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***SAMARKAND Conference***  
2-4 November 2016, Uzbekistan

***MATRACC Project: Regional Trade and Supply Chains  
(IAMO Organized Session)***

***Oleksandr Perekhozhuk***  
***IAMO, Germany***

# IAMO Organized Session

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Wednesday, November 2, 2016, 17:30 - 19:00, Lecture Hall

Session Chair: **Oleksandr Perekhozhuk**

**MATRACC Project: An Overview of Empirical Methods and Results**

Oleksandr Perekhozhuk (IAMO, Germany)

**Comparative Analysis of Wheat Supply Chains in Armenia and Uzbekistan**

Ihtiyor Bobojonov (IAMO, Germany)

**CIS what market integration**

Ivan Djuric (IAMO, Germany)

**Measuring the Degree of Oligopsony Power in Kazakh Grain Processing**

**Industry: Evidence from GIM Approach**

Giorgi Chezha (IAMO, Germany)

***SAMARKAND Conference***  
2-4 November 2016, Uzbekistan

***MATRACC Project:  
An Overview of Empirical Methods and Results***

***Oleksandr Perekhozhuk***  
***IAMO, Germany***

# Project Overview

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## **Project topic:**

- The Global Food Crisis – Impact on Wheat Markets and Trade in the Caucasus and Central Asia and the Role of Kazakhstan, Russia and Ukraine (MaTraCC)

## **Funding organization:**

- Volkswagen Foundation (Volkswagen-Stiftung), Germany

## **Funding period:**

- Five-year period from 2012 to 2017

## **Project staff:**

- 1 Post-Doc
- 6 PhD Students
- 6 IAMO Senior Researchers

# Project Partners

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- Leibniz Institute of Agricultural Development in Transition Economies (IAMO), **Germany**
- International Center for Agribusiness Research and Education (ICARE), **Armenia**
- The Fund "Georgian Center for Agribusiness Development" (GCAD), **Georgia**
- Analytical Center of Economic Policy in the Agricultural Sector (ACEPAS), **Kazakhstan**
- Higher School of Economics Moscow (HSE), **Russia**
- All-Russian Nikonov-Institute of Agrarian Problems and Informatics of the Russian Academy of Agricultural Sciences (VIAPI), **Russia**
- Samarkand Agricultural Institute (SAI), **Uzbekistan**
- Central Asia and Caucasus Association of Agricultural Research Institutions (CACAARI), **Uzbekistan**

# Working Groups and Sub-Projects

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## **WG-1: Transmission of Market Prices:**

- From the world market to the domestic markets in the KRU and CCA countries along the wheat supply chain (**SP-1**)
- Spatial price transmission between regional markets within a country (**SP-2**)

