Mom & Pop's or Big Box Stores: Some evidence of Walmart's impact on retail trade

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Abstract: This paper explores Walmart's impact on the retail sector in the counties in which it locates, as well as those in surrounding counties, by examining such measures as retail outlets per 1000 population. Using state wide data as well as a case study, we find that the main impact of the entrance of a Walmart is primarily placed on competitive big box stores. Furthermore, we find that the long run adjustment to the entrance of a Wal-Mmart takes between 18 and 36 months

Introduction

The impact of the entrance of a Walmart in a metropolitan area, especially a relatively small one, has been controversial for many years. It is the typical economic growth vs community culture argument concerning the "inevitable" loss of many treasured small retail establishments[1]. This paper examines this issue within two different contexts. The first extends the existing statistical studies of this impact along the lines of Sobel and Dean (2005), but using county rather than state level data. The second uses a case study which focuses on a small metropolitan area (Muncie, Indiana) that already had a significant number of big box retailers

[1] In recent years, critics of Walmart have also focused on such problems as the environment and working conditions.

and a regional mall before Walmart opened its first store. We plan to exploit a Walmart's opening in Indiana counties to establish clusters of counties that fall within easy driving distance of this Walmart.. This permits the analysis of the effect of a Walmart entrance on other local businesses within the county as well as adjacent counties, a frequent question addressed in earlier studies. Our results indicate that, unlike the "conventional wisdom", the biggest impact of the entrance of a Walmart is on other big-box stores or malls.

Literature Review

The examination of the impact of new forms of retailing on local retail establishments has a long tradition beginning, perhaps in the early twentieth century, with the introduction of mail order giants such as Sears. In the 1920s and 30s these studies expanded to the impact of chain stores (Woolworth, Grants, Ben Franklin, etc.). Studies of malls and discounters were a natural continuation of earlier studies. By the 1990's, estimating the impact of a Walmart's entry into a local retail market had become a bit of a cottage industry. The threads in this agenda include measuring its impact on the price level of retail goods, on existing, especially mom and pop, retail establishments, on local wages, employment and working conditions and on the local social structure.[2]

Unsurprisingly, the Walmart website (*Walmartstores.com/download/3097.pdf)* focuses exclusively on the studies that examine the impact of Walmart on retail prices which find that consumers, especially low income ones**,** save up to $18 billion per year by shopping at Walmart or at rivals who have been forced to lower their prices (Global Insight, 2006). The geographic question implicitly raised by this analysis is how and where do customers use these savings. If they spend part of this newly found savings, it could lead to the creation or expansion of businesses both locally and far afield. Furthermore, this spending impact could extend beyond retail establishments into the health, recreation, or tourism sectors. For example, perhaps some spending could be directed into financial markets which results in a wider disbursement both sectorally and geographically. A mom and pop recreational business coming into existence far away from any Walmart may be just as much a result of this aspect of Walmart as the closing of

[2] See Hicks, (2007b)

a directly competitive mom and pop business in the local main street in a town with a new Walmart**.** However this would not show up if a study focuses on just a particular county.

The critical literature suggests that Walmart sales often come at the expense of "downtown" smaller scale retail establishments. Kenneth (1988) found, for Iowa, clear negative impacts on towns in the surrounding area; towns within a 20-mile radius of the Walmart stores saw total retail sales drop an average of 25 percent within five years of an opening of the nearest Walmart. However, the retail employment impact was generally positive in the town where the store was located in part because of the employment added by Walmart itself and employment in activities complementary to the presence of a Walmart such as pizza parlors, movie complexes, etc. These segments of the retail market can benefit because shoppers from adjacent counties increase the frequency of trips to the Walmart town and shop in the complimentary outlets. Later studies have suggested that this positive impact can be short lived in places where Walmart has followed a saturation policy with multiple stores in adjacent counties. It is also the case that Walmart would be expected to differentially affect the sales of food stores, general merchandise stores, furniture stores, building materials stores, and miscellaneous retail stores. Stone, Artz, and Miles (2002) extend the study of Walmart Superstores impact on food stores in Mississippi as one example of narrow focus impact analysis. These studies are part of a large, primarily case study based literature on Walmart's entrance effects. [3]

