



Leibniz Institute of Agricultural Development
in Transition Economies



Agricultural policy effects on the Russian dairy sector: Evidence from survey data

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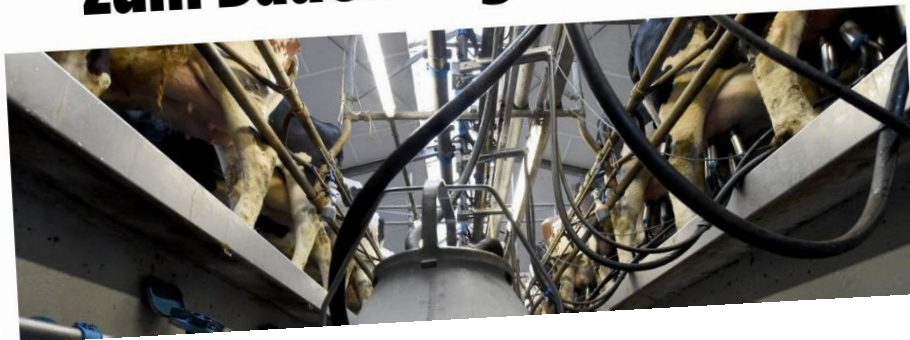
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Source: Associate Press.

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%,

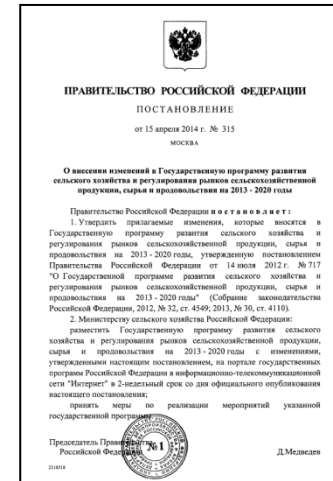
Ensure annual growth of **investment in fixed capital** in agriculture by 4.5%,

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:

State Programme for the Development of Agriculture of the Russian Federation 2013-2020 (2014), pp. 6-7.

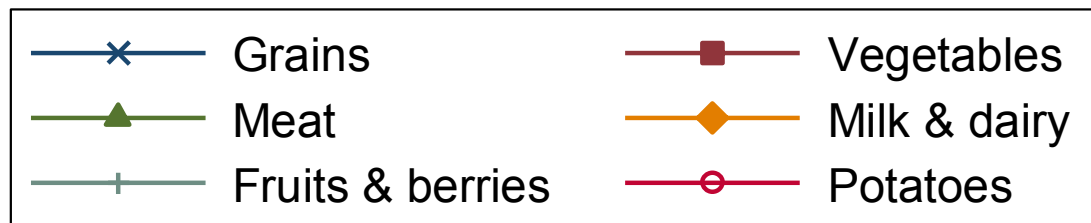
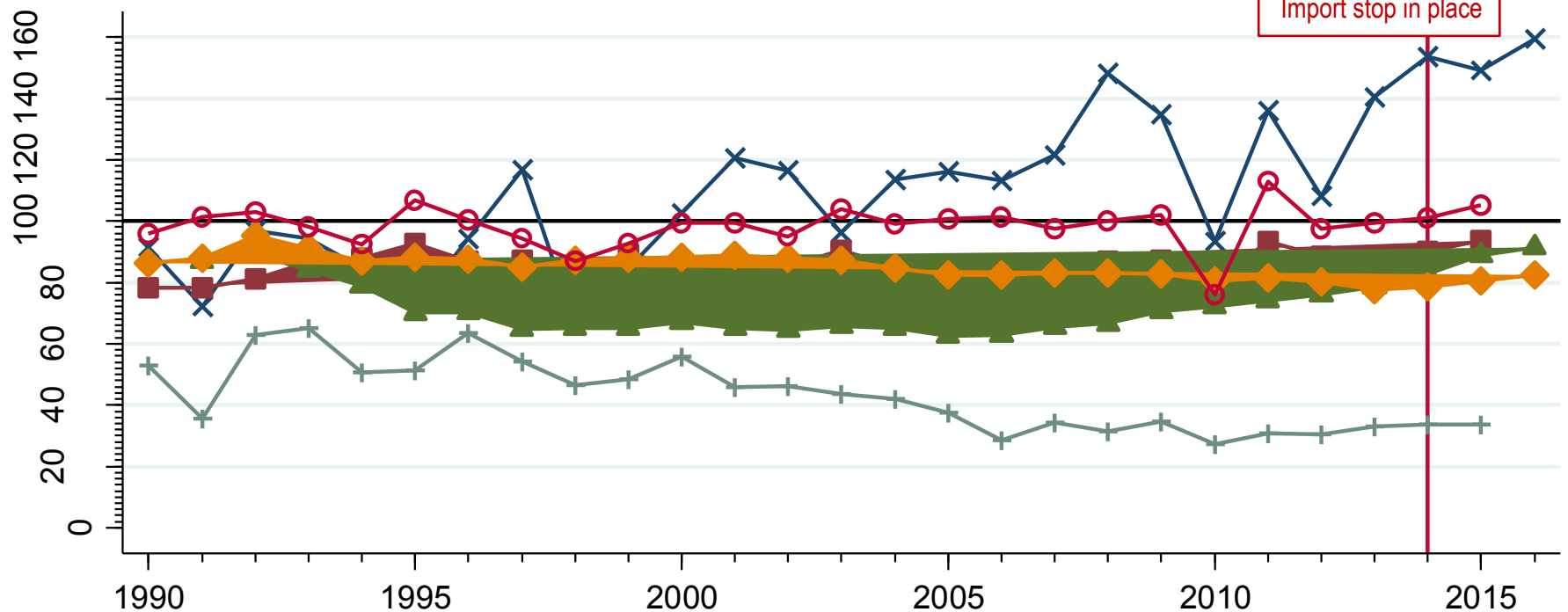


