Headline inflation is dropping but so far limited changes in core

**EU27: Inflation Dynamics**
(percent contribution and y/y change)

Legend:
- Core Services
- Core Durables
- Energy
- Food
- HICP Inflation
- Core Inflation
- PPI, Industry (RHS)

Core: 2021-23 avg.

Core: Pre-pandemic avg.
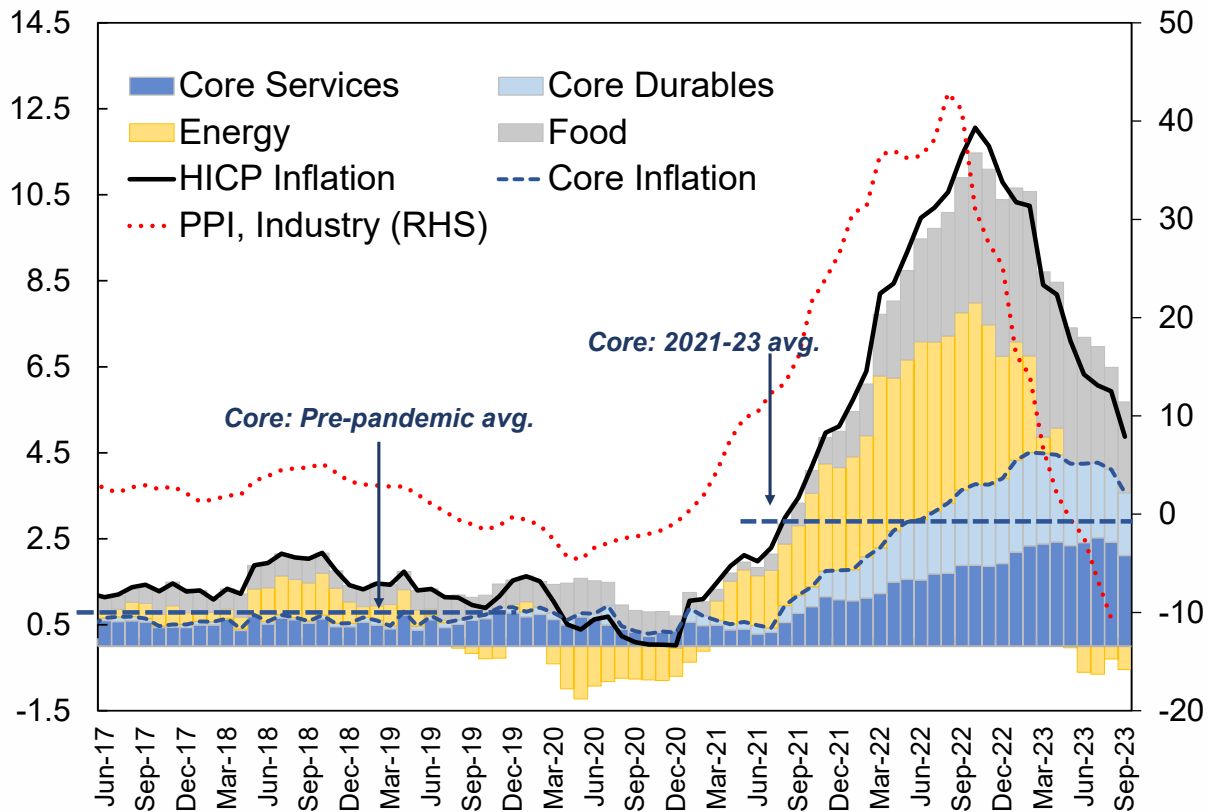
Sources: Eurostat, Haver Analytics and IMF staff calculations.
Note: Constant weights are used to compute the contribution to headline inflation.

Non-energy Goods and Services Inflation
(Percent change, year over year)

Legend:
- EA Services
- EE Services
- EA Goods
- EE Goods
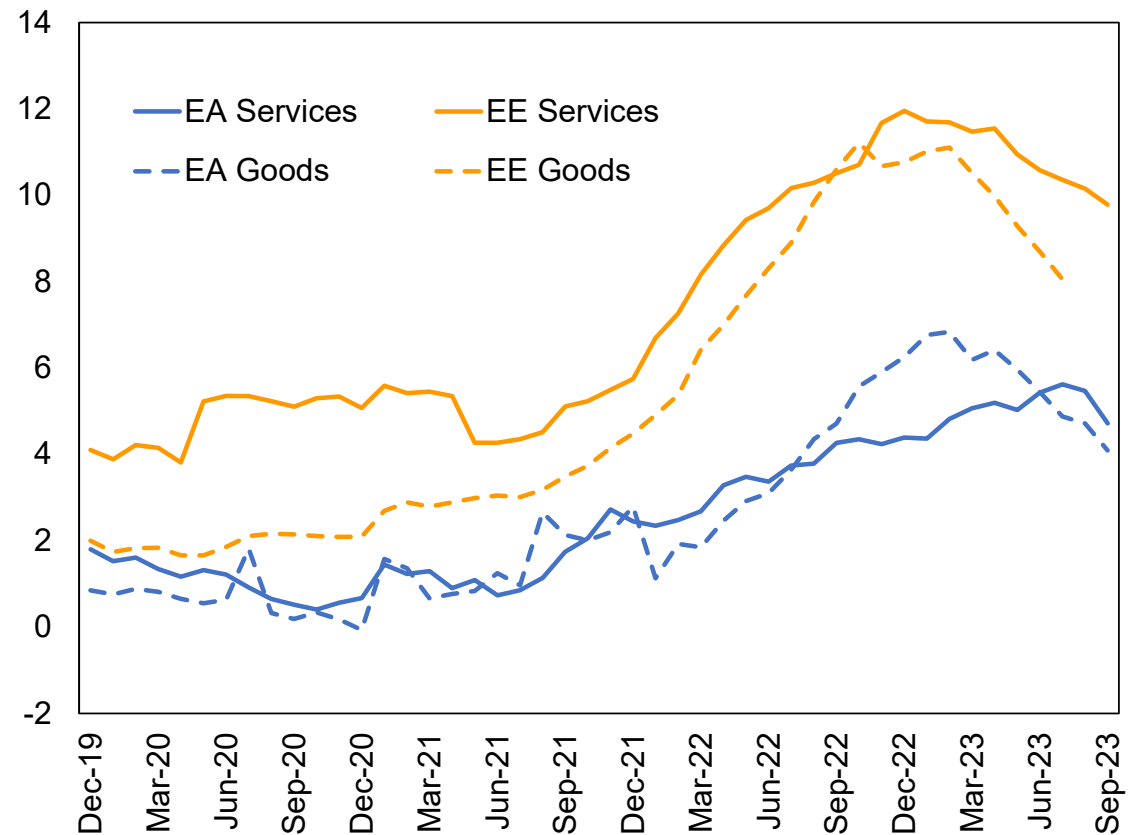
Sources: European Commission and IMF staff calculations.
Note: EA= Euro Area, EE = Emerging Market Europe; EE excludes Russia, Turkey and Ukraine.

Core inflation persistence implies headline above target until 2025

Year	CPI Inflation (average of the year)					
	2023		2024		2025	
WEO vintages	WEO Oct	Diff. since Jul. 2023	WEO Oct	Diff. since Jul. 2023	WEO Oct	Diff. since Jul. 2023
Europe	10.4	0.7	9.3	2.8	7.2	2.1
Advanced European Economies	5.8	0.2	3.3	0.3	2.2	0.1
Euro area	5.6	0.4	3.3	0.5	2.2	0.1
Emerging Market European Economies	20.4	1.6	22.3	7.9	17.9	6.3
Emerging Market Europan Economies excl. Belarus, Russia, Turkey, and Ukraine	11.9	0.0	5.8	0.3	4.0	0.1

Core Inflation
(percent, y/y)
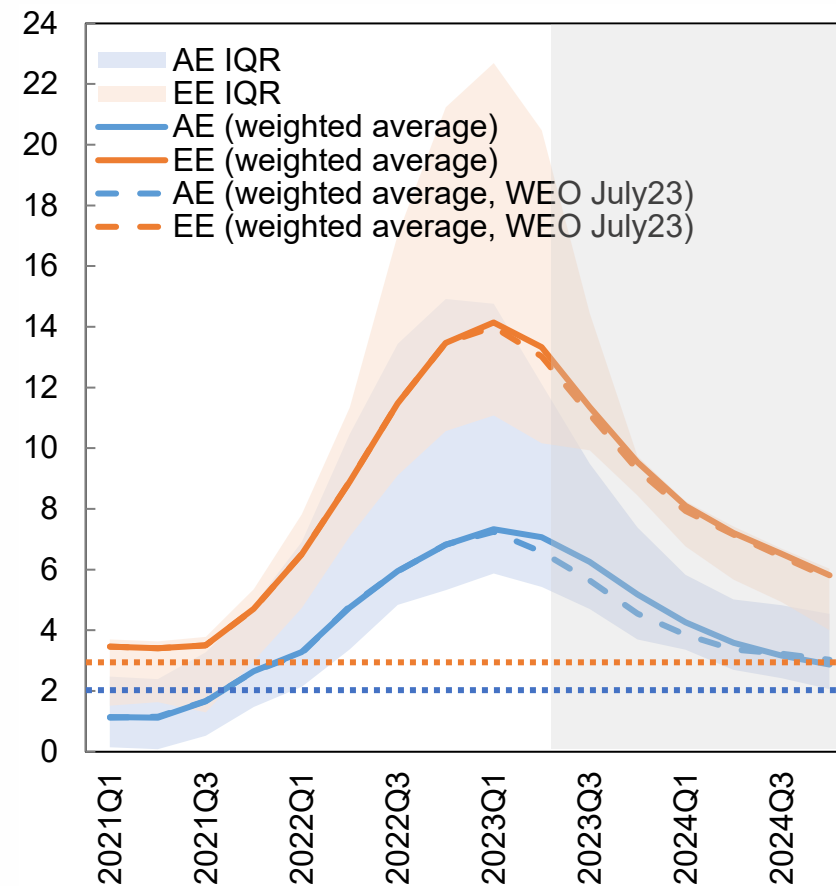
Sources: IMF, *World Economic Outlook*; and IMF staff calculations.
Note: In the right panel, dotted orange and blue line in inflation panel indicates the median central bank target for EE and AE, respectively. IQR is interquartile range.

