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COSTS & PROFITABILITY OF FLUID MILK IN RETAIL STORES

FOUR NEW YORK MARKETS & NORTHERN NEW JERSEY

by

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PREFACE

Richard D. Aplin and Gene A. German are Professor of Marketing and Associate Professor of Food Industry Management, respectively, in the Department of Agricultural Economics at Cornell University.

This publication is the first of two publications on the costs and profitability of milk in large retail food stores.

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Many contributed importantly to the research. In particular we owe our sincere gratitude to the managements and employees of the 139 retail food stores studied. Although their names and the names of their companies will remain anonymous to protect confidentiality, they spent hours in providing the necessary data.

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Many of our current and former colleagues contributed in significant ways to the research, be it in field survey work, computer programming, analysis or processing the manuscript. These include Andrew Cook, John Shane, Jennifer Lotwis, Jamie Marglin, Leonard Palmer, Lori Zucchino, Gregory Kuserk, Stanley Payson, Sandy Basso, Kathy Pierce and Sharon Wyllie. We thank all of them very much.

Despite all the assistance we received, the contents of the report are the responsibility of the authors.

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Objectives and Methodology

This study had three primary objectives:

1. To develop and demonstrate approaches that will aid retail food store managers in measuring the cost and the profitability contributions of fluid milk products in their stores.

2. To determine the costs incurred in handling various fluid milk products in retail stores.

3. To determine the gross margins, direct product profits and net profits realized on milk products and on all products in the store for various market areas.

Food retailers employ a pricing method known as "variable mark-up". This means that the gross margin on different products within a retail store, and even within a specific product category, may not be the same. Gross margin will vary depending on consumer demand, competitive pricing, and the amount of in-store handling, processing or packaging required. Low margins on some products may be off-set by relatively higher margins on other products in the store's total product mix.

This concept of variable markup on different products within a given category is important in the analysis of various fluid milk prices and profit measures. Although it is important to identify the retail prices as well as the profitability of individual fluid milk items, it must be kept in mind that in pricing decisions, food retailers view the contribution that each fluid milk item makes to the category as a whole. Also, fluid milk is only one category that contributes to the total profitability from the retailing of all the items in the store--not the profitability of one category of items.

Although gross margin has been the traditional method of measuring the "profitability" of items for food retailers, recently direct product profit has received much attention as a more useful indicator of a product's performance. Direct product profit (DPP) is especially useful in understanding pricing and merchandising strategies, because it gives a much clearer picture of true profitability than is possible using only gross margin as a measure. DPP can also be calculated on a per linear display foot basis to assist the store manager in allocating optimal space to each product item.

A random sample of 139 stores selling at least 2,000 quart equivalents of fluid milk per week were studied in five market areas. The marketing areas were Albany, Syracuse, Brooklyn and Nassau/Suffolk, in New York and Northern New Jersey. Although the number of different types of retail outlets varied among markets, chain supermarket stores represented 59 percent of the total sample; independent supermarkets, 12 percent; and dairy/convenience stores 29 percent.

Except for one market, Syracuse, the data are for early summer 1984. The Syracuse market was used as a test market in the fall of 1983. Adjustments in invoice costs were made in Syracuse to reflect conditions for May 1984.

A cost engineering approach was used to determine the relevant costs and profitability measurements of each store.

Two types of statistical analyses were completed on the data. The first test was to see if there were statistically significant differences in mean weighted costs and profitability measures across markets for different milk types and also for different store types. The second test determined whether there were statistically significant differences in the variance of profitability /cost measures across markets, for different milk types and also for different store types. These tests were completed on a dollars per unit basis only because of resource constraints.

Milk Sales

Sales of the six major items ranged from an average of 7,466 quart equivalents per week in Nassau/Suffolk stores to 3,900 per week in Albany where a high proportion of the sampled stores were dairy/convenience stores which tend to sell less milk than supermarkets (Table 3). Sales of these six items in the other three market areas averaged between 6,000 and 6,800 quart equivalents per week per store. Chain supermarkets were the dominant milk retailers in Northern New Jersey, Albany and Syracuse. Independent supermarkets had the highest average sales of milk in both Nassau/Suffolk and Brooklyn.

In all market areas except Brooklyn, the top three selling milk items were homogenized gallons, homogenized half gallons and lowfat gallons. These three items accounted for between 74 and 83 percent of total fluid milk sales in the five market areas.

Retail Prices, Invoice Costs, Gross Margins and Direct Product Profits On A Per Unit Basis

Chain Supermarkets. The highest retail prices for milk were found in Brooklyn, Nassau/Suffolk and Albany. Chain supermarkets in Brooklyn and Nassau/Suffolk also incurred the highest average invoice costs for milk products. Gross margins were the highest in Albany and the lowest in Nassau/-Suffolk and Northern New Jersey. When the direct costs are deducted from gross margin, the resulting profit is referred to as direct product profit (DPP). This DPP was the highest in the Albany market and the lowest in the Nassau/Suffolk and Northern New Jersey market areas for the chain supermarkets.

All Types of Retail Stores. Brooklyn and Nassau/Suffolk had the highest retail prices and invoice costs when data from all types of retail stores in each market area were included. Lowest invoice costs were found in Albany and Syracuse. In-store handling costs varied little between markets. Albany had the lowest direct costs while Syracuse and Brooklyn had the highest.

Due to low in-store direct costs, low invoice costs and relatively high retail prices, the Albany market had the highest direct product profits (DPP). Lowest DPP's was found in Brooklyn and Nassau/Suffolk for all types of retail stores.

Profit Comparison Between Chain Supermarkets and Dairy/Convenience Stores-Per Unit Basis

In all markets where dairy/convenience stores were included in the sample it was found that, as a group, they had lower gross margins than the chain supermarkets. However, in all but one market (Albany) the dairy/convenience stores had higher direct product profits (DPP) than the chain supermarkets due to lower wage rates and lower cost in-store handling systems. This means that dairy/convenience stores could sell milk for a lower retail price and still earn a higher DPP than the chain supermarkets.

Sales, Gross Margins and Direct Product Profits Per Linear Shelf Foot

Measuring the performance of items on a dollar per linear shelf foot basis is a useful management tool. The sales revenues generated per linear shelf foot by all fluid milk items taken as a group were similar in the Albany and Syracuse markets. Sales dollars per linear shelf foot varied more among store types and among markets in the other three market areas. Despite the generally higher sales revenue per linear shelf foot in Brooklyn, Nassau/ Suffolk and Northern New Jersey, the gross margin dollars and direct product profits per linear shelf foot were quite similar in all store types and in all markets with but two exceptions--independent supermarkets in Brooklyn (low) and dairy/convenience stores in Northern New Jersey (low).

Variability in Retail Prices, Cost and Margins

The three primary factors affecting direct product profit of fluid milk are (1) retail prices, (2) invoice costs and (3) in-store direct handling cost. In addition to examining the weighted averages of each of these factors, this study has also examined the range of each in the five market areas. The range in retail prices of homogenized gallons and half gallons was the widest in Brooklyn and the range in the retail prices of lowfat gallons was the widest in Nassau/Suffolk.

The range of retail prices was greater than that of either the range of invoice costs or direct costs in all markets except New Jersey where the range in invoice costs exceeded the range in retail prices.

The largest ranges in average gross margins and direct product profits (DPP) on fluid milk as an aggregate were recorded in the Brooklyn market where gross margins ranged from negative 14.4 percent to positive 25.5 percent and DPP ranged from a negative 17.6 percent to positive 21.5 percent. The narrowest range in profit margins was in the Northern New Jersey market where the percentage gross margins on all dairy products as a group ranged from 9.0 percent to 19.2 percent and DPP ranged from 4.9 to 15.1 percent. The highest profit margins were found in the Albany market where gross margins ranged from 12.2 to 31.7 percent and DPP ranged from 9.1 to 26.8 percent.

Milk Profit vs. Total Store Profits

As an average of all stores, milk as a category has a lower gross margin as a percentage of sales than the average gross margin of all items in the food store. However, the direct product profit measure shows that milk is a higher profit contributor as a percentage of sales than all items in the store in Albany and Syracuse and about equal in Brooklyn. This is due to the lower handling costs for milk than the average of all items in the store.

Although statistical tests of significance were not applied to this part of the analysis, an even more dramatic picture can be seen when measuring gross margin and direct product profit (DPP) by dollars per linear display foot. With this measure, milk is higher than the average of all store items in both gross margin dollars produced and DPP. The favorable profit picture for milk results from the high turnover and relatively low handling costs of milk compared with that of the average food store product. This means that milk, based on dollars per linear display foot, is a very profitable item for food retailers compared with the average of all items in the store.

INTRODUCTION

The purpose of this study was to examine the various costs and the profitability of handling fluid milk in retail stores. The study focused on the six fastest selling milk items distributed by the three principal types of retail outlets found in New York State: (1) chain supermarkets, (2) independent supermarkets and (3) dairy/convenience stores. Analysis was made of each milk type and comparisons were made among retail store types and among the market areas covered by this study.

Another important aspect of this study was that profitability analysis was carried beyond gross margin, which has been the traditional method of measuring profitability of milk, as well as other items, for food retailers. It has long been recognized that gross margin has two primary shortcomings as a profit measure:

1. Since gross margin is simply the difference between the selling price of an item and the wholesale cost of that item (cost of goods or invoice cost), it does not reflect the costs associated with handling the product in the retail store. Handling costs vary widely among product lines, depending on the method of receiving, frequency of stocking, packaging, processing requirements (if any), pricing methods, equipment and refrigeration requirements, size and type of product, as well as other factors.

2. When gross margin is viewed as a percentage of sales, it does not reflect the sales velocity (i.e., the number of units sold in a time period) of the product. Retailers often find that products with low gross margin percentages, but high sales volumes, produce more total profit dollars than products with high percentage gross margins but low sales volumes.

Direct Product Profit

Recently a technique has been developed that overcomes the problems associated with gross margin as an indicator of a product's performance. This technique makes it possible to measure the profitability of an individual product sold in a retail store by taking into account the various direct costs associated with the sale of the product. The approach produces a profit measurement known as "direct product profit" (DPP).

The direct product profit measurement is calculated as follows:

	Retail Selling Price
less	Invoice Cost
equals	Gross Margin
less	All Direct Costs
equals	Direct Product Profit

By subtracting all of the direct costs from the gross margin of an item, direct product profit provides a clearer picture of the true profitability of the product--or product line. Direct product profit measures the "contribution to indirect store costs, general overhead and profits" of the company. By applying only the direct costs associated with the sale of the product to each item, it is possible to derive an accurate measurement of the product's true contribution to store and company overhead and profit--a measurement not possible with gross margin.

Sales velocity can be accounted for by substituting total retail sales for retail selling price per unit. This produces the following equation which reflects the total direct product profit dollar contribution:

	Total Retail Sales (product A)
less	Total Invoice Cost
equals	Total Gross Margin
less	All Direct Costs
equals	Total Direct Product Profit Dollars

This profitability measure is especially useful in understanding pricing and merchandising strategies, because it gives a much clearer picture of true profitability than is possible using only gross margin as a measure. DPP can also be calculated on a per linear display foot basis to assist the store manager in allocating optimal space to each product item.

The Variable Mark-up Method

Food retailers employ a pricing method known as "variable mark-up". This means that the gross margin on different products within a retail store, and even within a specific product category, may not be the same. Gross margin will vary depending on consumer demand, competitive pricing, and the amount of in-store handling, processing or packaging required. For example, a retailer might price a certain product or product line at or below cost for competitive purposes (i.e. to attract customers). The low margins on these products would be off-set by higher margins on other products in the store's total mix.

In this study of fluid milk sold in the dairy case, wide variation in pricing policies among various firms resulted in a range of gross margins from 4.6 percent on homogenized gallons in the Brooklyn market to 20.6 percent on this same product in the Albany market. Margins are often a reflection of retail prices that tend to vary from product to product due to competitive pricing within the market. However, even when the gross margin (or retail price) of one item within the product category is low, the overall margin within the category may be higher, due to the contribution from the other items within the category. For example, in the Brooklyn market, gallons of homogenized milk averaged only 4.6 percent gross margin, but the average gross margin for all milk within the market area was 14.8 percent.

This concept of variable markup on different products within a given category is important in the analysis of various fluid milk prices and profit measures. Although it is important to identify the retail prices as well as the profitability of individual fluid milk items, it must be kept in mind that

in pricing decisions, food retailers view the contribution that each fluid milk item makes to the category as a whole. Also, fluid milk is only one category that contributes to the total profitability of the store. The retailer's ultimate interest is the store's profitability from the retailing of all the items in the store--not the profitability of one category of items, say, fluid milk.

The variable markup concept is further complicated by the emergence in recent years of different types of supermarket formats, each of which employs different and unique merchandising and pricing strategies. Seven typical types of formats were found in the New York and New Jersey markets.

The chain and independent supermarkets in the study included five formats:

1. The conventional supermarket with weekly advertised features--usually "loss leaders" (e.g. products sold at or below cost to attract customers to the store). This type of supermarket maintains fairly high gross margins on most products while offering the customer special savings each week from loss leader advertised specials.

2. The conventional supermarket with "everyday low prices" (e.g. slightly lower prices on all products but no loss leaders). This type of supermarket differs from the previous one in that it reduces the prices on all products by a small amount instead of offering greatly reduced prices on a few loss leaders. The overall gross margin for the total store tends to be about the same as the loss leader supermarket--since the effect of the markdowns on each item is about equal to the markdowns on loss leaders.

3. The super store--a very large supermarket with a wide variety of product lines including some general merchandise and specialty departments not usually found in conventional supermarkets. Because of the wide range of products in the super store, the pricing of specific product lines may vary more than that of a conventional supermarket. Overall, the gross margin tends to be higher for the total store due to the higher cost of the labor intensive departments such as deli, bakery and service meats.

4. The combination store--a very large retail store which devotes at least 40 percent of its selling space to food but the rest to general merchandise. The merchandising and pricing policy in a combination store is similar to that of a super store due to the wider range of items (including general merchandise) that contribute to the total product mix.

5. The warehouse store and super warehouse store--a supermarket which features very low prices on traditional dry grocery items such as canned goods. Some dry grocery items may actually be sold at cost to create a low price impression for the store. The differences between the traditional warehouse store and the super warehouse store is the

addition of upscale perishable departments such as in-store bakeries, delis, fresh fish departments and floral departments in the super warehouse store. The pricing strategies for the warehouse and super warehouse store are similar. Both depend on low overall prices to attract customers. For these low prices the customer gives up certain services and choice of products. Warehouse stores typically are able to offer low prices by eliminating services such as bagging, carry out, and check cashing. Operating costs are also held to a minimum by reducing the variety of products carried and through the use of functional, rather than elaborate, store decor. A super warehouse store attempts to broaden its customer appeal by offering quality perishable departments--not always at prices lower than other supermarkets. The higher gross margins from these perishable departments tend to offset the very low margins in the grocery department.

The dairy/convenience stores category in the study included two store formats:

6. Convenience stores carry a limited line of food products and offer customers the convenience of location as well as quick shopping, but do not compete with other food stores on prices. Convenience stores tend to have higher gross margins (and retail prices) than the other types of food stores described in this report.

7. Dairy stores are similar to convenience stores in size and total sales but typically carry fewer grocery products than convenience stores. Since these stores specialize in milk products, their sales in this category are much higher than convenience stores as a percent of total sales.

OBJECTIVES OF THE STUDY

This study had three primary objectives:

1. To develop and demonstrate approaches that will aid retail food store managers in measuring the cost and the profitability contributions of fluid milk products in their stores.

2. To determine the costs incurred in handling various fluid milk products in retail stores.

3. To determine the gross margins, direct product profits and net profits realized on milk products and on all products in the store for various market areas.

Data on profitability and costs of fluid milk were analyzed on a market by market basis as well as between each market using the following guidelines:

1. Although the costs and performance of all fluid milks as a product category were analyzed from a total of thirty five possible milk items (see appendix 1), only the six fastest selling milk items were

analyzed separately. This report focuses on the sales, cost and profitability of the following fluid milk items:

a. homogenized gallons
b. homogenized half gallons
c. homogenized quarts
d. lowfat gallons
e. lowfat half gallons
f. skim half gallons

2. In reviewing the data, it was found that three items (homogenized gallons, homogenized half gallons and lowfat gallons) accounted for between 74-83 percent of total fluid milk sales in each of the marketing areas. Therefore, only these three items were used in the more detailed statistical analyses.

Analysis also allowed for comparisons between types of retail stores. Sales, costs and profitability are presented by type of retail outlet as well as for the total market. The retail food stores were classified in three categories by store type:

1. Chain supermarkets: a chain store was defined as ten or more supermarkets under single ownership and operating under the same name.

2. Independent supermarkets: all supermarkets where a single owner operated less than ten stores--usually part of a voluntary or co-op wholesale group.

3. Dairy/convenience stores: the dairy stores in this category usually specialized in selling milk products. Convenience stores (such as stores in the 7-11 chain) had a broader product mix and milk products represented a smaller percentage of store sales than in dairy stores.

Analysis also provided for market totals for each fluid milk item as well as a comparison among markets.

The comparison among markets includes an analysis of sales, cost and profitability of each type of milk, as well as a comparison of costs and profitability by type of retail outlet.

METHODOLOGY

Markets Studied

Data for this study were gathered by the random sampling of large retail outlets in five market areas. The sample included two upstate New York, two New York Metropolitan and the Northern New Jersey market areas.

The specific markets and areas included in the study were:

1. Albany-including parts of Albany, Rensselear, Schenectady, and Saratoga Counties which are within a 15-mile radius of Latham.
2. Syracuse-including Onondaga County and small portions of Oswego and Madison counties which in the judgement of the authors might impact milk prices in Syracuse.
3. Brooklyn.
4. Nassau and the four western townships of Suffolk County.
5. Northern New Jersey-namely Bergen, Essex and Union Counties.

The Sample

Time and other resource constraints made it important to have a small but statistically valid sample of the population of retail stores selling milk in the market areas studied. Lists of retail outlets presumably selling milk in the counties and townships to be studied were obtained from a state agency. It was decided that in each market only retail food stores selling at least 2,000 quart equivalents of milk per week would be studied. This was done to characterize the total market with as small a sample as possible. In most markets, stores selling 2,000 quart equivalents of milk per week or more probably would represent only about 20 percent of the stores but 65 percent or more of the sales of fluid milk by food retailers. The goal was to obtain data from 30 stores in each market area.

With the help of milk suppliers, food brokers, food wholesalers and others, those retail outlets selling more than 2,000 quart equivalents were identified on the lists. The stores that qualified and those whose quantities were questionable were assumed to be the population and were sequentially numbered.

Using random number tables, numbers were pulled sequentially and matched with those store numbers. Knowing that some stores would be too small to qualify and that some retailers would refuse to cooperate, fifty-two or more stores were selected in each market. The stores were sequentially numbered as they were drawn from the population. If it was found that the milk volume that a store sold was too low, they were dropped from the sample. In this manner the first 30 qualified stores were identified as the sample. The owners of the stores in the sample were then contacted and asked to participate. In some cases retailers refused to provide data for the study. When this occurred, the researcher simply moved to the next store on the random sample list and sought their participation in the study. This procedure was followed until approval was gained for a sufficient number of stores in each market area.

As stated earlier, the goal of the study was to obtain data from 30 stores in each market area. The results fell below this minimum in all but one market (Syracuse). This happened because the data for some stores proved to be incorrect or incomplete, and could not be included in the final analysis. The market breakdown by store type is given in Table 1.

Table 1. Number and Type of Stores Studied by Market Area, 1984

TYPE OF STORE	MARKETS					
	ALBANY	SYRA-CUSE	BROOK-LYN	NASSAU/ SUFFOLK	NORTHERN N.J.	ALL MARKETS
Chain supermarkets	9	13	10	18	15	65
Independent supermarkets	2	11	15	5	0	33
Total Supermarkets	11	24	25	23	15	98
Dairy/convenience stores	16	7	0	5	13	41
Total Stores	27	31	25	28	28	139

Limitations

Due to the extremely sensitive nature of invoice costs, some retailers refused to provide this specific information, although they cooperated with the study by providing all of the other data requested. In these cases, careful estimates were made of these invoice costs from data obtained from other retailers in the market that operated stores of similar size and volume. Also, in some market areas these estimates were refined or confirmed by information supplied by various milk dealers. The number of stores in each market area where invoice costs were reported is shown in Table 2.

Table 2. Number and Types of Stores For Which Invoice Costs Were Reported By Market Area.

TYPE OF STORE	MARKETS				
	ALBANY	SYRA-CUSE	BROOK-LYN	NASSSAU/ SUFFOLK	NORTHERN N.J.
Chain supermarkets	9 (100%)	*	5 (50%)	12 (67%)	13 (87%)
Independent supermarkets	2 (100%)	*	14 (93%)	2 (40%)	-
Total Supermarkets	11 (100%)	*	19 (76%)	14 (61%)	13 (87%)
Dairy/convenience stores	16 (100%)	*	-	5 (100%)	13 (100%)
Total Stores	27 (100%)	*	19 (76%)	19 (68%)	26 (93%)

*Updated from fall '83 to May 1984, as explained below.

To provide the reseachers with invoice costs, the retailers usually supplied the milk distributors' invoices or bills. Any discounts on the invoices were considered in arriving at net invoice costs. Attempts also were made to obtain information on any discounts (eg. promotional allowances) that might not be reflected on the regular invoice. Undoubtedly some "hidden discounts" may not be reflected in the reported invoice costs.

Since some dairy/convenience stores are operated by vertically intergrated firms (ie. the same firm owns and operates the processing plant, wholesale dairy routes and retail outlets), invoice costs actually represent transfer prices in those cases.

Except for one market--Syracuse--data on sales volumes, retail prices and invoice prices were obtained for a six-week period beginning in early May 1984. The Syracuse market was used as a test market in the fall of 1983 to refine the survey questionnaire and the costing model. Thus the data on sales volumes, retail prices and invoice costs for Syracuse originally gathered were for a six-week period in the fall of 1983. The Syracuse information was updated to May 1984 levels to make it comparable with the other markets. After calling several retailers and milk distributors in Syracuse and studying the retail price reports of the New York State Department of Agriculture and Markets, it was concluded that only invoice costs had changed significantly between fall 1983 and May 1984. Invoice costs had decreased significantly, but retail prices had not changed in the market. Based on information obtained from several retailers, two milk distributors and from other informed sources, the invoice costs originally obtained in the fall of 1983 were adjusted downward to reflect the market in May 1984. The results as reported in this publication for the Syracuse market reflect the adjusted invoice costs--not the actual invoice costs observed in the fall of 1983.

Data Gathering

The data for this study were collected by making retail store visits as well as visits to company headquarters for supermarket and dairy/convenience store chains.

Store visits - Researchers scheduled visits to retail stores when store managers and dairy managers were available to answer questions and provide information. Information such as retail prices, shelf allocation for each milk item and certain milk handling variables such as the distance from the receiving dock to the milk cooler and to the milk case was obtained by researcher observation. Other information such as handling methods and employer wage rates were obtained from the store manager or the dairy manager. A sample of the survey form used may be found in Appendix I.

Headquarter visits - Visits to company headquarters were necessary to obtain important cost information such as sales volumes, invoice costs, employee fringe benefits and other general operating costs (e.g. lease payments, utilities, supplies). The visit at the headquarters of a supermarket chain usually necessitated an interview with several company executives because of the diverse nature of the information required.

When the store in the sample was an independent supermarket the "headquarters visit" took place at the retail store, usually with the owner.

Measurements of Costs and Profitability

The data gathered from the store and headquarter visits were designed to provide the following costs and measures of profitability:

Sales Revenue - For fluid milk products based on average retail prices and quantities sold during a six-week period in May-June 1984.

Gross Margin - For fluid milk products, price or sales revenues less the invoice costs of the products. For the total store, it was the gross margin that was reported to Cornell.

Direct Costs - Includes direct labor, display cabinet and energy costs. Direct labor includes the labor involved in receiving, moving product to the display case, monitoring display case, price marking, stocking and checkout. As described later, direct cost estimates for milk were based on detailed work measurement studies done in more than 100 retail outlets by John Phipps, with Edgar, Dunn Associates, San Francisco, California, at the time of this study (now with Touche Ross and Company, San Francisco, California), who served as a consultant on this study.

Direct Product Profit - Equal to gross margin less direct costs.

Indirect Costs - Includes costs of indirect labor, building lease, insurance, property taxes, other utilities, supplies and store or corporate overheads. All indirect costs except store and corporate overhead expenses were obtained on each store. Store and corporate overheads for the chain supermarkets and dairy/convenience stores were based on other studies done by the Food Industry Management Group at Cornell. Overhead costs for independent supermarkets were based on Operating Results of Independent Supermarkets, 1981 for the Northeast by the Food Marketing Institute. The following bases were used to allocate indirect costs to individual milk items:

indirect labor: on the basis of direct labor
space costs: on the basis of shelf linear feet
supplies and overhead expenses: on the basis of sales revenue

Net Income - Equal to direct product profit less indirect costs.

Total Store Handling Costs - Direct costs plus indirect costs.

Note that in a cost/profitability model for many items, the cost of capital tied up in the retailer's inventory would logically be included. In the model for this study, no cost of capital inventory is included because typically a retailer collects cash for the milk at the time of sale yet pays the milk supplier weekly or even less frequently. Thus, milk actually supplies operating capital to the retailer.

The Cost Model

A cost engineering approach was used to derive the model used to determine the needed cost and profitability measurements. John Phipps[1], a consultant experienced in time studies, played a major role in the design of the analytical model, which will be described in detail and illustrated in a forthcoming, companion publication. The model was derived from time studies, actual investment, occupancy and operating costs for individual pieces of equipment, actual supply costs and the pro-rating of overhead costs based on the factors by which they were "driven" (see above).

The in-store direct labor costs were based on actual time and motion studies made by Case and Company at more than 100 stores operated by more than twenty supermarket chains. To verify the applicability of the labor standards for New York conditions and to develop standards for dairy/convenience stores, Phipps made additional observations in New York during the summer of 1983. The labor standards were set at a normal day's work pace and have an allowance for personal, fatigue and delay time. The wage rates, which are a variable in the model, were the actual labor rates prevailing in the stores at the time of the study (i.e. fall 1983 in Syracuse and May-June 1984 in the other markets).

The in-store investment costs were based on 1983 replacement plus installation costs. These costs were amortized over their useful life using a 14 percent cost of money. The 14 percent represents either an interest cost on borrowed capital or an opportunity cost if the company's own capital is used. Note, that the use of a 1983 replacement cost allows for replacement cost accounting.

All other costs were based on the actual costs reported by the individual stores cooperating in the study. Except for the Syracuse market where data were collected in the fall of 1983, all costs are for May-June 1984.

Appendix 1 includes a confidential questionnaire used to collect data for this study.

Statistical Analysis

Two types of statistical analyses were completed on the data. The first test was to see if there were statistically significant differences in mean weighted costs and profitability measures across markets for different milk types and also for different store types. The second test determined whether there were statistically significant differences in the variance of profitability/cost measures across markets, for different milk types and for different store types. The tests were completed on a dollars per unit basis only.

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[1]Currently with Touche Ross and Co., San Francisco, California. Formerly he was employed with Case and Company, New York, New York, and Edgar, Dunn and Co., San Francisco, California.

Four key profitability/cost statistics were tested: (a) retail prices; (b) invoice costs; (c) direct costs; and (d) direct product profits.

These were tested on the three milks which had the highest quart equivalent sales volumes and represented between 74 and 83 percent of total fluid milk sales in each of the market areas:

a. homogenized gallons
b. homogenized half gallons
c. lowfat gallons

Time and resources did not permit statistical testing of the analyses on a per linear shelf foot basis or on the other less important fluid milk items.

When testing all the different combinations of market areas, there were 10 possible since there were five market areas and we only compared two at a time. For testing each cost/profitability measure on each type of milk for each total market average combination, there were 4 x 3 x 10 = 120 different tests. These tests were completed on both the total market and also on the chain stores alone. In total, this gave us 240 different tests per test type. Other store types were not tested as a category because of a lack of data. The tests were not to be completed on data in which there were sample sizes of less than nine.

Testing For Mean Differences. When using a small sample test for comparing population means of costs or profitability in two markets, a t-test was used. The means of the costs or profitability measures were weighted by quantity of quart equivalents sold. The respective variances were weighted by the number of stores to allow us to obtain a pooled standard deviation statistic. Testing was done at the 95 percent confidence level.

The testing was completed to determine if there were statistically significant differences between markets on the means of the four profitability criteria. An example of this testing is the t-test to determine if there is a significant difference in the mean retail price of homogenized gallons of milk sold in Nassau-Suffolk versus Brooklyn. This gives us a measure of the average prices/costs faced by consumers in one market versus another.

Testing For Variance Differences. An F-test was used to test the equality of population variances. The same four profitability/cost measures were tested on the three types of milk in the five different market areas. The testing was completed on chain stores alone as well as all stores together. Again, this was tested only in dollars/unit at the 95 percent confidence level.

The testing was completed to determine if there were statistically significant differences between markets or the variances of the four profitability criteria. An example of this testing is the F-test to determine if there is a significant difference in the variance of the retail prices of homogenized gallons of milk sold in Nassau-Suffolk versus Brooklyn. This gives us a measure of the degree of variability of prices/costs in one market versus another.

With the t-tests and the F-tests there were a total of 480 statistical tests completed. The results are in Appendix 3.

RESULTS

Notes Regarding Results

The sales volumes of the six fasting selling milk items are reported in the following pages together with the retail prices, gross margins, in-store handling costs, and the direct product profits in the stores studied in the five market areas. The cost and profitability performance of milk also is compared to those of the total store. The results are tabulated for types of retail stores (e.g. chain supermarkets, independent supermarkets and dairy/-convenience stores) as well as for market averages.

In studying the results, the following should be kept in mind:

1. All averages are weighted by the quart equivalent quantity of a milk item sold.

2. To protect confidentiality, the average of the two highest and the two lowest figures are used in reporting ranges.

3. Where a retail outlet sold two or more brands of the same fluid milk item, only that brand which sold the largest volume is reported in the tables when individual fluid milk items are being considered. When the performance of fluid milk in total is analyzed, all brands of all milk items sold are considered.

4. The results reflect May-June 1984 in all markets except Syracuse. The basic data for Syracuse, which served as a pre-test for the research, was gathered in the fall of 1983. As detailed previously, investigation indicated that cost and pricing conditions did not change significantly in Syracuse between the fall of 1983 and May 1984 except for invoice costs on milk. Milk invoice costs had dropped significantly and therefore adjustments were made to reflect May 1984 conditions.

5. In the milk study questionnaire thirty five possible types of fluid milk were surveyed from each retail outlet (see questionnaire in appendix 1). Therefore whenever this study refers to "all milk" it is referring to the data collected on all the possible fluid milk items sold in the specific market areas.

Sales Of The Six Fastest Selling Milk Items

The sales volume of a product or product line through a retail outlet is an important factor affecting handling efficiency and total profit potential. Several important observations can be drawn from reviewing the sales volume per store of the six fastest selling fluid milk items in each market area included in the study.

