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Retail and Place Attractiveness: The Effects of Big-box Entry on Property Values

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Abstract

Opponents of big-box entry argue that large retail establishments generate noise and other types of pollution and a variety of negative externalities associated with traffic. Big-box advocates, on the other hand, argue that access to a large retail market delivers not only direct economic benefits but also a variety of positive spillover effects and therefore can be considered a consumer amenity that increases the attractiveness of the entry location. To test the validity of these competing arguments, we use the entry of IKEA in Sweden as a quasi-experiment and empirically investigate whether increased access to retail affects place attractiveness, which is proxied by residential property values. We find that IKEA entry increases the prices of the properties sold in the entry cities by, on average, 4.4% or 60,425 SEK (approximately 6,400 USD), but this effect is statistically insignificant for the properties in the immediate vicinity of the new IKEA retail trade area. In addition, we observe an attenuation of the effect with distance from the new IKEA store and the associated retail trade area, where the properties located 10 km away experience a 2% price increase. Our results are in line with some previous findings regarding the effects of entry by Walmart or supermarket stores in the US and show that large retailers have the potential to increase place attractiveness, but perhaps not in the immediate vicinity of the new establishment.

Keywords: retail trade, large retailers, property values, place attractiveness, difference-in-differences estimation

JEL codes: D22, P25, R12, R32

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1 Introduction

Amenities are place-specific assets that increase a location's attractiveness. Traditionally, the urban and regional economics literature has focused on investigating the impacts of exogenous amenities such as clean air, green space or coastal borders. More recent studies have focused on the importance of man-made amenities as important place attractors, such as arts and entertainment facilities, museums, and nightlife, all of which are endogenous in nature (Brueckner et al., 1999; Glaeser et al., 2001; Florida et al., 2008; Partridge et al., 2008).

Whether retail trade may be considered an endogenous amenity is a controversial topic. While some researchers argue that access to retail trade has positive effects on place attractiveness (Öner, 2014, 2017), opponents argue that large retail areas, particularly those big-box retailers, are associated with environmental and aesthetic degradation, increased noise and light pollution, garbage accumulation, traffic congestion, and an increase in local crime (Corlija et al., 2006; Pope and Pope, 2015; Sale, 2015). These negative externalities may decrease the willingness of residents to pay to be located in the neighbourhood of big-box retailers, which means that it is not clear whether the total impact of increased access to retail trade on place attractiveness is positive. However, both positive and negative externalities are capitalized on property values (Kuethe and Keeney, 2012), making them an appropriate proxy for place attractiveness.

We use the entry of IKEA into five local markets in Sweden as a quasi-natural experiment to explore how a significant increase in access to retail trade affects place attractiveness, proxied by residential property prices. A new IKEA retail area is often the largest retail establishment ever to enter a city, which means that it can be considered a positive supply shock that improves a place's rank in the regional hierarchy by attracting consumers from longer distances, thus extending its market boundary. If access to retail can be considered an amenity, the entry of IKEA should provide an immediate and accentuated effect on residential property values.

Most previous studies on how big-box retail entry affects local markets have focused on its impact on other outcome variables, such as local business sustainability, employment levels, and revenues (e.g., Barnes et al., 1996; Artz and Stone, 2006; Basker, 2007; Neumark et al., 2008; Jia, 2008; Haltiwanger et al., 2010). Daunfeldt et al. (2017) previously used the entry of IKEA as a quasi-natural experiment, finding that it increases total durable goods sales and employment in the municipality, while the effects in neighbouring municipalities are small and,

in most cases, insignificant. These results are, however, based on aggregate data for the municipality and include the sales and employment of IKEA itself. Other studies have found that new IKEA retail areas also create positive spillover effects on nearby retailers (Daunfeldt et al., 2015; Han et al., 2018; Håkansson et al., 2019), although these positive spillover effects seem too small to motivate the substantial investments that local policymakers often undertake to attract IKEA to the region (Nilsson, 2015).

Nevertheless, the effects of large retailers on property values have been largely left unexplored, and the results from the few previous studies that have focused on this relationship are ambiguous. While some find positive effects of large establishments on property values (Sirpal, 1994; Pope and Pope, 2015; Van Fossen, 2017; Slade, 2018), others find negative effects (Corlija et al., 2006; Johnson et al., 2009), and some find no effects at all (Loyer, 2010). Consequently, we still lack knowledge on whether big-box retail entry increases the long-term attractiveness of the place.

The wide variation in the observed effects from entry by a large retailer on property values might be due a lack of robustness in methodology. Identifying the effect of increased access to retail trade on place attractiveness is not an easy task because the size of the local retail market is not orthogonal to the size and characteristics of the consumer base. Large local markets have a higher demand base, which in return dictates the size of the local retail market, both of which are correlated with property prices. Such simultaneity makes it empirically challenging to distinguish the effect of higher access to retail trade from the effect of the sheer market size.

Previous studies are often based on hedonic price models executed with cross-sectional data, which means that they cannot investigate the relationship between the establishment of a big-box retailer and its effects on property values. Some more recent studies also fail to control for spatial and temporal heterogeneity, and the results they observe – or some of them – may be driven by potential omitted variable bias. Some notable exceptions are Pope and Pope (2015) and Slade (2018), who found positive results of large retail entry on property values when using a difference-in-differences model and conducting the analysis at a more disaggregated geographical level. However, both of these studies investigate the effects when Walmart entered local markets in the United States, offering no insights for the effects of other types of retailers. The effect of Walmart has been shown to be highly localized (Pope and Pope, 2015; Slade, 2018); meanwhile, higher-order retailers (such as IKEA) are known to have wider

markets (Christaller, 1933; McCann, 2001), and their effects may differ in both magnitude and spatial extent from those of grocery-based retailers such as Walmart.

We contribute to the literature by investigating how property values, as strong proxies for place attractiveness, are affected by a sudden and significant expansion in the local retail market following the entry by IKEA in five Swedish cities. The entry by IKEA is thus used as a 'shock' in retail accessibility on the local markets it enters. To mitigate any possible geographical heterogeneity, we follow Pope and Pope (2005) and estimate the post-treatment effect within the city that IKEA enters, allowing us to investigate how the effect of IKEA on residential property prices in the entry cities varies with the distance from the entry location.

Our results indicate a non-linear effect of IKEA entry on residential property prices in the form of an inverse U-shaped relationship with a long tail (Figure 3). As such, we find that entry by IKEA increases the prices of the properties sold in the entry cities by, on average, 4.4% or 60,425 SEK (6,400 USD). The properties closest to the new IKEA retail area are not affected by the entry of IKEA, while properties located 1.5 km away experience an average increase of 6.87%. The effect of IKEA entry on residential property prices reaches a maximum (6.95%) at approximately 2 km from the entry location and then decreases smoothly to approximately 2% at a 10 km distance from the new IKEA retail area. A possible interpretation of our results is that the positive and negative externalities from a large retail establishment such as IKEA cancel each other out within close proximity of the new store, but while the negative externalities are rapidly decreasing with distance, the positive are not.

