

CONCENTRATION IN THE GREEK HOTEL INDUSTRY

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This paper applies the n -firm concentration ratio and the Herfindahl-Hirschman Index to Greek hotel industry. The results indicate that the concentration of the industry is quite low not only for the total market but also for the separate markets of the different stars categories. Moreover, it is found that there is a significant difference between the results obtained for the highest categories and those for the lowest categories, the latter displaying much lower concentration. Since the level of concentration in an industry is an important factor of the market structure, the economic policy implications of the findings of this paper would be of some importance for the relevant authorities.

Keywords: *Greek Hotels, Herfindahl-Hirschman Index, Economic Policy Implications, Market concentration, n -firm concentration ratio*



INTRODUCTION

Tourism is recognized as one of the most dynamic sectors of the global economy. According to the latest report of the World Tourism Organization (UNWTO), tourism contributes about 10% of global GDP and 6% of world's total exports (World Tourism Organization, 2016). In Greece, tourism activities contribute about 5% of GDP and 23% of total exports, whilst its relevant importance in the economy has risen during the last years.

In this paper we shall focus on one of the components of the tourism sector, i.e. the hotel industry. Lately, there has been an ongoing discussion about the competitiveness of the Greek hotel industry and, more specifically, about the legislative restrictions that may affect the structure of the industry resulting to operate in a non-competitive way. This discussion started with the OECD's competition assessment review, published in 2013. According to this review, (a) the hotels are significantly concentrated in a few regions of the country, and (b) there is a significant number of legislative restrictions in the Greek hotel industry that impose entry barriers in the industry and, therefore, are considered as harmful for the competitiveness of the market.

It has been supported by many scholars that the existence of high concentration in an industry reflects entry barriers, which, in the long run, give higher profits for the existing firms.¹ It is widely believed that a concentrated market may result in collusive behaviour amongst the firms operating in the respective market. Therefore, it is not surprising that the study of market concentration in various industries constitutes one of the main concerns not only for economic theory but also for the implementation of government policies regarding anti-monopoly laws.² Thus, the measurement of concentration in an industry, which reflects the market structure of this industry, can be proved a very useful tool for the respective authorities in many cases (e.g., in determining whether they should

allow a merger, whether legislative restrictions should be lifted, etc.).

This paper attempts an estimation of the degree of concentration in the Greek hotel industry. The measurement of concentration is based on the commonly used measures of concentration, such as the n -firm concentration ratio and Herfindahl-Hirschman Index, and the data provided by the database of the Hellenic Chamber of Hotels (HCH). An issue that often arises in such studies is that because of lack of data or censored information, it is necessary to use a sample of the market rather than the whole industry (see, e.g., Nauenberg et al. (2014)). However, in this paper, thanks to the data provided by the HCH, it is possible to provide estimations based on the total hotel market. Moreover, we also estimate the concentration for the separate markets of the different stars categories of hotels.

The remainder is structured as follows: section 2 presents the methodology of our analysis. Section 3 presents the data used in our estimations. Section 4 presents the empirical results of our analysis. Section 5 concludes the paper.

METHODOLOGY

A simple method to estimate the degree of concentration in an industry is to calculate the share of the n largest firms in the industry, or n -firm concentration ratio. These shares are usually denoted by CR_n , where CR_n constitutes an index that gives a concentration ratio based on the share of the n largest (based on their output shares) firms in the industry.³ However, the so-called Herfindahl-Hirschman Index (HHI hereafter)⁴ is considered more suitable index for such estimation and is often used by the authorities of competition policy to determine the degree of concentration in a specific industry.⁵ The HHI is defined as:

$$HHI = \sum_{i=1}^N (s_i)^2$$

where $s_i = (q_i / Q)100$, q_i the output of the i th firm, $Q (\equiv \sum_{i=1}^N q_i)$ the total output in the industry and N the total number of the firms in the industry. In the case where the total output in the industry is

derived by only one firm, say j , (i.e it holds $q_j = \sum_{i=1}^N q_i = Q$ and thus, it holds $s_j = 100$ and $s_i = 0, \forall i \neq j$) or, equivalently, in the case of monopoly, (i.e when it holds $N = 1$ and, thus, $q_1 = Q$ and $s_1 = 100$), then it holds $HHI = HHI_{MAX} = 10000$, which is the theoretical maximum value of HHI. On the other hand, in the case where all the firms in the industry have equal shares of output, i.e.

$$s_1 = s_2 = \dots = s_N = s, \text{ then it will hold } HHI = \sum_{i=1}^N (s_i)^2 = Ns^2$$

But, since $\sum_{i=1}^N (s_i)^2 = 100$, it will hold $Ns = 100 \Rightarrow s = 100 / N$.

