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# An Optimal Size for Rural Tourism Villages with Agglomeration and Club-Good Effects

**by**

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# An Optimal Size for Rural Tourism Villages with Agglomeration and Club-Good Effects

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## Abstract

*Helping to sustain a viable rural sector, rural tourism enjoys public support in many countries. We claim that due to club-good and agglomeration externalities in the rural accommodation market, public support should be integrated in a broader local development policy that regulates the number of accommodation units in a locality. To demonstrate this we extended an equilibrium model that accounts for product differentiation and oligopolistic competition to address club-good and agglomeration effects and applied it to data collected in north Israel. We show that under the prevailing regulation, the number of units is by far higher than the social optimum.*

## 1. Introduction

The decline of agriculture as an income and employment generator in rural areas in developed economies has led their populations to search for other more economically viable alternatives. Researchers and decision makers often consider rural tourism as an appropriate alternative, as it is perceived as a tool for raising the level of economic welfare of the local as well as the national economy. Accordingly, rural tourism is supported by different policy instruments (Jenkins et al., 1998; Fleischer and Felsenstein, 2000). In some cases, rural tourism is promoted without regulation, resulting in farmers diversifying to rural tourism as long as they consider it profitable. We contend that due to externalities in the rural tourism industry supporting it without appropriate regulation could lead to its overdevelopment. In fact, when the number of rural accommodations units in a locality starts exceeding the socially optimal one, public support might lead to opposite consequences than had been intended.

The rural tourism industry is uniquely characterized by club good elements on the demand side and industrial agglomeration effects on the technology side. Visitors enjoy the private good of rural accommodations and the club good of rural ambience and landscape. However, as the number of accommodations units and guests in the

village increases, congestion sets in and utility starts to decline (Buchanan, 1965). An unbalanced development of accommodation units can result in congestion, noise, and environmental pollution thereby causing disutility to the visitors up to the point that it can threatens the very same rural amenities that attracted them in the first place. Other possible negative externalities occur when an excessive number of rural households enters the rural tourism industry while abandoning their agricultural activity. In such a case the agricultural landscape, along with its positive impact, (Fleischer and Tsur, 2000) might gradually vanish. Moreover, in this special case an increase in the number of rural accommodation operators not only leads to club good effect as more visitors share the club good but also leads to a decline in the size of the club good. This is because more tourism operators mean less rural environment and landscape and more built tourism structures.

On the supply side, an increase in the number of rural tourism operators at a given locality can lead to agglomeration economies (Rosenthal and Strange, 2004) including shared infrastructure (scale economies), pulled labor and other inputs as well as information externalities. For example, infrastructure such as promenades, signposts, parking lots, information booths, and lighting systems can be considered a fixed costs shared by all the operators. As these costs are being shared among an increasing number of firms, the per-firm costs decrease. Furthermore, potential entrants to the rural tourism industry may enjoy information from the incumbents firms about existing demand, visitors' preferences and feasibility of production.

The EU as well as many individual EU countries have recognized the existence of externalities in the rural tourism market and the importance of sustainable development, and thus attempt to regulate and support it (see Tchetchik, 2006). In Israel too, support measures are accompanied by some level of regulation; the

government directly limits the supply of rural accommodations by prohibiting the establishment of rural accommodations in certain regions and by restricting the number of rural accommodations per firm (the limit is determined individually for each village). However, a major problem arises when implementing such regulations: Since there is no explicit limit on the number of accommodations units per village, this limit is actually determined by the number of households that enter the rural accommodation market and the limit set on the number of accommodation units per firm (which is usually set to meet different planning and national considerations). As a result, welfare considerations regarding the rural accommodations market are not taken into account. At present, there is a high concentration of firms in many villages; in fact, as many as 35 percent of the inhabitants are engaged in tourism and this figure is expected to grow even further (Tchetchik et al., 2008). We claim that without an appropriate government intervention in the rural accommodations market, the number of units in each village may ultimately exceeds the socially optimal one.

The aim of this study is to identify the socially optimal number of rural accommodation in a village by extending the model in Tchetchik el al. (2008) and applying it to the Upper Galilee region. The model developed is an equilibrium model of demand and pricing equations for each rural accommodation firm. The model addresses the effects of club good on consumers' preferences for rural accommodations and agglomeration at the technology side of the rural accommodations firm. Other than a regional competition, this model also integrates price competition within rural accommodation firms in the same village and its possible interplay with agglomeration and club good forces. By deriving the empirical model and applying it to our data set, we estimate the model's parameters and conduct simulations of the market equilibrium under different market regimes and

policies. We show that an increase in the number of accommodation units per village, although within the regulated limit, can eventually lead to a decrease in the market's total welfare. The contribution of this paper is two folds; conceptually, it addresses for the first time club good and agglomeration externalities in the tourism industry under a structural economic model. Empirically, the paper provides econometrically robust mechanism for analyzing and identifying optimal spatial density of accommodations units in the rural areas.

