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# Revisiting Wal-Mart's impact on Iowa small town retail: twenty-five years later

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## **Keywords**

Wal-Mart, retail trade, Iowa, retail, economic development

## **Disciplines**

Economics

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### Abstract

Stone conducted the first study of Wal-Mart stores economic impact in Iowa in 1988. Since then, research on Wal-Mart's impacts has exploded. Recent studies employ sophisticated statistical techniques to more accurately measure the size and direction of effects. Many reach conclusions similar to Stone's original work. This paper updates the original Stone study with additional years of data. It draws on recent methodological advances to help account for Wal-Mart's strategic location decisions on estimated retail sales impacts in Iowa. Consistent with previous studies, we find that Wal-Mart's entry into smaller trade centers in Iowa had a big initial impact on host town retail sales, with some categories experiencing large significant increases while others saw declines in sales per capita. Wal-Mart's presence helped to stabilize or even expand the local retail sector of most rural Iowa host communities. To conclude, policy implications for local economic development officials are discussed.

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## **Revisiting Wal-Mart's Impact on Iowa Small Town Retail: Twenty-Five Years Later**

Dramatic changes in retail market structure have occurred in the U.S. over the past few decades. Retail trade has become much more concentrated in cities and regional trade centers and retail sales in non-metropolitan areas of the U.S. have declined (Gale 1996). This shift is the result of a number of factors: improved transportation infrastructure that facilitates long distance shopping trips; the rise of shopping malls and increasing retail concentration in urban areas which offer consumers “one-stop” shopping, greater variety and improved convenience; declining customer bases in many rural areas due to outmigration and increased commuting by rural residents. More recently, a rapid expansion of discount stores such as Target and Wal-Mart, along with their sector specific counterparts like Home Depot, Staples and Best Buy, has further altered the structure of retail markets, not only redistributing retail trade geographically, but also among types of retail outlets.

Declining rural retail sales are a growing concern to local policymakers for several reasons. The ability of a community's retail sector to retain local customers (and to attract customers from other communities) is an important indicator of that community's economic health (Deller, et al. 1991). When declining sales lead to local business closures, the buying behavior of local consumers may change. Consider the loss of a grocery store. If residents are forced to shop outside the community for such necessities as food, they will likely begin to “outshop” for other goods as well. As a result of reduced local spending, the sales of the remaining local businesses will suffer, spurring further decline.

Retail business owners are not the only ones affected by declining retail sales. The retail sector employs more people in non-metropolitan areas than any other sector except government, accounting for 11.2 percent of non-metropolitan employment in 2009 (U.S. Department of

Commerce 2011). If declining retail sales threaten the survival of local retailers, a significant source of jobs is jeopardized as well. The loss of local businesses can erode a small community's tax base (Leistriz, Ayres & Stone 1992). The deterioration of a community's downtown business district is likely to have a psychological impact on local citizens as well. Ozment and Martin (1990) describe such loss as "a visual and symbolic decline of the entire town." Over the past twenty years revenues from local option sales taxes have become more important in local budgets. In some cases a local sales tax is allowed if part or all of the revenues are used to offset property taxes, further increasing the dependence of local governments on sales tax revenues (Krmeneč 1991).

Given this backdrop, many communities have begun to view retail as an important part of their economic development effort. But unless population or incomes are growing substantially, generally not the case in rural areas, there is a relatively fixed amount of money to be spent in the retail sector. A new large store will capture considerable trade from other merchants in the trade area (Blair & Kumar 1997). Even in large metropolitan areas, new retail development comes at least partially at the expense of existing merchants. In a study of the Dallas retail market, Ingraham, Singer and Thibodeau (2005) estimated that for every new dollar of retail sales within a 15-mile radius of the Dallas center, 34 cents is 'cannibalized' from existing retailers. Furthermore, the authors suggest that the primary source of the incremental 66 cents is not population and income growth, but more likely existing retail sales from nearby cities outside the 15-mile radius resulting in little contribution to overall economic growth. This suggests that, at least when it comes to retail, what is one community's gain is another community's loss.

Hence the controversy generated over the rapid expansion of the discount mass merchandiser Wal-Mart in relatively small, non-metropolitan retail markets during the last few

decades. On the one hand, Wal-Mart had the potential to shore up or increase the retail trade activity of the rural trade centers in which it located, but at some cost to competing retailers in nearby communities. On the other hand, because of the wide variety of goods sold by the mass merchandiser, Wal-Mart's entry induced some redistribution of retail sales among store types and posed a real threat to a number of existing retailers in the host town who sold products similar to those offered by Wal-Mart.

Stone (1989) conducted the first study of the economic impacts of Wal-Mart stores in Iowa with a small sample of Iowa towns and only a few years of operating experience. Wal-Mart was still in its early expansion years and very little was known about the impacts of its stores on existing stores in the local area. Consequently, the Stone study received widespread attention and was cited by many media outlets across the United States.

The 1988 Wal-Mart study concluded that local area businesses that sold things different from Wal-Mart tended to enjoy increases in sales, primarily benefiting from the increased traffic that Wal-Mart brought into the area. Conversely, businesses that sold the same merchandise as Wal-Mart usually lost sales because of their inability to compete with such a dominant business. Later studies in Maine by Artz and additional studies by Stone and Artz in Iowa and Mississippi reached similar conclusions (Artz & Stone, 2006; Stone, 1989; Stone, 1991; Stone 1995a; Stone 1995b; Stone 1997; Stone & Artz, 2000; Stone, Artz & Myles; 2002).

The academic research evaluating impacts of the growth of Wal-Mart stores at both the local and national level is now extensive and continues to grow. Early studies like Stone's were faulted for failing to account for the strategic nature of Wal-Mart's location decisions in their before and after type study designs. If Wal-Mart systematically chose to locate in high growth areas, a before and after type analysis would overestimate any positive impacts and

underestimate more negative effects. Conversely, if the mass merchandiser's strategy was to locate in slower growth areas, Wal-Mart's negative affects might be overstated.

Recent studies have employed a variety of methods to address the problem of non-random selection in econometric models of Wal-Mart's impacts on existing local retailers. In general, these more recent studies examining the effects of Wal-Mart entry confirm the general pattern, if not the magnitude, of many of Stone's original findings in Iowa (Basker 2007; Irwin & Clark 2006; Renkow 2005). Retailers who compete most directly with Wal-Mart are negatively impacted by the mass merchandiser's entry, while others can benefit. Jia (2008) estimates that Wal-Mart's expansion accounts for half or more of small discount retail closures between 1988 and 1997. Basker (2005) finds that on average four small competitors close within five years of Wal-Mart's entry. There is evidence that while Wal-Mart's entry may not lead existing firms to close, many experience significant declines in revenue. Additionally, the number of retailers may not change much, but the composition of businesses may (Basker 2007).

