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An Analysis of Milk Pricing in the Eastern United States

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Abstract

In 2008 and 2009 dairy farmers in the U.S. Southeast and Northeast regions filed class action antitrust lawsuits, in which they alleged that Dean Foods, the largest fluid milk processor in the country, and Dairy Farmers of America, the largest dairy cooperative in the country, engaged in anticompetitive conduct, which restricted competition in the fluid milk market in these regions. This research analyzes the behavior of Class I milk prices in ten cities located in the Southeast and Northeast regions during the period of alleged anticompetitive conduct (the pre-antitrust action period) and the period of antitrust actions (the antitrust action period). There is empirical evidence indicating that the monthly average Class I price and the monthly average cooperative Class I price are higher in the antitrust action period, as compared to the pre-antitrust action period, in all analyzed cities. The monthly average premium measured in \$ per cwt and the monthly average premium measured as a percentage of the cooperative Class I price increase in the antitrust action period, as compared to the pre-antitrust action period, in all analyzed cities located in the Southeast region and in one city representing the Northeast region.

Key words: antitrust, cartels, fluid milk, regulated pricing.

JEL codes: K21, L13, L41, L66, Q13.

1. Introduction

The process of increasing consolidation and concentration that affected fluid milk channel in the U.S. during recent decades included a series of mergers and acquisitions involving dairy cooperatives and fluid milk processors (Shields 2010). Dairy Farmers of America (DFA), the largest dairy cooperative in the country, was formed in 1998 as a result of the merger of four large regional dairy cooperatives. Dairy cooperatives have historically been involved in handling and marketing (including processing) milk of their members and representing dairy farmers in contract negotiations with milk processors. In 2001, Suiza Foods Corporation, then the largest milk processor, acquired Dean Foods Company to form a new company named Dean Foods Company, which has become the largest fluid milk processor in the country.

During the second part of 2000s, dairy farmers (plaintiffs) in the U.S. Southeast and Northeast regions filed class action antitrust lawsuits, in which they alleged that Dean Foods and Dairy Farmers of America (among other defendants) engaged in anticompetitive conduct, which restricted competition in the fluid milk market in these regions (Shields 2010; Greene and Rhee 2011; Abrams, Commins and Foix 2014). It was argued that this conduct affected the purchase, sale, marketing and processing of Grade A milk in Federal Milk Marketing Orders 5 and 7 (“Southeast”) and 1 (“Northeast”), and decreased milk prices paid to dairy farmers. The Grade A milk used in fluid milk processing, Class I milk (or “beverage” milk), which is sold to or purchased by fluid milk processing (bottling) plants, is the product affected by the alleged anticompetitive conduct.

The lawsuits alleged a conspiracy among the defendants to monopolize and to monopsonize fluid milk market in the affected geographic areas, which violated Section 1 and Section 2 of the Sherman Antitrust Act (1890). After several years of litigations, the lawsuits have been settled. Dean Foods and Dairy Farmers of America agreed to pay substantial monetary penalties and to change some of the business practices. Both Dean Foods and Dairy Farmers of America did not admit any wrongdoing.

The objective of this research is to analyze the behavior of Class I milk prices in the U.S. Southeast and Northeast regions during the period of alleged anticompetitive conduct (the pre-antitrust action period) and the period of antitrust actions (the antitrust action period). A general research question of interest is whether the Class I milk price has changed between the two periods. The cities representing the Southeast region include Louisville (KY), Memphis (TN), Charlotte (NC), Atlanta (GA) and New Orleans (LA). The cities representing the Northeast region include Boston (MA), Hartford (CT), Philadelphia (PA), Baltimore (MD) and Washington, D.C. The paper is organized as follows. Section 2 discusses data and methodology. Section 3 presents the results of a descriptive statistical analysis, and it is followed by the conclusion.

2. Data and Methodology

2.1. Data

Class I milk prices are available in the USDA Agricultural Marketing Service Milk Marketing Order Statistics Public Database. Class I milk prices are reported for a number of geographic locations (cities) throughout the United States. Class I milk prices are determined within the system of Federal and State Milk Marketing Orders. Milk price announcements are issued publicly on a monthly basis. Class I milk prices are announced approximately ten days before the beginning of the month in which these prices apply.

The Database contains three data items related to Class I milk price: (a) *Class I price* for city, which is a Federal Milk Marketing Order *minimum* Class I price for the county in which the city is located, (b) *Announced cooperative Class I price*, which is the price that the major cooperative operating in the city market has announced that it would be charging for milk used in Class I, and (c) *the difference* between the Federal milk order and the announced cooperative Class I price.

