

**Financial Analysis of
Small Food Manufacturing and Retailing Businesses****Cole R. Gustafson***

Abstract

The 1998 Survey of Small Business Finances provides robust information on the financing of small businesses including an overview of their firm's organization, financial characteristics, and credit use. Information from the survey is used in this study to compare the financial characteristics of food manufacturing and retailing small businesses. On average, both food manufacturing and food retailing small businesses had positive financial characteristics. Although they were only marginally profitable and liquid, they were highly solvent. Accounts receivable and inventory comprise nearly half of food manufacturers' total assets and a third of food retailers' assets. By most financial measures, food retailers were statistically smaller than food manufacturers. Both food manufacturers and food retailers utilized computers, primarily for accounting/bookkeeping, inventory management, and administration. Primary financial services used are for transactions and trade credit. Nearly three-fourths of food manufacturing and one-half of food retailing supply purchases involve trade credit from a large number of trade credit suppliers, on average. Both firm types have higher credit risks and are tardy with repayment of trade credit. Nonparametric rank order statistical methods were required because normality assumptions were violated due to asymmetric distribution of small firms.

Keywords: business, finances, food, manufacturing, retail, small, survey

Introduction

The food industry has been the focus of considerable academic investigation. The termination report of regional research committee NE-165 summarizes an impressive array of economic studies applied to the food industry. A key emphasis of this research has been on the structure, conduct, and performance of firms comprising the food industry, especially the evolution of the food processing and distribution sector as it moves to even higher levels of concentration and increasing vertical integration across market functions.

R. J. Sexton thoroughly critiques studies conducted to date and delineates the implications of food sector concentration on the economic welfare of producers, consumers, and marketers. He notes several important methodological gaps including the use of aggregate national data to investigate market power when markets in question could only be regional. A further, but unmentioned, limitation is that welfare measures are typically evaluated solely at the aggregate level. Measures of well-being and impact on individual firms or segments of the industry are many times unknown. The most notable and frequently studied example of consolidation is the meat packing industry. "New empirical industrial organization" (NEIO)

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methods are often used to evaluate pricing behavior because firm level data are scarce. Morrison Paul utilized firm level data in his study of meat packing concentration, but available variables were limited and observations were dated by time of publication.

Other studies of the food industry have attempted to identify the optimal number and size of food manufacturing establishments (Stollsteimer), as well as factors affecting firm growth and performance over time (Goetz and Adelaja, et al.). Implications on small- and medium-sized firms appear to be of special interest (Druffel, O'Rourke, and McCluskey). These studies are difficult to replicate and/or extend to other segments of the food industry because of the limited availability of economic and financial data.

With dramatic changes occurring within the food industry, several key competencies will be required. Boehlje, Akridge, and Kalaizanonakes state that successful agribusinesses must be capable of achieving profitability in a mature industry and operating with lowest production costs, yet preserving functionality of service. Again, limited availability of accounting and financial data precludes evaluation of success in the food industry.

The purpose of this article is two-fold. A primary goal is to introduce newly available data from the 1998 Survey of Small Business Finances. The periodic survey provides robust information on the financing of small businesses including an overview of the firms' organization, financial characteristics, and credit use. The survey is the most comprehensive source of such information; no other source provides the breadth and detail of information for a nationally representative sample of small businesses (Bitler, Robb, and Wolken). An appealing feature of this survey is the delineation of small businesses by Standard Industrial Classification (SIC) code. Research on food businesses has been difficult in the past due to data limitations. Hopefully, ready access to food business financial data will stimulate additional investigation on the performance of the food industry.

A second goal of this study is to present an overview of food business finance and delineate comparisons between firms at the manufacturing and retail levels. Results show that both food businesses face equally competitive financial markets, have ready access to modern financial products and services, and possess similar capital structures.

Following sections of this article describe the 1998 Survey of Small Business Finances including the survey's history, content, sampling procedure utilized, and procedures for access. Finally, an overview of food business finance and selected comparisons between manufacturing and retail levels are derived from the 1998 Survey of Small Business Finances.