Thus, it follows that $HHI = N(1/N)^2 = 1/N$, which is the minimum value of HHI. In the theoretical case where $N \rightarrow \infty$ (which it can be considered as a state of perfect competition), then it holds $s_1 = s_2 = \dots = s_\infty = 0$ and, therefore, $HHI = HHI_{MIN} = 0$, which is the theoretical minimum value of HHI.

The HHI is considered as a more suitable index than CR_n because it takes into account the distribution of all the shares of output in the industry, whilst each firm's share is weighted by the share of this firm.⁷ Thus, it follows that the larger (smaller) the share of a firm in the output, the larger (smaller) its contribution to the determination of HHI. For that reason, HHI could be sensitive to

extreme values of the sample. In alternative versions of the index, the weighting of the shares could be done, e.g., by giving different weights to the larger or smaller values of the shares. Thus, the results obtained by using the HHI in a specific industry are usually interpreted as follows: the higher the value of HHI, the higher the possibility that there is a lack of competition in the industry under consideration. The HHI is also used by the U.S. Department of Justice and the Federal Trade Commission as a measure of evaluation of competition and as a guide in order to approve or reject the merging of firms in an industry.⁸

In this paper, we estimate the degree of concentration in the Greek hotel industry by using the CR_n indices and the HHI. We express the CR_n indices as a percentage (%) of the total output of the n “larger” firms of the industry. Furthermore, we normalize the HHI as follows $H = HHI / HHI_{MAX}$, where H the normalized Herfindahl-Hirschman Index, and express H as a percentage as well. It then follows that H takes values from 0% to 100%, where 0% corresponds to the case of a perfect competitive market and 100% corresponds to the case of monopoly.⁹

DATA

The data used in this paper is derived from the database of the Hellenic Chamber of Hotels and refer to the year 2013. In the middle of this year in Greece operated 9.674 hotel units with 400.578 rooms and 771.896 beds. The Table 1 below shows how these units, rooms and beds are distributed according to the star category they belong. So, we notice that 357 units belong to the 5-star category (5* hereafter), 1.262 units belong to the 4-star category (4* hereafter), 2.340 units belong to the 3-star category (3*

hereafter), 4.230 units belong to the 2-star category (2* hereafter), 1.485 units belong to the 1-star category (1* hereafter), etc.

Table 1. The Greek Hotel Industry, 2013.

	Total	5*	4*	3*	2*	1*
Units	9.674	357	1.262	2.340	4.230	1.485
Rooms	400.578	57.044	100.031	95.204	119.888	28.411
Beds	771.896	115.865	193.540	182.804	225.329	54.358

Source: Hellenic Chamber of Hotels

In order to get a better picture of the Greek hotel industry, Figure 1 below displays the distribution of units, rooms and beds according to the stars category classification.

Figure 1. Distribution of Hotels According to Star Category, 2013.



In the case of the 4*-5* and 1*-2*, there is an obvious difference between their shares in total units and their shares in rooms and bedrooms. More specifically, although only 16,7% of units belong to 4*-5* hotels yet this share accounts for 39,2% and 40,1% of rooms and beds, respectively. On the other hand, although 59,1% of units belong to 1*-2* hotels yet this share accounts for 37,0% and 36,2% of total rooms and beds, respectively. This is an evidence of the relatively larger size of hotels that belong to highest star categories. Finally, the shares of 3* hotels seem to have a more

balanced distribution, since in this category belongs 24,2% of total units, 23,8% of total rooms and 23,7% of total beds.

Since we are interested in investigating concentration and its implications to the competitiveness of the hotel industry in Greece, it is necessary to identify which of the hotel units belong to the same firm. With the help of HCH's database, we were able to identify 9.513 different owners. Therefore, we shall base our analysis to these firms. A common issue that arises in relevant studies is that rarely are available market share information for all the firms of an industry and, therefore, it is often necessary to construct the necessary data through statistical methods (see, e.g., Nauenberg et al. (2014)). In this paper, we are able to use information for the total hotel industry, thanks to the data provided by the database of HCH. For this purpose, we use the number of rooms and the number of beds as variables to measure the market shares of each firm that operated in the year 2013. Although these variables measure the output potential rather than the actual output of hotels, they allow us to investigate the market structure of the total hotel industry, which, due to lack of the relevant data, it would not be possible if we had chosen to use as a variable, e.g., the sales of each firm.

In the next section we present the results of our analysis regarding the concentration in Greek hotel industry. More specifically, we apply the CR4, CR8, CR16 and HHI indices not only to the total hotel market but also to the markets of 5*-4*, 3*, and 2*- 1* hotels separately.

