Journal of
*Risk and Financial Management*

MDPI

*Article*

# Evaluation of Market with Accommodation Facilities Considering Risk Influence—Case Study Slovakia

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**Abstract:** Tourism currently contributes significantly to the national economy. When investing in the accommodation facility on the real-estate market, the tourism sector also represents a certain risk due to a high level of seasonality. This paper investigates the risks related to prices, income and occupancy of accommodation facilities for selected regions in Slovakia. The value of accommodation facilities is estimated using discounted cash flow, probabilistic distribution of rental prices and occupancy of accommodation facilities in selected Slovak regions. The results provide information for potential and profitable investments in exposed regions in tourism. The information can be used in the field of risk management to avoid or reduce the risk of risk investments. Although the resulting values were calculated only for some selected regions, the proposed procedure can be used for any region and compared with the current values.

**Keywords:** accommodation facilities; discounted cash flow; risk investments; occupancy of the tourism locality; tourism; Slovakia



**Citation:** Csikosova, Adriana, Katarina Culkova, Erik Weiss, and Maria Janoskova. 2021. Evaluation of Market with Accommodation Facilities Considering Risk Influence—Case Study Slovakia. *Journal of Risk and Financial Management* 14: 208. https://doi.org/10.3390/jrfm14050208

Academic Editor: Colin Michael Hall

Received: 17 March 2021
Accepted: 22 April 2021
Published: 5 May 2021



## 1. Introduction

Tourism presents one of the most dynamically developed sectors, presently contributing considerably to the economy of the country (UNWTO 2020). Income of the tourism industry has at present reached over 2 MLD EUR. In the area of tourism, more than 20 thousand businessmen create business, and more than 3500 accommodation facilities at present provide the possibility to accommodate more than 160 thousand beds, realizing over 12 million overnight stays. In Slovakia, there are recreation centers built, used during the summer and winter seasons. Tourism in Slovakia has a great potential to have a strategic position in the national economy due to its rich natural resources. During investment in the accommodation facilities in the real-estate market, the area of tourism also presents a certain risk. The real-estate market presents a market in which all transactions are connected with the transfer of ownership rights to lands and buildings. The transfer of such ownership rights can be permanent or temporary and commonly, it has monetary value. The rapid development of financial tools in the last decades means the real-estate market presents not an individual market, but an integral part of global financial markets, which enables more easy access to investment tools, but on the other hand, it also presents a source of considerable risks. Risk analysis presents the process of danger identification and risk evaluation for the individuals or for the group of inhabitants and other researched objects (Hiles 2002).

The goal of this contribution is therefore to evaluate risks, connected with accommodation facilities, using the area of Slovakian tourism through the determination of dependences between accommodation facilities' prices and chosen indexes of Slovakian

tourism. The total market of tourism facilities has been compared with information from Airbnb, since Airbnb's potential significantly disrupts the traditional accommodation sector, positively and negatively impacting destinations (Wang and Nicolau 2017). Moreover, in the present crisis situation, the online reservation system is more convenient (Trang et al. 2021). Guttentag (2015) studied the impacts through the disruptive innovation theory, which describes how products that lack in traditionally favored attributes but offer alternative benefits can over time transform a market and capture mainstream consumers. The area is also studied by Jerabek (2019), who investigated the effects that income as gross domestic product, tourism price as the real exchange rate, and travel cost as the price of Brent crude oil have on tourism demand, and it was found that tourists respond negatively to changes in tourism prices. Barnes and Kirshner (2021) re-examined trust and attractiveness based on facial features on Airbnb and found mixed support for impacts on pricing using deep learning to classify host faces for an extensive dataset of Airbnb accommodation in 10 US cities (n = 78,215). Together, trust and attractiveness contribute to almost a 5% increase in prices for Airbnb accommodation. They also tested Gray's theory of motivation via the examination of pricing for different types of accommodation, finding that trust is more important in situations of smaller accommodation shared with strangers.

We orientated the research in conditions of Slovakia to support the results of Matijová et al. (2019), using regression models, where the resulting relation between the price of accommodation and unemployment was conducted by using the simple linear regression, and we found that one of the factors of the decrease in the unemployment rate is the support of the production potential of tourism, conditioned by the quality of the services offered, which are reflected in higher prices of accommodation.

## 2. Present State of Problem Solving

The tourism sector affects not only the economy but also the social and cultural life (Goeldner and Ritchie 2012). According to Antonakakis et al. (2015), the tourism–economic growth relationship is not stable over time. Also, Saridogan (2020) found that tourism has long-term estimation revenues, having a positive impact on economic performance. Therefore, according to both short- and long-term estimation results, tourism revenues have a significant impact on economic growth (Adamou and Clerides 2010; Chatziantoniou et al. 2013). Balaguer and Cantavella-Jorda (2002) indicated that economic growth is sensitive to international tourism, together with competitiveness of economic growth. Brida et al. (2016) provided an assessment in terms of econometric methods used and main empirical findings achieved so far, and the findings suggest that overall, international tourism drives economic growth.

