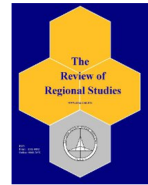




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# How does Big-box Retail Entry Affect Incumbents in the Hospitality Industry: Evidence from a Natural Experiment\*

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**Abstract:** We use entry by IKEA in four Swedish municipalities as a natural experiment to measure the effects of big-box retail entry on the revenues of incumbent firms in the hospitality sector. We further investigate whether the effects depend on the size of the local market before entry. Our results show a negative impact on the revenues of incumbents in Haparanda, Kalmar, and Karlstad, but insignificant effects in the metropolitan region of Gothenburg. As most firms in the hospitality sector are restaurants, we expect that our results are due to increased competition since all IKEA stores come with large, popular, and reasonably-priced restaurants.

*Keywords:* big-box entry, agglomeration, hospitality sector

*JEL Codes:* D22, L11, L25, L83, P25

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## 1. INTRODUCTION

The impact of large retail entry on the revenues of incumbent retailers has been shown to differ depending on the type of products the incumbents are selling (Han et al., 2018). Firms selling complements to the large entrant firm are expected to experience increases in revenues generated by demand- and supply-side spillovers. The relationship between large retail entry and firms selling substitutes is more intricate. On the one hand, incumbents selling substitutes may also be benefited through supply- and demand-side externalities. Industrial

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co-location helps decrease input costs, facilitates labor matching, and increases knowledge spillovers (Marshall, 1920; Hotelling, 1929; Weber, 1929; Christaller, 1933; Lösch, 1940), thus determining further increases in firm revenues within the cluster. On the demand-side, spillovers are explained by gravitation-related arguments, which state that entry by large retailers (like IKEA) selling high-order goods on a local market increases the centrality of the place, leading to a widening of its ‘catchment’/market area. This means that customers travelling from further away are now attracted to the enlarged shopping area, increasing its customer base and simultaneously the need for accommodation and food services.

On the other hand, entry by large retailers creates competitive pressure in the entry regions. A new IKEA store is expected to increase competition for incumbents selling furniture and furnishings. IKEA is also competing with the hospitality industry as every IKEA store comes with its own large, popular, and reasonably-priced restaurant. This relationship has been largely disregarded in the literature, although IKEA is expanding and entering new markets at a fast pace. In 2016 alone, sales at IKEA increased by 7.9 percent and net profits by 19.6 percent compared to the previous year, while they opened 31 new stores and pick-up points worldwide. In addition, IKEA welcomed close to 800 million visitors to their stores (IKEA, 2016) and 650 million guests to their restaurants (Krogarna, 2017), which are standard for all new stores. In Sweden only, IKEA Food had a turnover of about 1.7 billion SEK<sup>1</sup> and hosted more than 200,000 guests in 2016 (IKEA, 2016; Krogarna, 2017).

It is important to investigate how entry by IKEA impacts the revenues of incumbent firms within the hospitality sector in Sweden. A number of studies have previously focused on the impacts of entry by large retailers on the revenues, employment, and productivity of incumbent retail firms.<sup>2</sup> However, potential cross-industry effects of large retail entry on incumbent revenues are largely unexplored, although some studies warned about the importance of ‘micro-heterogeneity’ within locations. For example, Freedman and Kosová (2012) argue that not all firms are affected in the same way by agglomeration. Even within the same industry, while some firms may be gaining, others may be losing depending on the strength of the agglomeration and competition effects. We thus focus on cross-industry relationships and also differentiate between entry markets of different size because the literature indicates a productivity gap between smaller and larger markets, which is linked to firm productivity (Henderson et al., 2001; Rice et al., 2006; Saito and Gopinath, 2009). While Han et al. (2018) has already shown that this gap is reduced for retail firms following entry by IKEA, it is interesting to also see what the effect is for firms in the hospitality sector.

Although an investigation into how IKEA entry affects incumbent firms in the hospitality industry is important, there are also reasons to believe that the events analyzed in this study will become more common in other countries and for other big-box retailers. First, as IKEA increases the number of stores in other countries, it is likely that these entries will take place in increasingly smaller communities. Our analysis can provide an indication of how incumbent firms in the hospitality sector in these smaller cities will be affected. Second, as e-commerce increases its competition with traditional big-box stores, these businesses will have to differentiate their offer to the consumers, preferably in a manner that e-tailers cannot replicate. One way of doing so is to offer restaurant services at the big-box store location. We

<sup>1</sup>Approximately 160 million EURO. Exchange rate 2019-06-24: 1 SEK = 0.094 EURO.

<sup>2</sup>See, for example, Maican and Orth (2012), Daunfeldt et al. (2015), and Rudholm et al. (2018)

thus expect the combination of big-box retailing and restaurants to become more common in the future.

Methodologically, the estimation of how big-box retail entry might affect the revenues of incumbent firms within the hospitality sector in the entry municipalities is not an easy task. Previous studies of how IKEA entry affects incumbent retailers in local economies (Daunfeldt et al., 2015, 2017) use traditional difference-in-differences estimation methods, after first trying to select control group municipalities with similar characteristics to the entry municipalities. We follow these studies in that we first select control group municipalities that are similar to the entry municipalities in terms of the determinants of IKEA entry and other relevant characteristics, and thus suitable to use as counterfactuals when measuring the development in incumbent firms within the hospitality sector in absence of IKEA entry. As in Håkansson et al. (2016), we use the municipalities deemed suitable for entry by IKEA in the period 2013-2016 as controls for IKEA entries in smaller markets in the period 2006-2007, and the metropolitan area of Stockholm as a control for the entry in the larger Gothenburg area in 2004. Secondly, we use a difference-in-differences translog production function to measure the impact of IKEA entry on output, measured as the change in consumer price adjusted revenue at the time of IKEA entry, holding the use of capital and labor inputs constant.

Our results show that the effects of IKEA entry on the revenue of firms in the hospitality industry in the entry regions are negative and significant. Furthermore, the effect depends on the size of IKEA relative to the size of the local market, with larger (in absolute terms) negative effects identified for IKEA entry in smaller markets. While the effect is insignificant in the metropolitan area of Gothenburg, entry by IKEA accounts for an average decrease of 10 percent in the revenues of incumbents in Karlstad, 13 percent in Kalmar, and 34 percent in the much smaller municipality of Haparanda. The large effect in Haparanda is mainly due to the very small size of the market compared to the new establishment. In 2005, before IKEA entered, the turnover in durable goods retailing in Haparanda was of about 140 million SEK, compared to the average IKEA store turnover in Sweden of about 800 million SEK (IKEA, 2017).<sup>3</sup>

