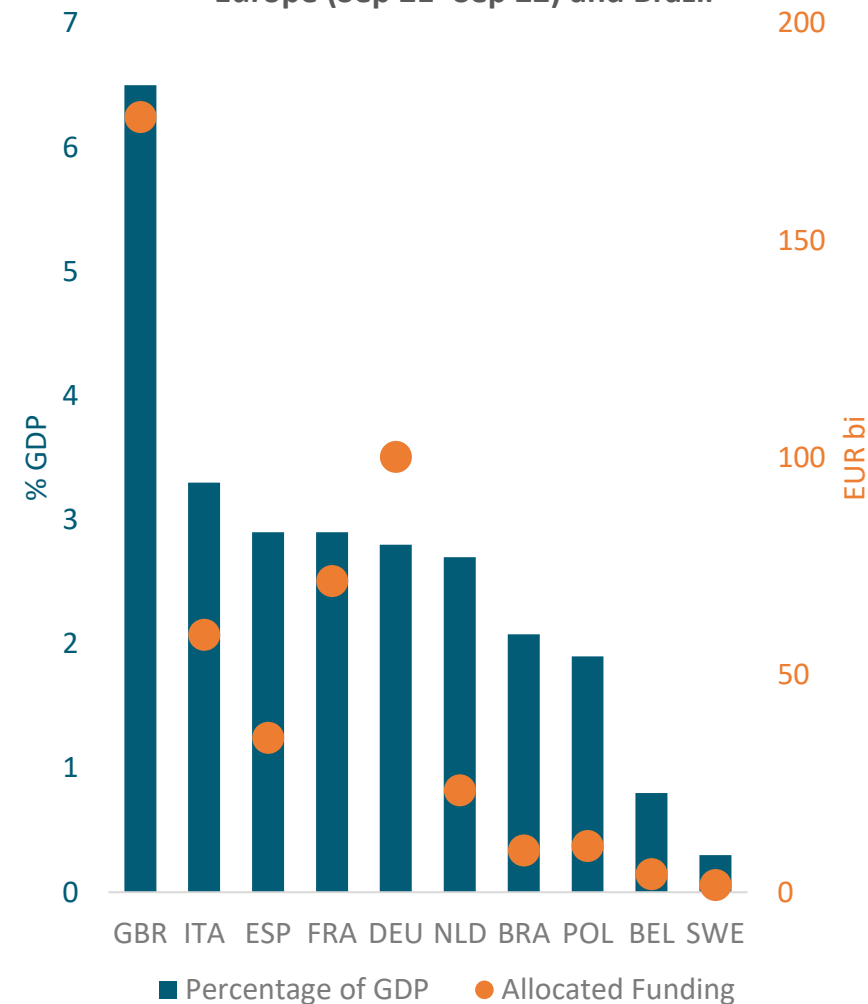
Energy CPI - Emerging countries (% YoY)



Energy CPI – Advanced countries (% YoY)

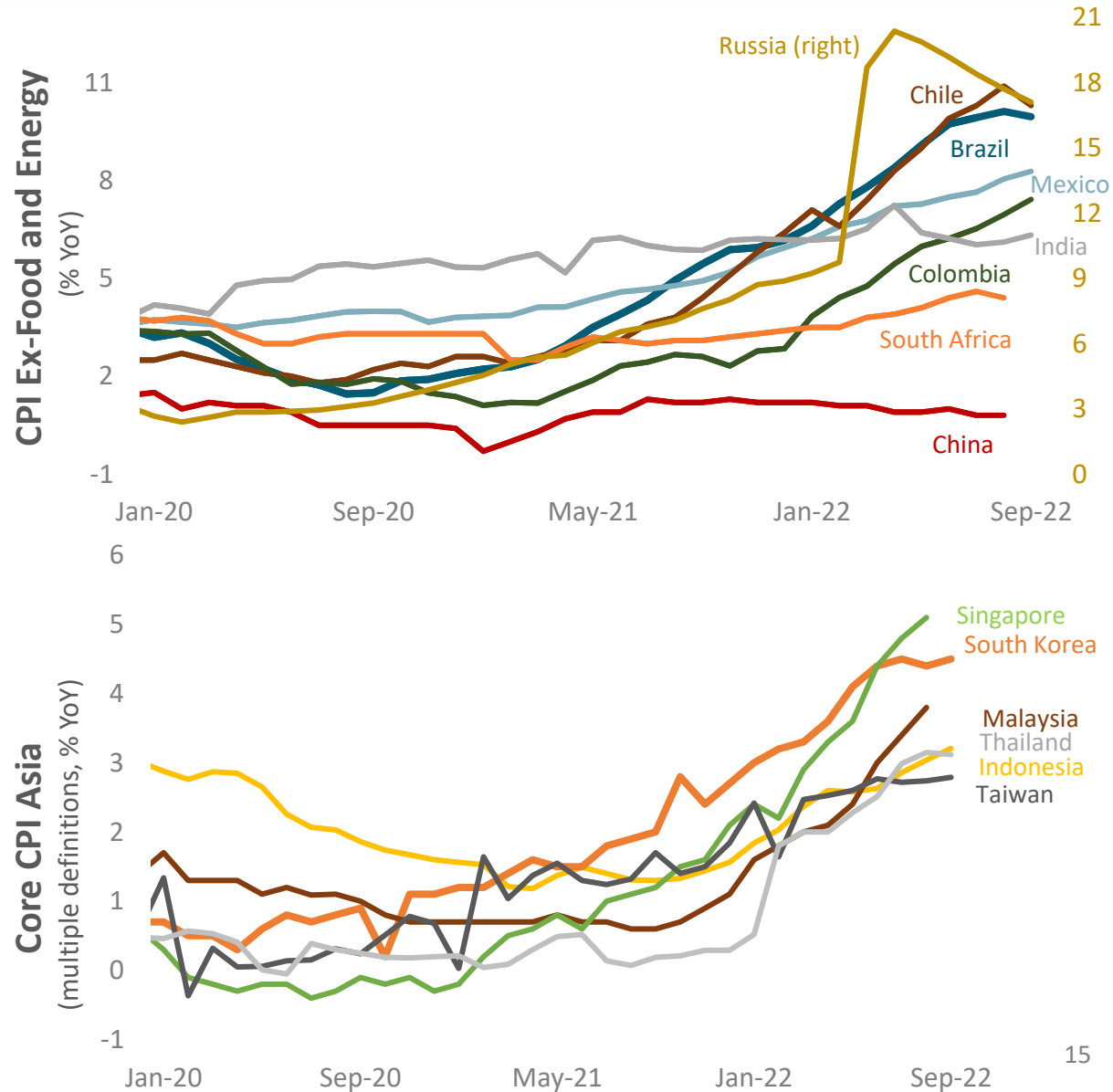
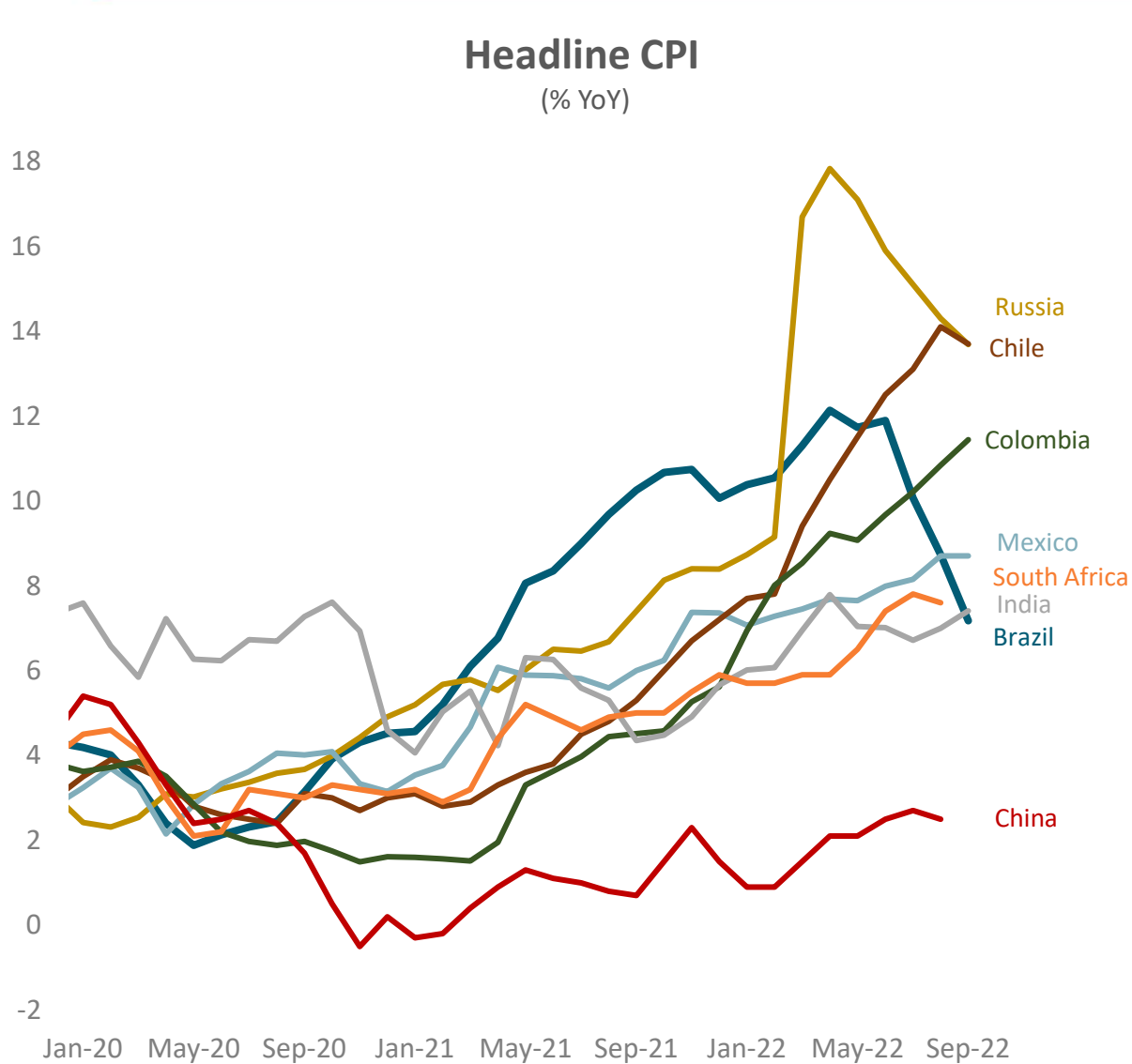


Fiscal Energy Relief Measures Europe (Sep 21- Sep 22) and Brazil



Sources: Bloomberg, Brazilian Institute of Geography and Statistic (IBGE), Bruegel, Central Bank of Brazil (BCB).

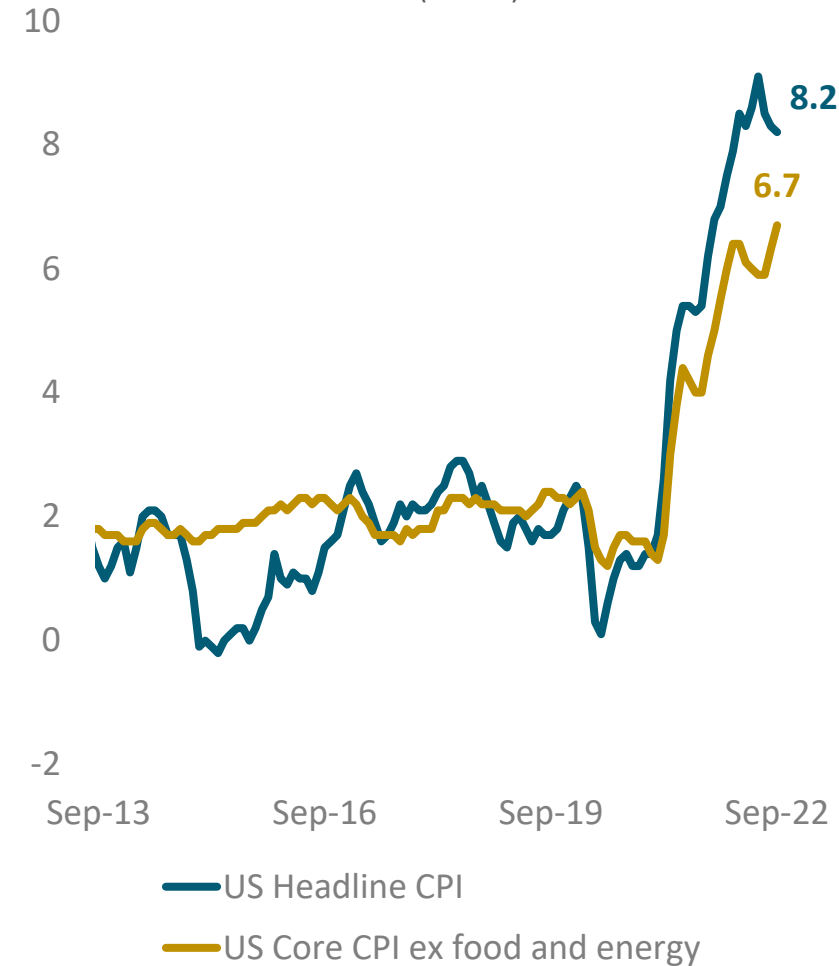
Ps: Numbers do not include subnational/supranational measures and loans, guarantees and bailouts of utility companies.



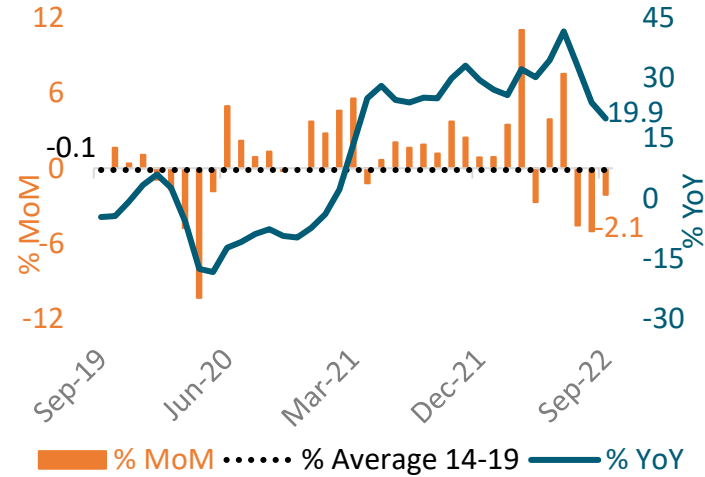
Inflation remains high in US, and core inflation growth is being pushed by services.

CPI U.S. Headline and Core

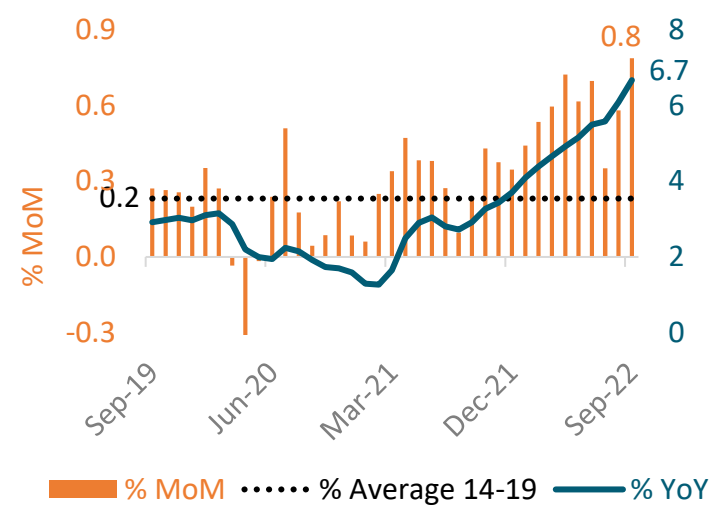
(% YoY)



