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DO BUSINESS DENSITY AND VARIETY DETERMINE RETAIL PERFORMANCE?*

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Abstract

Outlet location plays a crucial role in retail strategy. In this paper we study the relationship between spatial density (concentration) of retailers in the trade area and their economic performance. This analysis will help managers figure out the economic potential of starting a retail business in a given area, reducing business start-up risks. We find that retail businesses located in high and low retail density zones enjoy higher performance levels, consistent with competitive advantage arising from agglomeration economies and local market power respectively. We also find that retail businesses located in intermediate density areas use a differentiation strategy based on business variety (diversification across stores). Outlets located in areas with the highest variety enjoy performance levels similar to those achieved in the agglomeration and low density areas. The results suggest that retail companies should jointly consider variety and density to determine location.

Keywords: Retailing, Spatial density, Variety, Point Processes, Nonparametric estimation.

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INTRODUCTION

Outlet location plays a critical role in the performance of retail businesses. The same store might prosper in one location, but fail in another. Considering the extent of capital investments required for business start ups, few retailers can afford to make location decisions based on intuition. Despite the existence of rigorous location methods (Craig, Ghosh and McLafferty 1984), many retailers do not employ marketing models (Simkim et al., 1985), and when sophisticated methods are used, they are often misapplied and abused (Rogers, 2004). This is partially due to the heavy dependence of the results on the quality of the available data. Retail data are usually difficult to access, as companies usually keep this outlet sales data private (Duan and Mela, 2006).

A common approach to select a site for a retail outlet considers spatial demand-supply models. Using this approach, the retailer selects the site according to demand and supply conditions which determine the market potential of these various locales (Hoch et al. 1995; Reinartz and Kumar 1999, Kumar and Karande 2000). However, building supply-demand spatial models involve some crucial subjective assumptions. First, the direct observation of retail demand in the trade area is difficult, as it does not necessarily comport with the population density. To impute a demand model requires assumptions about the nature of competitive conduct and the latent distribution of demand (Duan and Mela, 2006). Second, the analysis of competition factors also faces serious impediments; mainly, because there are no clear criteria for classifying retailers and it is difficult to identify competitors (Miller, Reardon and McCorkle 1999). Another drawback is that it needs to be defined for one particular type of retail store format (supermarkets, in Hoch, Kim, Montgomery and Rossi 1995), or product category (sporting goods, in Miller, Reardon and McCorkle 1999).

In contrast, our work considers the density of outlets directly as reflective of market conditions in equilibrium. The retail density allows us to identify areas with higher market power and agglomeration economies. These areas are usually associated to high economic potential. There is evidence of the economies of agglomeration (positive externalities rendered by the spatial clustering) in retailing (Ghosh 1986; Brown 1989; Betancourt and Gautschi 1992; Miller et al. 1999), and of the market power enjoyed by retailers located far from competitors (Eaton and Lipsey 1975; Hoch et al. 1995). The analysis of retail spatial density can be easily determined. First, the raw data are easily available in directories or census commonly open to public. Second, it captures the two main underlying economic forces which have been consistently proposed and assessed in theoretical and empirical analysis: the market power and the agglomeration economies which give competitive advantage to retail businesses located respectively in the lowest and highest retail density areas.

This analysis has direct consequences for company managers. Depending on the type and nature of the retail business, the retail companies should look for sites in high density areas when the foreseen agglomeration economies are predominant or, on the contrary, for sites in low density areas where the distance to competitors enhances their market power. The intermediate density areas would be occupied by those retail businesses which have found barriers to entry in the low and high density areas. We show in this paper how spatial density analysis enables us to answer the following questions:

- Can we accurately identify clusters or agglomeration areas? If so, this suggests the potential for firms to exploit agglomeration externalities to show high performance. Can we test the presence systematically of higher returns?
- Can we characterize the spatial density of firms located in low density areas? Since these retail outlets exploit local market power, how is their performance compared to other areas?
- If the returns of the retail outlets located in the highest and lowest density areas are on average higher, how can we explain the presence of retail outlets in medium density areas? It calls for variety strategies (diversification across stores). Do outlets located in areas with the highest variety enjoy performance levels similar to those achieved in the agglomeration and low density areas?

Our work complements the foregoing stream of research in several key ways:

- First we propose a measure of retail spatial density, *the intensity function*, based on spatial point pattern processes. We use a nonparametric kernel estimator which does not impose parametric assumptions on the spatial density. Using this measure we identify areas with different levels of retail density.
- Second, we measure retail economic performance through a retail confidence index similar to the VNU retail index used by VNU Business Media and ACNielsen (see, www.progressivegrocer.com). The index is based on a survey with questions calling

for an appraisal of current business conditions as well as expectation for business conditions in the next year.

