October 2021 WEO – Chapter 2

Inflation Scares

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Rising inflation since beginning of 2021

Consumer Price Inflation
(Median, year-over-year percent change)
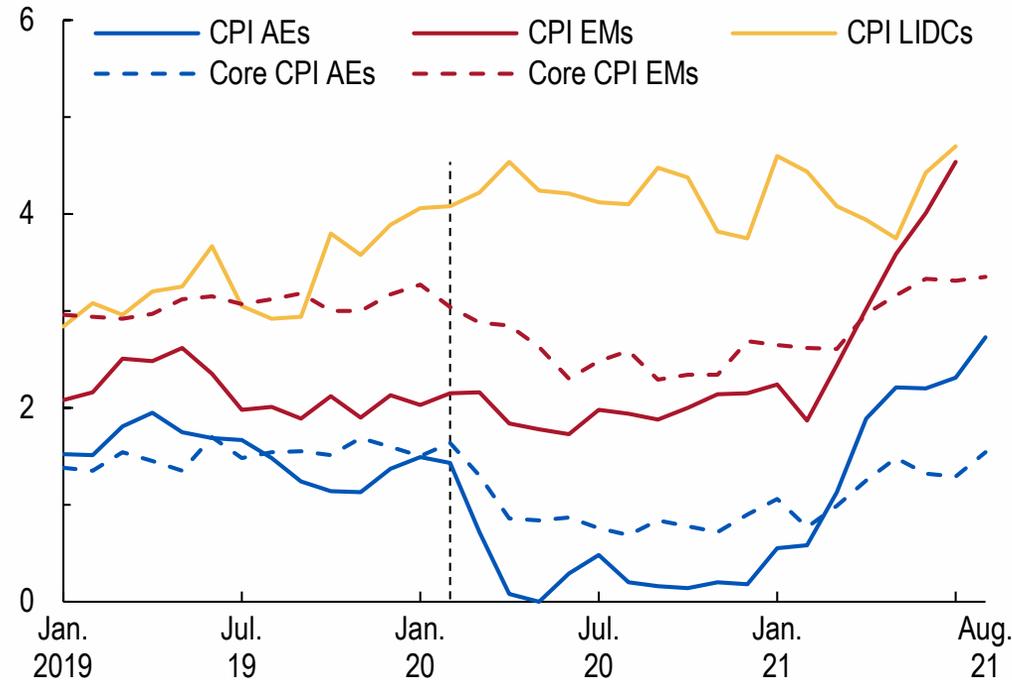
Sources: Haver Analytics; IMF, CPI database; and IMF staff calculations.
Note: The vertical line indicates February 2020. AEs = advanced economies; CPI = consumer price index; EMs = emerging market economies; LIDCs = low-income developing countries.

Driven by firming demand, rising commodity price pressures, and supply chain disruptions

1. Cumulative Excess Savings
(Percent of expected savings)

2. Commodity Prices
(Index, June 2014 = 100)

Metals — Oil — Food

3. Supply Chain Disruptions
(Index)

Euro area
United States
China
Emerging market economies
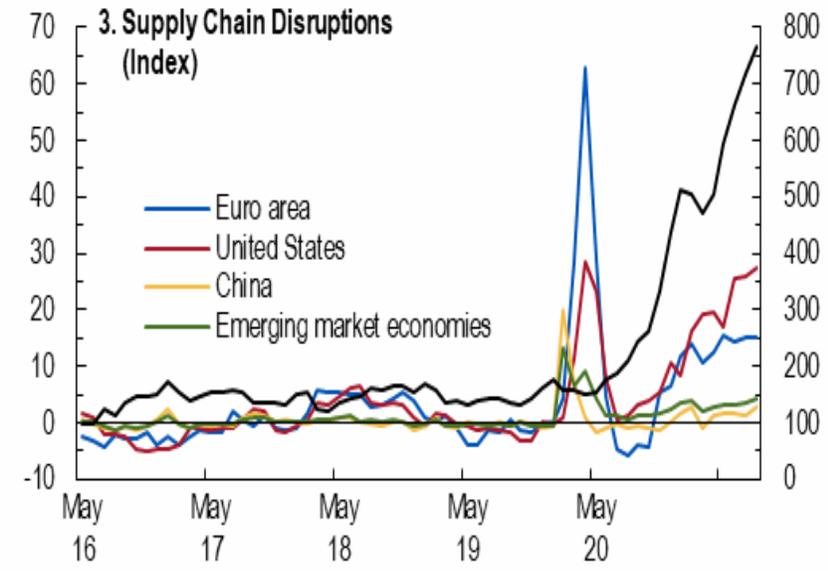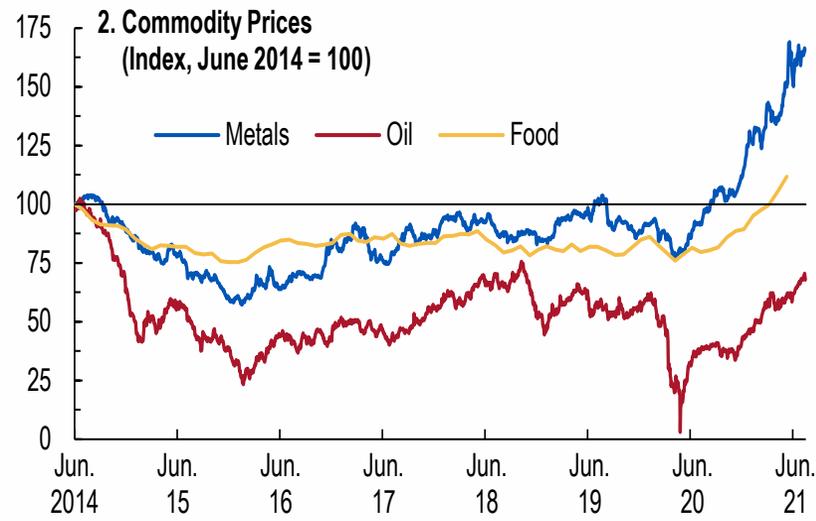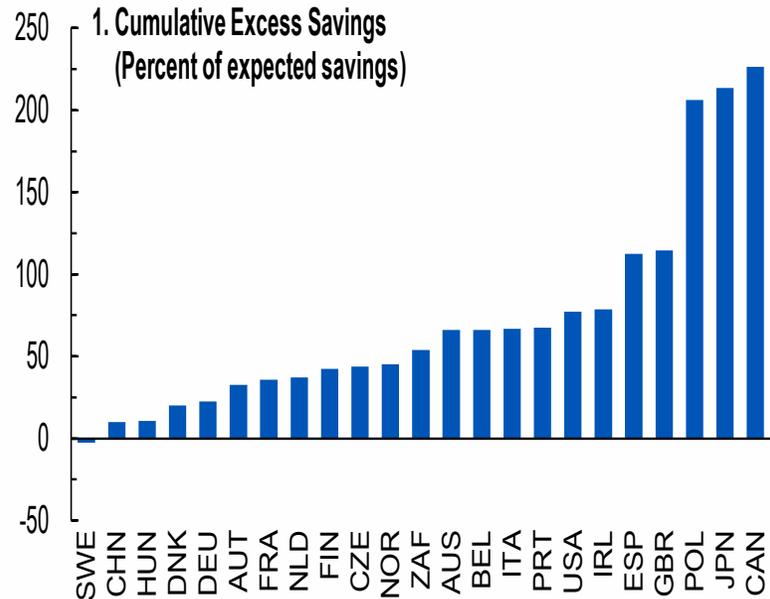
Sources: Haver Analytics; IMF, Primary Commodity Price System; Organisation for Economic Co-operation and Development; The Baltic Exchange; and IMF staff calculations.
Note: Cumulative excess savings are households savings from 2020:Q1–21:Q1 or the latest quarter available, in excess to expected savings based on a calculated linear trend from 2017:Q1–19:Q4 for each country. In panel 3, the composite emerging market economy data are from IHS Markit. Supply chain disruptions are calculated as the difference between the supply delivery times subindex in the purchasing managers' index (PMI) and a counterfactual, cyclical measure of supply delivery times based on the manufacturing output subindex in the PMI. Data labels use International Organization for Standardization (ISO) country codes.