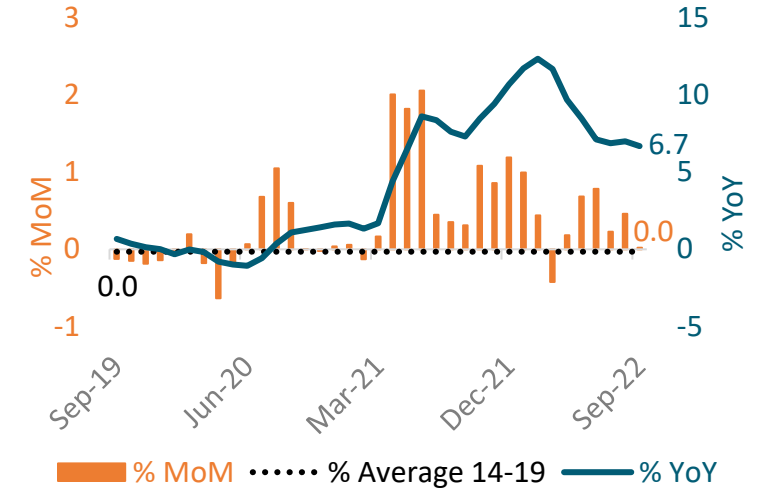
CPI U.S. Energy



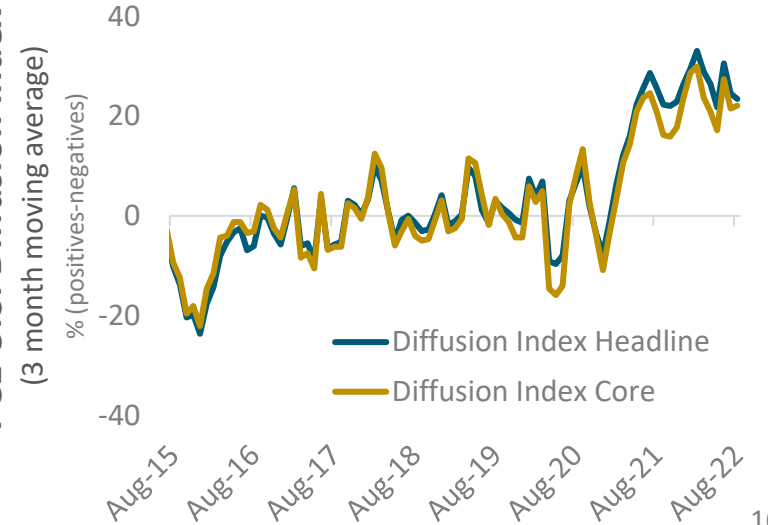
CPI U.S. Core Services



CPI U.S. Core Goods

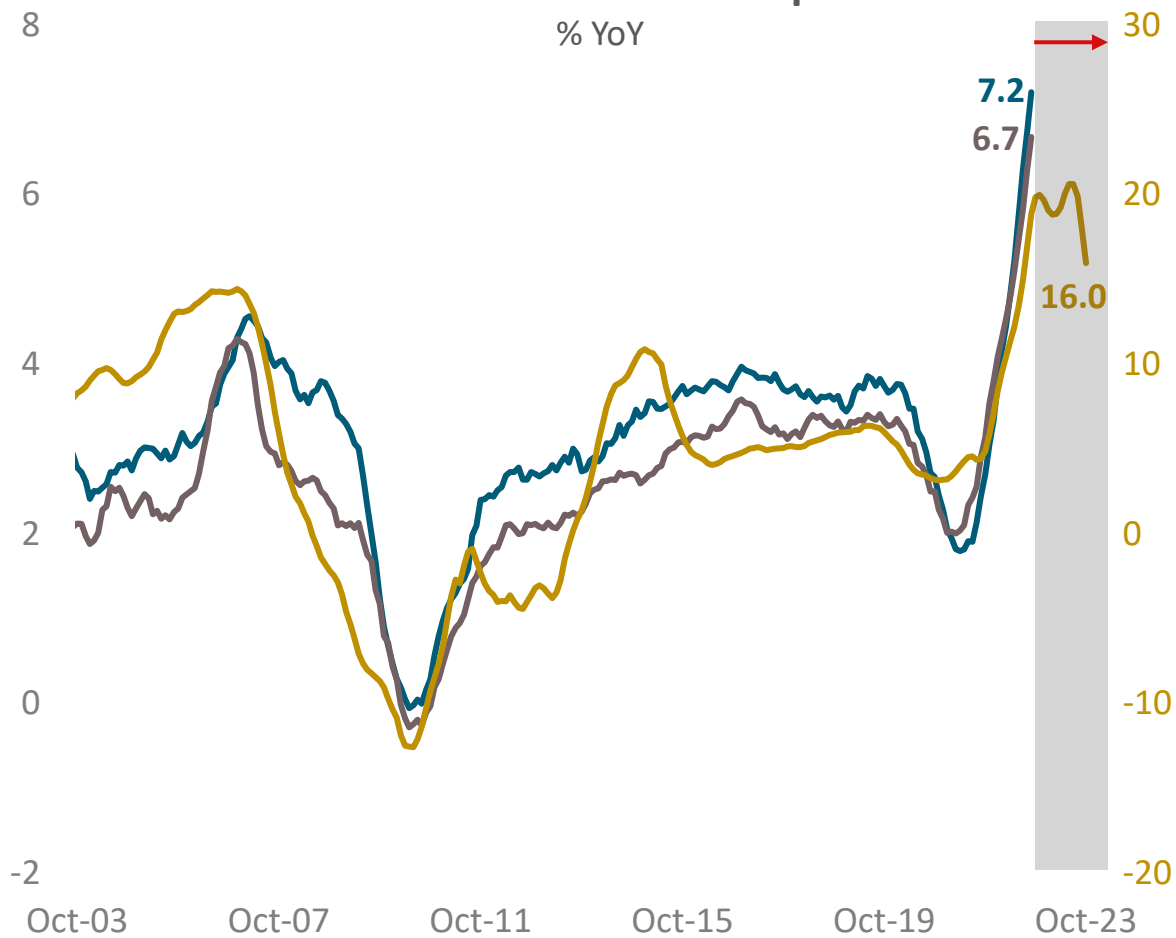


PCE U.S. Diffusion Index



Rent inflation and house prices

% YoY

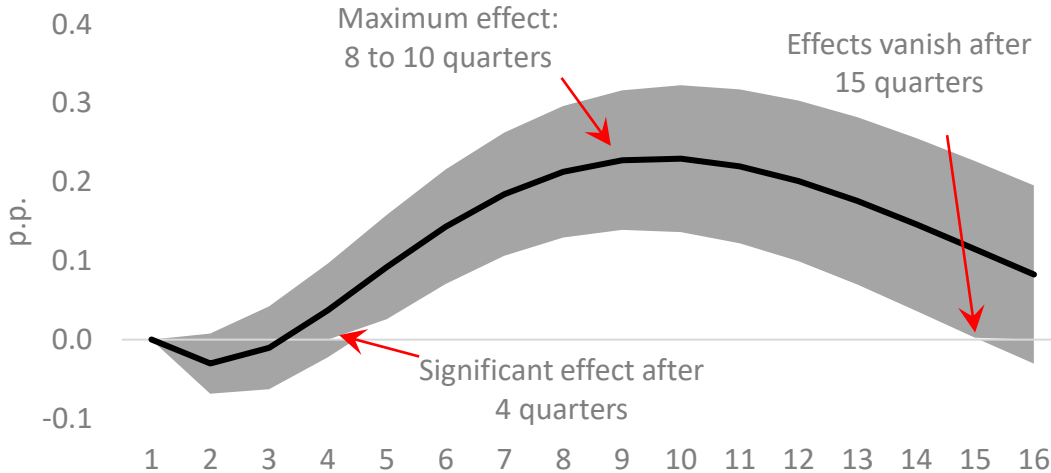


— CPI OER — CPI Rent Prim. — Case Shiller (+15 M)

Sources: Bloomberg, Refinitiv, BCB.

Response of rent inflation to a 1 p.p. change in houses prices

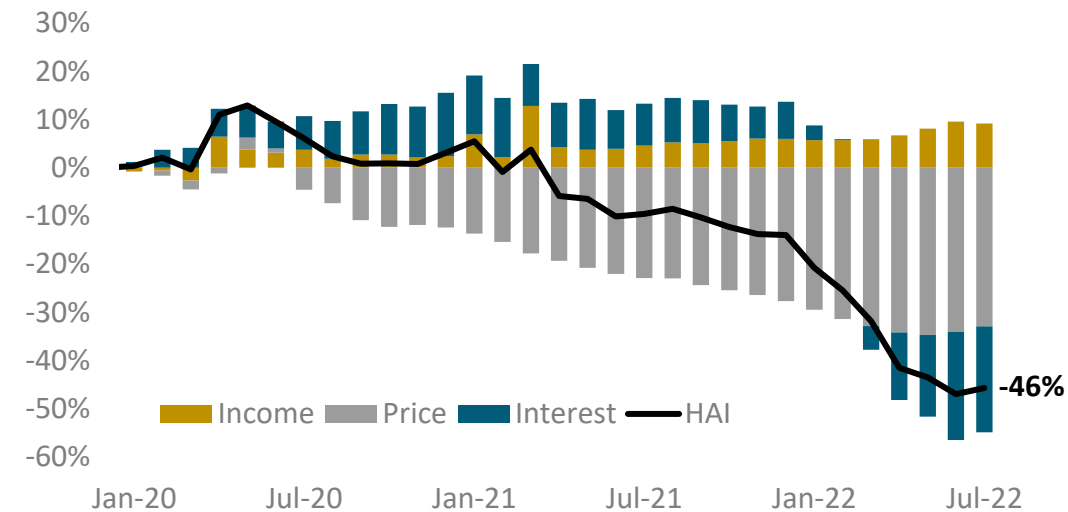
(p.p.)



Housing Affordability

(Dec/2019=0)

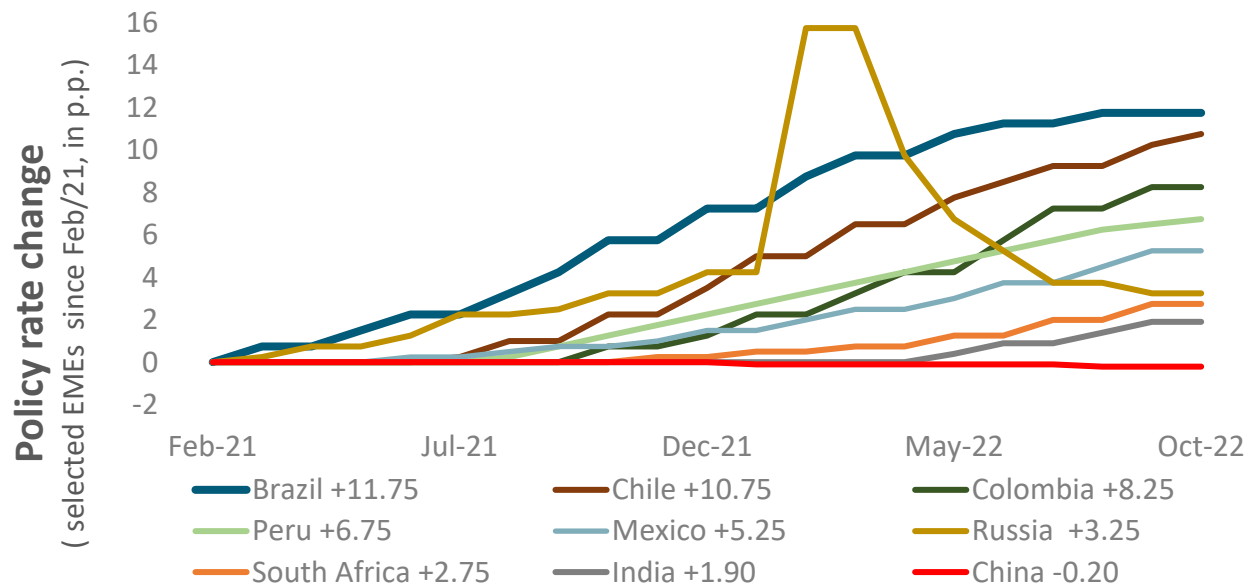
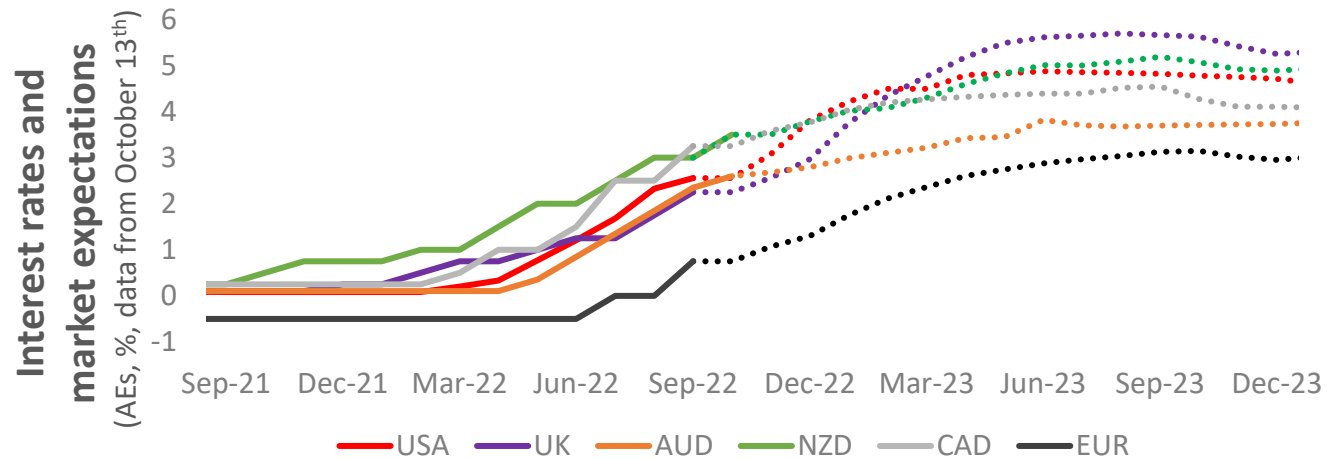
Accumulated change %*



■ Income ■ Price ■ Interest — HAI

* Seasonally adjusted. Calculated from the logarithmic difference of the main indicator and its components. 17

Monetary normalization in AEs is accelerating. Downward revision in terminal interest rates.



| MONETARY POLICY PRICING | | | |
|-------------------------|---------------------------|---------------------|---------------------|
| 10/12/22 | | | |
| Region/Country | Rate (%) last decision | 6 M Pricing b.p. | 1 Y Pricing b.p. |

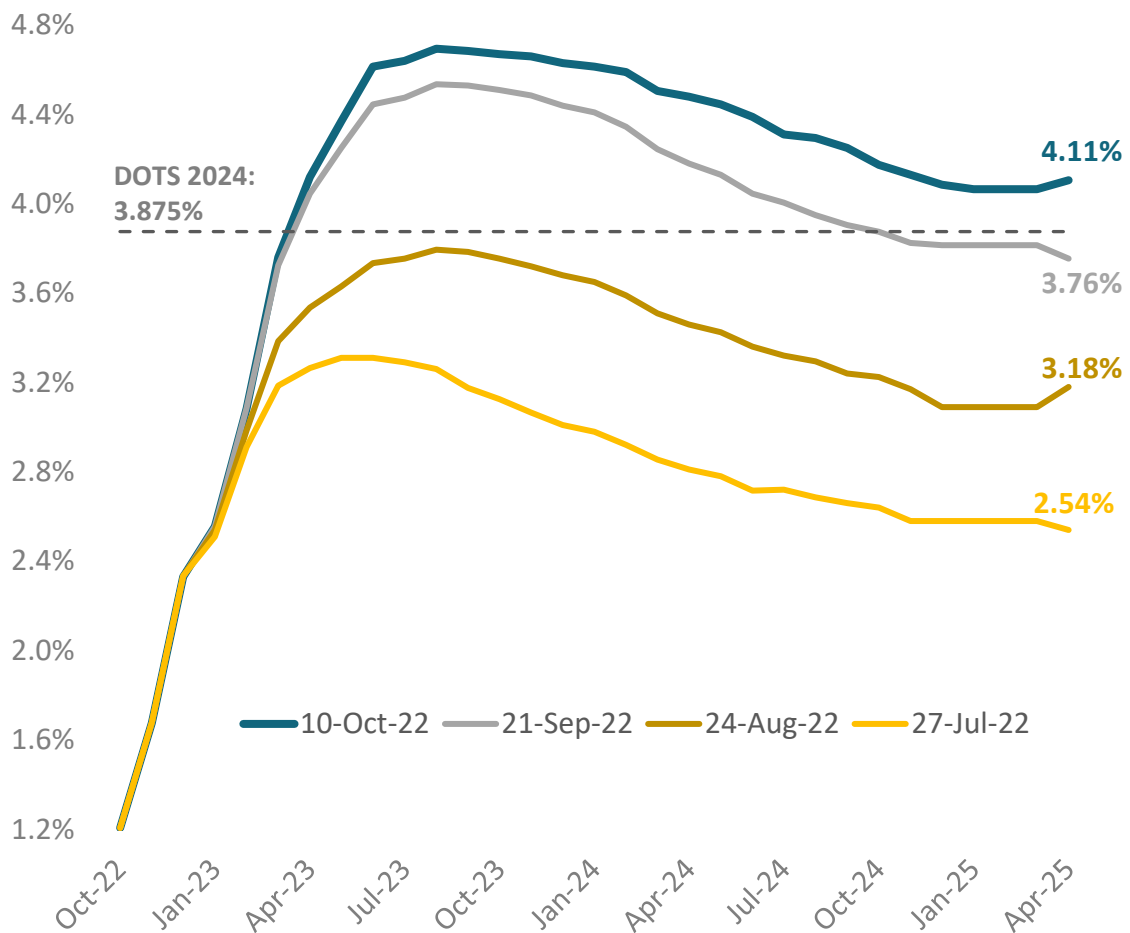
AEs

| | | | |
|-------------|---------|------|------|
| US | 3.13 ↑ | +155 | +141 |
| Canada | 3.25 ↑ | +94 | +85 |
| Euro Area | 0.75 ↑ | +194 | +234 |
| UK | 2.25 ↑ | +328 | +323 |
| Australia | 2.60 ↑ | +90 | +148 |
| New Zealand | 3.50 ↑ | +120 | +156 |
| Japan | -0.10 ↓ | +6 | +13 |

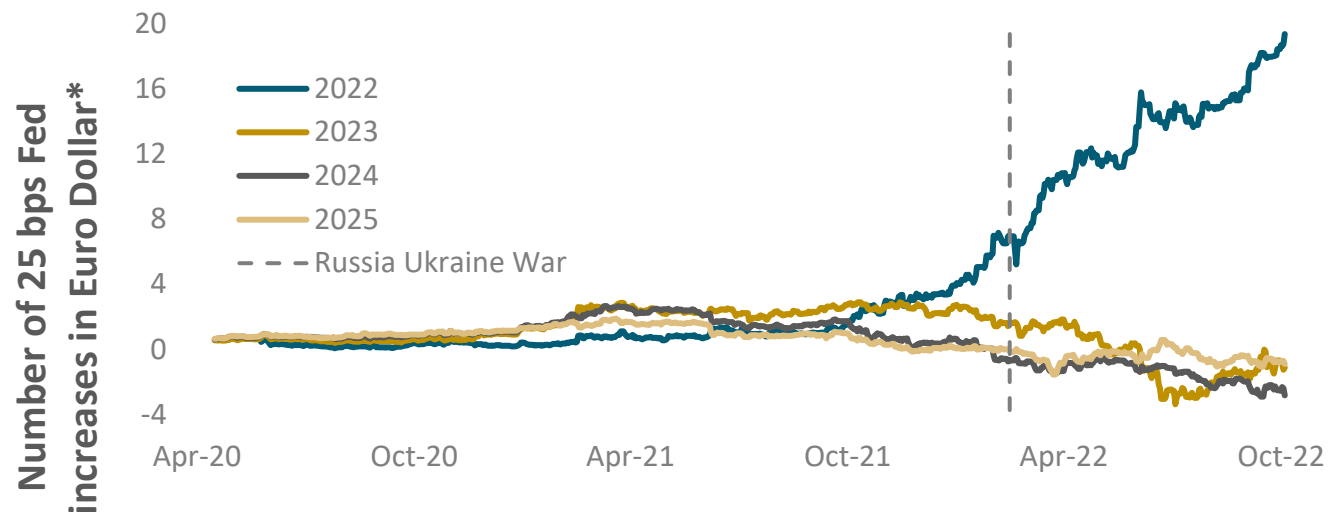
EMEs

| | | | |
|--------------|---------|------|------|
| Mexico | 9.25 ↑ | +148 | +92 |
| Chile | 11.25 ↑ | +43 | -123 |
| Brazil | 13.75 ↓ | -19 | -198 |
| Colombia | 10.00 ↑ | +195 | +211 |
| Russia | 7.50 ↓ | +12 | -8 |
| South Africa | 6.25 ↑ | +122 | +177 |
| China | 2.00 ↓ | +36 | +54 |
| India | 5.90 ↑ | +103 | +79 |
| South Korea | 3.00 ↑ | +60 | +73 |

Terminal rate from the FF futures curve

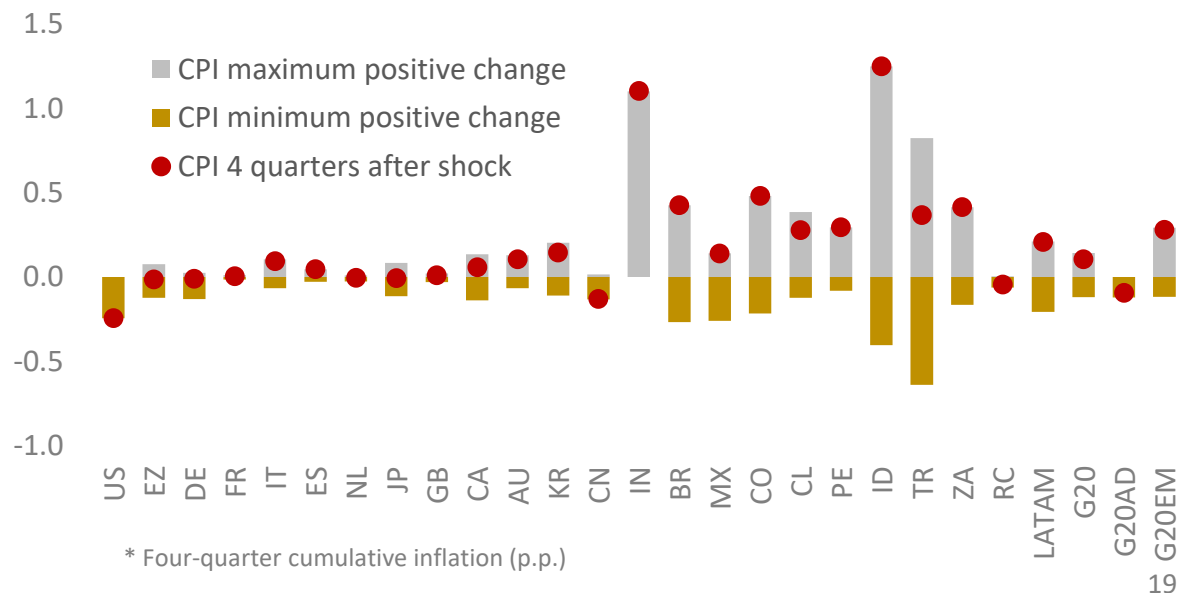


Sources: Bloomberg, BCB.