- For the considered areas we define an index of “business variety” to provide information about diversification across stores in the area. This index is the number of different business activities in each area divided by the number of retailers in the area. We find that diversification and retail density provide a good indication of retail prospects at each zone.

The paper is structured as follows. In the first section we discuss some of the related literature and propose hypotheses about the influence of spatial density and variety of activities on retail performance. We then present the empirical setting and the methodology. We use the surveys about retail confidence responded by retail CEOs along 11 consecutive terms to contrast our hypotheses about the impact of density on retail performance. The results section presents the main findings. We estimate nonparametrically the retail density at every location in the trade area, drawing iso-intensity curves for different levels of spatial density, and we test the proposed hypotheses. Finally, we provide concluding remarks of this research, discuss the implications for location decisions to be made by retail managers, and identify areas for future research.

THEORETICAL FRAMEWORK AND HIPOTHESES

The effect of retail density on the economic performance of individual retailers is the net result of two generally opposing forces: the economies of agglomeration, and the local market power. These two forces have been long time described. Hotelling (1929) introduced the idea of spatial local market power derived from isolation, and Weber (1909) called the positive and negative externalities associated to spatial density *economies of agglomeration* and *diseconomies or deglomerative tendencies* respectively.

From a marketing perspective, the analysis provided by Miller, Reardon and McCorkle (1999), gives an excellent review of the consumer behavior circumstances and types of competition driving retailers to look for performance enhancement by locating in high retail density zones. First, the agglomeration of different types of stores satisfies efficiently the needs and wants of consumer’s multipurpose shopping (Craig, Ghosh and McLafferty 1984; Arentze and Timmermans 2001). Second, the Hotelling’s minimum differentiation principle suggests that agglomeration of stores of the same type allows consumers to reduce uncertainty, to compare prices, and to socialize with other consumers with just one trip (Hotelling 1929; Brown 1989). Third, the symbiosis theory considers that stores of the same type target different segments of the demand so that they do not compete directly among each other allowing consumers to buy more goods (Hirschman 1978; 1979). In addition, retail concentration allows the development of public facilities, incentives the location of firms providing services that otherwise should be internalised by the store, and often increases the frequency of suppliers' visits, sometimes at lower costs. Finally, once there is a cluster, there are reasons to expect its growth, as other stores may decide to locate there on the grounds of agglomeration externalities. Besides, if the clustered firms are locating and surviving there, conditions must be satisfactory (Dicken and Lloyd 1999). These factors strengthen agglomerative tendencies.

High density agglomerations of retailers are not the only source of performance enhancement; on the other extreme of the density continuum, the local demand finding too onerous to shop far from their homes or workplaces might become the base of competitive advantage for retailers conveniently located. That is, retailers may find profitable selecting sites relatively isolated from other stores of the same or different type. By this way, they may hold the market power, i.e. the relative space monopoly, given by their competitive advantage in proximity (Eaton and Lipsey 1975). As an example of how store density may weaken the market power of individual stores, some studies have identified that the proximity of discount supermarkets have a larger effect on the price elasticity of the product categories of supermarkets than the proximity of other supermarkets (Hoch et al. 1995). This frequently observed behavior evidences that market power is a reason for supermarkets to locate in different trade areas. As a consequence, it seems interesting to test the following hypothesis:

Hypothesis 1: Retailers located in the area with low and high density have better performance than the average retailer.