- What combination of events could cause persistently faster price gains?
- Could de-anchoring of expectations result in a self-fulfilling inflationary spiral?

Considerable uncertainty on the inflation outlook

Food Staples Contribution to CPI Inflation; Median by Income
(Percentage points; percent on right scale)

- Staples contribution to CPI inflation
- Share of food in CPI (right scale)
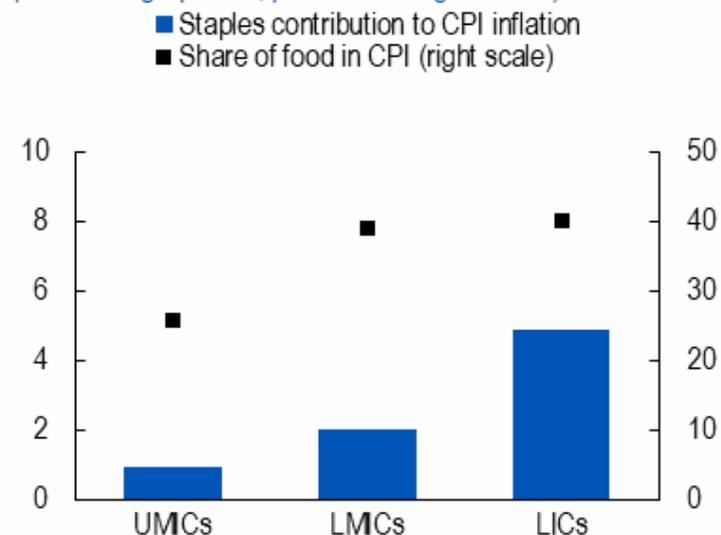
Sources: FAOSTAT New Food Balances; GIEWS FPMA Tool; IMF, *International Financial Statistics*; and IMF staff calculations.

Note: The staples included in the calculations are wheat, maize, rice, milk, poultry, sugar and cassava. The countries included in the dataset are those for which at least one staple price was available over the sample period. Missing prices are imputed from regional and income group averages. CPI = consumer price index; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries. The data are from 2020:Q1–2021:Q1.

Labor Demand
(Year-over-year percent change)

- Compensation per hour
- Hours per employee
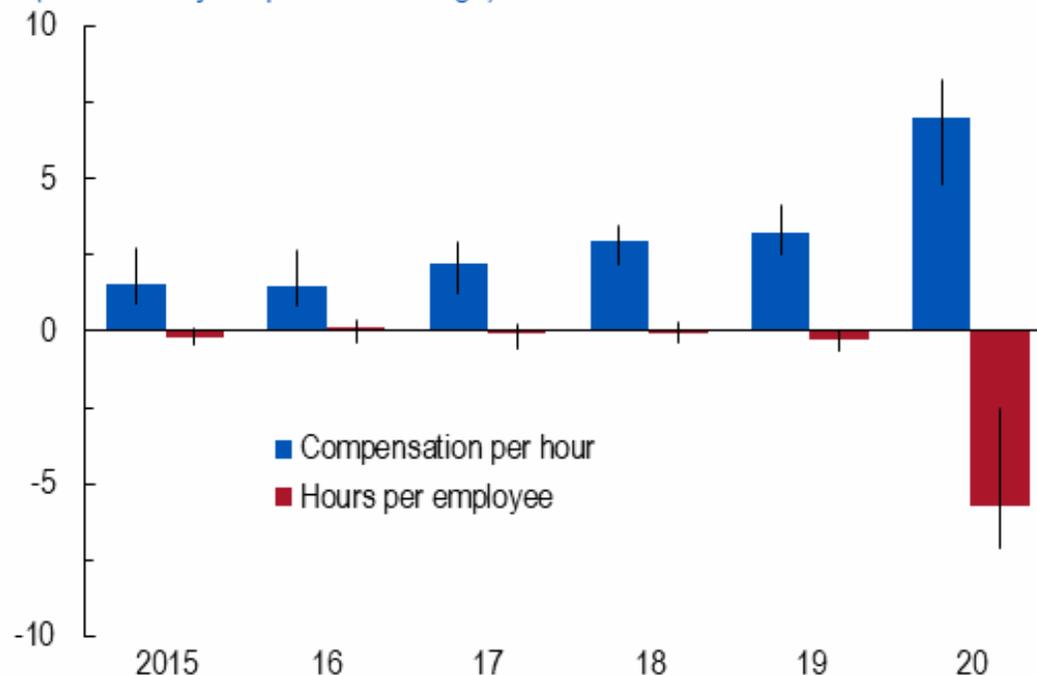
Sources: Eurostat; Haver Analytics; Organisation for Economic Co-operation and Development; and IMF staff calculations.

Note: The bars represent medians; vertical lines represent the interquatile ranges of corresponding variables across 24 advanced economies. See Online Annex 2.1 for further details.

