Forecasting

OGResearch

Tomas Motl

February / April 2019

Today's block

- Quick review of the model
- Quick review of the AZ story
- Review of external assumptions
- Forecasting exercises
- Final project specifications

Review of model equations

- Standard QPM business cycle model, equations for the trends are AR(1) processes
- We changed modeling of the FX rate:
  - No UIP - CBA manages the FX rate, closed capital account (no arbitrage)
  - We replace the UIP with a "policy rule"

$$s_t = \kappa_1 * \left((s_{t-1} + \Delta s_t^{tar} - \kappa_2 \widehat{z}_t)\right.$$
$$+ (1 - \kappa_1) \left(E_t[s_{t+1}] + (i_t^* + prem_t - i_t)/4 - \kappa_3 \widehat{oil}_t\right)$$
$$\Delta s_t^{tar} = \Delta \overline{z}_t + \pi_t^{tar} - \overline{\pi^*}_t$$

  - κ_1 close to 1
  - Note that the ultimate target here is still inflation
- We added influence of oil:
  - Oil trend influences the REER trend and the output potential
  - Oil gap influences the domestic demand (output gap) and the FX rate

Review of model parameters

- Let's take the behavioral parameters as given
  - In reality, we should always look to improve the model
- What about steady-state parameters?
  - These parameters determine the long-run GDP growth, long-run nominal/real depreciation, ...
  - Determine the forecast on the longer horizon (>3yrs)
- Forecasting model: the parameters should describe forecast period and possibly also recent history; we do not care about distant past
  - Also the reason why estimation on historical data is not always feasible or useful
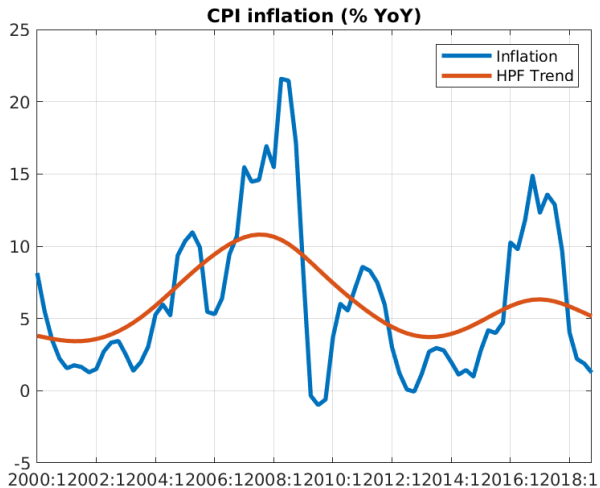- Let's check the sstate parameters

Steady-state for output potential growth

GDP Growth (% YoY)
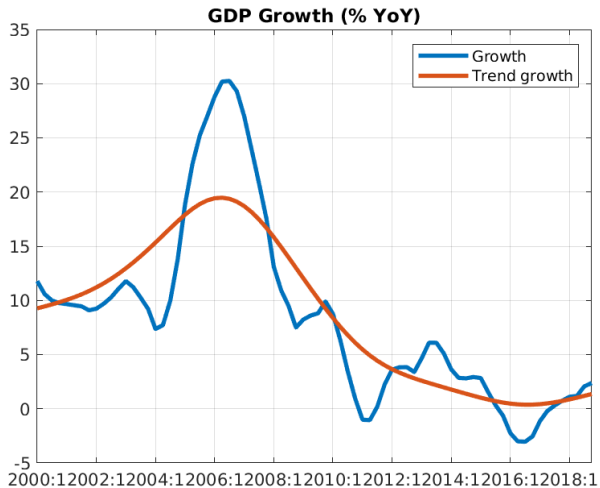
Steady-state for REER appreciation

Steady-state for inflation target

CPI inflation (% YoY)
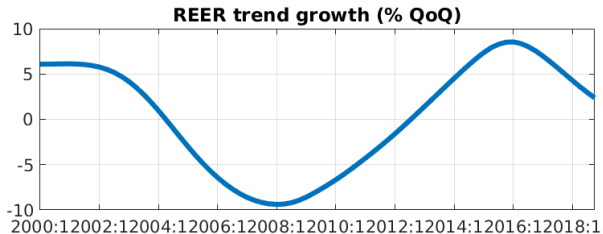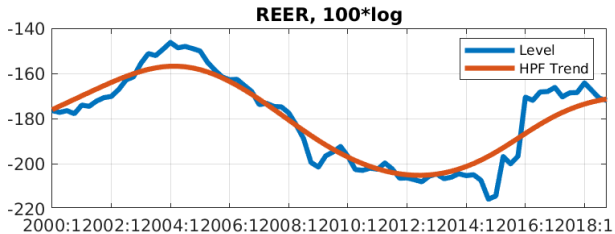
Steady-state for inflation target, cont.

- Inflation target is chosen by policy!
- That's different from the GDP potential or REER:
  - Generated by a different, much less persistent process
  - Can change abruptly without any external reason
- What are the CBA preferences? What inflation they want to achieve?
- Structural models are great because they force us to think about policy preferences, real vs nominal variables, etc.