Goetz and Rupasingha (2006) introduced another important dimension to the long run impact of Walmart and other big box operations. Most big box stores are national, or at least regional, operations. They are often headquartered in a distant location. Many activities including legal, financial, accounting and marketing decisions are run from the corporate headquarters. On the other hand, local retailers are likely to buy these services from local printers, law firms, advertising firms and accounting firms. To the extent that local retailers decline, one would expect employment in these business services to decline as well. In other words, there might be a negative impact on employment even if all displaced workers obtained employment at Walmart. Goetz and Rupasingha go one step further with this argument and posit

[3] For non-econometric studies see Artz (1999), Artz and McConnon (2001), Barnes and Connell (1996), Franz and Robb (1989), Hornbeck (1994), Ketchum and Hughes (1997), McGee and Gresham (1995), Stone (1988, 1995, 1995a, 1997), Stone, Deller and McConnon (1992).

that service club memberships may also decline as an important part of their base is lost and big box management is less likely to be interested in such memberships.

Hicks and Wilburn (2001) found that the entrance of a Walmart store led to a modest increase in the number of retail establishments, a permanent retail employment increase of roughly 54 workers and no impact on retail wages. They also found that entrance of a Walmart in a contiguous county reduces retail employment in a county. In a nearly contemporary study (Basker, 2005) performed a similar analysis of a much larger sample of U.S. counties. She employed an instrument to control for endogeneity, using proxies of the planned entrance date for each store location. She reports that after an initial increase in retail employment, this effect dissipates in approximately three years to a 55 worker increase with a modest reduction in the number of small retail firms. [4] Basker also found very modest impacts of Walmart entrance on adjoining counties.[5]

Sobel and Dean (2005) test the impact of Walmart on the composition of small businesses employing both detailed cross sectional and a spatial autoregressive estimates. The authors find no reduction in small businesses attributable to Walmart, a result similar to Basker's (2005) result. This study is particularly interesting in that it addresses specifically, the impact on small businesses, using spatial methods of analysis. Hicks (2010) provided a comparison of the findings of Sobel and Dean (2005) and Stone (1988) using a county level econometric study of Iowa. He found no evidence that Walmart impacts small businesses within the decade after Walmart began opening stores in Iowa. The question, then, is if small retailers are not affected, then what kind of retail establishments, if any, are affected.

The State before Walmart

The Indiana of the 1980's was no stranger to chain stores and had fully participated in the anti-chain store revolt of the 1920's and 1930's. The threat posed by such chains was sufficiently ominous to motivate associations of small retailers to successfully lobby for anti-chain store legislation in at least a dozen states. Indeed, Indiana's anti-chain store taxes or graduated license taxes survived judicial review in 1931 one of the few judicial successes of the period Lebhar, (1953). By the end of World War II, the nationwide expansion of chain stores

[4] Of course a net increase in employment of 55 workers is certainly better than not having these jobs.

[5]The endogeneity question with Walmart's entrance has also spawned a significant number of studies. These include work by Franklin [2001], Hicks and Wilburn [2001], Basker [2005], and Hicks [2008]. The conclusion of the endogeneity issue is not settled.

was as well entrenched in Indiana as anywhere in the country. Suburban malls became the new bogey in the 1950's which also saw the advent of the first big box stores, often "membership outlets such as Fedco, Gemco and Memco. Target often used these stores as leverage points to enter new markets. The following quote from Ghemawat and Mark captures the long run controversy over the introduction of new retail formats..

> History also provides perspective on the current clamor around Walmart. When catalog pioneers Sears and Montgomery Ward seemingly threatened small-town retailers with extinction in the nineteenth century, those retailers mounted an energetic counterattack. The rise of chain stores in the 1920s also provoked outcries from independent dealers and whole communities, resulting in thirteen states passing anti-chain-store tax laws. The lesson for Walmart is that successful new retailing formats tend to provoke vigorous reactions—in the nonmarket as well as the market sphere. (Ghemawat and Mark, 2006)

To clarify the distributional pattern of retail establishments in Indiana, the raw number was normalized to establishments per 1000 residents.[6] The raw and normalized data for total retail establishments are presented in Table 1a for the state covering the period 1977 to 1997. [7] The number of very small establishments fell significantly in this period. Other size classes increased over the period. Our interest is whether the county patterns of change over this period will reveal anything about the impact of Walmart on other big box stores as well as on smaller establishments. To answer this question requires a base line which we develop here.

