UNIVERSITY OF CENTRAL ASIA
GRADUATE SCHOOL OF DEVELOPMENT
Institute of Public Policy and Administration

Determinants of farmers' participation in the dairy value chain of Chui region

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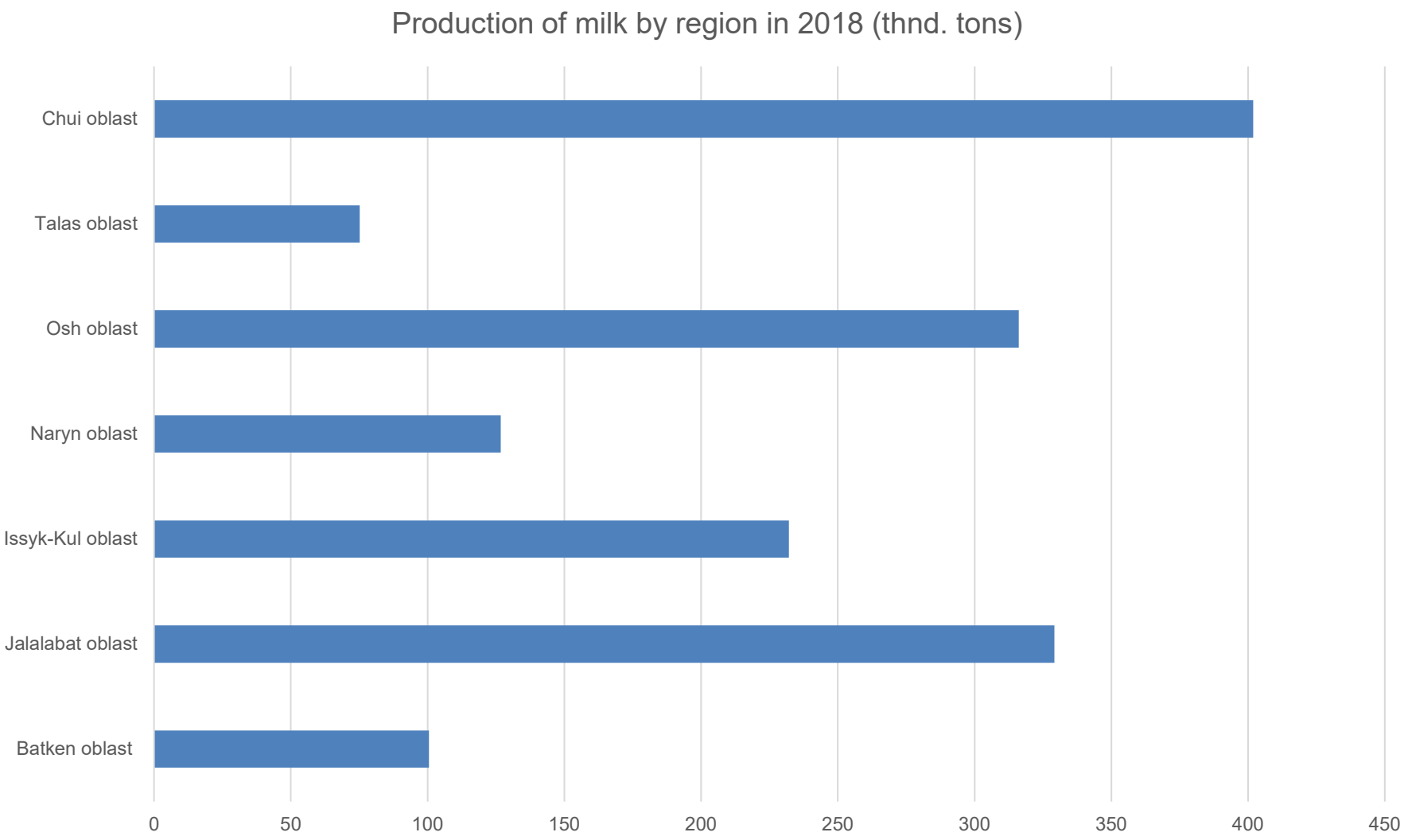
Overview

- Motivation of the study
- Literature review
- Data and methodology
- Hypotheses
- Regression results
- Summary
- Policy implications
- Discussion

Actuality of the study

1. Social factor, antipoverty effect
2. Market integration (from subsistence to commercialization)
3. Capitalization of the natural resources
4. Export potential



Source: NSC KR

Research questions

1. What are the determinants that explain a farmer's choice to participate in the dairy market in the Chui region of Kyrgyzstan?
2. If a farmer decides to participate in the dairy market, what factors influence the volume of milk sold?

