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Rural Consumers Go to Town with Retail Dollars

Residents of small rural communities make more than half of their retail purchases in large towns and cities that attract retail trade from the surrounding area. The interdependence among different sizes of communities resulting from retail trade patterns means that income received by rural residents has economic impacts that spill over into trade center towns.

THE retail sector is one of the largest and fastest growing U.S. industries. The United States has over 1.5 million retail establishments employing about 21 million persons, about 16 percent of total employment. Among major industries defined by the Standard Industrial Classification (SIC) System, the 1.4 million jobs added by the retail sector (SIC codes 52-59) between 1990 and 1995 exceeded job growth in all other industries, except for the service sector (SIC codes 70-79). While the retail sector is a major source of jobs, it is not a common focus of economic development efforts, because retail jobs are often low paying, and retail businesses are usually small, averaging only 12 paid employees. Nevertheless, a healthy retail sector is an important component of a vibrant local economy. The presence of retail businesses in a community keeps dollars flowing through the local economy, promotes a sense of community, and enhances the quality of life in rural areas.

Some kinds of retail businesses, such as outlet centers, tourism- or convention-related retail businesses, draw income into a region. But for the most part, retail businesses depend on spending by local residents who are employed by manufacturing plants, mines, farms, educational and other public institutions, or other organizations that bring in income from sources outside the local community. As the retail dollars of residents are spent and respent in the local community, this "multiplier effect" magnifies the local impact of those dollars, spurring local job and income growth and business start-ups.

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The absence of retail businesses in many small communities means the community misses out on the multiplier effect, suggesting a lack of economic vitality. These small rural communities do not have enough potential customers to support a full range of retail businesses. Eating and drinking places are commonly found in small communities, because they need an average of only about 600 persons to support one establishment. On the other hand, general merchandise stores and drug stores tend to be more centrally located in larger towns, because they serve an average of 5,000 to 6,000 persons.

Retail Trade Concentrated in Large Towns

Residents of rural or nonmetro counties often shop at larger towns and cities where retail businesses cluster, offering wider selection and often lower prices than establishments closer to home. Small town specialty and general merchandise stores have difficulty competing with large retail chain outlets, which are able to cut costs by taking advantage of economies of scale and sophisticated distribution networks.

Regional shopping patterns that emerge from Census Bureau data on retail trade in 20 multicounty areas show that the rural parts of these areas only capture about one-third of their residents' retail spending. Rural residents in these retail trade areas spend about two-thirds of their retail dollars in larger towns. These sales "leakages"—retail purchases that residents make outside their local community—reduce the local impact of income flowing to farms or businesses in the community. For example, a new manufacturing plant in a community will have a direct impact by creating jobs and income for employees of that plant. But the employees of the new plant will

have little impact in the community outside the gate of the manufacturing plant if they do not spend their earnings locally.

Leakage of retail trade from small communities to larger towns creates interdependence between small rural communities and the large towns where rural residents often shop. This means that retail businesses in large towns depend on spending by far-flung rural shoppers. Retail trade data indicate that, on average, about half of retail sales in 20 large trade center towns are made to shoppers from outlying areas. Thus, the benefits of new jobs or income in small communities will leak to large towns when rural shoppers spend part of their earnings at trade center businesses.

Concerns about loss of small town retail business are most acute in farm-reliant areas. However, comparing retail trade patterns in 10 farm-reliant areas with 10 rural areas with low farm-reliance shows little difference between the two groups. Retail trade is highly concentrated in trade center towns in both groups. However, the trends over

time show concentration increasing in farm-reliant areas, but decreasing in non-farm-reliant areas. Between 1987 and 1992, trade center towns in farm-reliant areas tended to gain market share at the expense of outlying rural areas. Over that period, trade centers in non-farm-reliant areas tended to lose market share, while secondary towns gained market share.