[6] Note in this study we are primarily interested in the number of establishments in each category rather than employment in each category. Because of the way the data is presented, we have no way of knowing if a mom and pop store that has stayed in the 5-9 employees category over two years increased or decreased its number of employees.

[7] This data set will be extended from 1998 to 2003 later in the paper when issues involving these years are crucial. This is because of coding issues involving in the change from SIC to NAICS.

Table 1a: State trends in retail establishments

	Retail Total		1-4 Employees		5-9 Employees		10-19 Employees		20 or more empl.	
year	Estabs.	Per 1000	Estabs.	Per 1000	Estabs.	Per 1000		Per 1000	Estabs.	Per 1000
1977	30750	5.69	15559	2.88	6995	1.29	4401	0.81	3795.00	0.70
1978	30312	5.57	14199	2.61	7173	1.32	4697	0.86	4243.00	0.78
1979	29831	5.45	13370	2.44	7233	1.32	4825	0.88	4403.00	0.80
1980	29238	5.33	12923	2.35	7304	1.33	4697	0.86	4314.00	0.79
1981	29151	5.32	13322	2.43	7187	1.31	4478	0.82	4164.00	0.76
1982	29974	5.48	13719	2.51	7575	1.39	4452	0.81	4228.00	0.77
1983	32447	5.95	15566	2.86	7836	1.44	4800	0.88	4245.00	0.78
1984	32128	5.89	15017	2.75	7916	1.45	4675	0.86	4520.00	0.83
1985	31704	5.81	14315	2.62	7816	1.43	4847	0.89	4726.00	0.87
1986	32053	5.88	14258	2.61	7880	1.44	4926	0.90	4989.00	0.91
1987	33416	6.11	14607	2.67	8083	1.48	5143	0.94	5583.00	1.02
1988	32529	5.92	13483	2.46	8241	1.50	5358	0.98	5447.00	0.99
1989	32880	5.95	13282	2.40	8431	1.53	5414	0.98	5753.00	1.04
1990	33564	6.04	13558	2.44	8451	1.52	5632	1.01	5923.00	1.07
1991	33811	6.04	13712	2.45	8467	1.51	5692	1.02	5940.00	1.06
1992	34415	6.09	13769	2.44	8739	1.55	5939	1.05	5968.00	1.06
1993	34124	5.98	13653	2.39	8551	1.50	5856	1.03	6064.00	1.06
1994	34459	6.00	13784	2.40	8437	1.47	5883	1.02	6355.00	1.11
1995	34845	6.02	13826	2.39	8496	1.47	6057	1.05	6466.00	1.12
1996	34949	5.99	13865	2.38	8462	1.45	6120	1.05	6502.00	1.11
1997	35056	5.97	13587	2.31	8616	1.47	6155	1.05	6698.00	1.14
Change	**14.00%**	**4.93%**	**-12.67%**	**-19.62%**	**23.17%**	**13.37%**	**39.85%**	**28.72%**	**76.50%**	**62.45%**

In Indiana, Walmart first opened a store in 1983 in Vincennes. Table 1b shows the raw counts for county business pattern size categories for total retail stores, general merchandise stores and apparel stores before and after the establishment of this Walmart. The latter two categories are those on which we expect Walmart to have the greatest effect in the 1980s as no supercenters were opened in this decade.

Table 1b: Size distribution of retail firms

Employment Size	1980			1990		
	Total retail	**General merchandise**	**apparel**	**Total Retail**	**General merchandise**	**apparel**
total	29238	933	2810	33564	948	2900
1-4	12923	214	1324	13558	221	1194
5-9	7304	148	907	8451	181	997
10-19	4697	152	446	5632	96	549
20-49	3072	141	103	4118	124	137
50-99	947	104	25	1218	105	15
100-249	251	145	5	532	198	7
over 250	44	29	0	55	23	1

In 1980, the average number of county retail establishments per 1000 was 5.26. Counties ranged from 2.45 to 7.29.

Scope of our Study.

Given this environment and history, this study focuses on the short term impact of Walmart on retail establishments and employment in Indiana. Here the short run is defined as the time interval between the opening of a Walmart in county X and the opening of the next Walmart within a two county distance with no less than one intervening county. Thus the methodology begins with finding the earliest opening dates for Walmart stores in the selected counties in Indiana and then the time intervals to the opening subsequent Walmarts nearby. A baseline of changes in employment with respect to different size retail establishments before the entrance of a Walmart will be determined using data on establishment and employment patterns in the retail and business services sectors of each of the surrounding counties for the periods immediately prior to the openings.