## **WG-2: Market Structure and the Supply Chain:**

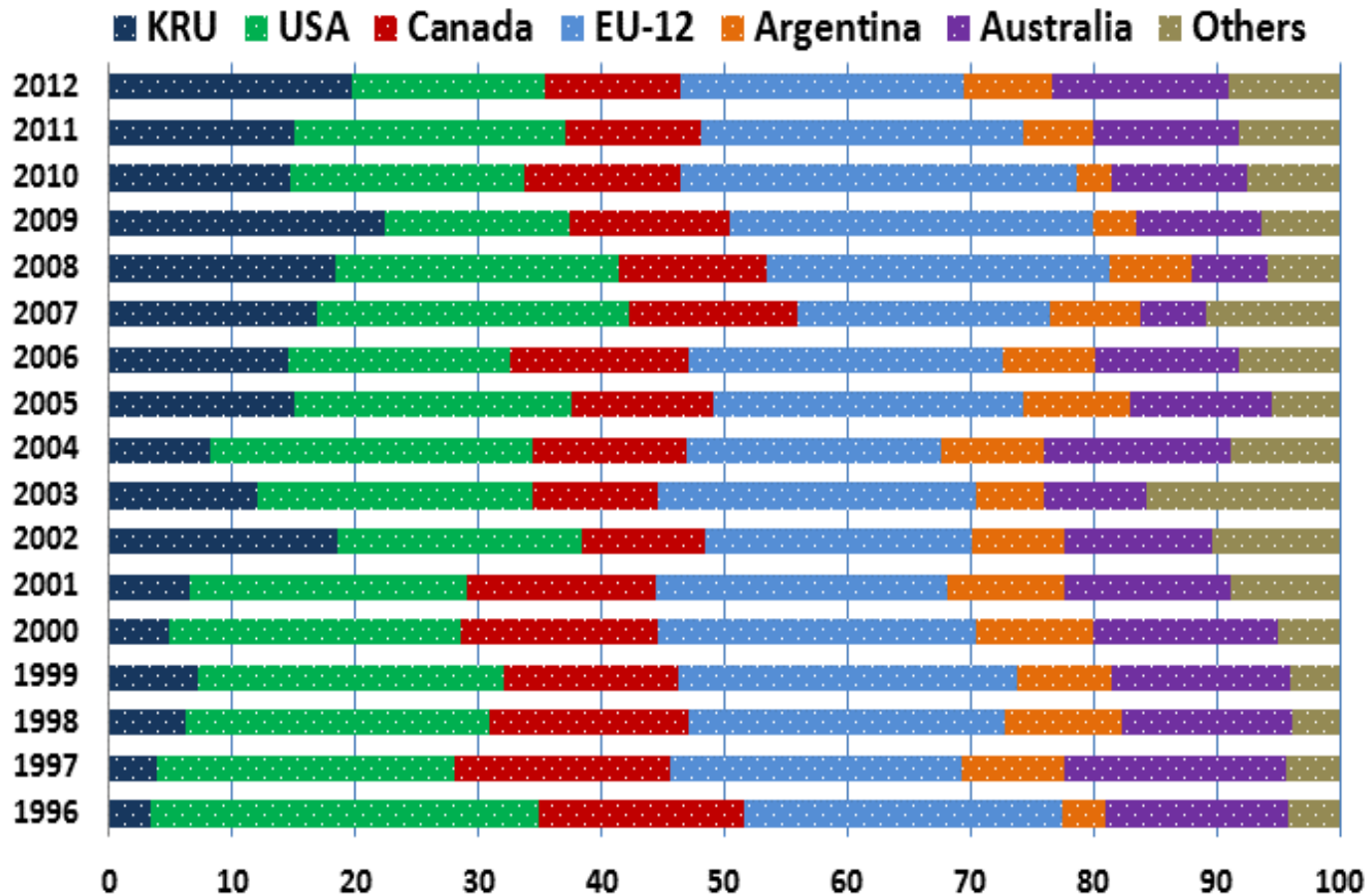
- Market interventions and regulations in the wheat supply chain of the CCA and KRU countries (**SP-3**)
- Comparative analysis of two suppliers (**SP-4**)
- Comparative analysis of two CCA countries (**SP-5**)

## **WG-3: Trade Patterns and Relationships:**

- Export pricing behavior of the KRU towards the CCA countries (**SP-6**)
- Impact on the trade pattern in terms of qualities and trading partners (**SP-7**)

# Background and motivation

Figure 1. Market shares of major wheat exporters in the world market (%)