The competitive advantages derived from local market power and agglomeration effects are both subjected to certain limits, beyond which some congestion effect may reduce the interest of these locations. These deglomerative forces may encourage some retailers to locate at intermediate density areas. The urban structure, deglomeration forces and retail variety, may contribute to explain these decisions. The bid rent theory suggests that competition for an inelastic supply of land ensures that, in the long run, all urban sites are occupied by the best use; as the city centre is the focal point of transportation networks, it offers maximum market potential and optimum access to sources of labour and customers. Competition takes place for high density areas, the most desirable of locations, and land goes to the highest bidders (those that can derive the greatest utility from a central location). Rents, therefore, are highest in the high density areas (usually city centres, geographic or historical) and decline with distance from the core, as empirical analysis has confirmed (see Brown 1992). This suggests that high density areas are devoted to a few activities (those generating high returns), where the effects of low variety are compensated by the high density of stores. Moving from levels of high retail density to lower retail density would mean a loss in the attainment of agglomeration economies, but the reduction in rent costs is low and this lost cannot be compensated with an increase of variety (e.g. the closest density level to the highest density areas) until the density is low enough to bear mild land prices that allow the existence of a wider variety of commercial activities, compensating the lost of agglomeration economies (an intermediate level of retail density). If density is reduced moving further away from the town centre, entrance barriers are not caused by costs but demand (low market potential) making levels closer to the less density areas less profitable. Summarizing, intermediate levels may bear costs and potential market that allow the presence of a wide diversity of retailers, which provides it with a competitive advantage. The variety of retail businesses in a site is a good proxy to complementarity; it is expected that the higher the diversification, the more complementarity available to customers shopping or consuming services in the area. Then, variety decreases the costs of customers when demanding retail services in multipurpose trips, and brings a relative competitive advantage to high variety areas. Consistent with these arguments, we propose the following hypothesis:

Hypothesis 2: Retail businesses located in intermediate density areas use a differentiation strategy based on business variety (diversification across stores). Outlets located in areas with the highest variety enjoy performance levels similar to those achieved in the agglomeration and low density areas.

If supported, this hypothesis can have a significant implication for retail managers. This implies that retail companies should jointly consider variety and density to determine location.

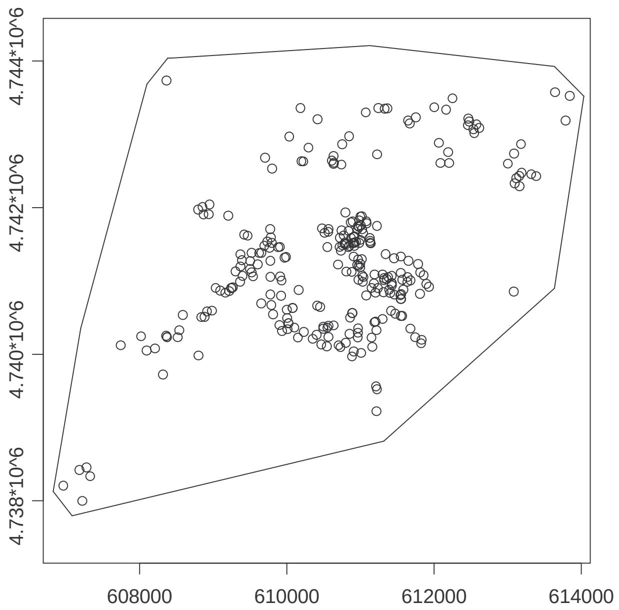
DATA

We test these hypotheses using data provided by a questionnaire survey of retail business located in a medium-sized city in Europe, with a population of about 200,000 (this type of cities represents about the 80% of the cities in Europe). The sample comprises 300 retail businesses, randomly selected by stratified sampling. Each stratus represents the main types of retail business in the trade area including merchandise, grocery, convenience and drug retailers, bars and restaurants among others. Special care was taken to ensure that the sample distribution was proportional to the population of each stratus by types of retail business.

Data was collected from a questionnaire addressed to the CEO of each retail business. Over 11 consecutive periods of 3 months from April 1999 to January 2001, the CEO has been asked about prospects for retailing on both current business conditions and future expected conditions to be 1 year from now. The questions have to be answered on a 3-point Likert-type scale, ranging from "positive" (recoded 1), "neutral" (recoded 2), to "negative" (recoded 3). We measure the retail economic performance through a retail confidence index similar to the VNU retail index used by VNU Business Media and ACNielsen (see, www.progressivegrocer.com). The retail confidence index is closely watched because many managers consider retail optimism an important indicator of the health of the retail business. Further, this data has three unique characteristics which make it very valuable compared to other data sources. First, the data contains observations of individual retail outlets (no retail firms) of very different types: independent businesses, branches, franchises. So they report the business situation of the outlet, not the company itself. Second, this measurement of economic performance avoids the "dimension effects" from heterogeneous retailers in the dataset. Finally, the survey sample is stable along a time period which provides a longitudinal perspective. All this evidence makes us confident about the value of this variable as a reasonable way to illustrate the applicability of point process theory to the study of retail performance.

The retail outlets of the sample were "geo-referenced" (i.e., they were assigned locations) by means of Universal Transverse Mercator (UTM) coordinates, using the service provided by a public regional spatial geo-reference system that is accessible on-line. Figure 1 shows the retailer locations in April 1999, within a polygonal envelope of the trade area.

