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# Cross-border dynamics of inflationary processes in Eurasian Economic Union (EAEU): an empirical assessment

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# Introduction

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- **Current global trends:**
  - international globalization,
  - integration of national economies,
  - rapid growth of free movement of capital and labor between countries.
- **Positive effects:**
  - increasing production efficiency,
  - reducing barriers to trade,
  - improving household welfare.
- **Negative consequence:**
  - the growth of international spillover and strengthening cross-border transmission of economic and financial shocks
- **From the perspective of monetary policy current trends strengthen the importance of examining the impact of international spillovers on consumer prices**
- **The key question : Can central banks of countries (especially in small open economy ) still control inflation themselves in conditions of close economic relations with other countries?**



# In the context of the EAEU

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- Eurasian Economic Union (EAEU) is a modern example of developing close economic and trade ties at the regional level.
- In particular the absence of trade barriers among the member countries of the Union increases the spillover effects on the mutual influence of inflationary processes in EAEU countries.
- Decreasing of the effectiveness of an independent monetary policy in EAEU countries in case of strengthening of spillover effects of economic integration on inflationary processes in Union's countries.
- The purpose of the study is an empirical assessment of regularities and phenomena in the cross-boundary dynamics of inflationary processes in EAEU.

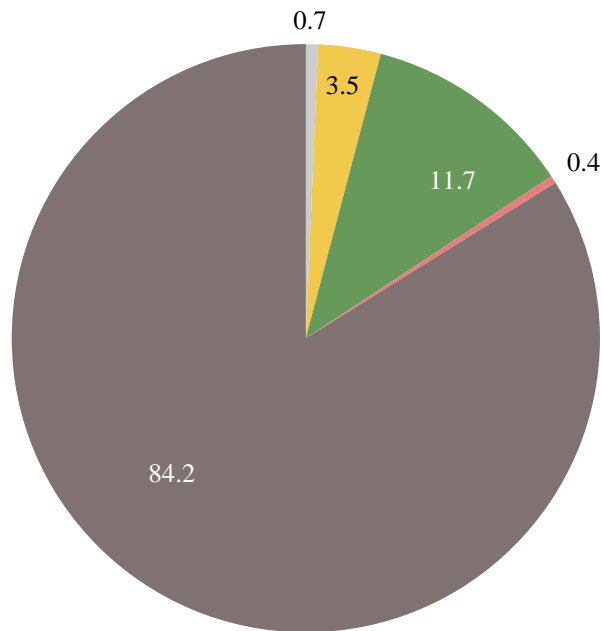


# EAEU: Timeline of evolution

Year of foundation	2000	2007	2007 and 2011	2014
Year of entry	2001	2010	2012	2015
Document	Treaty on the Establishment of the Eurasian Economic Community (EurAsEC)	Treaty on the creation of the common customs territory and establishment of the Customs Union	Declaration on the Eurasian Economic Integration	Treaty on the Eurasian Economic Union (EAEU)
Integration association: participating countries	Eurasian Economic Community (EurAsEC): Kazakhstan, Kyrgyzstan, Belarus, Russia, Tajikistan, Uzbekistan		Common Economic Space (CES): Kazakhstan, Belarus, Russia, Armenia (since 2014), Kyrgyzstan (since 2015)	<b>Eurasian Economic Union (EAEU): Kazakhstan, Belarus, Russia, Armenia, Kyrgyzstan (since August 2015)</b>

