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# Food Stamp Redemptions: Their Impact on Food Sales by Region, Size, and Kind of Participating Food Stores— Fiscal 1976

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Paul E. Nelson

U.S. Department of Agriculture  
Economics, Statistics, and Cooperatives Service

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#### ABSTRACT

The amount of food sales, food stamp redemptions, and cash/check receipts for all retail food stores which participated in the Food Stamp Program in fiscal 1976 were analyzed according to region, kind, and size of store. Differences among the distributions were identified to ascertain the extent to which any region, kind, or size of store received a greater proportion of the total value of food stamps redeemed than it had of the total value of cash/checks received for the same fiscal year. Differences were tested to determine if they might be attributed to chance.

Key words: Food stamps, fiscal 1976, food sales, cash/check receipts, food stamp redemptions, large chains, other chains, independents, dairy routes, bakery routes, other mobile stores, miscellaneous stores.

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## SUMMARY

The \$8.5 billion worth of food stamps spent in fiscal 1976 particularly affected the retail food sales of small and independent food stores.

Independent stores for each size class received a substantially larger proportion of the total food stamp redemptions than they did of the total cash/check receipts. Many small and independent stores would have had more difficulty surviving, had there been no Food Stamp Program.

This report examines the impact of the national Food Stamp Program on retail food sales during fiscal 1976 for independent as well as chain stores, bakery and dairy routes and other mobile stores, and miscellaneous food retail outlets.

The report specifically asked if, and found that, food stamp expenditures affected the distribution and amount of food sales received by participating stores among the Food and Nutrition Service regions. Particularly affected were the New England, mid-Atlantic, and Southeast regions.

Variation was found within regions in the distribution of store numbers and total food sales among kinds of stores. The ratio of food stamp redemptions to total food sales differed among regions for each category of store, and varied even more by kind of store within each region.

Data were analyzed using the Chi-square method according to kind and size of store and by region to determine if distributional differences in the data are attributable to chance. Tested differences, with one exception, were found to be statistically significant.

Comparison of data for stores participating in the program throughout the year to data for stores which ceased participating during this period showed that the differences in the data could be attributed to chance. Consequently, such stores did not cease participating because of impacts of the program.

**Food Stamp Redemptions:  
Their Impact on Food Sales by  
Region, Size, and Kind of  
Participating Food Stores—  
Fiscal 1976**

Paul E. Nelson

INTRODUCTION

Of the \$8.5 billion of food stamps spent during fiscal 1976 (July 1975-June 1976), 96.9 percent was spent in stores redeeming stamps throughout the fiscal year, 2.6 percent in stores which initiated participation during the year, and 0.5 percent in stores which ceased participation during this period. Of the \$8.5 billion, \$7.7 billion was spent in stores located in the 50 States and the District of Columbia; the residual was spent in Puerto Rico, the Virgin Islands, and Guam.

Of the \$7.7 billion spent in the United States, food stores redeemed \$7.6 billion. Food stores accounted for almost 97 percent of the 1976 food and nonfood sales for participating and nonparticipating stores (3). <sup>1/</sup> The residual is attributed to bakery and dairy routes, roadside stands, and the like. The \$7.6 billion amounted to about 7.5 percent of total food sales in 1975 (1).

Of the \$8.5 billion food stamps distributed during fiscal 1976, about \$5.3 billion were free. The resulting increase in food stamp household disposable income directly generated additional food purchases. Estimates based upon empirical observation indicate that at least \$2.4 billion was added directly to food sales during this period (2). When retail food sales are increased this much by a public program, it is important to identify where the impact falls within the economy.

This report addresses two questions which relate to this issue. First, it examines whether food stamp expenditures affect the distribution of food sales by retail food stores among the Food Nutrition Service (FNS) regions (fig. 1), and secondly, whether those expenditures within each region affect the amount of total food sales which constitute the retail market for food.

Method of Comparison

Frequency distributions were computed to show how store numbers, total food sales, cash/check receipts, and food stamp redemptions were distributed by kind and size of store, both within and among regions.

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<sup>1/</sup> Underscored numbers in parentheses refer to literature listed in the references section at the end of this report.

Figure 1--Food and Nutrition Service Regions 1/

Mountain Plains	Southeast	Midwest
Colorado	Alabama	Illinois
Iowa	Florida	Indiana
Kansas	Georgia	Michigan
Missouri	Kentucky	Minnesota
Montana	Mississippi	Ohio
Nebraska	North Carolina	Wisconsin
North Dakota	South Carolina	
South Dakota	Tennessee	New England
Utah		Connecticut
Wyoming	Western <u>2/</u>	Maine
	Alaska	Massachusetts
Mid-Atlantic	Arizona	New Hampshire
Delaware	California	Rhode Island
District of Columbia	Guam	Vermont
Maryland	Hawaii	
New Jersey	Idaho	Southwest
New York	Nevada	Arkansas
Pennsylvania	Oregon	Louisiana
Virginia	Washington	New Mexico
West Virginia		Oklahoma
Puerto Rico		Texas
Virgin Islands		

1/ When using regional data for the mid-Atlantic and Western regions, all data include Puerto Rico and the Virgin Islands, and Guam and Hawaii, respectively, unless otherwise indicated.

2/ At the time of this study, there was no Food Stamp Program in American Samoa and the Trust Territories. Since then, both have started to participate.

If the food stamp expenditures do not affect the distribution of food sales among regions or kinds or sizes of stores within regions, there should be no statistically significant differences in the distributions of total cash/check receipts and corresponding distributions of total food stamp redemptions. For example, if the food stamp expenditures do not affect the distribution of sales among large chains, independents, and all other types of stores, then the proportion of total food stamps redeemed by those stores essentially should be the same as the proportion of total cash/check receipts received.

While the computed frequency distributions will help indicate the extent to which the distributions of cash/check receipts and food stamp redemptions are alike or different, tests are needed to determine if observed differences could have occurred by chance.

The Chi-square technique was used to test for significant differences among the distributions. Essentially, this procedure tests null hypotheses which state that there are no differences between specified factors or distributions at some stipulated level of probability (4, p. 7). If a null hypothesis is rejected, the differences between the distributions are not attributed to chance at the preselected level of probability. For this analysis, the 5-percent level is adopted; that is, if the differences noted could have occurred no more than 5 percent of the time by chance, they will be treated as statistically significant.

Like other statistical tests, results based on the Chi-square test are subject to two types of error. The first type occurs whenever the null hypothesis is rejected, when in fact it should not have been. The second occurs when the null hypothesis is not rejected when it should have been. The probability of the first type of error is established by the choice of the level of significance. The second type of error is associated with sample size. In this instance, there should be no sampling error, since the data are for the universe of participating stores. Of course, observational error remains a possibility (6, p. 72).

### The Data

Data for this report were supplied by the FNS Minneapolis Automatic Data Processing Center. The data include numbers and types of store, gross sales, total food sales, and total food stamp redemptions. Total food sales were composed of checks, cash, and food stamps.

Data were provided separately for each of three store groups: (1) Stores which began participating in the program during fiscal 1976; (2) stores which ceased participation during this period; and (3) stores which participated throughout the year. Data were most complete and reliable for stores which participated throughout the year. Stores which ceased participating may or may not have redeemed all stamps in their possession. For example, a bankruptcy proceeding could have resulted in stamps normally redeemed in fiscal 1976 not being redeemed until after the end of that fiscal year, if at all. However, stores which ceased participating in the program did not necessarily go out of business. In addition, stores starting late in the fiscal year might have received stamps in fiscal 1976, which they submitted for redemption in fiscal 1977.

Even so, the data for stores which participated for part of the year remain relevant. All stamps issued and spent during the fiscal year had to be redeemed through some store. By comparing the share of total food sales or total stamps redeemed by specific store types and regions for the partial year stores with the corresponding distributions for the full year stores, we gain a clue as to whether the distribution for participating stores (full and partial) at the start of the next fiscal year is essentially the same as the distribution for the full fiscal 1976 stores of the past fiscal year.

For example, since the share of total food sales of the partial fiscal 1976 large chains was 27.4 percent, but the corresponding share of the full fiscal 1976 large chains was 51 percent, the share of all large chains at the start of the next fiscal year would have to be less than 51.0 percent. Further, since the share of redeemed stamps by the partial fiscal 1976 stores accounted for 22.7 percent, whereas the corresponding share of the full fiscal 1976 stores was 44.4 percent (appendix tables 6, 8, 10, and 12), the share of total redeemed stamps by all large chains would be less than 44.4 percent at the start of the next fiscal year.