Review of AZ story

- High dependence on oil for GDP growth, REER
- Policy preference for stable FX rate, but occasional adjustments, not a strict fixed FX rate
- Interest rates not relevant before 2014

The 2014-2016 oil shock

- Oil price drop impacted all variables in the economy
- Drop in exports => need to reduce imports and pressure on FX reserves => real depreciation => nominal depreciation (rather than decreasing price level)
  - Also, depreciations of the trading partners required nominal FX depreciation (but not real depreciation)
- Imports becoming more expensive relative to domestic production => CPI goes up, but less than the FX depreciation
- Lower incomes, banking sector troubles, less employment => declining domestic demand

Initial conditions etc.

- We will not bother with analyzing and tuning initial conditions
  - No time, lots of work, ...
  - We'll just trust the model to get it more or less right
- We won't calculate the necessary REER adjustment, the impact on GDP, ...not difficult, but time consuming
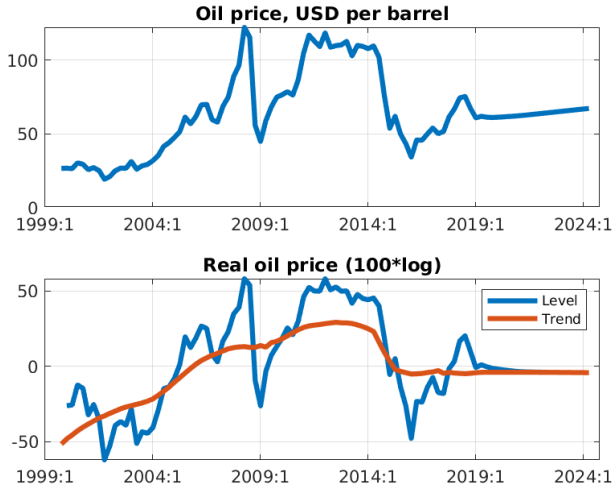
REER depreciated by about 35%
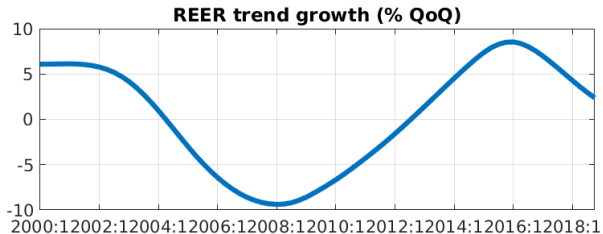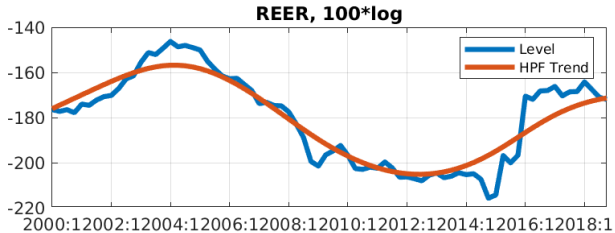
External assumptions

- Our model is not supposed to forecast oil price, RUB per USD, ...
- We will impose the actual paths (slight cheating) as hard tunes
- External assumptions are important and common source of forecast error
- QPM model is usually a part of a wider forecasting system

External assumptions: oil price

External assumptions: RUB per USD
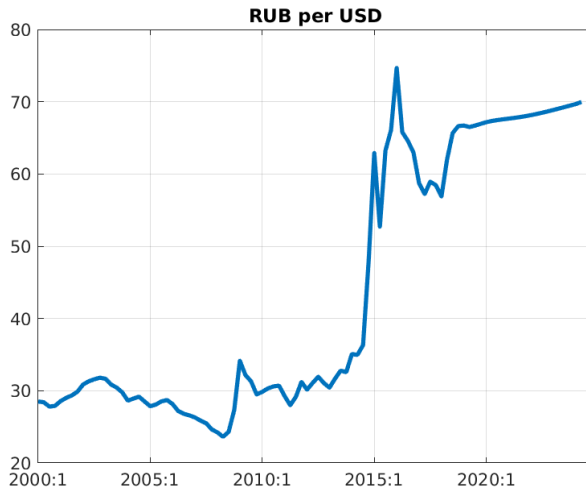
Forecasting exercises

- First, we'll examine the initial conditions
  - History (filter) period ends in 2014Q4
  - Forecast starts in 2015Q1
- Second, we'll examine the "plain forecast", just external assumptions without any judgment
- Third, we'll identify where the forecast is wrong (in our view)
- Fourth, we'll impose the soft tunes = shocks
  - We use a special CSV file for that
- Repeat third and fourth step until we are satisfied
- Important: we need to underestand what the shocks represent!

About the final project

- Two parts: the forecast and the text
- Forecast = forecast report from generated by the codes
- Text = approx 1.5 page explaining the rationale behind the text
  - Audience is your macroeconomics teachers: do not know QPM, but understand jargon and economics
  - I'll provide examples in Study materials; you should not put so many numbers and so much background, go for something similar but simpler (e.g. Master's vs Bachelor's thesis)
  - Describe the whole forecast period - immediate shocks + long term trends
  - Test if you really understand what drives the numbers
- To be done in groups again (the previous grouping or a new one)
- Deadline May 1, 10pm (?)
- Ask questions by email