

Wal-Mart and Local Labor Markets, 1990–2004

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Abstract

Contrary to popular opinion and previous estimates, this paper finds that Wal-Mart raises local retail (and possibly non-retail) employment, but has little effect on wages or the number of establishments. The main discrepancy with earlier studies arises because we control for trends that pre-date Wal-Mart's entry. Results indicate that Wal-Mart tends to expand where on-going growth is relatively strong overall, but relatively weak in the retail sector, so most previous work has been biased toward those conclusions. We also identify two reasons why effects are likely smaller now than previously: increased competition and Wal-Mart's shift toward more populous counties.

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1 Introduction

Few corporations currently arouse stronger emotions than Wal-Mart. Its advocates laud the firm for lowering prices and raising product variety, for employing more workers than any other private employer, for realizing massive economies through innovative supply chain management, and for generating much of the U.S.'s recent productivity growth. At the same time, Wal-Mart's critics accuse it of destroying local economies, lowering wages and health insurance coverage rates, increasing poverty, stifling unionization, and widening the U.S.'s international trade deficit. Many communities have tried to attract Wal-Mart with subsidies and other incentives, but many others have tried to deter Wal-Mart through zoning ordinances or targeted regulations. There is even some indication that support or opposition to this particular firm is becoming a defining issue between the major political parties (Nagourney and Barbaro, 2006).

This paper presents new evidence on one contentious aspect of that debate, Wal-Mart's effects on local labor markets. While there have been several previous studies of those effects, our results deviate considerably from most of the existing literature, as well as from widely-held impressions. Our main results are that Wal-Mart stores, especially Supercenters, are associated with a 3–4 percent gain in retail employment in a typical county, a much larger gain in less populous counties, and possibly a small increase in non-retail employment. There is little evidence that Wal-Mart's entry substantially affects the number of establishments in the county as a whole, in the retail sector, or in most retail subsectors. Average weekly wages in the retail sector may fall when Wal-Mart enters, but only slightly and only temporarily. Most of these effects simply represent the Wal-Mart store itself.

There are two main reasons for the discrepancy between our estimates and those in previous work. The primary reason is that we use a different empirical methodology. Although several previous studies have cited county-specific trends as a reason to be concerned about the endogeneity of store locations, ours is the first to control for those trends directly with a random growth model. Consistent with popular speculation and some previous work, we find that counties' retail sectors do not grow as quickly after a Wal-Mart store opens as they do in counties where Wal-Mart does not expand. Nevertheless, we also find that those counties have slower growth in retail throughout the sample period—and when we control for those on-going trends, we find that retail employment grows faster after Wal-Mart opens than it does in other counties. The difference is large: the estimated effects on both retail employment and the number of retail establishments are about 7 percentage points more positive in the latter specification. In addition, we find that Wal-Mart counties have a stronger than average trend in countywide employment and establishments (just not in retail). Since only a few previous papers have even attempted to adjust for those trends, most estimates in the literature have been biased toward finding that Wal-Mart has negative effects on local retail sectors and positive effects on other sectors.

Stated another way, these findings suggest that Wal-Mart tends to expand where a county's retail sector is not performing as well as other local sectors. This strikes us as a plausibly sensible business strategy—such places seem to present an opportunity for profitable entry by new retailers, and perhaps especially for a discount retailer like Wal-Mart. Unfortunately for Wal-Mart, this strategy may also be responsible for some of the firm's difficulties in public relations. It is challenging even for economists to distinguish between the existing trends that attract the firm and the changes caused by its entry, so one can

easily imagine how the public at large might observe the relative decline of the retail sector in places with Wal-Mart stores and mistakenly conclude that Wal-Mart caused that decline.

The other reason for the discrepancy with earlier work is that this paper uses more recent data than any previous study—we examine 1990–2004, while earlier work has often used data series starting in the 1970s. As the paper confirms, there are at least two good reasons to think that Wal-Mart’s effects are likely smaller now than in decades past. One is that a much greater fraction of Wal-Mart stores are now located in more densely populated counties than were earlier in the firm’s history. We show that Wal-Mart’s impact is substantially smaller in more populous counties, so the tendency to build new stores in such places has reduced the average Wal-Mart effect. The other reason is that competition has greatly increased in the General Merchandising subsector. Although the results will indicate that Wal-Mart Supercenters (but not Discount Stores or Neighborhood Markets) have larger employment effects than other general merchandising establishments, those effects are smaller in places where there are more general merchandising establishments. Thus, even if previous work estimated Wal-Mart’s effects accurately, those estimates may have greater historical interest than current policy relevance.

The discussion proceeds as follows. The following section provides background information about the Wal-Mart corporation and the previous literature. The latter topic leads naturally into a thorough discussion of our empirical methodology in Section 3. Section 4 then describes our data on Wal-Mart stores and county labor markets, and the empirical findings are presented in Section 5. Section 6 concludes with a brief discussion.

2 Background

2.1 A Brief Introduction to Wal-Mart

It may be helpful to begin by reviewing Wal-Mart's history and nature. The first Wal-Mart store opened in 1962 in Rogers, Arkansas, and the chain expanded rapidly after its stock was made public in 1970. Over the next two decades, Wal-Mart added hundreds of stores in a geographic progression from the South Central states to the Southeast and the Midwest, reaching the Northeastern and Western coasts of the U.S. by the early 1990s. Since then, the number of Wal-Mart stores in the U.S. has more than doubled, numbering over 3,900 by August 2006. By then the firm had 1.3 million employees in the U.S., making it the nation's largest private employer. Wal-Mart also operates another 2,700 stores in 14 other nations, employing an additional half-million workers there. With over \$300 billion in sales in 2005, it is the world's largest retailer, serving 175 million customers per week, and it continues to open more than 500 new stores per year worldwide.¹

Today, the Wal-Mart brand includes four distinct types of stores. During the firm's first two decades, all Wal-Marts were Discount Stores, but since 1988 most new stores have been Supercenters. Discount Stores are relatively large establishments (about 101,000 square feet) that sell about 120,000 different products and employ an average of 225 workers. Supercenters are larger still, typically selling about 142,000 products over 185,000 square feet, and employing 350 or more workers. In addition to the products carried at Discount Stores, Supercenters also sell a wide array of grocery items, and they often host supplemental busi-

¹Most of the information in this sub-section was gathered from Wal-Mart's website: <http://www.walmartfacts.com>. The list of nations in which Wal-Mart operates includes two countries where it is currently abandoning operations, Germany and South Korea. For detailed evidence on the geographic spread of Wal-Mart stores, see Holmes (2005) or Neumark, Zhang, and Ciccarella (2005).

nesses selling, e.g., fast food, haircuts, and automotive maintenance. There are currently more than 1,100 Discount Stores and more than 2,100 Supercenters in the U.S.

A third type of store was introduced in 1998, Wal-Mart Neighborhood Markets. These are smaller stores of about 41,000 square feet, and they sell a smaller variety of products (about 29,000), mainly groceries and pharmaceuticals. They are usually located near Supercenters in order to take advantage of distributional economies. They employ an average of 95 workers. At the end of 2004 (when our data will end), there were 76 Neighborhood Markets located in 30 counties, with 71 percent (54 stores) in just eight metro areas: Dallas-Fort Worth, Houston, Indianapolis, Memphis, Oklahoma City, Phoenix, Salt Lake City, and Tulsa.

A final type of store is known as “Sam’s Club.” Although they were the second type of store the firm developed (in 1983), Sam’s Clubs differ from other three types in that many of their customers are small businesses rather than households (although they will sell to anyone who pays the \$35 annual membership fee). Thus, Sam’s Club is often considered a wholesaler rather than a retailer. These stores are warehouses that specialize in large-volume sales of a much smaller set of products (about 5,500). There are currently about 570 Sam’s Clubs, and they typically employ 160–175 workers per establishment.

Between the Supercenters and the Neighborhood Markets, Wal-Mart has quickly become the largest grocer in the U.S. This success has raised questions about Wal-Mart’s competitive effects: between 1990 to 2000, 27 of the 31 supermarket chains that sought bankruptcy protection cited Wal-Mart as a reason (Fishman, 2006). Nevertheless, Hausman and Leibtag (2005) find that Wal-Mart’s expansion into the grocery sector has led to a 15–25 percent reduction in food prices and consequently a large increase in consumer welfare.

2.2 Literature Review

Interest in Wal-Mart's effects is hardly limited to the grocery sector. Many recent papers have investigated Wal-Mart's impact on important issues like prices (Basker, 2005b; Hausman and Leibtag, 2005), poverty rates (Hicks, 2005a; Goetz and Swaminathan, 2006), health insurance coverage (Dube and Jacobs, 2004), self-employment (Sobel and Dean, 2006), productivity growth (McKinsey Global Institute, 2001), and U.S. international trade policy (Basker and Van, 2006). The present paper addresses a topic with a longer history, Wal-Mart's impact on local businesses and local labor markets.