The first data item, the *minimum* Class I price, is the minimum price that milk processors have to pay for Grade A milk used in manufacturing fluid (beverage) milk products within the system of Federal Milk Marketing Orders. Dairy cooperatives are allowed to negotiate with milk processors premiums, which are paid in addition to the minimum Class I milk prices. These additional payments typically reflect milk quality characteristics, local demand and supply conditions, and cooperatives' charges for performing milk assembling functions. The second data item, the *announced cooperative* Class I price, includes the minimum Class I price and this additional payment (premium).

Therefore, the third item, the *difference* between the announced cooperative Class I price and the minimum Class I price is a payment the cooperative expects to charge (or to receive) in addition to the minimum Class I price at a particular location. This payment is to be referred to as a premium in this research paper. Given that this premium is calculated using the announced cooperative Class I price in this research, the premiums actually charged by the cooperatives may or may not be different from the premiums calculated using the announced cooperative Class I price.

2.2. Methodology

The empirical analysis includes a descriptive statistical analysis of the behavior of the minimum Class I price (to be referred to as Class I price), the announced cooperative Class I price (to be referred to as cooperative Class I price) and the calculated premium between the two periods of interest: the pre-antitrust action period and the antitrust action period. The monthly averages are calculated for Class I price measured in \$ per cwt¹, cooperative Class I price measured in \$ per cwt, premium measured in \$ per cwt and premium expressed as a percentage of the cooperative Class I price for the pre-antitrust action period and antitrust action period. The changes (including percentage changes) in the averages of the analyzed variables between the two periods are calculated as well.

¹ "cwt" is one hundredweight (=100 pounds).

In the case of the Southeast region, the pre-antitrust action period is January 2001 to July 2008, and the antitrust action period is August 2008 to December 2012. In the case of the Northeast region, the pre-antitrust action period is January 2002 to September 2009, and the antitrust action period is October 2009 to December 2012. The beginning dates of the pre-antitrust action periods are taken from the complaints filed by plaintiffs and the settlement notices (court documents publicly available). The beginning dates of the antitrust action periods are the moments when the antitrust lawsuits were filed by plaintiffs (dairy farmers).

The cities located in the Southeast region included in the analysis are Louisville (KY), Memphis (TN), Charlotte (NC), Atlanta (GA) and New Orleans (LA). The cities located in the Northeast region included in the analysis are Boston (MA), Hartford (CT), Philadelphia (PA), Baltimore (MD) and Washington, D.C.

3. Results

3.1. Southeast Region (Table 1, Figures 1 and 2)

During the pre-antitrust action period, the average² Class I price is in the range of \$16.32 per cwt in Louisville to \$17.72 per cwt in New Orleans, and the average cooperative Class I price is in the range of \$18.17 per cwt in Louisville to \$19.42 per cwt in New Orleans. The average Premium varies from \$1.70 per cwt in New Orleans to \$1.97 per cwt in Atlanta. The average Premium calculated as a percentage of the cooperative Class I price varies from 8.74% in New Orleans to 10.33% in Atlanta.

The following changes are observed in the averages of the analyzed variables in the antitrust action period, as compared to the pre-antitrust action period. The average Class I price and the average cooperative Class I price have increased in all analyzed cities. The average Class I price increase is \$1.93 per cwt in Louisville and Memphis, \$2.03 per cwt in New Orleans, \$2.13 per cwt in Charlotte and \$2.51 per cwt in Atlanta. These average Class I price increases are in the range of 11.4%-12.4% in New Orleans, Memphis, Louisville, Charlotte and 14.6% in Atlanta.

The average cooperative Class I price increase is \$3.19 per cwt in Louisville, \$3.27 per cwt in New Orleans, \$3.43 per cwt in Charlotte, \$3.47 per cwt in Memphis and \$3.86 per cwt in Atlanta. These average cooperative Class I price increases are in the range of 16.8%-18.6% in New Orleans, Memphis, Louisville, Charlotte and 20.1% in Atlanta.

The average Premium measured in \$ per cwt and as a percentage of cooperative Class I price have increased in all analyzed cities. The average Premium increase is \$1.24 per cwt in New Orleans, \$1.26 per cwt in Louisville, \$1.31 per cwt in Charlotte, \$1.35 per cwt in Atlanta and \$1.53 per cwt in Memphis. The average Premium (\$ per cwt) increases are approximately 68% in Atlanta, Louisville and Charlotte, 73% in New Orleans and 86% in Memphis.