Figure 1. SCATTER PLOT OF RETAILERS IN THE TRADE AREA



RESEARCH METHODOLOGY REVIEW

The most popular models for the assessment of retail locations are, perhaps, the gravitational models (see e.g., Wilson 1967; Geurts, Lawrence and Guerard 1994). Gravitational models provide a description of flows between specific stores or points in the plane, but lack a rigorous statistical basis to handle the problems of spatial data. To a major extent along the last two decades, the diffusion of Geographic Information Systems (GIS) has enhanced the use of spatial econometric and statistical methods (see e.g., Goodchild and Getis 2000), which are having a reflection in the marketing literature (see e.g., Hofstede, Wedel and Steenkamp 2002; Garber et al. 2004, among others). However, the impact of spatial statistics in marketing is heterogeneous, and some techniques are virtually ignored by academics and managers.

Tiled data or aggregated data are frequently used given that one of the most relevant features of GIS is its ability to partition the space in small tiles for which there are aggregated data. Also, the use of tiled data is common in social sciences, as privacy often leads to the spatial aggregation of individual information. During the 80-90’s decades, there was a strong development of the subject, following the work of Cliff and Ord (1981) and Anselin (1988).

These methods have been widely applied to marketing (e.g., Applebaum 1966; Morrill 1987; Clark 1967; Miki 1983; Hofstede, Wedel and Steenkamp 2002; Yang, and Allenby 2003, and Garber et al. 2004). But the use of spatially aggregated data brings with it a number of major problems. The most relevant is that the assignment of observation units to spatial regions is usually arbitrary and based on convenience, and this assignment has an impact on the coherence of the results derived from aggregated data. Typical regions (usually administrative regions, such as counties, postal codes, etc.) are not homogeneous, and this problem sometimes renders the inferences unreliable.

By contrast, here we consider point pattern processes (see e.g., Diggle 1993) which consider individual points (e.g., firms, retailers or customers) located in the plane. The use of point data avoids the aggregation biases. A spatial point process is defined as a stochastic set – namely a countable set – of points randomly located in the plane. Let **N** denote a spatial point process. For any region A in the plane R^2, we define a random variable *N(A)* representing the number of events on the region A. Then, *N(A)* takes integer values *{0,1,2,3,…}* with some probability. On any bounded region we assume that *N(A)* is finite with probability one. The spatial phenomena can be completely characterized by the probabilities $\Pr\{N(A_1)=n_1,...,N(A_K)=n_K\}$ any non negative integers $n_1,...n_K$ and finite collections of planar regions $A_1,...,A_K$. The probabilistic behavior of a point process *N* is often synthesised by the intensity function $\lambda(t)$, where t is the location of a point. The intensity function $\lambda(t)$ is defined as the expected number of events (stores in our case) at some infinitesimally small area around any point *t*, so that $E[N(A)]=\int_A \lambda(t)\,dt$ for any region A. Here we use the intensity function of retailers as a measure of their spatial density in the trade area.

Several approaches can be adopted to estimate the intensity function over a set B (e.g. the trade area). Here we consider the nonparametric estimator developed by Diggle (1985) using a kernel function *K(t)* such as the standard normal density. This estimator is given by,

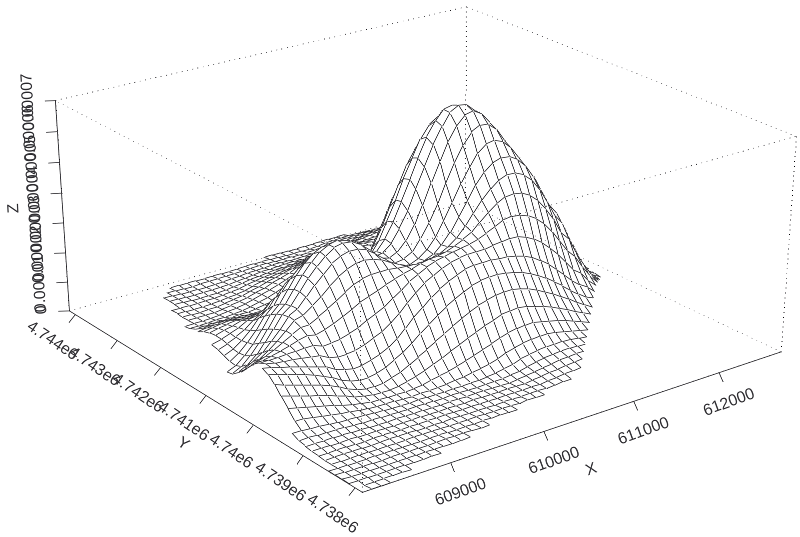
$$\lambda(t)=\frac{\sum_{i=1}^{n} K\left(h^{-1}(t_i-t)\right)}{\int_B K\left(h^{-1}(s-t)\right)ds},$$

where the parameter *h>0*, known as the smoothing number, has to be as small as possible provided that most of the balls or neighbourhoods of *t* with radius *h* have a reasonable number of points. The denominator is also useful to improve the estimation of at points *t* near the boundary of the region B. Further details can be found in Diggle (2003).