The paper proceeds as follows: next section provides the theoretical model. The derived empirical model, data source and the estimation procedure are described in the third section. The results of the estimated model are discussed in section four. Section five presents several simulations of possible policies scenarios. The last section concludes.

## 2. The Model

We model equilibrium in rural accommodations market at the regional level, following Tchetchik et al. (2008). We specify is a discrete-choice equilibrium model with product differentiation in which a nested-logit framework is used to describe consumer preferences. The different villages in the region naturally form the different nests. The regional market is modeled as a differentiated-product, oligopolistic market, with $N$ single product firms. The model is set in a "characteristic space" (Lancaster, 1971, McFadden, 1978) and allows for both vertical and horizontal differentiations. Consumers' utility depends on the chosen product's characteristics, on random idiosyncratic preferences, and on a small set of parameters to be estimated. Market demand is then determined by aggregating a discrete-choice model

of consumer behavior. Prices are endogenous and determined through competition among the firms.

The primitives of the model are the variety of brands offered by the firms, which is fixed in the short-run[1], consumer preferences over these products, and the equilibrium notion (Nash equilibrium). While all market decisions are assumed to be observed by all market participants, the econometrician observes only market outcomes (the firms' prices and market shares). Finally, the model allows that both the econometrician and the consumers do not observe all product characteristics (following Berry, 1994).

*Demand*

Consider a regional rural accommodations industry with $N$ lodging firms, dispersed in $V$ distinct villages and serving $M$ potential consumers. The utility of consumer $i \in \{1,...,M\}$ from staying at accommodation firm $j \in \{1,...,N\}$ is denoted $U_{ij}$ and depends on the attributes of the private good, i.e., the accommodation unit including its price, and on the attributes of the club good, i.e., the rural landscape and ambience. The club good effect is captured in the density variables $d_v$ and $d_v^2$, a second degree polynomial. The density variable can be measured by the number of accommodation units per village or per village local population. The utility function receives the following form:

$$(1) \qquad u_{ij} = x_j\beta - \alpha p_j + \mu d_v + \mu' d_v^2 + \zeta_j + \xi_{iv} + (1-\sigma)\varepsilon_{ij},$$

[1] Treating product characteristics as exogenous is commonly done in most empirical studies of differentiated products. In the context of accommodations facilities this is not a strong assumption since in the short run product characteristics are given.

where $x_j$ is a vector of observed product characteristics of the $j^{th}$ firm, $p_j$ is the price per unit night $\alpha$, $\sigma$, $\mu, \mu'$ and $\beta$ are the model's parameters; and $\varsigma_j$, $\xi_{iv}$, and $\varepsilon_{ij}$ represent utility components which are attached by the consumer to the unobservable characteristics of the unit. In particular, $\zeta_j$ is a firm-specific component which is common to all consumers, and $\xi_{iv}$ represents the $i^{th}$ tourist's preference for a specific village $v \in \{1,...,V\}$. Finally, $\varepsilon_{ij}$ represents the $i^{th}$ tourist's preferences for a specific firm.

An individual $i$ prefers alternative $j^*$ over all other k alternatives if $u_{ij^*} \geq u_{ik}\ \forall k \in \{1,..,N\},\ k \neq j$. This inequality sets the basis for the derivation of the various firms' market shares. For this end a few more assumptions about the population distribution of the idiosyncratic utility components, attached by the consumers to the unobserved characteristics, $\zeta_{ir} + (1-\sigma)\varepsilon_{ij}$, are required. In particular, the latter term is assumed to be an i.i.d variable with a population mean of zero. In addition, assuming that $\varepsilon$ is an extreme value variable implies that $\zeta_{ir} + (1-\sigma)\varepsilon_{ij}$ is also an extreme value random variable (Cardell, 1997).

With these assumptions, a closed-form expression for firm $j$'s market share, $S_j$, can be derived as follows:

$$(2)\ \mathrm{S}_j(\delta,\sigma) = \frac{e^{\delta_j/(1-\sigma)}}{\left(\sum_{j\in Nv} e^{\delta_j/(1-\sigma)}\right)^{\sigma}\left[\sum_{v=1..V}\left(\sum_{j\in Nv} e^{\delta_j/(1-\sigma)}\right)^{(1-\sigma)}\right]}$$

where $\delta_j$ is firm's $j$ mean utility level, $\delta_j = x_j\beta - \alpha p_j + \mu d_v + \mu' d_v^2 + \zeta_j$

*Pricing*

It is assumed that the single firm chooses its price to maximize short-run profit. In other words, for a given (exogenous) firms' attributes the price is chosen to maximize profit. At the regional-industry level, we assume that the observed prices reflect a Nash equilibrium in a price game. That is, each firm engages in an oligopolistic competition and sets its price to maximize profits given the prices of the other firms.