² All average prices and premiums are *monthly* average prices and premiums.

The average Premium calculated as a percentage of the cooperative Class I price increases by about 4.3%-points in Charlotte and Atlanta, 4.55%-points in New Orleans, 4.73%-points in Louisville and 5.72%-points in Memphis. These average Premium (% of cooperative Class I price) increases are approximately 42-43% in Atlanta and Charlotte, 47% in Louisville, 52% in New Orleans and 60% in Memphis.

In the antitrust action period, the average Premium is \$2.94 per cwt in New Orleans, \$3.11 per cwt in Louisville, \$3.24 per cwt in Charlotte, \$3.30 per cwt in Memphis and \$3.32 per cwt in Atlanta. In the majority of the analyzed cities in the Southeast region, in the antitrust action period, the average Premium expressed as a percentage of cooperative Class I price is in the range of 14.5%-15%. The average Class I price ranges from \$18.25 per cwt in Louisville to \$19.75 per cwt in Atlanta and New Orleans, and the average cooperative Class I price ranges from \$21.36 per cwt in Louisville to \$23.07 per cwt in Atlanta.

3.2. Northeast Region (Table 2, Figures 3 and 4)

During the pre-antitrust action period, the average Class I price is in the range of \$16.94 per cwt in Baltimore and Washington D.C. to \$17.19 per cwt in Boston, and the average cooperative Class I price is in the range of \$18.64 per cwt in Hartford to \$19.19 per cwt in Philadelphia. The average Premium varies from \$1.55 per cwt in Boston and Hartford to \$2.20 per cwt in Philadelphia. The average Premium calculated as a percentage of the cooperative Class I price varies from approximately 8.5% in Boston and Hartford to 11.68% in Philadelphia.

The following changes are observed in the averages of the analyzed variables in the antitrust action period, as compared to the pre-antitrust action period. The average Class I price and the average cooperative Class I price have increased in all analyzed cities. The average Class I price increase is \$3.05 per cwt in all analyzed cities, which is an increase of approximately 18%. The average cooperative Class I price increase is \$2.95 per cwt in Baltimore and Washington D.C., \$3.11 per cwt in Boston and Hartford and \$3.94 per cwt in Philadelphia. The average cooperative Class I price increase is approximately 16-17% in Boston, Hartford, Baltimore and Washington D.C., and it is 20.5% in Philadelphia.

The average Premium measured in \$ per cwt has increased in Boston, Hartford and Philadelphia, and it has decreased in Baltimore and Washington D.C. The average Premium increase is \$0.06 per cwt in Boston and Hartford, and it is \$0.89 per cwt in Philadelphia. The average Premium (\$ per cwt) increase is almost 4% in Boston and Hartford and 40.5% in Philadelphia. The average Premium decrease is \$0.11 per cwt in Baltimore and Washington D.C, which is approximately a 6% decrease.

The average Premium measured as a percentage of the cooperative Class I price has decreased in Boston, Hartford, Baltimore and Washington D.C., and it has increased in Philadelphia. The average Premium decrease is about 1%-point in Boston and Hartford, and it is approximately 2%-points in Baltimore and Washington D.C. The average Premium (% of the cooperative Class I price) decreases by almost 13% in Boston and Hartford and by approximately 20% in Baltimore and Washington D.C. The average Premium (% of the cooperative Class I price) in Philadelphia increases by almost 2%-points, which is a 16% increase.

In the antitrust action period, the average Premium is \$1.61 per cwt in Boston and Harford, \$1.67 per cwt in Baltimore and Washington D.C. and \$3.09 in Philadelphia. The average Premium measured as a percentage of the cooperative Class I price is approximately 7.5% in Boston and Hartford, 7.81% in Baltimore and Washington D.C., and it is 13.54% in Philadelphia. The average Class I price ranges from \$19.99 per cwt in Baltimore and Washington D.C. to \$20.24 per cwt in Boston. The average cooperative Class I price ranges from \$21.66 per cwt in Baltimore and Washington D.C. to \$23.13 per cwt in Philadelphia.