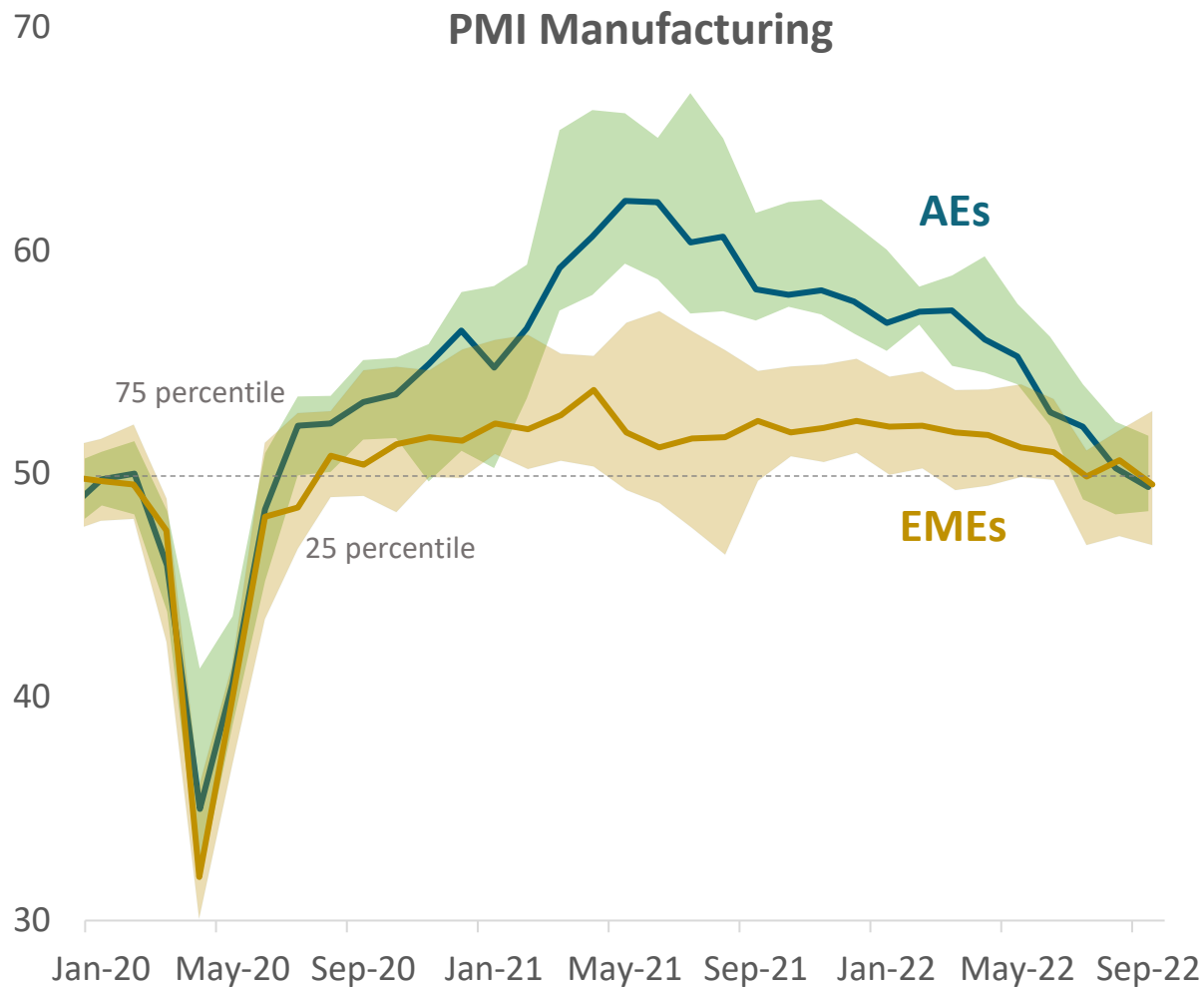
*2022 includes the increases already implemented by the Fed.

U.S. Monetary policy – Inflation spillovers*

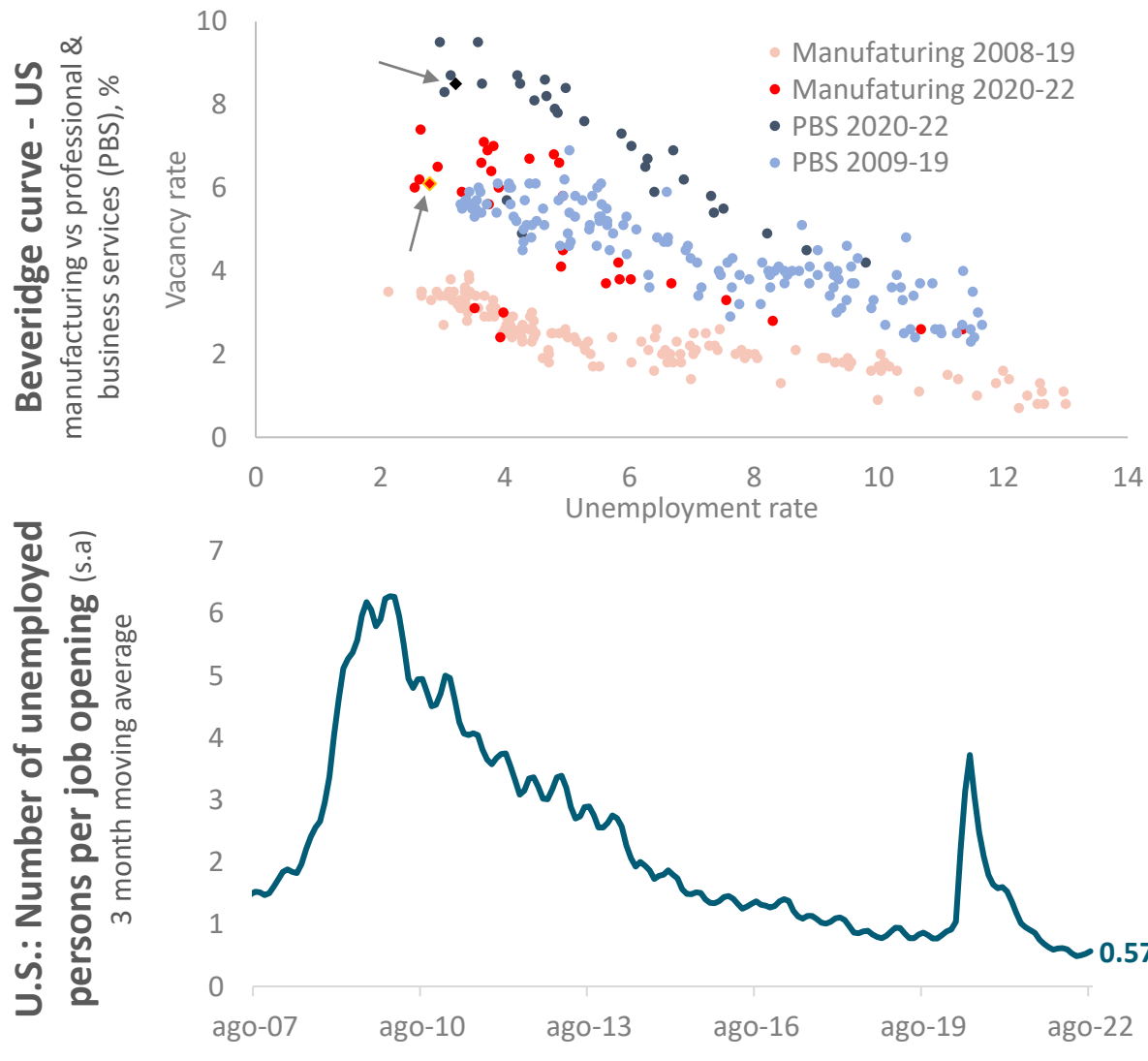


* Four-quarter cumulative inflation (p.p.)

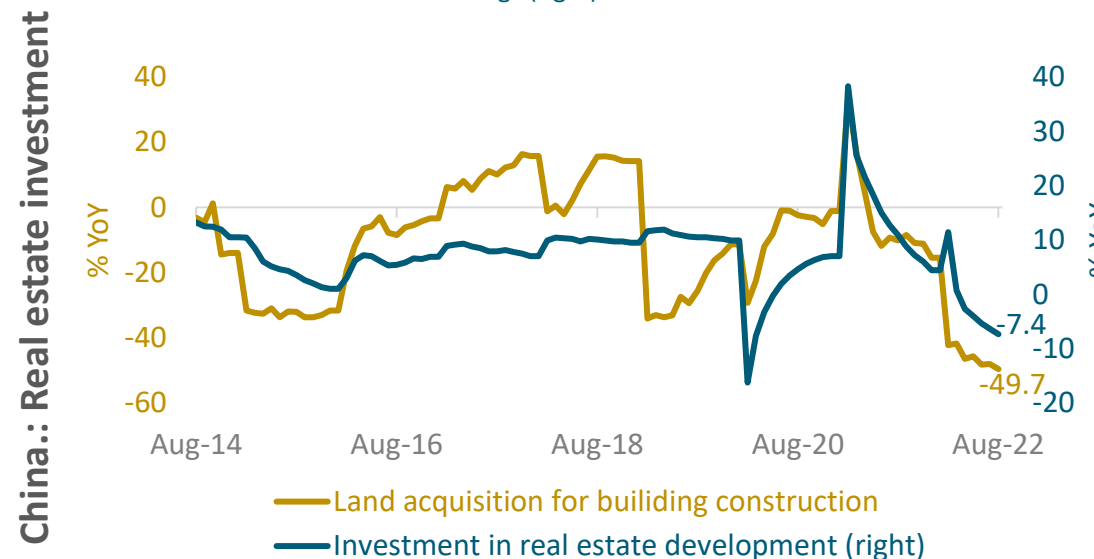
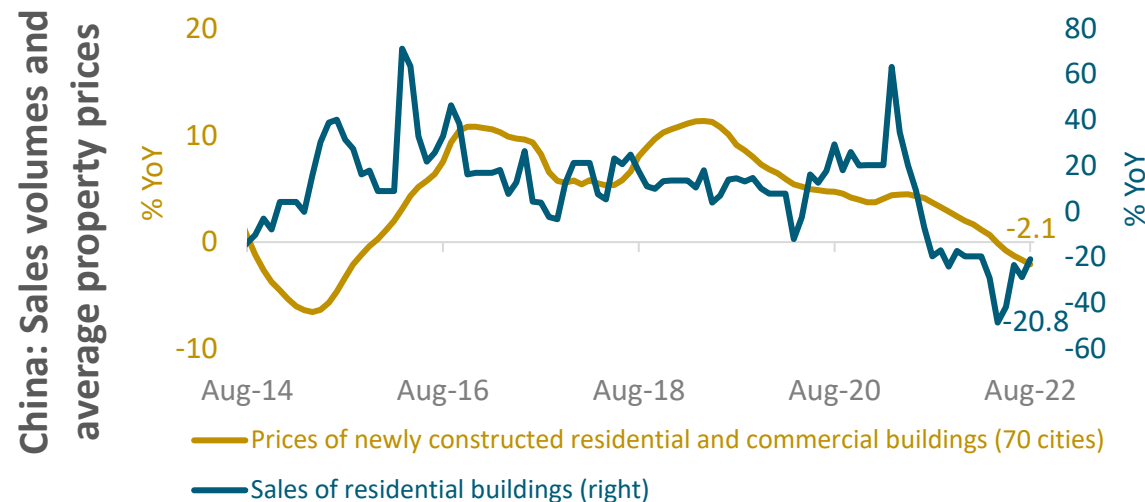
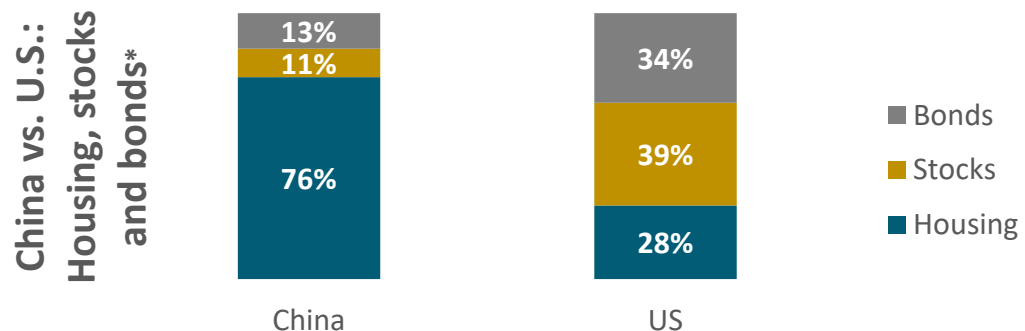
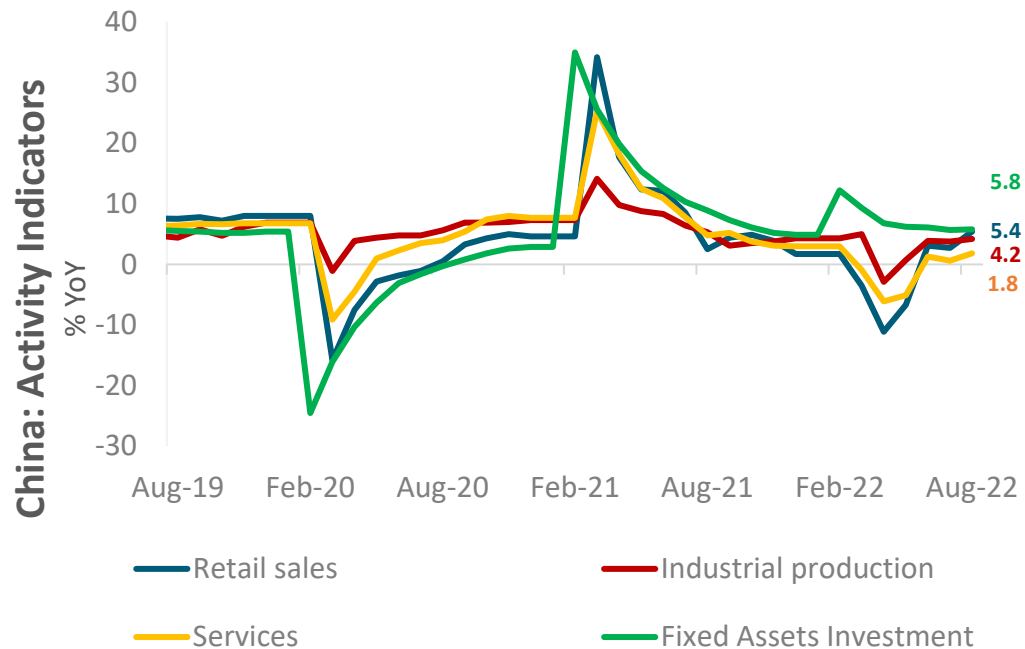
Signs of economic slowdown in the Euro Area and the US, although in different paces. In the US, dichotomy between GDP and labor market.



Sources: Bloomberg, BLS.



Signs of economic slowdown in China. The real estate sector is highly relevant to GDP and to households' wealth.