The necessary condition that characterizes firm *j*'s best response to the pricing of the other firms is given by:

$$(3) \qquad s_j + \left( p_j - \frac{\partial c(z, d_v, Ms_j)}{\partial s_j} \right) \frac{\partial s_j}{\partial p_j} = 0$$

where $c(z_j, d_v, s_j N)$ is the variable cost as a function of the accommodation units' attributes and the operator's characteristics $z_j$, the density level of the village, $d_v$, and annual occupancy ($M$ is the number of potential consumers, $s_j M = q_j$ is the annual quantity of sold nights for firm j). Due to agglomeration economies, we expect $c'(.)$ to decrease in $d_v$. Note that the characteristics that affect cost are not necessarily those that affect consumer preferences ($z \neq x$).

Equation (3) sets the basis for the estimation of the pricing behavior and the effects of the village and accommodation characteristics on marginal costs.

*Welfare Measurement*

The consumer surplus per person up to a constant (Choi and Moon, 1997) is given by:

$$(4) \qquad W = \frac{\ln\left( \sum_v \left( \sum_{j \in Nv} e^{\frac{\delta_j}{1-\sigma}} \right)^{1-\sigma} \right)}{\alpha}$$

This formula is utilized in the simulations below that examine the impact of industry agglomeration on consumer surplus.

## 3. Estimation Procedure and Data

The following section describes the empirical specification of the model which includes the demand and pricing equations and the estimation procedure.

### *3.1 Empirical Specification*

To derive an empirical specification for the demand equation we introduce an outside-good whose mean utility level is normalized to 0. We let rural accommodations in all other regions in the country represent the outside-good[2]. Dividing the natural logs of the analytical market shares by the outside-good's market share and transforming the dependent variable to be expressed in occupancy rates rather than market shares, yield the following equation:

$$(5) \qquad \ln(\frac{o_j}{o_0}) = x_j\beta - \beta^n \ln(n_j) + \mu d_v + \mu' d_v^2 - \alpha p_j + \sigma \ln(s_{j/v}) + \zeta_j$$

where $o_j$ and $o_0$ are firm's j and the outside good occupancy rate respectively, $s_{j/v}$ is the village market share of accommodation firm $j$ and $\beta$, $\beta^n$, $\alpha$, $\sigma$, $\mu$ and $\mu'$ are parameters to be estimated. Treating $\zeta_j$ as an error component, equation (5) can be used for the estimation of the model parameters. Rewriting equation (5) in terms of

[2] The assumption that the prices of rural accommodations in all other regions are exogenous is a strong one but can be justified based on the findings in Tchetchik et al. (2008) about the importance of the geographical region within the consumer choice process. In particular, the Upper Galilee region, on which we focus here, was found to demonstrate the highest positive marginal effect on the demand for rural accommodations

occupancy rates rather than market shares is done by using the basic identity

$o_j = \frac{q_j}{365n_j}$, where $n_j$ is the number of units offered by firm $j$.

The variable $d_v$ is a measure of the density of accommodation units in the village. The size of the plot for each household in the village is more or less the same, thus measuring density as the number of accommodation units per village residents provides a good approximation to the proportion of land used for tourism purposes. Similar to the case of other club goods (Buchanan, 1965) we assume that when a certain level of density is passed, the benefit the guests elicit from the rural ambiance of the area starts to decrease. Thus, we expect the market share (or occupancy rate) as a function of density to form an inverse U shape. Accordingly we include both $d_v$ and $d_v^2$ in the demand equation. Finally, the variable $\ln(n_j)$ is added to the right-hand side of equation (5) as a result of the transformation of the dependent variable from a market share to an occupancy rate.

In order to derive an estimable pricing equation we assume that the marginal cost is constant in the output level, linear in the accommodation units' characteristics, and has logarithmic relation with the industry density in the village. Incorporating these assumptions, rearranging (3), and substituting for $\frac{\partial s_j}{\partial p_j}$ from the demand theoretical equation yields:

$$(6) \qquad p_j = w_j\gamma + \gamma^d \ln(d_v) + \frac{(1-\sigma)}{\alpha} / \left[1 - \sigma s_{j/v} - (1-\sigma)s_j\right] + \omega_j$$

where $w_j\gamma$ is the marginal cost and $\gamma^d \ln(d_v)$ represents the agglomeration economies (accordingly $\gamma^d$ is expected to be negative), the term on the right-hand side

of equation (6) represents the oligopolistic price-cost markup. The error term, $\omega_j$ represents the marginal costs associated with the unobserved characteristics of the accommodation unit and the operator's unobserved managerial skills.