The Survey of Small Business Finances

The Survey of Small Business Finances (SSBF) collected demographic and financial information from 3,561 for-profit, nonfinancial, nonfarm small businesses (less than 500 employees) who were in business in the United States at the end of 1998. Similar surveys have been conducted in 1987 and 1993. Working papers, methodological documentation, codebooks, and full public datasets (SAS or PDF) are available online:

<http://www.federalreserve.gov/pubs/oss/oss3/nssbftoc.htm>

Information collected in the survey includes:

- Demographic information on the owners and characteristics of the firm including SIC, MSA, and Dun & Bradstreet industry classifications;
- Inventory of firm's deposit and savings accounts, leases, credit lines, mortgages, loans, and other financial services. For each financial service, the supplier is identified;
- Characteristics of financial service suppliers including type (e.g., bank, individual), method of conducting business, patronage, and reasons for choosing source;
- Experience in applying for credit in the past three years;
- Experience with trade credit and equity injections;
- Firm's income and balance sheet; and
- Credit history, credit scores for both firm and owners, and Herfindahl index of concentration.

The sample for the survey was drawn from the Dun & Bradstreet Market Identifier file which represents approximately 93 percent of full-time business activity. Sampling was done according to a two-stage stratified random sample. In the second stage, small businesses with more than 20 employees and minority-owned firms were oversampled to ensure their numbers would be sufficient for statistical testing. An overall response rate of 33 percent was obtained. Appropriate sample weights are included in the public dataset.

Bitler, Robb, and Wolken (2001) summarize key survey findings. Over 83 percent of the small businesses had less than 10 employees and over one-half were organized as sole-proprietorships. The primary activity for 43 percent of the firms was business or professional services. Commercial banks were the primary supplier of financial services. Fifty-five percent of small businesses reported having loans, capital leases, or lines of credit at year end. Sixty percent of small businesses in 1998 used trade credit, but interest rates were quite high; 2 percent a month was not uncommon. Three-fourths of the firms used computers, primarily to access the internet, inventory management, and bookkeeping.

Economists have made limited use of this data in their studies concerning agriculture. Data from this survey have been used to explore lending practices of rural banks involved in mergers (Walraven) and portfolio decisions of small agribusinesses (Holmes and Park). Walraven presents a table of summary statistics that compares demographic and financial characteristics of rural and urban small businesses. He concludes that rural small businesses are older, have greater sales and assets, experienced fewer business and personal bankruptcies, and have been denied trade credit less frequently.

Small Food Business Finance

Past studies evaluating the performance of small food businesses have not provided definitive assessments primarily because they relied on selected localized information, case studies, and anecdotal observations. Comprehensive financial survey information may alleviate these past shortcomings and provide the necessary quantitative data for statistical testing and extrapolation.

Financial Characteristics of Small Food Businesses

In general, both food manufacturing and retailing small businesses in the sample had positive financial characteristics (Table 1). Although they were only marginally profitable and liquid on average, they were highly solvent. These averages do mask the large amount of variation that is present within each group. Accounts receivable and inventory comprise nearly half of food manufacturers' total assets and a third of food retailers' assets. This is not atypical of other small urban or rural businesses (Gustafson). Roughly, 5-10 percent of assets are held in the form of cash. Land is a minor asset for most small businesses, whereas the average small business has a large investment in equipment. Trade financing in the form of accounts payable comprises a large portion of small food retailer total financing. Average corporate taxes paid were less than 1 percent of sales.

An appealing feature of the SSBF for purposes of this study is the ability to distinguish between food manufacturing and food retailing businesses who participated in the survey. Screening firms using the SIC-type variable yielded 20 food manufacturing and 79 food retailing firms. This sort formed the basis for the following comparative analyses in this article.

Traditional parametric statistical analyses that compare the financial characteristics of food businesses proved futile because the data violated assumptions of normality. A common feature of small business financial data is the presence of many small firms (Gustafson). The majority of firms contained in the dataset are of relatively small size (as measured by either sales, total assets, or number of employees). However, larger firms are also present, but fewer in number, thus creating a long right tail when modeling the distribution function. Classifying the largest firms as outliers failed to restore normality. Further, no clear demarcation for selecting outliers was evident.

Initial t-tests of mean financial characteristics found few significant differences between food manufacturing and food retailing firms, despite high statistical power as evidenced by a large number of observations and a sizable difference in mean values. Using Shapiro-Wilk and Kolmogorov-Smirnov tests, normality of the probability distribution function was readily rejected (SAS Institute Inc.). Efforts to transform the data into a normal distribution were unsuccessful. Therefore, the nonparametric Wilcoxon rank order method was used for statistical testing. Essentially, the Wilcoxon method determines whether two samples of financial data (food manufacturing and food retailing) have arisen from the same probability distribution function. Among linear rank statistics, Wilcoxon scores are locally most powerful for identifying location shifts of the distribution (SAS Institute Inc.). Standard deviations are reported and included in the following tables, but readers are advised against using traditional t- tests for significance tests due to non-normality of data.