The retail hinterland of an existing store is likely to truncate in the direction of a new store. In the time frame of interest to us**,** nearly all Walmarts did not have grocery operations so our focus in on the general merchandisers. By the time Walmart enters many of the medium to larger cities of the Ohio Valley and surrounding states, these towns had already had years of

experience with other large general merchandise discount houses including K-Mart, Zayres and Hills (both of the later acquired by Ames). Some of these stores had more than 30 year's presence before Walmart arrived but closed shortly thereafter. None of these stores fits the Mom and Pop retailer definition often used in other studies.

After the opening of a particular Walmart these employment changes can take some time. Thus, while previous models have used 5 year lags of Walmart's per capita at the state level to allow the effects of Walmart to become visible, for our approach this is not a usable variable. Therefore, we will use a lagged dummy variable structure instead. This permits an estimate of the duration of retail adjustment.

Empirical Analysis of the Impact of Walmart on Employment

In order to examine Walmart's impact on employment in surrounding counties, we consider state wide data and a regional case study. To do so, we wish to model the impact Walmart and Walmart Supercenters have on the number of retail stores, by size category, in a county. This presents a few concerns regarding the treatment of the Walmart variable in an empirical model, the degree to which we can or should treat the endogeneity of the Walmart entrance decision, and the speed of adjustment of markets to a new Walmart. Of particular interest in this research is the size of the effected firm (is it a big box or mom and pop store) and the length of time at which the impact of a Walmart is felt by the retail sector.

To answer these questions we report two separate empirical models, involving what we believe are fairly straightforward strategies.The first of these is the simple disaggregation of the retail sector by firm size. We ask how many firms opened or closed as a consequence of a new Walmart, and do so in separate empirical tests employing similar models. Second, in all the reported estimates provided in this study, we aggregate Walmart and Walmart Supercenters. However, we treat the time dimension separately in our two reported samples. First, we use a simple approach that counts the number of years since the opening of a Walmart store. This approach has been employed elsewhere (see Hicks, 2007). In the second approach, we employ small region upon which we can apply more qualitative analysis. Here, we treat lagged entrance of a Walmart store, testing successive annual lags from t to t-3. This is similar in concept to the

polynomial distributed lag approach used by Basker [2005], but unlike her approach, we do not include cumulative effects. [8]

In this paper we do not make endogeneity corrections for the entrance of a Walmart. There is considerable analysis of this matter, but it is not yet a settled matter. [9] In lieu of a formal identification strategy for the empirical section, we augment our analysis with a more detailed explanation of the speed of adjustment, and type of firm impacted. This is not an uncommon departure from a more formal identification approach, but does offer certain concerns that can be addressed by the specific analysis provided for entrance impacts on firms by size. [10] In other words, if we observed significant endogeneity bias in the impact, then that would fall across firms of all sizes. For example, if a Walmart entered a fast growing county, the traditional endogeneity concern, the bias introduced by failure to identify this equation, would be in the direction of more retail firms, without regard to size. As we shall shortly report, that is not what has occurred. Thus, we believe that in our modeling efforts, the endogeneity problem that has appeared across the existing literature is largely ameliorated by our choice of firm size in the model, the results we report, and a more closely explained case study approach.

In our case study approach we look not only at retail overall, but also the specific subsectors of the industry by size. Here we try to better explain what has happened in the region's retail structure, and what type of firms might have been effected by a Walmart presence along with the speed of adjustment estimates. This is a necessarily much more limited question.

Our models also treat more common econometric issues involving both temporal and spatial autocorrelation. We explain these in more detail for each. The following sections outline two models. The first of these we call the State Model, since it includes all 92 Indiana counties. The Second, we call the Sub-State Model since it is performed on six counties only. Both models include a pooled cross section and time series model which we specify separately. The Sub-State Model includes a more detailed case study examining a cluster of counties surrounding a metropolitan area of Muncie, Indiana.