A number of authors analyzed the relationship between tourism and economic growth (Risso 2018; Comerio and Strozzi 2019). The causal link between tourism revenues and GDP has recently become the major focus of some recent studies in tourism economics, showing a sensitive link with respect to the countries analyzed, sample period, and methodology employed (Arslanturk et al. 2011). Also, Apergis and Payne (2012) studied the causal relationship between tourism and economic growth from the view of GDP, finding a long-run equilibrium relationship between real GDP per capita. Brida et al. (2015) explored whether tourism activity leads—in the long run—to economic growth, or, alternatively, economic expansion drives tourism growth. Eyuboglu and Eyuboglu (2020) analyzed the asymmetric causality between tourism development and economic growth and indicated that there is no causality between tourism development and economic growth. Bilen et al. (2017) studied whether stock prices contain predictive power for the future economic activity of tourism. Boukas and Ziakas (2013) examined the impacts of the global economic crisis on tourism.

Tourism is studied not only from the view of relations with economic indicators but also from the view of individual countries´ development (Claveria et al. 2015). Brida et al. (2020) found the two main groups of countries with high and low performance in the tourism sector. According to Figini and Vici (2010), tourism-based countries did not

grow at a higher rate than non-tourism-based countries. Chingarande and Saayman (2018) identified critical success factors for tourism-led growth. Countries with more developed human capital and financial systems have better chances of achieving growth through tourism development (Ntibanyurwa 2006). De Vita and Kyaw (2017) investigated the relationship between tourism specialization and economic growth. They also found that for countries with a developed financial system, at exponential levels of tourism specialization, its effect on growth turns negative. Similarly, Adamou and Clerides (2010) found that tourism specialization is associated with higher rates of economic growth at relatively low levels of specialization.

Tourism studies cover a wide range of topics. According to Bangwayo-Skeete and Skeete (2015), Google information offers significant benefits to forecasters, particularly in tourism. Casalo et al. (2015) investigated the effects of online hotel ratings on travelers' attitudes toward the hotel and booking intentions. Fong et al. (2016) examined the prevalence and trend of experimental research in hospitality and tourism. Sen Cheong and Turner (2005) aimed to compare the performance of artificial neural network techniques for tourist demand forecasting. Masiero et al. (2015) focused their research on modeling the relationship between travel characteristics and the price of the accommodation by distributional characteristics of the expenditure variable, based on the estimation of a quantile regression model.

In spite of the above-mentioned studies, tourism-related research lack, to certain extent, research in some special conditions, and there is still room for improvement in tourism research (Sun et al. 2020). For example, Goncarova et al. (2020) studied special conditions in family businesses in the area of tourism and tourism companies. Voltes-Dorta and Sanchez-Medina (2020) considered special conditions of different types of rooms and presented a study about the Airbnb (2020) prices using ordinary least squares and geographically weighted regression methods, exhibiting sharply different levels of fit, suggesting that the prices of different room types might not be explained by the same set of price factors. A similar approach of different types of rooms is a goal of this contribution, with an aim to evaluate chosen aspects of accommodations in the area of tourism in Slovakia, having special conditions as a post-communist country. Airbnb stays serve as substitutes for hotel stays (Zervas and Proserpio 2014), however in Slovakia, Airbnb still does not have an important market position (www.airbnb.cz, accessed on 20 January 2021). The area of research is supported by Gibbs et al. (2018), raising important questions about pricing in the economy and suggesting avenues for future research in this area.

## 3. Methodology

The goal of this research is to evaluate the development of chosen aspects of accommodation facilities and to determine the dependence between accommodation facilities' prices and chosen indicators and risks that influence the prices of accommodation facilities in the area of tourism. To achieve the main goal of the research, the following partial goals have been observed:

- Analysis of the present state of tourism.
- Analysis of a prices database in Slovakia.
- Estimation of analyzed accommodation facilities' value.
- Analysis of tourism development influence on the value of accommodation facilities in the chosen tourism destination.
- Comparison of investment profitability to accommodation facilities.

The value of accommodation facilities had been estimated by the discounted cash-flow method. The analysis has been performed in the chosen regions—Liptov, Poprad-Tatry, Bratislava, and Košice. Income from accommodation facilities was obtained from the Airbnb portal. Slovakia has, in the European context, one of the smallest capital markets, which in the long-term also influences investment to the market with accommodation, which developed only in the last decades. We could therefore only use information from 2003. Moreover, one of the most important platforms of shared economy is Airbnb

operation, based in 2003, but in Slovakia, Airbnb is still finding its position. The possibilities for using Airbnb services in Slovakia are enough, but only for the area of Bratislava (capital city) and High Tatras—from approximately 2016. Airbnb is mostly popular for foreign tourists to Slovakia, whereas domestic tourists more often use classical accommodation, many times through rebate portals.

Discount rate reflected the risk in the area of tourism, as determined according to the research of Damodaran (2016), which analyzed individual areas of the economy, as well as risks of the individual countries. For Slovakia and for tourism, the discount rate had been determined at a level of 10.7%. Average prices of accommodation facilities per $m^2$ are calculated according to the data from portal www.nehnutelnosti.sk (accessed on 20 January 2021), as well as www.finstat.sk (accessed on 14 December 2020).

