Price transmission along the CIS wheat-to-bread supply chains

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Research conducted under the AGRICISTRADE project:

“Exploring the potential for agricultural and biomass trade in the Commonwealth of Independent States (CIS)”
(www.agricistrade.eu)

Countries included in the study:

Armenia, Azerbaijan, Belarus, Russia, Kazakhstan, Moldova, Ukraine and Georgia
Research background

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).
1. To identify how fast and to which extent are price changes transmitted along the CIS wheat-to-bread supply chains.

2. To investigate if some of the supply chain members exercise market power.

3. To identify factors affecting price transmission along the supply chain.
Price transmission approach

**Vertical price transmission**

Long run (pass-through of price changes from one stage of the supply chain to another)

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator of market power or governmental interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>Indicator of perfect competition</td>
</tr>
</tbody>
</table>

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

Threshold autoregressive model:
\[ \Delta \varepsilon_t = I_t \gamma_1 \varepsilon_{t-1} + (1 - I_t) \gamma_2 \varepsilon_{t-1} + \varphi_t \quad I_t = \begin{cases} 1 & \text{if } \varepsilon_{t-1} \geq \tau \\ 0 & \text{if } \varepsilon_{t-1} \leq \tau \end{cases} \]

Non-linear regime-dependent model:
\[ \gamma_t = \alpha + \gamma_\alpha D_t + \beta x_t + \gamma_\beta D_t x_t + u_t \quad D_t = \begin{cases} 1 & \text{if there is a policy intervention} \\ 0 & \text{if there is no policy intervention} \end{cases} \]
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).

<table>
<thead>
<tr>
<th>No.</th>
<th>Products</th>
<th>Data description</th>
<th>No. obs.</th>
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<tbody>
<tr>
<td>1</td>
<td>Wheat</td>
<td>Producer prices</td>
<td>77-140</td>
</tr>
<tr>
<td>2</td>
<td>Flour</td>
<td>Wholesale/retail prices</td>
<td>74-140</td>
</tr>
<tr>
<td>3</td>
<td>Bread</td>
<td>Retail prices</td>
<td>74-140</td>
</tr>
</tbody>
</table>
Wheat-to-bread supply chain

WHEAT PRICES

PRODUCER (WHEAT)  PROCESSOR (FLOUR)  PROCESSOR (BREAD)  RETAIL  BREAD  FLOUR

FLOUR PRICES

CONSUMER

Wheat prices

Flour prices
Wheat-to-bread supply chain

WHEAT PRICES

PRODUCER (WHEAT) → PROCESSOR (FLOUR) → PROCESSOR (BREAD) → RETAIL → FLOUR → CONSUMER

FLOUR PRICES

Wheat-to-bread supply chain

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Cross-product comparison

![Graph showing cross-product comparison for various goods like flour, bread, pork, beef, poultry, milk, cheese, and butter. The graph compares long-run price transmission and short-run price adjustment (retail and producer).](image)
Gross margin developments

![Diagram showing the ratio of gross margin in 2012-2014 to 2009-2011 for various products like Milk, Bread, Flour, Pork, Beef, Cheese, and Poultry. The diagram illustrates the margin and the percentage of margin in retail price for each product.]

Introduction

Theory

Methodology and data

Empirical results

Conclusions
Market power indicators

Wheat-to-bread supply chain in Russia

co-integrating vector for conjectural variations

wheat processing sector  bread

wheat export  theta processor

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Factors affecting price transmission / Conclusions

- **Import dependency**
  Domestic producers face strong competition (higher imports – faster adj. of producer prices – lower adj. of retail prices);

- **Underdeveloped processing sector**
  For most of the CIS countries;

- **Fast development of the retail sector**
  Possible exercise of market power (e.g. Russian wheat-to-bread supply chain);

- **Domestic trade and price regulations**
  Strong impact on price adjustments (affects both producers and retailers).
Thank you for your attention!

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