Research questions

- 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?

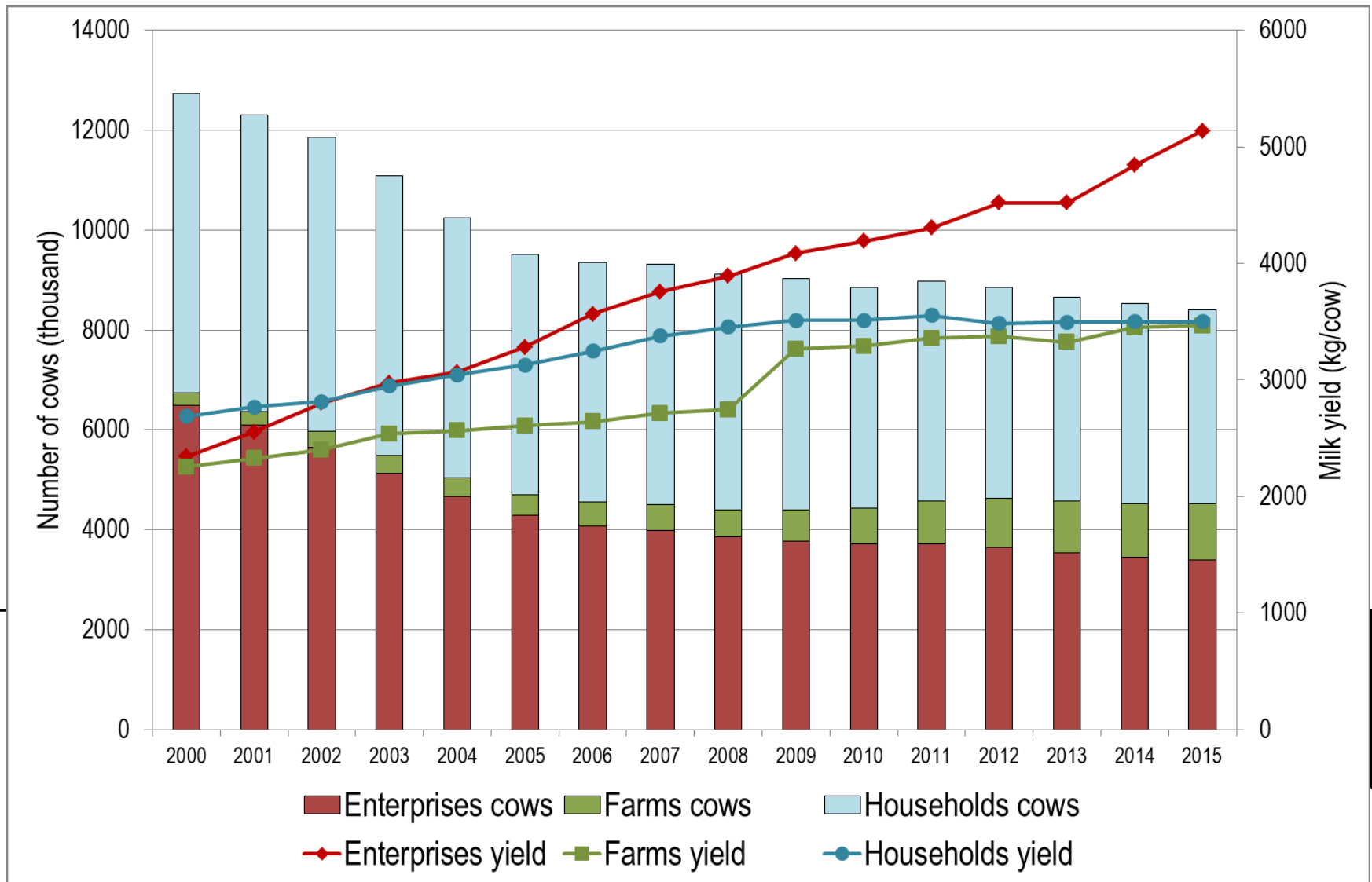
Russian self-sufficiency in major food items

