

Does monetary and fiscal policies interact in oil exporting countries? Evidence from Azerbaijan

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Outline

- ▶ Motivation
- ▶ Methodology
- ▶ Data description
- ▶ Impulse responses
- ▶ Conclusions & further research

Motivation

- ▶ Macroeconomic stability
- ▶ High dependency on oil revenues
 - the share of oil in exports ~ 90%
 - the share of oil in state budget ~ 60%
 - devaluations - 34% and 62% in 2015
- ▶ Moving to inflation targeting regime in the medium-term
- ▶ Lessons from other oil exporting countries

Contribution to the literature

- Scarcity of the literature for the interaction of two policies for Azerbaijan
 - The coordination between monetary and fiscal policy has not been examined for Azerbaijan yet
- Non-oil budget balance *instead of* budget balance
- Novel approach to definition of public debt
 - Transfers from Oil Fund is considered as public debt

Methodology

VAR model is used:

Monetary policy model:	Fiscal policy model :	Interaction model:
$\Pi(L) \begin{pmatrix} Rate_t \\ Infl_t \\ Gap_t \\ Reer_t \\ Mb_t \end{pmatrix} = c_t + \varepsilon_t$	$\Pi(L) \begin{pmatrix} Balance_t \\ Transfers_t \\ Tbills_t \end{pmatrix} = c_t + \varepsilon_t$	$\Pi(L) \begin{pmatrix} Rate_t \\ Infl_t \\ Gap_t \\ Reer_t \\ Mb_t \\ Balance_t \end{pmatrix} = c_t + \varepsilon_t$

where $\Pi(L) = I_n - \Pi_1 L - \dots - \Pi_p L^p$, Π_i are $n \times n$ coefficient matrices, c_t is a $n \times 1$ vector of intercepts, and ε_t is a $n \times 1$ white noise innovation process.

Data description (1)

- Sample period
 - 2003:I – 2018:IV
- Sources
 - National Statistical Office (NSO)
 - Ministry of Finance (MoF)
 - Central Bank (CB)
- Time series properties
 - Inflation, policy rate, non-oil GDP gap – I(0)
 - Other variables – I(1)

Data description (2)

Variable	Description
Balance	Non-oil budget balance in percent of non-oil GDP
Transfers	Transfers from SOFAZ to the budget in percent of non-oil GDP
Rate	Refinancing rate in percent
Gap	Non-oil GDP gap in percent of potential GDP (HP filter)
Infl	Annual inflation in percent
Reer	Non-oil real effective exchange rate, index (2000=100)
Mb	Monetary base in the national currency in percent of non-oil GDP
Tbills	Government T-bills in the national currency in percent of non-oil GDP

Granger Causality

Monetary

Gap, Inflation, $\Delta(\text{Reer})$, $\Delta(\text{MB})$

Policy Rate, Inflation

Output Gap

$\Delta(\text{Reer})$



Policy Rate

$\Delta(\text{Reer})$

Inflation

$\Delta(\text{MB})$

Fiscal

$\Delta(\text{Non-oil Budget Balance})$



$\Delta(\text{Transfers})$

Interaction

$\Delta(\text{Non-oil Budget Balance})$

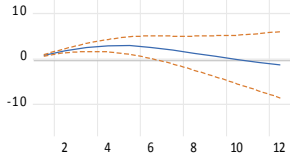


$\Delta(\text{MB})$

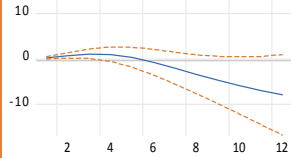
Impulse response – monetary policy

Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.

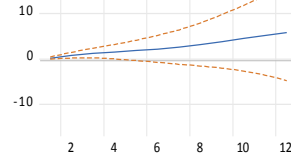
Accumulated Response of RATE to RATE



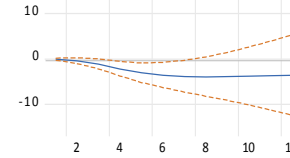
Accumulated Response of RATE to GAP



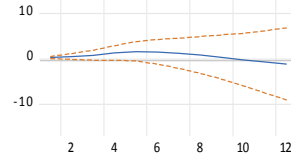
Accumulated Response of RATE to INFL



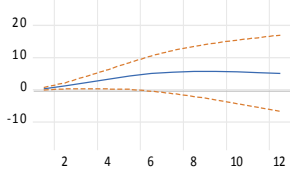
Accumulated Response of RATE to D(LREER_NO)



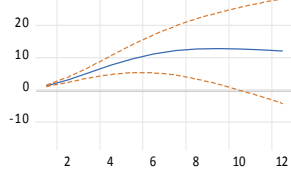
Accumulated Response of RATE to D(MB_GDP)



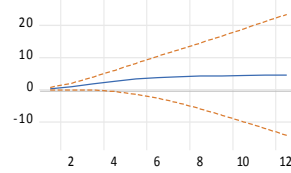
Accumulated Response of GAP to RATE



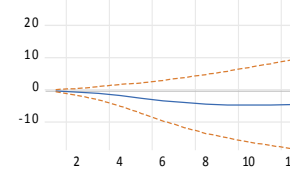
Accumulated Response of GAP to GAP



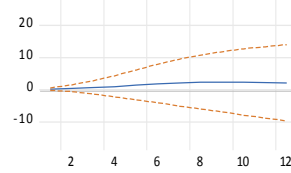
Accumulated Response of GAP to INFL



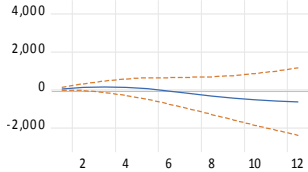
Accumulated Response of GAP to D(LREER_NO)



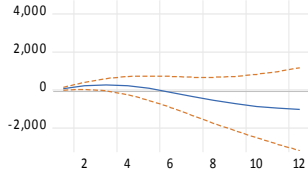
Accumulated Response of GAP to D(MB_GDP)



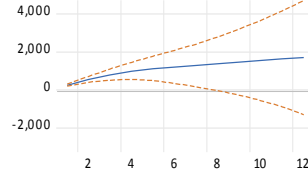
Accumulated Response of INFL to RATE



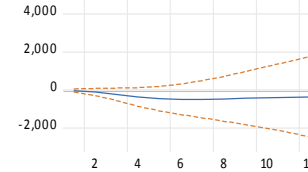
Accumulated Response of INFL to GAP



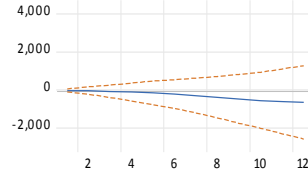
Accumulated Response of INFL to INFL



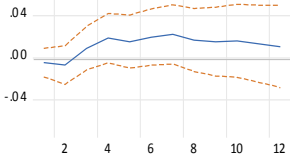
Accumulated Response of INFL to D(LREER_NO)



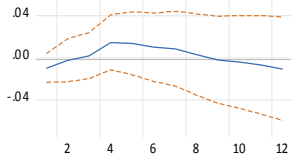
Accumulated Response of INFL to D(MB_GDP)



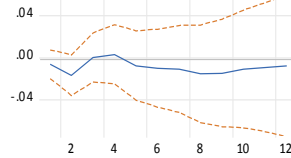
Accumulated Response of D(LREER_NO) to RATE



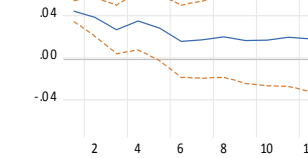
Accumulated Response of D(LREER_NO) to GAP



