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The location of new anchor stores within metropolitan areas

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ABSTRACT

We examine the intra-metropolitan location decisions of retail stores by focusing on the openings of a comprehensive list of department ("anchor") stores in the United States. The nonparametric K-density procedure shows that new stores are more dispersed than existing stores; their locations depend on existing competitive conditions. By applying a conditional logit model (CLM), we find that the location choices of new anchors can be associated with zoning, population, CBD and highway proximity, potential revenue and revenue growth, cannibalization, competition and localization economies. We find a lower bound on negative competitive effects in some regions. The CLM-based K-density confidence intervals explain actual location patterns within three miles.

1. Introduction

The retail sector is a dynamic sector, with new construction and expansion occurring side-by-side with high vacancy, bankruptcy and liquidation of leading retail chains. Wal-Mart, Target and wholesale club chains have expanded aggressively over the past 25 years, introducing new technology such as sophisticated distribution centers and systems, tight cost control and related internet sales. Foster et al. (2006) use establishment level data from the Census of Retail Trade to explore substantial increases in productivity in the retail sector.[1] These changes are associated largely with the entry and exit of retail establishments. They find that entry into local markets by large, multi-establishment retailers have displaced smaller retailers such as those with a single establishment over the 1987–97 decade. Moreover, they find that "the enormous restructuring of the retail trade sector towards large, national chains has been at the core of productivity gains in the retail sector (p. 749)."[2]

In this paper, we examine cross-sectional intra-metropolitan retail patterns by focusing on the openings of large, full-line department ("anchor") stores in the United States. The location decision of anchors is an important topic because the entry of a new multi-line, multi-store retail chain into a local market has the potential to change the retail landscape for smaller stores, causing some to thrive and others to go out of business. These changes may play out over a decade or more.

We focus on anchors for two reasons. First, data collection, while still difficult, is manageable whereas any attempt to model the entire retail sector would have to deal with its enormous size and complexity. Second, as suggested by previous literature, these stores lead the retail sector. Any new shopping center requires a commitment from one or

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[1] An establishment is a single physical location where economic activity takes place.

[2] In a recent study, Haltiwanger et al. (2010) examine the negative impact of Big-Box entry on small retail establishments within the DC metro area. Hausman and Leibtag (2007) find efficiency gains for consumers following the entry of a Wal-Mart. They ignore adjustments in the labor market.

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more anchors, and the economics of clusters of independent retail is changed by the opening of an anchor store.[3] By understanding the changing location pattern of anchor stores, we gain insight into the dynamics of a large segment of the retail industry.[4]

The hypothesis that anchor locations can be largely explained by the location of population provides a point of departure for our study. The suburbanization of populations and income has been a dominant trend in the US. After we control adequately for access to population and income then we can isolate the role of retail clustering in location decisions. It is our goal to understand localization economies, the benefits associated with a cluster of retail stores. But clustering implies costs associated with traffic congestion and competition among stores selling close substitutes. We separate variables associated with localization economies from those associated with negative competitive effects.

We use reduced form models to establish empirical regularities intended to account for the major determinants of location patterns, with emphasis on localization economies versus competition. Our most important innovation is to extend industrial location modeling to the large retail sector.

Our data are well-suited to the issues we address. Our sample includes 36 metropolitan statistical areas (MSAs) across East, Central, Midwest and Southwest regions in the US. By compiling data on all anchor stores each year from the beginning of 2005 to the end of 2011, we work with the universe of all anchors within these markets: there are 54 anchors in our data. We further classify all the chains into three categories, high-price, mid-price and low-price to control for price and quality variables. See Appendix 1B for details on our classification method based on Vitorino (2012) and Gould et al. (2005).[5]

Wal-Mart is a particularly visible anchor store that has been the subject of some scholarly research (Pope and Pope, 2013; Ellickson and Grieco, 2013; Holmes, 2011; Neumark et al., 2008; Jia, 2008; Hausman and Leibtag, 2007; Basker, 2005). Our low-price category includes Wal-Mart Supercenters and its major competitors – Target, Costco, and Kmart – as well as Sears Grand, Sears Essentials, Meijer, Shopko, BJ's Wholesale Club and Sam's Club (a Wal-Mart subsidiary). We model Wal-Mart as just one among many competitors because, with about 20% of openings, it does not dominate the data.[6]

Our analysis starts with a comparison of the location pattern of existing and new stores using a nonparametric approach proposed by Duranton and Overman (2005), and developed by Klier and McMillen (2008) and Billings and Johnson (2012). This K-density method estimates the density of distances separating each store location. We conclude that the location pattern of new stores is more dispersed than that of existing stores, i.e., there is less density at the short distances (e.g., three miles) of interest to decision makers. In all regions, the confidence intervals based on population-weighted probabilities poorly predict the location pattern of new stores, especially within three miles. We conclude the same results by investigating each of the three price types. As a result, the simple suburbanization hypothesis – that openings are simply following population – is rejected. This motivates a multivariate econometric model to explain the location pattern of openings as a function of localization and competitive effects.

