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

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IAMO Organized Session

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 Chezhia (IAMO, Germany)
MATRACC Project:
An Overview of Empirical Methods and Results

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Project Overview

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

• 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

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)

- 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;

Source: Own calculations based on FAO statistics (1996-2011) and UN COMTRADE statistics (2012)
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 the SP-6

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 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

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

\[
\ln P^\text{ex}_{mt} = \lambda_m + \eta_m \ln \hat{Q}^\text{ex}_{mt} + \alpha'_m \ln Z_{mt} + \beta' \ln W^N_{mt} + \varepsilon_{mt},
\]

- \(P^\text{ex}_{mt}\) - export prices expressed in local currency of importing country;
- \(m\) - importing market/country;
- \(t\) - time trend;
- \(\lambda_m, \eta_m, \alpha', \beta'\) - estimating parameters;
- \(\hat{Q}^\text{ex}_{mt}\) - instrumented export quantity;
- \(Z_{mt}\) - vector of demand shifters of \(m\) number of destinations (e.g. GDP of an importing country, time trend);
- \(W^N_{mt}\) - 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

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

Notes: Asterisks ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.
### 3SLS results for Russia

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

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

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)

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.
Thank you for your attention