These share figures may be used to make an additional comparison between these two categories of stores. <sup>2/</sup> For example, the partial fiscal 1976 large chains' share was 46.3 percent lower than the corresponding full fiscal 1976 large chains' share of total food sales. In an analogous manner, the partial fiscal 1976 large chain share of food stamp redemptions was 48.9 percent less than the corresponding share of redemptions accruing to full fiscal 1976 large chains. Thus, in terms of comparative shares, the partial fiscal 1976 large chains had a slightly smaller share of redemptions than they did of food sales vis a vis the full fiscal 1976 large chains.

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<sup>2/</sup> The percentages cited in the two following share comparisons were derived as:  $\{100 - (27.4/51.0) = 46.3\}$  and  $\{100 - (22.7/44.4) = 48.9\}$



In order to minimize the numbers of tables which need to be presented, and to capture the essence of the change, the figures for total numbers of stores, total food sales, and total food stamp redemptions for stores which ceased participation during the fiscal year have been deducted from the corresponding figures for the stores which initiated participation during this same period. These net figures will be identified as those for partial fiscal 1976 stores. Data for the stores which participated for the entire fiscal year will be identified as full fiscal 1976 stores.

### Store Categories

Store categories are defined as follows:

1. Large chains: All retail food firms which have 11 or more establishments, and total annual sales of \$1 million or more (including all establishments).
2. Other chains: All food firms with 11 or more establishments, and total annual sales of less than \$1 million (including all establishments). 3/
3. Independents: All food firms which had fewer than 11 establishments. No annual sales size was stipulated.
4. Dairy routes: All firms which serviced their customers with dairy products (primarily) by selling to them at their residences. Products were transported in motor vehicles.
5. Bakery routes: Except that the primary products are bakery products, these are identical to the dairy route definition.
6. Other mobile stores: All firms (other than dairy and bakery) which service customers at their residences or on the street by relying upon wheeled vehicles for transporting products. This category includes the South's "rolling stores," along with pushcarts sometimes seen in urban areas.
7. Miscellaneous: All firms other than chains and independents whose sales are made from stationary facilities. This category includes military commissaries, road-side stands, nonchain fish and seafood stores, and facilities within established farmers' markets, usually in central cities.

### Data Presentation Sequence

The frequency distributions used are: (1) Regional overview; (2) food stores by kind and region; (3) food sales by kind of store and region; (4) food stamp redemptions by kind of store and region; (5) food stamp redemptions by size of store; and (6) Chi-square tests of significance.

Most of the text tables present the actual figures for each variable discussed. For instance, text tables report the number of stores, the numbers of persons participating, the total value of food sales, and food stamp redemptions. Where it becomes important to differentiate the 50 States and the District of Columbia, a separate total is reported. However, given this statistical context, most of the data are

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3/ This store category included not only grocery chains, but also seafood and fish firms with 11 or more establishments per company, and some large baking firms which sell products through factory outlets. Some stores appeared to be highly seasonal, such as fruit and vegetable stands. These firms had relatively low annual food sales because of the limited time of operation each year.

discussed in terms of distributions of proportions. Percentages are easier to comprehend.

The distributions are computed and treated in two ways. The first treats the proportion of total store numbers or total food sales by region for fiscal 1976. This is called the "vertical distribution" because the sum of the column was used to divide the component amount for each region to determine how much of the U.S. total was received by each region. With this calculation, one can determine, for example, New England's share of total food stamp redemptions or total food sales. In contrast, the horizontal distribution takes as given the total for each region, and divides that total into the component amount for each type of store which in aggregate constitutes that region's participant food store universe. Tabulation of this distribution answers questions such as the proportions of total food stamps redeemed by large chains, independents, and each of the other types of participating food stores in any given region.

Table 1--Persons and stores participating in the Food Stamp Program, and total food sales, food stamp redemptions, and cash/check receipts by region, fiscal 1976

Region	Persons	Stores			
		Number	Food sales	Food stamp redemptions	Cash/ checks
		<u>Percent</u>			
New England	5.9	5.0	6.0	5.9	6.0
Mid-Atlantic	29.0	25.6	24.0	28.6	23.6
Midwest	16.8	15.1	20.6	17.4	20.8
Mountain Plains	4.4	6.9	7.8	4.4	8.1
Southeast	20.5	23.6	15.5	20.1	15.2
Southwest	11.2	11.6	10.2	11.0	10.2
Western	12.2	12.2	15.9	12.6	16.1
U.S. total <u>1/</u>	100.0	100.0	100.0	100.0	100.0
		<u>Number</u>	<u>-----Billion dollars-----</u>		
U.S. total	<u>2/</u>	216,372	108.1	8.2	99.9

1/ Mid-Atlantic region includes the District of Columbia, Puerto Rico, and the Virgin Islands; the Western region includes Guam. Disaggregated data for the territories were not available for fiscal 1976.

2/ The number of participants is the cumulative monthly total for the fiscal year. The number of total participants does not correspond strictly to the numbers for total stores, food sales, and total stamp redemptions. The dollar figures refer only to stores which participated throughout the year. Persons refer to the total number of people participating in the food stamp program during the year. The total number of participants includes those who purchased in stores participating throughout the year, stores which ceased to participate during the year, and stores which started to participate during the year, and any combination of such stores. There were 222,320,743 persons who participated in the program on a monthly basis during fiscal 1976. Excluding the Islands, 202,956,513 persons participated. Among the Islands, the total for Puerto Rico plus the Virgin Islands was 19,064,099. In Guam, there were 300,131 participants.

In presenting the data, figures for the full fiscal 1976 stores are presented preceding the corresponding figures for the partial fiscal 1976 stores. The interrelationship of these two data sets then follows.

#### PRESENTATION OF DATA

The Food and Nutrition Service's regions are similar to those of the Census Bureau, but they differ in two ways: (1) The States included within each region; and (2) the fact that Puerto Rico and the Virgin Islands are part of the mid-Atlantic region, and Guam is included in the Western region. In the appendix tables, subtracting the total (which includes the 50 States and the District of Columbia) from the grand total (which also includes the Islands) will yield totals attributable to the Islands treated as an aggregate.

Ranking of regional distributions of participating people and stores, as well as food sales, food stamp redemptions, and cash/check receipts, are generally consistent for all reported items (table 1). In each category, the mid-Atlantic region ranked first. It had the largest proportion of total participating persons, food stores, total food sales, cash/check receipts, and food stamp redemptions. At the bottom of the rankings were New England and the Mountain Plains. New England had fewer food stores and less food sales and cash/check receipts, but more food stamp participants and a larger share of total food stamp redemptions than did the Mountain Plains.

Logically, there is a necessary association between a region's share of the number of persons participating in the program and its share of the total value of stamp redemptions. The greatest difference between a region's share of participating persons and its share of food stamp redemptions amounted to only 0.6 percent, which occurred in the Midwest. With the relationship so close, there was no purpose in continuing to treat both items. Throughout the following discussions, distributions of the value of food stamp redemptions have been used for comparisons with distributions of stores, sales, and so on to reflect possible impacts of the Food Stamp Program.

Distribution of stores and sales varied considerably. For example, regional shares in numbers of participating stores and total food sales differed substantially. The Southeast had 23.6 percent of the Nation's stores but only 15.5 percent of its total food sales.

The differences in the shares of sales appear to be linked to the different store sizes which predominate within each region. The average store size measured in mean sales per year makes the point quite clearly. For example, Census data (5, p. 40) (arranged to match FNS regional classifications) report food store sales for 1972. The annual mean sales of food stores located within the Southeast was \$263,657; the corresponding figure for the Midwest was \$449,324.

Census data for the West and Mountain Plains regions further illustrate the larger volume of sales characteristic of stores in other areas. The West had 12.2 percent of total stores, but 15.9 percent of the total food sales. The Mountain Plains had 6.9 percent of the stores, but 7.8 percent of total food sales. Once more, the size of store accounts for the distributive difference. The West's stores averaged \$528,638 per year for each food store; the Mountain Plains stores, \$415,325 (5, p. 40).

