The Milk Price Effect of a Private Supply Management Program in the U.S. Dairy Industry

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Selected Poster prepared for presentation at the
2016 Agricultural & Applied Economics Association Annual Meeting, Boston, MA, July 31-Aug. 2

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Cooperatives Working Together (CWT)

A voluntary, producer-funded national program is developed to benefit American dairy farmers.

- Includes individual farms and cooperatives.
- Participating dairy farmers have marketed 70% of the national milk supply.

Capper-Volstead Act (1922)

- Allows collective marketing activities of agricultural producers.

CWT supply management program (2003 – present)

Was originally developed to address milk over-supply and increasing milk price volatility in the industry experienced after a substantial decline in the Federal price support.

CWT program objective

- To balance milk supply and milk demand.
- To achieve good returns and relative price stability for U.S. dairy farmers.

CWT program has included

- Herd retirement program (2003 - 2009)
- Export assistance program (2003 – present)
- Marketing area program (2003 – present)
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Research objective

To analyze milk price effect of the CWT program at the dairy farm level.

Econometric model: Variables and data sources

- Dependent variable is all milk price ($ per cwt).
- Data source: USDA National Agricultural Statistics Service.

Independent variables

- Wholesale prices of cheddar cheese, butter, dry whey and nonfat dry milk ($ per pound).
- 2 model specifications: USDA survey-based prices and CME spot prices.
- Data source: USDA Agricultural Marketing Service.

A set of binary variables for pre-CWT period, CWT-1 period and CWT-2 period


Federal Milk Marketing Orders (FMMOs): Milk pricing

FMMOs set the minimum prices for Grade A milk:

- Regulated handlers at the farm-handler level have to pay.
- Based on the final use of milk (classified milk pricing principle).

Since 2000, a series of price formulas is used:

- Class I milk price = f (P cheese, P butter, P dry whey, P nonfat dry milk).
- Class II milk price = f (P nonfat dry milk, P butter).
- Class III milk price = f (P cheese, P butter, P dry whey).
- Class IV milk price = f (P butter, P nonfat dry milk).

USDA survey-based wholesale prices are used in milk price formulas.

Are highly correlated with the Chicago Mercantile Exchange (CME) spot prices:

U.S. dairy industry (1996-2014)

Milk production, all-milk price and milk production costs

Econometric model: ARCH(1) model

Conditional mean equation

\[ MP_t = \beta_0 + \beta_1 \times CheeseP_t + \beta_2 \times ButterP_t + \beta_3 \times DryWheyP_t + \beta_4 \times NonfatDryMilkP_t + \mu_1 \times preCWTP + \mu_2 \times CWT + \mu_3 \times CWT^2 + u_t \]

- A set of monthly binary variable is included.
- Not reported due to space limitation.
- Reference group: CWT-1 period observations.
- Pre-CWT and CWT-2 period, relative to CWT-1 period.

Conditional variance equation

\[ u_t^2 = \alpha_0 + \alpha_1 \times u_{t-1}^2 + \gamma_1 \times preCWT + \gamma_2 \times CWT \]

- CWT period and CWT-2 period, relative to CWT-1 period.

Variable Costs ($/cwt)

- Adjustments take place on a monthly basis.
- Due to FMMOs monthly price announcements.

CWT period industry performance, relative to pre-CWT period

- All milk price is lower and all milk price variance is higher.
- Reflects effects of herd retirement and export assistance programs.

CWT-2 period industry performance, relative to CWT-1 period

- All milk price is higher, and evidence on price variance change is mixed.
- Reflects effects of export assistance programs.

CWT-2 period industry performance, relative to CWT-1 period

- All milk price is higher and all milk price variance is higher.

Discussion

Wholesale dairy product prices are the key determinants of milk price:

- Higher (lower) wholesale prices lead to a higher (lower) milk price.
- Adjustments take place on a monthly basis.

Research limitations

The estimation results are affected by the length of the pre-CWT period:

- The empirical findings characterize the national dairy industry performance.
- CWT Federal and State Milk Marketing Orders.
- Non-participating dairy farmers have marketed 30% of national milk supply.
- Milk price effect of the supply management in the U.S. dairy industry is blurred due to the nature of milk pricing within the FMMOs.