As Neumark, Zhang, and Ciccarella (2005) explain in their more extensive review of the literature, most early papers on the topic restricted the analysis to an individual state or portion of a state (e.g., Stone, 1988, 1995, 1997; Artz and McConnon, 2001; Hicks and Wilburn, 2001; Stone, Artz, and Myles, 2002; Hicks, 2005b). Although these studies deserve ample credit for starting the debate, it is not clear that their results can be extrapolated to other regions. As we will show below, Wal-Mart's effects vary strikingly across locations.

Many early studies can also be faulted for failing to address counterfactual hypotheses very well. Several papers just ask how some factor (e.g., employment) changes when a Wal-Mart store opens in a local community. While this comparison may describe how those communities are changing, it does not demonstrate that those changes are caused by the introduction of Wal-Mart. Somewhat more sophisticated analyses use a difference-in-differences framework, comparing changes in locations where Wal-Mart expands against contemporaneous changes elsewhere. Nevertheless, such comparisons are still inadequate if the location of Wal-Mart stores is correlated with the dependent variable. For example,

if Wal-Mart tends to expand in regions where there is stronger economic growth, it would not be surprising to find that overall employment grew faster in places where Wal-Mart entered—but the difference would reflect selection bias rather than Wal-Mart’s influence.

Three recent papers have attempted to address this endogeneity in a nationally representative sample. Basker (2005a) examines Wal-Mart’s influence on retail employment in a sample of roughly half of U.S. counties between 1977–1998. She adjusts for the endogeneity of store locations by using planned Wal-Mart store openings as an instrumental variable for actual store openings. Her results indicate that a new Wal-Mart store initially creates about 100 retail jobs in an average county, but about half of the gains are lost over the next five years as existing firms exit, and employment in the wholesale sector falls by about 20 jobs. Thus, she finds that Wal-Mart has little effect on long-run employment.

Basker’s study is currently the only published paper on these effects that uses nationally representative data and attempts to correct for endogeneity, and as such it forms the basis for much of the subsequent discussion. That said, the more recent literature has identified three shortcomings of her results. The most important critique (made by both papers discussed below) is that her instrument may not be valid, since many of the same unobserved factors that influence Wal-Mart’s construction of actual stores may also influence Wal-Mart’s decision to plan a store in that location in the first place. Neumark, Zhang, and Ciccarella (2005) also note that there is considerable measurement error in Basker’s data on store opening dates (although they do acknowledge that her data was the best available at the time). Finally, there has also been some concern that the sample of counties used in Basker’s study excludes many of the smaller counties that have Wal-Mart stores, which would bias the estimates toward finding no effect if Wal-Mart’s effects are larger in smaller places.

The other two recent papers are by Dube, Eidlin, and Lester (2005) and Neumark, Zhang, and Ciccarella (2005). Both of these papers exploit the fact that Wal-Mart stores opened in a distinct geographical pattern, radiating outward from northwestern Arkansas in a wave-like fashion. This pattern is not a coincidence; Wal-Mart tends to expand in places near existing store locations in order to harness distributional economies (Holmes, 2001, 2005). That particular motivation for opening a store in a specific place has more to do with geography than economic conditions, so it is presumably uncorrelated with levels or trends in a location's employment or wages. Thus, these papers use time and counties' distance from Benton County, Arkansas, to form an instrumental variable for Wal-Mart store openings. Dube, Eidlin, and Lester focus on Wal-Mart's effects on workers' earnings, while Neumark, Zhang, and Ciccarella consider its effects on both employment and earnings.

Considering the methodological similarities between these two papers, it is perhaps surprising that they reach somewhat different conclusions. Neumark, Zhang, and Ciccarella find relatively large negative effects of Wal-Mart entry on local labor markets. According to their results, a new store is associated with a 2–4 percent decrease in retail employment, a 3.5 percent decrease in payroll per retail worker, and a 2.5 percent decrease in payroll per worker throughout the local economy, yet a 2 percent increase in total local employment. In contrast, Dube, Eidlin, and Lester find no statistically significant effects on wages in most retail subsectors or in aggregate local labor markets. However, their results associate Wal-Mart entry with a small decrease in wages (less than 1 percent) in urban general merchandising and grocery sectors, and a small increase in earnings for general merchandising workers outside of metropolitan areas.

While it is possible that the discrepancy between the papers is due to differences in

their data,² the most likely explanation is that the papers cover different periods: Neumark, Zhang, and Ciccarella examine data from 1977–1995, while Dube, Eidlin, and Lester study 1992–2000. Lending some support to this explanation, the former authors report that when their data set is expanded to 2002, Wal-Mart’s estimated effects on retail employment decrease substantially. As they note, one possible reason for this decrease is that the instrumentation strategy is more appropriate before the early-to-mid 1990s, since by then Wal-Mart had already expanded throughout the entire U.S. (This is also fairly apparent in Holmes’ (2005) video presentation.) Alternatively, it is also possible that Wal-Mart’s effects may have diminished over time due to increased competition in “big box” retailing³ or to changes in the types of locations in which Wal-Mart opens new stores, and the analysis below produces evidence in favor of both of those mechanisms.

3 Methodology

Insofar as the magnitude of Wal-Mart’s effects may have changed over the last several decades, their more recent magnitudes presumably hold greater policy relevance. However, as noted above, the strategy of using geographic instruments is no longer promising now that Wal-Mart has expanded throughout the nation. A new estimation strategy is thus required.

The previous literature has emphasized three main ways in which the location and timing of Wal-Mart store may be endogenous. First, the firm may prefer to build stores in counties

²Neumark, Zhang, and Ciccarella use information on employment and wages from the Census Bureau’s County Business Patterns data and obtained data on Wal-Mart store openings from the Wal-Mart corporation itself, whereas Dube, Eidlin, and Lester use the Quarterly Census of Employment and Wages and a data set on store openings compiled from published sources by Emek Basker.

³Although Wal-Mart continues to expand, Furman (2005) notes that its stock price, dividend, and sales (especially on high-margin goods) have not kept pace with its competitors (e.g., Target) since the late 1990s. See Jia (2005) for econometric evidence on retail competition.

that have certain characteristics that are correlated with one of our dependent variables—e.g., there is likely greater consumer demand in counties with higher average wages. Insofar as such characteristics are fixed over the sample period, this concern can be remedied with the standard difference-in-differences specification used in many papers. A second concern is that the trends in the dependent variables may differ between counties where Wal-Mart expands and counties where it does not. For example, Wal-Mart might reasonably prefer to build in counties where wages are growing more slowly. If so, a standard difference-in-differences model would underestimate Wal-Mart’s effect on wages because wages would have increased by a smaller amount in the Wal-Mart counties even if the store had not been built. Finally, there is a third concern that Wal-Mart’s effects may vary across location and the firm prefers to build where its effects are atypically large or small, such as if stores were more likely to open in counties where a new store would cause a smaller increase in wages.

All three of these potential problems can be overcome by using a random growth model. Similar models have been used in many other contexts (e.g., Heckman and Hotz, 1989; Jacobson, LaLonde, and Sullivan, 1993; Friedberg, 1998), and their merits are discussed thoroughly by Wooldridge (2002, pp. 315–322). In essence, the idea is to control for county-specific trends directly. Thus, we identify Wal-Mart’s effect on the dependent variable as a change that occurs when a Wal-Mart opens, adjusted for both changes that occur at the same time in non-Wal-Mart counties and for the county’s on-going trend. Put another way, if the dependent variable evolves in the same way before and after Wal-Mart opens (relative to its path in other counties), we will not consider that change as evidence of a Wal-Mart effect, but breaks in the trend will be attributed to Wal-Mart.

Specifically, if our dependent variable for location i at time t is denoted Y_{it} , and W_{it} is a

vector of variables related to Wal-Mart, we propose the following model:

$$Y_{it} = \alpha_0 + \alpha_t + \gamma_i(t) + \beta_i W_{it} + \epsilon_{it} \quad (1)$$

Equation (1) differs from the standard difference-in-differences framework in two ways. First, it includes a location-specific time trend $\gamma_i(t)$, which (as in previous work) we will specify as either linear or quadratic. Second, it allows Wal-Mart's effect β_i to vary across locations.