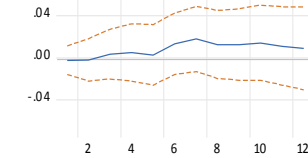
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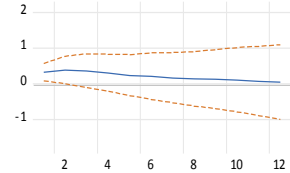
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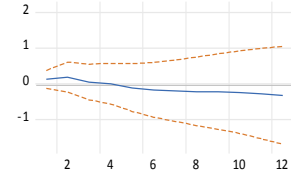
Accumulated Response of D(LREER_NO) to D(MB_GDP)



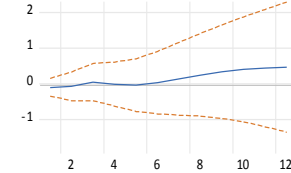
Accumulated Response of D(MB_GDP) to RATE



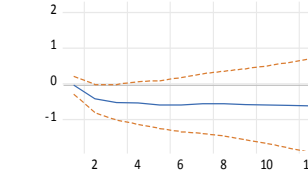
Accumulated Response of D(MB_GDP) to GAP



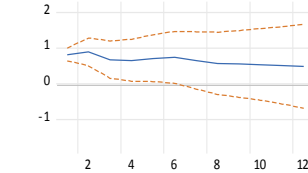
Accumulated Response of D(MB_GDP) to INFL



Accumulated Response of D(MB_GDP) to D(LREER_NO)



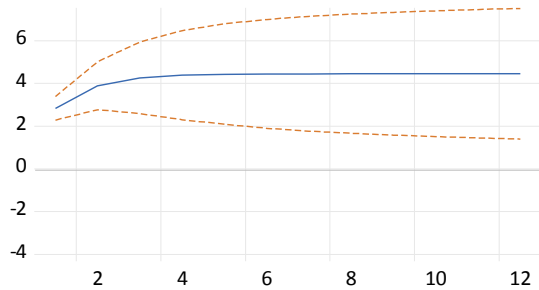
Accumulated Response of D(MB_GDP) to D(MB_GDP)



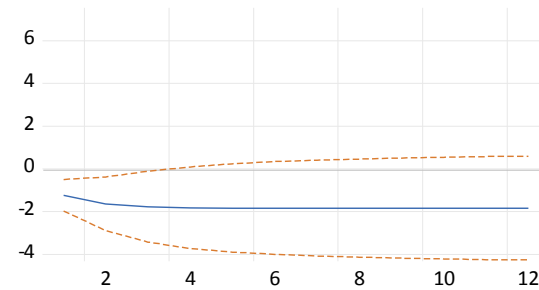
Impulse response – fiscal policy

Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.

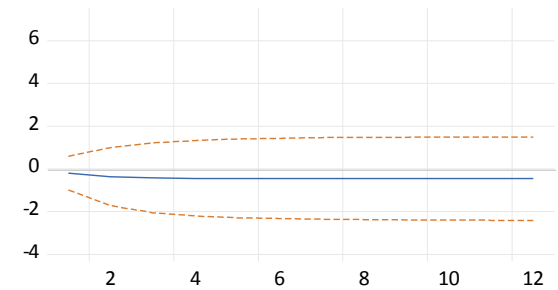
Accumulated Response of D(BB_GDP) to D(BB_GDP)



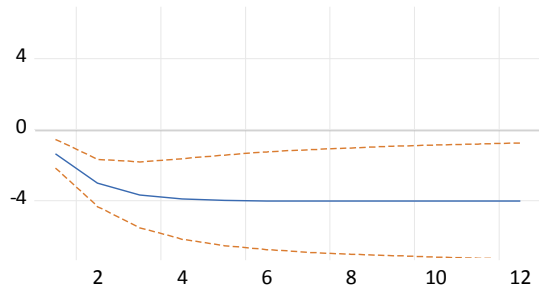
Accumulated Response of D(BB_GDP) to D(SOFAZ_GDP)



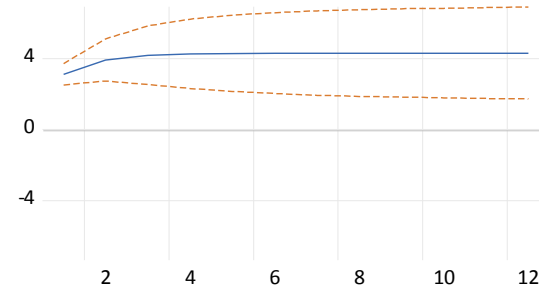
Accumulated Response of D(BB_GDP) to D(TBILLS_GDP)



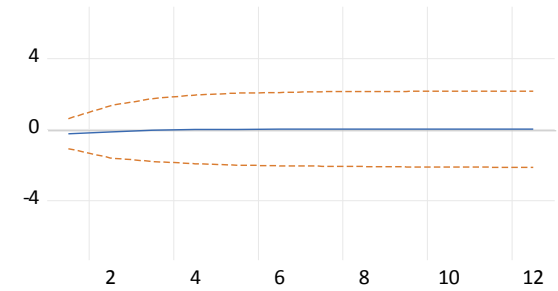
Accumulated Response of D(SOFAZ_GDP) to D(BB_GDP)



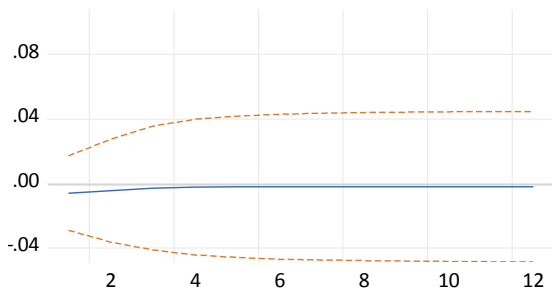
Accumulated Response of D(SOFAZ_GDP) to D(SOFAZ_GDP)



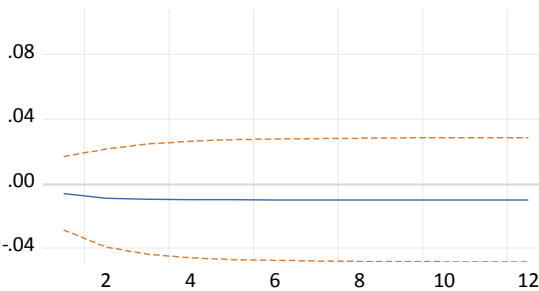
Accumulated Response of D(SOFAZ_GDP) to D(TBILLS_GDP)



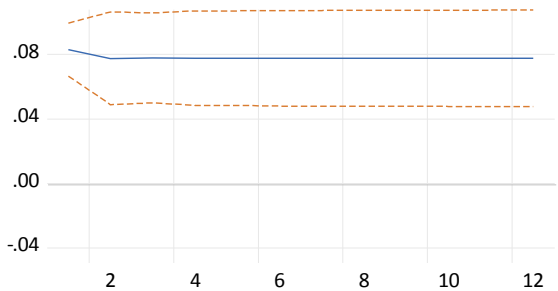
Accumulated Response of D(TBILLS_GDP) to D(BB_GDP)



Accumulated Response of D(TBILLS_GDP) to D(SOFAZ_GDP)