Labor Markets, Wages, and Inflation

Continued labor market tightness could add to price pressures

Demand for Workers: Labor Market Tightness
(Index of vacancy to unemployment ratio, 2019Q4 = 100)
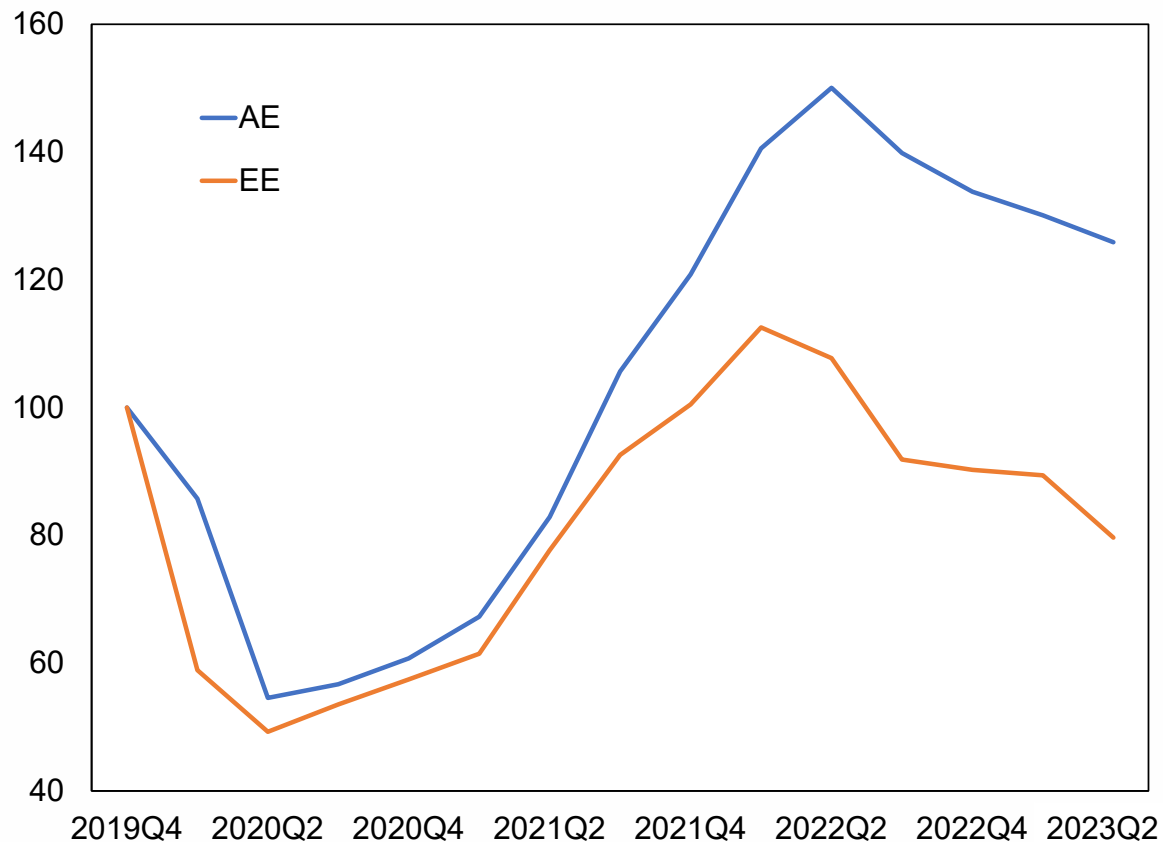
Labor Supply: Employment and Hours Worked
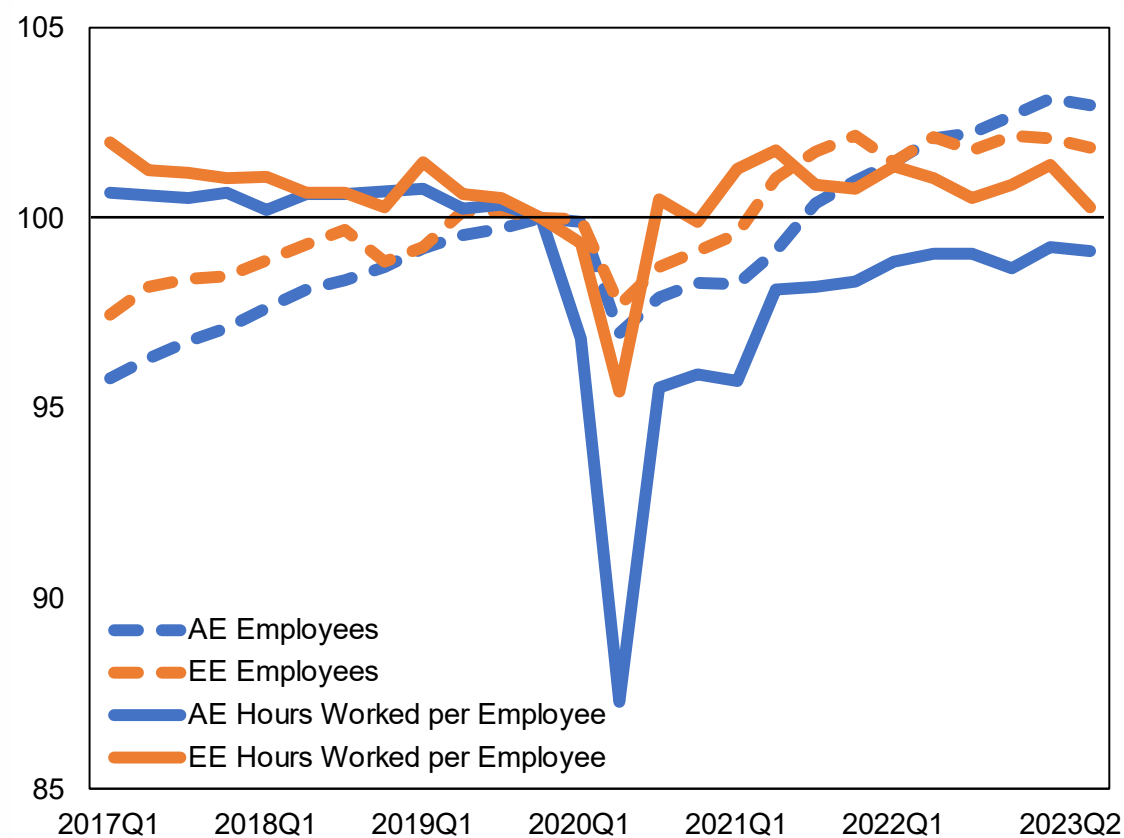(Index of employment and average hours, 2019Q4 = 100)

Sources: Haver Analytics and IMF staff calculations.
Note: AE= Advanced Europe, EE= Emerging Market Europe. AE excludes ISL, ISR, ITA, and SMR. EE includes BGR, HUN, MKD, POL, and ROU due to data constraints.
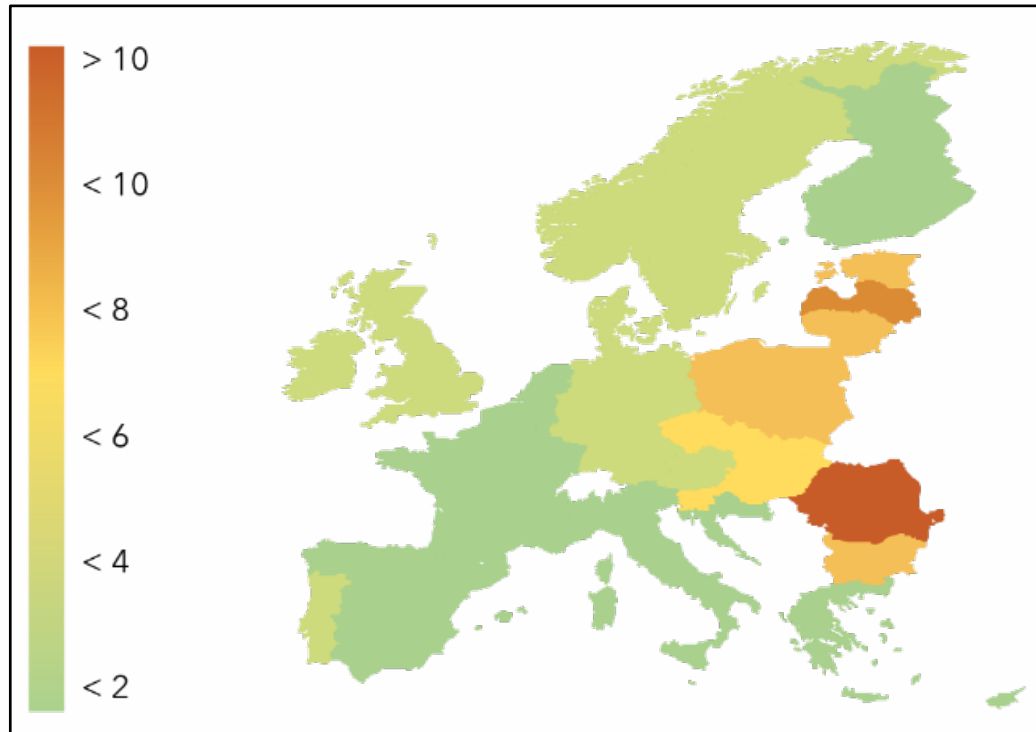
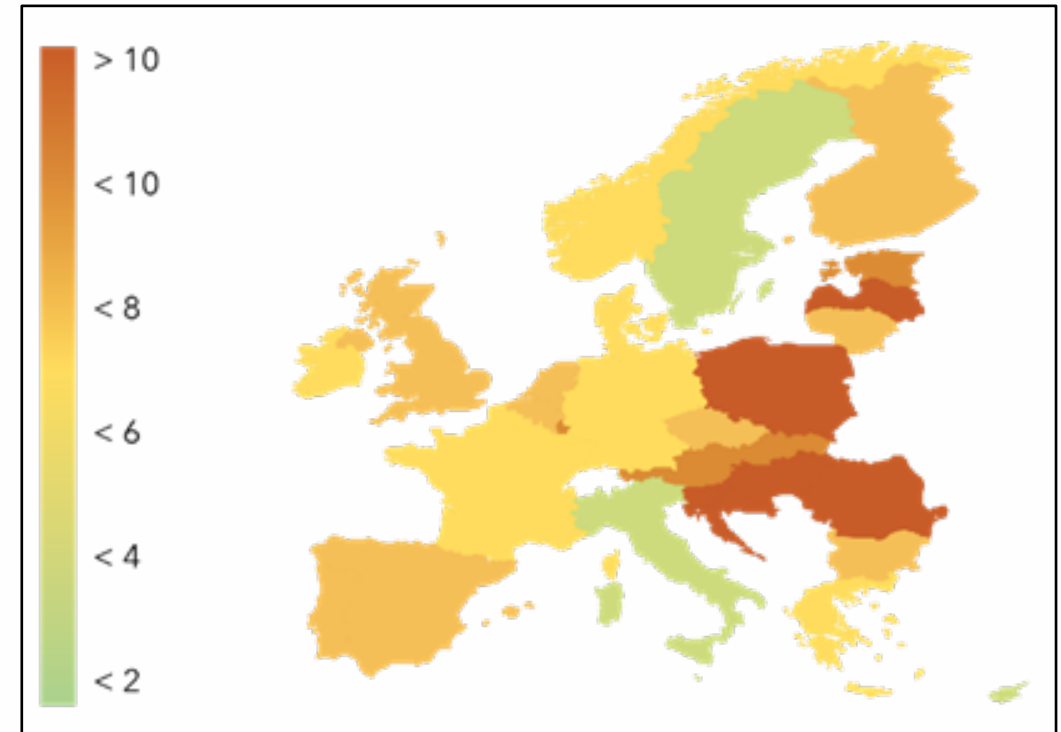Sources: Haver Analytics and IMF staff calculations.
Note: AE= Advanced Europe, EE= Emerging Market Europe. AE excludes ISR, SMR, and CHE. EE includes BGR, HUN, POL, and ROU.

