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How Does Big-Box Entry Affect Labor Productivity in Durable Goods Retailing? A Synthetic Control Approach

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Abstract: Using data from 2001–2012, the effects of IKEA entry in four Swedish municipalities, 2004–2007, on labor productivity in durable goods retailing is investigated using synthetic control methods. We contribute to the literature on synthetic control methods by considering parametric specifications of the intervention effect, which in our case arguably improves the likelihood of identifying the intervention effect of IKEA entry on labor productivity. As inference relies on a single treated observational unit (i.e., a single IKEA-entry municipality), statistical testing is a challenge, and randomization and replication for inference is done with regard to the pool of control municipalities. Our results indicate that in three out of four entry municipalities, labor productivity increased more than in their synthetic counterparts after IKEA entry, and that the size of the positive effect is related to the size of the new IKEA relative to the size of the existing durable goods retail sector in the entry municipalities, with larger positive effects found in municipalities where the new IKEA was large relative to the existing durable goods retail market.

Keywords: Productivity growth; Quantitative case studies; Parametric synthetic matching; Bootstrap confidence intervals
Introduction

A new big-box retailer is often considered particularly important for regional development because it tends to attract consumers from far away, and the claim that big-box retailers benefit regions has been supported by several studies (Ailawadi et al. 2010; Basker 2005, 2007; Daunfeldt et al. 2017; Han et al. 2018). The importance of big-box retailers for regional development is further supported by local authorities, which often spend considerable amounts of money to attract them (Daunfeldt et al. 2017). Whether or not big-box entry is beneficial to a region is of interest, not only in terms of the policy implications and the resources spent attracting such retailers, but also because there is ongoing debate on how big-box retail areas affect the local communities they enter.

A relatively large literature considers how big-box retailers affect the communities they enter (see “The Big-Box Entry Literature,” below). However, most of these studies focus on how the entry of Wal-Mart affects retail revenues or employment in the entry regions, presenting ambiguous findings (e.g., Ailawadi et al. 2010; Artz and Stone 2012; Basker 2005, 2007; Neumark, Zhang, and Cicarella 2008; Stone 1997). Although retail revenues and retail employment are important determinants of the long-term economic welfare of the retail sector in a region, a factor overlooked by most of these studies is the development of labor productivity after the entry of a big-box retailer into a region. This merits study because labor productivity is closely related to wages, as it forms the basis for wage negotiations between employers and employees, and a positive impact of a big-box entry on labor productivity in an entry region would therefore indicate the possibility of increased wages for employees in the retail sector.1

In this paper, we study the impact of big-box retail entry on labor productivity in durable goods retailing in affected entry regions, using IKEA entry into four Swedish municipalities, 2004–2007, as our natural experiments. The studied big-box entry events consist of entry by IKEA itself, and the establishment of a surrounding retail area comprising 20–30 other retail stores, approximately 2500 parking spaces, and in most cases convenient location of the retail area relative to major highways. We are therefore evaluating how all changes related to the establishment of the new IKEAs affected labor productivity in the entry municipalities, and not only the effects of the IKEA store itself.

Previous studies of how big-box retail entry in Sweden affects productivity (Håkansson et al. 2016; Han et al. 2018; Maican and Orth 2012, 2015) have one thing in common: they all focus on the impact of big-box entry on incumbent retailers in the entry regions. However, the largest impact on productivity in the entry regions is likely due to the big-box entrants themselves. For Wal-Mart, Basker

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1 The dataset used does not contain information regarding wages, so we cannot directly study the impact of IKEA entry on wages; instead, we focus on the impact on labor productivity.
reported that the real value-added per worker was 40% higher than that of other US general merchandise retailers, and that Wal-Mart alone was responsible for nearly half of the productivity growth in the general merchandise sector in the US retail market between 1982 and 2002. By considering the impact on incumbents rather than the total impact of big-box entry on productivity in the entry regions, previous studies likely underestimated the impact of big-box retail entry on productivity, a potential caveat addressed here.

From an econometric perspective, the estimation of how big-box retailers might affect the local economies they enter is not easy. Previous studies often use difference-in-difference estimations, sometimes after first having tried to select control group regions with characteristics similar to those of the studied entry regions (e.g., Basker 2007; Daunfeldt et al. 2015, 2017; Håkansson et al. 2016; Han et al. 2018). However, difference-in-difference estimation might not be appropriate in this setting for several reasons.

First, difference-in-difference estimation relies on the assumption that the treated and control regions would have experienced parallel trends in the absence of treatment, i.e., if no big-box retail entry had taken place, labor productivity growth would have been similar in the entry- and non-entry regions used in the difference-in-difference estimations. In previous studies (Daunfeldt et al. 2015, 2017; Håkansson et al. 2016; Han et al. 2018), this assumption has been investigated by plotting the pre-entry trends in the outcome variables for entry and control municipalities, and when found to be parallel, it was argued that these trends would have continued to be parallel in the absence of big-box entry. However, since the validity of this argument cannot be proven, it remains an assumption in these difference-in-difference models. Second, as demonstrated by Daunfeldt et al. (2015, 2017), IKEA does not enter Swedish municipalities at random, but rather after a deliberate process of finding the most profitable entry sites. As discussed in Ando (2015), this might very well increase the potential problems with the assumption of parallel trends in the absence of entry. Third, the number of treated units is small, with only four Swedish municipalities having had IKEA enter their markets during the study period. In addition, these entry municipalities are very heterogeneous with respect to economic, geographic, and demographic characteristics, making it likely that IKEA would have different effects on productivity in the different entry municipalities.

To address these empirical challenges, and since the heterogeneity among the entry municipalities makes it reasonable to treat each IKEA entry as a separate case study, we use the synthetic control method first employed by Abadie and Gardeazabal (2003) and then elaborated upon by Abadie, Diamond, and Hainmueller (2010, 2015). This method estimates the intervention effect by measuring the difference in the outcome variable of interest between the treated unit and a synthetic counterfactual unit. The counterfactual is created by weighing potential control units (i.e., municipalities
without IKEA entry during the study period) such that the synthetic control unit’s outcomes and relevant covariates before the intervention have characteristics and trajectories similar to those of the treated unit. The synthetic control method does not rely on the parallel trends assumption necessary for difference-in-difference estimation, and it also requires only one treated unit, making it possible to study the four IKEA entries in Swedish municipalities one by one.