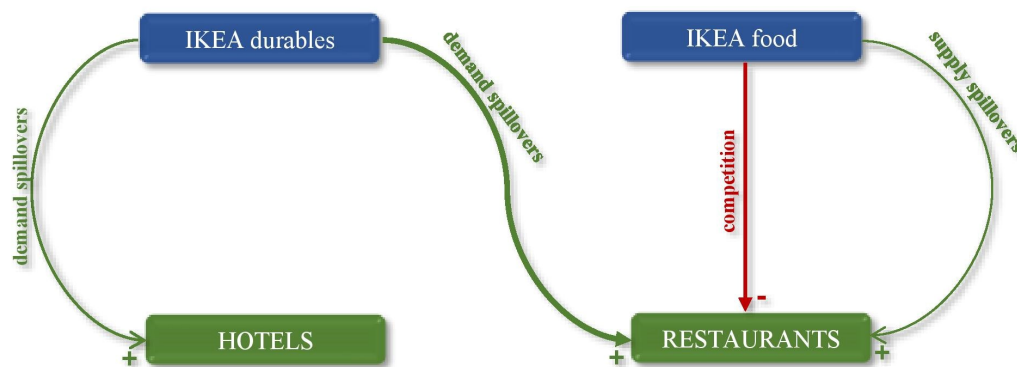
The rest of the paper will proceed as follows. Section 2 presents the theoretical foundations for why big-box entry affects revenues of firms in the hospitality sector and a summary of previous research. Section 3 presents our identification strategy and empirical model, while Section 4 presents the data, descriptive statistics and estimation results. Section 5 discusses the findings of the study.

## 2. THEORETICAL FOUNDATIONS AND PREVIOUS RESEARCH

To our knowledge, no previous studies have investigated the effects of IKEA entry on the revenues of incumbent firms in the hospitality sector in the entry regions. This merits study because a positive impact of big-box retail entry on revenues in incumbent hospitality sector firms in an entry region would indicate the possibility of both increased wages for employees and increased profits for firms.

<sup>3</sup>Approximately 13 and 75 million EURO, respectively. Exchange rate 2019-06-24: 1 SEK = 0.094 EURO.

**Figure 1:** Supply and Demand Spillovers between IKEA and the Hospitality Industry



In addition, the hospitality sector includes both restaurants and hotels, which makes it both a substitute and a complement to IKEA. IKEA sells furniture and furnishings, but in the same time comes with its own large, popular, and reasonably-priced restaurant. While the durables section of IKEA acts as a complement to the whole hospitality sector, IKEA Food becomes a complement to hotels in the entry region, but a substitute to incumbent restaurants. This triggers a series of mechanisms within the entry cluster that affect substitute and complement incumbents (restaurants and hotels) differently (see Figure 1).

### 2.1. IKEA as Complement to the Hospitality Industry

The possible agglomeration effects between IKEA and the restaurant industry in the entry areas are due to two types of linkages: demand spillovers and supply spillovers. Demand-side externalities are derived from three main factors: the increased size of the retail area, IKEA selling high-order products, and ‘branding.’

The gravitational pull model, grounded in Reilly’s (1931) law of retail gravitation, explains that it is the increasing total size of a trade center that leads to a widening of the ‘catchment’/market area for the respective center. The Central Place Theory (CPT), (Christaller, 1933) also states that entry by a large retailer selling high-order goods on a local market (like IKEA) increases the centrality of the place. This means that customers travelling from further away are attracted to the newly enlarged shopping area. Its size and its retailing profile (specialized on durable goods) makes that IKEA stores have considerably wider ‘catchment’

areas than other stores in the cluster. A new IKEA store is further increasing the customer base of the entry area because it ‘brands’ the shopping centers where it makes entry. As Kinley et al. (2002) explain, well-known brands have the power to attract customers from greater distances, increase loyalty, increase spending, target wider customer groups, and offer competitive advantage for the entry areas. They also explain that branded shopping centers become tourist destinations. It is thus understandable why IKEA boosts shopping tourism to the entry areas, thus increasing the customer base for the incumbent hotels and restaurants<sup>4</sup>.

These factors contribute to an increase in the attractiveness and thus the range of the retail area. This means that customers travelling from longer distances are likely to patronize the enlarged retail area, including some of the other incumbent shops and restaurants, due to increased possibilities for comparison and multipurpose shopping (Brown, 1989; Chung and Kalnins, 2001). Previous research shows that entry by IKEA increases the revenues of incumbent retail firms selling complementary products (in general) and located relatively close (within 2 km) to the new IKEA store (Han et al., 2018). The effect is also found to be larger in regions where the new entry is large relative to the existing local market (Håkansson et al., 2016; Han et al., 2018). An increase in the customer base may also mean a potential increase in sales for the restaurants in the entry area.

## 2.2. IKEA as Substitute to the Hospitality Industry

According to agglomeration theories, both supply and demand externalities could benefit incumbent restaurants in IKEA entry areas as they are substitutes to the new IKEA restaurants. Supply-side spillovers are achieved through decreases in shared costs from, for example, cost savings in distribution through shared infrastructure, better labor matching, and lower costs of innovation due to increased knowledge spillovers from co-location (Marshall, 1920; Hotelling, 1929; Weber, 1929; Christaller, 1933; Lösch, 1940). These spillovers lead either to reductions in the costs for inputs used in production or more efficient personnel, and thus increase firm productivity (Grossman and Helpman, 1991; Lucas Jr., 1988; Glaeser, 1999).

Demand-side spillovers from IKEA restaurants to incumbent restaurants are less likely, since ‘comparison shopping’ in the restaurant industry is less common than in retailing. This could mean that any positive effects from co-location may be counteracted by the centrifugal forces created by increased competition. Entry by big-box retailers creates competitive

<sup>4</sup>As IKEA attracts customers from longer distances, some of them would want to spend a night (or more) at the hotel before returning home, generating demand spillovers to the hotel industry. This trend has become stronger as shopping centers have become more popular as tourist destinations than seaside resorts, parks, and main towns (Robertson and Fennell, 2007). In Sweden, revenues from shopping tourism (trips whose primary goal are shopping activities) increased by 136 percent between 2000 and 2016, while revenues in hospitality in general increased by 97 percent and in retailing by 85 percent (Svensk Handel, 2017). This development is particularly important for smaller cities, such as Haparanda, where the income from shopping tourism activities generated by the entry of such giants like IKEA may generate a large part of their revenues. Such developments may generate so-called ‘self-reinforcing processes’ (Glaeser, 1999), where, for example, entry by firms such as IKEA may stimulate the creation of new amenities (e.g., hotels and restaurants) and the demand for specialized labor, which may stimulate further entry by firms in an area and thus create agglomerations (Johansson and Karlsson, 2009).

pressure in the entry regions because they are highly productive due to economies of scale and due to innovations in logistics, distribution, inventory control, computerization and use of specialized software, and communications (Foster et al., 2006; Basker, 2007), and many of these factors also apply to the new IKEA restaurants.

The response of the incumbents to increased competition depends on their capacity to increase their productivity or to differentiate their offer from that of the new entrant, but also on whether the customer base is large enough to support increased trade on the same local market (Freedman and Kosová, 2012). If incumbent restaurants in the entry area can innovate and differentiate their products enough to make them attractive to the customers, they will likely manage to increase their productivity and consequently survive the new challenge. However, if incumbents lack an appropriate reaction or if the customer base is not large enough (as it may very well be in sparsely populated areas), some of them will experience a decrease in productivity and eventually they will be displaced from the market. A new spatial equilibrium will then occur at a degree of spatial concentration where the agglomeration forces balance competition (Krugman, 1991; Venables, 1996; Ottaviano et al., 2002).