To determine the aforementioned dependence, a database of prices for double-room accommodation facilities in Slovakia was created, with a sample of 5002 facilities, sold during 2018–2019. Average selling prices for the double-room facilities in individual counties were calculated, as well as average prices per $m^2$. To determine the value of accommodation facilities, the probabilistic distribution of rental prices in chosen regions was used, as well as occupancy of accommodation facilities. The Monte Carlo method was used for the determination of the resulting value of accommodation facilities in tourism, made by simulation according to the obtained data. The value of accommodation facilities is determined according to the discounted cash-flow method. Expected incomes of the facilities are determined according to the obtained prices in 2018–2019, and their probabilistic distribution was obtained by the program Crystal Ball from Oracle Company. According to the input data, the probable value of accommodation facilities in chosen regions was determined by the Monte Carlo simulation. Since input indexes are determined as probabilistic distribution, final value is also determined as probabilistic distribution. The principle of the Monte Carlo method is as follows (Fabian and Kluiber 1998):

- Creation of the model which sufficiently describes the searching objects (process, system, etc.).
- Simulation of a large number of experiments in balance with the model, based on generation of random variables (or pseudorandom number).
- Statistical evaluation of simulation.

The discounted cash-flow method is used according to Kislingerová (1999) for the evaluation of prices, with an aim to determine the attractiveness of investment possibilities. The DCF method is used to determine the value of future cash flow and discount rate determination by the net present value of the cash flow a company earns after investment cost-covering. The calculation is as follows:

$$NPV = \sum_{t=1}^{T_Z} CF_t \bullet (1+r)^{-t} - IC$$

where:

$CF_t$—cash flow from project in year $t$ (changes to cash flow following project implementation),

$r$—discount rate (hurdle rate, alternative cost of capital, real interest rate),

$t$—evaluated period ($1-n$ years),

$T_{\check{Z}}$—life cycle of the project,

$IC$—investment costs.

The process of the research includes the following steps:

- Selection of the regions, collection of necessary data, creation of probabilistic distribution creation.
- Results by way of probabilistic distribution and evaluation of the profitability of the accommodation facility compared with other alternative investments at the market (either with own capital or debts).

This paper looks at the way in which uncertainty can be incorporated into the explicit DCF model. This is done by recognizing that the input variables are uncertain and will have a probability distribution pertaining to each of them. Thus, by utilizing a probability-based valuation model (using Crystal Ball), it is possible to incorporate uncertainty into the analysis and address the shortcomings of the current model (French and Gabrielli 2005). A limitation of the research is in the validity of adopting discounted cash flow against the shortcut market appraisal approach (Camilleri 2015). Smooth adaptation and simplification of the data from the dataset considering Slovakia still does not have developed capital market, which requires the adaptation of data. However, during evaluation, we observed the following principles of analysis:

- During simplification of the reality, we maintained its basic aspects.
- Data are simplified only to the considerable and important base.
- Every simplification is made with a concrete aim and its interpretation is subject to this aim.

## 4. Results

Evaluation of occupancy of the accommodation facilities in Bratislava is given in Table 1, which shows the descriptive statistics and data values of the probability distribution. Figure 1 shows further development of probability distribution during 2003–2019.

**Table 1.** Descriptive statistics of probability distribution for accommodation facilities' occupancy in Bratislava.

| Statistic | Fit: Lognormal | Data Values |
|---|---|---|
| Values | - | 18 |
| Base Case | - | - |
| Mean | 0.28 | 0.27 |
| Median | 0.26 | 0.26 |
| Mode | 0.24 | - |
| Standard Dev | 0.06 | 0.05 |
| Variance | 0.00 | 0.00 |
| Skewness | 2.75 | 0.7899 |
| Kurtosis | 18.91 | 2.51 |
| Coeff. of Vari | 0.2234 | 0.1829 |
| Minimum | 0.20 | 0.21 |
| Maximum | ∞ | 0.38 |
| Mean Std. Err | - | 0.01 |

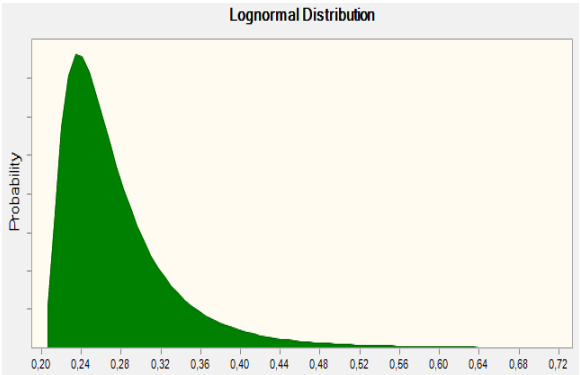


**Figure 1.** Probability distribution of accommodation facilities' occupancy in Bratislava during 2003–2019.

Probable distribution of accommodation facilities' occupancy in Bratislava registered minimal occupancy at 21% to 38%, and the average value is 27%. Individual occupancies were calculated as the rate of the number of overnights in accommodation facilities to the maximum possible number of overnights in the analyzed region (number of beds multiplied by 365 days).