RESULTS

The application of the previous analysis gives the results presented in Table 2 below.¹⁰ From the first row of the table we notice that the four largest hotels own the 3,66% of the total rooms, the eight largest hotels own the 5,37% of the total rooms and the sixteen largest hotels own the 7,88% of the total rooms. From the

sixth row of the table it follows that the four largest hotels that belong to the 4*-5* category own the 9,23% of the total beds in this category, the eight largest hotels own the 13,23% of the total beds and the sixteen largest hotels own the 19,42% of the total beds. Furthermore, the HHI for the total industry is only 0,08%, which can be interpreted as a value that corresponds to a highly competitive index. The rest of the rows of the table can be read in the same way.

Table 2. Concentration in the Greek Hotel Industry, 2013.

Size Variable	Hotel Market	CR4	CR8	CR16	HHI
Rooms	Total	3,66%	5,37%	7,88%	0,08%
	4*-5*	9,20%	13,20%	19,39%	0,44%
	3*	2,09%	3,34%	5,33%	0,09%
	1*-2*	0,54%	0,92%	1,59%	0,03%
Beds	Total	3,75%	5,50%	8,04%	0,08%
	4*-5*	9,23%	13,23%	19,42%	0,45%
	3*	2,08%	3,34%	5,33%	0,09%
	1*-2*	0,57%	0,95%	1,62%	0,03%

In general, we notice that there is no significant difference between the results based on rooms and those based on beds. Figure 2 below gives a picture of the three concentration ratios that we applied and, more specifically, it shows the share of total hotel industry that is owned by the four, eight and sixteen largest firms, respectively.¹¹

Figure 2. Concentration Ratios of the Greek Hotel Industry (Size Variable: Rooms).



Now, if we examine the results of the different star categories, we notice that there is a significant difference in the concentration between the hotels in the lower categories and those in the higher, the latter displaying much higher concentration ratios and HHI's. More specifically, the HHI in the 4*-5* hotels is about five times higher than in the 3* hotels and about fifteen times higher than in the 1*-2* hotels. However, even in the case of the 4*-5* hotels, the HHI can be considered as rather low. Figure 3 below gives a picture of the values of HHI in the different categories on the basis of rooms, whilst Figure 4 gives the respective picture regarding the concentration ratios CR4, CR8 and CR16.¹²

Figure 3. The Herfindahl-Hirschman Index per Category (Size Variable: Rooms).

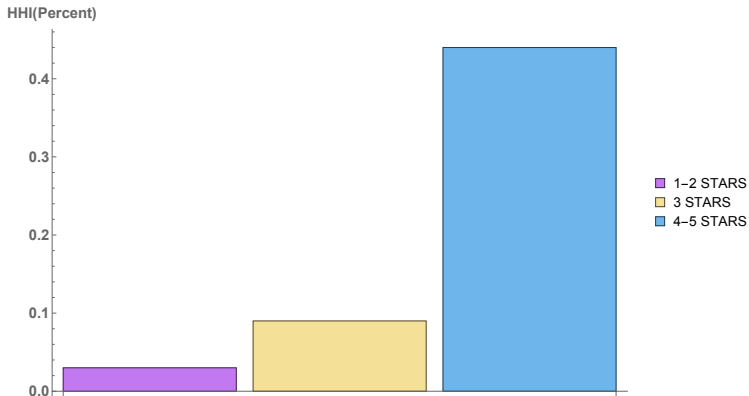
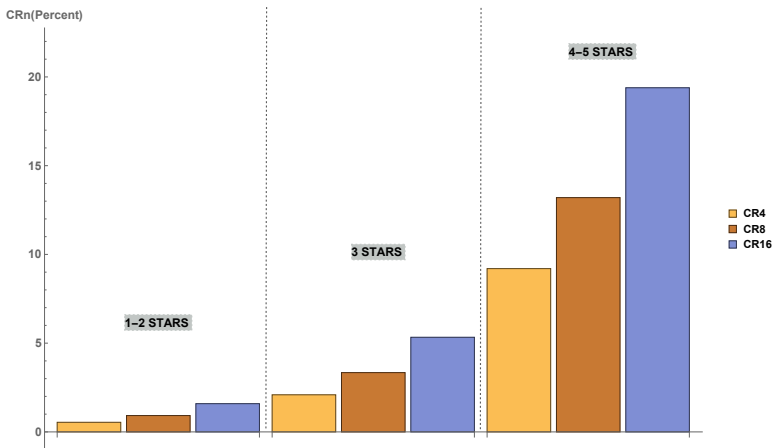


Figure 4. Concentration Ratios (Size Variable: Rooms).