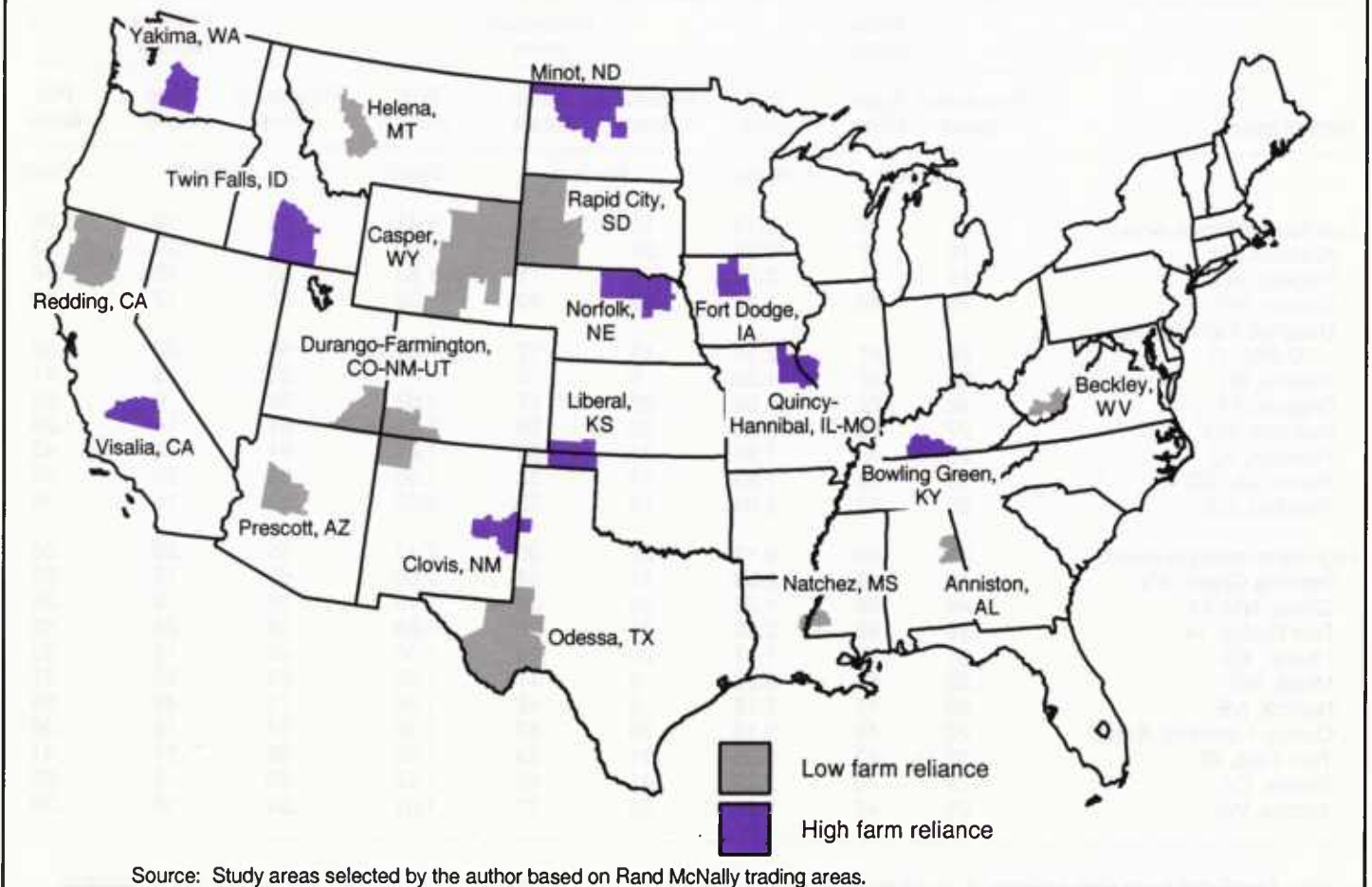
Sales Leakage Measured in Twenty Rural Trading Areas
Information about sales leakages—how big they are and their destination—is useful for policymakers, local officials, and economic development practitioners to assess economic impacts of income changes or development needs. It is widely recognized that sales leakage occurs, but community leaders often lack information on the magnitude and economic importance of leakages for various types of communities.

I selected 20 multicounty trading areas representing various parts of the United States to measure the extent of sales leakages in various types of rural counties (fig. 1). Since much of the attention given to retail trade problems

Figure 1

Twenty multicounty retail trade areas

Areas selected for study represent areas with high and low degrees of farm reliance in various parts of the country



Source: Study areas selected by the author based on Rand McNally trading areas.

has been on farming communities, I chose 10 trading areas with a high degree of economic reliance on farming and 10 areas with low-farm-reliance for comparison.