Evaluation of occupancy of the accommodation facilities in Košice is shown in Figure 2 according to the description statistics given in Table 2.

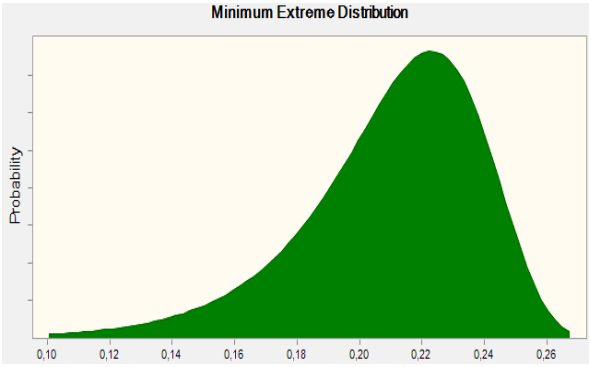


**Figure 2.** Probability distribution of accommodation facilities' occupancy in Košice in 2003–2019.

**Table 2.** Descriptive statistics of probability distribution of accommodation facilities in Košice.

| Statistic | Min Extreme Distribution |
|---|---|
| Trials | - |
| Base Case | 0.00 |
| Mean | 0.21 |
| Median | 0.21 |
| Mode | 0.22 |
| Standard Dev | 0.03 |
| Variance | 0.00 |
| Skewness | −1.14 |
| Kurtosis | 5.40 |
| Coeff. of Vari | 0.1427 |
| Minimum | $-\infty$ |
| Maximum | $\infty$ |
| Mean Std. Err | - |

The occupancy of accommodation facilities in Košice is illustrated in Figure 2, where minimal occupancy is 10% to 27%, and the average value is 21%. Individual occupancies were calculated as the rate of the number of overnights in accommodation facilities to the maximum possible number of overnights in the analyzed region (number of beds multiplied by 365 days).

Evaluation of occupancy of the accommodation facilities in Liptov region is calculated according to the descriptive statistics of the probability distribution of accommodation facility occupancy in Liptov (see Table 3).

**Table 3.** Descriptive statistics of the probability distribution of accommodation facility occupancy in Liptov.

| Statistic | Weibull Distribution |
|---|---|
| Trials | - |
| Base Case | 0.00 |
| Mean | 0.20 |
| Median | 0.20 |
| Mode | 0.20 |
| Standard Dev | 0.02 |
| Variance | 0.00 |
| Skewness | −0.0439 |
| Kurtosis | 2.73 |
| Coeff. of Vari | 0.0985 |
| Minimum | 0.13 |
| Maximum | ∞ |
| Mean Std. Err | - |

Probability distribution of accommodation facilities' occupancy in Liptov is illustrated in Figure 3, where minimal occupancy is 14% to 26%, and the average value is 20%. Individual occupancies were calculated as the rate of the number of overnights in accommodation facilities to the maximum possible number of overnights in the analyzed region (number of beds multiplied by 365 days).

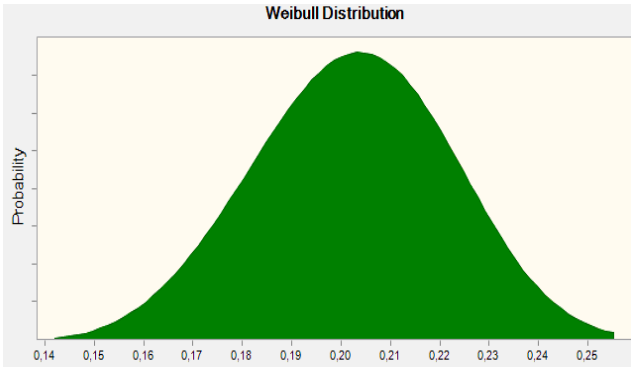


**Figure 3.** Probability distribution of accommodation facilities' occupancy in 2003–2019 in the region of Liptov.

Evaluation of occupancy of the accommodation facilities in the region of Poprad–Vysoké Tatry during the analyzed period 2003–2019 is shown in Figure 4, evaluated according to the descriptive statistics of the probability distribution of accommodation facilities' occupancy in the region from Table 4.

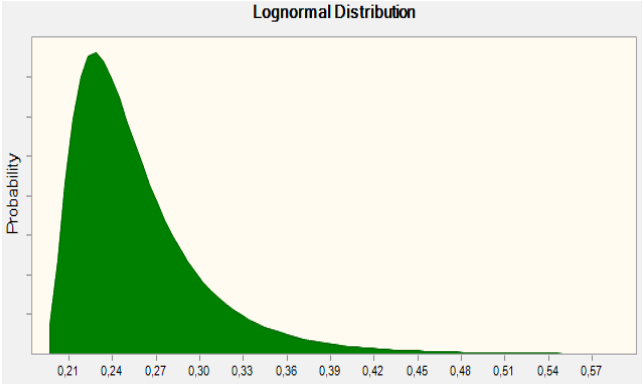


**Figure 4.** Probability distribution of accommodation facilities' occupancy in the region of Poprad–Vysoké Tatry during 2003–2019.