This paper updates Stone's early work on the "Wal-Mart Effect" on sales of retail businesses in Iowa host towns. A new addition to this study is a comparison of the retail sales performance of host towns for 15 years before the opening of a Wal-Mart store relative to the performance of these same towns for 15 years after the Wal-Mart opening. The earlier Stone studies compared the sales performance after the opening of a Wal-Mart store to the "base year", the year before the Wal-Mart store opened, but did not consider the longer term trends in retail sales that existed prior to Wal-Mart entry. In addition, we include comparisons to a group of control towns -- similar sized Iowa towns without a Wal-Mart store. While Stone's 10 year study (1997) did include a control group for comparison, for this study, we use a matching

strategy to select a set of comparison towns as a way to try to account for the strategic nature of Wal-Mart's location decisions on the empirical results.

## **Data**

Retail sales data were obtained from the *Iowa Retail Sales and Use Tax Reports*, published annually by the Iowa Department of Revenue and Finance. The department has published total taxable retail sales data for virtually every town and city in the state since the early 1970s. Sales of all taxable goods and services are also reported by two digit North American Industrial Classification System (NAICS) Codes for communities over 2,500 population, if the community has five or more businesses within the category. The two digit classification is a broad description of merchandise categories such as food, general merchandise, building materials, and apparel (see table 1 for descriptions of these categories). It is important to note that all merchandise sold in a store is reported in one category. For example, although Wal-Mart sells a variety of merchandise, apparel, sporting goods, food, hardware, etc., all of the retailer's taxable sales are classified as general merchandise. Retail sales data by merchandise category was reported for 122 Iowa towns and cities between 1976 and 2008. Statewide sales are also published at more detailed three digit NAICS levels. For example, in the building materials category, statewide sales would be reported for hardware stores, lumber yards, paint and glass stores, etc.

[Table 1 about here]

An advantage of using data on sales rather than business counts is that sales figures are precise and a proxy measure of employment. Conversely, business counts do not discriminate between large and small businesses. In smaller towns and rural areas, many businesses are very

small and sometimes one-person operations. Many small businesses are also seasonal or part-time. Therefore, we believe that sales tax data is a superior measure of retail vitality.

Population figures and income data were obtained from U.S. Census reports. Geographic distance of Wal-Mart host towns to the nearest city of 50,000 population or greater were calculated using Mapquest.com. Opening dates for Wal-Mart stores were obtained from a combination of information posted on the retailer's website<sup>i</sup> and from the authors' personal records of store openings compiled from media accounts.

### *Study sample*

The set of Iowa Wal-Mart host towns included in the analysis met two criteria. First, Wal-Mart opened in the town no later than 1994; this ensured we had fifteen years of data post-entry. This cut-off also corresponds with the end of the first wave of Wal-Mart entry in Iowa as shown in figure 1. Wal-Mart opened 45 stores in Iowa between 1983 and 1994. No stores opened in the state over the next five years. Then beginning in 1999, the retailer began a second wave of store openings and conversions of discount stores to supercenters. Iowa now hosts 59 Wal-Mart stores in 55 different towns and cities. The second criterion for inclusion in the analysis was that the host town's 1980 population was 20,000 or less. We chose to focus on these smaller towns for three main reasons: first, Wal-Mart's early strategy focused on locating in smaller towns and cities (29 of the 'first wave' stores were located in towns with fewer than 20,000 residents in 1980); second, it is more difficult to isolate the effects of Wal-Mart in larger cities because the sales of a single Wal-Mart store is overwhelmed by the overall sales of the city and is barely detectable; and, third, we have several control towns for this population range but no possible controls for the larger Iowa cities which all have one or more Wal-Mart stores.

[Figure 1 about here]

### *Selection of the Control Group*

For the subset of Iowa towns between 3,000 and 20,000 population in 1980, we compare changes in retail sales before and after Wal-Mart's entry into host communities with a control group of similar, non-host towns. The set of possible control towns includes towns below 20,000 population in 1980 that did not have a Wal-Mart store by 2008. That is, we exclude towns that become Wal-Mart host towns after 1994 as possible controls. Of the 122 towns with reported retail sales data by merchandise category, 103 had populations less than 20,000 in 1980. Of these 103, 29 hosted a Wal-Mart store by 1994 and an additional six towns had a Wal-Mart store by 2008, leaving a total of 68 possible control towns.

A key to this type of analysis is finding a good 'counterfactual' for comparison. That is, for each host town, we need to find a non-host match that represents what would have happened in the host town had Wal-Mart not located there. The concern is that Wal-Mart strategically chooses the best locations for its stores, so that there is something fundamentally different about the towns it locates in compared to those it doesn't. If so, non-host towns will not provide a good 'counterfactual.' A common method for addressing this problem is called propensity score matching. Propensity score matching provides a systematic way to select control group matches that most closely resemble the host towns (Angrist & Krueger 1999; Smith & Todd 2005).

We first generate a propensity score for each town using probit analysis. The dependent variable in this first step is a binary indicator variable measuring whether Wal-Mart is present in the community during any year in our sample. The independent variables are a vector of pre-period observable attributes of the town believed to affect the probability of getting a Wal-Mart store: 1980 population, 1980 median household income, retail sales growth between 1980 and 1985 and distance to the nearest city with population of 50,000 or greater. The estimated

probabilities, or propensity scores, are then used to match each host town to a non-host control town. The results from this probit estimation are presented in table 2. Since there were relatively few non-host towns in the population range by 2008, we used matching with replacement; that is some non-host control towns are matched with more than one host community.<sup>ii</sup> Figure 2 shows the locations of the host and control towns included in the study; both are relatively evenly disbursed across the state. Table 3 compares the mean values of variables used to derive the propensity scores for the host towns, the selected control towns and for the whole set of possible control towns. The mean values for the selected controls are very similar to those for the host towns suggesting that the control group provides a reasonable counterfactual. Figure 3 plots the distributions of the propensity scores for the host and control samples.

[Table 2 about here]

[Figure 2 about here]

[Table 3 about here]

[Figure 3 about here]

Prior to undertaking a formal statistical analysis of the impact of Wal-Mart on sales in host towns we present some descriptive graphical analyses to give readers a general sense of the impact of Wal-Mart. Figures 4 and 5 illustrate the basic idea behind this analysis. Each chart plots the average inflation-adjusted retail sales before and after Wal-Mart entry in the Iowa host towns and control towns (solid grey line) in the study.<sup>iii</sup> Data for each control town is aligned with its matched host town to determine the base year for control towns. The charts also depict trend lines for the 15 years preceding Wal-Mart entry and the 15 years following entry. To conserve space, we include only a sample of the merchandise categories included in the analysis.

Figure 4 includes trends for total retail sales and general merchandise sales, the category in which Wal-Mart is classified. In both cases, the charts show a sizable increase in average per capita sales in the host towns following Wal-Mart's entry, relative to the pre-entry trend in the host town and relative to the overall trend for control towns. This marked change suggests a large, positive impact on retail sales in the host towns. Figure 5 shows trends for food stores and apparel stores. In both cases, the host town trend in average per capita sales apparently falls post-entry. In the food store category, the trend for control towns is increasing in the post-entry time period. This suggests that Wal-Mart had a negative effect on per capita food store sales in host towns. In contrast, the post-entry trend in control towns for apparel stores is similar to that of host towns. In this case, it is unclear whether the downward trend in per capita apparel sales might be attributed to Wal-Mart entry or instead part of a larger decline in this merchandise category among towns of this size.