Several studies (Corlija et al., 2006; Aliyu et al., 2011) report similar patterns, with no or even negative effects close to the entry sites; these effects become positive and increase up to some maximum value, after which the impact decreases with distance. Regarding the size of the effect, our results regarding the average impact in the entry cities, occurring at 4,5 kilometres (approximately 3 miles), with a positive impact of 6,400 USD are in line with the 7,000 USD effect of Walmart establishments reported by Pope and Pope (2015) for properties within half a mile of a new Walmart and the 6,000 USD effect per additional supermarket within a 3-mile radius of the analysed neighbourhoods reported by Van Fossen (2017). A difference between our study and most previous studies is, however, that the effects have a slower distance decay and do not turn zero within the entry cities. Thus, it seems that a higher-order retailer such as IKEA has an impact on residential property values in a larger part of the local market than does a new Walmart or supermarket.

The following section explains the theoretical background of our analysis. Section 3 is focused on a survey of previous studies, while section 4 describes the data and the methodology of our research. The results are presented in Section 5, while the last section concludes and discusses the policy implications and limitations of our study.

2 Theoretical framework

A series of factors have led to the rise in the number of large retail areas located on city outskirts and in the number of consumers patronizing these areas in recent decades. The possibility of establishing shopping areas outside the city limits originated in the increased access to and use of cars, which contribute to improved mobility (Forsberg, 1998). Meanwhile, the increased participation of women in the workforce has considerably increased households' purchasing power. As the economy has evolved towards what is called "the experience economy", more value is derived from the experience of consuming a product compared to the actual value of the commodity (Pine and Gilmore, 1999; Öner, 2014, 2017). The consequence of these factors has been an increased demand for and patronage of large shopping centres, most of which are located outside the city limits and include one or several big-box retailers.

Agglomeration theories provide a solid argument for why such large retailers may impact the attractiveness of their entry places and how this effect is capitalized in property values. Large retail establishments exert both positive and negative externalities in their entry locations, e.g., regions. The positive externalities are due to an increased level of convenience generated from easy access to shopping and entertainment facilities (Des Rosiers et al., 1996). The argument of traditional location theories (i.e., Weber, 1929; Christaller, 1933; Lösch, 1940; Isard, 1956) is that large and dense markets become more attractive to consumers than smaller and less dense counterparts due to a series of individual advantages related to augmented possibilities for comparison and one-stop shopping, which help minimize shopping time, costs, and uncertainty and thus increase individual utility.

Meanwhile, transportation costs to the retail cluster also play an important role in the determination of land prices (Dicken and Lloyd, 1990; Klaesson and Öner, 2014). Consumers make longer – more expensive – and thus less frequent trips to patronize stores selling high-order goods, such as furniture, whereas they make shorter – cheaper – and more frequent trips to stores selling low-order goods, such as milk and bread. The variation in the willingness to travel means that the distance decay is different for different types of retailers. Therefore,

depending on the retailer in question, the market reach would also be different. Consequently, stores selling goods for less frequent purchases have a larger market reach than low-order retailers such as grocery stores (Klaesson and Öner, 2014; Öner and Klaesson, 2017).

Entry by IKEA, a large retailer selling high-order goods, should expand the reach of local market and increase its rank in the regional hierarchy by making it relatively more central (Christaller, 1933). Expansion in market reach implies that customers travelling from farther distances are now attracted to the larger retail trade area. Being located close to retail agglomerations is thus potentially attractive due to the prospect of minimizing travel costs and maximizing consumer utility, and increased demand may drive up land prices. These positive effects make retail trade often regarded as an amenity, a place-specific asset that increases the attractiveness of a location (Öner, 2017); thus, in general, cities with rich consumption opportunities grow more quickly than their amenity-poor counterparts.

However, large retail establishments may also be a source of negative externalities due to increased noise and light pollution, garbage accumulation, traffic congestion, and a loss of perceived visual aesthetics (Pope and Pope, 2015; Sale, 2015). Several studies have shown that such disamenities are capitalized into housing prices. For example, Smithetal (2002) shows that traffic noise can have a negative impact on housing prices. Green Leigh and Coffin (2005), Lim and Missios (2007), Mihaescu and vom Hofe (2012; 2013), and Lin (2013), among others, find that landfills and brownfields negatively affect property values.

Thus, the question is whether the convenience benefits from being located in the proximity of a large retail store outweighs the costs imposed by any negative externalities. In other words, does entry by a big-box retailer exert a positive or a negative effect on adjacent residential house prices, and is this relationship homogenous over space? If we observe a decrease in housing prices near a big-box store following its entry, this might indicate that there are significant negative externalities imposed on landowners and households. However, if we observe an increase in housing prices, this might signal that the benefits of easy access to shopping outweigh any negative externalities imposed on local residents. Furthermore, any variation in these effects over space indicates whether the value of accessibility increases or declines more or less rapidly across space than the costs of localized externalities.

3 Previous empirical studies

Retail decentralization and expansion at large have previously been explored through the lens of economic geography by a number of studies, which mostly address the trends in the UK market (e.g., Langston et al., 1997; Thomas et al., 2004; Wrigley et al., 2009). In fact, efforts to empirically examine the impact of major retail developments on the economy, e.g., other shops, date back as late as the 1970s (see, e.g., Guy, 1977). We summarize previous studies about the impact of large retail developments on property values, particularly in the entry regions, in Table 1. The findings are inconclusive. While some studies report increased property values as a possible effect of large retail development (e.g., Sirpal, 1994; Des Rosiers, 1996; Pope and Pope, 2015; Van Fossen, 2017; Slade, 2018), others have found no significant relationship (Loyer, 2010) or even negative effects (Johnson and Lybecker, 2010). Moreover, the effects of big-box retailers on property values appear highly heterogeneous over space.

On the one hand, both Johnson et al. (2009) and Alyiu et al. (2011) found a decrease in the price of properties located in the direct vicinity of a new Walmart store. Johnson and Lybecker (2010), on the other hand, found that new Walmart stores did not affect the properties located in their close vicinity but determined a decrease of 3,200-6,800 USD in the price of properties located between 1.5 and 2 miles (2.4 and 3.2 km) from the new stores. Other studies reveal the exact opposite, i.e., that the positive externalities are stronger than any negative impacts in the immediate vicinity of new large retail establishments (Addae-Dapaah and Lan, 2010; Pope and Pope, 2015; Van Fossen, 2017). Addae-Dapaah and Lan (2010) find that the price of flats increases by 4.7% for every 1% decrease in distance to the closest shopping centre, while Pope and Pope (2015) report that a new Walmart increases the price of residential properties by approximately 7,000 USD for properties located within half a mile of the new store. Van Fossen (2017) found that houses benefit an average premium of approximately 6,000 USD for every additional supermarket store located within 2 miles (3.2 km) of the analysed neighbourhoods; this value decreased to approximately 4,100 USD for every additional supermarket located within 5 miles (8 km) of the analysed neighbourhoods. Finally, Slade (2018) found that urban land prices increased by 39% over the four-year construction period of the new Walmart stores and by 26% within three years after their opening date. These positive effects, however, decreased with distance from the new store.