Each trading area is centered around a large town or small city, the trade center, which is the focus of retail activity in the trading area. The trade center draws retail trade from throughout the trading area, and may be the location of choice for a regional shopping center, department stores, or auto dealers. Each trading area also has smaller secondary towns that draw retail trade from a smaller area within the trading area. Secondary towns offer a range of retail shopping less extensive than that available in the trade center town. Secondary towns attract trade from surrounding areas to a lesser extent than the trade center town, but they also lose a portion of their residents' retail sales to auto dealers, department stores, and specialty stores in the trade center town. The remainder of the trade area is called the tributary region. The tributary region is composed of small communities and rural areas, and generally offers a minimum of retail

shopping options, such as small restaurants, convenience stores, gas stations, food stores, and some specialty stores. Residents of the tributary region make a large portion of their retail purchases in the trade center and secondary towns.

A sense of how much retail trade flows from tributary regions to secondary towns and trade centers can be gained by comparing the concentration of population and retail sales. While population is fairly evenly dispersed across these trade areas, retail sales are concentrated in trade center towns, revealing the magnitude of the flow of retail trade across trading areas.

According to the 1990 Census of Population, the bulk of the population in these areas resides in places with population under 2,500—the tributary regions—an average of 54 percent. As much as 83 percent live in the retail tributary region in the Beckley, WV, area, and 71 percent in the Norfolk, NE area (table 1). All but 4 of the 20 selected areas have more than half their population in tributary

Table 1

Distribution of population and retail sales for selected trading areas, 1992

While population is concentrated in tributary regions, retail trade is concentrated in trade center towns, suggesting considerable leakage of retail sales from small communities to larger towns

Trading area	Trade center			Secondary towns			Tributary regions		
	Population share	Sales share	Pull factor	Population share	Sales share	Pull factor	Population share	Sales share	Pull factor
	Percent		Ratio	Percent		Ratio	Percent		Ratio
Low-farm-reliance areas:	31	57	2.13	16	23	1.41	53	19	0.36
Anniston, AL	16	47	2.94	22	33	1.50	61	20	.33
Beckley, WV	11	41	3.73	6	11	1.83	83	48	.58
Casper, WY	35	48	1.37	29	40	1.38	37	12	.32
Durango-Farmington, CO-NM-UT	29	61	2.10	13	17	1.31	58	22	.38
Helena, MT	68	87	1.28	0	0	--	32	13	.41
Odessa, TX	42	65	1.54	26	27	1.02	32	9	.28
Natchez, MS	27	66	2.44	12	20	1.67	61	14	.23
Prescott, AZ	25	49	1.96	24	29	1.21	51	22	.43
Rapid City, SD	30	58	1.93	17	23	1.35	53	20	.38
Redding, CA	26	53	2.04	16	32	2.00	58	15	.26
High-farm-reliance areas:	25	50	2.12	21	30	1.47	55	20	.36
Bowling Green, KY	19	49	2.58	17	34	2.00	65	18	.28
Clovis, NM-TX	44	68	1.55	20	23	1.15	36	9	.25
Fort Dodge, IA	18	36	2.00	24	38	1.58	58	26	.45
Liberal, KS	31	58	1.87	20	26	1.30	49	16	.33
Minot, ND	28	66	2.36	9	11	1.22	63	23	.37
Norfolk, NE	20	43	2.15	8	15	1.88	71	42	.59
Quincy-Hannibal, IL-MO	22	48	2.18	25	33	1.32	53	19	.36
Twin Falls, ID	20	47	2.35	21	29	1.38	59	24	.41
Visalia, CA	18	40	2.22	41	52	1.27	40	8	.20
Yakima, WA	25	48	1.92	23	37	1.61	51	15	.29

Note: See "Retail Trade Area Analysis," p. 15, for an explanation of how the pull factor is measured. Percentages may not add due to rounding. Source: Calculated by ERS using data from 1992 Census of Retail Trade and 1990 Census of Population.

areas. The share of population in the trade center town was between 20 and 30 percent for most of the selected areas, and the share in secondary towns generally ranged from 12 to 25 percent. Typical of the selected trading areas is Quincy-Hannibal, IL-MO, where 53 percent live in the tributary region, 25 percent in secondary towns, and 22 percent in the trade center. Farm-reliant areas tended to have a lower share of population in the trade center (25 percent vs. 31 percent for low-farm-reliance areas), and a higher share of population in secondary towns (21 percent vs. 16 percent for low-farm-reliance areas).