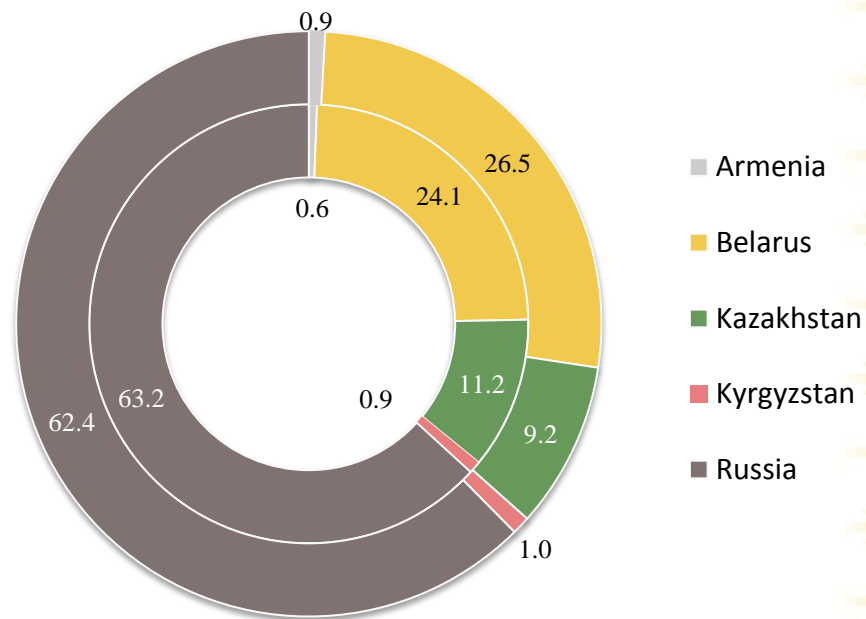
# EAEU: GDP and trade structure

The share of member countries in the total volume of nominal GDP of the EAEU  
in dollar terms at the end of 2015, %



Source: author's calculations according to Trading Economics website

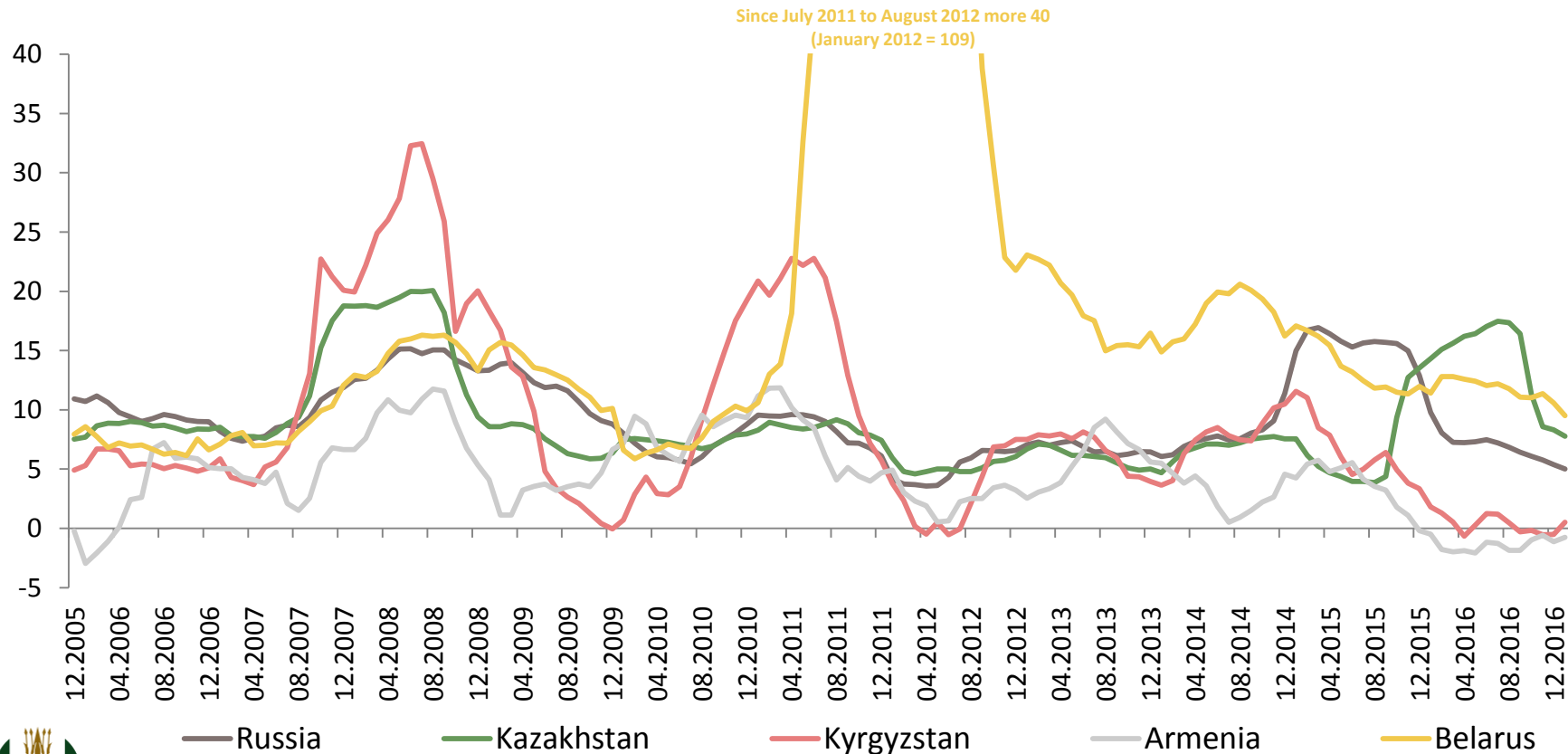
The share of member countries in the total volume of mutual trade turnover the EAEU  
in dollar terms, % (inner circle - 2015, outer circle - 2016)