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[8] Our model will estimate coefficients for t, t+1, . . t+n. A traditional polynomial distributed lag will estimate coefficients for t, t+1 . .. t+n, with a cumulative effect where the value of the coefficient is represented as β^n

[9] See Hicks (2008) for a recent review of this literature.

[10] See Sobel and Dean (2009).

The State Model

The state data set is a pooled cross section and time series dataset which includes retail establishments by employment size by county for the years 1989 to 2002.[11] As such, it is subject to both time series and spatial autocorrelation issues that must be addressed. Separate dummies are used for Walmarts(WMD) and Walmart Supercenters (WMSD). Since it is likely that it will take some time for the impact of either type of Walmart to be measurable, the dummy variable is multiplied by a time variable that is simply the years since the opening of either type of store (WMD*TIME and WMSD*TIME). Importantly, this single variable measures the number of years since the opening of each Walmart within a county, and is not an interaction term in the traditional sense.

The dependent variables are the number of establishments in each size class (NESn). Data suppression issues limit the model to total retail outlets in county business patterns size categories from n = 1-4, 5-9, 10-19, 20 – 49, 50-99, 100- 49, and 250 or over. An order one autoregressive variable is used to deal with temporal autocorrelation (AR(1)). We define surrounding counties as those with a shared border or which meet at a point. The average number of establishments of the same size (n) in surrounding counties is used in an attempt to control for spatial effects of retail establishments (NESnC). A variable measuring total establishments of all types in each country is used as a scalar (EST). As indicated above, there are many factors affecting county growth in Indiana. For each county a trend variable is used to attempt to capture these effects. The pull (or gravity) factor is defined as retail payroll per capita relative (divided by) the state average and measures underexploited (PULL< 1) or over exploited (PULL>1) potential for retail sales based on the share of local income spent on retail relative to the state wide share. Table 2 provides the summary statistics of these data.

[11] When one is faced with county data over time, there is always the possibility of spatial autocorrelation. Using Moran's I and Geary's C analyses, we found that spatial autocorrelation was not present. Should the reader wish a copy of this analysis, it is available from the authors.

Table 2, Summary Statistics

	Mean	Std. Dev.	Source
NES1-4	134.69	211.4679	U.S. Census, County Business Patterns
NES5-9	86.76	152.3825	U.S. Census, County Business Patterns
NES10-19	57.91	108.062	U.S. Census, County Business Patterns
NES20-49	38.58	81.71096	U.S. Census, County Business Patterns
NES50-99	11.74	26.60063	U.S. Census, County Business Patterns
NES100-249	5.65	14.28138	U.S. Census, County Business Patterns
NES> 250	0.69	1.860948	U.S. Census, County Business Patterns
WMD	0.24	0.446314	2005 Walmart Data release
WMSD	0.45	0.619158	2005 Walmart Data release
PULL	1.00	0.022117	Regional Economic Information Systems, authors calculations
EST	330.01	581.1968	U.S. Census, County Business Patterns

Finally, since the characteristics of counties such as income, unemployment, poverty, change slowly, to avoid singularity issues, we use a cross sectional fixed effect model with separate dummies for each county. The general form of the model is

(1) $NESn = \beta_0 + \beta_1 (WMD*TIME + WMSD*TIME) + \beta_3 PULL + \beta_4 EST + \beta_5 NESnC + \beta_6 TREND + \beta_7 AR(1) + \omega$

Table 3 shows the results of this estimation on the number of retail establishments after the introduction of Walmart in each country separately. The time trends are highly autoregressive and the general trend picks up much of the change in establishments. Walmart seems to have had some effects**,** but not in all size classes. The most significant measured effect (both economically and statistically) is for the size class 100 to 249 (an increase of 0.475). This is the size class that appears to encompass Walmart's located in non-metropolitan counties. Thus, the interpretation is that Wal-Mmart's presence cost the average county 0.525 establishments by the end of our study period. Just as important, it appears that Walmart's effect is basically on big box stores which are most likely owned by out of state corporations. Thus Walmart might be replacing, for the most part, stores with non-local management. This seems to contradict a widely held belief that Walmart hurts locally owned subsidiary business establishments such as local printers, lawyers, financial institutions or marketing firms.