Goal of the chapter: Assess the inflation outlook and evaluate risks

I. Examine drivers of inflation using Phillips curve framework that relates inflation to economic slack

II. Examines evolution of inflation expectations during and assess potential risk of de-anchoring during the recovery phase

III. Study sectoral and commodity price movements and their impact on headline inflation

- Forecast inflation, its balance of risks, and inflation expectations for the short and medium-term

Key takeaways

Baseline Inflation forecasts point to strong short-term dynamics

➤ Balance of risks tilted to the upside

I. Recovering demand to have only a small impact on future inflation

➤ Output gap uncertainties remain

II. Inflation expectations have stayed relatively anchored so far

III. Sectoral price dynamics so far suggest moderate risks to outlook

Relating economic slack to inflation

Evidence from the Phillips Curve

- A key element of central banks' policy frameworks – the trade-off between low slack and high inflation

- Estimated for 31 AEs and 18 EMDEs:

$$\pi_{i,t} = \beta_1 \pi_{i,t}^e + \beta_2 \pi_{i,t-1} + \beta_3 y_{i,t}^{dom} + \beta_4 y_{i,t}^{for} + \beta_5 z_{i,t} + FE + \varepsilon_{i,t}$$

- The statistical relationship between unemployment (or output gap) and inflation holds in saturated empirical specification

  - A 1-percentage-point widening of the unemployment gap— that is, unemployment higher than the natural rate of unemployment—is associated with a decline in core inflation of 0.22 percentage point, on average

  - Unprecedented pandemic disturbances do not seem to have altered the Phillips curve relationship for AEs. Estimates for EMDEs more sensitive to the inclusion of pandemic period.

- Mixed evidence on nonlinear effects at different levels of slack

Unemployment Gap–Inflation Phillips Correlation
(Percentage points)
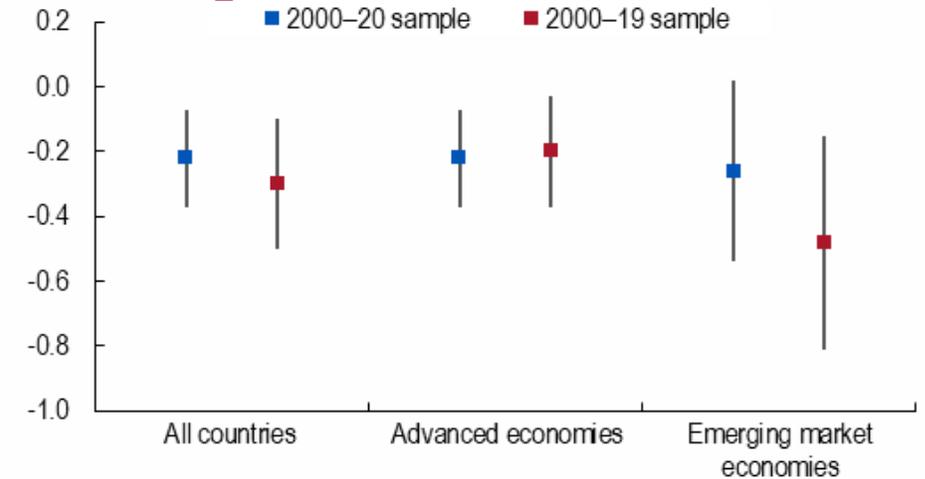
Sources: Haver Analytics; and IMF staff calculations.
Note: The squares present the coefficient estimates of the unemployment gap–inflation Phillips correlation. The vertical bars represent the 90 percent confidence intervals. See Online Annex 2.1 for further details.

Recoveries induce small and short-lived inflation impulse

Slack-Induced Inflation Dynamics from Structural Phillips Curve in Advanced Economies
(Percentage points)

Legend: ■ PPP-weighted mean estimate

Values: 2021: 0.23; 22: 0.14; 23: 0.05; 24: -0.01; 25: -0.01; 26: -0.02
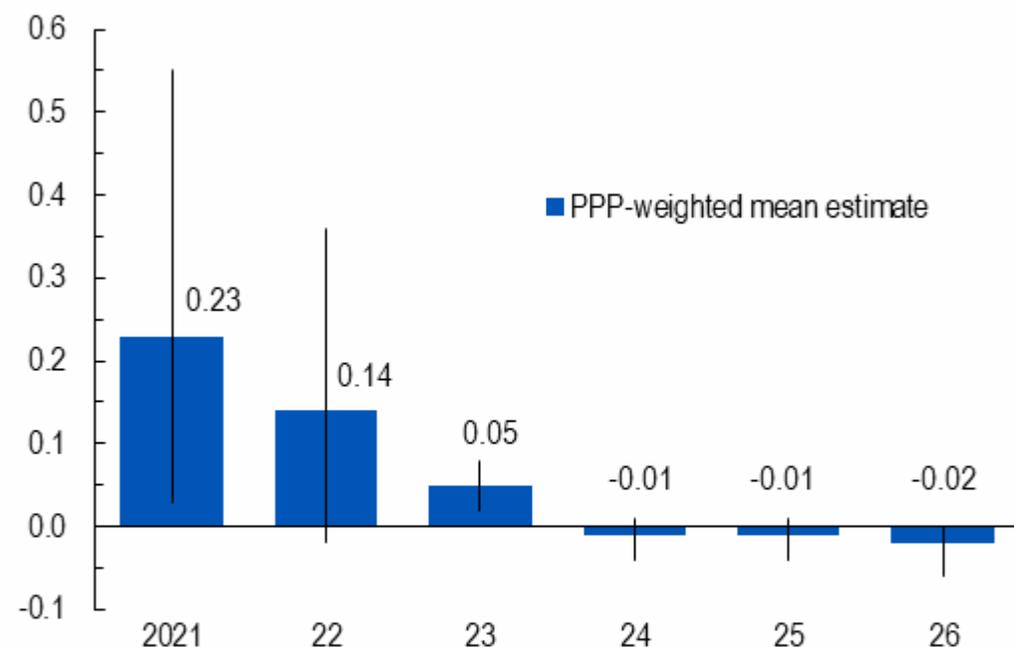
Sources: Haver Analytics; and IMF staff calculations
Note: The bars represent the inflation impulse from changes in the unemployment gap based on the October 2021 *World Economic Outlook* vintage and the structural Phillips curve estimation described in the chapter. The vertical lines represent the interquartile ranges. PPP = purchasing power parity.