## Food Stores by Kind and Region

## Full Fiscal 1976 Stores

The data presented in table 2 indicate the two distributive perspectives. For all retail food stores in the economy, the first distribution shows the number of each food store type by region. The second distribution shows how many food stores fall within each category for each region as an entity.

Of the nation's retail food stores, 49.2 percent are located in the mid-Atlantic and Southeast regions (appendix table 1). These two regions had over 42 percent of all large chains, other chains, and bakery routes, and over 52 percent of all independents and other mobile stores. At the other extreme, the New England and the Mountain Plains regions accounted for only about 12 percent of all retail food stores. These two regions had less than 20 percent of each type of food store, except for dairy routes, which accounted for 22.2 percent. Together, these regions accounted for less than 15 percent of any type of food store.

Data reported in appendix table 1 also show that New England had only 5.5 percent of the nation's large chains, and 4.4 percent of its independents. New England's total number of retail food stores was so distributed that large chains amounted to 9.2 percent, and independents, 66.2 percent (appendix table 2).

In general, because stores tend to cluster in the three largest categories, (independents, large chains, and other chains), the vertical percentages tend to be smaller than the horizontal (appendix tables 1 and 2). For example, the mid-Atlantic and Southeast, respectively, have 27.8 and 25.0 percent of all independents. However, independents account for 82.6 and 80.3 percent of the stores within these two regions, respectively.

Table 2--Stores with full-year food stamp participation, by region and kind of store,  
fiscal 1976

Region	: Large chains	: Other chains	: Inde- pendents	: Dairy route	: Bakery route	: Other mobile stores	: Miscel- laneous	: Total
	:	:	:	<u>Number</u>			:	:
New England	: 997	1,077	7,140	429	13	279	850	10,785
Mid-Atlantic	: 4,329	2,501	45,744	688	156	1,290	689	55,397
Midwest	: 2,975	1,975	24,412	942	58	573	1,714	32,649
Mountain Plains	: 1,374	904	10,573	542	94	425	951	14,863
Southeast	: 3,300	4,446	41,186	332	204	929	862	51,259
Southwest	: 2,057	2,293	19,156	336	61	198	1,012	25,113
Western	: 3,014	1,750	16,458	1,096	205	557	3,226	26,306
	:	:	:	:	:	:	:	:
U.S. total, including territories <u>1</u> /	: 18,046	14,946	164,669	4,365	791	4,251	9,304	216,372
	:	:	:	:	:	:	:	:
U.S. total, excluding territories <u>2</u> /	: 17,969	14,916	151,832	4,355	772	3,975	9,253	203,072
	:	:	:	:	:	:	:	:

1/ Mid-Atlantic region includes the District of Columbia, Puerto Rico, and the Virgin Islands; the Western region includes Guam.

2/ Excludes Puerto Rico, the Virgin Islands, and Guam.



In contrast, in the two regions with the smallest proportion of stores, New England and Mountain Plains, the independents accounted for 4.4 and 6.4 percent of all food stores, respectively, while within each of these regions they accounted for 66.2 and 71.1 percent of the region's stores. Thus, within each region, independents account for from 62.6 to 82.6 percent of its total number of stores, although each region's share of all independents ranged from 4.4 to 27.8 percent.

These average horizontal percentages illustrate the distribution found nationwide, with and without the Islands. The three largest categories account for most of the stores. The pattern which shows that independents are considerably more common than either large or other chains, and that chains are more common than the residual minor categories repeats itself consistently throughout all regions. Only large and other chains occur in frequencies of such similar magnitude that at times one category is greater and at others, smaller. Other chains are more common in the Southeast, New England, and the Southwest regions.

#### Partial Fiscal 1976 Stores

In comparing the distribution of partial to full fiscal 1976 stores, interpretations must reflect the fact that when one category gains, another must lose (tables 3 and 4). The independents are the largest category with respect to numbers, with their share of total partial fiscal 1976 stores only 0.1 percent more than their share of total full fiscal 1976 stores. Other store categories which had greater shares of total partial than full fiscal 1976 stores were other chains, other mobile stores, and miscellaneous stores. Because these categories had greater shares, large chains and bakery and dairy routes had smaller shares. Although gaining in absolute numbers of stores, they lost relatively in comparison to the independents, other chains, and so on. If this change in share should continue, the result would be a shift in the kinds of stores composing the market for foods.

One of the more obvious shifts was the decline in share on the part of large chains, and the very slight gain on the part of independents. Both may be explained in part by the historical fact that each of these store types had a larger proportion of total stores participating than did other categories.

#### Food Sales by Region and Kind of Store

##### Full Fiscal 1976 Stores

The \$55.1 billion total food sales by large chains (table 5) accounted for 51.0 percent of the total food sales by all kinds of food stores. The more numerous independents accounted for \$45.3 billion, or 41.9 percent of all food sales through participating stores. This left 7.1 percent for all other kinds of food stores. Of this group, other chains accounted for 2.4 percent of total food sales. Kinds of stores ranked in order of percentage of total food sales (see appendix table 6) are:

<u>Store category</u>	<u>Percent of total food sales</u>
Large chains	51.0
Independents	41.9
Miscellaneous	2.5
Other chains	2.4
Dairy routes	1.9
Other mobile stores	0.2
Bakery routes	0.1
Total	100.0

Table 4--Stores participating in the Food Stamp Program, by kind of store and participation, fiscal 1976

Kind of store	Full-year participation	Partial-year participation
		<u>Percent</u>
Large chains	8.3	1.6
Other chains	6.9	9.3
Independents	76.1	76.2
Dairy routes	2.0	1.2
Bakery routes	0.4	0.3
Other mobile stores	2.0	4.2
Miscellaneous	4.3	7.2
Total	100.0	100.0

Sources: Appendix tables 2 and 4.

The distributive comparisons made for store numbers were repeated for retail food store sales. The mid-Atlantic and Southeastern regions together accounted for 39.5 percent of total food sales (appendix table 5). More specifically, these regions together account for over 40 percent of the total food sales by participating large chains, other chains, and dairy and bakery routes. They accounted for more than 35 percent of total food sales for each of the other mobile stores and independent categories, but only 28.6 percent for miscellaneous.

At the other extreme, New England and the Mountain Plains regions together accounted for 13.8 percent of total retail food store sales. By specific type of store, their large chains accounted for more than 13 percent of total food sales as did their other chains, independents, dairy routes, and miscellaneous stores. Bakery routes had 10.2 percent and other mobile stores 6.3 percent of total retail food store food sales.

Appendix table 6 reports within-region distribution, showing that large chains accounted for more than 47.0 percent of total food sales within each region. Independents followed closely with 36.0 percent or more; all other types of stores had less than 4 percent of the regions' total food sales. These food sales data are essentially consistent with the findings for the numbers of retail food stores. For both data series, within-region shares of the region's total by type of store often is greater than that region's share of the Nation's total for that type of store.

### Partial Fiscal 1976 Stores

Total food sales for partial fiscal 1976 stores were \$7.4 billion (table 6). This figure compares with \$108.1 billion for the full fiscal 1976 stores. Thus, during fiscal 1976, food sales by partial fiscal 1976 stores amounted to nearly 7 percent of the total food sales by the full fiscal 1976 stores. These sales data for partial fiscal 1976 stores were used to derive the proportions reported in appendix tables 7 and 8 in the same manner that the corresponding proportions in appendix tables 5 and 6 were computed for the full fiscal 1976 stores food sales.