1990-2016



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

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
Voronezh



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:

With:

dairy herd growth 2012-2015 of farm i

dairy herd size 2012

factors determining herd growth

, parameters to be estimated

independent error term

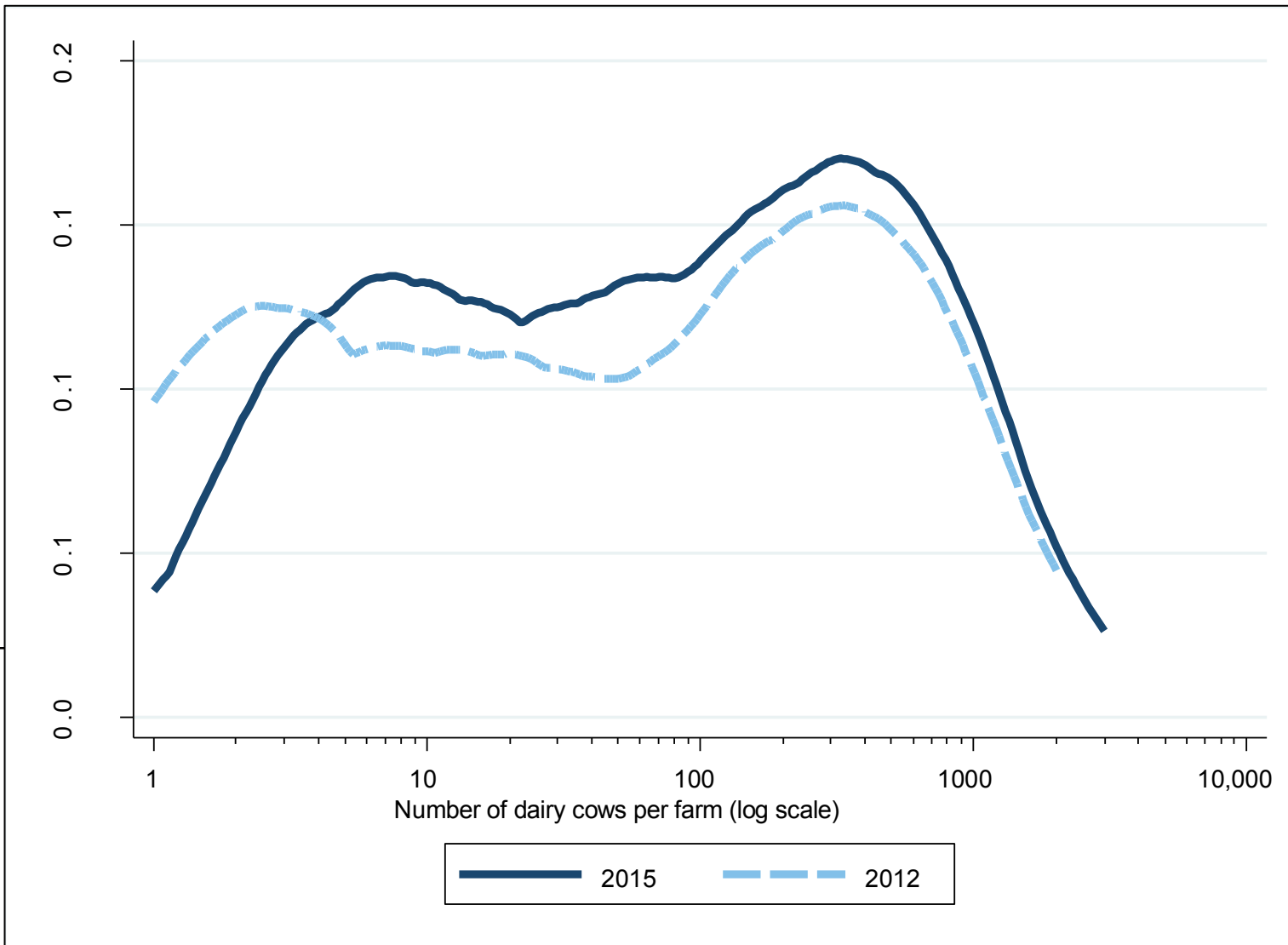
Inspired by Weiss (1999), Rizov and Mathijs (2003).