[Figure 4 and Figure 5 about here]

It is important to note that these figures do not fully account for other factors that may be impacting retail sales trends. The following econometric analysis attempts to both quantify the divergence in per capita retail sales that appear in figures 3 and 4, and to determine if it is statistically significant after controlling for other town characteristics and for the likelihood that Wal-Mart locates its stores in a non-random fashion.

### **Estimation Strategy**

We use a fixed effects estimation strategy to control for unobserved differences across towns in the sample. Equation (1) provides the basis for our empirical specification:

$$\ln S_{it} = \beta_i + \beta_1 t + \delta_W W_{it} + \delta_{Wt} W_{it} \cdot t + \varepsilon_{it} \quad (1)$$

where  $S_{it}$  denotes per capita retail sales for town  $i$  at time  $t^{iv}$  and  $t$  is time trend that does not vary across towns. The parameter  $\beta_i$  is a town-specific intercept that captures time-invariant, unmeasured differences across towns. The coefficient,  $\beta_1$ , is the growth rate in per capita retail sales for the average town in the sample. The presence of a Wal-Mart store is indicated by the variable  $W_{it}$  which is a dummy variable that takes the value of 1 in host towns for years in which a Wal-Mart store is open. The coefficient on  $W_{it}$  measures the average effect of the Wal-Mart stores on retail sales in the host towns. We interact  $W_{it}$  with the time trend to examine the impact of the discount store on retail sales in the host towns over time. The reference group in this case is similar towns that do not have (and have never had) a Wal-Mart store by the end of the time period. The error term,  $\varepsilon_{it}$ , is assumed to be normally distributed with  $E[\varepsilon_{it}] = 0$ . Time is measured in years; the change from period 0 to period 1 represents a change from one year to the next. The estimates are presented in table 4. We also report the level and results of an F-test on a set of restrictions testing the sustained impact of the presence of a Wal-Mart store after five, ten and fifteen years in the host town (for example,  $\delta_W + \delta_{W_t}(5) = 0$ ).

## Results

The estimates in table 4 provide evidence that the impact of Wal-Mart's entry on host town retail sales varies across merchandise category. Not surprisingly the biggest impact is seen in the general merchandise category where Wal-Mart is classified, followed by eating and drinking, and total retail sales. Smaller, positive impacts occur in the apparel, specialty and services categories. Per capita retail sales of building materials, the category which includes home improvement and hardware stores, saw an immediate and sizable decline in the average host town post-entry. The coefficients for home furnishings and food stores are also negative, although smaller in magnitude.

[Table 4 about here]

In all but three merchandise categories, apparel, home furnishings and specialty, Wal-Mart's impact endures for fifteen years after entry, although the magnitude of the effect tends to diminish over time. In several cases, while the immediate impact is positive, the post-entry trend is negative, although generally quite small in magnitude. This is the case for total retail sales, eating and drinking, and specialty stores. Such a trend is consistent with anecdotal evidence that, especially during the earlier years of Wal-Mart openings in Iowa, Wal-Mart attracted a large number of consumers from nearby towns. This increased customer traffic benefitted retailers like restaurants and certain specialty stores whose goods and services complemented Wal-Mart's offerings. Over time, however, as the "novelty" effect wore off, and as more and more Wal-Mart stores opened in nearby towns, a portion of this increased customer traffic subsided.

Figure 6 shows the estimated percentage change in per capita retail sales for host towns upon entry and 15 years post-entry.<sup>v</sup> Wal-Mart host towns' total per capita retail sales rose on average roughly 11 % upon entry and remained positive over time, although by year fifteen the effect had diminished to roughly 5 %. The estimated percentage change in per capita sales upon Wal-Mart's entry in general merchandise was 84 %, which tapered only to roughly 81 % fifteen years later.

[Figure 6 about here]

Interestingly, these estimates confirm the apparent negative effect of Wal-Mart entry observed in figure 5 for the food store category, but for apparel, indicate that Wal-Mart's presence boosted apparel stores sales, if only temporarily, relative to what occurred in the control towns. This result highlights the importance of establishing a frame of reference in analyzing before and after impacts of economic changes. Suppose only the post-entry pattern of per capita

apparel sales were considered. It would be easy to conclude that Wal-Mart's entry caused, or at least significantly contributed to, the steep decline in apparel sales. Even comparing before and after trends in the impacted communities can result in misleading interpretations of the data, if post-entry patterns are part of larger trends affecting similar communities without Wal-Mart stores.

### **Change in Sales (Dollars) for Host Town Merchandise Categories**

Using the estimates from the regression analysis we can compute the change in sales by merchandise category for the average host town in our dataset. These estimates are presented in table 5. Upon entry of Wal-Mart, general merchandise sales rose roughly \$9.5 million dollars. The magnitude of the increased sales in the host towns suggests that the new Wal-Mart captured a significant portion of its sales from existing general merchandise retailers in the host towns. An average Wal-Mart discount store opening in the late 1980s and early 1990s in Iowa contained about 90,000 square feet. A conservative estimate of the sales generated by a new Wal-Mart store would be between \$250/square foot at that time<sup>vi</sup>, or \$22.5 million, well above the \$9.5 million increase in general merchandise sales implied by our estimates. Furthermore, the average increase in total sales was somewhat less, on average \$7.8 million. This implies that the net effect of the new Wal-Mart also included some capture of retail sales from existing host town retailers outside of the general merchandise category, especially categories like food and building materials where retail sales fell following Wal-Mart's entry.

[Table 5 about here]

Nevertheless, total retail sales do increase significantly in the average host town, prompting the question, where do these sales come from? In a state like Iowa where population and income are stable or even declining, retail trade approximates a zero-sum game, where new

entrants capture trade from other businesses rather than expanding the size of the market. While some trade was apparently re-distributed between the various types of retail stores, anecdotal evidence indicates that redistribution also occurred geographically, as Wal-Mart captured, or cannibalized, some trade from stores in smaller, neighboring communities. Figure 7 provides a cursory look at this geographic shift, plotting the average retail sales per capita (in inflation-adjusted dollars) over the study period for the two groups of towns included in this analysis (study host towns and study control towns) as well as the remainder of Iowa communities divided between Wal-Mart host cities (larger than 20,000 population) and all other Iowa towns without a Wal-Mart store. Real per capita sales in Wal-Mart towns remained steady or increased slightly over the time period, while falling in the average non-Wal-Mart towns. For the study control towns, the average decline was roughly 25 percent; the decrease in all other non-Wal-Mart towns (95 % of which have populations under 2,500) was substantially larger, on the order of 33 percent. Wal-Mart's entry into the state is only one factor in the shift of retail sales from smaller towns to larger regional trade centers over time. Future research could investigate the magnitude of Wal-Mart's impact on this larger trend.