Table 6--Total food sales of stores with partial-year food stamp participation, by region and kind of store, fiscal 1976

Region	: Large chains	: Other chains	: Inde- pendents	: Dairy routes	: Bakery routes	: Other mobile stores	: Miscel-laneous	: Total <u>1/</u>
	:	:	:	<u>1,000 dollars</u>				
New England	: 108,796	: 21,189	: 303,316	: 4,656	: 35	: 8,991	: 34,256	: 481,239
Mid-Atlantic	: 532,007	: 71,565	: 1,616,968	: 15,461	: 1,155	: 40,114	: 4,621	: 2,281,891
Midwest	: 295,046	: 49,569	: 683,143	: 14,267	: 60	: 49,841	: 25,658	: 1,117,584
Mountain Plains	: 118,437	: 25,521	: 227,704	: 4,800	: 506	: 3,747	: 4,922	: 385,637
Southeast	: 400,418	: 166,908	: 946,115	: 1,719	: 3,126	: 13,648	: 18,638	: 1,550,572
Southwest	: 208,653	: 59,040	: 348,069	: 1,595	: 258	: 4,819	: 9,707	: 632,141
Western	: 359,679	: 40,133	: 461,464	: 12,860	: 563	: 7,350	: 54,686	: 936,735
U.S. total, including territories <u>2/</u>	: 2,023,036	: 433,925	: 4,586,779	: 55,358	: 5,704	: 128,509	: 152,488	: 7,385,799
U.S. total, excluding territories <u>3/</u>	: 2,004,809	: 433,925	: 4,446,823	: 54,437	: 5,112	: 121,777	: 152,409	: 7,219,292

If large chains and independents of the partial fiscal 1976 stores had accrued the same share of total food sales as their counterpart full fiscal 1976 stores, each would have received 51.0 and 41.9 percent, respectively. Actually, they received 27.4 and 62.1 percent, respectively (table 7). Thus, partial fiscal 1976 independent stores accounted for a disproportionate share of the apparent growth in food sales in fiscal 1976.

Table 7--U.S. food sales accounted for by stores participating in the Food Stamp Program, by kind of store and participation, fiscal 1976

Kind of store	:	Full year	:	Partial year
	:	participation	:	participation
	:	<u>Percent</u>		
	:			
Large chains	:	51.0		27.4
Other chains	:	2.4		5.9
Independents	:	41.9		62.1
Dairy routes	:	1.9		.7
Bakery routes	:	.1		.1
Other mobile stores	:	.2		1.7
Miscellaneous	:	2.5		2.1
Total	:	100.0		100.0
	:			

Sources: Appendix tables 6 and 8

On a nationwide basis, these within-region comparisons also show that the share of partial fiscal 1976 store food sales by other chains and other mobile stores were more than twice the share reported by their full fiscal 1976 counterparts. The dairy routes and miscellaneous categories, however, each had a smaller share of total food sales received by the partial than by the full fiscal 1976 stores.

While these within-region shifts are important, so also are those among the regions. Across regions, the distributions of share of total food sales were compared for full and partial fiscal 1976 stores (appendix tables 5 and 7). The results for the aggregate of all categories of stores showed that for some regions, their share of total food sales was greater for the partial than for the full fiscal 1976 stores. Such a distributional difference infers that inter-regional sales shifts may be taking place. For example, New England, the Mid-Atlantic, and the Southeast regions' share of total food sales of partial fiscal 1976 stores, respectively, were 0.5, 6.9, and 5.5 percentage points greater than their corresponding shares of total food sales for the full fiscal 1976 stores.

This all-store category comparison, however, masks some important regional differences for specific types of stores. Data derived from appendix tables 5 and 7 for large chains show the Southeast's share of total food sales for partial fiscal 1976 was 4.8 percent greater than its corresponding share of full fiscal 1976 store food sales. Other chains exceeded their share of full fiscal 1976 food sales by 13.8 and 1.6 percent, respectively, in the Southeast and Southwest regions. The independents' corresponding gain was 12.9 percent for the mid-Atlantic region.

These increments in regional shares of partial fiscal 1976 food sales are consistent with corresponding gains in regional shares of partial fiscal 1976 large chains,

and other chains in the Southeast, other chains in the Southwest, and independents in the mid-Atlantic region reported in appendix table 3. In contrast, the mid-Atlantic region's large chains had a gain in their share of partial fiscal 1976 food sales, but a loss in their corresponding share of partial fiscal 1976 store numbers (appendix table 1).

### Food Stamp Redemptions by Kind of Store and Region

#### Full Fiscal 1976 Stores

Of the full fiscal 1976 stores' \$8.2 billion redeemed food stamps, the largest share of redemptions accrued to independent stores was \$4.3 billion (table 8). Large chain redemptions amounted to 3.7 billion. Together, these fiscal 1976 store categories redeemed 52.3 and 44.4 percent (96.7 total) of all food stamps, respectively. This left 3.3 percent to be distributed among the other kinds of stores. Of the residual categories, other chains and miscellaneous kinds of stores combined to account for slightly more than 2 percent.

The heavy weighting toward large chains and independents means that the capacity for the remaining kinds of stores to affect the distribution of food stamp redemptions is limited. One would anticipate that within regions which have a large share of the region's stamp redemptions accruing to large chains (relatively speaking), there must be a smaller share redeemed by the independents, and vice versa.

Table 9 shows that the region in which large chains had the greatest proportion of the region's total food stamp redemptions was the same region in which the independents had their lowest rank. Thus, in New England large chains ranked first and independents ranked seventh. The rankings have a perfect inverse relationship.

#### Partial Fiscal 1976 Stores

Table 10 presents the food stamp redemptions received by the partial fiscal 1976 stores. Proportions computed from this table show that for all regions, independents accounted for 70 percent. By region, their share ranged from 46.0 to 80.2 percent of total food stamp redemptions (appendix table 12). Together, large chains and independents accounted for 92.7 percent of all net redemptions. Of the residual 7.3 percent, other chains and miscellaneous stores together accounted for 5.2 percent.

Three regions had a greater share of food stamp redemptions for their partial stores than for their full fiscal 1976 ones--New England, the mid-Atlantic, and the Southeast (table 11). This difference in share may be linked to either a geographical shift in coupon use among regions, a "catchup" in program participation by stores in these regions, or both. That is, these regions historically may have had a smaller proportion of their total number of food stores which participated than did other regions. The data for fiscal 1976 could therefore merely reflect that more of these regions' stores now had begun to participate. Because there are no available data indicating the total number of stores by region which could have participated, there is no sure way to determine how the shifts in the distribution of food stamp redemptions for these regions may be attributed to each of these sources of explanation.

However, reference to the distributions of those stores which ceased, those which initiated participation during fiscal 1976, and those from which the net figures for the partial fiscal 1976 stores were derived provide some additional insight. If the number of stores in any given region which ceased to participate during fiscal 1976

Table 8--Food stamp redemptions of stores with full-year food stamp participants, by region and kind of store, fiscal 1976

Region	: Large chains :	: Other chains :	: Inde- pendents :	: Dairy routes :	: Bakery routes :	: Other mobile stores :	: Miscel- laneous :	: Total
	:	:	:	<u>1,000 dollars</u>				
New England	: 264,849	: 10,527	: 199,756	: 3,473	: 48	: 380	: 10,690	: 489,723
Mid-Atlantic	: 916,574	: 24,646	: 1,388,818	: 9,745	: 1,240	: 6,152	: 10,200	: 2,357,375
Midwest	: 695,794	: 15,653	: 698,174	: 9,030	: 422	: 3,742	: 11,996	: 1,434,811
Mountain Plains	: 170,506	: 5,571	: 175,441	: 2,816	: 169	: 314	: 3,929	: 358,746
Southeast	: 706,098	: 29,434	: 898,849	: 7,261	: 1,138	: 5,827	: 4,711	: 1,653,318
Southwest	: 359,800	: 12,028	: 512,951	: 9,771	: 475	: 1,093	: 10,941	: 907,059
Western	: 544,340	: 8,406	: 436,395	: 7,297	: 1,687	: 1,255	: 36,599	: 1,035,979
U.S. total, including territories <u>1/</u>	: 3,657,961	: 106,265	: 4,310,384	: 49,393	: 5,179	: 18,763	: 89,066	: 8,237,011
U.S. total, excluding territories <u>2/</u>	: 3,581,254	: 103,011	: 3,659,099	: 48,997	: 4,596	: 14,812	: 86,169	: 7,497,938

1/ Mid-Atlantic region includes the District of Columbia, Puerto Rico, and the Virgin Islands; the Western region includes Guam.

2/ Excludes Puerto Rico, the Virgin Islands, and Guam.

Table 9--Regional ranking of large chain and independent food stores with full-year food stamp participation, fiscal 1976

Rank	:	Large chain stores	:	Independent stores
1	:	New England	:	Mid-Atlantic
2	:	Western	:	Southwest
3	:	Midwest	:	Southeast
4	:	Mountain Plains	:	Mountain Plains
5	:	Southeast	:	Midwest
6	:	Southwest	:	Western
7	:	Mid-Atlantic	:	New England

Source: Appendix table 10.

exceeded the number which started to participate in the net, that region could not be assessed as having caught up.