If we temporarily ignore the heterogeneity in Wal-Mart effects (i.e., if $\beta_i = \beta$ for all i), Equation (1) is equivalent to running a regression with a series of dummy variables for each period and location, as well as each location dummy interacted with time.⁴ With a large number of locations, it is computationally advantageous (and algebraically equivalent) to estimate the model in two stages, first regressing each variable on a county-specific time trend, then running regression (1) on the pooled set of residuals (Wooldridge, 2002). Thus, if we denote the detrended variables with tildes (e.g., \tilde{Y}), our estimator $\hat{\beta}$ is unbiased if:

$$E(\widetilde{W}_{it} \cdot \tilde{\epsilon}_{it}) = 0. \quad (2)$$

Condition (2) says that $\hat{\beta}$ would be biased only if counties tend to have more Wal-Mart stores in periods when (e.g.) wage levels there differ systematically from their long-run, county-specific trends for reasons unrelated to Wal-Mart's presence. Considering that stores typically remain open for many years at a time, it is somewhat difficult to imagine how the

⁴This statement implies that the random growth model is a trended analogue to a fixed effects model. In principle, one could instead use a trended analogue to a random effects model by specifying, e.g., that $\gamma_i(t) \equiv \gamma_{0i} + \gamma_{1i}t$, with $(\gamma_{0i}, \gamma_{1i}) \sim N(0, \Sigma)$. However, doing so would involve assuming that $(\gamma_{0i}, \gamma_{1i})$ is uncorrelated with W_{it} , which is contrary to the motivation for such a model.

estimator could be substantially biased. It would seem to require that, e.g., Wal-Mart times its store openings to coincide with localized recessions or expansions (that are not induced by the store opening). Such planning would be possible only if Wal-Mart had the ability to forecast local (not macroeconomic) economic shocks far enough in advance to influence the timing of store construction, and it would only make sense if it did not conflict with other important considerations like the geographic factors discussed earlier. We thus find it difficult to believe that such timing is an important feature of the data, and we note that previous studies have found no evidence that it occurs (Hicks and Wilburn, 2001).

Moreover, even if Wal-Mart’s effects are heterogeneous ($\beta_i \sim F(\beta)$) and correlated with the decision to build a store (as in (1)), Wooldridge (2005) has shown that $\widehat{\beta}$ is a consistent estimator of the population-wide average treatment effect $E[\beta_i]$ as long as

$$E \left[\beta_i | \widetilde{W}_{it} \right] = E [\beta_i] \text{ for all } t. \tag{3}$$

In contrast, an uncorrected instrumental variables estimator would not estimate the average treatment effect across the population, but rather the average treatment only among the subset of places associated with the instrument.⁵

Condition (3) indicates that $\widehat{\beta}$ is consistent even if β_i is correlated with place-specific levels or trends in the Wal-Mart variables—e.g., even if Wal-Mart tends to build more stores in places with abnormally large or small β_i . The condition would be violated only if there were a systematic relationship between location-specific Wal-Mart effects and the *detrended* Wal-Mart openings. It is difficult even to describe what that would mean in practical terms.

⁵Dube, Eidlin, and Lester (2005) note this problem and use a correction proposed by Garen (1984). None of the other papers that use IV estimation address this concern.

In particular, the magnitude of \widetilde{W}_{it} in a given period does not have a simple relationship with the timing of store openings, so it is not clear that condition (3) would be violated even if stores opened in order of β_i .⁶ Of course, many other considerations undoubtedly have greater influence over store openings anyway.

Before moving on, we should mention a few other methodological points. First, the standard errors reported in Section 5 are clustered on counties in order to adjust for heteroskedasticity and non-independence of observations from a given county, such as autocorrelation (Kloek, 1981; Wooldridge, 2002; Bertrand, Duflo, and Mullainathan, 2004). That said, it is not clear that this is the best level at which to apply the clustering. For example, observations may not be independent across counties within a state if there are state-specific macroeconomic shocks. We have also experimented with clustering at the state and regional levels, but we found no clear pattern in the results—sometimes standard errors were larger with clustering at the county level, other times at the state level, and still other times at the regional level. That said, the differences were generally small, so we are confident that any downward bias that may remain in the reported standard errors is mild.

Second, we use a logarithmic specification for each of our dependent variables. Most previous work has worked with levels rather than logs, but a series of preliminary Box-Cox regressions lent much stronger support to the latter.

Finally, we include counties' log population as an additional regressor in equation (1). Many papers in the literature use, e.g., employment/population as a dependent variable, but in a log-linear specification this is equivalent to restricting the coefficient on log population to

⁶For example, suppose there are two counties i and j and one Wal-Mart will open in each location, but at different times. It is necessarily true that $(1/T) \sum_t \widetilde{W}_{it} = (1/T) \sum_t \widetilde{W}_{jt} = 0$, but also that $\widetilde{W}_{it} > \widetilde{W}_{jt}$ for some t and $\widetilde{W}_{it} < \widetilde{W}_{jt}$ for some other t —and $[\widetilde{W}_{it} - \widetilde{W}_{jt}]$ is typically non-monotonic in t .

be 1. It was not clear to us that this restriction was appropriate, especially considering that we analyze deviations from county-specific trends. For instance, within-county population fluctuations might be due to changes in the birth rate, which could even be negatively correlated with fluctuations in employment if new mothers often exit the labor force. Our results bear out our concern, as the coefficient on log population is always much less than 1, and usually much closer to 0. That said, the estimated Wal-Mart effects are quite robust to different specifications of the population variable, typically changing by less than 5 percent even if population is dropped from the regression entirely.

4 Data

4.1 Wal-Mart Stores

To implement the methodology described above, we have combined data on Wal-Mart stores and economic outcomes. Like Neumark, Zhang, and Ciccarella (2005), we obtained the former information from Wal-Mart Stores, Inc., itself. In response to our data request, Wal-Mart provided the exact street address, the exact opening date, and the type of store for each of the 3,194 Discount Stores, Supercenters, and Neighborhood Markets operating in June 2005. We have no information on Sam's Clubs or stores that were closed before June 2005.⁷ To align the Wal-Mart data with the other data described below, the store locations have been matched to the appropriate counties and opening dates have been converted to a

⁷The fact that we are missing closed stores likely does not have a major effect on our results. Neumark, Zhang, and Ciccarella (2005) report that 54 stores had ever closed as of January 31, 2005, and their results were not sensitive to the inclusion of that information. Presumably many of the stores closed before our data series begins in 1990, so they would not have affected our analysis anyway, and at any rate the missing stores are a small fraction of the more than 3,000 stores that were ever open.

quarterly basis, with a store coded as open if it is in operation for at least half the quarter.

Unlike most previous papers, the analysis below will allow Wal-Mart's effects to vary across store types. Given the differences in the scale of operation and the products for sale, we think there are good reasons to expect different effects from the three types of stores. The discussion will focus on the results for Discount Stores and Supercenters. Our specifications will always include variables for Neighborhood Markets as well, but we de-emphasize those estimates due to the limited number and geographical coverage of those stores.

The analysis will cover the sixty quarters from the beginning of 1990 to the end of 2004. Before that time (including the first quarter of 1990), there were already 1,375 Wal-Mart stores in 1,019 counties. Over the next 59 quarters, Wal-Mart opened 1,736 new stores in 935 counties (at a nearly constant rate⁸), including 752 counties with no previous Wal-Mart stores. Nearly half (862) of the new stores were Supercenters, 798 others were Discount Stores, and the remaining 76 were Neighborhood Markets.

Although many people think of Wal-Mart as operating in rural areas, during this period it expanded primarily in large counties. Nearly 80 percent of its new stores (1,368) opened in counties ranked in the top quartile by population in the 2000 U.S. Census, including 404 stores that were the first in their counties and all but one of the Neighborhood Markets. By the end of 2004, just 34 of the 785 counties in that quartile did not have a Wal-Mart store (many of them near New York City, Washington, D.C., or Northern California). At the other extreme, only 8 new stores (all Supercenters) opened in 8 bottom quartile counties, and 89 more stores (35 Discount Stores and 54 Supercenters) were built in 89 counties in the next lowest population quartile. At the start of our sample, 19.7 percent (51.7 percent) of

⁸Over this period, a linear time trend fits the cumulative number of Wal-Mart stores with an R^2 of 0.987.

Wal-Mart stores were in counties ranked in the bottom half (respectively, three-fourths) by population, but only 5.6 percent (21.2 percent) of the stores that opened after 1990 were.⁹

4.2 County Labor Markets

Our data on economic outcomes come from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW).¹⁰ The QCEW reports quarterly data on the number of establishments, the number of employed workers, and the average weekly wage for narrowly defined industries in each county in the U.S. The data are gathered from paperwork employers file in conjunction with unemployment insurance, so they cover all workers who are subject to state and federal unemployment insurance laws—virtually every U.S. worker who is not self-employed.¹¹ The series is available since 1990 for industries coded according to the North American Industry Classification System (NAICS). Many industries are disaggregated to the six-digit level, although data is suppressed when it would compromise confidential information (e.g., when there are fewer than five establishments in the industry in a particular county). Even when information is suppressed at a fine level of aggregation, it is included in counts reported at a higher level of aggregation. In all, the data since 1990 include about 80 million quarterly observations on county-level industries.

The analysis below uses the observations on aggregate county labor markets, counties' aggregate retail sectors, all twelve of the three-digit subsectors that comprise the retail sector,

⁹Holmes (2001) hypothesizes that the trend from more rural locations to more urban locations may reflect larger profit opportunities in the former environment.

