Food Marketing Policy Center

An Empirical Investigation of Wal-Mart's Expansion into Food Retailing

by Alessandro Bonanno

Food Marketing Policy Center
Research Report No. 105
April 2008

Research Report Series

http://www.fmpc.uconn.edu

University of Connecticut
Department of Agricultural and Resource Economics

An Empirical Investigation of Wal-Mart's Expansion into Food Retailing

Alessandro Bonanno

Assistant Professor of Agricultural Economics
Department of Agricultural Economics and Rural Sociology
The Pennsylvania State University,
207-D Armsby Building,
University Park, PA 16802-5600,
Phone (814)-863-8633, Fax: (814)-865-3746,
Email abonanno@psu.edu

An Empirical Investigation of Wal-Mart's Expansion into Food Retailing

Alessandro Bonanno

This paper analyzes Wal-Mart's expansion into food retailing, focusing on its store conversion strategy via a formal IO entry framework. Forty-eight different competing model specifications are considered to determine how the company perceives competition from incumbent food retailers and how its geographic expansion pattern has influenced its store differentiation decisions over time. The results show that Supercenter openings mainly have targeted large areas with low population density and a high percentage of population receiving food stamps. The results also suggest that as the company moves toward geographic saturation of local markets, some of the strategic location decisions creating economies of density may need to be reconsidered in future years.

Keywords: Wal-Mart, Food retailing, Economies of density

JEL: L81, L29

An Empirical Investigation of Wal-Mart's Expansion into Food Retailing

1. Introduction

Wal-Mart, the largest retailer in the world, grossing $345 billion annually (Wal-Mart Annual Report, 2007), has reinvented the concept of mass merchandising with its Discount Stores, becoming also the largest food-retailer in the United States with its Supercenters: with $91.998 billion of grocery sales in 2006, Wal-Mart outperformed the second largest food retailer in the U.S., Kroger, by more than $31 billion (Food Marketing Institute, 2007).

Wal-Mart's unprecedented growth throughout the United States has triggered a wide body of literature providing evidence of both benevolent impacts and adverse consequences of the company's expansion.[1] However, the number of studies that have investigated the determinants of Wal-Mart's growth and expansion is limited, especially regarding the entry of the company into food retailing. This limited interest in understanding the economic and social factors driving the company's expansion is surprising, especially in light of the interest policymakers have shown in either

[1] Generally speaking, the existing literature has focused on three broad areas dealing with the impact of the company on 1) local retail businesses, 2) consumers and 3) local economies. The literature on Wal-Mart's impact on retail businesses has shown how the company has reshaped the competitive environment of the retail industry resulting in losses for small-sized retailers (Stone, 1988, 1995 and 1997), strategic reaction to the company's entry (Khanna and Tice, 2000) and a disciplining effect on other firms' conduct (Cleary and Lopez, 2008). Wal-Mart impacts consumers by pushing retail prices down (Basker, 2005b; Basker and Noal, 2007; Hausman and Leibtag, 2005; Volpe and Lavoie, 2008), containing the inflation rate (Hausman and Liebtag 2004) and increasing consumer surplus (Hausman and Leibtag, 2005; Cleary and Lopez, 2008). Wal-Mart's presence appears to permeate local economies in many ways, such as causing an increase in the poverty rate (Goetz and Swaminathan, 2006) and negatively impacting retail workers' conditions (Basker, 2005a; Neumark, Zhang and Ciccarella, 2006; Bonanno and Lopez, 2008).

supporting[2] or opposing the expansion of the company in local areas.[3] Wal-Mart's differentiation into food retailing is also of interest for two more reasons: first, by opening Supercenters in rural and/or poor areas, Wal-Mart enhances food availability to individuals who otherwise would not have access to supermarkets; second, the opening of supercenters diverts demand from existing food retailers, causing a change in the conduct of traditional food retailers (Cleary and Lopez, 2008).[4]

This paper draws from the industrial organization entry literature to analyze the determinants of Wal-Mart's expansion into food retailing across the continental U.S. over a thirteen-year period using as the dependent variable the number of store conversions from Discount Store to Supercenter rather than the total number of Supercenter openings because first, it avoids modeling complications arising with entry in heterogenous product markets (Mazzeo, 2002; Seim, 2006), and second, the company has capitalized much more on store conversions than it has on *ex novo* openings. The choice of variables used to explain this process comes from both the literature on entry and the specific literature on Wal-Mart. In particular, a first set of variables includes socio-economic population characteristics and the structure of the local food retailing industry, and a second set includes the distance from the closest Wal-Mart food distribution center, the

---

[2] City officials lured Wal-Mart into locating in a low income suburb of Hartford, Connecticut, of a site once occupied by a blighted housing project, with the purpose of creating more retail businesses, better shopping and more jobs for local residents (Malanga, 2004).
[3] Maryland's General Assembly voted in January 2006 on a bill that required private companies with more than 10,000 employees in Maryland to spend at least 8 percent of their payroll on employee health benefits or make a contribution to the state's insurance program for the poor. Wal-Mart, which at the time of the bill employed nearly 17,000 individuals in the state, was the only such company known not to meet that spending requirement (Wagner, 2006). The bill was found to violate federal regulations by the Federal Court in July of the same year and was therefore rejected.
[4] As for the latter, it should be mentioned that the presence of Supercenters may also have an indirect impact on food prices, following the increase in food retailing concentration. Neither of these effects was found in metropolitan areas, as shown by Franklin (2001) and Stiegert and Sharkey (2007), respectively.

lagged number of stores and the presence of nearby Wal-Mart stores of both formats (discount stores and supercenters). Forty-eight competing model specifications are considered and the best specification selected using the Bayesian Information Criterion. Results show that Wal-Mart store conversion has occurred mainly in large areas with low population density, where income inequality is larger, and where the number of incumbent food retailers is lower. The spatial pattern of the company's store conversion strategy is consistent with *a priori* expectations regarding the positive but decreasing effect of store-clustering and a slight increase in dependence on established locations, suggesting that the company's Supercenters are saturating local markets. It is likely that for further expansion into this industry, the company may soon be forced to consider alternative location strategies which will limit the economies of density arising from the hub-and-spoke logistic system.