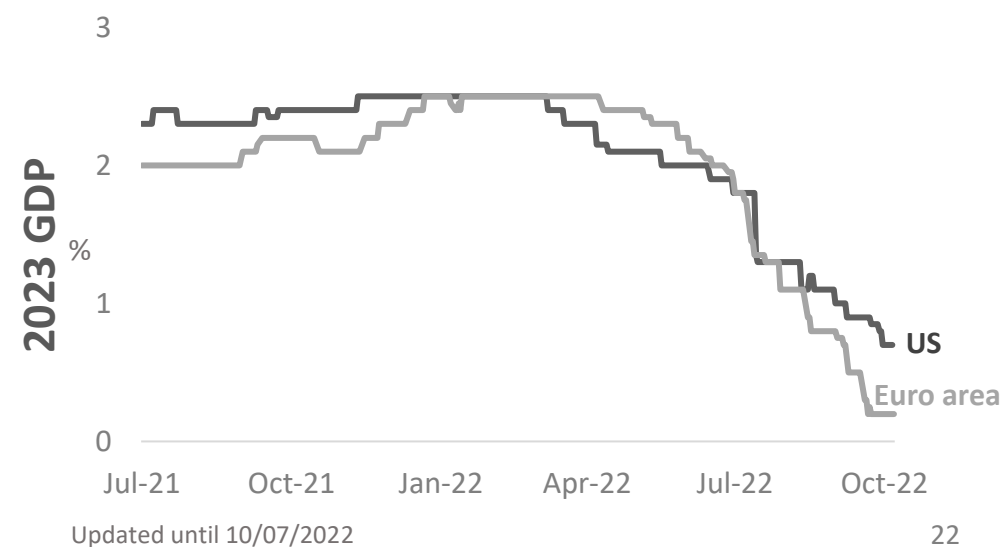
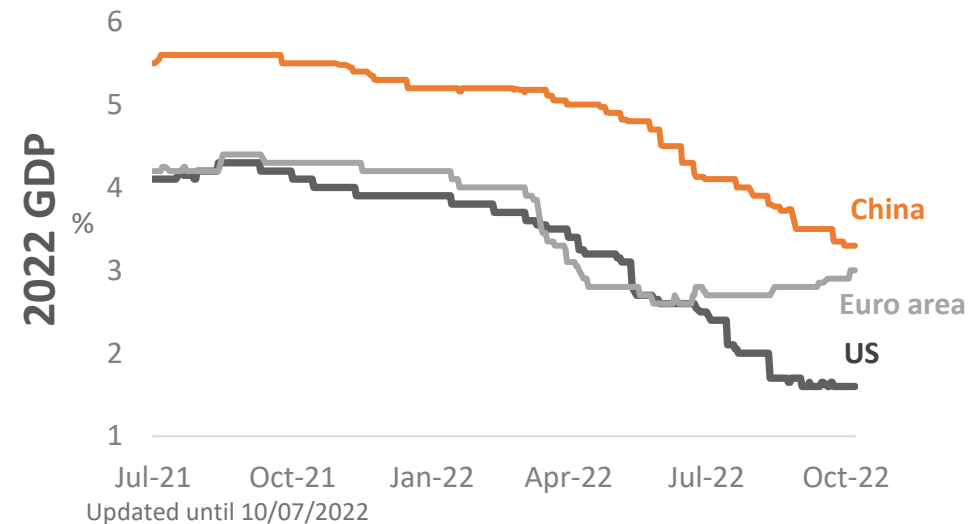
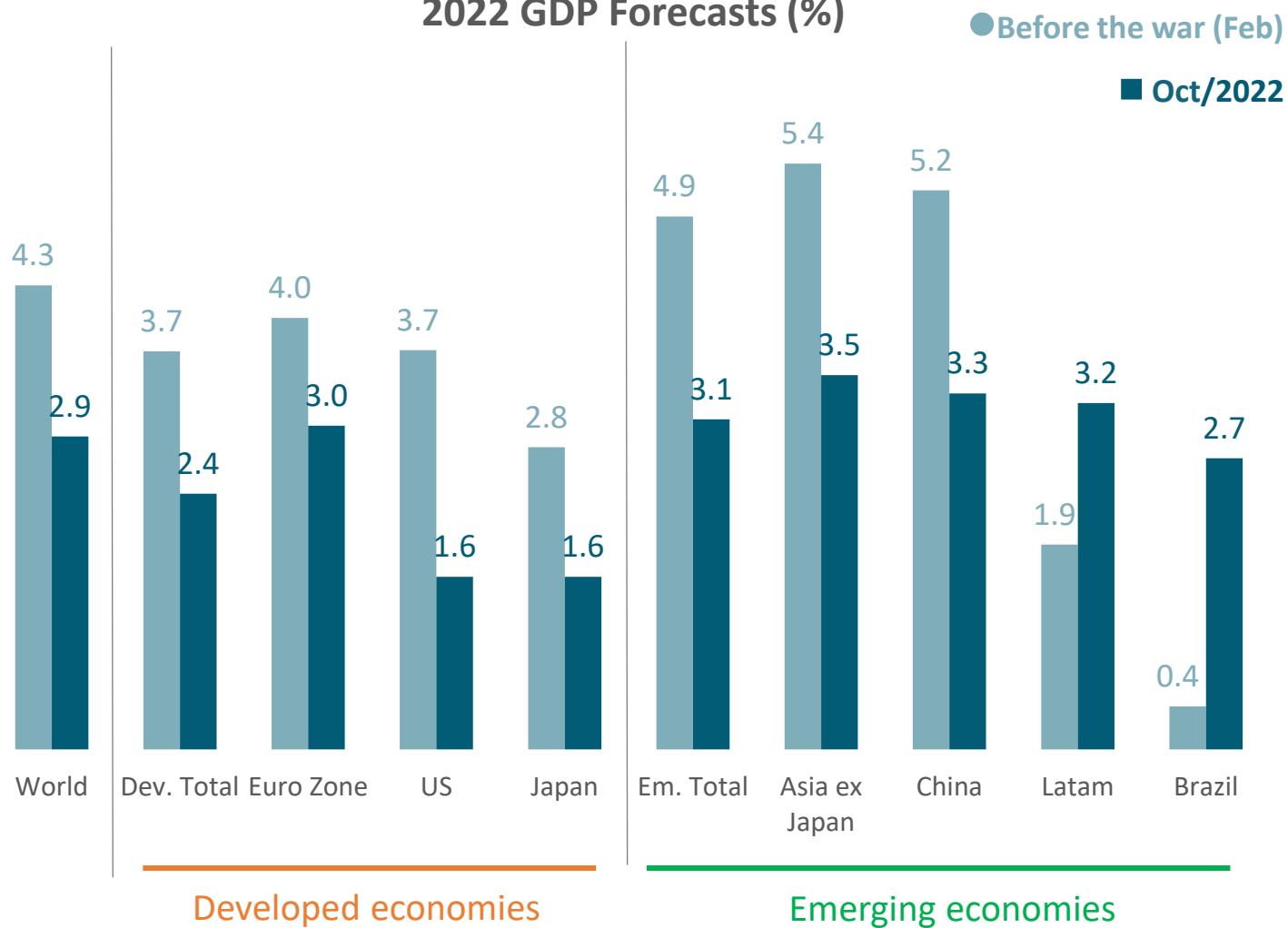


*Percentage of each group in the sum of the valuation of the three assets.

Sources: Rogoff, Kenneth, and Yuanchen Yang. 2021. "Has China's Housing Production Peaked?" China and the World Economy 21 (1): 1-31, BLS, Bloomberg.

Drop in 2022 GDP forecasts. Brazil is an exception.

2022 GDP Forecasts (%)

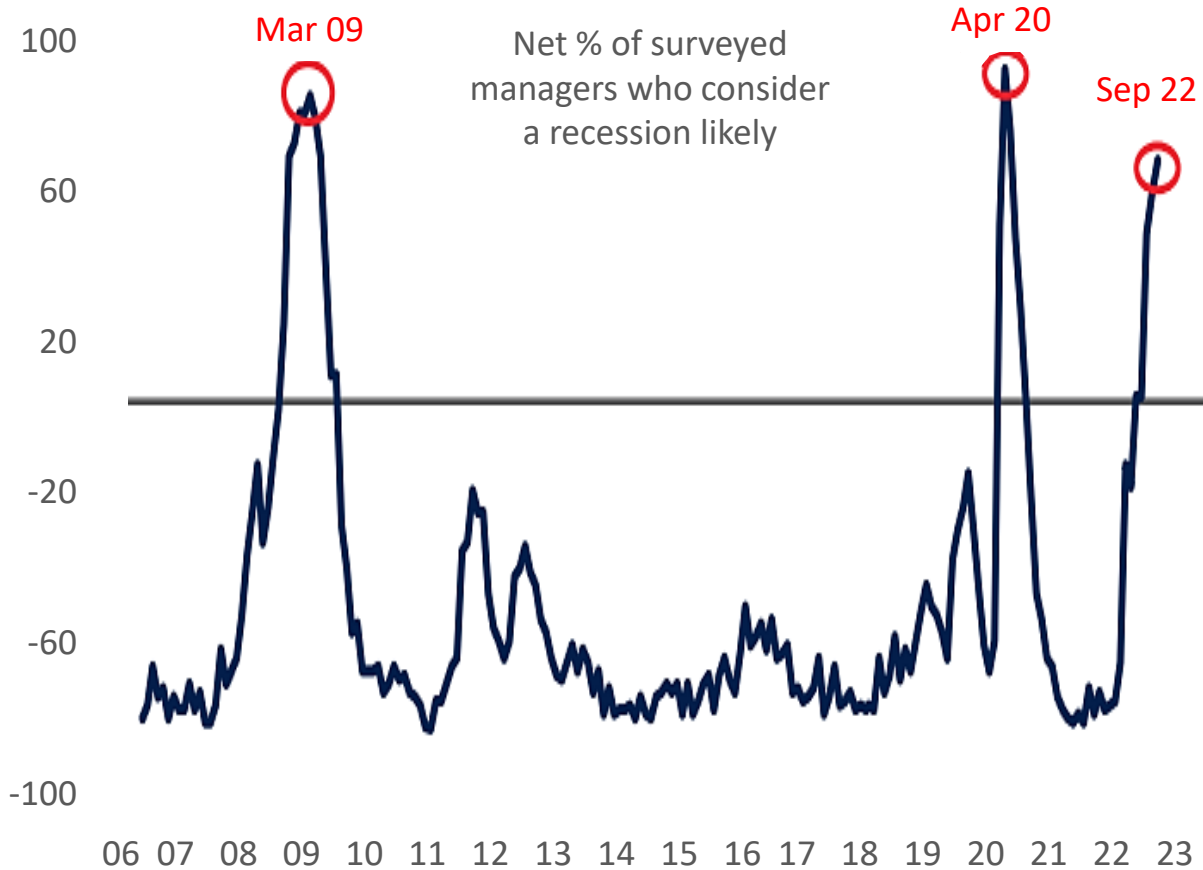


Source: Bloomberg and BCB Focus Report (median of the last 5 days)

Increased concerns related to global recession. Decrease in consumer confidence in advanced countries.

Perception regarding likelihood of recession

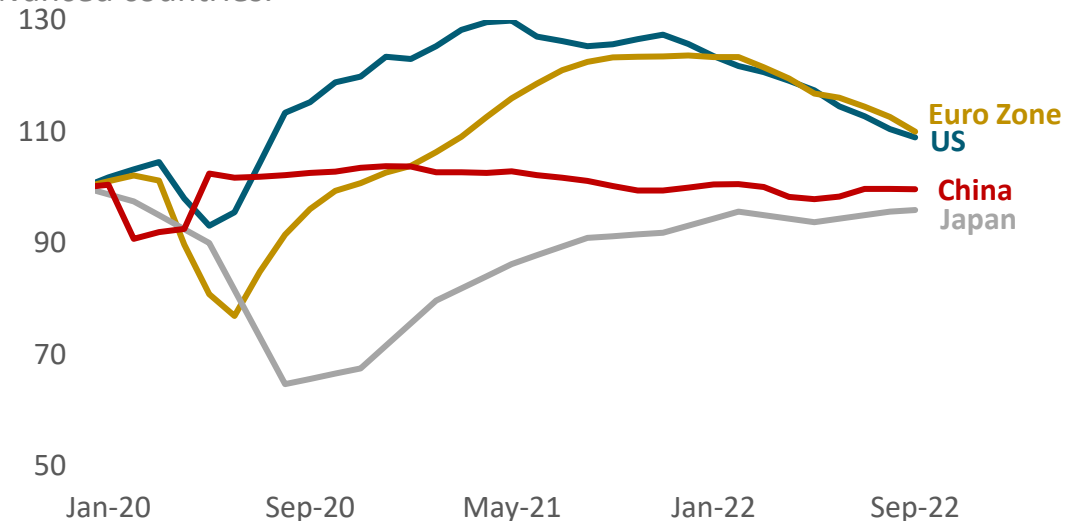
(BofA Global Fund Manager Survey)



Sources: BofA, Bloomberg, OECD.

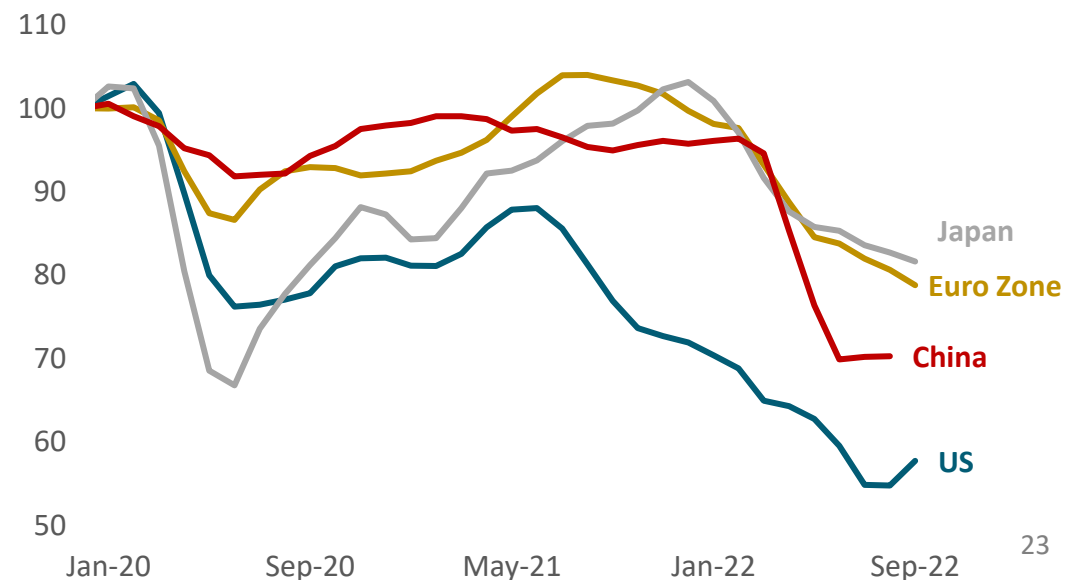
Manufacturing confidence

(3-Month MA, Dec/19 = 100)

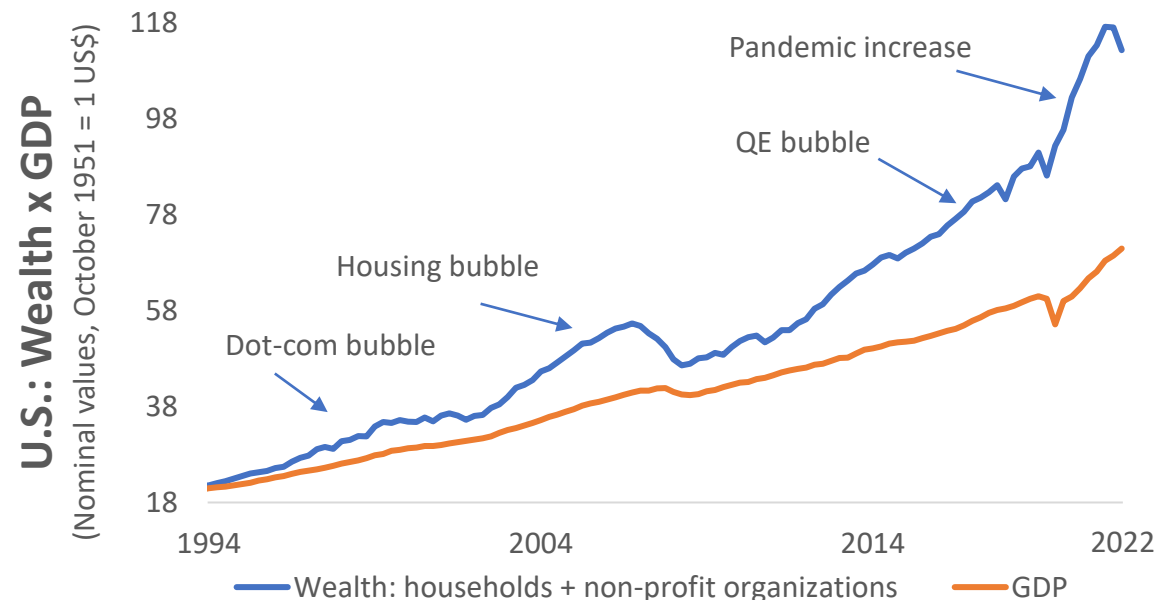
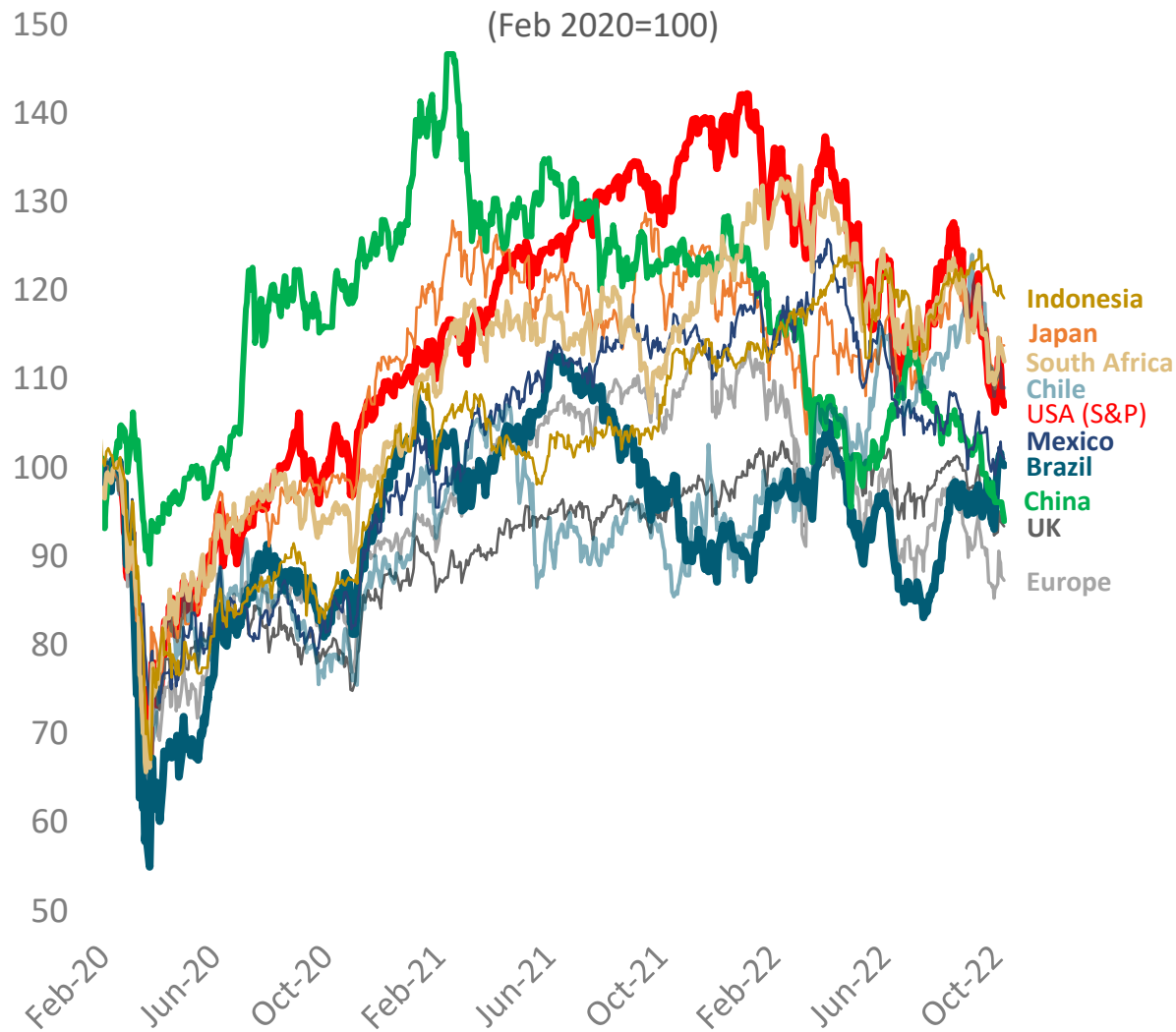


