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Fluid Milk Prices and Price Spreads: A Second Look

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Introduction

Recent studies have suggested that the retail price of fluid milk does not accurately reflect the cost of farm milk during periods of falling prices to the same degree as during periods of rising prices (Capps and Sherwell, 2005; Romain, Doyon and Frigon, 2002).[1] From a national perspective, there is conflicting evidence as to whether in fact there is this asymmetry. The following figure shows the *change* in Cooperative (Coop) Class I and the U.S. average whole milk price over the 2003-2007 period where the Coop price can be considered the cost bottlers pay for fluid milk. The difference in the path of the changes in these two price series may provide an indication of the dynamics of milk retailer margins. For example, when the Coop Class I price decreases and the retail price decreases by less, this may indicate an increase in margins. Using the above national data for example we see that over the Nov. '03 - Jan.'04 and the Jun '04-Aug '04 there appears to have been an increase in margins. In contrast, there are a significant number of months where margins appear to be decreasing.

As a result of the concern as to the fluid milk price transmission process, in 2003, the U.S. Government Accountability Office (GAO) was asked to examine the spread between farm-level milk prices and the prices received by retailers. They examined 15 fluid milk markets between October 2000 and May 2004 and found that during this

[1] Capps, O. and P. Sherwell, 2005. Spatial Asymmetry in Farm-Retail Price Transmission Associated with Fluid Milk Products, paper presented at the 2005 *Annual Meeting of the American Agricultural Economics Association*, Denver, CO, August.
Romain, R., M. Doyon and M. Frigon, 2002. Effects of State Regulations on Marketing Margins and Price Transmission Asymmetry: Evidence from the New York City and Upstate New York Fluid Milk Markets, *Agribusiness*, 18(3):301-315.

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period, in 12 of the 15 markets the price spread increased (GAO, 2005 p. 4-6).[2] In a recent analysis undertaken by Cotterill et al (2007) encompassing data for Northeast, the authors found that in certain areas the gross margin on retail fluid milk sales (net of farm and processing costs) over the 2003-2006 period were what could be considered excessively high and that certain retailers have adopted a flat milk pricing strategy that is independent of fat content of the milk sold.[3]

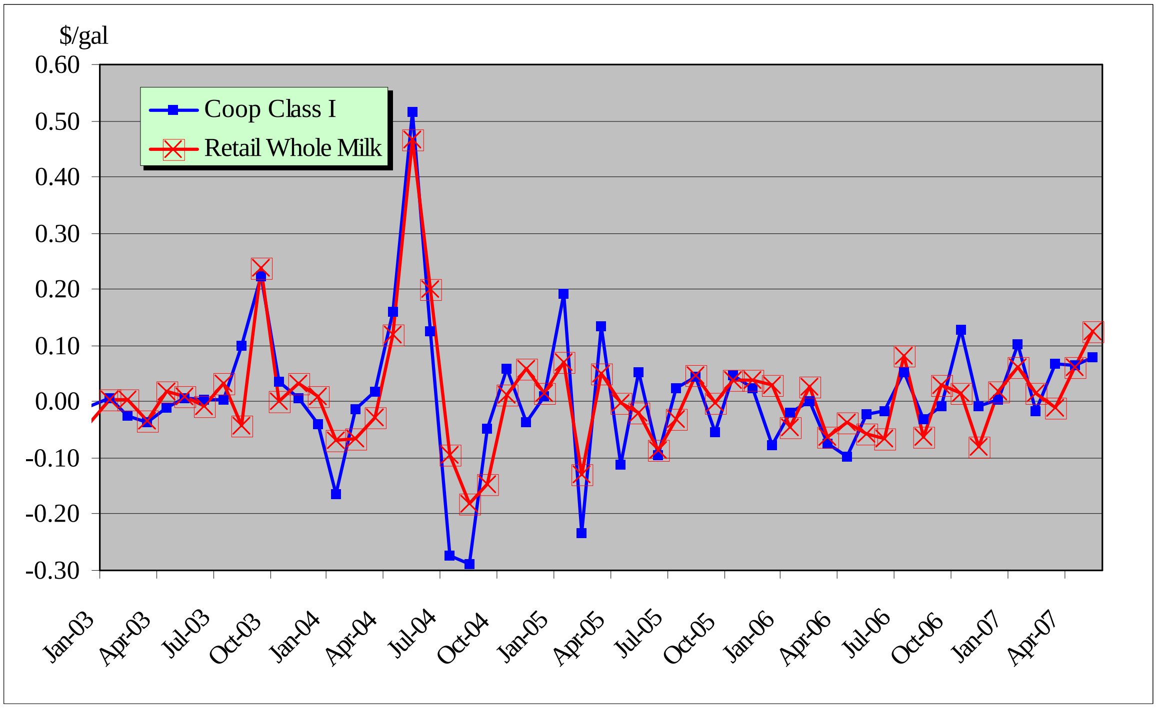

Figure 1. Month-to-Month Changes in Cooperative Class I and Average U.S. Retail Whole Milk Prices: Jan. 2003-April 2007

The question remains as to whether local market conditions differ from that indicated using overall U.S. values. That is, the above data using national average values may be masking specific local price relationships. In a previous Marketing and Policy Briefing Paper, Jesse (2003) addressed the topic of the relationship between farm and retail fluid milk prices. In that paper, he examined the relationship between the cost of milk to processors and the price charged by retailers and estimated how sensitive retail prices were to changes in the cost of milk over Jan. 1997 through Dec. 2002.[4]

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[2] United States Government Accountability Office (GAO), 2004. Dairy Industry Information on Milk Prices, Factors Affecting Prices, and Dairy Policy Options, " GAO Report to Congressional Requesters, GAO-05-50, Jan. 2005.

[3] Cotterill, R., A. Rabinowitz, M. Cohen, M. Murphy, and C. Rhodes, 2007. Toward Reform of Fluid Milk Pricing in Southern New England: Farm Level, Wholesale and Retail Prices in the Fluid Milk Marketing Channel: 2003 – 2006, *A Report to the Connecticut Legislature Committee on the Environment*, Feb. 12.