2. Wal Mart's Expansion and Differentiation into Food Retailing: Background

The expansion of Wal-Mart has been characterized by the sheer number of its stores and more recently by its differentiation into food retailing, the success of which surpassed previous forecasts (Graff, 1998). The company began its expansion into the world of groceries in 1988,[5] opening its first Supercenter in Washington, Missouri. Later, in 1999, Wal-Mart introduced a new store format, the Neighborhood Market, to compete directly with supermarkets in smaller, urban areas. The transition to the supercenter format has been gradual but steady: Figure 1 shows how Supercenters are gradually

[5] The company failed a first attempt at entering food retailing in the 1980's with the "Hypermart USA." The large size of these stores (created to replicate the large hypermarket formats used by Carrefour in Europe, exceeding 200,000 sq. ft), was hardly manageable, resulting in dismissal of this format in favor of the smaller (125,000 sq. ft.) supercenter format.

replacing Discount Stores. By the end of fiscal year 2006 Wal-Mart operated 3,443 stores in the U.S., of which 2,256 were Supercenters, 1,075 were Discount Stores and only 112 were Neighborhood Markets.

A key factor in the success of Wal-Mart's entry into food retailing has been the ability of the company to capitalize on its pre-existing stores by turning them into larger, more profitable Supercenters.[6] In fact, the decision to enter the food retailing industry has been accompanied by the transformation of numerous Discount Stores into Supercenters. As can be seen from Figure 2, until 2002 more than 90% of all Supercenters opened in the U.S. were once Discount Stores. Another aspect of Wal-Mart's entry into food retailing is that the expansion of the Supercenters has followed the same logic as that for Discount Stores (Graff, 2006; Holmes, 2008), based on a precise pattern of geographic growth. Wal-Mart has expanded by placing new stores at relatively short distances (initially approximately one driving day, less in later years) from existing distribution centers. Once the area surrounding a distribution center is saturated and opening a new store in a more distant area is not economically manageable in terms of logistic expenses and transportation costs, a new distribution center is opened that can serve additional stores to be opened in future years: this location/logistic strategy is defined as "hub-and-spoke" (Walton and Huey, 1992).[7]

---

[6] It is also remarkable how the company did not rely heavily on acquisition of other chains for its expansion: for example, not long after the acquisition of Phillips Food Centers and the food distribution company MacLane Company Inc., Wal-Mart disposed of all facilities previously acquired after having internalized their marketing expertise (Graff, 1998).

[7] See Walton and Huey (1992), Khanna and Tice (2000), and Neumark *et al*. (2006) for more details on the hub-and-spoke expansion system of the company. Also the time-geographic pattern of Wal-Mart expansion fits some of the empirical evidence provided by Cotterill and Haller (1992), who found that food retailing chains tend to expand into closer markets.

Table 1 reports the state-specific number of Wal-Mart Discount Stores and Supercenters over time. These figures show how the number of Discount Stores has dramatically decreased in southern states: in some cases (such as Texas, Arkansas, Tennessee and Florida) the ratio of Supercenters and Discount Stores was 3 to 1 or larger at the end of fiscal year 2005. The differentiation into food retailing appears instead much slower in states located farther away from Benton County, Arkansas, where Wal-Mart's headquarter is located. In northeastern states such as Connecticut, New Jersey, New York, and Massachusetts, and in other states such as California and Indiana, the discount store still dominates as the company's preferred store format. Also, excluding the Northeast and California, as the state-level number of Supercenters increases, the number of Discount Stores decreases, indicating that the company bases its continuous expansion into food retailing on store conversion more than on *ex novo* store openings.

Although the literature addressing the expansion of the company is large, only two studies (Jia, 2007; Holmes, 2008) have formally analyzed the characteristics of Wal-Mart's expansion; of these two studies only Holmes (2008) has (partially) addressed the company's differentiation into food retailing.

Jia (2007) analyzed the simultaneous location decisions of Wal-Mart, Kmart, and a fringe of small retailers using a dynamic location game, and finds that Wal-Mart's expansion is positively related to market size (total population), percentage of urban population, and per capita retail sales. Jia also finds that competition from other large chains negatively affects Wal-Mart's expansion and that the company preferentially locates stores in geographic clusters (the "chain effect").

In the second study, Holmes (2008), investigated Wal-Mart's store location strategy, evaluating the company's economies of density arising from savings in logistic costs[8] accounting also for sales cannibalization among stores that are located too close to one another, combining revealed preferences (i.e., the actual actions taken by Wal-Mart), with a moment inequality approach. Holmes' results show that the company benefits consistently from economies of density, the extent of which can go beyond simple distributional/logistic savings. For the scope of this paper, it should be noted that although Holmes (2008) considers both Discount Stores and Supercenters in the first steps of its complex methodology, the final results only marginally touch the issue of Wal-Mart having two store formats.

3. A Model of Wal-Mart's Expansion into Food Retailing

The empirical aim of this paper is to investigate the driving forces of Wal-Mart's expansion into food retailing. The focus of the analysis is on the number of store conversions (from Discount Store to Supercenter) instead of on the increase in the number of Supercenter openings. Focusing on store conversion has two justifications: 1) Wal-Mart primarily used store conversions to expand into food retailing, and 2) methodologically this focus avoids problems of "product heterogeneity" that arise when studying empirically firms entering markets with more than one product. Recent empirical analyses of entry into heterogenous product markets (Mazzeo, 2002; Seim, 2006) have modeled entry and product choice as sequential decisions, assuming that

[8] Caves, Christensen, and Tretheway (1984) originally studied economies of density in the airline industry arising when there is a reduction in unit cost for an increase in the transportation services in a network of given size.

firms decide first whether to enter a market and then the type of product to be offered.[9] Constraining the analysis to Wal-Mart's store conversions, the focus will be only on the second stage of the decision process. This allows abstracting away from the need to factor in discount stores' location decisions.

In line with the existing entry literature, it is assumed that Wal-Mart's post-conversion profit is a linear function of both market characteristics and incumbents' presence (Berry, 1992; Bresnahan and Reiss, 1991; Jia, 2007; Mazzeo, 2002; Seim, 2006). While the assumption of linearity simplifies the estimation procedure, the variables included in the post-conversion profit function aim to circumvent the lack of availability of firm-level variables, such as quantity, prices and market shares. Wal-Mart's post-conversion profit is also driven by the beneficial effect of economies of density (Holmes, 2008) that arise from locating stores both in geographic clusters and at driving distance from a pre-existing food-distribution center. It is also assumed that, in those markets where Wal-Mart converts Discount Stores into Supercenters, it will be the firm with the largest profitability. This implies (as in Bresnahan and Reiss, 1991, and Berry, 1992),[10] that Wal-Mart will decide whether to convert its stores regardless the composition of the set of rivals. Although strong, this assumption permits us to focus only on Wal-Mart decisions, considering incumbents and potential entrants' decisions as exogenous. Wal-Mart is also assumed to have perfect information on competitor retailers'

---

[9] Mazzeo (2002) uses both a simple two-stage Stackleberg game in which firms act sequentially in deciding whether to enter or not the market and then choose the product, and a more complex game where firms' entry and product choice decisions are made in two sequential sub-stages of the same game.

