



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

## **An Analysis of Retail Milk Pricing in the Eastern United States**

Yuliya V. Bolotova<sup>a</sup> and Andrew M. Novakovic<sup>b</sup>

<sup>a</sup>*Assistant Professor of Agribusiness, Department of Agricultural and Environmental Sciences, Clemson University, 237 McAdams Hall, Clemson, SC 29634 USA, Phone 864-656-4079, Email: yuliyab@clemson.edu*

<sup>b</sup>*E.V. Baker Professor of Agricultural Economics, The Charles H. Dyson School of Applied Economics and Management, Cornell University, 451a Warren Hall, Ithaca, NY 14850 USA, Email: a.novakovic@cornell.edu*

---

### **Abstract**

An analysis presented in the article evaluates the behavior of retail fluid milk prices, farm-level milk prices and farm-to-retail margins during the period of 2000-2010 in six cities located in the Eastern United States: Boston, MA; Syracuse, NY; Philadelphia, PA; Louisville, KY; Atlanta, GA; and Miami, FL. The empirical evidence presented in the article supports empirical findings reported in the existing literature: retail fluid milk prices tend to increase at a higher rate than farm-level milk prices and there is a presence of asymmetries in the farm-to-retail price transmission process. Furthermore, there is empirical evidence that may suggest that the patterns of behavior of fluid milk prices and farm-to-retail margins are different in the states with resale milk price control regulations (New York State and Pennsylvania) and states without resale milk price control regulations. In the former case, the pattern of changes in retail fluid milk prices is similar to the pattern of changes in farm-level milk prices. In the latter case, changes in the retail fluid milk prices do not necessarily reflect changes in the farm-level milk prices, which often causes farm-to-retail margin to increase.

**Keywords:** milk pricing, margins, market power, price regulations.

---

<sup>ⓐ</sup>Corresponding author

## Introduction

The behavior of fluid milk prices at the retail level and the relationship between retail milk prices and farm-level milk prices have raised concerns among dairy industry participants, policy decision makers and consumers' advocates. First, milk prices that consumers pay at the retail level have been increasing over the last decades. Second, the rate of the retail milk price increase has exceeded the rate of the farm milk price increase. As a result, the farm share of the retail milk price has decreased, and the farm-to-retail margin has increased. Apparently, dairy farmers do not benefit from higher retail milk prices. At the same time, higher retail prices decrease milk quantity purchased by consumers. The existing research suggests that increasing concentration and consolidation in milk processing, distribution and retailing and in particular increasing market power of supermarkets are likely to be a major force explaining the observed pattern of retail milk price behavior and the relationship between retail and farm-level milk prices (Carman and Sexton 2005; Chidmi et al 2005; Bolotova and Novakovic 2012).

The objective of this research is to conduct an analysis of the behavior of retail fluid milk prices and farm milk prices in selected cities in the Eastern United States during the period of 2000 to 2010. The Eastern U.S. cities have received a limited attention in the existing literature focusing on retail milk pricing. The cities included in the analysis are Boston (MA), Philadelphia (PA), Syracuse (NY), Louisville (KY), Atlanta (GA) and Miami (FL).

## Factors Affecting Retail Fluid Milk Price Behavior

### *Farm-level Milk Pricing*

Milk prices at the farm level have been historically set within the system of Federal and State Milk Marketing Orders. The Milk Marketing Orders determine the minimum prices for Grade A milk that the first-level handlers (milk processors) have to pay for milk based on the final use of milk. Currently there are four classes of milk. Class I milk is used to manufacture fluid (beverage) milk products. Dairy cooperatives may negotiate the over-order premium to the announced Class I milk price. Since 2000 Federal Milk Marketing Orders (FMMOs) use a series of formulas, according to which Class milk prices are related to wholesale prices of cheese, butter, dry whey and nonfat dry milk. The USDA Agricultural Marketing Service determines and publicly announces Class milk prices on a monthly basis. Dairy farmers do not receive the Class milk prices directly; they receive a mailbox price. The latter reflects prices of all Classes of milk sold in a particular Order and the utilization rate of each Class milk in the total volume of milk. The mailbox price typically includes adjustments, such as over-order premiums and payments to cooperatives for performing marketing functions.