Wage growth has started to accelerate...

Nominal Wage Growth, 2015-19 average
(Percent, year-over-year)

Nominal Wage Growth, 2023Q2
(Percent, year-over-year)

Sources: Haver Analytics and IMF staff calculations.
Note: Nominal wage is calculated as compensation per hour.

- As of mid-2023, real wage levels:

  - Almost recovered in CESEE (avg. 2%)
  - Still notable in AE (avg. 4½%)
  - But important heterogeneity
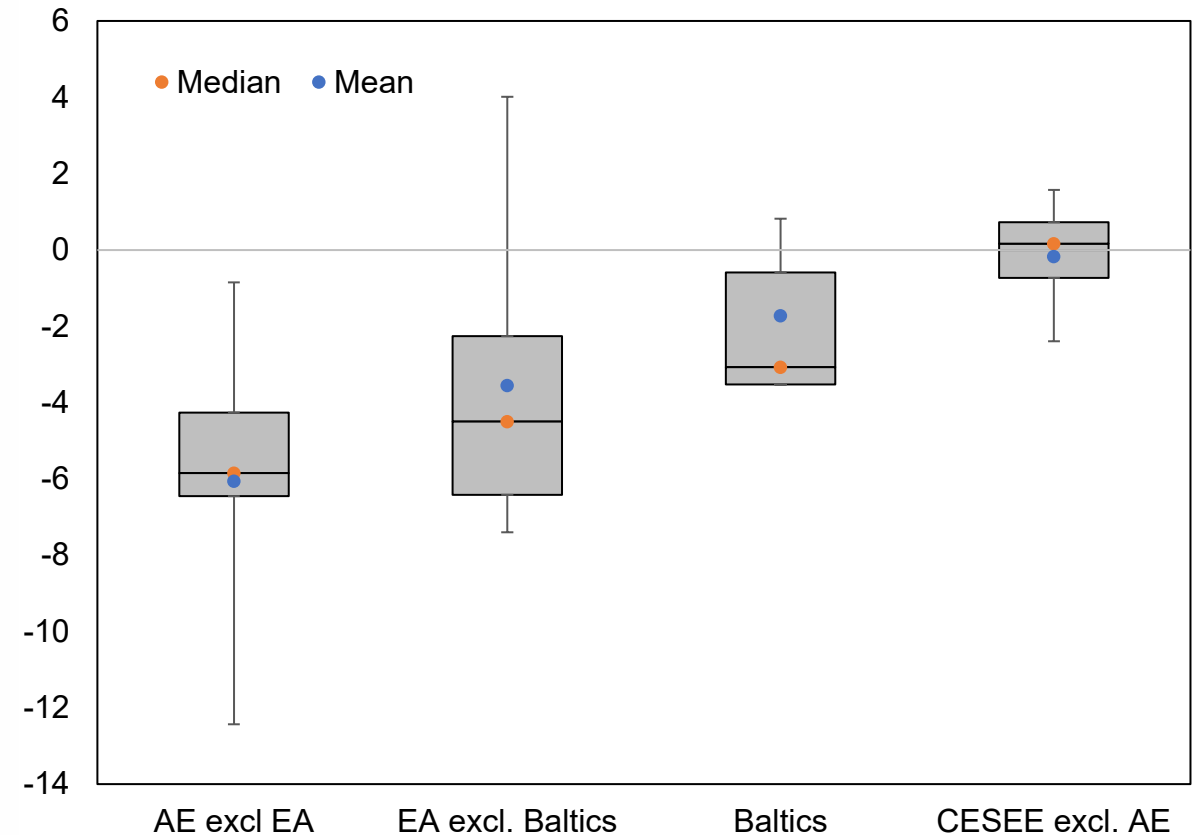
- Estimates based on country-by-country

- Real wage gap estimation ($\epsilon_{i,t}$):

$$\log w_{i,t}/p_{i,t} = \gamma_1 + \gamma_2 \log g_{i,t} + \gamma_3 \tau_t + \epsilon_{i,t}$$

- Data start from 2000Q1 or later for CESEE

Real Wage Gap 2023Q2
(Percent deviation of real wage from long-term trend)

Sources: Eurostat, Haver Analytics, and IMF staff calculations.
Note: The productivity adjusted real wage gaps are estimated by relating wages to labor productivity around a time trend, based on country-by-country regressions. AE excl. EA includes CZE, DNK, FIN, GBR, NOR, SWE. EA excl. Baltics includes AUT, CYP, DEU, ESP, FRA, GRC, HRV, IRL, ITA, MLT, NLD, PRT, SVN. Baltics includes EST, LVA, LTU. CESEE excl. AE includes BGR, HUN, POL, ROU.

Wage Phillips Curve Panel Estimation Results

	(1) CESEE	(2) CESEE	(3) AE
Lagged wage inflation (Sum of coefficients)	0.357* (0.153)	0.394* (0.173)	0.302*** (0.106)
Inflation expectations	0.643*** (0.153)	0.606*** (0.173)	0.698*** (0.106)
Wage catch-up	-0.503*** (0.115)	-0.573*** (0.146)	-0.234*** (0.057)
Unemployment gap	-1.600*** (0.371)	-1.850*** (0.421)	-0.998*** (0.246)
Labor productivity growth	0.757*** (0.054)	0.807*** (0.059)	0.370*** (0.066)
Imported price growth	0.125*** (0.029)	0.088*** (0.034)	0.017 (0.019)
Observations	905	762	1,337
Country FE	Yes	Yes	Yes
Coef. Const.	Yes	Yes	Yes
Sample Period	Full	Pre-Covid	Pre-Covid

Sources: IMF staff estimates.
Note: Unbalanced panel data for 11 CESEE and 15 AE (excl CESEE) countries. CESEE includes BGR CZE, EST, HRV, HUN, LTU, LVA, POL, ROU, SVK, SVN. "Full" sample is estimated with 1991Q1-2023Q2 data, and "pre-Covid" is estimated with 1991Q1-2020Q1 data. The sum of coefficients on lagged wage growth and expected inflation rates are constrained to be one. Standard errors, reported in parentheses, are corrected for heteroscedasticity and autocorrelations. *** p<0.01, ** p<0.05, * p<0.1.

Nominal Wage Growth in CESEE
(percentage points; qoq growth annualized)
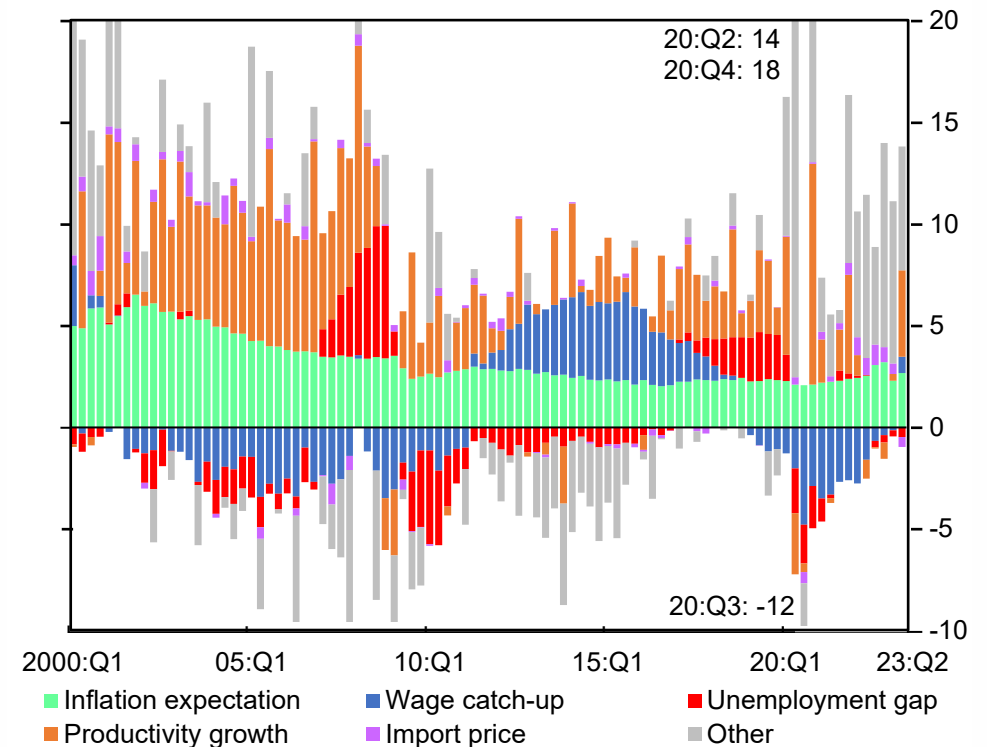
Sources: Consensus Economics, Haver Analytics, and IMF staff calculations.
Note: The bars represent cross-country average contributions based on country-by-country wage Phillips curve regressions.