¹⁰This is the same data set used by Dube, Eidlin, and Lester (2005), although we use observations from almost twice as many years. The data can be downloaded from <ftp://ftp.bls.gov/pub/special.requests/cew/>.

¹¹The BLS website claims that “this includes 99.7 percent of all wage and salary civilian employment.” Besides self-employed workers, the largest excluded group appears to be domestic workers. We were initially somewhat concerned that the exclusion of the self-employed might bias the results, but Sobel and Dean (2006) find that Wal-Mart's effects on self-employment are small and, if anything, positive.

and one more narrowly defined industry in which Wal-Mart is thought to have relatively large effects (Supermarkets and Grocery Stores). All three variables in the QCEW will be used as dependent variables: employment, average wages, and establishments. Many previous papers have examined Wal-Mart effects on wages and employment (especially on counties' aggregate retail sectors), but there has been less emphasis on establishments. We consider the effects on establishments in order to assess the hypothesis that Wal-Mart's entry frequently tends to reduce competition in local markets. To a lesser extent, it is also interesting to consider the extent to which any observed changes in employment can be attributed to changes in the number of establishments or to changes in the size of those employers.

Table 1 reports summary statistics for the three dependent variables and for county populations, information on which comes from the Census Bureau's annual estimates. The population quartiles listed in the table are based on the 2000 Census, so that a given county is always listed in the same population quartile.¹² The average wage data include most wage-like compensation (e.g., tips, bonuses, stock options, employer contributions to 401(k) plans), but not other fringe benefits. The most notable exclusion is health insurance, which unfortunately means that we cannot investigate whether the firm affects insurance coverage rates.¹³ Among other things, the table shows that retail workers account for about 1/8 of all workers, but their compensation is substantially less than average; we cannot determine the extent to which the difference is due to differences in hours worked or differences in hourly

¹²The third population quartile contains 12 observations for Broomfield County, Colorado, which did not form until the end of 2001. The land forming Broomfield County came from four other counties, so all of our regressions include four dummy variables, one for each those counties in the quarters after Broomfield's secession. Also, the formerly-independent city of Clifton Forge, Virginia, was absorbed into Alleghany County in 2001, so we have combined the data from those locations into a single area throughout the sample period.

¹³For example, Dube and Jacobs (2004) claim that many of Wal-Mart's workers rely on publicly funded health insurance. On the other hand, Furman (2005) argues that Wal-Mart's benefits are similar to, and perhaps more generous than, other retail employers'.

compensation. There are also large differences across three-digit retail subsectors.

[TABLE 1 ABOUT HERE]

As one might expect from the confidentiality restrictions, Table 1 shows that more data are available at higher levels of aggregation. If figures were reported for every county in every quarter, there would be 188,412 observations. For county aggregates, only 117 of those potential observations are missing, 60 of which are for a single county that never appears in the data.¹⁴ The data are also fairly complete (91%) for the retail aggregates. All of the missing observations on county aggregates, and 98 percent of those on retail aggregates, come from counties in the bottom population quartile. Most importantly, no Wal-Mart stores have ever been located in any of the counties with missing data at these levels.

In contrast, many observations are missing for the retail subsectors. The data are still fairly complete in counties where Wal-Mart built new stores during the sample period, with over 85 percent of the possible observations available in eight three-digit subsectors (all but Furniture and Home Furnishing Stores; Electronics and Appliance Stores; Sporting Goods, Hobby, Book, and Music Stores; and Nonstore Retailers). Likewise, only a small fraction is missing for the counties in the top population quartile—fewer than five percent of the possible observations for ten of the twelve subsectors. At the other extreme, over half (and in some cases over 90 percent) of the possible observations are missing for every subsector in the bottom population quartile, and this accounts more than 3/4 of the missing data for the

¹⁴The missing county can only be described as an extreme outlier with an interesting but sad history. From 1865 to 1969, Kalawao County, Hawaii, was a colony for people affected by Hansen's Disease (leprosy). No new residents have been permitted to move there since, so the population (estimated at 111 in 2005; only Loving County, TX, is smaller) consists of surviving patients (all are cured and free to leave, but are not required to) and no more than 100 visitors per day. At just 13 square miles, it has the smallest area among all U.S. counties, and it is physically separated from the rest of the island of Moloka'i by the world's highest sea cliffs. (See http://en.wikipedia.org/wiki/Kalaupapa%2C_Hawaii and links therein.)

Food and Beverage, Motor Vehicles, and Gasoline Station subsectors. It is unfortunate that many observations are missing for the remaining subsectors in the lower two quartiles because Wal-Mart's effects are often thought to be largest there. That said, similar data availability issues have plagued every previous study of Wal-Mart's effects on retail subsectors, and it is at least somewhat reassuring that Wal-Mart has recently built few stores in such counties anyway. Indeed, during the sample period, only eight new Wal-Mart stores opened in the bottom population quartile counties.

5 Results

5.1 Estimates with and without county-specific trends

Table 2 reports the estimated Wal-Mart effects from a series of regressions based on Equation (1), with three different specifications of the county-specific trends and at two levels of aggregation: county-wide labor markets, and county retail sectors. The dependent variables are in logs, and the estimated coefficients have been multiplied by 100 to improve readability. Thus, the first number in the table (-0.06) means that estimates from a fixed effects specification without county-specific trends associate a new Discount Store with a (statistically insignificant) 0.06 percent decrease in county-wide employment.

[TABLE 2 ABOUT HERE]

The first thing to note is that the different specifications of county-specific effects lead to meaningfully different estimates. The results from random growth models, with linear

or quadratic county-specific trends, often differ substantially from estimates from fixed effects specifications. This implies that Wal-Mart store openings are correlated with on-going growth rates for employment, wages, and establishments—and consequently that estimates that do not account for this endogeneity can lead to quite misleading results.

This is most striking in the case of retail employment. If we just control for county fixed effects, Discount Stores and Supercenters appear to cause large statistically significant decreases in retail employment, 5.4 and 3.5 percent, respectively. However, when county-specific linear trends are added, the conclusion is reversed: both types of stores are associated with statistically significant *increases* in retail employment (2.2 and 4.0 percent increases, respectively). With quadratic county-specific trends (i.e., allowing for the trends to be accelerating or decelerating at a constant rate), the estimates are no longer statistically significant for Discount Stores, but still large, positive, and statistically significant for Supercenters (3.1 percent). Put another way, Wal-Mart’s estimated effects on retail employment are 6-7.5 percentage points more positive when we control for on-going county-specific trends.

A weighted average of the point estimates for the three types of stores (from the quadratic specification) implies that a typical Wal-Mart store raises retail employment by a bit more than 2 percent, which amounts to about 160 jobs in a typical county with a Wal-Mart store. For comparison, we note that these estimates are modestly larger than Basker’s (2005a), and several other estimates in the literature are negative. Since Wal-Mart stores generally employ more than 160 workers, it appears that Wal-Mart displaces some jobs at other retailers, although we address that issue more fully in Section 5.4. There is also some mild evidence that Wal-Mart’s entry promotes jobs outside of counties’ retail sectors. The estimates from the county aggregates (which are not statistically significant) imply that Wal-Mart creates

about 75 total jobs in an average county, and a separate regression (not shown) with log non-retail employment as the dependent variable yielded small positive estimated effects for all three types of stores, with the estimate for Discount Stores being statistically significant. Yet whether the effects outside of retail are positive, negative, or zero, all of these results indicate that the employment effects are at least highly concentrated in the retail sector.

The estimates in the second panel of Table 2 address Wal-Mart's effects on weekly wages (payroll per worker). In contrast to the results for employment or establishments, it appears that Wal-Mart tends to enter counties where retail wages are growing slightly faster than average, as the inclusion of county-specific trends makes the estimated weekly wage effects more negative. Still, there is no indication that Discount Stores affect weekly wages, and Supercenters' estimated effects are small: 0.5 percent on weekly wages in retail and 0.3 percent on weekly wages countywide, or around \$1.50 to \$2 per week. If the average hours per week did not change, this would imply a change in wages of perhaps five cents per hour. That said, at least part of the effect is likely due to the greater prevalence of part-time work in retail employment, and insofar as Supercenters raise employment, another possibility is that the new workers command lower wages due to, e.g., inexperience or reduced labor force attachment. (For instance, Wal-Mart is commonly said to be a leading employer of retirees.) At any rate, the evidence does not support the claim that Wal-Mart substantially lowers wages through either monopsony power or anti-union activities. Moreover, to echo a point made by Furman (2005), it should also be noted that these wage effects do not take into account Wal-Mart's substantial effects on local price levels (Basker, 2005b; Hausman and Leibtag, 2005). Indeed, in light of the estimated price effects, it is likely that a \$2/week decrease in nominal compensation actually amounts to a modest raise in real terms.