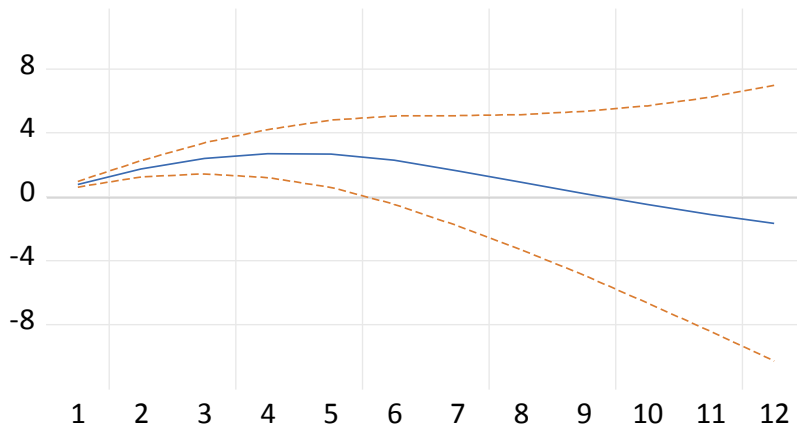
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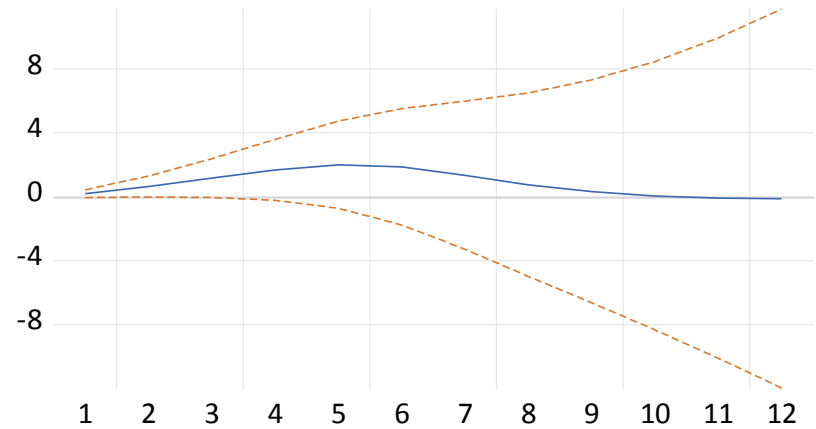
Impulse response – interaction

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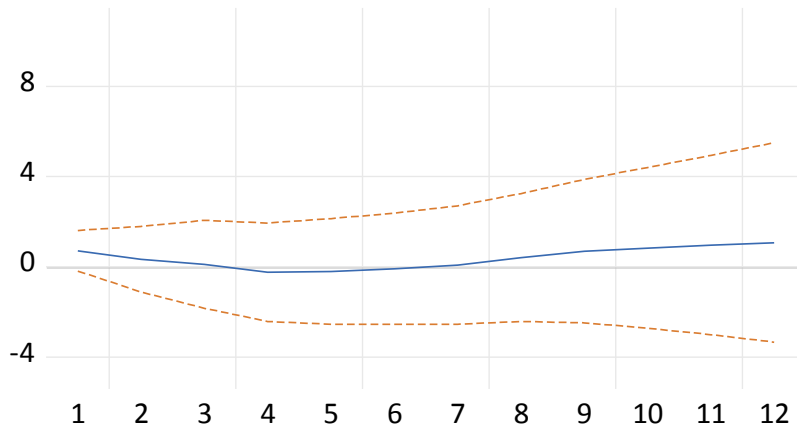
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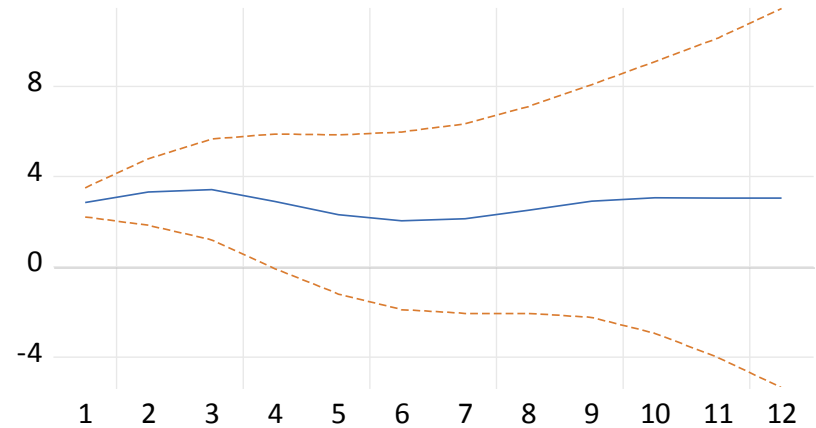
Accumulated Response of RATE to D(BB_GDP)



Accumulated Response of D(BB_GDP) to RATE



Accumulated Response of D(BB_GDP) to D(BB_GDP)



Results for Russia and Kazakhstan

Kazakhstan

- Mainly non-Ricardian behavior
 - oil fund transfers do not affect non-oil budget balance
 - Borrowings of MoF have a positive effect on non-oil budget balance
- Fiscal dominance

Russia

- Non-Ricardian behaviour
 - oil fund transfers do not affect non-oil budget balance
 - Borrowings of MoF have a negative effect on non-oil budget balance
- Fiscal dominance

Conclusions & further research

Azerbaijan

- Monetary policy - monetary policy is passive
- Fiscal Policy - is active
- Interaction of two policies - non-Ricardian regime

Kazakhstan & Russia

- Passive monetary policy
- Active fiscal policy
- Non-Ricardian regime

Further research

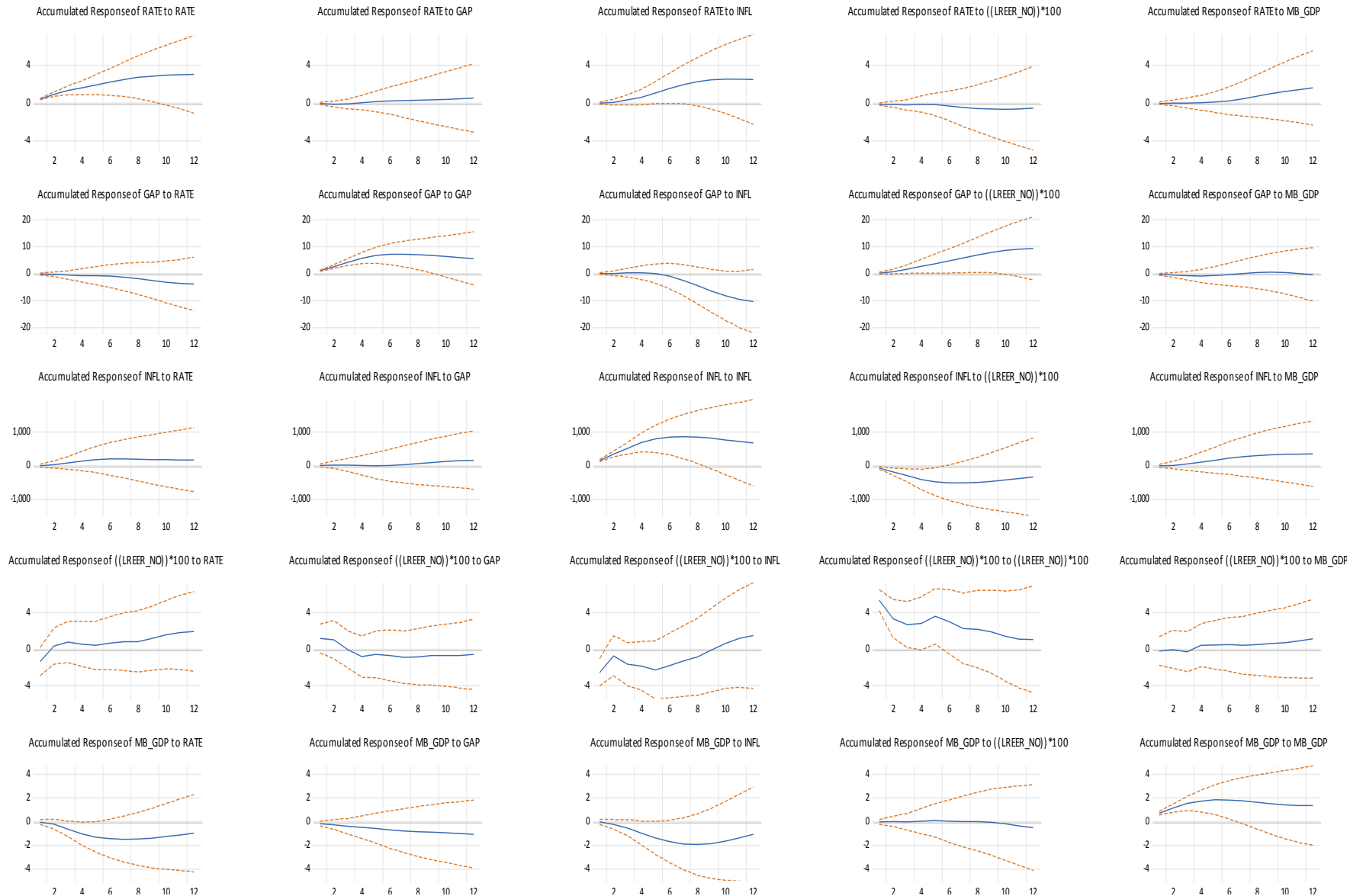
- Markov-Switching VAR model for Russia and Kazakhstan