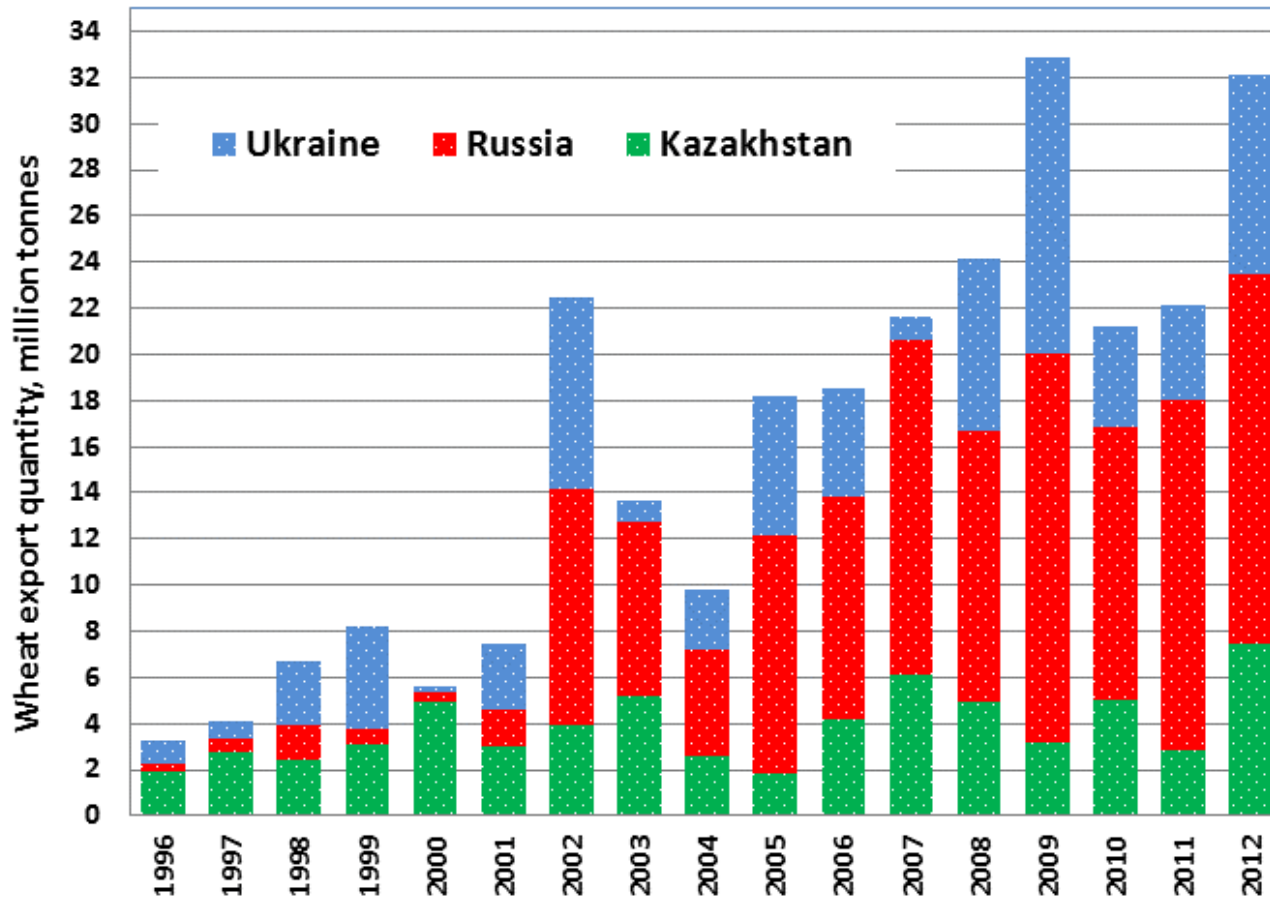


- KRU countries became world's largest wheat exporters;
- the shares of the world's main wheat exporters were significantly affected;
- the competition should be increased;

Source: Own calculations based on FAO statistics (1996-2011) and UN COMTRADE statistics (2012)