Consequently, if that region's share of total food stamp redemptions were greater for its partial than for its full fiscal 1976 stores, the difference could be attributed to a regional shift in food stamp use. If, however, the region's share in the numbers of stores entering were greater than its share of the number of stores ceasing to participate, the regional shift in stamp use and "catchup in store participation" explanations appear plausible.

In this instance, the net resulting from the comparison of the stores which ceased with the stores which initiated participation in the Southeast was negative. More stores ceased than initiated participation. The corresponding comparisons for New England and the mid-Atlantic, however, resulted in a positive net; that is, more stores initiated than ceased participation.

Consequently, the negative net change in numbers in the Southeast means the figures appear to represent regional shift. In the case of New England and the mid-Atlantic, the shift appears to include both a net increase in the number of stores redeeming stamps and some regional shift.

#### Food Stamp Redemptions Relative to Total Food Sales

##### Full and Partial Fiscal 1976 Stores

The ratio of total food stamp redemptions to total food sales for stores which ceased to participate could differ from the corresponding ratios for stores which participated throughout the year (full fiscal 1976 stores). If the ratios were either greater than or equal to those for the full fiscal 1976 stores, it cannot be said that the stores ceased participation because they were not receiving comparable proportions of food stamp redemptions. In contrast, if the stores which entered during the year had corresponding ratios which were lower, the explanation could be either that (1) they entered so late in the year that there was not time for their ratios to fully reflect the share that food stamps will be of their total food sales or (2) that these stores were among those which historically had as a small proportion of their total number household patrons which were food stamp households. There was no evidence that



Table 11--Food stamp redemptions of stores participating in the Food Stamp Program, by region and participation, fiscal 1976

Region	Full-year participation	Partial-year participation <u>1/</u>
		<u>Percent</u>
New England	5.9	6.9
Mid-Atlantic	28.6	37.7
Midwest	17.4	9.7
Mountain Plains	4.4	2.4
Southeast	20.1	25.1
Southwest	11.0	7.6
Western	12.6	10.6
U.S. total	100.0	100.0

1/ This share computed for the net value of stamps received. Prior to computing regional shares, the value of redeemed stamps for stores which ceased participation was deducted from value of redeemed stamps for stores which started to participate.

Sources: Appendix tables 9 and 11.

the stores which entered were clustered during the last quarter of the fiscal year. Thus, if the second explanation holds true, it suggests that up until fiscal 1976, these stores did not consider that the gains from anticipated participation would be worth the estimated costs and administrative burden of handling stamps.

For the nation, the mean ratio for stores which ceased participation was 7.95 percent (table 12). This was slightly higher than the ratio for full fiscal 1976 stores, which was 7.62 percent. By region, these ratios were also essentially compatible. It cannot be construed from these data which stores ceased to participate did so typically because their share of food stamp redemptions was unusually low.

In contrast, the ratios for stores which initiated their participation 4/ were substantially lower than either those for full fiscal 1976 stores, or for the stores which had ceased to participate. Of the explanations offered above, the most likely is that these stores primarily represent those which historically had a sufficiently small proportion of their total household patronage from food stamp households to cause them to delay participation in the program.

### Full Fiscal 1976 Stores By Region and Kind

Table 13 shows the relationship between both region and kind of store, and the magnitude of the food stamp redemptions to total food sales ratio. For all kinds of

4/ The numbers of stores initiating program participation and the total value of both their total food sales and food stamp redemptions were so much greater than the corresponding figures for stores which ceased program participation that they outweigh those for the latter store category when partial fiscal 1976 store food sales and food stamp redemption figures were computed. This weighting, of course, is reflected in the ratios computed for the partial fiscal 1976 stores.

Table 12--Food stamp redemptions as a proportion of total food sales: Stores with partial- and full-year food stamp participation, by region, fiscal 1976

Region	Stores with partial-year participation			Stores with full-year participation
	Ceased	Started	Partial	
	Percent			
New England	7.63	2.68	2.84	7.54
Mid-Atlantic	8.83	3.27	3.60	9.09
Midwest	7.89	2.05	2.50	6.45
Mountain Plains	5.62	1.50	1.83	4.27
Southeast	9.27	3.24	3.58	9.85
Southwest	9.81	2.76	3.31	8.20
Western	4.88	2.24	2.46	6.05
National average	7.95	2.77	3.11	7.62

stores, the regional range in ratio was 4.27 to 9.85 for the Mountain Plains and Southeast regions, respectively. By kind of store, the corresponding range was from 3.26 for the miscellaneous category to 9.51 percent for the independents.

There were also important regional variations by kind of store. For example, the ratio for the independents varied from 4.58 to 13.73 percent for the Mountain Plains and the mid-Atlantic regions. In the case of the large chains, the ratio spread from a low 4.32 to a high 8.54 percent for the Mountain Plains and the Southeast, respectively. Such differences may partially be explained by store and regional characteristics. For example, the miscellaneous category is composed of several kinds of stores, the greatest contributor being military commissaries. Their total sales, total food sales, and total food stamp redemptions substantially weight the results for the total miscellaneous category.

The military bases' proportion of total military households 5/ eligible to participate in the program should logically be substantially smaller than the corresponding proportion of total civilian households. This means that within the same region, ratios of food stamp redemptions to total food sales for the miscellaneous store category will tend to be smaller than most other store categories.

Number and size of stores within a region in relationship to the total number of participating persons also help explain such differences. In the case of the independents, the two regions which had the largest share of small stores and the largest number of persons participating also had the highest food stamp/total food sales ratio.

5/ The number of service households eligible to participate would be married couples. Single service persons customarily eat at the facilities provided by the base. Of eligible "marrieds," those meeting the requirements would typically come from noncommissioned officer ranks. The numbers of married "noncoms" is fewer than the married officers. The numbers of married noncoms who actually participate in the program is probably a smaller proportion of all married households than the corresponding proportion for the civilian population.



Table 13--Food stamp redemptions as a proportion of total food sales: Stores with full-year food stamp participation, by region and kind of store, fiscal 1976

Region	:	: Large chains :	: Other chains :	: Inde- pendants :	: Dairy routes :	: Bakery routes :	: Other mobile stores :	: Miscel-laneous :	Total
	:				<u>Percent</u>				
New England	:	7.94	4.47	7.71	2.38	8.52	8.16	5.96	7.54
Mid-Atlantic	:	6.46	4.17	13.73	1.72	5.03	16.78	2.37	9.09
Midwest	:	6.63	3.95	6.66	1.84	5.55	3.50	4.34	6.45
Mountain Plains	:	4.32	3.45	4.58	1.25	2.22	3.17	1.87	4.27
Southeast	:	8.54	4.61	12.48	2.84	5.63	12.99	1.34	9.85
Southwest	:	6.81	3.89	10.37	5.86	10.32	11.90	3.13	8.20
Western	:	5.67	3.42	7.08	4.69	11.41	7.18	3.92	6.05
National average including territories <u>1/</u>	:	6.64	4.12	9.51	2.46	6.47	8.17	3.26	7.62
Average excluding territories <u>2/</u>	:	6.53	4.00	8.25	2.45	5.90	6.67	3.19	7.02

1/ Includes the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam.

2/ Excludes Puerto Rico, the Virgin Islands, and Guam.

Data from table 1 and appendix tables 9 and 13 indicate that the mid-Atlantic region had 29 percent of all persons participating; 27.8 percent of all independent stores; 28.59 percent of the nation's independent stores with gross sales of less than \$1 million per year 6/; and 32.2 percent of all the independents' food stamp redemptions. This region's food stamp redemptions/total food sales ratio for independents was 13.73 (table 13). The same data sources report a similar picture for the Southeast. This region had 20.5 percent of persons participating; 25.0 percent of all independent stores; 25.85 percent of all independents with gross sales of less than \$1 million per year 7/; 20.9 percent of all independents' food stamp redemptions; and a food stamp/total food sales redemption ratio of 12.48 percent.

## STATISTICAL ANALYSIS

Comparisons of the frequency distributions for the number of food stores, food sales, food stamp redemptions, and cash/check receipts indicate differences among regions and by kind and size of store within regions. If these differences were to continue over time because they are due to more than randomly occurring factors, the composition of the retail market for food could be affected. The initial step is to determine if these observed differences are attributable to chance. However, if, as their magnitude suggests, they are not due to chance, additional analysis will be conducted to determine which independent variables explain them.

