The expansion of dairy herds in Russia and Kazakhstan after the import ban on Western food products

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Milchkrise: Landwirte hoffen zum Bauerntag auf Politik
The EU & the Eurasian Economic Union

Source: Associate Press.
Russia’s food self-sufficiency goals

Increase the **domestic self-sufficiency** in food to
- 99.7% in grains,
- 93.2% in sugar beet,
- 87.7% in oilseeds,
- 98.7% in potatoes,
- 88.3% in meat and meat products,
- 90.2% in milk and dairy products

by 2020,

Increase **farm output** in all categories of farms by 20.8% (2020 vs. 2012 in constant prices), food products by 35%,

Ensure annual growth of **investment in fixed capital** in agriculture by 4.5%,

Increase av. **profitability of agricultural organisations** by not less than 10-15% (including subsidies),

Increase **wage levels** in agriculture to 55% of the overall economy average.

Source:
Research questions

- How successful have the Russian attempts to boost self-sufficiency in dairy been so far?
- More specifically: What drives the expansion of dairy herds in the Eurasian Union?
Russian self-sufficiency in major food items
1990-2016

Self-sufficiency = Domestic Production / (Private + Industrial Consumption + Losses) * 100.
Data: ROSSTAT. 2016 prelim. data.

August 2014: Import stop in place
Number of cows & milk yield Russian Federation

Source: Authors based on ROSSTAT.
Agroholdings in the black earth region

Belgorod
All photographs by Martin Petrick.
Diversity in livestock operations

Calving box in a dairy holding
Voronesh

Household farm
Belgorod
Challenges down the value chain

Milk collection
Belgorod

Fresh meat counter
Belgorod
Objective: Study determinants of herd growth 2012-2015

Based on a micro-econometric analysis of farm-level data for enterprises & individual farms in six provinces of Russia (5) & Kazakhstan (1) in 2015, N=180

Estimating equation:

$$g_{i1215} = \alpha h_{i12} + x'_i \beta + \epsilon_i$$

With:

- $g_{i1215}$: dairy herd growth 2012-2015 of farm $i$
- $h_{i12}$: dairy herd size 2012
- $x'_i$: factors determining herd growth
- $\alpha, \beta$: parameters to be estimated
- $\epsilon_i$: independent error term

Survey regions

Source: Ronja Puschmann, IAMO.
Distribution of herd sizes 2012 & 2015

Source: Author based on survey data.
Determining factors of herd growth

- Output & input prices,
- Resource endowments,
- Human capital & technologies employed,
- Various dimensions of vertical coordination,
- Subsidies,
- Regional fixed effects.

Growth equation embedded into a recursive multi-equation system that endogenises:
- herd size in 2012,
- subsidy absorption,
- use of marketing contracts for milk.

Roodman (2011)
## Determinants of herd growth

Maximum Likelihood estimation of recursive multi-equation model (N=172)

<table>
<thead>
<tr>
<th>Herd growth 2012-2015</th>
<th>Coeff</th>
<th>Sig</th>
<th>Sample mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy cows 2012 (heads) (log)</td>
<td>-0.402</td>
<td>**</td>
<td>201.4</td>
</tr>
<tr>
<td>Milk price (USD/kg) (log)</td>
<td>-0.539</td>
<td>***</td>
<td>0.33</td>
</tr>
<tr>
<td>Agricultural wage (USD/month) (log)</td>
<td>0.073</td>
<td>*</td>
<td>218.1</td>
</tr>
<tr>
<td>Fodder land (ha) (log)</td>
<td>0.032</td>
<td>*</td>
<td>701.8</td>
</tr>
<tr>
<td>Permanent workers in 2012 (heads) (log)</td>
<td>-0.002</td>
<td></td>
<td>43.5</td>
</tr>
<tr>
<td>Livestock subsidies received (USD) (log)</td>
<td>0.117</td>
<td>***</td>
<td>636.0</td>
</tr>
<tr>
<td>Age of farm (years)</td>
<td>0.008</td>
<td>**</td>
<td>17.3</td>
</tr>
<tr>
<td>Share of hired workers (0..1)</td>
<td>0.482</td>
<td>**</td>
<td>0.71</td>
</tr>
<tr>
<td>Practices pregnancy tests (0/1)</td>
<td>0.552</td>
<td>**</td>
<td>0.18</td>
</tr>
<tr>
<td>Practices artificial insemination (0/1)</td>
<td>-0.061</td>
<td></td>
<td>0.38</td>
</tr>
<tr>
<td>Agroholding member (0/1)</td>
<td>-0.040</td>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td>Individual farm (0/1)</td>
<td>-0.336</td>
<td></td>
<td>0.54</td>
</tr>
</tbody>
</table>

Also included: dairy cows squared, concentrate price, livestock value, age & education of manager, credit rationing, milk contracting, new entrant, five regional dummies, all non significant.