Since there is only one treated unit, statistical inference is somewhat of a challenge when using synthetic control methods. Abadie, Diamond, and Hainmueller (2010, 2015) suggested using placebo testing, which is performed below. However, we also use the non-parametric and parametric bootstrap methods suggested by Carling and Li (2017) to create confidence interval estimates of the effect of IKEA entry on municipal-level labor productivity in durable goods retailing in the entry municipalities.

The results of our research indicate that the establishment of a new IKEA positively affects average labor productivity in durable goods retailing in three out of four entry municipalities in Sweden, and that the size of the positive effect is related to the size of the new IKEA relative to the size of the existing durable goods retail sector in the entry municipalities. In Haparanda, the smallest studied entry municipality, average productivity, measured as consumer price index (CPI)-adjusted sales per employee, increased by 80%, while in Kalmar, the second smallest studied entry municipality, it increased by 8%. For the larger entry municipality of Karlstad, the increase in productivity was 4%, while in the urban entry into Gothenburg, no statistically significant increases in productivity were found.

The large increase in Haparanda is related to certain special characteristics of that entry region. Haparanda is a small municipality with approximately 9500 inhabitants during the study period, and its retail sector before IKEA entry was less developed than in other Swedish municipalities of a similar size. The year before IKEA entry, total sales in durable goods retailing were approximately SEK 140 million, about 10% lower than in other municipalities of comparable size. In 2010, five years after IKEA entered the market, durable goods sales in Haparanda had increased to SEK 1081 million, a 772% increase. Data availability requires that we measure productivity growth as the change in CPI-adjusted sales per employee, resulting in the large estimated impact of IKEA entry on labor productivity in Haparanda relative to the other entry sites.

The rest of the paper is structured as follows. “The Big-Box Entry Literature” reviews the literature on big-box entry, while “Theoretical Framework” presents a theoretical rationale for expecting IKEA entry to positively affect labor productivity in the affected municipalities. Then in “Empirical Method,” our identification strategy, i.e., the synthetic control method, and the various

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2 Data regarding durable goods retail sales in Haparanda were collected from Trade in Sweden (Handeln i Sverige), a free database accessible at http://www.handelnisverige.se/ (in Swedish).
methods used for statistical inference are presented. “Empirical Analysis” presents the empirical results, while “Summary and Discussion” summarizes and discusses the present findings.

The Big-Box Entry Literature

A relatively large literature treats big-box entry (Table 1). Most of these studies are based on US data and concern the entry of Walmart and/or Walmart Supercenters, with only a few being based on data from other countries or considering other big-box retailers. There is reason to believe that the entry effects of IKEA might differ from those of Walmart, since IKEA concentrates more on selling durable goods than does Wal-Mart, and consumers tend to travel farther to buy durable than non-durable goods (Brown 1993). A new Wal-Mart store could therefore focus more on fulfilling nearby demand than does a new IKEA store, suggesting that the regional effects of entry might differ.

Most previous studies also focus on retail sales and/or employment, and the results these studies are mixed. When studying the development of retail revenues after Wal-Mart entry, Davidson and Rummel (2000) and Artz and Stone (2012) both found that retail revenues increased following the entry of Wal-Mart, while Barnes et al. (1996), Jones and Doucet (2000), Hernandez (2003), Artz and Stone (2006), Jia (2008), Ailawadi et al. (2010), and Merriman et al. (2012) reported that retail revenues declined after Wal-Mart entry. To our knowledge, Daunfeldt et al. (2015, 2017) are the only researchers who investigated how IKEA entry affects retail revenues. The results of Daunfeldt et al. (2017) indicate that durable goods revenues increased by 20% on average in the four studied entry municipalities compared with similar municipalities where IKEA did not enter, while only small (2% or less) and mostly statistically insignificant reductions in revenues were found in neighboring municipalities. Daunfeldt et al. (2015) analyzed how IKEA entry affected incumbent retailers in the entry municipalities, and their results indicate that IKEA entry increased the retail revenues of incumbents located near the new IKEA, and that the positive effects were reduced with distance from the new IKEA. For incumbents located within 1 km of the new IKEA, revenues increased by 26% on average, while no increases were found for retailers located over 5 km from the new IKEA. Also, no effects were found on retail revenues in the city centers of the entry municipalities. It should be noted, however, that neither of the studies by Daunfeldt et al. (2015, 2017) treated the IKEA entries as separate events; rather, they considered the average effect over all entry municipalities, giving no information about possible regional heterogeneity in IKEA entry effects.

Empirical findings regarding the effects of big-box entry on retail employment are ambiguous as well. Basker (2005), Drewianka and Johnson (2006), and Hicks (2007a; 2007b) all found positive effects on employment, while the opposite was found by Neumark, Zhang, and Ciccarella (2008), Hicks
(2008), and Haltiwanger, Jarmin, and Krizan (2010). For the case of IKEA, Daunfeldt et al. (2015) found that for incumbent retailers in the IKEA-entry municipalities, the effects on employment were less pronounced than those on retail revenues and in most cases being statistically insignificant, while at the municipal level, employment in durable goods retailing increased by 17% when IKEA entered.\(^3\) Taken together, Daunfeldt et al.’s (2015, 2017) results suggest that the effect of IKEA entry on employment is mostly due to the personnel hired by IKEA itself in the entry municipalities.

Empirical studies of the effect of big-box entry on the productivity of incumbent retailers in the entry regions, or on the productivity in the retail sector in general in the entry regions, are scarce and more recent. Foster et al. (2006) found that labor productivity growth in the retail sector in the USA is due to the entry of more productive establishments from national chains into local markets, displacing less productive local establishments. Basker (2007) found that Wal-Mart alone was responsible for nearly half of the productivity growth in the general merchandise sector in the US retail market between 1982 and 2002, that Wal-Mart’s real value-added per worker was 40% higher than that of other general merchandise retailers, and that its productivity increased by 55% over the 20-year 1982–2002 period. Apart from contributing to a significant increase in productivity in the general-merchandise sector, Wal-Mart also reduced local competitors’ market shares and profit margins, causing 50–70% of the net exit of small discount retailers in the US market between 1988 and 1997 (Jia 2008). The exiting establishments were approximately 25% less productive than the surviving incumbents, were not affiliated with any national chains, and were also smaller and younger than the surviving firms.

\(^3\) This might seem like a large increase, but for the average Swedish municipality 17% equals about 250 new jobs in durable goods retailing, which is about the number that a new IKEA store usually employs.
Table 1. Summary of previous studies of big-box entry.