[10] Both Bresnahan and Reiss (1991), and Berry (1992) assume that profits are declining in rivals' entry decisions. Under the assumption that those firms that are more profitable given one set of rivals will remain more profitable given any set of rivals, it follows that only entrant firms will be profitable and that the order of entry generates a Nash equilibrium (although not unique); this allows the researcher to treat the observed number of market participants as one of the possible equilibrium outcomes of a game played by all the firms that decide whether to enter the market or not.

behavior (as in Jia, 2007) which results in perfect foresight, with the post-conversion being equal to the expected profits.

Wal-Mart will decide to convert an existing Discount Store into a Supercenter if the expected profit of the new Supercenter will exceed that of the Discount Store. In general terms, the post-conversion profit of Wal-Mart operating in market i at time t, with $i \in L = \{1,2, \ldots , l\}$, and l representing the maximum number of markets, can be expressed by the following reduced form equation:

$$\pi_{it} = \sum_k \beta_k X_{kit} + g\left(N_t, W; \Gamma\right) + h\left(M_t, W; \Lambda\right) + e_{it}, \tag{1}$$

where X_{it} represents demand and cost characteristics specific to location i at time t, and the βs their coefficients; the two functions $g\left(N_t, W; \Gamma\right)$ and $h\left(M_t, W; \Lambda\right)$ are the effects of competition and economies of density/sales cannibalization on profits, respectively; Γ and Λ are vectors of coefficients; N_t and M_t are matrixes of variables capturing the competition facing Wal-Mart supercenters and the structure of Wal-Mart presence at time t; and e_{it} is an idiosyncratic post-conversion profit component, assumed to be i.i.d. from a known distribution. W is an (l x l) matrix of row standardized spatial weights whose elements are defined as:

$$w_{ij} = \begin{cases} \dfrac{1}{dist_{ij}} & \text{for } i \neq j \text{ and } dist_{ij} \leq B \\ 0 & \text{otherwise,} \end{cases} \tag{2}$$

where $dist_{ij}$ represents the distance between markets i and j, $\sum_{-l} w_l = 1$, and B is the maximum distance of influence.

First, in order to parameterize $g\left(N_t, W; \Gamma\right)$, it is assumed competitors' effect is constant, additive, and separable across locations (as in Seim, 2006). Wal-Mart's post-conversion profits are expected to be impacted in different ways by the presence of competitors of different size (similarly to Jia, 2007) or:

$$g\left(N_t, W; \Gamma\right) = \gamma_1 \ln n_{it} + \gamma_2 siz_{it}\,, \qquad (3\text{ - a})$$

where the γs are parameters, n_{it} represents the number of food retailers operating in area i at time t, siz_{it} represents their average size, and ln is the natural log operator.[11] An alternative specification of incumbents' effect on a store conversion's profits considers explicitly the impact of firms operating in the neighboring areas, given that: 1) they can attract away costumers from the entrant and 2) they represent the threat (queue) of potential entrants that may decide to locate in location i in the near future (Cotterill and Haller, 1992).[12] Including these factors, one has:

$$g\left(N_t, W; \Gamma\right) = \gamma_1 \ln n_{it} + \gamma_2 siz_{it} + \gamma_3 \ln \sum_{-i} n_{-it} w_{-i} + \gamma_4 \sum_{-i} siz_{-it} w_{-i}\,, \qquad (3\text{ - b})$$

where n_{-it} and siz_{-it} represent the total number of food retailers operating in locations different than i and their size, respectively, the w_{-i} s are non-diagonal elements of W, and the other elements are as described above. In a third alternative specification of incumbents' effect on store conversion, Wal-Mart perceives food retailers operating in both area i and in its surroundings as direct competitors:

$$g\left(N_t, W; \Gamma\right) = \gamma_1 \ln(\tilde{n}_{it}) + \gamma_2 \tilde{siz}_{it}\,, \qquad (3\text{ - c})$$

---

[11] A post-entry profit function linear in demand characteristics can be derived (in logarithmic terms) from a Cournot model with constant and identical marginal cost together with a constant-elasticity of demand function (Berry, 1992); this justifies the use of logs for both population characteristics and number of incumbents.

[12] Cotterill and Haller (1992), studying entry into grocery retailing, consider the pool of potential entrants as the number of major chains operating in nearby areas. Given the nature of the problem investigated here, it is not possible to consider all the major chains operating in each area; therefore the total number of food retailers is used as a proxy for the number of potential entrants.

where $\tilde{n}_{it} = (n_{it} + \sum_{-i} n_{-it} w_{-i})$ and $s\tilde{i}z_{it} = (empl_{it} + \sum_{-i} empl_{-it} w_{-i}) / \tilde{n}_{it}$, $empl_{it}$ being employment in food retailing in the area *i*.

A first parameterization of $h(M_t, W; \Lambda)$ is

$$h(M_t, W; \Lambda) = \lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \lambda_{2h} \sum_{-i} m_{-it}^{h} w_{-i} + \sum_{h=SC,DS} \lambda_{3h} m_{it-1}^{h} , \qquad \text{(4-a)}$$

where the λ s are parameters, $m_i^{(.)}$ s and $m_{-i}^{(.)}$ s represent respectively the number of Wal-Mart facilities in location *i* and locations different from *i*, and the subscripts *FDC*, *DS* and *SC* indicate food-distribution centers, discount stores and supercenters, respectively. $\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i}$, $\sum_{h=SC,DS} \lambda_{2h} \sum_{-i} m_{-it}^{h} w_{-i}$ and $\sum_{h=SC,DS} \lambda_{3h} m_{it-1}^{h}$ capture (in order) a first component of economies of density deriving from the proximity of food-distribution centers (Holmes, 2008), a second component capturing the effect of proximity to other stores (the "chain effect" as in Jia, 2007) and a third term representing the "presence-effect," capturing the impact of the number of pre-existing Discount Stores and Supercenters operating in the area. In terms of expected signs of the coefficients, closeness to distribution centers should increase the likelihood of store conversion, the spatial number of both Supercenters and Discount Stores could show both signs, indicating either a beneficial (positive) "chain effect" or a negative effect due to diseconomies (or to sales cannibalization), while the "presence-effect" is expected to be positive for the lagged number of Discount Stores and negative for the number of Supercenters.

The specification in (4-a) does not allow for changes in the store conversion strategy over time: one could instead conjecture that economies generated though locating stores in geographic clusters will be more effective in early years and that as markets become saturated, this effect would wear off, eventually becoming negative, with the location of new Supercenters becoming more sparse to avoid sales cannibalization. The opposite effect can be expected for the spatial number of Discount Stores. Also, store conversion strategy could be more carefully designed in early periods, when the Supercenter format was still at an experimental stage. In later periods the rate of conversion may increase, resulting in an increasing positive effect of the existing number of Discount Stores on the likelihood of store conversions. The effect of existing supercenters will move in the opposite direction.