### **2.3. Differentiated Externalities**

The expected impact of a new IKEA store on the hospitality industry is two-folded depending on whether the incumbents are substitutes or complements to IKEA, and to which section of IKEA (durable goods or food) we relate them. It is expected that the durables section of IKEA increases the output of incumbent firms in the hospitality sector, probably less through supply- and much more through demand-side externalities as suggested by the findings presented in Han et al. (2018). When it comes to IKEA Food, although some supply externalities may occur (for example in the form of better labor matching or knowledge spillovers), the strongest acting force might very well be increased competition for the incumbent restaurants, which may reduce revenues faster than they can adjust their use of inputs. Consequently, their profits may decrease, which may at some point in time force them out of the market if they are not able to innovate and differentiate enough to survive the challenge.<sup>5</sup> So the question is whether supply and demand externalities created by IKEA entry are greater than the negative effect produced by increased competition for restaurants, coffee shops, and the like in the entry area.

### **2.4. Agglomeration Effects and the Size of the Local Market**

The literature also indicates that wages have persistently lagged behind in rural regions, compared with their urban counterparts (Henderson et al., 2001; Rice et al., 2006). This difference is due to a gap in productivity between urban and rural areas, a gap that is

<sup>5</sup>Our dataset is not ideally suited for identifying entry and exit. The only way of identifying entry and exit is by recording when a specific organization number for a retail firm appears in or leaves the dataset. There can, however, be a number of reasons for this, other than a formal entry or exit of a firm. If, for example, the firm is sold, it is often the case that the firm is registered with a new organization number. Thus, we are not able to analyze the effects of IKEA entry on the entry and exit of firms in the hospitality industry in the entry regions.

inherently linked to firm productivity (Saito and Gopinath, 2009). This would suggest that in small markets, where firms are on average less productive, competition effects generated by entry of a large actor may be stronger than in urban areas, where firms are more productive. This means that incumbent firms in the hospitality sector might have a harder time coping with increased competition due to the IKEA Food entry, and consequently that the gap between urban (large) and rural (small) markets is widened following the new large entry. On the other hand, supply and demand externalities from the large and more productive establishment may spillover to incumbent firms, helping them increase their output levels in the long-run. Incumbent firms may also be forced to find innovative ways to survive the challenge and thus force their productivity levels up. However, this depends to a great extent on whether a large enough customer base is available in the area to serve both the large new entrant and the smaller incumbents.

Previous research emphasized an inverse relationship between the size of the local market and the positive effect of big-box entry on retail revenues, suggesting that positive spillovers may be stronger in small markets than the centrifugal forces generated by competition. For example, Håkansson et al. (2016) indicated that big-box entry increased the CPI-adjusted revenues of incumbent retail firms in regions where the entry was large relative to the local retail market, while no such effects could be found in the case of larger urban markets. Other studies (Maican and Orth, 2015; Han et al., 2018; Rudholm et al., 2018) also show that the impact of big-box retail entry is larger in magnitude for markets that are smaller relative to the size of the new retailer, i.e., rural markets. This is, at first sight, surprising because the urban spatial literature indicates that it is large markets that grow more rapidly because of stronger spillovers and more highly-productive firms that want to locate in the area, thus creating a self-reinforcing process (Glaeser, 2011; Andersson and Larsson, 2018). Theories such as Reilly's (1931) law also suggest that increasing the total size of a market leads to a widening of the market, which may in the long-run lead to further entry, and thus growth of the respective market. However, these theories also suggest that these positive externalities may reach a saturation point when markets are too large and thus no further spillovers are likely to occur. That previous studies have found the positive impact of big-box retail entry on retail revenues to be larger in magnitude for rural markets is a clear sign that in such markets the demand- and supply-side externalities outweigh the increased competition, at least for retailers selling complement products to the big-box establishment.

## 2.5. Previous Studies

Studies on how shopping centers, big-box stores, and particularly entry by IKEA impact the hospitality industry in the entry region is a field largely left unstudied. Most of the literature on the relationship between retailing and hospitality is focused on the effects of investments in shopping centers and of shopping center attributes on patronage. Maronick and Stiff (1985) studied the effect of downtown shopping centers on patronage and found an increase in the number of visits for recreation and dining-out in the entry area in the period immediately following the entry. Kinley et al. (2002) added on the importance of shopping center attributes in attracting tourists. Both internal attributes such as cleanliness, safety, and the variety of the merchandise, as well as external attributes such as proximity to

transportation hubs and location in general, were deemed essential for shopping tourists. A few years later, Maronick (2007) found that the power of new specialty centers such as festival markets to attract tourists wears off in time. They also found that such centers attract ‘shopper tourists’ and ‘recreational shoppers’ rather than ‘conventional shoppers,’ which suggests that such developments may drive hospitality firms to locate in the area (see also Chapin (2004)). According to Jacobs (1961), when a primary use (such as shopping) is effectively combined with secondary diversity (such as restaurants), the city flourishes and the secondary diversity may even become a primary use itself in time, reinforcing the cycle and attracting even more customers to the area.

Only a few studies touched on the possible effects of large retailing on the hospitality industry. Robertson and Fennell (2007) found that visitors of shopping centers form a significant proportion of the trade of local hotels. They counted that up to 90 percent of weekend guests in certain areas with retail centers in the U.K. were staying specifically to undertake a shopping trip there, and that many returned on a regular basis. Shopping centers are a main factor in attracting short trips and business tourists, which are higher spenders than leisure visitors and also tend to return to attractive locations as leisure tourists. Freedman and Kosová (2012) studied agglomerations of establishments in the hotel industry and found that hotels are reluctant to enter areas with high concentrations of similar hotels as opposed to hotels with other standards. Studying retailing, Han et al. (2018) found no causal effects of increased agglomeration on substitute firms at all, while all positive effects pertain to firms that sell complements to new large entrants. However, no equivalent studies have to our knowledge been performed for the hospitality industry.

### 3. METHOD

In order to investigate the effects of IKEA entry on the CPI-adjusted revenues of incumbent firms in the hospitality industry in Sweden during the period 2001–2010, we treat the four IKEA entries in Sweden from 2004 to 2007 as exogenous events for the incumbent firms in the hospitality sector in the entry regions. Then, we select suitable control municipalities to the IKEA entry municipalities and use a difference-in-differences production function regression model on firm level data to estimate the impact of IKEA entry on the revenues of these firms. As such, we compare the CPI-adjusted revenues of hospitality sector firms in the entry regions after IKEA entry with the CPI-adjusted revenues of the same firms before IKEA entry, as well as with that of hospitality sector firms in the control regions throughout the study period.

#### 3.1. Selection of Control Group Municipalities

Two fundamental identification problems relate to our modeling strategy. First, it is impossible for a hotel or restaurant located in a region where an IKEA store enters to also be observed in the counterfactual state of not having IKEA enter that region. Second, it is likely that the regions chosen for entry by IKEA will differ substantially from randomly selected regions. Greenstone et al. (2010) point out that firms choose locations in an effort to maximize profits. If we are to correctly measure how IKEA entry affects incumbent



hospitality sector firms in the entry regions, we need to identify control regions that are as similar as possible to the entry regions with respect to the likelihood of IKEA entry and other relevant regional characteristics.