Consumer confidence

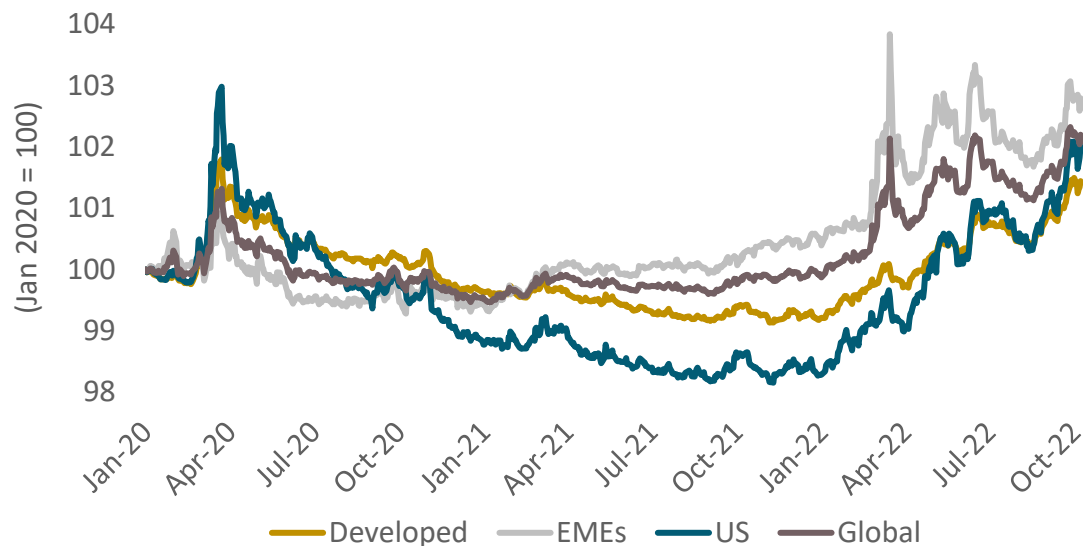
(3-Month MA, Dec/19 = 100)



Stock Markets
(Feb 2020=100)



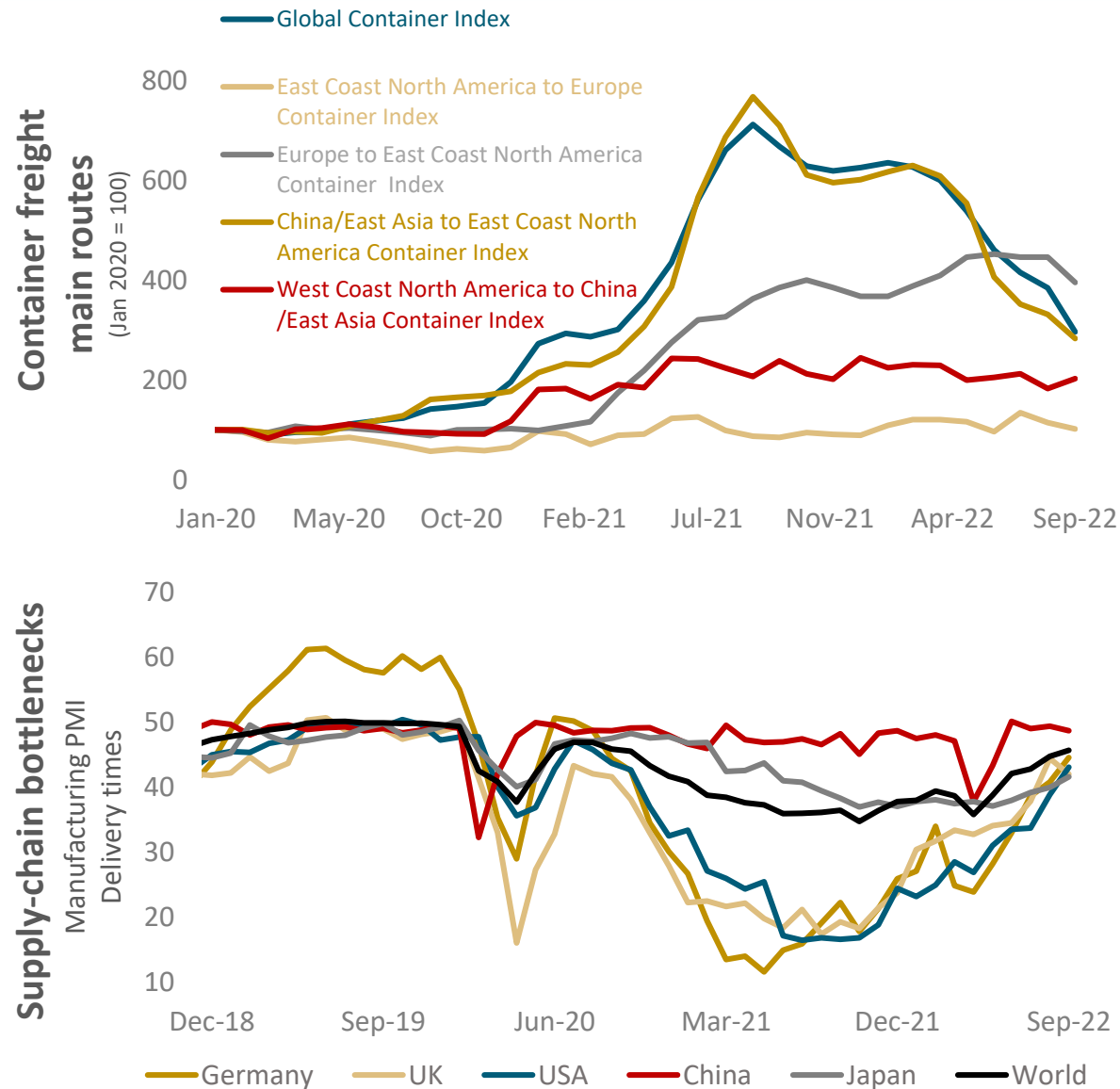
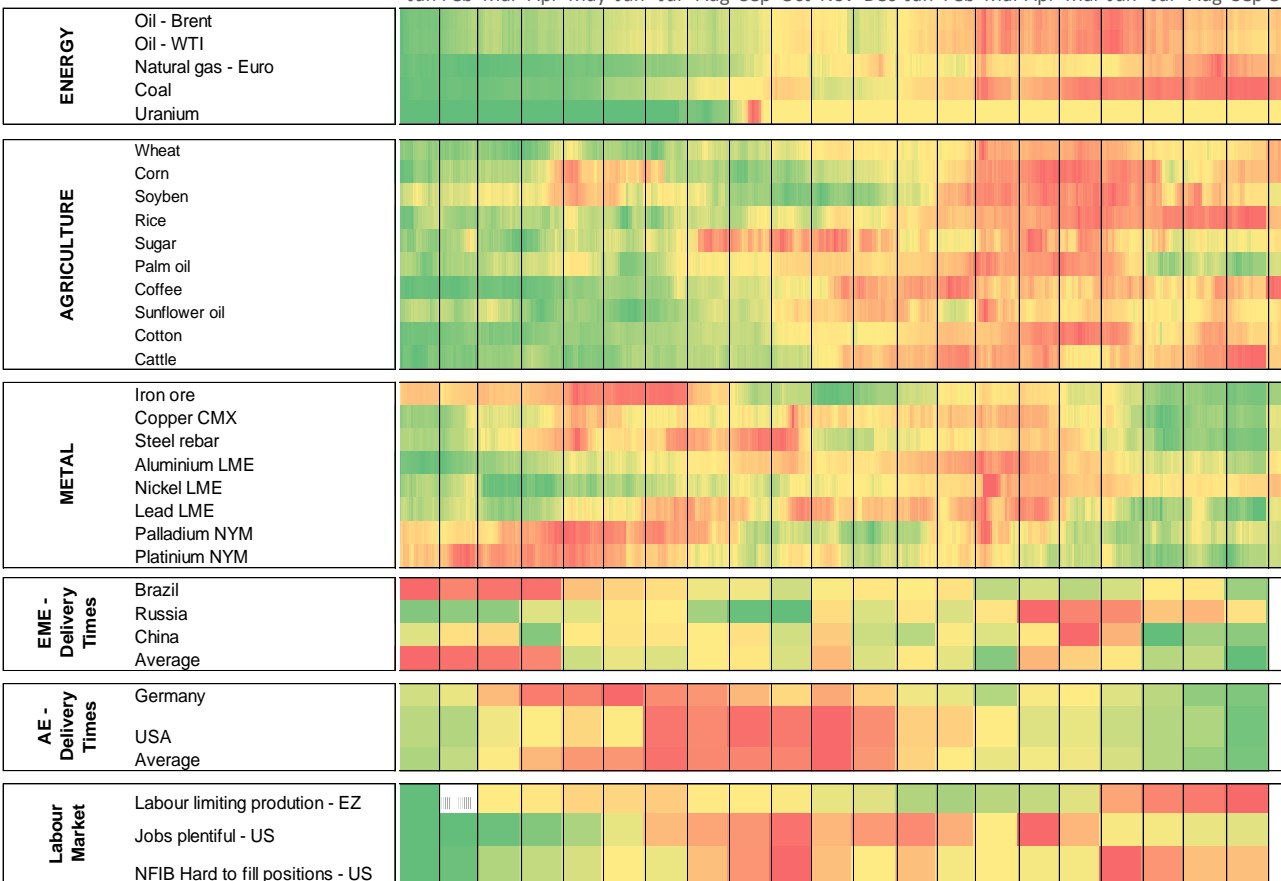
Financial conditions indexes – GS
(Jan 2020 = 100)

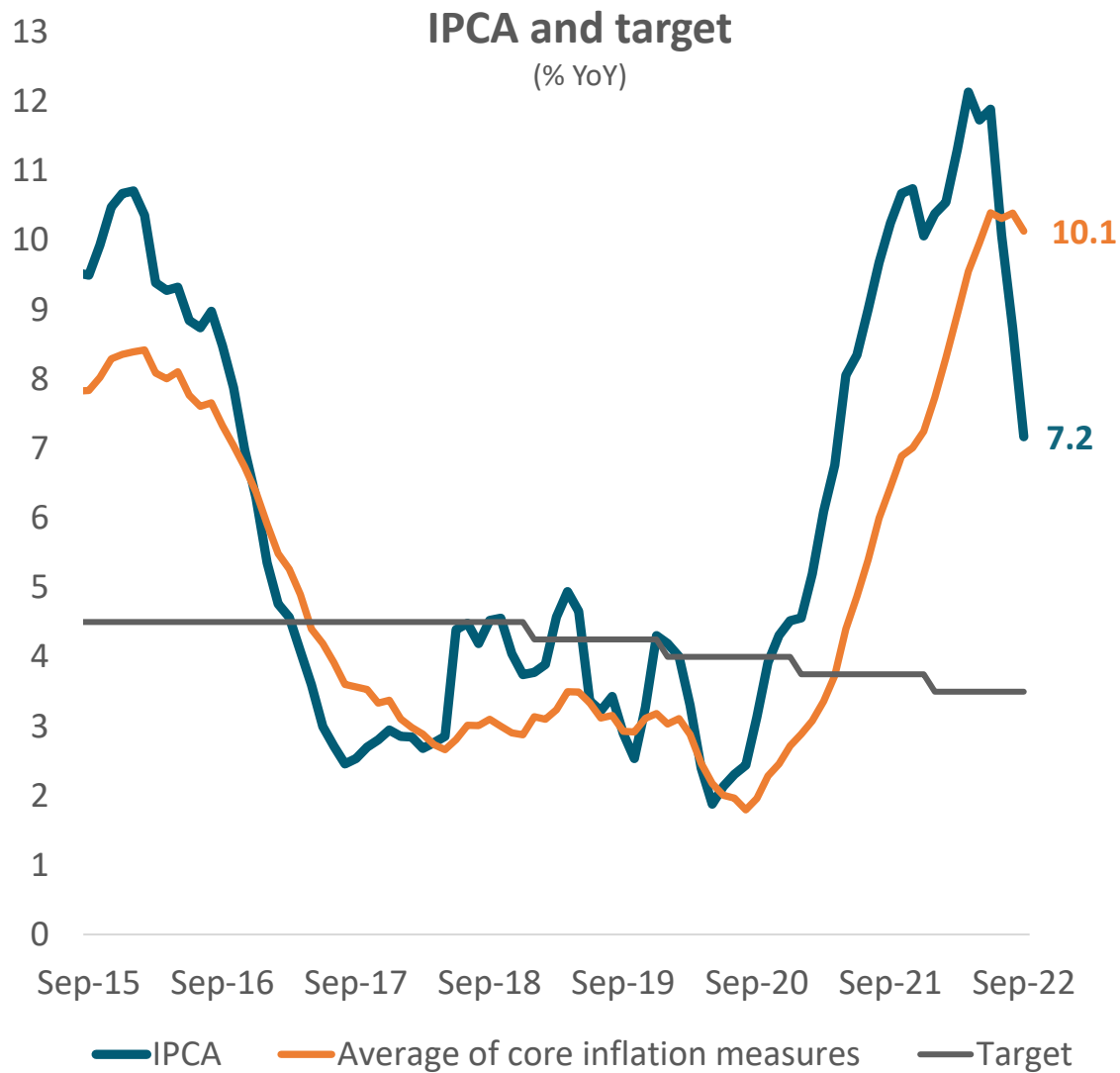


Some relief in existing sectoral bottlenecks: freights and delivery times.

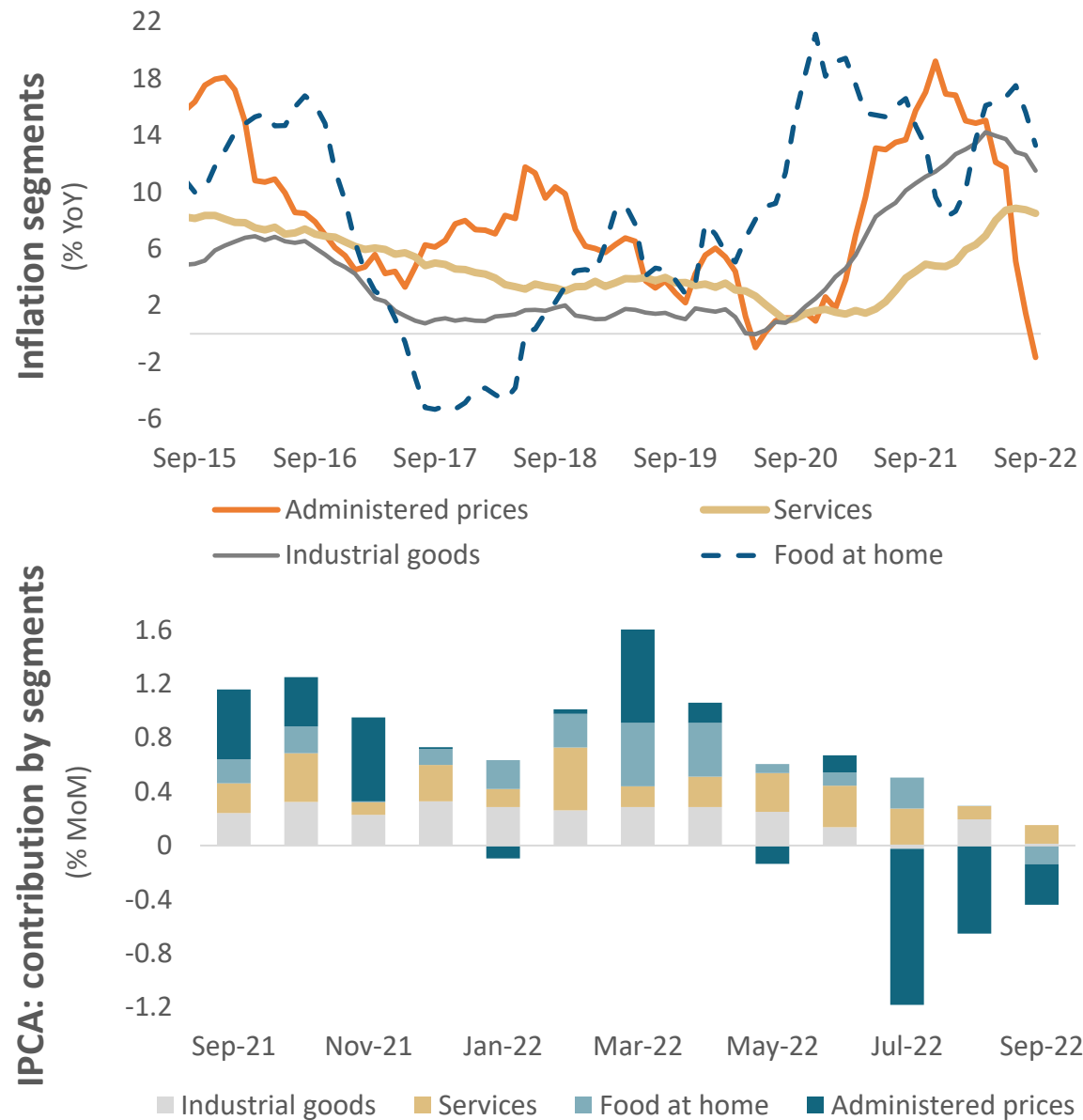
Supply Pressures on Inflation

2021 2022
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr Mai Jun Jul Aug Sep Oct