Therefore, a more complete specification of $h\left(M_t, W; \Lambda\right)$ is:

$$h\left(M_t, W; \Lambda\right) = \lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{2ht} \sum_{-i} m_{-it}^{h} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{3ht} m_{it-1}^{h} \text{ ,(4-b)}$$

where all the parameters capturing the "chain-effect" and the "presence-effect" vary over time. Specification (4-b) nests (4-a). In order to allow for all possible combinations of effects, fourteen intermediate specifications can be identified, as listed in Table 2. In all the alternative parameterizations of $h\left(M_t, W; \Lambda\right)$ the effect of proximity of food-distribution centers does not vary over time due to the fact that Wal-Mart adjusts the number of distribution centers over time to match the needs of the stores already operating and future expansion plans (Walton and Huey, 1992). Combining the different parameterizations of $g\left(N_t, W; \Gamma\right)$ and $h\left(M_t, W; \Lambda\right)$, one has 48 alternative specifications of equation (1).

4. Data, Estimation and Model Selection

The different specifications of the models are estimated using county-level data which include the entire population of counties in the contiguous U.S. over the thirteen-year period 1993-2005. The main source for Wal-Mart store location and opening years is data collected by Thomas J. Holmes at the University of Minnesota, publicly available on his website.[13] The data were aggregated, obtaining county-level observations for: the number of store conversions, number of Discount Stores and Supercenters, and their lagged values. The number of store conversions was used as the dependent variable. Only counties where Wal-Mart operated were retained for a total of 21,204 observations.

Spatially weighted averages of the number of stores operating in neighboring counties were calculated using the row-standardized matrix of spatial weights W described in (2). The distance between counties is obtained using the Harvestine formula from the latitude and longitude coordinates reported by the Bureau of Census Gazetteer of counties for the year 2000. The maximum distance of influence for food distribution centers was obtained assuming 400 miles as a likely maximum distance for a one-day drive while, for the spatial number of supercenters and discount stores, the maximum distance of influence was assumed for simplicity to be 100 miles.

Data on both county characteristics and the competitive environment of the food-retailing industry were obtained from publicly available sources for the years 1993-2005 to match the Wal-Mart data. The socio-demographic county characteristics considered were population density, total county population (from the Population Estimates Program of the Bureau of Census), median household income and percentage of the population being food stamps recipients (from the Small Area Income & Poverty Estimates of the U.S. Bureau of Census). Population density was obtained dividing total county population for the number of square miles of land in each county (from the Bureau of

---

[13] I am grateful to Professor Holmes for not having put any restrictions on the scholarly use of the database. For details on the data and on the original sources used, see Holmes (2008) or http://www.econ.umn.edu/~holmes.

Census Gazetteer for the year 2000) and is expressed in thousand of individuals per square mile. The variables capturing the effect of competition on post-conversion profits are obtained from the County Business Patterns of the Bureau of Census: number of establishments and number of employees for the food retailing industry (SIC 54 for the years previous to 1998 and NAICS 445 from 1999 forward) were collected and the average store size obtained by dividing the total number of employees by the number of establishments. Spatial measures were obtained using a maximum radius of 100 miles. Except for population density and store size, all variables were used as natural logs.

The forty-eight different specifications of the model were estimated via an ordered-logit estimator using STATA (v. 10). Model selection was performed using the Bayesian Information Criterion (BIC), chosen because it offers the opportunity to compare competing models (both nested and non-nested), penalizing at the same time less parsimonious specifications.

5. Empirical Results and Discussion

The values of the BICs are reported in Table 3. Given the features of the specification that best fits the data it is possible to infer that 1) Wal-Mart considers all the firms competing in a 100-mile radius as direct competitors; 2) the number of Discount Stores operating in surrounding areas and the lagged number of Supercenters have effects that are constant over time; 3) the effects of both the number of Supercenters in nearby areas and the lagged number of Discount Stores impact the likelihood of Wal-Mart converting Discount Stores into Supercenters in ways that vary over time.

Detailed results of the selected model are reported in Table 4. The results for the other specifications are omitted, although a brief discussion of the differences between specifications are included as the results for the selected model are illustrated. The results show that for its store conversions, Wal-Mart has preferentially targeted large rural areas (with a large population but low population density), capitalizing on larger shares of population receiving food stamps (though median income does not impact the likelihood of a store conversion). These findings are consistent (in both terms of sign and significance level) across all specifications, with the exception of median income, which in some cases appears to have a negative impact on the likelihood of observing a store conversion (although only significant at the 10% level), which strengthens the finding that Wal-Mart explicitly targets less wealthy consumers.

The presence of incumbents negatively impacts the likelihood of store conversion, as expected, while average store size does not impact store conversion likelihood. Also, the selected model rejects the hypothesis of Wal-Mart perceiving competition in the same area differently than that coming from stores operating in neighboring areas, suggesting that the queue of potential entrants (Cotterill and Haller, 1992) does not create a concern for the company. Also, incumbents do not seem to affect the likelihood of store conversion across all specifications. It should be noted that in all the specifications where the effects for the queue of entrants and actual incumbents are accounted for separately (as in 3-b), the two effects are opposed, and their signs are inconsistent with Cotterill and Haller's (1992) findings that potential entrants have a positive effect on the likelihood of entry.

The estimated parameter for the inverse of the distance from a food distribution center ("economies of density") is positive and significant and the effect is consistent across specifications. As for the "chain-effect," the selected specification sees the number of Discount Stores operating in a 100-mile radius affecting the likelihood of a store conversion in a constant, negative and significant way (the estimated coefficient is approximately -0.77). The coefficients capturing the effect of clustering supercenter stores are positive, significant at the 1% level and decrease in magnitude over time, going from 12.8771 for the year 1994 to 0.6235 for 2005. These results indicate that the company is actively using an expansion strategy consistent with the "hub-and-spoke" strategy, and that the company is moving towards a saturation of local markets, given that the clustering of stores in neighboring areas is becoming a weaker and weaker determinant of the likelihood of store conversion.

Interestingly, as the estimated coefficients for the spatial number of Supercenters decline, the magnitude of the coefficients for the lagged number of Discount Stores increases: this is consistent with the trend depicted in Figure 2, showing that the number of store conversions dominates the opening of *ex novo* supercenters. As a local market becomes close to saturated with the presence of Supercenters, the rate of store conversions is expected to increase. The estimated coefficients are in fact small and not different from one another in early years (1994-1997), ranging from 0.14 in 1994 to 0.1533 in 1997, while they become larger (up to 0.6023 in 2004) in later years.