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

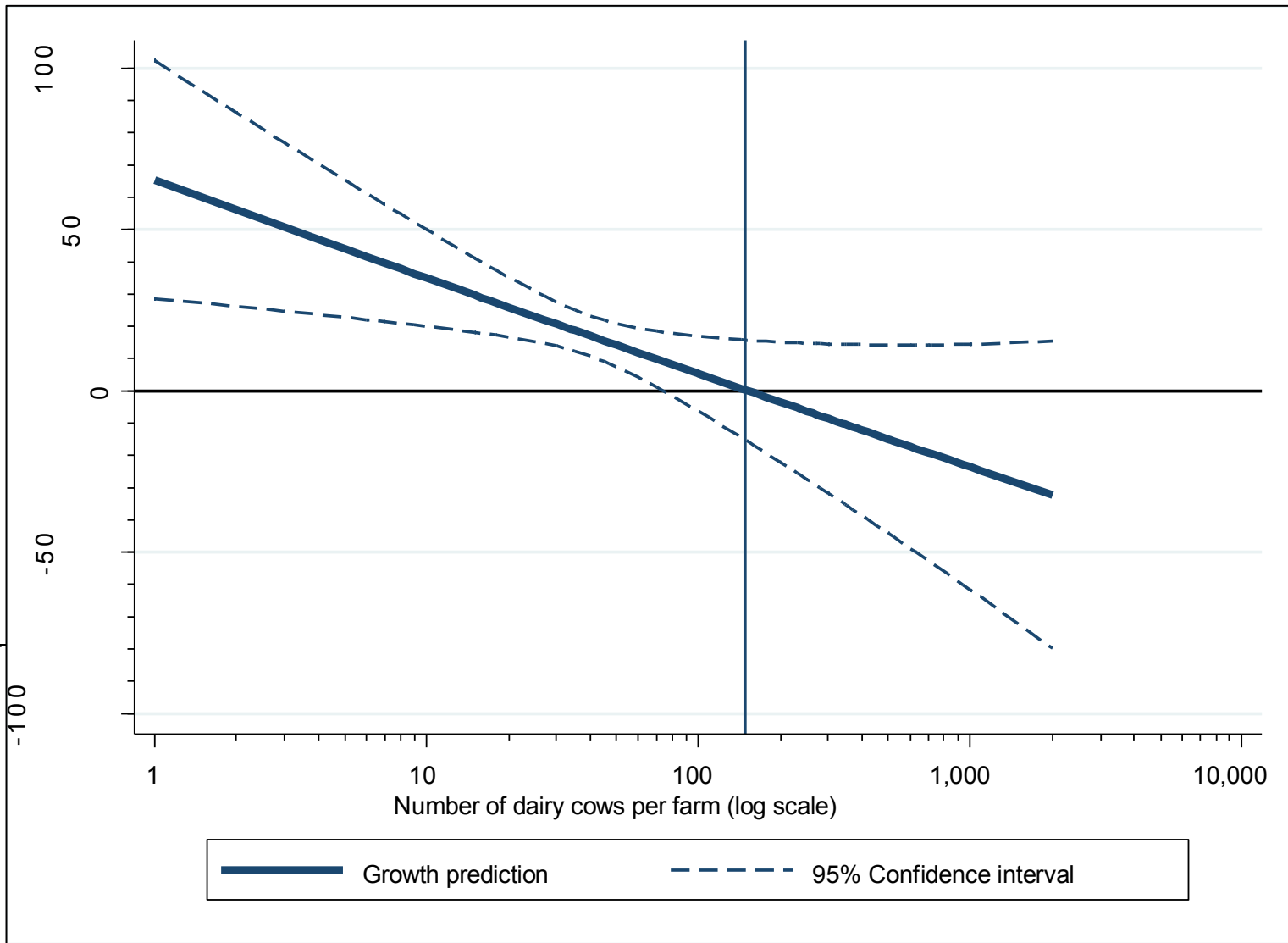
Maximum Likelihood estimation of recursive multi-equation model (N=172)