...and pass-through to prices, which varies across countries.

- IPVAR estimation:

$$A(L)_{i,t} y_{i,t} = FE_i + \epsilon_{i,t}$$

with coefficients varying with country factors

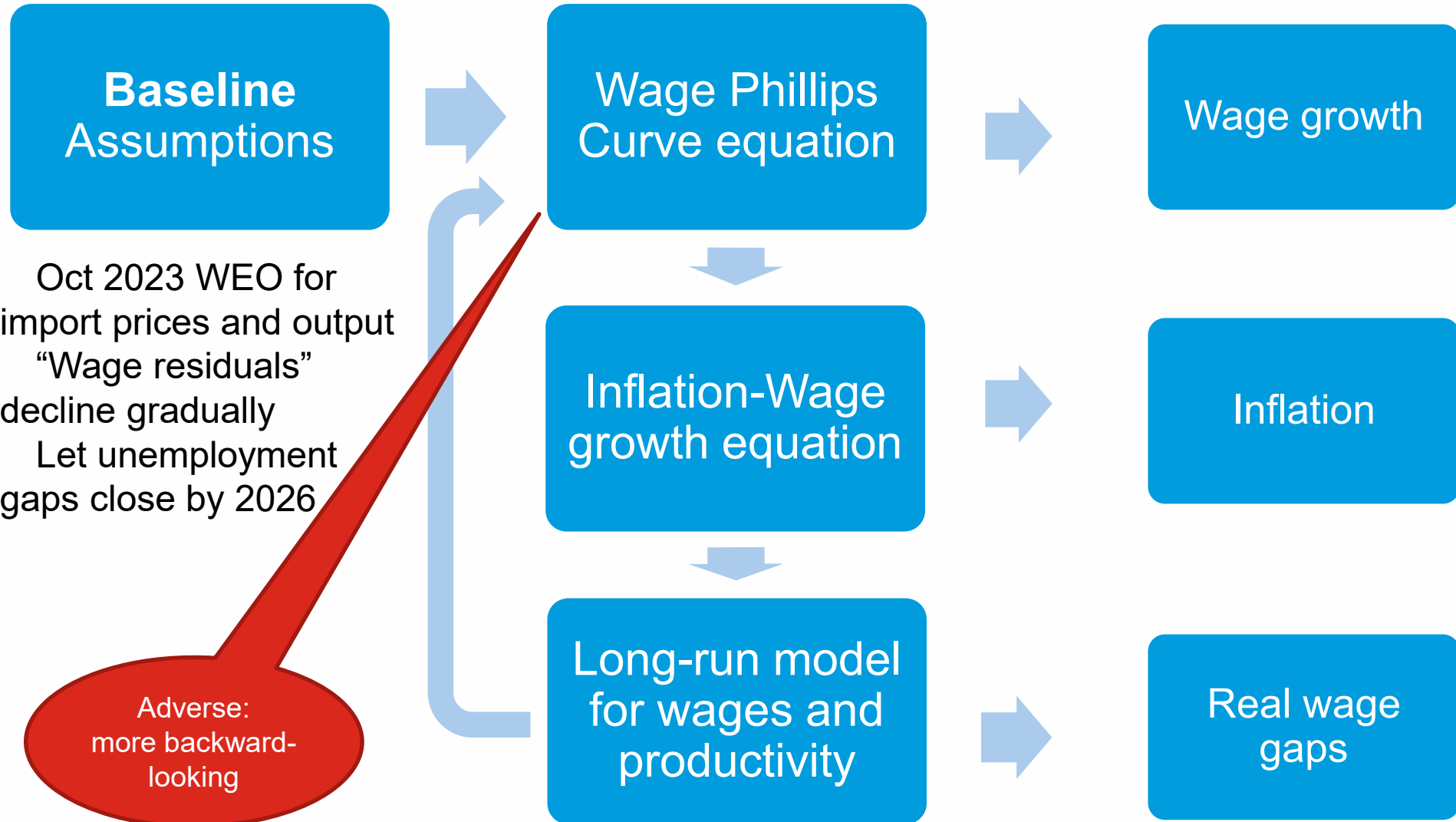$$\alpha_{l,it}^{jk} = \theta_{1,l}^{jk} + \theta_{2,l}^{jk} factor_{it}$$

- where $y_{i,t}$ includes (1) import price inflation, (2) nominal wage growth adjusted for trend productivity growth, (3) core inflation and (4) the unemployment gap

- Sample unbalanced panel of 29 countries from 1991Q1 through 2023Q1.

Passthrough of a Wage Shock to Inflation
(Percent, after 3 years)
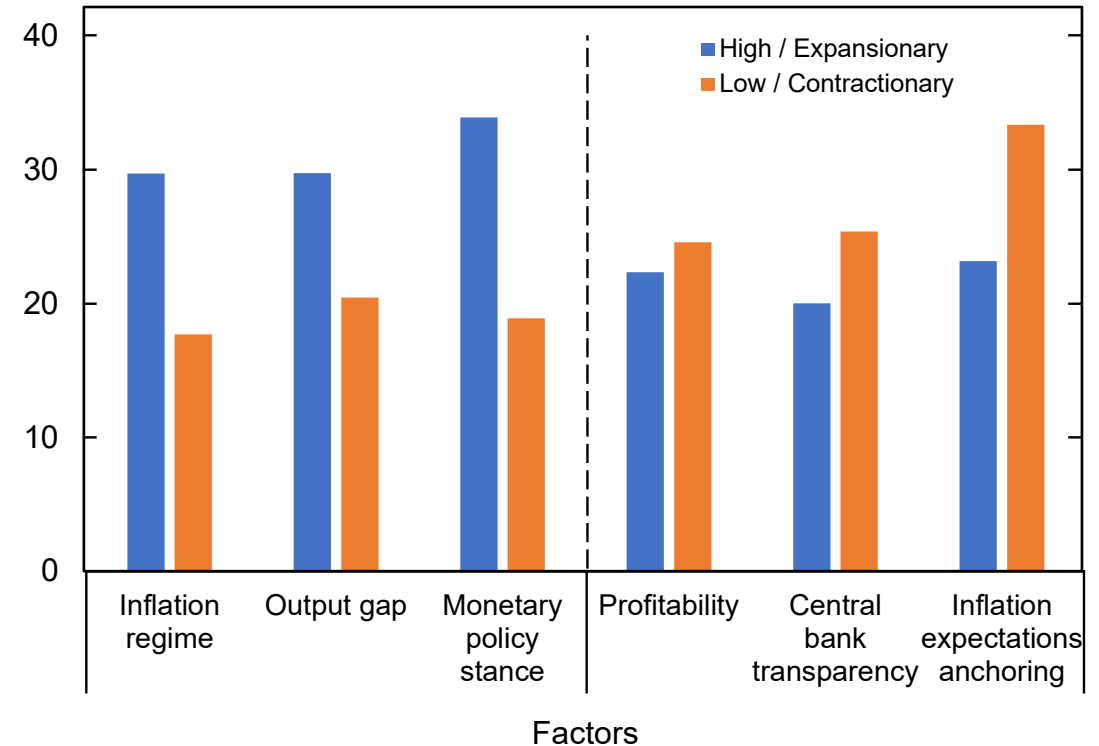
Notes: The following variables are used to define regimes: (1) inflation relative to country-specific average inflation (one quarter lagged); (2) output gaps (two quarter lagged); (3) changes in real interests (two quarter lagged); (4) profit per unit of output (two quarter lagged); (5) central bank transparency; and (6) inflation expectation anchoring. Values outside of cross-country inter-quartile ranges are used to define high/low regimes.

Top-down projection of wage growth and inflation

Baseline Assumptions

- Oct 2023 WEO for import prices and output
- "Wage residuals" decline gradually
- Let unemployment gaps close by 2026

Wage Phillips Curve equation → Wage growth

Inflation-Wage growth equation → Inflation

Long-run model for wages and productivity → Real wage gaps

Adverse: fix u* pre-Covid = less slack

Adverse: more backward-looking

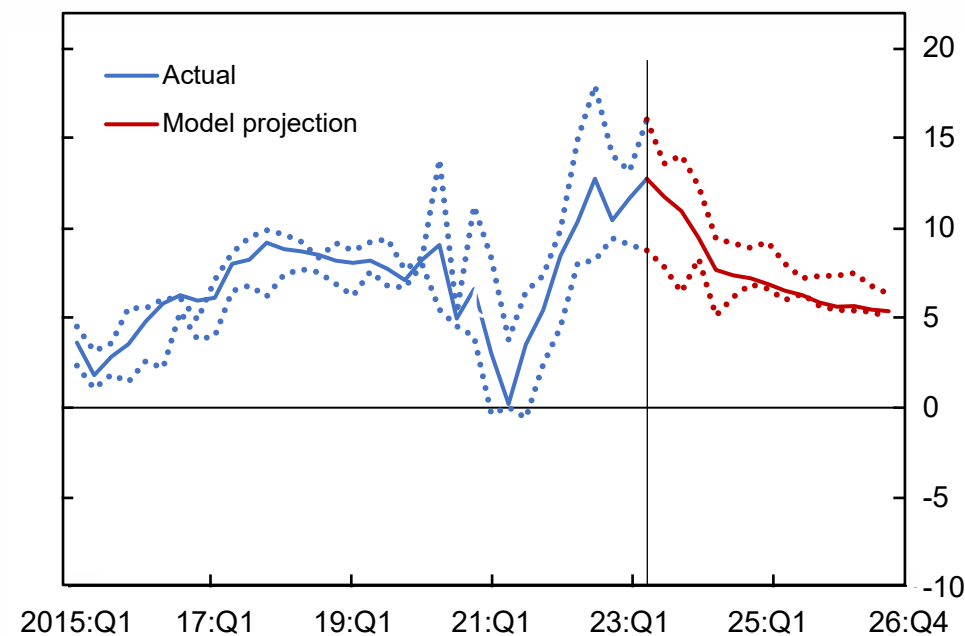# Wage growth is projected to remain elevated through 2024