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Entrant</th>
<th>Unit of analysis</th>
<th>Type of study</th>
<th>Period</th>
<th>Dependent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnes et al. (1996)</td>
<td>USA</td>
<td>Walmart</td>
<td>County</td>
<td>Descriptive</td>
<td>1988–1993</td>
<td>No. of retailers/retail sales</td>
</tr>
<tr>
<td>Stone (1997)</td>
<td>USA</td>
<td>Walmart</td>
<td>City</td>
<td>Descriptive</td>
<td>1980s–1990s</td>
<td>Retail sales</td>
</tr>
<tr>
<td>Davidson and Rummel (2000)</td>
<td>USA</td>
<td>Walmart</td>
<td>Town</td>
<td>Descriptive</td>
<td>1990s</td>
<td>Retail sales</td>
</tr>
<tr>
<td>Franklin (2001)</td>
<td>USA</td>
<td>Walmart Supercenter</td>
<td>Metropolitan area</td>
<td>Descriptive</td>
<td>1993–1999</td>
<td>Retail market share</td>
</tr>
<tr>
<td>Hicks and Wilburn (2001)</td>
<td>USA</td>
<td>Walmart and Walmart Supercenter</td>
<td>County</td>
<td>Inferential</td>
<td>1988–1998</td>
<td>Retail employment/no. of firms</td>
</tr>
<tr>
<td>Foster et al. (2006)</td>
<td>USA</td>
<td>Big-boxes in retail</td>
<td>Firm</td>
<td>Inferential</td>
<td>1999–2001</td>
<td>Retail sales</td>
</tr>
<tr>
<td>Hicks (2007a)</td>
<td>USA</td>
<td>Walmart and Walmart Supercenter</td>
<td>County</td>
<td>Inferential</td>
<td>1985–2003</td>
<td>Labor force participation</td>
</tr>
<tr>
<td>Hicks (2007b)</td>
<td>USA</td>
<td>Walmart and Walmart Supercenter</td>
<td>County</td>
<td>Inferential</td>
<td>2001–2005</td>
<td>Retail employment</td>
</tr>
<tr>
<td>Hicks (2008)</td>
<td>USA</td>
<td>Walmart and Walmart Supercenter</td>
<td>County</td>
<td>Inferential</td>
<td>1988–2003</td>
<td>Retail and total employment</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Type</td>
<td>Measure</td>
<td>Time Period</td>
<td>Notes</td>
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<td>-------------------------------------------</td>
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<td>----------------------------------------------</td>
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<tr>
<td>Drewianka and Johnson (2006)</td>
<td>USA</td>
<td>County</td>
<td>Inferential</td>
<td>1997–2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artz and Stone (2012)</td>
<td>USA</td>
<td>City</td>
<td>Inferential</td>
<td>1997–2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huang et al. (2012)</td>
<td>USA</td>
<td>Zip code</td>
<td>Inferential</td>
<td>1997–2002</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Daunfeldt et al. (2017) and own additions. GTA = Greater Toronto Area.
In the Swedish retail food market, Maican and Orth (2012) found that big-box entry forced low-productivity stores to exit, and that surviving stores experienced subsequent productivity increases of approximately 3%. In another study, they also found that more liberal entry regulations boosting competition increased productivity in the Swedish retail food sector (Maican and Orth 2015).

Håkansson et al. (2016) and Han et al. (2018) are, to our knowledge, the only previous authors examining how IKEA entry affects productivity. They measured the change in total factor productivity in incumbent retailers in the four Swedish municipalities that hosted new IKEA stores, 2004–2007, using difference-in-difference methods. Håkansson et al. (2016) found that entry by IKEA increased the total factor productivity of incumbents, but only in two out of the four entry municipalities, Haparanda and Kalmar, by 38% and 10%, respectively. Han et al. (2018) focused on the impact of IKEA entry on incumbents near the new IKEA stores, investigating whether the impact differs depending on whether the goods sold are complements or substitutes of goods sold in IKEA. Using spatial difference-in-difference analysis, Han et al. (2018) reported that productivity increases were found only for incumbents selling complements to goods sold at IKEA, and again only in the two smallest entry municipalities, Haparanda and Kalmar. The size of the productivity increase for incumbent retailers selling complements to IKEA was found to be 35% in Haparanda and 18% in Kalmar. Since the sizes of the four new IKEA retail areas were similar, while the existing retail sectors in Haparanda and Kalmar were clearly much smaller that in the other two entry regions, Karlstad and Gothenburg, Håkansson et al.’s (2016) and Han et al.’s (2018) results seem to indicate that agglomeration economies due to IKEA entry are mainly found when the big-box entry is large relative to the existing retail market.

Theoretical Framework

We do not present any formal theoretical model of how IKEA entry should affect labor productivity in durable goods retail. Instead, we discuss possible pathways by which IKEA entry might affect productivity in the entry municipalities, either directly or through agglomeration economies affecting other durable goods retailers in the entry areas. The thought experiment is as follows. Supposing two otherwise identical municipalities, one that receives an IKEA entry and another that does not, why should we expect IKEA entry to increase the average level of labor productivity in durable goods retailing in the entry municipality?
**Direct Effects of IKEA Entry on Productivity**

From a purely mathematical perspective, entry by IKEA will increase average labor productivity in the entry municipalities if IKEA is more productive than the incumbent durable goods retailers in the pre-entry period. IKEA does not present any labor productivity data, and we have not found any previous studies estimating the labor productivity in IKEA stores. However, based on the literature regarding the efficiency of another big-box retailer, Wal-Mart, we would expect IKEA to be more efficient than most other Swedish durable goods retail firms, and as such, that IKEA entry would increase average labor productivity in the entry municipalities. For Wal-Mart, Basker (2007) reported that the real value-added per worker was 40% higher than that of other US general merchandise retailers, and that Wal-Mart alone was responsible for nearly half of the productivity growth in the general merchandise sector in the US retail market between 1982 and 2002.

**Indirect Effect Due to Displacement of Low-Productivity Retailers**

Entry by IKEA will also increase average municipal-level labor productivity in durable goods retailing if IKEA entry leads to the displacement of low-productivity durable goods retailers in the entry municipalities. Again, this has not been investigated in the Swedish market, but in the US retail sector, Foster et al. (2006) reported that labor productivity growth in the retail sector occurred because national chain stores entered local markets, displacing less productive local retailers, and Jia (2008) reported that Wal-Mart entries caused 50–70% of the net exit of small discount retailers in the US market, and that exiting establishments were 25% less productive than the surviving incumbents. Finally, in the Swedish retail food market, Maican and Orth (2012) found that big-box entry forced low-productivity stores to exit, and that surviving stores experienced productivity increases of approximately 3%. Although none of these examples concerns IKEA specifically, these previous studies seem to indicate that entry by big-box retailers such as IKEA causes low-productivity retailers to exit the market, raising the average productivity level in IKEA-entry municipalities.

