The CWT Program Effects:
An Analysis of Retail Fluid Milk Pricing in Selected U.S. Cities

Ralph Mondesir
A former graduate student
John E. Walker Department of Economics
Clemson University
rmondes@g.clemson.edu

Yuliya V. Bolotova
Assistant Professor of Agribusiness
Department of Agricultural Sciences
Clemson University
yuliyab@clemson.edu

Scott Templeton
Associate Professor
John E. Walker Department of Economics
Clemson University

William C. Bridges Jr.
Alumni Distinguished Professor
Department of Mathematical Sciences
Clemson University

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

Copyright 2016 by R. Mondesir, Y.V. Bolotova, S. Templeton and W.C. Bridges Jr. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.
The CWT Program Effects: An Analysis of Retail Fluid Milk Pricing in Selected U.S. Cities

Ralph Mondesir1, Yuliya V. Bolotova2, Scott Templeton1 and William C. Bridges Jr.3
1John E. Walker Department of Economics, 2Department of Agricultural Sciences and 3Department of Mathematical Sciences

CWT program
A supply management program implemented by the Cooperatives Working Together (CWT)
Originally developed in 2003 to address
- Milk oversupply problem
- Increasing volatility of milk prices received by dairy farmers
- A substantial decrease in government intervention in dairy industry pricing

CWT include dairy cooperatives and individual dairy producers throughout the country
- Participating dairy farmers have marketed approximately 70% of national milk supply
CWT program has included
Herd retirement program (2003-2009)
- Was used to remove from production the entire milking herds of selected dairy farmers
Export assistance program (2003-present)

Research objective
To analyze possible effects of the CWT herd retirement program at the retail level
Focus on fluid whole milk markets in six cities
- Atlanta, GA; Cincinnati, OH; Louisville, KY
- Miami, FL; Philadelphia, PA; St. Louis, MO

Hypothesis
- The retail fluid whole milk price is higher and price variance is lower during the period of the CWT herd retirement program implementation
- As compared to the periods prior and after the program implementation

Methodology
An econometric analysis of the retail fluid whole milk price level and volatility during three periods
- Pre-HR period (01/2000 – 06/2003): the period prior to the herd retirement program implementation
- HR-period (07/2003 – 12/2009): the period of the herd retirement program implementation
- Post-HR period (01/2010 – 06/2012): the period following the herd retirement program implementation
- A set of binary variables is used to represent three periods: HR-period observations are reference group

Data
Retail prices of fluid whole milk sold in gallon containers
Class I milk prices ("farm-level" prices)
Source: USDA Agricultural Marketing Service

Econometric model: ARCH(1) model
Conditional mean equation
\[ R_T = \beta_0 + \beta_1 F_T + \beta_2 Pre-HR + \beta_3 Post-HR + u_t \]
- \( \beta_1 \) is cost pass-through
- \( \beta_2 \) and \( \beta_3 \) capture changes in retail milk price in pre-HR and post-HR periods, relative to HR period

Conditional variance equation
\[ u_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \alpha_2 Pre-HR + \alpha_3 Post-HR + \nu_t \]
- \( \alpha_2 \) and \( \alpha_3 \) capture changes in price variance in pre-HR and post-HR periods, relative to HR period

Selected estimation results: ARCH(1) models

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated Coefficient (t-ratio)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR prior period</td>
<td>2.15 (9.62)</td>
</tr>
<tr>
<td>HR period</td>
<td>1.06 (7.99)</td>
</tr>
<tr>
<td>Post-HR period</td>
<td>1.06 (7.99)</td>
</tr>
<tr>
<td>Pre-HR period</td>
<td>2.04 (10.62)</td>
</tr>
</tbody>
</table>

Conclusion
HR-period, as compared to pre-HR period
- Retail fluid milk price is higher in Atlantic, Miami, Louisville and Philadelphia
HR-period, as compared to post-HR period
- Retail fluid milk price is higher in Atlanta, Miami, Louisville, Cincinnati and St. Louis

Empirical evidence on changes in price variance is mixed (including statistical significance)

Research limitations
A number of economic and policy forces affecting dairy industry might have contributed to the observed effects: structural changes in fluid milk processing and retailing; state milk price controls: Philadelphia, PA; local fluid milk pricing strategies used by retailers