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

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.

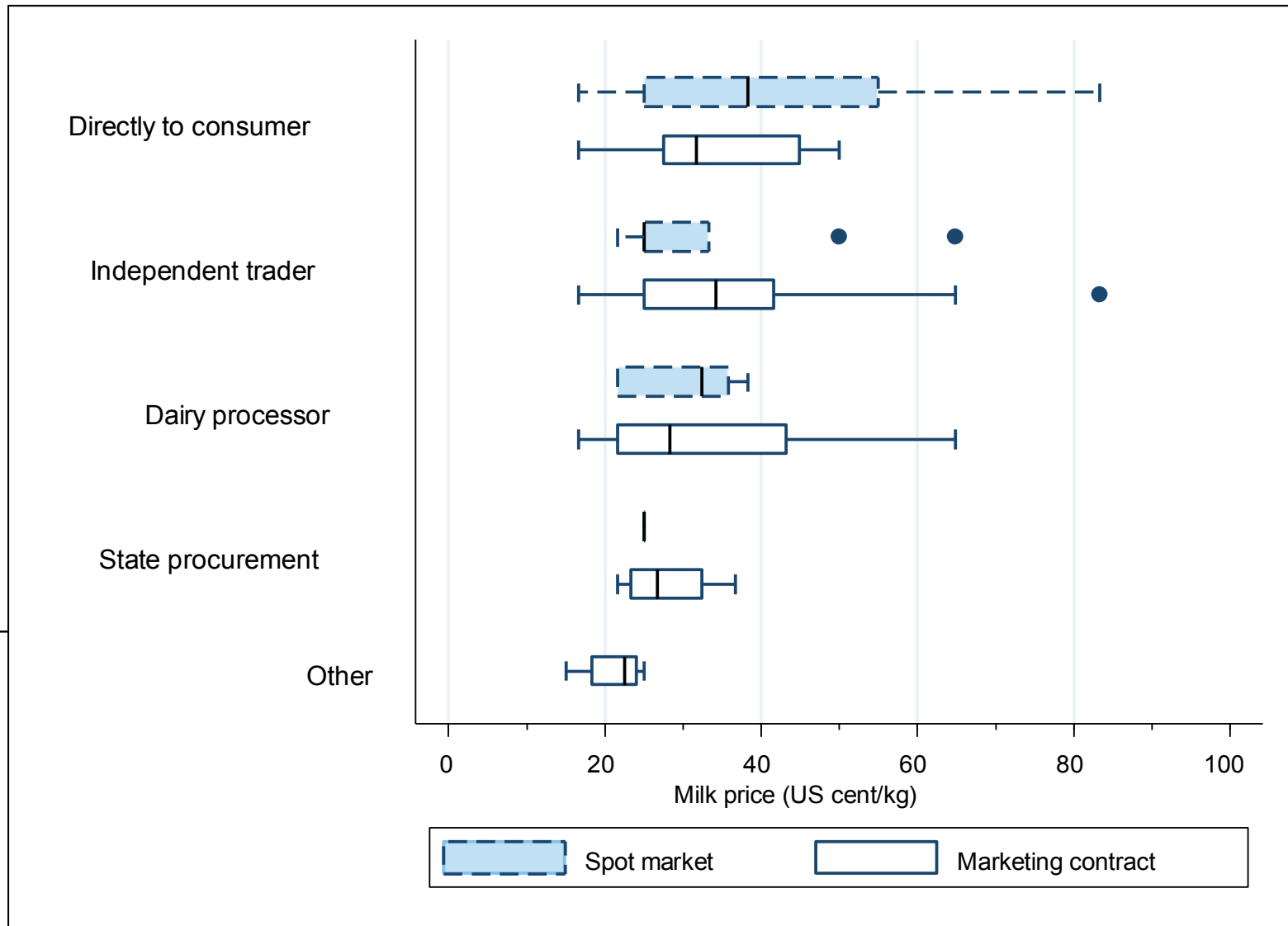
*, **, *** significantly different from zero at 10, 5, 1% level.