- Phillips Curve relationship is used to back out the contribution of the projected closing of the unemployment gap in AEs on inflation dynamics for the next six years

- A moderately positive inflation impulse in each of 2021 and 2022, respectively. Impact softens in 2023 and 2024 before turning into a negligible disinflation impulse in 2026

- Aggregate figures mask significant degree of heterogeneity, with U.S. and its extraordinary policy support driving short-term inflation dynamics

- Results for EMs show a stronger impulse toward inflation as a result of recovering labor markets, but moderate contributions through the forecast horizon

Anchoring of inflation expectations

Historical episodes of inflation acceleration

- Identify "inflation accelerations or scares"
- 55 episodes identified
  - ► Associated with large exchange rate depreciations
  - ► Preceded by upsurge in fiscal and CA deficits in EMs
  - ► More persistent episodes associated with a steeper rise in three-year-ahead inflation expectations

- Case studies on high inflation episodes
  - ► Brazil, Chile, India, and the United States
  - ► Persistent "inflation scares" lead to higher expectations

Inflation Episodes
(Percentage points)

■ All ■ Advanced economies ■ Emerging market economies

NEER (Percent change)

Current account (Percent of GDP)

Fiscal balance (Percent of GDP)

Three-year-ahead inflation expectations (Percentage points)
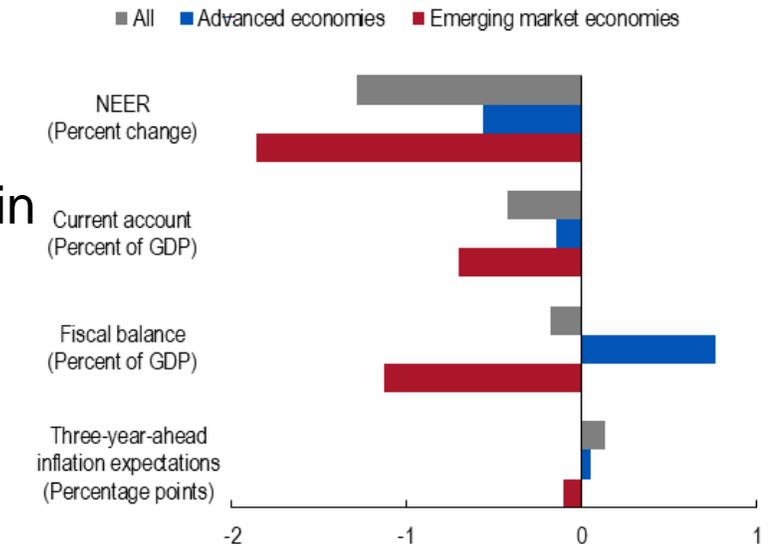
Sources: Bloomberg Finance L.P.; Consensus Economics; Haver Analytics; and IMF staff calculations.
Note: The chart presents the difference in the three-quarter averages just prior to the start of an inflation acceleration episode (from $t-3$ to $t-1$) compared with the previous six-quarter averages ($t-9$ to $t-4$). NEER = nominal effective exchange rate.

Historical evolution of inflation expectations' anchoring
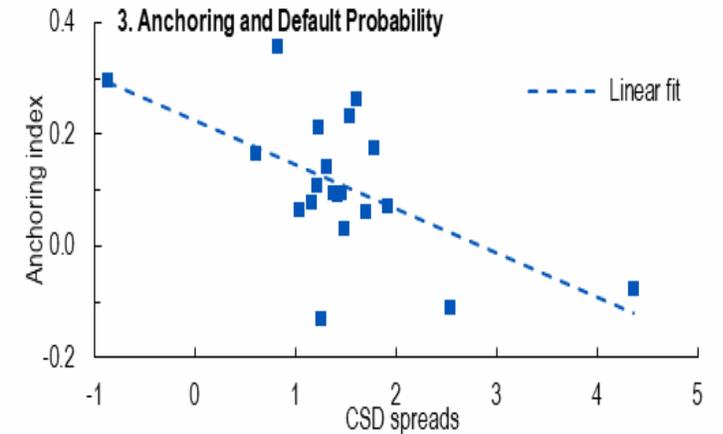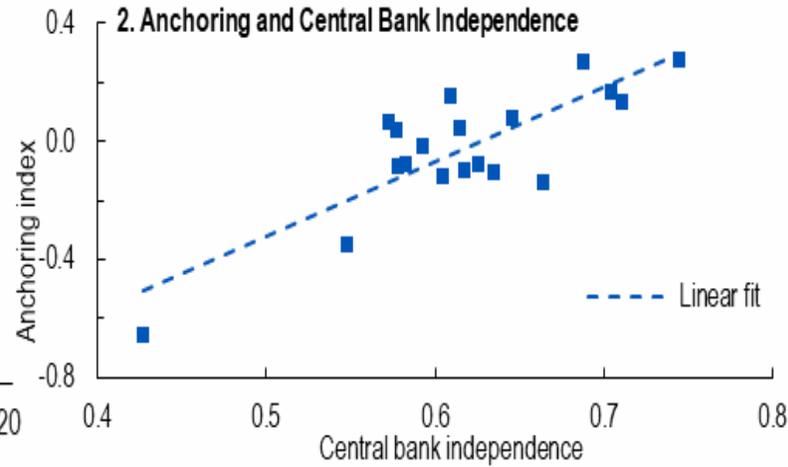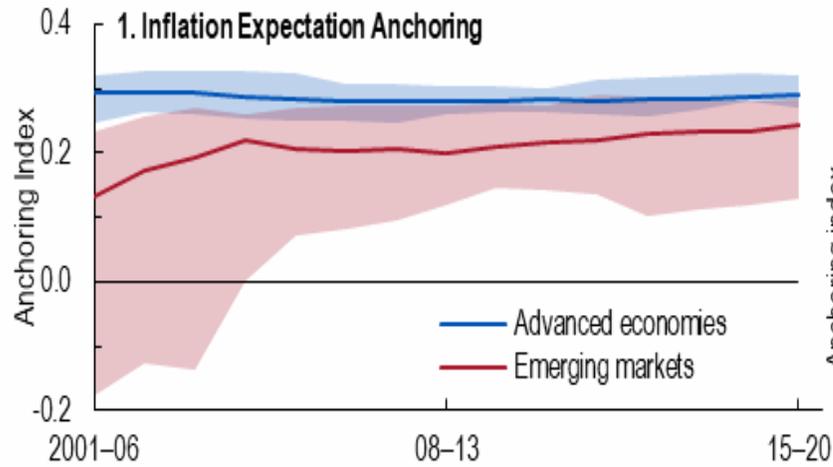
Market-based inflation expectations – historical impact of oil price shocks and pandemic period

- **Long-term expectations measure:** Forward inflation compensation: the 5 year 5-year forward break-even rate