With the more general Wilcoxon statistical test, food manufacturing and food retailing small business firms were found to have significant differences in financial characteristics. As shown in Table 1, food retailing small businesses were found to have statistically lower levels of costs, assets, and liabilities. Income levels were not statistically different, although mean values for food retailers were lower.

Table 1. Financial Characteristics

| Item | Metro | | Rural | |
|-----------------------------------|---------------------|-------------|-----------------|-------------|
| | (Weighted Mean) | (Std. Dev.) | (Weighted Mean) | (Std. Dev.) |
| | ----- dollars ----- | | | |
| Income: | | | | |
| Total sales | 3,582,046 | 7.12E8 | 813,033 | 94.79E6 |
| Other income | 12,543 | 11.9E6 | 4,457 | .82E6 |
| Cost of doing business | 3,593,509 | 6.88E8 | 707,639* | 90.98E6 |
| Corporate tax | 15,048 | 26.46E6 | 3,661 | .62E6 |
| Assets: | | | | |
| Cash on hand | 108,435 | 27.57E6 | 18,096 | 2.18E6 |
| Accounts receivable | 376,266 | 69.72E6 | 7,678** | 1.58E6 |
| Inventories | 716,161 | 54.50E6 | 42,206** | 3.61E6 |
| Other current assets | 70,388 | 17.55E6 | 4,935** | .74E6 |
| Investments | 164,675 | 25.50E6 | 2,890** | .71E6 |
| Land, book value | 27,237 | 8.95E6 | 16,634 | 2.33E6 |
| Depreciable assets | 720,387 | 14.1E8 | 86,898** | 11.27E6 |
| Total Assets | 2,183,932 | 33.34E8 | 180,476** | 18.74E6 |
| Liabilities: | | | | |
| Accounts payable | 249,152 | 26.02E6 | 65,011** | 3.44E6 |
| Other current liabilities | 208,488 | 27.09E6 | 20,013** | 1.70E6 |
| Total liabilities | 1,353,363 | 24.77E8 | 95,036* | 11.69E6 |
| Organization: ----- percent ----- | | | | |
| Sole proprietor | 29.4 | NA | 53.2 | NA |
| Partnership | 4.8 | NA | 8.9 | NA |
| Corporation | 65.0 | NA | 35.8 | NA |

* Statistically significant at $p < .05$ using Wilcoxon rank order test.

** Statistically significant at $p < .01$ using Wilcoxon rank order test.

With respect to financial organization, the majority of food manufacturing firms were organized as corporations whereas food retailers were primarily organized as sole proprietorships. Surprisingly, less than 9 percent of both small business types were organized as partnerships.

Financial Accounts

Food manufacturing and food retailing small businesses both rely on a wide variety of sources for financing (Table 2). Despite their differences in size, food retailers utilize each source just as frequently and to the same degree as their manufacturing counterparts.

Just about all manufacturing and retail firms have a checking account with an average balance of \$76,000 and \$13,000, respectively. Savings accounts are far less frequent with only 22 percent of firms using one. The firms more commonly use business credit cards than the owner's credit card. Over a third of food manufacturing and food retailing firms use an owner's credit card for transaction financing. Over 80 percent of food manufacturers use a business credit card, whereas 80 percent of food retailers do not.

Firms in poor financial condition and those with limited access to capital often have multiple (split) credit lines to bridge their financial needs. Over two-thirds of both manufacturing and retailing firms in this survey patronize more than one creditor. The average credit limit ranges from \$2.2 million for manufacturing firms to \$90,321 for retailing firms. The actual amount borrowed on both lines is approximately one-half for food manufacturing firms and less than 10 percent for retailing firms. The majority of these lines do require collateral, but not necessarily a guarantee.

Neither food manufacturing or retailing small businesses rely heavily on mortgage financing as a source of capital. This is in contrast to most other small businesses where reliance is high (Gustafson). Food manufacturing and retail small businesses do not utilize vehicle loans as a source of capital either (less than 20 percent of firms). Similarly, both small businesses do not utilize equipment financing extensively. Small business equipment is often so specialized with minimal salvage value that financing is difficult to obtain. Moreover, many small business equipment manufacturers may not have the financial capacity to offer financing programs.