*, **, *** significantly different from zero at 10, 5, 1% level.
Predicted growth path of dairy herds

Source: Author based on survey data.
Milk sales price by marketing channel & contracting

Source: Author based on survey data.
Summary of regression results

- **Small farms** show higher growth rates than large farms
- Predicted minimum herd size is **150 cows**
- **Good agricultural practice** (pregnancy testing) leads to higher growth rates
- Higher milk prices imply lower growth rates due to **local market saturation** in direct sales to consumers
- **Livestock subsidies** generate extra growth, but effect is economically negligible for larger farms (only <10% of farms manage to get any subsidies)
Implications

- Russia’s import substitution has **not been very successful** in the dairy sector so far
- Following our results on Eurasian dairy farms, **best practice & market access** matter more for growth than cash hand-outs
- Targeting relatively small subsidy amounts to a much larger group of **small farms** promises significant extra herd growth
- Structural change in dairy farming **similar to patterns observed in US or EU**: catch-up of small farms up to 70+ cows, coexistence of family & corporate farms
- Outlook: study farm-individual profitability of dairy farming
Total milk production Russian Federation (ths tons)

Source: Author based on ROSSTAT.
Russia's dairy balance 1990-2013

Domestic milk consumption & production (by farm types)

Consumption  Household producers  Individual farms  Corporate farms

Data: ROSSTAT.
Milk yields per cow (kg)
Corporate farms in East Germany & Russia

Sources: Author based on EUROSTAT; ROSSTAT; ZMP.
Russia’s rural brain drain
Population density & dynamics (2010 census in % of 1959 census)

Source: Nefedova 2012, p. 45.
Russian food self-sufficiency: the state of play

Grain production broadly competitive, Russia a top exporter
Supply deficits pronounced in dairy, meat, fruits & vegetables

Main challenges to increasing livestock output:

- Fragmented production structures
  household producers geared towards subsistence needs
- Low yield levels
- Lack of human capital
  devastating brain drain, image problems of agriculture, poor education system
- Insufficient quality control, absence of closed cooling chains, fraud
- Inefficient government policies
  to be analysed next
Russia’s agricultural policy approach today

- Top-down modernisation via capital subsidies
- Little decoupling despite WTO accession
- Little support to strengthen grassroots institutions outside the government administration (e.g. breeders, quality control)
- Forced import substitution via import ban
- Ban reinforced a “Soviet style” approach: central planning of imports, production targets, state funding
- Budget support under pressure due to economic crisis
Agricultural finance in Russia

Interest subsidies mostly handed out via state-owned Sberbank and Rosselkhozbank (which also collects taxes)

Requirements for obtaining credit (Yastrebova et al. 2008):
- Intended spending conforms with positive list of eligible equipment
- Collateral 1.3 – 2 times the loan amount (livestock, machinery, real estate)
- Repayment history
- No overdue debt, no outstanding taxes
- Approval (possibly guarantee) by local administration

Credit disbursement beyond carrying capacity of farms, problems of over-indebtedness

Government approval on several levels leaves much room for corruption

Poor payment morale both up- & downstream
Assets & debts in Russian agriculture
In 2012 prices, 1999-2012

Data: ROSSTAT, Min. of Agr.
Conclusions

Russia is currently self-sufficient in many **field crops**
Long-standing deficits exist in **livestock products & high value crops**
Structural weaknesses will **make it difficult** to reach full self-sufficiency soon:
- Lack of human capital in agriculture
- Productive entrepreneurship held in check by excessive government involvement & inefficient policies
- Economic & institutional framework necessary for the operation of value chains (funding, genetics, quality control, processing) is dysfunctional
- Increasing livestock production may reduce self-sufficiency in grains (Soviet experience)

If integration in global markets is undesired for political reasons, a convincing policy alternative is still missing!