[4] Jesse, E., 2003. Fluid Milk and Price Spreads, *Marketing and Policy Briefing Paper*, *#83*, Department of Agricultural and Applied Economics, University of Wisconsin Madison, October. (http://www.aae.wisc.edu/future/publications/M_P_83.pdf)

Since the above analysis was undertaken, the fluid milk market has continued to experience significant price variability. Figure 2 shows the U.S. average Cooperative (Coop) Class I price over the original 1997-2002 study period and for the additional years encompassed by this study. This figure shows that over the full study period, the extremes of this series occurred after 2002.

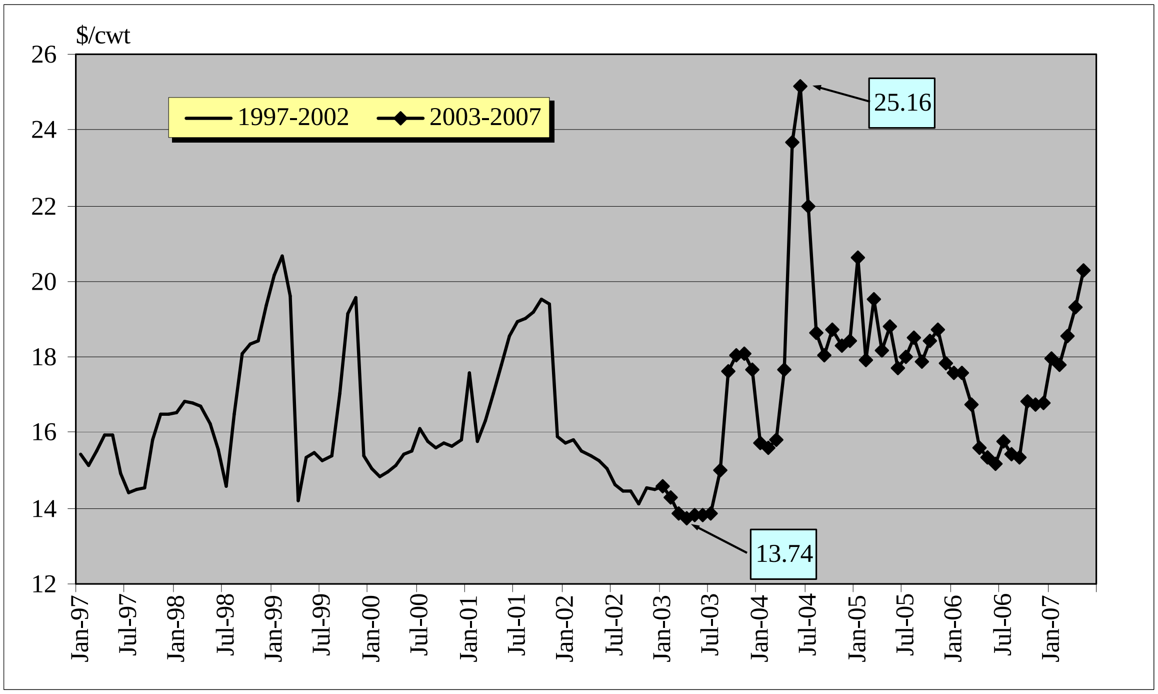

Figure 2. Average U.S. Cooperative Class I Price: Jan. 1997-April 2007

Given the continuing concern by both consumers and farm groups as to the relationship between farm and retail milk prices and recent dramatic increases in milk prices, this paper will update the previous results obtained by Jesse (2003) by using data encompassing Jan. 2003 through May 2007. We also use an improved method to quantify the relationship between farm and retail milk prices. [5] With this new data and methodology we find much more of a statistical relationship between retail and farm-level milk prices than found previously.

Similar to the previous analysis, we will be examining the relationship between farm and retail milk prices at a city level using monthly retail price data collected by USDA. It is important to control for the differences between cities because there are several specific variables that affect the cost of processing and selling milk between cities. These variables include "input costs such as labor and energy, and the continued consolidation of firms". In addition, cooperatives in some areas have more bargaining power and we would expect to see these areas negotiate higher farm-level prices. Similarly we would anticipate the market concentration of milk retailers affecting an area's retail price. As

[5] Specifically, using the original specification and data contained in Jesse (2003) we found evidence of significance regression error term correlation for all cities. This implies an alternative method is required for obtain model parameter estimates and associated standard errors.

well, if retailers and farmers in some areas have to pay higher wages or property taxes, we would predict seeing see these increased costs manifested in higher farm and retail prices(GAO, 2005 p. 108-116). In this paper we will not attempt to explain how these factors are related to farm versus retail prices, but rather will control for these variables through examining the data on a city basis.

Description of the Data Use in Our Analysis

This analysis utilizes three sets of data - two of which have been compiled by USDA's Agricultural Marketing Service (AMS). The first data set consists of city-specific retail prices for whole and 2% reduced fat milk. The data is collected on a monthly basis from three retail locations in each of 24 cities. The first location is a member of the largest food chain in the area, the second is a member of the second largest food chain, and the third is a member of the largest convenience store chain. The AMS collects price data on the most popular brand while not allowing for sales or coupon redemptions.[6]

The second data set consists of monthly city-specific Cooperative Class I (Coop Class I) prices.[7] The Coop Class I prices are obtained from price announcements sent by the major cooperative or pricing agency to the handlers (fluid milk processors) in each city who buy raw milk from them. This data is also collected by USDA's AMS.[8] These prices are typically higher then the city-specific Advanced minimum Class I prices as they include charges for various services performed by cooperatives and may also be influenced by the market power of the cooperative or the cooperative's bargaining organization. It is important to note that the Coop Class I price series is for milk at a standard composition: 3.5% butterfat, 3.1% protein, and 5.9% other solids.

The third dataset used in our analysis is the monthly Consumer Price Index (CPI) which is compiled by the U.S. Bureau of Labor Statistics. We use the CPI to deflate all values into a common unit for our regression analysis. We felt that it was important to account for inflation of the study period given the greater than 10 year range of data used in the econometric models.[9] The CPI deflator used here is the "U.S. Urban All-Item CPI". We use January 2002 as the benchmark CPI and deflated all prices with respect to the CPI in this month. The CPI in January 2002 is 177.1 so, for example, when we adjust January 2000 retail fluid milk prices (which has a CPI of 168.8) we multiplied these prices by the ratio 177.1/168.8 (=1.049). This result tells us how much it would cost to purchase a gallon of milk in January 2000 using January 2002 denominated dollars.