**Indirect Effects Through Supply-Side Spillovers to Incumbent Retailers**

Ever since the early contributions of Marshall (1890), Hotelling (1929), and Weber (1929), economists and economic geographers have argued the economic merits of firm co-location in
related industries such as retailing. According to these theories, firm co-location decreases input costs, facilitates labor matching, and creates knowledge spillovers (McCann 2001; O’Sullivan 2003). More recent literature has often focused specifically on the impact of knowledge spillovers in terms of increased productivity (Glaeser 1999; Grossman and Helpman 1991; Lucas 1988), while some studies have also noted that not only geographical but also other types of proximity matter for knowledge spillovers in an industry. Boschma (2005), for example, identified five types of proximity that might affect inter-firm learning and thus productivity: geographical, cognitive, organizational, social, and institutional proximity.

Note that for knowledge spillovers to occur, there is some optimal level of specialization in the type of retailers that co-locate. If retail density increases via the co-location of very similar stores, this means a high level of competition for the co-located firms and few knowledge spillovers, as one firm’s knowledge is also the other firm’s knowledge. If firms are instead too dissimilar, the knowledge of one firm will have little or no value for the other firms. Newly established IKEA retail areas in Sweden usually consist of 10–20 retailers selling different types of (mostly) durable goods retail products and should therefore create a good environment for knowledge spillovers within durable goods retailing.

**Indirect Effects Through Demand-Side Spillovers to Incumbent Retailers**

Demand-side spillovers are important in understanding how the establishment of a new IKEA retail area might improve labor productivity in durable goods retailing. Demand-side spillovers occur when the output of one retailer is positively affected by the locations and outputs of other retailers. There are two types of demand-side spillovers depending on whether the products sold are complements or substitutes: the co-location of retailers selling close substitutes establishes the basis of comparison shopping, while the co-location of retailers selling complements establishes the basis of one-stop shopping (Håkansson et al. 2016; Han et al. 2018). In the case of IKEA entry, for close substitute products the mechanism increasing the average level labor productivity in the municipality is that it creates competitive pressure forcing the close substitute retailers to increase their productivity or be forced to leave the market, while for complements, sales at IKEA create increased demand for the complementary products sold in other stores in the new IKEA retail area. Han et al.’s (2018) results indicate that the main impact of big-box retail entry on productivity is through the second mechanism, i.e., creating increased demand for complementary products in the entry areas.
To sum up, we have identified four possible pathways explaining why one can expect an IKEA entry to increase average labor productivity in durable goods retailing in the entry municipality, either directly due to IKEA being more productive than the average incumbent retailer in the entry area, or through agglomeration economies affecting incumbent durable goods retailers in the entry area. These four pathways all imply that after IKEA entry one would expect productivity to reach a new and higher level than in the pre-entry period, perhaps after some time of adjustment. It should, however, be noted that the use of aggregate data makes it impossible for us to discriminate between these potential pathways, and that what is being measured is the total effect on productivity of IKEA entry through all these pathways.

**Empirical Method**

*Identification Strategy*

It is difficult to identify how the entry of IKEA (or a big-box retailer in general) affects productivity in the entry municipality due to this fundamental problem: a municipality that receives a new IKEA cannot also be observed in the counterfactual state of not having received that entry, and IKEA does not enter municipalities randomly but rather after a deliberate process of seeking the best entry site possible (Daunfeldt et al. 2017).

Several different identification strategies have been used in previous research into big-box entry to deal with this problem. Spatial endogeneity has been addressed using geographic variables as instruments to capture the probability of big-box entry, such as distance from the store’s corporate headquarters (Basker 2007; Neumark, Zhang, and Cicarella 2008). To address temporal endogeneity, a store’s initial planning date has been used as such an instrument, based on the rationale that while a big-box’s opening date can be manipulated to coincide with favorable conditions, this is impossible for the big-box’s initial planning date (Basker 2005, 2007). Hicks (2008) used the instruments suggested by Basker (2007) and Neumark, Zhang, and Cicarella (2008) and an additional instrument based on market size, identified as a selection variable for market entrance by Walmart officials. However, the use of instrumental variables has some limitations since the spatial instruments may be correlated with other spatial patterns and thus lead to implausible results, and temporal instruments can only be defined for locations where big-boxes have eventually opened (Basker 2007).

Other studies try to solve the endogeneity problem by using control group regions that are as similar as possible to the treatment group regions. Basker (2005), for example, used
population levels and average employment growth rates to find control counties that were as similar as possible, in terms of these variables, to the treatment counties. In studying the effects on revenues and employment of IKEA entry in Sweden, Daunfeldt et al. (2015, 2017) addressed endogeneity by using logit estimations to identify control municipalities in Sweden that IKEA did not enter during the study period, but which had a similar probability of entry as the municipalities that IKEA did enter during 2004–2007 based on pre-entry observables at the municipal level. However, Daunfeldt et al. (2015, 2017) also found that differences remained between entry and control municipalities even after the matching procedure, so they ran difference-in-difference regressions in a second step. In their study of how the IKEA entries during 2004–2007 affected productivity in incumbent retail firms from entry and until 2010, Håkansson et al. (2016) and Han et al. (2018) instead used municipalities that IKEA entered in the 2012–2015 period as control municipalities, and compared the productivity development of firms located in the first-round IKEA-entry municipalities with that of firms located in the second-round entry municipalities using difference-in-difference regressions.

The difference-in-difference regressions used in several of the studies mentioned above suffer from several potential empirical problems when trying to estimate something like the impact of IKEA entry on municipal-level outcome variables. First, Swedish municipalities are quite heterogeneous with respect to the economic, geographic, and demographic variables potentially affecting productivity (e.g., retail sales and employment, transportation costs, education level of the population, logistics organization of retail firms in the region, and management competence in local retail firms), variables that are not always readily available for researchers. In such a setting, neither a set of non-treated regions nor a single non-treated region will likely provide valid counterfactuals to the treated regions under study (Munasib and Rickman 2015). Second, difference-in-difference models are based on the rather strong assumption that the intervention and control units would have displayed parallel trends in the outcome variables if the intervention had never occurred, meaning that potential confounding factors must be constant over time and possible to control for by taking account of time differences (Abadie, Diamond, and Hainmueller 2010). As Ryan, Burgess, and Dimick (2014) pointed out, while the theoretical properties of difference-in-difference estimation are well understood, a major concern is whether the parallel trends assumption is plausible in practice. Finally, as pointed out by Bertrand, Duflo, and Mullainathan (2004), regression-based difference-in-difference estimates also often tend to overstate the statistical significance of the intervention effects.