The sales volume of milk per store outlet ranged widely from one market to another. In measuring sales volumes of these six items, the weighted average of quart equivalents sold per store per week was used. The Nassau/Suffolk area stores averaged the highest volume of milk sold per week of the five markets studied with average sales of 7,466 quart equivalents per week. The Albany area stores averaged the least at 3,900 quart equivalents per week, probably in part because the sample included a high proportion of dairy/convenience stores which tend to sell less milk than supermarkets. The stores in the other three market areas all averaged between 6,000 and 6,800 quart equivalents of these six milk items sold per week (Figure 1 and Table 3).

Chain supermarkets were the dominant milk retailers in Northern New Jersey selling an average of 10,330 quart equivalents per week of the six best selling items (Table 3). This was in comparison to Nassau/Suffolk at 8,227 quart equivalents. Chain supermarkets averaged between 6,000 and 6,700 quart equivalents of milk in the other three market areas.

Independent supermarkets had the highest average sales of milk per week in Nassau/Suffolk at more than 9,500 quart equivalents per week of the six items (Table 3). Independent supermarkets actually out-sold the chain supermarkets in both the Nassau/Suffolk and Brooklyn market areas. In Syracuse, independent supermarkets sold about the same volume of milk as the dairy/convenience stores. No independent supermarkets were included in the Northern New Jersey sample.

Dairy/convenience stores sold the least amount of milk on average of any store type except in Albany where independent supermarkets had the lowest sales volume. The range for quart equivalents sold of these six items was between 2,000 and 2,900 per week in every market except Syracuse where dairy/convenience stores averaged more than 5,500 quart equivalents sold per week (Table 3). No dairy/convenience stores were studied in the Brooklyn sample.

In all market areas except Brooklyn, the top three selling milk items were homogenized gallons, homogenized half gallons and lowfat gallons. The best selling milk item in terms of average weekly quart equivalents sold per retail outlet was the homogenized milk gallon in Syracuse, Brooklyn and Northern New Jersey. Lowfat gallons were the best seller in Albany and homogenized half gallons in Nassau/Suffolk area (Figure 2).

Further detail on the sales of the six best selling milk items is available in Table 3.

Figure 1. Average Weekly Sales Per Store, Six Fastest Selling Milk Items By Type of Retail Outlet, May-June 1984

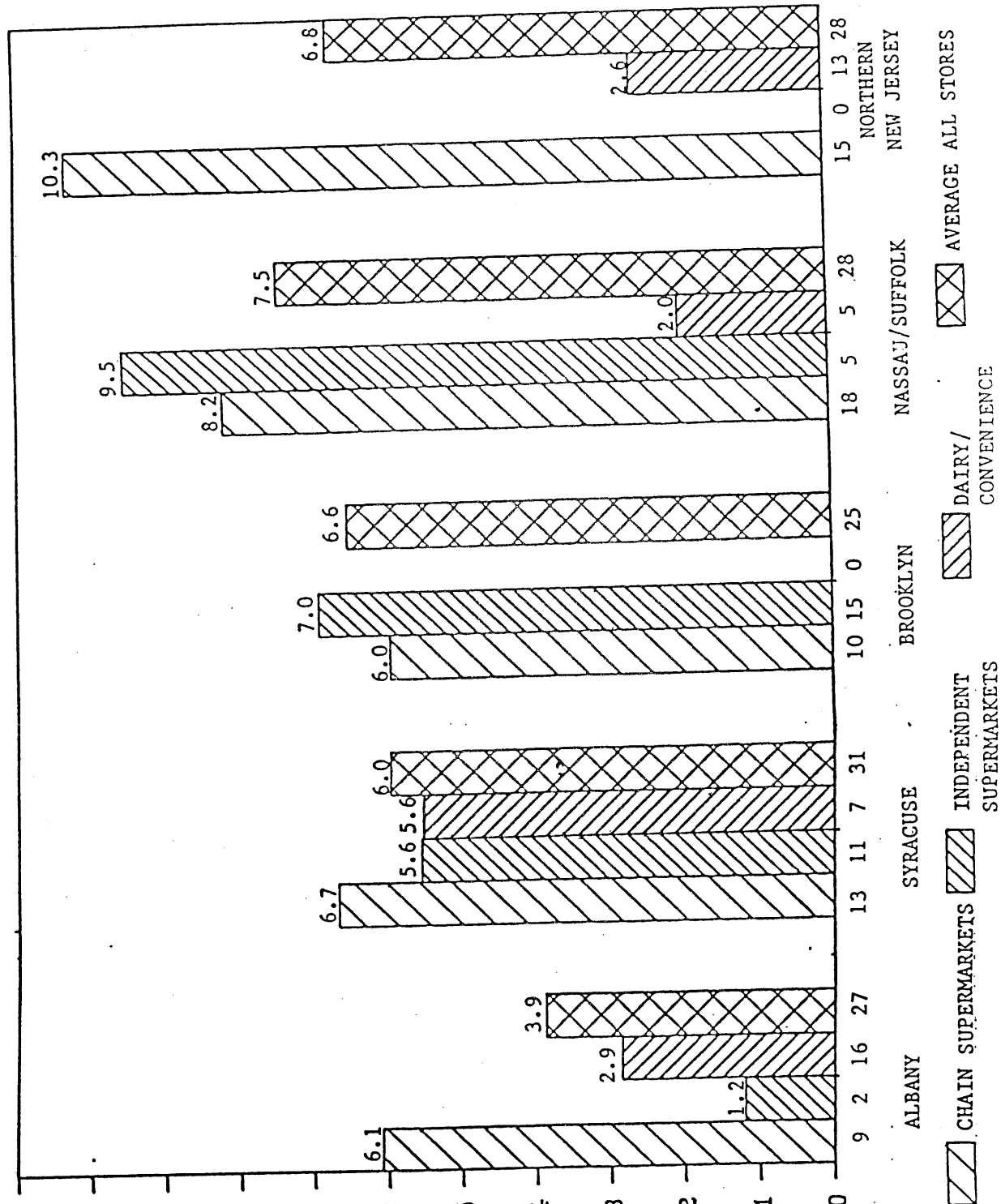


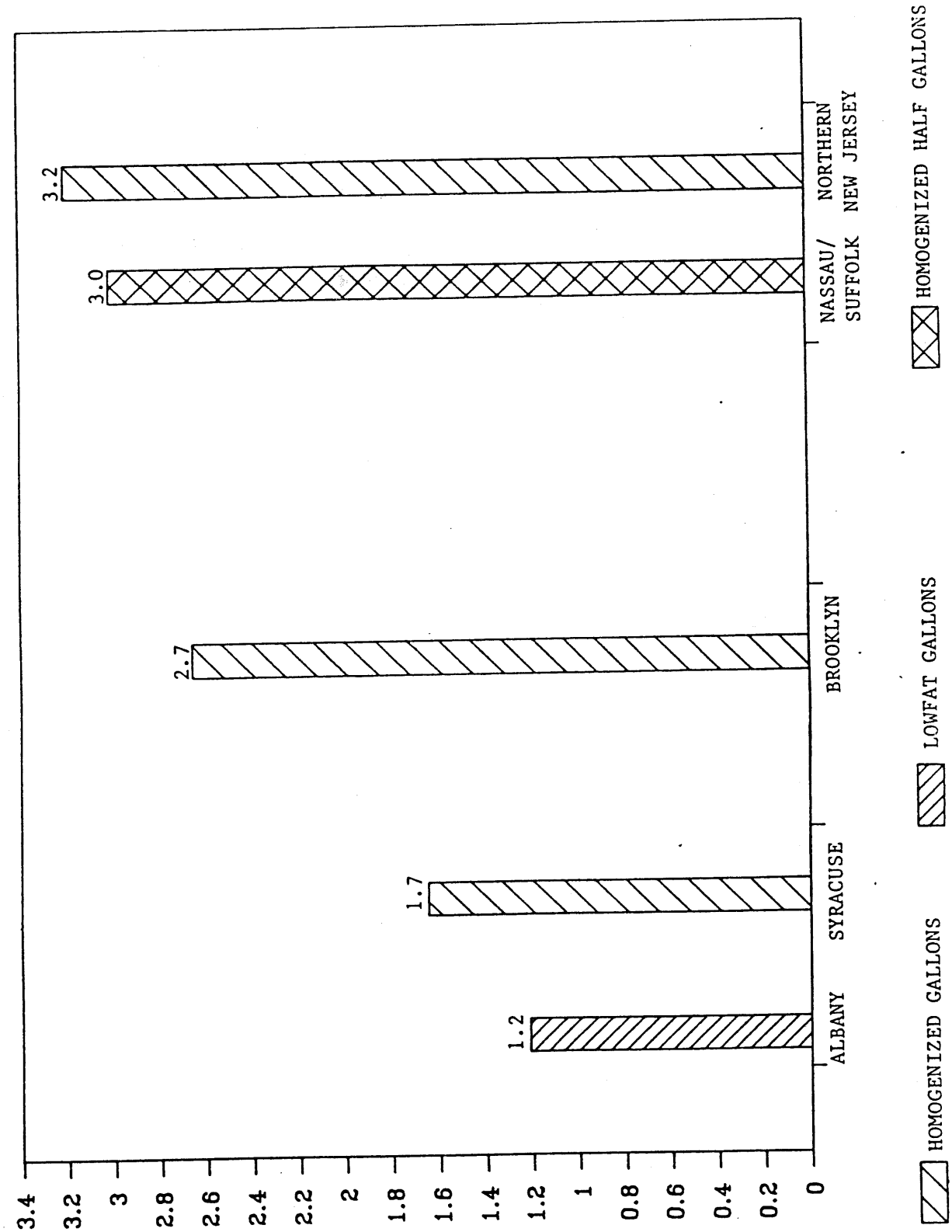
Table 3. Average Weekly Sales Per Store of the Six Fastest Selling Milk Items, May-June 1984

Market & Store Type[1]	Homogenized			Lowfat		Skim	Total
	Gallons	Half-Gallons	Quarts	Gallons	Half-gallons	Half-gallons	Units
	Quart Equivalents Per Week						
Albany							
Chain supermarkets (9)	1921	1483	275	1699	437	279	6064
Independent supermarkets (2)	257	456	58	358	72	--	1201
Dairy/convenience stores (16)	776	480	64	1051	434	49	2854
Average all stores (27)	1148	836	145	1216	412	142	3899
Syracuse[2]							
Chain supermarkets (13)	1762	1421	179	1810	1154	360	6686
Independent supermarkets (11)	2037	1414	176	1144	537	274	5582
Dairy/convenience stores (7)	838	1477	160	902	1042	1136	5555
Average all stores (31)	1651	1431	173	1369	910	465	5999
Brooklyn							
Chain supermarkets (10)	2249	1934	728	523	398	160	5992
Independent supermarkets (15)	2943	2076	754	549	529	104	6955
Dairy/convenience stores (0)	--	--	--	--	--	--	--
Average all stores (25)	2665	2019	743	532	456	148	6563
Nassau/Suffolk							
Chain supermarkets (18)	2539	3296	414	1016	694	268	8227
Independent supermarkets (5)	2316	3909	470	1585	1266	--	9546
Dairy/convenience stores (5)	620	1145	129	52	87	--	2033
Average all stores (28)	2151	3011	373	977	688	266	7466
New Jersey							
Chain supermarkets (15)	4941	2375	816	1243	452	503	10,330
Independent supermarkets (0)	--	--	--	--	--	--	--
Dairy/convenience stores (13)	1201	609	156	431	166	77	2640
Average all stores (28)	3205	1525	537	852	319	322	6760

[1]Number in parenthesis indicates number of stores in study.

[2]Syracuse sales are for Fall 1983.

Figure 2. Best Selling Fluid Milk Item in Each Market Area, May-June 1984



Retail Prices, Invoice Costs, Gross Margins And Direct Product Profits

Analysis Per Unit

To obtain the gross margins on fluid milk items, the reported invoice costs were subtracted from the retail prices observed. Then, the in-store direct handling costs (as determined by the costing model previously described) were subtracted from the gross margins to determine the direct product profits. Although the focus of this study was direct product profit, the indirect costs of the stores were also determined. The indirect costs were subtracted from the DPP to arrive at a net income for the item. The detailed information on prices, gross margins, direct costs, and direct product profits for each milk item and each type of store in each market is given in Appendix 2. The cost and profitability information on the three largest volume items is given in Tables 4, 5 and 6 for chain supermarkets only.

The results measured on a per unit basis that were tested for statistical significance included retail prices, invoice costs, direct costs and direct product profits. All differences in these measures on a per unit basis noted between markets and types of stores cited in the text are statistically significant at the 95 percent level. Complete results of the statistical tests are found in Appendix 3.

Because the costs and profitability of milk in all stores will be examined in detail in succeeding pages, only a few general comments will be made here regarding the costs and performance of milk in chain supermarkets.

Chain Supermarkets: Homogenized Gallons. The average retail prices for gallons of homogenized milk in chain supermarkets were the highest in the Brooklyn, Albany, and Nassau/Suffolk market areas (Table 4). The average prices of gallons were not significantly different in these three markets. The average prices for gallons of homogenized were the lowest in Syracuse and Northern New Jersey. There were significant differences in the retail prices between these two groupings.

The average invoice costs for chain supermarkets were statistically significantly lower in Albany, Syracuse and Northern New Jersey than in Brooklyn[2] and Nassau/Suffolk, which had the highest reported invoice costs at approximately $1.95 per gallon (Table 4). The invoice costs for homogenized gallons were the lowest in Syracuse, followed by Albany and Northern New Jersey.

The average gross margins of chain supermarkets for homogenized gallons ranged from a high of $.561 in Albany to a low of $.243 in Nassau/Suffolk (Table 4). The average gross margin in Albany was more than twice as high as the gross margins in Nassau/Suffolk and Northern New Jersey for this same item.

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[2]Actual invoice costs were obtained for only 5 chain supermarkets in Brooklyn. See Table 2.

Table 4. Prices, Costs and Profits for Homogenized Milk Gallons, Chain Supermarkets, Five Market Areas, May-June 1984*

	Albany	Syracuse	Brooklyn	Nassau/ Suffolk	Northern New Jersey
Retail price	$2.223	$2.019	$2.271	$2.200	$1.997
Invoice cost	1.662	1.620	1.948	1.956	1.741
Gross margin ($)	.561	.399	.324	.243	.256
Gross margin (%)	25.2%	19.8%	14.3%	11.0%	12.8%
Direct cost	.068	.097	.081	.078	.074
Direct product profit ($)	.493	.301	.242	.165	.182
Direct product prof. (%)	22.2%	14.9%	10.7%	7.5%	9.1%
Indirect cost	.057	.066	.068	.062	.053
Net profit	.437	.235	.175	.104	.129
Total handling cost	.125	.164	.149	.139	.126

*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

The chain supermarkets' direct costs of handling milk ranged from $.068 per gallon in Albany to $.097 in Syracuse. The direct costs in most markets were not significantly different from each other. The total in-store handling costs also did not vary greatly in the chain supermarkets in the five markets. The total in-store handling costs on homogenized gallons ranged from $.125 in Albany to $.164 in Syracuse (a significant difference) (Table 4).

In chain supermarkets, the direct product profits on gallons of homogenized milk ranged from a market average low of $.165 in Nassau/Suffolk to a high of $.493 in Albany. Syracuse too was relatively high at a DPP of $.301 per homogenized gallon (Table 4).

Chain Supermarkets: Lowfat Gallons. Somewhat similar conclusions can be reached on gallons of lowfat milk in chain supermarkets as with gallons of homogenized milk. The average retail price in chains was the highest in Brooklyn and Nassau/Suffolk at $2.235 and $2.084 respectively and the lowest retail prices were observed in Syracuse ($1.895) and Northern New Jersey ($1.903) (Table 5).

Chain supermarket invoice costs reported on lowfat gallons were the highest in the Brooklyn[2] and Nassau/Suffolk markets and the lowest in Albany and Syracuse. The average direct product profit on lowfat gallons ranged from a high of $.455 in Albany to a low of $.218 in Northern New Jersey (Table 5). The direct product profits on gallons of lowfat milk did not differ significantly among Syracuse, Northern New Jersey and Nassau/Suffolk but big differences were found between these three market areas and Brooklyn and Albany.

Table 5. Prices, Costs and Profits for Lowfat Milk Gallons, Chain Supermarkets, Five Market Areas, May-June 1984*

	Albany	Syracuse	Brooklyn	Nassau/ Suffolk	Northern New Jersey
Retail price	$2.026	$1.895	$2.235	$2.084	$1.903
Invoice cost	1.499	1.546	1.813	1.768	1.603
Gross margin ($)	.527	.349	.422	.316	.300
Gross margin (%)	26.0%	18.4%	18.9%	15.2%	15.8%
Direct cost	.072	.098	.091	.078	.082
Direct product profit ($)	.455	.251	.331	.239	.218
Direct product prof. (%)	22.5%	13.2%	14.8%	11.5%	11.5%
Indirect cost	.058	.065	.089	.063	.058
Net profit	.397	.186	.242	.176	.161
Total handling cost	.130	.164	.178	.141	.139

*Fall 1983 data for Syracuse market with invoice costs adjusted to May-June 1984 conditions.

Chain Supermarkets: Homogenized Half Gallons. The average chain supermarket retail price on homogenized half gallons was the highest in Brooklyn at $1.192 (Table 6). The next highest priced markets were Nassau/Suffolk and Albany at $1.157 and $1.128, respectively. The lowest average retail prices for homogenized half gallons in chain supermarkets were observed in Syracuse at $.979 and Northern New Jersey, where the price was $1.015.

The reported chain supermarket invoice costs on half gallons of homogenized milk ranged from lows of $.814 in Syracuse and $.825 in Albany per half gallon to about $1.00 in Brooklyn[3] and Nassau/Suffolk (Table 6). Again the direct product profits on half gallons of homogenized milk were the highest in Albany at $.254. The direct product profits of chain supermarkets in other market areas ranged from $.079 in Northern New Jersey to $.127 per half gallon in Brooklyn.

[3]Actual invoice costs were obtained for only 5 chain supermarkets in Brooklyn. See Table 2.

Table 6. Prices, Costs and Profits for Homogenized Milk Half Gallons, Chain Supermarkets, Five Market Areas, May-June 1984*

	Albany	Syracuse	Brooklyn	Nassau/ Suffolk	Northern New Jersey
Retail price	$1.128	$.979	$1.192	$1.157	$1.015
Invoice cost	.825	.814	1.004	1.008	.882
Gross margin ($)	.303	.165	.189	.149	.133
Gross margin (%)	26.9%	16.9%	15.9%	12.9%	13.1%
Direct cost	.049	.055	.062	.056	.054
Direct product profit ($)	.254	.110	.127	.093	.079
Direct product prof. (%)	22.5%	11.2%	10.7%	8.0%	7.8%
Indirect cost	.037	.037	.046	.041	.035
Net profit	.217	.073	.081	.053	.044
Total handling cost	.086	.092	.108	.096	.089

*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

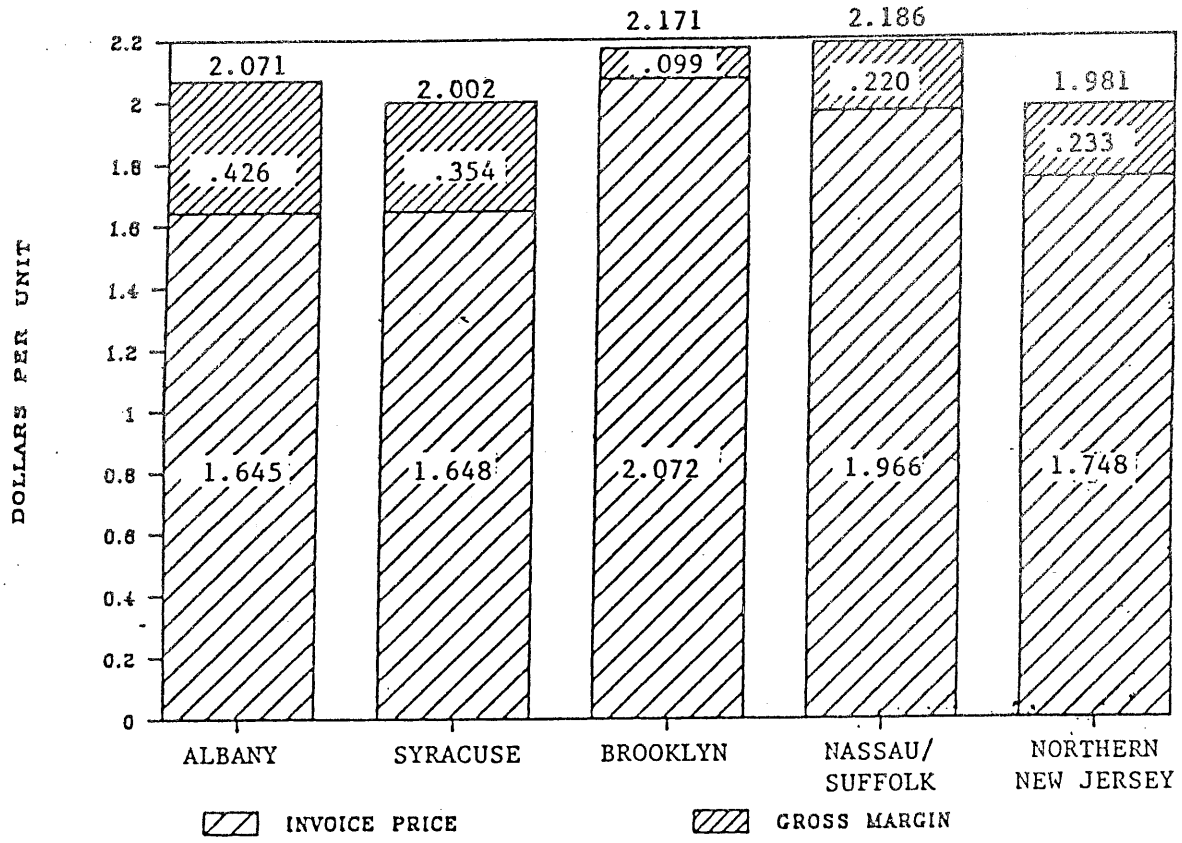
The above overview on the costs and profitability of the three major fluid milk items applies only to chain supermarkets. The next section will present some of the more important findings pertaining to all types of stores--not exclusively chain supermarkets. As will be seen, somewhat different conclusions are reached on average retail prices, invoice costs, direct costs and direct product profits when all stores in the sample in each market are considered. The sample profiles differ substantially from market to market (Table 1). For example, in the Albany market, dairy/convenience stores were 59 percent of the sample and independent supermarkets only 7 percent of the stores. At the other extreme of the sample profile was the Brooklyn market, where no dairy/convenience stores were in the sample and 60 percent of the stores studied were independent supermarkets.

All Stores: Homogenized gallons. In Nassau/Suffolk gallons of homogenized milk sold for the highest average retail price of all market areas, at $2.186 per gallon. Brooklyn was a close second at $2.171 per gallon (Figure 3). The average price for gallons was $2.003 and $1.981 in Syracuse and Northern New Jersey, respectively. Although retail prices of gallons of homogenized milk in Albany were significantly lower than Nassau/Suffolk, Albany prices were not significantly lower than prices in Brooklyn. The retail prices of homogenized gallons in Syracuse and Northern New Jersey were significantly lower than in the other three markets. The homogenized milk gallon prices were not significantly different from each other in these two markets.

The highest average invoice cost was recorded in Brooklyn at $2.072. Nassau/Suffolk was second highest at $1.966 (Figure 3).

Albany and Syracuse had the lowest average invoice costs for homogenized gallons at $1.645 and $1.648 per gallon respectively. Although the average invoice cost was $.10 higher in the New Jersey market, the average retail price in New Jersey was $.09 lower than Albany.

Figure 3. Average Retail Price, Invoice Cost and Gross Margin, For Homogenized Milk Gallons, Five Market Areas, May-June, 1984*

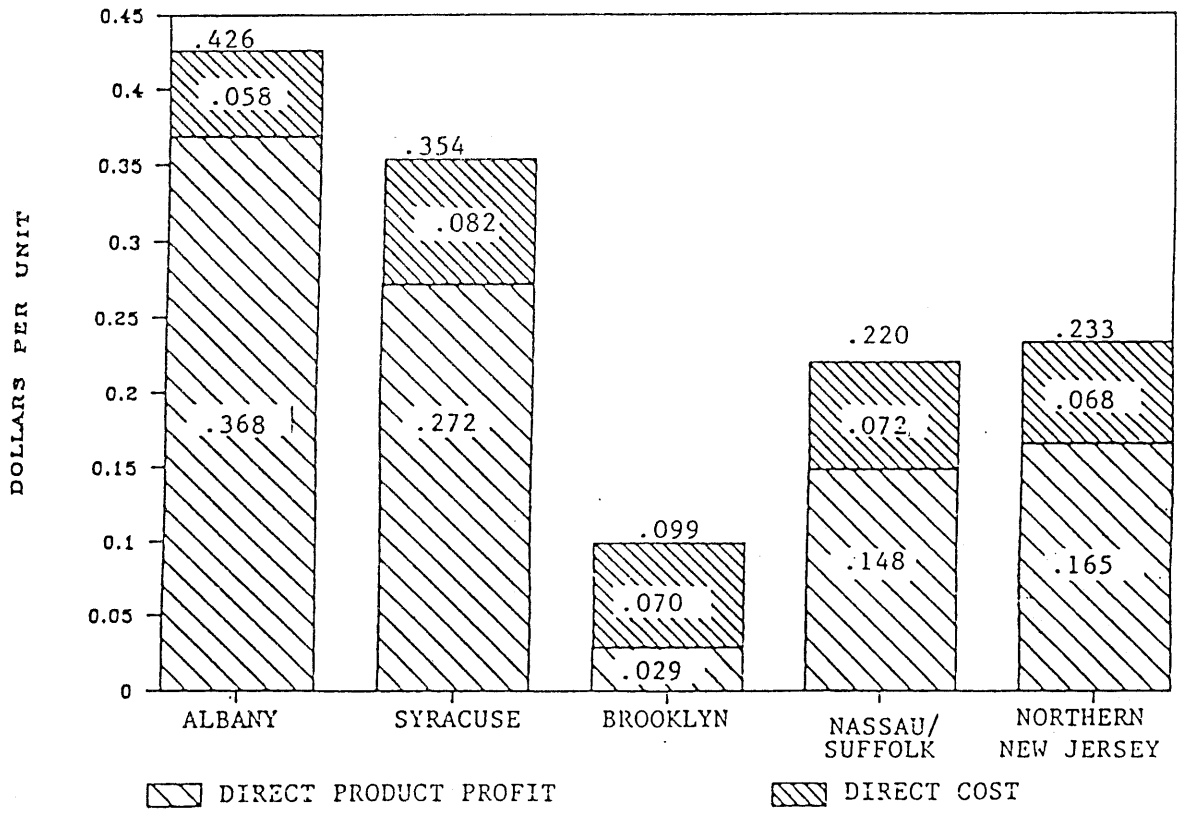


*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

The Albany market recorded the highest gross margin of all market areas at an average of $.426 per gallon for homogenized milk. Syracuse was second in gross margin with $.354 per gallon (Figure 4). The low average invoice costs in both Albany and Syracuse enabled these two markets to record high gross margins on homogenized gallons. Low gross margins in Nassau/Suffolk and Brooklyn were the result of high average invoice costs relative to average retail prices.

Although differing somewhat among markets, direct instore costs did not vary as much as retail prices, invoice costs and gross margins. Thus the direct product profit on homogenized gallons varied widely from market to market from highs of $.369 per gallon in Albany and $.272 per gallon in Syracuse to a low of $.029 per gallon in Brooklyn (Figure 4). The direct product profits were $.148 and $.165 per gallon in Nassau/Suffolk and Northern New Jersey, respectively.

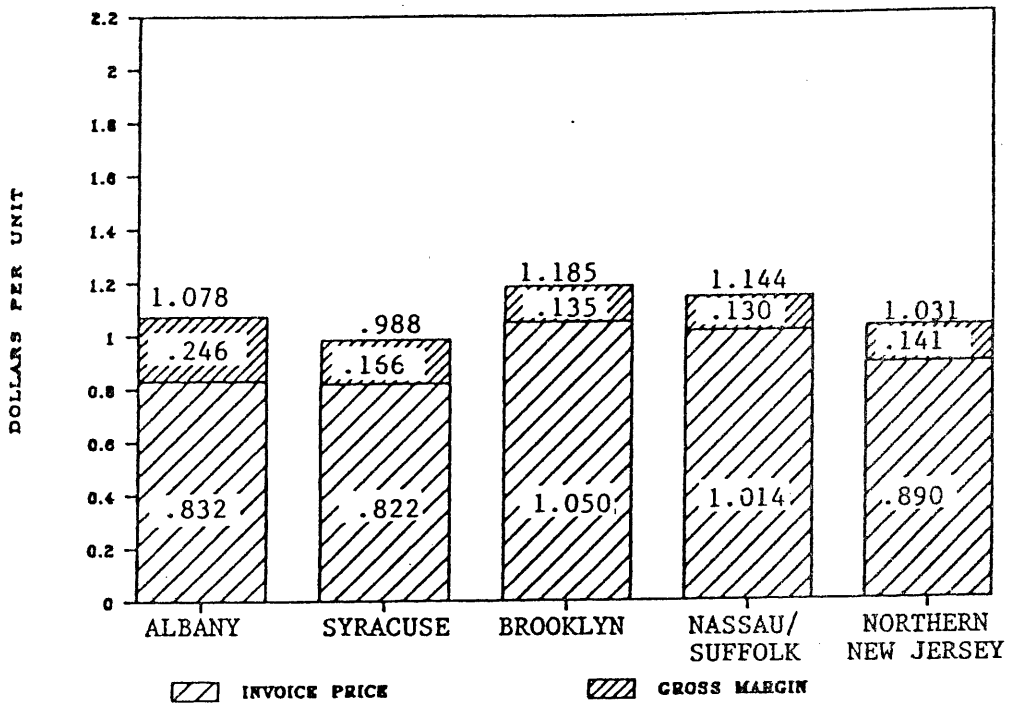
Figure 4. Average Gross Margin, Direct Product Profit and Direct Cost For Homogenized Milk Gallons, Five Market Areas, May-June, 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

All Stores: Homogenized Milk Half Gallons. The retail price of homogenized half gallons was the highest in the Brooklyn market and lowest in the Syracuse market. Syracuse and Albany recorded the lowest average invoice costs of all five markets and Brooklyn had the highest average invoice costs (Figure 5).