The Relationship between Coop Class I and Retail Prices

As an example, Figure 3 is used to portray the relationship between the 2004 annual average Coop Class I and retail whole milk prices, a high price year, for the 24 cities

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[6] For more detail concerning this data, refer to Jesse (2003).

[7] The Coop Class I prices used in this analysis can be obtained from the UW Dairy Marketing website. The specific spreadsheet used can be downloaded via the following URL: http://www.aae.wisc.edu/future/data/cash/cash/class1/Coop_class_I_prices_rev.xls .

[8] For more detail, refer to the following USDA website: http://www.ams.usda.gov/dyfmos/mib/acc1prc_dscrp.htm .

[9] This CPI data can be downloaded from the following website: http://www.bls.gov/cpi/home.htm . Over the 124 month study period there was close to a 30% increase in the Consumer Price Index.

included in our analysis. Similar to Jesse (2003) we find little relationship between these two data series as evidenced by an estimated correlation coefficient of 0.103 .[10] In 2004 St. Louis had the lowest Coop Class I price but its average whole milk retail price was only slightly below the all-city average of $3.31/gal. In contrast, Seattle experienced the highest retail price and the 6th lowest annual average Coop Class I price. Miami had the highest Coop Class I price of $1.864/gal but its retail price was only slightly above average. This lack of statistical relationship provides one indication that there exists significant variability in absolute and relative retail margins across city. [11]

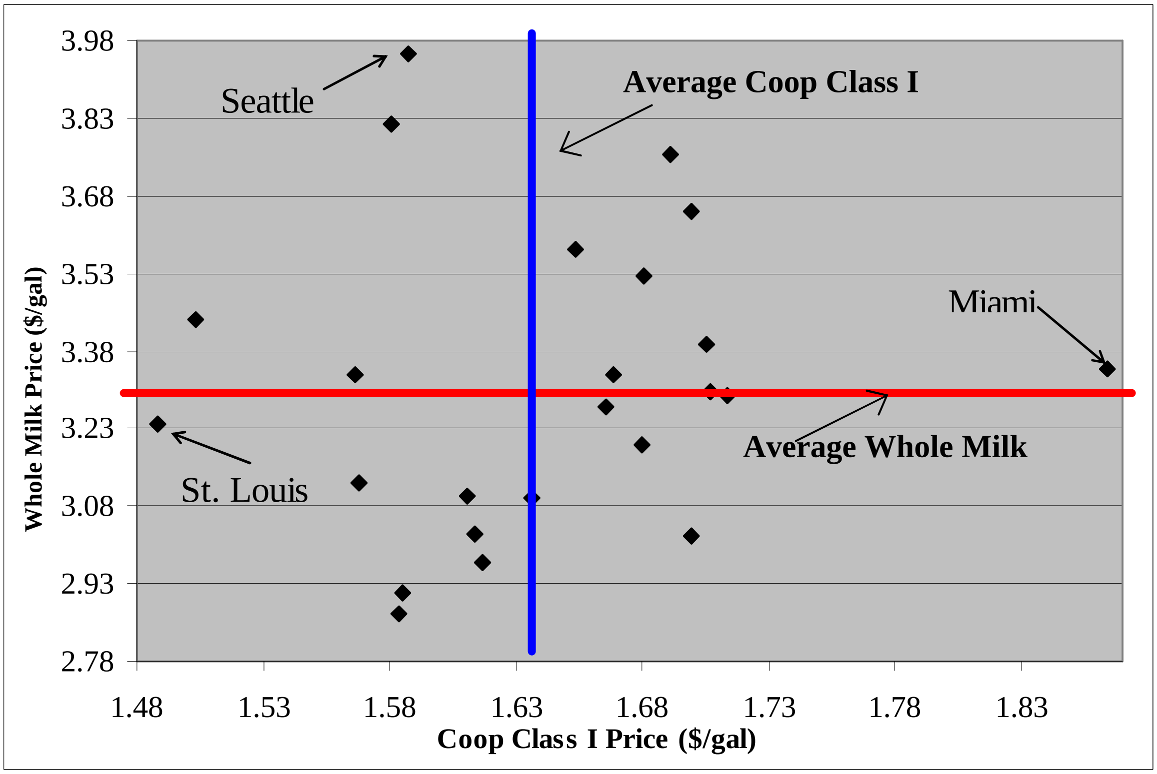

Figure 3. Relationship Between Retail and Coop Class I Prices, Various Cities-2004

Figure 4 shows the distribution of the average Coop Class I price, retail whole milk margin and retail whole milk price for 2004 across the 24 study cities. In the top of this Figure we see that there is a wide range in margins from $1.29 in Oklahoma City to $2.36 in Seattle. Given the large range in both the Coop Class I price and margins, the bottom of this figure is used to display each citiy's average 2004 margin relative to the retail price. The relative importance of the margins follows the pattern of the abosulte size of these margins. That is, Baltimore's estimated margin in 2004 was 43.8% of the average whole milk retail price compared to 59.9% for Seattle.