In two studies of how entry by IKEA affects revenues and employment in the durable goods retail industry in Sweden (Daunfeldt et al., 2015, 2017), control municipalities are identified using logit estimations to detect municipalities where IKEA did not enter, but which had a similar probability of entry based on observables. However, as pointed out by Greenstone et al. (2010), such a strategy implies that the IKEA entry decision can be correctly modeled by the observable characteristics of the municipalities, while in most cases many important characteristics are generally unknown and unobserved by the researcher. One obvious example is the subsidies often given to IKEA for entering certain municipalities, which in some cases become known for the entry municipalities after entry, but which remain unknown for the alternative entry sites (i.e., potential control municipalities).

Greenstone et al. (2010) address this problem by comparing the development for incumbent plants in winning counties to that of incumbent plants in losing counties that were the new plant's runner-up choice. As such, also the losing counties survived most of the selection process but narrowly lost in the end, making it likely that the entry and runner-up counties were similar in both observables and un-observables affecting the entry choice of the large plant.

We instead follow Håkansson et al. (2016) and Han et al. (2018) and choose the next round of IKEA entries, completed during the 2013–2016 period, as control municipalities for three of the four IKEA entries in Sweden during the 2004–2007 period, i.e., Kalmar (2006), Haparanda (2006), and Karlstad (2007). Our study period covers the years 2000–2010, and the building permits for the 2013–2016 round of IKEA entries, i.e., Borlänge, Uddevalla, and Umeå, were issued in 2011 (Borlänge and Uddevalla) and 2014 (Umeå), making it unlikely that incumbents in these municipalities anticipated the arrival of the new IKEA stores during our study period. The municipalities in the 2013–2016 round of entries are also similar to the pre-IKEA entry characteristics of the entry municipalities (Kalmar, Haparanda, and Karlstad) in several observables. For example, both Karlstad and Umeå have local universities, and both Borlänge and Kalmar have university college campuses, while the municipalities of Haparanda and Uddevalla have no higher education institutions. In addition, both the markets in the entry and in the control groups are essentially rural and similar in population density with fewer than 80 inhabitants per square kilometer. Most importantly, however, is that both the entry and control group municipalities were deemed suitable entry locations by IKEA itself within a 10-year period, indicating that these municipalities should be similar in terms of both observable and unobservable determinants of IKEA entry. Daunfeldt et al. (2015, 2017) and Han et al. (2018) have also demonstrated that for the Swedish entries under study, the regional spillover effects regarding revenues, employment, and productivity in the retail industry of IKEA entry are limited to the entry municipalities. Therefore, we focus our study on the potential spillover effects within the above-mentioned entry municipalities.

The fourth IKEA entry under study took place in the urban metropolitan area of Gothenburg in 2004 and is the second IKEA store in the region. Gothenburg is Sweden's second largest city; its metropolitan area consists of 13 municipalities and has approximately 1 million inhabitants. As explained in Håkansson et al. (2016), only two other Swedish metropoli-

tan areas can reasonably be considered potential control regions for Gothenburg: Stockholm and Malmö.<sup>6</sup> However, Malmö is a special case with its close ties to another metropolitan area, Copenhagen. Thus, Stockholm metropolitan area, with its 26 municipalities and about 2 million inhabitants is more suited as a control for Gothenburg than Malmö. Most importantly, Stockholm has two IKEA stores, one in the northern and another in the southern part of the metropolitan core, meaning that both Stockholm and Gothenburg have been deemed suitable as two-store metropolitan areas by IKEA.

In Figure 2, the entries studied here (i.e., Gothenburg metropolitan area and Haparanda, Kalmar, and Karlstad municipalities) are marked in (dark) blue while the control regions (i.e., Stockholm metropolitan area and Borlänge, Uddevalla, and Umeå municipalities) are marked with stripes. The other previous IKEA-entry municipalities are marked in (light) green.

### 3.2. The Difference-in-differences Production Function Model

After selecting suitable control regions, we follow Greenstone et al. (2010) and Håkansson et al. (2016) and use a difference-in-differences production function regression model to measure the effect of IKEA entry on the CPI-adjusted revenues of incumbent hospitality sector firms in the entry municipalities.

In our most general specification, the firms are assumed to use a production technology that can be described by the transcendental logarithmic (translog) production function developed by Christensen et al. (1971). This functional form can be seen as a second-order Taylor series approximation with a remainder term of an arbitrary production function, and can be written as follows:

$$\ln Q_{i,t} = \beta_1 \ln L_{i,t-1} + \beta_2 \ln K_{i,t-1} + \beta_3 \ln^2 L_{i,t-1} + \beta_4 \ln^2 K_{i,t-1} + \beta_5 \ln L_{i,t-1} \ln K_{i,t-1} + R_{i,t}, \quad (1)$$

where  $Q_{i,t}$  is a measure of output in hospitality sector firm  $i$  at time  $t$ , and where  $L_{i,t-1}$  and  $K_{i,t-1}$  are measures of the labor and capital inputs used by firm  $i$ , respectively, both lagged one period.<sup>7</sup>

As discussed in Håkansson et al. (2016), the revenues of the studied hospitality firms must be discounted using a price index to arrive at a relevant measure of output. As such, following a suggestion of the OECD regarding how to measure output in multiple product or service firms (OECD, 2001), output ( $Q_{i,t}$ ), is defined as revenues of firm  $i$  in year  $t$  discounted by the Swedish consumer price index (CPI). Labor ( $L_{i,t-1}$ ) is measured as the total number

<sup>6</sup>As noted by Håkansson et al. (2016), municipalities in Swedish metropolitan areas are geographically very small and not individually representative of the market of new IKEA stores. As such, we use metropolitan areas instead of municipalities for comparison when studying the urban IKEA entry in Gothenburg.

<sup>7</sup>A potential problem is that the input variables may be endogenous, i.e., they may correlate with the error term of the equation for the CPI adjusted revenue of hospitality sector firms. Such endogeneity could be due to missing or measurement errors in the data, but our main concern in this paper is endogeneity due to revenues being simultaneously determined with the use of capital and labor. As such, we choose to use lagged (i.e., predetermined) values of capital and labor in the estimation of equation (3).

**Figure 2:** IKEA-entry, Control, and Previous IKEA-entry Municipalities in Sweden



of employees of firm  $i$  at time  $t - 1$ , while capital ( $K_{i,t-1}$ ) is measured as the book value of total capital of firm  $i$  at time  $t - 1$ , and both variables have been log transformed.