4. Conclusion

A descriptive statistical analysis presented in the paper reveals empirical evidence indicating that the monthly average Class I price and the monthly average cooperative Class I price are higher in the antitrust action period, as compared to the pre-antitrust action period, in all analyzed cities. The monthly average premium measured in \$ per cwt and the monthly average premium measured as a percentage of the cooperative Class I price increase in the antitrust action period, as compared to the pre-antitrust action period, in all analyzed cities located in the Southeast region and in Philadelphia. The monthly average premium measured in \$ per cwt and the monthly average premium measured as a percentage of the cooperative Class I price decrease in the antitrust action period, as compared to the pre-antitrust action period, in Baltimore and Washington, D.C. The decreases in the premiums in these two cities are very small in magnitude. The monthly average premium measured in \$ per cwt increases, and the monthly average premium measured as a percentage of the cooperative Class I price decreases in Boston and Hartford. These changes in the premiums in these two cities are very small in magnitude.

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Table 1 U.S. Southeast Region. Louisville (KY), Memphis (TN), Charlotte (NC), Atlanta (GA) and New Orleans (LA): *Class I Milk Price, Announced Cooperative Class I Milk Price and Premium (2001-2012).*

City/Variable	Unit of measurement	Pre-antitrust action period 01/2001-07/2008 Average	Antitrust action period 08/2008-12/2012 Average	Change in the average between two periods (%)
<i>Louisville, KY</i>				
MP_LOU	\$/cwt	16.32	18.25	1.93 (11.8)
MPC_LOU	\$/cwt	18.17	21.36	3.19 (17.6)
PREM_LOU	\$/cwt	1.85	3.11	1.26 (68.1)
PREM_LOU	% of MPC	10.12	14.85	4.73 (46.7)
<i>Memphis, TN</i>				
MP_MEM	\$/cwt	16.92	18.85	1.93 (11.4)
MPC_MEM	\$/cwt	18.68	22.15	3.47 (18.6)
PREM_MEM	\$/cwt	1.77	3.30	1.53 (86.4)
PREM_MEM	% of MPC	9.48	15.20	5.72 (60.3)
<i>Charlotte, NC</i>				
MP_CHAR	\$/cwt	17.22	19.35	2.13 (12.4)
MPC_CHAR	\$/cwt	19.16	22.59	3.43 (17.9)
PREM_CHAR	\$/cwt	1.93	3.24	1.31 (67.9)
PREM_CHAR	% of MPC	10.20	14.57	4.37 (42.8)
<i>Atlanta, GA</i>				
MP_ATL	\$/cwt	17.24	19.75	2.51 (14.6)
MPC_ATL	\$/cwt	19.21	23.07	3.86 (20.1)
PREM_ATL	\$/cwt	1.97	3.32	1.35 (68.5)
PREM_ATL	% of MPC	10.33	14.66	4.33 (41.9)
<i>New Orleans, LA</i>				
MP_NEWOR	\$/cwt	17.72	19.75	2.03 (11.5)
MPC_NEWOR	\$/cwt	19.42	22.69	3.27 (16.8)
PREM_NEWOR	\$/cwt	1.70	2.94	1.24 (72.9)
PREM_NEWOR	% of MPC	8.74	13.29	4.55 (52.1)

MP is Class I milk price, MPC is announced cooperative Class I milk price, PREM is premium.

Table 2 U.S. Northeast Region. Boston (MA), Hartford (CT), Philadelphia (PA), Baltimore (MD) and Washington, D.C.: *Class I Milk Price, Announced Cooperative Class I Milk Price and Premium (2002-2012).*

City/Variable	Unit of measurement	Pre-antitrust action period 01/2002-09/2009 Average	Antitrust action period 10/2009-12/2012 Average	Change in the average between two periods (%)
<i>Boston, MA</i>				
MP_BOS	\$/cwt	17.19	20.24	3.05 (17.7)
MPC_BOS	\$/cwt	18.74	21.85	3.11 (16.6)
PREM_BOS	\$/cwt	1.55	1.61	0.06 (3.9)
PREM_BOS	% of MPC	8.52	7.45	-1.07 (-12.6)
<i>Hartford, CT</i>				
MP_HART	\$/cwt	17.09	20.14	3.05 (17.8)
MPC_HART	\$/cwt	18.64	21.75	3.11 (16.7)
PREM_HART	\$/cwt	1.55	1.61	0.06 (3.9)
PREM_HART	% of MPC	8.57	7.48	-1.09 (-12.7)
<i>Philadelphia, PA</i>				
MP_PHI	\$/cwt	16.99	20.04	3.05 (18.0)
MPC_PHI	\$/cwt	19.19	23.13	3.94 (20.5)
PREM_PHI	\$/cwt	2.20	3.09	0.89 (40.5)
PREM_PHI	% of MPC	11.68	13.54	1.86 (15.9)
<i>Baltimore, MD</i>				
MP_BALT	\$/cwt	16.94	19.99	3.05 (18.00)
MPC_BALT	\$/cwt	18.71	21.66	2.95 (15.8)
PREM_BALT	\$/cwt	1.78	1.67	-0.11 (-6.2)
PREM_BALT	% of MPC	9.79	7.81	-1.98 (-20.2)
<i>Washington, D.C.</i>				
MP_WASH	\$/cwt	16.94	19.99	3.05 (18.0)
MPC_WASH	\$/cwt	18.71	21.66	2.95 (15.8)
PREM_WASH	\$/cwt	1.78	1.67	-0.11 (-6.2)
PREM_WASH	% of MPC	9.79	7.81	-1.98 (-20.2)