Due to these potential weaknesses of traditional difference-in-difference estimation in the current setting, we instead use the synthetic control method (Abadie, Diamond, and Hainmueller
2010, 2015; Abadie and Gardeazabal 2003), which relaxes the parallel trends assumption and allows the effects of observed and unobserved predictors of the outcome to change over time. The synthetic control method is a data-driven procedure in which the created counterfactual unit is a weighted average of the available control units in the donor pool (i.e., pool of suitable potential controls for the unit exposed to treatment). Compared with traditional difference-in-difference estimation, the synthetic control method also has the advantage that the relative contribution of each potential control unit to the counterfactual is made explicit, as is the similarity in the pre-intervention outcomes between the treated unit and the created counterfactual (Abadie, Diamond, and Hainmueller 2010).

The Synthetic Control Method

The synthetic control method estimates the intervention effect by measuring the difference in the outcome variable in the treated unit and the synthetic control unit. The counterfactual or control unit is created by weighing potential control units (i.e. municipalities without IKEA-entry during the period under study) such that the synthetic control unit’s outcomes and relevant covariates prior to the intervention have similar characteristics and trajectories as the treated unit. It is assumed that the outcomes of the untreated units used in the donor pool (the pool of potential control units, i.e. non-IKEA entry municipalities) are not affected by the intervention implemented in the treated unit. The observed outcome variable of interest is denoted by $y_{jt}$ for unit $j$ at time $t$, where $j = 0$ refers to the treated unit and $j = 1, ..., J$ refers to $J$ control units in the donor pool. $T_0$ is the time point when the intervention occurs, and $\eta_{0t}$ denotes the outcome of the variable of interest had the treated unit not been treated (i.e. the counterfactual). The estimator of the counterfactual is $\hat{\eta}_{0t} = \sum_{j=1}^{J} w_j^* y_{jt}$, with the constraints that $\sum_{j=1}^{J} w_j = 1$ and $0 \leq w_j \leq 1$. For $t \geq T_0$, the intervention effect equals $\alpha_t = y_{0t} - \eta_{0t}$. The estimated value of the intervention effect at time $t$ is $\hat{\alpha}_t = y_{0t} - \hat{\eta}_{0t} = y_{0t} - \sum_{j=1}^{J} w_j^* y_{jt}$ where $w_j^*$ is obtained by optimizing an objective function that minimizes the discrepancy between the observed treated unit and the synthetic control unit before the intervention. The outcome variable is explained by covariates in a linear factor model

$$y_{jt} = \delta + \theta_1 z_t + \lambda_1 t_1 + \epsilon_{jt}, \quad j = 0, 1, 2, ..., J$$ (1)
where $\delta_t$ is an unknown common factor with constant factor loadings across unit, $z_t$ is a $r \times 1$ vector of observed covariates, $\mu_t$ is an $F \times 1$ vector of unobserved covariates, and $\epsilon_{jt}$ is an error term with variance $\sigma^2$.

Carling and Li (2017) argued that it would often be sensible to parameterize the intervention effect for greater precision in estimating it. In the present study of productivity growth as a result of a big-box retail entry, one would expect gradual growth over time to a new productivity level after entry, as discussed in the section “Empirical Framework.” To model such growth, we assume that the intervention effect, $\alpha_t$, follows a growth curve model and we consider three different specifications in the empirical work; monomolecular growth $\alpha_t = a_{\infty}(1 - b \cdot \exp(-\gamma t))$, logistic growth $\alpha_t = a_{\infty}/(1 + b \cdot \exp(-\gamma t))$ and Gompertz growth $\alpha_t = a_{\infty} \exp(-b \cdot \exp(-\gamma t))$, where $a_{\infty}$ is the asymptotical effect (i.e. the new steady-state productivity level) and $\gamma$ determines the speed of the intervention to reach it. To discriminate between the three alternatives, we make use of Akaike information criterion (AIC).

**Refining the Donor Pool**

In principle all Swedish municipalities, except for the four entry municipalities, could be in the donor pool. However, there are two reasons for refining the donor pool before applying the synthetic control method (SCM). The first is pragmatic: in our experience the estimation program for SCM as implemented in the R environment breaks down at about 80 control units or more, while there are 290 Swedish municipalities. The second reason is that it is sensible to use control units similar to the treated unit, as one would expect similar municipalities to manifest more similar economic development over time in the absence of intervention. We will use a set of predictors that previous research has found to affect productivity in order to cluster donor pool municipalities into groups of potential control municipalities similar to the IKEA-entry municipalities. The predictors used are pre-IKEA-entry period productivity, durable goods retail sales, number of employees in durable goods retail, municipal population, percentage of the population with a university education, an indicator variable for municipalities with good infrastructure, an indicator variable for being a land-border municipality with Norway or Finland, and the number of patents awarded to firms or individuals in a specific municipality.

The similarity between two municipalities during the pre-intervention period is measured by the Euclidean distance $\|x_i - x_j\|^2$ where $x_i = (x_{i1}, x_{i2}, ..., x_{im})$, $i$ denotes the municipality and $m$ is the number of valid covariates based on a Pearson correlation test. Note that in our
case, $x_{tm}$ is the average value of the $i$ covariates of municipality $m$ before IKEA-entry since the clustering method does not apply to time-series data.

Several algorithms are available with which to retrieve the clustering results: principal component analysis, K-means, and self-organizing maps (Teuvo 1982). In our setting, self-organizing maps are preferable to K-means since they are less sensitive to initial values and to noise, while principal component analysis is not suitable for the task at hand as it was created and is used mainly for clustering when there is a large set of predictor variables, which is not the case here. Note that the clustering procedure might provide either very few or very many comparable municipalities to be used in the donor pool cluster. If the clustered donor pool is too small it will exclude proper donor pool municipalities, and if too large it will contain unsuitable donor pool units. As such, we will re-run the clustering procedure until we achieve a donor pool size consisting of approximately 30 donor pool municipalities. This lower bound for the donor pool size is not absolute, but is suggested to provide consistent estimation of the intervention effect based on the findings of Carling and Li (2017).

**Inference in Synthetic Control Methods**

As the inference relies on only a single treated observational unit (i.e., a single IKEA-entry municipality), statistical testing is a challenge, and randomization and replication are done with regard to the donor pool to establish inference. Three inference methods are used below: first, we conduct the placebo tests suggested by Abadie, Diamond, and Hainmueller (2010); second, we estimate non-parametric bootstrap confidence intervals; and, finally, we estimate confidence intervals based on the parametric specifications of a growth model.