Separate analysis (not reported here) restricted to non-metropolitan counties indicates that TREND accounts for most of the changes in establishment counts. Walmart seems to have little

effect on establishments under employment size 49, a small negative effect on establishments between 50 and 99 employees, reduces the number of establishments between 100 and 249 workers by about 0.5 per year after opening, and similar reduces competing firms by about 1.5 per year in the over 250 category. Since most Walmarts are in this category, the net effect is a loss of 0.5 establishments per year, a finding that is nearly identical to the results reported above which indicates that it is the competitive big box stores that are primarily affected.

Table 3: After Walmart's Entry up to 2003.

Pooled GLS results – County Fixed effects Model

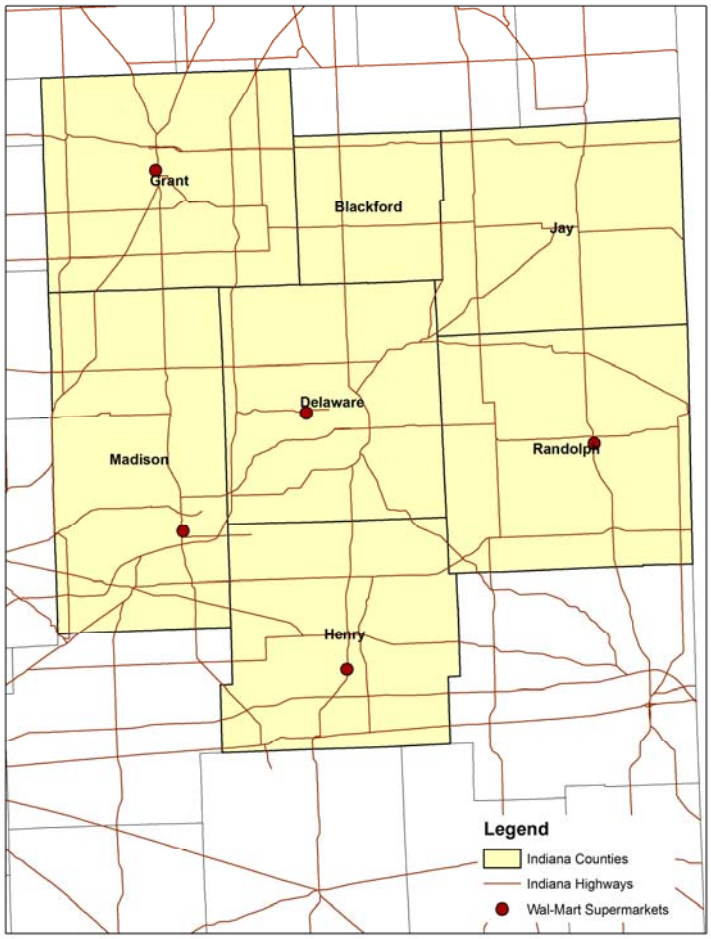
Variable	Number Est. 1-4 Employees Coefficient	Number Est. 5-9 Employees Coefficient	Number Est. 10-19 Employees Coefficient	Number Est. 20-49 Employees Coefficient	Number Est. 50-99 Employees Coefficient	Number Est. 100-249 Employees Coefficient	Number Est. Over 250 Employees Coefficient
Constant	19.08	294.25	125.17	-277.13*	10.31	30.19	14.71*
WMD*TIME [1]	-0.4042	1.410*	0.196	-0.271	-0.281	0.475***	0.0796
PULL	5.790	-264.703	-124.252	256.102*	-14.794	-27.124	-13.950*
EST	0.335***	0.170***	0.159***	0.167***	0.049***	0.0065***	0.0002
NESnC	0.0079	0.0038	0.039***	0.011	-0.011	0.030**	-0.0025
TREND	-0.658***	0.049***	0.227***	0.065*	0.033***	0.016***	0.016***
AR(1)	0.282***	0.028***	0.387***	0.550***	0.450***	0.482***	0.867***
			Weighted Statistics				
R-squared	0.99	0.99	0.99	0.98	0.96	0.95	0.88
Adj R-squared	0.991	0.988	0.990	0.985	0.960	0.942	0.87
Standard Error of Est.	10.31	7.90	5.84	4.72	2.47	1.68	0.370
F-Statistic	1176.5***	929.68***	1020.3***	699.47***	253.83***	169.17***	70.510***
Durbin Watson	2.215	2.177	2.142	2.262	2.205	20.79	2.224
(observations)	11years x 92 counties	11years x 92 counties	11years x 92 counties	11years x 92 counties	11years x 92 counties	11years x 92 counties	11years x 92 counties