MP is Class I milk price, MPC is announced cooperative Class I milk price, PREM is premium.

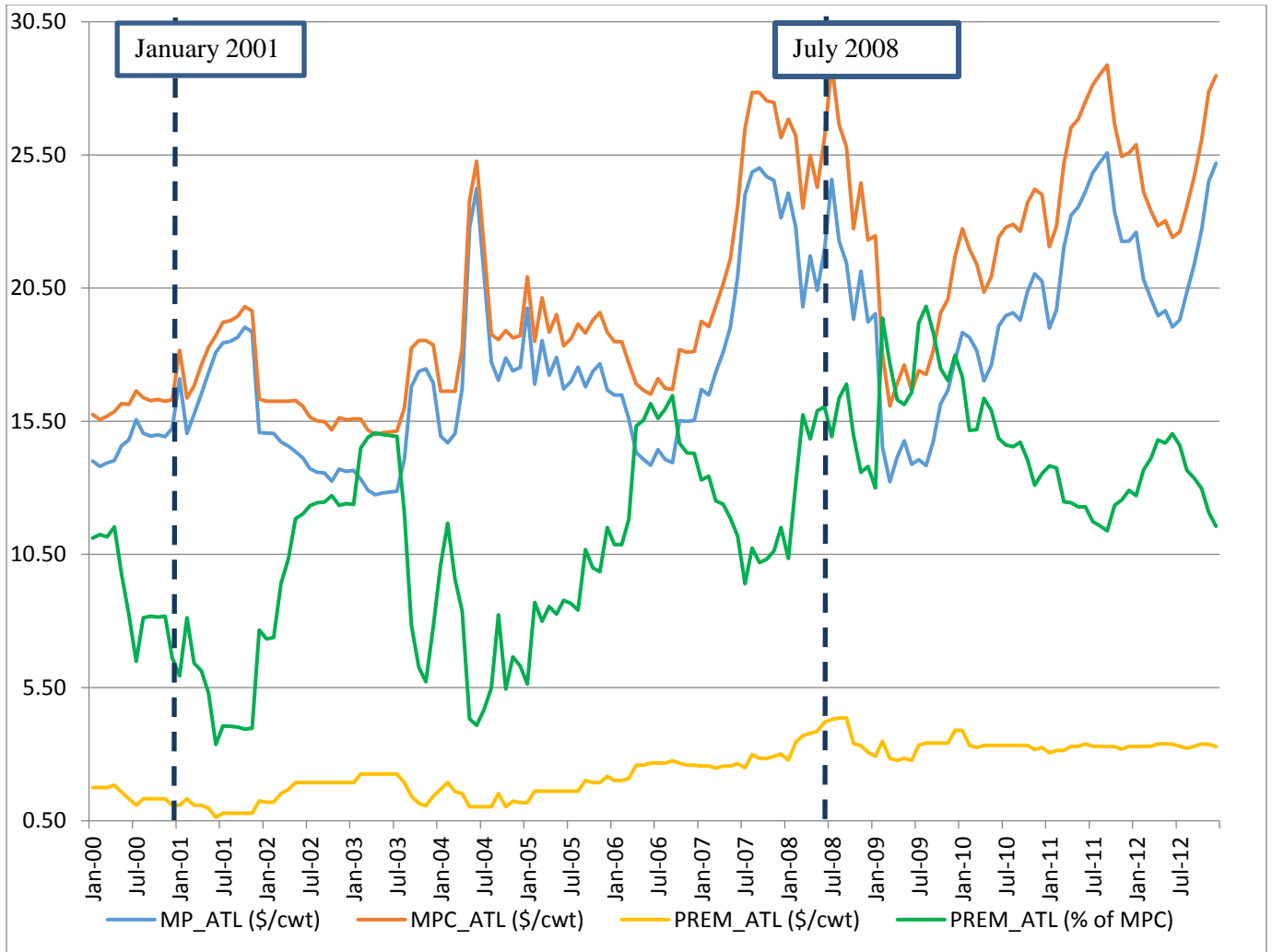


Figure 1 Atlanta (GA): Class I milk price (MP), announced cooperative Class I milk price (MPC) and Premium (PREM): 2000-2012.