Further heterogeneity in the results may be caused by other attributes, such as the size of the centre or the size of the entry market. Sirpal (1994) explains that the value of a residential

property located at a distance from a larger shopping centre is higher than that of an identical property located at the same distance from a smaller shopping centre.

Table 1. Previous studies on the impact of large retailers on property values

Author	Dependent variable	Key independent variable	Method	FE	Level of analysis	Land	Main result	Spatial extent of effect/selected sample
Sirpal (1994)	Residential property prices	Size of (3) shopping centres	Cross-sectional OLS	No	Property	US	+, various functional forms	Selected sample: up to 3,000 feet (1 km) from the outer boundaries of selected shopping centres in Gainesville, Florida
Des Rosiers et al. (1996)	Residential property prices	Size and proximity of (87) shopping centres	Cross-sectional OLS	No	Property	Canada	+, various functional forms	Selected sample: Quebec region
Corlija et al. (2006)	Residential property prices	Proximity and construction phase of (1) shopping centre	Panel OLS (2000-2004)	Time	Property	US	Inverse-U-shaped relationship between property prices and distance from the shopping centre	Selected sample: Maricopa county, Arizona
Johnson et al. (2009)	Residential property prices	Distance to and type of closest big-box (Walmart, Kmart, Target, Best Buy)	Panel OLS (1994-2005)	Time	Property	US	−7,000 USD, increasing with distance from Walmart +29,000 - +39,000 USD, U-shaped relationship between property prices and distance from Kmart, Target, Best Buy	Selected sample: up to 2 miles (3.2 km) from the big-box stores in El Paso county, Colorado
Addae-Dapaah and Lan (2010)	Residential property prices	Distance to the closest (19) shopping centre	Pooled OLS (2005-2008)	No	Property	Singapore	+4.7% for flats within 0.5 km of a shopping centre; +15% for flats within 0.1 km of a shopping centre, decreasing with distance from the shopping centre; +6.1% for flats in blocks close to a town centre with a shopping mall, compared to flats in blocks close to a town centre without a shopping mall	Selected sample: up to 0.5 km from shopping centre in Singapore
Johnson and Lybecker (2010)	Change in residential property prices; change in days on the market	Number of existing and new big-boxes (Walmart, Best Buy) within 2 miles of a sold property; indicator variable (1 if big-box located within different distances from each property); proximity to closest big-box	Panel OLS (1994-2005)	Spatial & time	Property	US	−For the number of existing stores; no significant effect for the number of new stores; −3,200 - −6,800 USD for new Walmart stores, if property is located between 1.5 and 2 miles (2.4 - 3.2 km) from the store; no significant effect for the new Best Buy stores; proximity to store is insignificant	Selected sample: up to 2 miles (3.2 km) from the big-box store (increments of 0.1 miles (0.16 km)) in El Paso county, Colorado
Loyer (2010)	Total value of residential properties	Entry of (30) new Walmart stores	Panel OLS (1998-2007)	Time	Municipality	US	no significant effect in either entry or in adjacent municipalities	Selected sample: 566 municipalities in New Jersey;

								entry municipality and nearest adjacent municipality
Aliyu et al. (2011)	Residential property prices	Distance to (1) shopping centre	Panel OLS (2003-2009)	Time	Property	Nigeria	−For properties located within 1,500 feet (0.5 km) from the shopping centre; + for properties located farther than 1,500 feet (0.5 km) from the shopping centre	Selected sample: up to 0.75 miles (1.2 km) from shopping centre in Bauchi, Nigeria
Vandergrift et al. (2011)	Total value of residential property prices	Treatment indicator (entry region * period for (30) Walmart stores)	Panel OLS (1998-2007)	Spatial & Time	Municipality	US	+5.2% in entry municipality in the second year after entry; no effect in the entry municipality in the first and third year after entry; no effect in the adjacent municipality in the first year after entry; mixed results in adjacent municipalities in the second and third year after entry	Selected sample: 566 municipalities in New Jersey; entry municipality and nearest adjacent municipality
Pope and Pope (2015)	Residential property prices	Treatment indicator (entry region * entry period for (159) new Walmart stores)	DID (1998-2008)	Spatial & time	Property	US	+2 - +3% if property within 0.5 miles (0.8 km); +1 - +2% if property between 0.5 - 1 mile (0.8 - 1.6 km)	Selected sample: up to 4 miles (6.4 km) from opening point, 2.5 years from opening date
Sale (2015)	Residential property prices	Distance to (1) shopping centre	Pooled OLS (1995-2009)	No	Property	South Africa	-112.68 ZAR (7.74 USD)[1] for every 1 metre increase from the shopping centre	Selected sample: Walmer neighbourhood, Port Elizabeth, South Africa
Van Fossen (2017)	Residential property prices	Number of supermarkets (36,704 in total) within different buffers from each neighbourhood	Panel OLS (1997-2015)	Spatial & time	Neighbourhood	US	+8,406 USD for every additional supermarket within a 1-mile (1.6 km) radius from the neighbourhood; + 6,057 USD for every additional supermarket within a 3-mile (3.2 km) radius from the neighbourhood; + 4,145 USD for every additional supermarket within a 5-mile (8 km) radius from the neighbourhood; higher effects for second, third, etc., new stores within every buffer	Buffers: 1, 3, 5 miles (1.6, 3.2, 8 km) around supermarkets
Slade (2018)	Residential, commercial, and industrial property prices	Treatment indicator (entry region * entry period for (3,180) Walmart stores)	DID (1990-2015)	Spatial & time	Property	US	+26% within 0.25 miles (0.4 km) of the entry, within 3 years after the open date	Buffers: 0 - 0.25, 0.25 - 0.50, 0.50 - 1 mile (0 - 0.4 km, 0.4 - 0.8,0-8 - 1.6 km) in 40 metro areas in the US

[1] At an exchange rate of 1 USD = 14.45 ZAR, 8 March 2019.

4 Empirical analysis

4.1 Data and descriptive statistics

In Sweden, IKEA is often the largest retail establishment to enter a municipality, which means that its impact should provide an upper limit on the effect of increased access to higher-order retail on place attractiveness. The advantage of using entry by a new IKEA retail area as a 'treatment' is that it is sufficiently large to act as a positive retail supply 'shock' on the local market and thus allows us to observe a clear discontinuity point in both space and time, whose effects can be accurately isolated and measured. The studied IKEA entry events consist of entry by IKEA itself and the establishment of a surrounding retail area comprising 20–30 other retail stores and approximately 2,500 parking spaces; the retail areas are conveniently located relative to major highways and are similar in both size and design in all entry cities.

We focus on five IKEA entries in Sweden between 2005 and 2014: namely, Kalmar (2006), Haparanda (2006), Karlstad (2007), Uddevalla (2013), and Borlänge (2013), and the entry locations are displayed in Figure 1. These entry cities are also similar in that they are located at some distance from other IKEA retail areas in Sweden (Figure 1) and all have less than 100,000 inhabitants. As such, both the type of retail entry and the entry cities are similar, making these entries comparable events.