Thank you for your attention !

Appendix

IRF – monetary policy (Russia)

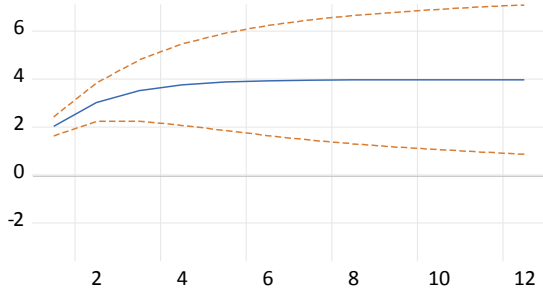
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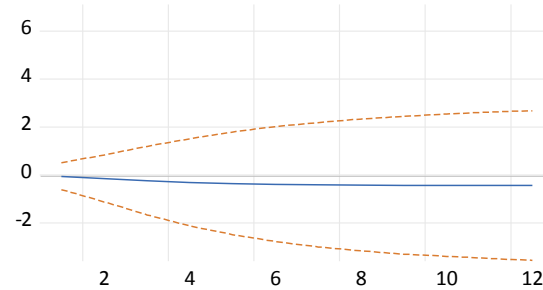
IRF – fiscal policy (Russia)

Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.

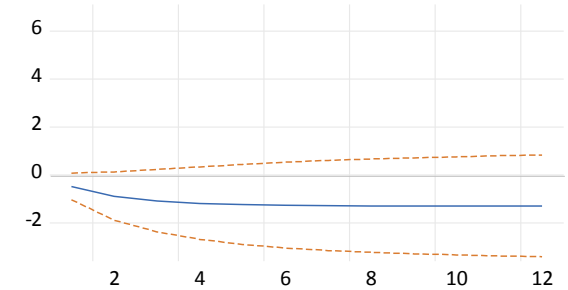
Accumulated Response of D(BB_GDP) to D(BB_GDP)



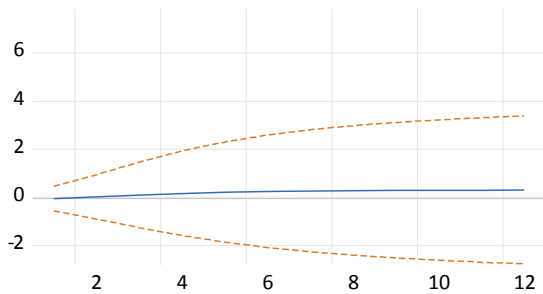
Accumulated Response of D(BB_GDP) to D(SOFAZ_GDP)



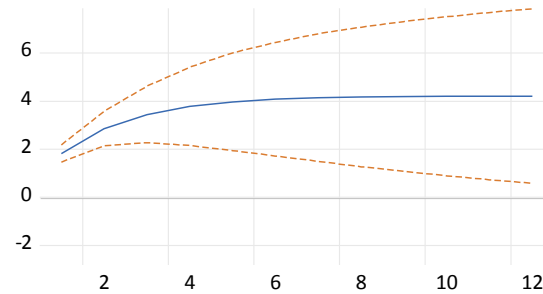
Accumulated Response of D(BB_GDP) to D(TBILLS_GDP)



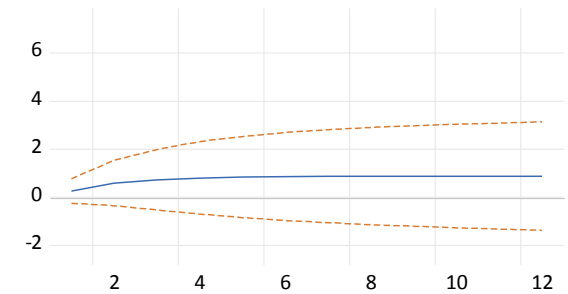
Accumulated Response of D(SOFAZ_GDP) to D(BB_GDP)



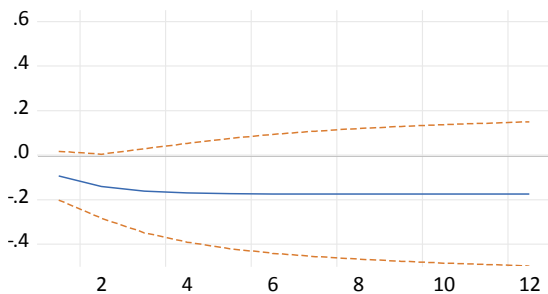
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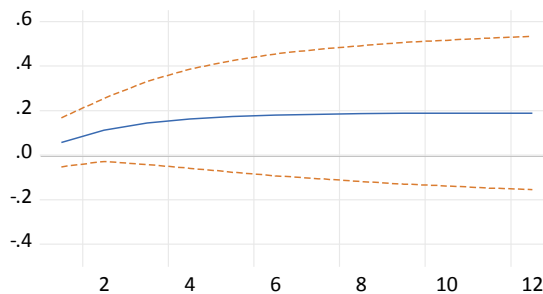
Accumulated Response of D(SOFAZ_GDP) to D(TBILLS_GDP)



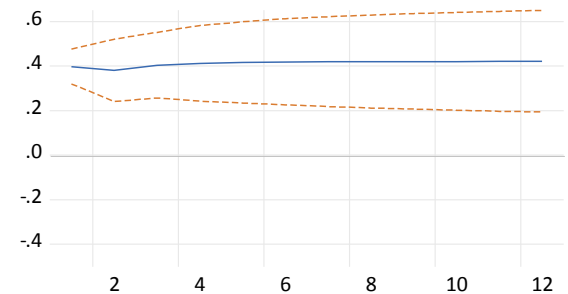
Accumulated Response of D(TBILLS_GDP) to D(BB_GDP)



Accumulated Response of D(TBILLS_GDP) to D(SOFAZ_GDP)