01/2001-07/2008 is pre-antitrust action period, and 08/2008-12/2012 is antitrust action period.

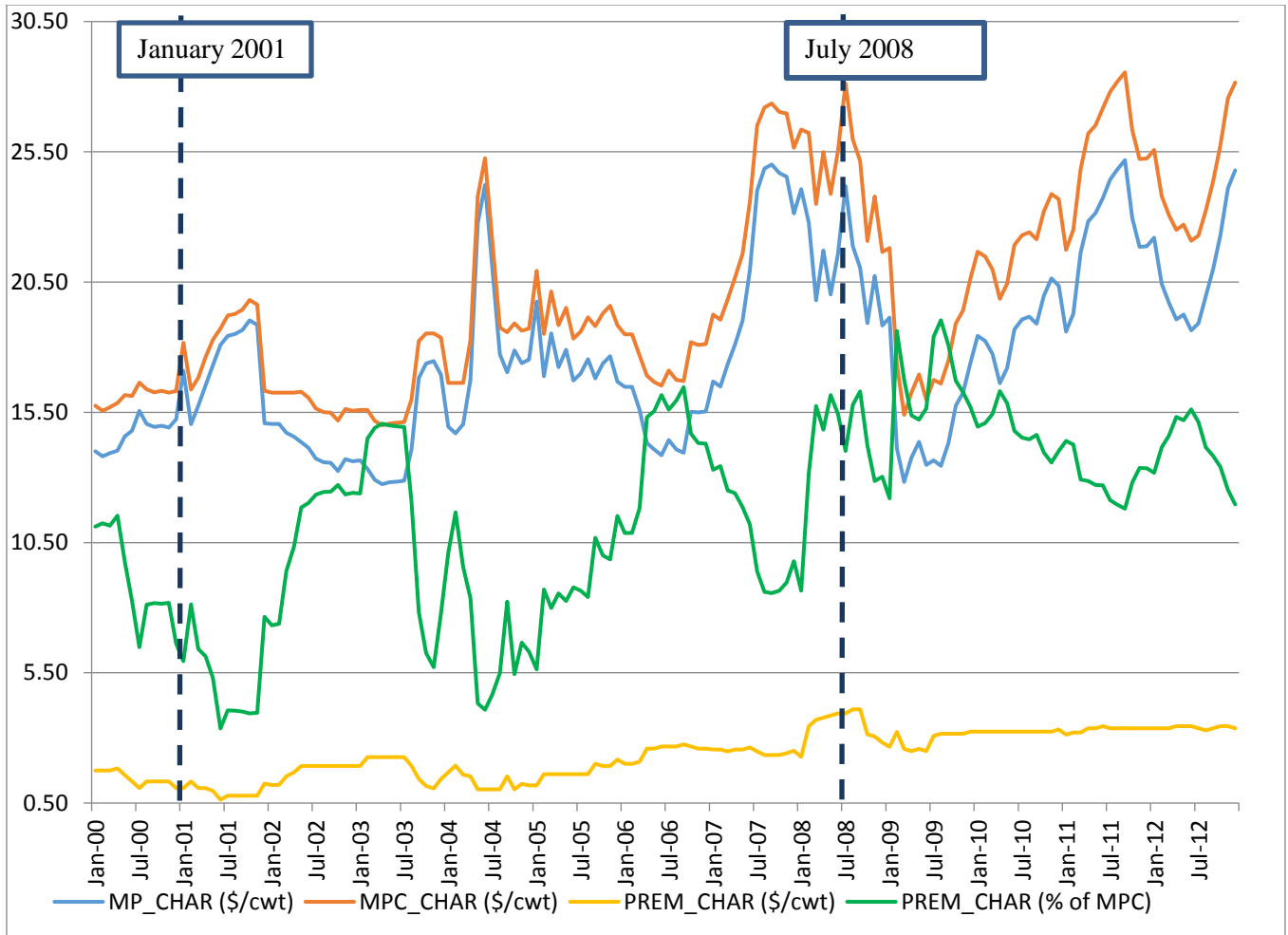


Figure 2 Charlotte (NC): Class I milk price (MP), announced cooperative Class I milk price (MPC) and Premium (PREM): 2000-2012.