[Figure 7 about here]

## **Discussion**

Consistent with previous studies, this analysis shows that Wal-Mart's entry into smaller trade centers in Iowa had a big initial impact on host town retail sales, with some categories experiencing large significant increases while others saw declines in retail sales. Over time, the impact declined, but in general towns hosting a Wal-Mart store appeared to have fared better, in terms of total retail sales, compared to similar towns in which Wal-Mart did not locate. This

analysis supports the idea that Wal-Mart's presence helped to stabilize or even expand the local retail sector of most rural host communities.

It is important to note that these findings are derived from a relatively small sample, Iowa towns with less than 20,000 population in which Wal-Mart opened prior to 1994. Therefore, these results reflect the impacts of discount stores, which are a smaller format store without the full line of grocery items found in the more recent supercenter format. Wal-Mart's impact may vary by location and across time. Furthermore, the merchandise category groupings allowed by the Iowa sales tax data are still relatively aggregated, especially for categories with a wide variety of store types such as specialty. As a result, we can only estimate net changes; these data might yet mask significant changes that have occurred at the firm level. Some firms may close while others open, resulting in small, or no, net impacts. Finally, this study is focused quite narrowly on one measure of Wal-Mart's impact: retail sales in the communities in which it locates. But clearly the debate surrounding Wal-Mart's impacts (both positive and negative) extends far beyond the impacts on other local retailers.

### **Policy Implications**

When Wal-Mart opened its first stores in Iowa in the mid-1980s, it generated considerable concern among business people and chambers of commerce across the state. Part of the controversy may have been fear of the unknown; people simply didn't know what to expect, or how to adjust, to such a significant change in the local retail market. Twenty-five years later, there is much less controversy when Wal-Mart does establish a new store. While some retail businesses did lose trade, and some did ultimately go out of business, many others adopted new strategies to compete effectively with Wal-Mart. As demonstrated in this analysis, having a Wal-Mart store stabilized the retail sector of smaller trade centers, helping to curtail the out-migration of shoppers to the larger cities. A robust local retail district provides residents

with more convenient shopping options and the higher level of competition introduced by a store like Wal-Mart forces other local businesses to improve efficiency whereby they can offer lower prices or else compete on quality and service<sup>vii</sup>. As a result, consumers benefit.

So what should a local economic developer do with this information? Does it make sense to recruit large retailers, potentially offering financial incentives, or is it better to discourage it? Unfortunately, it's not an easy question. In previous years potential host town economic development officials fell into three camps; 1) most local governments simply welcomed the introduction of a Wal-Mart store, 2) some were adamantly against it or 3) a minority of local officials wanted a Wal-Mart store so badly that they offered the company financial incentives to come to their towns. Generally, economists agree that incentives should only be used when they do not compromise the competitive position of other local firms. Stallmann and Ball (2002) state:

To maintain competitive conditions, the public sector should avoid actions that directly favor one firm over another, often referred to as maintaining a level playing field. When the public sector takes actions that relax the rules or lower the costs of doing business specifically to benefit one firm, but not for all, it is adding a noncompetitive element to the business climate.

The empirical results from this analysis suggest that the practice of offering financial incentives to a company like Wal-Mart fails this level playing field test because it captures a substantial amount of sales from existing local merchants. Some would further caution against the use of economic development incentives when one local economy benefits at others' expense, contributing little to overall economic growth, and leading to greater economic

disparity among communities (Stallmann & Artz 2006). As noted above, in the case of retail, incentives may merely move sales from one community to another.

From the community's point of view, however, offering incentives to retailers may make sense. One major factor in the decision to offer incentives is the fact that communities are increasingly dependent on revenues from sales taxes (Krmenc 1991). Thus more retail means greater tax revenues. And, most local officials don't consider the effects on neighboring towns in their decision-making process. Ingraham, Singer and Thibodeau (2005) argue that as long as the incremental tax revenue from a proposed project exceeds the cost of subsidizing a retail development, it is in a city's best interest to offer incentives.

Perhaps a more regional approach to retail development in rural areas could alleviate some of these concerns. Encouraging retail development can benefit rural consumers by offering greater convenience, variety and lower prices. Off-setting negative impacts within the region might be identified and, where appropriate addressed. For example, Wal-Mart could be encouraged to extend the geographic distribution of its local donations to smaller surrounding towns whose residents are likely shop in the host communities, or host town officials might find ways to share the increased tax revenue generated by higher retail sales in the host community across impacted communities.

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<sup>i</sup> A spreadsheet containing store locations, types, and opening dates was available on Wal-Mart's website in 2005.

The link is no longer active.

<http://walmartstores.com/GlobalWMStoresWeb/navigate.do?catg=130&yearID=131&monthID=138>.

<sup>ii</sup> As it turns out, none of the control towns are matched more than twice; seven are matched twice and the remaining fifteen matched uniquely.

<sup>iii</sup> Retail sales were adjusted for inflation using the consumer price index data from the Bureau of Labor Statistics available at: <http://www.bls.gov/>.

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<sup>iv</sup> The semi-log functional form has the advantage of limiting the influence of outliers in the data. It is also convenient because it allows the coefficients on the regressors to be interpreted as the percentage change in sales for a change in a regressor, with the exception of dummy variable regressors in which case the percentage change in sales is given by  $e^{\beta} - 1$  (Kennedy, 2003, p. 123).

<sup>v</sup> The estimated percentage change is calculated as  $e^{\beta} - 1$

<sup>vi</sup> Data from Wal-Mart's 10-K form for 1990, the earliest year accessible online (<http://www.sec.gov>) report average sales per square foot of \$272.75.

<sup>vii</sup> Some authors have suggested that improved efficiency by Wal-Mart's competitors is due to competitive pressure on wage levels. Dube, Lester and Eidlin explain (2007, p. 12) "... increased competition from a low-cost competitor like Wal-Mart might reduce overall product market rents for competitors, and hence wages." While they find empirical evidence of a negative impact of Wal-mart's entry on retail wages in metro areas, the results for non-metro areas are not clear.