Thus, we may conclude that the application of CR4, CR8, CR16 and HHI to the Greek hotel industry indicates that the industry can be considered as highly competitive, whilst the competitiveness is higher on the markets of the hotels of lower star categories. It has been supported that highly concentrated markets are characterized by entry barriers for new firms and high profits for the existing firms.¹³ Not quite unexpected, most economic policy authorities consider these characteristics as harmful for the competitiveness of the industry and apply measures to improve the structure of the

respective market (see, e.g., OECD, 2014). On the other hand, some scholars have provided evidence that the degree of concentration is not positively related with entry barriers and higher profits (see, e.g., Willis and Rogers, 1998; Davies, 1999). Moreover, it has been pointed out that the larger profits in an industry could be explained on the basis of the higher efficiency of larger firms and not on their dominant role in the market (see Damsetz, 1973). Thus, it seems that there is not an unambiguous relationship between concentration and entry barriers and, therefore, the results of the relative measurements should be considered with caution. In any case, we think that the authorities should also take into account and other factors that may define the market structure, the special characteristics of the industry, and act in accordance with the general interests of the majority of people involved in the economic process.

CONCLUDING REMARKS

This paper applied the Concentration Ratios for the largest 4, 8 and 16 firms, and the Herfindahl-Hirschman Index to the Greek hotel industry for the year 2013. The base of measurement was rooms and beds of hotels. It has been found that:

(i). There is no significant difference between the results based on rooms and those based on beds.

(ii). The results derived from the Concentration Ratios and the Herfindahl-Hirschman index indicate that the Greek hotel industry is highly competitive. This result holds not only for the total hotel market but for the separate markets of the different star categories as well.

(iii). There is a significant difference between the results obtained for the highest categories and those for the lowest categories, the latter displaying much lower concentration ratios and Herfindahl-Hirschman Indices. More specifically, the Herfindahl-Hirschman Index in 4*-5* hotels is about five times

higher than in 3* hotels and about fifteen times higher than in 1*-2* hotels.

Thus, on the basis of the previous analysis, it can be supported that the Greek hotel industry is highly competitive, whilst the competitiveness is even higher on the markets of the hotels of lower star categories. Since there is an ongoing discussion about the implementation of the recommendations of OECD's competition assessment reviews regarding the tourism sector, the results of this paper would be of some importance for the authorities of tourism policy.

Future research efforts should investigate whether alternative measures of concentration and/or methodology could give differentiated results and examine the evolution of concentration in the industry through time.

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ACKNOWLEDGEMENTS

We are indebted to Sofia Panousi and Anastasia Psalti for their help on the data provided by the Hellenic Chamber of Hotels. We are also grateful to Theodore Mariolis for helpful comments on a previous version of the paper. The usual disclaimer applies.

ENDNOTES

1. See, e.g., Bain (1951), Rhoades (1970), Amel and Liang (1997), Pan (2005), and Folta et al. (2006).
2. See, e.g., Ijiri and Simon (1971), Bikker (2004), and Nauenberg et al. (2014).
3. For empirical applications of the n -firm concentration ratio, see, e.g., Akehurst (1984), Ratnayake (1999), and Bikker and Haaf

(2002).

4. This index was introduced by Hirschman (1945). A few years latter, it was also proposed by Herfindahl (1950), who was unaware of Hirschman's contribution. See, also, Hirschman (1964).
5. For the theoretical relationships between the various measures of concentration, see Hall and Tideman (1967), Naldi (2003), Hennessy and Lapan (2007), Alegria and Schaeck (2008), and Geronikolaou (2015).

$$\sum_{i=1}^N (s_i) = 100$$

6. Obviously, it holds .
7. The HHI is also proposed as a suitable measure of concentration in an industry by the Competition Assessment Toolkit of OECD (see OECD, 2016).
8. For empirical applications of HHI, see, e.g., Bikker and Haaf (2002), Beck et al. (2006), Pan (2005), and Bai et al. (2014).
9. It is interesting to note that according to the U.S. Department of Justice and the Federal Trade Commission (2010), the values of H can be interpreted as follows:
 $H < 1\% \rightarrow$ highly competitive index
 $1\% < H < 15\% \rightarrow$ unconcentrated index
 $15\% < H < 25\% \rightarrow$ moderate concentration
 $H > 25\% \rightarrow$ high concentration.
10. These results constitute a further elaboration of the findings reported in Soklis (2014).
11. A similar picture can be derived if we focus on the beds instead of the rooms.
12. Essentially the same picture would be derived if we had focused on beds instead of rooms.
13. For evidence that support this view, see, e.g., Bain (1951), Pan (2005) and Niu et al. (2012).

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