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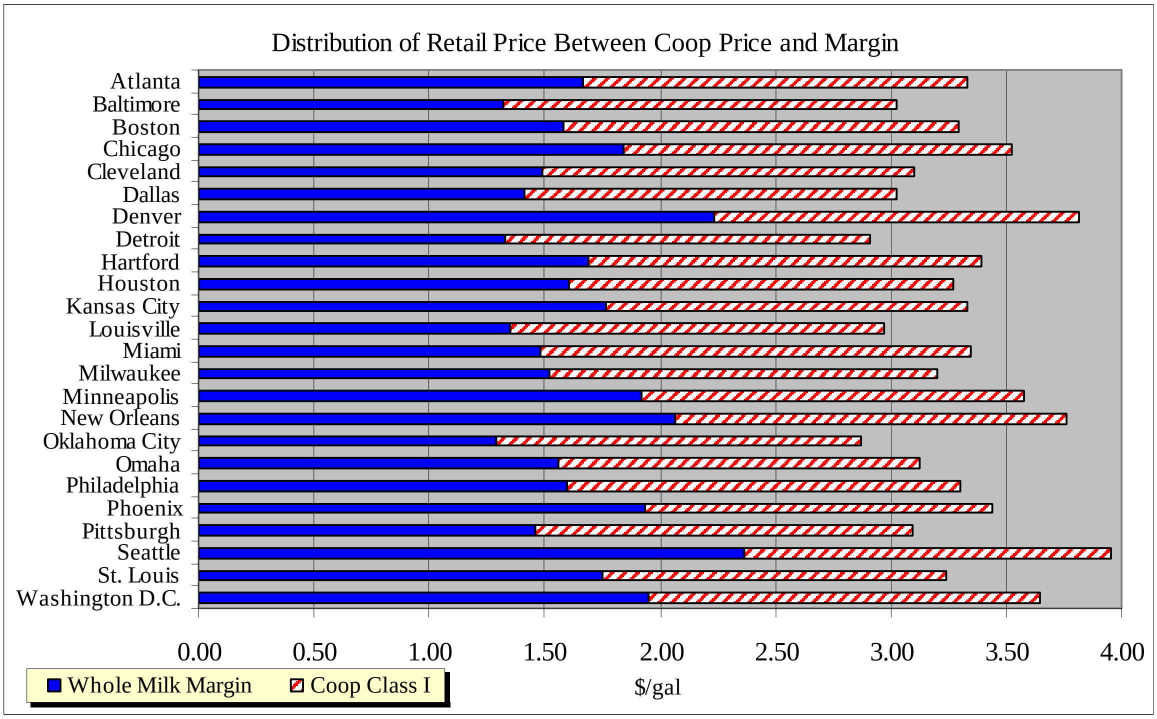
[10] Remember, a correlation coefficient ranges between values of ±1. The closer the calculated value is to ±1, the stronger the relationship between the two series. When we constructed similar scatter plots for other years, a similar relationship was found as was exhibited for 2004.

[11] The retail margin for this analysis is defined as a city's retail milk price minus the associated Coop Class I price.



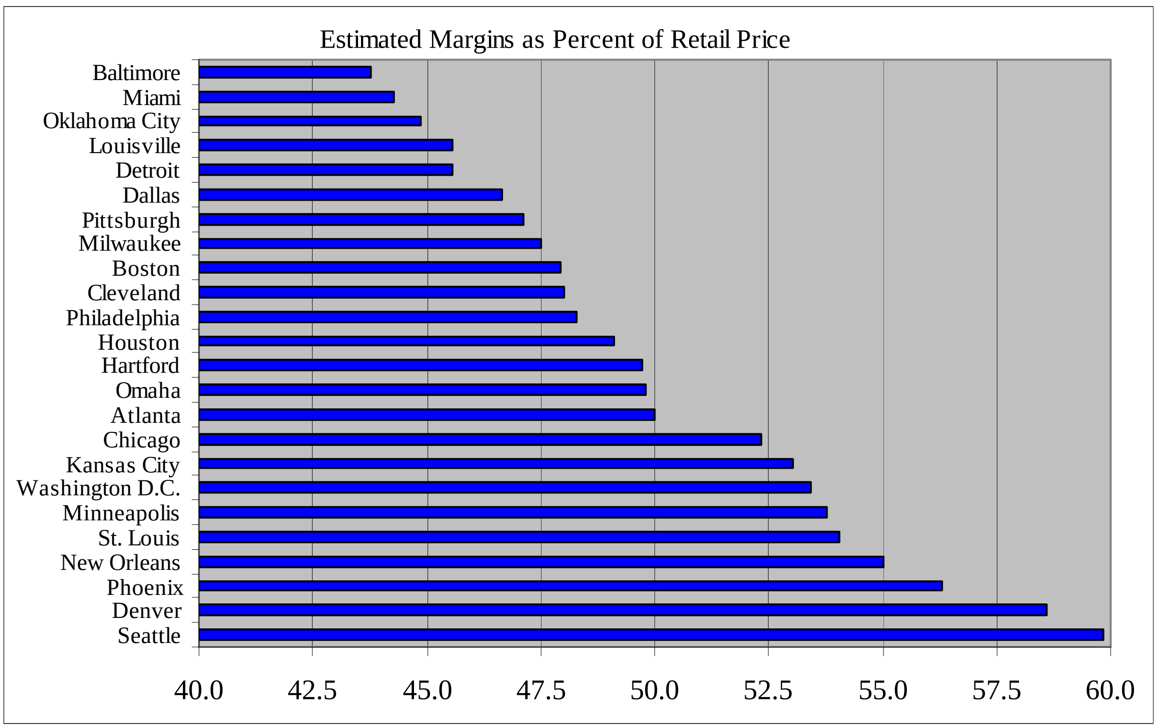


Figure 4. Comparison of 2004 Average Retail Whole Milk Margins and Retail Price

In Figure 5 we show the relationship between estimated whole milk margins and retail price in 2004. Cities with lower retail prices tended to have lower price margins and cities with higher retail prices have higher price margins. The very large correlation coefficient value of 0.962 indicates a strong positive relationship between these two series. Again to place this in a relative sense, Figure 6 shows a scatter plot using this same data but showing the relationship between the margin/retail price ratio and the retail price level. The large correlation coefficient of 0.861 indicates that with higher retail prices, the share going to producers declines.