Source: compiled by the author according to the data of the Eurasian Economic Commission



# Dynamic of inflation in EAEU countries, YoY in %



Source: compiled by the author according to national statistical offices and Thomson Reuters

# EAEU: Correlation analysis of tradable inflation in countries (January 2005 – December 2016)

## «Nominal» Food-CPI, MoM SA

	RUSSIA	KAZAKHSTAN	KYRGYZSTAN	BELARUS	ARMENIA
RUSSIA	1.00				
KAZAKHSTAN	0.41	1.00			
KYRGYZSTAN	0.48	0.58	1.00		
BELARUS	-0.14	-0.03	-0.15	1.00	
ARMENIA	0.20	0.21	0.35	-0.03	1.00

## «Nominal» Nonfood-CPI, MoM SA

	RUSSIA	KAZAKHSTAN	KYRGYZSTAN	BELARUS	ARMENIA
RUSSIA	1.00				
KAZAKHSTAN	0.09	1.00			
KYRGYZSTAN	0.29	0.07	1.00		
BELARUS	0.08	-0.03	0.04	1.00	
ARMENIA	0.31	-0.03	0.07	-0.01	1.00

## «Real» Food-CPI, MoM SA

(adjusted for the exchange rate of USD against local currencies)

	RUSSIA	KAZAKHSTAN	KYRGYZSTAN	BELARUS	ARMENIA
RUSSIA	1.00				
KAZAKHSTAN	0.41	1.00			
KYRGYZSTAN	0.36	0.49	1.00		
BELARUS	0.37	0.25	0.16	1.00	
ARMENIA	0.23	0.28	0.34	0.19	1.00