Next, we apply the conditional logit model (CLM) to anchor location decisions.[7] We find that, consistent with plausible hypotheses, new openings are affected by location proximity to Central Business District (CBD) and highway, potential revenue and growth. Most important, we find a strong negative cannibalization effect (i.e., competition from an existing store owned by the same chain) as well as a positive localization effect. There is also heterogeneity among different regions, where openings in Southwest are more influenced by population and hence least affected by localization. Zoning is taken into account with proxy variables such as the presence of existing retail establishments and proximity to a limited access highway.

To test whether the CLM effectively explains the location pattern of openings, we use the predicted probabilities from the model to calculate K-density measures of concentration. We find that the CLM-based confidence intervals perform considerably better than do population-based confidence intervals, especially within the important threshold of three miles between anchors. We present evidence that the CLM successfully captures the possibility of zoning constraints with the proxy variables included. By separating into three price types, we find that the K-densities based on CLM perform better than the aggregate level, indicating that decision makers can accurately explain location patterns if they disaggregate by price type. Most importantly, the model by matched type (i.e., when the price-type and chain of an opening are matched to existing stores to capture the mix of types and chains; hereafter, "matched type") also has significant explanatory power. This means that the model has the potential to explain the location pattern of openings from the point-of-view of a particular retailer, a useful result for any decision maker.

Our paper contributes to the literature in several ways. First, it is the first location choice paper to focus on anchor store openings and to extend the concept of localization economies to include clusters of anchors of different types.[8] Second, our data are far more comprehensive than that used in other retail studies since we cover all anchors, existing and newly-opened, inside shopping centers and freestanding, in a broad range of MSA sizes over the period 2005–2011.[9] We develop a new way of collecting data at the business establishment level, using CoStar and company web sites with 10 K reports and a database of mergers and acquisitions. Third, this is the first paper we know of to apply CLM to a retail establishment database. Our application of the Duranton and Overman (2005) K-density method is also the first to a retail database. Most importantly, this paper develops

[3] Kramer (2008) defines the Wal-Mart shadow as open air strip shopping centers built in conjunction with a large Wal-Mart store. She says that "several chain stores, notably Dollar Tree, Cato and Shoe Show, make it their stated corporate objective to follow Wal-Mart's path (p 46)." Kramer gives other examples of smaller stores that locate near Wal-Mart and compete directly with some of Wal-Mart's lines.

[4] Anchors generate traffic to a shopping center or retail cluster because customers can economize on transportation costs by making multipurpose shopping trips. Stahl (1982) and Schulz and Stahl (1996) develop the importance of nonconvex transportation costs. Additional theory is provided by Brueckner (1993), Pashigian and Gould (1998) and Salvo (2010). Konishi and Sandfort (2003) argue that stores with substantial advertising reduce uncertainty about product quality. Shopping centers and retail clusters attract customers because easy price and quality comparison implies low prices, good service and higher product variety.

[5] There are three types of anchors in Vitorino (2012) and four types of anchors in Gould et al. (2005). Although classifications of anchors in both studies are similar, Vitorino's classficiation focuses more on product quality while Gould et al.'s method focuses more on reputation (national versus regional). As most of anchors in our sample are national chains, we adopt Vitorino's classification.

[6] We exclude three of Wal-Mart's formats (Wal-Mart discount, Wal-Mart Market and Wal-Mart Express) because they do not satisfy our definition of a multiline department store. Target has about 15% of openings, leaving about two-thirds spread out among many competitors.

[7] The CLM is central to much of industrial location literature (see Arauzo-Carod et al., 2010).

[8] Our paper follows Hotelling (1929) in that anchors locate to serve a local population, and we consider competition albeit with reduced form models. Since Hottelling, localization economies have been introduced. They are usually defined as sharing of inputs such as specialized labor and technology (Arauzo-Carod et al., 2010). Our extension to the retail sector includes the benefits from comparison shopping and multi-purpose shopping trips. For example, the clustering of stores selling high-value differentiated goods (e.g., jewelry and automobiles) is explained by this concept of localization economies rather than by Hotelling's (1929) game theory.

[9] For example, Hausman and Leibtag (2007) focus on supermarket competition only; Holmes (2011) studies Wal-Mart only; Jia (2008) evaluates Wal-Mart and Kmart competition in counties with small population; Vitorino (2012) works with nine anchor stores in regional shopping centers in 2006. By way of contrast, we have 54 anchors in 36 MSAs, and these MSAs represent all but the smallest and largest markets.