**Table 4.** Descriptive statistics of probability distribution for accommodation facilities' occupancy in the region of Poprad–Vysoké Tatry.

| Statistic | Lognormal Distribution |
|---|---|
| Trials | - |
| Base Case | 0.00 |
| Mean | 0.26 |
| Median | 0.25 |
| Mode | 0.23 |
| Standard Dev | 0.05 |
| Variance | 0.00 |
| Skewness | 2.37 |
| Kurtosis | 14.42 |
| Coeff. of Vari | 0.1904 |
| Minimum | 0.19 |
| Maximum | ∞ |
| Mean Std. Err | - |

Probability distribution of accommodation facilities' occupancy in the region is illustrated in Figure 4, where minimal occupancy is 19% to 55%, and the average value presents 25%. Individual occupancies were calculated as the rate of the number of overnights in accommodation facilities to the maximum possible number of overnights in the analyzed region (number of beds multiplied by 365 days).

As for the probability distribution of the rental prices in standard accommodation double-rooms in Bratislava, Figure 5 shows the negative binomial distribution in accordance with probability development. Figure 5 illustrates the probability distribution of rent prices for a standard double-room in Bratislava. The data were obtained by searching for rent prices' development during two years from the Airbnb portal.

Individual statistic values are illustrated in Table 5, where the average value is 94.41 EUR, and 50% of overnight prices were under 92 EUR/night. The standard deviation is around 23.68%.

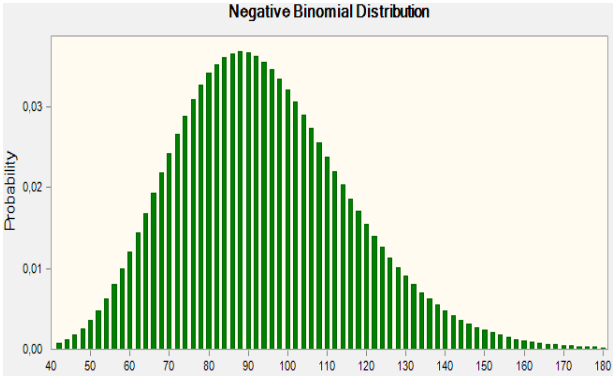


**Figure 5.** Probability of distribution of rental prices for a standard double-room in Bratislava.

**Table 5.** Descriptive statistics of probability distribution for rent prices of a standard double-room in Bratislava.

| Statistic | Neg Binomial Distribution |
|---|---|
| Trials | - |
| Base Case | 0.00 |
| Mean | 94.41 |
| Median | 92.00 |
| Mode | 89.00 |
| Standard Dev | 22.36 |
| Variance | 499.77 |
| Skewness | 0.5183 |
| Kurtosis | 3.40 |
| Coeff. of Vari | 0.2368 |
| Minimum | 15.00 |
| Maximum | ∞ |
| Mean Std. Err | - |

Figure 6 gives information about the probability distribution of the rental prices in standard accommodation double-rooms in Košice, where data was obtained by searching for rent prices' development during two years from the Airbnb portal.

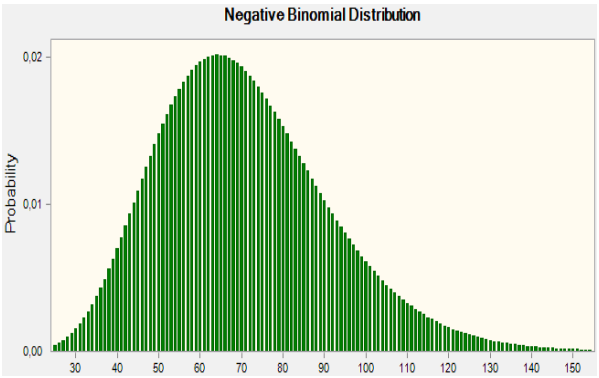


**Figure 6.** Probability distribution of the rental prices for a standard double-room in Košice.

Individual statistics values are illustrated in Table 6, where the average value is 70.72 EUR, and 50% of overnight prices are under 69 EUR/night. The standard deviation is 29.30%.

**Table 6.** Descriptive statistics of the probability distribution for rent prices of a standard double-room in Košice.

| Statistic | Neg Binomial Distribution |
|---|---|
| Trials | - |
| Base Case | 0.00 |
| Mean | 70.72 |
| Median | 69.00 |
| Mode | 64.00 |
| Standard Dev | 20.72 |
| Variance | 429.37 |
| Skewness | 0.6343 |
| Kurtosis | 3.60 |
| Coeff. of Vari | 0.2930 |
| Minimum | 10.00 |
| Maximum | ∞ |
| Mean Std. Err | - |

In the region of Liptov, the situation from the view of the probability distribution of rental prices of a standard double-room is shown in Figure 7 and Table 7. Data was obtained by comparing prices during two years from the Airbnb portal. Individual statistics values, given in Table 7, show the average value 83.00 EUR and standard deviation of 28.17%.