- Local projections: $\Delta\pi^{e,LT}_{i,t+h} = \alpha^h_i + \tau^h_{month} + \sum^P_{p=0}\Delta\pi^{e,LT}_{i,t-p} + \sum^P_{p=0}\beta^h_p Oil_{t-p} + \sum^P_{p=0}\delta^h_p NEER_{i,t-p} + \sum^P_{p=1}\rho^h_p VIX_{i,t-p} + \varepsilon_{i,t+h}$

- Sample of 14 countries

- Inflation surprises proxied by oil price shocks

- Results indicate a small effect of oil price shocks

- No significant change in the relationship during pandemic

- No evidence of de-anchoring in response to the exceptionally large policy responses to the pandemic

Response of Five-Year, Five-Year Forward Breakeven Inflation to Oil Price Shocks
(Basis points)
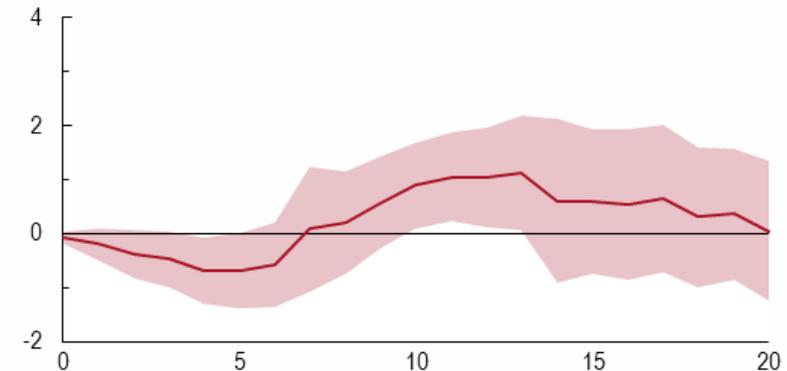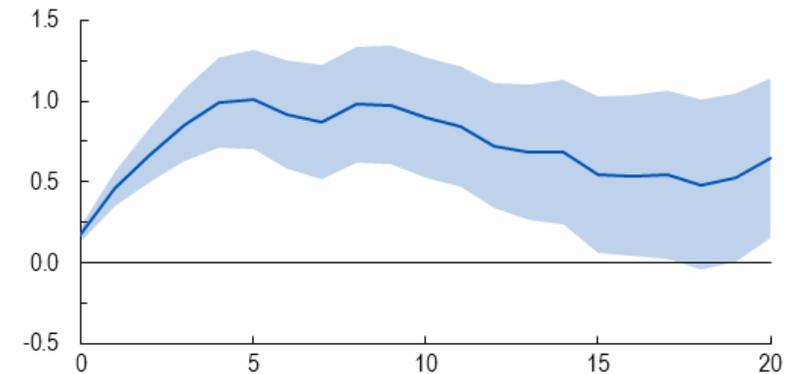
Sources: Bloomberg Finance L.P.; and IMF staff calculations.
Note: The solid lines represent the estimated response; shaded areas represent 95 percent confidence intervals. The x-axis indicates the number of days after the shock starts.

Sectoral inflation dynamics

Sectoral inflation dynamics in a historical perspective

Sectoral Inflation Dynamics
(Index, unless noted otherwise)

1. Sectoral Inflation Dispersion (Index)

2. Sectoral Inflation (Year-over-year percent change)
— Food — Housing — Transport — Others
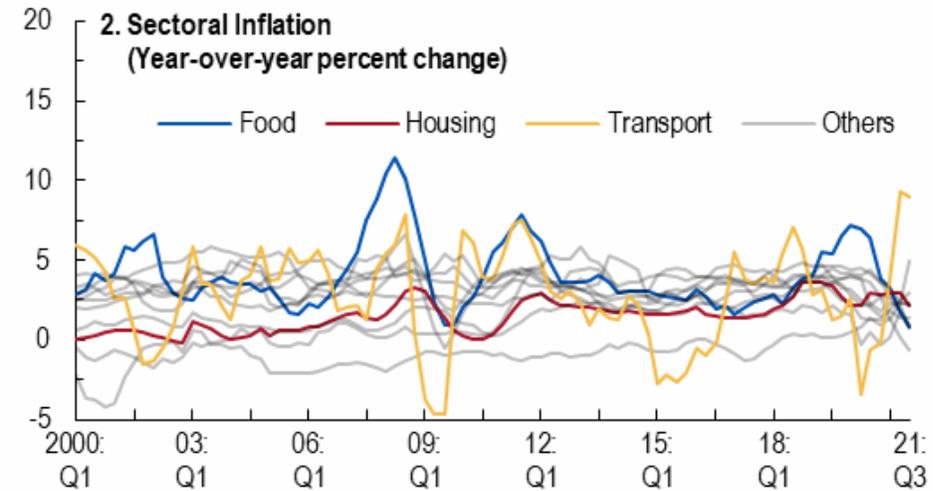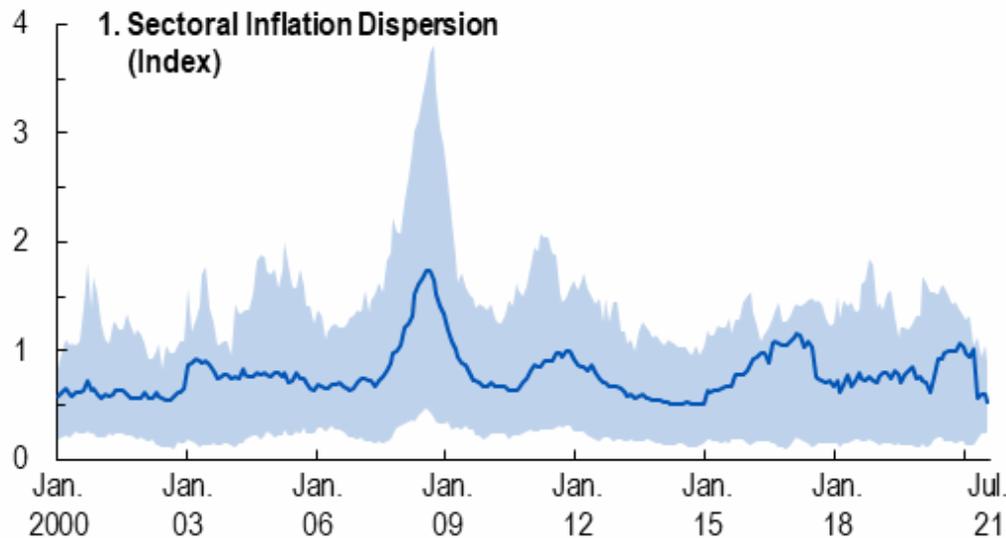
Sources: Haver Analytics; IMF, CPI database; and IMF staff calculations.
Note: In panel 1, the solid line represents the cross-country mean of sectoral inflation dispersion; shaded area represents the 10th–90th percentile range. The sectoral inflation dispersion is calculated as the standard deviation of sectoral inflation weighted by consumption shares. Panel 2 presents averages weighted by country's purchasing-power-parity GDP.