While population is heavily concentrated in the tributary regions of these areas, most retail trade occurs in trade center towns. Tributary regions contain, on average, over half of trading area population, but only about 20 percent of retail sales are made there. Trade centers' share of retail trade far exceeds their share of population in each of the 20 trading areas. Secondary towns' share of retail trade also exceeds their share of population, but by a smaller margin. The share of retail sales in trade centers varies considerably from 41 percent in Beckley to 87 percent in Helena. Farm-reliant areas tend to have slightly less concentration of sales in trade centers compared with low-farm-reliance areas (averaging 50 percent vs. 57 percent) and a slightly higher share of sales in secondary towns (30 percent vs. 23 percent). The average share of sales in tributary regions is roughly equal for areas with high farm-reliance and low farm-reliance.

Half of Trade Center Sales Go to Outside Shoppers

The mismatch between shares of population and of retail trade for trade center towns and tributary regions clearly shows that residents of tributary regions do much of their shopping in trade center and secondary towns. The pull factor, computed as the ratio of the retail trade and population shares, is a simple, but useful, measure that quantifies the extent of sales leakage from tributary regions and the degree of retail attraction for larger towns. When a place's share of retail sales exceeds its share of population, the pull factor is greater than 1.0, and we conclude that the place attracts retail trade from outside its boundaries. When the pull factor is less than 1.0, we conclude that a place is losing retail trade to other places; that is, sales leakage is occurring. This assumes that average per capita sales are the same for the various parts of the trading area, and that retail trade is self-contained within the trading area.

Pull factors for tributary regions in the 20 selected trading areas suggest that their residents make most of their retail purchases in larger towns. Tributary region pull factors are all considerably less than 1.0, with an average of 0.36, indicating that tributary region residents make about 64 percent of their retail purchases in larger towns (table 1). The Norfolk, NE, and Beckley, WV, tributary regions

had the highest pull factors, at 0.59 and 0.58, suggesting that they retained the highest share of their residents' retail sales. All other tributary regions had pull factors under 0.50, including seven regions with pull factors under 0.30.

Pull factors for trade center towns in the 20 selected trading areas average about 2.0, indicating that trade center retail sales are about double what it would take to serve the residents of the trade center town. In other words, about half of a trade center's retail sales are made to shoppers from outside the town. Pull factors for trade centers vary from 1.28 in Helena to 3.73 in Beckley, but most are around 2.0. Secondary towns have lower pull factors, averaging about 1.4. This suggests that sales in secondary towns are about 40 percent greater than what it would take to serve residents of those towns. Secondary towns draw retail shoppers from tributary areas, but they also lose some of their residents' sales to the trade center town. The highest secondary town pull factors are 2.0 in the Redding, CA, and Bowling Green, KY, areas, while the lowest, at 1.02, is in the Odessa, TX, area.

Much of the attention given to rural retail trade problems has focused on the decline of small communities in farming areas, but pull factor estimates show considerable sales leakage from tributary regions in both high-farm-reliance and low-farm-reliance areas. Pull factors for tributary regions average 0.36 for both types of areas. The tributary regions retaining the most retail sales included one high-farm-reliance area (Norfolk, NE) and one low-farm-reliance area (Beckley, WV). Areas with tributary region pull factors under 0.30 included three low-farm-reliance areas, Natchez, MS, Redding, CA, Odessa, TX, and three high-farm-reliance areas, Yakima, WA, Clovis, NM-TX, and Bowling Green, KY.

Comparison of pull factors for trade centers and secondary towns between high- and low-farm-reliance areas also shows little difference. The averages for trade centers was essentially equal at 2.12 and 2.13. Seven high-farm-reliance trade centers had pull factors of 2.0 or higher, while five low-farm-reliance trade centers had pull factors in that range. Secondary town pull factors were also similar, averaging 1.47 for high-farm-reliance areas, and 1.41 for low-farm-reliance areas.