### *3.2 Estimation Procedure and Instruments*

Equations (5) and (6) were estimated as a system of equations using the general method of moments (GMM) which was found to be the most econometrically suitable (for a more detailed discussion see Tchetchik et al, 2008). To carry out the procedure we utilize the NLOGIT3 (LIMDEP) NLSUR procedure. This procedure requires instruments for the price and market shares. We chose two groups of instruments, the first one for the market share includes the attributes of the accommodation unit that do not affect cost such as the number of other- accommodation units, luxury elements, log-cabins and tourists' attractions in the village and the surveyor impression of the unit. These variables are correlated with the firm's market share but are independent of the unit's unobserved characteristics. The second group for the price includes the characteristics of competing rural accommodation units in the village such as area of cultivated land, and village type (specifically, whether the village is a nonagricultural community). These instruments are cost-shifters that do not appear in the demand equation and other exogenous variables that are not included in the model, but are found to be correlated with price.

### *3.3 Data*

The rural accommodations industry has exhibited an average annual growth rate of 15% over the last 20 years. It currently consists of 12,000 accommodation units scattered in about 250 rural communities including semi-cooperatives (moshavin),

collectives (kibbuzim), and private villages. The villages are located in five distinct geographical regions. About half of which are located in the Upper Galilee region.

We extract from Tchetchik's (2006) data those observations that refer to the Upper Galilee region only (for details on the data collecting procedure see Tchetchik, 2006). Out of a total sample of 200 observations, those of the Upper Galilee sum up to 107 observations (24% of the regional population of units) and are dispersed over six villages. Table 1 presents descriptive statistics of these rural accommodations and includes the variables and instruments employed in the regression analysis.

**Table 1: Descriptive Statistics of Regression Variables and Instruments**

| **Variable** | **Description** | **Mean** | **S.D.** |
|---|---|---|---|
| Firm's total market share | Total nights divided by the entire market size (%) | 0.57 | 0.51% |
| Firm's regional market share | Total nights divided by the region's market size | 0.93% | 0.84% |
| Within village share | Equals firm's share within the village | 5.61% | 5.87% |
| Occupancy rate | Annual average occupancy rate | 0.28 | 0.12 |
| Price | Average price per unit night in NIS | 296.4 | 77.4 |
| Breakfast* | =1 if breakfast is included in the hospitality price | 0.34 | |
| Luxury (a) | Value of luxury elements based on their cost | 4.95 | 4.15 |
| Amenities | # of amenities, e.g. bath-oils, homemade jam, fruits | 2.7 | 2.19 |
| Number of units | # of accommodations units per firm | 4.07 | 2.66 |
| Unit size | Average size of each firm's units in $m^2$ | 33.73 | 12.52 |
| Business age | # of years the firm operates in the market | 7. 71 | 6.26 |
| Village Density (b) | Village number of accommodation per 1000 residents | 104.95 | 56.04 |
| Owners Agriculture* | =1 if the owner's agric. land is on sight from the units | 0.45 | |

| | | | |
|---|---|---|---|
| Rosh-Pina* | =1 if the firm is located in Rosh-Pinahvillage | 0.22 | |
| Active Farm* | =1 if the operator is also an active farm operator | 0.58 | |
| Cultivated land | Total cultivated land in dunam (0.1 Hectare) | 8.20 | 2.5 |
| **Instruments** | | | |
| Surveyor rating | The surveyor impression from the accommodations on a 1-5 scale | 2.9 | 0.62 |
| Nonagricultural community | =1 if the firm is located at a nonagricultural community | 0.18 | |
| Cultivated Land | Total area of cultivated land in dunam (0.1 hectare) for active farmers | 9.45 | |
| OTHBRKST | Number of other rural accommodations operators in the village who serve breakfast | 12.6 | 8.4 |
| OTHLUXSE(a) | Other luxury features in the village | 97.95 | 38.8 |
| OTHLCSET | Other log-cabin shares in the village | 4.52 | 3.53 |
| OTHARTRS | Other attractions in the village operated by rural accommodations operators | 13.5 | 8.6 |
| OTHAMENST | Other amenities offered in the village | 53.8 | 17.2 |

*Notes: One asterisk indicates a dummy variable (a) Each point represents NIS 1000 of investment in luxury elements per unit (b) number of residents in each village was adjusted to fit sample size.*

## 4. Econometric Estimates

### *4.1 Demand estimates*

Table 2 reports the GMM estimation results of the demand equation coefficients, marginal effects and partial elasticities. With the exception of the dummy variable for an active farm, all the coefficients estimated in the demand equation are significant and have the expected sign. The view of the farmland landscape, luxury elements, special amenities, unit size, and breakfast serving all have a positive sign, meaning that they contribute to an increase in the market share. Units in the village of Rosh-Pinah enjoy an extra benefit from the unique setting of its quaint little houses, art galleries and specialty restaurants. Being an active farm does not have any significant impact on demand.

