ESTIMATION OF THE BUSINESS CYCLE COMPONENT OF THE RUSSIAN GDP WITH UNOBSERVED COMPONENT MODEL UNDER HIGH DEPENDENCE ON THE TERMS OF TRADE

Andrey Polbin

RANEPA, Gaidar Institute

Modern Econometric Tools and Applications – META2018

September 28, 2018

The reported study was funded by RFBR according to the research project № 18-310-00365

Outline

- Motivation
- Model
- Empirical results
- Conclusions and further dimensions of research

Motivation

- Two of the most important indicators of the current economic conditions for policy analysis are cyclical and trend components of GDP
- A popular approach to decomposition is unobserved component model:

$$y_t = \tau_t + c_t + s_t$$

$$\tau_t = \mu_t + \tau_{t-1} + \xi_t$$

$$\mu_t = \mu_{t-1} + \nu_t$$

$$c_t = \rho_1 c_{t-1} + \rho_2 c_{t-2} + \varepsilon_t$$

$$s_t + s_{t-1} + s_{t-2} + s_{t-3} = u_t$$

where τ_t - trend component, c_t - cyclical component, s_t - seasonal component, μ_t - long run growth, $\xi_t, \nu_t, \varepsilon_t, u_t$ - shocks

Motivation

- Esfahani, Mohaddes , Pesaran (2014), Kuboniwa (2014), Rautava (2013) and many other provide theoretical reasons and empirical evidences on the long-run dependence of the GDP of the oil-exporting countries on terms of trade (oil prices)
- The purpose of this study is to adapt the unobserved component model to account for the price dependence of the Russian economy

Model

$$y_t = \tau_t + c_t + s_t$$

$$\tau_t = \mu_t + \tau_{t-1} + \beta p_t^O$$

$$\mu_t = \mu_{t-1} + v_t$$

$$p_t^O = p_{t-1}^O + \eta_t$$

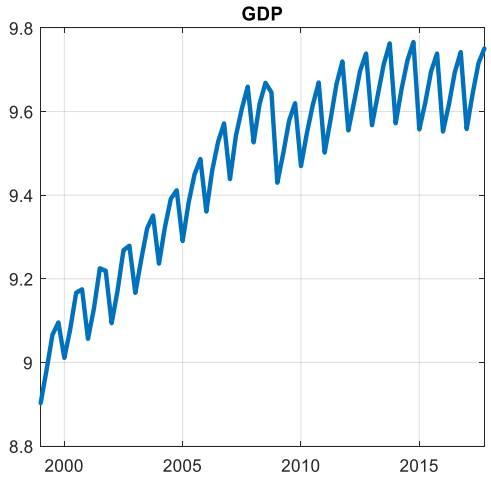
$$c_t = \rho_1 c_{t-1} + \rho_2 c_{t-2} + \varepsilon_t$$

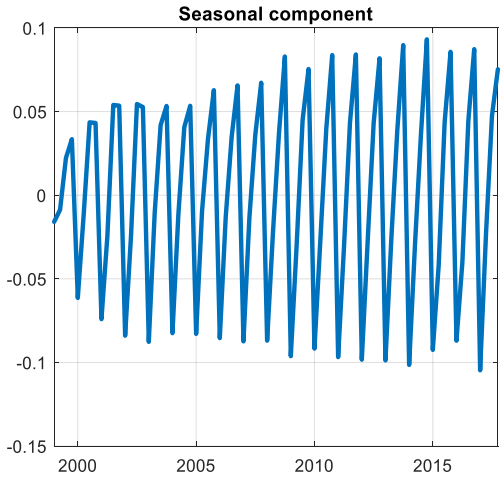
$$s_t + s_{t-1} + s_{t-2} + s_{t-3} = u_t$$