### *Wholesale and Retail Milk Pricing*

In the past, a substantial number of states had milk price control regulations at the wholesale and/or retail level. The design of wholesale and retail milk price controls varied across the states. Some states set minimum or maximum resale prices, and some states established margins requirements. Over the last decades the majority of states abandoned these regulations. New York State and Pennsylvania are the states which currently have resale milk price regulations

(Novakovic and Washburn 2008; Bolotova and Novakovic 2012). The New York State Milk Price Gouging Law (NYS MPGL) passed in 1991 aims to prevent unconscionably excessive fluid milk prices at the retail level. During the period of 1991-2008, the NYS Department of Agriculture and Markets (NYSDAM) calculated and announced the threshold prices that retail fluid milk prices were not supposed to exceed. The threshold retail price was equal to 200% of the Class I milk price. The NYS MPGL enforcement procedure was changed in October 2008. To consider whether retail fluid milk prices are unconscionably excessive, the NYSDAM now uses a \$ retail margin standard (\$ per container). Pennsylvania established milk price regulation controlling wholesale and retail prices of fluid milk. Pennsylvania Milk Marketing Board calculates and publicly announces on a monthly basis the minimum wholesale milk prices and the minimum retail milk prices.

The nature of supermarket pricing practices is another factor affecting the behavior of retail fluid milk prices and in particular their response to changes in the farm-level milk prices. Supermarket industry is a concentrated industry; typically there are a few supermarket chains located in the area. Supermarkets have a potential to exercise a seller market power to increase fluid milk prices paid by consumers. The exercise of market power can take different forms, including a direct setting (fixing) of retail milk prices (retail price stabilization practice) and asymmetric transmission of changes in farm prices onto retail prices.

## Data and Methodology

The analysis includes a descriptive statistical analysis and a graphical analysis of (a) the behavior of retail prices for fluid *whole* milk sold in supermarkets and convenience stores in gallon containers, (b) farm-level milk prices and (c) farm-to-retail margins. The cities included in the analysis are Boston (MA), Philadelphia (PA), Syracuse (NY), Louisville (KY), Atlanta (GA) and Miami (FL).

The retail fluid *whole* milk prices are obtained from monthly surveys conducted by the USDA Agricultural Marketing Service (include whole milk and reduced fat milk). The surveys report prices charged by the first largest food store chain, second largest food store chain, and largest convenience store chain. The average price over the three outlets is reported. The average retail fluid whole milk price measured in \$ per gallon is used in the analysis. The retail fluid milk prices are available in the USDA Milk Marketing Order Public Database.

The farm-level price used in the analysis is the announced Class I milk price. We use a location-specific price. The Class I milk price is announced on a monthly basis, approximately ten days before the beginning of the month in which it applies. The Class I milk price is announced in \$ per hundredweight (cwt). The announced Class I milk prices are available in the USDA Milk Marketing Order Public Database. To be comparable to retail prices, Class I milk prices are converted from \$ per cwt to \$ per gallon. The farm-to-retail margin is calculated as the difference between retail price and Class I milk price, it is measured in \$ per gallon. The margin is also expressed as a percentage of retail price.

In the case of each analyzed city, the averages and the coefficients of variation are calculated for retail price, Class I milk price (“farm price” to be referred further in the article) and farm-to-

retail margin (“margin” to be referred further in the article). The minimum and maximum values of the analyzed variables are recorded. The period of analysis is 2000-2010. Table 1 presents the results of a descriptive statistical analysis. Figures 1-6 depict the analyzed prices and margins expressed as a percentage of the retail price.

