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Overview of the MATRACC Project – Research questions, data, major outcomes

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

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What is it about?

- Investigation of wheat markets in the Caucasus and Central Asia and the major supplier countries of this region, namely Kazakhstan, Russia and Ukraine (KRU)
- Capacity building
Project Background (I)

Research component

• Long-term rising prices and increasing price volatility on the world markets for agricultural raw materials have considerably affected the countries in Central Asia and the Caucasus.

• However, there is nearly no empirical evidence on how wheat markets in this region work and how prices are formed.

• The MATRACC project wants to close this research gap. Three different but closely connected working groups carry out empirical analyses on

  (i) price transmission and price volatility,
  (ii) structure of the wheat supply chains, and
  (iii) wheat trade patterns and relationships.
Project Background (II)

Capacity building

- PhD students coming predominantly from the CCA countries are trained at IAMO working in an international research team;
- PhD students take part in graduate courses, PhD workshops and present their work at international conferences;
- Building up sustainable research cooperation with local project partners
Local Project Partners

• 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
• World Bank
Wheat in the CAC region (I)

**Political dimension** of wheat after independence

- Wheat is considered a **strategic crop**
- Particularly important for food security and thus wheat production has been prioritized by most governments
- **Wheat self-sufficiency as goal in most countries**
  - Wheat Seed Production Development Plan 2010-2014 for the Republic of Armenia
  - State procurement mechanism for wheat in Uzbekistan
  - State managed crop allocation in Turkmenistan
  - Per hectare subsidy for wheat production in Azerbaijan
- Wheat expansion at the expense of other commodities
Wheat in the CAC region (II)

Per-Capita Consumption of Wheat in kg, 2009

- Kazakhstan
- Kyrgyz Republic
- Tajikistan
- Turkmenistan
- Uzbekistan
- Armenia
- Azerbaijan
- Georgia
- Germany

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Wheat in the CAC region (III)

Source: Prishchepov
Wheat in the CAC region (IV)

Share of wheat from Kazakhstan, Russia and Ukraine (KRU) in total wheat imports, average 2010-2012

Source: Own calculation based on FAOStat
International wheat markets

Market shares of major wheat exporting countries in international wheat trade, 1996-2012

Source: Gafarova et al. (2014)
Project Team and Working Groups

- 6 PhD students plus 1 Post-Doc financed by the Volkswagen foundation
- 6 IAMO Senior Researcher as Supervisor/Coordinator

The research project is organized around three working groups (WG) which address pricing, market and trade issues from different perspectives

- Transmission of Market Prices (WG-I)
- Market Structure and the Supply Chain (WG-II)
- Trade Patterns and Relationships (WG-III)
Research objectives

• Focuses on the analysis of price transmission between the world and the domestic wheat markets as well as within domestic markets;

• The knowledge of the degree of the transmission of price changes from the world to local markets and an understanding of determining factors is decisive for correctly assessing the implications and welfare effects of high prices.

• For example, welfare assessments are often based on the assumption of complete price transmission. If this assumption is violated, i.e., price transmission is incomplete, the derived welfare assessments might be strongly biased.
Research questions:

• To what extent are high and volatile food prices transmitted from the world market to local markets?
• To what extent do political market interventions, trade costs and market power in the supply chain explain country differences?
• How are price changes transmitted across regional markets within a country?
Team: Dmytro Serebrennikov, Miranda Svanidze, Linde Götz

Topics addressed:

• **Spatial integration of Russian wheat markets** (Dmytro Serebrennikov)

• **Wheat market integration in the regions of South Caucasus and Central Asia: evidence from Armenia, Azerbaijan, Georgia and Kyrgyzstan** (Miranda Svanidze)
Spatial Integration of Russian domestic wheat markets (Serebrennikov et al., 2014)

Research aim:
Analyze spatial integration of major wheat growing regions in Russia

Background: Russia implemented several policies in recent years to restrict grain exports such as export bans and export taxes

Methodology: Threshold autoregressive model (TAR)

Data: Regional wheat prices and trade flows for Jan 2005 - Dec 2012

Preliminary results: 20 market pairs are analyzed. In all cases integration is confirmed. However, the strength of integration varies across pairs. In the export ban time, trade between domestic markets is more active. This might be a consequence of reduced transport tariffs.
Wheat market integration in the regions of South Caucasus and Central Asia: evidence from Armenia, Azerbaijan, Georgia and Kyrgyzstan (Miranda Svanidze)

**Background:**
- Wheat is important for food security in South Caucasian and Central Asian countries. On average, **35%-55%** of total daily calories stem from wheat.
- On the other side, those countries are highly dependent on wheat imports. In particular, share of wheat import in total consumption is 90% in Georgia, 60% in Armenia, 45% in Azerbaijan and 35% in Kyrgyzstan.
- Those countries import wheat predominantly from Black Sea region.
- Understanding wheat market integration of South Caucasian and Central Asian countries with world wheat markets is of high importance due to the prevalence of high food insecurity in those countries.
Research aims

• Investigate the degree of South Caucasian and Central Asian wheat markets integration with the world wheat markets;
• Investigate the role of trade costs in the integration of South Caucasian and Central Asian wheat markets with the world wheat markets.