Finally,  $R_{i,t}$  is the remainder term of the Taylor series approximation, which in most empirical work is assumed to contain a constant and a random error term, making equation (1) a standard ordinary least squares regression model. However, as we are interested in measuring how the entry of an IKEA store in a region affects the revenues of incumbent hospitality sector firms, i.e., whether IKEA entry causes a shift in the production function of the affected firms while holding the levels of the capital and labor inputs constant, our remainder term needs to take this into account. As such, we propose the following remainder term:

$$R_{i,t} = \beta_0 + \beta_6 TR_i + \beta_7 TP_t + \beta_{TP*TR} (TP_t * TR_i) + \gamma_m + \alpha_n + \varepsilon_{i,t} \quad (2)$$

where  $\beta_0$  is a constant,  $TR_i$  is an indicator variable equal to one for firms located in the IKEA-entry region, and zero otherwise, and  $TP_t$  is an indicator variable equal to one for the treatment period (i.e., after IKEA entry), and zero otherwise. Our key variable of interest is the interaction between  $TP_t$  and  $TR_i$ , as this will provide an estimate of the treatment effect, i.e., how the revenues of incumbent firms in the hospitality sector in the entry region after IKEA entry compares with their own revenues before entry, and with the revenues of the hospitality sector firms in the control group throughout the study period, holding the levels of inputs (i.e., labor and capital) constant. A positive and statistically significant parameter estimate for  $\beta_{TP*TR}$  indicates that revenues have increased while holding the use of capital and labor constant. To control for heterogeneity between the IKEA entry- and control municipalities, municipality fixed effects ( $\gamma_m$ ) are also included in our model. Finally, the model contains four-digit NACE-code industry fixed effects ( $\alpha_n$ ) to consider possible time-invariant heterogeneity across the different sub-industries belonging to the hospitality sector. As such, the treatment effect will be identified by the change in treatment status of hospitality sector firms within the same municipality and 4-digit SNI-2002 code hospitality industry.<sup>8</sup>

Combining Equations (1) and (2) gives:

$$\ln Q_{i,t} = \beta_0 + \beta_1 \ln L_{i,t-1} + \beta_2 \ln K_{i,t-1} + \beta_3 \ln^2 L_{i,t-1} + \beta_4 \ln^2 K_{i,t-1} + \beta_5 \ln L_{i,t-1} \ln K_{i,t-1} + \beta_6 TR_i + \beta_7 TP_t + \beta_{TP*TR} (TP_t * TR_i) + \gamma_m + \alpha_n + \varepsilon_{i,t}. \quad (3)$$

Equation (3) is a difference-in-differences translog production function model in which  $\beta_{TP*TR}$  estimates the conditional average treatment effect. This type of difference-in-differences estimator is one of the tools most frequently used in applied economics research to evaluate the effects of public interventions and other treatments of interest on relevant outcome variables (Abadie, 2005). As mentioned above, the ordinary least square estimation for  $\beta_{TP*TR}$  indicates a significant IKEA entry effect on the CPI-adjusted revenues of incumbent firms in the hospitality sector if we can reject the hypothesis that  $\beta_{TP*TR} = 0$ . For comparison, we will also present results from two other specifications, a Cobb-Douglas production function difference-in-differences model and a traditional, non-production function difference-in-differences model (see section 4 and the online supplemental material).

<sup>8</sup>The SNI-2002 code system for industry classification is discussed in more detail in section 4 below.

The results from our empirical estimations are difficult to predict as they will be a combination of two opposing forces. On one side, hospitality sector firms in entry regions may become more productive in that they increase their revenues for given levels of labor and capital after IKEA entry. Agglomeration economies caused by the new IKEA may function as centripetal forces since knowledge spillovers may make labor more productive and there may be demand externalities from the pull generated by the size, order of goods sold, and reputation of IKEA. However, co-location with IKEA also intensifies competition, especially for incumbent restaurants, and could do so to the extent that the positive agglomeration effects are dominated by the competition effects.

#### 4. DATA, DESCRIPTIVE STATISTICS, AND ESTIMATION RESULTS

To investigate the effect of IKEA entry on the revenues of incumbent hospitality sector firms in IKEA-entry municipalities, we use data on all limited liability companies in the hospitality industry that were active in the entry and control municipalities at some point between 2001 and 2010. The data were collected from PAR, a Swedish consulting firm that compiles this information from the Swedish Patent and Registration Office (PRV), and include all variables registered in the annual reports.

The determination of if a firm belongs to the hospitality industry is made based on the firm's reported main activity within the Swedish SNI-2002 code system. According to the Swedish industry classification (SNI)<sup>9</sup>, the hospitality industry includes data on accommodation facilities (assembled in this paper under the denomination of 'hotels:' hotels, hostels, conference facilities, camping sites, and holiday villages) and on food facilities (or 'restaurants,' including not only restaurants but also coffee shops, bars, restaurants in hospitals, schools, and other institutions, and catering activities). Of the 7,775 firms in our sample, 20 percent are hotels and 80 percent are restaurants which also resembles the distribution at the national level. Consequently, the results presented below will to a larger extent be driven by the restaurant industry, making it more likely that the competition effects outweigh the agglomeration effects since the food sector hospitality firms must compete with the new IKEA restaurants after entry. A potential caveat is that this classification does not allow us to differentiate between the effects of IKEA entry on accommodation and on food facilities since many of the firms within the accommodation category also include food facilities at their place of business.

Descriptive statistics for the variables included in the empirical model are presented in Table 1, and the t-tests of differences in means indicate that the data from the entry and control municipalities are quite similar, not only for output but also for our measures of capital and labor.

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<sup>9</sup>Similar to the European NACE-code system.

**Table 1:** Means, Standard Deviations, T-tests of Differences in Means, Variable Description, and Data Source for Incumbent Firms in the Hospitality Industry

Variable	Small market entries		Kalmar	Karlstad	Small market controls	Mean difference	t-value	Large market entry	Gothenburg	Large market control	Mean difference	t-value	Variable description	Data source
	Haparanda													
$\ln Q_{i,t}$	6.61 (0.74)	6.59 (0.70)	6.54 (0.51)	6.54 (0.73)	0.097**	2.12	6.55 (0.72)	6.59 (0.77)	-0.004 (0.77)	-0.17	Revenues of firm $i$ in year $t$ discounted by CPI	PAR/Statistics Sweden/own calculations		
$\ln K_{i,t-1}$	5.64 (1.70)	5.72 (1.90)	5.44 (1.65)	5.48 (1.87)	0.082	1.31	5.60 (2.02)	5.48 (2.07)	0.095***	2.85	Total capital of firm $i$ in year $t$	PAR/own calculations		
$\ln L_{i,t-1}$	1.12 (0.86)	1.58 (0.88)	1.58 (0.87)	1.56 (0.96)	0.005	0.15	1.72 (1.11)	1.62 (1.14)	0.004	0.22	Total number of employees of firm $i$ in year $t$	PAR/own calculations		
$\ln^2 K_{i,t-1}$	34.60 (17.44)	36.31 (23.43)	32.34 (18.22)	33.50 (20.50)	-0.128	-1.17	35.46 (23.30)	34.29 (24.84)	-0.115	-1.38	$\ln K_{i,t-1}$ squared	PAR/own calculations		
$\ln^2 L_{i,t-1}$	1.98 (1.97)	3.29 (2.96)	3.25 (3.21)	3.34 (3.37)	0.467	0.66	4.18 (4.99)	3.92 (5.17)	0.746*	1.91	$\ln L_{i,t-1}$ squared	PAR/own calculations		
$\ln K_{i,t-1} \ln L_{i,t-1}$	6.59 (5.43)	10.02 (7.55)	9.44 (6.82)	9.66 (7.32)	-0.143	-0.55	11.41 (10.05)	10.65 (10.43)	-0.005	-0.03	$\ln L_{i,t-1}$ multiplied by $\ln K_{i,t-1}$	PAR/own calculations		
$TP_t$	0.53 (0.50)	0.57 (0.49)	0.45 (0.50)	0.54 (0.50)	0.019	1.33	0.72 (0.45)	0.55 (0.50)	0.001	0.19	Indicator variable equal to one for treatment period years	Own calculations		
$TR_i$	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00	.	1.00 (0.00)	0.00 (0.00)	1.00	.	Indicator variable equal to one for firms located in treatment municipalities	Own calculations		
$TP_t \times TR_i$	0.53 (0.50)	0.57 (0.49)	0.45 (0.50)	0.00 (0.00)	0.124***	44.52	0.72 (0.45)	0.00 (0.00)	0.711***	139.64	Indicator variable equal to one for firms located in treatment years	Own calculations		