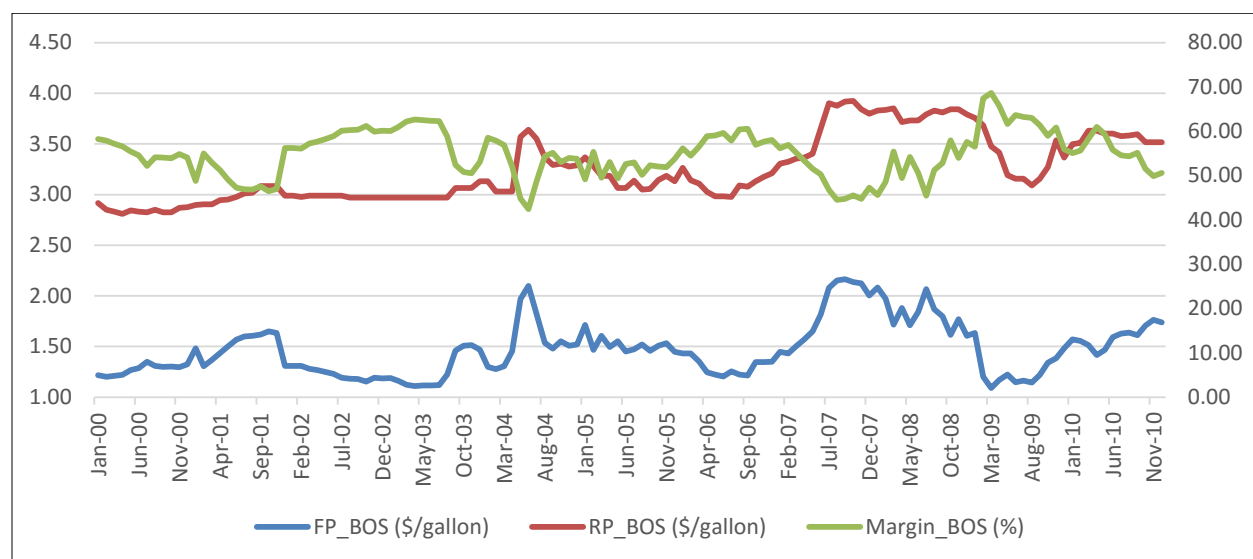
**Table 1.** Retail Fluid Whole Milk Prices, Farm Prices and Margins: Selected Eastern United States Cities (2000-2010).

	Average	CV	Minimum	Maximum
<b>Boston, MA</b>				
Farm price (\$/gallon)	1.47	0.18	1.09	2.16
Retail price (\$/gallon)	3.25	0.10	2.81	3.92
Margin (\$/gallon)	1.78	0.11	1.41	2.48
Margin (% of retail price)	54.86	0.10	42.40	68.63
<b>Syracuse, NY</b>				
Farm price (\$/gallon)	1.41	0.19	1.03	2.10
Retail price (\$/gallon)	2.84	0.12	2.19	3.84
Margin (\$/gallon)	1.43	0.10	1.05	1.79
Margin (% of retail price)	50.77	0.09	38.64	63.05
<b>Philadelphia, PA</b>				
Farm price (\$/gallon)	1.45	0.18	1.07	2.15
Retail price (\$/gallon)	3.28	0.12	2.75	4.12
Margin (\$/gallon)	1.82	0.13	1.40	2.34
Margin (% of retail price)	55.75	0.08	45.56	66.56
<b>Atlanta, GA</b>				
Farm price (\$/gallon)	1.47	0.18	1.10	2.15
Retail price (\$/gallon)	3.28	0.12	2.52	4.49
Margin (\$/gallon)	1.80	0.15	0.99	2.46
Margin (% of retail price)	55.08	0.11	39.37	64.27
<b>Louisville, KY</b>				
Farm price (\$/gallon)	1.38	0.19	1.01	2.07
Retail price (\$/gallon)	2.88	0.13	2.42	4.02
Margin (\$/gallon)	1.50	0.19	0.87	2.29
Margin (% of retail price)	51.98	0.13	34.10	68.41
<b>Miami, FL</b>				
Farm price (\$/gallon)	1.60	0.17	1.20	2.30
Retail price (\$/gallon)	3.40	0.12	2.92	4.49
Margin (\$/gallon)	1.80	0.12	1.37	2.48
Margin (% of retail price)	53.13	0.08	40.98	61.83

**Notes.** Farm price is the announced Class I milk price for the analyzed city. CV is the coefficient of variation (the ratio of standard deviation to the mean).