The Abadie, Diamond, and Hainmueller (2010, 2015) placebo test investigates whether the estimated effect of the actual intervention is large relative to the distribution of the effects estimated for the units not exposed to the intervention, where the distribution of the placebo effects is generated by iteratively applying the synthetic control method to every potential control unit in the donor pool as if it had been the treated unit. If the estimated intervention effect then falls well within the distribution of estimated placebo effects, our confidence that we have found an actual intervention effect is undermined (Abadie, Diamond, and Hainmueller 2015). In more technical notation, a significant intervention effect is present if confirmed by a larger

$$\text{MSPE} = \sqrt{\|y_{0t} - \hat{y}_{0t}\|^2} \quad (t > T_0)$$

for the treated unit than for its peers in the control unit donor pool. In practice, we also calculate and use the test statistic

$$\text{MSPE}_{\text{ratio}} = \frac{\text{MSPE}_{\text{post}}}{\text{MSPE}_{\text{pre}}}$$

to
evaluate the intervention, with the subscripts referring to MSPE computed before and after the intervention. If this ratio is greater than one, and greater for the treated unit than for most of the placebo units, then there is evidence of a statistically significant intervention effect. The $p$-value associated with the test statistic is found by calculating the frequency of placebo tests that generate a ratio equal to or greater than that observed for the treated unit.

As mentioned above, we also provide two types of bootstrapped confidence intervals, in line with the suggestion of Carling and Li (2017). First, non-parametric bootstrapped confidence intervals are estimated. These confidence intervals are provided by the randomization of donor pool units (non-IKEA-entry municipalities), since the unique treated unit (the true IKEA-entry municipality) is impossible to replicate. In the non-parametric bootstrapping procedure, we created 200 bootstrap samples by sampling from the treated unit’s donor pool units with replacement, and then we applied the synthetic control method to estimate an intervention effect for each of the 200 bootstrap samples. From the resulting distribution of the intervention effect, the 0.025 and 0.975 quantiles serve as our non-parametric bootstrap confidence interval. Similarly, the parametric bootstrap confidence interval is generated by first sampling with replacement 200 times as above, and then estimating the three growth models on the new samples using the AIC to select the best-fitting model.

**Empirical Analysis**

**Data and Productivity Measure**

We use annual municipal-level panel data for all 290 Swedish municipalities over 12 years (2001–2012), yielding 3480 observations in total. Data regarding durable goods sales, durable goods employment, and population in the municipality were collected from Trade in Sweden, a database that includes information on a variety of retail-related variables and their development over time. Data regarding the percentage of the population with a university education, the number of patents, and the quality of the infrastructure in the municipalities were all collected by Statistics Sweden.

When analyzing productivity in retailing, increased productivity is usually measured as the increase in sales or value-added per worker (Reynolds et al. 2005), sometimes also accounting for other inputs such as capital (Håkansson et al. 2016; Han et al. 2018). Sales is quantity sold times the selling price, and to make it possible to compare productivity in different municipalities, with different compositions of goods sold, controlling for price is crucial (Griffith and Harmgardt...
As such, durable goods retail sales in the studied municipalities must be discounted using an appropriate price index, so sales were discounted by the Swedish consumer price index (CPI). Also, to facilitate comparisons of productivity in Swedish durable goods retailing in all municipalities, a productivity index \( \text{Prod}_{it} \) was constructed. This index is measured as the CPI-adjusted durable goods retail sales per employee in municipality \( i \) at time \( t \), relative to the national average counterparts, in durable goods retail, i.e:

\[
\text{Prod}_{it} = \frac{\text{Sales}_{it} / \text{Emp}_{it}}{\text{National Sales}_{t} / \text{National Emp}_{t}} \times 100
\]

where \( \text{Emp}_{it} \) is employment in durable-goods retailing in municipality \( i \) at time \( t \), while \( \text{National Sales}_{t} \) and \( \text{National Emp}_{t} \) are the cumulative national average sales and employees in durable good retailing, respectively. Municipalities with an index number above 100 thus have a higher level of CPI-adjusted sales than we would expect given the number of employees in durable goods retailing in that municipality, and if the index value at the time of IKEA entry is 100 (or at least close to 100) the change in the index can also be interpreted as the change in productivity in percent. As such, the index is easy to interpret both when comparing levels and changes in productivity due to IKEA entry.

**Refining the Donor Pool, Empirical Results and Inference**

When refining the donor pool, we start by clustering Swedish municipalities using the average of the valid predictors from a Pearson correlation test for the three years before actual entry: for Haparanda and Kalmar (entry 2006), the years 2003–2005 are used; for Karlstad (entry 2007), the years 2004–2006 are used; and for Gothenburg (entry 2004), the years 2001–2003 are used. Based on the refined donor pools and valid predictors from the Pearson correlation test, we construct synthetic control units that mirror the development of the productivity index and the predictors in the IKEA-entry municipalities before IKEA entry. The results are displayed in Figure 1, which compares the development of the productivity index for the actual entry municipality (solid line) and its synthetic control unit (dashed line).

We also find that the productivity index of the synthetic control units closely tracks the trajectory of the productivity index of the true entry municipalities during the pre-entry period, at least for Haparanda, Kalmar, and Karlstad, and that a clear IKEA-entry effect can be seen in Haparanda and Kalmar, while the effect in Karlstad and Gothenburg is less pronounced.
For the construction of the synthetic control units, Table 2 displays the weights of each control municipality used in creating the synthetic control unit for the five top contributors. For example, the weights indicate that the productivity trend in Haparanda before IKEA entry is best reproduced by a combination of Strömstad and Krokom, with all other municipalities in the donor pool being assigned zero weights.

![Fig. 1. Productivity index for IKEA-entry municipalities and their synthetic control units, 2001–2012.](image)

Table 2. Weights used to create the synthetic control units, top five contributors.