Figure 5. Average Retail Price, Invoice Cost and Gross Margin For Homogenized Milk Half Gallons, Five Market Areas, May-June, 1984*

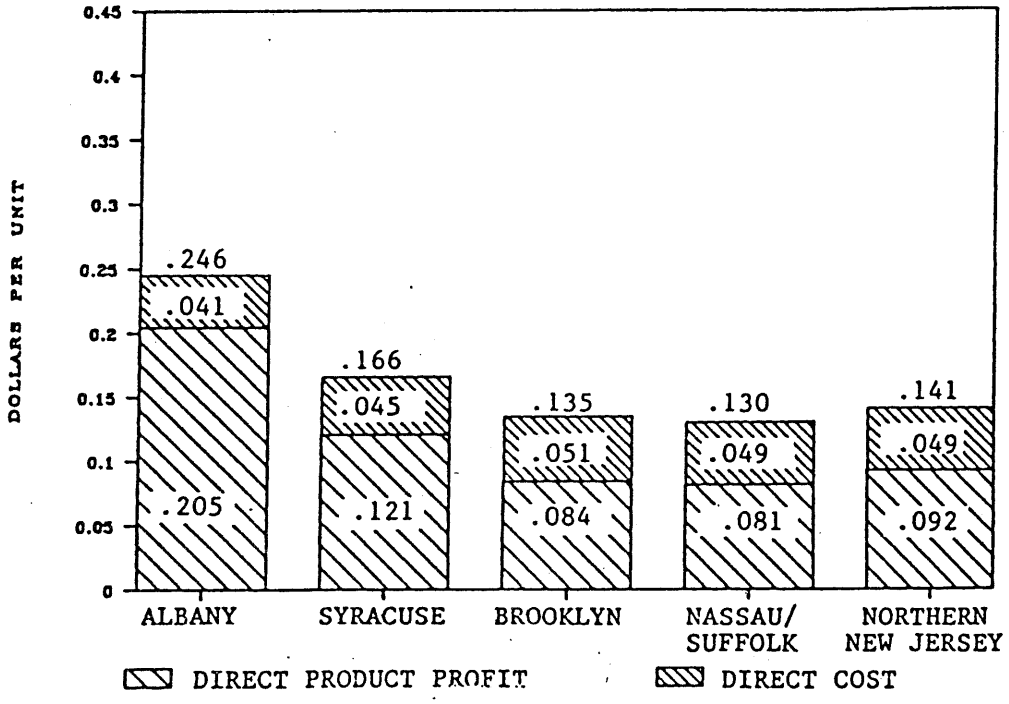


*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

The Albany market had the highest gross margin and the lowest direct cost for handling half gallon homogenized milk which resulted in a direct product profit of $.205 per unit, the highest of all market areas (Figure 6).

Nassau/Suffolk reported the second highest invoice cost which resulted in the lowest gross margin on homogenized half gallons and a direct product profit of $.081, the lowest of all the five markets. The direct product profits in Brooklyn and New Jersey were only slightly higher than Nassau/Suffolk and not significantly so. These three market areas all had significantly lower DPP's than did Albany.

Figure 6. Average Gross Margin, Direct Product Profit and Direct Cost For Homogenized Milk Half Gallons, Five Market Areas, May-June, 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

All Stores: Lowfat Gallons: The retail price of lowfat gallons was the highest in the Brooklyn market ($2.169) and lowest in the Albany market ($1.857) (Figure 7).

As with the homogenized half gallons, Albany again averaged the highest gross margins for lowfat gallons ($ .386) and the lowest direct cost ($ .056) thus recording the highest direct product profit ($ .330). Nassau/Suffolk had the lowest gross margins ($ .283) on lowfat gallons and recorded the lowest direct product profit ($ .211) (Figure 8).

Figure 7. Average Retail Price, Invoice Cost and Gross Margin For Lowfat Milk Gallons, Five Market Areas, May-June, 1984*

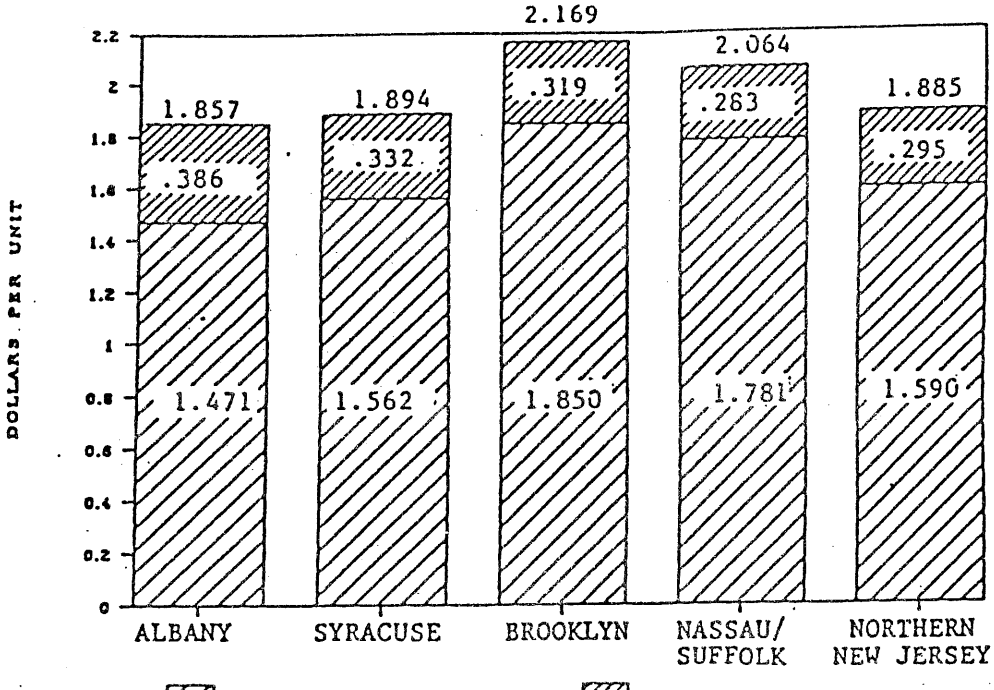
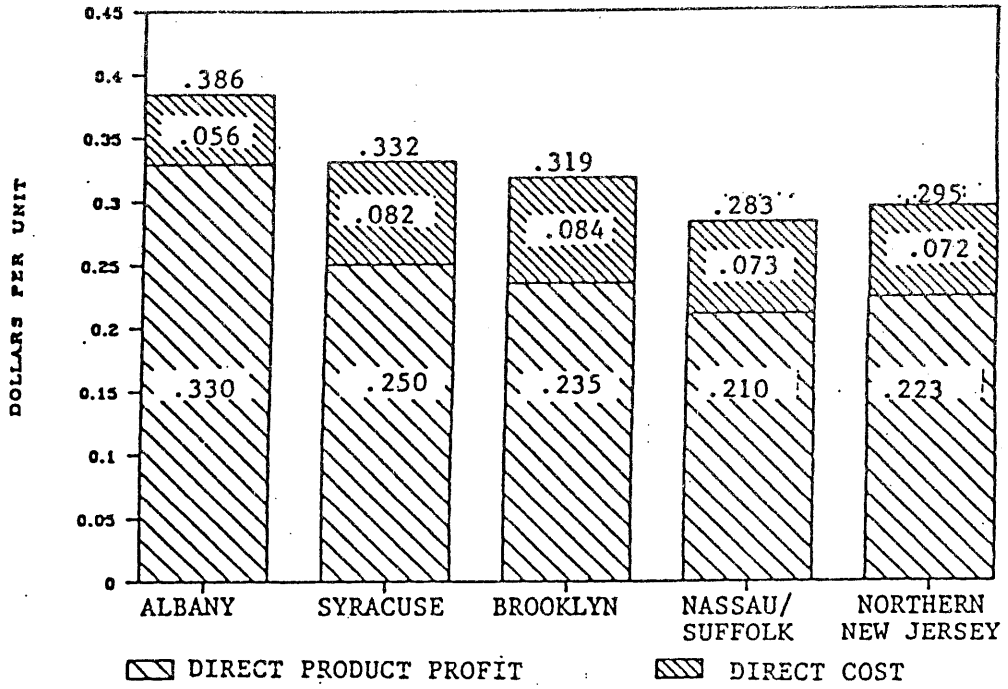


Figure 8. Average Gross Margin, Direct Product Profit and Direct Cost For Lowfat Milk Gallons, Five Market Areas, May-June 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Summary and Conclusions - Analysis Per Unit

Some statistically significant differences in retail prices, invoice costs, direct costs and direct product profits were found among the market areas.

When chain supermarkets only were compared:

1. The average retail prices for gallons of homogenized milk were the highest, and not statistically different, in the Brooklyn, Albany and Nassau/Suffolk market areas. Syracuse and Northern New Jersey, whose retail prices were statistically different, had to lowest retail prices.

2. The average invoice prices for gallons were statistically the lower in Syracuse and Albany than the other three market areas. Also, the reported invoice prices for chain supermarkets were lower in Northern New Jersey than in Brooklyn and Nassau/Suffolk.

3. The direct costs of handling gallons of milk in chains in most markets were not significantly different from each other.

4. The direct product profits on gallons differed significantly among some markets, with a market average low of $ .165 in Nassau/Suffolk to a high of $ .493 in Albany.

5. Somewhat similar conclusions can be reached on gallons of lowfat milk and half gallons of homogenized milk in chain supermarkets as with gallons of homogenized milk.

When all types of retail stores (not just chain supermarkets) were considered, the general findings regarding retail prices, invoice costs, gross margins and DPP's on a per unit basis were similar for the three major fluid milk items (ie. homogenized gallons, homogenized half gallons and lowfat gallons):

1. The retail prices generally were the highest in the Brooklyn and Nassau/Suffolk market areas and the lowest in the Syracuse market. In the case of homogenized and lowfat gallons, the retail prices were the lowest in Northern New Jersey and in Albany respectively.

2. Average invoice costs were significantly higher in the Brooklyn and Nassau/Suffolk markets and the lowest in Albany and Syracuse. The average invoice costs on all three major fluid milk items were significantly lower in Northern New Jersey than in the two metropolitan New York market areas (Brooklyn and Nassau/Suffolk).

3. Gross margins were the highest in the Albany market, with Syracuse following as second highest. Despite high retail prices, gross margins were the lowest in Nassau/Suffolk and Brooklyn due to the high average invoice costs.

4. Although differing somewhat among markets, instore direct costs did not vary as much as retail prices, invoice costs and gross margins.

5. The direct product profits varied widely from market to market, with DPP's for homogenized gallons being the highest in Albany, second highest in Syracuse and the lowest in Brooklyn. The DPP on half gallons of homogenized was also the highest in Albany and Syracuse and the lowest in Nassau/Suffolk.

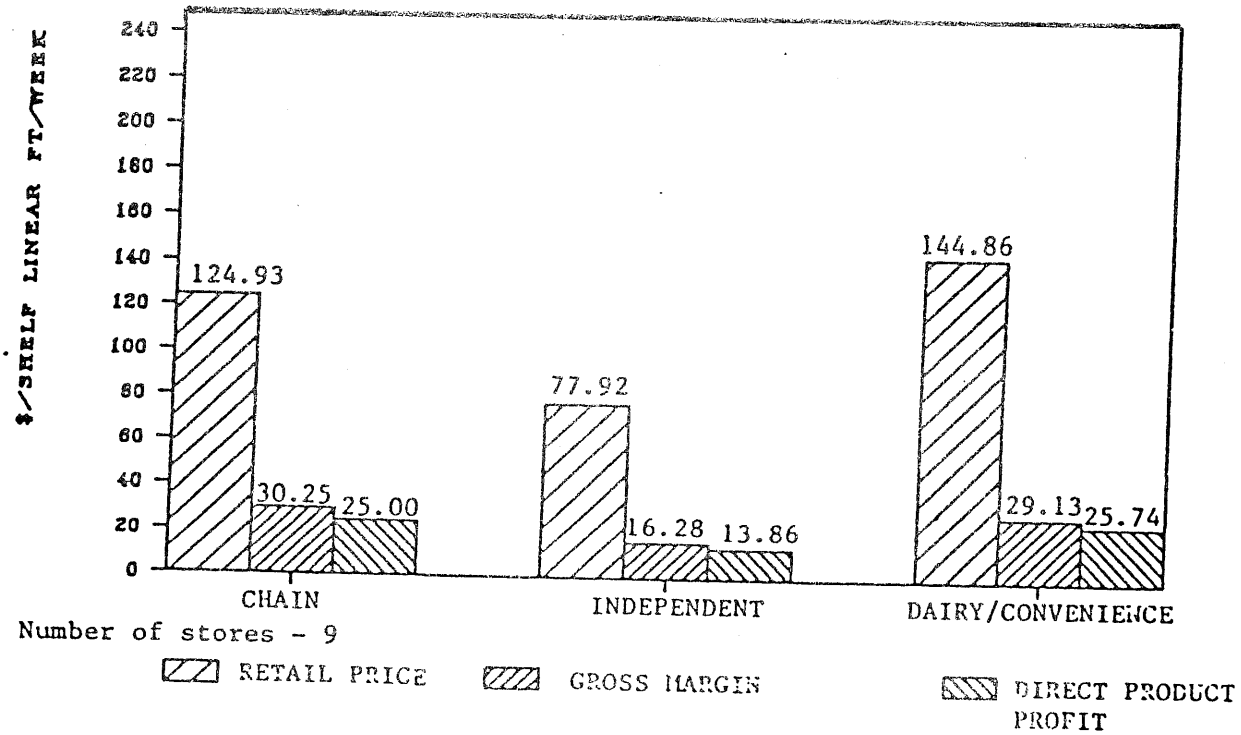
Analysis Per Linear Shelf Foot[4]

Sales revenue and profit per linear shelf foot are important to retailers because shelf space is a limited factor, at least in the short run. In this section all fluid milk items are observed.

All Milk: Albany Market. Sales per linear shelf foot were approximately 16 percent higher in dairy/convenience stores than in chain supermarkets ($144.86 per linear shelf foot in dairy stores compared with $124.93 in chain supermarkets) (Figure 9). In dollars per linear shelf foot per week, gross margins and direct product profit were about the same in both chain supermarkets and dairy/convenience stores.

It should be noted that the sample of stores in Albany contained only two independent supermarkets. Due to this small sample size it is not reasonable to draw specific conclusions regarding the relationship of independent supermarkets to other stores in the Albany market.

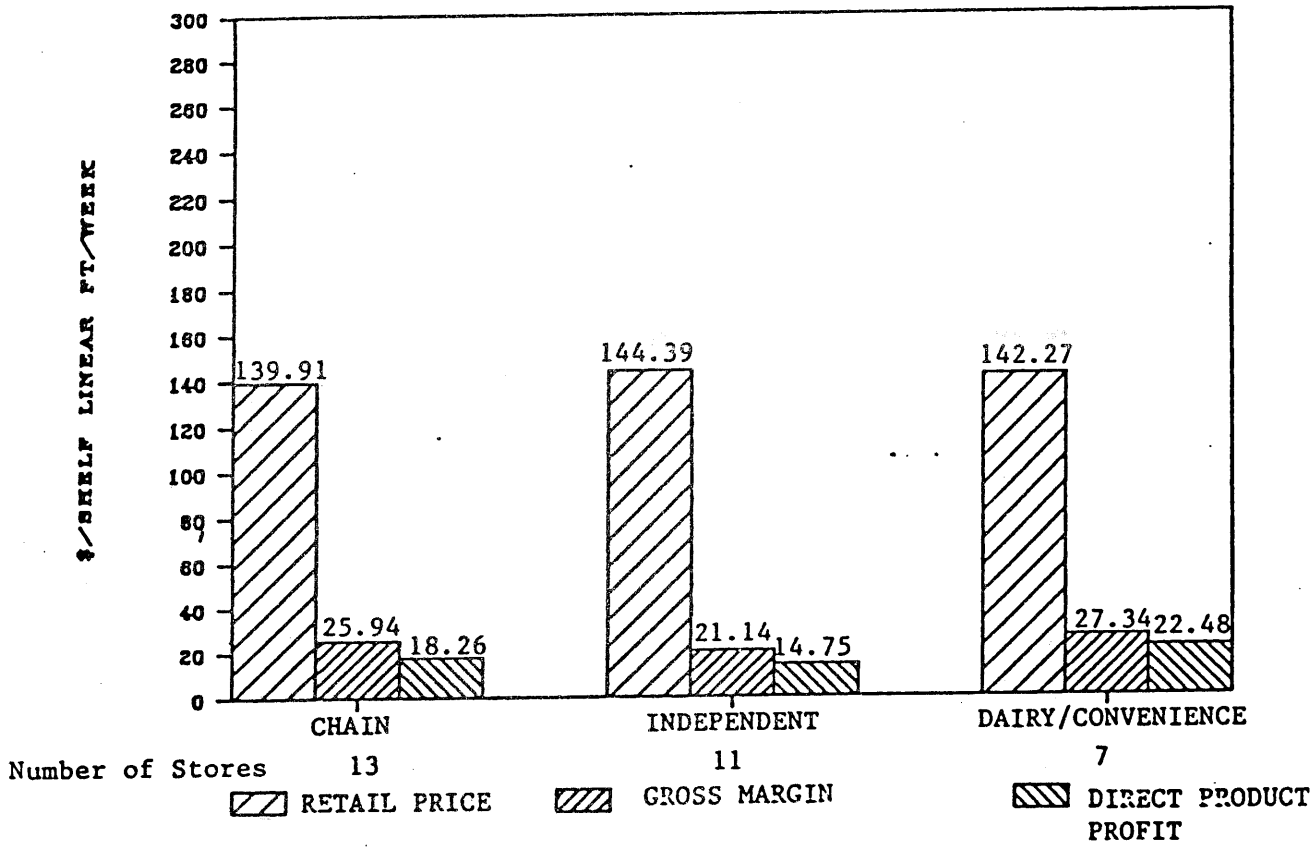
Figure 9. Average Retail Sales, Gross Margin and Direct Product Profit By Retail Outlet, Dollars Per Linear Shelf Foot, Albany Market, May-June, 1984



[4]These results were not tested for statistical significance.

All Milk: Syracuse Market. In the Syracuse market area, independent supermarkets had the highest sales per linear shelf foot at $144.39 per week but had the lowest gross margin and direct product profit of the three types of stores (Figure 10). The average sales per linear shelf foot for dairy/convenience stores and chain supermarkets were only slightly lower than for independent supermarkets. Both the highest gross margins and direct product profit as measured by dollars per linear shelf foot were reported by the dairy/convenience stores, with chain supermarkets a close second.

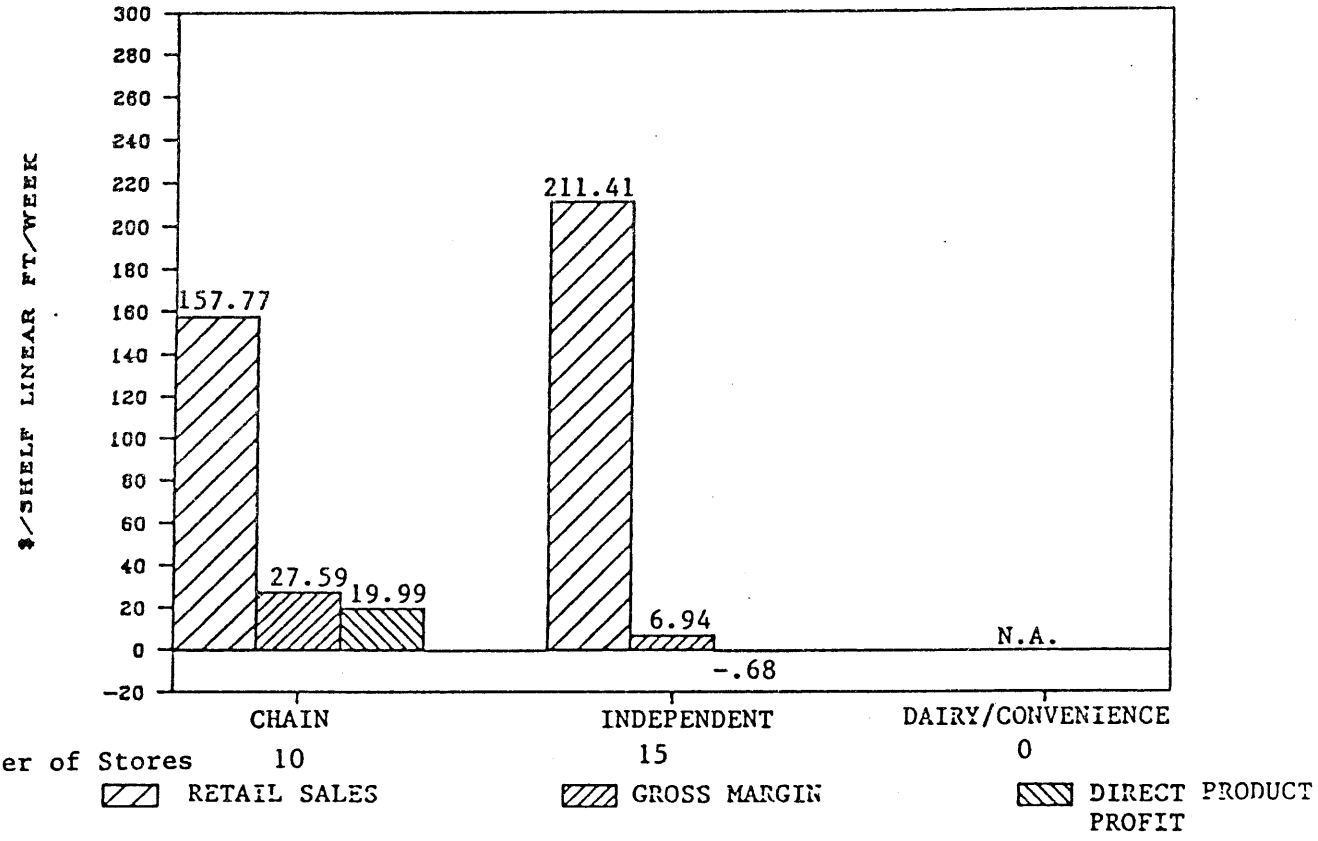
Figure 10. Average Retail Sales, Gross Margin and Direct Product Profit By Retail Outlet, Dollars Per Linear Shelf Foot, Syracuse Market*, May-June, 1984.



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

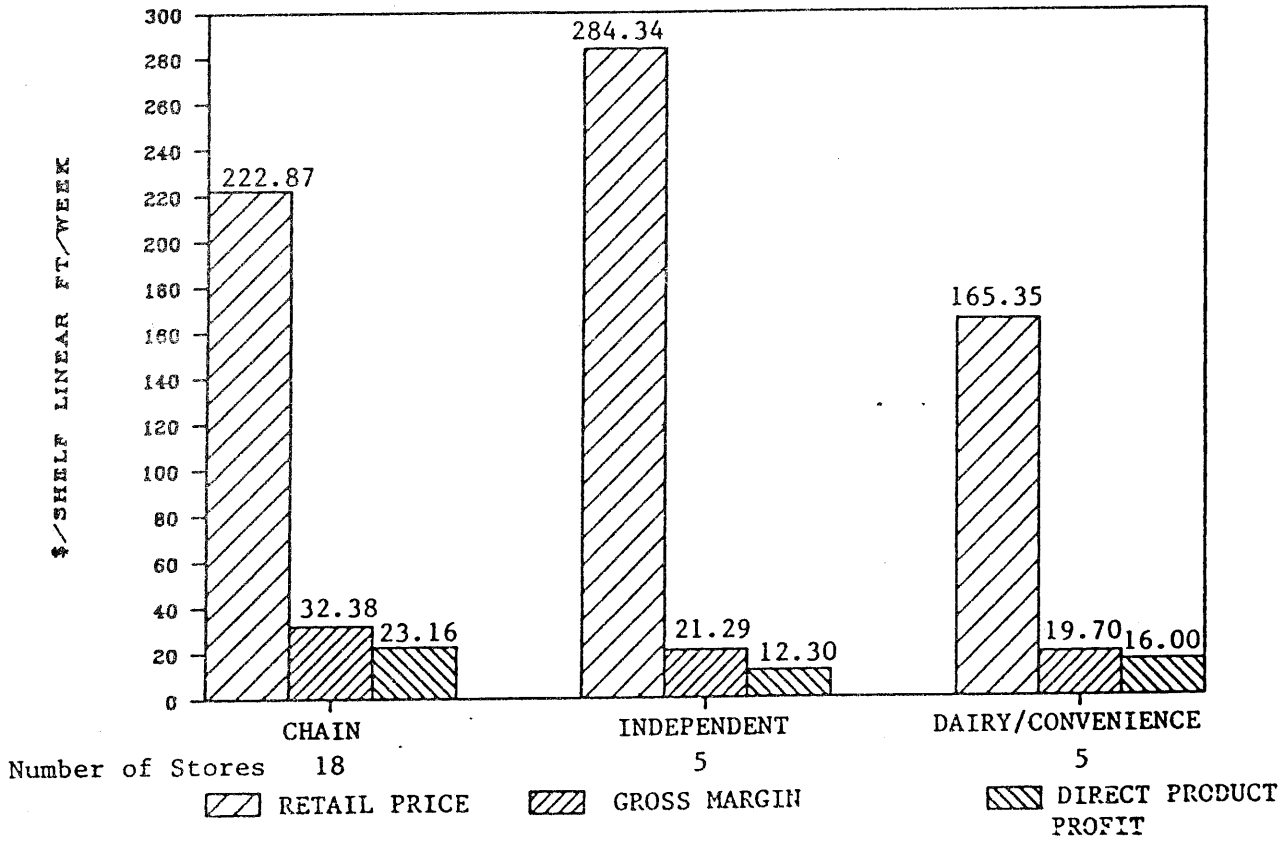
All Milk: Brooklyn Market. In the Brooklyn market, independent supermarkets returned the highest sales dollars per linear shelf foot per week, ($211.41 vs $157.77) but the chain supermarkets had the highest gross margin dollars and direct product profit at $27.59 and $19.99 respectively (Figure 11). Independent supermarkets generated gross margin dollars of only $6.94 per linear shelf foot and had a negative direct product profit (DPP) of $.68 per linear foot of shelf display. There were no dairy/convenience stores in the Brooklyn sample.

Figure 11. Average Retail Sales, Gross Margin and Direct Product Profit By Retail Outlet, Dollars Per Linear Shelf Foot, Brooklyn Market, May-June, 1984.



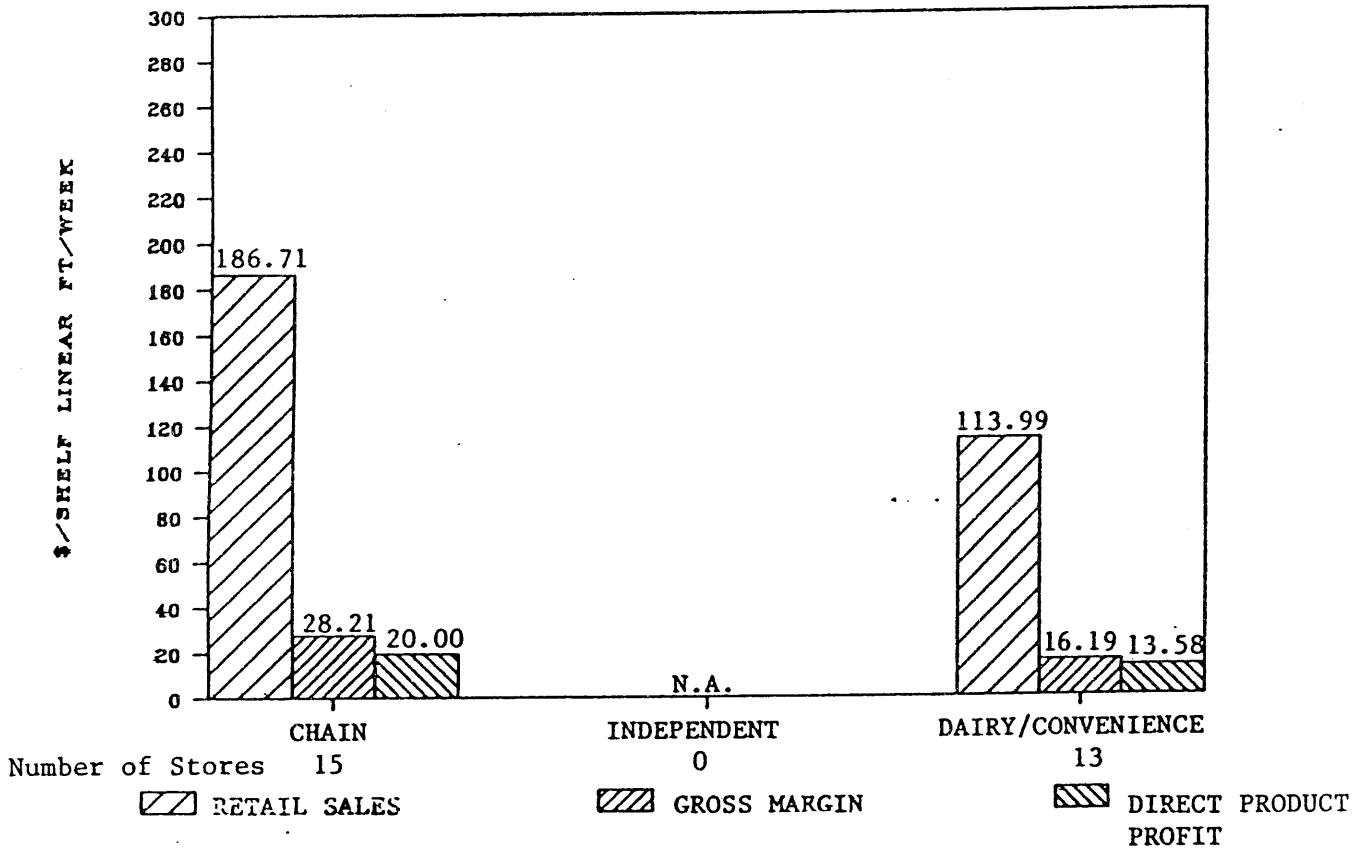
All Milk: Nassau/Suffolk Market. Independent supermarkets in Nassau/Suffolk had the highest sales per linear shelf foot per week ($284.34) for all milk products-the highest of all the market areas included in this study. Food chains had the second highest sales per linear shelf foot yet returned higher gross margins and direct product profits per linear shelf foot than either independent supermarkets or dairy/convenience stores in this market area (Figure 12).

Figure 12. Average Retail Sales, Gross Margin and Direct Product Profit By Retail Outlet, Dollars Per Linear Shelf Foot, Nassau/Suffolk Market, May-June, 1984.



All Milk: Northern New Jersey Market. In Northern New Jersey, chain supermarkets had sales per linear shelf foot of $186.71 for all milk items compared with only $113.99 per linear foot per week for dairy/convenience stores (Figure 13). Both gross margins and DPP were higher for chain supermarkets than dairy/convenience stores. There were no independent supermarkets in the sample for this market area.

Figure 13. Average Retail Sales, Gross Margin and Direct Product Profit By Retail Outlet, Dollars Per Linear Shelf Foot, Northern New Jersey Market, May-June, 1984.



Six Fasting Selling Milk Products. Earlier sales information was given based on the volume of milk sold for the six fastest selling items in each market as measured in quart equivalents. In this portion of the report sales are measured in dollars of sales per linear shelf foot per week.

In the Syracuse and Nassau/Suffolk market areas the milk item with the highest sales volume per quart equivalent and highest sales as measured in dollars per linear shelf foot were the same: homogenized gallons in Syracuse and homogenized half gallons in Nassau/Suffolk (Figures 16 & 20). In the other

three markets the highest volume milk item, as measured in quart equivalents, did not produce the highest return in sales per linear shelf foot. This probably was due to the fact that these high selling milk items were given additional space in the dairy case disproportionate to their sales volume. The amount of space allocated to a milk product, or any retail item, is usually in direct proportion to its sales velocity. When a product is given excessive display space, sales per linear foot should decline. Conversely, if the display space of this product is reduced, then sales per linear foot should increase.

In the Albany market the lowfat gallon was the best selling fluid milk item but the homogenized gallon returned the highest sales and gross margins per linear shelf foot (Figure 14).

In the Brooklyn market the homogenized gallon was also the best selling fluid milk item but the lowfat half gallon grossed a higher dollar revenue per linear shelf foot (Figure 18).