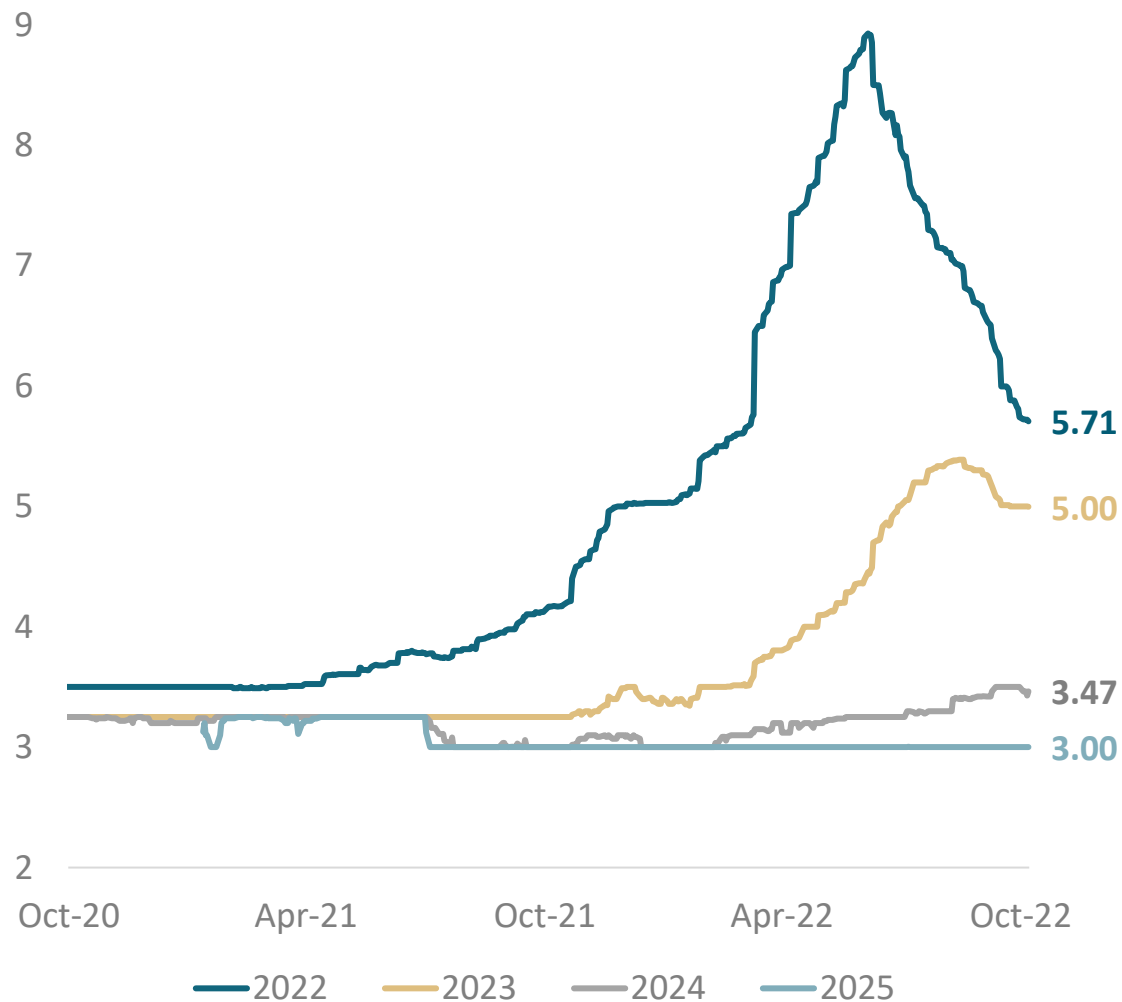


Sources: IBGE and BCB.



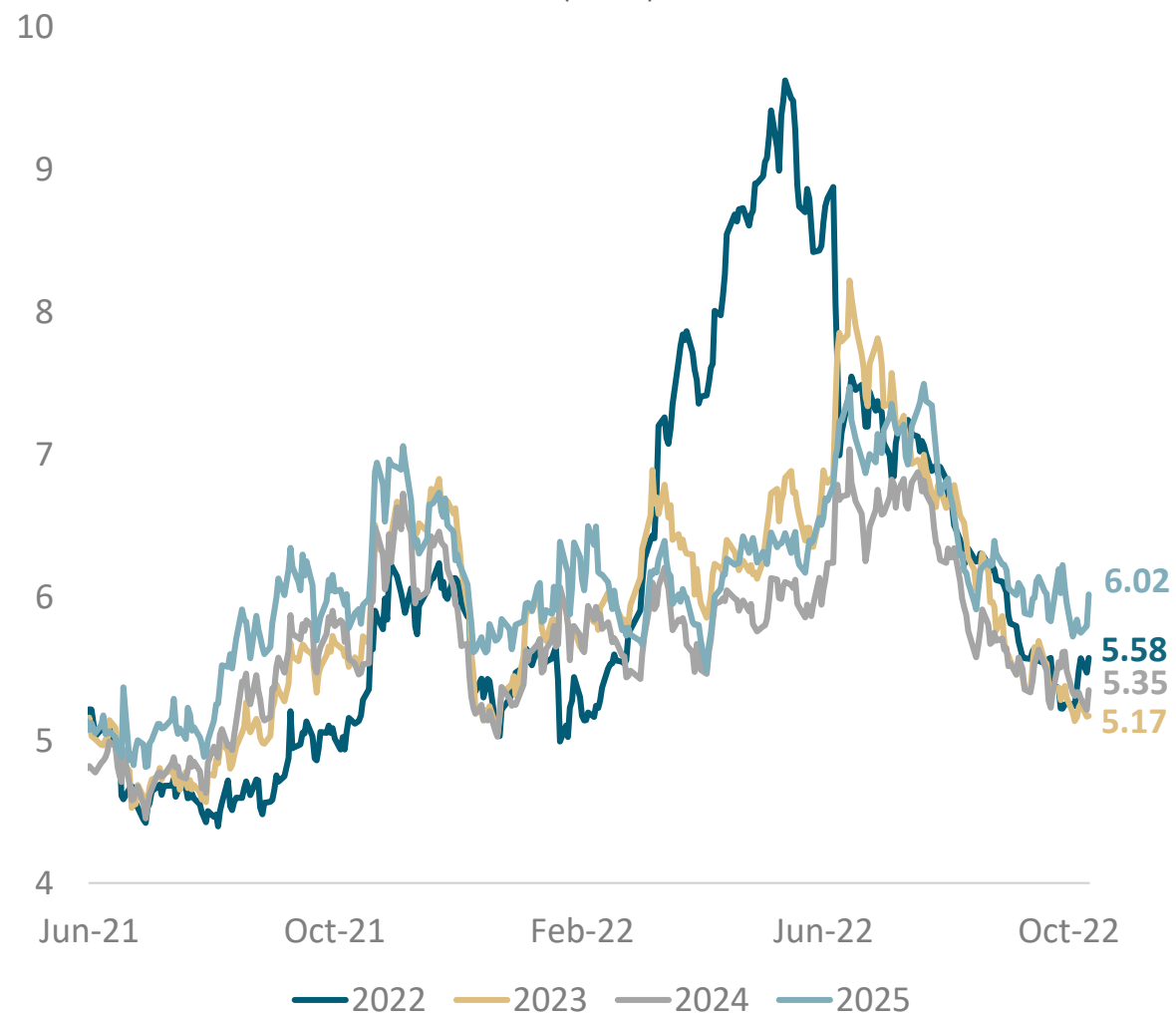
Inflation Expectations

(professional forecasters; % YoY, informed in the last 30 days)

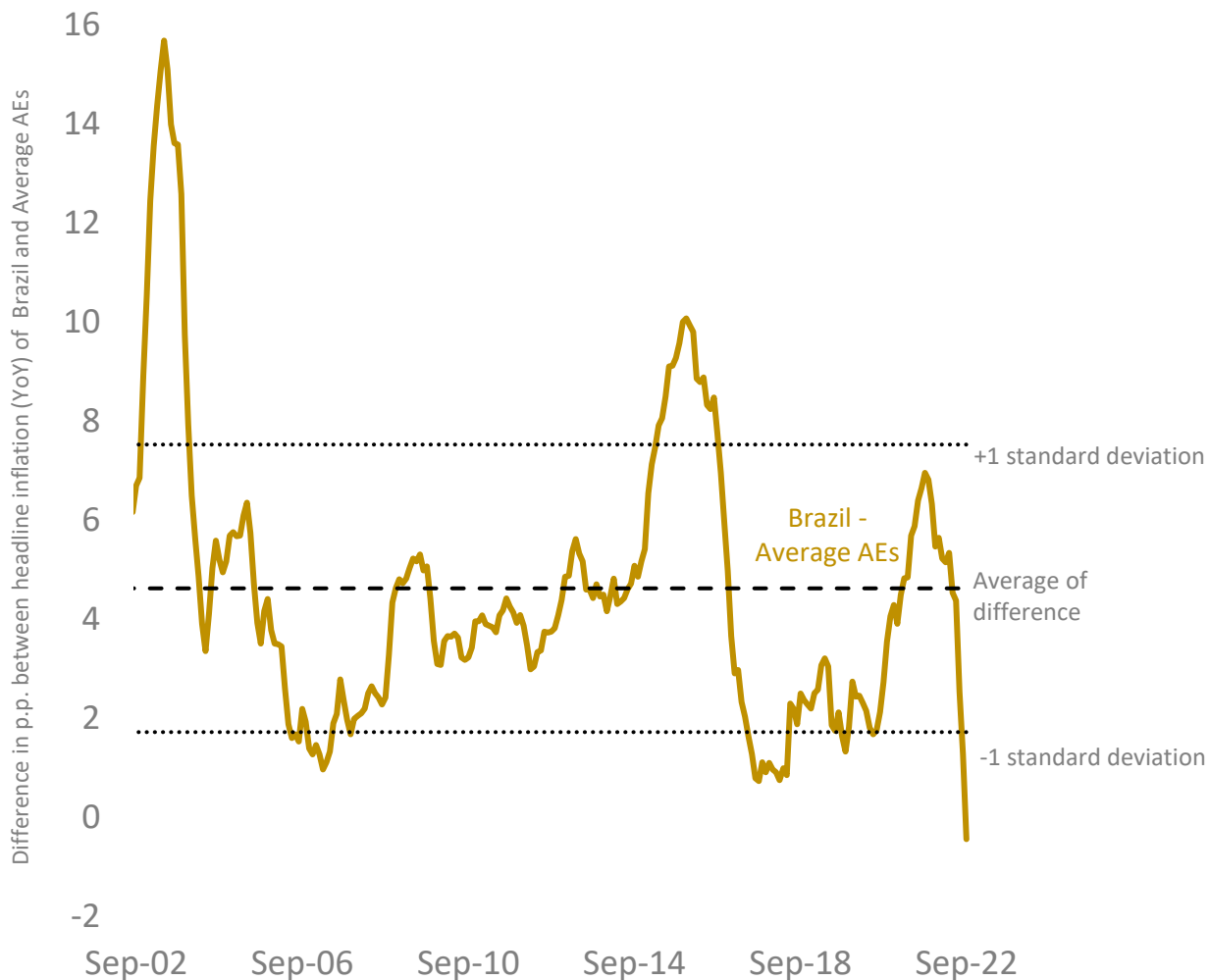


Break-even inflation

(% YoY)



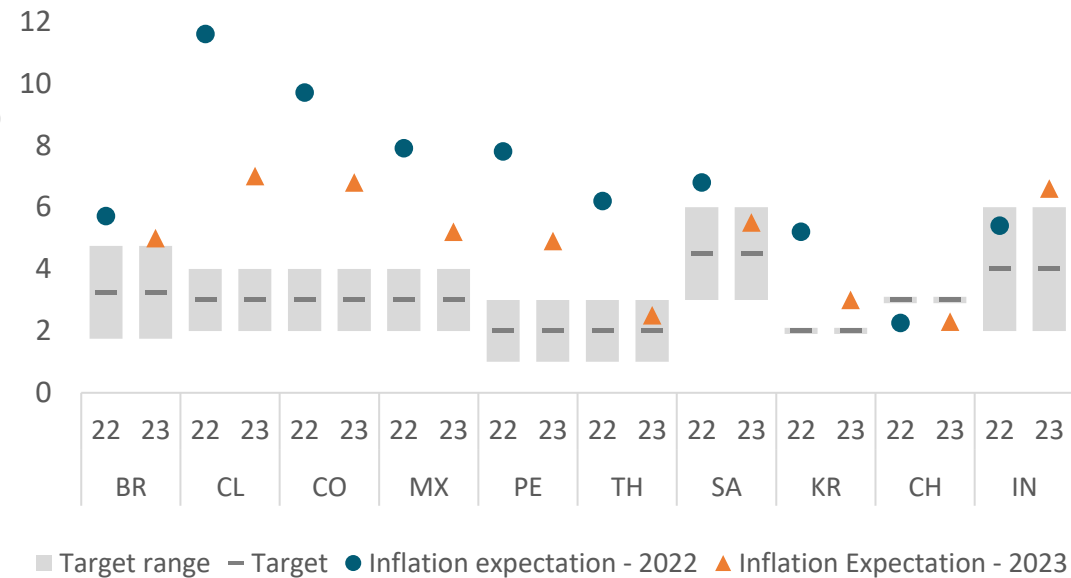
Consumer Inflation: Difference between Brazil and AEs



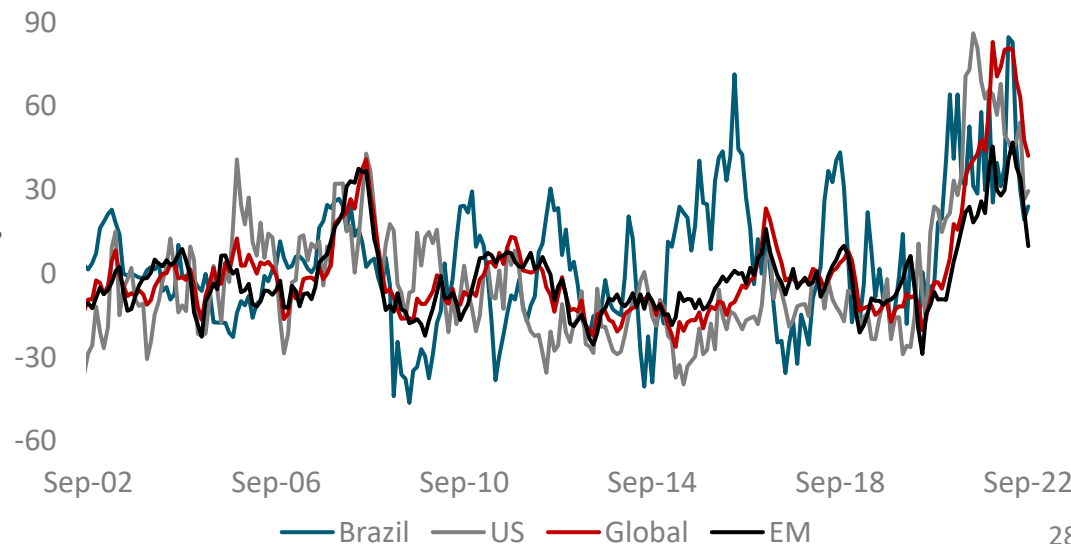
AEs average: USA, Euro area, Japan, United Kingdom, Canada.

Sources: Bloomberg, Citibank, BCB (Focus Report).