01/2001-07/2008 is pre-antitrust action period, and 08/2008-12/2012 is antitrust action period.

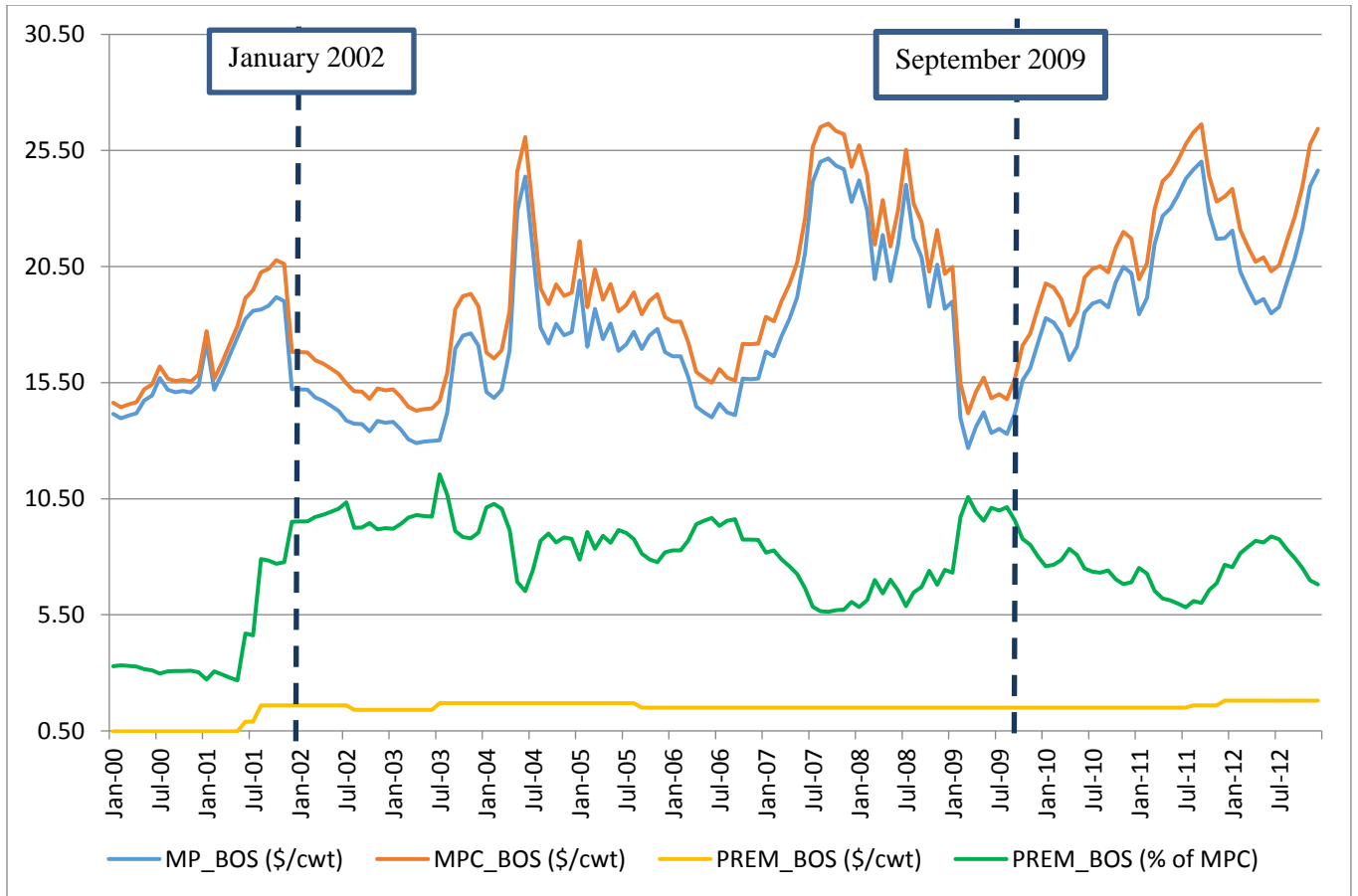


Figure 3 Boston (MA): Class I milk price (MP), announced cooperative Class I milk price (MPC) and Premium (PREM): 2000-2012.

