An empirical analysis of producer prices in the dairy sector in Argentina: what can we expect from milk processing cooperatives?

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Outline

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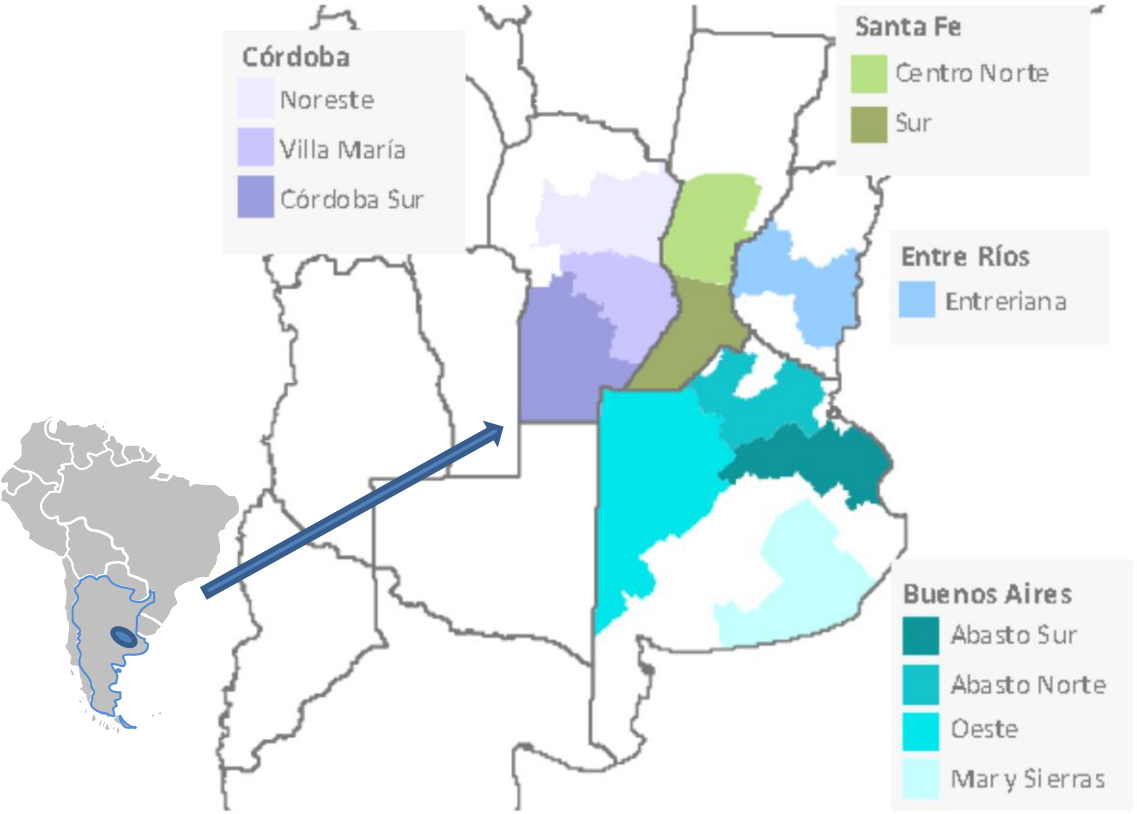
Dairy production in Argentina: Raw milk



- Milk Production (2015):
  11.184 million liters

➡ 93% in three **provinces**

➡ 80% in five **basins**

- Dairy farmers (2015):
  11.660 production units

⬇

Decreasing trend

Source: Ministry of Agriculture, Livestock and Fishing; National Institute of Agriculture Technology (INTA)

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Dairy market in Argentina: Industry profile

Three Segments:

1) **Large traditional dairy firms:** obsolete and oversized productive structures, high labor costs and low efficiency in crisis for several years.

2) **Foreign or domestic capital medium-large firms:** higher efficiency and export profile.

3) **Small and medium firms:** geographically dispersed, with medium or low technological level, oriented to the domestic market.