**Table 2: GMM Estimates for the Demand Equation**

| *Variable* | Coefficients | Standard Errors | Marginal Effects [b] | Elasticities [c] |
|---|---|---|---|---|
| Constant | -1.086* | 0.19 | | |
| Owner Agriculture view | 0.18* | 0.05 | 49.17* | 0.21* |
| Luxury elements | 0.024* | 0.01 | 6.43 * | 0.31* |
| Rosh-Pina | 1.34* | 0.14 | | |
| ln(No. of units) | 0.43* | 0.09 | 28.2 | 0.27* |
| Village Density | 0.026* | 0.0049 | 1.23* | 1.19* |
| Village Density sq. | -0.0001034* | 0.000020 | | |
| Active farm | -0.01 | 0.03 | | |
| Special amenities | 0.05* | 0.01 | 13.8* | 0.36* |
| Breakfast included | 0.03** | 0.03 | 8.25 | 0.03 |
| Unit size | 0.05** | 0.02 | 12.33* | 0.40* |
| Price (NIS per night)[a] | -0.0026* | 0.0005 | -0.71* | -2.03* |
| $\sigma$ [a] | 0.64* | 0.05 | | |

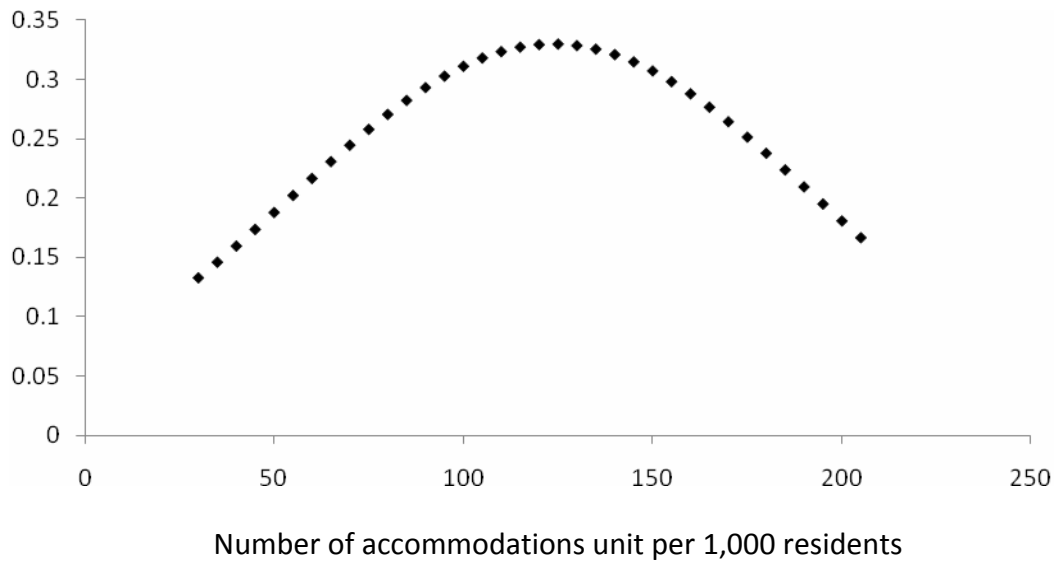
*,** Significant at 5% and 10% respectively

(a) These variables are shared with the pricing equation in Table 4.
(b) Calculated by using bootstrapping
(c) Elasticities were calculated only for continuous variables at the mean value.

The demand elasticity is elastic and equals -2.03. This high level of elasticity indicates that despite the differentiation among the units there is still a high level of substitution between them. The "nested-logit" parameter $\sigma$=0.64 is statistically significant indicating a strong within village dependency between the stochastic parts of the utility. The significance of $\sigma$ provides a justification to the employment of the nested-logit to describe the demand of the rural accommodation market at the regional level.

Finally and most importantly we assess the existence of a club good effect in the consumer preferences for rural accommodations and to quantify it. Both coefficients for density and density squared are significant and demonstrate an inverse U shaped relation between the firms' average occupancy rate and the density of rural accommodations units in the village. These relations are depicted graphically in Figure 1.

**Figure 1: Average Occupancy Rate as a Function of Accommodations Units' Density at the Village**




A possible explanation for these relations is that at the earlier stage of development when the number of accommodation units in a village is low, visitors might enjoy the feeling and ambience of a rural village when they see a few other tourists. However, as the density of the units grows the quiet rural environment disappears and the average occupancy rate starts to decline. The average optimal density level of accommodation units within a village is calculated to be 124 units for each 1000 residents. At this level of units the average occupancy rate per firm is the highest. This result can be translated from the aggregate market level to the individual level as the highest probability to choose the firms in the village with the optimal density (all other things being equal).

### *4.2 Pricing Equation*

Table 3 reports the estimation results and elasticities of the pricing equation. The variables *Luxury* and *Special Amenities* are found to have a positive and significant

contribution to the cost. The negative and significant coefficient of the variable *Village Density* confirms the existence of agglomeration economies in the production of rural accommodations services. Elasticity is found to be -0.13 which indicates that an increase of 1% in the village density lowers costs by 0.13 percent. These relations are depicted graphically in Figure 2.