Projected Wage Growth in AE
(Percentage points, 4 quarter MA of qoq annualized growth)
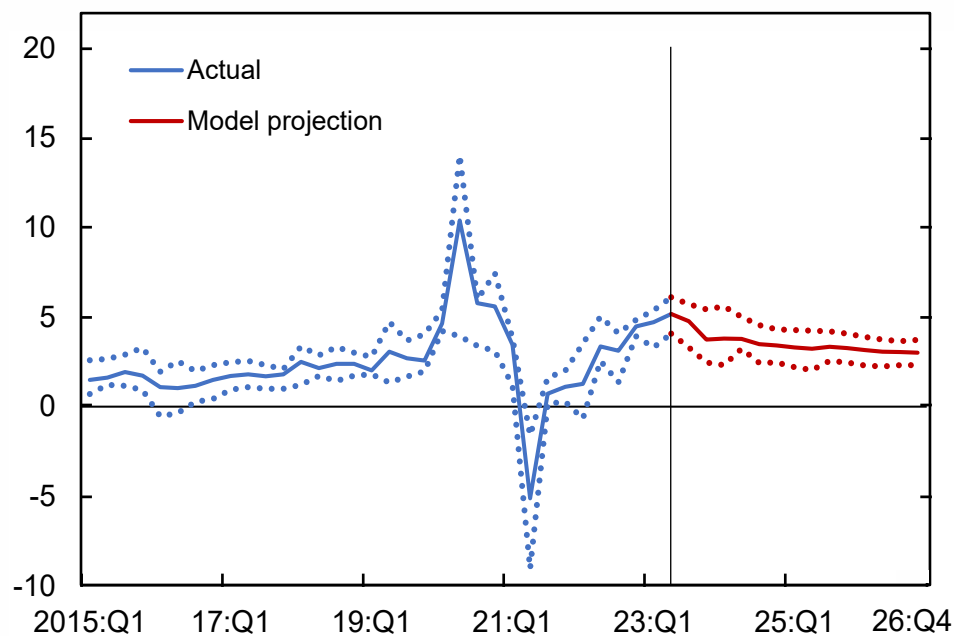
Projected Wage Growth in CESEE
(Percentage points, 4 quarter MA of qoq annualized growth)

Sources: IMF staff calculations.
Note: The solid lines report the purchasing-power-parity GDP-weighted average of observed and projected wage growth across countries. The dashed lines report inter-quartile ranges. AE = Advanced Europe; CESEE = Central, Eastern, and Southeastern Europe.

(Above-history) Baseline wage growth compatible with disinflation. Declining profits expected to help.

Nominal Wage Projections: Percentage Point Deviations from 2015-19 average levels
(Percentage point)

AE excl. CESEE | CESEE
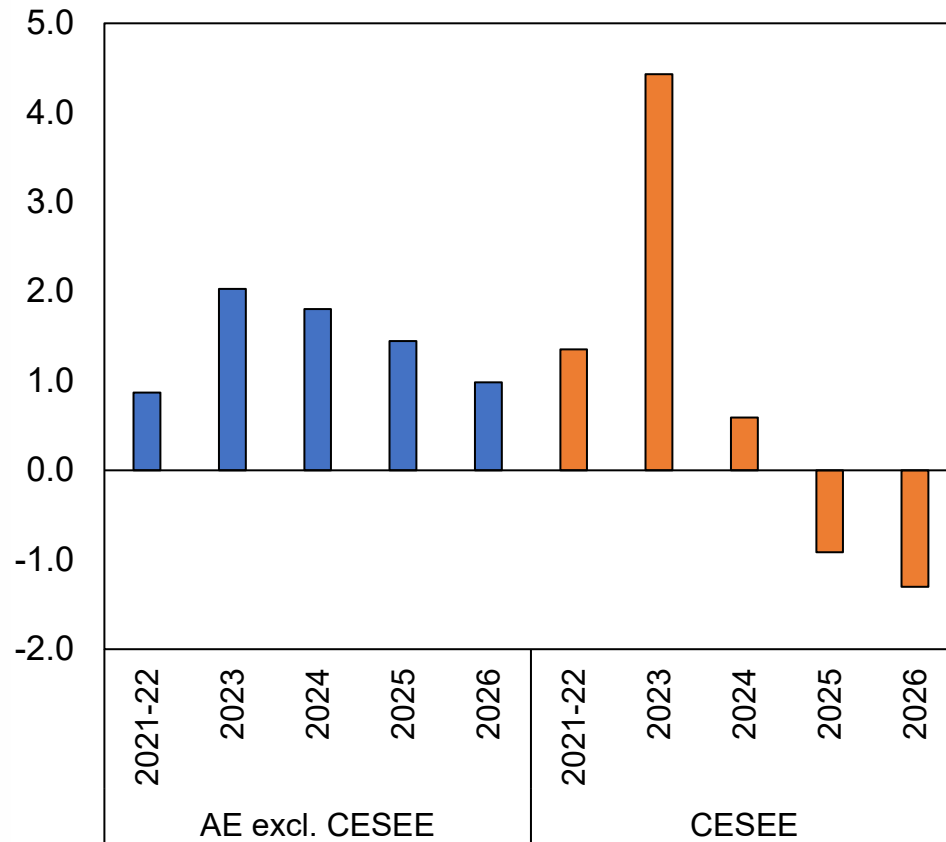
Sources: Eurostat; Haver Analytics; World Economic Outlook, Consensus Economics, and IMF staff calculations.

Inflation Decomposition by Wage and Profits
(percent contributions to change in deflator)

- Foreign
- Tax
- Unit labor
- Unit profit
- ○ Consumption deflator inflation
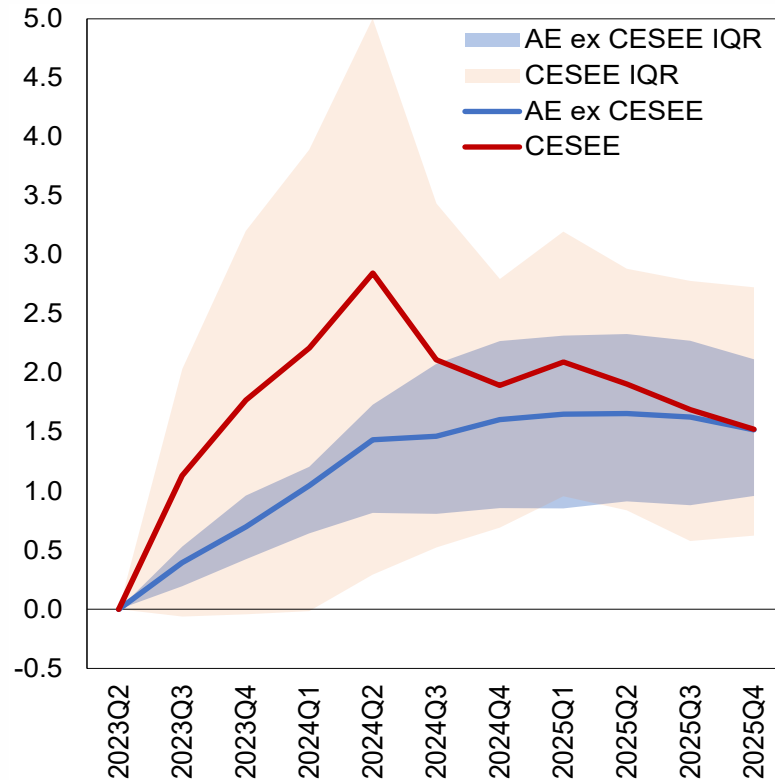
CESEE | Advanced Europe (excl. CESEE)
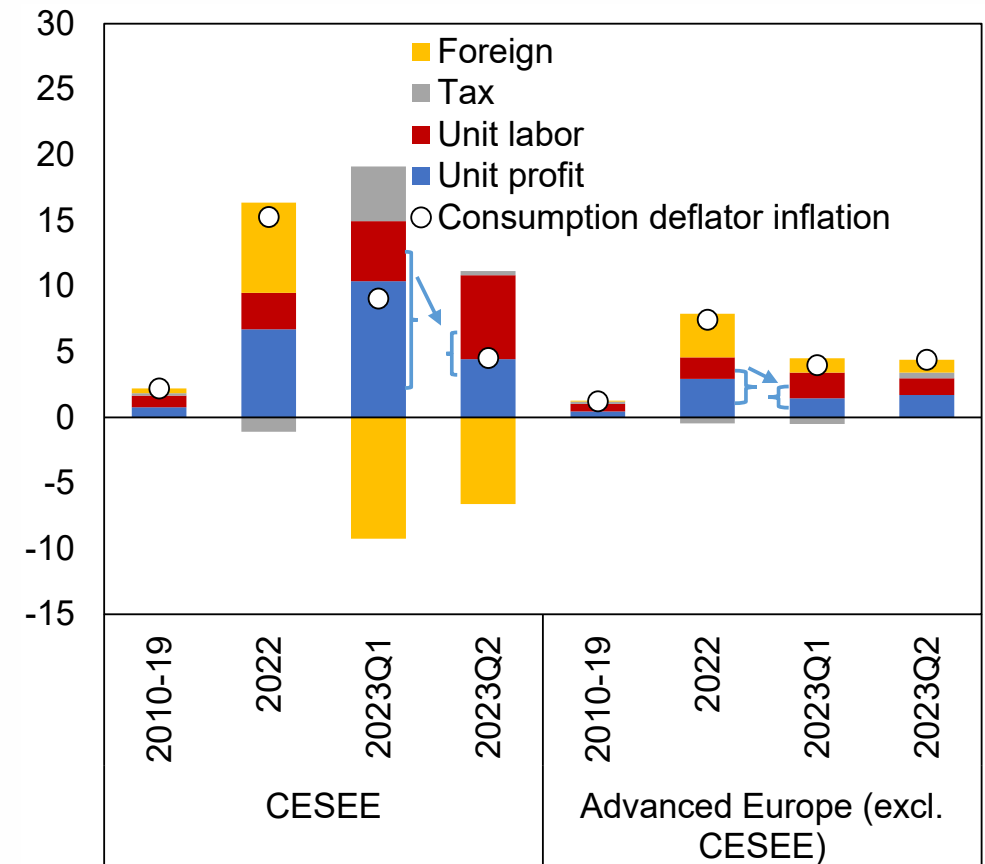
Sources: Hansen et. al. (2023).
Note: Advanced Europe (excl. CESEE) includes AUT, BEL, DEU, DNK, ESP, FIN, FRA, GBR, GRC, IRL, ITA, NLD, NOR, PRT, SWE and CESEE includes BGR CZE, EST, HRV, HUN, LTU, LVA, POL, ROU, SVK, SVN.