# Background and motivation (2)

Figure 2. Total wheat export quantity of KRU countries

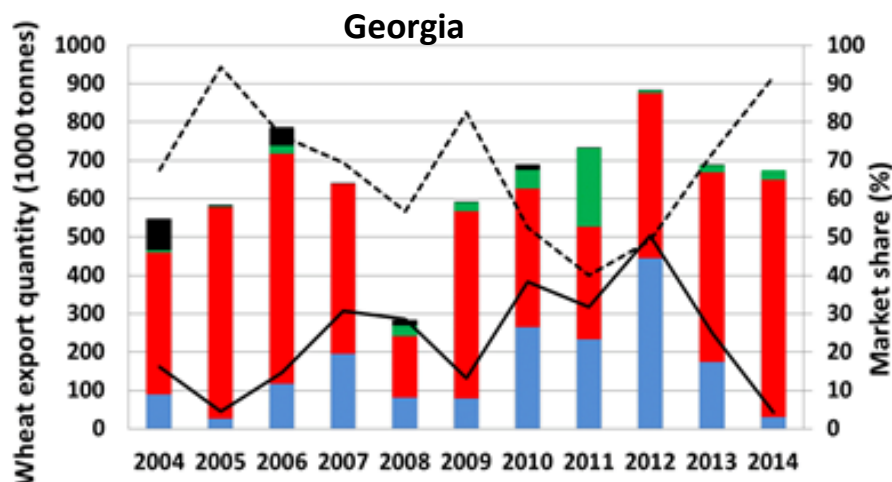
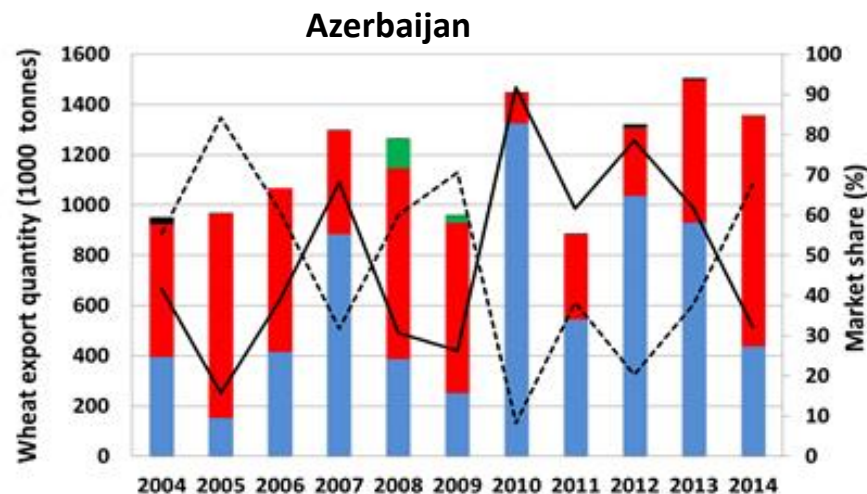
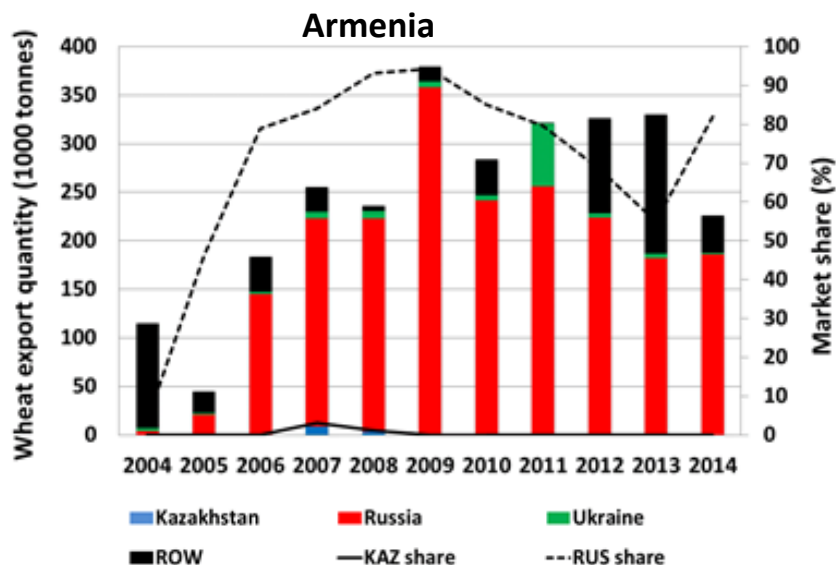


Source: Own calculations based on FAO statistics (1996-2011) and UN COMTRADE statistics (2012)

- Russia has developed into one of the leading actors in the world market;
- Russia annually exported between 11 and 17 million MT wheat;
- Kazakhstan exported between 3 and 7 million MT wheat;
- Ukraine exported between 4 and 12 million MT wheat;

# Background and motivation (3)

Figure 3. Wheat export quantity and market share of KRU countries in South Caucasian markets



- Market shares of Russian exporters in Armenia is 85% (on average), in Azerbaijan - 50%, and in Georgia - 75%;
- Market shares of Kazakh exporters in Azerbaijan is 50% and Georgia - 30%;

Source: Own contribution based on UN COMTRADE statistics

## **Objectives of Empirical Studies:**

- (1) to apply an econometric analysis of oligopolistic behaviour of Kazakh and Russian exporters;
- (2) to investigate whether Kazakh and Russian wheat exporters are able to exercise market power in South Caucasian wheat market;
- (3) to measure the extent of competition in Armenian, Azerbaijani and Georgian wheat markets.

