COMPETITIVE BEHAVIOR IN THE FOOD RETAILING INDUSTRY

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ABSTRACT: We develop a flexible model to examine competitive conditions in the food retailing industry based on the Box-Cox transformation of the demand and industry equilibrium conditions. The impact of key technological and market developments on shifts in the competitive index is examined. Adoption of optical scanning technology was positively related to the market power index but the index was stable and consistent with competitive conditions over the 1982-1992 period.

KEY WORDS: market power, food retailing, Box-Cox model, technological innovations
COMPETITIVE BEHAVIOR IN THE FOOD RETAILING INDUSTRY

Food retailing is an important industry in the United States in its contribution to the GNP and employment. Sales and employment in the food retail industry represent a significant and growing component of the U.S. service economy, dwarfing the combined values for the automobile, steel and machine-tools industries.

Two closely linked changes in the food retailing industry motivate this research. First, the structure of the food retailing industry was dramatically altered by leveraged buyouts (LBO's), mergers, acquisitions, and financial restructuring during the 1980s. Grocery retailers offered steady cash flows matched with undervalued, readily saleable assets and food retailing became a primary target for merger and takeover activity. The total amount of financial leverage increased significantly, shifting away from short-term liabilities toward long-term debt.

A second important industry development was the increasing concentration in food retailing, particularly at the regional level, due to the surge of mergers and leveraged buyouts, resulting in fewer and larger food stores. Cotterill (1992) noted a "trend toward fewer, larger supermarkets owned by large chains" resulting in increased market concentration and segmentation and strategic marketing techniques to deter entry. Chain stores registered significant growth in market share, as firms increasingly developed integrated marketing patterns with stores in several geographic regions.
Increases in market concentration and market segmentation has promoted concern that retail food store owners exert market power and set prices above the average cost of production. Previous studies that employed the structure-conduct-performance paradigm to understand the market conduct of food retailers centered their focus on the relationships between price and market structure measurements such as firm concentration, market growth, and per capita income (see Cotterill, 1993).

We use an alternative approach that explicitly measures the degree of competitiveness in the food retail industry. The model is based on the assumption that firms maximize profits. This approach yields precise, easily interpretable statistical tests for the degree of market power in food retailing. Financial variables are incorporated into the industry cost function to account for the effect of changes in industry financial structure on the competitiveness of the industry.

In section II, the theoretical framework of the cost function and the industry equilibrium condition are presented. The data, construction of variables, and the application of the model to the food retail industry are developed in section III. Interpretation of results and the implications for competitive behavior in the food retail industry are discussed in section IV. Section V concludes the paper.

II. INDUSTRY EQUILIBRIUM AND THE COST FUNCTION

A model to measure the degree of market power used by Bresnahan is applied to aggregate industry data in food retailing. The procedure exploits the industry equilibrium
condition to reveal the degree of market power. The basis of the model is that profit-maximizing firms set marginal cost equal to perceived marginal revenue. When perceived marginal revenue equals market price, the outcome is consistent with perfectly competitive behavior. When perceived marginal revenue equals industry marginal revenue, this result indicates imperfect competition or collusion.

In the theoretical model firms maximize profits by setting marginal cost equal to perceived marginal revenue. The actual marginal revenue function is

\[ P + \frac{\partial D^{-1}(Q, Z, \delta)}{\partial Q} Q \]  

where \( P \) is industry price. The inverse demand function for industry output is \( D^{-1}(Q, Z, \delta) \) where \( Q \) denotes aggregate industry output, \( Z \) represents a set of exogenous variables, and \( \delta \) is a vector of demand system parameters.

A firm's perceived marginal revenue is

\[ P + \lambda \frac{\partial D^{-1}(Q, Z, \delta)}{\partial Q} Q \]  

where \( \lambda \) is an estimated parameter which represents an index of market power and is restricted to lie between 0 and 1. When \( \lambda = 0 \), firms behave as perfect competitors by setting price equal to marginal cost. A value for \( \lambda = 1 \), indicates perfect collusion or joint monopoly when firms choose output or prices based on industry marginal revenue. As an index of firm behavior, \( \lambda \) measures the gap between marginal cost and price or the degree of competition.
To maximize profit marginal revenue (MR) is equated to marginal cost (MC) and this condition is rewritten as:

\[ P = -\lambda Q \frac{\partial D^{-1}}{\partial Q} + \frac{\partial C}{\partial Q} \tag{3} \]