1. Measures either/or presence of a regular or supercenter store

The Sub-State Model

To examine the more localized effects of the entrance of a Walmart, we present a case study involving those counties adjoining Delaware County in east-central Indiana. This case study focuses on providing an econometric study of a smaller, sub-state region. In this effort we seek to understand whether or not a Walmart entrance results in changes to local retail structure that persists, or evolves over time. Our area of exploration is the counties of Blackford, Delaware, Grant, Henry, Jay, Madison and Randolph. The largest of these counties, Delaware, had a 2010 population of fewer than 125,000 residents. The first two Walmarts enter this cluster in 1991. There were already 15 large retail establishments in Delaware County in 1990 including 5 big box discount stores. Thus, this cluster will give us a chance to examine the impact of Walmart on other big box operations as well as small retailers. (See Figure 1)

Figure 1, East Central Indiana Walmart Stores



To test the impact of a Walmart's entrance, we followed the approach of Hicks and Wilburn, [2001] testing the number of establishments by size and type as a function of a Walmart's entrance dummy and dummy variables measuring the years since Walmart's entrance and a time trend. Our model is also augmented with a fixed effects and common intercept, taking the form:

$$(2)\quad NES_{i,t} = \beta_0 + \beta_1 (WM) + \beta_2 WM_{,I,t+1} + \beta_3 WM_{,i,t+2} + \beta_3 WM_{,I,t+3} + \beta_4 TREND + \omega_{i,t} + \varepsilon_i$$

where the number of establishments (NES) in county i, in time t is a function of Walmart entrance, and the number of years since Walmart entrance ($WM,i_{,t+n}$) a time trend, a fixed effect error, common intercept and a normally distributed error term. We tested this model across 17 sub-retail industries and across 7 firm sizes. In lieu of reporting each of these models, we report

the magnitudes that were modestly statistically meaningful (at the .15 level) and only for the entrance and lagged entrance coefficients. Recall that here we are primarily interested in the speed of adjustment, though we also provide specific retail sub-sectors from which to better understand the impacts of a Walmart. Selected results appear in Table 4.

Table 4: Selected East Central Indiana Walmart Presence Impacts
(selected results from equation 5, zero's not statistically significant at the 0.15 level)

Dependent variable	Walmart entrance	Walmart t+1	Walmart t+2	Walmart t+3
Retail (1-4 employees)	-9.7	-12.1	0	0
Retail (5-9 employees)	0	0	0	0
Retail (1-9 employees)	-11.4	-11.7	0	0
Retail (10-19 employees)	0	8.2	0	0
Retail (20-49 employees)	0	0	0	0
Retail (50-99 employees)	0	0	0	0
Retail (100-249 employees)	0	0	0	0
Retail (250-499 employees	**-0.34**	**-0.39**	0	0
Gen Merchandise (1-4 employees)	0	-0.5	-1.3	-0.5
Gen Merchandise (5-9 employees)	-0.7	0	0	0
Gen Merchandise (1-9 employees)	-0.9	-1.0	-1.09	0
Gen Merchandise (10-19 employees)	0	0	-0.6	-0.5
Gen Merchandise (20-49 employees)	0.55	0	0	0
Gen Merchandise (50-99 employees)	0	0	0	0
Gen Merchandise (100-249 employees)	0	0	0	0
Gen Merchandise (250-449 employees)	**-0.2**	**-0.2**	0	0
Food (1-4 employees)	0	-2.43	0	0
Food (5-9 employees)	0	0	0	0
Food (1-9 employees)	-3.1	-2.3	0	0
Food (10-19 employees)	2.33	0	0	0
Food (20-49 employees)	-0.6	-1.1	-0.8	0
Food (50-99 employees)	0	0	0	0
Food (100-249 employees)	0.7	0.6	0.7	0
Food (250-449 employees)	0	0	0	0
Personal Service (1-4 employees)	-3.8	-3.3	0	0
Personal Service (5-9 employees)	0	1.6	0	2.5
Personal Service (1-9 employees)	-4.6	0	0	0
Personal Service (10-19 employees)	0	0	0	0
Furniture (1-4 employees)	0	0.7	0.9	0
Furniture (5-9 employees)	-0.4	-0.4	-0.4	0
Furniture (1-9 employees)	0	0	0	0
Furniture (10-19 employees)	0	0	0.3	0
Furniture (20-49 employees)	0	0	0	0