## Results

The average *farm price* (Class I milk price) is in the range of \$1.38 per gallon in Louisville to \$1.60 per gallon in Miami. The average *retail price* is in the range of \$2.8 per gallon in Louisville and Syracuse to \$3.40 per gallon in Miami. The average *margin measured in \$ per gallon* is in the range of \$1.43 per gallon in Syracuse to \$1.8 per gallon in Philadelphia and Miami. The average *margin measured as a % of retail price* is in the range of 50.77% in Syracuse to 55.75% in Philadelphia. The *highest average margins* are in Boston (54.86%), Atlanta (55.08%) and Philadelphia (55.75%). The *lowest average margins* are in Syracuse (50.77%), Louisville (51.98%) and Miami (53.13%). The following patterns are revealed by the analysis of minimum and maximum margins. The *minimum margin* ranges from 34.10% in Louisville to 45.56% in Philadelphia. The *maximum margin* ranges from 61.83% in Miami to 68% in Louisville and Boston.

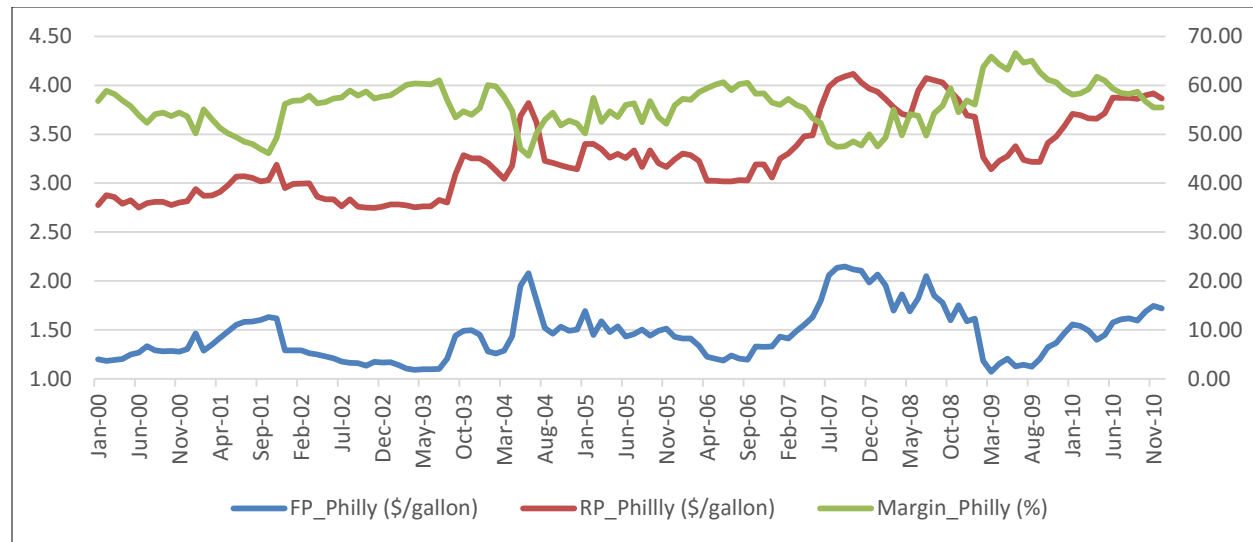


**Figure 1.** Retail Fluid Whole Milk Price, Farm Price and Margin: Boston, MA (2000-2010).

There is empirical evidence indicating that the retail milk price volatility is considerably lower than the farm price (Class I milk price) volatility. The coefficients of variation (CV) are used to measure price volatility. CVs for farm milk prices are very similar across the cities: 0.17-0.19. This reflects that fact that farm milk prices are set within the Federal and State Milk Marketing Orders and move in a similar manner across different locations. CVs for retail fluid whole milk prices are 0.10 for Boston, 0.12 for Syracuse, Philadelphia, Miami and Atlanta, and 0.13 for Louisville. The variability of retail milk prices is lower than the variability of farm milk prices, which may be evidence of asymmetric farm price transmission process. A graphical analysis reveals the following patterns supporting the presence of asymmetries in the transmission of farm price increases as compared to the transmission of farm price decreases.