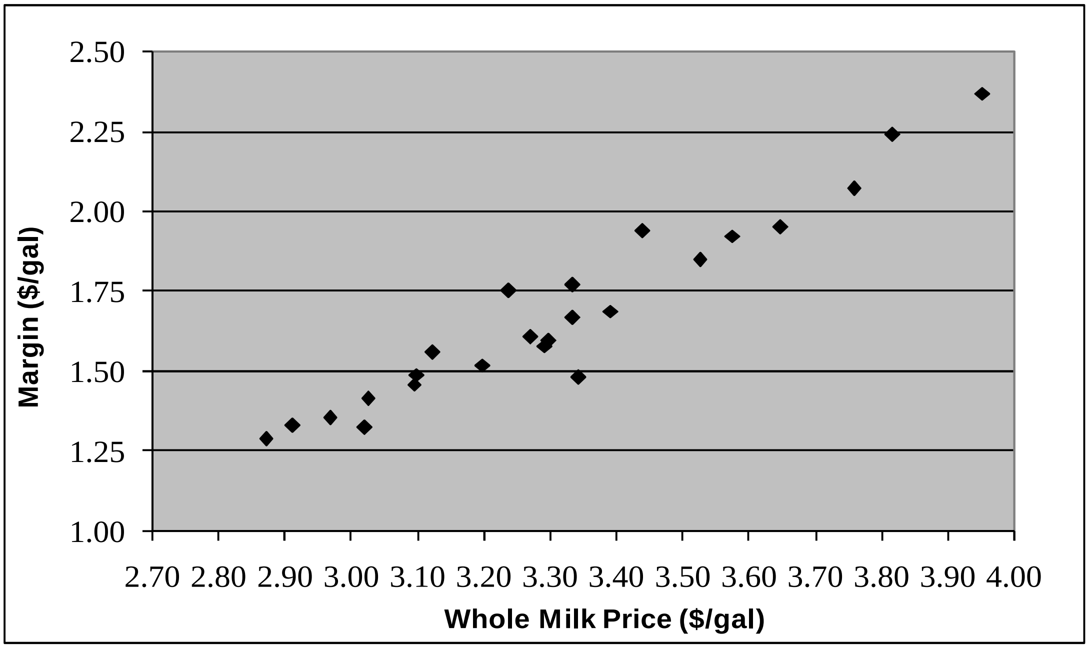


Figure 5. Whole Milk Retail Margins vs. Retail Price (2004)

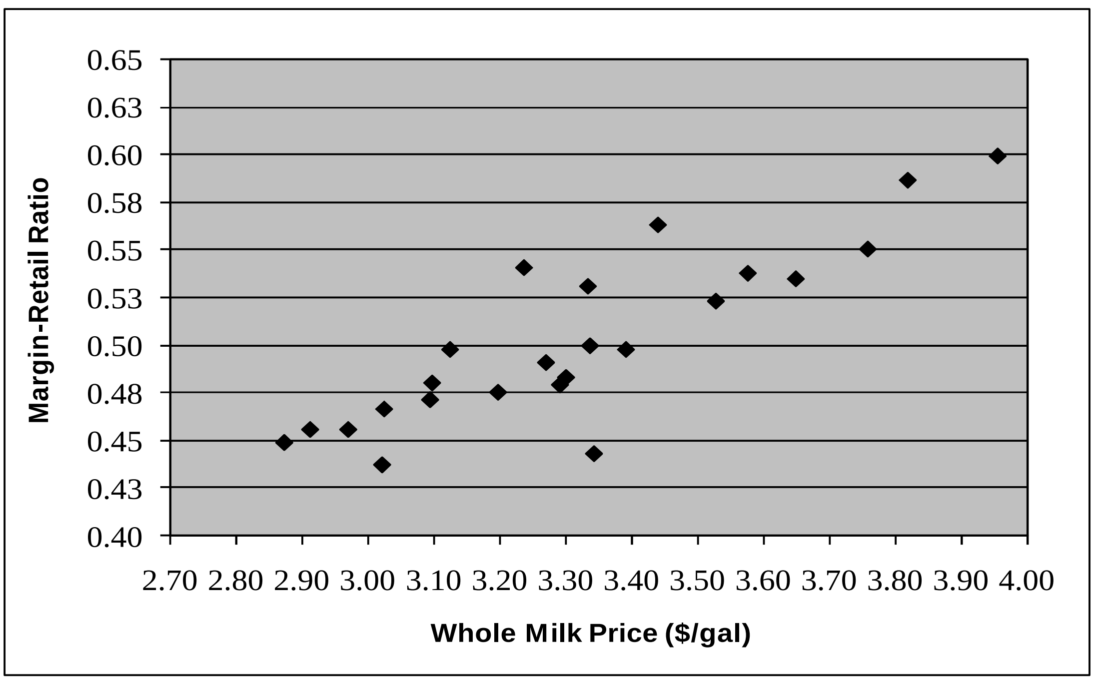


Figure 6. Relionship Between Margin/Retail Price Ratio and Retail Whole Milk Price (2004)

Description of Statistical Models Used to Analyze Retail Milk Prices and Margins
The above graphical analyses have used data for 2004 as an example. As noted in the introduction, for our statistical analysis we use monthly retail milk and Coop Class I data for each city encompassing the 1997-2007 period. These data are deflated by the CPI index mentioned above. Two separate statistical analyses are undertaken.

One set of analyses attempt to answer the question: *What is the relationship between retail milk prices and the Coop Class I price?* This analysis will be undertaken using a simple regression analysis where the dependant variable is the city-specific retail milk price and the explanatory variable is the city-specific Coop Class I price.

In addition to the above, a second set of analyses focuses on the determinants of the relative payments to producers as represented by the ratio of Coop Class I and retail milk prices. The specific question we investigate is: *Does the Coop Class I share of the retail milk price change with the level of retail prices?* This second set of analyses is undertaken using a slightly more sophisticated regression procedure where the dependent variable is the city-specific ratio of Coop Class I and Retail milk prices and the explanatory variable is the city-specific retail milk price.[12]

The Responsiveness of Retail Fluid Milk Prices to Changes in Farm Level Prices
As noted above, to determine how sensitive retail prices are to changes in Coop Class I prices, we compared each city's monthly retail prices with its associated Coop Class I price. Using simple regression techniques we regressed monthly deflated retail price against deflated Coop Class I price for each of the 24 cities in our sample over the January 1997 to May 2007. Given the nature of our data, for each city we anticipated that the regression error terms would be correlated across months. For example, one reason could be that when farm level prices change dramatically retailers may be reluctant to pass through the entire price change in a single month given possible consumer reactions. There also may be menu costs associated with changing prices that may cause a delay in enacting a price change. These are classic reasons to anticipate having correlated errors. An initial regression analysis of the data used by Jesse (2003) found very strong evidence that that we indeed have correlated errors over the original 1997-2002 period for all cities. A similar result was found for the 1997-2007 period. Accounting for this serial correlation is extremely important if one is interested in examining the statistical significance of the estimated coefficients. Given that we found evidence of correlated errors we needed to adopt an estimation strategy that accounts for this correlation.[13]

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[12] We transformed the Coop Class I share of retail price in such a manner that the regression model ensures that the predictions we obtain from the estimated models are between 0 and 1 and that the relationship between the Coop Class I share and retail price depend on the current retail price level. This transformation is commonly referred to as a logit transformation. More detail can be obtained from the authors upon request.