Predicted growth path of dairy herds



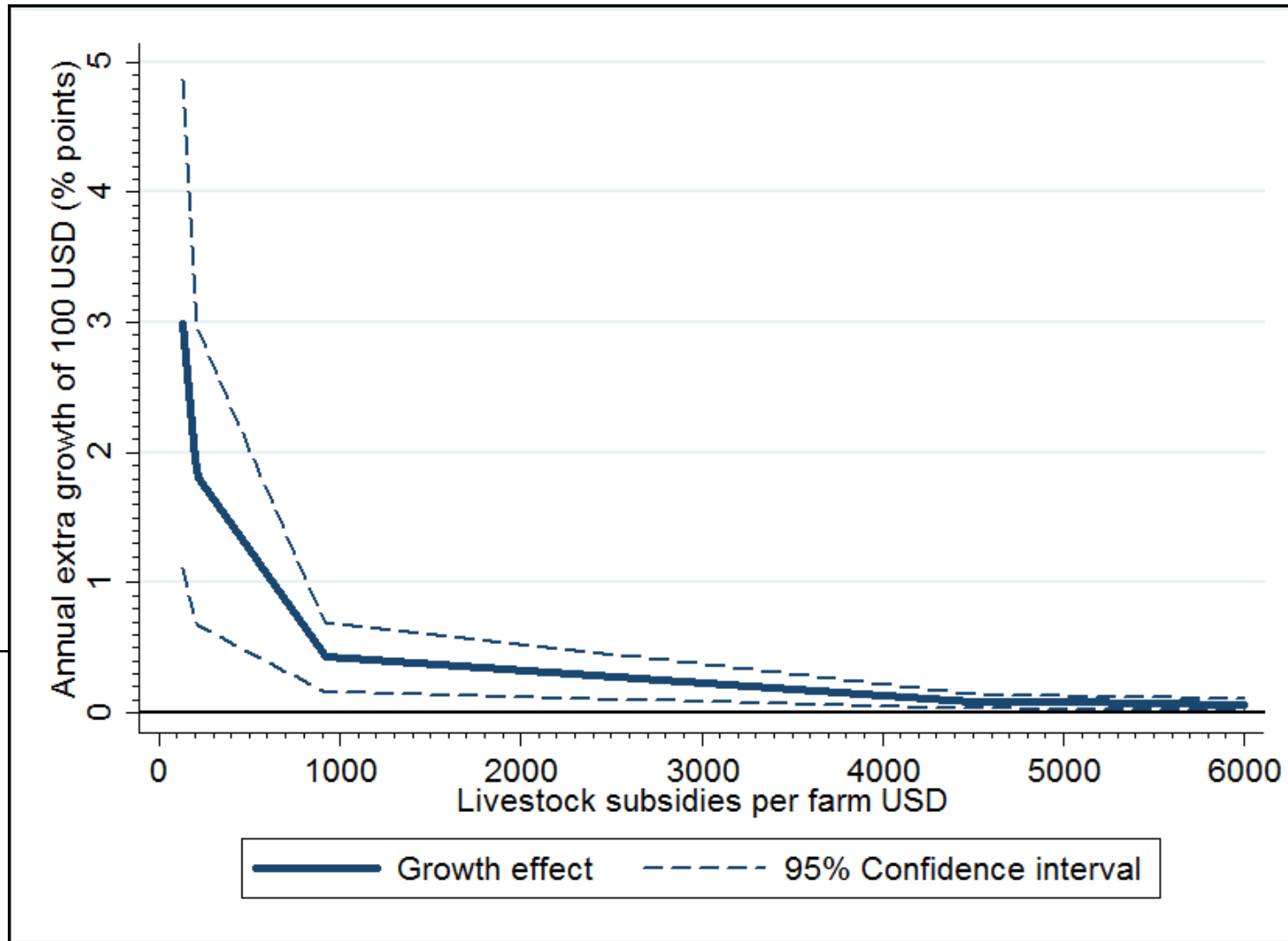
Source: Author based on survey data.