These results offer some opportunities for discussion. In the first place, the estimated coefficients for the socio-demographic characteristics show that Wal-Mart expansion into food retailing through store conversion has consistently targeted rural areas where consumers present more income inequalities (this is so across all specifications). This may be an issue if one considers that individuals with lower income will spend a larger share of it on food and other necessities, becoming more "dependent" on the presence of Wal-Mart, and that the company capitalizes its expansion into food retailing on food stamps recipients, which may add another item to the already long list of the alleged social costs of the company's expansion, given that the company capitalizes on the public expenditure aimed to help food access to low income individuals. On the opposite, the fact that the company has converted more Discount Stores into Supercenters in areas with a limited presence of food retailers may result in consumers benefiting from the increased availability of outlets selling food.

The results also indicate that the company's location strategy may be destined to face some issues in the future, especially if Wal-Mart wants to maintain its current rate of growth. This is shown by the positive impact of the "chain-effect" decreasing over time, which suggests that part of those economies of densities obtained through locating stores in geographic clusters may be vanishing soon. Wal-Mart's expansion into food retailing has already surpassed previous expectations in terms of both rate of growth and numbers (Graff, 1998), succeeding where other big companies have failed (see for example the failure of Super Kmart as described in Graff, 2006). It may be time for Wal-Mart to reconsider part of its expansion strategy if it is planning to expand further.

6. Concluding Remarks

The unprecedented expansion of Wal-Mart has attracted the interest of economists, sociologists, politicians, historians, and opinion leaders of all kinds. In the last ten years, a large number of journalistic and academic articles have either raised or answered questions as to the impact of the company on retail competition, prices, the inflation rate, retail employment and earnings, poverty rates, retail concentration and economic indicators. However, aside from a few recent attempts, little has been said on the determinants of the company's successful expansion into food retailing.

This paper provides some empirical evidence that the company has both followed an expansion strategy consistent with the "hub-and-spoke" logistic system already in place for its Discount Stores, and targeted areas with precise demographic characteristics (low population density, high population, and high percentage of population being food stamps recipients) where competition from existing food retailers was scant. The spatial pattern of Wal-Mart store conversion shows that the company has capitalized on proximity to food distributions centers and that, as the advantages of store clustering are decreasing over time, the company's store conversion strategy becomes relatively less focused on market characteristics.

These findings offer some input for future avenues of research, which could address either the impact of the company on low-income individuals' supermarket access or determining whether Wal-Mart's presence could eventually result in a more efficient outcome of food stamp policy (i.e., individuals receiving food stamps shopping preferentially at Wal-Mart because they can acquire more food for the same policy expenditure).

References

Basker, E. (2005a). Job Creation or Destruction? Labor Market Effects of Wal-Mart Expansion. Review of Economics and Statistics, 87, (1), 174-183.

Basker, E. (2005b). Selling a Cheaper Mousetrap: Wal-Mart's effect on retail prices. Journal of Urban Economics, 58, (2), 203-229.

Basker, E. and Noel M. (2007). The Evolving Food Chain: Competitive Effects of Wal-Mart's Entry into the Supermarket Industry. University of Missouri Department of Economics Working Paper 07-12. Available at http://economics.missouri.edu/~baskere/papers/. Accessed 06/20/2007.

Berry S. T. (1992). Estimation of a Model of Entry in the Airline Industry. Econometrica, 60, (4), 889–917

Bonanno, A. and Lopez, R. A. (2008). Wal-Mart's Monopsony Power in Local Labor Markets. Food Marketing Policy Center Research Report, No. 103, 34 pages. University of Connecticut, Storrs, CT. Available at http://www.fmpc.uconn.edu/publications/reports.php. Accessed 02/20/2008.

Bresnahan, T. F., and Reiss, P. C. (1991). Entry and Competition in Concentrated Markets. Journal of Political Economy, 99, (5), 977-1009.

Caves, D. W., Christensen L. R. and Tretheway, M.W. (1984). Economies of Density versus Economies of Scale: Why Trunk and Local Service Airline Costs Differ. The RAND Journal of Economics, 15, (4), 471-489

Cleary, R. L. O.and Lopez, R. A. (2008). Does the Presence of Wal-Mart Cause Dallas/Fort Worth Supermarket Milk Prices to Become More Competitive? Food Marketing Policy Center Research Report, No. 99. University of Connecticut, Storrs, CT. 28 pages. Available at http://www.fmpc.uconn.edu/publications/reports.php. Accessed 01/31/2008.

Cotterill, R.W. and Haller L. (1992). Barrier and Queue Effects: A Study of Leading Us Supermarket Chains Entry Patterns. The Journal of Industrial Economics, 40, (4), 427–440.

Franklin, A. W. (2001). The Impact of Wal-Mart Supercenters on Supermarket Concentration in U.S. Metropolitan Areas. Agribusiness, 17, (1), 105-114

Food Marketing Institute, (2007). Top U.S. Supermarket and Grocery Chains, 2006. Available at http://www.fmi.org/docs/facts_figs/faq/top_retailers.pdf. Accessed 12/07/2007

Goetz, S. J. and Swaminathan, H. (2006). Wal-Mart and County-Wide Poverty. Social Science Quarterly, 87, (2), 211–216.

Graff, T. O. (1998). The Location Strategy of Wal-Mart and Kmart Supercenters: Contrasting Corporate Strategies. The Professional Geographer, 50, (1), 46–57.

Graff, T. O. (2006). Unequal Competition among Chains of Supercenters: Kmart, Target and Wal-Mart. The Professional Geographer, 58, (1), 54–64.

Hausman, J. and Leibtag, E. S. (2004). CPI Bias from Supercenters: Does the BLS Know That Wal-Mart Exist? NBER working paper series, Working Paper 10712. Available at http://www.nber.org/papers/w10712. Accessed 06/10/2006.

Hausman, J. and Leibtag, E. S. (2005). Consumer Benefits from Increased Competition in Shopping Outlets: measuring the Effect of Wal-Mart. NBER working paper series, No 11809. Available at http://www.nber.org/papers/w11809 . Accessed 06/10/2006.

Holmes, T. J. (2008). Database of Wal-Mart's Location and Store Opening Dates. Available at http://www.econ.umn.edu/~holmes/data Accessed 03/06/2008.

Holmes, T. J. (2008). "The Diffusion of Wal-Mart and Economies of Density" NBER Working Paper series, No 13783. Available at http://ssrn.com/abstract=1091418. Accessed 03/06/2008.