We refer to this as the linear industry equilibrium condition. An equivalent form of the industry equilibrium condition in logarithmic form is

\[ \ln P = -\lambda \left( \frac{Q}{P} \frac{\partial D^{-1}}{\partial Q} \right) + \ln \left( \frac{\partial C}{\partial Q} \right) \tag{5} \]

Sjostrom shows that this form can be conveniently approximated as

\[ \ln P = -\lambda \ln \left( 1 + \frac{Q}{P} \frac{\partial D^{-1}}{\partial Q} \right) + \ln \left( \frac{\partial C}{\partial Q} \right) \tag{4} \]

The Box-Cox transformation \( Y^{(c)} = (Y^\theta - 1)/\theta \) contains both the linear and logarithmic specifications of industry equilibrium and can be used to test between the competing models. We specify demand and marginal cost functions which allow us to nest the linear and logarithmic model in the Box-Cox model.

Let demand for output from food retailers be specified using the Box-Cox transformation as:

\[ Q^{(0)} = \delta_0 + \delta_1 P_Q^{(0)} + \delta_2 Z^{(0)} + \delta_3 P_Q^{(0)} Z^{(0)} \tag{6} \]

where \( Q \) is the quantity of food sold by food retailers and \( P_0 \) is the price of food. The exogenous variables in the demand function are represented by the vector \( Z \) and include per capita disposable income, the price of food away from home as a substitute for food purchased from food retailers, and the relative female to male wage rate.
Following Baker let marginal cost be

\[ MC^{(0)} = \left(\frac{\partial C}{\partial Q}\right)^{(0)} = \exp(\beta_0 + \beta_1 \ln Q + \sum_{i=2}^{5} \beta_i \ln w_i + \sum_{i=1}^{2} d) \]  

(7)

where C is total variable cost, Q is industry output, \( w_i \) are exogenous input prices, and \( F_i \) is a set of financial variables. The input prices represent goods sold by food retailers \( (w_2) \), capital \( (w_3) \), labor \( (w_4) \), and energy \( (w_5) \).

Following Kim and Maksimovic the impact of leverage is incorporated into the cost function for the food retailing industry in two financial variables. Industry analysts noted the role of financial leverage in the restructuring of the food retailing industry. Cotterill (1992) focused on the link between increased debt and rising concentration in food retailing, noting that the "historically unprecedented increase in financial leverage and total value of the industry was concentrated primarily in the operations of large retailers." We examine whether changes in total current liabilities \( (F_1) \) and long-term debt have shifted the industry cost function \( (F_2) \).

The generalized industry equilibrium condition using the marginal cost and inverse demand functions defined above is

\[ p^{(0)} = \frac{-\lambda}{\delta_1 + \delta_3 z^{(0)}} + \left[ \frac{\partial C}{\partial Q}\right]^{(0)} \]  

(8)

The linear model results when \( \theta = 1 \) while the logarithmic model is appropriate when \( \theta = 0 \). This generalized model allows us to specify a more flexible set of demand and marginal cost specifications.
The system of equations represented by the generalized industry equilibrium condition in equation (8) and the demand function facing the food retailing industry in equation (6) is estimated jointly. Additive error terms \( v_i \) are appended to the system of equations. The error terms for the estimated system are assumed to be identically distributed normal random vectors with mean vector zero and nonsingular covariance matrix \( V \). The estimated parameters are obtained using nonlinear three-stage least squares imposing the implied cross-equation restrictions.

III. MODEL SPECIFICATION

The cost function for the food retailing industry is based on the inputs for foods sold, labor, energy, and capital. Changes in these inputs have played an important role in the cost and financial structure of the industry. The Food Marketing Institute's (FMI) financial review of the supermarket industry noted the importance of capital spending in food retailing. The Institute's reports show the increase in interest expenses along with the growth of net property and equipment, measured as a percent of total assets.