Upside surprise in wage growth could be costly and delay reaching the inflation targets

Wage Growth in Adverse Scenario
(q/q annualized, percent deviation from baseline; 4Q moving average)

Legend:
- AE ex CESEE IQR
- CESEE IQR
- AE ex CESEE
- CESEE

Core Inflation in WEO and Adverse Scenario
(percent)

Legend:
- WEO Core Inflation (end-of-period)
- Adverse Scenario
- Inflation Target

AE ex CESEE / CESEE

Sources: World Economic Outlook, Consensus Economics, Haver Analytics and IMF staff calculations.
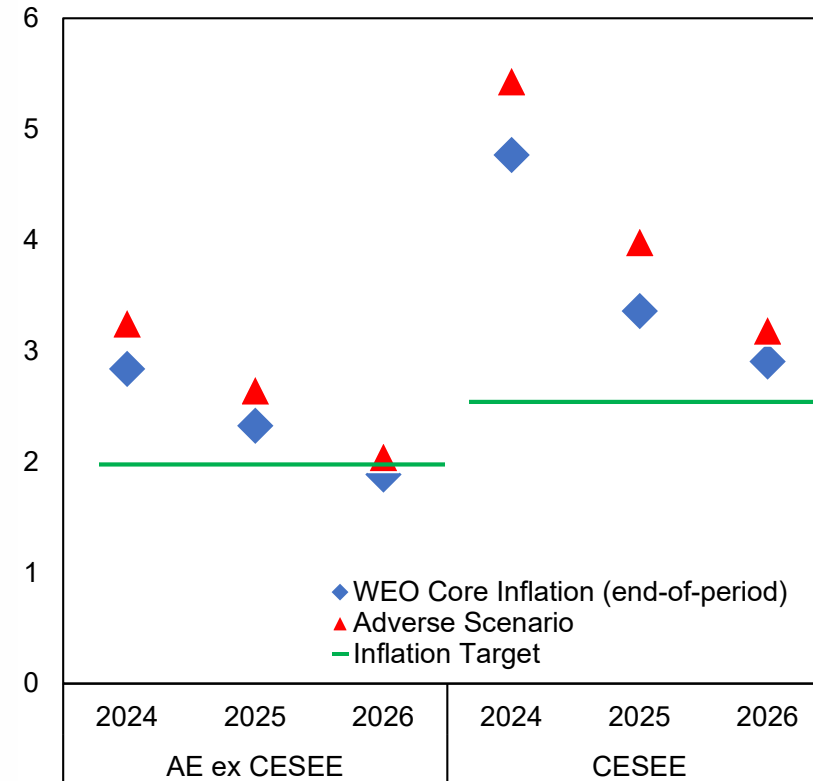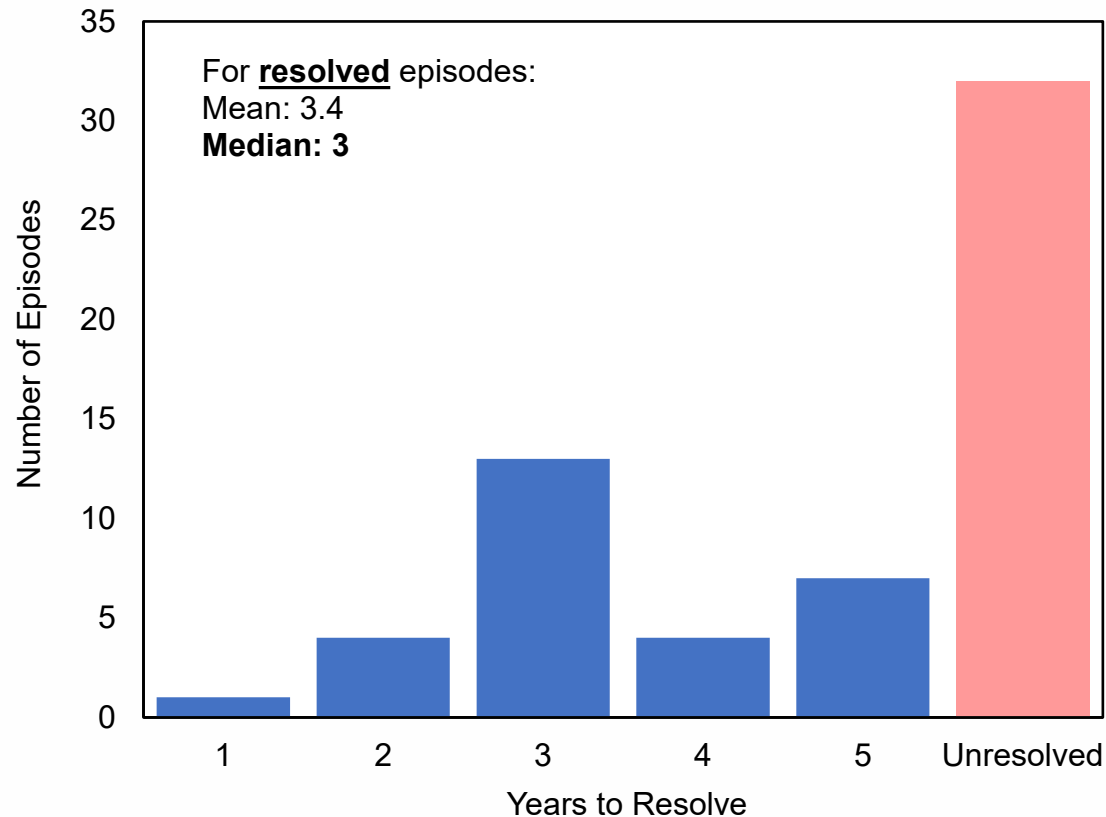Note: Advanced Europe includes AUT, BEL, DEU, DNK, ESP, FIN, FRA, GBR, GRC, IRL, ITA, NLD, NOR, PRT, SWE and CESEE includes BGR CZE, EST, HRV, HUN, LTU, LVA, POL, ROU, SVK, SVN. The adverse scenario assumes lower slack in the labor market and higher backward-lookingness in the wage formation. In the right panel, WEO Core Inflation is end-of-period and year-on-year. The green dotted line refers to the average inflation target in the respective sample. For CESEE, inflation target shows non-Euro Area CESEE country aggregate.

Policy Considerations

Prolonged restrictive stance needed to restore price stability
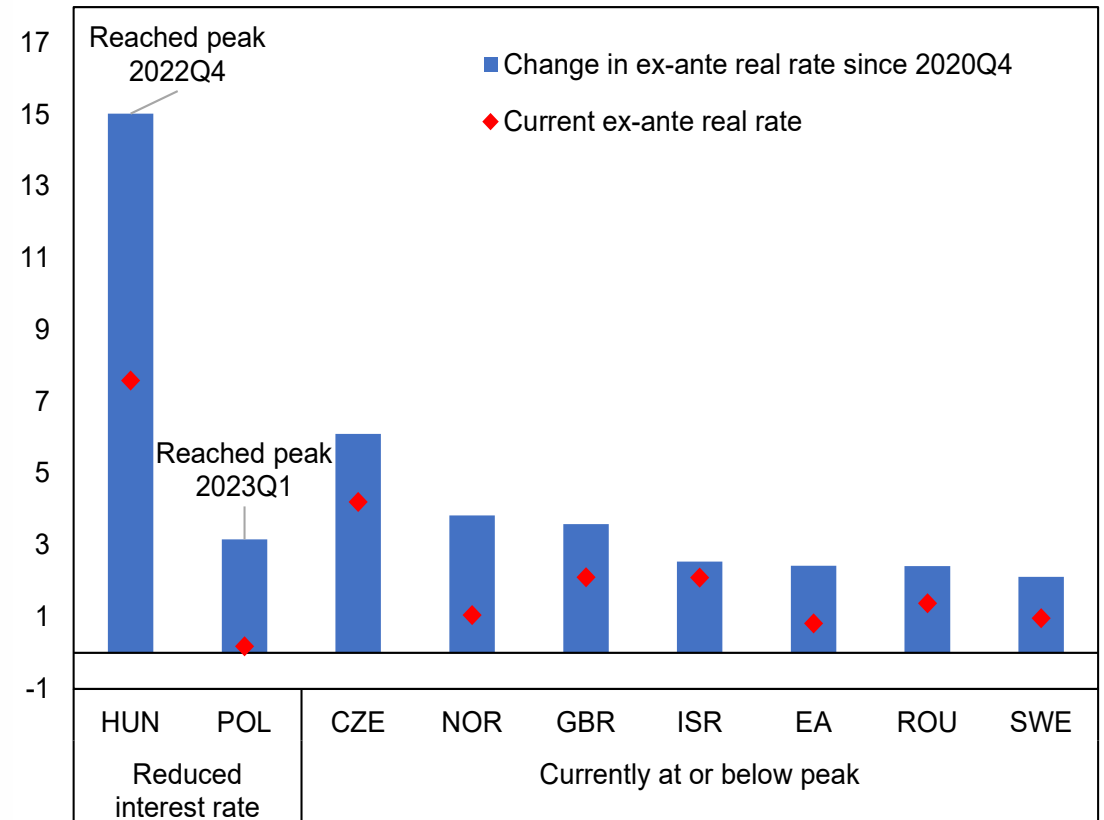
Historical Inflation Persistence
(Years until inflation falls to within 1 pp of its pre-shock rate)

For **resolved** episodes:
Mean: 3.4
Median: 3

Real Rate Change and Monetary Stance in Select Countries
(percent)

