

The estimation of non-accelerating inflation rate of unemployment in Uzbekistan

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Outline

- NAIRU in monetary policy framework
- Literature review
- Empirical methodology
- Discussion of empirical results
- Concluding remarks

NAIRU in monetary policy framework

- NAIRU as a foundational concept for formulating macroeconomic policies represents the level of unemployment at which inflation does not accelerate, assuming supply shocks in the economy are fully controlled (Laubach, 2001).
- Assessing NAIRU is crucial for effective monetary policy, enabling timely measures to counter inflationary pressures deriving from labor market fluctuations.
- Inflation forecasts estimated using the NAIRU based the Phillips curve are more accurate than forecasts using other macroeconomic indicators, including the interest rate and broad money supply (Stock and Watson, 1999).

Literature review

- Gruen et al. (1999) utilize a Phillips curve model to estimate the time-varying NAIRU, with the basic equation incorporating inflation expectations, the unemployment gap, per-labor expenditure and wages. The analysis indicates that the estimated NAIRU rate in Australia rose from 2 percent in 1960 to 7 percent in 1997.
- Ball and Mankiw (2002) used a particular version of the Phillips curve equation to estimate the NAIRU, incorporating supply shocks into the basic equation. The changes in world market food and oil prices are included as supply shocks, the exchange rate is used as a control variable, and wage changes are included as a dummy variable.
- Chow (2011) calculates the NAIRU for Hong Kong by employing a system of equations that encompasses the Phillips curve and Okun's Law. Over the period from 1988 to 2010, the estimated NAIRU exhibited an upward trend, averaging 3.9%.

Empirical methodology

The empirical model proposed by **Fabiani** and **Mestre (2004)** is used as a basis for estimating NAIRU for Uzbekistan.

$$\pi_t = \alpha_{0,t} * \pi_{t-1} + \alpha_{1,t} * (u_{t-1}^a - u_{t-1}^*) + \alpha_{2,t} * (N_t) + \varepsilon_t$$

- π_{t-1} – the first lag of inflation (YoY), %;
- π_t – inflationary expectation, %;
- u_{t-1}^a – observed unemployment rate, %;
- u_{t-1}^* – NAIRU, %;
- N_t – log (nominal exchange rate, relative to the US dollar) ;
- ε_t – error.

Empirical methodology: continued

The equation (3) is considered as a basic model, while the equation (4) is regarded as an alternative model.

$$\bullet \text{ } ugap_{t-1} = u_{t-1}^a - u_{t-1}^* + \vartheta_t \quad (2)$$

$$\bullet \text{ } ugap_t = \beta_{1,t} * ugap_{t-1} + \beta_{2,t} * ygap_{t-1} + \epsilon_t \quad (3)$$

The state-space model has the following mathematical form,

$$\bullet \text{ } z_t = Az_{t-1} + Bx_t + F \epsilon_t$$

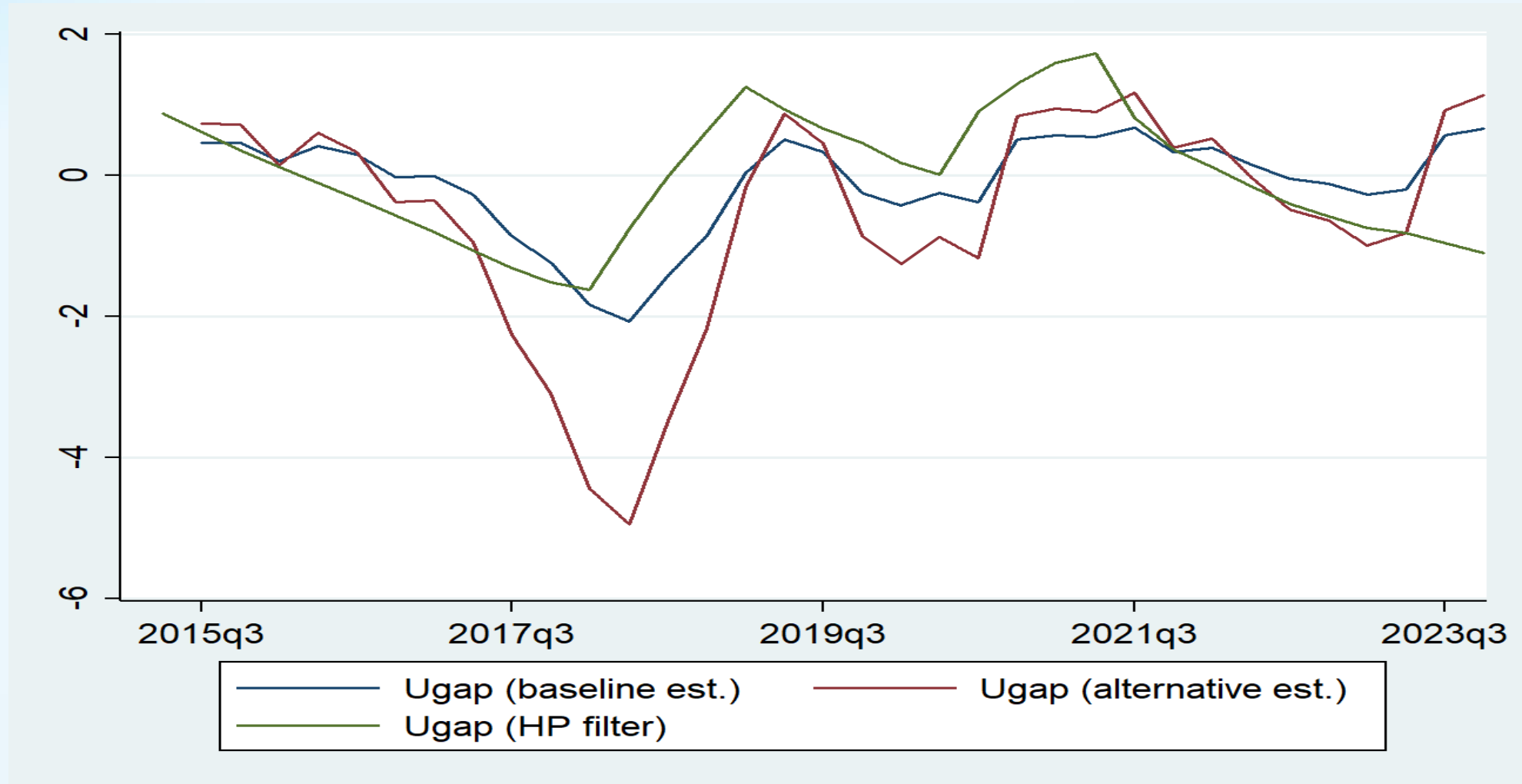
$$\bullet \text{ } y_t = Dz_t + Cw_t + K \vartheta_t$$