In the Northern New Jersey market the homogenized gallon was also the best selling fluid milk item but the homogenized half gallon grossed more dollars revenue per linear foot of shelf space (Figure 22).

In most cases in each market area there was a relationship between sales, gross margin and direct product profit (DPP) as measured by dollars per linear shelf foot per week for individual milk items. In Albany, where the homegenized gallon produced the highest dollar sales per linear shelf foot, the gross margin and DPP were also the highest for this item (Figures 14 and 15). Also, conversely where the sales for the homogenized quart was the lowest of all milk items in dollars per linear shelf foot per week, the gross margin and DPP were also the lowest in dollars per linear shelf foot per week.

In the Syracuse market, this same relationship between sales volume and product profitability was apparent (Figures 16 and 17) for all products except homogenized quarts which had the lowest sales, but its profits were higher than two other milk items.

In Brooklyn, however, the homogenized gallon enjoyed a high sales level but had a negative DPP (actual dollar loss) (Figures 18 and 19).

Also in Nassau/Suffolk, the second leading sales item in dollars per linear shelf foot per week (lowfat half gallons) returned the highest DPP (Figures 20 and 21).

The lowfat half gallon was the second best selling item in Northern New Jersey in dollars per linear shelf foot per week but returned the highest DPP (Figure 22 and 23).

Figure 14. Average Retail Sales, Invoice Cost and Gross Margin For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Albany Market, May-June, 1984

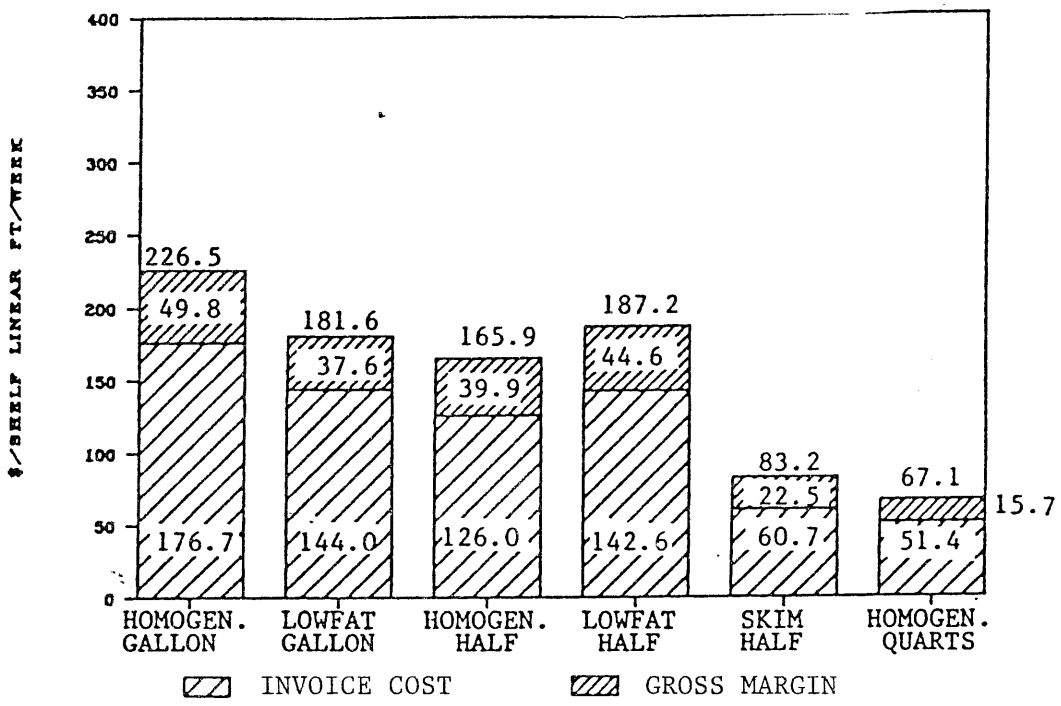


Figure 15. Average Gross Margin, Direct Product Profit and Direct Cost, For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Albany Market, May-June 1984

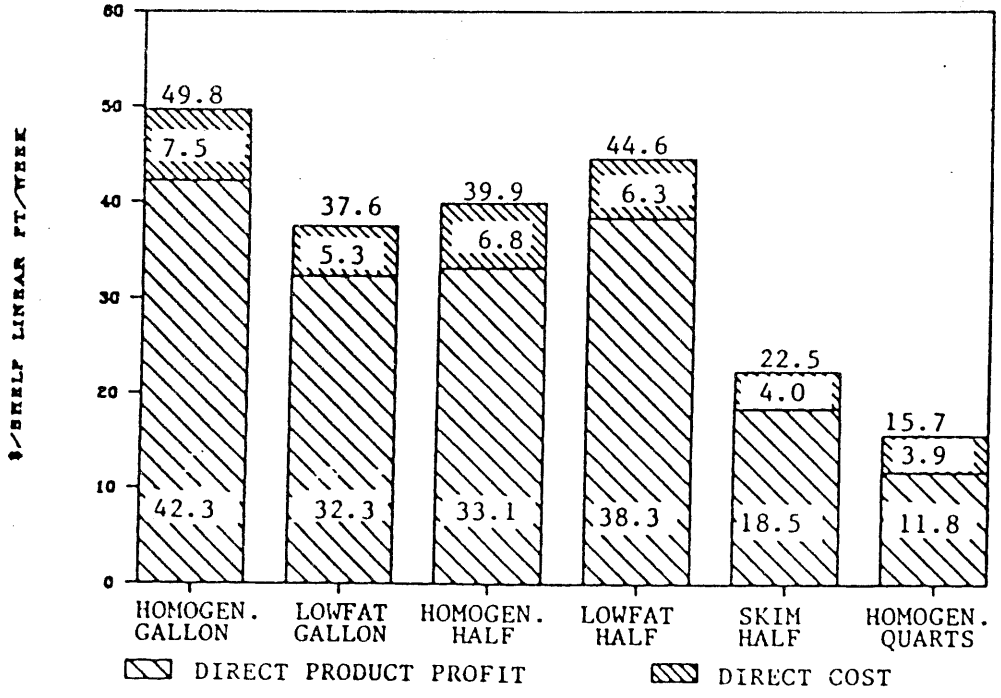


Figure 16. Average Retail Sales, Invoice Cost and Gross Margin For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Syracuse Market*, May-June, 1984

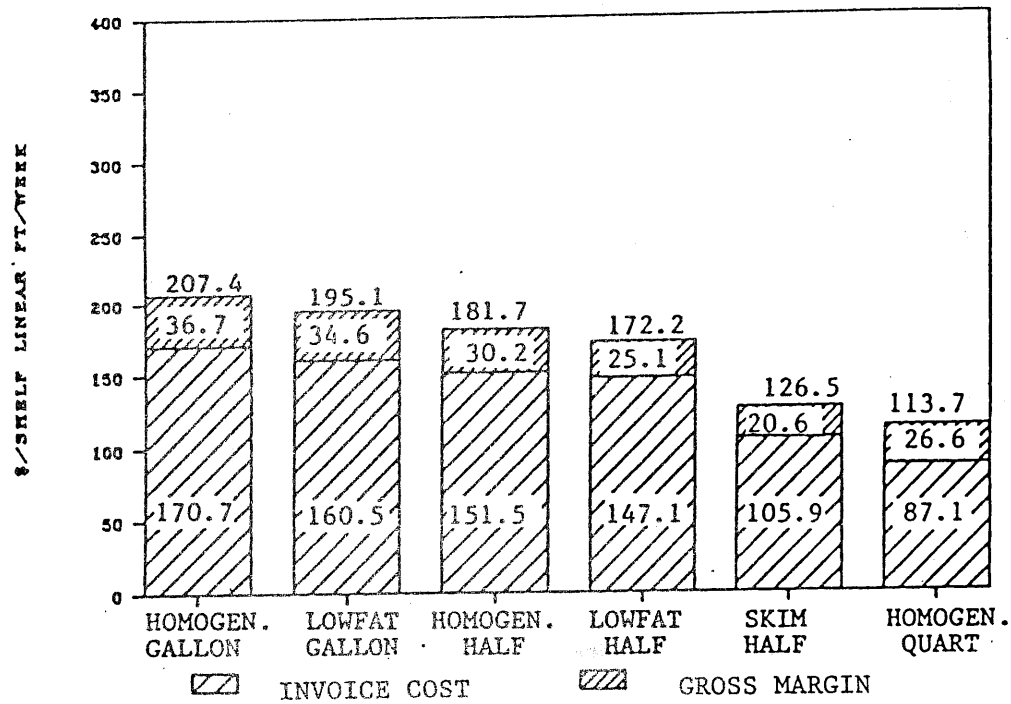
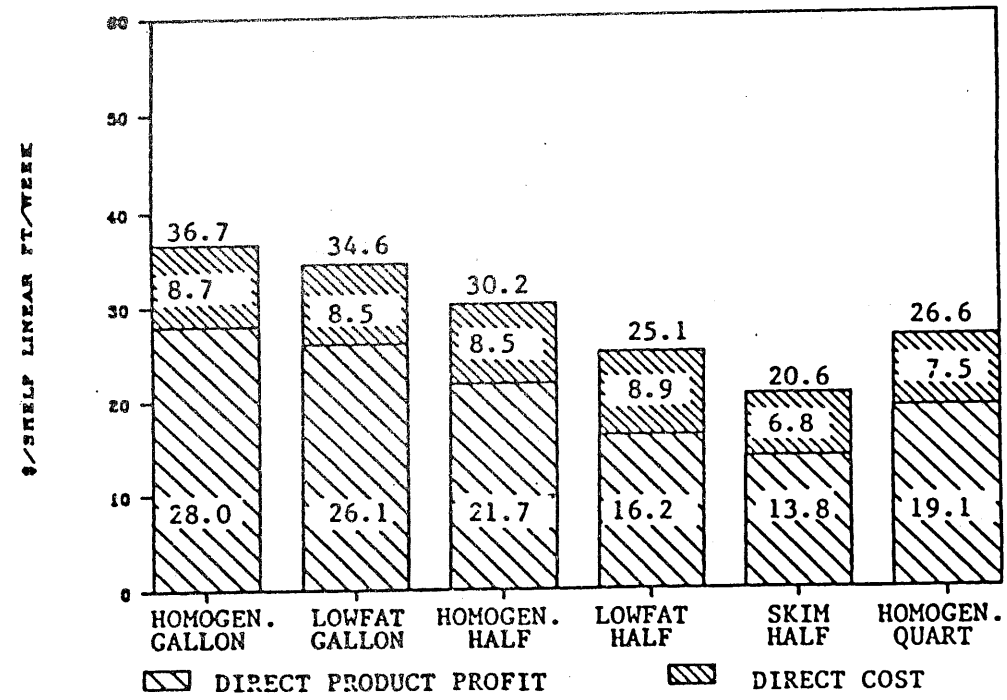


Figure 17. Average Gross Margin, Direct Product Profit and Direct Cost, For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Syracuse Market*, May 1984



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Figure 18. Average Retail Sales, Invoice Cost and Gross Margin For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Brooklyn Market, May-June, 1984

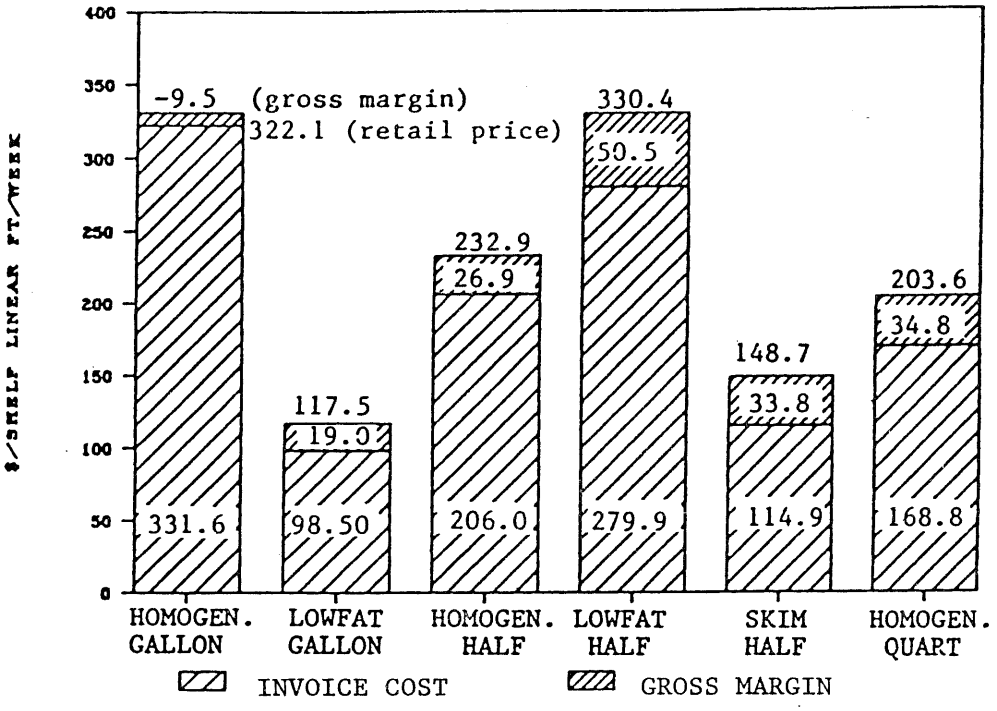


Figure 19. Average Gross Margin, Direct Product Profit and Direct Cost, For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Brooklyn Market, May-June 1984

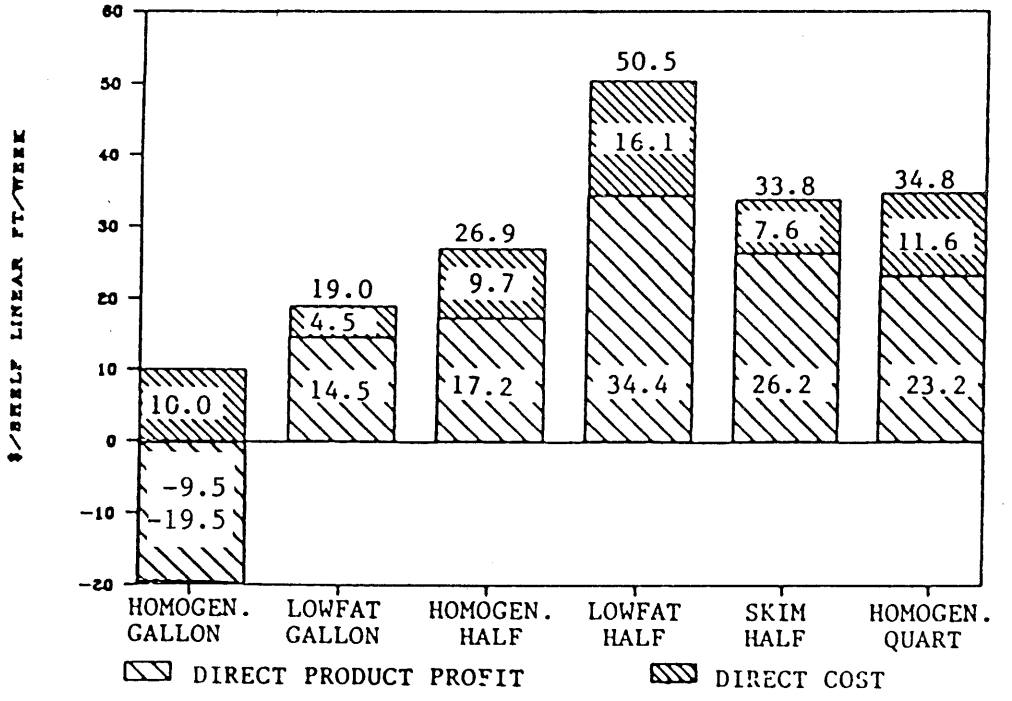


Figure 20. Average Retail Sales, Invoice Cost and Gross Margin For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Nassau/Suffolk Market, May-June 1984

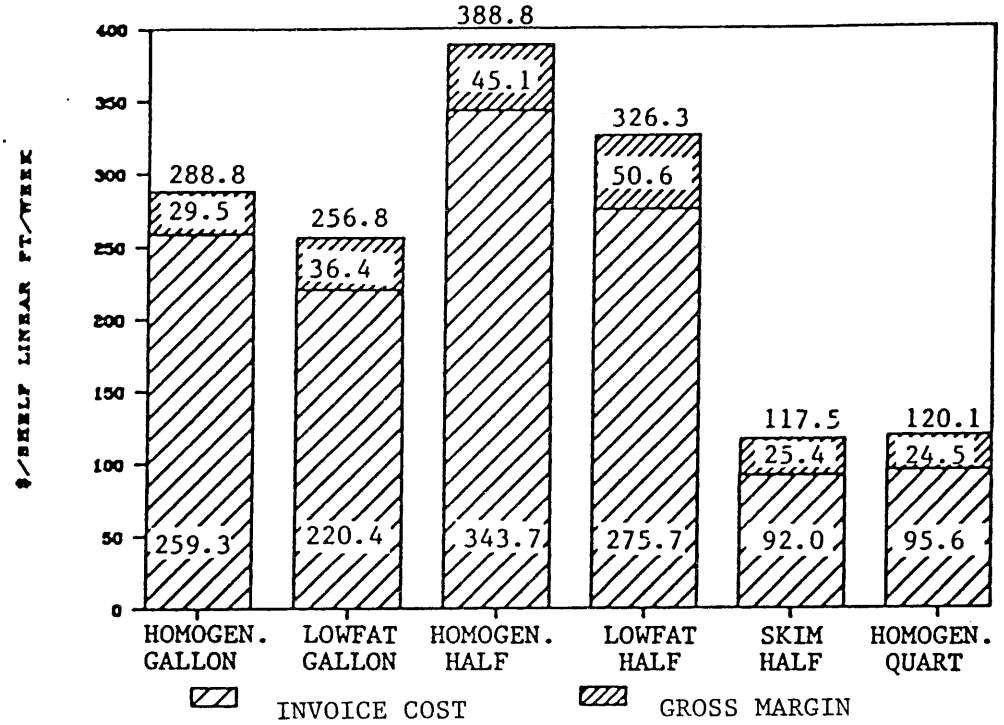


Figure 21. Average Gross Margin, Direct Product Profit and Direct Cost, For The Six Fastest Selling Milk Products Dollars Per Linear Shelf Foot, Nassau/Suffolk Market, May-June 1984

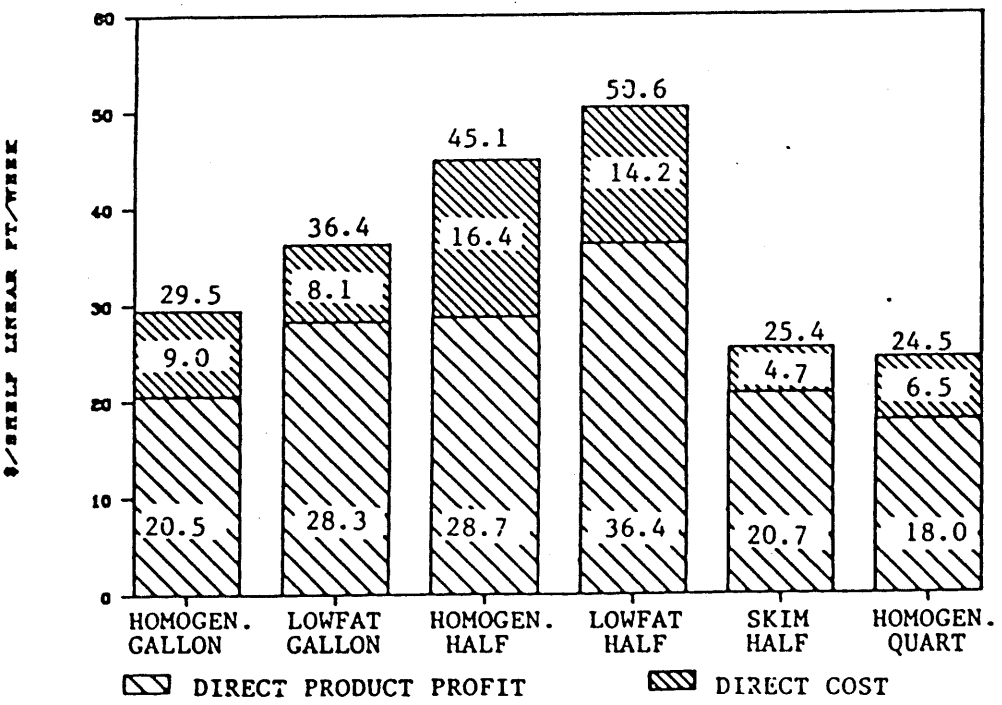


Figure 22. Average Retail Sales, Invoice Cost and Gross Margin For The Six Fastest Selling Milk Products, Dollars Per Linear Shelf Foot, Northern New Jersey Market, May-June 1984

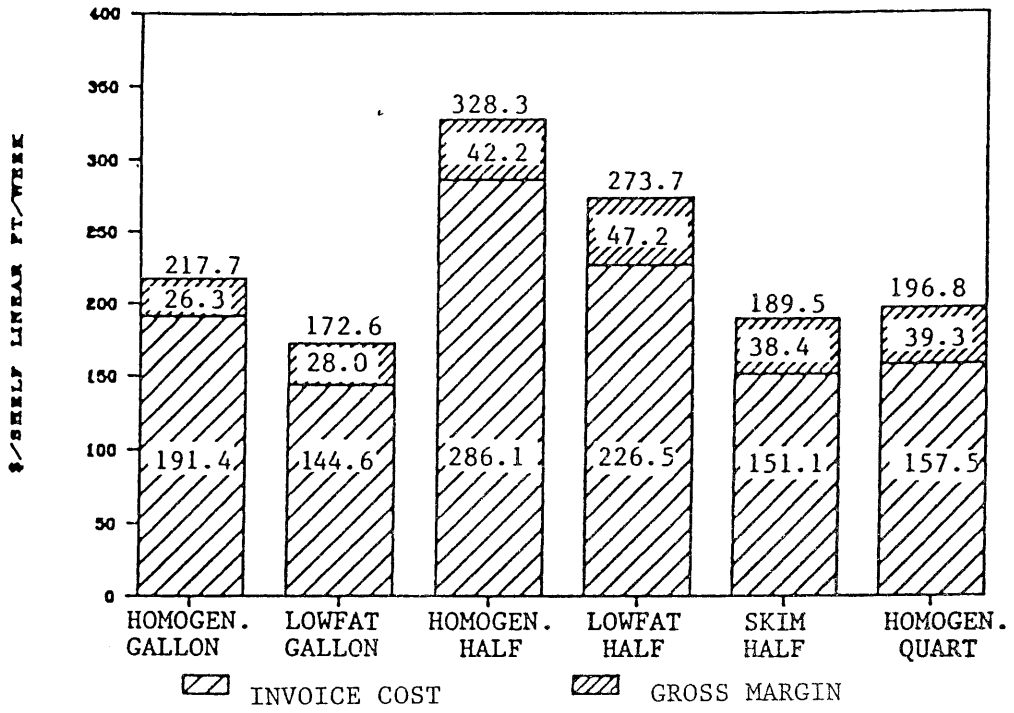
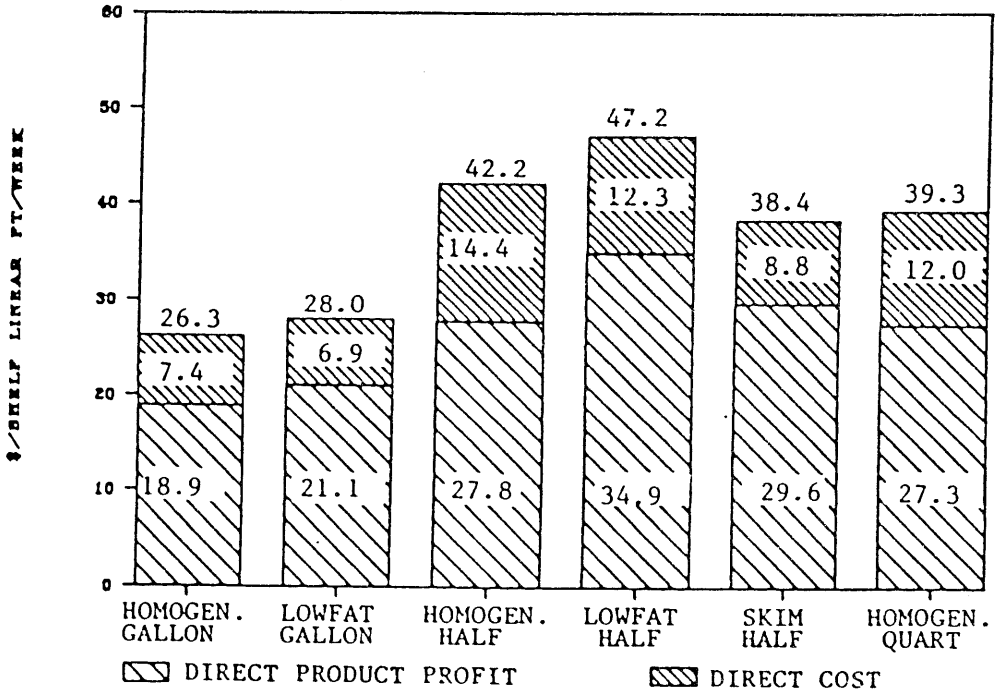


Figure 23. Average Gross Margin, Direct Product Profit and Direct Cost, For The Six Fastest Selling Milk Products Dollars Per Linear Shelf Foot, Northern New Jersey Market, May-June 1984



Summary and Conclusions - Analysis Per Linear Shelf Foot

The use of "dollars per linear shelf foot" as a measurement of sales and profits is a useful tool in comparing various products and different types of retail stores. The dollars per linear foot measurement can be helpful to retailers in properly allocating shelf space to various items within a product category. Although this study did not provide sales and profit information on specific products other than milk, a profit comparison of milk with other food categories and products based on sales per linear shelf foot is also a valuable tool for food retailers.

The following is a summary of the results of the performance of total milk sales in each market area in terms of dollars per linear shelf foot per week:

1. Independent supermarkets in Nassau/Suffolk had the highest retail sales for milk of all types of retail stores in all market areas (Figure 12).

2. Independent supermarkets in Brooklyn had the lowest gross margin and direct product profit of all types of retail stores in all market areas (Figure 11).

3. Chain supermarkets had the highest gross margins of all types of retail stores in all market areas except Syracuse. In Syracuse gross margins for dairy convenience stores were slightly higher than those reported in chain supermarkets (Figures 9-13).

4. Chain supermarkets had the highest direct product profits in Brooklyn, Nassau/Suffolk and Northern New Jersey of all types of retail stores. Dairy/convenience stores had the highest DPP in Albany and Syracuse (although there was very little differences between the DPP of dairy/convenience stores and chain supermarkets in Albany) (Figures 9-13).

5. The greatest consistency in sales, gross margins and DPP's per linear shelf foot among various types of retailers was found in Albany and Syracuse (Figures 9 & 10).

The following is a summary of the results of the average retail sales, gross margins and direct product profits (DPP) as measured in dollars per linear shelf foot per week for the six fastest selling milk items in the five market areas:

1. Homogenized half gallons had the highest sales in Nassau/Suffolk of any milk item in any market area (Figure 20).

2. Homogenized quarts had the lowest sales in Albany of any milk items in any market area (Figure 14).

3. High gross margin were produced in four market areas:

   (a) Homogenized gallons in Albany ($49.80) (Figure 15)
   (b) Lowfat half gallons in Brooklyn ($50.50) (Figure 19)

(c) Lowfat gallons in Nassau/Suffolk ($50.60) (Figure 21)
(d) Lowfat half gallons in Northern New Jersey ($47.20) (Figure 23).

4. Homogenized gallons in Brooklyn had the lowest gross margin (-$9.50) and the lowest DPP ($-19.50) of any milk item in any market area (Figure 19).

5. The highest DPP was produced in Albany on homogenized gallons ($42.30), with lowfat half gallons almost as high ($38.30) (Figure 15).

Gross Margins and Direct Product Profits--Chains vs. Dairy/Convenience Stores

The value of using direct product profit as a measure of profitability rather than gross margin alone can be seen in a comparison of these two variables in the sale of all milk products in the market areas covered in this study. High gross margins are usually assumed to be an indication of either high retail prices, high profits,or both. In comparing gross margins as a percentage of sales for all milk products, it was found that chain supermarkets had higher margins in four market areas than dairy/convenience stores (figure 24). (The sample did not include any Brooklyn dairy/convenience stores.) Despite the higher gross margins of the chain supermarkets, the direct product profits (DPP) of the chains were lower than, or equal to that of the dairy/convenience stores in three of the four markets. The tendency for lower DPP's in chains was due to higher direct costs incurred by the chain supermarkets in handling fluid milk compared with dairy/convenience stores.

Therefore in measuring the true profitability of milk products, gross margin alone would have given an incorrect reading of the retailers profits in three of the four markets. This illustrates the value of using direct profit to measure retailer profitability on a product or group of products.

The DPP measure also shows that it is theoretically possible in three out of four of these market areas for dairy/convenience stores to sell milk for lower retail prices than the chain supermarkets and still earn a DPP as high or higher than the chains (due to the lower direct product costs of the dairy/convenience stores).

Instore Direct Costs of Handling Milk

In this study, the costs to the retailers of handling milk were divided into three categories: invoice cost, direct cost and indirect cost. Direct costs included the costs of direct labor, display cabinet space and refrigeration. Direct labor included the labor involved in receiving, checking the display case, moving the product from the backroom cooler to the display case, price marking (if done), stocking and checkout.

The in-store direct cost of handling fluid milk is primarily affected by the following factors:

1. Store receiving methods.
2. Employee wage rates
3. Type of dairy case (e.g., whether bosse system or other).
4. Distance of the milk cooler and display case from the storage area.
5. Frequency and method of stocking.
6. Amount of display space.
7. Checkout methods, equipment used and services offered (e.g., carryout).

Of all these factors, the first three were the most important in determining the level of cost per unit of milk. These three have the largest effect on total labor costs, which is the primary cost associated with the in-store direct cost of handling milk.

Although the retail prices and invoice costs varied considerably more than in-store costs, the direct cost of handling milk in stores did differ between individual stores and types of retail outlets, as well as among markets.

Direct Costs in Various Markets[4]

In comparing costs on a market by market basis, Syracuse and Nassau/-Suffolk had the highest average direct costs of handling homogenized gallons and Syracuse and Brooklyn had the highest handling costs for low fat gallons. The direct cost of handling homogenized gallons was statistically higher for Syracuse than for either Nassau/Suffolk or Northern New Jersey. Brooklyn also had the highest direct cost in handling all types of half gallon milk (Figure 26). But statistically, except for the Albany market, the in-store direct costs of handling milk in Brooklyn were not significantly higher than in the other market areas. The Albany market reported the lowest overall in-store direct costs for the handling of all types of fluid milk in gallons. The average direct costs of handling homogenized half gallons were also statistically lower in Albany than in Brooklyn.

The differences between markets in the average cost of handling a given size container were influenced by the profile of store types in the sample. The fact that dairy/convenience stores were more common in the sample of stores studied in Albany, and Northern New Jersey partially explains the lower market average for direct costs in these markets.

Direct Costs--Supermarkets vs. Dairy/Convenience Stores

In all markets, chain supermarkets consistently had the highest in-store direct costs of all types of stores and dairy/convenience stores the lowest in-store direct costs (Figures 25-27).