01/2002-09/2009 is pre-antitrust action period, and 10/2009-12/2012 is antitrust action period.

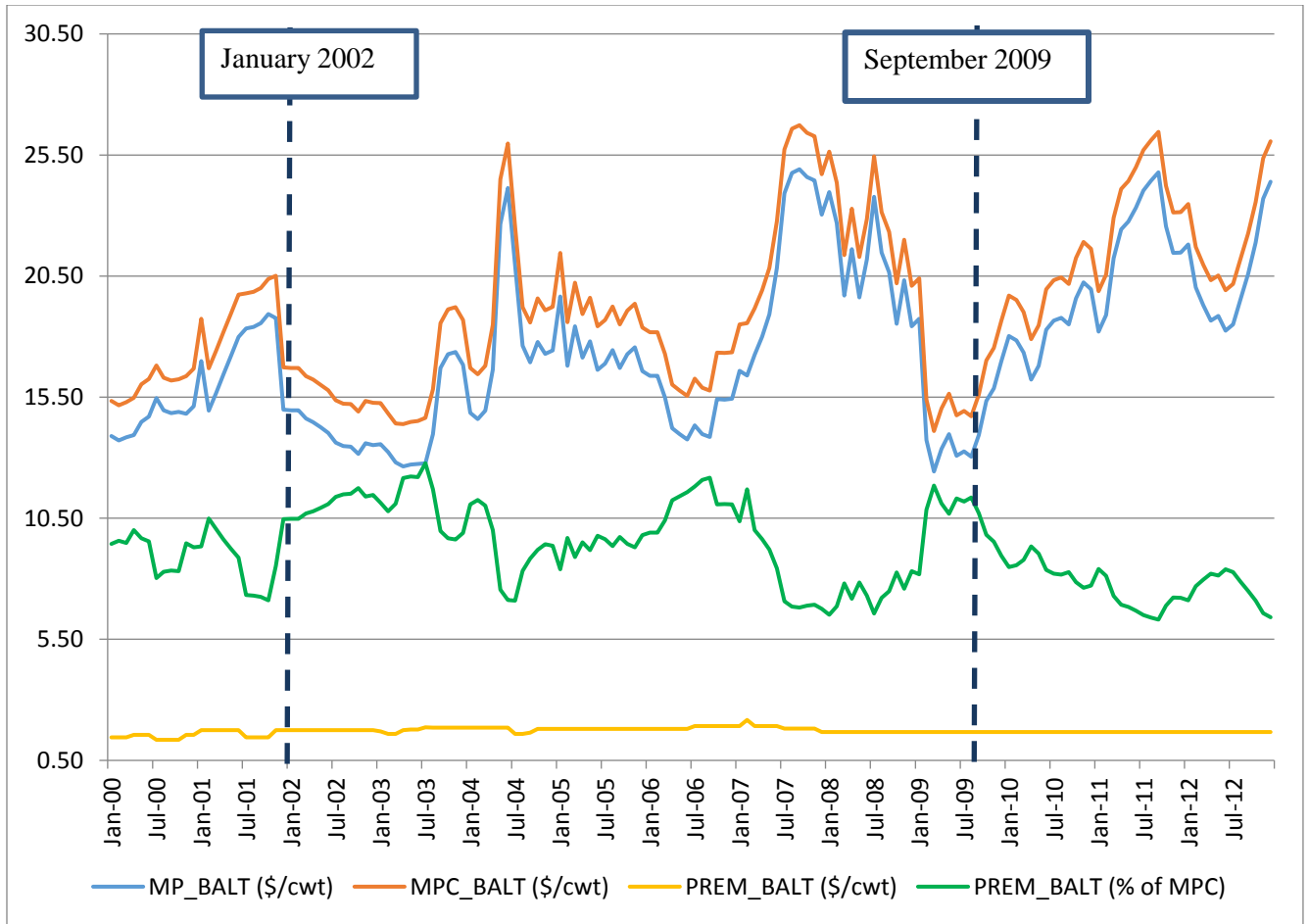


Figure 4 Baltimore (MD): Class I milk price (MP), announced cooperative Class I milk price (MPC) and Premium (PREM): 2000-2012.
01/2002-09/2009 is pre-antitrust action period, and 10/2009-12/2012 is antitrust action period.