Though not an exhaustive list, this representation demonstrates a few characteristics of Walmart entrance that echoes our earlier findings, and those of other researchers; Hicks and Wilburn, (2001); Hicks, (2008); Sobel, (2008); and Hicks, (2010). In general, we observe two features from this set of regressions. The first is that the changes to industry structure following

a Walmart entrance are small. This is not immediately apparent however without exhaustively testing each category of retailer. For example, while we observe a large decline in small retail establishments almost immediately following a Walmart entrance, and for a year afterwards, this is accompanied by growth in year two of larger retail operations. Thus the anecdotal decline in small businesses following a Walmart entrance may really be a pattern of post Walmart entrance consolidation or expansion of smaller retailers into a larger size category.

When observing Walmart's effect on retail subcategories, we see a very modest effect on small general merchandise, food and furniture stores, including at least some instances where growth in the number of firms in a category occurred. We found no evidence of structural change beyond those reported in Table 3 (and many non-effects are reported in Table 3 as well). The changes in magnitude reported here are roughly consistent with the creation of a small strip mall, with outparcels of larger stores, replacing smaller existing stores. Actual employment growth in retail is certainly possible in this scenario.

This is consistent with the argument presented in Hicks and Wilburn, (2001) that Walmart stores created multi-county retail centers in more rural areas. In terms of employment, the largest potential loss is among large and medium sized big-box stores. Indeed, the loss of 0.2 competing big box retailers (general merchandise stores of 250 to 449 employees) included employment losses that dwarf all other effects. Importantly, since this includes a Walmart, the actual loss is greater than one. It would seem that the largest effect of Walmart is on competing big-box format stores, and continues for some time after a Walmart entrance. In the decade after our sample, the two largest big box stores, Sears and K-Mart, declared bankruptcy, but Sears remained in place and K-Mart closed only one of two stores in Deleware County.

The other finding is the temporal adjustment to a Walmart entrance. We know when Walmart entered, and make no special allowance for the month, but find immediate and first year impacts the most common. We find 29 industries that had changes in structure in the year of Walmart opening and the subsequent year. This dropped to eight in the second year, and only three in the third year. We found no evidence of a fourth year effect. Thus, it appears that the industry structural adjustment to a Walmart entrance is largely complete between 18 and 36 months of a new store opening.

Summary and Conclusions

In this study we address the questions of how does the entrance of Walmart affect the local retail structure. This is not a new question, but our contribution is in testing several refutable hypotheses in the aggregate along with a reinforcing case study involving Indiana.

In the first part of our study we find that there are mild economies of scale in retailing captured especially in metropolitan area counties. We also find that Walmart does not appear to influence either the number of establishments per 1000 or the number of employees per 1000 in the retail sector. The analysis finds no significance of any variable for the pattern establishment data, a lack of significance of adjacency with positive signs and significance for urban, early Walmart entrance and higher population areas. This suggests that mom and pop establishments are not affected by the presence of a Walmart.

In the state level analysis we find that Walmart's presence costs the average county 0.525 establishments by the end of our study period. In this part of the study it appears that Walmart's effect is basically on big box stores which are most likely owned by out of state corporations. Thus Walmart might be replacing predominantly stores already characterized by non-local

management. This seems to contradict a widely held belief that Walmart hurts locally owned business subsidiary establishments.

In our case study, we focused on the largely rural areas surrounding the Muncie MSA in east central Indiana. We find that there is little evidence of widespread loss of retail establishments. Instead, we find that the possibility that growth in the size or the displacement of small firms has occurred. Consistent with our state study, the largest impact in terms of employment impacts occurs with the loss of competing bigbox format stores. It is the Ames, Sears and K-Mart's which seem to have suffered most when Walmart arrived. In other words, it is not the small downtown retailers that were mostly affected, but rather, we find that the direct competitors of the Walmart where the main losers. As such, the local retail sector possesses a consistency during the a long term trend that has seen a movement from department stores to chain stores to shopping malls to membership stores to big-box stores. And finally, we find that as a whole, the impacts that do occur generally ran their course within 18 and 36 months of a new Walmart opening.

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