Milk sales price by marketing channel & contracting



Source: Author based on survey data.

Marginal subsidy effect on herd growth



Source: Author based on survey data.

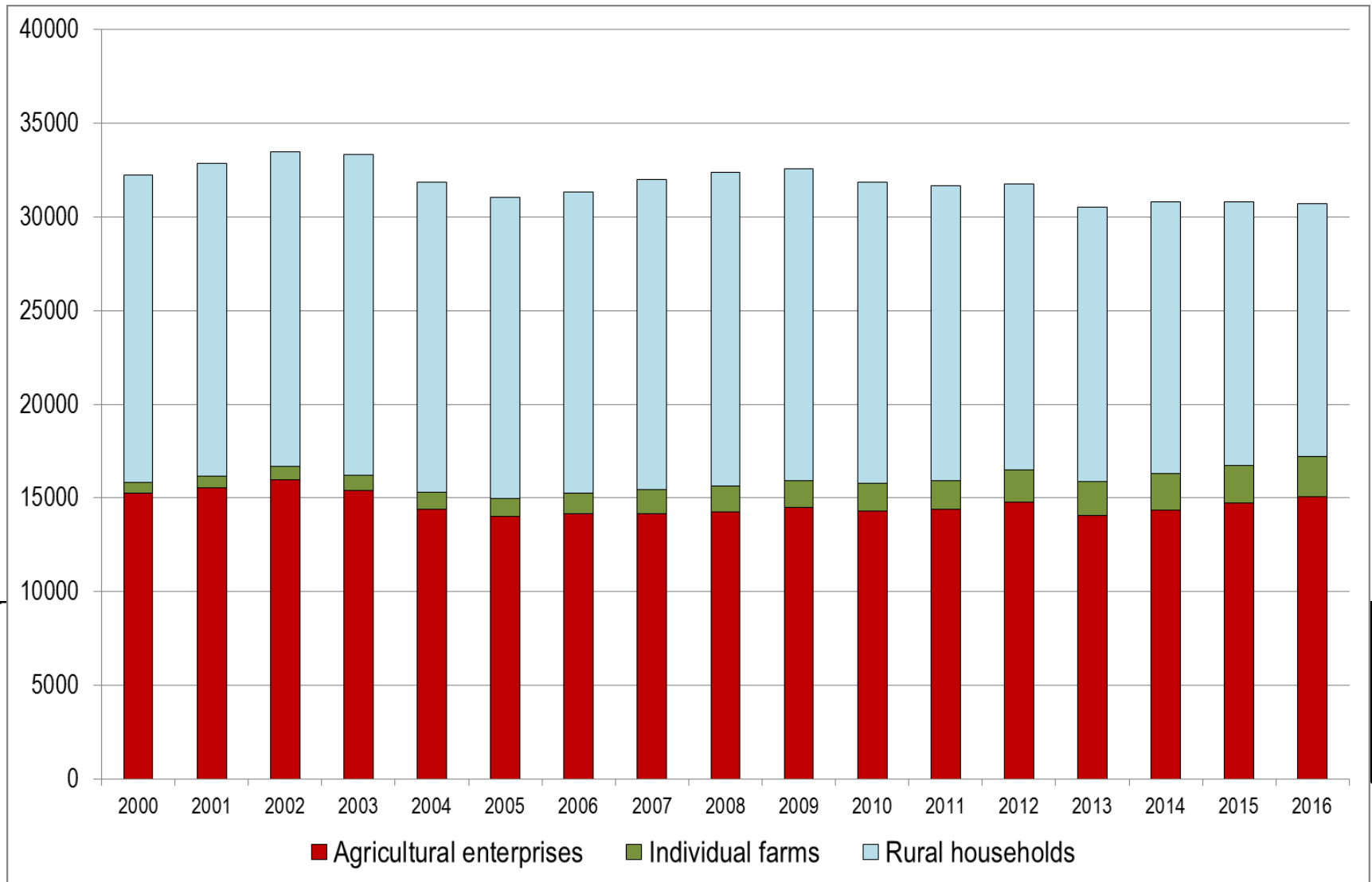
Summary of regression results

- **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