Inflation outlook: baseline scenario

- Headline inflation expected to revert to pre-pandemic levels by mid-2022

- Risks tilted to the upside over the medium term

- Long-term inflation expectations present a relatively strong degree of anchoring

Headline Inflation and Inflation Expectation Baseline Outlook
(Percent)
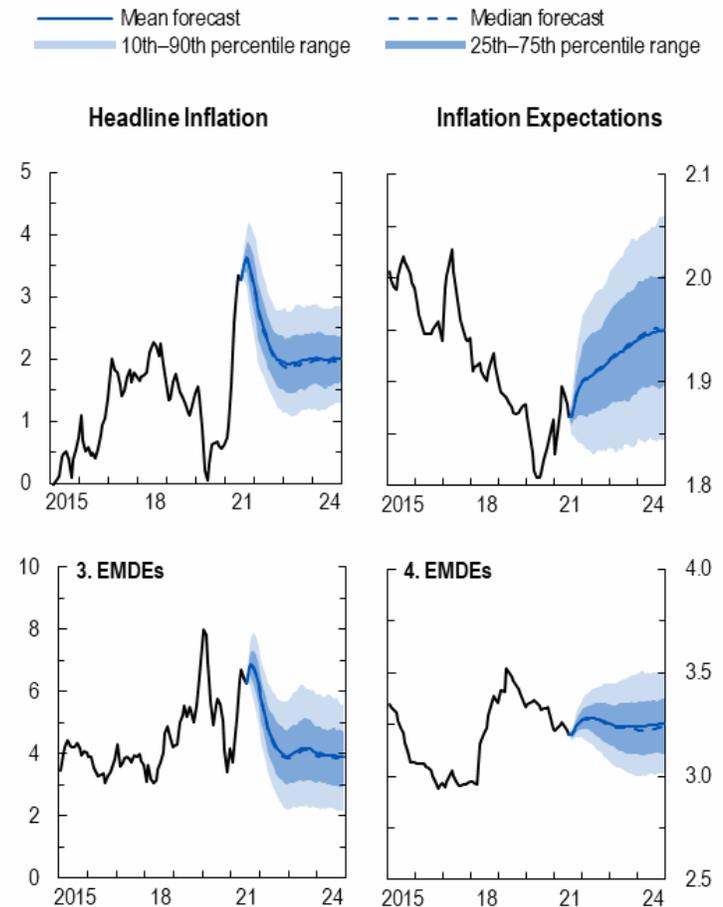
Source: Consensus Economics; Haver Analytics; IMF, CPI database; and IMF staff estimates.
Note: Lines are averages weighted by countries' purchasing-power-parity GDP. Central tendencies for headline inflations are adjusted to ensure consistency with mean World Economic Outlook inflation forecasts. AEs = advanced economies; EMDEs = emerging market and developing economies. See Online Annex 2.1 for further details about the list of countries included in the samples.

Inflation risk scenarios: adverse sectoral and commodity price shocks

➢ Headline inflation would increase significantly

  ➢ Peaking at 4.4 percent, on average, in AEs by mid-2022 and 8.4 percent in EMs by early 2022

  ➢ Broadly balanced risks over the medium term

➢ Yet inflation expectations strongly anchored in AEs

➢ Overshooting of expectations in EMDEs

  ➢ in the short-term

Headline Inflation and Inflation Expectation Outlook with Adverse Sectoral and Commodity Price Shocks
(Percent)
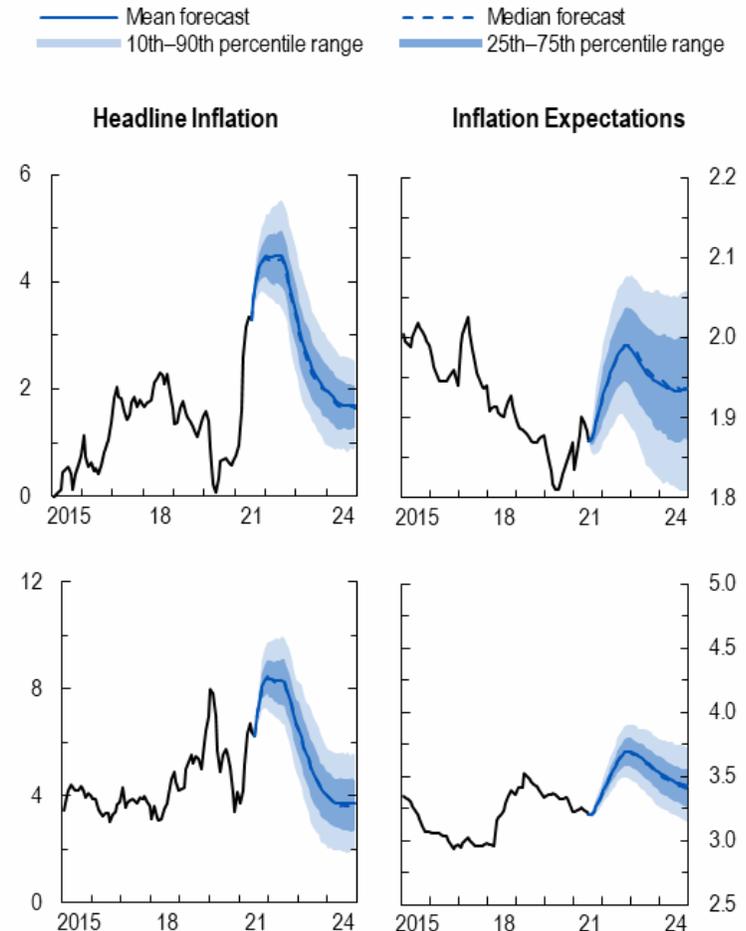
Mean forecast — — — Median forecast
10th–90th percentile range   25th–75th percentile range

Headline Inflation   Inflation Expectations

Source: Consensus Economics; Haver Analytics; IMF, CPI database; and IMF staff estimates.
Note: The lines are averages weighted by countries' purchasing-power-parity GDP. Sectoral dispersion and commodity price shocks are assumed to be drawn from the top 75 percent of the predictive distributions for 12 consecutive months from July 2021 to June 2022. AEs = advanced economies; EMDEs = emerging market and developing economies. See Online Annex 2.1 for further details about the list of