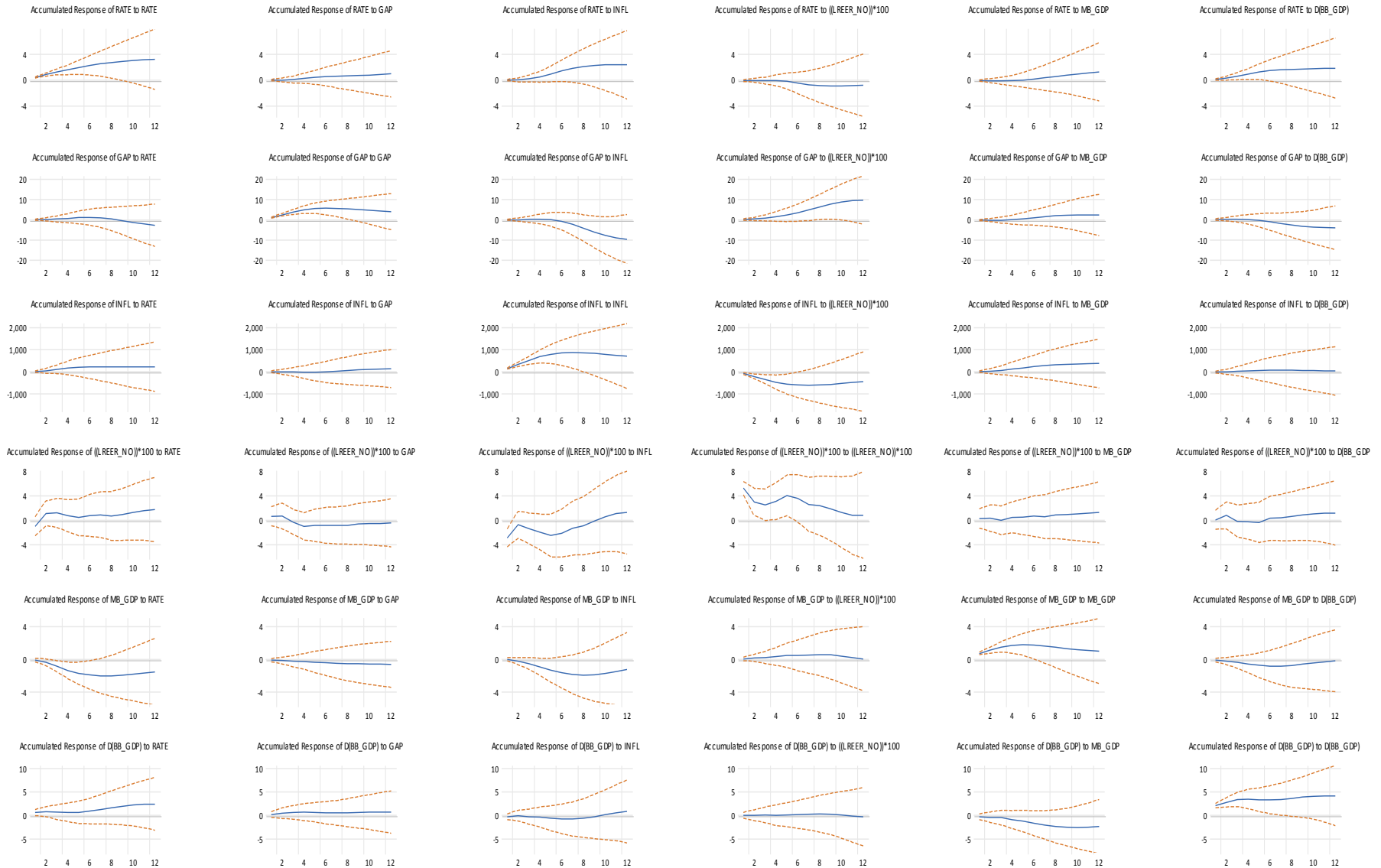


Accumulated Response of D(TBILLS_GDP) to D(TBILLS_GDP)



IRF – interaction 1 (Russia)

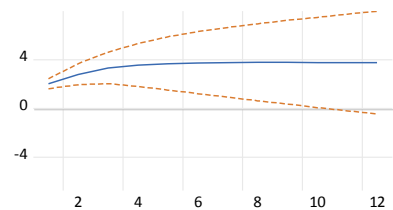
Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.



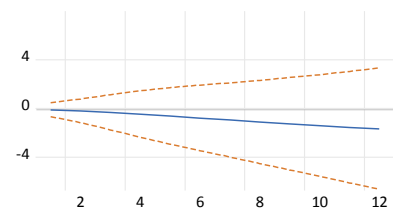
IRF – interaction 2 (Russia)

Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.

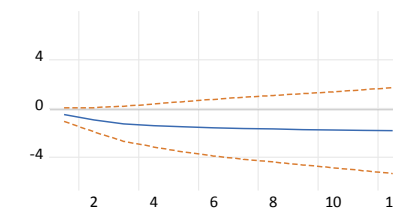
Accumulated Response of D(BB_GDP) to D(BB_GDP)



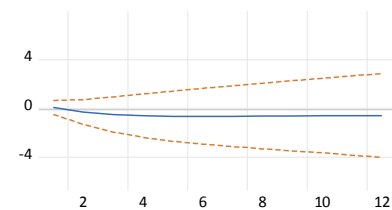
Accumulated Response of D(BB_GDP) to SOFAZ_GDP



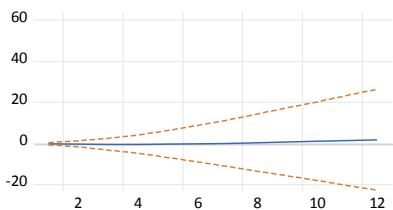
Accumulated Response of D(BB_GDP) to D(TBILLS_GDP)



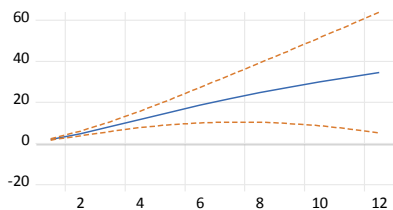
Accumulated Response of D(BB_GDP) to RATE



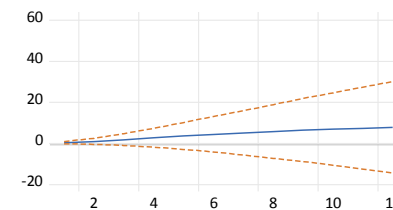
Accumulated Response of SOFAZ_GDP to D(BB_GDP)



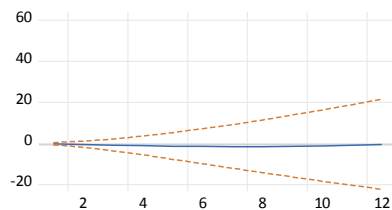
Accumulated Response of SOFAZ_GDP to SOFAZ_GDP



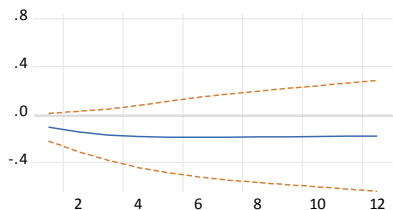
Accumulated Response of SOFAZ_GDP to D(TBILLS_GDP)



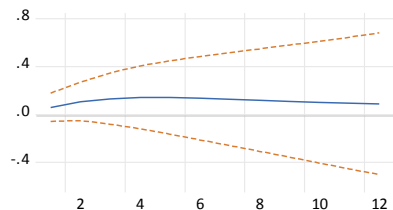
Accumulated Response of SOFAZ_GDP to RATE



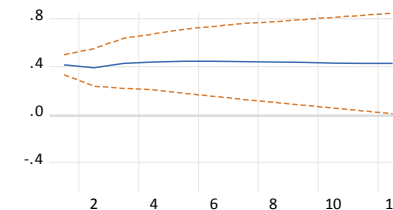
Accumulated Response of D(TBILLS_GDP) to D(BB_GDP)



