Spatial Price Transmission of Milk Soaring Prices from Global to Domestic Markets: Evidence from Panama

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1. Introduction

- Price volatility has implications on consumers and producers welfare
- Milk has become the most volatile agricultural commodity in the international market.
- This paper is about a deeper understanding of the magnitude, speed and symmetry to which global milk prices are being transmitted to domestic prices in Panama
- Our econometric analysis shows that global and domestic prices are correlated, that it takes only two months 2 months for domestic prices to fully adjust, and that global price increases tend to be transmitted faster than price reductions

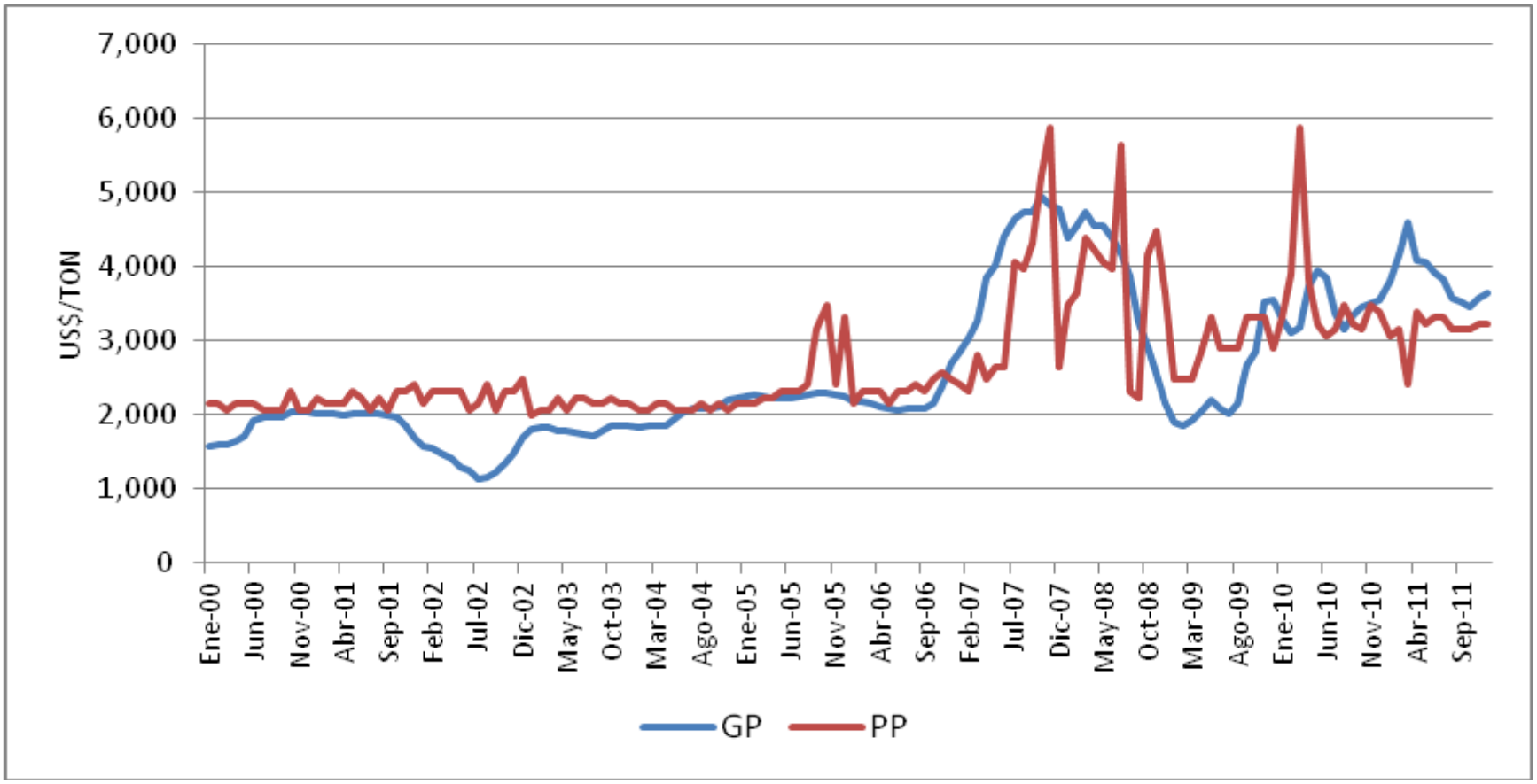
2. Trends and Perspectives of the Global Milk Market

- Before 2006, global prices for milk were relatively stable, with minor fluctuations.

