CIS wheat market integration

Ivan Djuric, Miranda Svanidze, Aaron Grau, Linde Götz and Thomas Glauben

Leibniz Institute of Agricultural Development in Transition Economies
Department Agricultural Markets
Research conducted under the following projects:

**AGRICISTRADE**  
EU FP7  
([www.agricistrade.eu](http://www.agricistrade.eu))

**MATRACC**  
VolkswagenStiftung  
([www.projects.iamo.de/matracc](http://www.projects.iamo.de/matracc))

Countries included in the study:

Moldova, Belarus, Armenia, Azerbaijan, Russia, Kazakhstan, Tajikistan, Kyrgyzstan, Uzbekistan, Georgia, and Ukraine
Trade relations between the EU and selected CIS
(e.g., negotiations about free trade agreements
– Armenia, Georgia, Moldova, and Ukraine);

Regional integration becomes political priority for CIS
(e.g., Eurasian Economic Union);

Extreme agricultural price fluctuations
(e.g., 2007/08, 2010/11, 2012);

Recent geo-political developments
(e.g. Russian agricultural import ban in 2014).
Research aim

1. To investigate to which extent are the CIS wheat markets integrated on regional and international level;

2. To identify factors affecting CIS wheat market integration.
Price transmission approach

Spatial price transmission

**Long run (pass-through of price changes from one market to another – market integration)**

| No | No market integration |
| Complete | Indicator of perfect market integration |

**Short run (speed of adjustment)**

| Low value | Long period of adjustment (inefficient markets) |
| High value | Short period of adjustments (efficient markets) |
Price transmission models

Vector error-correction model:

\[ \Delta p_t = \alpha \beta' p_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta p_{t-i} + \varepsilon_t \]

Autoregressive distributed lag model:

\[ \gamma_t = \beta_0 + \beta_1 \gamma_{t-1} + \cdots + \beta_k \gamma_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \cdots + \alpha_q x_{t-q} + \varepsilon_t \]

Threshold autoregressive model:

\[ \Delta \varepsilon_t = I_t \gamma_1 \varepsilon_{t-1} + (1 - I_t) \gamma_2 \varepsilon_{t-1} + \varphi_t \]

\[ I_t = \begin{cases} 1 & \text{if } \varepsilon_{t-1} \geq \tau \\ 0 & \text{if } \varepsilon_{t-1} \leq \tau \end{cases} \]

Non-linear regime-dependent model:

\[ \gamma_t = \alpha + \gamma_\alpha D_t + \beta x_t + \gamma_\beta D_t x_t + u_t \]

\[ D_t = \begin{cases} 1 & \text{if there is a policy intervention} \\ 0 & \text{if there is no policy intervention} \end{cases} \]
Data sources:

- Statistical offices (CIS);
- State and consulting agencies (EU and international markets);
- AGRICISTRADE country reports (CIS: www.agricistrade.eu);
- Scientific papers and country reports (e.g. FAO, WB, OECD, etc.);
- Expert interviews (CIS).
Price transmission results

Regional market integration (among CIS countries)

Market integration

<table>
<thead>
<tr>
<th>Region</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU</td>
<td>61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>76</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Long-run price transmission

- strong
- moderate
- weak
Price transmission results

Share of import in total wheat domestic consumption, 2006 - 2014

Source: USDA (2015), own illustration.
Price transmission results

Source: UN COMTRADE (2015), own illustration.
Price transmission results

Domestic and World markets, 2006-2014

<table>
<thead>
<tr>
<th>Domestic markets</th>
<th>World markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uzbekistan</td>
<td>USA</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>France</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>Russia</td>
</tr>
<tr>
<td>Armenia</td>
<td>Ukraine</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>Georgia</td>
</tr>
<tr>
<td>Kazakhstan (S)</td>
<td>Kazakhstan (N)</td>
</tr>
<tr>
<td>Kazakhstan (N)</td>
<td></td>
</tr>
</tbody>
</table>

Volatility is measured as the standard deviation of returns (the log ratio of prices in month t to prices in month t-1).

Source: own calculations

NOTE: Volatility is measured as the standard deviation of returns (the log ratio of prices in month t to prices in month t-1)
Example: Wheat supply chain

CIS-EU market integration

[Map showing CIS-EU market integration with regions colored in varying shades of blue indicating degrees of market integration: strong, moderate, weak]
Example: Wheat supply chain

CIS-World market integration

Market integration

Long-run price transmission

- strong
- moderate
- weak
Factors affecting market integration / Conclusions

• Market support measures
  High level of state support – low integration with international markets (e.g. Belarussian wheat market);

• Trade-oriented policy measures
  Trade restrictions – low/no market integration (e.g. wheat export restrictions of Russia, Ukraine and Kazakhstan);

• Physical trade flows
  Higher trade volumes – stronger integration (e.g. Armenia, Azerbaijan and Georgia – regional integration);

• Regional economic and political integration
  Less trade barriers – higher market integration (e.g. EU trade agreements and the Eurasian Customs Union).
Factors affecting market integration / Conclusions

- **Infrastructure**

   Underdeveloped infrastructure – lower market integration (e.g. high trade costs);

   ![Box plot showing total trade costs in South Caucasus and Central Asia](image)

   - Armenia: 60 (45), 80, 20
   - Azerbaijan: 80
   - Georgia: 90, 15
   - Kyrgyzstan: 135, 80, 120
   - Tajikistan: 180
   - Uzbekistan: 130, 90
Thank you for your attention!

Contact:

Dr. Ivan Djuric
Senior Researcher

Leibniz Institute of Agricultural Development in Transition Economies

Tel: +49 345 29 28 241
Fax: +49 345 29 28 299
Address: Theodor-Lieser Str. 2, 06120 Halle Saale, Germany
email: djuric@iamo.de
www.iamo.de

https://twitter.com/iamoLeibniz
https://www.facebook.com/iamoLeibniz/