Sales leakage from tributary regions and dependence of trade center retail stores on purchases by outside shoppers suggests considerable flow of trade between tributary regions and larger towns. Converting sales leakage into dollar terms (assuming that tributary region residents have per capita sales equal to the average for their trading area) shows average retail trade flows of about \$370 million going from tributary regions to trade center and secondary towns (table 2). The dollar value of the sales leak-

age varies among areas with the rate of leakage and the population of the area, reaching as high as \$786 million in the populous Visalia, CA, area, and as low as \$82 million in the much less populated Helena, MT, area. The Census of Retail Trade shows an average ratio of about \$100,000 in retail sales per paid retail employee, which suggests that the average trade flow of \$370 million represents about 3,700 retail jobs.

The reliance of trade center and secondary towns on outside retail trade can also be gauged in dollar values and jobs. The net flow of retail dollars into trade center towns from outside shoppers averages about \$270 million, or 2,700 jobs. The net flow into secondary towns is smaller, at about \$95 million, or 950 jobs. These estimates illustrate the importance of outside shoppers as a source of jobs in larger towns.

Are Trade Centers Gaining Market Share?

While the situation in 1992 shows little difference between farm-reliant areas and other areas in retail trade patterns, comparing trends over time shows retail trade becoming more concentrated in trade centers in farm-reliant areas, but becoming less concentrated in low-farm-reliance areas. Between 1987 and 1992, farm-reliant trade center towns tended to gain retail market share, generally at the expense of tributary regions (table 3). In contrast, trade centers in low-farm-reliance areas tended to lose market share to secondary towns.

Trade centers in six high-farm-reliance areas gained market share between 1987 and 1992. Trade centers in Liberal, KS, Minot, ND, and Quincy-Hannibal, IL-MO, gained the most—4-5 percentage points. Trade centers in Twin Falls, ID, Norfolk, NE, and Visalia, CA, gained modestly. There

Table 2

Estimated retail sales leakages by trading area, 1992

The dollar value of retail trade flows between communities and the number of associated jobs can be substantial

Trading area	Tributary regions		Secondary towns		Trade center	
	Sales leakage	Retail job equivalent	Sales leakage	Retail job equivalent	Sales leakage	Retail job equivalent
	Million dollars	Number	Million dollars	Number	Million dollars	Number
Low-farm-reliance areas	-372	-3,565	81	782	291	2,789
Anniston, AL	-386	-2,786	104	748	282	2,033
Beckley, WV	-350	-3,228	50	461	300	2,767
Casper, WY	-248	-2,735	115	1,269	136	1,497
Durango-Farmington, CO-NM-UT	-444	-4,341	49	482	395	3,859
Helena, MT	-82	-828	0	0	82	828
Odessa, TX	-296	-2,768	8	72	290	2,708
Natchez, MS	-184	-1,941	31	330	153	1,611
Prescott, AZ	-486	-4,833	84	833	402	3,999
Rapid City, SD	-456	-4,705	81	838	377	3,889
Redding, CA	-786	-7,490	293	2,787	494	4,703
High-farm-reliance areas	-369	-3,764	107	1,088	262	2,685
Bowling Green, KY	-709	-7,377	256	2,668	453	4,709
Clovis, NM-TX	-119	-1,261	13	140	106	1,121
Fort Dodge, IA	-227	-2,628	99	1,150	128	1,478
Liberal, KS	-109	-1,193	20	217	89	976
Minot, ND	-307	-3,297	15	166	294	3,156
Norfolk, NE	-177	-2,063	43	498	140	1,636
Quincy-Hannibal, IL-MO	-341	-3,779	80	889	261	2,890
Twin Falls, ID	-379	-3,629	87	830	292	2,800
Visalia, CA	-750	-6,946	251	2,329	503	4,659
Yakima, WA	-570	-5,461	208	1,992	357	3,422

Note: Negative sales leakage indicates that the county lost trade to other parts of the trading area. Positive sales leakage indicates that the county attracted sales from other parts of the trading area. Sales leakages were converted to job equivalents using the ratio of retail sales per retail employee for each trading area. See "Retail Trade Area Analysis," p. 15, for an explanation of how the leakages are measured.