Nearly three-fourths of food manufacturing small businesses received loans from stockholders, whereas less than one-fourth of food retailing firms had obtained such loans. Average loan size ranged from \$77,275 for manufacturing firms to \$29,467 for retail firms. This result runs counter to expectations, as food retailing firms were expected to face greater credit constraints and thus require more stockholder financing. Perhaps the greater percentage of assets held as investments explains the higher incidence of stockholder loans.

Financial markets are presumed to be most efficient when a large number of financial institutions compete against each other. A common measure of financial market competition is the Herfindal index which is created by taking the percentage market shares of each firm in the market, squaring them, and summing. In this survey, both food manufacturing and food retailing small businesses operated in regions of relatively high bank concentration. Easy access to bank products may explain the higher number of split credit lines.

Table 2. Source of Financing

| Item | Metro | | Rural | |
|--|-----------------|-------------|-----------------|-------------|
| | (Weighted Mean) | (Std. Dev.) | (Weighted Mean) | (Std. Dev.) |
| Have checking account (1=yes, 2=no) | 1.12 | 11.62 | 1.02 | 5.53 |
| If yes, average balance | \$75,543 | 16.94E6 | \$13,450 | 1.38E6 |
| Have savings account (1=yes, 2=no) | 1.78 | 13.96 | 1.88* | 12.13 |
| If yes, average balance | \$47,731 | 3.10E6 | \$60,705 | 3.92E6 |
| Use owner's credit card for business (1=yes, 2=no) | 1.64 | 16.36 | 1.60 | 18.21 |
| If yes, average balance | \$422 | 10,959 | 2,837 | 51,771 |
| Use business credit card (1=yes, 2=no) | 1.18 | 13.15 | 1.81** | 14.59 |
| If yes, average balance | \$1,549 | 72,136 | \$427 | 18,088 |
| Number of credit lines | 1.67 | 15.96 | 1.84 | 13.75 |
| If yes, credit limit | \$2,245,762 | 1.78E8 | \$90,321* | 6.70E6 |
| Amount owed | \$1,108,739 | 5.71E6 | \$7,715 | .46E6 |
| Collateral required (1=yes, 2=no) | 1.41 | 13.19 | 1.41 | 16.30 |
| Guaranty required (1=yes, 2=no) | 1.40 | 13.09 | 1.77 | 13.91 |
| Any mortgages? (1=yes, 2=no) | 1.82 | 12.45 | 1.84 | 13.71 |
| If yes, principle owed | \$2,385,548 | 53.7E6 | \$159,823 | 8.81E6 |
| Motor vehicle loan? (1=yes, 2=no) | 1.85 | 12.05 | 1.93 | 9.77 |
| If yes, principle owed | \$15,800 | 1.26E6 | \$12,499 | .35E6 |
| Equipment loan? (1=yes, 2=no) | 1.75 | 14.78 | 1.92 | 10.13 |
| If yes, principle owed | \$222,320 | 6.87E6 | \$23,401 | 3.07E6 |
| Average loans from stockholders? (1=yes, 2=no) | 1.26 | 14.28 | 1.76** | 14.18 |
| If yes, principle owed | \$77,275 | 7.72E6 | \$29,467 | 1.88E6 |
| Any other loans? (1=yes, 2=no) | 1.84 | 12.23 | 1.86 | 12.69 |
| If yes, principle owed | \$11,231 | 4.83E6 | \$159,521 | 12.24E6 |
| Herfindahl index | 2.38 | 17.03 | 2.54 | 21.37 |
| 1 = 0 < Herfindahl < 1,000 | | | | |
| 2 = 1,000 < Herfindahl < 1,800 | | | | |
| 3 = 1,800 <= Herfindahl | | | | |

* Statistically significant at $p < .05$ using Wilcoxon rank order test.

** Statistically significant at $p < .01$ using Wilcoxon rank order test.

Use of Technology and Financial Services

There is a significant difference in computer use between food manufacturing and food retailing small business firms (Table 3). Whereas all food manufacturers use computers, slightly more than half of food retailers use computers frequently for business purposes. This has important ramifications for data interchange leading to greater coordination of inventory management. Most popular uses of a computer are for accounting/bookkeeping, inventory management, and general administration. Food manufacturing firms have significantly greater use of computers for email. Use of computers by either firm type for financial services such as PC banking and online credit applications is limited.