Dairy market in Argentina: Industry concentration

Top Ten Companies in Argentina

Order	Company	Origin of capital	Milk processed (Mill lt/year)	Share (%)
1	Mastellone	IOF National	1,500	13%
2	**SanCor**	**Co-operative National**	**1,400**	**12%**
3	Molfino	Saputo (Canada)	1,100	10%
4	Williner	IOF National	580	5%
5	Verónica	IOF National	440	4%
6	Nestlé	Nestlé (Switzerland)	400	4%
7	Danone	Danone (France)	330	3%
8	Milkaut	Bongrain (France)	300	3%
9	La Sibila	IOF National	290	3%
10	Punta del Agua	IOF National	220	2%
	First 10 firms		**6,560**	**58%**
	Others		4,656	42%
	TOTAL		**11,216**	**100%**

Between countries comparison

Country	Largest (%)	CR4 (%)
Argentina	14%	40%
United States	31%	45%
Australia	36%	60%
Canada	31%	80%
Ireland	35%	80%
Chile	34%	90%
Uruguay	68%	90%
The Netherlands	88%	95%
New Zealand	92%	98%

Consumer/Producer price ratio

2007	2014	2016
2.24	2.65	5.67

Source: Galetto, Alejandro. Centro de Agronegocios y Alimentos – Universidad Austral.

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Research questions

Which are the **determinants** of producer prices?

- Farmer size
- Firm size
- Type of firm (Coop, IOF's)
- Milk quality

What role can cooperatives fulfill in determining producer prices?

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Conceptual Framework: transaction costs

The costs of arranging a transaction:

- Search and information costs
- Bargaining costs
- Enforcements costs

They may influence prices paid

Smaller producers may have higher costs per unit transacted, they accept lower prices

Smaller processors may have higher costs per unit transacted, they pay lower prices

Source: Vakis et al. 2003; Coase 1937; Williamon 1981.

Conceptual Framework: yardstick effect

Oligopolistic Market

Cooperatives

Mechanism to determine prices ≠ Maximize Profit

Can offer better conditions and pay better prices for members.

Yardstick effect

Investor-Oriented Firms (IOFs)

Maximize Profit

They have to follow the coops to avoid that all farmers join them.

Basins with higher cooperative market share may evidence higher producer prices.

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Data and empirical strategy : Pampas Survey

Database: Milk Production Systems of the Pampas Survey (INTA)

Period	Number of dairy farms surveyed
2001-2002	494
2002-2003	472
2003-2004	528
2005-2006	116
2012-2013	118
Total	**1,728**

Basin	Number of dairy farms surveyed
Central Santa Fe	623
West Buenos Aires	244
Northeast Córdoba	238
Abasto Buenos Aires	180
Villa María	175
Other Basins	*268*
TOTAL	**1,728**

Monthly collected data:
20.736 observations

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Data and empirical strategy: Multilevel model

$$\ln\_price_{ijk} = \beta_1 + \beta_2 \ln\_liters\_sold_i + \beta_3 firm\_small_i + \beta_4 firm\_medium_i + \beta_5 \ln\_solids_i$$
$$\beta_6 coop\_mkt\_share_l + \beta_7 coop\_buyer_i + \beta_8 coop\_buyer_i * coop\_mkt\_share_i + \zeta_{1j} + \zeta_{2k} + \varepsilon_{ijk}$$

Variable Name	Description	N	Mean	Std. Dev.	Min	Max
ln_pricemilk	Natural logarithm of real price per liter	11,330	0.27	0.17	0.0001	1.27
ln_liters_sold	Natural logarithm of the monthly volume milk sold	11,330	10.96	0.76	7.09	13.74
Firm_size_small	= 1 if buyer is a small firm	11,330	0.15	0.36	0	1
Firm_size_medium	= 1 if buyer is a medium firm	11,330	0.34	0.48	0	1
ln_solids	Natural logarithm of the % of solids (fat and protein) per liter of milk	11,330	-2.69	0.05	-2.97	-2.36
Coop_mkt_share	Cooperatives ' market share of the total milk delivered per basin	5	18.7	11.72	5.07	39.4
Coop_buyer	= 1 if buyer is a cooperative	11,330	0.32	0.47	0	1

Results

	l_pricemilk
ln_liters_sold	0.0155*** (-0.0015)
Firm_size_small	-0.0126*** (-0.0035)
Firm_size_medium	-0.0329*** (-0.0031)
ln_solids	0.2891*** (-0.024)
Coop_mkt_share	-0.0011*** (-0.0002)
Coop_buyer	-0.0941*** (-0.0073)
int_Coop_mkt_share*coop_buyer	0.0017*** (-0.0003)
Constant	0.9692*** (-0.0988)
Random intercept department (ζ_{1j})	0.0577*** (-0.0057)
Random intercept year (ζ_{2k})	0.0577*** (-0.0057)
ε_{ijk}	0.1122***(-0.0007)
N	11,330
chi2_c	8495.1956

