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Market power in food supply chain: evidence from Italian pasta chain

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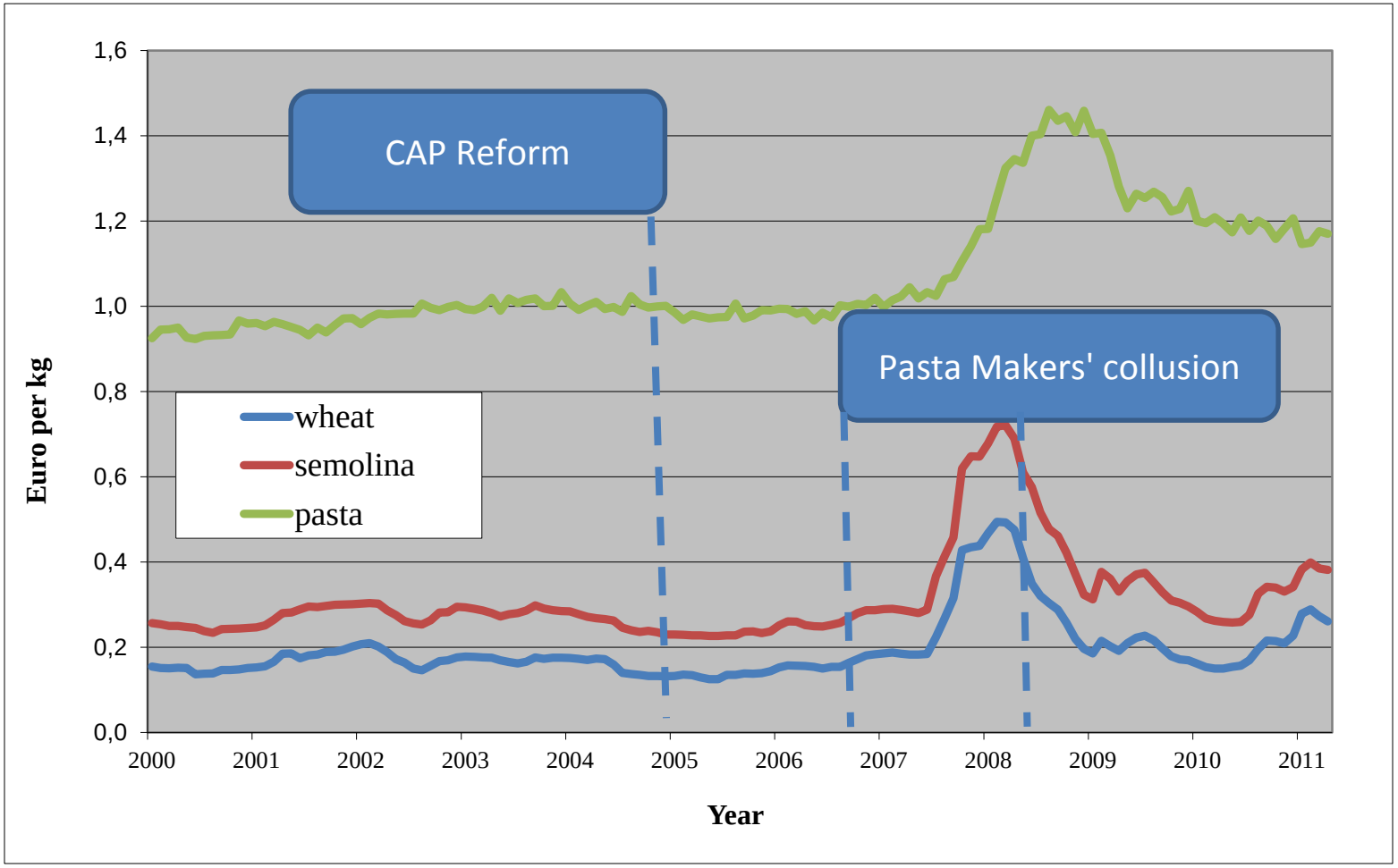
Outline

- Overview of wheat-pasta chain
- Literature review
- Research Question
- Theoretical model
- Results
- Interpretation

Overview



Source: Ismea

Literature Review on Market power

- Various approaches: Asymmetric Price Transmission, SCP and NEIO

- **APT.** verify asymmetries in price transmission but no causal relation between market power and APT

- **NEIO.** The main advantage: detect market power and its intensity. The disadvantages: data requirements in term of quality and quantity and the sensitivity to the specification error

- **Lloyd et al. (2006, 2009) model** represents a preliminary test to verify market power practice. Advantage: requires times series easily available. Disadvantage: does not permit to estimate market power intensity

Literature Review on APT

- APT verifies asymmetries in price transmission.

- Possible explanations:

  - Market power exertion in processing and retailing (Peltzman, 2000)
  - Menu cost (Levy et al., 1997)
  - Price support policy (Lass, 2005)

- But no causal relation between these possible causes and APT

Research Question

- This work is a second step of a research project aimed at analyzing price transmission and market power in the Italian pasta chain
- The first step results (Cacchiarelli et al., 2013) on Asymmetric Price Transmission show:

	Pre-CAP (2000-2004)	Post-CAP (2005-Aug 2008)	Post-CAP (Sep 2008-Aug 2013)
Durum wheat-semolina	YES	NO	NO
Semolina-pasta (producer)	NO	YES	YES (Increases<decreases)
Pasta (producer)-pasta (retailer)	YES (Increases<decreases)	NO	YES

- Question: May we explain positive APT along pasta chain with market power exertion by some operators?