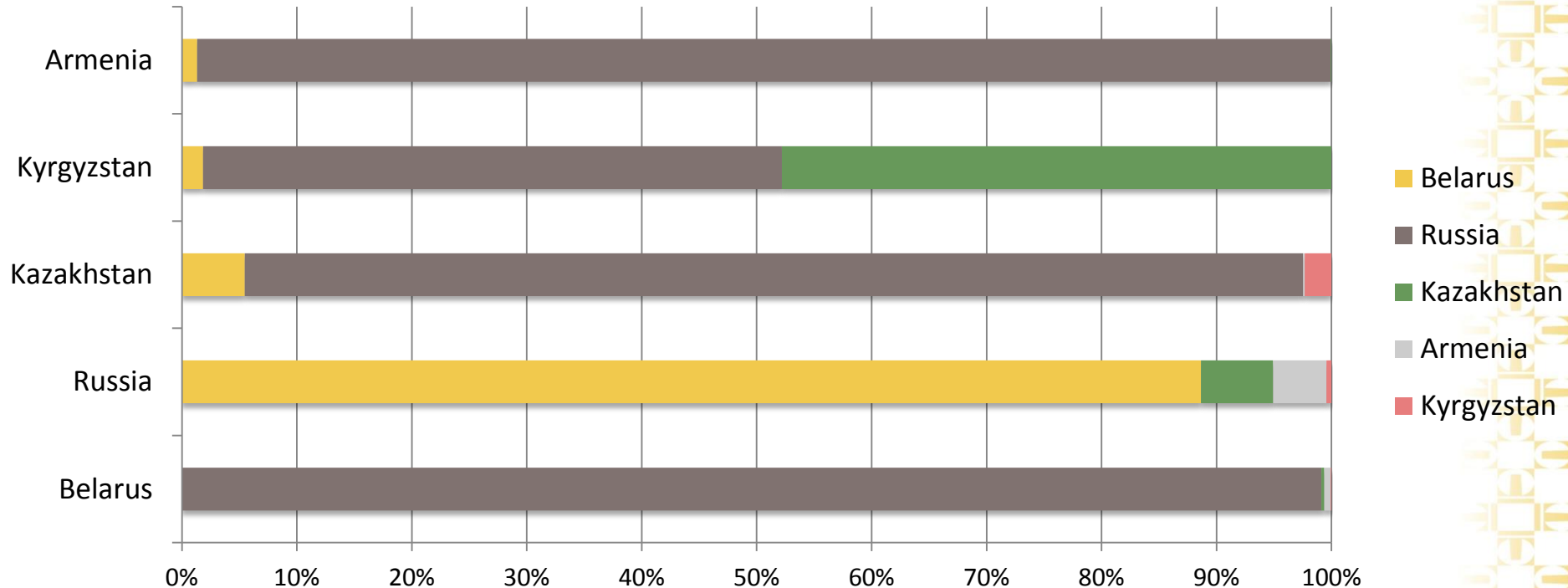
## «Real» Nonfood-CPI, MoM SA

(adjusted for the exchange rate of USD against local currencies)

	RUSSIA	KAZAKHSTAN	KYRGYZSTAN	BELARUS	ARMENIA
RUSSIA	1.00				
KAZAKHSTAN	0.42	1.00			
KYRGYZSTAN	0.30	0.38	1.00		
BELARUS	0.37	0.27	0.13	1.00	
ARMENIA	0.25	0.19	0.28	0.14	1.00