- z_t – $m \times 1$ vector of unobserved state variables;
- x_t – $kx \times 1$ vector of exogenous variables;
- y_t – $n \times 1$ vector of observed endogenous variables;
- w_t – $kw \times 1$ vector of exogenous variables;
- ϵ_t and ϑ_t – vector of statistical errors;
- A, B, D, F, C, K – parameter matrices.

z_t is entered into the model as the state equation and y_t is the observation equation. A diffuse Kalman filter is used for estimation, while the Hodrick-Prescott (HP) filter was separately used to estimate the output gap.

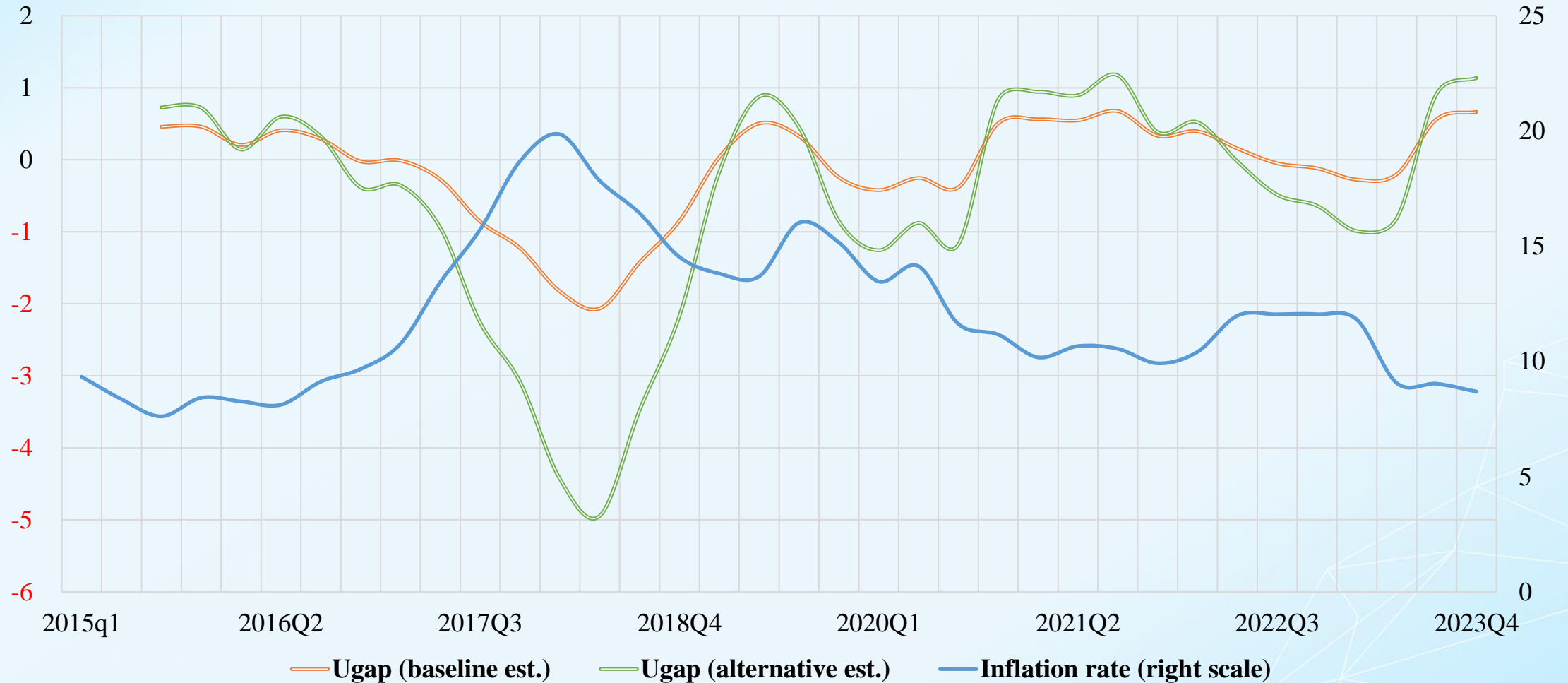
Empirical Results

Figure 1: Estimated unemployment gap in Uzbekistan (2015-2023), *in percent*



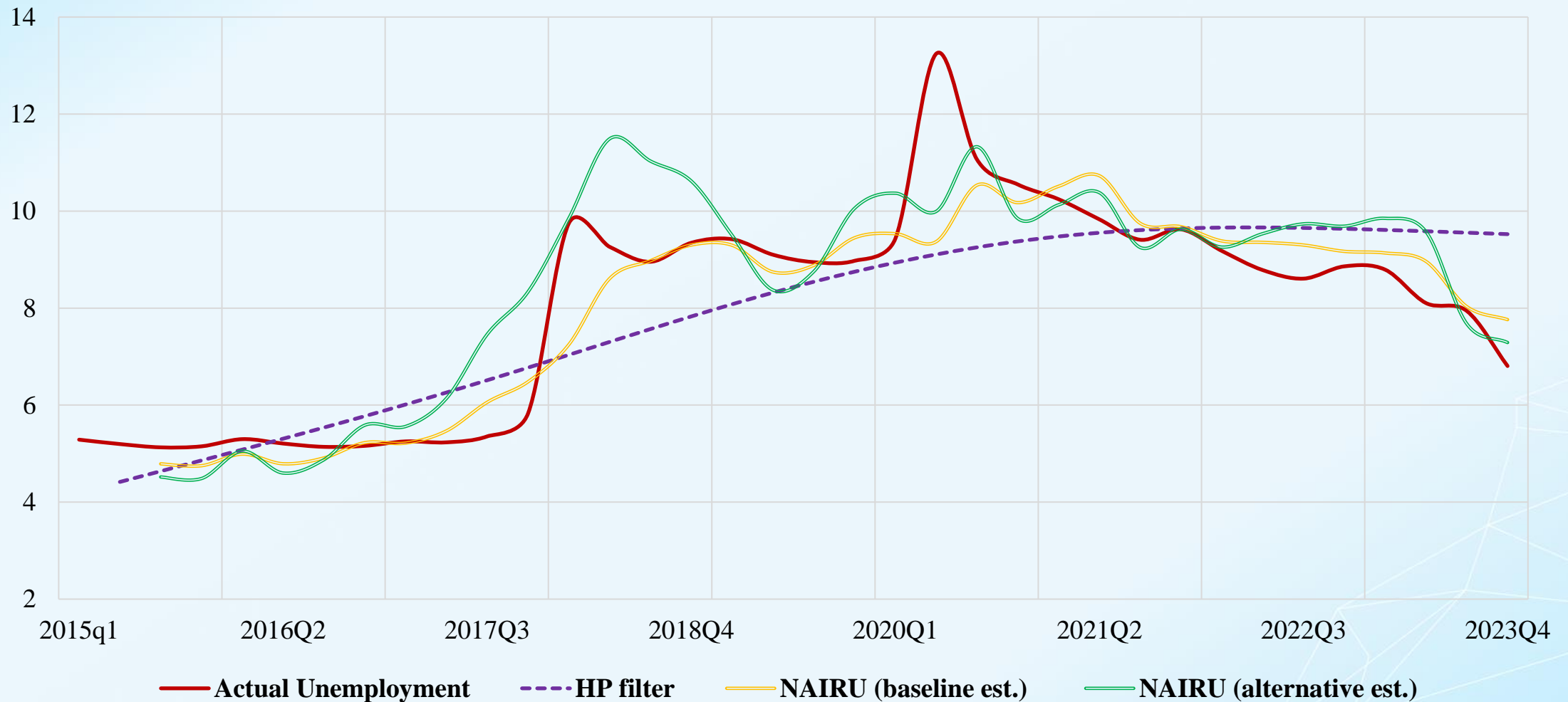
Empirical Results: continued

Figure 2: Changes in the unemployment gap and inflation rate in Uzbekistan in 2015-2023, *in percent*



Empirical Results: continued

Figure 3: NAIRU estimation for Uzbekistan in 2015-2023, in percent



Thank you !