The introductory discussion of statistical treatments described Chi-square as one statistical technique for testing whether these distributional differences are attributable to chance. If the following hypotheses are rejected, then the differences observed in the distributions are not (at the 5 percent probability level) considered attributable to chance. The following comparisons involved either six or seven degrees of freedom. If the computed Chi-square value equaled or exceeded 16.81 for tests involving six, and 18.48 for those involving seven degrees of freedom, the null hypothesis is rejected.

All computations are based on absolute figures, and unless otherwise stated, upon the distributions for the full fiscal 1976 stores. While absolute figures were used in the computation of the Chi-squares, text discussion will continue to be in terms of the proportions of percentages of total food stamp redemptions, cash/check receipts, and food stamp redemptions for comparisons among regions, by kind and size of store.

The descriptive data presented so far suggest that independents are very important with respect to the kind of retail food marketing structure which exists in each region for persons participating in the Food Stamp Program. Even so, the structural role of independents is much more significant for some regions than for others. Appendix table 13 adds to earlier descriptions. It shows that the mid-Atlantic and Southeast regions, respectively, account for 27.8 and 25.0 percent of all independents, or more than half. For the former region, appendix table 14 shows that 94.64 percent of all its independents had sales of less than \$1 million per year. The Southeast was almost

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6/ The basic data from which appendix table 13 was computed also show that of the total number of 151,341 full fiscal 1976 independents which had gross sales of less than \$1 million per year, 43,270 were in the mid-Atlantic region. Appendix table 14 shows that within this region, 94.64 percent of the independents had gross sales of less than \$1 million per annum.

7/ In the Southeast region, there were 39,126 stores with less than sales of \$1 million per year, which amounted to 25.85 percent of the 151,341 independents with less than \$1 million of annual sales. Appendix table 14 also shows that this region had 95.0 percent of all its independents with gross sales of less than \$1 million per year.

identical with 95.0 percent of all its independents within that size category. In contrast, the Midwest's independents were somewhat larger, with only 86.1 percent having gross sales of less than \$1 million per annum.

The difference in the structural configuration of independents among regions is tested as follows:

1. Ho: There is no difference in the proportion of the total number of independents within each of the food store size categories, across all regions.

The null hypothesis is rejected. The computed Chi-square test value was statistically significant. The differences among regions are not attributed to chance.

2. Ho: There is no difference in the proportion of total food stamp redemptions and corresponding shares of cash/check receipts among regions.

Specifically, this test is designed to determine if a region's share of total food stamp redemptions was different from its share of total cash/check receipts.

In actuality, three regions received a greater share of total food stamp redemptions than they did of cash/check receipts (table 14). The mid-Atlantic received 28.6 percent of all food stamp redemptions, and 23.6 percent of the total cash/check receipts. The Southeast correspondingly received 20.1 percent of total redemptions, and 15.2 percent of total cash/check receipts. The Southwest received 11.0 percent of the redemptions, and 10.2 percent of the total cash/check receipts. A total of 10.7 percent more stamp redemptions occurred in these three regions, and 10.7 percent more cash/check receipts occurred in the residual regions. Three regions accounted for all but 0.1 percent of the greater share of cash/check receipts. These were the Midwest, Mountain Plains, and Western regions. Each received between 3.4 to 3.7 percent more in cash/check receipts than they did in food stamp redemptions.

Table 14--Food stamp redemptions and cash/check receipts of stores participating in the Food Stamp Program by region, fiscal 1976

Region	Food Stamps	Cash/Checks
		<u>Percent</u>
New England	5.9	6.0
Mid-Atlantic	28.6	23.6
Midwest	17.4	20.8
Mountain Plains	4.4	8.1
Southeast	20.1	15.2
Southwest	11.0	10.2
Western	12.6	16.1
Total	100.0	100.0

The Chi-square test value was statistically significant. The null hypothesis is rejected. The observed differences in the distributions of food stamp redemptions and cash/check receipts among regions are not attributed to chance.

#### Kind of Store: With and Without Size Constraints

##### No Size Constraint

3. Ho: There is no difference among kinds of stores in their share of total food stamp redemptions and their corresponding share of total cash/check receipts, regardless of size.

The independents are the sole category of stores which received a greater share of total food stamp redemptions (52.3 percent), than they did of cash/check receipts (41.1 percent) (table 15). This meant that all other categories of stores either received the same or a greater share of cash/check receipts than of redemptions. Of the 11.2 percent greater share of cash/check receipts received by these residual store categories, large chains accounted for 7.1 percent. The remainder was distributed among other chains, dairy routes, and miscellaneous store categories. Bakery routes and other mobile stores each received the same share of redemptions as they did of cash/check receipts.

The Chi-square test of these distributional differences was statistically significant. The null hypothesis is rejected. Consequently, these distributional differences are not attributed to chance.

##### With Size Class Constraint

4. Ho: There is no difference among kinds of stores in their share of total food stamp redemptions, and their corresponding share of total cash/check receipts, within a particular store size class measured by gross sales.

This null hypothesis is for kinds of stores within each specified size class. The discussion of the null hypothesis for each size class appears under the size class category indicated by the left-hand margin headings. All proportions cited in the test discussion come from table 15.

\$0-\$24,999 - The independent stores were the only category which received a greater share of the total food stamp redemptions than they did of total cash/check receipts. They received 92.7 percent of the total food stamp redemptions for this size category, but only 70.6 percent of the category's total cash/check receipts. This meant that all other store categories received a 22.1 percent greater share of cash/check receipts than they did of food stamp redemptions. The two store types which received the greatest proportion were other mobile and miscellaneous stores. Together they accounted for 19.3 percent more in cash/check receipts than they did in food stamp redemptions.

The Chi-square test value was statistically significant. The null hypothesis is rejected. Consequently, the distributional differences are not construed as being due to chance.

Table 15--Food stamp redemptions and cash/check receipts of stores with full-year food stamp participation, by kind of store and gross sales class, fiscal 1976

Kind of store	All stores		\$0-\$24,999		\$25,000-\$49,999		\$50,000-\$99,999		\$100,000-\$249,000	
	Food stamps	Cash/ checks	Food stamps	Cash/ checks	Food stamps	Cash/ checks	Food stamps	Cash/ checks	Food stamps	Cash/ checks
	Percent		Percent		Percent		Percent		Percent	
Large chains	44.4	51.5	---	---	---	---	---	---	---	---
Other chains	1.3	2.5	0.1	0.4	0.4	0.9	3.0	5.9	4.9	15.8
Independents	52.3	41.1	92.7	70.6	94.1	84.7	91.2	83.3	90.6	77.5
Dairy routes	.6	2.0	.2	1.6	.9	4.5	2.2	5.0	1.0	1.9
Bakery routes	.1	.1	.4	1.5	.6	1.2	.4	.7	.2	.4
Other mobile stores	.2	.2	3.6	12.1	1.8	3.0	.9	.9	.6	.4
Miscellaneous	1.1	2.6	3.0	13.8	2.2	5.7	2.3	4.2	2.7	4.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	\$250,000-\$499,999		\$500,000-\$999,999		\$1,000,000-\$9,999,999		\$10,000,000 and over			
	Food stamps	Cash/ checks	Food stamps	Cash/ checks	Food stamps	Cash/ checks	Food stamps	Cash/ checks	Food stamps	Cash/ checks
	Percent		Percent		Percent		Percent		Percent	
Large chains	---	---	---	---	64.7	66.7	58.4	52.4	---	---
Other chains	6.4	16.7	5.5	6.9	---	---	---	---	---	---
Independents	89.5	77.6	91.4	87.2	34.7	31.0	38.1	22.7	---	---
Dairy routes	.8	2.0	1.3	3.1	.3	1.2	.4	6.6	---	---
Bakery routes	.1	.2	1/	1/	1/	2/	---	---	---	---
Other mobile stores	.3	.2	.1	.2	1/	2/	.3	1.3	---	---
Miscellaneous	2.9	3.3	1.7	2.6	.3	1.1	2.8	17.0	---	---
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

--- = Not applicable.

1/ Less than 0.05 percent.