# Approaches and methods

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Approaches and methods for the econometric analysis of market power in the international markets:

- **Pricing-to-Market (PTM)** approach introduced by Krugman (1986);
- **Residual Demand Elasticity (RDE)** approach developed by Baker and Bresnahan (1988);
- **General Identification Method (GIM)** demonstrated by Bresnahan (1982) and Lau (1982).

# Overview of RDE Studies

| Authors (Year)                       | Export country/firm                        | Import country  | Market/Product    | Period                     | Data | Model | Method | Result   |
|--------------------------------------|--|---|-------------------|----------------------------|------|-------|--------|--|
| Baker & Bresnahan (1988)             | Anheuser-Busch<br>Coors<br>Pabst           | n/a   | Beer              | 1962-1982                  | A    | ME    | 3SLS   | -0.31***<br>-0.75***<br>-0.06                                  |
| Carter, MacLaren & Yilmaz (1999)     | Australia<br>Canada<br>USA                 | Japan   | Wheat             | 1970-1991                  | Q    | SE    | 2SLS   | -0.08<br>-0.49<br>-0.93***                                     |
| Yang & Lee (2001)                    | Australia<br>Canada<br>USA<br>China<br>USA | South Korea   | Wheat<br><br>Corn | 1993-1999<br><br>1991-1999 | Q    | SE    | IDM    | -0.14**<br>-0.15***<br>-0.38**<br>-0.05<br>-0.03               |
| Cho, Jin & Koo (2002)                | USA  | Indonesia<br>Japan<br>Korea<br>Malaysia<br>Philippines<br>Singapore | Wheat             | 1973-1994                  | A    | ME    | SUR    | -0.01<br>-0.11<br>-0.61***<br>-0.12***<br>-0.84***<br>-0.16*** |
| Glauben & Loy (2003)                 | Germany                                    | Canada<br>France<br>Unit. Kingdom<br>USA                            | Beer              | 1991-1998                  | M    | SE    | IV     | 0.28<br>-0.71**<br>0.58***<br>0.19*                            |
| Tasdogan, Tsakiridou & Mattas (2005) | Greece<br>Italy<br>Spain                   | EU  | Olive Oil         | 1970-2001                  | A    | SE    | 2SLS   | -0.08**<br>-0.36***<br>-0.16***                                |

# Residual Demand Elasticity model

$$\ln P_{mt}^{ex} = \lambda_m + \eta_m \ln \hat{Q}_{mt}^{ex} + \alpha'_m \ln \mathbf{Z}_{mt} + \beta'_m \ln \mathbf{W}_{mt}^N + \varepsilon_{mt},$$

$P_{mt}^{ex}$  - export prices expressed in local currency of importing country;

$m$  - importing market/country;

$t$  - time trend;

$\lambda_m, \eta_m, \alpha', \beta'$  - estimating parameters;

$\hat{Q}_{mt}^{ex}$  - instrumented export quantity;

$\mathbf{Z}_{mt}$  - vector of demand shifters of  $m$  number of destinations (e.g. GDP of an importing country, time trend);

$\mathbf{W}_{mt}^N$  - vector of cost shifters (e.g. producer price of competing country, destination-specific exchange rate);

$N$  - number of competitors in a importing market/country;

$\varepsilon_{mt}$  - error term.

# Parameters of RDE model

The parameter  $\eta_m$  is coefficient of inverse residual demand elasticity:

- $\eta_m < 0$  indicate that the market for wheat is imperfectly competitive and the exporting country is a price maker.
- $\eta_m = 0$  indicate that the market for wheat is perfectly competitive and the exporting country faces a perfectly elastic demand curve.

The parameter  $\beta'$  is coefficient of cost shifters:

- $\beta' > 0$  indicate that wheat from a competing country is a perfect substitute to a wheat from a exporting country and means that these two countries compete in importing country and intervene with each other's market power;
- $\beta' < 0$  indicate that wheat from of the competing country is an imperfect substitute to a wheat from the exporting country.