RESULTS

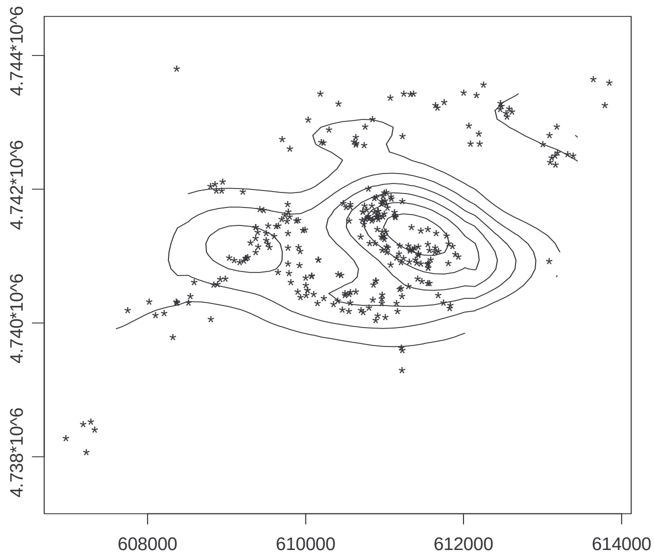
First, we estimate nonparametrically the intensity rate function to assess the patterns of retailers' density in the trade area. Figure 2 shows the nonparametric estimation of the intensity rate function for retailers in April 1999.

Figure 2. INTENSITY RATE PLOT OF RETAILERS



Also, we consider the *iso-intensity curve*; i.e. the contour plot of the intensity function. In a first stage, we have selected 7 levels to define a complete partition of the region of interest , see Figure 3. The iso-intensity levels define a partition of the studied region in 7 areas of similar density.

Figure 3. ISO-INTENSITY LEVELS: CONTOUR PLOT OF RETAILERS INTENSITY

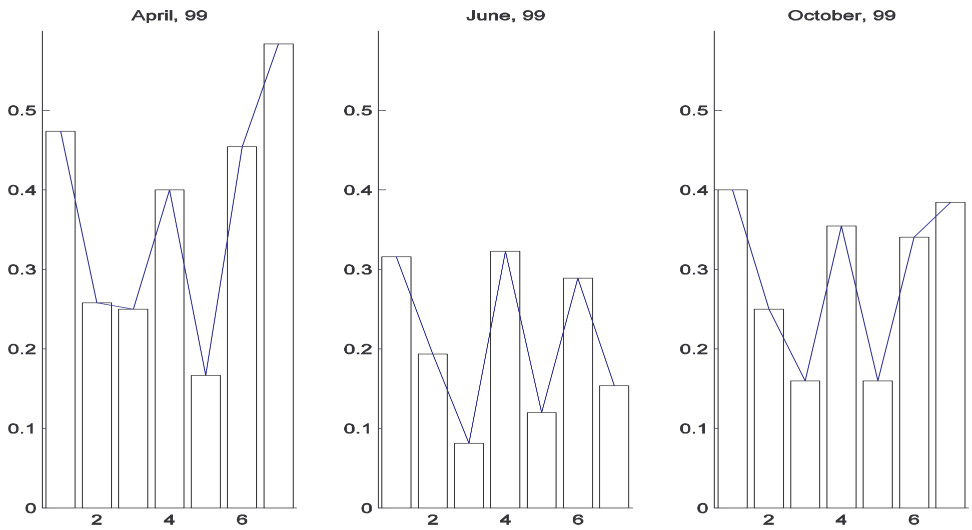


Similarly, we can consider a higher or a lower number of levels, depending on the roughness of the intensity function and the desired degree of accuracy. As this decision is difficult to set a priori, we study the relative frequency of retailers over each density level allocating each point to an intensity level. The intensity function evaluated at locations in levels 1 and 2 is similar and both levels contain a moderate number of retail outlets, and the same happens with the levels of higher density (6 and 7). As a consequence, we aggregate these areas to define 5 levels with increasing intensity (1&2, 3, 4, 5, and 6&7), which is an interesting benchmark for further analysis, since the number of retailers in each geographic level is not too different, nor too small. This structure is henceforth considered.