Reached peak 2022Q4

Reached peak 2023Q1

■ Change in ex-ante real rate since 2020Q4
◆ Current ex-ante real rate

Sources: Ari, A., Mulas-Granados, C., Mylonas, V., Ratnovski, L., and Zhao, W. (2023). *One Hundred Inflation Shocks: Seven Stylized Facts*. IMF Working Paper, WP/23/190;
Note: Episodes associated with the1973-79 oil crises. Unresolved episodes are those where inflation remains at least 1 percent above the pre-shock rate after 5 years.
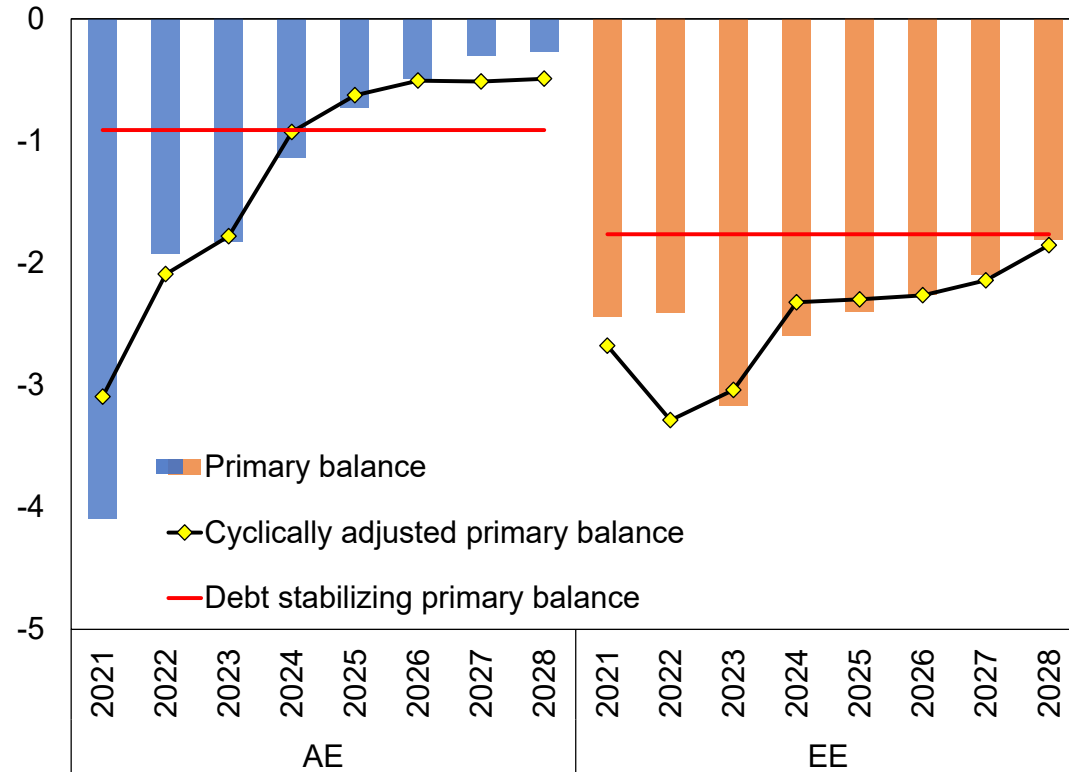
Sources: Haver Analytics and IMF staff calculations.
Note: Data as of end-September, 2023. For countries which have eased, the blue bars represent the real rate change between the month before nominal rate easing and 2020Q4. Ex-ante real rates are calculated using consensus one-year ahead inflation expectations or desk projections. For Hungary, the one-day deposit tender is used as the de facto policy rate between October 2022-September 2023.

# More consolidation needed and revenue mobilization can help

Fiscal Balances
(In percent, 2023-28)

Legend:
- Primary balance
- Cyclically adjusted primary balance
- Debt stabilizing primary balance

X-axis (AE): 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028
X-axis (EE): 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028

Sources: IMF WEO ; GDP purchasing power parity–weighted average for AE and EE.
European emerging market economies excludes Belarus, Russia, Türkiye, and Ukraine

Revenue Mobilization Potential in Europe: Gains from Tax System Reform and Institutional Capacity Building
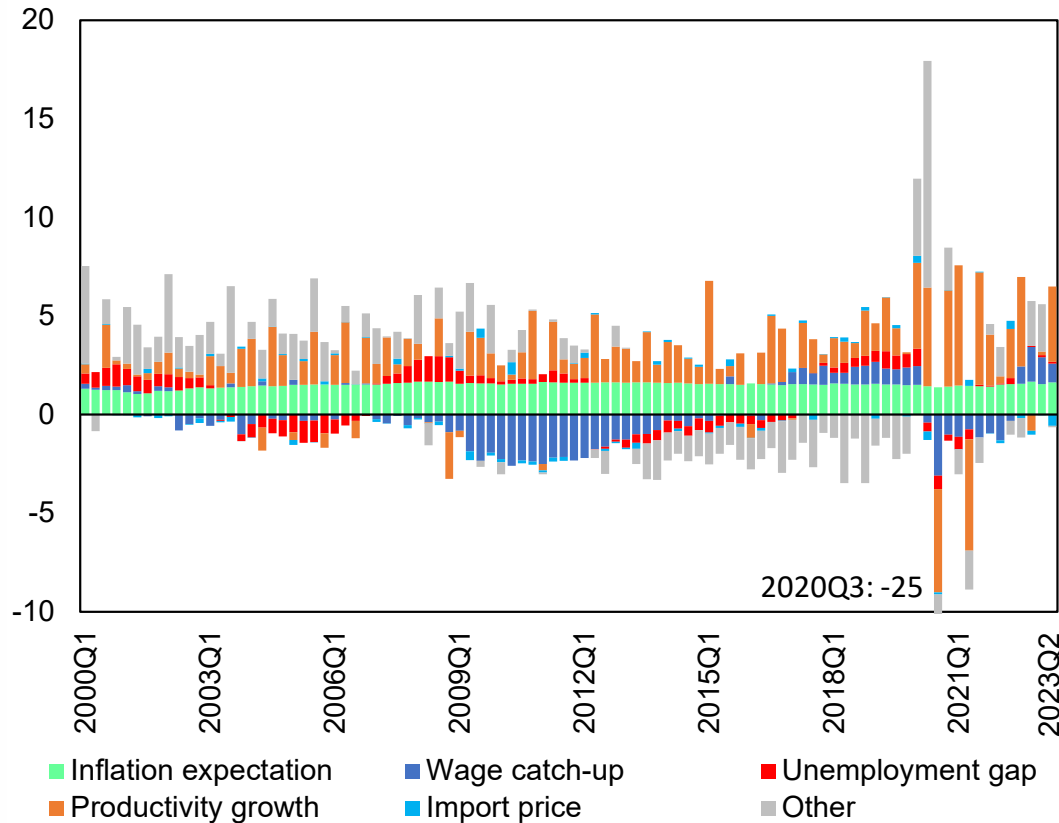(revenue gains as percent of GDP)
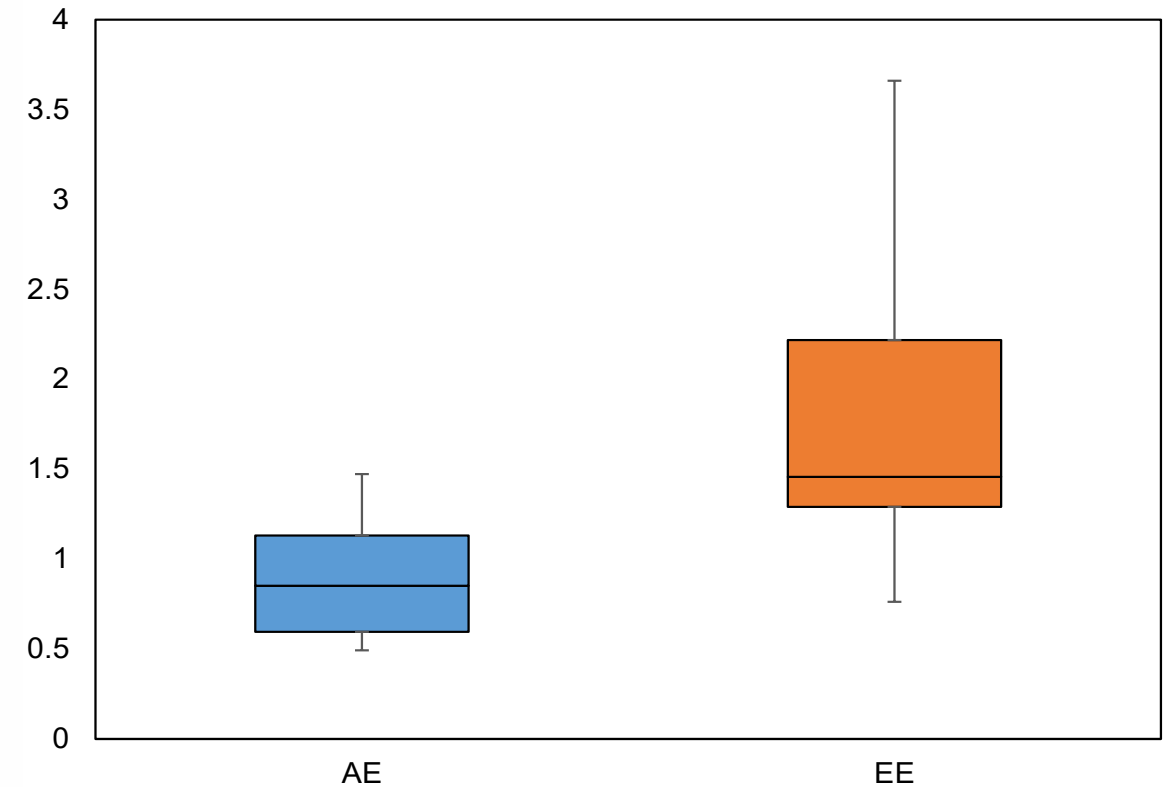
Sources: Benitez et. al. (2023)
Note: AE= Advanced Europe, EE= Emerging Market Europe The figures report the distribution of tax gains (in percent of GDP) across Advanced and Emerging Market European countries. Tax gains are estimated by closing the gap between the country's observed level of tax collection and its tax potential which is the highest observed level controlling for country characteristics. EE excludes BLR, UKR, and RUS.
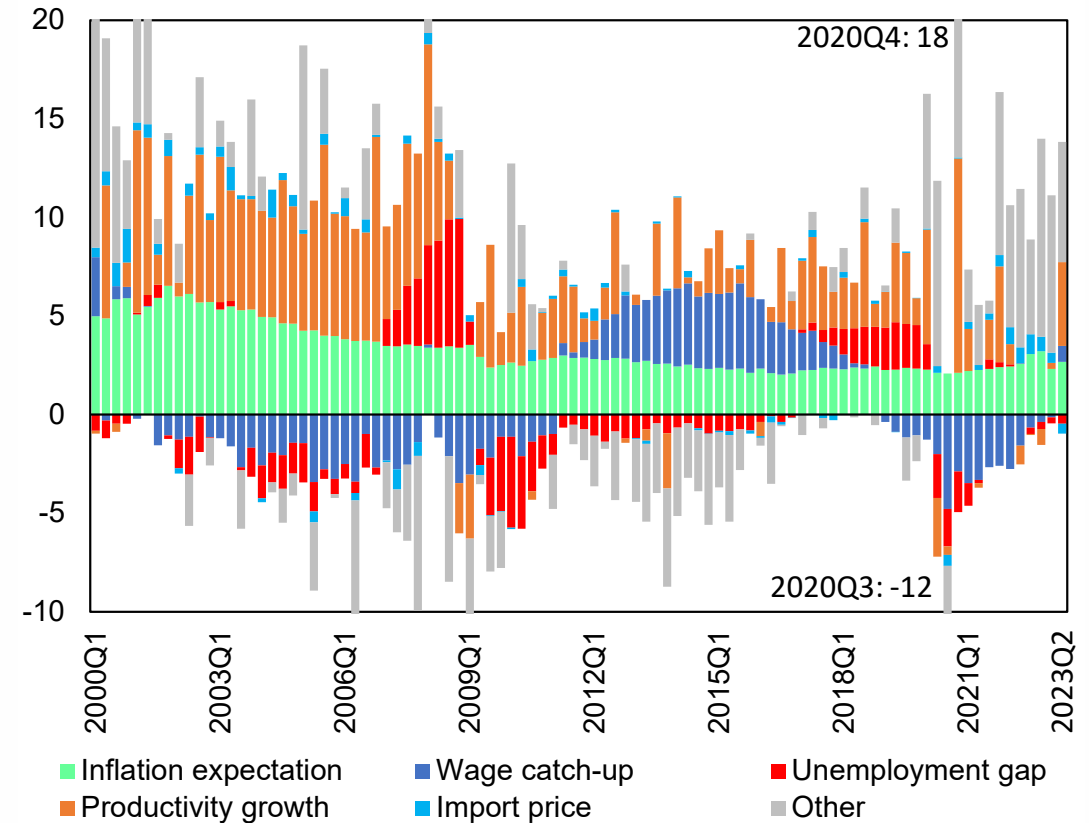
Thank you