Khanna, N. and Tice, S. (2000). Strategic Responses of Incumbents to New Entry: The Effect of Ownerships Structure, Capital Structure and Focus. The Review of Financial Studies, 13, (3), 749 – 779.

Jia, P. (2007). "What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retail Industry" MIT working paper. Available at http://econ-www.mit.edu/files/1090. Accessed 19/06/2007.

Malanga, S. (2004). What Does the War on Wal-Mart Mean? The City Journal, available at http://www.city-journal.org/html/14_2_what_does_the_war.html. Accessed 14/08/2007

Mazzeo, M. J. (2002). Product Choice and Oligopoly Market Structure. The RAND Journal of Economics, 33, (2), 221–242.

Neumark, D., Zhang, J., and Ciccarella, S. (2006). The Effects of Wal-Mart on Local Labor Markets. University of California-Irvine, Department of Economics Working Paper No.060711. Available at http://www.econ.uci.edu/docs/2006-07/Neumark-11.pdf Accessed 06/02/2007.

Seim, K. (2006). An Empirical Model of Firm Entry with Endogenous Product –Type Choices. The RAND Journal of Economics, 37, (3), 619 - 640.

Stiegert, K. W. and Sharkey, T. (2007). Food Pricing, Competition, and the Emerging

Supercenter Format. Agribusiness, 23, (3), 295–312

Stone, K.E. (1988). The Effect of Wal-Mart Stores on Business in Host Towns and Surroundings Tows in Iowa. Iowa State University: 36 pages. Available at http://www.econ.iastate.edu/faculty/stone/ . Accessed 06/10/2006.

Stone, K.E. (1995). Competing with the Discount Mass Merchandisers - Impact of Wal-Mart Stores and Other Mass Merchandisers in Iowa, 1983-1993. Iowa State University. Available at http://www.econ.iastate.edu/faculty/stone/. Accessed 06/10/2006.

Stone, K.E. (1997). "Impact of the Wal-Mart Phenomenon on Rural Communities," *Increasing Understanding of Public Problems and Policies, Oak Brook*, IL:Farm Foundation.:189-200. Available at http://www.econ.iastate.edu/faculty/stone/. Accessed 06/10/2006.

U. S. Bureau of Census, County Business Patterns Database: Various Years. Available at http://www.census.gov/epcd/cbp/download/cbpdownload.html. Accessed 06/20/2006.

U.S. Bureau of Census, Gazetteer of Counties: Year 2000. Available at http://www.census.gov/geo/www/gazetteer/places2k.html. Accessed 11/02/2007.

U. S. Bureau of Census, Population Estimates Program: Various Years. Available at http://www.census.gov/popest/estimates.php. Accessed 07/16/2006.

U. S. Bureau of Census, Small Area Income & Poverty Estimates. Various Years. Available at http://www.census.gov/hhes/www/saipe/county.html. Accessed 10/10/2006.

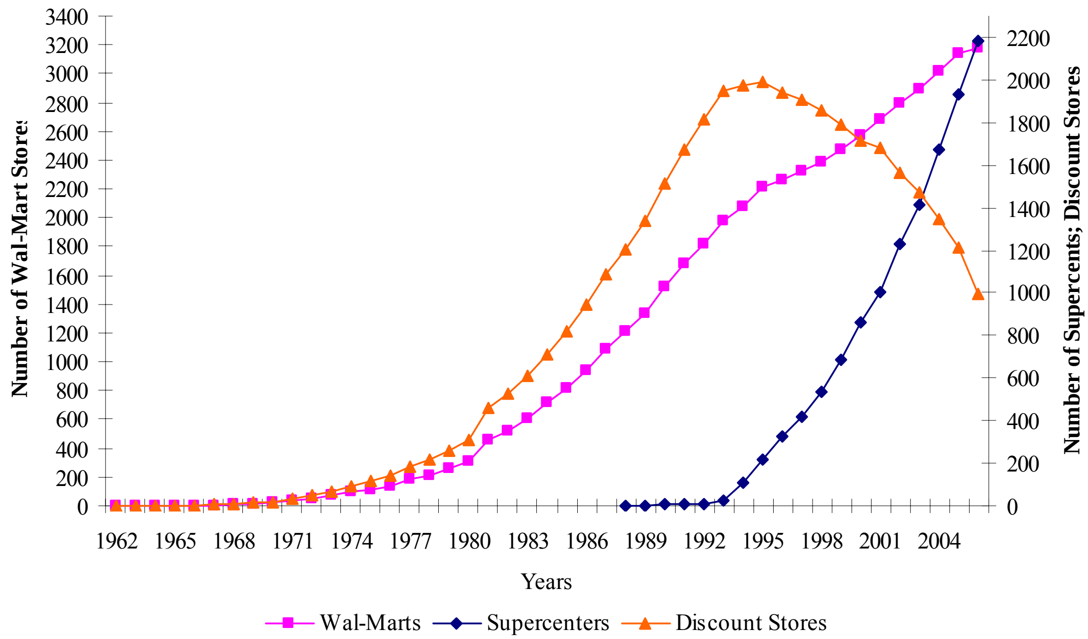
Volpe, R. J. III and Lavoie, N. (2008). The Effect of Wal-Mart Supercenters on Grocery Prices in New England. Review of Agricultural Economics, 30, (1), 4-26.

Wal-Mart Inc., Shareholders' Annual Report 2007. Available at www.walmartstores.com Accessed 06/15/2007

Walton, S. and Huey, J. (1992). "Sam Walton, Made in America: My Story", Doubleday Publisher, New York City, New York.