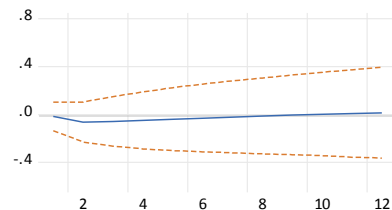
Accumulated Response of D(TBILLS_GDP) to SOFAZ_GDP



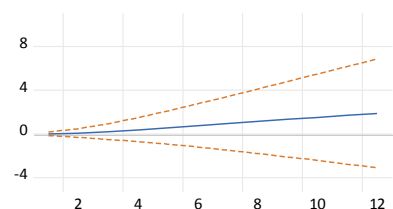
Accumulated Response of D(TBILLS_GDP) to D(TBILLS_GDP)



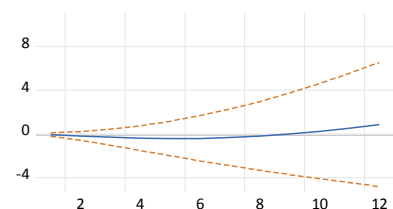
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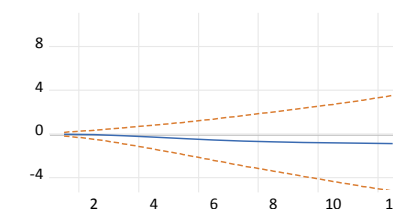
Accumulated Response of RATE to D(BB_GDP)



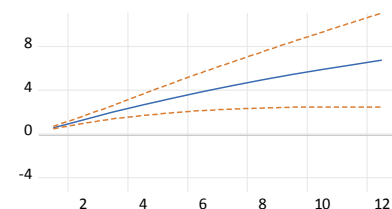
Accumulated Response of RATE to SOFAZ_GDP



Accumulated Response of RATE to D(TBILLS_GDP)



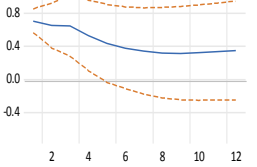
Accumulated Response of RATE to RATE



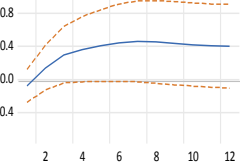
IRF – monetary policy (Kazakhstan)

Accumulated Response to Generalized One S. D. Innovations ± 2 S. E.

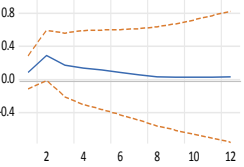
Accumulated Response of D(RATE) to D(RATE)



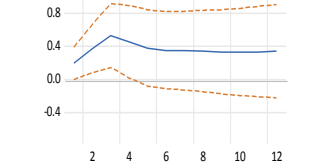
Accumulated Response of D(RATE) to GAP



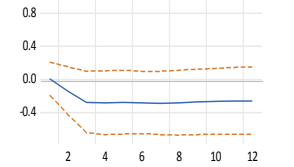
Accumulated Response of D(RATE) to INFL



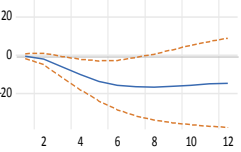
Accumulated Response of D(RATE) to (D(LREER_NO)) *100



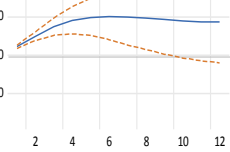
Accumulated Response of D(RATE) to D(MB_GDP)



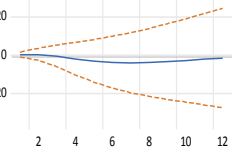
Accumulated Response of GAP to D(RATE)



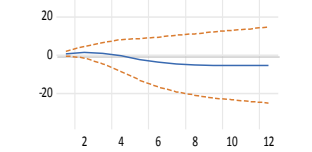
Accumulated Response of GAP to GAP



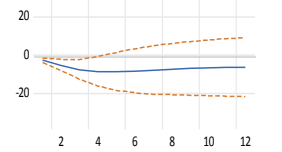
Accumulated Response of GAP to INFL



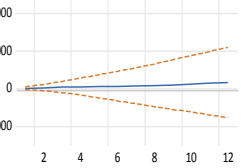
Accumulated Response of GAP to (D(LREER_NO)) *100



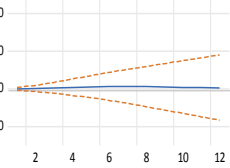
Accumulated Response of GAP to D(MB_GDP)



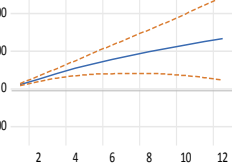
Accumulated Response of INFL to D(RATE)



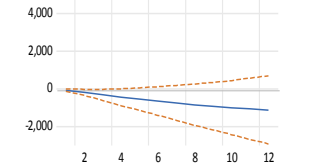
Accumulated Response of INFL to GAP



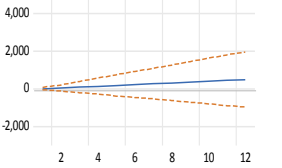
Accumulated Response of INFL to INFL



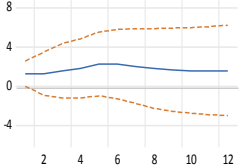
Accumulated Response of INFL to (D(LREER_NO)) *100



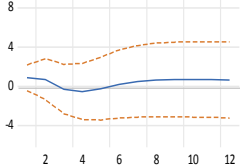
Accumulated Response of INFL to D(MB_GDP)



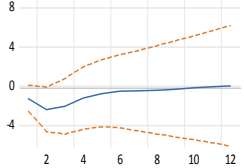
Accumulated Response of (D(LREER_NO)) *100 to D(RATE)



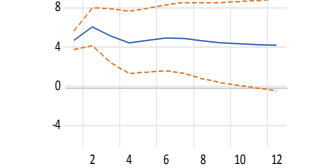
Accumulated Response of (D(LREER_NO)) *100 to GAP



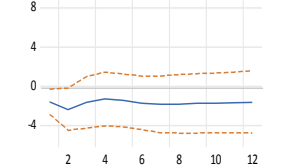
Accumulated Response of (D(LREER_NO)) *100 to INFL



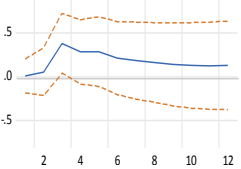
Accumulated Response of (D(LREER_NO)) *100 to (D(LREER_NO)) *100



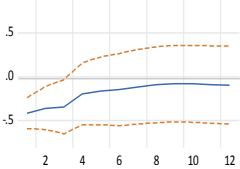
Accumulated Response of (D(LREER_NO)) *100 to D(MB_GDP)



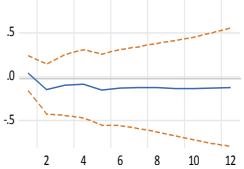
Accumulated Response of D(MB_GDP) to D(RATE)



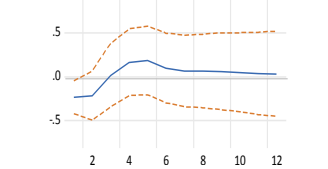
Accumulated Response of D(MB_GDP) to GAP



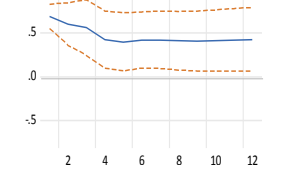
Accumulated Response of D(MB_GDP) to INFL



Accumulated Response of D(MB_GDP) to (D(LREER_NO)) *100



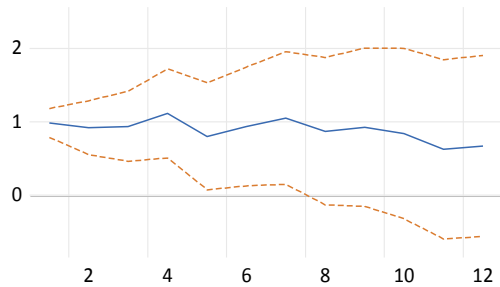
Accumulated Response of D(MB_GDP) to D(MB_GDP)



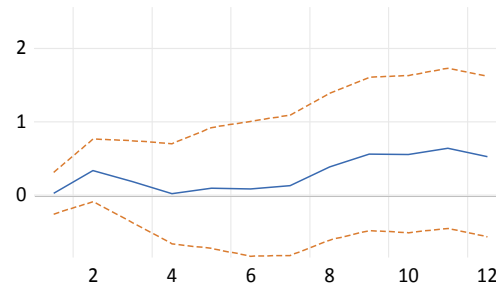
IRF – fiscal policy (Kazakhstan)

Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.