We use market prices of single-family residential properties in the entry regions as a proxy for place attractiveness and estimate the changes in these property values attributable to the entry of IKEA. Data on the market prices of single-family properties in Sweden are obtained from Lantmäteriet (The Swedish Mapping, Cadastral, and Land Registration Authority) and include all transactions (N=18,163) that occurred in the entry municipalities between 2005 and 2014. We regard the market price of residential properties as an adequate measure for the attractiveness of a specific location because individuals are willing to pay a premium for living in certain locations (Glaeser et al., 2001), and amenities explain most of the price variation for residential properties across cities and over time (Rosen, 1979; Roback, 1982). Previous research shows that the effects of amenities are capitalized on the prices of residential properties much more than, for example, on wage levels (Nilsson, 2013).

Figure 1. IKEA retail areas in Sweden, 2019

To avoid any heterogeneity imposed by across-city varying economic conditions (Hwang and Quigley, 2006; Pope and Pope, 2015), we restrict our sample (N=13,497) to properties located within the city of entry by excluding all properties located more than 10 km from the entry

locations. Figure 2 and Figures A1-A4 in Appendix 1 show that this approach is effective and ensures that both pre-entry and post-entry property prices for sold units are located within the same city.

Descriptive statistics for market prices and market prices per square metre, property attributes (area, standard, and age), distance to the IKEA retail area, and indicator variables defining the extent of treatment in time, as well as our treatment variable, are provided in Table 2. The area measure is adjusted for additional structures such as garages, sunrooms, balconies or unequipped attisc, with these additional spaces adding 20% of their area to the total. The standard of the building is an aggregate index measure that varies between 0 and 54 depending on both the construction materials and the equipment existent in the house.[2] The age is adjusted for improvements, renovations, and extensions; the adjustment is carried out by the Swedish Tax Agency. The distance to the IKEA retail area is calculated in ArcGIS using an Euclidean distance measure.[3]

The descriptive statistics indicate that the properties included in our sample and sold before IKEA entry have an average market price of 1.4 million SEK (147,802 USD)[4], compared to an average of 1.7 million SEK (179,425 USD) for those sold after entry, and an average square-metre price of approximately 11,000 SEK (1,161 USD) and 13,000 (1,372 USD) for the properties sold before and after entry, respectively. There is, however, almost no change in the attributes of the properties sold before and after IKEA entry: while the average size increases slightly from 124 to 133 square metres, the average standard index is unchanged at 30, and the average age decreases slightly from 53 to 51. The average distance from the properties sold before IKEA entry to the closest IKEA is 4.33 km, while the average distance is 4.57 for those properties sold after IKEA entry.

[2] These calculations and the standard index are all computed by Lantmäteriet (The Swedish Mapping, Cadastral, and Land Registration Authority).
[3] We have excluded outliers larger or smaller than 3 standard deviations for the market price per square metre to minimize potential bias from errors and non-arm's-length transactions, which tend to be common when working with property values (Pope and Pope, 2015).
[4] Exchange rate of 1 USD = 9.47 SEK, 8 March 2019.

Table 2. Variable definitions and descriptive statistics

Variable	Variable definition	Mean		Median		Std Dev		Min		Max	
		Pre-IKEA	**Post-IKEA**	**Pre-IKEA**	**Post-IKEA**	**Pre-IKEA**	**Post-IKEA**	**Pre-IKEA**	**Post-IKEA**	**Pre-IKEA**	**Post-IKEA**
	Market price (SEK)	1,371,709	1,710,935	1,300,000	1,625,000	854,048	1,173,265	63,000	97,000	1,925,000	13,500,000
$Price_{it}$	Market price per sqm (SEK)	11,074.78	12,993.59	10,505.72	12,711.86	6,737.23	9,166.17	847.22	857.14	203,333.30	184,230.80
ln $Price_{it}$	Ln of market price per sqm (SEK)	9.17	9.18	9.26	9.45	0.55	0.89	6.74	6.75	12.22	12.12
$\mathbf{X}_i$	*Property attributes:*										
	Area (square metres)	124.08	132.70	120	131	36.61	36.86	18	20	480	570
	Standard	29.69	30.33	30	30	4.32	4.14	10	10	54	53
	Age (years)	53.39	51.70	50	49	19.54	18.14	8	7	90	90
$dist$	Distance to the closest IKEA retail area (km)	4.33	4.57	3.59	4.67	2.44	2.46	0.33	0.35	10.00	10.00
P	Indicator variable equal to 1 for properties sold after IKEA entry	0	1	0	1	0	0	0	1	0	1
TR	Treatment variable equal to $P/dist$ for properties sold after IKEA entry, 0 otherwise	0	0.32	0	0.25	0	0.21	0	0.10	0	2.87

4.2 Identification strategy and empirical design

To measure the relationship between access to retail trade and place attractiveness, with the latter proxied by residential property values, we need to observe a large exogenous change in access to retail. Pope and Pope (2015) previously used entry by new Walmart stores in the United States as a quasi-natural experiment and combined it with a difference-in-differences within estimation to establish its effect on property values. They included properties located within 2 miles (3.2 km) of a new Walmart store in the treatment group, while properties located between 2-4 miles (3.2-6.4 km) away were included in the control group.

By restricting their analysis to properties located in the vicinity of the new Walmart store and performing a within estimation, Pope and Pope (2015) acknowledged that housing markets are local. Their identifying assumption is thus that housing price trends for areas near big-box entry and those for areas slightly farther away from the entry location likely would have been the same in the absence of entry.

Following Pope and Pope (2015), we restrict our sample to properties located within the city of entry to avoid any heterogeneity imposed by across-city varying economic conditions. However, initial analysis of the data showed that, contrary to Pope and Pope (2015), there is no clear boundary within the city in which the effect of the new IKEA retail area becomes zero, which may be because, while the effects of grocery-based retailers such as Walmart on property prices are highly localized (Pope and Pope, 2015; Slade, 2018), higher-order retailers such as IKEA could have impacts that reach much farther from the entry site (Klaesson and Öner, 2014; Öner and Klaesson, 2017). Consequently, we cannot make a clear distinction between any 'treatment' and 'control' groups within the city, and we therefore use a within-city analysis of the impact of IKEA entry on property values. Furthermore, as IKEA is likely to be established in regions with positive development trends, ignoring this possibility would make the estimated effects of IKEA entry on property prices positively biased in cross-city comparisons, which we avoid by making within-city estimations.[5]

More specifically, we estimate the effects of a new IKEA retail area on the prices of all properties located no more than 10 km from the entry locations.[6] The sales of residential

[5] We did make an effort to find suitable control cities using propensity score matching but failed to find cities with similar pre-entry trends as the entry citie,s and the suggested control cities also differed with respect to other characteristics As such, we decided to use the within estimations described below.