Catch-up effects matter for wages

Nominal Wage Growth in AE
(Percentage point; QoQ growth annualized)

2020Q3: -25

Nominal Wage Growth in CESEE
(Percentage point; QoQ growth annualized)

2020Q4: 18

2020Q3: -12

Legend (both charts):
- Inflation expectation
- Wage catch-up
- Unemployment gap
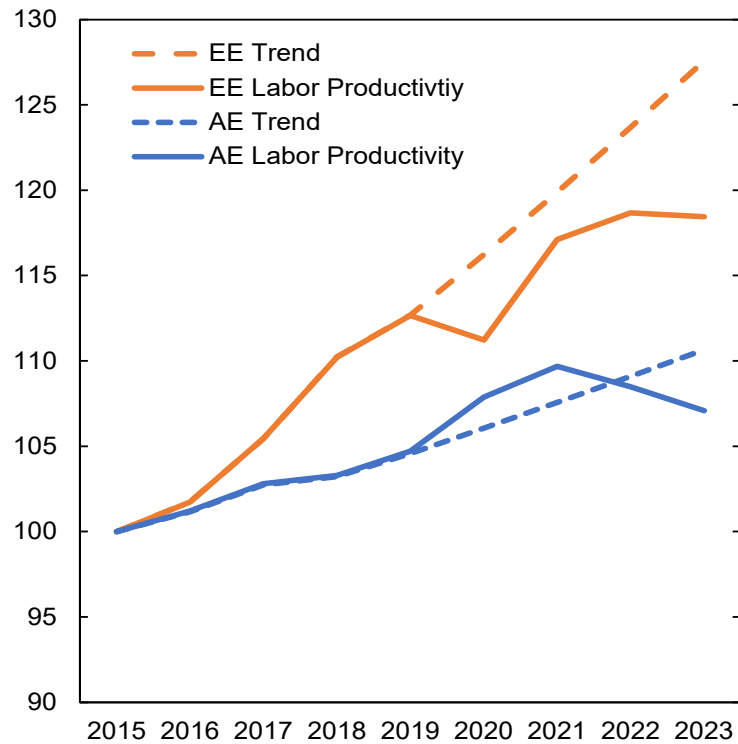- Productivity growth
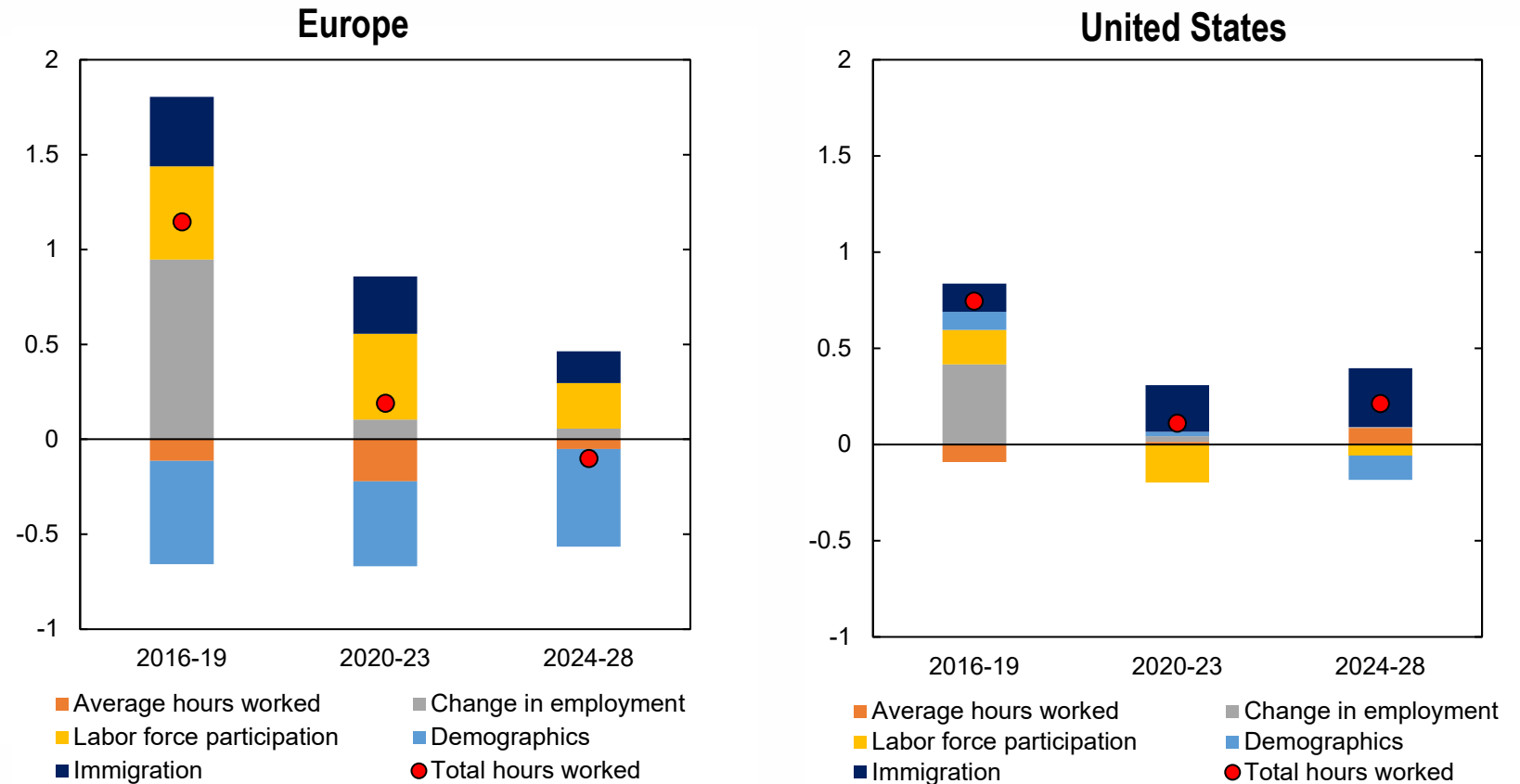- Import price
- Other

Source: IMF staff estimation.
Notes: The bars represent PPP-GDP weighted average contribution of each factor across countries in AE and CESEE. Contributions are calculated based on the dynamic simulation of country-by-country wage Phillips curve regressions.

Boost output by labor supply and productivity enhancing reforms

Labor productivity Trend
(index, 2015=100)

Legend:
- EE Trend
- EE Labor Productivtiy
- AE Trend
- AE Labor Productivity

Drivers and overall change in total hours worked
(Annualized growth, percent, weighted average)

Europe

Legend:
- Average hours worked
- Change in employment
- Labor force participation
- Demographics
- Immigration
- Total hours worked

United States

Legend:
- Average hours worked
- Change in employment
- Labor force participation
- Demographics
- Immigration
- Total hours worked

Sources: World Economic Outlook, Haver Analytics and IMF staff calculations.
Note: Labor productivity is measured by output per hours worked. Trend productivity is calculated based on the productivity growth average between 2015-2019. AE= Advanced Europe, EE= Emerging Market Europe. Simple average for AE and EE. EE sample includes BGR, HRV, HUN, POL, ROU.

Sources: Eurostat, European Commission, Federal Reserve Economic Data, World Economic Outlook, US Congressional Budget Office, and IMF staff calculations.
Note: Demographics captures working age population and domestic population growth.