Source: Calculated by ERS using data from the 1992 Census of Retail Trade and the 1990 Census of Population.

About the areas studied

I analyzed retail trade patterns in 10 farm-reliant trading areas and 10 rural trading areas with low farm reliance. These are groupings of counties identified by Rand McNally based on transportation and communication networks, physiography, and population distribution. I used the percentage of employment in farming as a measure of each trading area's reliance on farming. The farm share of employment was 9 percent or more in each of the farm-reliant trading areas and about 4 percent or less in the areas with low farm-reliance. The trading areas are predominantly composed of nonmetro counties, but some of the counties that contain trade center towns/cities are metro counties.

These trading areas had 1992 populations ranging from 56,000 in the Liberal, KS area to 439,000 in the Visalia, CA, area, with an average around 160,000. Half the areas had fewer than 15 people per square mile in 1992. Only Yakima, WA, Visalia, CA, and Anniston, AL were close to the U.S. average of 72 persons per square mile. The number of counties in the trading areas ranges from 2 to 12. Per capita personal income was less than the U.S. average of \$20,000 in each of the 20 areas. The averages were \$15,500 for low-farm-reliance areas and \$16,400 for high-farm-reliance areas. Per capita incomes ranged from \$12,874 in the Natchez, MS, area to \$19,431 in the Casper, WY, area.

Per capita retail sales and incomes in these areas were generally lower than U.S. levels. Per capita retail sales for 1992 were below the U.S. average of \$7,430 in 19 of the 20 selected trading areas. High-farm-reliance areas averaged \$6,200, and low-farm-reliance areas averaged \$6,600. Only the Twin Falls, ID, area had per capita sales exceeding the U.S. average, and Casper, WY, Durango-Farmington, CO-NM-UT, Prescott, AZ, and Rapid City, SD, had per capita sales only slightly less than the U.S. average. Part of the reason for lower sales in these areas is lower income.

Characteristics of the selected multicounty trading areas

These areas are more sparsely populated and have lower income and retail sales than the U.S. average

Area	1990		1992		
	Population	Persons per sq. mile	Percent farm emp.	Per capita income	Per capita retail sales
	Thousand	Number	Percent	Thousand dollars	
Low farm-reliance areas	156	23	3.7	15.5	6.6
Anniston, AL	163	69	3.2	14.8	5.8
Beckley, WV	169	57	4.3	14.5	5.9
Casper, WY	138	4	4.2	19.4	7.3
Durango-Farmington, CO-NM-UT	170	10	3.7	14.1	7.3
Helena, MT	61	10	3.4	17.4	7.0
Odessa, TX	215	8	1.8	14.2	5.9
Natchez, MS	72	32	4.9	12.9	5.4
Prescott, AZ	116	14	0.6	15.3	7.2
Rapid City, SD	188	6	6.1	15.8	7.3
Redding, CA	267	16	4.5	16.2	6.9
High farm-reliance areas	170	33	12.9	16.4	6.2
Bowling Green, KY	226	57	12.1	14.8	6.7
Clovis, NM	75	11	9.6	15.5	5.8
Fort Dodge, IA	135	26	13.8	17.6	6.1
Liberal, KS	56	8	13.4	19.0	6.2
Minot, ND	130	29	13.8	16.4	6.5
Norfolk, NE	112	10	18.4	16.6	5.4
Quincy-Hannibal, IL-MO	180	34	12.3	16.2	5.7
Twin Falls, ID	143	13	10.4	16.6	7.6
Visalia, CA	439	71	11.3	14.6	5.2
Yakima, WA	207	72	13.6	17.0	6.9
	Million				
United States	255	72	1.0	20.1	7.4

Source: Calculated by ERS using population data from the 1990 Census of Population, 1992 farm employment and per capita income data from the Bureau of Economic Analysis, and retail sales data from the 1992 Census of Retail Trade.

was no change in Clovis, NM-TX. In the other three high-farm-reliance areas, trade centers lost market share. The Bowling Green, KY, and Fort Dodge, IA, trade centers lost share to secondary towns, and the Yakima, WA, trade center lost share to its tributary region. Changes in market share for secondary towns in high-farm-reliance areas were modest, with 8 of 10 areas experiencing gains or losses of 1 percentage point or less. Secondary towns in the Bowling Green, KY, and Fort Dodge, IA, areas were the only ones to gain market share. Tributary regions in Liberal, KS, and Quincy-Hannibal, IL-MO, lost 4 percent, and tributary regions in Minot, ND, and Twin Falls, ID, lost 2 percent. The Yakima, WA, area's tributary region was the only one to gain market share.