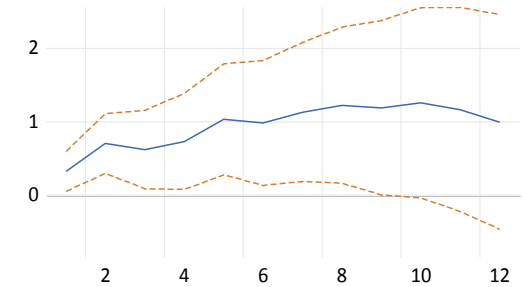
Accumulated Response of D(BB_GDP) to D(BB_GDP)



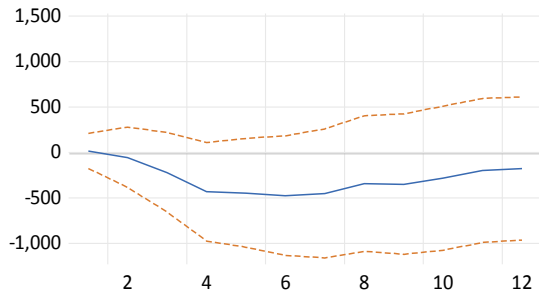
Accumulated Response of D(BB_GDP) to D(SOFAZ_GDP)



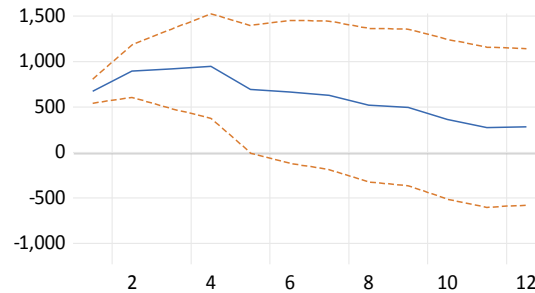
Accumulated Response of D(BB_GDP) to D(TBILLS_GDP)



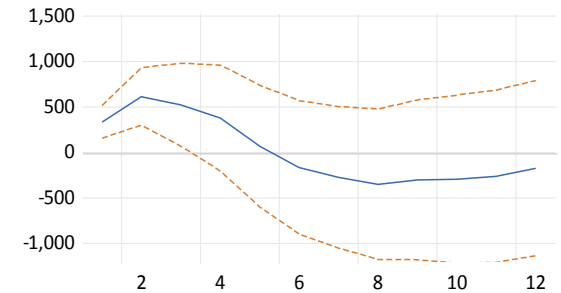
Accumulated Response of D(SOFAZ_GDP) to D(BB_GDP)



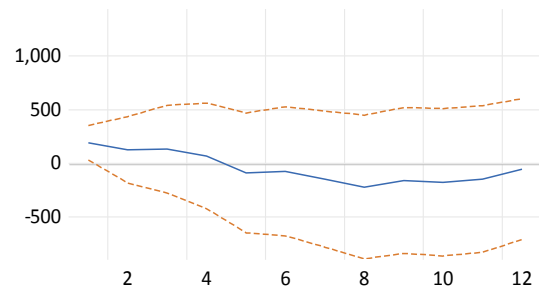
Accumulated Response of D(SOFAZ_GDP) to D(SOFAZ_GDP)



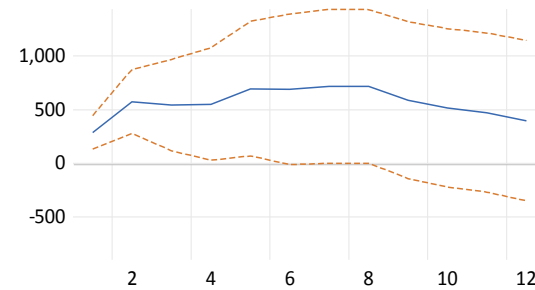
Accumulated Response of D(SOFAZ_GDP) to D(TBILLS_GDP)



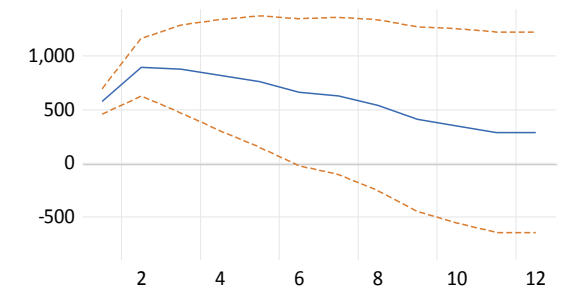
Accumulated Response of D(TBILLS_GDP) to D(BB_GDP)



Accumulated Response of D(TBILLS_GDP) to D(SOFAZ_GDP)