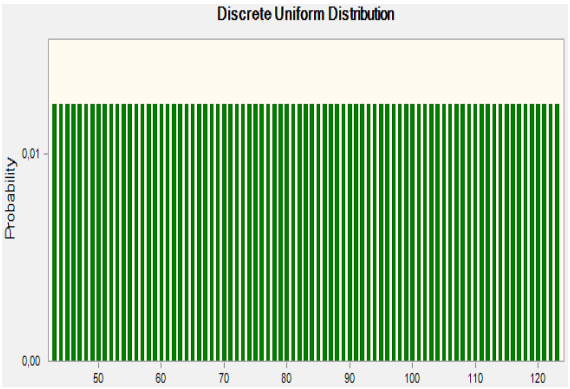


**Figure 7.** Probability distribution of rent prices of a standard double-room in the region of Liptov.

**Table 7.** Descriptive statistics of the probability distribution for rent prices of a standard double-room in the region of Liptov.

| Statistic | Discrete Uniform Distribution |
|---|---|
| Trials | - |
| Base Case | 0.00 |
| Mean | 83.00 |
| Median | 83.00 |
| Mode | - |
| Standard Dev | 23.38 |
| Variance | 546.67 |
| Skewness | 0.00 |

**Table 7.** *Cont.*

| Statistic | Discrete Uniform Distribution |
|---|---|
| Kurtosis | 1.80 |
| Coeff. of Vari | 0.2817 |
| Minimum | 43.00 |
| Maximum | 123.00 |
| Mean Std. Err | - |

The probability distribution of rental prices in the next analyzed region—Poprad–Vysoké Tatry—of a standard double-room (see Figure 8) is determined by description statistics of the probability distribution of the rental prices in the region given in Table 8. The average value is 51.10 EUR, and 50% of prices were under 48 EUR per night. The standard deviation is 42.48%.

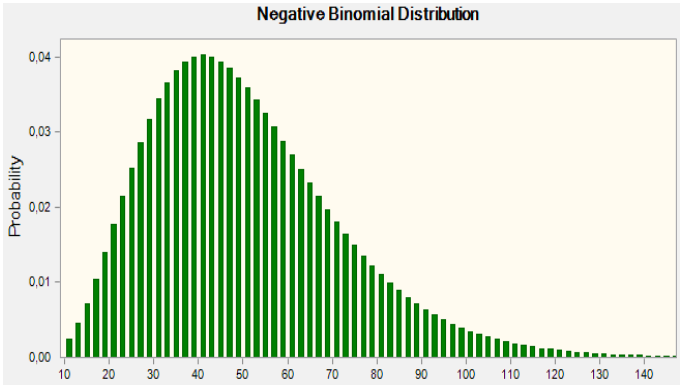


**Figure 8.** Probability distribution of rent prices for a standard double-room in the region of Poprad–Vysoké Tatry.

**Table 8.** Descriptive statistics of the probability distribution of the rent prices for a standard double-room in the region of Poprad–Vysoké Tatry.

| Statistic | Neg Binomial Distribution |
|---|---|
| Trials | - |
| Base Case | 0.00 |
| Mean | 51.10 |
| Median | 48.00 |
| Mode | 41.00 |
| Standard Dev | 21.71 |
| Variance | 471.14 |
| Skewness | 0.8956 |
| Kurtosis | 4.20 |
| Coeff. of Vari | 0.4248 |
| Minimum | 5.00 |
| Maximum | ∞ |
| Mean Std. Err | - |

Figure 8 illustrates the probability distribution of rent prices for a standard double-room in Poprad. The data were obtained from the development of rental prices during two years in the Airbnb portal.

Present values of future incomes from the accommodation rental facilities in chosen tourism regions are as follows. To determine the values of accommodation facilities, the probability of rent price distribution was used for chosen regions, as well as the occupancy of individual facilities. The resulting value is then also determined as a probability distribution. To determine the resulting value of the accommodation facilities in the area of tourism, the Monte Carlo method is used with an aim to make simulations according to the obtained data. The results for Bratislava are given in Table 9.

**Table 9.** Descriptive statistics of the present value distribution for the future incomes from accommodation rental facilities for 10 years in Bratislava.

| | |
|---|---|
| Trials | 1000 |
| Base Case | 0.00 |
| Mean | 52,900.89 |
| Median | 48,566.50 |
| Mode | - |
| Standard Dev | 19,233.40 |
| Variance | 369,923,829.50 |
| Skewness | 2.61 |
| Kurtosis | 16.88 |
| Coeff. of Vari | 0.3636 |
| Minimum | 20,209.67 |
| Maximum | 217,919.02 |
| Mean Std. Err | 608.21 |

Figure 9 illustrates the probability distribution of values of the future incomes from accommodation rental facilities for 10 years in Bratislava, when the values are fluctuating around 20,209–217,919 EUR. Such distribution presents the results of Monte Carlo simulation, where input values also included the probability distribution of incomes and occupancy.