[6] Note that using a smaller buffer around the new IKEA would mean excluding properties that were affected by the new IKEA, creating bias in the estimates of the effect. Likewise, increasing the area around the entry sites

properties in Borlänge are displayed in Figure 2, showing that the 10 km restriction ensures that all properties are located within the same urban area.[7]

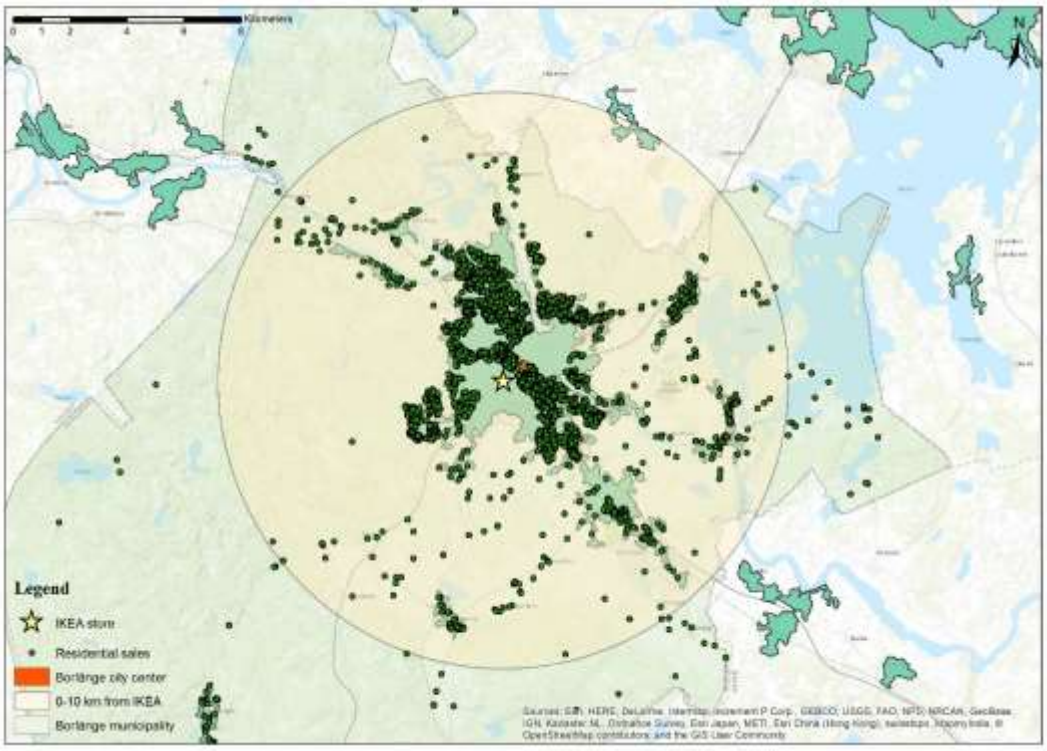

Figure 2. Borlänge – Entry of IKEA retail area (star), 10-km buffer zone, sales of residential properties, and the location of the city centre

As discussed in section 3, the relationship between the distance to large retail areas and property prices is likely to be non-linear. We therefore estimate a model that takes into account how the effect of IKEA entry depends on the distance to the new IKEA retail area. More specifically, our baseline model specification (model 1) can be written as follows:

$$\ln Price_{imt} = \beta_0 + \beta_1 TR + \beta_2 TR^2 + \delta_t + \gamma_m + (\delta_t \times \gamma_m) + \varepsilon_{imt}, \qquad (1)$$

where $Price_{imt}$ is the market price per square metre for a single-family residential property *i*, located in municipality *m*, sold during year *t*; β_0 is a constant term; TR is our treatment variable and is described in detail below. Like Pope and Pope (2015), we do not have access to any city-specific control units, so it is essential to control for both time- and city-specific heterogeneity. As such, we include δ_t, which is a year-specific fixed effect included to adjust for time-variant

above 10 km would lead to including properties in other cities in the analysis, which would also bias the estimates of the entry city effect.

[7] The corresponding 10 km buffer zones for the other cities of entry (Haparanda, Kalmar, Karlstad, and Uddevalla) are presented in Figures A1-A4 in Appendix 1.

heterogeneity given by, e.g., nationwide trends in property values, such as the crisis of 2008-2009, and γ_m, which is a city-specific fixed effect to control for any city-specific heterogeneity. However, the lack of city-specific control units also makes it important to account for any city-specific shocks that could affect property values. The interaction ($\delta_t \times \gamma_m$) thus represents city-year specific fixed effects, controlling for potential city-year specific shocks to the local real estate market. Finally, the equation contains a random error term assumed to have zero mean and constant variance (ε_{imt}).[8]

Our variable of interest is $TR = P/dist$, where P is an indicator variable equal to 1 after IKEA entry and 0 otherwise; and $dist$ is the distance to the IKEA retail area, in km. TR is thus 0 for the properties sold within the city of entry, before entry, and equal to the inverse of distance to the IKEA entry site, after entry. TR will thus provide an estimate of how the market prices of properties in the city of entry change after entry, while controlling not only for city and year level heterogeneity but also for city-year specific shocks. A positive and statistically significant parameter estimate for TR would indicate an increase in property prices due to IKEA entry. If property prices increase more in locations close to where we have entry, then access to a retail trade area can be considered an amenity that adds to the attractiveness of the location.

To correct for the possibility that some of the property characteristics may be different in the treatment and control groups, we also estimate a second model in which we add a vector of variables $\mathbf{X}_i$ that includes structural characteristics of the analysed properties. Variables included in the vector $\mathbf{X}_i$ are the area of the property (measured in square metres), the standard of the property, and the age of the property. As such, this model controls not only for city- and year-level heterogeneity and city-year-specific shocks but also for differences in the attributes of the properties sold.

4.3 Results

The coefficients corresponding to our treatment variable (TR) illustrate the effects of entry by IKEA on property prices at various distances from the entry locations. The log transformation of property prices (ln $Price_{imt}$) has the benefit of making these parameter estimates interpretable

[8] To mitigate possible heteroskedasticity problems, we estimate equation (1) using White's (1980) heteroskedasticity-robust standard errors.

in percentage terms after using the formula $100 \times [\exp(\hat{\beta}_{TR}) - 1]$ (Wooldridge, 2010). These treatment effects in percentage terms are presented in Table 3.

Table 3. Estimated impact of IKEA on residential property values

	Model 1		**Model 2**	
Distance (km)	Treatment effect (std.err.)	p-value	Treatment effect (std.err.)	p-value
4.45 (average)	4.40%***	0.001	4.60***	0.001
1.00	3.07%	0.240	3.13%	0.227
1.50	6.87%***	0.005	7.15%***	0.004
2.00	6.95%***	0.002	7.25%***	0.001
5.00	4.02%***	0.001	4.19%***	0.001
10.00	2.20%***	0.001	2.30%***	0.001
No. obs.	13,497		13,497	

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

The average change in residential property prices within the city of entry when IKEA enters is 4.40%. This result is equivalent to an average increase of 487 SEK (52 USD)[9] in the pre-IKEA average price per square metre for properties located within 10 km of new IKEA retail areas. This figure translates to an increase of 60,425 SEK (approximately 6,400 USD) in the total price of the average house located within 10 km of a new IKEA retail area.