# 3SLS results for Kazakhstan

| Parameter | Variable      | Azerbaijan | Georgia   |
|-----------|---------------|------------|-----------|
| $\eta_m$  | EQ            | -0.0122    | -0.0131   |
| $\beta$   | ER KZT        | 1.1549***  | 0.0918*** |
| $\beta$   | ER RUB        | -0.2312    | -0.2450   |
| $\beta$   | ER UAH        | 0.1288     | 0.6123**  |
| $\beta$   | PP KAZ        | 0.5623***  | 0.4394*** |
| $\beta$   | PP RUS        | 0.5167***  | 0.2588**  |
| $\beta$   | PP UKR        | 0.1986*    | 0.2826*** |
| $\alpha$  | GDP           | 0.1261**   | 0.0785    |
| $\alpha$  | TIME          | -0.0111*   | 0.0055    |
|           | Constant      | -3.4184    | -3.9729   |
|           |               |            |           |
|           | Obs.          | 42         | 42        |
|           | R-squared     | 0.9237     | 0.9291    |
|           | DW statistics | 1.8879     | 1.9117    |

Notes: Asterisks \*\*\*, \*\* and \* denote statistical significance at the 1%, 5% and 10% levels, respectively.

# 3SLS results for Russia

|           | Variable      | Armenia    | Azerbaijan | Georgia    |
|-----------|---------------|------------|------------|------------|
| Parameter | EQ            | -0.1510*** | -0.0045    | -0.0267*   |
| $\eta_m$  | ER KZT        | -0.8345    | 0.7676*    | 0.0357*    |
| $\beta$   | ER RUB        | 0.7553     | 0.3308     | 0.3586     |
| $\beta$   | ER UAH        | 0.0128     | 0.0826     | 0.1766     |
| $\beta$   | PP KAZ        | 0.0647     | 0.0785     | -0.0263    |
| $\beta$   | PP RUS        | 0.5203**   | 0.4978***  | 0.5089***  |
| $\beta$   | PP UKR        | 0.2983     | 0.2936***  | 0.3322***  |
| $\beta$   | GDP           | 0.4328***  | 0.0467     | 0.3101***  |
| $\alpha$  | TIME          | -0.0140*   | 0.0033     | -0.0080*   |
| $\alpha$  | Constant      | -5.0993    | 2.2424     | -5.5803*** |
|           |               |            |            |            |
|           | Obs.          | 39         | 39         | 39         |
|           | R-squared     | 0.7181     | 0.9280     | 0.9592     |
|           | DW statistics | 2.1284     | 1.7237     | 1.4569     |

Notes: Asterisks \*\*\*, \*\* and \* denote statistical significance at the 1%, 5% and 10% levels, respectively.

# Summary and conclusions

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## **Residual demand elasticity parameter:**

- (1) Kazakh wheat exporter faces a perfectly elastic demand curve in Armenian and Georgian wheat markets, the market is perfectly competitive;
- (2) Russia has market power in Armenian and Georgian markets. Market power of Russian wheat exporters is much stronger in Armenia (markup 15.1%) than in Georgia (markup 2.7%) wheat market.

## **Cost shifter parameters:**

- (1) Both Kazakh and Russian exporters intervene to each other's market powers in Azerbaijani and Georgian markets;
- (2) Neither Kazakh, nor Ukrainian exporters are able to restrict Russian exporters' market powers in Armenian market;
- (3) Ukrainian exporters intervene both Kazakh and Russian exporters' market powers in Azerbaijani and Georgian markets. However, they constrain market powers more strongly in Georgia in compare to Azerbaijan;

# Summary and conclusions (2)

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## **Cost shifter parameters (continued):**

- (4) Kazakh exporters' market powers are constrained more effectively by Russian exporters in Azerbaijan, while by Ukrainian exporters in Georgia;
- (5) Russian exporters' market powers are constrained more effectively by Kazakh exporters in Azerbaijan, while by Ukrainian exporters in Georgia.

## **Demand shifter parameters:**

- (1) An increase in Azerbaijani GDP stimulate wheat exports from Kazakhstan;
- (2) An increase in Armenian and Georgian GDPs stimulate wheat exports from Russia.

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**Thank you for your attention**