In the ten low-farm-reliance areas, six trade centers lost market share of 3 percentage points or more. On average, in low-farm-reliance areas trade centers' share of retail sales declined 3 percentage points between 1987 and 1992, while secondary towns' share increased 3 points. Secondary towns gained market share in seven low-farm-reliance areas. For low-farm-reliance areas changes in tributary region market share varied, with five losing

Table 3
Change in retail market share, 1987-92
Trade center towns tended to gain market share from tributary regions in high-farm-reliance areas, while they lost market share in most low-farm-reliance areas

Area	Trade center	Secondary towns	Tributary region
	Percentage points		
Low farm-reliance areas	-3	3	0
Anniston, AL	-6	1	5
Beckley, WV	3	0	-3
Casper, WY	-3	3	0
Durango-Farmington, CO-NM-UT	-3	1	2
Helena, MT	1	--	-1
Odessa, TX	-13	7	6
Natchez, MS	-5	5	0
Prescott, AZ	0	7	-7
Rapid City, SD	-3	4	-1
Redding, CA	3	-1	-2
High farm-reliance areas	1	0	-1
Bowling Green, KY	-1	2	-1
Clovis, NM-TX	0	0	0
Fort Dodge, IA	-1	1	0
Liberal, KS	5	-1	-4
Minot, ND	4	-2	-2
Norfolk, NE	1	-1	0
Quincy-Hannibal, IL-MO	4	0	-4
Twin Falls, ID	2	0	-2
Visalia, CA	2	-1	-1
Yakima, WA	-4	0	4

Source: Calculated by ERS using data from the 1987 and 1992 Censuses of Retail Trade.

market share, three gaining market share, and no change in two areas.

Summary

When income flows into small rural communities in the form of new jobs, transfer payments, or farm income, much of that income quickly flows back to larger towns and cities where rural residents make more than half of their retail purchases. Planners and policymakers should be aware that the benefits of job creation schemes or income transfers targeted at remote rural areas will spill over to larger towns and cities. The trade areas analyzed here demonstrate that sales leakages from outlying rural areas and smaller towns may account for as much as half of retail trade in large towns that serve as regional trading centers.

Development of a local retail sector can improve the economic vitality and sense of community in a small town. However, the benefits of measures taken to promote retail business development should be weighed carefully against the costs. The tangible benefits, in terms of job creation, can be small, since retail businesses average only about 12 paid employees per establishment. The estimated retail jobs lost by outlying areas to trade center towns and secondary towns through sales leakages averaged about 1,300 jobs per trading area in the areas studied here. The intangible benefits provided by the presence of local retail shops—promoting a sense of community well-being and economic vitality—are harder to measure, but often are an important motivation in promoting local retail businesses.

The loss of small local retail shops is a pressing concern for many community leaders, but the possible benefits to consumers from concentration of retail trade should not be ignored. In some types of retail business, larger centrally located stores take advantage of economies of scale and sophisticated distribution and management systems to reduce overhead and costs of operation. Large retailers pass these savings on to consumers through lower prices and greater variety than smaller independently operated stores can offer. Consumers in sparsely populated areas may also value the convenience of "one-stop" shopping in large general merchandise stores by reducing the frequency of time-consuming shopping trips.

For Additional Reading . . .

T.L. Anding and others, *Trade Centers of the Upper Midwest: Changes from 1960 to 1989*, Hubert H. Humphrey Center, Minneapolis, MN, 1990.

B.J.L. Berry and others, *Market Centers and Retail Location: Theory and Applications*, Prentice Hall, Englewood Cliffs, NJ, 1988.