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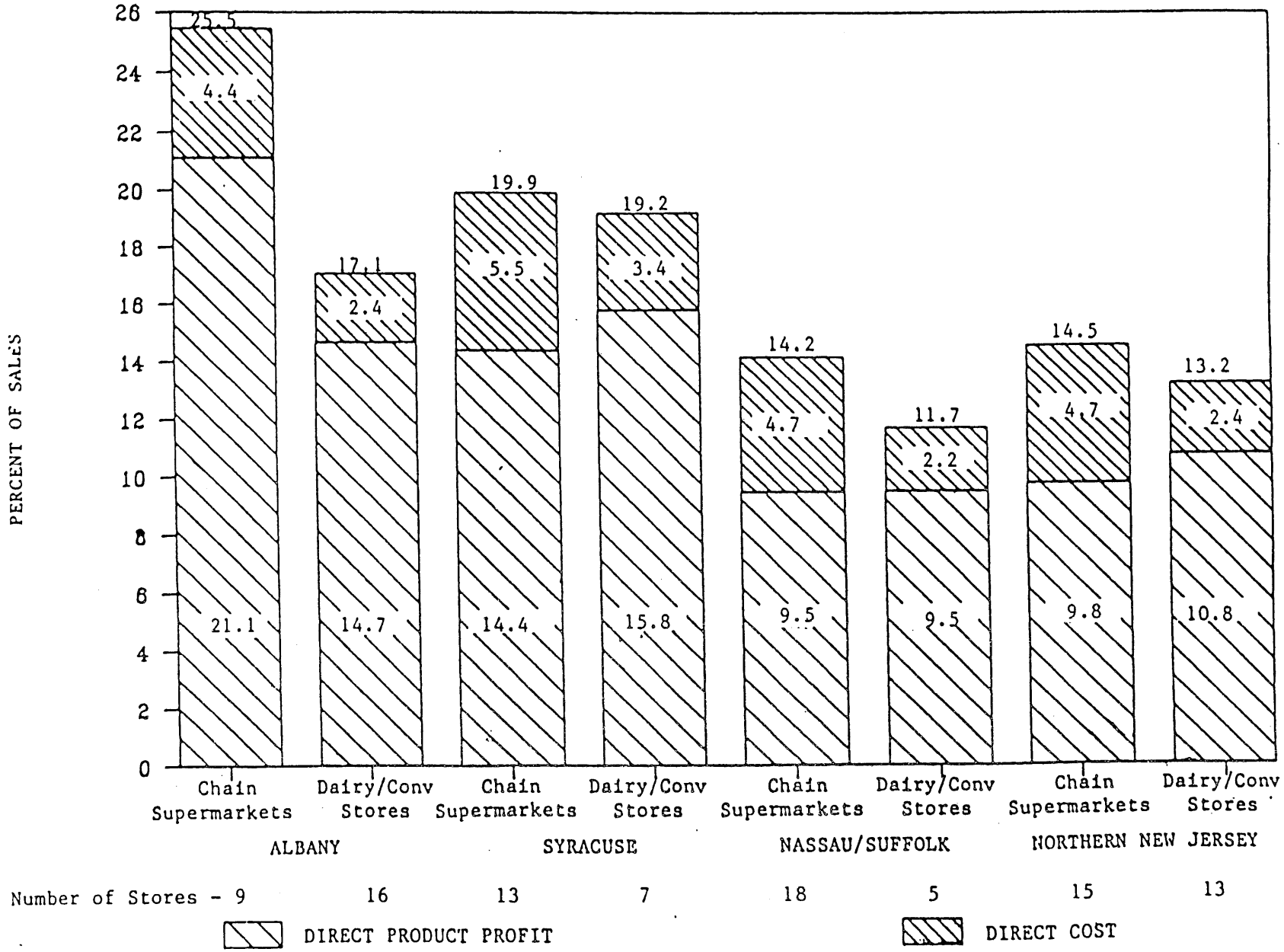
[4]The direct costs per unit results were tested for statistical significance.

Figure 24. Gross Margins and Direct Product Profit Comparison, Chain Supermarkets vs. Dairy/Concenience Stores, Four Market Areas, May-June 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

At least two things help explain why dairy/convenience stores in all areas had substantially lower handling costs for milk than either chain or independent supermarkets. First, the average wage rates for store employees were lower in dairy/convenience stores than in independent supermarkets. In turn, the average wages per hour of labor in independent supermarkets were lower than in chain supermarket stores. On average in the four markets where dairy/convenience stores were studied, the wage rate for direct store labor was approximately $3.50 per hour higher in chain supermarkets than in dairy/convenience stores. This difference in hourly wage rates, not including the cost of fringe benefits, ranged from $2.30 per hour in Syracuse to $4.26 per hour in Northern New Jersey.

The second factor contributing to dairy/convenience stores' having lower direct handling costs for milk than either chain or independent supermarkets stems from differences in handling methods or procedures in the store. In all dairy/convenience stores studied, the milk routeman unloaded the milk and moved it to the cooler. Dairy/convenience store personnel were not involved in the physical handling of milk when it was received at the store. On the other hand, in all markets, store personnel in some supermarkets moved milk from the receiving dock to the cooler. In three markets (Brooklyn, Syracuse and Nassau/-Suffolk), store personnel in at least 60% of both the chain and independent supermarkets were involved in this part of the milk receiving activity.

Another factor contributing to lower direct labor costs in dairy/convenience stores is that less time typically was required to stock the dairy cases there than in supermarkets. The dairy cases in dairy/convenience stores usually were stocked from the rear of the case. The time required per unit to stock from the rear is less than stocking dairy case shelves from the front -the typical method used in supermarkets.

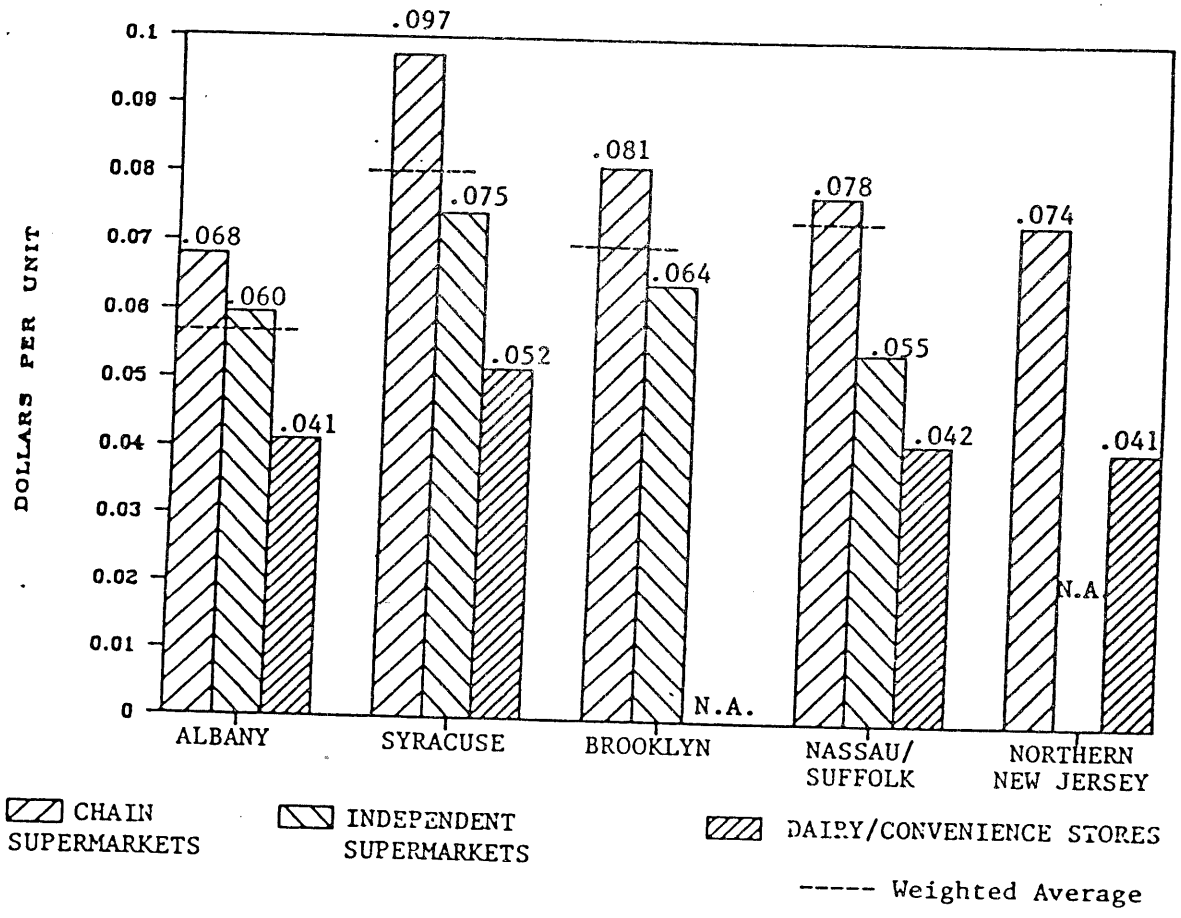
The lower average wage rates in dairy/convenience stores, together with the lower cost of receiving and stocking the dairy case, more than offset the cost advantage supermarkets obtained from handling larger volumes of milk.

Direct Costs -- Chain vs. Independent Supermarkets

Where the comparison is possible, the in-store direct costs of independent supermarkets were less than chain supermarkets but slightly higher than dairy/convenience stores in all market areas (figures 25-31).

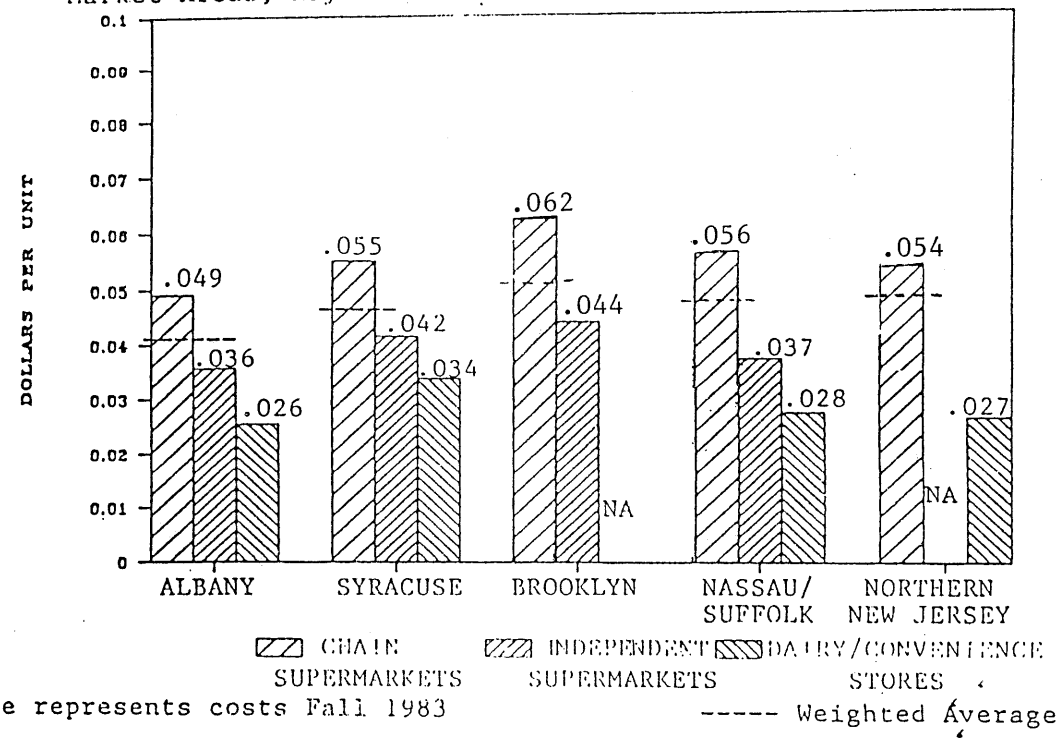
Most of the cost differences can be explained by the variation in wage rates that exist between the three types of retail outlets. The cost is also affected by the actual wage rate of the person performing the task within the store (e.g. the department manager vs. a part-time clerk).

Figure 25. Instore Direct Handling Costs, Homogenized Milk Gallons, Five Market Areas, May-June 1984*



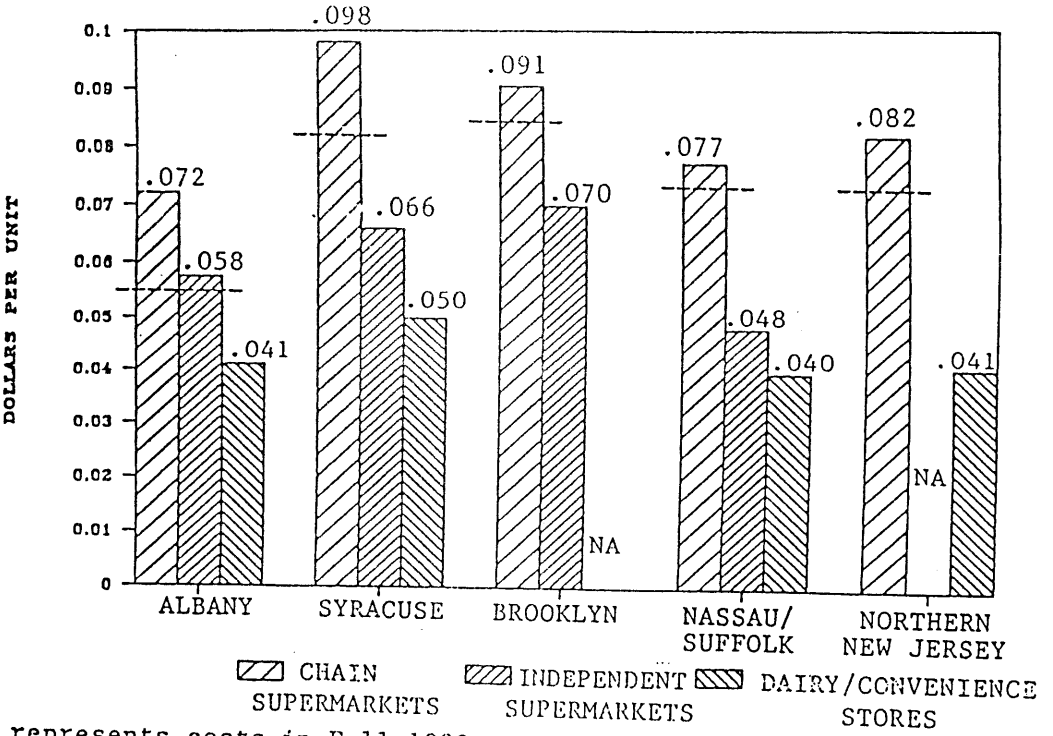
*Syracuse represents costs in Fall 1983

Figure 26. Instore Direct Marketing Costs, Homogenized Milk Half Gallons, Five Market Areas, May-June 1984[1]



[1]Syracuse represents costs Fall 1983

Figure 27. Instore Direct Marketing Costs, Lowfat Milk Gallons, Five Market Areas, May-June 1984[1]



[1]Syracuse represents costs in Fall 1983

Summary and Conclusions - In-Store Direct Costs

By identifying the in-store direct costs of an individual product (sometimes referred to as Direct Product Costs), it is possible to obtain a more accurate measure of the profitability of the item as compared with the use of average costs. Until recently, retailers have used average labor costs and average overhead costs to forecast the profitability of individual products as well as product groups. Direct product costs allow retailers and suppliers of fluid milk to not only identify the high cost products, but more importantly to pinpoint the problem areas.

Comparisons between markets can be useful to retailers who operate stores in several market areas. It can also assist the high cost operator seek out problem areas in order to correct them.

The following summarizes the analysis of in-store direct product costs of handling milk products in the various types of retail food stores in each of the five market areas studied:

1. Where many statistically significant differences were found among markets in retail prices, invoice costs and direct product profits, relatively few significant differences were found in the in-store direct product costs of handling milk among markets. All markets had similar costs in the handling of a given container size regardless of the type of milk. The costs of handling gallons of both homogenized and lowfat were similar in each market, and the costs of all types of fluid milk sold in half gallon containers were similar in each market area.

2. The differences between markets in the average cost of handling a given size container, many of which were not statistically significant, were influenced by the profile of store types in the market samples.

3. Chain supermarkets consistently had the highest in-store direct costs of all types of stores and dairy/convenience stores the lowest in-store direct costs.

4. Dairy/convenience stores had the lowest direct product costs due primarily to:

    a. lower wage rates for store employees.
    b. little or no labor required of store employees in moving milk from receiving door to cooler (this was done by a delivery person). In supermarkets, employees frequently helped perform this work activity.

5. Independent supermarkets had costs somewhere in the middle-between chain supermarkets and dairy/convenience stores. This was consistent in all market areas where comparison was possible.

6. In all markets, the in-store direct cost of handling gallons was considerably lower than handling two half-gallons, the cost of which, in turn, was considerably lower than handling two, one quart containers (Figures 28-32).

Figure 28 In-store Direct Handling Costs, Six Fastest Selling Milk Products, Albany Market, May-June, 1984.

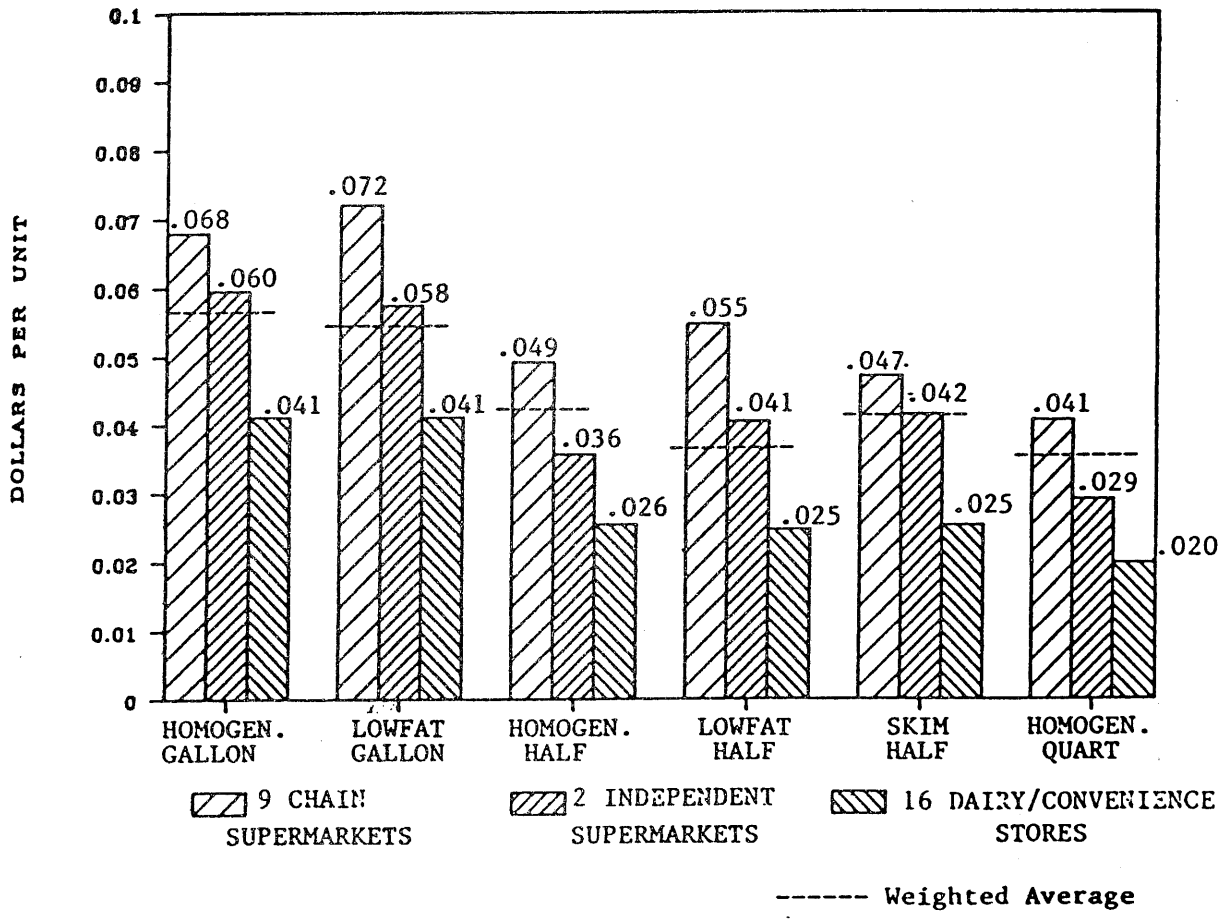


Figure 29 In-store Direct Handling Costs, Six Fastest Selling Milk Products, Syracuse Market, Fall 1983*

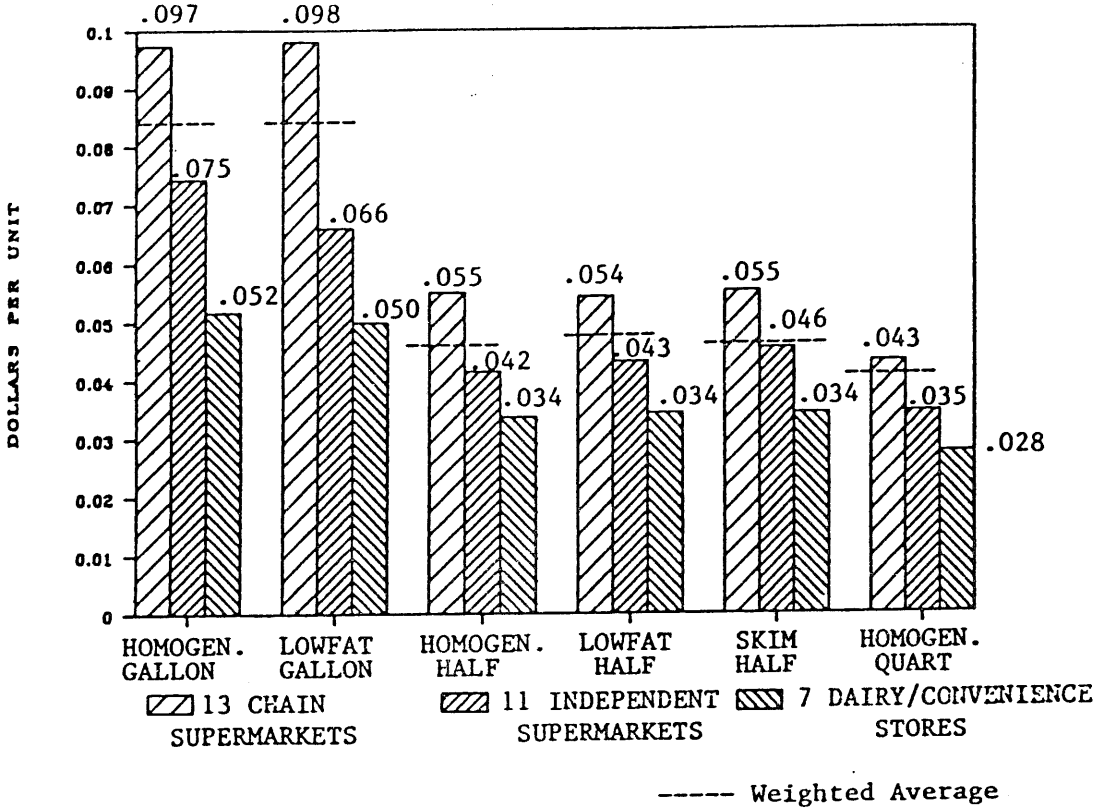
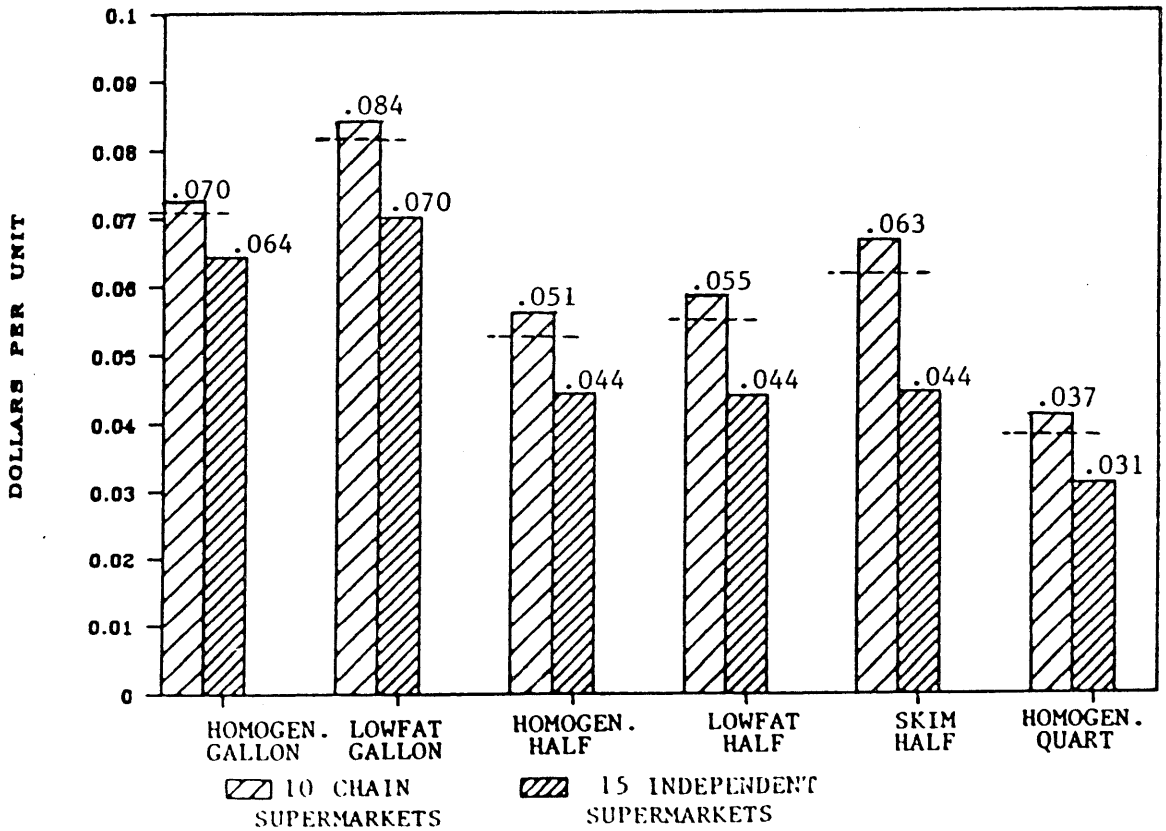


Figure 30 In-store Direct Handling Costs, Six Fastest Selling Milk Products, Brooklyn Market, May-June, 1984



*Syracuse represents costs Fall 1983

Figure 31 In-store Direct Handling Costs, Six Fastest Selling Milk Products, Nassau/Suffolk Market, May-June, 1984

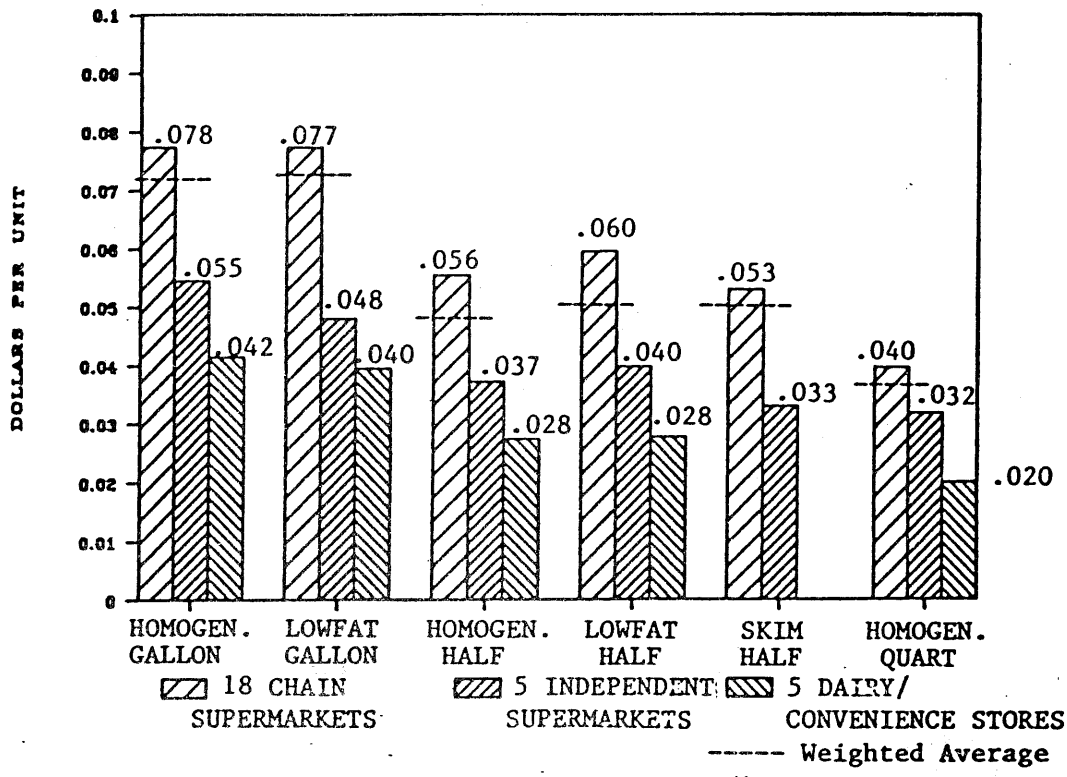
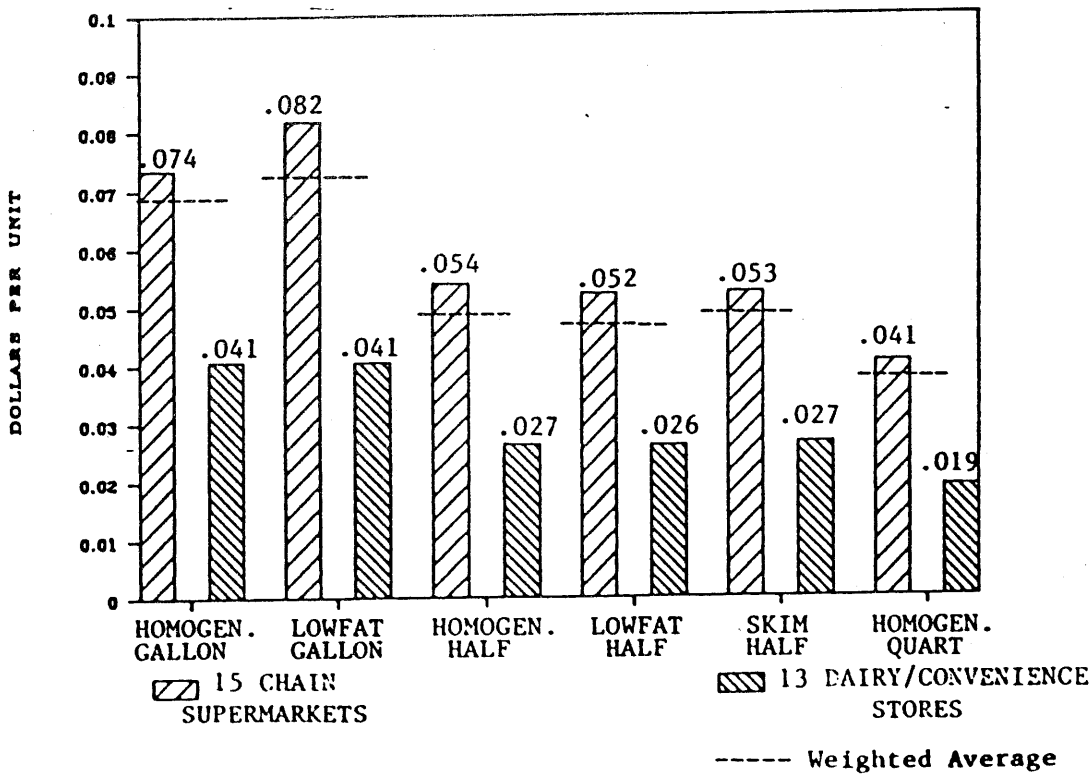


Figure 32 In-store Direct Handling Costs, Six Fastest Selling Milk Products, Northern New Jersey Market, May-June, 1984



Variability in Retail Prices, Costs, Gross Margin and Direct Product Profit

Three primary factors affect the direct product profit (DPP) of fluid milk: (1) retail prices, (2) invoice costs, and (3) in-store direct handling costs. In all markets except Northern New Jersey, the range in retail price in dollars per unit was the largest of these three for all the biggest-selling fluid milk items. The range in invoice costs was second, and the range in direct costs (handling costs) was the smallest of the three factors (Figures 33-35). In the Northern New Jersey market, the range in invoice costs was larger than the range in retail prices. The range of retail prices for all three best-selling milk items was smaller in the Northern New Jersey market than in the other four New York markets included in this study.