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Figure 1. Number of Wal-Mart Host Towns by Fiscal Year and Population Class

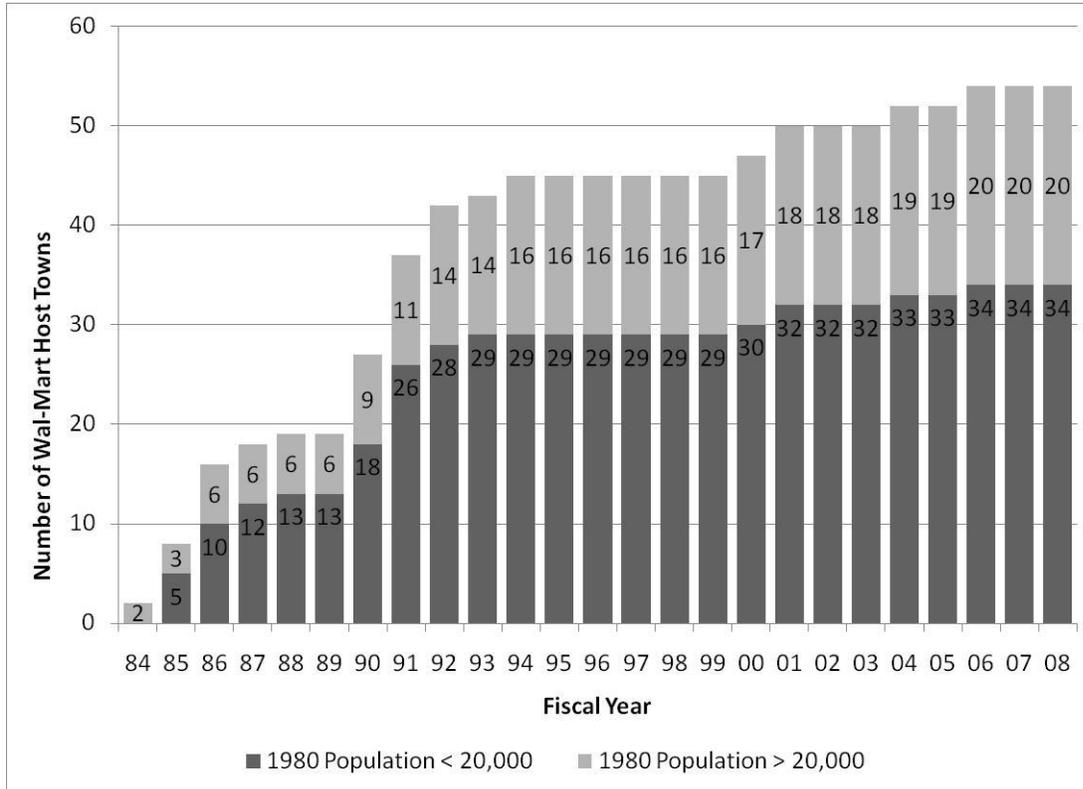


Figure 2. Location of Study Host and Control Towns

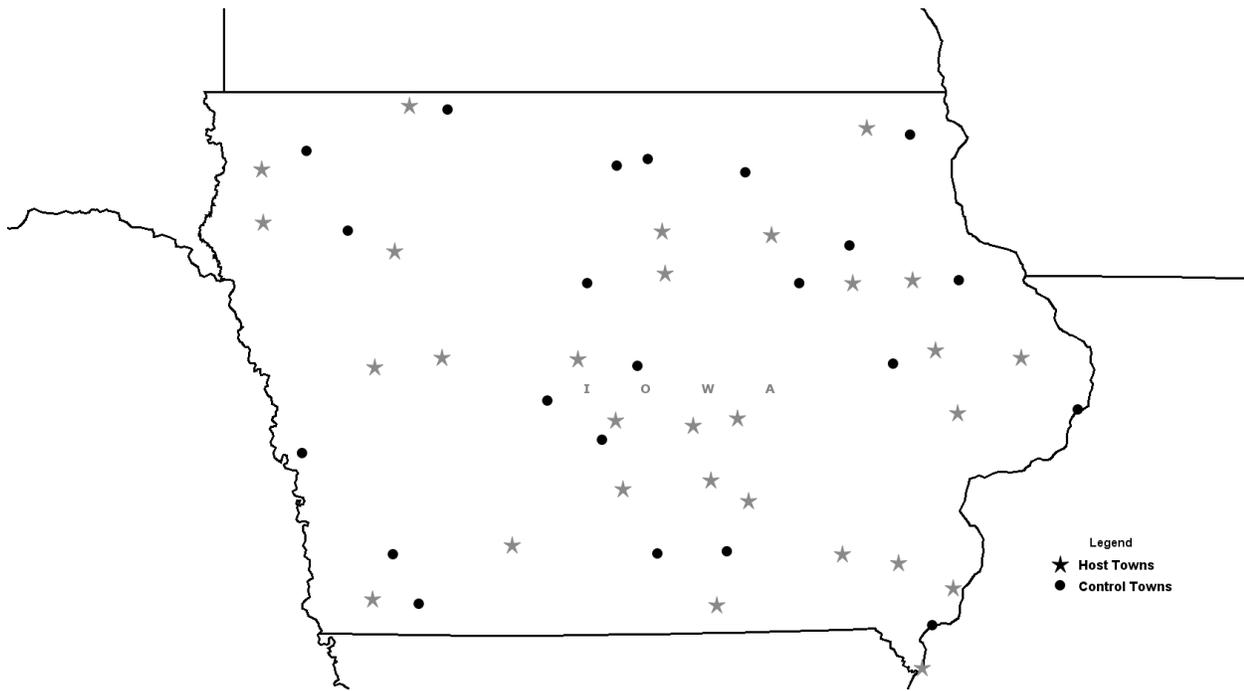


Figure 3. Distribution of Propensity Scores for Wal-Mart and Control Group Samples

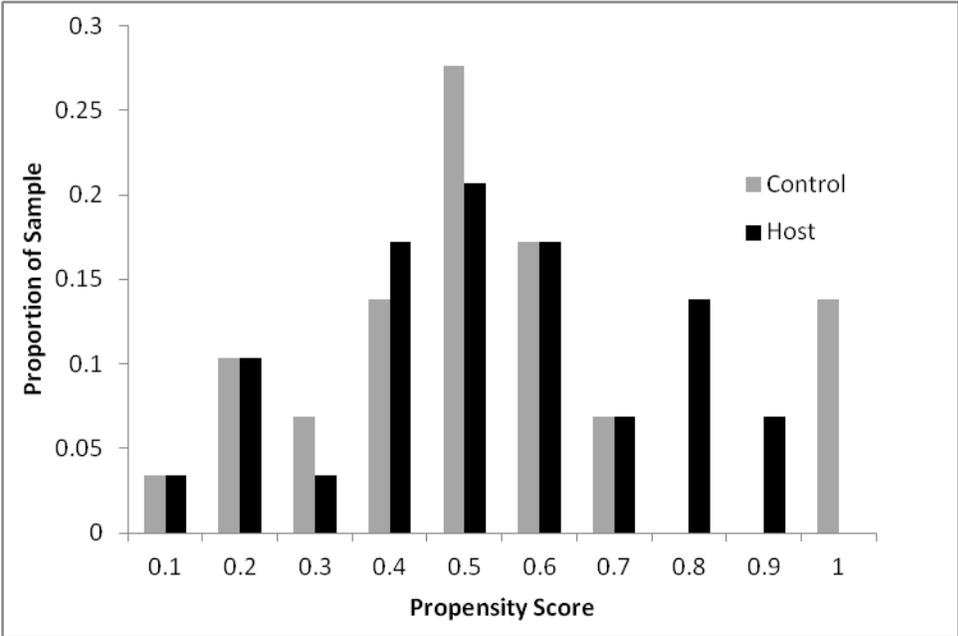


Figure 4. Average Per Capita Sales for Host Towns and Control Towns, 15 Years Before and 15 Years After Wal-Mart Entry, Total Sales and General Merchandise Stores