<table>
<thead>
<tr>
<th></th>
<th>Haparanda</th>
<th>Kalmar</th>
<th>Karlstad</th>
<th>Gothenburg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strömstad</td>
<td>0.682</td>
<td>0.340</td>
<td>0.511</td>
<td>0.435</td>
</tr>
<tr>
<td>Krokom</td>
<td>0.318</td>
<td>0.295</td>
<td>0.304</td>
<td>0.275</td>
</tr>
<tr>
<td>Östersund</td>
<td>0.295</td>
<td>0.295</td>
<td>0.102</td>
<td>0.245</td>
</tr>
<tr>
<td>Vellinge</td>
<td>0.013</td>
<td>0.013</td>
<td>0.061</td>
<td>0.045</td>
</tr>
<tr>
<td>Falun</td>
<td>0.011</td>
<td>0.011</td>
<td>0.003</td>
<td></td>
</tr>
</tbody>
</table>
Inference in the Synthetic Control Method

Placebo Test

As mentioned, we first perform a series of placebo studies (Abadie, Diamond, and Hainmueller 2010) to confirm that our estimated effects are large relative to the distribution of the estimate obtained when applying the same analysis to the municipalities in the refined donor pool. We first present and discuss the results regarding the IKEA entry into Haparanda, later discussing the other three IKEA entries. For the IKEA entry into Haparanda, Figure 2a (left panel) shows the gap in productivity between each unit in the donor pool and its respective synthetic control unit (bold black line: Haparanda; other lines: control units), while Figure 2b (right panel) shows the distribution of the test statistic $\text{MSPE}_{\text{ratio}} = \frac{\text{MSPE}_{\text{post}}}{\text{MSPE}_{\text{pre}}}$. Graphs like Fig. 2a and b for the other entry municipalities are found in Appendix 1, while the $\text{MSPE}_{\text{ratio}}$ measure, along with non-parametric and parametric bootstrapped confidence intervals, are found for all entry municipalities in Table 3 below.

Several matters should be noted from Figure 2 regarding the inference. The observed productivity growth, compared with the synthetic control unit, is strong and obvious—the estimated productivity growth is almost 100% due to the IKEA entry. Furthermore, the productivity evolution in Haparanda is characterized by gradual and fairly smooth growth, suggesting the possibility of a simple growth curve approximation. Finally, for the placebo tests, there is no control unit remotely matching the observed productivity growth in Haparanda, so one would expect clear-cut statistical significance when conducting formal statistical testing. However, the placebo test is not particularly powerful, as can be seen in Figure 2b. There is one control with an $\text{MSPE}_{\text{ratio}}$ exceeding and two others with ratios close to that of Haparanda. The price of using the non-parametric placebo test is a weaker likelihood of identifying an intervention effect.
Fig. 2a and b. Placebo results for the IKEA entry into Haparanda: the left panel shows productivity gaps in Haparanda and placebo gaps in all 21 control municipalities; the right panel shows the MSPE ranking of all 21 units in the donor pool for Haparanda.

**Bootstrap Confidence Intervals Using Non-Parametric and Parametric Models**

In this section, we provide parametric and non-parametric bootstrap confidence intervals for the IKEA entry effect on productivity. The analysis is conducted using the following procedure: (1) sampling with replacement 200 times from the refined donor pool for each entry municipality; (2) applying the synthetic control method to obtain an estimated intervention effect for each of the 200 bootstrap samples; and (3) estimating non-parametric and parametric confidence intervals.

A contribution to the literature on synthetic control methods is that we also consider a parametric specification of the intervention effect, which in this case arguably improves the likelihood of identifying an intervention effect without imposing overly harsh model assumptions. Another reason why we consider using parametric versions is that the post-entry periods are quite short in our setting, possibly even too short for the full manifestation of the new productivity level. When the duration of observed data is sufficiently long, the estimates from parametric and non-parametric versions should not differ much, though in our setting there could be differences. We assume, based on the theoretical discussion above, that IKEA should
positively affect productivity through its direct effect on productivity levels, through agglomeration effects on other retailers in the entry area, or both.

![Graph](image)

**Fig. 3.** Bootstrap intervals for the effect of IKEA entry into Haparanda; the left panel is the non-parametric and the right panel the parametric model.

Figure 3 compares the bootstrap interval from the non-parametric and parametric estimations of the IKEA-entry effect on productivity in Haparanda, while similar figures for the other entry municipalities are presented in Figure 4. In the non-parametric estimations for Haparanda, the synthetic control unit provides a similar development of the productivity index before IKEA entry, with a fitting error, $\text{MSPE}_{\text{pre}}$, of 33.28 (Table 3). Table 4 provides the results regarding both parametric and non-parametric confidence interval estimations for all entry municipalities. The estimated intervention effect for Haparanda indicates an increase in the productivity index of 79.62, with a 95% non-parametric bootstrap interval of [59.44, 90.14], meaning that productivity (measured as CPI-adjusted sales per employee in durable goods retailing) increased by an average of almost 80% over the 2007–2012 period.

Another way, which we expect to be less powerful, to evaluate the treated unit’s gap relative to the gaps obtained from the placebo runs is to look at the distribution of the ratios of post-/pre-IKEA-entry MSPE. The main advantage of looking at ratios is that we need not arbitrarily choose a cut-off to exclude ill-fitting placebo runs (Abadie, Diamond, and Hainmueller 2010). If nothing had happened in Haparanda at the time of IKEA entry, this ratio would equal one, while if there is a treatment effect it will be significantly greater than 1. We find that the ratio
for Haparanda is 7.73 with an associated $p$-value of 0.04, indicating that IKEA entry into Haparanda has influenced labor productivity in durable goods retailing. Using the parametric estimation method, the estimated asymptotic IKEA-entry effect for Haparanda is 88.43 [60.39, 101.90], where the optimal growth model based on the AIC was found to be monomolecular. Averaging the implied intervention effect over the post-entry years, the effect is found to be 64.54 [47.97, 75.69].

The development of productivity in the synthetic control unit for Kalmar is also similar to the actual development in Kalmar in the pre-entry period as measured by the average fitting error presented in Table 3. Using the non-parametric method, the effect of IKEA entry on productivity was estimated to be 8.42 [1.37, 15.58], so the result suggests that the productivity in durable goods retailing in Kalmar increased by an average of 8% due to IKEA entry for the 2007–2012 period. The $\text{MSPE}_{post}$ measure for Kalmar is 2.83 with a $p$-value of 0.38, indicating no IKEA entry effect. Turning to the parametric estimates, the asymptotic and average effects of IKEA entry are 9.98 [2.39, 18.27] and 6.37 [1.19, 12.93], respectively, with the optimal model again being the monomolecular one.

Also for Karlstad, the fitness is good before IKEA entry, with a small pre-intervention fitting error of 7.90 (Table 3). The productivity in durable goods retailing in Karlstad is point-estimated to have increased by an average of 3.86% due to IKEA entry when measured for the 2007–2012 period, and the $\text{MSPE}_{post}$ value is 1.59 with a $p$-value of 0.36. The asymptotic and average effects are 0.06 [–0.35, 0.29] and 3.54 [0.21, 7.1], with the optimal model being the monomolecular one for the third time.