Brooklyn recorded the widest range in both invoice costs and retail prices for homogenized gallons and half gallons. Nassau/Suffolk had the widest range in retail prices and Northern New Jersey in invoice costs for lowfat gallons (Figures 33-35).

In Albany, Syracuse, Nassau/Suffolk and Northern New Jersey, there was more variability in the retail prices and invoice costs of gallons of lowfat milk than in gallons of homogenized. In Brooklyn, the variability in retail prices and invoice costs, was larger for homogenized gallons than for lowfat gallons (Figures 33-35). Ranges were tested as variance differences in the F-tests of the statistical analysis.[5]

The largest range in profitability, as measured by gross margins and direct product profits (DPP), was recorded in the Brooklyn market. Stores reported gross margins as low as negative 14.4 percent and as high as positive 25.5 percent as an average on all milk items. DPP in this market ranged from a low of negative 17.6 percent to a high of positive 21.5 percent (Figure 36). Albany had the second largest range in gross margins and direct product profits.

The narrowest range in profitability as measured by gross margins and DPP was in the Northern New Jersey market, where the average percentage gross margin on all dairy products ranged from 9.0 percent to 19.2 percent. Direct product profits in Northern New Jersey varied from 4.9 percent to 15.1 percent. Syracuse also had a narrow profit range and was close to that of Northern New Jersey.

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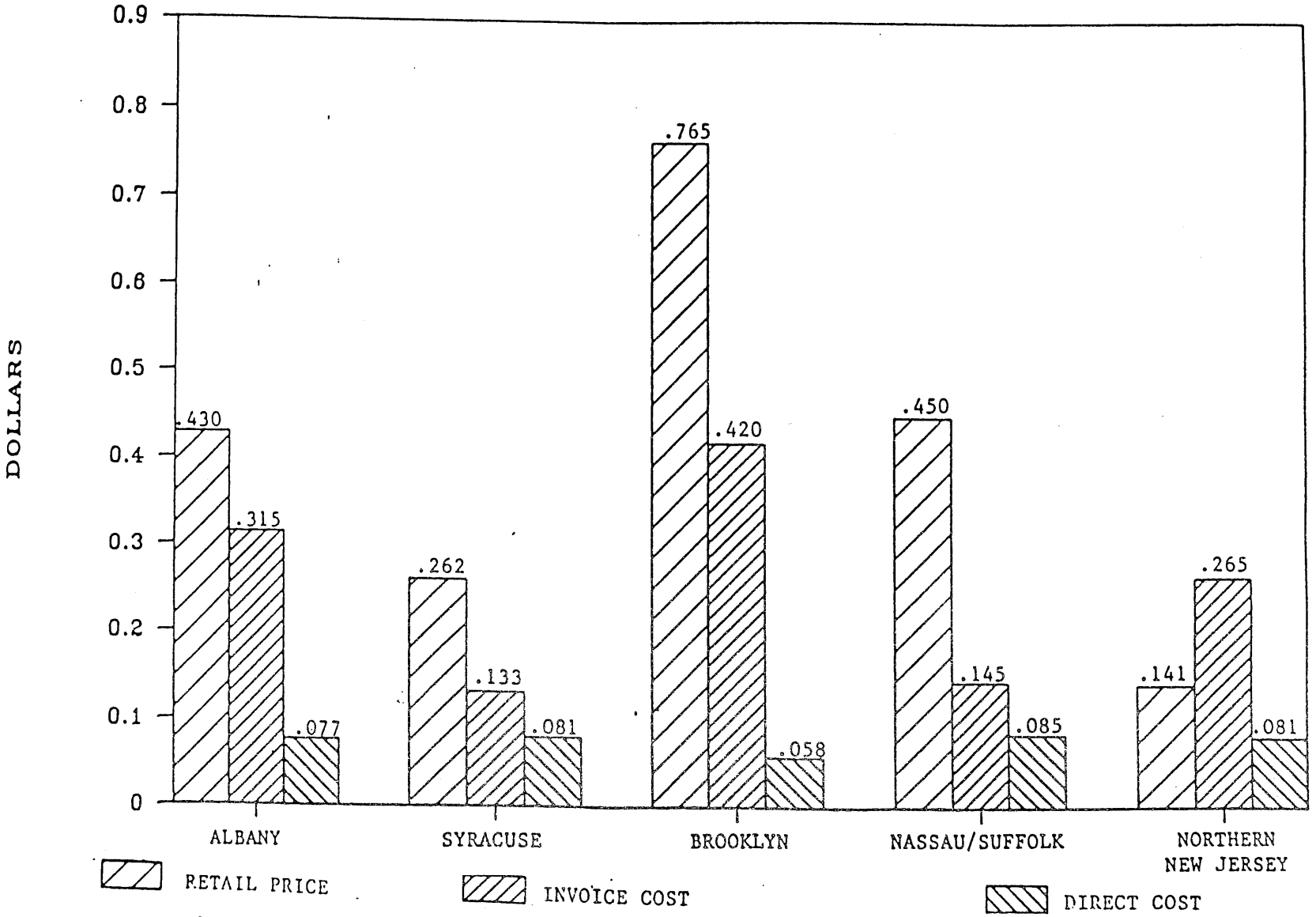
[5]See appendix 3 for complete results of the statistical analysis.

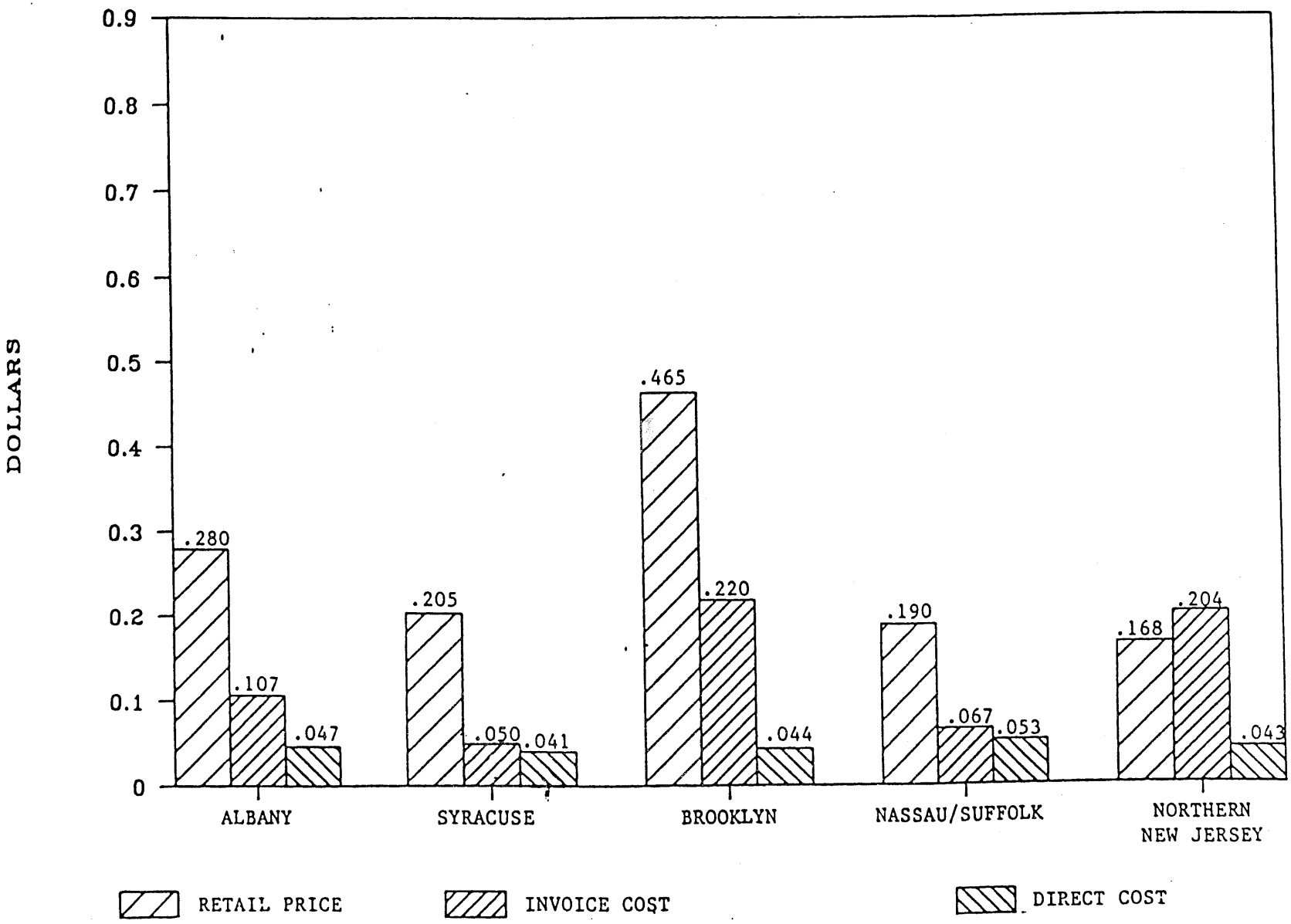
In markets such as Northern New Jersey where the range in retail prices was even narrower than the range in invoice costs, there was considerable homogeneity between various chain supermarkets included in the study. The authors have observed that there is a greater tendency for retail price stability between the stores of a single food chain organization than between stores of various independent supermarkets. Also there appears to be a greater sensitivity of retail prices between chain supermarket competitors than between chain supermarkets and dairy/convenience stores or between chains and independent supermarkets. Since there were no independent supermarkets included in the Northern New Jersey sample, the narrow retail price range may be the result of the price competition between the chain supermarkets.

Figure 33 Range in Retail Prices and Direct Store Costs*, Homogenized Milk Gallons, All Stores May-June 1984, Five Market Areas



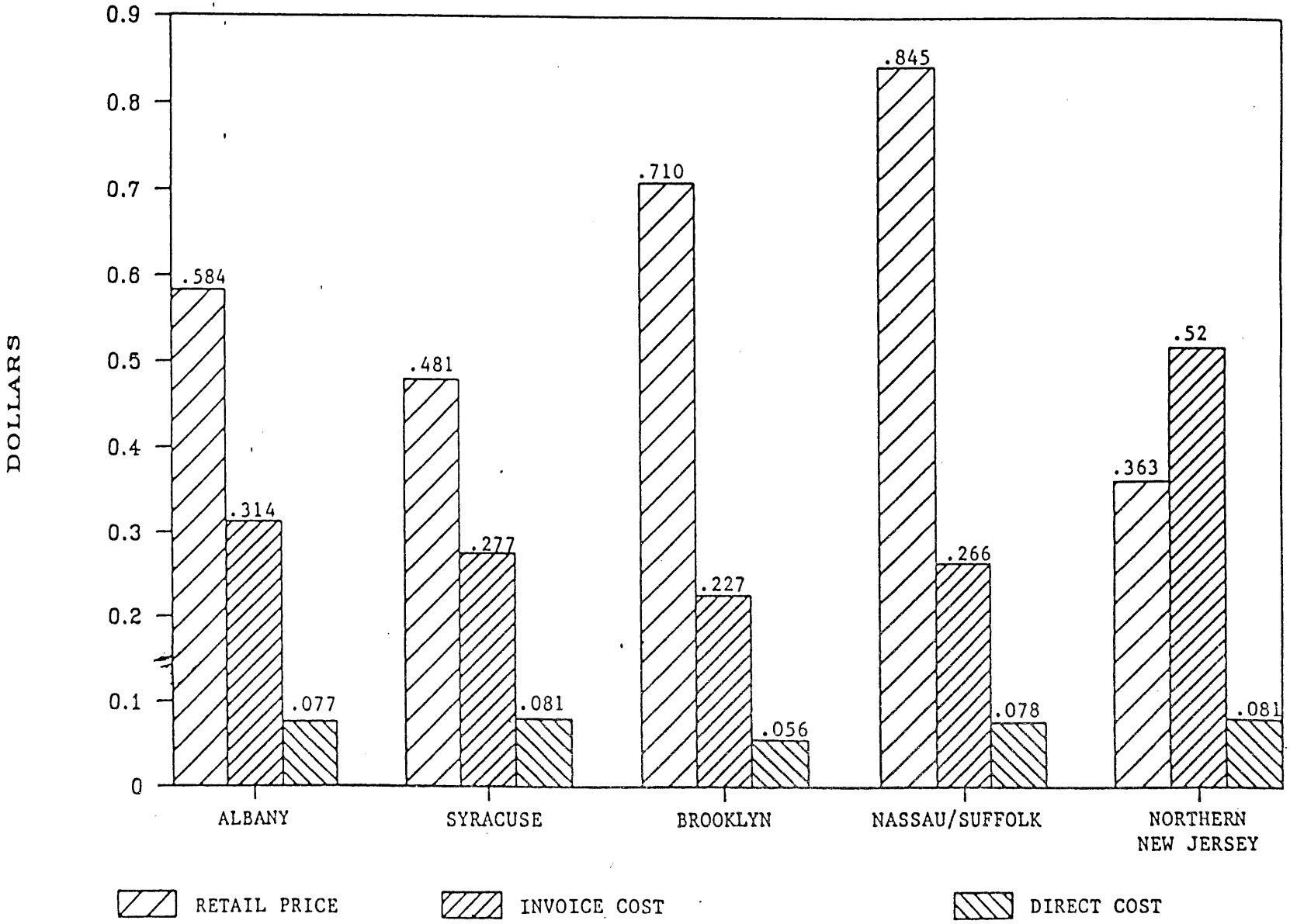
*Range equals difference between average of two lowest and average of two highest.

Figure 34 Range in Retail Prices and Costs, Homogenized Milk Half Gallons All Stores May-June 1984



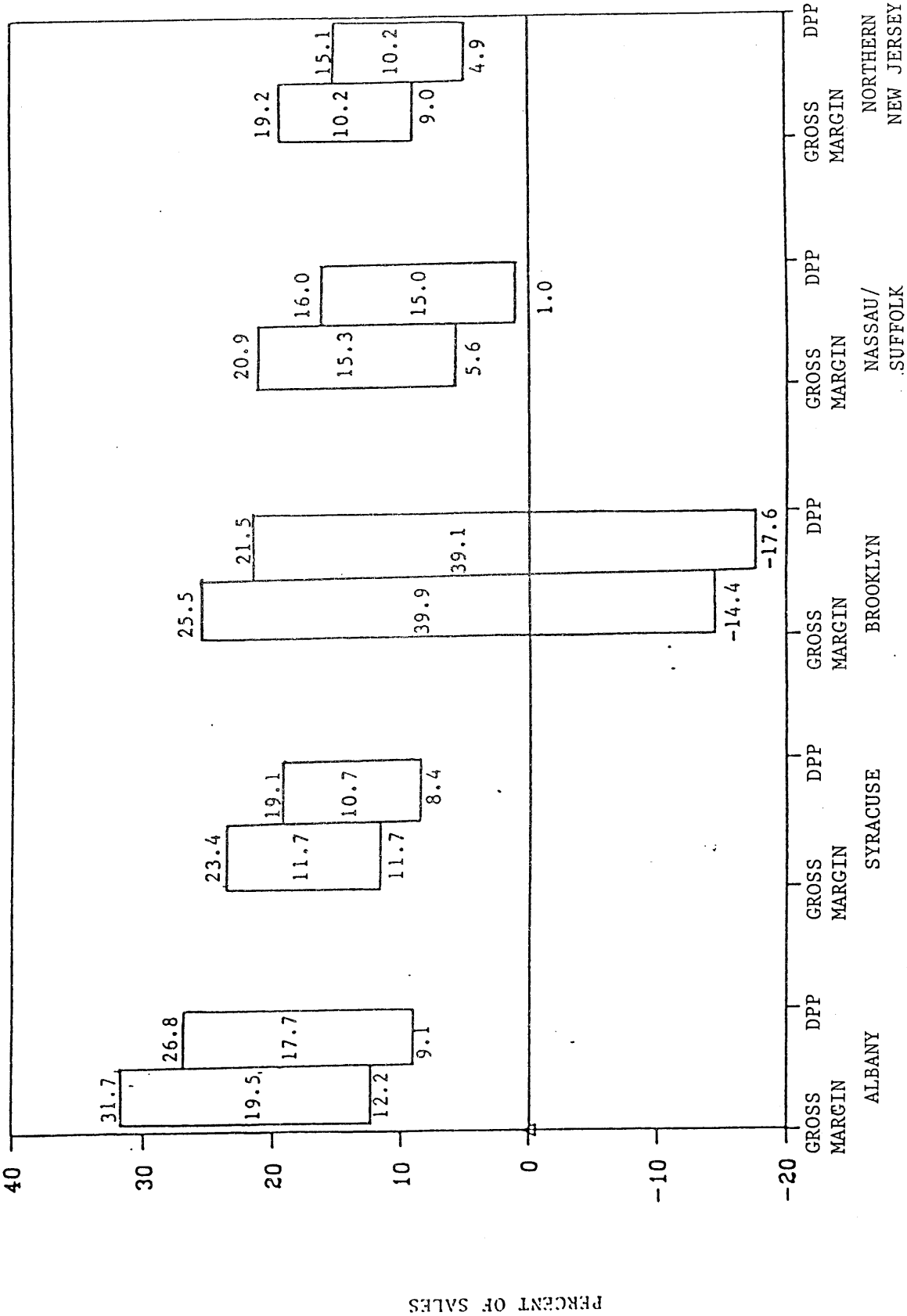
*Range equals difference between average of two lowest and average of two highest.

Figure 35 Range in Retail Prices and Costs, Lowfat Milk Gallons All Stores May-June 1984



*Range equals difference between average of two lowest and average of two highest.

Figure 36 Range in Profitability of Gross Margins and Direct Product Profitability, Average All Milk Items, Percentage of Sales Dollars, May-June 1984



*Range equals difference between average of two lowest and average of two highest.

Summary and Conclusions - Variability in Prices and Profitability

Considerable variability existed in the ranges in retail prices, costs, gross margins and direct product profits for the three top selling milk items in each market area.

1. The range in invoice costs was the widest in Brooklyn for homogenized gallons and half gallons (Figures 33 & 34) and in Northern New Jersey for lowfat gallons (Figure 35).

2. Brooklyn also recorded the widest range in retail prices of all market areas for homogenized gallons and half gallons (Figures 33 and 34). Nassau/Suffolk had the widest retail price range for lowfat gallons (Figure 35).

3. Northern New Jersey had the narrowest range in retail prices and was the only market where the variability in retail prices was less than invoice costs (Figures 33-35).

4. The ranges in gross margins and direct product profits on all fluid items as an aggregate were the widest in Brooklyn, where both of these profit measurements went from highly positive to highly negative (Figure 36).

5. The narrowest ranges of gross margins and direct product profits were found in Northern New Jersey and Syracuse (Figure 36).

Profit Comparison--Milk As Compared To Total Store

All Stores

The purpose of this portion of the study is to compare the profitability of fluid milk with the average profitability of all other items sold in the retail food store. As mentioned previously, gross margin is the traditional measure of product profitability and is not always accurate or consistent with the results as presented by the direct product profit method. This inconsistency is seen when a profit comparison is made between fluid milk and the average of all items in the store using both gross margin and direct product profit.

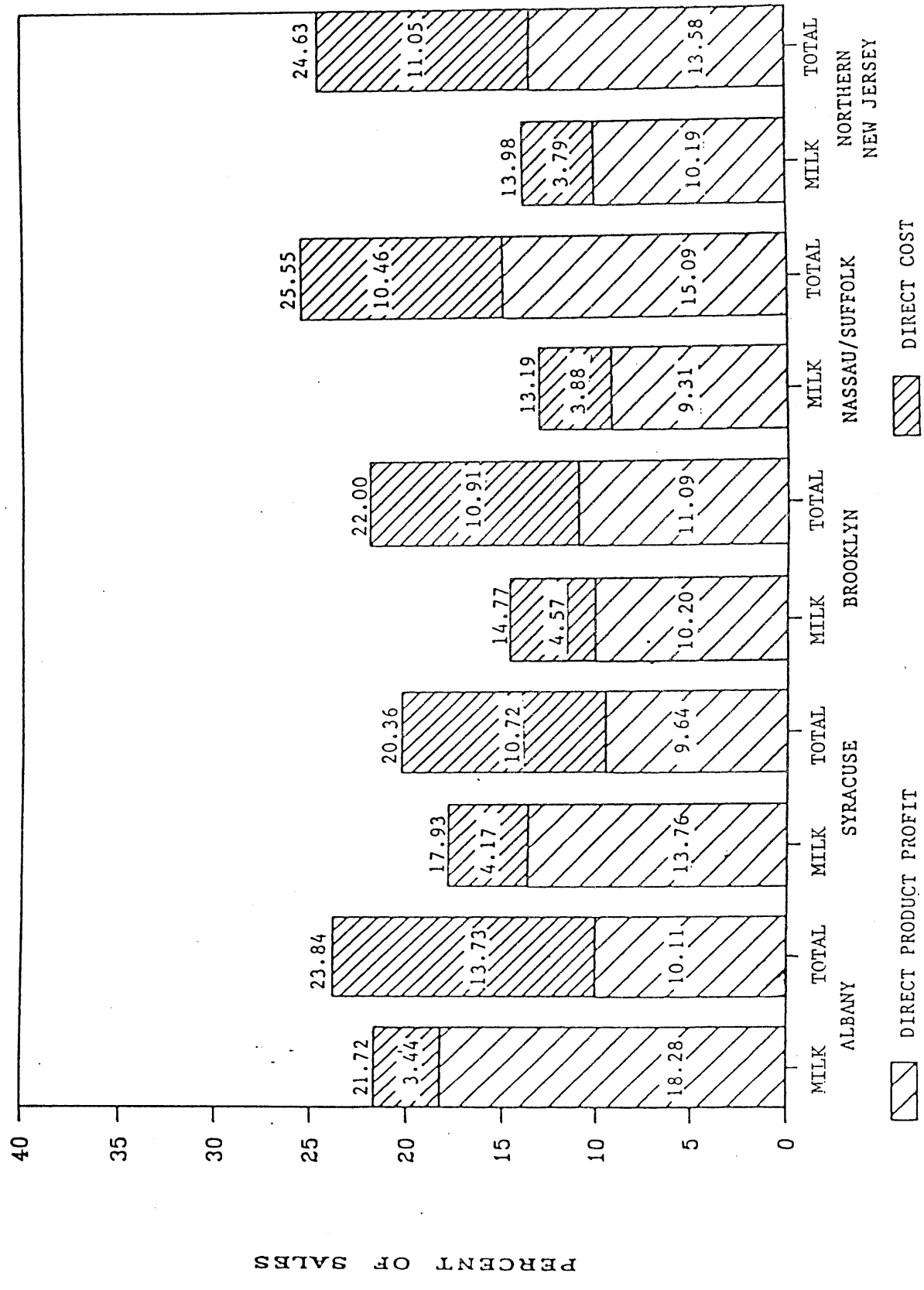
Looking at the average for all stores, the percentage gross margin on fluid milk was lower in all five markets than the percentage gross margin on all products in the store (Figure 37). However, the amount by which the percentage gross margin for all items in the store exceeded the percentage gross margin for the total store varied widely from market to market. The percentage gross margin difference was twelve percentage points (25.5 percent versus 13.2 percent) in Nassau/Suffolk, but only about 2 percentage points (23.8 percent versus 21.7 percent) in Albany.

A somewhat different picture of the relative profitability of milk is obtained when it is measured by direct product profits (DPP) (Figure 37). Although the DPP as a percentage of sales for the total store was still higher than DPP for milk in Northern New Jersey and Nassau/Suffolk, milk was about equally profitable to all items in the store in Brooklyn. Moreover, the direct product profit as a percentage of sales for milk was higher than the DPP for the total store in Albany and Syracuse. The fact that milk is often more profitable than the average of all items in the store when measured by direct product profits reflects the fact that in-store direct handling costs as a percentage of sales are much lower on milk than for all items in the store taken as an aggregate. Compared with the average of all items in a retail food store, milk requires less labor per dollar of sales and has a faster turnover, which contributes to its lower direct costs.

In comparing the profitability of the average of all milk items with the average of all store items as measured by dollars per linear shelf foot per week, milk profits are much higher in all market areas both on a gross margin and a DPP basis (Figure 38).

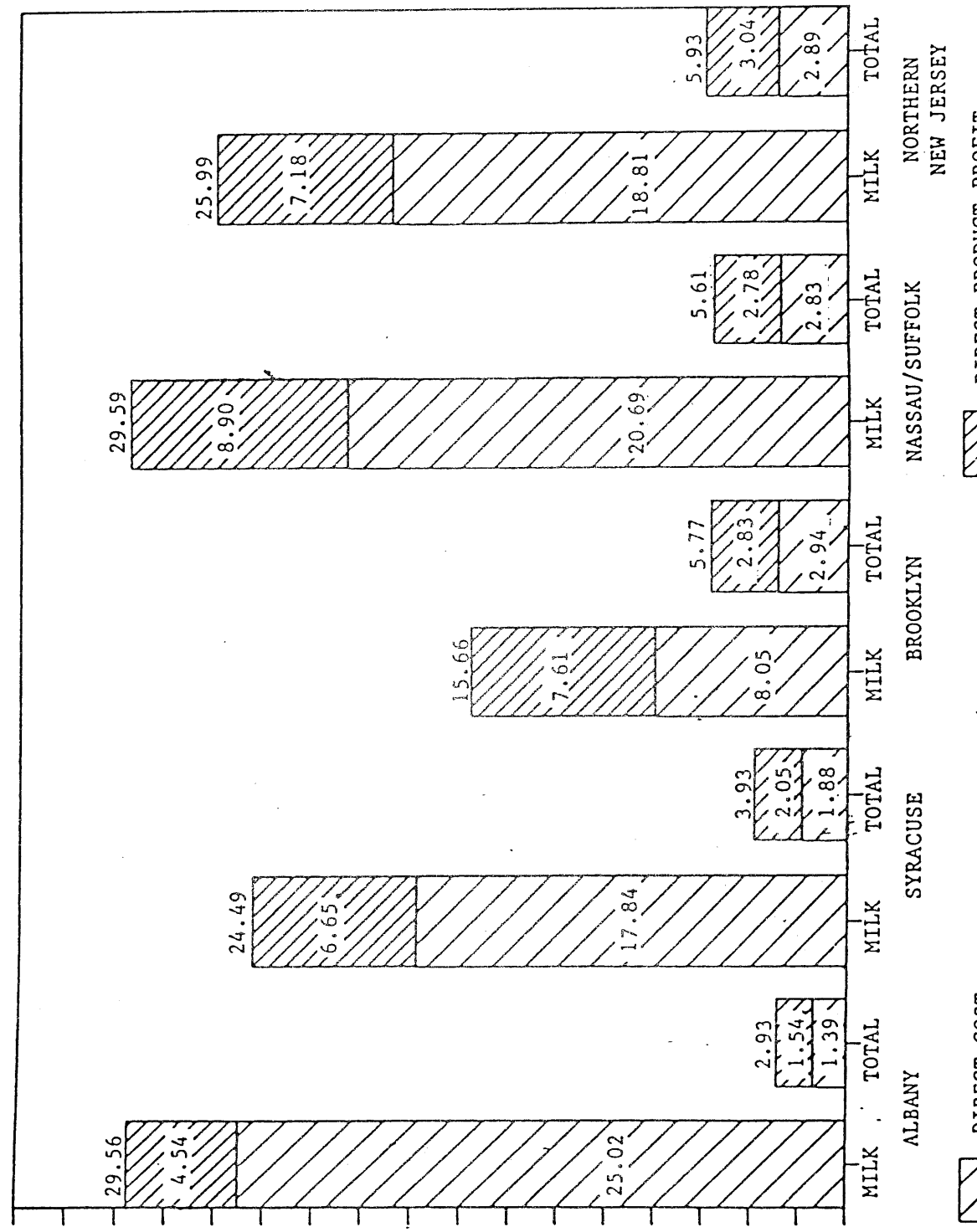
For example, the direct product profit (DPP) of milk in the Albany market was $25.02 per linear shelf foot per week, compared with $1.39 for the average of all products in the store. Albany had the highest DPP per linear shelf foot per week for milk products and Brooklyn had the lowest DPP for milk products at $8.05 per linear shelf foot per week (Figure 38). In spite of the low profit figure reported for milk in the Brooklyn market, milk was still more than two and one half times more profitable as measured in dollars per linear shelf foot per week than the average of all items in the store.

Figure 37 Gross Margin and Direct Product Profit Comparison, Average All milk Items vs. All Store Items, Percentage of Sales Dollars, All Stores, Five Market Areas, May-June 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Figure 38 Gross Margin and Direct Product Profit Comparison, Average All Milk Items vs. All Store Items, Dollars Per Linear Shelf Foot, All Stores, Five Market Areas, May-June 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Different Types of Outlets

In comparing the profitability of milk to the profitability of the total store for chain supermarkets only, the percentage gross margin on milk was lower than the percentage gross margin for the total store in all but the Albany market (Figure 39). However, on a percentage DPP basis, milk was more profitable than the average of all items in the chain supermarkets in Syracuse, Brooklyn and Albany. The DPP percentage on milk was about equal to the total store in the Northern New Jersey chain supermarkets and only slightly less profitable in the chain supermarkets in Nassau/Suffolk.

A similar picture is obtained in comparing the relative profitability of milk versus the total store for independent supermarkets (Figure 41). However, there were only three market areas in which a sufficient number of independent supermarkets were included in the sample to permit a comparison (Syracuse, Brooklyn, Nassau/Suffolk). The DPP on milk was higher in Syracuse, slightly lower in Nassau/Suffolk and about 50% lower in Brooklyn when compared with the average DPP as a percentage of sales for all store items.