EMEs: Inflation expectations 2022 e 2023 vs. target



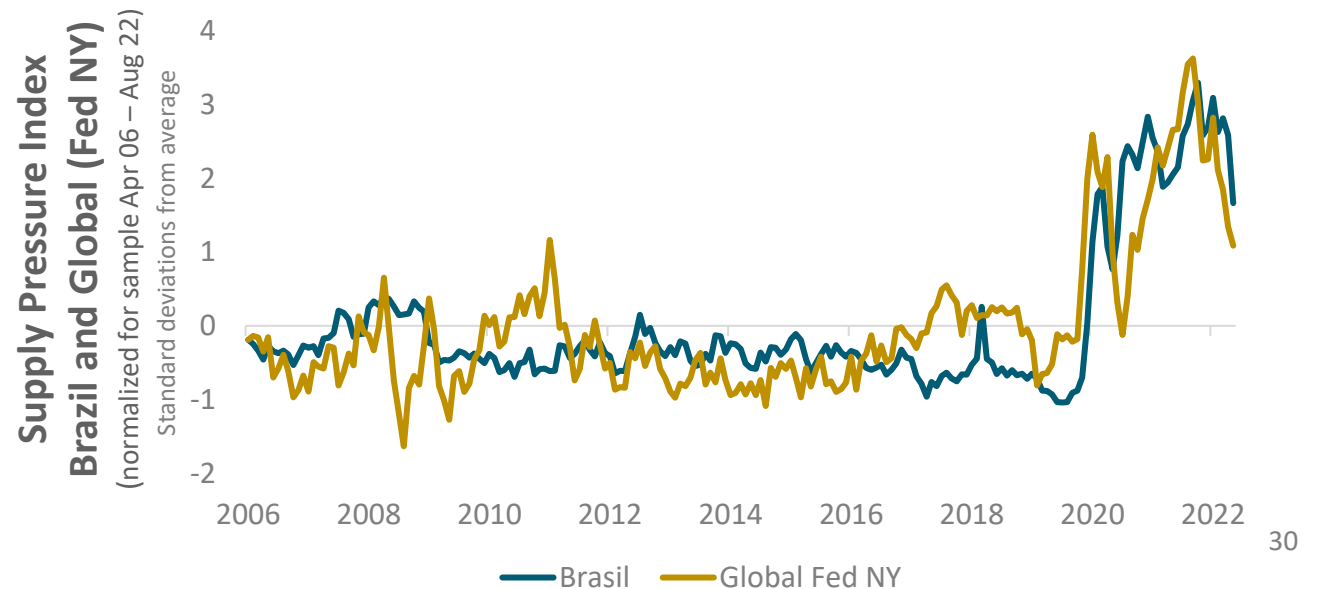
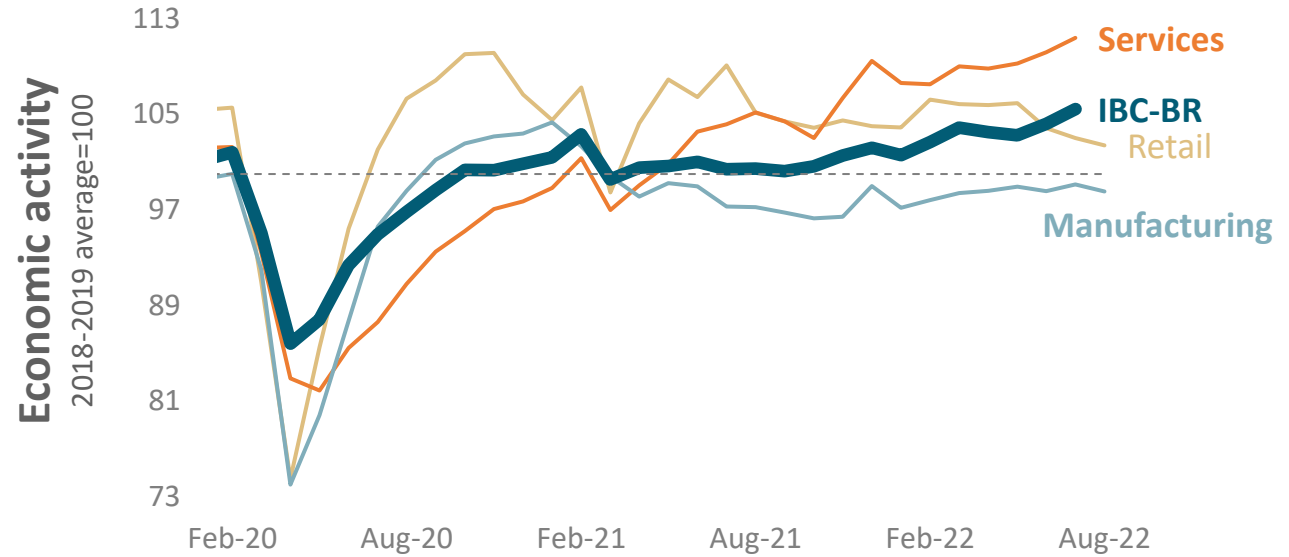
Inflation Surprise Index



249th Copom Meeting – September 2022

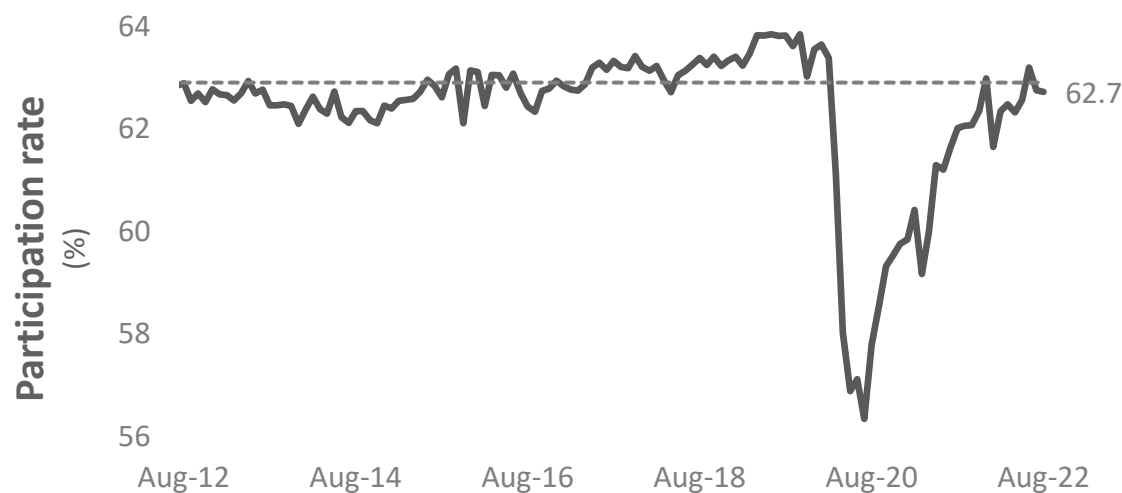
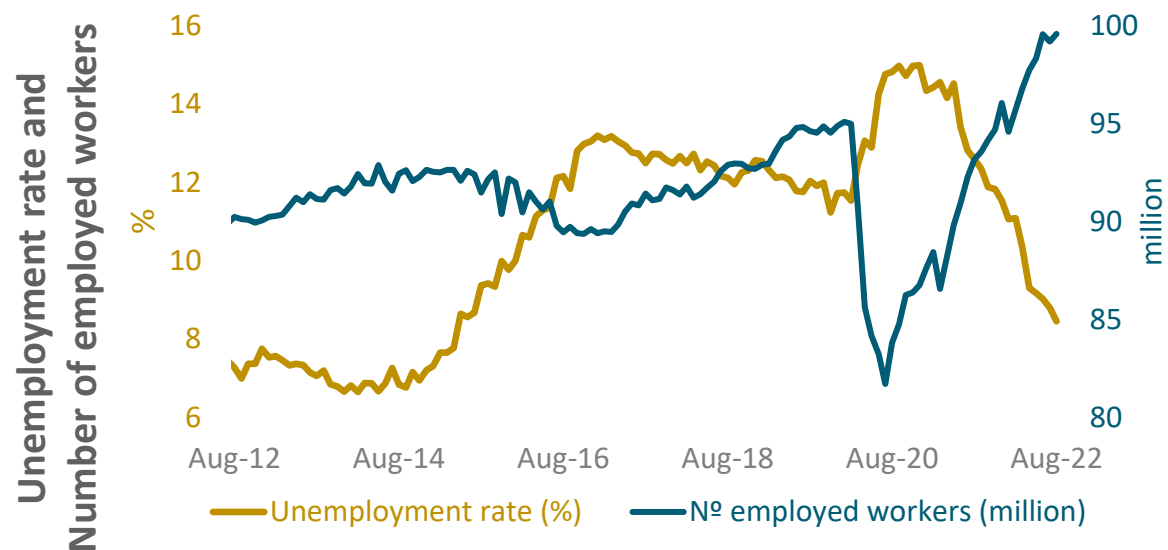
- Considering the assessed scenarios, the balance of risks, and the broad array of available information, the Copom decided to maintain the Selic rate at 13.75% p.a.
- The Committee judges that this decision reflects the uncertainty around its scenarios for prospective inflation, an even higher-than-usual variance in the balance of risks, and is consistent with the strategy for inflation convergence to a level around its target throughout the relevant horizon for monetary policy, which includes 2023 and, to a lesser extent, 2024.
- The Committee will remain vigilant, assessing if the strategy of maintaining the Selic rate for a sufficiently long period will be enough to ensure the convergence of inflation.
- The Committee emphasizes that it will persist until the disinflationary process consolidates and inflation expectations anchor around its targets.
- The Committee reinforces that future monetary policy steps can be adjusted and will not hesitate to resume the tightening cycle if the disinflationary process does not proceed as expected.

Recent improvement in market forecasts for GDP.



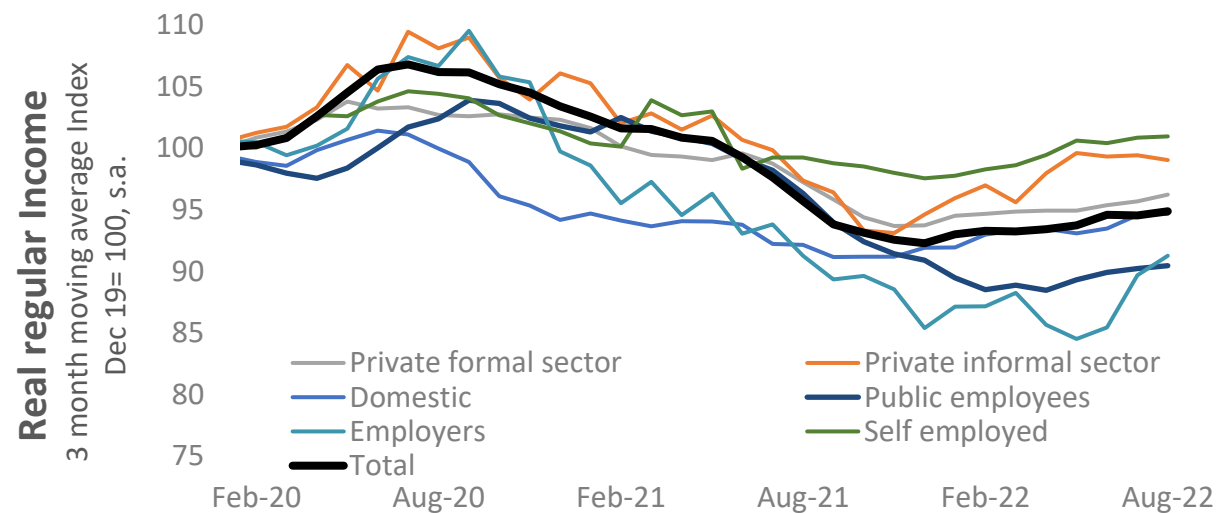
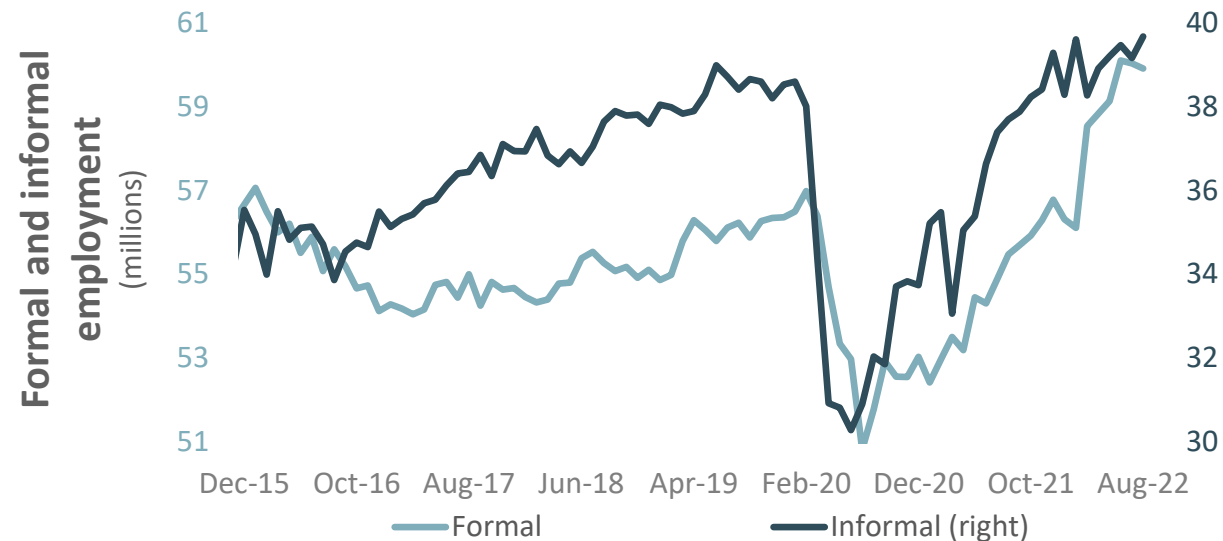
Sources: Focus Report (median of the last 5 days) BCB, IMF, IBGE, Fed NY.

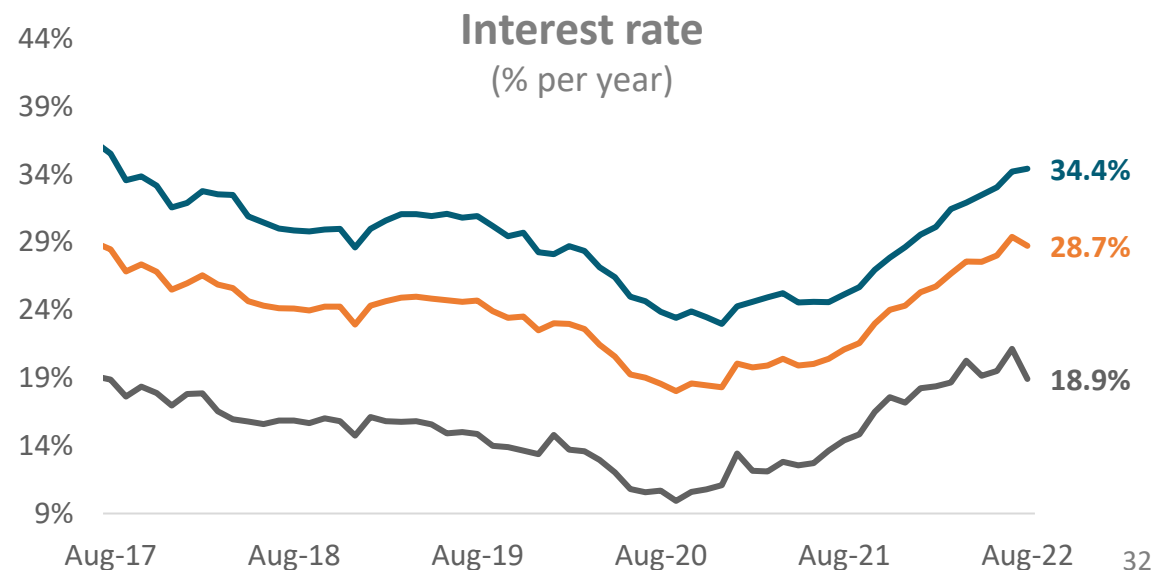
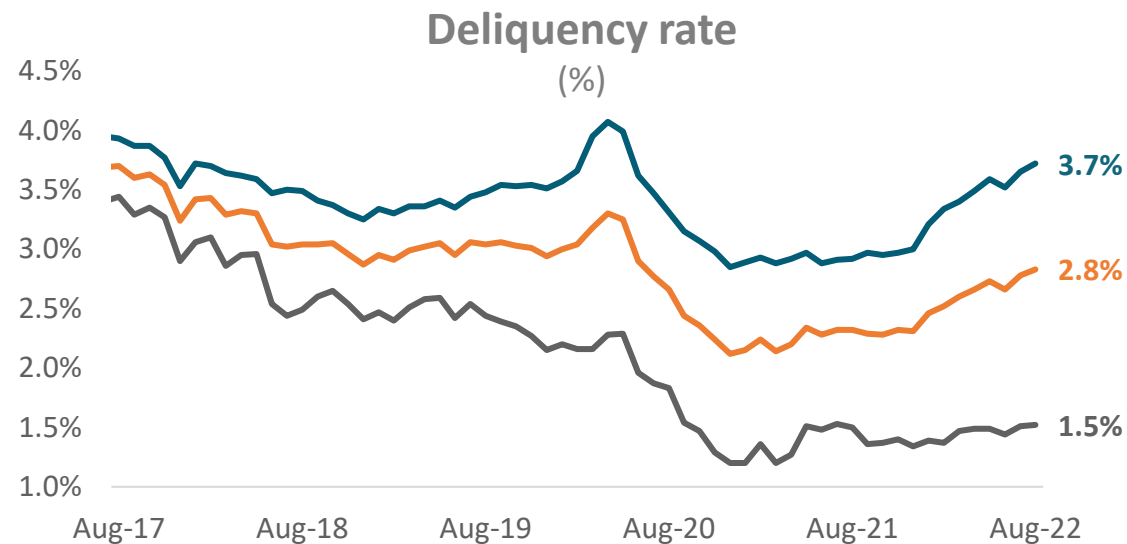
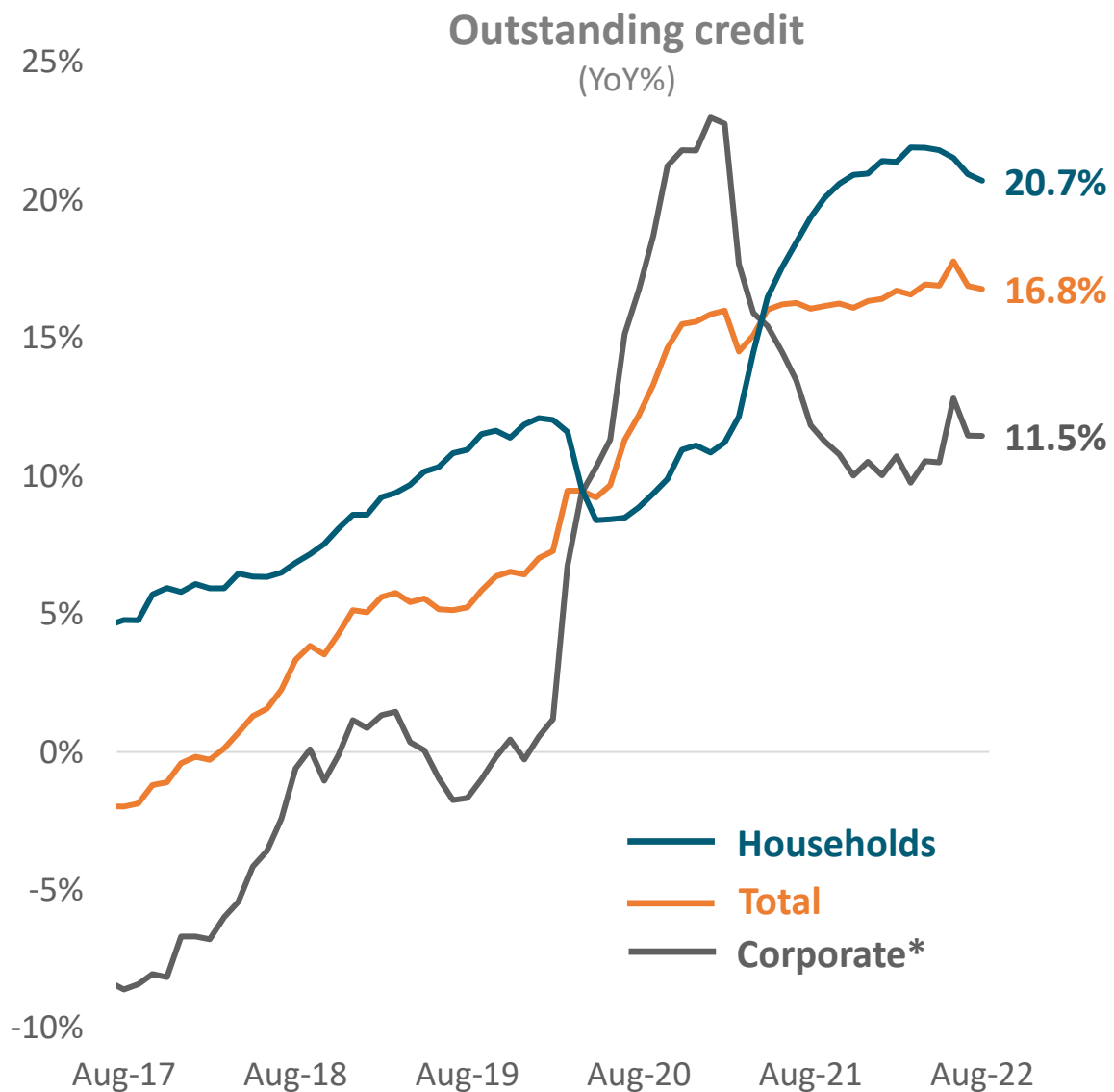
Consistent improvement in the labor market.