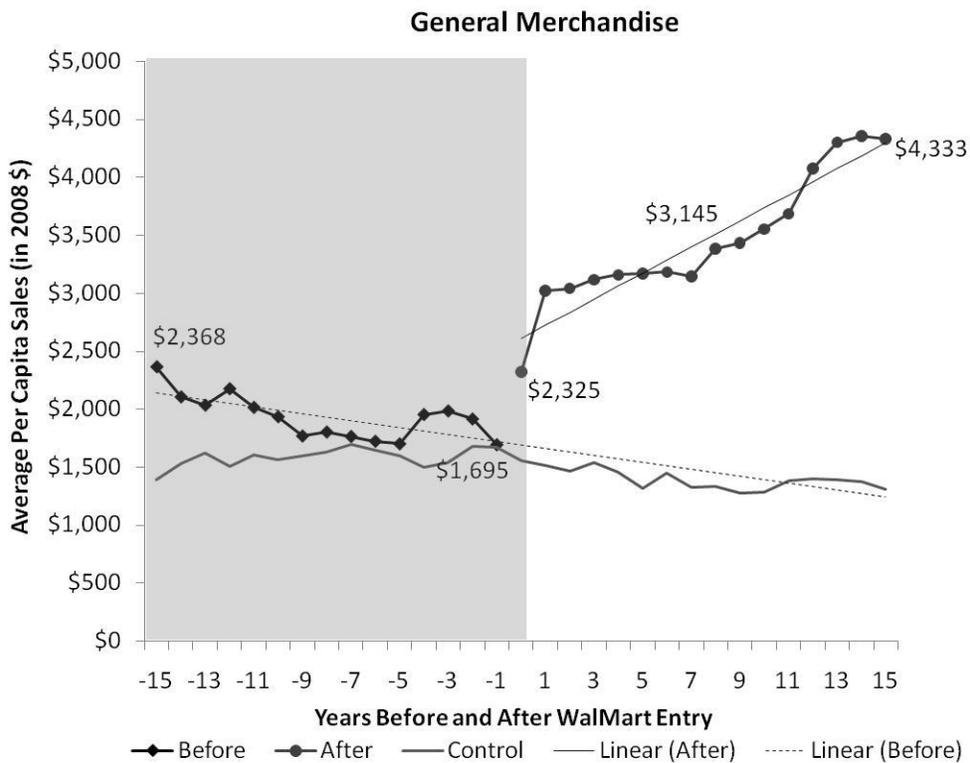
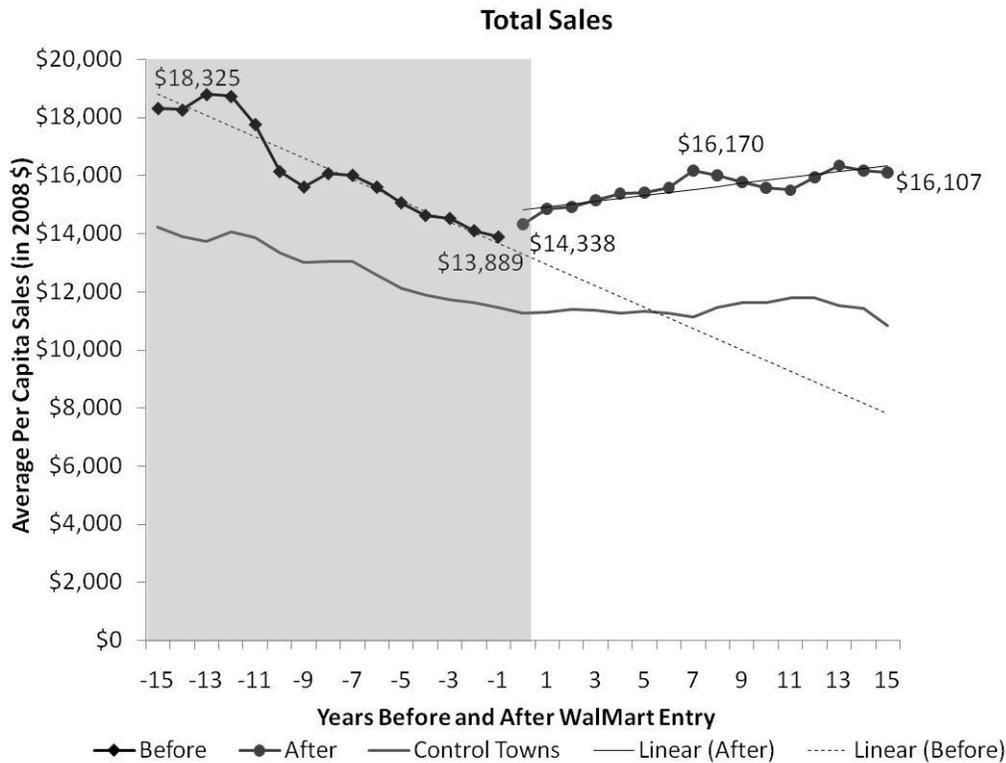


Figure 5. Average Per Capita Sales for Host Towns and Control Towns, 15 Years Before and 15 Years after Wal-Mart Entry, Food and Apparel Stores