2/ When combined, bakery and other routes amount to 0.1 percent.

\$25,000-\$49,999 - The independent store category had 94.1 percent of all food stamp redemptions, and 84.7 percent of the total cash/check receipts for this store size class. All other store categories had a greater share of cash/check receipts than of food stamp redemptions. Of their aggregate 9.4 percent greater share of cash/check receipts, dairy routes and miscellaneous stores together accounted for 7.1 percent.

The Chi-square test value was statistically significant. The null hypothesis is rejected. The distributional differences are not attributed to chance.

\$50,000-\$99,999 - The independent store category accounted for 91.2 percent of the total food stamp redemptions, and 83.3 percent of the total cash/check receipts for this store size class. All other store categories except other mobile stores had a greater share of cash/check receipts than food stamp redemptions. In aggregate, this greater share amounted to 7.9 percent. Dairy routes and other chains together accounted for 5.7 of the 7.9 percent. Other mobile stores had exactly the same share of food stamp redemptions (0.9%) as they did of cash/check receipts.

The Chi-square test value was statistically significant. The null hypothesis is rejected. The distributional differences are not attributed to chance.

\$100,000-\$249,999 - The independent and other mobile store categories both had greater shares of total food store redemptions than they did of cash/check receipts for this store size class. The former category had 90.6 percent of the redemptions, and 77.5 percent of cash/check receipts. The latter's corresponding shares were 0.6 and 0.4 percent. All other store categories had a greater share of total cash/check receipts than they did of food stamp redemptions. In aggregate this greater share amounted to 13.3 percent. Of this amount, 12.2 percent was attributable to other chains and miscellaneous store categories. Other chains accounted for 10.9 percent.

The Chi-square test value was statistically significant. The differences in the distributions are not attributed to chance.

\$250,000-\$499,999 - Two store categories had a greater share of total food stamp redemptions than they did of cash/check receipts for this size store class. Independents had 89.5 percent of the redemptions, and 77.6 percent of cash/check receipts. Other mobile stores had corresponding shares of 0.3 and 0.2 percent. All other store categories had a greater share of cash/check receipts. In aggregate, this amounted to 12.0 percent. Of this, other chains accounted for 10.3, and dairy routes, 1.2 percent.

The Chi-square test value was statistically significant. The null hypothesis is rejected. The distributional differences are not attributed to chance.

\$500,000-\$999,999 - For this store class, the independents had 91.4 percent of total food stamp redemptions but only 87.2 percent of cash/check receipts. All other store categories had a greater share of cash/check receipts than they did of food stamp redemptions. Together they had 4.2 percent more cash/check receipts. Of these, other chains and dairy routes together accounted for 3.2 percent.

The Chi-square test value was statistically significant. The null hypothesis is rejected. The differences in the distributions are not attributed to chance.

\$1,000,000-\$9,999,999 - For stores of this size range, independents accounted for 34.7 percent of total food stamp redemptions and 31.0 percent of all cash/check receipts. All other categories of stores had a greater share of cash/check receipts. In aggregate, these other categories accounted for a 3.7 percent greater share of

cash/check receipts. Of this amount, large chains accounted for 2 percent; dairy routes, 0.9; and miscellaneous stores, 0.8 percent.

The Chi-square test value was statistically significant. The null hypothesis is rejected. The differences in the distributions are not attributed to chance.

\$10,000,000 and over - For this size of store class, both the independents and large chains had a greater share of total food stamp redemptions than they did of cash/check receipts. Large chains had a 6.0 percent larger share of food stamp redemptions than they did of cash/check receipts, and the independents' corresponding figure was 15.4 percent, or about 2.6 times greater than that for the large chains. All other store categories had a greater share of cash/check receipts. In aggregate, their greater share of cash/check receipts was 21.4 percent more than their combined share of the redemptions. Of this amount, dairy routes accounted for 6.2 percent; other mobile stores, 1.0 percent; and miscellaneous stores, 14.2 percent.

The Chi-square test value was statistically significant. The null hypothesis was rejected. The differences in the distributions are not attributed to chance.

#### Size of Store: Regardless of Kind

5. Ho: There is no difference among different size classes of food stores in each class's share of total food stamp redemptions, and its corresponding share of total cash/check receipts, regardless of kind of store.

All store size classes from \$0-\$24,999 through \$500,000-\$999,999 had a larger share of total food stamp redemptions than they did of total cash/check receipts (table 16). The two size categories, \$1,000,000-\$9,999,999, and \$10,000,000 and over in contrast had 69.8 percent of food stamp redemptions and 79.1 percent of cash/check receipts. Of the 9.3 percent greater share of cash/check receipts accruing to these two store size classes, 7.3 percent is attributable to stores in the \$1,000,000-\$9,999,999 category.

The Chi-square test value was statistically significant. The null hypothesis was rejected. The differences in the distributions are not attributed to chance.

#### Full vs. Partial Fiscal 1976 Stores

The Chi-square tests reported above treated only full fiscal 1976 stores. Comparisons between full fiscal 1976 stores and those which ceased participation during the year along with additional comparisons for the partial fiscal 1976 stores are needed to more fully develop the statistical context of all test results.

6. Ho: There is no difference in the ratio of total food stamp redemptions to total food sales for corresponding store categories for full fiscal 1976 stores and stores which ceased participation.

With the exception of bakery routes, there were modest differences between ratios for corresponding store categories (table 17). For bakery routes, those which ceased program participation had a total food stamp redemption/total food sales ratio of 15.7 percent. The corresponding ratio for the full fiscal 1976 bakery routes was 6.5 percent.

Table 16--Food stamp redemptions and cash/check receipts of stores with full-year food stamp participation, by gross sales class, fiscal 1976

Gross sales class	:	Food stamps	:	Cash/checks
	:		:	
	:		<u>Percent</u>	
\$0-\$24,999	:	1.3		0.2
\$25,000-\$49,999	:	2.2		.5
\$50,000-\$99,999	:	4.4		1.8
\$100,000-\$249,999	:	8.6		6.2
\$250,000-\$499,999	:	6.8		6.1
\$500,000-\$999,999	:	6.9		6.1
\$1,000,000-\$9,999,999	:	65.3		72.6
\$10,000,000 and over	:	4.5		6.5
Total	:	100.0		100.0

Table 17--Comparison of the ratio: Food stamp redemptions and cash/check receipts of stores with full-year participation and stores that ceased participation, by kind of store, fiscal 1976

Kind of store	:	Full-year participation	:	Stores that ceased participation
	:		:	
	:		<u>Ratios</u>	
Large chains	:	6.6		6.8
Other chains	:	4.1		2.7
Independents	:	9.5		8.9
Dairy routes	:	2.5		2.5
Bakery routes	:	6.5		15.7
Other mobile stores	:	8.2		6.0
Miscellaneous	:	3.3		4.7

Thus, bakery routes which ceased program participation had a much higher share of total food stamp redemptions. In spite of this one category's difference, the Chi-square test value was not statistically significant. The null hypothesis was not rejected. The differences among categories of stores with respect to their size of ratios may be attributed to chance.

#### Partial Fiscal 1976 Stores Without Respect to Size

7. Ho: There is no difference by kind of partial fiscal 1976 stores in shares of total food stamp redemptions and corresponding shares of cash/check receipts.



Independent and miscellaneous stores had greater shares of total food stamp redemptions than of cash/check receipts (table 18). Together, these two store types had 8.8 percent more food stamp redemptions than cash/check receipts. The independents accounted for 8.1 percent. Of the store categories which had a greater share of cash/check receipts, large chains accounted for 4.8 percent, and other chains, 3.5 percent.

Table 18--Food stamp redemptions and cash/check receipts: stores with partial-year food stamp participation, by kind of store, fiscal 1976

Kind of store	Food stamps	Cash/checks
	<u>Percent</u>	
Large chain	22.7	27.5
Other chain	2.5	6.0
Independents	70.0	61.9
Dairy routes	0.5	0.8
Bakery routes	0.1	0.1
Other mobile stores	1.5	1.7
Miscellaneous	2.7	2.0
Total	100.0	100.0

The Chi-square test value was statistically significant. The null hypothesis was rejected. The differences in the distribution may not be attributed to chance.