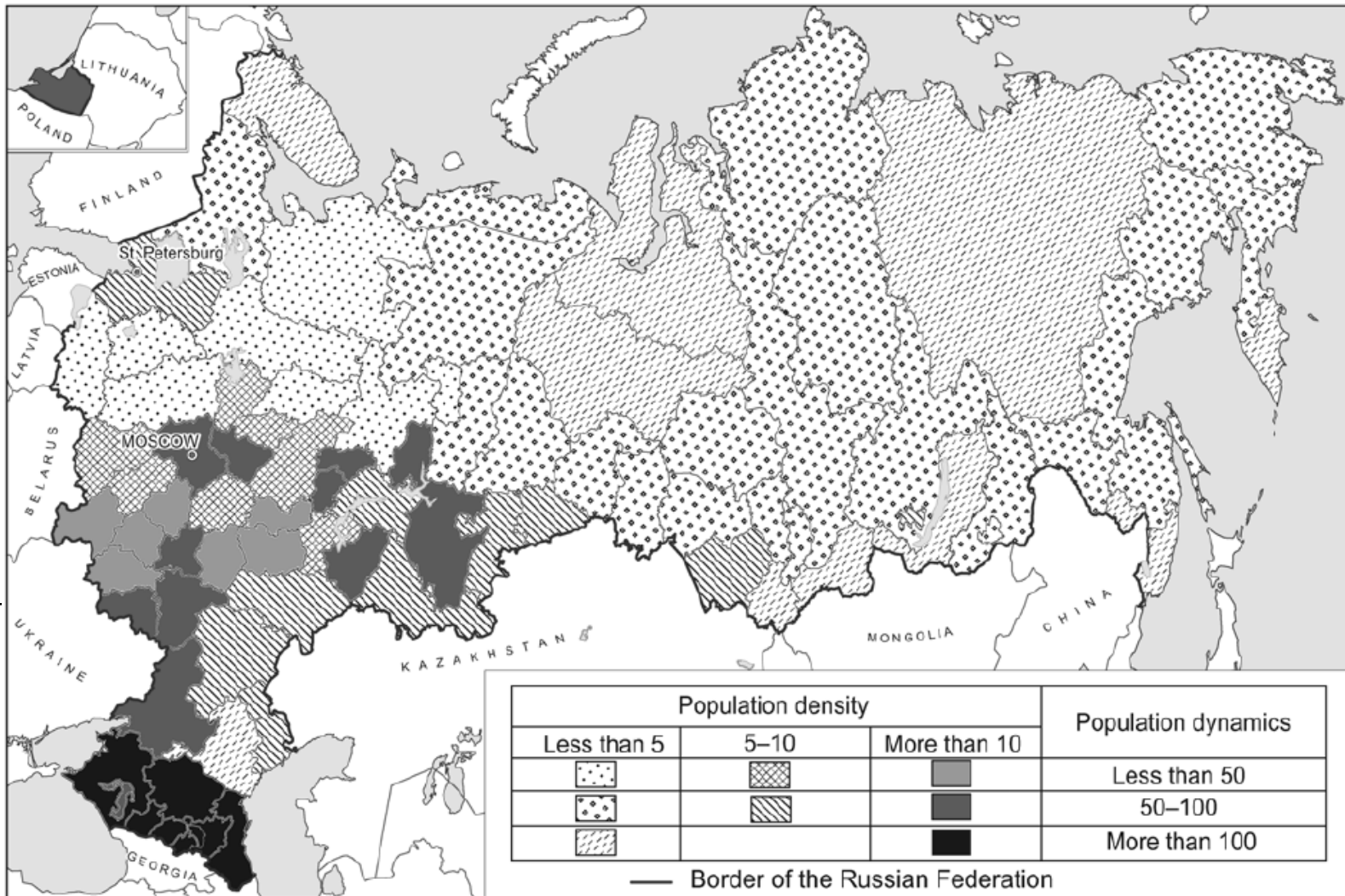
Total milk production Russian Federation (ths tons)



Source: Author based on ROSSTAT.

Russia's rural brain drain

Population density & dynamics (2010 census in % of 1959 census)



Source: Nefedova 2012, p. 45.