Finally, to provide enough potential control units for Gothenburg, we had to relax the clustering conditions to using only two variables: pre-entry productivity and the percentage of the population with a university education. Doing this, we could create a synthetic control unit where the pre-IKEA-entry fit is good for Gothenburg as well, with a fitting error of 8.62 and an estimated IKEA-entry effect of 2.68 [–1.62, 5.80], and thus not statistically significant at conventional levels. The $p$-value based on the placebo test is 0.90. Moreover, the asymptotic and average effects are 3.89 [–1.20, 7.53] and 2.60 [–1.44, 5.27], respectively, again indicating no effects of IKEA entry on labor productivity. The preferable growth model was found to be the Gompertz one.
Table 3. SCM estimation fitness prior to intervention.

<table>
<thead>
<tr>
<th>Periods prior to IKEA entry</th>
<th>Haparanda</th>
<th>Kalmar</th>
<th>Karlstad</th>
<th>Gothenburg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>6.98</td>
<td>-1.67</td>
<td>0.87</td>
<td>1.83</td>
</tr>
<tr>
<td>1~3 years</td>
<td>11.34</td>
<td>-4.47</td>
<td>0.39</td>
<td>-2.63</td>
</tr>
<tr>
<td>All years</td>
<td>10.69</td>
<td>0</td>
<td>-0.16</td>
<td>1.83</td>
</tr>
<tr>
<td><strong>MSPE</strong></td>
<td><strong>All years</strong></td>
<td><strong>33.28</strong></td>
<td><strong>8.99</strong></td>
<td><strong>7.90</strong></td>
</tr>
</tbody>
</table>
Table 4. IKEA-entry effect estimation; bootstrapped non-parametric and parametric 95% confidence intervals.

<table>
<thead>
<tr>
<th></th>
<th>Haparanda</th>
<th>Kalmar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-parametric</td>
<td>Parametric</td>
</tr>
<tr>
<td>gap_post_1</td>
<td>50.54          [30.32, 55.47]</td>
<td>4.25 [–4.07, 10.63]</td>
</tr>
<tr>
<td>gap_post_3</td>
<td>72.87          [63.74, 81.06]</td>
<td>7.72 [0.56, 13.93]</td>
</tr>
<tr>
<td>gap_post_all</td>
<td>79.62          [59.44, 90.14]</td>
<td>64.54 [47.97, 75.69]</td>
</tr>
<tr>
<td>MSPE_ratio</td>
<td>7.73           [2.29, 11.15]</td>
<td>2.83 [0.53, 5.99]</td>
</tr>
<tr>
<td>α∞</td>
<td>Monomolecular   0.06 [–0.35, 0.29]</td>
<td>Gompertz 3.89 [–1.20, 7.53]</td>
</tr>
</tbody>
</table>

Note: gap_post_1 is the value of the productivity gap between the intervention unit and its synthetic control one year post intervention; gap_pre_3 is the value of the productivity gap three years post intervention; gap_post_all is the mean value of gaps for all years after the intervention.
Figure 4. Bootstrap intervals for the effect of IKEA entry into Kalmar, Karlstad, and Gothenburg; left panel is the non-parametric and the right panel the parametric model.
Summary and Discussion

This paper has investigated how IKEA entry affects local labor productivity in durable goods retailing. Estimation and inference are done using the synthetic control method (Abadie, Diamond, and Hainmueller 2010, 2015; Abadie and Gardeazabal 2003). This method has several advantages over traditional difference-in-difference analysis, which has been the standard tool used in the literature to evaluate big-box retail entry. It can be used without imposing the assumption that the treated and control units would have had parallel trends in the absence of treatment, when treatment assignment is non-random, when the number of treated units is small or even one, and when one suspects that estimation of an average treatment effect for several treated units would be misleading due to significant heterogeneity in the treatment effects, all problems that could occur in our setting.

A potential drawback of the synthetic control method is that statistical inference is challenging when there is only one treated unit, and previous studies have resorted to placebo testing for inference. A caveat with placebo testing is its potentially low power, implying a difficulty in identifying an actual intervention effect. In this paper, we therefore also consider parametric specifications of the productivity growth due to the entry of IKEA and bootstrap observations from the pool of potential control units for inference. We apply three inferential methods: we use the placebo testing of Abadie, Diamond, and Hainmueller (2010, 2015), but we also use the non-parametric and parametric bootstrap interval estimations suggested by Carling and Li (2017) to establish inference.

We find that the establishment of new IKEA retail areas has a positive effect on average labor productivity, and that the positive effect is less pronounced when IKEA entry takes place in a municipality with a well-developed durable goods retail sector even before IKEA entry. In Haparanda, the smallest entry municipality, average productivity increased by some 80%, while in Kalmar, the second smallest entry municipality, it increased by 8%. In the larger entry municipality of Karlstad, the increase in productivity was 4%, while in the case of the urban entry into Gothenburg, all three inferential methods suggested no statistically significant increases in productivity.

The large effect in Haparanda was due to the characteristics of that entry region, which had a less developed durable goods retail sector before IKEA entered the market and was also a small municipality with only 9500 inhabitants. In such a setting, entry by a big-box retailer such as IKEA will have profound effects, since an IKEA store in Sweden has an average turnover of approximately SEK 800 million. This should be compared with the total durable goods retail sector in Haparanda before IKEA entry, which had a turnover of SEK 140 million. For the
larger entry municipalities of Kalmar and Karlstad, IKEA still positively affects productivity in durable goods retail, but the effects are less pronounced.

These results are also important for local policymakers, as many Swedish municipalities are spending large amounts to attract IKEA outlets. It should be noted that if IKEA would have entered a new market in Sweden in any case, and many different municipalities were bidding for IKEA entry into their municipality, then this bidding may very well have turned into a zero-sum game in which the benefits that IKEA brings to the municipality might have been lost (Daunfeldt et al. 2017). Second, as demonstrated here as well as by Håkansson et al. (2016) and Han et al. (2018), the benefits for labor productivity and total factor productivity were much more pronounced in smaller entry municipalities, with the largest effect found in Haparanda and no statistically significant positive effects found for the urban entry into Gothenburg in any of these studies. This suggests that smaller municipalities might have an incentive to use public funds to attract IKEA entries, while large municipalities do not.
Acknowledgments

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References


Appendix

Kalmar placebo test

Karlstad placebo test