In order to check the dynamic stability of retail spatial patterns, we also studied the spatial density of the retail business over the 11 consecutive quarters of the data. For all the samples, we obtained the same spatial density function, suggesting that spatial density is fairly stable, at least for a five-year period – time enough to recover the investment associated with retail business. We have validated the analysis using an independent sample dated April 1997, and the estimated intensity is identical to the one estimated for 1999 as well as the estimations with consecutive quarters.

Next we study the relationship between the spatial density and business performance conveyed through the retail confidence index. Figure 4 shows the *regressogram* of the confidence retail index and the intensity level along the 3 terms since April, 1999 until October, 1999. A regressogram is like a histogram but with a dependent and an independent variable, in which the bins are defined by intervals of the values of the independent variable and the height of each bar is given by the mean of the dependent variable for observations with values of the independent variable in the corresponding bin. It can be observed that the most optimistic climates among retailers are found in density level 1 (the lowest), level 4 (the intermediate), and levels 6 or 7 (the highest ones). Although we only reported 3 terms, the observed pattern is relatively stable along the 11 terms. Therefore, these descriptive results clearly support Hypothesis 1.

Figure 4. REGRESSOGRAM OF THE CONFIDENCE RETAIL INDEX AND INTENSITY LEVELS



Also, we examined this pattern with a multinomial Logit model for the conditional probability of having positive (recoded 1), neutral (recoded 2), or negative (recoded 3) confidence in business performance. Taking (2) as the comparison category, we explain these probabilities through dummies associated with different density levels. To avoid multicollinearity, we drop the constant term. Hence,

$$\Pr\{Y = j \mid level\ k\} = \Phi\left(\beta_{j,k}\right)$$

for $j = 1, 2, 3$ and $k = 1\&2, 3, 4, 5, 6\&7$, where Φ is the Logistic distribution. Table 1 contains the estimated coefficients and their main statistics estimated from data collected in April 1999. This model is globally significant, as the Log likelihood is -218.7333 and the LR chi2(10) = 61.30. Furthermore, many of the coefficients associated to the dummies structure are significant.

Table 1. MULTINOMIAL LOGIT FOR RETAIL CONFIDENCE INDEX VERSUS INTENSITY LEVELS, FOR APRIL 1999.

Returns	Density	Coef.	Std. Err	Z	P>|Z|
Expectation=1	**Level 1&2**	0.3364722	0.2618615	1.28	0.199
	Level 3	-0.2876821	0.3118048	-0.92	0.356
	Level 4	0.4700036	0.4031129	1.17	0.244
	Level 5	-0.4054651	0.4564355	-0.89	0.374
	Level 6&7	0.6632942	0.2985407	2.22	0.026
Expectation=3	**Level 1&2**	-1.021651	0.3887301	-2.63	0.009
	Level 3	-1.386294	0.4564355	-3.04	0.002
	Level 4	-0.9162907	0.591608	-1.55	0.121
	Level 5	-1.098612	0.5773503	-1.90	0.057
	Level 6&7	-1.041454	0.4748581	-2.19	0.028

Clearly, the density level k with better performance expectations is the density levels maximizing $\Pr\{Y=1\,|\,level\ k\}$, i.e. the level k with larger $\beta_{1,k}$, since Φ is a monotonous function. For this quarter (January, February, and March 1999), the best region is Levels 6 & 7 (with coefficient 0.66); the second best is Level 4 (with coefficient 0.47); and the third option is Levels 1 & 2 (with coefficient 0.33). The coefficient for Levels 6 & 7 is significant; therefore, it is the most reliable choice.

These estimations were also conducted over 11 consecutive terms. For all periods, the model is globally significant as well as many individual coefficients associated to the dummies' structure. We find that for 8 of these 11 terms, the retailers maximize the probability of having improvement expectations at levels 1&2, 6&7, or 4. In particular, Table 2 contains the relative frequencies of being optimal locations (best, second best or third positions), showing the systematic advantage at levels 1&2, 4 and 6&7 and therefore, providing further evidence of Hypothesis 1.