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Likelihood-ratio test (Assumption: reg (2) nested in reg (3))

LR chi2(1) = 40.22 Prob > chi2 = 0.0000

Farmer Size:
↑10% liters → ↑0.15% price

Milk Quality:
↑10% solids/lt→ ↑2.8% price

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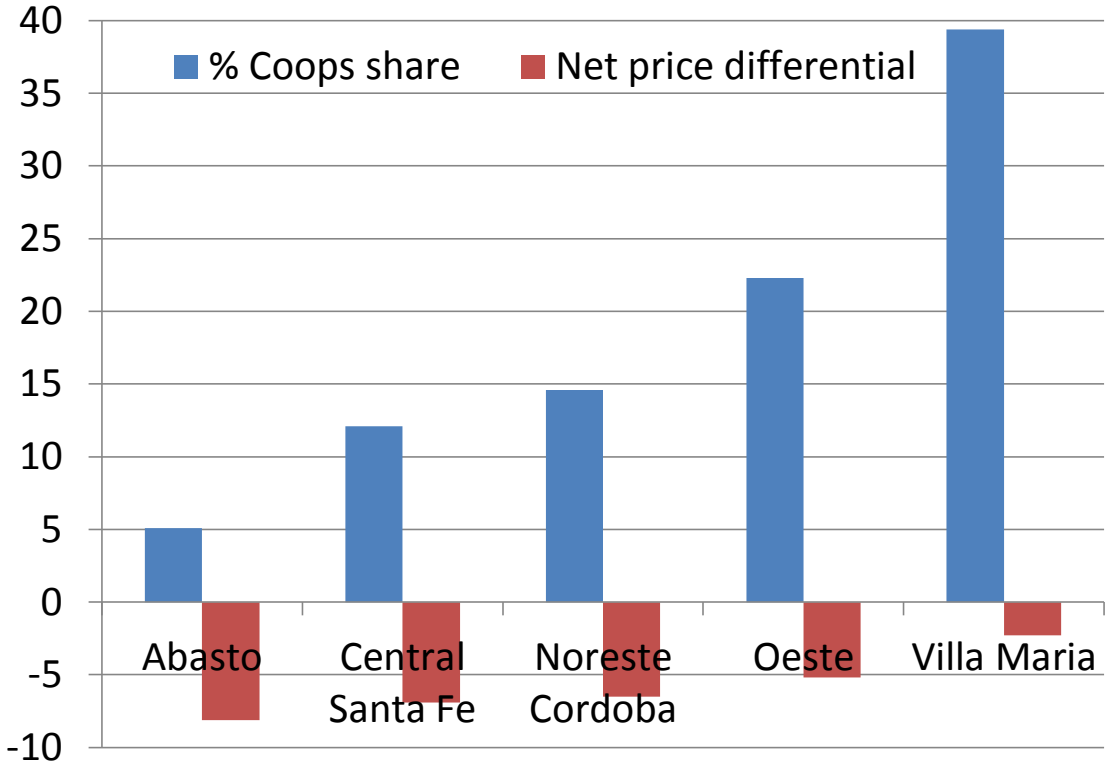
Results

$$\ln\_price = -8.98(1) + 0.17(1) * coop\_mkt\_share$$



Interaction effect:

greater cooperatives' market share lowers the price gap.

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Discussion

- Why do cooperatives pay **lower prices**?
  - ✓ **Benefits of belonging**: lower input prices, financial services at lower interest rates, medical coverage, etc.
  - ✓ **Assured purchase:** important for perishable products such as milk
  - ✓ **Assured income:** stable prices, specially when prices decrease

Discussion

Why are prices lower in basins with **higher cooperative** market share?

Some questions:

- ✓ Strong institutional and structural changes in the 90's affect dairy sector (coops and no coops)
- ✓ Different performance among cooperatives: big vs. small cooperatives
- ✓ Cooperatives perform in marginal regions
- ✓ Structural differences among farmers in the basins

Conclusions

About determinants of producer prices

- Quality differential matters
- Volume delivered by farmers matters
- Firm size matters too

About Cooperatives role

- The cooperative role goes beyond prices in the Argentinean dairy sector

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Thanks for your attention!

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