However, the effect of IKEA entry is not significantly different from zero for the properties located 1 km away from the new IKEA retail area, while the prices of properties located beyond 1 km are positively affected when IKEA enters the city. The prices of properties located at 1.5 km away from the entry location increase by, on average, 6.87% when IKEA enters. The positive effect of IKEA entry on property prices reaches a maximum (6.95%) at approximately 2 km from the new IKEA retail area. The effect then decreases smoothly so that properties located 10 km away from the entry location experience an average increase of only approximately 2% due to IKEA entry (Figure 3).

The results from model 2 show no large changes in the coefficient estimates, indicating that the treatment effect variable is not correlated with the property attributes to any significant extent. Thus, removing these variables from the estimated model has not caused any significant missing variable bias (Studenmund, 2014). Finding that the estimates of the treatment effect do not change when we remove these variables from the regression also provides support for the claim that the attributes of the houses in the entry regions do not change in any major way at the time of IKEA entry. Otherwise, the variables defining these characteristics ($\boldsymbol{X}_i$) would

[9] At an exchange rate of 1 USD = 9.47 SEK, 8 March 2019.

have been correlated to the treatment effect variable and would have caused, when removed from the regression, omitted variable bias, altering the estimate of the treatment effect.

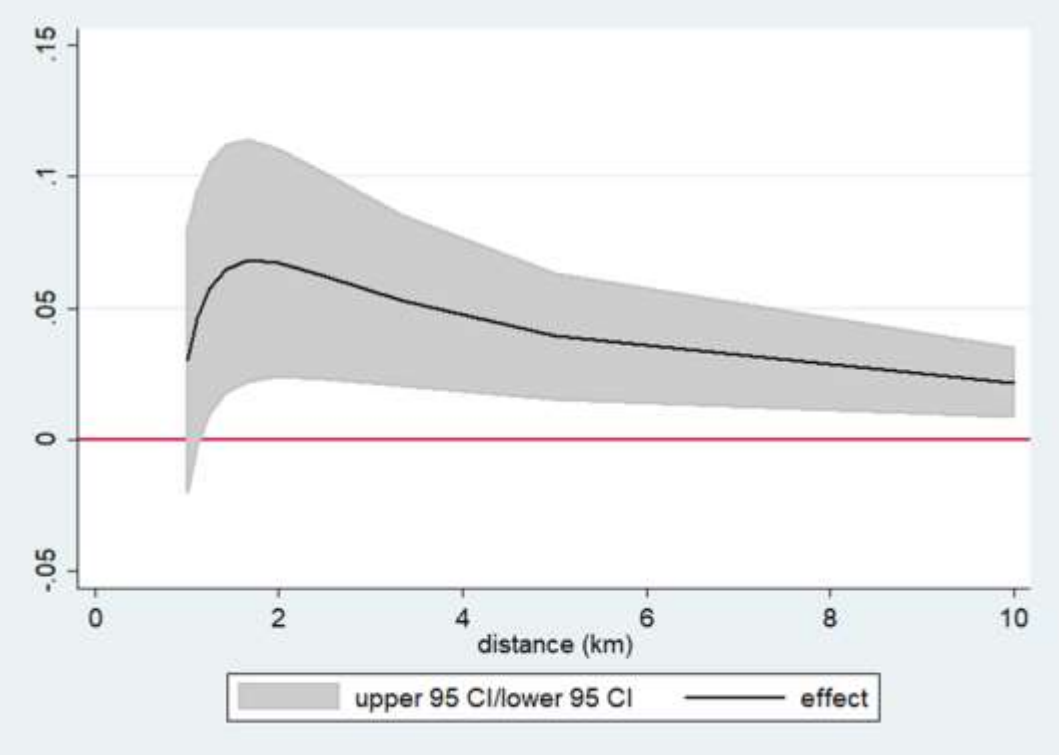

Figure 3. Impact of IKEA entry on residential property values depending on distance from the entry location, point estimates and 95% confidence interval

5 Concluding remarks

Using the entry of IKEA in Sweden as a quasi-natural experiment, the purpose of our study was to investigate whether better access to retail activities can increase the attractiveness of a location. An IKEA retail area is often the largest retail establishment to enter a city, which means that it can be considered a positive shock that significantly increases access to higher-order retail in the local market. The effects of IKEA entry on property values can thus be considered an upper limit for the possible effects of increased accessibility to retail. In agreement with the agglomeration theories, if the positive spillovers from increased accessibility to retail overcome any negative externalities, then retail activities can be considered a consumer amenity and entry by IKEA should have a positive impact on the prices of residential properties.

We have followed theoretical arguments and previous research on the effects of large retail establishments (Hwang and Quigley, 2006; Pope and Pope, 2015; Slade, 2018) by restricting

our sample to properties located within the city of entry, which allows us to avoid any heterogeneity imposed by across-city varying economic conditions. Using a time series model, we then estimate how the effect of IKEA entry depends on the distance to the new IKEA retail area.

We find that the average change in residential property prices within the city of entry is 4.40% following the entry by IKEA. This result is equivalent to an average increase of 487 SEK (52 USD)[10] in the pre-IKEA average price per square metre for properties located within 10 km of new IKEA retail areas. This figure translates to an increase of 60,425 SEK (approximately 6,400 USD) in the total price of the average house located within 10 km of a new IKEA retail area. The direction of the effect is in line with previous studies indicating positive effects following the establishment of large retail areas (e.g., Sirpal, 1994; Des Rosiers, 1996; Van Fossen, 2017).

Our results indicate a non-linear effect of IKEA entry on residential property prices in the form of an inverse U-shaped relationship with a long tail. The prices of properties located 1 km away from a new IKEA retail area were not significantly impacted by the new entry, while the prices of properties located beyond 1 km from the new IKEA retail area experienced a positive effect that dissipates with distance. The prices of properties located at 1.5 km away from the entry location site increased by, on average, 6.87% when IKEA entered the local market. The effect of IKEA on property prices reached a maximum at approximately 2 km from IKEA at 6.95% and then decreased smoothly so that properties located 10 km away from IKEA experienced an increase of only approximately 2%.

Our research thus suggests that positive and negative externalities generated by the entry of a higher-order retailer such as IKEA cancel each other out and end up in a zero-sum game close to the entry location. The negative costs of being located close to a higher-order retailer seem to be higher in its direct vicinity than for lower-order retailers such as Walmart. At a longer distance from the IKEA entry location, the negative costs generated by, e.g., increased traffic, noise and light pollution, seem to subside. Several studies (Corlija et al., 2006; Aliyu et al., 2011) report similar patterns, with no or even negative effects of entry by new shopping centres close to the entry sites; these effects become positive and increase up to some maximum value, after which the impact decreases with distance. This finding is different from the results of

[10] At an exchange rate of 1 USD = 9.47 SEK, 8 March 2019.

studies focused on grocery-based stores, which seem to indicate that the positive externalities are larger in the immediate proximity of the new establishment (Addae-Dapaah and Lan, 2010; Pope and Pope, 2015; Van Fossen, 2017; Slade, 2018). Another difference between our study and most previous studies is that the effects have a slower distance decay and do not become zero within the entry cities. As such, it seems that a higher-order retailer such as IKEA has an impact on residential property values in a larger part of the local market than does a new Walmart or supermarket. Regarding the size of the effect, our results regarding the average impact in the entry cities, occurring at 4.5 kilometres (approximately 3 miles), translate to a positive impact of 6,400 USD. This finding is in line with the results reported by Pope and Pope (2015), who found a premium of 7,000 USD for properties within half a mile of a new Walmart, and by Van Fossen (2017), who found a premium of 6,000 USD for every additional supermarket within a 3-mile radius of the analysed neighbourhoods.