Table 2. OPTIMAL LEVELS FOR 11 TERMS, JUNE 1998 TO JANUARY 2001

	First-position	**Second-position**	**Third-position**	**Summa**	**Optimality Frequency**
Level 6&7	**4/11**	**3/11**	**3/11**	= 10/11	= **0,909**
Level 1&2	**2/11**	**3/11**	**4/11**	= 9/11	= **0,818**
Level 4	**2/11**	**4/11**	**3/11**	= 9/11	= **0,818**
Level 5	2/11	1/11	0/11	= 3/11	= 0,272
Level 3	1/11	0/11	1/11	= 2/11	= 0,181

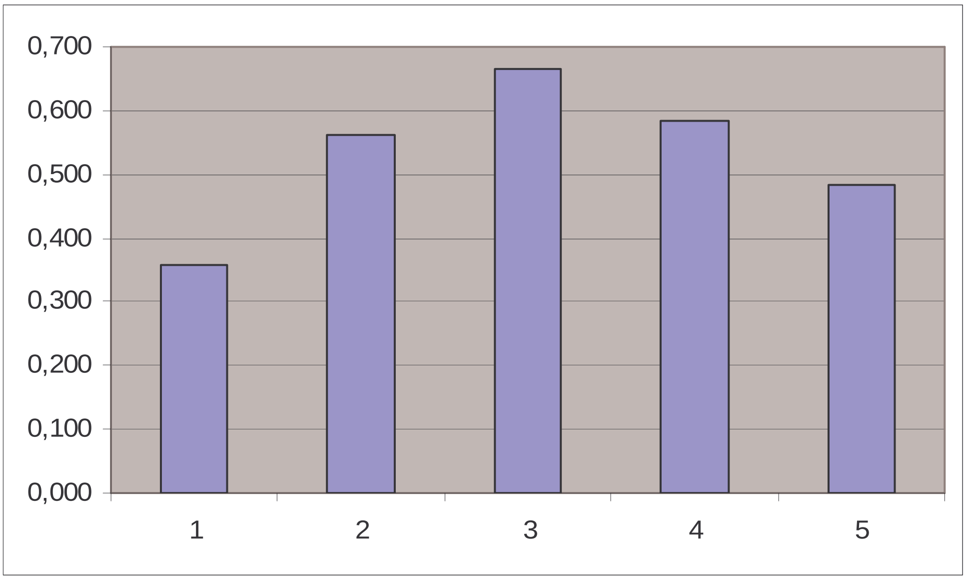
Further, notice that level 4 includes far apart regions, including a local maximum of the density function, as Figure 5 shows. Therefore, a plausible explanation for the presence of a systematic competitive advantage at level 4, is that this area includes a local maximum of the density function, and this maximum leads to some agglomeration economies.

Figure 5. INTENSITY LEVEL 4 AND TOWN PICTURE

However, we have compared the average expectations for retailers within the local maxima of spatial density and the annulus, and we do not find differences.

Next we define a business variety index, which is the number of different business activities in each area divided by the number of retailers in the area. When analysing the variety of retail business, we found that the diversification of retail main activities is higher in intermediate density areas. This result also provides evidence that the retail variety is not a distinctive strategy for retail businesses in the clustering levels 1&2 and 6&7. Figure 6 shows an index of retail variety within each level, for April 99. The structure is stable along the different terms. Taken together, this result supports Hypothesis 2.