*Dashed line equals to 62.9, the average participation rate from August 2012 to February 2020.

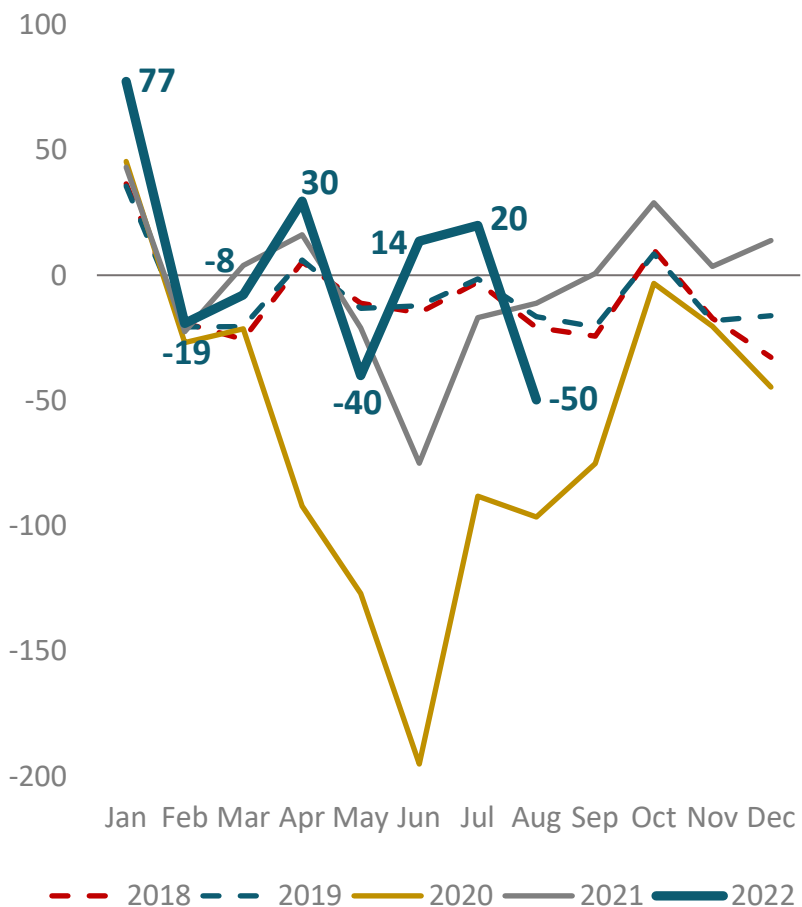
Source: IBGE, seasonally adjusted by the BCB.





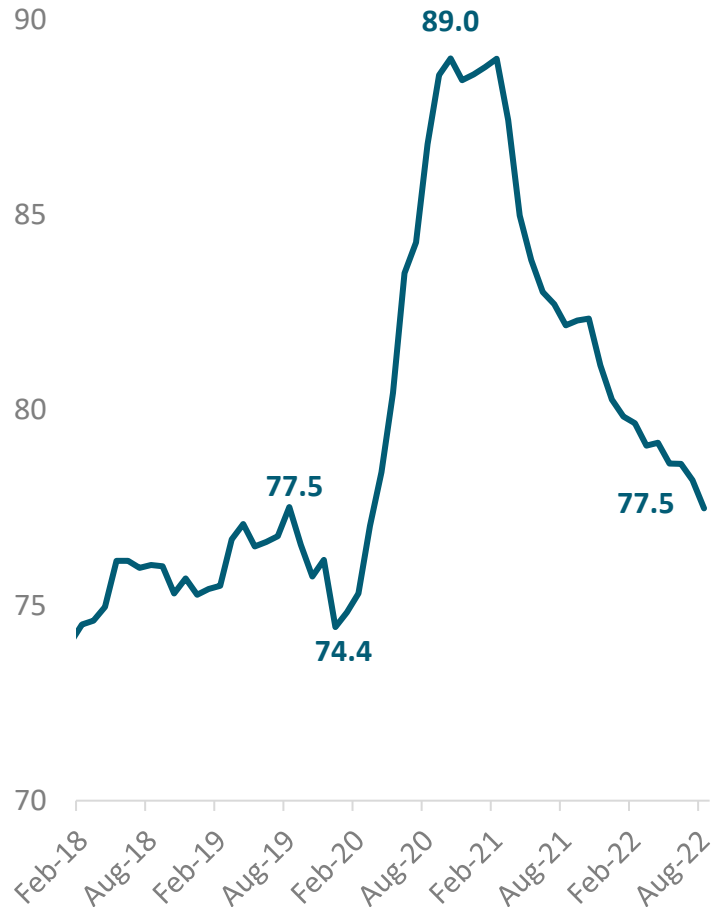
Central Government Primary Result

R\$ billions



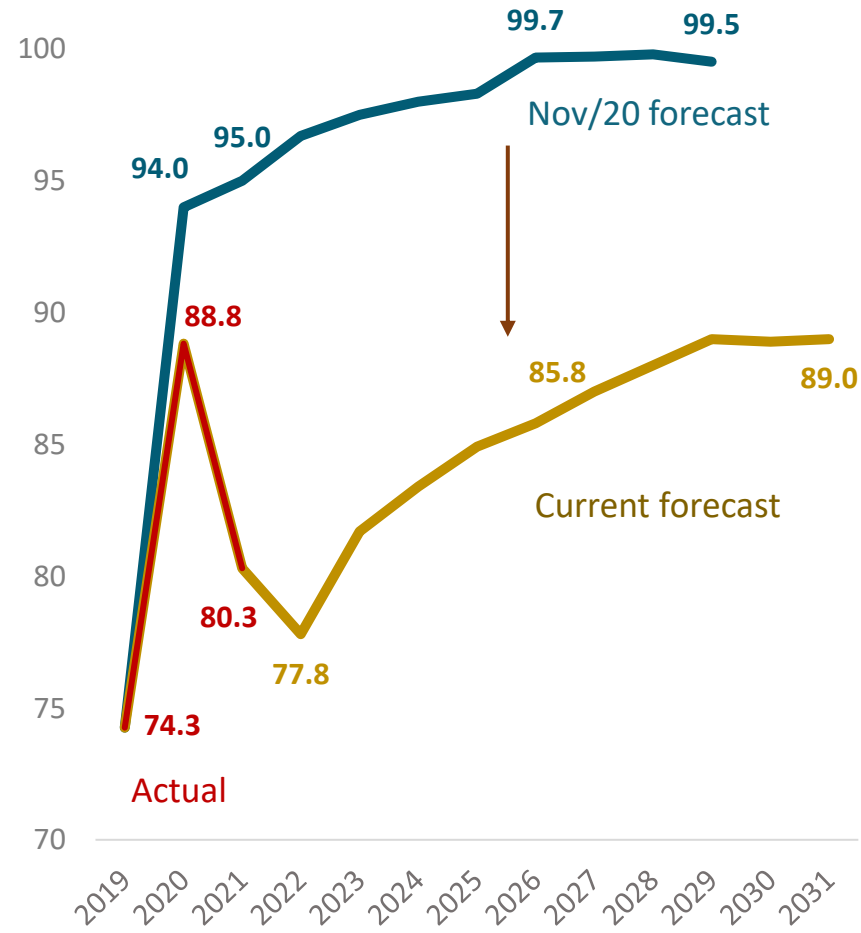
General Government Gross Debt

% GDP



Evolution of GGGD/GDP forecast

(several years, Focus* median %)



* Updated until 10/07/2022

Modernization of exchange rate legislation

- The new law approved establishes:
 - A modern, compact, and safe legal framework for the FX market.
- Objectives:
 - Simplify the FX legislation and improve the business environment in Brazil.
 - Ease the connections with payment systems of other countries.
- BCB launched public consultations on new rules.



What is happening in the digital world



- People look for a digital representation of value
- Assets are becoming encrypted
- Distributed ledgers allow assets to be verifiable and transferable, with divisibility

So, what is the real debate?

- Are we moving towards a tokenized economy?
- Tokenizing assets for trading is the main transformation
- To extract value from an asset in its digital form
 - Art, pictures, properties, ideas and even money

Metaverse

W6C9A6L26

Even virtual reality is being monetized



It's only the beginning!

If the tokenization thesis holds true, then the 21st Century may see the creation of regulated, global, token-based, multi-asset networks*

* The Regulated Internet of Value, Citi's Digital Policy, Strategy and Advisory, Jun/21.



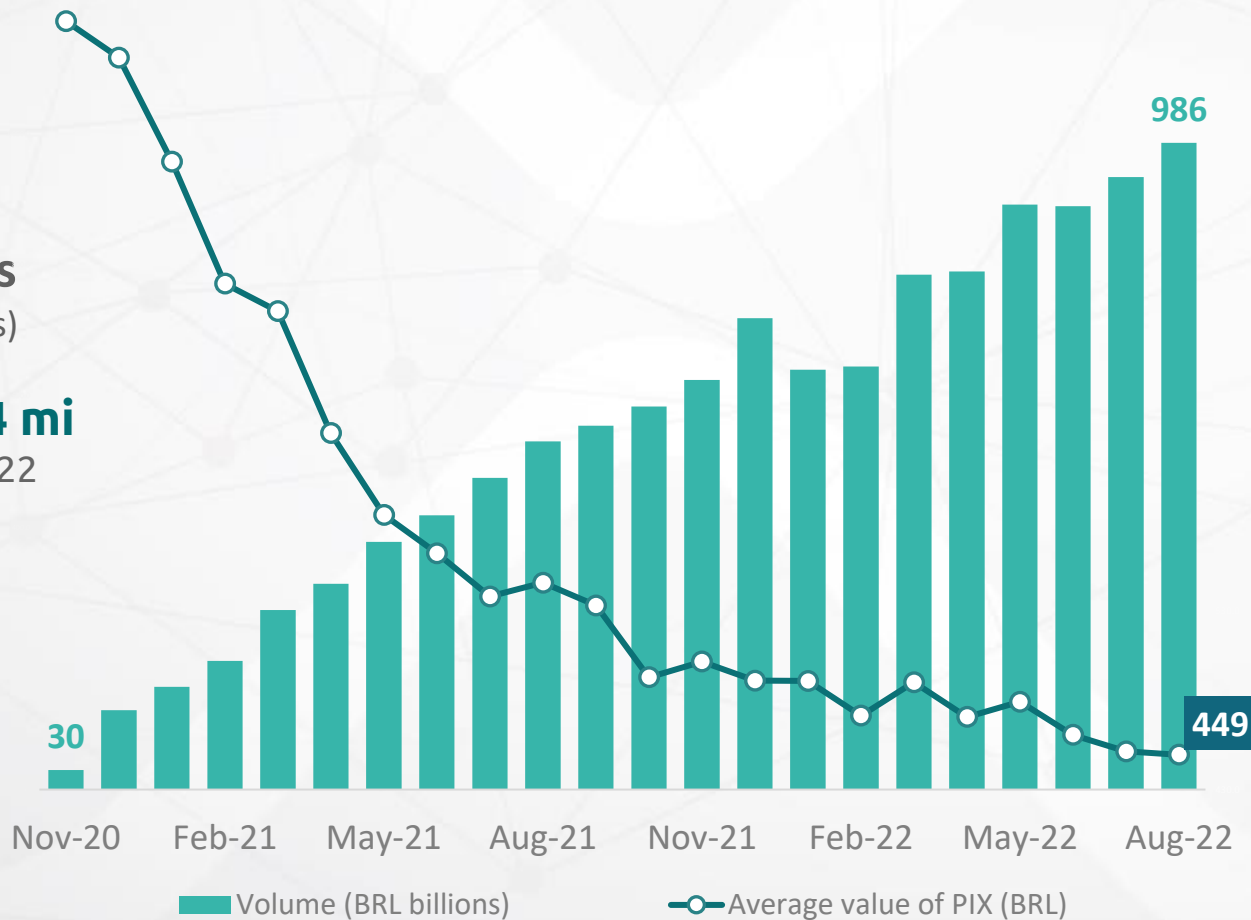
Technologic Agenda

Pix gains space and becomes popular



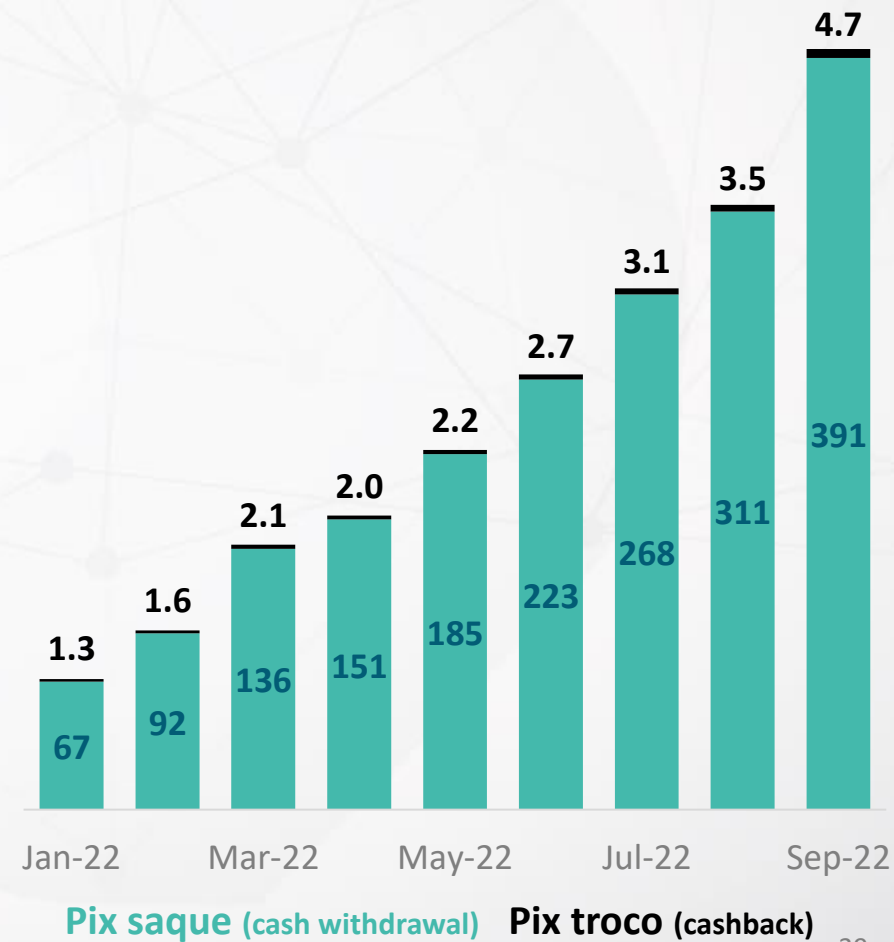
Volume of transactions and average value

(in BRL billions and in BRL)



Pix Saque and Pix Troco

(thousands of operations)



Pix: Evolution Agenda 2022

Products/Features 2022-2023

In progress



Direct Debit



Non-Priority Settlement



Electronic bill payment
(standardized file specification)



Products under design

Examples:

- Pix Internacional (cross-border payments)
- Offline payments
- Pix Garantido/Crédito
- International cooperation
 - Colombia, Uruguay

Features already in use

Incentive to use and measures for assimilation of features



Users

Payment initiator
(initial operations)



Participants

Instant Payment Account
Remuneration



Automation



To be defined
Evolution agenda
2023

openfinance



- Implementation will be gradual

Goals:

- To promote **competition, efficiency and data safety**
- Proper **balanced conditions** between existing financial institutions and new players

Solutions that can be developed from Open Finance:



Devices to compare services and fees



Apps for financial advice and planning



Payment initiation in social medias



Credit marketplace



Open Finance in figures:



Over **7.5 million** customer data sharing consents



Average of over **260 million** API calls (phase 2) in the last weeks



Over **4 billion** API calls (phase 2)



Over **800** participating institutions (phases 2 and 3)



The Brazilian model is a world benchmark: the largest in number of institutions and scope



Digital Brazilian Real



Focus

Use cases

- DeFi protocols
- DvP, PvP
- IoT

Infrastructure

- Interoperability, Scalability
- Programmability, Privacy
- Accessibility, usability

Next step

Pilot projects



Real Digital



Selected proponents

Aave

Banco Santander Brasil

Febraban

Giesecke + Devrient

Itaú Unibanco, B3 and R3

Mercado Bitcoin, Bitrust and CPqD

Tecban and Capital

VERT, Digital Assets and Oliver Wyman

Visa do Brasil, ConsenSys and Microsoft

Use cases

DeFi – Liquidity pool

DvP – Real assets

DvP – Tokenized securities

Dual offline

PvP – Brazil and Colombia

DvP – Digital assets (crypto)

IoT – Smart lockers/e-commerce logistics

Programmable money – funding for rural activity

Defi – funding for SMEs

Financial services aggregator: an example

Offline

Online



BC# Sustainability

Measures:

- BCB's S&E Responsibility
- Partnerships
- Policies
- Supervision
- Regulation

Vision for the future

- Acceleration of technological changes and transition to an integrated and tokenized financial world
- Changes in global trade and in GVCs
- Redesign of energy matrices and production systems
- Normalization of monetary policy in advanced economies
- Deceleration of global growth

Thank You!

Roberto Campos Neto
Governor of Banco Central do Brasil
October 14, 2022



**BANCO CENTRAL
DO BRASIL**