- Since late 2006, and coinciding with the global food crisis, milk price movements became significantly more volatile.

- This increase in price volatility is not perceived any longer as a temporary state, but as the new trend of global markets

2. Trends and Perspectives of the Global Milk Market



3. The Milk Market Structure in Panamá

- Dairy subsector = approximately 12% Agricultural Gross Production Value(Acosta and Valdes, 2011).

- 40% (16,000 farms) are considered small producers with herds of 20 or fewer animals per farm.

- There are three main livestock production systems:
  - Specialized in milk
  - Specialized in meat
  - Dual-purpose production system, milk and meat.

- Milk production is highly dependent on the rainfall regime.

3. The Milk Market Structure in Panamá

- Milk is classified in three main groups: A (46%), B (4%), and C (50%) depending on its quality.

- Milk grade A is used exclusively for the production of pasteurized fluid milk, while the grades B and C are mainly use for industrial purposes.

- The two main types of processing industries in the country are classified as big and small plants.
  - The big milk processing plants are constituted by 5 main enterprises, NESTLÉ, Estrella Azul, PROLACSA, BONLAC, and COOLECHE. Together, they absorb approximately 88% of national production. The small processing plants are comprised of 46 enterprises that consume about 12% of national production, which primarily is used to create cheese.

3. The Milk Market Structure in Panamá

- Panama has traditionally been a net importer of dairy products.
- Most imports of milk products came from Oceania.
- 99% of dairy exports go to Central American region (mainly El Salvador and Honduras), of which 62% consisted of different formulas of milk and 32% of various types of cheese.
- Domestic milk production is about 168 million liters of fluid milk equivalents (FME), imports are 177 million, and exports 17 million (dependency ratio is about 54%)

4. Spatial Price Transmission Analysis

- The notion of price transmission can be better understood as being based on three main components (Rapsomanikis et al 2003):
  - Co-movement and completeness of adjustment
  - Dynamics and speed of adjustment
  - Asymmetry of response.

- The factors that constrain price transmission are:
  - Transaction cost
  - Trade policy mechanisms
  - Market power

5. Econometric Methods

1. Unit root test of time series (with/without intercept, deterministic time trend)
   - Series are non-stationary (Augmented Dickey Fuller test was used)

2. Two-Step Error Correction Model (ECM)

$$y_t = \alpha + \beta x_t + z_t \qquad (4)$$

$$\Delta y_t = c + \beta_y \Delta y_{t-1} + \beta_x \Delta x_{t-1} - \phi_1 z_{t-1} \qquad (5)$$

3. Asymmetric Error Correction Model AECM

$$\Delta y_t = c + \beta_y \Delta y_{t-1} + \beta_x \Delta x_{t-1} - \phi ECT_{t-1}^{+} + \phi ECT_{t-1}^{-} + \varepsilon_t$$

6. Data

- Monthly price observations, period 2000 (1) to 2011 (12) (144 obs)
- Domestic market: Producer monthly milk price observations at the farm gate level reported by the Contraloria General de la Republica in Panama.
- International market: F.O.B. Oceania whole milk powder monthly prices reported by the USDA Dairy Market News.

7. Results

- Using Augmented Unit Root Test (ADF) we conclude that both series are no-stationary
- Johansen´s Test suggests that a long-run co-integration relationship exists between global and producer prices
- ECM indicates that a change of one unit in global milk prices leads to a change of about 0.34 units on the producer price in the next period, and that the speed at which producer prices return to an equilibrium is about 2 months
- AECM suggests that an increase in global prices tends to be transmitted to producers faster than decreases (increase takes one month, decrease takes three months)

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8. Final comments

- In addition to technological adoption to increase competitiveness of small dairy producers it is important to design policies to minimize the impact of domestic milk prices volatility.

- Policies should include:
  - Better price information system and strengthening the capacities of agricultural policy units to conduct market prospective (time series analysis)
  - Removal of policy trade distortions such as restrictions on imports and exports.

- Other measures:
  - Safety nets to assist producers when prices are extremely low to help them purchase inputs to avoid the overgrazing and degradation of pastures
  - Market-based risk management schemes, including the use of forward contracts available to small producers.

THANK YOU !