Figure 6. VARIETY OF ACTIVITIES BY INTENSITY LEVELS IN APRIL, 99

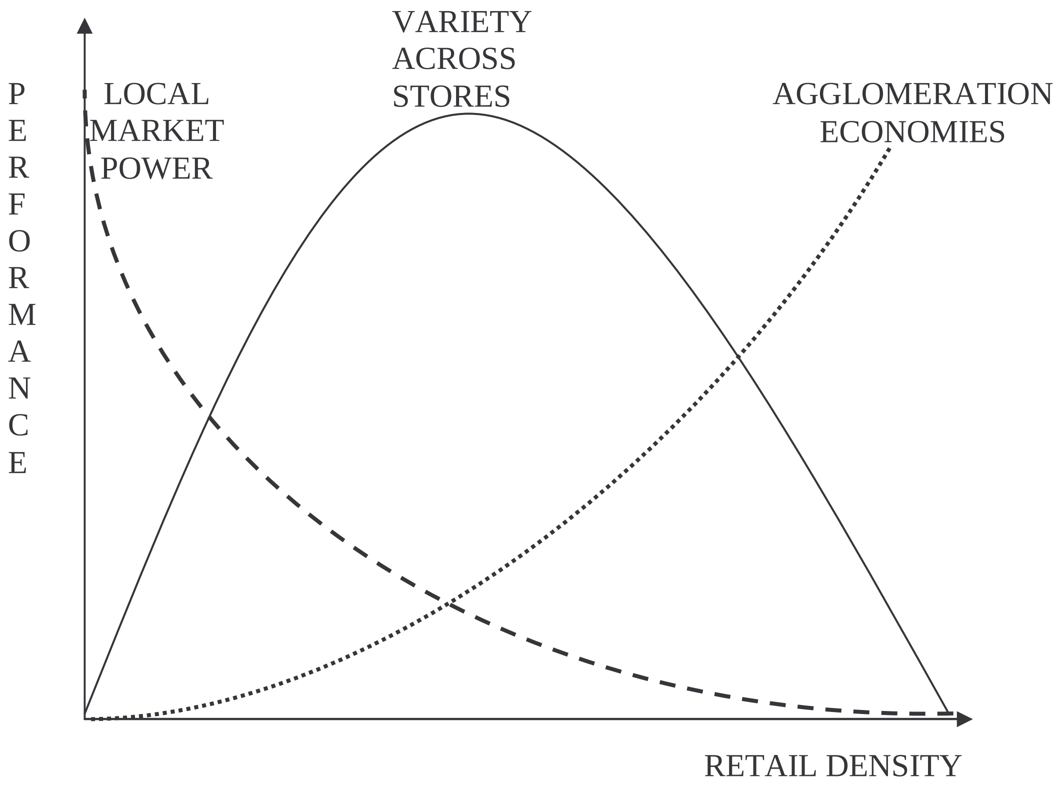


This analysis can be particularized to specific sectors, provided that we have a large enough sample. In particular, bars and restaurants have been studied alike and again the results support our hypotheses.

CONCLUSIONS

In this paper we have considered the use of spatial point pattern methods to present a global measure of spatial retail density, the intensity function. Among the various ways to estimate an intensity function, we have used a nonparametric approach which is robust against misspecification biases. We have estimated the spatial intensity of retail stores which is stable along the observed time period. On the basis of iso-intensity curves derived from the spatial intensity, we have found the stable nonlinear relation between the retail density and business performance described above. Since the measurement considers the interdependence of neighbour retailers, it has allowed us to generate a trade area partition which is relevant for the economic performance of retailers; moving across density areas has an impact on the business performance. Our findings suggest that retail businesses should jointly consider variety and density to determine location, as illustrated in Figure 7.

Figure 7. EFFECTS OF DENSITY AND VARIETY ON PERFORMANCE



Implications for retail business managers

In general, if the results of our empirical analysis hold for any other town, there would be an interesting array of implications for the decision making of retail locations. For any retail business, location in the highest density areas enhances the business performance .When sales and customer visits to the retail business are the priorities (flagship stores), high density locations provide a sustainable competitive advantage in the medium term. When the priority is about the profitability of the specific store or service outlet, the analysis of price differentials in the renting of space between high and medium density zones should guide the decision on whether to pay premium prices for locations in high density areas or not. When the price gap is low or when it is stable, high density locations are a good opportunity especially if long-term contracts keep low the price gap. In general, medium density areas are not attractive for the location of retail businesses unless the retail businesses of the area are varied. The variety of retail businesses is a source of complementarity of retail services which improves the productivity of customers in multipurpose trips. So that when there is a combination of high variety and medium density, customers are attracted to the zone in which they can solve in one trip a wide range of needs. From a profitability perspective of the individual retail store or service, if the rent prices in medium density-high variety areas are lower than in high density areas, the decision to locate in the former should be considered. For low density areas, it is a matter of stability; locations in low density areas provide consistently better performance than in medium density areas. Sometimes migration flows may affect the size and shape of a particular town in a medium term, generating a structural change of the retail density in the outskirts. So it is important to know if this density is not likely to have a moderate increase in the near future; moderate increases would result in a repartition of sales not compensated by the attraction of new customers.

As the evolution of retail density can be foreseen in the medium term, retail managers can take positions in advance of the urban developments and redevelopments.

Limitations and future research

There are of course limitations to the present research that should be mentioned and can help to direct future research. The sample size has not allowed us to get deeper in the analysis to assess if the retail density has different effects on different types of retail businesses, although the only sector in which we had enough observations (the bars and restaurants) did not matter when including it in the model. Furthermore, the questionnaire did not go further into competition and promotion strategies which could be associated to retail density.

This research suggests that more attention should be given to theoretical models that reflect profit implications of location and (competition) in order to adapt the marketing-mix strategies to differentiated spatial regions, maximizing profitability at individual store level.

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