Note: The t-test of difference in means for the small markets has been performed between averages over the three entries (Haparanda, Kalmar, Karlstad) and the averages of the three controls (Borlänge, Uddevalla, and Umeå).

**Table 2:** Estimation Results, Dependent Variable  $\ln Q_{i,t}$ , Translog Model

	Haparanda		Kalmar		Karlstad		Gothenburg	
	coef.	std. err.	coef.	std. err.	coef.	std. err.	coef.	std. err.
$\ln K_{i,t-1}$	-0.012	0.042	0.009	0.036	0.060	0.037	0.098***	0.018
$\ln L_{i,t-1}$	0.359***	0.115	0.457***	0.119	0.218**	0.101	0.191***	0.023
$\ln^2 K_{i,t-1}$	0.015***	0.004	0.009**	0.004	0.005	0.004	0.002	0.002
$\ln^2 L_{i,t-1}$	-0.003	0.022	-0.054**	0.024	0.006	0.019	0.004	0.004
$\ln K_{i,t-1} \ln L_{i,t-1}$	-0.048***	0.017	-0.032*	0.018	-0.032**	0.015	-0.027***	0.000
$TP_t$	0.099**	0.040	0.095**	0.039	0.106***	0.035	0.035**	0.020
$TR_i$	0.143	0.090	0.036	0.061	0.019	0.059	0.258	0.200
$TP_t \times TR_i$	-0.418**	0.190	-0.139**	0.066	-0.108**	0.041	-0.009	0.027
<i>Treatment Effect</i>	-34.16%**		-12.98%**		-10.24%**		-0.90%	
Industry FE	yes		yes		yes		yes	
Municipality FE	yes		yes		yes		yes	
Obs	1,070		1,392		1,466		15,303	
R <sup>2</sup>	0.12		0.10		0.10		0.11	

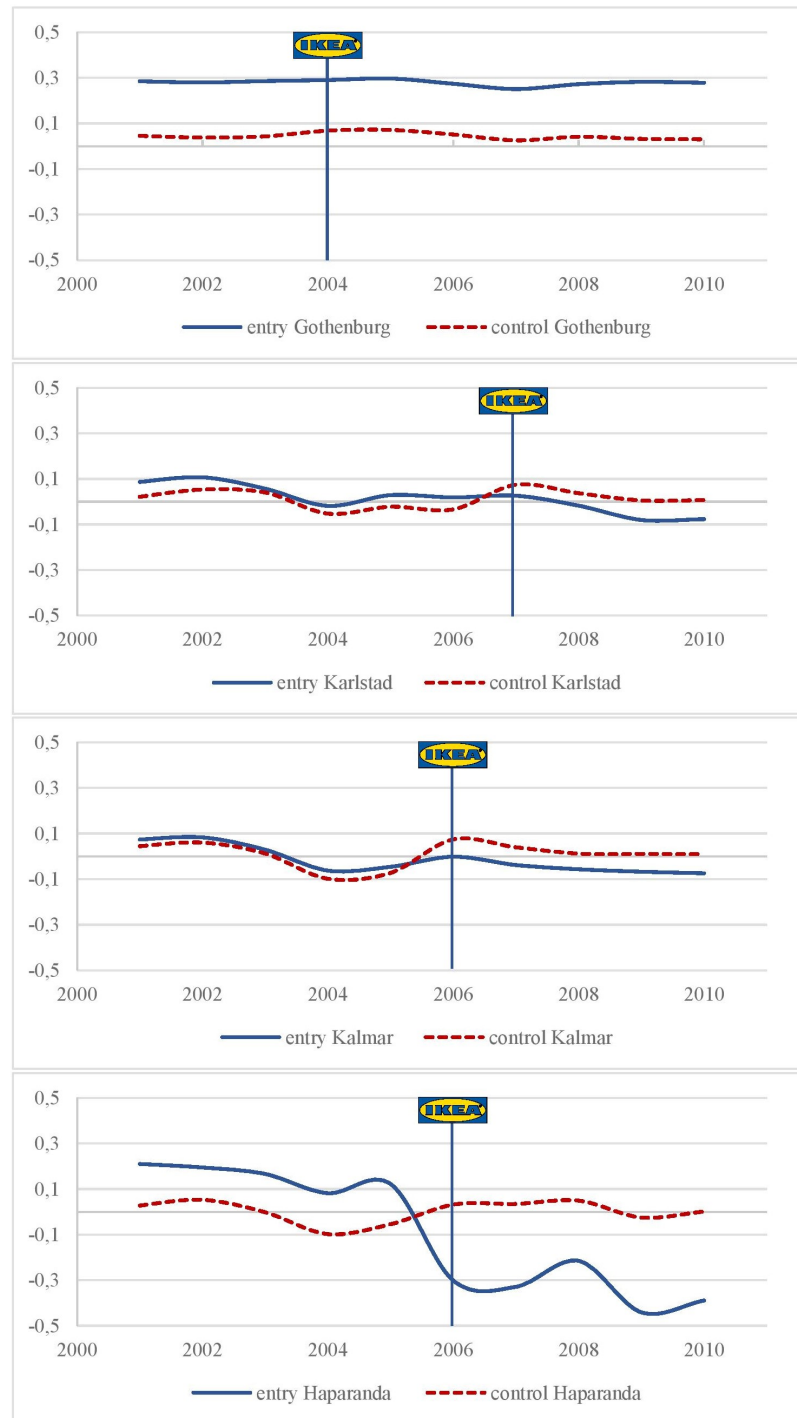
\*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, and \* significant at the 10 percent level. Note: The treatment effects are calculated using the formula  $100 \times [\exp(\beta_{TP*TR}) - 1]$ , which allows us to present the results in percentage terms (Woolridge, 2010). We use Huber-White robust standard errors in all our estimated models.