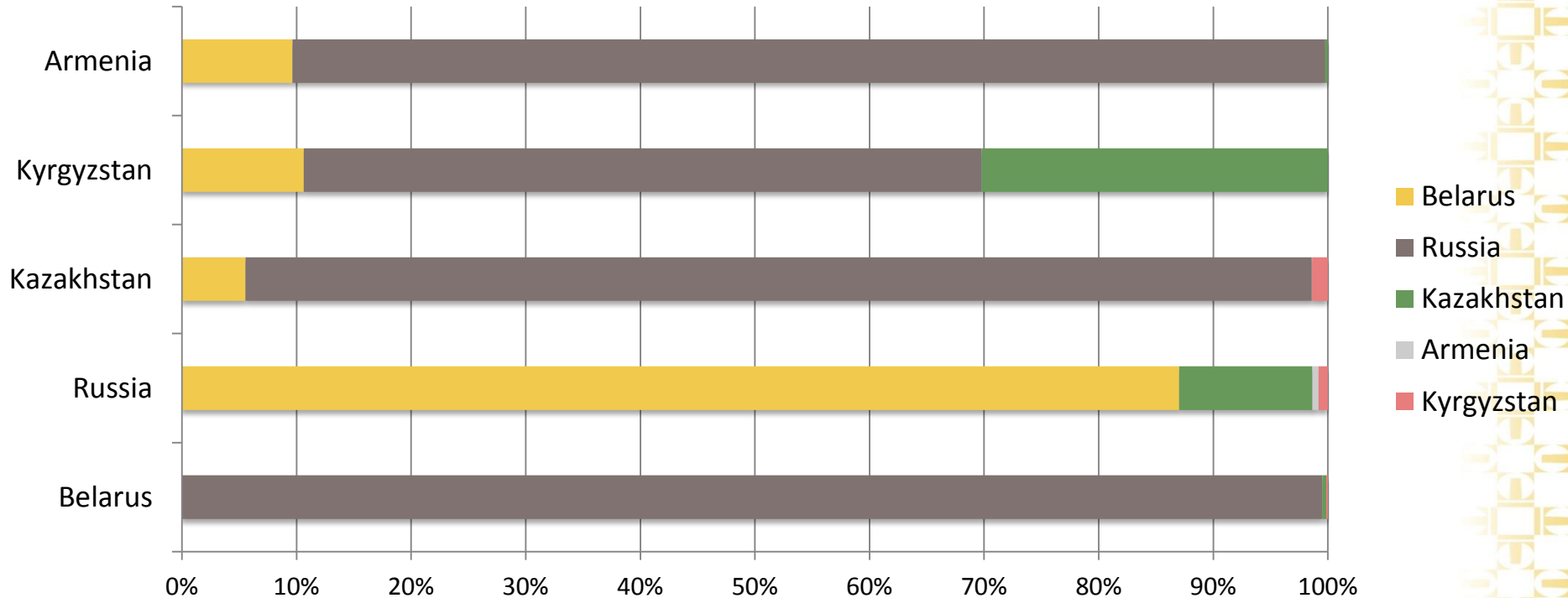


# The structure of food imports of member country from the EAEU, on average for 2015-2016, %



Source: compiled by the author based on the Trade Map data

# The structure of nonfood imports of member country from the EAEU, on average for 2015-2016, %



Source: compiled by the author based on the Trade Map data





# Modeling of cross-border dynamics of inflation in the EAEU

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- The model investigates the dynamics of tradable prices (food CPI and non-food CPI)
- In order to exclude the effect of the exchange rate pass-through, tradable prices (food-CPI and nonfood-CPI) are adjusted for the change of the nominal exchange rate of the US dollar against local currencies of the member countries
- The SVAR model is used as the modelling approach
- The impulse responses functions of the SVAR model are used as a main tool for the analysis of the cross-boundary dynamics of inflationary processes

# SVAR-models

SVAR-models	SVAR-1 (Food-CPI)	SVAR-2 (Nonfood-CPI)
<b>Endogenous variables (symbol and description)</b>	ARM_RCPI_F, BE_RCPI_F, KR_RCPI_F, KZ_RCPI_F, RU_RCPI_F – seasonal-adjusted food-CPI (MoM), respectively, in Armenia, Belarus, Kyrgyzstan, Kazakhstan, Russia adjusted for exchange rate of USD against of local currencies	ARM_RCPI_NF, BE_RCPI_NF, KR_RCPI_NF, KZ_RCPI_NF, RU_RCPI_NF – seasonal-adjusted nonfood-CPI (MoM), respectively, in Armenia, Belarus, Kyrgyzstan, Kazakhstan, Russia adjusted for exchange rate of USD against of local currencies
<b>Exogenous variables (symbol and description)</b>	BRENT - MoM percent change of Brent Oil GOLD - MoM percent change of GOLD FAO_CER - MoM percent change of FAO Cereals Index KCI - MoM percent change of Potassium Chloride Monthly Price	
<b>Observation period</b>	Since February 2005 to December 2016	



# SVAR-models

## Augmented Dickey-Fuller Test

Null Hypothesis: variable has a unit root

Variable	t-Statistic
ARM_RCPI_NF	-9.19*
BE_RCPI_NF	-10.47*
KR_RCPI_NF	-8.36*
KZ_RCPI_NF	-8.51*
RU_RCPI_NF	-8.31*
ARM_RCPI_F	-8.26*
BE_RCPI_F	-10.16*
KR_RCPI_F	-7.53*
KZ_RCPI_F	-7.13*
RU_RCPI_F	-8.38*
BRENT	-8.74*
GOLD	-5.13*
FAO_CER	-7.61*
KCI	-6.88*

## Restrictions matrix of SVAR-1 (food-cpi)

$$\begin{pmatrix} u^{ARMENIA} \\ u^{BELARUS} \\ u^{KYRGYZSTAN} \\ u^{KAZAKHSTAN} \\ u^{RUSSIA} \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 & 0 & a_5 \\ 0 & 1 & 0 & 0 & b_5 \\ 0 & 0 & 1 & c_4 & c_5 \\ 0 & d_2 & d_3 & 1 & d_5 \\ f_1 & f_2 & 0 & f_4 & 1 \end{pmatrix} \times \begin{pmatrix} e^{ARMENIA} \\ e^{BELARUS} \\ e^{KYRGYZSTAN} \\ e^{KAZAKHSTAN} \\ e^{RUSSIA} \end{pmatrix},$$