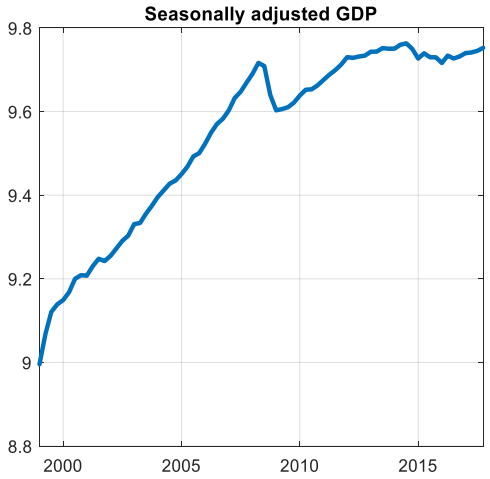
$$\begin{bmatrix} v_t \\ \eta_t \\ \varepsilon_t \\ u_t \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_v^2 & 0 & 0 & 0 \\ 0 & \sigma_\eta^2 & \sigma_{\eta\varepsilon} & 0 \\ 0 & \sigma_{\eta\varepsilon} & \sigma_\varepsilon^2 & 0 \\ 0 & 0 & 0 & \sigma_u^2 \end{bmatrix} \right)$$

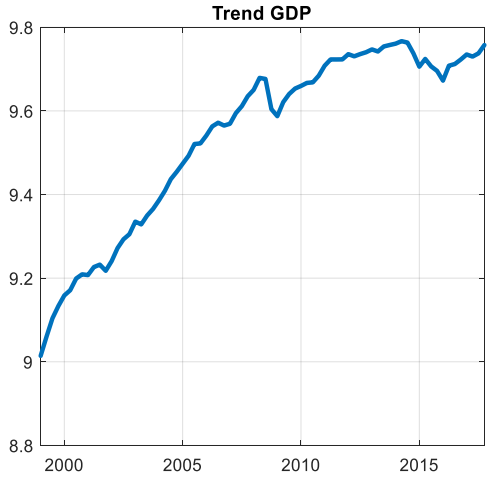
where τ_t - trend component, c_t - cyclical component, p_t^O - log of the real oil prices, s_t - seasonal component, μ_t - long run growth, $\xi_t, \eta_t, \varepsilon_t, u_t$ - shocks