The results from the estimation of equation (3) are presented in Table 2. The main variable of interest is the interaction between being a hospitality sector firm located in the entry regions ( $TR_i$ ) and having an observation related to the time period after entry ( $TP_t$ ). The parameter estimate related to this variable compares the CPI-adjusted revenues of hospitality sector firms in the entry region after IKEA entry with the revenues of the same firms before IKEA entry, and with that of hospitality sector firms in the control regions throughout the study period. The log transformation of revenues in the hospitality sector firms ( $Q_{i,t}$ ) has the benefit of making the parameter estimate related to the effect of IKEA entry from our difference-in-differences model interpretable in percentage terms after using the formula  $100 \times [\exp(\beta_{TP*TR}) - 1]$ . The index  $TP * TR$  indicate that it is the parameter estimate related to the interaction variable equal to one for hospitality sector firms being in the entry regions ( $TR$ ) in the period after IKEA entry ( $TP$ ) that should be used in the calculations (Woolridge, 2010). These results interpreted in percentage terms are presented on the row marked *Treatment Effect* in Table 2.

The results show that IKEA entry decreased the revenues of incumbent hospitality sector firms by, on average, 34 percent in Haparanda, the smallest market analyzed in our study. For Kalmar, the decrease in revenues was 13 percent, while for the larger entry municipality of Karlstad the effects were smaller (10 percent), but still statistically significant at the 5 percent level. No statistically significant effects were found for the IKEA entry in the Gothenburg metropolitan area<sup>10</sup>.

<sup>10</sup>To eliminate the possibility that the null effect is being driven by establishments in municipalities that are far from the new store, we have excluded from our sample all the municipalities that are not adjacent neighbors to the entry municipality of Gothenburg. We have done the same for the control metropolitan area of Stockholm and excluded all the municipalities that are not adjacent neighbors to the two municipalities that have IKEA stores in this area. Rerunning our regression with the new entry and control

**Figure 3:** Pre- and Post-treatment Trends in Residuals for each Entry and the Corresponding Control Municipalities





**Table 3:** IKEA Entry Effect on the Productivity of Incumbent Firms in Hospitality

	Haparanda	Kalmar	Karlstad	Gothenburg
Translog model	-34.16%**	-12.98%**	-10.24%**	-0.90%
Cobb-Douglas model	-33.44%**	-14.27%**	-10.42%**	-1.09%
Difference-in-differences model	-31.55%**	-19.43%***	-3.54%	0.30%

\*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, and \* significant at the 10 percent level. Estimation results of  $TP_t \times TR_i$ , dependent variable  $\ln Q_{i,t}$ ; results in percentage terms, i.e., calculated using the formula  $100 \times [\exp(\beta_{TP*TR}) - 1]$ .

A key assumption in our difference-in-differences identification strategy is that trends in the treatment and control municipalities would have been parallel in absence of treatment. This assumption is impossible to test formally, but to give an indication of its validity, we follow Pope and Pope (2015) and graphically illustrate output trends in entry and control municipalities before and after IKEA entry. Following Pope and Pope (2015), we run the regression model described in equation (3) using the data for each entry and the corresponding control municipalities, while leaving out the treatment municipality indicator and the interaction with the treatment period. We then aggregate the residuals for each year and plot them over the entire period of analysis. The graphs (Figure 3) show that the residual pre-entry trends in entry and control municipalities are parallel for all four entries in our study. One minor exception is that there appears to be a bit of an anticipatory effect, with the dip starting in all situations about a year earlier, likely after the plan to open a new store has been announced. Furthermore, while the trend for Gothenburg is not changing for the entire period of analysis, we observe that for the other three municipalities (where we obtain negative and significant effects) there is a shift at the time of IKEA entry. The shift is smaller in the case of Karlstad and largest in the case of Haparanda, where we also observe the largest effect of IKEA entry.

In Table 3, we compare the results from our preferred model (the translog model) with results from two other, less general, models. The full tables of estimates for the additional models can be found in the Appendix.

The results from the estimation of the Cobb-Douglas production function model indicate that the effects are very similar to those from our preferred (translog) model, showing a decrease of 33 percent for Haparanda, 14 percent for Kalmar, and 10 percent for Karlstad. This indicates that the treatment effect variable is not correlated with the squared labor and capital terms to any significant extent. Otherwise removing these variables would have caused missing variable bias (Studenmund, 1914) and thus changed the estimate of the treatment effect. The results remain very similar for the small market of Haparanda even if we use a traditional difference-in-differences model excluding all labor and capital terms from the regression. This indicates that hotels and restaurants in Haparanda did not change their labor and capital levels in any major way at the time of IKEA entry. Otherwise the

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municipalities, that are now either the entry municipalities themselves or directly adjacent to the entry municipalities, we observe no change in the result. The new coefficient for the treatment variable is 0.002, with an attached standard error of 0.06 (p-value of 0.951). This indicates that the null effect in Gothenburg is not driven by establishments in municipalities that are far away from the new store.

capital and labor variables would have been correlated with the treatment effect variable and would have caused omitted variable bias altering the estimate of the treatment effect when removing these variables from the regression.

For the entries in Kalmar and Karlstad, we do note a change in the size of the treatment effect estimates when using the difference-in-differences model rather than the translog or Cobb-Douglas model. These changes indicate that labor and capital (now removed from the model) are correlated to the treatment effect variable, and thus generate omitted variable bias when excluded. This is an indication that hotels and restaurants in Kalmar and Karlstad changed their use of labor and/or capital in direct connection in time with IKEA's entry into the region.

The results also show that the impact of new IKEA stores on firms in the hospitality sector is inversely related to the size of the local market. The effect is the largest in the rural market of Haparanda, the smallest market with a population of 10,059 in 2010, and the impact becomes smaller the larger the market becomes as Kalmar had 62,815 inhabitants and Karlstad had 85,753 inhabitants in 2010. None of the models show significant results for the Gothenburg metropolitan area with a population of almost 1 million inhabitants in 2010. These results can be compared to those of Håkansson et al. (2016) and Han et al. (2018), who report that IKEA entry had a positive and statistically significant impact on the revenues of incumbent retailers only in the smaller entry municipalities of Haparanda and Kalmar, while no statistically significant effects were reported for the larger markets, Karlstad and Gothenburg. However, while Han et al. (2018) found no significant effects on firms selling substitute goods, we do find that the effects on firms in the hospitality sector are negative and significant. Our results thus show the importance of taking into account how the entrant firm will affect all products and services that incumbent firms in the entry areas are providing and not only those directly related to the entrant itself. This also shows the importance of using disaggregated data not only at the geographical, but also at the industry level, when studying potential spillover effects of big-box retail entry.

## 5. SUMMARY AND DISCUSSION

The purpose of this paper has been to investigate inter-industry effects of IKEA entry on the revenues of incumbent firms in the hospitality industry. The results show that IKEA entry negatively affects revenues for firms in the hospitality sector in the entry municipalities and that the magnitude of the effect is inversely proportional with the size of the local market of entry. IKEA entry decreased the CPI-adjusted revenues of incumbent firms in the hospitality industry by 34 percent for the smallest municipality in our study, Haparanda. For Kalmar, the decrease was 13 percent, while for the larger entry municipality of Karlstad the results showed a decrease of only 10 percent. No statistically significant effects were found for the IKEA entry in the Gothenburg metropolitan area.