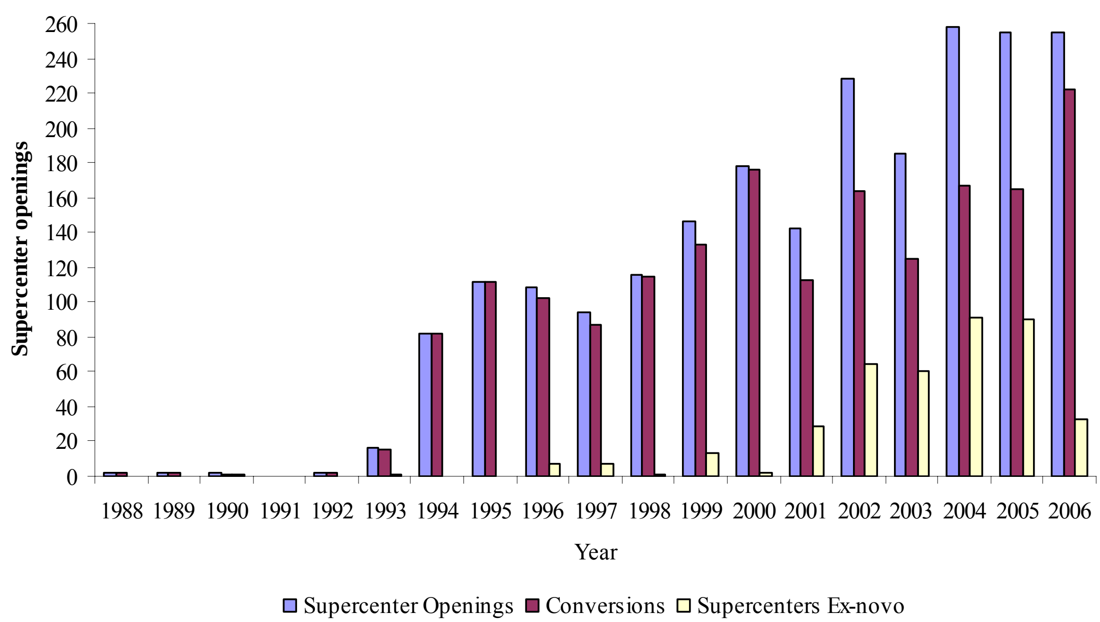
Wagner, J. (2006). Md. Legislature Overrides Veto on Wal-Mart Bill. The Washington Post, January 13, Page A01

Figure 1. Number of Wal-Mart Stores by Type of Store Format



Source: Elaboration from Wal-Mart Opening database by T. J. Holmes

Figure 2. Number of Supercenters by Type of Opening



Source: Elaboration from Wal-Mart Opening database by T. J. Holmes

Table 1 Number of Wal-Mart Supercenters and Discount Stores by Region and State

	Supercenters			Discount Stores		
Region	**1993**	**1999**	**2005**	**1993**	**1999**	**2005**
South						
Arkansas	4	31	60	69	43	21
Louisiana	1	28	60	72	47	23
Oklahoma	1	27	52	76	51	30
Texas	5	94	250	225	153	62
Alabama	0	37	74	74	44	15
Kentucky	1	32	58	67	39	23
Mississippi	1	25	51	55	34	14
Tennessee	1	38	80	83	49	16
Delaware	0	1	4	2	3	3
Florida	0	50	125	124	88	49
Georgia	0	32	97	82	59	17
Maryland	0	1	8	13	25	33
North Carolina	0	20	75	79	68	35
South Carolina	0	23	48	49	33	14
Virginia	0	34	60	38	26	20
West Virginia	0	14	25	12	8	6
Northeast						
Connecticut	0	0	4	1	14	28
Maine	0	3	12	13	17	10
Massachusetts	0	1	3	7	31	41
New Hampshire	0	3	7	10	18	19
Rhode Island	0	0	1	2	6	7
Vermont	0	0	0	0	4	4
New Jersey	0	0	1	8	20	40
New York	0	9	33	25	52	48
Pennsylvania	0	25	67	32	49	46
West						
Arizona	0	2	40	28	33	17
Colorado	0	14	43	33	25	13
Idaho	0	0	14	7	9	3
New Mexico	0	0	7	3	9	4
Montana	0	0	14	5	13	8
Utah	0	13	26	19	9	3
Nevada	0	0	25	11	14	3
Wyoming	0	0	8	9	9	1
California	0	0	10	62	111	147
Oregon	0	0	12	15	23	17
Washington	0	0	16	3	24	21
Midwest						
Indiana	1	22	50	101	85	78
Illinois	0	22	61	68	56	27
Michigan	0	0	39	29	53	37
Ohio	0	9	67	48	75	53
Wisconsin	0	3	42	48	55	35
Iowa	0	12	35	44	35	19
Kansas	0	11	35	44	37	18
Minnesota	0	0	21	29	35	31
Missouri	9	42	76	94	67	40
Nebraska	0	5	23	17	13	3
North Dakota	0	0	1	8	8	7
South Dakota	0	0	9	8	8	1
Total U.S.	24	683	1929	1951	1787	1210

Source: Elaboration from Wal-Mart Opening database by T. J. Holmes

Table 2. Alternative Specifications of $h(M_t, W; \Lambda)$

$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \lambda_{2h} \sum_{-i} m_{-it}^{h} w_{-i} + \sum_{h=SC,DS} \lambda_{3h} m_{it-1}^{h}$	(4-a)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{2ht} \sum_{-i} m_{-it}^{h} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{3ht} m_{it-1}^{h}$	(4-b)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{2ht} \sum_{-i} m_{-it}^{h} w_{-i} + \sum_{h=SC,DS} \lambda_{3h} m_{it-1}^{h}$	(4-c)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \lambda_{2h} \sum_{-i} m_{-it}^{h} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{3ht} m_{it-1}^{h} +$	(4-d)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2SC} \sum_{-i} m_{-it}^{SC} w_{-i} + \sum_{t} \lambda_{2DSt} \sum_{-i} m_{-it}^{DS} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{3ht} m_{it-1}^{h}$	(4-e)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2DS} \sum_{-i} m_{-it}^{DS} w_{-i} + \sum_{t} \lambda_{2SCt} \sum_{-i} m_{-it}^{SC} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{3ht} m_{it-1}^{h}$	(4-f)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2SC} \sum_{-i} m_{-it}^{SC} w_{-i} + \sum_{t} \lambda_{2DSt} \sum_{-i} m_{-it}^{DS} w_{-i} + \sum_{h=SC,DS} \lambda_{3h} m_{it-1}^{h}$	(4-g)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2DS} \sum_{-i} m_{-it}^{DS} w_{-i} + \sum_{t} \lambda_{2SCt} \sum_{-i} m_{-it}^{SC} w_{-i} + \sum_{h=SC,DS} \lambda_{3h} m_{it-1}^{h}$	(4-h)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \lambda_{2h} \sum_{-i} m_{-it}^{h} w_{-i} + \lambda_{3SC} m_{it-1}^{SC} + \sum_{t} \lambda_{3DSt} m_{it-1}^{DS}$	(4-i)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \lambda_{2h} \sum_{-i} m_{-it}^{h} w_{-i} + \lambda_{3DS} m_{it-1}^{DS} + \sum_{t} \lambda_{3SCt} m_{it-1}^{SC}$	(4-j)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{2ht} \sum_{-i} m_{-it}^{h} w_{-i} + \lambda_{3SC} m_{it-1}^{SC} + \sum_{t} \lambda_{3DSt} m_{it-1}^{DS}$	(4-k)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \sum_{h=SC,DS} \sum_{t} \lambda_{2ht} \sum_{-i} m_{-it}^{h} w_{-i} + \lambda_{3DS} m_{it-1}^{DS} + \sum_{t} \lambda_{3SCt} m_{it-1}^{SC}$	(4-l)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2SC} \sum_{-i} m_{-it}^{SC} w_{-i} + \sum_{t} \lambda_{2DSt} \sum_{-i} m_{-it}^{DS} w_{-i} + \lambda_{3SC} m_{it-1}^{SC} + \sum_{t} \lambda_{3DSt} m_{it-1}^{DS}$	(4-m)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2DS} \sum_{-i} m_{-it}^{DS} w_{-i} + \sum_{t} \lambda_{2SCt} \sum_{-i} m_{-it}^{SC} w_{-i} + \lambda_{3SC} m_{it-1}^{SC} + \sum_{t} \lambda_{3DSt} m_{it-1}^{DS}$	(4-n)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2SC} \sum_{-i} m_{-it}^{SC} w_{-i} + \sum_{t} \lambda_{2DSt} \sum_{-i} m_{-it}^{DS} w_{-i} + \lambda_{3DS} m_{it-1}^{DS} + \sum_{t} \lambda_{3SCt} m_{it-1}^{SC}$	(4-o)
$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2DS} \sum_{-i} m_{-it}^{DS} w_{-i} + \sum_{t} \lambda_{2SCt} \sum_{-i} m_{-it}^{SC} w_{-i} + \lambda_{3DS} m_{it-1}^{DS} + \sum_{t} \lambda_{3SCt} m_{it-1}^{SC}$	(4-p)