In the four markets where dairy/convenience stores were included in the sample, the DPP on milk as a percentage of sales was higher in two markets (Albany and Syracuse) when compared with the average DPP on all store items and lower in the two other markets (Nassau/Suffolk and Northern New Jersey) (Figure 43).

Dollars Per Linear Shelf Foot Per Week

In all store types and in all market areas where data were available except independent stores in Brooklyn, milk showed a higher DPP per linear display foot than the average of all other items in the store (Figures 38, 40, 42, and 44).

Summary and Conclusions - Milk vs. Total Store

The issue here is how to measure the true profitability of fluid milk in a retail food store and what does this mean in terms of other types of products sold in the retail food store.

A summary of the results presented here indicates that compared with the average of all items sold in the retail food store, milk has a:

1. lower gross margin as a percentage of sales in all markets;

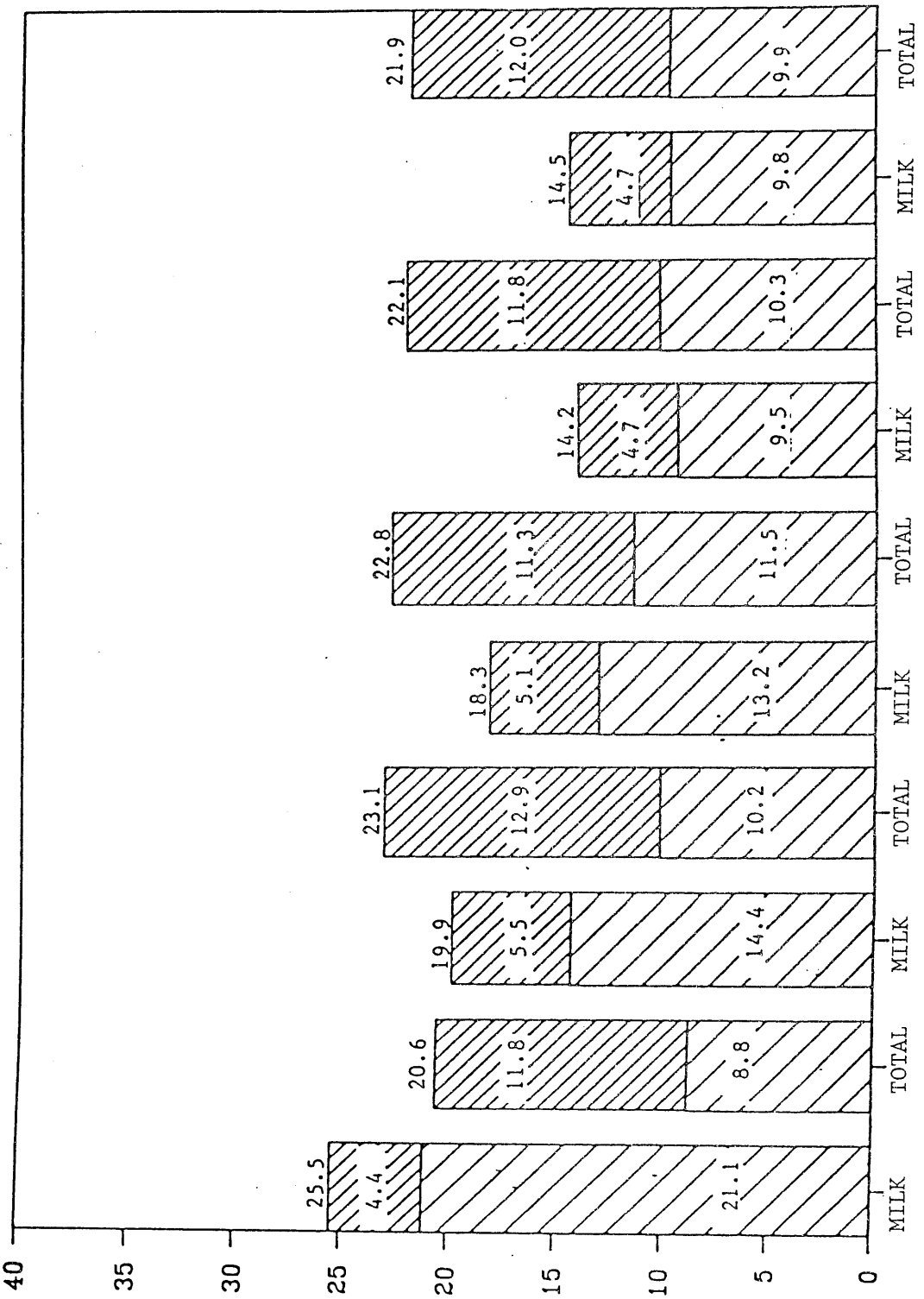
2. higher direct product profit as a percentage of sales in two of five markets;

3. higher gross margin in dollars per linear shelf foot per week in all markets;

4. and with but one exception (independent supermarkets in Brooklyn), a much higher direct product profit per linear shelf foot per week in all markets and in all types of retail food stores - chain supermarkets, independent supermarkets and dairy/convenience stores.

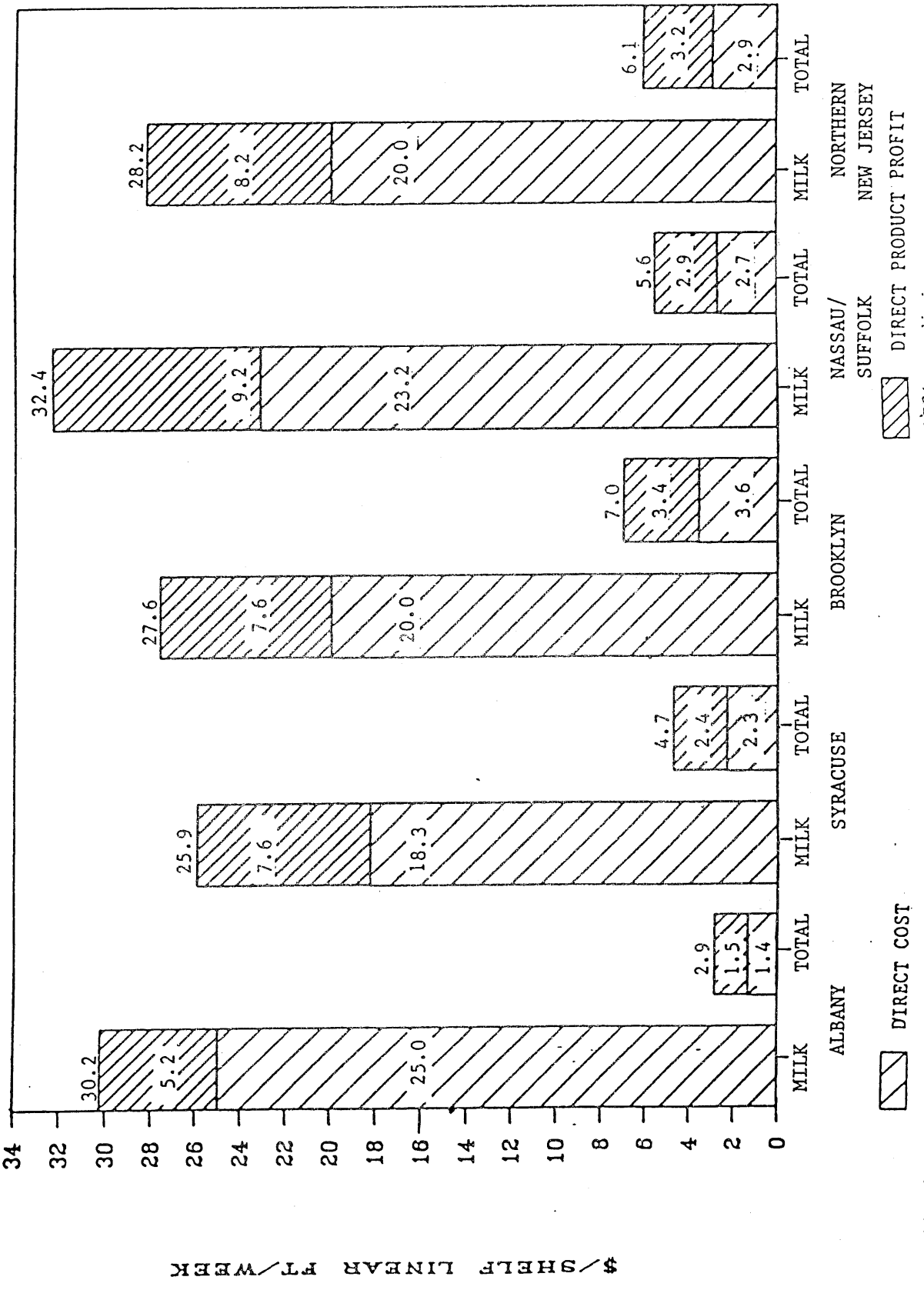
Since profit measured as a percentage of sales does not take into account sales velocity, it is not a true indication of the profitability of a product, but only of the product's profit potential. And because profit measured in dollars per linear shelf foot does account for sales velocity, it is a better measure of a product's true profit contribution. In this latter category, milk consistently outperforms the average of all products in the store and is seen to be a major profit producer for the retailer.

Figure 39 Gross Margin and Direct Product Profit Comparison, Average All Milk Items vs. All Store Items, Percentage of Sales Dollars, Chain Supermarkets, Five Market Areas, May-June 1984*



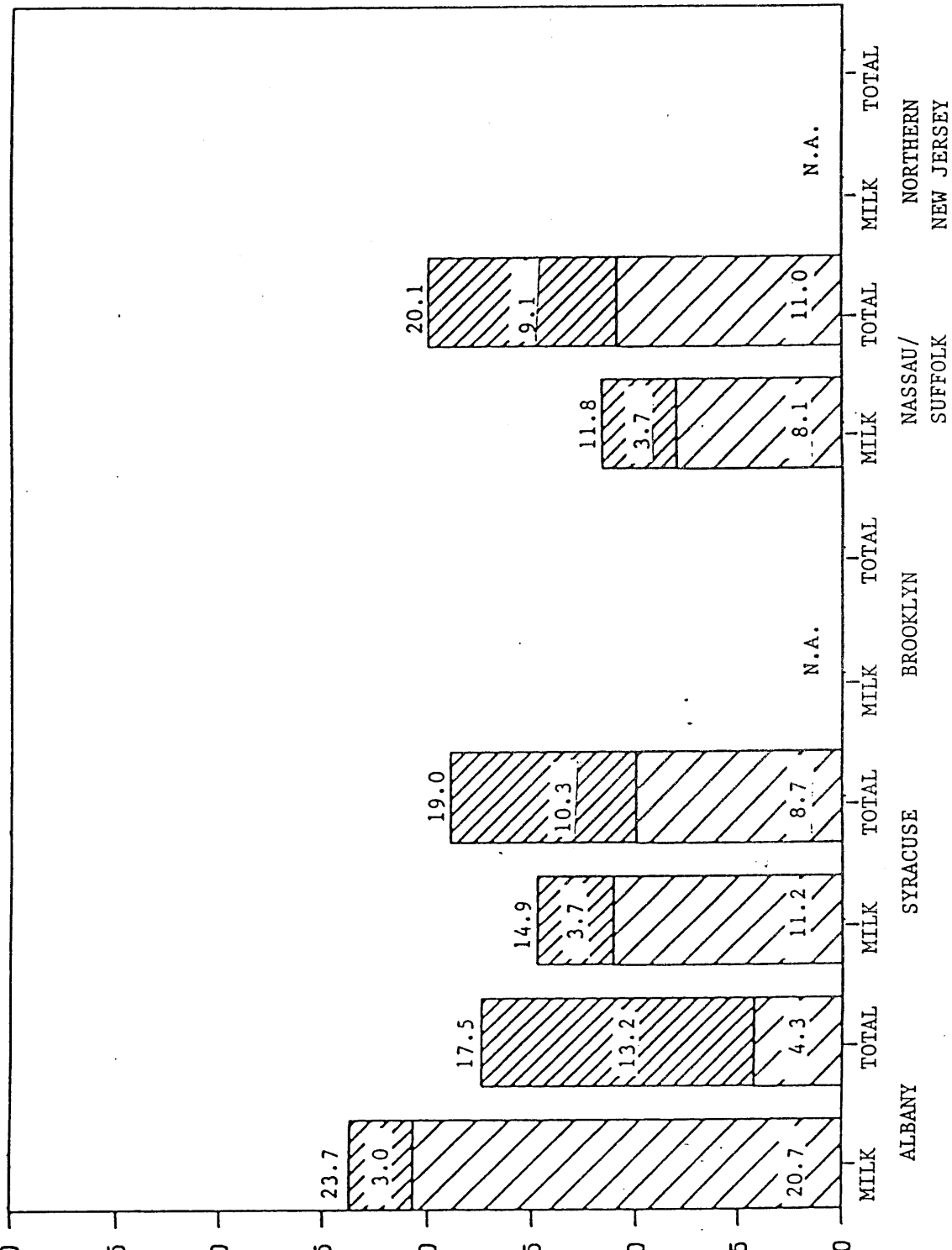
*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Figure 40. Gross Margin and Direct Product Profit Comparison, Average All Milk Items vs. All Store Items, Dollars Per Shelf Linear Foot, Chain Supermarkets, Five Market Areas, May-June 1984*



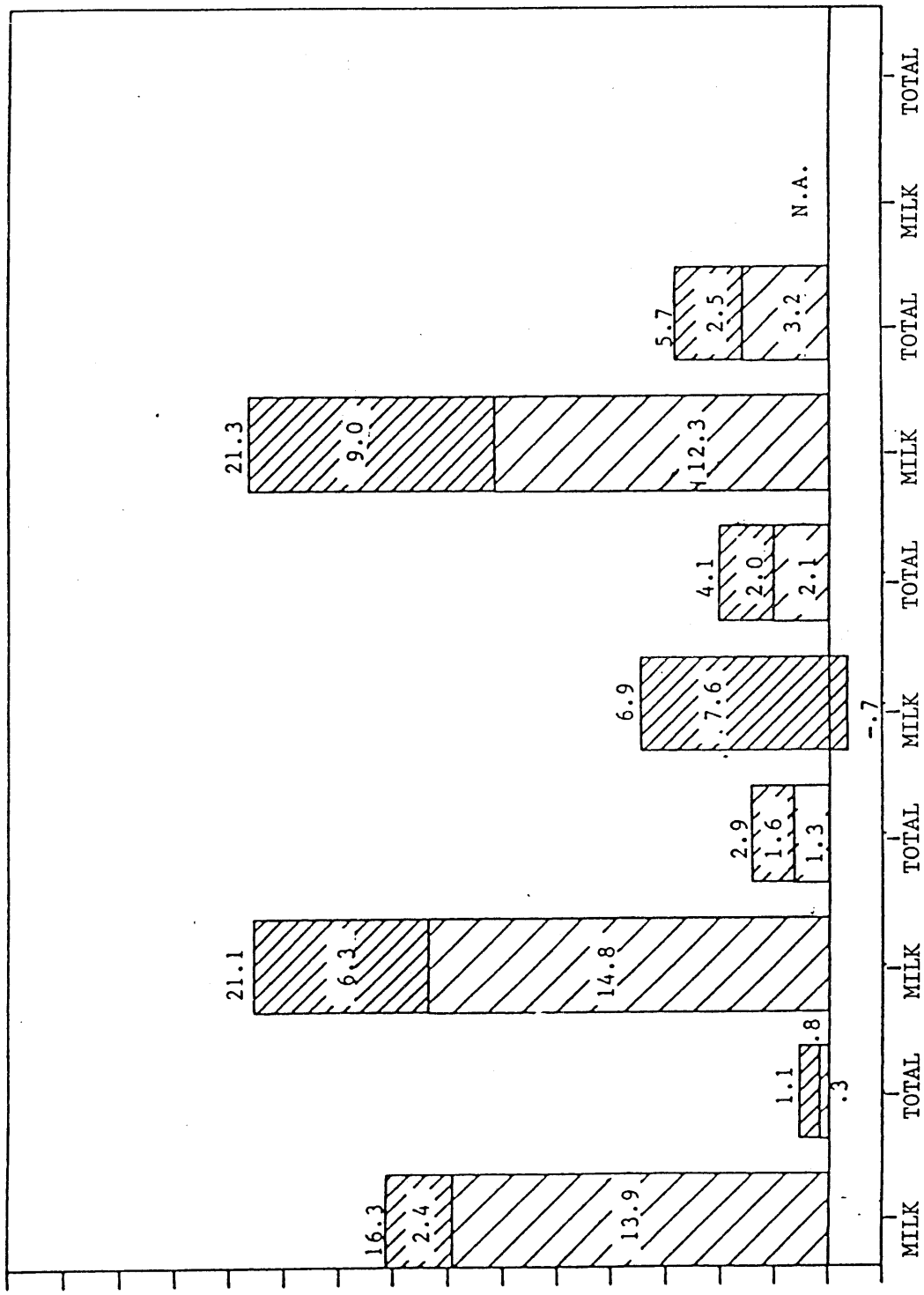
*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Figure 41 Gross Margin and Direct Product Profit Comparison, Average All Milk Items, Percentage of Sales Dollars, Independent Stores, Three Market Areas, May-June 1984*



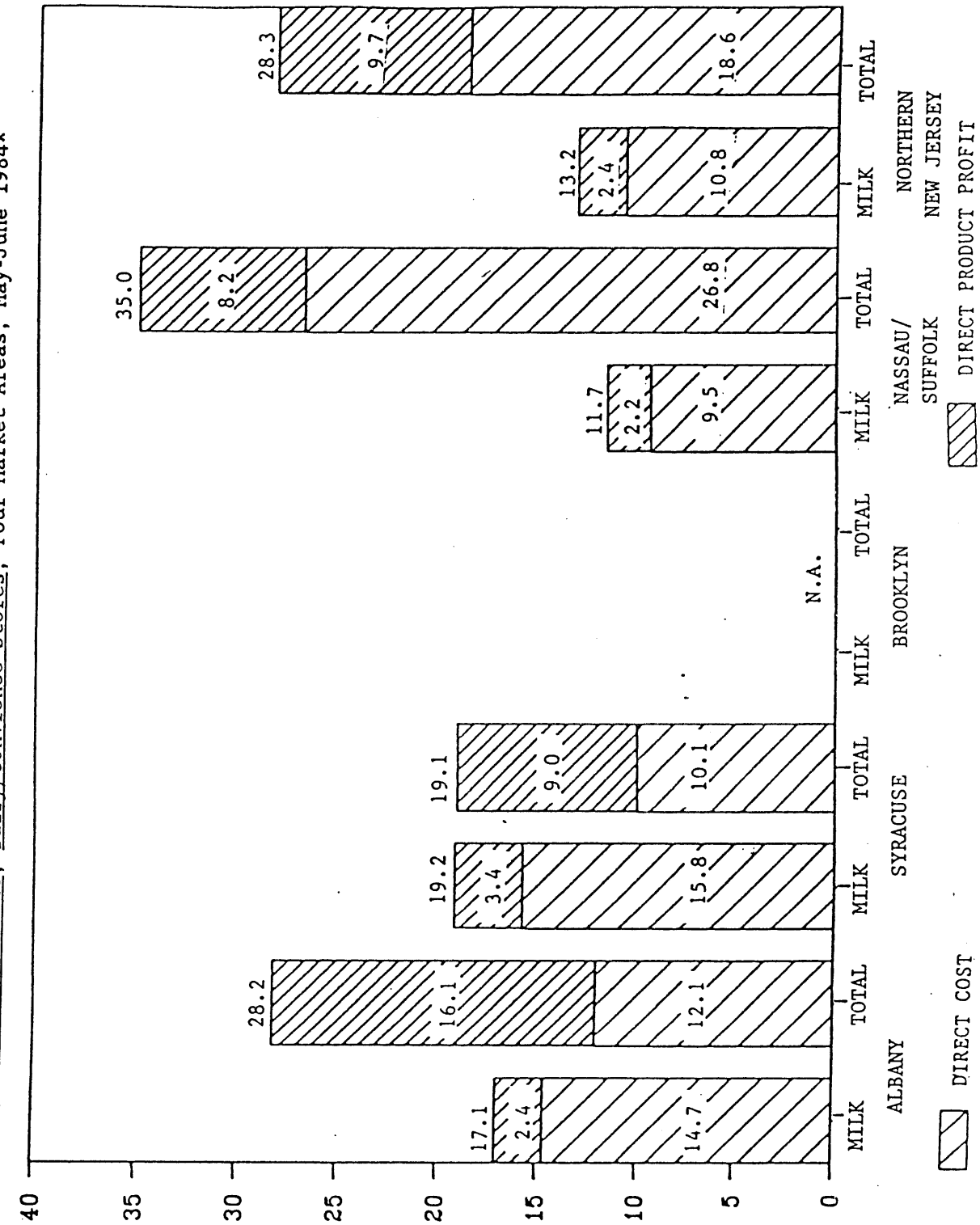
*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Figure 42 Gross Margin and Direct Product Profit Comparison, Average All Milk Items vs. All Store Items, Dollars Per Shelf Linear Foot, Independent Stores, Three Market Areas, May-June 1984*



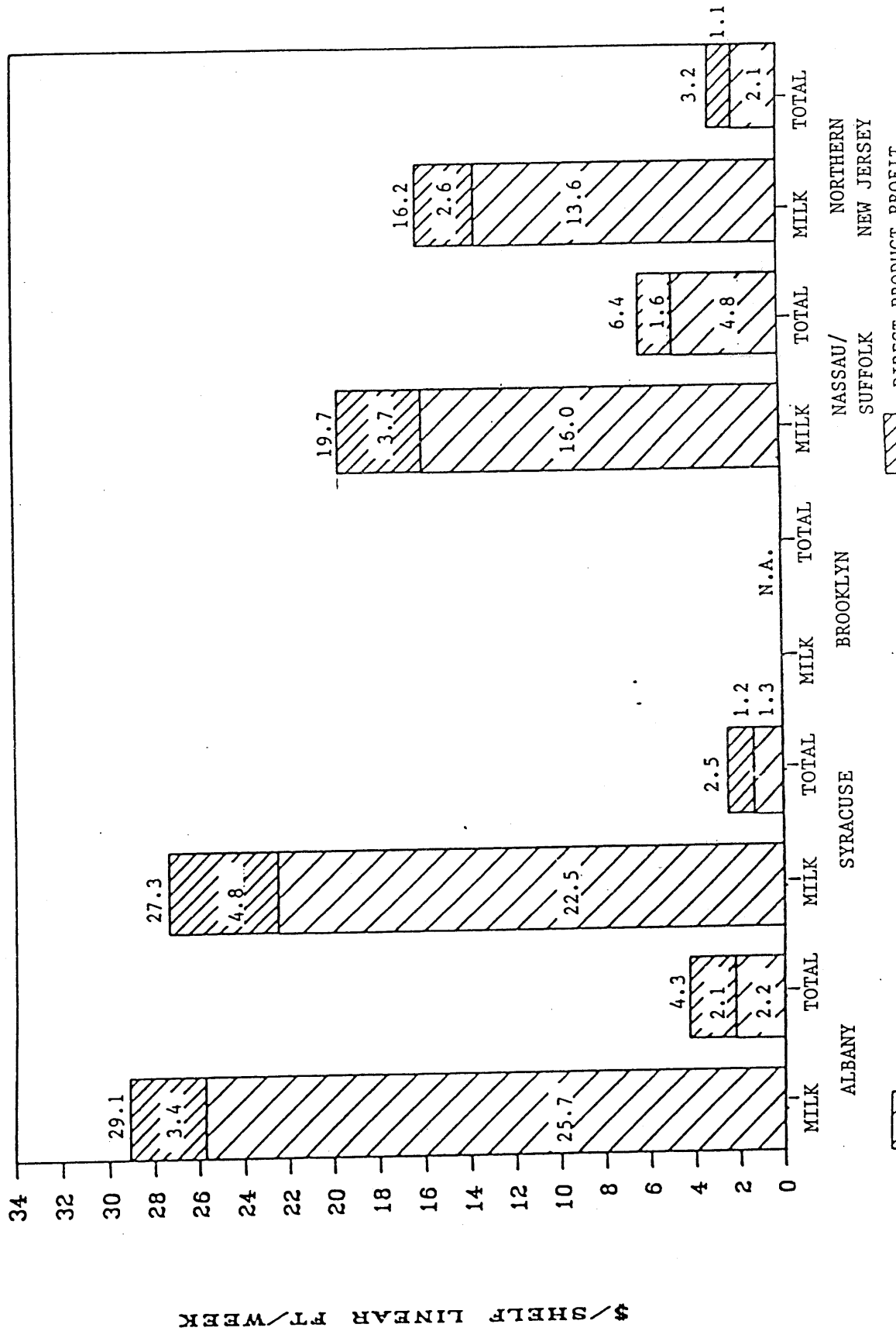
*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Figure 43 Gross Margin and Direct Product Profit Comparison, Average All Milk Items vs. All Store Items, Percentage of Sales Dollars, Dairy/Convience Stores, Four Market Areas, May-June 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

Figure 44 Gross Margin and Direct Product Profit Comparison, Average All Milk Items vs. All Store Items, Dollars Per Shelf Foot, Dairy/Convenience Stores, Four Market Areas, May-June 1984*



*Fall 1983 data for Syracuse market with invoice costs adjusted to May 1984 conditions.

APPENDIX 1

MILK STUDY QUESTIONNAIRE

C O N F I D E N T I A L

Cornell University, College of Agriculture & Life Sciences
Department of Agricultural Economics, Ithaca, NY 14853

MILK STUDY QUESTIONNAIRE: Part I. Store Observation Measurement

(1) _____ DATE
(2) _____ INTERVIEWER INITIALS
(3) _____ STORE NAME AND #

*(4) Type of retail outlet?

a. _____ Supermarket (includes warehouse stores)
b. _____ Dairy (specializes and carries a full line of dairy products, e.g. Byrne Dairy)
c. _____ Other (includes convenience stores, pharmacies and delicatessans)

(5) Chain store? (3 or more stores)

a. _____ Yes
b. _____ No

*(6) Checkout procedure used by this store?

a. _____ Self service store; checker bags in same movement as ringing
b. _____ Self service store; checker or bagger bags in separate movement from ringing
c. _____ Self service store; customer bags
d. _____ Checker gets milk for customer

*(7) Type of dairy case used for milk?

a. _____ Open upright
b. _____ Upright - glass doors
c. _____ Bosse owned by store } Ask manager
d. _____ Bosse owned by vendor }

(8) Milk loaded into the dairy case?

a. _____ Front
b. _____ Rear
c. _____ Bosse

*(9) Size of milk case store receives?

a. _____ 16 qt./9 half gal./4 gal.
b. _____ 24 qt./12 half gal./6 gal.
c. _____ Pre-loaded bosse

*(10) Measure the display length of the total store

_____ Shelf linear feet = (_____ Base linear feet X 5)

*(11) Measure the floor area for the total store, including backrooms (perimeter of building)

_____ Square [feet] = (_____ Length [feet]) X (_____ Width [feet])

(12) Round trip distance from loading dock to cooler?

_____ Feet

* (13) Round trip distance from the middle of the cooler to the milk cabinet?

_____ Feet

MILK STUDY QUESTIONNAIRE: Part II. Interview with Store or Dairy Manager

(14) What percentage of carryout and/or parcel pick-up is provided by store personnel?

_____%

* (15) How is the milk received by the store?

a. _____ Driver moves milk to the cooler.
b. _____ Store personnel move milk to cooler by HANDTRUCK or HOOK.
c. _____ Store personnel move milk to cooler by PALLETS or BOSSE.

* (16) What type of equipment is used to move the milk from the cooler to the dairy case?

a. _____ Hand truck, cart or hook
b. _____ Hand
c. _____ Pallet
d. _____ Bosse

(17) What percent empty is the milk case when restocked?

_____ % empty

*(18) What percentage of the stocking is done by your vendor?

_____ %

LABOR RATE SCHEDULE

Lead in: Consider the individuals that maintain the fluid milk products, are some of them full-time and some part-time?

Personnel	What Percent of the Total Hours Worked in Fluid Milk are Handled by?	Weighted Wage/Salary $/hour (including overtime)	INTERVIEWER WORKSPACE: Number of Employees	INTERVIEWER WORKSPACE: Labor Rate $/hour Range (including overtime)	Fringe Benefit Percent
Dairy Manager	(19) _____	(20) _____			(21) _____
Other Full-Time Employees	(22) _____	(23) _____			(24) _____
Part-Time Employees	(25) _____	(26) _____			(27) _____
	100% of milk work				

LABOR RATE SCHEDULE (Continued)

Lead in: Do you have both checkers and baggers working in your Front end?

Consider the checkers (& baggers) who do the front end work, are some of them full-time and some of them part-time?

Personnel	What Percent of the Total Hours Worked in the Front end are Handled by?	Weighted Wage/Salary $/hour (including overtime)	INTERVIEWER WORKSPACE: Number of Employees	INTERVIEWER WORKSPACE: Labor Rate $/hour Range (including overtime)	Fringe Benefit Percent
Full-time checkers	(28) _____	(29) _____			(30) _____
Part-time checkers	(31) _____	(32) _____			(33) _____
Full-time baggers	(34) _____	(35) _____			(36) _____
Part-time baggers	(37) _____	(38) _____			(39) _____
	100% of front end work				

LABOR RATE SCHEDULE (Continued)

Lead in: Besides yourself, there are probably other store employees who perform work other than product handling or physical labor (i.e. bookkeeping, ordering, office work). (We need to enumerate these individuals.)

Personnel	INTERVIEWER WORKSPACE: Number of Employees	Percent of Time Handling Product or Doing Physical Labor	$ for Last Pay Period (including overtime)	* Total Wage/Salary $/week (Add)	Weighted Percent of Time Handling Product or Doing Physical Labor (calculate)	Fringe Benefit Percent
Store manager				(40) _____	(41) _____	(42) _____
Assistant manager(s)				(43) _____	(44) _____	(45) _____
Mid night				(46) _____	(47) _____	(48) _____
Dept. managers						
Dairy						
Produce						
Grocery						
Frozen						
Meat						
Deli						
Bakery						
Other _____						
Other _____						
Other _____						

LABOR RATE SCHEDULE (Continued)

Personnel	INTERVIEWER WORKSPACE: Number of Employees	Percent of time handling product or doing physical labor	$ for last pay period (including overtime)	*Total wage/salary $/week (Add)	Weighted percent of time handling product or doing physical labor (calculate)	Fringe benefit percent
Customer service and office personnel Bookkeeper Assistant Bookkeeper Frontend Manager Head Cashier Other _____ Other _____				(49) _____	(50) _____	(51) _____

(52) Total Store Payroll? $_____/week

(53) Considering the total store payroll in $ per week, what percent of that is full-timers and what percent is part-timers?

_____% full-timers _____% part-timers

(Interviewer calculates the weighted fringe benefits for the store (non-management).)

_____

** Fringe Benefits % (Store's Contribution) INTERVIEWER WORKSPACE

ITEM	FULL-TIME	PART-TIME	MANAGEMENT	ITEM	FULL-TIME	PART-TIME	MANAGEMENT
FICA (Soc. Sec.) Fed. & State Unempl. Workman's Comp. Pension/Retirement Medical & Dental				Vacation Holidays Personal Days Sick Days Other Fringes (i.e. Christmas Bonus, store reductions)			

MILK STUDY QUESTIONNAIRE: Part III. Store Headquarters Interview

(54) Do you own or lease the store?

_____Own
_____Lease

(55) Lease payment?