Annual data from 1967 through 1992 were used in the estimation. Annual nominal price indexes for processed food inputs, labor, energy, and capital are reported in the Food Cost Review. An annual labor price index for the food retailing industry is based on the average annual hourly earnings for retail food workers. The labor price index includes employee benefits such as employer social security taxes, unemployment taxes, pensions, and health insurance costs. The total price
index for energy includes components for electricity, petroleum, and natural gas. The reported capital price index was based on the implicit GNP deflator for new plant and equipment. All price indexes were deflated by the consumer price index for food consumed at home to obtain a constant-dollar price index series.

Annual constant dollar sales were used as the measure of annual output in food retailing (Bureau of Economic Analysis). Information on cost of food inputs (good sold in food retailing) for food retailers is gathered from yearly reports issued by Robert Morris Associates.

Price indexes for food at home and food away from home are reported in Food Cost Review. The food away from home sector includes eating and drinking places such as restaurants and fast food outlets, hotels and motels and other institutional organizations. Consumer expenditures on food away from home offer an alternative to food purchased from food retailers.

As more women enter the labor force and their value of time increases, the demand for food away from home shifts. The effect of the decrease in demand for food eaten at home is incorporated into the demand equation by including the ratio of female to male wages. The data on median female and male incomes are available in the Statistical Abstract of the U.S.

Measures for two financial variables are used in the cost function to reflect the impact of changes in the financial structure on the industry. The financial variables are the total current liabilities and the amount of long-term debt for food retail stores, which are available from Robert Morris Associates.
Total current liabilities are composed of short-term liabilities including accounts payable, notes payable, income taxes payable, and other liabilities. The changing liabilities structure of the industry balance sheet is most apparent in the growth of long-term debt. Long-term debt includes bonds, debentures, bank debt, mortgages and capital lease obligations.

Long-term debt grew significantly during the 1980s as the industry shifted from equity to debt financing, expanding from 16 percent of total assets in 1967 to a peak of 25 percent of total assets in 1986. Total current liabilities averaged about 39 percent of total assets during the sample period. Fluctuations in the key components of current liabilities are highlighted each year in the FMI annual financial review.

**IV. MODEL ESTIMATION AND RESULTS**

The parameter estimates and R-squared measures for the industry equilibrium condition and the demand equation are presented in Table 1 and Table 2 for the logarithmic and linear model respectively. The model of industry equilibrium and competitive structure provides insight into the structure of the food retailing industry as measured by the index of market power. We examine the impact of key technological and market developments on shifts in the index. In a final issues we comment on the comparative performance and flexibility of the competing models of industry conduct.

**Model Diagnostics and Tests**

Before interpreting the market power index we examine a general set of diagnostic tools which confirm the consistency of
the model with economic theory. The validity of the model in identifying \( \lambda \) is confirmed by a statistical test. The necessary and sufficient condition for identification of the market power index defined by Lau is that the demand function is not separable in the exogenous variables.

The coefficients on two interaction terms with the price of food from food retailers are both significantly different from zero: coefficients for the price of food away from home and the ratio of female to male wages. The fitted demand curve is downward sloping over the sample period consistent with economic theory. An increase in the price of food purchased away from home induces consumers to expand food purchased from food retailers, indicating that consumers consider these substitute goods. The estimated income effect is also positive implying that food purchased from retailers is a normal good.

In the linear demand equation, the relative wage rate has a negative relationship with the demand for food purchased from food retailers, suggesting that increases in female wages lower the demand for food eaten at home.

In the industry equilibrium equation, marginal cost is increasing in industry output. The coefficients for both the price of capital and price of energy indicate that marginal cost is positively influenced by these two inputs. The marginal cost curve is negatively related to changes in wage levels.

The hypothesis that the financial variables do not affect the industry cost function is rejected. Changes in total current liabilities have contributed to increases in costs but increases
in long-term debt have lead to an increase in efficiency. Investors in long-term debt have incentives to engage in closer monitoring of the firm to protect against wealth transfers to stockholders. These findings are consistent with results summarized by Maloney et al. indicating that leverage increases managerial work effort and enhances decision making by managers to lower costs.

**Competitive Conduct in Food Retailing**

We allow the index of market power $\lambda$ to vary in response to shifts in industry conditions and technological innovations in food retailing. The market power index was specified as linear function of three variables and we will define these variables here and evaluate their impact on the market power measure. The variables are average weekly sales per checkout, the percentage of stores using scanning technology, and a dummy variable representing intensified merger activity from 1983-1992.