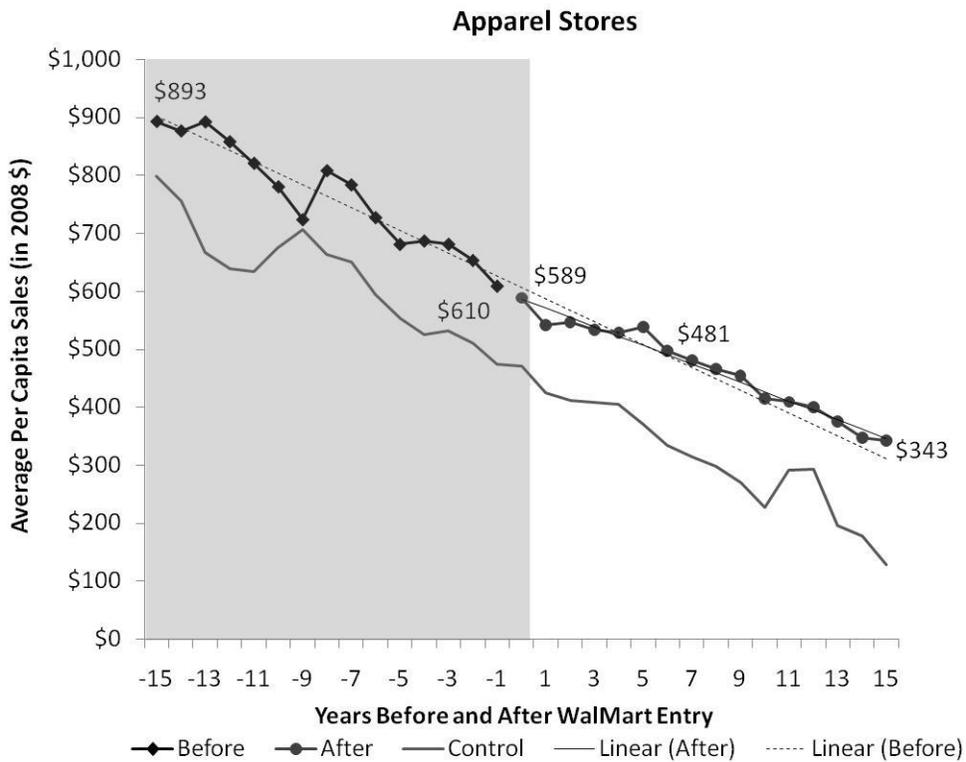
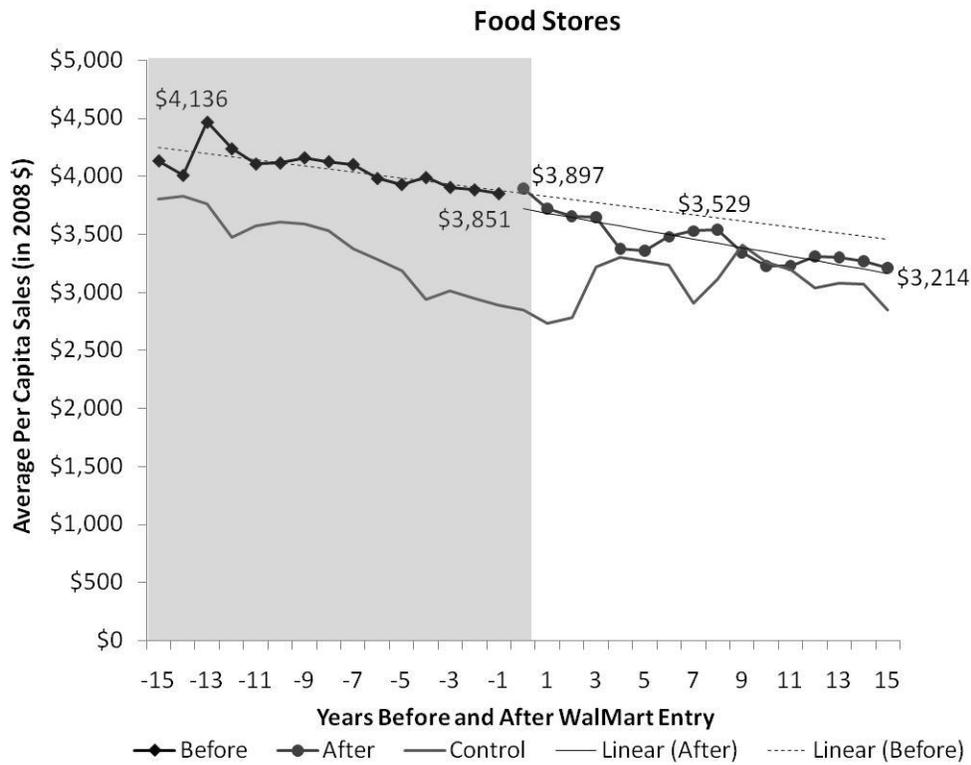


Figure 6. Estimated Percent Change in Average Host Town Sales Per Capita After Wal-Mart Entry

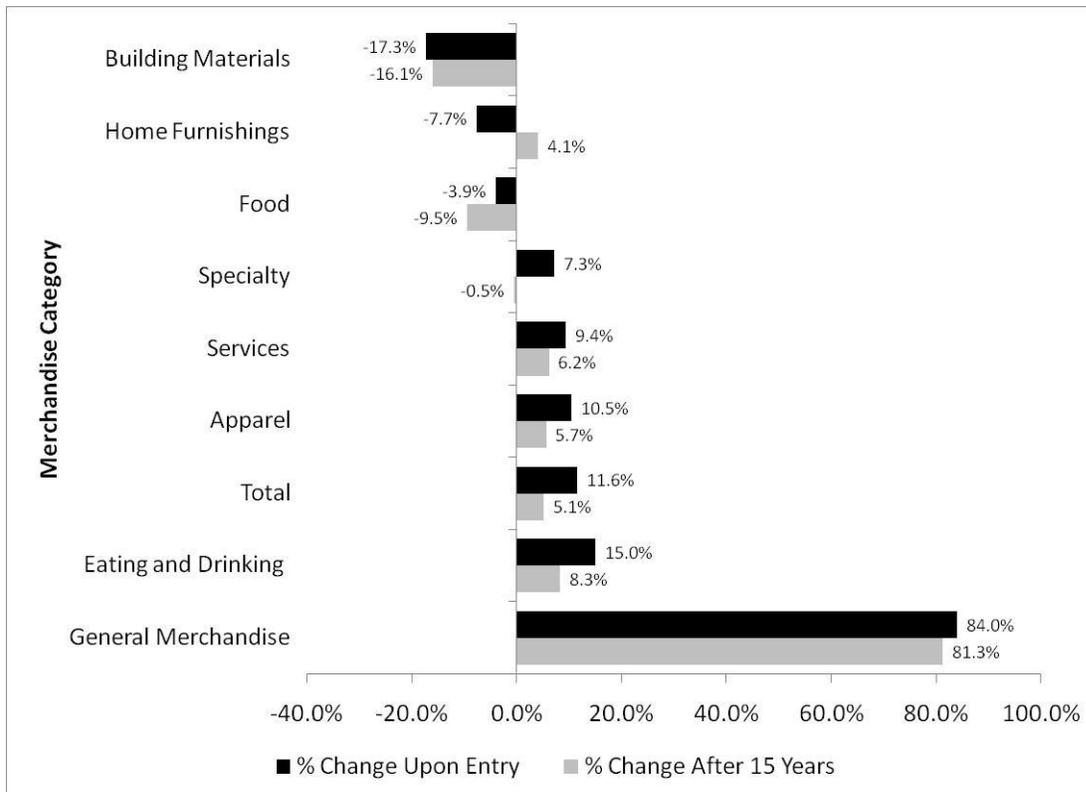


Figure 7. Average Retail Sales Per Capita for Wal-Mart and Non-Wal-Mart Towns, 1976-2008