Methodological approach

Spatial price transmission analysis: linear and threshold error correction models

Data

National level monthly data for 2006 – 2014 years, 95 obs.
Producer prices for domestic (importing) markets and export FOB prices for world (exporting) markets
Results

• South Caucasian wheat markets have a **higher degree of wheat market integration** than Central Asian countries that are segregated from all selected export markets (i.e. Russia, Ukraine, France and USA) except Kazakhstan;

• **Transaction costs** play a significant role in the integration of Central Asian wheat markets, whereas thresholds are not identified for South Caucasian countries.
Research objectives

The sub-projects in this working group aim at providing results on how wheat markets in the CCA countries and in the major supplier countries work.

In particular it will be investigated what kind of market imperfections are present and in what way they influence the price formation process and thus the market outcome.

• How do domestic wheat markets in the CCA and KRU countries work? Who are the major actors? How are transactions conducted?

• In what way do market imperfections and local public authorities influence the market outcome?
Team: Nurzat Baisakova, Giorgi Chezhia, Ihtiyor Bobojonov, Thomas Herzfeld, Oleksandr Perekhozhuk, Ramona Teuber

Topics addressed:

• Agribusiness in Transition: Insights from the structural change in grain processing in Central Asia (N. Baisakova)
• Quantitative analysis of the heterogeneous effects of grain export policies on Kyrgyz wheat producers and consumers (N. Baisakova)
• Oligopsony Power in the Kazakhstan grain supply chain: Production-theoretic-approach (G. Chezhia)
• Agrifood sector transformation and its implications on development of small farmers in Central Asia (I. Bobojonov)
• Comparative analysis of wheat supply chains (I. Bobojonov)
Agribusiness in Transition: Insights from the Structural Change in Grain Processing in Central Asia

- **Research problem:** Ongoing structural change in the flour processing industry of Central Asian countries (case study)

- **Research question:** What are the drivers of the structural change in the milling industry of Kyrgyzstan and Uzbekistan?

**Firm specific:**
- high processing costs
- high market entry-costs
- new technologies with increasing returns to scale

**Economic:**
- increasing consumer demand for variety of higher quality flour and flour products
- lower transport costs with improving infrastructure

**Policy:**
- liberal trade policy
- enforcement of competition
- tariff escalation

Contact person: **Nurzat Baisakova**, Department Agricultural Policy (IAMO)
Results:

- Structural change in the flour processing industry of Kyrgyzstan is proceeding faster through **perfect competition** among the milling companies and the government’s liberal trade policy.

- Uzbekistan’s **protective trade- and industry policy**, in contrary, inhibits the structural development in the flour processing sector and **eliminates competition** among mills.
Quantitative Analysis of the Heterogeneous Effects of Grain Export Policies on Kyrgyz Wheat Producers and Consumers

Research question:
How did global wheat price volatility and Kazakhstan and Russia’s embargo (2008 and 2010, respectively) on grain exports affect household welfare in Kyrgyzstan?

Method:
Econometric estimation of the welfare effects of food price volatility and price policies (supply-demand functions)

Data: Kyrgyz Integrated Household Survey (KIHS)
- Rotating panel data on households budget expenditure
- Sample: 5000 (with about 1/4 being replaced every year)
- Conducted quarterly (2003 – 2012)
- Diary on food consumption (more than 150 food items) for 2 weeks each quarter of the year filled by households
- Information on expenditure for non-food items and services collected during the quarterly interviews
Results:

- Own-price elasticities of almost all commodities included in the analysis in both periods are negative. This means, for 1% increase in the prices of those commodities, their marketed surpluses decrease in both periods independent from the export ban.

- The second important aspect is encompassed in the result that demonstrates lower own-price elasticities of the marketed surpluses of wheat, wheat flour, and potatoes in the second period.

- Such result implies that there has been a significant effect on the agricultural households.
Oligopsony Power in the Kazakhstan grain supply chain: Production-theoretic-approach (G. Chezhia)

Background:
Investigating the aspects of market structure and market behavior seems to be especially interesting given the fact that in Kazakhstan significant market imperfections exist:

• underdeveloped transport and technology infrastructure,
• local authorities that still intervene in agricultural commodity markets in many ways.

Under such circumstances it seems likely that some actors in the supply chain might be able to extract market power rents.
• This assumption is supported by **anecdotal evidence on anticompetitive behavior**. The Agency of the Republic of Kazakhstan for Competition Protection (Antimonopoly Agency) pays particular attention to the grains and oilseeds product supply chain for which they discovered 28 antitrust law violations for the period 2009 through 2010 (Antimonopoly Agency of Kazakhstan, 2012).

• In **Kostanay** province, the largest agroholding company controls 20% of total sown area and owns 70% of grain elevators.
Research question:
Analyze the degree of competition among grain processors/traders on Kazakhstan grain markets.