Inflation risk scenarios: an additional de-anchoring shock:

- *Tail-risk scenario with de-anchoring expectations:* Inflation expectations to become adaptive for a period of 12 months (no longer forward-looking but rather react to incoming data)

➤ Serious implications: Inflation increases substantially in this extreme scenario and becomes more persistent and volatile

Headline Inflation with Adverse Sectoral and Commodity Price Shocks and Adaptive Expectations Shock
(Percent)
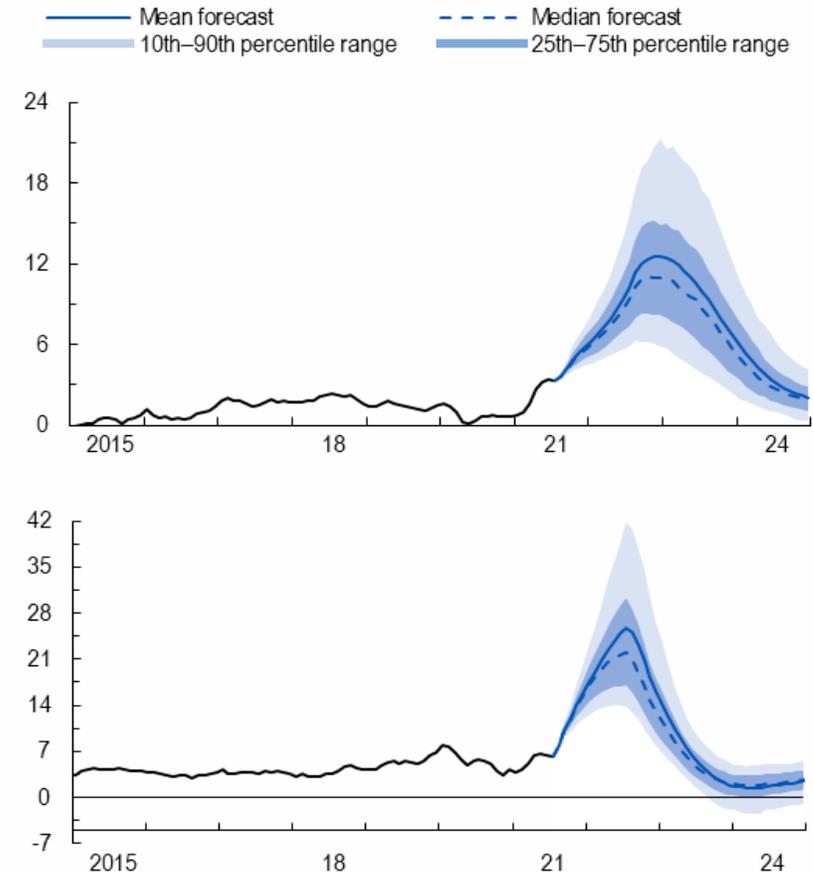
— Mean forecast	- - - Median forecast
10th–90th percentile range	25th–75th percentile range

Source: Consensus Economics; Haver Analytics; IMF, CPI database; and IMF staff estimates.
Note: The lines are averages weighted by countries' purchasing-power-parity GDP. Adaptive expectations assume that inflation is driven by one-year-ahead inflation expectations instead of the conventional three-year-ahead horizon for 12 consecutive months from July 2021 to June 2022. See Online Annex 2.1 for further details about the list of countries included in the samples.

Main findings

- **A significant relationship between slack and inflation remains**

- **Inflation expectations have remained relatively anchored**

- **Sectoral price dynamics suggest moderate risks to the inflation outlook**

  - Sectoral price dispersion during the pandemic not exceptional by historical standards

- **Inflation forecasts show a sharp rise in inflation in the near term**

  - Continued sectoral and commodity price shocks would push-up headline inflation

  - However, even extreme sectoral disruptions have only short-lived effects on the inflation outlook

Policy implications

- Central banks to walk a tightrope

- Clear and state-contingent forward guidance and communication (with well-articulated triggers for action) are key

- Maintaining strong fiscal credibility is important for inflation anchoring.

- Uncertainty about medium-term output gaps remains high

World Economic Outlook
October 2021

THANK YOU!

Long-run inflation expectations remain anchored
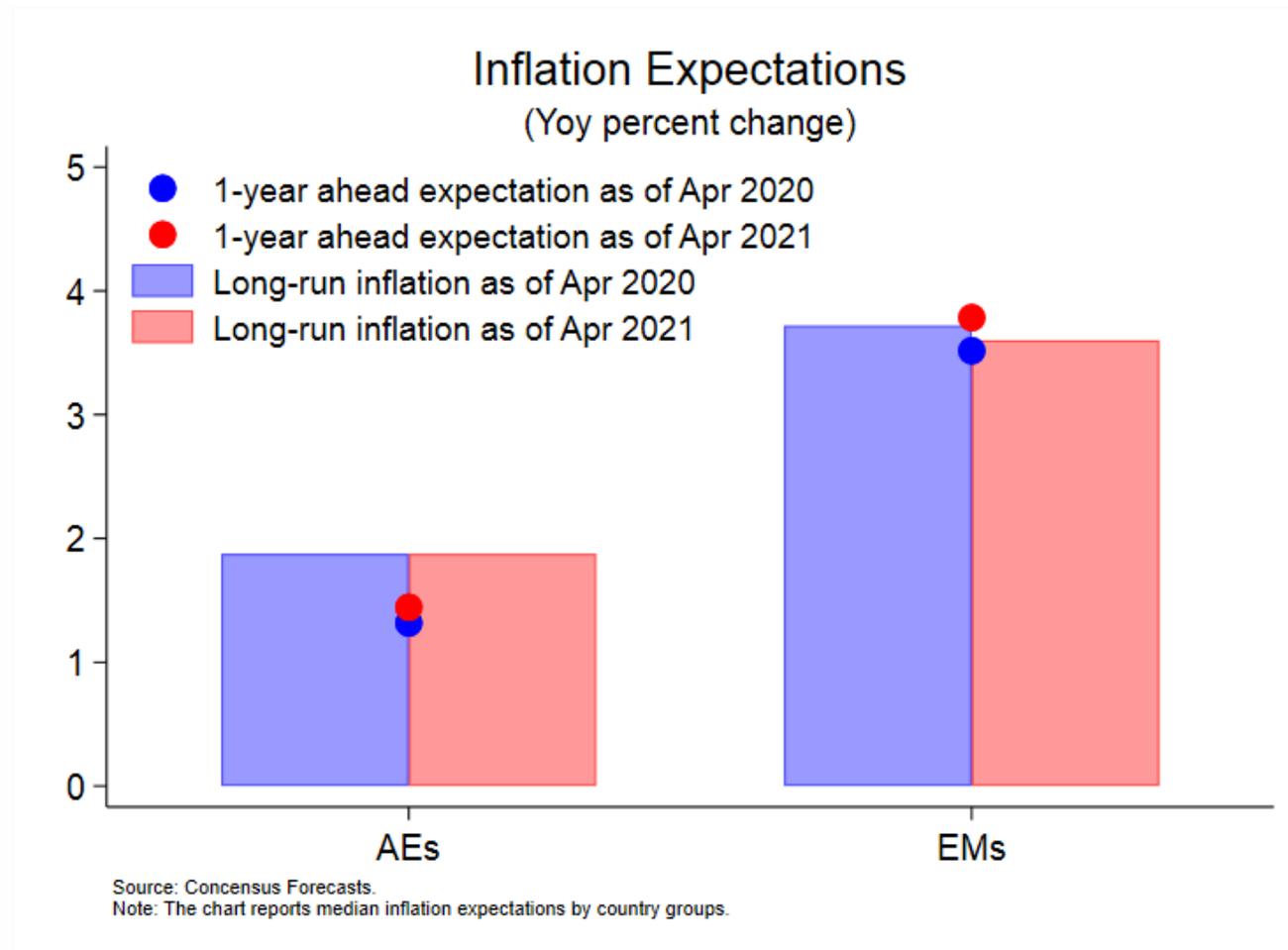
A causal Phillips curve estimation...