Literature Review

- Globalization, privatization, and vertical coordination in food value chains in developing and transition countries (Swinnen, J. & Maertens, M., 2007)
- Farmers, Vertical Coordination, and the Restructuring of Dairy Supply Chains in Central and Eastern Europe (Dries, L., Germenji, E. & Noev, N., 2009. Farmers)
- Formal versus informal: Efficiency, inclusiveness and financing of dairy value chains in Indian Punjab (Birthal, P. S., Chand, R. & Josh, P. K., 2017)
- "Key factors for increasing farmer participation in markets: evidence from the Malian dairy sector" (Vroegindewey, R., Richardson, R. & Thériault, V., 2021)

Methodology

Cragg Double-Hurdle Model- econometric model used to analyze consumer behavior and estimate the demand for a particular product or service

The Cragg Model consists of two parts: the first hurdle and the second hurdle

First Hurdle: This part of the model estimates the probability that farmer decides to sell the product (milk) at all.

Second Hurdle: It models the quantity decision.

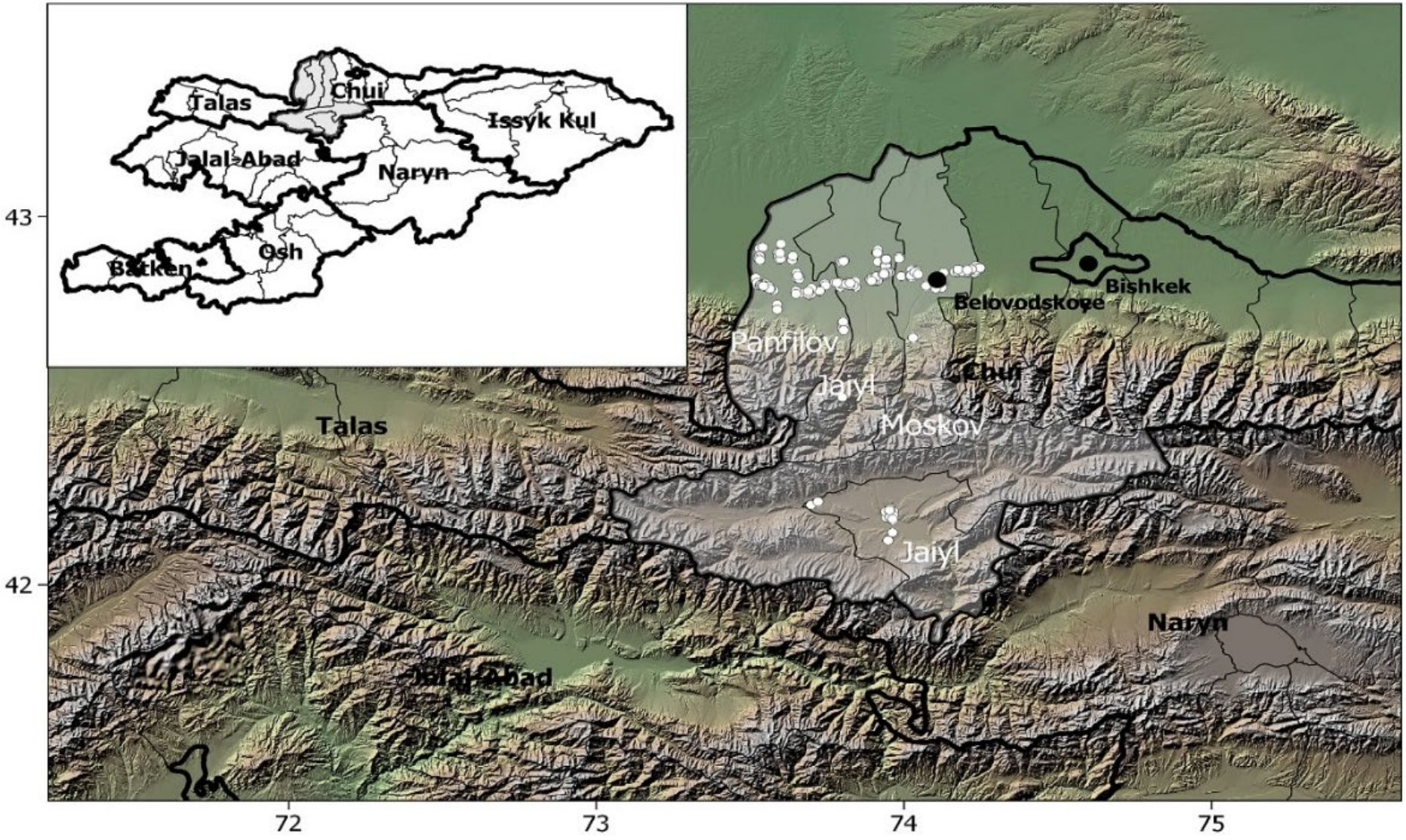
Data

Source: AniCAnet project in 2018 (summer)