*Progressive Grocer*'s annual survey of the grocery industry reports information on industry conditions, productivity measures, and consumer trends. A key industry productivity measure monitored consistently in the *Progressive Grocer* surveys is weekly sales volume per checkout. Information on sales per checkout are presented in categories based on sales volume per store, by region of the country, and by total square footage of selling area.

The impact of sales per checkout on the market power index is positive but not statistically significant. Industry analysts typically use sales per checkout figures to identify economies of
scale and to gauge store efficiency in supermarket retailing. Sales figures suggest the optimal number of checkouts to allocate per store and the most efficient store size. Sales per checkout are uniformly higher each year in the sample for supermarkets with higher total sales. However, the empirical results do not indicate that the higher productivity of larger stores had a significant impact on competitive conditions in food retailing.

The Progressive Grocer survey reports the percentage of stores using scanning technology each year. The annual operating survey of grocery stores initially reported on the percentage of stores using scanning technology in 1981. We extrapolate the existing data series on scanning technology gathered from the trade journal backward from 1980 to 1974 to obtain the figures for missing years. For years prior to 1974, the annual survey noted that the use of scanners was negligible.

Optical scanners were first available by 1972, but adoption was feasible only after the development of the standardized Uniform Product Code in 1973. Levin et al. noted that the first scanners were installed in 1974 and by August 1981 scanners were installed in about 12 percent of stores in the United States.

Optical scanners speed the checkout process and increase labor productivity. Initial analysis of optical scanners by industry observers suggested that the estimated savings to a medium-sized store with $140,000 per week in sales was about $199,000 per year in 1975. Given average costs ranging from about $110,000 to $130,00 per year, Coyle suggested that the costs of installing the optical scanners could potentially be
recovered in about one year. Walsh argued that scanning, in conjunction with development of the universal product code (UPC), facilitated the spread of computerization and automation throughout supermarket operation into ordering and inventory and product control.

In the economics literature the impact of competitive conditions on the adoption of innovations is ambiguous. Reinganum's theoretical model suggested that increased competition delays the adoption of a cost-reducing, capital-intensive innovation. The cost of policing a collusive agreement decreases with technological advances in information and data processing, leading firms with market power to adopt new technology at a more rapid pace than competitive firms. This implies that adoption of scanning is positively related to the market power index. Bowman argued that are no clear cut results that show how an oligopolistic industry would behave toward new process innovations.

Bresnahan's model allows us to integrate industry developments related to the adoption of technological innovations into the market power index and examine this issue empirically. Levin's results suggested that firms in more concentrated markets diffuse optical scanners through their network of stores more quickly. Our results are consistent with Levin's findings and show that adoption of scanning technology had a positive and significant impact on the market power index. However, the overall market power index was not significantly different from zero, the level consistent with competitive pricing.
Oster identified a wave of merger activity lasting from 1982-1992 with a significant slowing of activity at the end of this period. The index was allowed to vary over time by using a time dummy variable equal to 0 from 1967-1982 and equal to 1 from 1983-1992. The coefficient on the time variable for merger activity was positive but not significantly different from zero as indicated by a likelihood ratio test.

Competitive conditions in the food retailing industry during the merger wave of 1983-1992 are measured by the index of market power $\lambda$ of 0.016 (0.017 for the logarithmic model). The precision of the estimated index of market power $\lambda$ is indicated by its small standard error of 0.10. The market power index is very low and its calculated confidence interval includes zero, implying that the structure of the industry is consistent with perfect competition. From 1967-1992 the index was very low at 0.002 for both the linear and logarithmic models.

A likelihood ratio test examined whether the index of market power was constant from 1967-1992. The calculated $\chi^2$ test statistic of 14.196 (15.803 for the logarithmic model) exceeded the critical $\chi^2$ value of 7.82 at the 5 percent significance level. We reject the hypothesis that the index was constant and independent of industry conditions.

The key finding is that the estimated index of market power was virtually unchanged over the time period. This result provides support for the robustness of the estimated index and does not indicate a significant shift in competitive conditions associated with merger and leveraged buyout activity. Cotterill
(1993) concluded that increased market concentration and segmentation during the 1980s enhanced the ability of leading firms to deter entry and facilitated the exercise of market power. These results confirm that a slight increase in market power has occurred but that behavior in the food retailing industry is consistent with competitive conditions.