Retail trade area analysis

Since retail trade often crosses county lines, analysts like to use trading areas as the unit of analysis. Below is a diagram of the Fort Dodge trading area, composed of nine counties. Fort Dodge is the largest town, where much of the area's retail and other business activity occurs, dubbed the "trade center."

Seven smaller towns with populations of at least 2,500 are the area's "secondary towns." They are also centers of business activity, but on a smaller scale. The remainder of the trading area is referred to as the "tributary region." This is composed of small communities and rural areas of the nine counties, in other words, everything in the nine counties outside of Fort Dodge and the seven secondary towns.

Fort Dodge attracts retail shoppers from the smaller towns and rural places in the surrounding area. The secondary towns also attract shoppers, but to a lesser extent.

A little algebra helps to define measures of retail trade concentration in the area. Total retail sales in the trading area equal the sum of sales in each of its three parts: the trade center, secondary towns, and tributary region. Algebraically, we can write,

$$S = S_{TC} + S_{Sec} + S_{Trib}$$

The shares of sales in each of the three parts are:

$$\begin{aligned} s_{TC} &= S_{TC} / S, \\ s_{Sec} &= S_{Sec} / S, \\ s_{Trib} &= S_{Trib} / S. \end{aligned}$$

In the same way, shares of area population can be computed. If we assume that, on average, every resident makes the same amount of retail purchases, we can compare each part's share of population to its share of sales to get an indicator of the amount of sales it draws from other parts of the area or loses to other parts.

The trade center's share of sales will exceed its share of area population. The algebraic expression of this is the pull factor:

$$PF_{TC} = s_{TC} / p_{TC} = (S_{TC} / P_{TC}) / (S / P),$$

where the p and P represent population share and total population. The pull factor is equal to the ratio of per capita sales in the trade center to per capita sales for the entire trading area. A ratio greater than 1.0 indicates that the trade center attracts trade from outside its borders. Pull factors can be computed in the same way for secondary towns and tributary regions. For tributary regions the pull factor will be less than 1.0.

The sales leakage is calculated from the pull factor:

$$SL = (PF - 1) S \cdot 100,$$

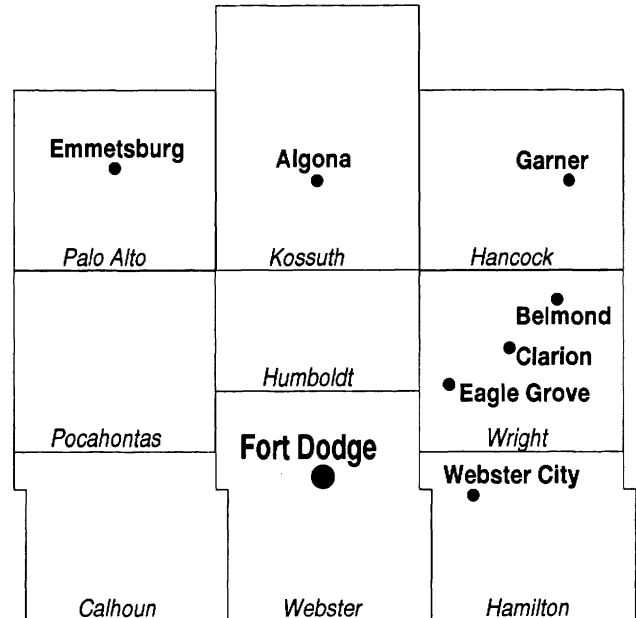
which shows the percentage of retail sales lost to the trade center and secondary towns. SL will be negative for tributary regions, and positive for trade centers and secondary towns. For tributary regions, SL shows the sales leaking out of the region as a percentage of total purchases by the tributary region's residents. For trade centers and secondary towns, SL shows the town's retail sales to outside shoppers as a percentage of retail sales to the town's residents.

SL can be expressed as a dollar magnitude by assuming that residents of all parts of the trading area have equal per capita sales. The rate of sales leakage, SL, is multiplied by the product of trading area per capita sales (S/P) and population for each part of the trading area:

$$SLD_k = (S / P) P_k SL_k,$$

where k=TC, Sec, Trib. The dollar value of sales leakage can be converted to a measure of retail jobs lost or gained by dividing SLDk by the average retail sales per retail job.

The Fort Dodge, IA trading area



Note: County names are in italics.