Our results have a series of implications for local policymakers. First, previous studies have found that entry of IKEA increases total durable good sales and number of employees within the municipality and has positive spillover effects on incumbent retailers in terms of both productivity and sales. However, the economic significance of these results does not seem to motivate the large investments that local policymakers are often willing to undertake to attract IKEA to their municipality (Daunfeldt et al., 2015; Han et al., 2018; Håkansson et al., 2019). Nevertheless, our results indicate that there may be other benefits that can motivate such investments, as access to higher-order retailing also increases the attractiveness of the location. Attractive places are known to have the power to further draw business, investments and a skilled workforce and thus grow faster than their less-attractive counterparts (Glaeser et al., 2001).

We can thus conclude that IKEA creates favourable conditions for the development of the entry regions, despite the fact that big-box stores are often perceived as the seed of degradation in their entry areas. Popular science journals have, in recent years, published a large number of articles demonstrating people's concern about the possible negative effects of large retailing – , e.g., "America learns to hate Wal-Mart" (Walsh, 1999); "New Rochelle residents turn out in force to block IKEA" (Mitchell, 2001); "IKEA expansion plan irritates Emeryville residents" (Maher, 2010). However, our results provide scientific evidence against these NIMBY (Not In My Back Yard) reactions, showing that these almost overwhelmingly negative reactions by affected residents to big-box entry are not justified. The effects of IKEA are not significant in

the worst-case scenario (in the immediate vicinity of the new stores), and they even become positive at 1.5 km from the new stores.

Our research does not come without limitations. First, our identification strategy captures all other changes that occurred simultaneously with the entry of IKEA, such as infrastructure investments that come with the establishment of a new IKEA retail area. Our results should therefore be interpreted as a general equilibrium reduced-form effect that combines the impact of a new IKEA retail area and all other changes in the local market that are associated with this entry (Greenstone et al., 2010). Furthermore, IKEA entry is not a representative event. In contrast, it is most likely the largest entry of a higher-order retailer to ever occur in a Swedish city. Our estimates should therefore be interpreted as an upper bound compared with the effects of retail firm entry on place attractiveness in general. Moreover, local policymakers tend to partly finance the entry by IKEA. Consequently, we expect the municipalities that offer the largest subsidies to be more likely to obtain a new IKEA retail area and to benefit most from IKEA entry. Our results thus should be interpreted as impacts of a new IKEA retail area on residential property prices in the municipalities that IKEA choses to enter, and any generalization of our results beyond that should be undertaken with caution. Future studies should aim at extending the external validity of such models by, for example, looking beyond IKEA at the effects of shopping centres of various sizes and characteristics on the attractiveness of the entry locations.

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Appendix 1. Entry locations

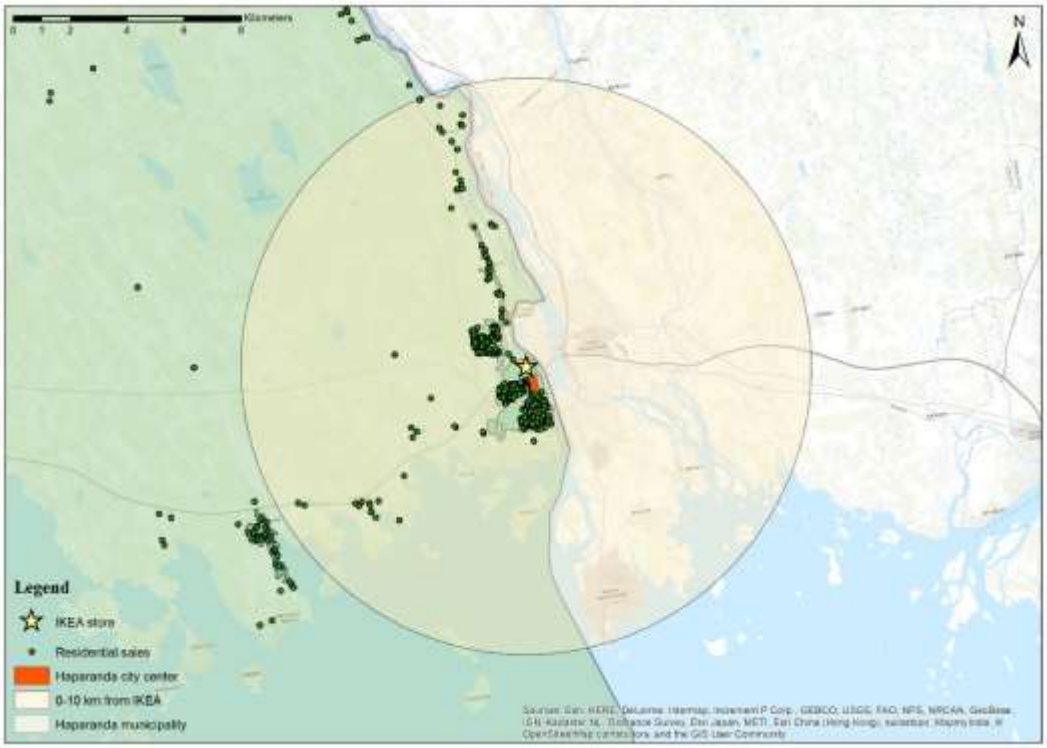

Figure A1. Haparanda – Entry of IKEA retail area (star), 10-km buffer zone, sales of residential properties, and the location of the city centre