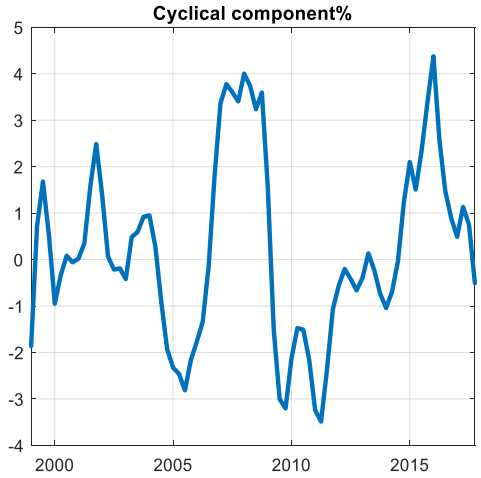
Empirical results

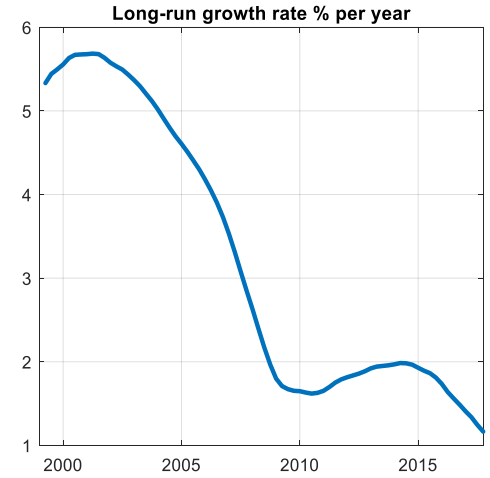




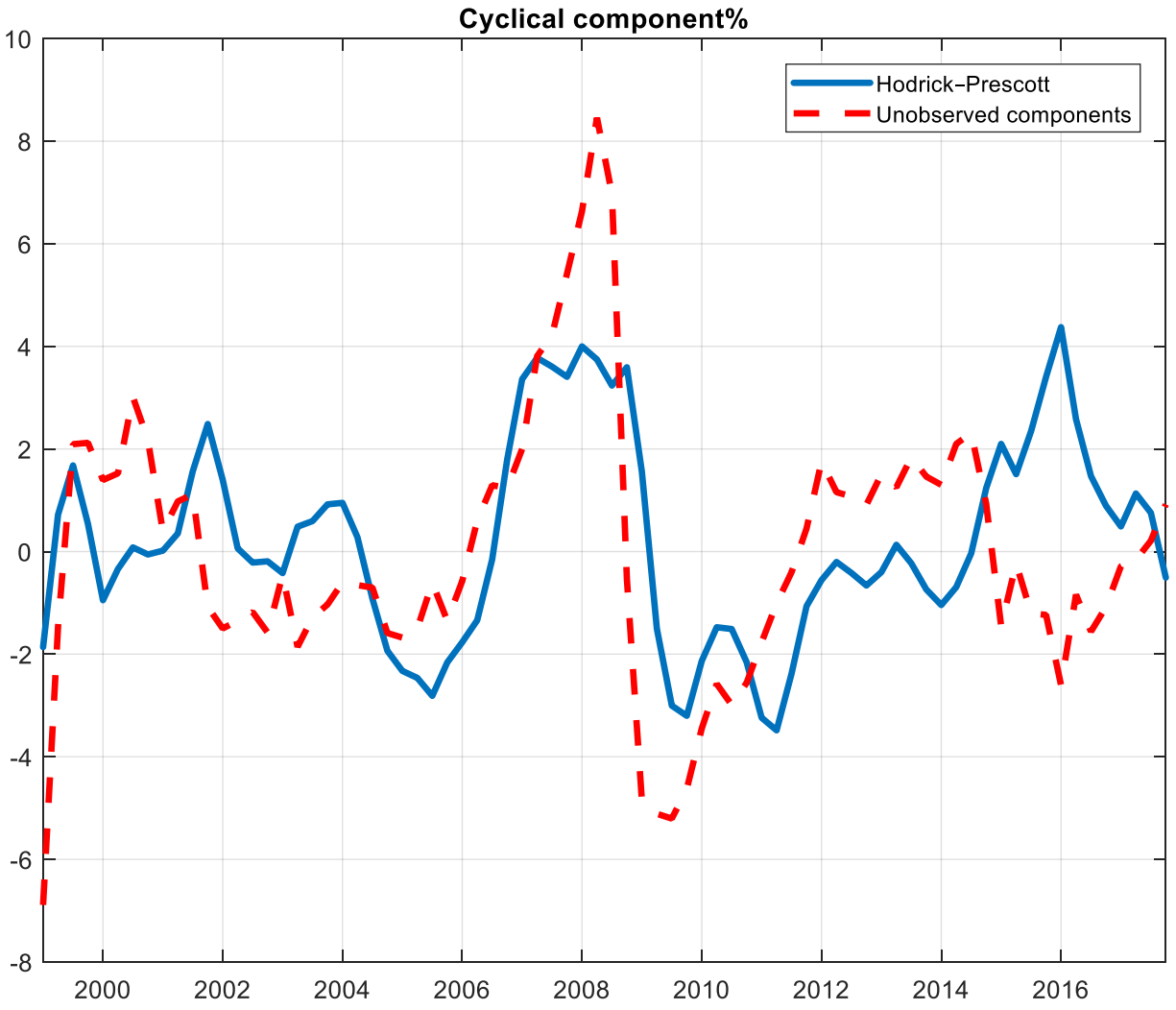








Comparison with HP filter



Conclusions and further dimensions of research

- We identified the sharp slowdown in the long-run growth rate of the Russian real GDP
- The cyclical component is near zero now
- From the policy perspective the primary goal is to stimulate long-term growth, not short term demand
- Model could be useful for forecasting
- Next steps: estimation of the alternative specifications, forecasting experiments, exploring possibility of structural changes, multivariate model

Thank you for your attention!

Andrey Polbin
apolbin@gmail.com