Methodological Approach:
New Empirical Industrial Organization approach

Data:
Regional level data for the period 2000-2011
Results:

- Econometric results indicate no evidence of oligopsony market power in the Kazakh grain processing industry for the investigation period from 2000 to 2003 and from 2004 to 2007;
- But the results indicate evidence of oligopsony market power of grain processors in the Kazakh grain supply chains for the investigation period from 2008 to 2011;
- Degree of oligopsony market power is small and statistically significant.
The sub-projects in the third working group address trade-related issues. A special emphasis is put on the analysis of the impact of the policy actions implemented during the food crisis on trade flows and trade relationships of the CCA countries.

- Is there any evidence that the KRU countries price discriminate in international wheat trade against the CCA countries?

- To which extent did the crisis and the imposed governmental interventions affect trade patterns in terms of trading partners and traded quantities and qualities?
Team: Gulmira Gafarova, Nizami Imamverdiyev, Sören Prehn, Thomas Glauben

Topics addressed:

- **Price discrimination and pricing to market behavior of black sea region wheat exporters** (G. Gafarova)
- **Analysis of oligopolistic behaviour of Kazakh and Russian exporters in the South Caucasian wheat markets** (G. Gafarova)
- **Competitive structure of Kazakhstan, Russia and Ukraine in world wheat markets** (N. Imamverdiyev)
- **Trade duration analysis of Kazakh wheat exports** (N. Imamverdiyev)
Competitive structure of Kazakhstan, Russia and Ukraine in world wheat markets (N. Imamverdiyev et al.)

Research objective: Investigate potential market power in international wheat markets with a focus on KRU wheat exports/trade

Methodology: Gravity approach

Results: Empirical results indicate that the international wheat market/trade is competitive, no signs of market power

Policy implications: There is no reason for governmental interventions into wheat markets
Price discrimination and Pricing to Market behaviour of Black Sea Region wheat exporters (Gafarova et al., 2015)

**Research objectives:** To test behavior of Black Sea Region wheat exporters (KRU Exporters) in foreign markets during 1996-2012, and to analyze pricing strategies among the exporting countries in the wheat export market.

**Methodology:** Pricing-to-Market Approach

**Data:** Market: HS code 1001 - wheat and meslin; Investigation period 1996-2012; Number of destination countries for Kazakhstan - 48, Russia- 72 and Ukraine – 65;

**Results:**
In *most destinations* the results indicate **perfect competition** but there are also destinations in which price discrimination is detected
Summary & Conclusions

• Classification: ”High risk” project

• Very good research outcomes thanks to
  – qualified and motivated project members
  – fruitful collaboration with local project partners

• Successful capacity building
Outlook (I)

Which research directions to go in the future:

Linking agricultural and food systems with health and nutritional outcomes

- Changing agriculture and food systems impact nutritional outcomes
- Changing demand patterns also impact on agricultural systems
- Diet quality in Central Asia (Follow-up project based on work carried out on Russia (Burggraf et al., 2015))
Outlook (II)

- Nearly no empirical evidence on these aspects for Central Asia
- First report on this topic by Mazzocchi et al. (2014), Agri-Food Systems for Better Nutrition in Europe and Central Asia
  - Central Asia is affected by three dimensions of malnutrition: undernutrition, micronutrient deficiencies, and overnutrition
  - One the one hand rather high prevalence of stunting (low height for age) and iodine deficiency among children
  - On the other hand high prevalence of adult obesity

=> A major nutrition transition is ongoing in CA
Malnutrition (I)

Kazakhstan – Under- and Overweight of Children

Child (<5 y) Anthropometry

For comparison:
2006 data
Germany
Underweight 1.1%
Overweight 3.5%
United States
Underweight 1.1%
Overweight 8.1%

Source: WHO, Nutrition Landscape Information System
Malnutrition (II)

Prevalence of overweight and obesity in Central Asia and Russia among adults, 2008

Source: WHO
Outlook (III)

What is driving the nutrition transition?

• Rising incomes
• Urbanization
• Technological changes for work, leisure and food processing
• Rapid shifts in food value chains and consumption of processed food

Crucial research area:

• Role of (modernization of) supply chains in nutrition transition
• Link between production diversity & dietary diversity
Primary data collection at farm/household level, potentially in Kazakhstan

Linking production patterns/diversity with nutritional outcomes

Production diversity, dietary diversity & role of modern marketing channels
Thanks for your attention!

For further information please visit

http://www.iamo.de/matracc

or write an E-Mail to

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Selected References


• ICARE (2012), Assessment of the wheat, barley and emmer wheat value chains in Armenia. Prepared and intended for GIZ. Available at https://www.icare.am/uploaded_files/Assessment%20of%20wheat,%20barley%20and%20emmer%20wheat%20value%20chains%281%29.pdf


• Serebrennikov, D., Goetz, L., T. Glauben (2014), Spatial Integration of Russian Domestic Wheat Markets. Paper presented at the EAAE Congress „Agri-Food and Rural Innovations for Healthier Societies, August 26 to 29, Ljubiljana, Slovenia