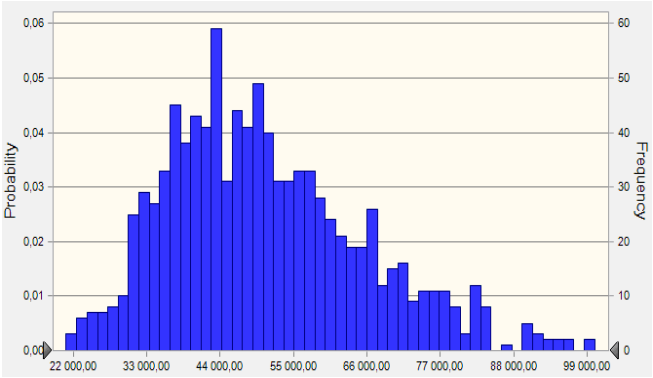


**Figure 9.** Probability distribution of present values of incomes from accommodation rental facilities during 10 years in Bratislava.

Table 10 shows descriptive statistics of the probability distribution of present values of incomes from accommodation rental facilities in Košice for 10 years.

**Table 10.** Description statistics of the probability distribution of present values of incomes from accommodation rental facilities in Košice for 10 years.

| Statistic | Forecast Values |
|---|---|
| Trials | 1000 |
| Base Case | 0.00 |
| Mean | 52,461.18 |
| Median | 50,552.46 |
| Mode | - |
| Standard Dev | 16,462.97 |
| Variance | 271,029,351.66 |
| Skewness | 1.37 |
| Kurtosis | 7.62 |
| Coeff. of Vari | 0.3138 |
| Minimum | 18,238.62 |
| Maximum | 176,621.21 |
| Mean Std. Err | 520.60 |

Figure 10 illustrates the probability distribution of present value of incomes from the accommodation rental facilities for 10 years in Košice. The values are fluctuating around 18,238–176,621 EUR. Such distribution presents the results of Monte Carlo simulation, where input values also included probability distribution of incomes and occupancy.

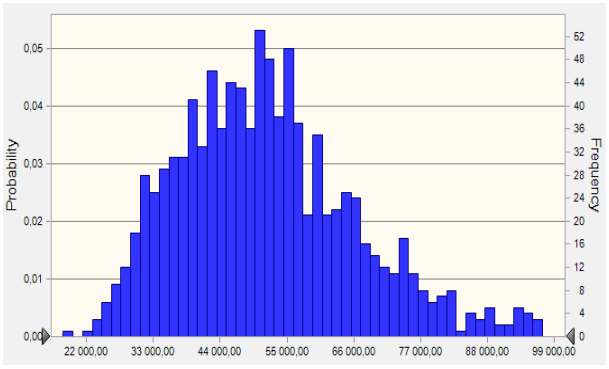


**Figure 10.** Probability distributions of the present value of incomes from the accommodation rental facilities for 10 years in Košice.

The probability distribution of the present value of incomes from the accommodation rental facilities during 10 years in the Liptov region is calculated according to Table 11 and shown in Figure 11.

Figure 11 shows an illustration of the probability distribution of the present value of incomes from accommodation rental facilities in the region of Liptov for 10 years, where values are from 21,076 to 188,547 EUR. Such distribution presents the results of Monte Carlo simulation, where input values also included probability distribution of incomes and occupancy.

**Table 11.** Descriptive statistics of the probability distribution of the present value of incomes from the accommodation rental facilities for 10 years in the region of Liptov.

| | |
|---|---|
| Trials | 1000 |
| Base Case | 0.00 |
| Mean | 52,955.35 |
| Median | 49,914.70 |
| Mode | - |
| Standard Dev | 18,750.97 |
| Variance | 351,598,801.10 |
| Skewness | 1.73 |
| Kurtosis | 8.82 |
| Coeff. of Vari | 0.3541 |
| Minimum | 21,076.49 |
| Maximum | 188,547.37 |
| Mean Std. Err | 592.96 |

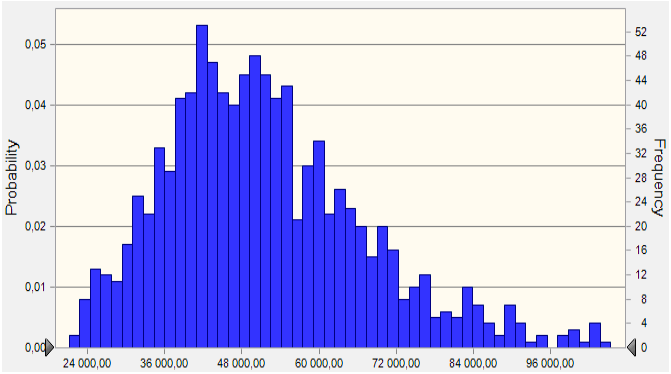


**Figure 11.** Probability distribution of the present value of incomes from the accommodation rental facilities for 10 years in the region of Liptov.

The results of probability distribution of the present value of incomes from the accommodation rental facilities for 10 years in the region of Poprad are shown in Table 12 and Figure 12.