Interpretation of \( \lambda \) warrants some attention since the model is estimated with aggregate industry data. The food retailing industry is comprised of local markets and \( \lambda \) represents an index for the average degree of market power over the individual local markets. This interpretation does not restrict all grocery retailers in a local market to possess the same degree of market power. The different firms are allowed to exhibit different degrees of market power and \( \lambda \) represents the degree of market power of an average firm in the market.

Following Shaffer, \( \lambda \) is also interpreted as a local estimate of the percentage deviation of the industry output from competitive equilibrium. The estimated value of \( \lambda \) from logarithmic model suggests that the level of competitive industry output would be approximately 1.7 percent higher than the current level of output. The test of competitive conduct shows no evidence for the existence of market power in food retailing.

A final issue is to compare the performance of the linear and logarithmic specifications. The specifications yield similar results for the interpretation of competitive conditions in the food retailing industry. On a theoretical basis the logarithmic model is consistent with demand specifications
yielding constant own-price elasticities, forms which are often estimated in applied studies.

The logarithmic demand model avoids biases in estimating welfare effects in imperfectly competitive markets which are inherently associated with the linear demand model. A functional form for the demand equation which incorrectly imposes a linear specification when demand is actually convex produces a downward biased estimate of the output effects associated with market power.

Malueg showed that the relative welfare loss due to market power depends on the shape of the demand curve. When the demand curve is concave the relative welfare loss in imperfectly competitive markets is lower than when the demand curve is convex. The linear demand specification with interaction terms is frequently used in market power studies. This specification lacks the flexibility to account for demand curvature and its impact on deviations from the efficient competitive output. By contrast the logarithmic model has the flexibility to allow for a curvature in the demand specification.

V. CONCLUSION

This work develops a model of the food retailing industry to examine industry competitive conditions and shifts in an index of market power. An econometric model based on the industry cost function, demand for industry output and industry equilibrium addresses the impact of two key structural changes that shaped the industry from 1967-1992.
Due to merger activity and leveraged buyouts in food retailing, financial leverage increased significantly and shifted away from short-term liabilities toward long-term debt. Markets in the food retailing industry became more concentrated and segmented, offering opportunities for firms to exert market power and set prices above the average costs of production. A theoretical model of industry behavior is applied to test for non-competitive behavior in the food retailing industry.

The degree of market power was assessed in the U.S. food retailing industry using a flexible model to identify deviations from marginal-cost pricing. The estimated index of market power does not differ from zero, implying that the structure of the industry is consistent with perfect competition. The stability of the index over the 1982-1992 period, indicates that higher debt levels have not been translated into increased market power. We extend the industry model to examine the impact of technological changes and innovations in retail store formats on competitive conduct.
FOOTNOTE

1. As Greene (1993) notes the linear and logarithmic models are not nested. Attempts to apply a Lagrange multiplier test or a likelihood ratio test for the linear model ($\theta = 1$) and the logarithmic model ($\theta = 0$) against the general model were not successful. We are unaware of attempts to test the Box-Cox model in nonlinear three-stage least squares models.
Table 1. Parameter Estimates for Food Retailing Industry -- Logarithmic Industry Equilibrium and Demand Model