The results on establishments are more interesting because there is a large discrepancy between the estimates from the fixed effects and random growth specifications. The fixed effects estimates appear to indicate that Wal-Mart has a devastating effect on local retail sectors, with Discount Stores and Supercenters both reducing the number of establishments by 5–8 percent. This is undoubtedly one important reason why many people believe that Wal-Mart destroys local economies. However, these results disappear when county-specific trends are included. Like the evidence on employment, this means that Wal-Mart tends to enter counties where the retail sector was becoming stagnant even before Wal-Mart arrived. This is perhaps not so surprising, since such places may be more willing to accommodate Wal-Mart’s entry through subsidies, land use regulations, and similar incentives.¹⁵

Alternatively, Wal-Mart may simply enter counties with stagnant retail sectors because it is a promising business strategy to fill an unmet consumer need. This explanation gains additional support from the countywide results. Earlier we saw that Wal-Mart’s estimated effect on countywide employment was smaller when county-specific trends are included, and the result on establishments show the same pattern. (The random growth estimates still associate Supercenters with an increase of 5–10 establishments in a typical county, some of which may be due to the separate businesses that often operate inside of Supercenters, such as a McDonald’s or a barber shop.) Thus, the results on both employment and establishments suggest that Wal-Mart tends to enter counties that are growing faster than average overall, but where retail sectors are growing slower than average.

It is also worth noting that the estimated effects are net changes, not gross changes. Even if Wal-Mart’s net effect is small, it may displace many establishments and promote

¹⁵Jia (2005, Table 12(B)) presents some evidence for this hypothesis.

others. For example, we have heard conjectures that firms offering relatively homogenous goods may falter when Wal-Mart enters, but their departure may open a niche for another, more specialized retailer. We discuss this possibility a bit more in Section 5.4.

The last panel of Table 2 takes an initial step in that direction by asking how the typical size of establishments changes when a Wal-Mart store opens. The regressions reported in that panel again use employment as the dependent variable, but the specification adds the number of establishments as an additional regressor. Consistent with the results above, the estimates from the retail sector suggest that Supercenters, but not Discount Stores, increase the average size of retail outlets: employment increases about four percent more than one would expect given the change in establishments. Of course, some portion of this effect is likely due to the size of the Supercenter itself, as Section 5.4 will show. As an aside, it is also notable that the coefficient on log establishments is less than 1 in every specification. This means that the marginal establishments that are entering and exiting have fewer employees than the average establishment, illustrating the stabilizing effect of larger establishments and the greater dynamism of small firms.

5.2 Dynamic effects

The models estimated above implicitly assumed that Wal-Mart stores have a constant effect over time, but it is also possible that the effects are either temporary or growing over time. For example, if Wal-Mart causes wages to fall, that may encourage other firms to enter the market, which could cause wages to revert gradually toward the original level. Alternatively, potential entrants may be discouraged by the prospect of competing with a large retailer, which could increase Wal-Mart's effects over time.

To investigate, we have run another series of regressions that allow a Wal-Mart store's effects to vary over its lifetime. Table 3 presents the results for the four cases in which Wal-Mart had a statistically significant effect in Table 2. The specification also includes three years of leads as a mild specification test; Wal-Mart might have some effects shortly before it opens due to construction or store preparation,¹⁶ but we would interpret statistically significant effects more than a year prior to the store opening as evidence of mis-specification. We do not find any such effects in any of the cases.

For retail employment and wages, the results in Table 3 indicate that Supercenters' effects dissipate after only a few years. About half of the initial employment effect (about 190 jobs for a typical county) vanishes after five to seven years. Wages adjust even more quickly and completely, consistent with a competitive retail labor market.

[TABLE 3 ABOUT HERE]

In contrast, the effects appear to grow for the county aggregates. Whereas the wage effects for the retail sector alone were no longer statistically significant after about three years, Wal-Mart's effects on county-wide wages appear to grow gradually for about three years before reaching their long-run level, with the combined dynamics possibly reflecting some labor supply adjustment. The estimated effects of Supercenters on county-wide establishments do not reach a plateau, but rather grow throughout the store's first ten years, suggesting that Wal-Mart may mildly promote economic development. That said, it probably wise to take these dynamic effects with a large grain of salt, as estimates from dynamic specifications with trends are often less precise or robust than one might hope.

¹⁶An effect immediately prior to a store opening may also be due to the fact that it was necessary to round the opening dates to the nearest quarter.

5.3 Differences by county size

The results above did not distinguish between Wal-Mart stores located in small and large communities. Nevertheless, as noted earlier, Wal-Mart's effects may be larger in less densely populated areas because there is less competition from other retailers in such places. Since almost 80 percent of new Wal-Mart stores are located in counties with relatively large populations,¹⁷ the regressions reported in Table 2 could be heavily weighted toward Wal-Mart's effects in such places, and thus they may mask its effects in smaller communities.

Table 4 presents similar regressions for each population quartile separately. It should be noted up front that the estimates for the lowest quartile are based on the experience of just 8 new Wal-Mart stores, and as such those estimates should be interpreted cautiously.

[TABLE 4 ABOUT HERE]

As expected, the results for the largest counties are quite similar to the corresponding estimates for the complete sample in Table 2, with two exceptions. In Table 2, Supercenters were associated with a 3.1 percent increase in retail employment and possibly a small decrease in retail establishments (0.5 percent, with marginal statistical significance), but when the sample is restricted to the top quartile, Supercenters have no statistically significant effect on retail employment and a small positive effect on retail establishments. In all, the largest estimated effects of either Discount Stores or Supercenters in top population quartile counties is just 0.5 percent. Most of the estimates are not statistically significant, and the effects for employment (where even a small percentage effect could affect a large number of people) are smaller and statistically insignificant.

¹⁷Holmes (2001) speculates that Wal-Mart first expanded in rural areas because supercenters generate larger distributional economies in such places.

The discrepancy between Table 2 and the last column of Table 4 in regard to retail employment is telling. As the remaining columns show, the difference is explained by the fact that Supercenters have much larger (positive) effects in smaller communities. Discount Stores are also associated with a statistically significant increase in employment in the third population quartile. The estimates for county-wide employment also show that Supercenters, and in one case Discount Stores, have statistically significant effects on county-wide employment in the middle two population quartiles. Thus, it seems that Wal-Mart does indeed have considerably different effects in communities of different sizes.

Having said that, two clarifications should be noted. First, the evidence points to different effects in percentage terms only. In absolute terms, the point estimates imply fairly similar numbers of retail jobs in all four quartiles, about 50–140 in a typical county. This pattern would seem to suggest that a Supercenter alters the economic landscape of smaller counties more dramatically, but the absolute impact is similar, at least in the number of jobs created. Another implication is that a given level of public subsidies to attract a Wal-Mart store would yield similar returns in terms of employment in both small and large counties. Likewise, the results indicate that Supercenters cause a larger percentage change in retail employment than county-wide employment, but that actually amounts to a larger absolute increase in county-wide employment (except for the top population quartile), suggesting once again that Supercenters may have some small positive spillovers outside the retail sector.

Second, some may be surprised that the point estimates associate Supercenters with increasing, rather than decreasing, employment in all four quartiles—and especially so in the middle two. As before, the misperception may arise from the endogeneity of store locations. In most cases, the estimated effects on retail employment are substantially smaller when a

fixed-effects specification is used. For example, the fixed effects estimates (not shown in the table) of Supercenter's impact on retail employment are -1.1 percent and -0.6 percent for the bottom two population quartiles, although neither is statistically significant. The fact that the estimates are so much larger when we control for county-specific trends provides additional evidence that Supercenters are often built in counties with slow growth in the retail sector. The explanation receives additional support from a comparison of fixed effects and random growth estimates on the number of retail establishments: in every case, the estimate is larger when we control for county-specific trends.

The estimates for weekly wages are a bit more puzzling. The most consistent evidence that Wal-Mart reduces either countywide or retail wages comes from the regressions on the third population quartile. Average wages are somewhat different between the third and top quartiles, but the gap is not nearly as large as the difference in estimates, so the effect is also larger in absolute terms. Having said that, the estimates for the second population quartile are (with one exception) smaller and not statistically significant, so the broader pattern is not consistent with either an explanation involving monopsony power or one involving the composition of the workforce (at least if we accept the evidence that a given store type has larger employment effects in smaller counties). Perhaps it is unwise to make too much of the difference anyway. After all, the difference across quartiles, and indeed the effect itself, amounts to just a few dollars per week for the average worker, which may well be explained by unobserved factors like differences in average hours worked.

5.4 Effects on individual retail sub-sectors

As previous work has invariably noted, some retailers compete more closely with Wal-

Mart than others. This likely means that the estimates presented above mask considerably variability across retail subsectors. Accordingly, Table 5 presents another series of regressions that disaggregates the data by the 12 three-digit subsectors that comprise the retail sector, as well as one particularly notable sub-subsector. As discussed in Section 4.2, the data are less somewhat less complete at this level of disaggregation, but we still have the great majority of observations for the counties in which Wal-Mart built stores during this period.