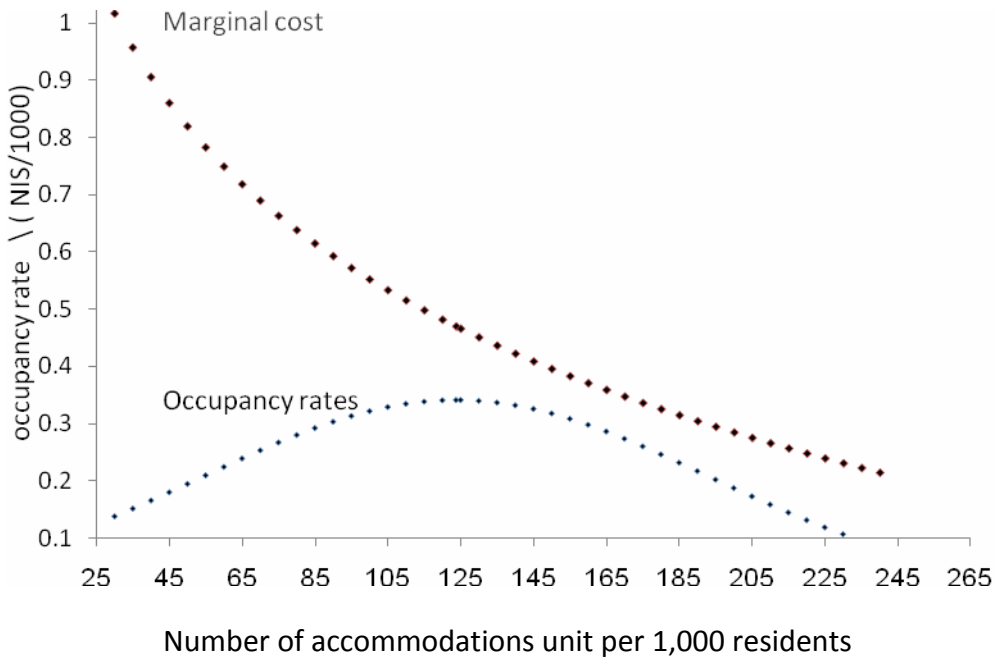
**Table 3: GMM Estimates for the Pricing Equation**

| ***Variable*** | **Coefficients** | **Standard Errors** | **P[\|Z\|>z]** | **Marginal Effects** [a] | **Elasticities** [b] |
|---|---|---|---|---|---|
| Constant | 246.50* | 64.69 | 0.01 | | |
| Special amenities | 14.72* | 2.51 | 0.00 | | 0.13 |
| Breakfast included | -3.39 | 8.60 | 0.71 | | |
| Luxury elements* | 8.03* | 1.12 | 0.00 | | 0.13 |
| Unit size | 5.87 | 5.12 | 0.32 | | |
| Farm's cultivated area | -0.92 | 1.69 | 0.65 | | |
| Number of years since establishment of firm | 1.61 | 0.78 | 0.26 | | |
| Number of units | -0.17 | 1.69 | 0.92 | | |
| Village Density (ln) | -38.61* | 8.35 | 0.00 | -0.34 | -0.13 |

* Significant at 5%
(a) Calculated by using bootstrapping.
(b) Elasticities were calculated only for continuous variables at the mean value.

Based on the estimated coefficients, the average markup margin among the 107 sampled firms was calculated to be 57%. These results indicate that the rural accommodations market in the Upper Galilee significantly deviates from a competitive, marginal-cost pricing.

**Figure 2: Marginal Cost and Occupancy Levels as Functions of Rural Accommodations Density Level**




### *4.3 Goodness of Fit*

Since our estimation procedure is based on instrumental variables, the usual $R^2$ statistics is inappropriate, neither as a selection criterion nor as a measure of goodness of fit (Pesaran and Smith, 1994). In order to assess the goodness of fit we compare the predicted versus the actual distributions of the dependent variables. Predicted values for the estimated system were obtained by designing a computer program. In particular, Gauss non-linear simultaneous-equations subroutine was employed. Solving demand and pricing equations for each of the firms in the market yields equilibrium predicted outputs and hence equilibrium prices can be immediately calculated. This program was used to conduct the simulations in the next section. The calculated goodness of fit figures for the demand and pricing equations are 0.63 and 0.36 respectively, demonstrating a good fit of the model to the data.