Table 3. Use of Technology and Financial Services

| Item | Metro | | Rural | |
|---------------------------------------|-----------------|-------------|-----------------|-------------|
| | (Weighted Mean) | (Std. Dev.) | (Weighted Mean) | (Std. Dev.) |
| Computer use (1=yes, 2=no) | | | | |
| Used computer for business | 1.00 | 0 | 1.45** | 18.49 |
| If yes, computer used for: | | | | |
| PC banking | 1.96 | 6.46 | 1.92 | 9.04 |
| Email | 1.19 | 13.24 | 1.60** | 17.24 |
| Internet sales | 1.40 | 16.63 | 1.81 | 13.83 |
| Credit applications on line | 2.00 | 0 | 1.96 | 6.96 |
| Inventory management | 1.19 | 13.28 | 1.34 | 16.74 |
| Administration | 1.02 | 4.97 | 1.23 | 14.73 |
| Accounting/bookkeeping | 1.04 | 6.94 | 1.21 | 14.36 |
| Financial services used (1=yes, 2=no) | | | | |
| Transaction services | 1.38 | 16.52 | 1.43 | 18.40 |
| Cash management services | 1.93 | 5.60 | 1.97* | 6.13 |
| Credit services | 1.99 | 2.24 | 1.99 | 3.17 |
| Trust services | 1.86 | 11.78 | 1.97* | 6.13 |
| Brokerage services | 1.99 | 3.77 | 2.00 | 0 |
| Used trade credit | 1.16 | 12.59 | 1.24 | 16.01 |
| If yes, % of purchases | 78.5 | 725.27 | 53.5** | 1,141 |
| Number of trade credit suppliers | 66.9 | 3,998 | 14.1** | 1,244 |
| % offering cash discounts | 15.3 | 1,006 | 16.1 | 1,040 |
| % balance paid after due date | 47.7 | 1,585 | 37.8 | 1,226 |
| Length of discount period | 10.5 | 121.4 | 11.3 | 309 |
| Amount of discount | 2.0 | 13.90 | 3.6 | 168.7 |

* Statistically significant at $p < .05$ using Wilcoxon rank order test.

** Statistically significant at $p < .01$ using Wilcoxon rank order test.

Both food manufacturing and food retailing firms are frequent users of trade credit and periodic users of transactions services. However, few food small businesses use other financial services for cash management, credit, trusts, or brokerage. Food manufacturing firms use a statistically higher rate of cash management and trust services, although both are infrequent.

With respect to trade credit, food manufacturing firms purchase over three-fourths of their supplies on trade credit while food retailing firms purchase slightly more than one-half. Consequently, it is not surprising that they each report a large number of trade credit suppliers. Rates of cash discount appear similar (16 percent). Over half of both food manufacturing and food retailing small businesses report repayment of trade credit after the due date. The average length of discount is 11 days and the average discount is 2.0 percent for food manufacturing firms and 3.6 percent for food retailing firms, although the latter is more variable.

Creditworthiness

As measured by the Dun & Bradstreet credit score, both food manufacturing and food retailing small businesses possess high credit risk (Table 4). Both firm types appear to have similar frequency of being denied trade credit and bankruptcy. Moreover, no statistical difference exists in the frequency of being delinquent on business obligations, but the mean of food retailers is lower than food manufacturers. Forty-two percent of food manufacturers and 18 percent of food retail small businesses reported being so discouraged about a mortgage loan application that they didn't even apply.

Table 4. Credit Worthiness

| Item | Metro | | Rural | |
|--|-----------------|-------------|-----------------|-------------|
| | (Weighted Mean) | (Std. Dev.) | (Weighted Mean) | (Std. Dev.) |
| Dun & Bradstreet credit score (1 = low risk, 5 = high risk) | 3.56 | 43.29 | 3.05 | 29.97 |
| Denied trade credit (1=yes, 2=no) | 1.64 | 16.29 | 1.93 | 8.49 |
| Bankrupt in past seven years (1=yes, 2=no) | 2.00 | 0 | 1.98 | 3.80 |
| Delinquent on business obligations (1=yes, 2=no) | 1.93 | 47.04 | 1.32 | 33.52 |
| Didn't apply for mortgage loan fearing denial (1=yes, 2=no) | 1.58 | 16.72 | 1.82 | 14.41 |

Conclusions

The 1998 Survey of Small Business Finances provides robust information on the financing of small businesses including an overview of their firm's organization, financial characteristics, and credit use. Information from the survey is used in this study to compare the financial characteristics of food manufacturing and food retailing small businesses. Nonparametric rank order statistical methods were required when comparing dollar values of these small businesses because normality assumptions were violated due to the high concentration of small firms.