[TABLE 5 ABOUT HERE]

Two features of Table 5 are striking. First, a large majority of the estimates are relatively small and statistically insignificant, including every estimate for 5 of the 12 subsectors (at the 5 percent level of significance). This is not surprising; it was the very premise of the exercise, we would have been disturbed by results showing that Wal-Mart has substantial effects on, e.g., automobile dealers or non-store retailers. That said, the fact that only a few estimates are statistically significant strengthens the earlier conclusion that Wal-Mart’s effects are concentrated in a narrow set of industries.

The table’s other striking feature is the magnitude of the effects in the general merchandising sector: Supercenters are associated with a 23.5 percent increase in general merchandising employment, and Discount Stores have a 9.2 percent effect. Obviously, these “effects” reflect the fact that Wal-Mart belongs to this subsector. For the typical county in which each type of store is built over this period, the estimates imply that Discount Stores increase general merchandising employment by 293 ± 81 jobs and establishments by 1.0 ± 0.5 , while Supercenters are associated with 478 ± 70 jobs and 1.5 ± 0.3 establishments—both of which

are approximately what one would expect from the Wal-Mart store itself, even a bit more.¹⁸ This might seem trivial, but it is significant in that it implies that Wal-Mart's entry does not typically force out other general merchandisers.

There are some negative effects on employment in other retail subsectors, however. According to the point estimates, in the average county in which such stores are built and where data are available, a Discount Store reduces employment by 31 jobs in the Building Materials/Garden Equipment subsector, by 24 in Food and Beverage Stores, and by 10-15 in the Electronics, Clothing, and Miscellaneous Store Retailers subsectors. Several of these estimates are not statistically significant, but the estimates are consistently negative.

For Supercenters, the effects outside of General Merchandising are heavily concentrated in Food and Beverage Stores, which is not surprising considering that Supercenters sell groceries. The estimates indicate that Supercenters reduce employment by a statistically significant 2.8 percent in that subsector, and the reduction grows to 3.8 percent if we restrict attention to the Supermarket sub-subsector (the last panel of Table 5). The latter estimate is based on a smaller sample, but if we repeat the Food and Beverage regression using only the observations for which Supermarket information is available, the point estimate is actually slightly smaller, 2.7 percent. For the average county in that common sample, this amounts to 72 Food and Beverage jobs and 93 Supermarket jobs—implying a gain of about 20 jobs in non-supermarket Food and Beverage Stores (bakeries, fish markets, liquor stores, etc.). This conclusion is bolstered by the results for establishments, where the point estimates imply an increase of 0.27 Supermarket establishments¹⁹ and 1.27 total Food and Beverage

¹⁸Lest there be any concern, the estimates are similar if we use linear county-specific trends.

¹⁹This estimate is positive but not statistically significant. In any event, it is not consistent with the charge (noted in Section 2) that Wal-Mart has caused many supermarkets to fail.

establishments in a typical county in that sample.

Although the effects are often weak, a similar pattern emerges in nearly all of the retail subsectors. There are only three cases in Table 5 where a particular type of Wal-Mart store does not have a more positive estimated effect on establishments than on employment. Few of the estimates are either large or statistically significant, but it is striking that the pattern is so pervasive. This provides some mild support to the hypothesis that competition from Wal-Mart reduces the average size of other retail establishments; the opposite result from Table 2 seems to have been driven by the Wal-Mart store itself. What this means for consumers is less clear. One possibility is that some retailers reduce customer service in order to compete more aggressively with Wal-Mart's low prices, but alternatively it could be that they are becoming more specialized—for example, ceding the market for mass-produced goods to Wal-Mart and concentrating more on a smaller number of customized or high-end products. We have heard anecdotal evidence for both possibilities, and it would be interesting to know whether either can be supported by a more extensive analysis.

Finally, Table 5 shows that Wal-Mart does not have strong effects on average weekly wages in most of these subsectors. Only three of the estimates are statistically significant, and all of them are just barely so. The most interesting result is for the general merchandising sector itself, where Supercenters (but Discount Stores) are associated with a 1 percent decrease in wages. This seems to be a real effect, and it supports the conclusion of Dube, Eidlin, and Lester (2005). Even so, it is fairly small, and once again we would have no way of determining whether arises because Supercenters pay lower wages than other general merchandisers, because they hire more part-time or less qualified workers, or because the added competition puts downward pressure on wages at other firms. At any rate, more than anything else we

are struck by how little wages change when this large employer enters the market.

5.5 Does Wal-Mart differ from other general merchandisers?

Whatever Wal-Mart's effects, it is not clear that a county would want to encourage or discourage them if a similar firm would enter in Wal-Mart's absence. It is thus desirable to know how Wal-Mart's effects differ from those of other General Merchandising firms. This group includes both Department Stores (including discounters) and Warehouse Clubs/Supercenters, so it represents most establishments that are at least superficially comparable to Wal-Mart.

Table 6 presents evidence on General Merchandising firms' effects on both countywide retail employment and retail employment excluding the general merchandising subsector. The estimates in the first column indicate that a ten percent increase in general merchandising establishments (i.e., adding about 2 establishments in a typical county for which data are available) leads to a 0.15 percent reduction in retail employment outside of the general merchandising subsector, but no statistically significant change in overall retail employment.

[TABLE 6 ABOUT HERE]

These estimates are smaller than the estimated Wal-Mart effects from Table 2. To allow a more direct comparison, the regressions in the second column of Table 6 add information on Wal-Mart stores. In both panels of the table, the estimated effects of general merchandise establishments are only slightly changed by this inclusion, and there are no statistically significant differences between Discount Stores and Neighborhood Markets and other general merchandisers. Supercenters are significantly different from other general merchandisers, however—as before, they are associated with a larger reduction in retail employment outside

of general merchandising, but positive effects on overall retail employment.²⁰

A related question is whether Wal-Mart's effects are muted when there is more competition in general merchandising. To test this, the regression in the last column of Table 6 adds interactions between the Wal-Mart variables and log general merchandising establishments. In every case, the estimated coefficients on the interactions have the opposite sign from the estimates on the corresponding Wal-Mart variables alone, and the interactions are significant whenever the uninteracted Wal-Mart variables are. Thus, the results suggest that the expansion of general merchandising over this period has indeed reduced Wal-Mart's effects.

A back of the envelope calculation suggests that the magnitudes of these reductions are moderate relative to the average Wal-Mart effect. Nationwide, the number of general merchandising establishments increased 43 percent between 1990 and 2004 (from 32,905 to 47,086), which corresponds to a 0.36 increase in log establishments. For retail employment outside of general merchandising, the estimated interaction effect for Supercenters is 0.46, so the increase in establishments reduces the magnitude of the Supercenter effect by 0.17 percentage points, or about 1/7 of its mean (see note 20). Similarly, the results in top panel imply that the Supercenter effect fell by about 1/5 of its mean level. These are admittedly only rough calculations and that do not adjust for the considerable variation across counties, but even so, they suggest that increased competition has been a somewhat important factor in reducing Wal-Mart's impact on local economies over recent decades.

²⁰Note that adding a Supercenter also changes the number of general merchandisers. However, a typical county in this sample (which is larger than an average county overall) has about 25 general merchandisers, so the Supercenter's total effect differs only slightly from the coefficient on the Supercenters variable. For example, in the second column of panel B, a Supercenter changes retail employment by about $(-1.40) \times (1/25) + (-1.12) = -1.18$ percent.

6 Conclusion

While many of the results in this paper are relatively favorable to Wal-Mart, for the sake of balance it should be noted that the findings do not rebut every complaint levied against Wal-Mart. For one thing, the estimates indicate that employment at other retailers falls slightly when Wal-Mart enters, especially outside the general merchandising sector. Supercenters' effect was largest on employment at supermarkets, while Discount Stores' effects on other industries were smaller but more pervasive. Other evidence suggested that Wal-Mart's presence reduced average weekly wages slightly, especially in the general merchandising sub-sector itself. And of course the paper has not investigated other potentially important issues, including Wal-Mart's effects on health insurance rates—or for that matter, on issues like prices or productivity where Wal-Mart has often appeared quite beneficial.

Yet in spite of these caveats, and with only a few exceptions, the results consistently portray Wal-Mart as a fairly benign force in local labor markets. There is little here to recommend either regulations to discourage Wal-Mart's entry into a local market or subsidies to promote it. The great majority of estimated effects on other industries are just a fraction of one percent, especially in the densely populated areas where Wal-Mart is expanding most rapidly. There is also scant evidence of large effects on wages or the number of establishments. To be sure, some effects are statistically significant, and we do not deny that they occur. Rather, our point is that estimates of this magnitude do not seem to justify the rancor of the debate. Perhaps it can be justified on other grounds, but if so it would seem wise to redirect the discussion in that direction.