[13] When serial correlation is present and one does not account for this in the estimation process, the corresponding standard errors of the estimated coefficients are not correctly calculated using standard regression techniques. This implies that any resulting hypothesis tests are incorrect. One of the simplest strategies and the one adopted here is the First Order Auto-Regressive [AR(1)] Model structure. Adopting this structure ensures that are standard errors are correctly calculated and are the more efficient than

For each city we estimated two models, one with whole milk retail price (adjusted for inflation) as the dependent variable and the other with adjusted reduced fat retail prices. Table 1 lists the results of the regressions for each city and milk type. Next to the name of each city, the intercept and slope coefficients for the whole and reduced fat milk regressions are presented.

The *COOP* coefficients measure the affect that a per gallon increase in Coop Class I price will have on retail milk prices. For instance, if the Coop Class I price increased by 50¢ in Atlanta then our model would predict that whole milk retail prices should rise by 21¢. The results from the whole milk regressions indicate that in 20 of the 24 cities the Coop Price slope coefficient were statistically different from 0 and positive. Among these cities the estimated Coop price coefficient ranges from 0.221 (St. Louis) to 1.002 (Pittsburgh). While this represents a wide range of values, it is interesting to note that the values are all approximately less than one. This means that when coop prices change the retail prices will change by a lesser or equal amount. For the remaining 4 cities the relationship is not strong enough to draw any conclusions. The results from the reduced fat milk regressions were similar. In 19 out of 24 cities the Coop Price slope coefficients were statistically significant. The values of these coefficients ranged from 0.209 (St. Louis) to 0.751 (Pittsburgh).

Our results are in contrast to those obtained by Jesse (2003). In terms of our whole milk regression results, a greater percentage of the Coop Class I coefficients are statistically significant than obtained under Jesse (2003). This difference in results is due to both the longer time period included in the analysis and the use of an estimation technique with resulting coefficient standard errors that account for the correlated error structure.

In terms of our analysis of whole milk prices, if we sort the point estimates of the estimated slope coefficient in ascending order, regardless of statistical significance, this provides an indication of how variable retail margins are with respect to changes in retail price. The value 0.024 for Denver indicates that there will be significant variability in margins as the retail price is unaffected by changes in Coop Class I price. In contrast, Pittsburgh's retail whole milk price changes almost 1 to 1 with Coop Class I price. Such a relationship provides an indication of a relatively stable whole milk retail margin in this city. Figure 7 shows the margins in both of these cities over the study period. The range of variability in margins is evident and reflects the above regression results.

With very few exceptions, the results obtained for the pricing of whole milk was also obtained for the reduced fat milk market. That is for those markets where there was no statistical relationship found in the pricing of whole milk to changes in the Coop Class I price we also found a lack of statistical relationship for the pricing of reduced fat milk. The last half of Table 1 presents a summary of the reduced fat milk regression results. The one exception was Milwaukee where the pricing of reduced fat milk was not related to Coop Class I prices.

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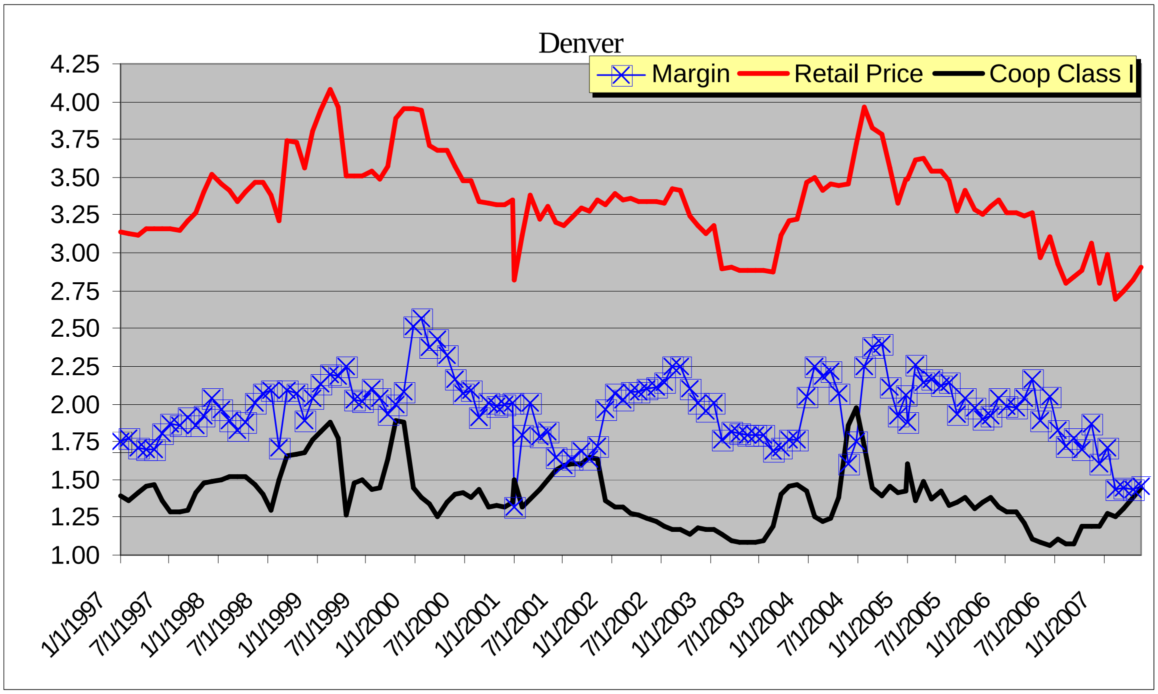
correctly calculated OLS-based standard errors. A more detailed discussion of the AR(1) estimation strategy can be obtained from the authors upon request.