Table 3. Model Specification Choice*: Values of BICs

$h(M_t, W; \Lambda) / g(N_t, W; \Gamma)$	(3-a)	(3-b)	(3-c)
(4-a)	10793.22	10784.68	10771.97
(4-b)	10964.87	10944.55	10936.26
(4-c)	10925.17	10894.87	10887.84
(4-d)	10873.59	10871.46	10860.84
(4-e)	10984.19	10958.52	10955.08
(4-f)	10833.47	10828.83	10816.31
(4-g)	10948.81	10901.54	10903.20
(4-h)	10781.23	10773.94	10757.45
(4-i)	10781.94	10778.17	10767.43
(4-j)	10877.97	10871.41	10860.98
(4-k)	10880.04	10861.15	10852.75
(4-l)	11009.91	10979.06	10971.65
(4-m)	10896.58	10868.14	10865.27
(4-n)	10749.91	10746.13	**10733.35**
(4-o)	11033.32	10989.22	10991.28
(4-p)	10866.72	10857.87	10842.28

*The specification that best fits the data is $g(N_t, W; \Gamma)$:(3-c); $h(M_t, W; \Lambda)$: (4-n) or

$$\pi_{it} = \sum_k \beta_k X_{kit} + \gamma_1 \ln(\tilde{n}_{it}) + \gamma_2 s\tilde{i}z_{it} +$$

$$\lambda_1 \sum_{-i} m_{-it}^{FDC} w_{-i} + \lambda_{2DS} \sum_{-i} m_{-it}^{DS} w_{-i} + \sum_t \lambda_{2SCt} \sum_{-i} m_{-it}^{SC} w_{-i} + \lambda_{3SC} m_{it-1}^{SC} + \sum_t \lambda_{3DSt} m_{it-1}^{DS} + e_{it}$$

Table 4: Estimated Coefficients and Related Statistics – Ordered Logit

Variable	Coefficients	Std. Errors	T-ratios
Population Density	-0.0820	0.0105	-7.8300
Population	0.5936	0.0731	8.1200
% Population on Food Stamps	0.1790	0.0782	2.2900
Median Income	0.1203	0.2325	0.5200
# Food Retailers	-0.3636	0.0951	-3.8200
Average Size Incumbents	0.0019	0.0050	0.3800
Proximity of a FDC	0.0222	0.0091	2.4400
Spatial DS	-0.7679	0.0890	-8.6300
Spatial SC 1994	12.8771	1.5180	8.4800
Spatial SC 1995	7.4906	1.0594	7.0700
Spatial SC 1996	6.1841	0.7818	7.9100
Spatial SC 1997	3.7228	0.7498	4.9700
Spatial SC 1998	3.2816	0.5650	5.8100
Spatial SC 1999	2.1068	0.4365	4.8300
Spatial SC 2000	2.1170	0.3260	6.4900
Spatial SC 2001	1.0613	0.3167	3.3500
Spatial SC 2002	1.3170	0.2166	6.0800
Spatial SC 2003	0.9133	0.1774	5.1500
Spatial SC 2004	0.6950	0.1461	4.7600
Spatial SC 2005	0.6235	0.1185	5.2600
Lag SC	-0.1770	0.0400	-4.4200
Lag DS 1994	0.1441	0.0777	1.8500
Lag DS 1995	0.1722	0.0725	2.3700
Lag DS 1996	0.1098	0.0682	1.6100
Lag DS 1997	0.1533	0.0702	2.1900
Lag DS 1998	0.2292	0.0667	3.4300
Lag DS 1999	0.4112	0.0605	6.7900
Lag DS 2000	0.4531	0.0592	7.6600
Lag DS 2001	0.4810	0.0612	7.8700
Lag DS 2002	0.5514	0.0581	9.4800
Lag DS 2003	0.4378	0.0560	7.8100
Lag DS 2004	0.6023	0.0543	11.0900
Lag DS 2005	0.5736	0.0550	10.4300

N(obs)= 21,204

Pseudo R^2=0.0799

LR test for overall significance $\chi^2(33)$= 899.55 Pval=0.000

Legend: DS= number of Wal-Mart's Discount Stores;
SC= Number of Wal-Mart's supercenters;
FDC= Wal-Mart's Food Distribution Centers

FOOD MARKETING POLICY CENTER
RESEARCH REPORT SERIES

This series includes final reports for contract research conducted by Policy Center Staff. The series also contains research direction and policy analysis papers. Some of these reports have been commissioned by the Center and are authored by especially qualified individuals from other institutions. (A list of previous reports in the series is available on our web site.) Other publications distributed by the Policy Center are the Working Paper Series, Journal Reprint Series for Regional Research Project NE-165: *Private Strategies, Public Policies, and Food System Performance*, and the Food Marketing Issue Paper Series. Food Marketing Policy Center staff contribute to these series. Individuals may receive a list of publications in these series and paper copies of older Research Reports are available for $20.00 each, $5.00 for students. Call or mail your request at the number or address below. Please make all checks payable to the University of Connecticut. Research Reports can be downloaded free of charge from our web site given below.

Food Marketing Policy Center
1376 Storrs Road, Unit 4021
University of Connecticut
Storrs, CT 06269-4021

Tel: (860) 486-1927
FAX: (860) 486-2461
email: *fmpc@uconn.edu*
http://www.fmpc.uconn.edu