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Table 1: Summary Statistics

	No. of obs.	Average employment		Real avg. weekly wage (2004=100)		Number of Establishments		Population	
	Count	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<u>All establishments</u>									
All Counties	188,295	37,518	136,800	520.47	121.60	2,250	8,159	86,228	282,767
By Population Quartile:									
Lowest	46,983	1,825	1,305	456.23	113.66	180	99	6,040	2,892
Second	47,100	5,203	2,510	481.67	82.89	413	190	16,697	3,830
Third	47,112	13,040	5,301	523.00	91.25	885	350	37,726	10,036
Highest	47,100	129,922	251,649	620.82	123.81	7,517	15,124	284,260	516,442
<u>Retail establishments only</u>									
All counties	171,120	4,601	14,003	359.40	80.21	339	971	94,477	295,356
By Population Quartile:									
Lowest	30,239	146	127	306.35	92.86	19	14	7,261	2,395
Second	46,669	484	407	334.31	70.50	53	34	16,744	3,811
Third	47,112	1,510	797	361.09	52.20	142	64	37,726	10,036
Highest	47,100	14,631	23,914	416.62	66.94	1,024	1,662	284,260	516,442
<u>3-digit retail subsectors</u>									
Motor Vehicle and Parts Dealers	147,855	685	1,896	574.51	138.37	46	98	107,849	315,660
Furniture and Home Furnishing Stores	84,382	328	799	452.23	125.75	38	80	172,793	405,644
Electronics and Appliance Stores	68,053	397	1,092	503.23	200.84	41	92	204,684	445,703
Building Material and Garden Equipment & Supplies Dealers	137,029	440	1,062	452.54	110.80	34	64	115,125	326,777
Food and Beverage Stores	149,252	1,035	2,935	303.08	84.28	51	162	106,784	314,365
Health and Personal Care Stores	103,530	468	1,311	444.75	114.52	40	100	146,650	370,446
Gasoline Stations	160,323	326	615	273.86	63.76	40	75	100,233	304,268
Clothing and Clothing Accessories Stores	95,420	777	2,359	274.50	73.15	82	224	156,668	384,191
Sporting Goods, Hobby, Book and Music Stores	70,960	492	1,161	281.74	89.45	51	103	199,456	437,305
General Merchandise Stores	94,769	1,408	2,713	300.53	63.26	20	31	156,329	385,730
Miscellaneous Store Retailers	119,404	424	1,204	318.00	111.62	63	157	129,902	347,623
Nonstore Retailers	64,679	349	807	531.08	177.49	24	40	211,674	455,990
<u>A closely related narrowly-defined subsector</u>									
Supermarkets and Other Grocery Stores	68,433	1,605	3,512	354.61	162.17	40	103	189,835	447,458

Notes: Data on establishments, employment, and wages come from the Quarterly Census of Employment and Wages (QCEW). County population estimates are from the U.S. Census Bureau. Population quartiles are defined by the 2000 Census.

Table 2: Effects of Wal-Mart Entry on County and Retail Aggregates

Level:	County Aggregates									County Retail Sectors								
County-specific factors:	Fixed effects only			Linear trends			Quadratic trends			Fixed effects only			Linear trends			Quadratic trends		
Type of store	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P
Effect on Log Employment																		
Discount Stores	-0.06	0.16	0.68	-0.25	0.21	0.24	0.16	0.14	0.27	-5.35	0.50	0.00	2.22	0.83	0.01	0.79	0.76	0.30
Supercenters	0.70	0.24	0.00	0.18	0.19	0.36	0.24	0.15	0.11	-3.48	0.66	0.00	4.03	0.85	0.00	3.13	0.86	0.00
Neighborhood Markets	-0.43	0.26	0.10	-0.72	0.28	0.01	-1.19	0.31	0.00	-1.33	0.76	0.08	-5.36	0.70	0.00	0.14	0.67	0.84
Effect on Log Average Weekly Wages																		
Discount Stores	0.06	0.19	0.76	-0.09	0.12	0.46	-0.02	0.12	0.90	-0.19	0.16	0.22	0.00	0.12	0.98	-0.06	0.14	0.69
Supercenters	-0.24	0.19	0.20	-0.30	0.12	0.01	-0.32	0.13	0.01	0.21	0.17	0.21	-0.73	0.22	0.00	-0.52	0.24	0.03
Neighborhood Markets	0.31	0.16	0.05	-0.13	0.17	0.44	-0.48	0.19	0.01	-0.70	0.15	0.00	-0.59	0.24	0.02	-0.37	0.21	0.08
Effect on Log Establishments																		
Discount Stores	0.97	0.16	0.00	0.03	0.15	0.82	0.16	0.18	0.38	-4.65	0.56	0.00	3.01	0.51	0.00	-0.05	0.23	0.82
Supercenters	1.53	0.31	0.00	0.28	0.14	0.05	0.52	0.12	0.00	-7.74	0.77	0.00	-0.10	0.48	0.83	-0.49	0.28	0.07
Neighborhood Markets	-0.83	0.31	0.01	-0.98	0.22	0.00	0.29	0.21	0.17	-0.16	1.40	0.91	-4.35	0.64	0.00	0.86	0.56	0.13
Effect on Log Employment, Conditional on Log Establishments																		
Discount Stores	-0.51	0.15	0.00	-0.26	0.20	0.20	0.11	0.16	0.52	-1.96	0.35	0.00	0.22	0.86	0.79	0.83	0.76	0.28
Supercenters	0.00	0.23	0.99	0.07	0.18	0.70	0.06	0.15	0.67	2.17	0.58	0.00	4.10	0.77	0.00	3.51	0.85	0.00
Neighborhood Markets	-0.04	0.17	0.80	-0.34	0.25	0.17	-1.29	0.33	0.00	-1.21	0.60	0.04	-2.47	0.64	0.00	-0.52	0.63	0.41
Log establishments	46.09	2.08	0.00	38.61	2.19	0.00	33.95	2.46	0.00	72.92	1.28	0.00	66.45	1.44	0.00	76.78	1.45	0.00

Notes: In addition to the variables and trends listed in the table, all regressions include counties' log population and common time effects (quarter dummies).

Table 3: Dynamic Effects of Wal-Mart Entry

Dependent Variable:		County Aggregates						County Retail Sectors					
		Log Wages			Log Establishments			Log Employment			Log Wages		
Store type	Year after store opens	Est. (x100)	SE (x100)	P	Est. (x100)	SE (x100)	P	Est. (x100)	SE (x100)	P	Est. (x100)	SE (x100)	P
Discount Stores	-3	0.04	0.14	0.76	-0.02	0.20	0.93	0.18	0.95	0.85	0.14	0.13	0.29
	-2	-0.06	0.12	0.60	0.14	0.25	0.57	1.03	1.08	0.34	-0.05	0.20	0.79
	-1	-0.32	0.15	0.04	0.29	0.29	0.32	0.25	1.30	0.85	-0.13	0.19	0.49
	0	-0.10	0.17	0.54	0.35	0.30	0.23	1.96	1.49	0.19	-0.20	0.20	0.31
	1	-0.30	0.18	0.10	0.26	0.31	0.40	2.08	1.56	0.18	-0.09	0.18	0.60
	2	-0.25	0.24	0.28	0.21	0.35	0.55	2.56	1.70	0.13	0.08	0.21	0.70
	3	-0.22	0.22	0.32	0.17	0.38	0.65	2.17	1.86	0.24	0.43	0.26	0.10
	4	-0.15	0.24	0.53	0.22	0.41	0.60	2.46	1.97	0.21	0.40	0.25	0.11
	5	-0.08	0.24	0.75	0.26	0.43	0.55	2.59	2.10	0.22	0.34	0.22	0.12
	6	-0.09	0.28	0.74	0.26	0.44	0.56	2.23	2.18	0.31	0.14	0.21	0.50
7	-0.02	0.31	0.95	0.26	0.47	0.58	2.48	2.28	0.28	0.27	0.27	0.32	
8	-0.03	0.30	0.91	0.41	0.51	0.42	2.15	2.38	0.37	0.31	0.23	0.19	
9+	0.08	0.34	0.81	0.43	0.55	0.43	0.72	2.70	0.79	0.44	0.25	0.08	
Supercenters	-3	0.00	0.06	0.99	-0.13	0.07	0.06	-0.64	0.46	0.17	-0.03	0.09	0.71
	-2	-0.07	0.07	0.32	-0.08	0.07	0.26	-0.49	0.53	0.35	-0.15	0.11	0.17
	-1	-0.23	0.13	0.07	0.03	0.11	0.80	0.39	0.60	0.51	-0.39	0.15	0.01
	0	-0.39	0.18	0.03	0.26	0.17	0.13	4.16	0.99	0.00	-0.98	0.22	0.00
	1	-0.47	0.19	0.02	0.40	0.20	0.05	3.17	1.17	0.01	-0.73	0.31	0.02
	2	-0.60	0.24	0.01	0.63	0.24	0.01	3.43	1.30	0.01	-0.60	0.34	0.08
	3	-0.80	0.25	0.00	0.75	0.27	0.01	3.65	1.45	0.01	-0.55	0.35	0.12
	4	-0.85	0.26	0.00	0.91	0.31	0.00	3.37	1.59	0.03	-0.27	0.40	0.50
	5	-0.93	0.31	0.00	1.07	0.34	0.00	2.76	1.73	0.11	-0.04	0.39	0.92
	6	-0.71	0.40	0.08	1.20	0.36	0.00	2.53	1.90	0.18	0.16	0.46	0.72
7	-0.84	0.33	0.01	1.33	0.39	0.00	2.42	2.00	0.23	0.13	0.47	0.78	
8	-0.85	0.32	0.01	1.40	0.41	0.00	1.23	2.11	0.56	0.20	0.53	0.71	
9+	-0.91	0.32	0.00	1.51	0.44	0.00	1.63	2.21	0.46	0.18	0.56	0.75	

Notes The Wal-Mart Corporation provided data on store opening dates. Year 0 begins in the quarter in which the store opens. The regressions also control for Wal-Mart neighborhood markets, but coefficients are not reported because there are few such stores and none were open for more than six years in our data. Specification controls for county population and includes linear county-specific trends.