#### Partial Fiscal 1976 Store Size Without Respect to Kind

8. Ho: There is no difference by size of partial fiscal 1976 store class, regardless of store category, in each size class's share of total food stamp redemptions and corresponding share of cash/check receipts.

Each store class within the \$0-\$99,999 range of store class sizes had a greater share of total food stamp redemptions than it had of cash/check receipts (table 19). In aggregate, this amounted to 7.6 percent. The size class for which the share of cash/check receipts most exceeded the share of food stamp redemptions was the \$1,000,000-\$9,999,999 class. This class had a 4.5 percent greater share of cash/check receipts than it did food stamp redemptions. The \$250,000-\$499,999 size class had a corresponding 1.3 percent greater share in cash/check receipts.

The Chi-square test value was statistically significant. The null hypothesis is rejected. The differences in the distributions are not attributed to chance.

Table 19--Food stamp redemptions and cash/check receipts of stores with partial-year food stamp participation, by gross sales class, fiscal 1976

Gross sales class	:	Food stamps	:	Cash/checks
	:		:	
	:		:	
	:		<u>Percent</u>	
\$0-\$24,999	:	3.8		1.0
\$25,000-\$49,999	:	4.6		1.9
\$50,000-\$99,999	:	7.4		5.3
\$100,000-\$249,999	:	14.8		15.6
\$250,000-\$499,999	:	9.4		10.7
\$500,000-\$999,999	:	7.3		7.4
\$1,000,000-\$9,999,999	:	45.7		50.2
\$10,000,000 and over	:	7.0		7.9
	:			
Total	:	100.0		100.0
	:			

#### Answers to Questions

This research was conducted to help answer two questions:

(1) Are food stamp expenditures affecting the distribution of food sales by retail food stores among the Food and Nutrition Service regions, and

(2) Within each region, are the food stamp expenditures affecting the amount of total food sales received by the stores which constitute the retail market for food?

Comparisons of the full and partial fiscal 1976 stores show:

(a) Large chains, dairy routes, and bakery routes each had a smaller proportion of the total number of partial fiscal 1976 stores than they did of the total number of full fiscal 1976 stores (table 4). Other chains, independents, and other mobile stores each had a larger share. Since the partial fiscal 1976 total is net, gains in participation in the Food Stamp Program is implied for stores with larger shares, with decreases implied by smaller shares.

(b) With respect to total food sales, large chains, dairy routes, and miscellaneous stores each had a smaller proportion of total food sales of partial fiscal 1976 than they did of full fiscal 1976 stores. Bakery routes had the same share. Other chains, independents, and other mobile stores had larger shares, paralleling their greater participation in the Food Stamp Program (table 7).

(c) Comparable distributions for food stamp redemptions (appendix tables 10 and 12) show that large chains and dairy routes each had smaller proportions of total food stamp redemptions going to partial than to full fiscal 1976 stores. The independents, other mobile stores, and miscellaneous stores each had a greater share of the partial fiscal 1976 store total. The shares of food stamp redemptions for independents and other mobile stores were also consistent with their higher participation in the Food Stamp Program.

(d) In terms of regional distributions, appendix tables 9 and 10 show that the New England, mid-Atlantic, and the Southeast regions each had a greater proportion of total redemptions from partial than from full fiscal 1976 stores.

(e) In addition, appendix tables 1 and 3 show that the New England, mid-Atlantic, and Southeast regions each had a larger proportion of the total number of partial than of full fiscal 1976 stores. All other regions had a smaller proportion than they did of the total number of full fiscal 1976 stores. Thus, gains in stamp redemptions by partial fiscal 1976 stores in these regions coincided with gains in store participation in the Food Stamp Program. Since historically, all regions have been losing stores in terms of absolute numbers, ratios of the number of participating stores to total stores apparently increased in all regions in 1976, but more so in the New England, mid-Atlantic, and Southeast regions.

The comparisons for impact upon the size and kind of store are more definitive. This is evident in the comparisons of distributions of food stamp redemptions and cash/check receipts for each category of store and size class. If the distributions showed that a higher proportion of total food stamp redemptions than of total cash/check receipts was received, then because bonus stamps increase the expenditures for food, it might be concluded that such stores were helped relatively more as a result of the Food Stamp Program. The continued receipt of a relatively large share of food stamp expenditures by some store types and sizes could mean that in the long run the program was affecting the composition of the retail food sector.

Except for one comparison, all distributions were judged statistically different. The kind of store, regardless of size, showed that independents had received 52.3 percent of all food stamp redemptions, but only 41.1 percent of total cash/check receipts. When size was compared, regardless of kind, all stores with less than \$1 million in sales received greater proportions of redemptions than of cash/check receipts (table 16). Chain stores with \$10 million or more gross sales did also (table 15). However, it must be noted that many of the large commissaries were in this category and thus shared total cash/check receipts with the large chains, although they had a much smaller share of cash/check receipts. The result shows that the large chains had a slightly higher share of redemptions than of total cash/check receipts (6%). However, in this same size class (table 15) the independents had a 15.4 percent greater share, so that even for these large stores (relatively speaking), the independents received a higher share of redemptions.

When kind of store was compared within specified size groups, results consistent with those just described were found. Equally important is the finding that when the size of the food stamp redemptions/total food sales ratios for full fiscal 1976 stores are compared with stores which ceased participation during the year, the differences are attributable to chance. Thus, stores did not cease to participate because they were receiving smaller shares of redemptions than the stores which remained in the program.

The comparisons made for kind regardless of size and size regardless of kind for the full fiscal 1976 stores were also completed for the partial fiscal 1976 stores. The results were consistent with the other findings. Independents appear particularly helped in the sense that they receive a higher proportion of food stamp redemptions than they do of cash/check receipts. Among the independents, those which are small appear to benefit relatively more.

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Appendix table 13--Independent stores: Regional percentage distribution of full fiscal 1976 store food stamp participation, by gross sales class and region

Gross sales class	Region								United States
	New England	Mid- Atlantic	Midwest	Mountain Plains	Southeast	Southwest	Western		

Appendix table 14--Independent stores: Within-region percentage distribution of full fiscal 1976 store food stamp participation, by gross sales class and region

Gross sales class	Region								United States
	New England	Mid- Atlantic	Midwest	Mountain Plains	Southeast	Southwest	Western		
	Percent								
\$0-\$24,999	4.09	15.59	4.92	6.28	13.61	9.01	3.34	10.43	
\$25,000-\$49,999	6.99	15.95	8.82	9.91	15.72	12.11	6.62	12.68	
\$50,000-\$99,999	20.53	23.39	17.96	18.79	24.34	20.46	16.12	21.33	
\$100,000-\$249,999	36.82	26.07	28.43	28.68	27.86	29.12	33.21	28.57	
\$250,000-\$499,999	15.39	9.28	15.84	15.12	9.16	13.70	20.17	12.46	
\$500,000-\$999,999	7.01	4.36	10.17	9.24	4.31	7.38	8.97	6.45	
\$1,000,000-\$9,999,999	8.95	5.25	13.73	11.85	4.95	8.13	11.48	7.98	
\$10,000,000 and over	0.22	0.11	0.13	0.13	0.05	0.09	0.09	0.10	
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	

Appendix table 15--Independent stores: Within-store gross sales class percentage distribution of full fiscal 1976 store food stamp participation, by gross sales class and region

Gross sales class	Region								United States
	New England	Mid- Atlantic	Midwest	Mountain Plains	Southeast	Southwest	Western		
	Percent								
\$0-\$24,999	1.70	41.54	7.00	3.87	32.64	10.05	3.20	100.00	
\$25,000-\$49,999	2.39	34.94	10.30	5.02	31.02	11.11	5.22	100.00	
\$50,000-\$99,999	4.17	30.45	12.48	5.65	28.54	11.16	7.55	100.00	
\$100,000-\$249,999	5.58	25.34	14.76	6.44	24.40	11.86	11.62	100.00	
\$250,000-\$499,999	5.35	20.67	18.84	7.79	18.39	12.79	16.17	100.00	
\$500,000-\$999,999	4.71	18.77	23.38	9.20	16.71	13.32	13.91	100.00	
\$1,000,000-\$9,999,999	4.87	18.29	25.52	9.54	15.53	11.86	14.39	100.00	
\$10,000,000 and over	9.64	31.32	19.88	8.43	11.45	10.24	9.04	100.00	