Scenario A: farm price increases, retail price increases at a higher rate. Scenario B: farm price decreases, retail price decreases at a lower rate. In both scenarios margin increases. The patterns revealing these two scenarios can be seen on practically all graphs. Scenario C: farm price decreases, retail price does not change; this causes margin to increase (Boston, Atlanta, Miami

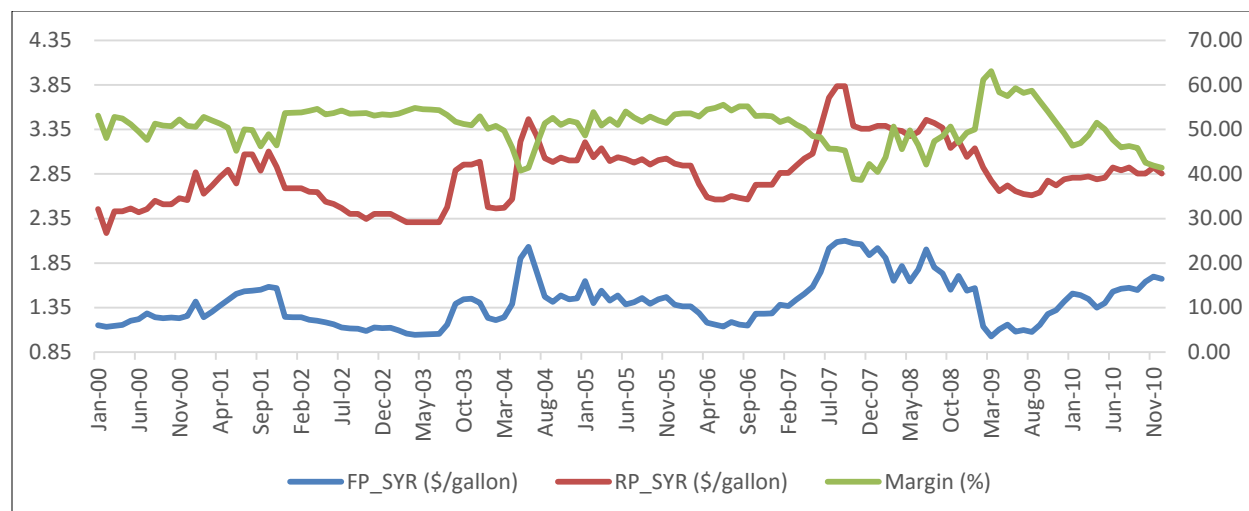
and Louisville). Scenario D: farm price decreases, retail price increases; margin increases as a result (Boston, Miami and Louisville). Scenario D pattern typically lasts for a very short period of time. Asymmetries in the farm price transmission process may indicate a presence of the seller market power exercised by retailers.



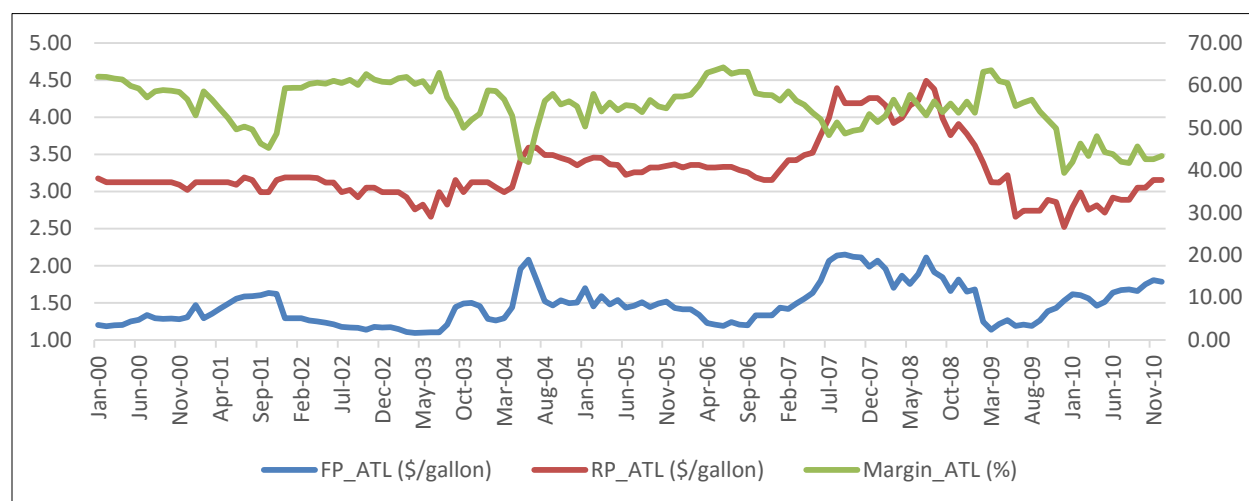
**Figure 2.** Retail Fluid Whole Milk Price, Farm Price and Margin: Philadelphia, PA (2000-2010).