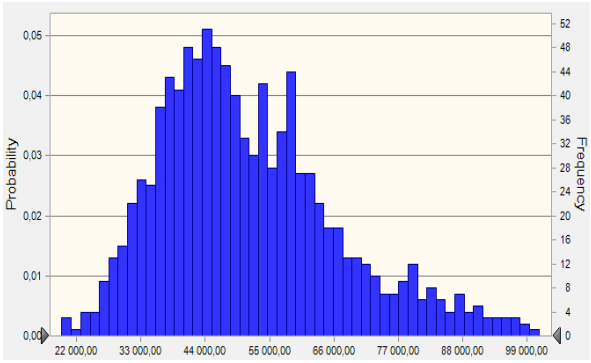


**Figure 12.** Probability distribution of the present value of incomes from the accommodation rental facilities for 10 years in the region of Poprad–Vysoké Tatry.

**Table 12.** Descriptive statistics of the probability distribution of the present value of incomes from the accommodation rental facilities for 10 years in the region of Poprad–Vysoké Tatry.

| Statistic | Forecast Values |
|---|---|
| Trials | 1000 |
| Base Case | 0.00 |
| Mean | 52,431.80 |
| Median | 48,882.57 |
| Mode | - |
| Standard Dev | 17,362.51 |
| Variance | 301,456,890.26 |
| Skewness | 1.37 |
| Kurtosis | 6.60 |
| Coeff. of Vari | 0.3311 |
| Minimum | 19,470.45 |
| Maximum | 173,861.33 |
| Mean Std. Err | 549.05 |

Figure 12 illustrates the probability distribution of the present value of incomes from the accommodation rental facilities for 10 years in the region of Poprad, where we can see fluctuation of values between 19,470 and 173,861 EUR. Such distribution presents the results of Monte Carlo simulation, where input values also included the probability distribution of incomes and occupancy.

## 5. Discussion and Conclusions

The market with accommodation facilities belongs to the real-estate market, when there are transactions connected with ownership rights of lands and buildings. Transactions of ownership rights can be permanent or temporary, from one subject to another, by exchange for retribution, commonly with monetary value. Rapid development of financial tools in the last decades means that the market is presently not independent, but it presents an integral part of global financial markets, which enables access to investments, but on the other hand, it is connected with number of risks. Risk analysis presents the process of possible dangers' identification and the evaluation of risk for the individual investors, inhabitants and analyzed objects. During investment to the accommodation facilities in the area of tourism, there is also certain risk and uncertainty. The effort should therefore be put into catching the risk according to probability distribution of historical data.

Evaluation of accommodation facilities is estimated by the discounted cash-flow method, regarding the risk. Analysis of the risk means a process of identification of dangers and evaluation of risk for the individuals or group of inhabitants, objects, surrounding environment and other objects. Incomes from the accommodation facilities can be determined from the database with the discount rate, reflecting the risk in the area of tourism. To determine the price of accommodation facilities, probability distribution of prices of accommodation rental facilities in chosen communities and regions can be used, as well as the occupancy of individual facilities. The resulting value is therefore also determined as a probability distribution. To determine the resulting values of accommodation facilities in the area of tourism, the Monte Carlo method can be used, as well as a simulation of data obtained. The value of the accommodation facilities according to discounted cash-flow considers assumed incomes from the rent of accommodation facilities, determined by prices of the rent when their probability distribution can be used, created by the program Crystal Ball from Oracle.

The result of the contribution is an evaluation of possible and profitable investing in exposed regions in tourism. The suggestion was applied in the chosen regions—Liptov, Poprad–Tatry, Bratislava and Košice. In the first region, profitability of investment to the accommodation facilities was compared with revenue from 10-year term deposits, and in the second region, the investments were compared with the annual interest rate of mortgage loans in chosen banks, with 10-year fixations. The results of the comparison can be used for any potential investor in the area of investment to the accommodation facilities in tourism. Despite that the resulting values were calculated only for several chosen regions in Slovakia in the present time, and investment profitability is compared with an actual interest rate at the market, the suggested process can be used for any region and the resulting value can be compared with actual values in any time. The same applies to the type of evaluated facilities, investment costs and alternative revenues at the market, of debt expenses. The model has a general use for any region of the country. The findings support the econometric approach used and enable the elaboration of relevant managerial implications.

**Author Contributions:** Conceptualization, K.C.; Methodology, K.C. and A.C.; Validation, K.C., A.C. and M.J.; Formal Analysis, M.J.; Investigation, K.C.; Resources, M.J.; Data Curation, K.C. and A.C.; Writing—Original Draft Preparation, K.C.; Writing—Review and Editing, M.J. and E.W.; Visualization, M.J. and E.W.; Supervision, A.C. and E.W.; Project Administration, K.C. and M.J.; Funding Acquisition, M.J. and A.C. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by KEGA-006TUKE-4/2019.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** The data can be found at www.finstat.sk (accessed on 23 April 2021).

**Conflicts of Interest:** The authors declare no conflict of interest.

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