Table 4: Effects on Counties Stratified by Population

	Lowest Quartile			Second Quartile			Third Quartile			Top Quartile		
	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P
A. Effects on county aggregates												
Log employment												
Discount Stores				0.56	0.91	0.537	0.99	0.50	0.047	0.12	0.13	0.334
Supercenters	3.82	2.39	0.110	2.23	0.83	0.007	1.57	0.36	0.000	0.04	0.13	0.763
Neighborhood Markets										-0.73	0.26	0.004
Log average weekly wages												
Discount Stores				-0.33	0.51	0.523	-0.66	0.34	0.053	-0.01	0.12	0.950
Supercenters	0.45	1.69	0.789	-0.16	0.40	0.699	-1.01	0.43	0.019	-0.28	0.12	0.025
Neighborhood Markets										-0.43	0.18	0.018
Log establishments												
Discount Stores				-0.27	0.54	0.623	-0.23	0.49	0.643	0.17	0.19	0.378
Supercenters	1.17	1.09	0.284	1.21	0.52	0.020	-0.18	0.26	0.493	0.40	0.13	0.002
Neighborhood Markets										0.15	0.19	0.433
B. Effects on counties' retail sectors												
Log employment												
Discount Stores				1.32	5.31	0.804	6.15	2.65	0.021	-0.01	0.78	0.988
Supercenters	12.37	4.75	0.009	9.58	5.22	0.067	7.97	1.82	0.000	0.50	0.84	0.556
Neighborhood Markets										0.50	0.77	0.513
Log average weekly wages												
Discount Stores				-4.84	1.42	0.001	-1.90	0.67	0.004	-0.02	0.14	0.876
Supercenters	-1.69	2.41	0.482	0.05	1.09	0.962	-1.87	0.45	0.000	-0.44	0.24	0.072
Neighborhood Markets										-0.32	0.22	0.145
Log establishments												
Discount Stores				-2.06	2.31	0.373	-0.21	0.70	0.765	0.25	0.18	0.172
Supercenters	3.31	5.58	0.554	-1.80	1.94	0.354	-0.07	0.50	0.890	0.53	0.22	0.016
Neighborhood Markets										1.26	0.30	0.000
Notes	Counties are assigned to population quartiles based on 2000 Census. All but one Neighborhood Market are located in top-quartile counties, and no Wal-Mart stores opened the lowest population quartile counties during the sample period. Specification uses quadratic county-specific trends.											

Table 5: Effects on Individual Retail Subsectors

Dependent Variable:	Log Employment			Log Weekly Wages			Log Establishments		
	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P
Motor Vehicle and Parts Dealers									
Discount Stores	-0.95	0.79	0.228	-0.10	0.16	0.547	0.21	0.25	0.405
Supercenters	0.54	0.79	0.491	-0.17	0.21	0.419	0.24	0.32	0.455
Furniture and Home Furnishing Stores									
Discount Stores	-0.51	0.90	0.574	0.11	0.21	0.596	0.24	0.33	0.465
Supercenters	0.59	1.07	0.580	-0.59	0.39	0.123	0.80	0.46	0.080
Electronics and Appliance Stores									
Discount Stores	-1.70	0.96	0.076	0.81	0.40	0.042	-0.77	0.36	0.032
Supercenters	0.04	1.30	0.978	-0.14	0.45	0.765	0.64	0.54	0.235
Building Material and Garden Equipment & Supplies Dealers									
Discount Stores	-2.32	0.90	0.010	-0.11	0.22	0.627	-0.02	0.28	0.956
Supercenters	0.66	0.95	0.486	-0.34	0.26	0.192	0.35	0.33	0.290
Food and Beverage Stores									
Discount Stores	-0.71	1.05	0.502	0.68	0.54	0.206	0.98	0.64	0.122
Supercenters	-2.76	1.05	0.009	-0.29	0.57	0.614	1.14	0.73	0.120
Health and Personal Care Stores									
Discount Stores	-0.29	0.85	0.734	-0.38	0.32	0.242	0.42	0.36	0.243
Supercenters	-0.98	0.99	0.324	0.29	0.48	0.553	0.84	0.46	0.067
Gasoline Stations									
Discount Stores	-0.27	0.83	0.743	-0.49	0.34	0.149	0.68	0.38	0.074
Supercenters	-0.55	0.93	0.556	-0.28	0.54	0.606	1.33	0.49	0.006
Clothing and Clothing Accessories Stores									
Discount Stores	-0.66	0.86	0.444	0.12	0.25	0.641	-0.09	0.42	0.829
Supercenters	0.61	1.03	0.555	-0.51	0.66	0.442	1.26	0.48	0.009
Sporting Goods, Hobby, Book and Music Stores									
Discount Stores	-0.86	0.92	0.353	0.27	0.36	0.459	0.06	0.39	0.879
Supercenters	0.62	1.11	0.575	-0.57	0.44	0.196	0.87	0.49	0.075
General Merchandise Stores									
Discount Stores	9.19	1.27	0.000	-0.33	0.36	0.353	2.48	0.71	0.001
Supercenters	23.50	1.73	0.000	-0.95	0.47	0.043	5.79	0.59	0.000
Miscellaneous Store Retailers									
Discount Stores	-1.00	0.91	0.271	-1.06	0.52	0.042	-0.13	0.34	0.689
Supercenters	-0.15	1.02	0.882	0.08	0.56	0.887	0.14	0.50	0.779
Nonstore Retailers									
Discount Stores	0.16	1.10	0.885	1.83	1.96	0.351	0.59	0.48	0.226
Supercenters	0.12	1.58	0.941	-1.71	0.98	0.080	-0.25	0.72	0.734
Supermarkets and Other Grocery Stores (a subcategory of Food and Beverage Stores)¹									
Discount Stores	-0.84	0.68	0.215	1.67	1.13	0.14	0.31	0.53	0.56
Supercenters	-3.77	0.83	0.000	-0.90	2.17	0.68	0.54	0.75	0.47

Notes:

This first twelve categories comprise a complete list of the NAICS three-digit retail sub-sectors. Regressions control for Wal-Mart Neighborhood Markets, counties' log population, and county-specific quadratic time trends.

Table 6: Estimated Effects of Wal-Mart Stores and Other General Merchandising Establishments on Counties' Retail Employment and Non-General Merchandising Retail Employment

Variable	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P	Est (x100)	SE (x100)	P
A. Estimated effects on countywide retail employment									
log GM establishments	-1.00	1.37	0.467	-1.53	1.37	0.265	0.12	1.49	0.935
Number of Discount Stores				0.93	0.75	0.214	6.64	2.49	0.008
Number of Supercenters				3.99	0.84	0.000	11.97	3.63	0.001
Number of Neighborhood Markets				0.18	0.65	0.781	-7.43	4.39	0.091
Interactions with log GM establishments:									
Discount Stores							-1.48	0.58	0.010
Supercenters							-2.46	1.09	0.024
Neighborhood Markets							2.03	0.99	0.041
B. Estimated effects on retail employment, other than general merchandising									
log GM establishments	-1.54	0.47	0.001	-1.40	0.47	0.003	-1.73	0.51	0.001
Number of Discount Stores				0.03	0.24	0.892	-0.19	1.01	0.854
Number of Supercenters				-1.12	0.27	0.000	-2.61	0.83	0.002
Number of Neighborhood Markets				-0.34	0.46	0.460	2.28	2.01	0.257
Interactions with log GM establishments:									
Discount Stores							0.06	0.23	0.809
Supercenters							0.46	0.23	0.043
Neighborhood Markets							-0.63	0.39	0.109
Notes:	Regressions include all county-quarter observations for which the general merchandising sector is observed. The specification includes counties' log population and county-specific quadratic trends.								