Syracuse, NY and Philadelphia, PA are the cities located in the states with resale milk price control regulations. The behavior of retail prices in these two cities reflects the nature of milk price controls. The New York State Milk Price Gouging Law (NYS MPGL) enforcement procedure included announcing the threshold prices that were equal to 200% of the Class I milk price. Retail fluid milk prices were not supposed to exceed the threshold prices. This NYS MPGL enforcement procedure took place during the majority of the analyzed period of time. Figure 3 indicates that the behavior of retail milk price practically mirrors the behavior of farm price (Class I milk price), and the margin is rather stable during the period of 2000-2008. The margin is at the 50% of retail price on average, which is consistent with the 200% rule. The Syracuse average and minimum margins are the lowest among the analyzed cities. In Philadelphia, the behavior of retail milk price also follows the behavior of farm milk price (Class I milk price). However, the margin tends to increase over time. The Philadelphia average and minimum margins are the highest among the analyzed cities.

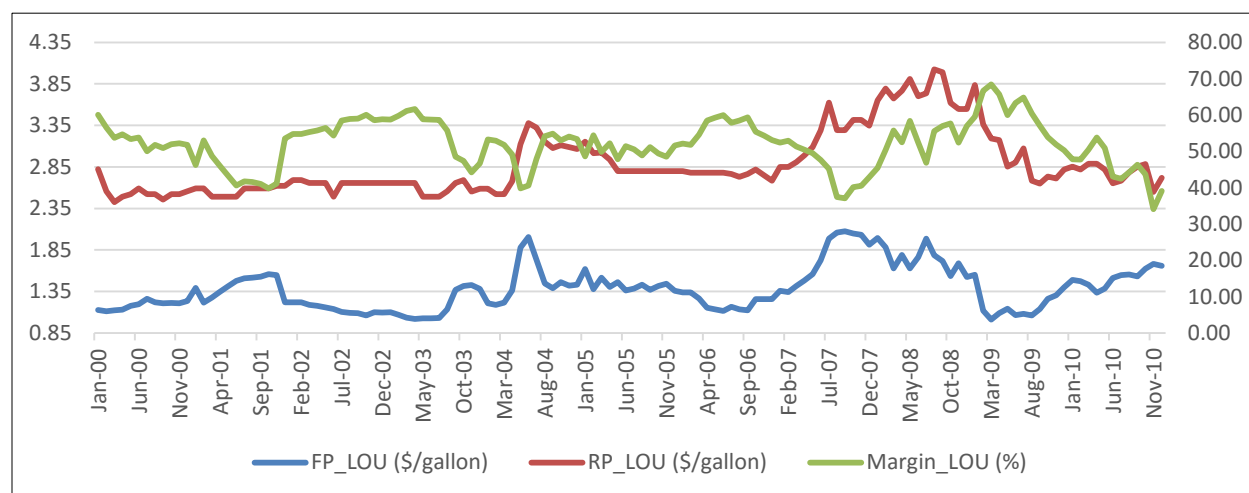
In contrast to Syracuse and Philadelphia, retail prices respond somewhat differently to changes in farm prices in Boston, Atlanta, Miami and Louisville. These cities are located in the states without resale milk price control regulations. A graphical analysis of the retail milk price behavior in these cities indicates that there are periods when retail prices are practically fixed, while farm prices change. The examples include Boston during the period of 2002-2003 (Figure 1), Atlanta during the period of 2000-2001 and during the period of 2004-2006 (Figure 4), Miami during the period of 2000-2003 (Figure 6) and Louisville during the period of 2000-2003 and 2005-2006 (Figure 5). In Boston, Atlanta, Miami and Louisville retailers tend to vary their milk pricing strategies from time to time.