On average, both food manufacturing and food retailing small businesses had positive financial characteristics. Although they were only marginally profitable and liquid, they were highly solvent. Accounts receivable and inventory comprise nearly half of food manufacturers' total assets and a third of food retailers' assets. By most financial measures, food retailers were statistically smaller than food manufacturers. Both food manufacturers and food retailers utilized computers, primarily for accounting/bookkeeping, inventory management, and administration. Primary financial services used are for transactions and trade credit. Nearly three-fourths of food manufacturing and one-half of food retailing supply purchases involve trade credit from a large number of trade credit suppliers, on average.

Food manufacturing and food retailing small businesses both rely on a wide variety of sources for financing. Despite their differences in size and organizational structure, food retailers utilize each source just as frequently as their manufacturing counterparts. They are also viewed as having relatively high credit risk by rating agencies which has translated into discouragement when applying for mortgage loans. The higher credit risk ratings may be justified given slow repayment of trade credit.

Preliminary results of the survey leave a number of unanswered researchable questions. First, it is unknown whether the lack of statistical difference between food manufacturing and food retailing small businesses is in fact due to few differences between the two groups or whether high variation and non-normal distributions of firm size within each group limits statistical power. Second, the results reflect only one observation in time, a period of relatively strong economic prosperity. Additional study utilizing either past or future survey results could provide more robust conclusions. Finally, a number of interesting financial differences including high credit risk, computer use, and firm size that characterize each group could be delineated with multivariate analysis and resolve unexplained relationships raised in this preliminary review of the dataset.

References

- Adelaja, A, R.M. Nayga, Jr., B. Schilling, and K. Tank. "Understanding the Challenges Facing the Food Manufacturing Industry." *Journal of Food Products Marketing* 6(2)2000:35-55.
- Bitler, M.P., A.M. Robb, and J.D. Wolken. "Financial Services Used by Small Businesses: Evidence From the 1998 Survey of Small Businesses." *Federal Reserve Bulletin*, Washington, DC, 87,4(April, 2001):183-205.
- Boehlje, M.D., J.T. Akridge, and N.G. Kalaizandonakes. "Preparing for Success in the Agribusiness Market Place." *Journal of Agribusiness* 20(1)2002:31-39.
- Druffel, S.M., D. O'Rourke, and J.J McCluskey. "Implications of Changes in the Food Supply Chain for Small- and Medium-Sized Produce Supply Firms in the Pacific Northwest." *Journal of Food Distribution Research* 31(1):240-43.
- Goetz, S.J. "State- and County-Level Determinants of Food Manufacturing Establishment Growth: 1987-93." *American Journal of Agricultural Economics* 79(3)1997:838-50.
- Gustafson, Cole R. "*Rural Small Business Finance - Evidence From the 1998 Survey of Small Business Finances.*" AAE03003, Department of Agribusiness and Applied Economics, North Dakota State University, Fargo, June 2003, 12pg.
- Holmes, M., and T.A. Park. *Portfolio Decisions of Small Agribusinesses: Evidence From the 1993 National Survey of Small Business Finance.* Selected paper, 2000 AAEA Annual Meetings, Tampa, FL, July 30-August 2, 2000, 23pg.
- Morrison Paul, C.J. "Market and Cost Structure in the U.S. Beef Packing Industry: A Plant-Level Analysis." *American Journal of Agricultural Economics* 83(1)2001:64-76.
- NE-165, Private Strategies, Public Policies, and Food System Performance. *Termination Report of Cooperative Regional Projects.*
<http://www.umass.edu/ne165/ne165%20termination%20report%201996-2002.pdf>, viewed May 21, 2002.
- SAS Institute Inc. *SAS OnlineDoc, Version 8*, Cray, NC, 1999.
- Sexton, R. J. "Industrialization and Consolidation in the U.S. Food Sector: Implications for Competition and Welfare." *American J. of Ag. Econ.* 82(5)2000:1087-1104.
- Stollsteimer, J.F. "A Working Model for Plant Numbers and Locations." *Journal Farm Economy* 45(3)1963:631-45.
- Walraven, N.A. "Lending by Rural Banks Involved in Mergers." *Journal of Agricultural and Applied Economics* 31,2 (August 1999):201-214.

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