Sample: 250 households keeping 5 or more cattle

Variables:1470 from ANICANET+19 from WorldClim V1 climatic dataset

Map of sampling



Source: Sarah Robinson

Survey questionnaire

- **Household/farm structure, labor and production specifics;**
- **Land ownership and land transactions;**
- **Farming: production and marketing;**
- **Grazing and fodder;**
- **Costs of farm inputs, investment and loans, labor and access to information;**
- **Animal breeding and health.**

Hypotheses

- Access to **village pasture** can push the farmer to keep cows as they will save on fodder preparation and purchase (+) (Stage 1)
- Using of **hayfields** increases the fodder base for feeding cattle, consequently the milk volume (+) (Stage 1)
- More **hay** provided to the animals will increase milk output (+) (Stage 1)
- The more the village **population** the more milk can be collected by intermediaries (+) (Stage 1)
- The high **prices** can incentivize to sell the milk (+) (Stage 1/Stage 2)
- **More cows** produce more milk (+)(Stage 1/Stage 2)
- The high **milk yield** can be the incentive for the participation decision and the sold quantity (+) (Stage 1/Stage 2)
- High **rainfall** increases the hay and crop growth intensity which affects on milk productivity (+) (Stage 1/Stage 2)
- The **loan** can be used for fodder purchase increasing the milk volume (+) (Stage 1/Stage 2)
- **Milking machinery** is a precondition for larger milk quantities produced per farm (+) (Stage 2)
- Large milk quantities can be stored only with professional **cooler** (+) (Stage 2)
- Cultivating the **cropland** increases the fodder base for feeding cattle consequently the milk volume (+) (Stage 2)
- More **grain** provided to the animals will increase milk output (+) (Stage 2)

Regression output

	Probit (1 stage)		Truncated regression (2 stage)	
	coef		coef	
Loan	0.3		5.1	**
Hayfields_used	-0.05			
Cropland_area_cultivated			0.2	**
Total_hay_provided_in_T	-0.005			
Provided_grain_in_T			0.08	
Local_pasture_access	0.8	***		
Median_milkprice	0.3	**	3.4	***
Precipitation	-0.7		3.3	
Pop_village	-0.06			
Number_cows_12monthago	0.7	***	2.2	***
Milking_machinery			6.3	**
Cooler			0.7	
Farm registration			6.8	**
Cooperation membership			4.8	*
Constant	-2.5			
HH: Household; Dependent variable of the probit model is 1 if household sold milk and 0 otherwise; Dependent variable of truncated normal model is '000' liters of milk sold';				
*** p<0.01; ** p<0.05; * p<0.1				

Summary

Significant determinants of the 1 stage:

- Access to the local pasture
- Median milk price
- Number of cows

Significant determinants of the 2nd stage:

- Loan access
- Cropland area cultivated
- Median milk price
- Number of cows
- Milking machinery
- Farm registration
- Cooperation membership

Policy implications

- Promoting Financial Inclusion for Dairy Farmers (financial intermediation, Financial Literacy and Training Programs)
- Improving access to credit facilities for farmers interested in investing in modern milking machinery (subsidies, leasing)
- Incentives for Farm Registration (reduced taxes, access to subsidized resources, or eligibility for government support programs)
- Support for Cooperative Formation (providing financial assistance, technical support, and training to farmers interested in forming or joining cooperatives)
- Price stabilization mechanisms can also be explored to mitigate market fluctuations (revealing of collusion on purchasing price among big actors)
- Promoting Sustainable Pasture Management for Dairy Farms (regulations to prevent overgrazing, educating farmers on rotational grazing, payments for environmental services)

Discussion

- Actuality of the used data for paper
- Number of determinants in regression models
- Inclusion of seasonal price to regression
- How to take into account reverse causality. What if farmers stock up their herd or invest into milking equipment only as a consequence of better market access? This problem needs to be discussed in the framework of what econometricians call the “identification strategy” for your model.

Thank you for your attention!

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