**Figure 3.** Retail Fluid Whole Milk Price, Farm Price and Margin: Syracuse, NY (2000-2010).

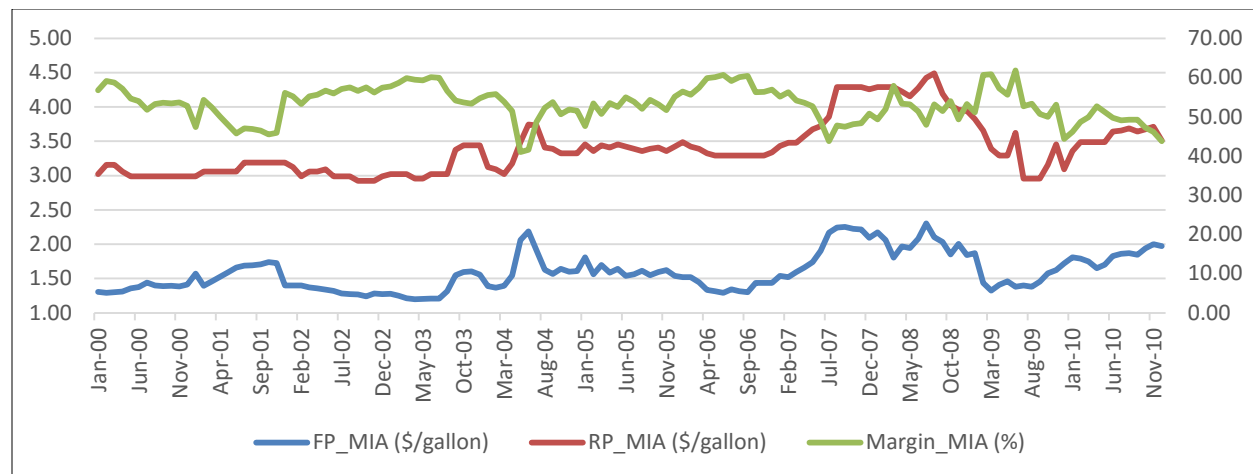


**Figure 4.** Retail Fluid Whole Milk Price, Farm Price and Margin: Atlanta, GA (2000-2010).



**Figure 5.** Retail Fluid Whole Milk Price, Farm Price and Margin: Louisville, KY (2000-2010).





**Figure 6.** Retail Fluid Whole Milk Price, Farm Price and Margin: Miami, FL (2000-2010).

## References

- Bolotova, Y.V. and A.M. Novakovic. 2012. "The Impact of the New York State Milk Price Gouging Law on the Price Transmission Process and Supermarket Pricing Strategies in the Fluid Whole Milk Market." *Agribusiness: An International Journal* 28: 377-399.
- Carman, H.F. and R.J. Sexton. 2005. "Supermarket Fluid Milk Pricing Practices in the Western United States." *Agribusiness: An International Journal* 21: 509-530.
- Chidmi, B., R.A. Lopez, and R.W. Cotterill. 2005. "Retail Oligopoly Power, Dairy Compact, and Boston Milk Prices." *Agribusiness: An International Journal* 21: 477-491.
- Novakovic, A.M. and E. Washburn. 2008. "Farm and Retail Milk Price Relationships in New York." Briefing Paper Number 08-01. Ithaca, NY: Cornell University, Department of Applied Economics and Management, Cornell Program on Dairy Markets and Policy.
- U.S. Department of Agriculture. Milk Marketing Order Statistics Public Database. <http://apps.ams.usda.gov/USDAMIB/Main/Welcome.aspx>.