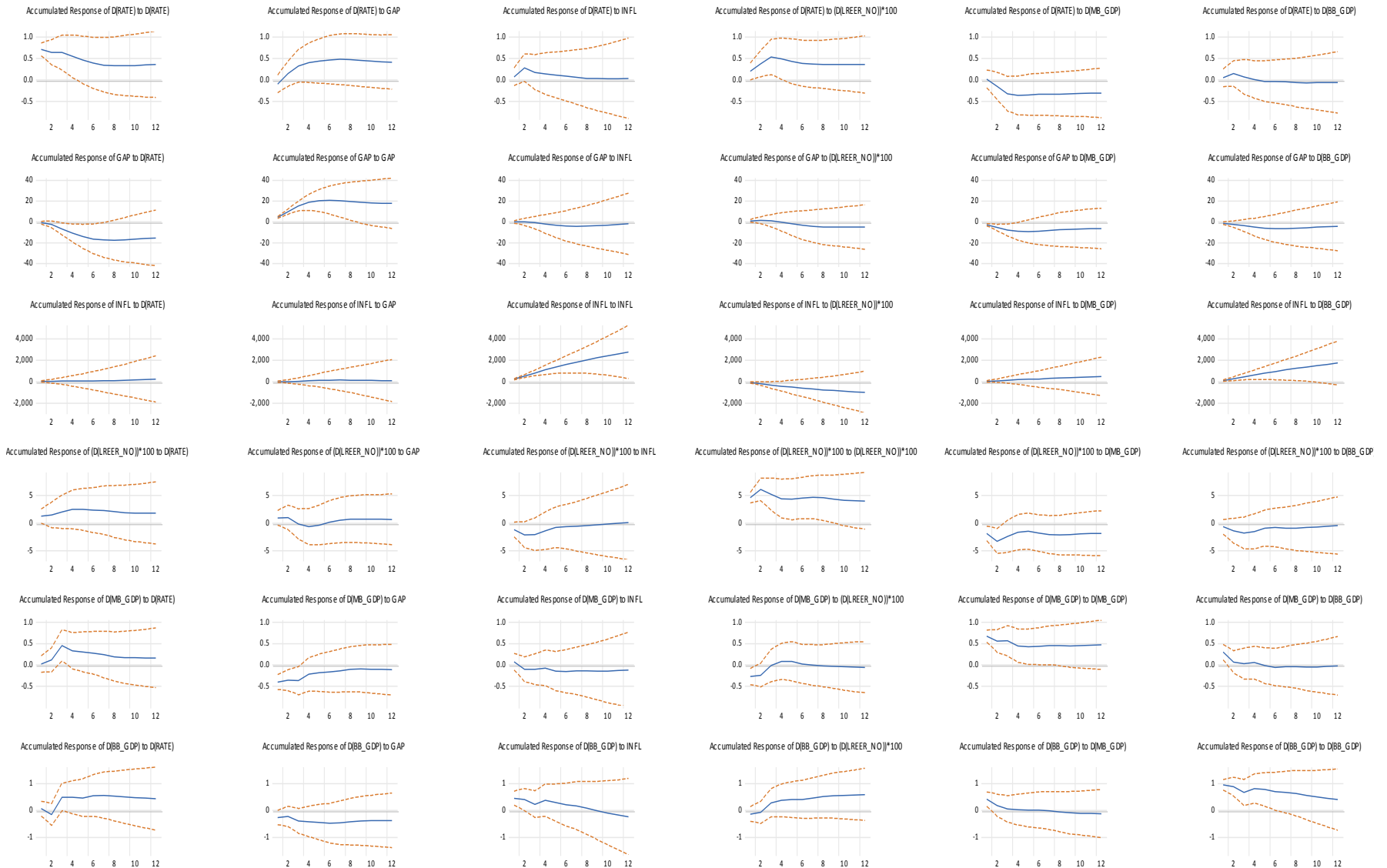


Accumulated Response of D(TBILLS_GDP) to D(TBILLS_GDP)



IRF – interaction 1 (Kazakhstan)

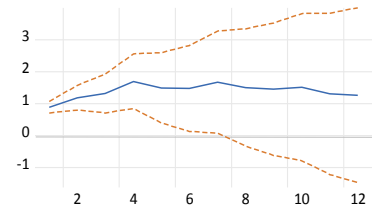
Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.



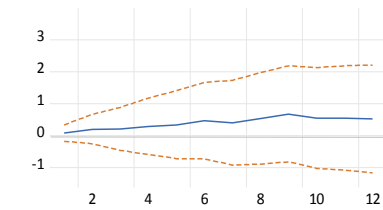
IRF – interaction 2 (Kazakhstan)

Accumulated Response to Generalized One S.D. Innovations ± 2 S.E.

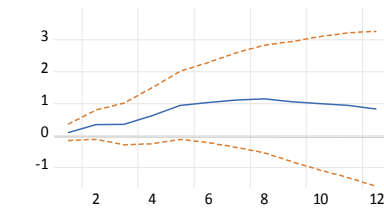
Accumulated Response of D(BB_GDP) to D(BB_GDP)



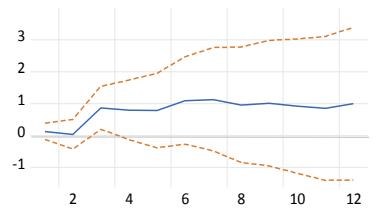
Accumulated Response of D(BB_GDP) to D(SOFAZ_GDP)



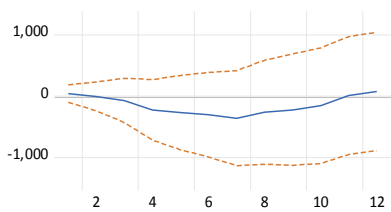
Accumulated Response of D(BB_GDP) to D(TBILLS_GDP)



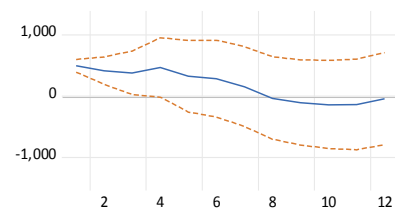
Accumulated Response of D(BB_GDP) to D(RATE)



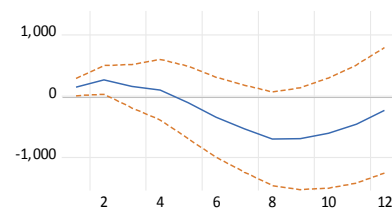
Accumulated Response of D(SOFAZ_GDP) to D(BB_GDP)



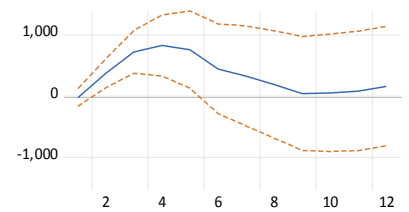
Accumulated Response of D(SOFAZ_GDP) to D(SOFAZ_GDP)



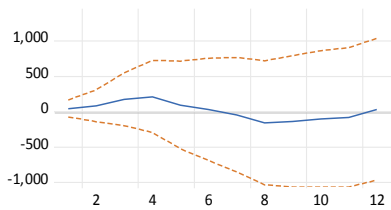
Accumulated Response of D(SOFAZ_GDP) to D(TBILLS_GDP)



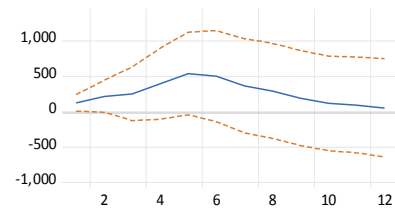
Accumulated Response of D(SOFAZ_GDP) to D(RATE)



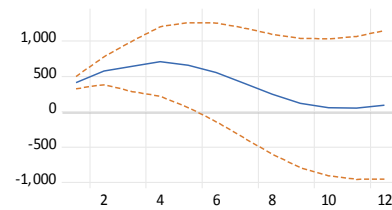
Accumulated Response of D(TBILLS_GDP) to D(BB_GDP)



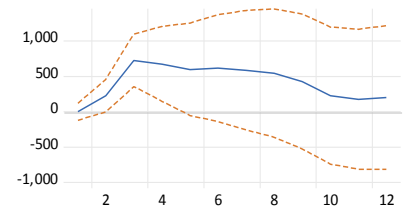
Accumulated Response of D(TBILLS_GDP) to D(SOFAZ_GDP)



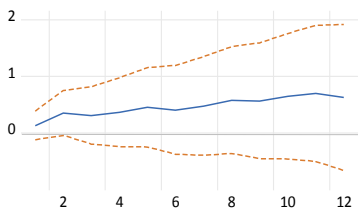
Accumulated Response of D(TBILLS_GDP) to D(TBILLS_GDP)



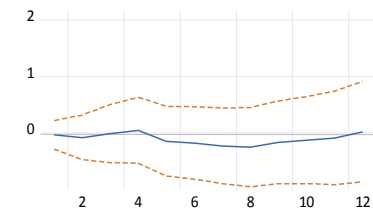
Accumulated Response of D(TBILLS_GDP) to D(RATE)



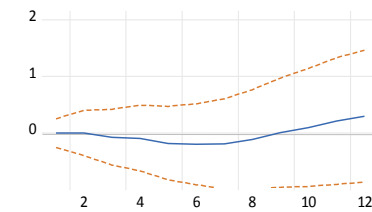
Accumulated Response of D(RATE) to D(BB_GDP)



Accumulated Response of D(RATE) to D(SOFAZ_GDP)



Accumulated Response of D(RATE) to D(TBILLS_GDP)



Accumulated Response of D(RATE) to D(RATE)