## 5. Simulations

Using the estimated parameters we were able to simulate different equilibrium scenarios in the Upper Galilee rural accommodations market. In the first scenario, we evaluated the effectiveness of the existing regulation. We increased the number of units for each operating firm up to the limit set by the existing regulation, assuming no new firms would enter the market. As mentioned previously, the limit for the maximum number of units differs between villages thus we increase the number of units for each firm according to its village limit. Many of the firms are operating below the regulation thus for them the number of units increases in the simulation. The simulation results in Table 5 show that although the number of units increases, the market share for some of the villages decreases while in other villages it increases (original and simulated density levels appear in Table 4). Specifically, in two out of the three villages where the original densities are above 124 (Amirim and Bet-Hillel), market shares have decreased while in the third village (Shar-Yeshuv) market-share increased by 5%. Note that for high density villages, as the number of accommodation units increases, two opposite forces come to action. On the one hand, the increase in the number of units lowers the production cost and thus the price which leads to an increase in the market share. On the other hand, the increased density lowers the guests' utility from the accommodation which leads to a decrease in the market share. Market shares in the other three villages (Korazim, Metula, and Rosh Pinah) increase since their original densities were lower than 124 and are still so in the simulation.

**Table 4: Present and Simulated Density Levels**

| Village Density | Present Density | Simulation |
|---|---|---|
| Shar-Yeshuv | 186 | 192 |

| | | |
|---|---|---|
| Amirim | 136 | 191 |
| Bet-Hillel | 165 | 302 |
| Korazim | 33 | 52 |
| Metula | 77 | 95 |
| Rosh-Pinah | 30 | 39 |

**Table 5: Simulation 1- Increase in Number of Units Up to the Limit Sets by Regulation for Presently Operating Firms**

| | **Actual Change** | **Percentage Change** |
|---|---|---|
| **Village Market Share** | | |
| Shar-Yeshuv | 0.6% | 5% |
| Amirim | -3.4% | -21% |
| Bet-Hillel | -17.3% | -94% |
| Korazim | 3.3% | 80% |
| Metula | 4.8% | 23% |
| Rosh-Pinah | 12.1% | 44% |
| **Other Indicators** | | |
| consumer welfare (NIS) | 13 | 3% |
| Average firm profits (NIS) | -2,424 | -3% |
| Aggregate firms' profits (000' NIS) | -259.3 | -3% |
| Total welfare (000' NIS) | -297.3 | -1% |
| Average price (NIS) | -2.0 | -1% |
| Average markup | -0.3% | -0.7% |
| Size of the market (000' rooms nights) | -1.6 | -3% |
| Average occupancy rate | -11.5% | -28% |

The simulation results with a decrease in average price, mark-up and firm's profit. Whereas average consumer surplus increases by 3%, total market size decreases by 3% and as a result total welfare decreases by 1%. Namely, if all the incumbent firms exhaust their village regulated limit some villages will benefit while other will incur losses and total welfare will only marginally shrink. However, it should be noted that in this simulation we assumed that no new firms will enter. In a simulation where each household in a village enters the market with an existing average number of

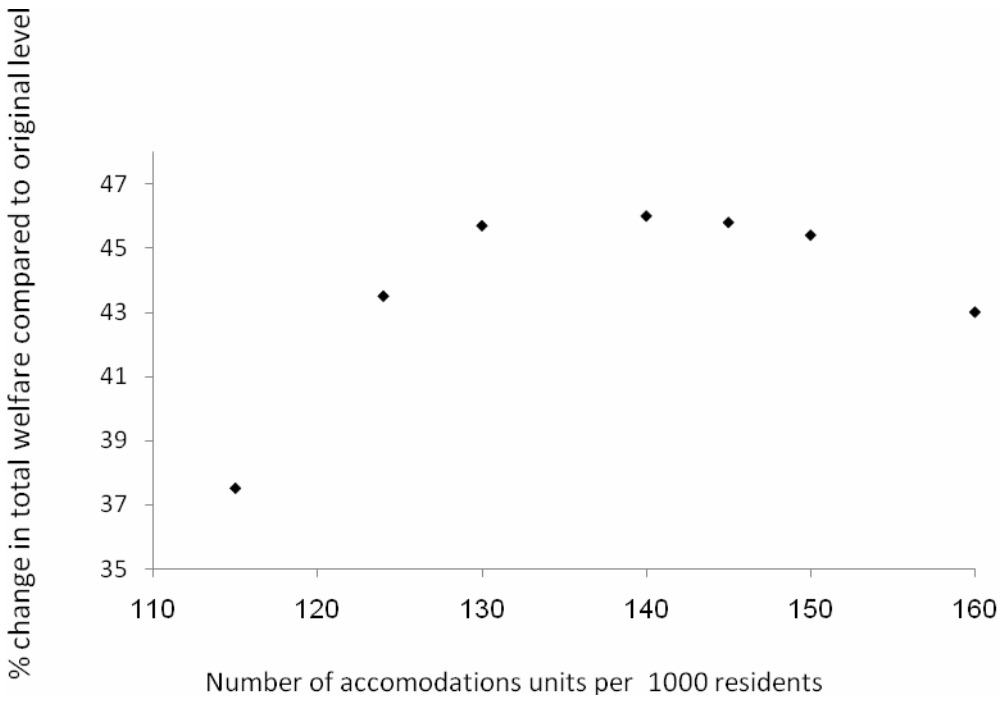
units, the welfare level suffers a decline of 50 percent. These results show that at the present situation the club good effect in the demand overpowers the agglomeration effect in the supply. When number of units surpasses the optimum level the market is facing a drop in its welfare level.