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>Coefficient</th>
<th>Estimatea</th>
<th>T Ratio</th>
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<tbody>
<tr>
<td><strong>Demand Equation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>δ₀</td>
<td>3.555′</td>
<td>26.127</td>
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<td>Price of Food from Retailers (P₀)</td>
<td>δ₁</td>
<td>1.509′</td>
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<td>Disposable Income Per Capita (DI)</td>
<td>δ₂</td>
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<td>0.743</td>
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<td>Price of Food Away from Home (PFAWAY)</td>
<td>δ₃</td>
<td>1.514′</td>
<td>12.7580</td>
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<td>Female/Male Wage Ratio (WAGERATIO)</td>
<td>δ₄</td>
<td>0.190′</td>
<td>2.805</td>
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<td>P₀*DI</td>
<td>δ₅</td>
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<td>-1.805</td>
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<td>P₀*PFAWAY</td>
<td>δ₆</td>
<td>-3.186′</td>
<td>-2.083</td>
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<tr>
<td>P₀*WAGERATIO</td>
<td>δ₇</td>
<td>2.379′</td>
<td>2.150</td>
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<td><strong>Marginal Cost Equation</strong></td>
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<tr>
<td>Constant</td>
<td>β₁</td>
<td>-1.352′</td>
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<td>Output of Food Retailers</td>
<td>β₂</td>
<td>0.430′</td>
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<td>Price of Food Purchased by Retailers</td>
<td>β₃</td>
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<td>Price of Capital</td>
<td>β₄</td>
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<td>Price of Labor</td>
<td>β₅</td>
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<td>Price of Energy</td>
<td>β₆</td>
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<td>Total Current Liabilities</td>
<td>φ₁₁</td>
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<td>Total Long Term Debt</td>
<td>φ₁₂</td>
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<td><strong>Market Power Index</strong></td>
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<tr>
<td>Sales per Checkout</td>
<td>γ₁</td>
<td>-0.493E-05</td>
<td>1.496</td>
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<td>Merger Activity Dummy (1983-1992)</td>
<td>γ₂</td>
<td>0.015</td>
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<tr>
<td>Percent of Stores Scanning</td>
<td>γ₃</td>
<td>0.011</td>
<td>1.741</td>
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<tr>
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<th>Demand</th>
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<tr>
<td><strong>R-Squared</strong></td>
<td>0.98</td>
<td>0.93</td>
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*a Asterisk indicates significance at the 5 percent level.*
Table 2. Parameter Estimates for Food Retailing Industry -- Linear Industry Equilibrium and Demand Model

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>Coefficient</th>
<th>Estimate(^a)</th>
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**Demand Equation**

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<tr>
<td>Constant</td>
<td>(\delta_0)</td>
<td>-48.415(^*)</td>
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<td>Price of Food from Retailers ((P_0))</td>
<td>(\delta_1)</td>
<td>28.728</td>
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<tr>
<td>Disposable Income Per Capita ((DI))</td>
<td>(\delta_2)</td>
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<td>(\delta_3)</td>
<td>114.330(^*)</td>
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<td>Female/Male Wage Ratio ((WAGERATIO))</td>
<td>(\delta_4)</td>
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<tr>
<td>(P_0 \times DI)</td>
<td>(\delta_5)</td>
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<td>(P_0 \times PFAWAY)</td>
<td>(\delta_6)</td>
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<td>(P_0 \times WAGERATIO)</td>
<td>(\delta_7)</td>
<td>152.330(^*)</td>
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**Marginal Cost Equation**

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<tr>
<td>Constant</td>
<td>(\beta_1)</td>
<td>-1.489(^*)</td>
<td>-2.709</td>
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<tr>
<td>Output of Food Retailers</td>
<td>(\beta_2)</td>
<td>0.474(^*)</td>
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<tr>
<td>Price of Food Purchased by Retailers</td>
<td>(\beta_3)</td>
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<tr>
<td>Price of Capital</td>
<td>(\beta_4)</td>
<td>0.373(^*)</td>
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<td>Price of Labor</td>
<td>(\beta_5)</td>
<td>-0.507(^*)</td>
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<td>Price of Energy</td>
<td>(\beta_6)</td>
<td>1.158(^*)</td>
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<tr>
<td>Total Current Liabilities</td>
<td>(\phi_{F1})</td>
<td>0.295(^*)</td>
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<tr>
<td>Total Long Term Debt</td>
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<td>-0.184(^*)</td>
<td>-2.050</td>
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**Market Power Index**

<table>
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<tr>
<th>Variable Description</th>
<th>Coefficient</th>
<th>Estimate(^a)</th>
<th>T Ratio</th>
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<tbody>
<tr>
<td>Sales per Checkout</td>
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<td>-0.430E-05</td>
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<td>Merger Activity Dummy (1983-1992)</td>
<td>(\gamma_2)</td>
<td>0.014</td>
<td>1.623</td>
</tr>
<tr>
<td>Percent of Stores Scanning</td>
<td>(\gamma_3)</td>
<td>0.010</td>
<td>1.780</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demand</th>
<th>Ind Equil</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.98</td>
<td>0.94</td>
</tr>
</tbody>
</table>

\(^a\) Asterisk indicates significance at the 5 percent level.
REFERENCES