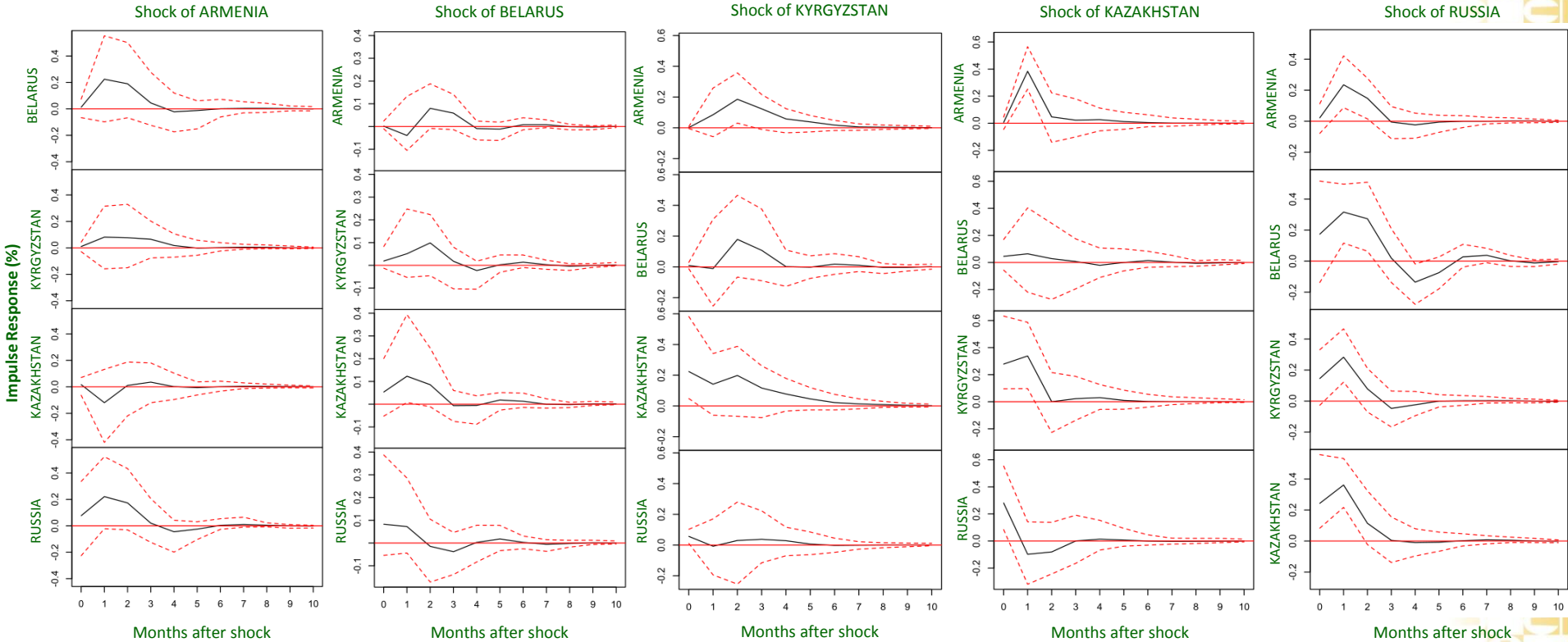
## Restrictions matrix of SVAR-2 (nonfood-cpi)

$$\begin{pmatrix} u^{ARMENIA} \\ u^{BELARUS} \\ u^{KYRGYZSTAN} \\ u^{KAZAKHSTAN} \\ u^{RUSSIA} \end{pmatrix} = \begin{pmatrix} 1 & a_2 & 0 & 0 & a_5 \\ 0 & 1 & 0 & 0 & b_5 \\ 0 & c_2 & 1 & c_4 & c_5 \\ 0 & d_2 & 0 & 1 & d_5 \\ 0 & f_2 & 0 & f_4 & 1 \end{pmatrix} \times \begin{pmatrix} e^{ARMENIA} \\ e^{BELARUS} \\ e^{KYRGYZSTAN} \\ e^{KAZAKHSTAN} \\ e^{RUSSIA} \end{pmatrix},$$

where  $u$  – statistical shocks,  $e$  – structural shocks

\*, \*\* and \*\*\* indicate the statistical significance of the estimated coefficients at 1%, 5%, and 10% significance levels, respectively