The second simulation is comprised of six simulations for six different density levels below and above the optimal density level of 124. The simulation results are presented in Table 6 and the changes in the welfare levels are shown graphically in Figure 3.

**Table 6: Percent Change in Market Share and Other Market Indicators in Six Simulations According to Density Level**

| | Density level – Number of Units per 1000 residents | | | | | |
|---|---|---|---|---|---|---|
| **Village Market Share** | 110 % change | 115 % change | 124 % change | 130 % change | 140 % change | 145 % change |
| Shar-Yeshuv | -3 | -42 | -42 | -18 | -6 | 1 |
| Amirim | 4 | -55 | -55 | -48 | -48 | -46 |
| Bet-Hillel | -21 | -49 | -51 | -51 | -52 | -54 |
| Korazim | -88 | 90 | 93 | 96 | 97 | 94 |
| Metula | 18 | -39 | -41 | -29 | -26 | -26 |
| Rosh-Pina | 13 | 102 | 105 | 80 | 73 | 70 |
| **Other Indicators** | | | | | | |
| Consumer welfare | 30 | 39 | 40 | 36 | 35 | 34 |
| Average firm profits | -41 | -43 | -42 | -39 | -43 | -44 |
| Aggregate firm profits | -7 | -31 | 8 | 18 | 20 | 21 |
| Total welfare | 18.9 | 37.5 | 43.5 | 45.7 | 45.9 | 45.8 |
| Average price | -0.7 | -0.7 | -2 | -2 | -3 | -3 |
| Average markup | -0.2 | -3 | -0.1 | 2 | 3 | 3 |
| Market size | -4 | 7 | 11 | 13 | 14 | 15 |
| Average occupancy rate | -52 | -32 | -32 | -46 | -51 | -54 |

**Figure 3: Simulated Welfare Level as a Function of Density**




We can see that at an average density level of 140 the welfare level reaches a maximum. Moreover, the difference in the slope up to the optimum level and after it is due to the different impacts of the agglomeration and club good effects. Up to 124 units both forces act in the same direction, increase in the number of units lowers the costs of the operators and increases consumer utility. Between 124 and 140 although both forces act in opposite directions total welfare still increases, however at a higher density level, consumer disutility from its' negative externalities take over and cause the drop in the market share and hence total welfare. Since agglomeration economies are still pushing for an increase in the market share, the slope is not as sharp as up to the optimum. These results confirm the finding of the first simulation that the demand's club good effect of an increase in the density level overpowers the technological agglomeration effect. If all households in the villages will enter the market with their regulated number of units, the density level will varies between 600

to 900 which is far from the optimum level of 140. This means that the current regulation is based on considerations which are irrelevant to the welfare level of the rural accommodations market.

## 6. Summary and Conclusions

We utilized a regional market equilibrium model in the rural accommodations industry to analyze externalities and their impacts on the market. The model comprises of demand and pricing equations that accounts for product differentiation and oligopolistic competition, and more importantly, for agglomeration externalities and club good effects. The model was estimated using data on rural accommodations the Upper Galilee region in Israel. The results obtained suggest that both club good and agglomeration effects exist in this regional market. Specifically, an inverse U-shaped relationship was found between consumer's preferences for rural accommodations and the level of accommodations units' density in the village. This implies that an optimum level of rural accommodations development at the village level exists. On the technology side, evidence was found for technological agglomeration economies.

The importance of regulation in the regional accommodation market is presented in the simulations showing that public support in rural tourism has to be integrated into a broader locality-level development planning, and should be accompanied by specific means of regulation otherwise it may achieve inefficient result. With the existing regulation and the support policy, the regional rural accommodations market in the Upper Galilee can reach overdevelopment and face loss of welfare. The number of firms has been constantly increasing since the survey was conducted, in fact, the market has doubled itself, and signs for an overdevelopment might have been seen in

2009 where many operators reported losses (TheMarker, Israel, 9/2009). This evidence coincides with Tchetchik et al. (2008) prediction that the number of units can be doubled before a significant price decrease would occur.

The model employed in this study introduces for the first time a structural economic framework that addresses club good and agglomeration effects, as well as product differentiation and oligopolistic competition. Application of this framework to the rural tourism industry, which is subject to these distinctive market failures, provides important policy implications. This framework can be easily applied to tourism and rural tourism markets in other economies and help in designing long-term policies. Our study is concerned with the impact of overdevelopment of rural accommodation units on the market welfare. However, this is only one facet of the overall picture. Another group whose welfare may be affected by an overcrowded village is the local community that is not involved in the tourism activity but lives in the village. Further research dealing with the carrying capacity of tourism destination to avoid negative externalities felt by the host community is warranted.

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