Table 1: Whole and Reduced Fat Milk Regression Results

City	Whole Milk		Reduced Fat Milk	
	Intercept	COOP	Intercept	COOP
Atlanta	2.404	0.420	2.398	0.419
Baltimore	2.433	0.320	2.315	0.384
Boston	2.173	0.505	2.175	0.489
Chicago	2.444	0.556	2.498	0.389
Cleveland	1.911	0.624	1.844	0.586
Dallas	1.903	0.596	1.817	0.649
Denver	3.169	0.024	2.989	0.117
Detroit	2.293	0.235	2.243	0.255
Hartford	2.258	0.506	2.243	0.509
Houston	2.194	0.547	2.176	0.537
Kansas City	2.047	0.661	2.000	0.602
Louisville	1.898	0.487	1.900	0.460
Miami	2.214	0.525	2.246	0.511
Milwaukee	2.283	0.466	2.460	0.190
Minneapolis	2.643	0.422	2.556	0.376
New Orleans	3.169	0.187	3.042	0.191
Oklahoma City	1.950	0.517	1.967	0.462
Omaha	2.041	0.583	2.047	0.525
Philadelphia	1.827	0.755	1.781	0.713
Phoenix	2.637	0.332	2.612	0.303
Pittsburgh	1.413	1.002	1.637	0.751
St. Louis	2.608	0.221	2.419	0.209
Seattle	2.391	0.410	2.528	0.234
Washington DC	2.553	0.359	2.534	0.348

Note: For each city, the basic regression model can be represented as: RP = a + ßCOOP where RP is the retail price, COOP is the Coop Class I price and a and ß are the intercept and slope parameters to be estimated. The shading indicates statistically significant coefficients. Though not reported, all estimated AR(1) coefficients except for the reduced fat milk regression for Washington, D.C. were statistically significant. These values can be obtained from the authors upon request.



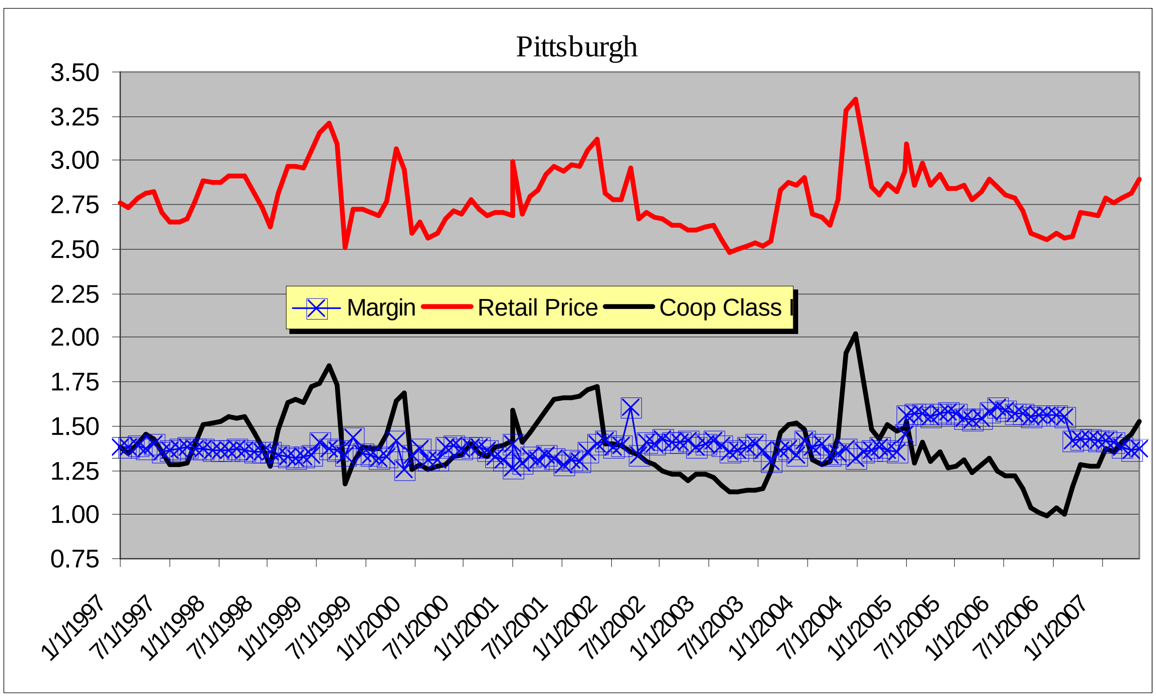


Figure 7. Comparison of Denver and Pittsburgh Whole Milk Retail Margins

Jesse (2003) summarized the results of his analysis of the retail pricing of whole milk via the following:

> "With few exceptions, the responsiveness of retail whole milk prices to processor milk costs as measured by announced cooperative Class I prices is weak or non-existent. The process of price transmission from farmers, as represented by their fluid milk bargaining associations, to consumers is flawed in many markets. This is a sobering, though not surprising, conclusion supported by other research. The implication for dairy farmers is that lower farm level milk prices do not uniformly translate into lower retail milk prices… (p.10)

We reach different conclusions in the present analysis. For whole milk the results in only 4 of the 24 cities studied here showed no statistical relationship between Coop Class I milk and the retail whole milk price.

For the 20 cities in which we found a statistically significant relationship these results do not imply that the relative movement of retail versus Coop Class I prices are the same regardless of the direction of the movement of Coop Class I prices. The current structure of the model imposed this assumption in the estimation process. Future research will allow the data to tell us whether in fact there are symmetric price relationships between the farm and retail sectors

The Relationship of the Share of Coop Class I of Retail Milk Prices and Retail Price
So far we have examined the relationship between changes in retail versus Coop Class I price over time and across cities. As noted above we are also interested in examining how the share of the farm-level milk price of the total retail price of milk changes as the level of retail prices change. If we find a negative relationship this would indicate an increase in margins for higher retail prices.

As noted above we use a logistic transformation of the ratio of Coop Class I to retail price of both whole and reduced fat milk to answer this question. The results of this logistic regression analysis are presented in Table 2. Note that for most of the cities in our sample the retail price slope coefficient is negative. This negative sign indicates that an increase in the retail price of milk is correlated with a decrease in the coop to retail price ratio. In other words, when coop prices increase, retail prices increase by a greater percentage. Conversely, if coop prices fall then retail prices fall by a greater percentage. For the cities with positive coefficients the opposite is true: when coop prices change, retail prices change by a smaller percentage.

Of the 24 cities in our sample, 17 have statistically significant coefficients and of those 17, 12 have negative signs. The results of reduced fat regressions were similar: 16 have statistically significant coefficients and of those 17, 13 have negative signs. As noted above the relationship between the retail milk price and the Coop Class I share of the retail price can be quantified via the "marginal effect". We calculated these marginal effects with an assumed retail price equal to the mean value of each city's monthly retail price. Table 3 provides a summary of these marginal effects across city and milk type.