The most obvious explanation for these results would be that any positive externalities, both on the supply and on the demand side, are overshadowed by competition effects for firms in the hospitality industry. We believe that this is due to the IKEA restaurant capturing a large share of existing diners from the incumbent restaurants and this effect being larger than any effects on lodging. This is a likely development after IKEA entry as it is

a Swedish custom to eat lunch (rather than dinner) out, and both IKEA and most of the incumbent restaurants in the entry municipalities compete for the lunch guests. While most Swedish restaurants offer lunch that costs between 85 (7.99 EUR<sup>11</sup>) and 110 SEK (10.34 EUR<sup>11</sup>), lunch alternatives in IKEA restaurants cost at the most 79 SEK (7.45 EUR<sup>11</sup>) with some alternatives (including Swedish meatballs) available for 49 SEK (4.61 EUR<sup>11</sup>). In addition, IKEA restaurants offer a nice environment that can accommodate a high number of customers, making the IKEA restaurant a strong competitor in any local restaurant market.

This result is also boosted by the fact that we have a dominance of restaurant and similar facilities over hotels (and other accommodation facilities) in our sample. Of the 7,775 firms in our sample, 20 percent are hotels and 80 percent are restaurants. The proportion is approximately the same in all four municipalities under study and resembles the proportion at national level – 24 percent hotels and 76 percent restaurants. Furthermore, many of the hotels include restaurants and other food facilities but are registered under the “hotel” category, so the actual proportion of restaurants is even larger. Unfortunately, the data does not allow us to disaggregate further and check the effect on hotels and restaurants separately, but it is likely that our results are driven by the restaurant facilities in each area under study.

The magnitude of the effects is larger in smaller markets, showing that, in the case of the hospitality sector, the gap in firm revenues between small and large markets is accentuated by IKEA entry. IKEA brings in a combination of goods and services that makes shopping an experience and attracts more customers. Smaller municipalities often do not have a large enough customer base to cover both the new large entrant and the incumbents, which makes it likely that the new IKEA restaurant will attract customers from incumbent restaurants in the area. This means less sales for incumbent restaurants, and thus a decrease in their profits if they are not able to adjust their use of inputs such as capital and labor to a similar extent.

The finding that an IKEA entry has a larger impact on incumbents in smaller markets is not that surprising bearing in mind how large an IKEA entry is compared to existing restaurants in the smaller entry municipalities. Although IKEA never releases any local statistics regarding sales, we know that IKEA Food has an average yearly turnover of 1.7 billion SEK<sup>1</sup> in Sweden (IKEA, 2016), which would mean an average of about 85 million SEK<sup>12</sup> per IKEA restaurant and year. As such, one might expect a larger impact on existing hospitality firms in the smaller markets (Haparanda, Kalmar, and Karlstad) than in Gothenburg. Considering all four entry municipalities, the average market share of the IKEA restaurants is 7.22 percent of total municipal turnover in hospitality as a whole, and 10.29 percent of total turnover in the restaurant market. When excluding Gothenburg, the average market share of the IKEA restaurants is 40.55 percent of total municipal turnover, and 84.16 percent of total turnover in the restaurant market.

Moreover, although our results may seem to indicate that local support in the form of subsidies for the establishment of IKEA stores in small-city regions may not be a good idea if the region has a large hospitality industry, possible benefits may eventually give taxpayers their money’s worth in the long-term. IKEA may, for example, increase the attractiveness of

<sup>11</sup>Exchange rate 2019-06-24, 1 SEK = 0.094 EUR.

<sup>12</sup>Approximately 8 million EUR. Exchange rate 2019-06-24, 1 SEK = 0.094 EUR.

the municipality where it enters, which ultimately could lead to an increase in the tax base and thereby in long-run benefits for the taxpayers, which would even off the initial subsidy spending. This would be an interesting question for future research into the effects on local economies of big-box retail entry.

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# A. SENSITIVITY ANALYSIS

In this appendix, we present the results of the Cobb-Douglas production-function model (Table A.1) and of an ordinary difference-in-differences regression model (Table A.2). For Gothenburg, Stockholm is the control region and for the other three entry regions, Umeå, Uddevalla, and Borlänge are used as control regions in our estimations. The results indicate only small differences between the translog and the Cobb-Douglas models, while the differences are larger when a non-production-function difference-in-differences model is estimated.

**Table A.1:** Estimation Results, Dependent Variable  $\ln Q_{i,t}$ , Cobb-Douglas Model

	Haparanda		Kalmar		Karlstad		Gothenburg	
	coef.	std. err.	coef.	std. err.	coef.	std. err.	coef.	std. err.
$\ln K_{i,t-1}$	0.076***	0.012	0.062***	0.011	0.070***	0.010	0.071***	0.004
$\ln L_{i,t-1}$	0.061**	0.025	0.084***	0.025	0.047**	0.020	0.026***	0.007
$TP_t$	0.098**	0.040	0.102**	0.039	0.106***	0.036	0.037**	0.015
$TR_i$	0.132	0.089	0.049	0.062	0.016	0.059	0.269	0.201
$TP_t \times TR_i$	-0.407**	0.188	-0.154**	0.068	-0.110**	0.053	-0.011	0.114
<i>Treatment Effect</i>	-33.44%**		-14.27%**		-10.42%**		-1.09%	
Industry FE	yes		yes		yes		yes	
Municipality FE	yes		yes		yes		yes	
Obs	1,070		1,392		1,466		15,303	
R <sup>2</sup>	0.10		0.09		0.10		0.10	

\*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, and \* significant at the 10 percent level. Note: The treatment effects are calculated using the formula  $100 \times [\exp(\beta_{TP*TR}) - 1]$ , which allow us to present the results in percentage terms (Wooldridge, 2010). We use Huber-White robust standard errors in all our estimated models.

**Table A.2:** Estimation Results, Dependent Variable  $\ln Q_{i,t}$ , Difference-in-differences Model

	Haparanda		Kalmar		Karlstad		Gothenburg	
	coef.	std. err.	coef.	std. err.	coef.	std. err.	coef.	std. err.
$TP_t$	0.108***	0.040	0.112***	0.040	0.094**	0.039	0.032**	.013
$TR_i$	0.148*	0.076	0.089	0.063	-0.048	0.058	0.033	.177
$TP_t \times TR_i$	-0.379**	0.151	-0.216***	0.068	-0.036	0.056	0.003	.025
<i>Treatment Effect</i>	-31.55%**		-19.43%***		-3.54%		-0.30%	
Industry FE	yes		yes		yes		yes	
Municipality FE	yes		yes		yes		yes	
Obs	1,481		1,928		2,021		21,557	
R <sup>2</sup>	0.05		0.03		0.03		0.04	

\*\*\* significant at the 1 percent level, \*\* significant at the 5 percent level, and \* significant at the 10 percent level. Note: The treatment effects are calculated using the formula  $100 \times [\exp(\beta_{TP*TR}) - 1]$ , which allow us to present the results in percentage terms (Wooldridge, 2010). We use Huber-White robust standard errors in all our estimated models.