- Although reduced form Phillipe curve results are based on a model that includes country- specific indicators and several controls, they could still be confounded by omitted variables and reverse causality

- Potential bias (McLeay and Tenreyro 2020)
  - Optimal monetary policy causes bias towards zero
  - Mismeasurement of potential output
  - Cost-push shocks affect reduced-form PC correlation

- Instrument for unemployment using monetary policy shocks in TSLS

  - E.g. narrative-based monetary policy shocks for US and UK (Barnichon and Mesters 2021)
  - No need for unobserved potential/NAIRU

- Identify monetary policy shocks using treatment effects approach

  - Changes in short-term interest rates
  - Policy propensity score weighting (Angrist, Jordà and Kuersteiner 2018)
  - Extend to 30 advanced economies

...confirms the relevance of the inflation-activity trade-off

Response of Unemployment and Core Inflation to Monetary Policy Tightening
(Percentage points)

1. Unemployment Rate

2. Core Inflation
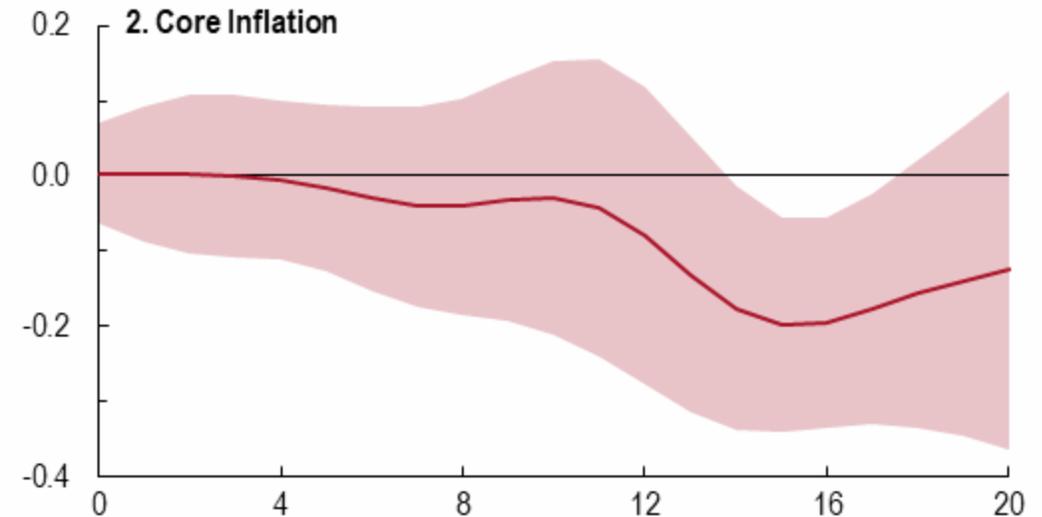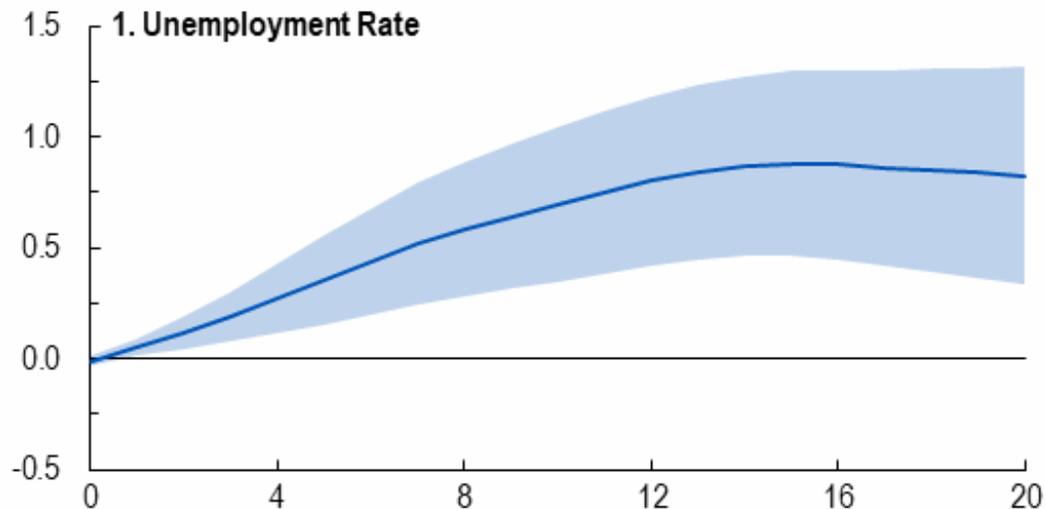
Source: IMF staff calculations.
Note: The solid lines represent the smooth local projection and shaded areas represent 90 percent confidence intervals. The x-axis indicates the number of quarters after the monetary tightening starts.

- Phillips curve slope of -0.22 for AEs, consistent with the reduced form estimation