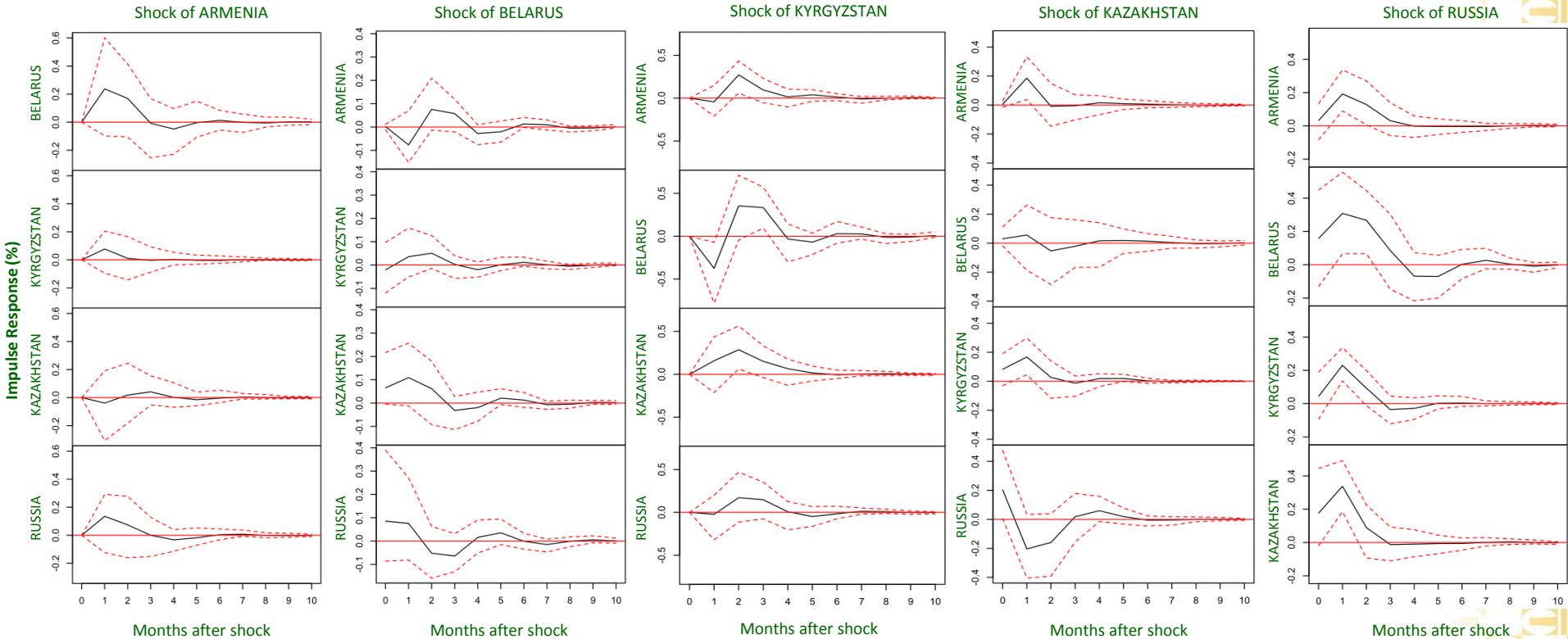
# SVAR Impulse Response Response from 1% Food-CPI Shocks



----- -95% confidence interval for the bootstrapped errors bands



# SVAR Impulse Response from 1% Nonfood-CPI Shocks



----- -95% confidence interval for the bootstrapped errors bands



# Conclusion

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- Russia within the framework of the EAEU plays the role of a "big economy". Against the backdrop of developed export-oriented trade relations with all the countries of the EAEU, the shocks of Russian traded inflation significantly affect the price dynamics in other EAEU countries.
- The countries of the EAEU largely react to the food inflation shocks in Kazakhstan and Armenia, which mainly export wheat and grain products, as well as alcoholic and non-alcoholic beverages
- Consumer prices in Belarus react to price shocks in the EAEU countries "in an unnatural manner", because there are market imperfections and significant administrative and planned regulation in the country's economy. For the same reasons, food and non-food prices in the EAEU countries are also "ambiguous" reacting from economically point of view to the shocks of the traded part of the Belarusian CPI.





# Conclusion

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- The cross-boundary dynamics of inflationary processes within the framework of the EAEU can be strengthened for two reasons:
  - large trade turnover on the background of the presence of common state borders and the development of transport and logistics infrastructure (the impact of Russia's prices on Kazakhstan and Belarus; the mutual impact of prices in Kazakhstan and Kyrgyzstan);
  - high transport and transit costs due to the absence of a common state border (the impact of prices in Kazakhstan and Kyrgyzstan on prices in Armenia; the impact of prices in Armenia on Belarus and Russia).
- Further strengthening of the cross-boundary dynamics of inflationary processes in the EAEU can reduce efficiency and create additional external risks of monetary policy that are independently conducted in the member countries



# Thank you for your attention



Olzhas Tuleuov (email: [Olzhas.Tuleuov@nationalbank.kz](mailto:Olzhas.Tuleuov@nationalbank.kz)). «Cross-border dynamics of inflationary processes in Eurasian Economic Union (EAEU): an empirical assessment». 14th Annual NBP-SNB Joint Seminar Zurich, May 10-11, 2017.

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