Theoretical Model (1)

- The main equations of Lloyd model:

- **Retailers** face the following **demand function** for the processed product:

$$x = D(Px, N) \qquad (1)$$

Where: **x**: quantity of product; **Px**: retail price; **N**: exogenous shifter

- The **supply function** of the **agricultural** raw material is given, in inverse form, from:

$$Pa = k(A, W) \qquad (2)$$

where **A**: quantity of agricultural product; **Pa**: farm price; **W**: exogenous shifter

- Exogenous shifters **N** and **W** affect both farm price and retail price

Theoretical Model (2)

- Assumption:
  - ✓ constant returns to scale in retail sector
  - ✓ Technical processing coefficients exogenous and constant
- Introducing the aggregate input and output conjectural elasticity. (interpreted as an index of oligopsonistic power,μ, and oligopolistic power, θ), follows:
- The retail-farm price spread equation:

$$Px - Pa = \frac{D\left(\frac{\theta}{b} - g\mu\right) + (1 + bg)(y + zE) + \left(\frac{\theta}{b} + g\mu\right)cN - (\theta + bg\mu)(h + gW)}{(1 + \theta) + bg(1 + \mu)} \qquad (3)$$

If θ and μ = 0 ⟶ Px-Pa= zE=M where M are production costs (excluded raw material)

If θ and μ > 0 ⟶ Px-Pa is affected by N (↑) and W (↓)

Econometric Equation

The equation to estimate is:

$$\mathbf{Px - Pa = \beta 0 + \beta 1\ M + \beta 2\ N + \beta 3\ W + \varepsilon}$$

- ✓ $\beta 2$ and $\beta 3$ are not significant ⟶ perfect competition
- ✓ $\beta 2$ and $\beta 3$ are significant ($\beta 2 > 0$; $\beta 3 < 0$) ⟶ Market power exertion

Preliminary Analysis

- Data

- prices: durum wheat, semolina, pasta producer, pasta retail; Costs: labour, energy; shifters: farm input price index and retail price index of all food
- Three periods: Pre-CAP (Jan 2000-Dec 2004); Post-CAP price instability (Jan 2005-Aug 2008); Post-CAP price stability (Sept 2008-Aug 2013)

- Preliminary test

- Stationarity (ADF, KPPS)
- Cointegration (Johansen's Trace test)

- Variables in the models are only the ones showing one cointegrating vector
- Error Correction Model.

Results (1)

- Semolina producers' behaviour

	2000-2004		2005-2008		2008-2013	
	coefficient	p value	coefficient	p value	Coefficient	p value
labour	-	-	-	-	0.09781	0.000
energy	-	-	0.00019	0.471	-	-
demand shifter	0.1065	0.014	0.00221	0.134	0.005038	0.041
supply shifter	-0.0043	0.000	0.00071	0.281	-0.000335	0.501
trend	-0.0019	-	0.00146	-	-0.00059	-
constant	-0.5126	-	0.3041	-	0.67819	-
alpha (y)	-0.0312	0.452	-0.5284203	0.000	-0.0657	0.431

- Pasta makers' behaviour

	2000-2004		2005-2008		2008-2013	
	coefficient	p value	coefficient	p value	coefficient	p value
labour	0.03945	0.000	-	-	0.1923	0.000
energy	-	-	0.03464	0.091	-	-
demand shifter	0.00356	0.717	0.6227	0.000	0.03241	0.566
supply shifter	-0.00288	0.325	-0.1842	0.000	-0.002503	0.821
trend	0.1068	-	0.0986	-	0.01813	-
constant	0.3743	-	0.4608	-	0.2021	-
alpha (y)	-0.01112	0.852	-0.2345	0.002	-0.0252	0.799

Results (2)

- Retailers' behaviour

	2000-2004		2005-2008		2008-2013	
	coefficient	p value	coefficient	p value	coefficient	p value
labour	-	-	-	-	-	-
energy	0.001949	0.007	0.0030498	0.061	0.0102	0.000
demand shifter	0.0262387	0.000	0.04913	0.000	0.01003	0.022
supply shifter	-0.0042	0.178	-0.0032	0.156	0.00644	0.068
trend	0.0044	0.002	0.0017	-	-	-
constant	0.9124	-	0.4652	-	-	-
alpha (y)	-0.2606	0.041	-0.0851	0.002	-0.08598	0.013

- Results show that in all cases positive APT is explained by market power exertion

Interpretation (1)

- **Semolina producers: CAP plays a crucial role**

- **2000-2004**: partially decoupled payments ⟶ high production levels of wheat ⟶ semolina producers exerted buyer power against farmers

- **2005-2013:** decoupled aid ⟶ reduction of wheat production ⟶ improved farmers bargaining power

  - Italian and international wheat are not perfect substitutes

- **PASTA MAKERS: both CAP reform and Prices increase play an important role**

- CAP reform: weakened semolina producers

- Prices: inflationary pressure and a lower purchasing power of consumers ⟶ weakened retailers

  - Pasta retail prices do not permit to the various segment to apply double marginalization

Interpretation (2)

- **Retailers:**
  - Pasta is considered as a loss leader product
  - Private label

Thank you for your attention