Each value displayed in this table represents how much the ratio of Coop to retail prices is expected to change when we have a $1 increase in retail price. For example, if the retail price increases by $1 in Baltimore, then we would expect to see the Coop to retail price ratio fall by 0.054.

Conclusion

In an earlier Marketing and Policy briefing paper, Jesse (2003) used a regression analysis to examine the relationship between retail and farm prices. In terms of his analysis of whole milk prices, he found statistically insignificant results for 11 of the 26 cities in his sample. Of the remaining 15 cities he found statistically significant coefficients where a majority were much less than 1.0 (i.e., ranging from 0.92 in Pittsburgh to 0.32 in Detroit). This led Jesse to conclude that "with few exceptions, the responsiveness of retail whole milk prices to processor milk costs as measured by announced cooperative Class I prices is weak or non-existent." (p. 10). Using similar methods (substituting his regression analysis for ours based on the AR(1) structure) and an expanded dataset, we found statistically significant relationships between retail whole milk and Coop Class I prices in 20 out of the 24 cities in our sample. These coefficients also tended to be larger than obtained by Jesse (2003). These initial results suggest Coop Class I and retail prices are more highly correlated than indicated in the earlier study.

We gained an increased understanding of the relationship between Coop Class I and retail price by incorporating a logit transformation of the Coop Class I share of the retrial price into a regression model where the explanatory variable is the city-specific retail price.. For at least 12 of the cities in the sample we found that an increase in retail price is reflected in a lower coop to retail price ratio. This implies that the percentage change in retail price is always greater than the percentage change in coop price. This implies that changes in the cost of milk may not be fully transmitted into changes in retail price. Specifically, it would seem that when the cost of production falls, these lower costs are not passed onto the consumer but are instead manifested in higher profit margins for retailers.

The analysis undertaken here provides intuition for the general relationships between retail and coop prices and is based upon rough data estimations. It is only intended to provide motivation for future research and we emphasize that without further analysis we cannot explain with any confidence why one sees such large price spreads between milk costs and retail prices. An important question for dairy researchers to address is, "Why are retail prices in some cities more sensitive than in others?" We speculate that the discrepancies between the cities can be explained by the varying market power of food retailers in these cities. We would expect to observe cities with a higher concentration of milk retailers have more sensitive retail prices. By incorporating some measure of market power of firm concentration, a model may be able to better explain why some cities enjoy more responsive retail prices.

Another important topic concerning the retail pricing of retail fluid milk and not addressed in the present analysis is that of the existence of price asymmetry. That is we do not address the question which was of concern of the GAO (2004) as to whether retail prices are more responsive to increases in the processing costs than to decreases in processing costs. In other words, it is possible that retail prices rise more easily and more quickly than they fall. If this is the case, then it would support the notion that milk retailers are retaining excessive profits. Researchers could test this hypothesis by incorporating a model that treats increases in coop prices and decreases in Coop Class I prices as separate variables such as illustrated in the model of Romain, Doyon and Frigon (2002) and Capps and Sherwell (2005). Future research will attempt to answer this question.

Table 2. Summary of Logit Regression Results

City	Whole Milk Price Ratio		Reduced Fat Milk Price Ratio	
	Intercept	Retail Price	Intercept	Retail Price
Atlanta	0.406	-0.144	0.451	-0.157
Baltimore	0.668	-0.216	0.742	-0.237
Boston	-1.054	0.387	-0.618	0.248
Chicago	0.049	-0.096	0.626	-0.253
Cleveland	0.233	-0.069	0.225	-0.027
Dallas	1.229	-0.425	1.112	-0.382
Denver	0.581	-0.276	0.437	-0.226
Detroit	1.339	-0.486	1.413	-0.511
Hartford	-0.125	0.049	-0.089	0.043
Houston	0.192	-0.061	0.328	-0.103
Kansas City	-0.923	0.270	-0.622	0.203
Louisville	1.799	-0.624	1.675	-0.558
Miami	-0.625	0.245	-0.594	0.234
Milwaukee	0.754	-0.234	1.649	-0.539
Minneapolis	-1.152	0.265	-1.020	0.252
New Orleans	0.999	-0.368	0.959	-0.351
Oklahoma City	0.877	-0.292	0.899	-0.293
Omaha	-0.313	0.075	-0.279	0.086
Philadelphia	-0.919	0.325	-0.691	0.286
Phoenix	0.975	-0.390	1.283	-0.488
Pittsburgh	-1.227	0.436	-0.827	0.348
St. Louis	0.599	-0.239	0.715	-0.266
Seattle	0.180	-0.186	0.395	-0.240
Washington DC	1.354	-0.461	1.410	-0.477

Note: The dependent variable used in the above model is the transformed share of retail prices associated with the Coop Class I price. The model was estimated assuming an AR(1) error structure. The shading indicates statistically significant coefficients. Thought not reported, all estimated AR(1) coefficients were statistically significant and can be obtained from the authors upon request.

Table 3. Marginal Effects of a Change in Retail Price on Coop Class I Share

City	Whole Milk	Reduced Fat Milk	City	Whole Milk	Reduced Fat Milk
Atlanta	-0.036	-0.039	Miami	0.061	0.058
Baltimore	-0.054	-0.059	Milwaukee	-0.058	-0.133
Boston	0.097	0.062	Minneapolis	0.065	0.062
Chicago	-0.024	-0.063	New Orleans	-0.091	-0.087
Cleveland	-0.017	-0.007	Oklahoma City	-0.073	-0.073
Dallas	-0.106	-0.096	Omaha	0.019	0.022
Denver	-0.067	-0.055	Philadelphia	0.081	0.071
Detroit	-0.121	-0.128	Phoenix	-0.097	-0.121
Hartford	0.012	0.011	Pittsburgh	0.109	0.087
Houston	-0.015	-0.026	St. Louis	-0.059	-0.066
Kansas City	0.067	0.051	Seattle	-0.044	-0.058
Louisville	-0.155	-0.137	Washington DC	-0.115	-0.119

Note: The marginal effects (ME) of a change in retail price on the Coop share can be shown to be the following when using the logit specification $ME = ?\hat{P}\left(1-\hat{P}\right)$ where $\hat{P}$ is predicted share and $?_i$ is the estimated retail price coefficient. These marginal effects are evaluated at the mean Coop share value for each city. Shading indicates that the calculated value is significantly different from zero.