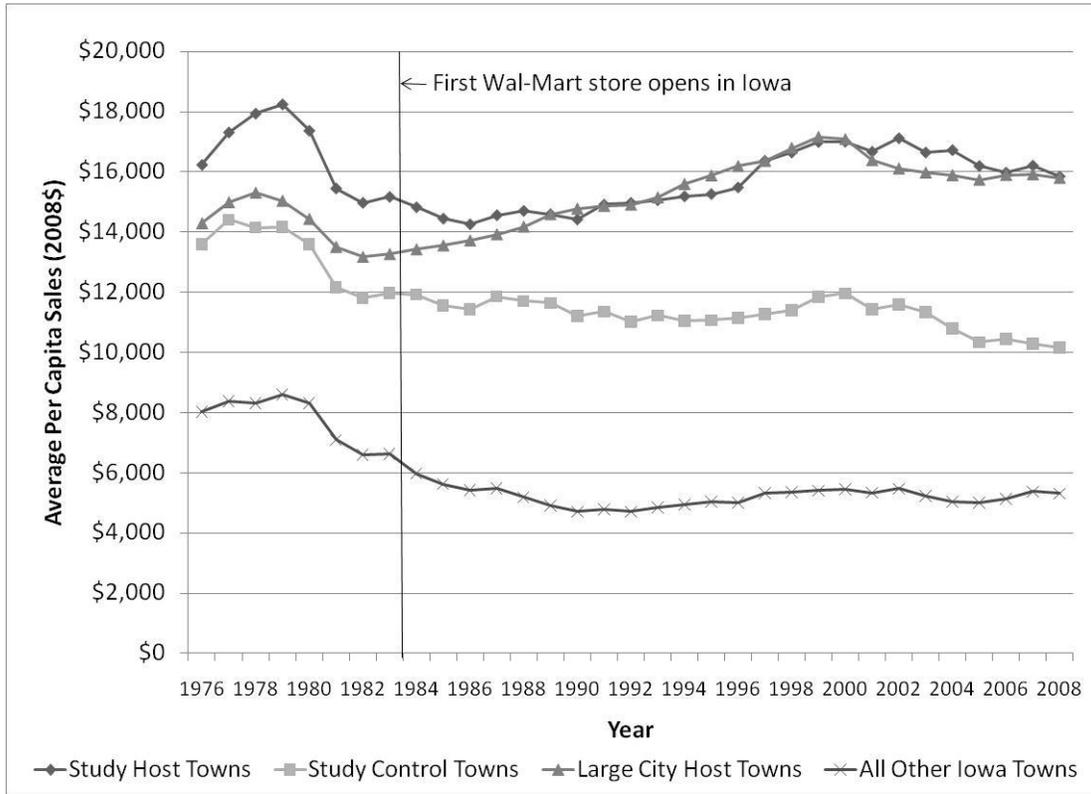


Table 1. Description of Merchandise Categories

Merchandise Category	Description
Apparel	Clothing and accessories stores and shoe stores.
Building Materials	Home improvement stores, lumber yards, hardware stores and paint stores.
Eating and Drinking	Restaurants and bars.
Food Stores <sup>a</sup>	Grocery stores, convenience stores and specialized food stores.
General Merchandise	Department stores and variety stores. Wal-Mart stores are classified as general merchandise stores.
Home Furnishings	Furniture stores, home furnishings stores and appliance entertainment equipment stores.
Services	A wide array of service firms, including hotels, motels, dry cleaners, photo studios, hair salons, building maintenance, auto rental, auto repair, movie theaters, and several others.
Specialty	Includes drug stores, sporting goods stores, book stores, jewelry stores, toy stores, gift stores, florists, and other specialized retailers.
Total Sales	Includes above categories and three miscellaneous categories not shown above.

<sup>a</sup> In Iowa, the food bought in stores is not taxable (sales tax). However, approximately 25 percent of the sales in grocery stores are non-food items and are therefore taxable. While total food sales are not known with certainty, the non-taxable sales serve as a good proxy for the total sales.

Table 2. Probit Estimates for Propensity Scores

Variable	
Population (000s)	0.186 (0.00)
Income (0,000s)	-0.784 (0.04)
Sales growth	1.361 (0.06)
Distance	-0.003 (0.62)
Constant	0.390 (0.70)
N	103
Pseudo R2	0.193

Notes: Estimates based on a probit regression of the form  $W_i = X_i\beta + \varepsilon_i$ . P-values in parantheses.

Table 3. Comparison of Treatment and Control Groups

Variable	All Possible Controls	Matched Controls	Host Towns
1980 Population	4763	7988	8004
Sales Growth (1980-1985)	0.06	0.09	0.11
Distance to nearest city	51.71	52.53	54.30
1980 Median HH Income (\$0,000)	2.50	2.42	2.44
Pr(Walmart)	0.25	0.48	0.49
Number of Observations	68	22	29

Table 4. Estimated Impact of Wal-Mart on Per Capita Sales by Merchandise Category

Variable	Merchandise Category								
	Total Sales	General Merch.	Apparel	Building Materials	Eating and Drinking	Food Stores	Home Furnish.	Specialty	Services
<i>Trend</i>	0.03*** [0.001]	0.04*** [0.001]	-0.01*** [0.002]	0.02*** [0.002]	0.04*** [0.001]	0.03*** [0.001]	0.03*** [0.002]	0.02*** [0.001]	0.04*** [0.001]
$W_{it}$	0.11*** [0.018]	0.61*** [0.030]	0.1*** [0.031]	-0.19*** [0.043]	0.14*** [0.018]	-0.04* [0.021]	-0.08* [0.045]	0.07** [0.033]	0.09*** [0.021]
$W_{it} * Trend$	-0.004** [0.001]	-0.001 [0.003]	-0.003 [0.003]	0.001 [0.005]	-0.004*** [0.001]	-0.004* [0.002]	0.008** [0.003]	-0.005* [0.003]	-0.002 [0.002]
$W_{it} + W_{it} * 5$	0.09***	0.605***	0.085***	-0.185***	0.12***	-0.06***	-0.04	0.045*	0.08***
$W_{it} + W_{it} * 10$	0.07***	0.6***	0.07*	-0.18***	0.1***	-0.08***	0	0.02	0.07***
$W_{it} + W_{it} * 15$	0.05***	0.595***	0.055	-0.175***	0.08***	-0.1***	0.04	-0.005	0.06**
$\ln S_i$	8.861	7.000	5.478	6.192	6.401	7.560	5.545	6.148	6.633
N	1,914	1,535	1,451	1,383	1,900	1,244	1,673	1,906	1,906
Adjusted R <sup>2</sup>	0.743	0.731	0.038	0.104	0.826	0.710	0.191	0.205	0.794

Notes: Dependent variable is the natural logarithm of per capita sales in town  $i$  at time  $t$ . Model estimated using fixed effects. Robust standard errors reported in parentheses below the coefficient. Level of confidence associated with asterisks (\*s).

Table 5. Estimated Change in Average Annual Host Town Retail Sales by Merchandise Category

Merchandise Category	Change Upon Entry	Change After 15 Years
Apparel	\$284,714	\$153,064
Building Materials	-\$658,058	-\$610,530
Eating and Drinking	\$851,161	\$471,744
Food	-\$724,403	-\$1,758,100
General Merchandise	\$9,466,355	\$9,157,725
Home Furnishings	-\$171,588	\$91,081
Specialty	\$417,702	-\$28,732
Services	\$575,142	\$377,649
Total	\$7,784,307	\$3,432,375