$_____year — Security payment? _____.

(56) Insurance (if not included in the lease) (fire, theft, property, etc.)?

$_____year

(57) Property tax (if not included in the lease) (local and municipal)?

$_____year

* (58) $_____Utilities/year (heat and electricity)

*** MAKE SURE PARKING LOT IS INCLUDED. ***

(59) What is the average cost of electricity per month; kilowatt hours consumed?

$_____.____per kilowatt hour = _____ COST ÷ _____ # KWH

Who is your supplier of electricity_____?

* (60) What is this store's total dollar sales per week? (on average)

$_____week

* (61) What is the gross margin as a % of the total store sales for an average week?

_____% of sales

* (62) $_____. Supplies/year (i.e. bags, cleaning materials, register tapes, etc.

(63) If a chain supermarket, corporate sales $/year?

a._____ $150 million
b._____$150 x $500 million
c._____ $500 million

(64) If an independent, sales $/week?

a._____ $40,000
b._____$40,000 x $80,000
c._____ $80,000

	BRAND NAME	CONTAINER CODE P=plastic; G=glass; C=paper	PRICE MARKING Y=yes; N=no	SHELF LINEAR FEET DEVOTED TO EACH FLUID MILK ITEM	OBSERVED PRICE $ per unit	FEATURE PRICE (SALE) $ per unit[1]	INVOICE COST $ per unit 1st Week	INVOICE COST $ per unit 2nd Week	INVOICE COST $ per unit 3rd Week	INVOICE COST $ per unit 4th Week	INVOICE COST $ per unit 5th Week	INVOICE COST $ per unit 6th Week
	(AA)	(BB)	(CC)	WidthX Height=	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Regular												
(01) SB gal.												
(02) SP gal.												
(03) SB 1/2												
(04) SB 1/2												
(05) SP 1/2												
(06) SP 1/2												
(07) SB qt.												
(08) SP qt.												
(03A) TWIN 2%												
(09) SB gal.												
(10) SP gal.												
(11) SB 1/2												
(12) SB 1/2												
(13) SP 1/2												
(14) SP 1/2												
(15) SB qt.												
(16) SP qt.												
(16A) TWIN 1%												
(17) SB gal.												
(18) SP gal.												
(19) SB 1/2												
(20) SB 1/2												
(21) SP 1/2												
(22) SP 1/2												
(23) SB qt.												
(24) SP qt.												
(24A) TWIN skim												
(25) SB gal.												
(26) SP gal.												
(27) SB 1/2												
(28) SB 1/2												
(29) SP 1/2												
(30) SP 1/2												
(31) SB qt.												
(32) SP qt.												

SB = store brand; SP = supplier brand

If store or dairy manager cooperative, ask whether any of milk prices are specials this week. Also ask if had any specials in milk lately. If so, when, what items, etc. The answers to these questions will provide background for headquarters visit.

(I)	PRICE $ per unit	1st Week
(J)	PRICE $ per unit	2nd Week
(K)	PRICE $ per unit	3rd Week
(L)	PRICE $ per unit	4th Week
(M)	PRICE $ per unit	5th Week
(N)	PRICE $ per unit	6th Week
(O)	QUANTITY SOLD OR DELIVERED	1st Week
(P)	QUANTITY SOLD OR DELIVERED	2nd Week
(Q)	QUANTITY SOLD OR DELIVERED	3rd Week
(R)	QUANTITY SOLD OR DELIVERED	4th Week
(S)	QUANTITY SOLD OR DELIVERED	5th Week
(T)	QUANTITY SOLD OR DELIVERED	6th Week
(U)	WEIGHTED AVERAGE * INVOICE COST $ per unit	
(V)	AVERAGE QUANTITY * SOLD OR DELIVERED/WEEK	
(W)	WEIGHTED AVERAGE * PRICE $ per unit	

APPENDIX 2

RETAIL PRICES, GROSS MARGINS, COSTS AND PROFITS, DIFFERENT RETAIL OUTLETS, SIX MAJOR MILK ITEMS, FIVE MARKET AREAS, MAY-JUNE 1984

Appendix 2. Retail Prices, Gross Margins, Costs and Profits, Different Retail Outlets, Six Major Milk Items, Albany, May-June 1984

	Homogenized			Lowfat		Skim
	Gallon	Half Gal.	Quart	Gallon	Half Gal.	Half Gal.
RETAIL PRICE						
CHAIN	2.2228	1.1282	0.5807	2.0261	1.0668	0.9865
INDEP	2.0977	1.0929	0.6089	1.9229	1.0084	0.9500
D/C	1.9603	1.0438	0.6107	1.7759	0.9981	0.8781
ALL STORES	2.0709	1.0776	0.5890	1.8570	1.0464	0.9681
INVOICE COST						
CHAIN	1.6615	0.8254	0.4410	1.4988	0.7855	0.7032
INDEP	1.8008	0.8734	0.4695	1.5823	0.9090	0.8100
D/C	1.6119	0.8397	0.4750	1.4416	0.7982	0.7126
ALL STORES	1.6446	0.8320	0.4500	1.4713	0.7943	0.7062
GROSS MARGINS						
CHAIN	0.5613	0.3028	0.1397	0.5273	0.2813	0.2833
INDEP	0.2969	0.2189	0.1394	0.3406	0.0994	0.1400
D/C	0.3484	0.2041	0.1357	0.3343	0.1999	0.1655
ALL STORES	0.4263	0.2457	0.1389	0.3858	0.2521	0.2619
DIRECT COSTS						
CHAIN	0.0681	0.0493	0.0407	0.0722	0.0549	0.0472
INDEP	0.0598	0.0357	0.0291	0.0576	0.0406	0.0417
D/C	0.0413	0.0255	0.0200	0.0412	0.0248	0.0255
ALL STORES	0.0576	0.0410	0.0354	0.0560	0.0375	0.0431
DPP						
CHAIN	0.4932	0.2535	0.0990	0.4551	0.2264	0.2361
INDEP	0.2371	0.1832	0.1103	0.2830	0.0588	0.0983
D/C	0.3071	0.1786	0.1157	0.2931	0.1751	0.1400
ALL STORES	0.3687	0.2047	0.1035	0.3298	0.2146	0.2189
INDIRECT COSTS						
CHAIN	0.0565	0.0369	0.0292	0.0578	0.0404	0.0378
INDEP	0.0458	0.0239	0.0194	0.0419	0.0264	0.0378
D/C	0.0522	0.0319	0.0288	0.0487	0.0303	0.0393
ALL STORES	0.0547	0.0348	0.0288	0.0528	0.0345	0.0381
TOTAL HANDLING						
CHAIN	0.1246	0.0862	0.0699	0.1300	0.0953	0.0850
INDEP	0.1056	0.0597	0.0485	0.0995	0.0670	0.0795
D/C	0.0935	0.0574	0.0488	0.0899	0.0552	0.0648
ALL STORES	0.1122	0.0758	0.0642	0.1088	0.0720	0.0811
NET PROFIT						
CHAIN	0.4367	0.2166	0.0698	0.3973	0.1860	0.1983
INDEP	0.1913	0.1593	0.0909	0.2411	0.0324	0.0605
D/C	0.2549	0.1467	0.0869	0.2444	0.1448	0.1007
ALL STORES	0.3140	0.1699	0.0747	0.2770	0.1801	0.1808

Appendix 2. Retail Prices, Gross Margins, Costs and Profits, Different Retail Outlets, Six Major Milk Items, Syracuse, May-June 1984

	Homogenized			Lowfat		Skim
	Gallon	Half Gal.	Quart	Gallon	Half Gal.	Half Gal.
RETAIL PRICE						
CHAIN	2.0185	0.9794	0.5623	1.8948	0.8899	0.8816
INDEP	1.9867	0.9986	0.5916	1.8508	0.9225	0.8152
D/C	2.0064	1.0006	0.5393	1.8351	0.9312	0.7855
ALL STORES	2.0026	0.9882	0.5672	1.8938	0.9107	0.8062
INVOICE COST						
CHAIN	1.6198	0.8143	0.4303	1.5456	0.7680	0.6860
INDEP	1.6839	0.8328	0.4554	1.6384	0.8185	0.6921
D/C	1.6246	0.8194	0.4066	1.4709	0.7563	0.6299
ALL STORES	1.6484	0.8219	0.4344	1.5620	0.7756	0.6629
GROSS MARGINS						
CHAIN	0.3987	0.1651	0.1320	0.3492	0.1219	0.1956
INDEP	0.3028	0.1658	0.1362	0.2124	0.1040	0.1231
D/C	0.3818	0.1812	0.1327	0.3642	0.1749	0.1556
ALL STORES	0.3542	0.1663	0.1329	0.3318	0.1351	0.1432
DIRECT COSTS						
CHAIN	0.0975	0.0552	0.0432	0.0982	0.0544	0.0553
INDEP	0.0746	0.0416	0.0345	0.0662	0.0433	0.0456
D/C	0.0518	0.0338	0.0277	0.0500	0.0344	0.0343
ALL STORES	0.0822	0.0454	0.0369	0.0815	0.0469	0.0439
DPP						
CHAIN	0.3012	0.1099	0.0888	0.2510	0.0675	0.1403
INDEP	0.2282	0.1242	0.1017	0.1462	0.0607	0.0775
D/C	0.3300	0.1474	0.1050	0.3142	0.1405	0.1213
ALL STORES	0.2720	0.1208	0.0960	0.2503	0.0882	0.0993
INDIRECT COSTS						
CHAIN	0.0662	0.0366	0.0292	0.0653	0.0348	0.0395
INDEP	0.0615	0.0317	0.0254	0.0533	0.0310	0.0315
D/C	0.0641	0.0342	0.0272	0.0554	0.0344	0.0313
ALL STORES	0.0639	0.0343	0.0274	0.0603	0.0339	0.0341
TOTAL HANDLING						
CHAIN	0.1636	0.0918	0.0725	0.1635	0.0893	0.0949
INDEP	0.1360	0.0734	0.0599	0.1195	0.0743	0.0771
D/C	0.1160	0.0679	0.0549	0.1055	0.0688	0.0657
ALL STORES	0.1461	0.0798	0.0643	0.1418	0.0808	0.0780
NET PROFIT						
CHAIN	0.2350	0.0733	0.0596	0.1857	0.0327	0.1008
INDEP	0.1667	0.0925	0.0763	0.0929	0.0297	0.0460
D/C	0.2659	0.1132	0.0778	0.2588	0.1061	0.0900
ALL STORES	0.2081	0.0865	0.0686	0.1900	0.0543	0.0652

Appendix 2. Retail Prices, Gross Margins, Costs and Profits, Different Retail Outlets, Six Major Milk Items, Brooklyn, May-June 1984

	Homogenized			Lowfat		Skim
	Gallon	Half Gal.	Quart	Gallon	Half Gal.	Half Gal.
RETAIL PRICE						
CHAIN	2.2714	1.1922	0.6487	2.2348	1.2350	1.2203
INDEP	2.1211	1.1759	0.6305	2.0747	1.1225	1.3356
D/C	---	---	---	---	---	---
ALL STORES	2.1711	1.1850	0.6388	2.1690	1.1839	1.2461
INVOICE COST						
CHAIN	1.9477	1.0036	0.5131	1.8131	0.9790	0.9374
INDEP	2.1357	1.0789	0.5402	1.9213	1.0690	1.0296
D/C	----	----	----	----	----	----
ALL STORES	2.0723	1.0501	0.5291	1.8503	1.0254	0.9518
GROSS MARGINS						
CHAIN	0.3237	0.1886	0.1356	0.4217	0.2560	0.2829
INDEP	-0.0146	0.0970	0.0903	0.1534	0.0535	0.3060
D/C	---	---	---	---	---	---
ALL STORES	0.0988	0.1349	0.1096	0.3187	0.1585	0.2943
DIRECT COSTS						
CHAIN	0.0814	0.0617	0.0464	0.0906	0.0666	0.0666
INDEP	0.0644	0.0443	0.0310	0.0702	0.0439	0.0444
D/C	-----	-----	-----	-----	-----	-----
ALL STORES	0.0702	0.0509	0.0373	0.0836	0.0549	0.0632
DPP						
CHAIN	0.2423	0.1269	0.0892	0.3311	0.1894	0.2163
INDEP	-0.0790	0.0527	0.0593	0.0832	0.0096	0.2616
D/C	---	---	---	---	---	---
ALL STORES	0.0287	0.0839	0.0724	0.2351	0.1037	0.2316
INDIRECT COSTS						
CHAIN	0.0676	0.0463	0.0334	0.0890	0.0517	0.0479
INDEP	0.0585	0.0388	0.0260	0.0667	0.0399	0.0496
D/C	-----	-----	-----	-----	-----	-----
ALL STORES	0.0616	0.0416	0.0290	0.0813	0.0456	0.0482
TOTAL HANDLING						
CHAIN	0.1491	0.1080	0.0798	0.1797	0.1183	0.1146
INDEP	0.1230	0.0830	0.0570	0.1370	0.0838	0.0940
D/C	-----	-----	-----	-----	-----	-----
ALL STORES	0.1318	0.0926	0.0663	0.1650	0.1005	0.1113
NET PROFIT						
CHAIN	0.1747	0.0806	0.0558	0.2421	0.1377	0.1684
INDEP	-0.1375	0.0139	0.0333	0.0165	-0.0303	0.2120
D/C	---	---	---	---	---	---
ALL STORES	-0.0329	0.0423	0.0433	0.1537	0.0580	0.1830

Appendix 2. Retail Prices, Gross Margins, Costs and Profits, Different Retail Outlets, Six Major Milk Items, Nassau/Suffolk, May-June 1984

	Homogenized			Lowfat		Skim
	Gallon	Half Gal.	Quart	Gallon	Half Gal.	Half Gal.
RETAIL PRICE						
CHAIN	2.1993	1.1574	0.6524	2.0842	1.1787	1.2126
INDEP	2.0809	1.1043	0.6177	1.9787	1.1087	1.1900
D/C	2.3051	1.1830	0.7216	2.1700	1.1858	---
ALL STORES	2.1861	1.1447	0.6489	2.0644	1.1578	1.2099
INVOICE COST						
CHAIN	1.9564	1.0084	0.5146	1.7678	0.9674	0.9451
INDEP	1.9741	1.0187	0.5156	1.8441	1.0064	1.0026
D/C	2.0799	1.0570	0.5474	1.9299	1.0409	---
ALL STORES	1.9658	1.0143	0.5169	1.7811	0.9819	0.9520
GROSS MARGINS						
CHAIN	0.2429	0.1490	0.1378	0.3164	0.2113	0.2675
INDEP	0.1068	0.0856	0.1021	0.1346	0.1023	0.1874
D/C	0.2252	0.1260	0.1742	0.2401	0.1449	---
ALL STORES	0.2203	0.1304	0.1320	0.2834	0.1759	0.2579
DIRECT COSTS						
CHAIN	0.0776	0.0556	0.0398	0.0775	0.0597	0.0531
INDEP	0.0547	0.0374	0.0319	0.0481	0.0399	0.0331
D/C	0.0416	0.0275	0.0202	0.0396	0.0279	---
ALL STORES	0.0720	0.0493	0.0368	0.0725	0.0525	0.0507
DPP						
CHAIN	0.1653	0.0934	0.0980	0.2389	0.1516	0.2144
INDEP	0.0521	0.0482	0.0702	0.0865	0.0624	0.1543
D/C	0.1836	0.0985	0.1540	0.2005	0.1170	---
ALL STORES	0.1483	0.0811	0.0952	0.2109	0.1234	0.2072
INDIRECT COSTS						
CHAIN	0.0615	0.0405	0.0291	0.0628	0.0441	0.0370
INDEP	0.0520	0.0331	0.0289	0.0460	0.0368	0.0509
D/C	0.0634	0.0393	0.0298	0.0807	0.0440	---
ALL STORES	0.0601	0.0386	0.0291	0.0601	0.0417	0.0387
TOTAL HANDLING						
CHAIN	0.1390	0.0961	0.0688	0.1402	0.1037	0.0901
INDEP	0.1068	0.0705	0.0609	0.0941	0.0768	0.0840
D/C	0.1050	0.0668	0.0501	0.1203	0.0718	---
ALL STORES	0.1321	0.0879	0.0659	0.1326	0.0942	0.0894
NET PROFIT						
CHAIN	0.1038	0.0529	0.0689	0.1761	0.1075	0.1774
INDEP	-0.0001	0.0151	0.0413	0.0405	0.0256	0.1034
D/C	0.1202	0.0592	0.1242	0.1198	0.0730	---
ALL STORES	0.0882	0.0425	0.0661	0.1507	0.0818	0.1685

Appendix 2. Retail Prices, Gross Margins, Costs and Profits, Different Retail Outlets, Six Major Milk Items, Northern New Jersey, May-June 1984

	Homogenized			Lowfat		Skim
	Gallon	Half Gal.	Quart	Gallon	Half Gal.	Half Gal.
RETAIL PRICE						
CHAIN	1.9973	1.0154	0.5703	1.9032	1.0429	1.0068
INDEP	---	---	---	---	---	---
D/C	1.9752	1.0736	0.6623	1.8352	1.0315	1.0722
ALL STORES	1.9813	1.0310	0.5865	1.8854	1.0405	1.0177
INVOICE COST						
CHAIN	1.7414	0.8823	0.4586	1.6033	0.8568	0.7943
INDEP	---	---	---	---	---	---
D/C	1.7797	0.9236	0.5047	1.5486	0.8361	0.7822
ALL STORES	1.7481	0.8902	0.4643	1.5899	0.8518	0.7931
GROSS MARGINS						
CHAIN	0.2559	0.1331	0.1117	0.2999	0.1860	0.2125
INDEP	---	---	---	---	---	---
D/C	0.1955	0.1500	0.1576	0.2866	0.1954	0.2900
ALL STORES	0.2332	0.1408	0.1222	0.2954	0.1886	0.2246
DIRECT COSTS						
CHAIN	0.0737	0.0541	0.0406	0.0819	0.0534	0.0526
INDEP	---	---	---	---	---	---
D/C	0.0408	0.0265	0.0192	0.0406	0.0262	0.0267
ALL STORES	0.0679	0.0488	0.0379	0.0718	0.0461	0.0500
DPP						
CHAIN	0.1823	0.0790	0.0711	0.2180	0.1326	0.1599
INDEP	---	---	---	---	---	---
D/C	0.1547	0.1235	0.1384	0.2460	0.1692	0.2633
ALL STORES	0.1653	0.0920	0.0844	0.2236	0.1426	0.1746
INDIRECT COSTS						
CHAIN	0.0528	0.0348	0.0252	0.0575	0.0350	0.0355
INDEP	---	---	---	---	---	---
D/C	0.0460	0.0286	0.0227	0.0465	0.0291	0.0367
ALL STORES	0.0516	0.0336	0.0249	0.0548	0.0336	0.0356
TOTAL HANDLING						
CHAIN	0.1265	0.0889	0.0658	0.1394	0.0874	0.0881
INDEP	---	---	---	---	---	---
D/C	0.0868	0.0551	0.0419	0.0872	0.0553	0.0634
ALL STORES	0.1196	0.0824	0.0628	0.1267	0.0796	0.0857
NET PROFIT						
CHAIN	0.1294	0.0442	0.0459	0.1605	0.0976	0.1244
INDEP	---	---	---	---	---	---
D/C	0.1088	0.0949	0.1157	0.1995	0.1401	0.2266
ALL STORES	0.1137	0.0583	0.0595	0.1688	0.1090	0.1390

APPENDIX 3

STATISTICAL TABLES

Test of Significance (t-test) For
All Stores for Mean Differences

Albany Compared To Other Markets

Factor	Product/ Size	MARKET Syracuse	Brooklyn	Nassau-Suffolk	Northern New Jersey
Retail Price	H G	*	NS	*	*
	H H	*	*	*	*
	L G	NS	*	*	NS
Invoice Costs	H G	NS	*	*	*
	H H	NS	*	*	*
	L G	*	*	*	*
In-Store Direct Costs	H G	*	*	*	NS
	H H	NS	*	NS	NS
	L G	*	*	*	*
Direct Product Profit	H G	*	*	*	*
	H H	*	*	*	*
	L G	*	NS	*	*

Test of Significance (F-Test) For All Stores
For Variance Differences

Albany Compared to Other Markets

Factor	Product/ Size	MARKET Syracuse	Brooklyn	Nassau-Suffolk	Northern New Jersey
Retail Price	H G	*	*	NS	*
	H H	*	*	*	*
	L G	*	NS	NS	*
Invoice Costs	H G	*	*	*	NS
	H H	*	*	*	NS
	L G	*	NS	*	NS
In-Store Direct Costs	H G	NS	*	NS	NS
	H H	NS	NS	NS	NS
	L G	NS	NS	NS	NS
Direct Product Profit	H G	*	*	NS	*
	H H	NS	*	NS	NS
	L G	*	*	NS	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
All Stores for Mean Differences

Syracuse Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Brooklyn	Nassau-Suffolk	Northern New Jersey
Retail Price	H G	*	*	*	NS
	H H	*	*	*	*
	L G	NS	*	*	NS
Invoice Costs	H G	NS	*	*	*
	H H	NS	*	*	*
	L G	*	*	*	NS
In-Store Direct Costs	H G	*	*	NS	*
	H H	NS	NS	NS	NS
	L G	*	NS	NS	NS
Direct Product Profit	H G	*	*	NS	*
	H H	*	NS	*	*
	L G	*	NS	NS	NS

Test of Significance (F-Test) For All Stores
For Variance Differences

Syracuse Compared to Other Markets

Factor	Product/ Size	MARKET Albany	Brooklyn	Nassau-Suffolk	Northern New Jersey
	H G	*	*	*	*
Retail Price	H H	*	*	NS	NS
	L G	*	*	*	NS
Invoice Costs	H G	*	*	NS	*
	H H	*	*	NS	*
	L G	*	NS	*	*
In-Store Direct Costs	H G	NS	*	NS	NS
	H H	NS	NS	*	NS
	L G	NS	NS	NS	NS
Direct Product Profit	H G	*	*	*	NS
	H H	NS	*	NS	NS
	L G	*	*	*	NS

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
All Stores for Mean Differences

Brooklyn Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Nassau-Suffolk	Northern New Jersey
Retail Price	H G	NS	*	NS	*
	H H	*	*	NS	*
	L G	*	*	NS	*
Invoice Costs	H G	*	*	*	*
	H H	*	*	*	*
	L G	*	*	NS	*
In-Store Direct Costs	H G	*	*	NS	NS
	H H	*	NS	NS	NS
	L G	*	NS	NS	NS
Direct Product Profit	H G	*	*	*	*
	H H	*	NS	NS	NS
	L G	NS	NS	NS	NS

Test of Significance (F-test) For
All Stores for Variance Differences

Brooklyn Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Nassau-Suffolk	Northern New Jersey
	H G	*	*	*	*
Retail Price	H H	*	*	*	*
	L G	NS	*	NS	*
Invoice Costs	H G	*	*	*	*
	H H	*	*	*	*
	L G	NS	NS	*	NS
In-Store Direct Costs	H G	*	*	*	*
	H H	NS	NS	*	NS
	L G	NS	NS	NS	*
Direct Product Profit	H G	*	*	*	*
	H H	*	*	*	*
	L G	*	*	*	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
All Stores for Mean Differences

Nassau/Suffolk Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Northern New Jersey
Retail	H G	*	*	NS	*
Price	H H	*	*	NS	*
	L G	*	*	NS	*
Invoice	H G	*	*	*	*
Costs	H H	*	*	*	*
	L G	*	*	NS	*
In-Store	H G	*	NS	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	*	NS	NS	NS
Direct	H G	*	NS	*	NS
Product	H H	*	*	NS	NS
Profit	L G	*	NS	NS	NS

Test of Significance (F-test) For
All Stores for Variance Differences

Nassau/Suffolk Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Northern New Jersey
	H G	NS	*	*	*
Retail	H H	*	NS	*	NS
Price	L G	NS	*	NS	*
Invoice	H G	*	NS	*	NS
Costs	H H	*	NS	*	*
	L G	*	*	*	*
In-Store	H G	NS	NS	*	NS
Direct	H H	NS	*	*	NS
Costs	L G	NS	NS	NS	NS
Direct	H G	NS	*	*	*
Product	H H	NS	NS	*	NS
Profit	L G	NS	*	*	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
All Stores for Mean Differences

Northern New Jersey Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Nassau-Suffolk
Retail Price	H G	*	NS	*	*
	H H	*	*	*	*
	L G	NS	NS	*	*
Invoice Costs	H G	*	*	*	*
	H H	*	*	*	*
	L G	*	NS	*	*
In-Store Direct Costs	H G	NS	*	NS	NS
	H H	NS	NS	NS	NS
	L G	*	NS	NS	NS
Direct Product Profit	H G	*	*	*	NS
	H H	*	*	NS	NS
	L G	*	NS	NS	NS

Test of Significance (F-test) For
All Stores for Variance Differences

Northern New Jersey Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Nassau-Suffolk
	H G	*	*	*	*
Retail Price	H H	*	NS	*	NS
	L G	*	NS	*	*
Invoice Costs	H G	NS	*	*	NS
	H H	NS	*	*	*
	L G	NS	*	NS	*
In-Store Direct Costs	H G	NS	NS	*	NS
	H H	NS	NS	NS	NS
	L G	NS	NS	*	NS
Direct Product Profit	H G	*	NS	*	*
	H H	NS	NS	*	NS
	L G	*	NS	*	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
Chain Stores for Mean Differences

Albany Compared To Other Markets

Factor	Product/ Size	MARKET Syracuse	Brooklyn	Nassau-Suffolk	Northern New Jersey
	H G	*	NS	NS	*
Retail	H G	*	NS	NS	*
Price	L G	*	*	NS	*
Invoice	H G	*	*	*	*
Costs	H H	NS	*	*	*
	L G	*	*	*	*
In-Store	H G	*	NS	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	*	NS	NS	NS
Direct	H G	*	*	*	*
Product	H H	*	*	*	*
Profit	L G	*	NS	*	*

Test of Significance (F-test) For
Chain Stores for Variance Differences

Albany Compared To Other Markets

Factor	Product/ Size	MARKET Syracuse	Brooklyn	Nassau-Suffolk	Northern New Jersey
	H G	NS	NS	NS	*
Retail	H H	NS	NS	NS	NS
Price	L G	*	NS	NS	*
Invoice	H G	*	NS	NS	NS
Costs	H H	*	*	*	NS
	L G	NS	*	NS	NS
In-Store	H G	NS	*	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	NS	NS	NS	NS
Direct	H G	NS	*	NS	*
Product	H H	NS	*	NS	NS
Profit	L G	*	NS	NS	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
Chain Stores for Mean Differences

Syracuse Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Brooklyn	Nassau-Suffolk	Northern New Jersey
	H G	*	*	*	*
Retail	H H	*	*	*	*
Price	L G	*	*	*	NS
Invoice	H G	*	*	*	*
Costs	H H	NS	*	*	*
	L G	*	*	*	*
In-Store	H G	*	*	*	*
Direct	H H	NS	NS	NS	NS
Costs	L G	*	NS	*	*
Direct	H G	*	NS	*	*
Product	H H	*	NS	NS	*
Profit	L G	*	NS	NS	NS

Test of Significance (F-test) For
Chain Stores for Variance Differences

Syracuse Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Brooklyn	Nassau-Suffolk	Northern New Jersey
	H G	NS	*	*	NS
Retail	H H	NS	*	NS	NS
Price	L G	*	*	*	NS
Invoice	H G	*	*	*	*
Costs	H H	*	NS	*	*
	L G	NS	NS	*	*
In-Store	H G	NS	NS	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	NS	NS	NS	NS
Direct	H G	NS	*	*	NS
Product	H H	NS	*	NS	NS
Profit	L G	*	*	*	NS

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
Chain Stores for Mean Differences

Brooklyn Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Nassau-Suffolk	Northern New Jersey
	H G	NS	*	NS	*
Retail	H H	NS	*	NS	*
Price	L G	*	*	*	*
Invoice	H G	*	*	NS	*
Costs	H H	*	*	NS	*
	L G	*	*	NS	*
In-Store	H G	NS	*	NS	NS
Direct	H H	NS	NS	NS	*
Costs	L G	NS	NS	NS	NS
Direct	H G	*	NS	NS	NS
Product	H H	*	NS	NS	NS
Profit	L G	NS	NS	NS	NS

Test of Significance (F-test) For
Chain Stores for Variance Differences

Brooklyn Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Nassau-Suffolk	Northern New Jersey
	H G	NS	*	NS	*
Retail	H H	NS	*	*	*
Price	L G	NS	*	*	*
Invoice	H G	NS	*	NS	NS
Costs	H H	*	NS	*	*
	L G	*	NS	*	*
In-Store	H G	*	NS	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	NS	NS	NS	NS
Direct	H G	*	*	*	*
Product	H H	*	*	*	*
Profit	L G	NS	*	NS	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
Chain Stores for Mean Differences

Nassau-Suffolk Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Northern New Jersey
	H G	NS	*	NS	*
Retail	H H	NS	*	NS	*
Price	L G	NS	*	*	*
Invoice	H G	*	*	NS	*
Costs	H H	*	*	NS	*
	L G	*	*	NS	*
In-Store	H G	NS	*	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	NS	*	NS	NS
Direct	H G	*	*	NS	NS
Product	H H	*	NS	NS	NS
Profit	L G	*	NS	NS	NS

Test of Significance (F-test) For
Chain Stores for Variance Differences

Nassau-Suffolk Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Northern New Jersey
	H G	NS	*	NS	*
Retail	H H	NS	NS	*	NS
Price	L G	NS	*	*	*
Invoice	H G	NS	*	NS	NS
Costs	H H	*	*	*	NS
	L G	NS	*	*	NS
In-Store	H G	NS	NS	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	NS	NS	NS	NS
Direct	H G	NS	*	*	*
Product	H H	NS	NS	*	NS
Profit	L G	NS	*	NS	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons

Test of Significance (t-test) For
Chain Stores for Mean Differences

Northern New Jersey Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Nassau-Suffolk
	H G	*	*	*	*
Retail	H H	*	*	*	*
Price	L G	*	NS	*	*
Invoice	H G	*	*	*	*
Costs	H H	*	*	*	*
	L G	*	*	*	*
In-Store	H G	NS	*	NS	NS
Direct	H H	NS	NS	*	NS
Costs	L G	NS	*	NS	NS
Direct	H G	*	*	NS	NS
Product	H H	*	*	NS	NS
Profit	L G	*	NS	NS	NS

Test of Significance (F-test) For
Chain Stores for Variance Differences

Northern New Jersey Compared To Other Markets

Factor	Product/ Size	MARKET Albany	Syracuse	Brooklyn	Nassau-Suffolk
	H G	*	NS	*	*
Retail	H H	NS	NS	*	NS
Price	L G	*	NS	*	*
Invoice	H G	NS	*	NS	NS
Costs	H H	NS	*	*	NS
	L G	NS	*	*	NS
In-Store	H G	NS	NS	NS	NS
Direct	H H	NS	NS	NS	NS
Costs	L G	NS	NS	NS	NS
Direct	H G	*	NS	*	*
Product	H H	NS	NS	*	NS
Profit	L G	*	NS	*	*

* Significant differences at 95% level of confidence
NS - NOT Significant differences at 95% level of confidence
HG = Homogenized gallons
HH = Homogenized half gallons
LG = Lowfat gallons