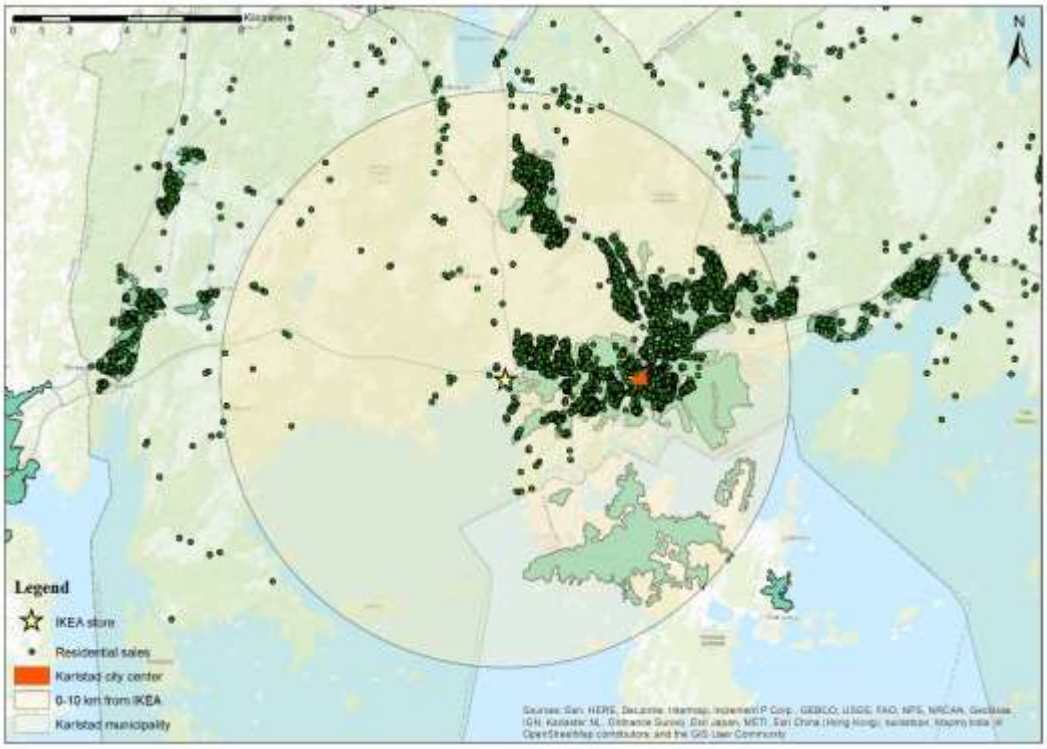

Figure A2. Karlstad – Entry of IKEA retail area (star), 10-km buffer zone, sales of residential properties, and the location of the city centre

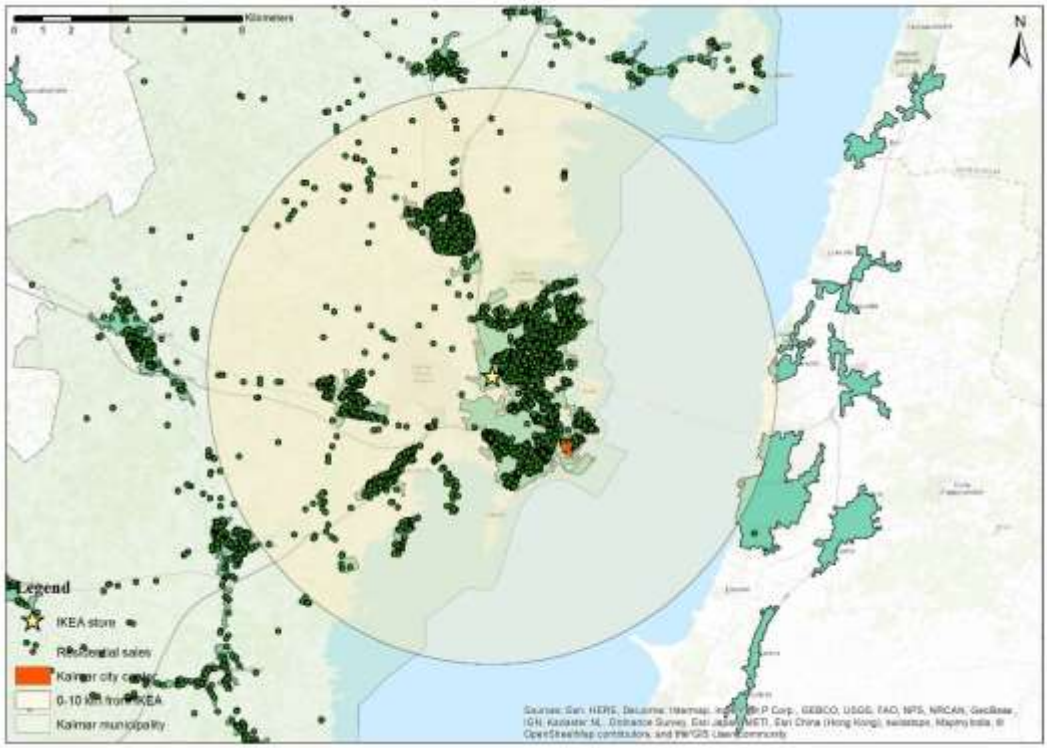

Figure A3. Kalmar – Entry of IKEA retail area (star), 10-km buffer zone, sales of residential properties, and the location of the city centre

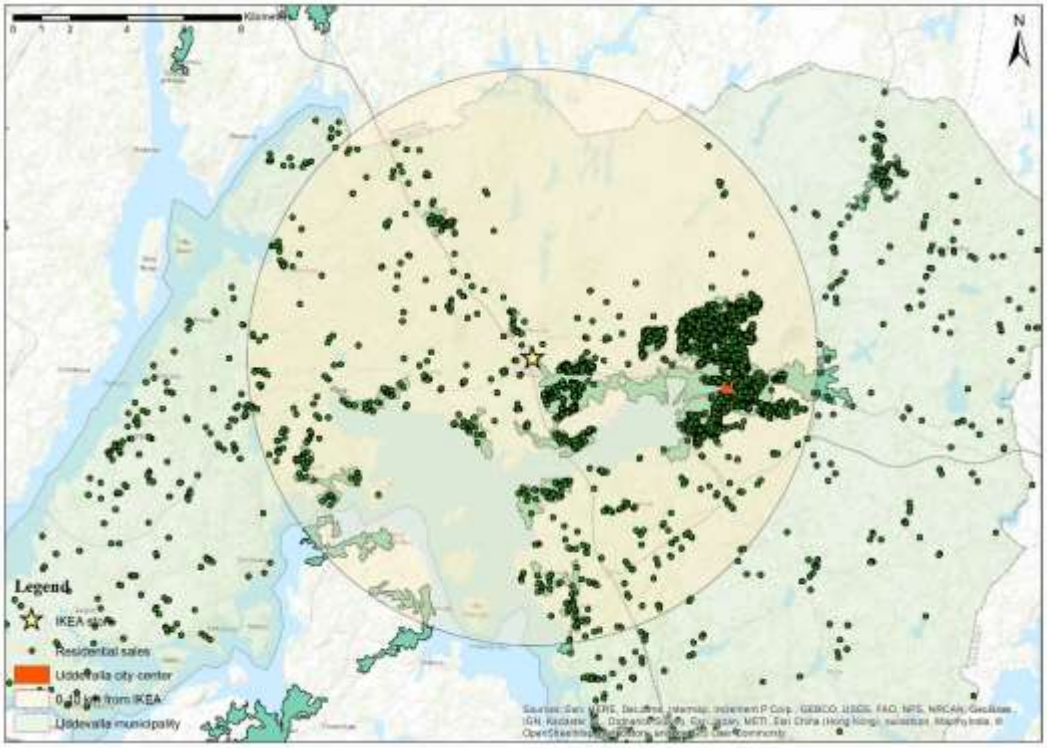

Figure A4. Uddevalla – Entry of IKEA retail area (star), 10-km buffer zone, sales of residential properties, and the location of the city centre