Analysis of the impact of selected variables on the availability of accommodation facilities

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Abstract. One of the evaluation criteria of success of tourism destinations are the outputs of accommodation facilities for tourism, it is the availability of accommodation facilities. Statistical data helps assess not only the domestic availability, as well as foreign participants. The subject of investigation will be the evaluation criteria in terms of occupancy residents and not residents. The actual criterion is influenced by many factors, such as substitution, crime, the amount of disposable income of the population of the CZ. etc. However, these effects have an impact not only on the level of demand of the accommodation, but also affect the selection of categories (hotels, cottages, campsites). Organizations providing services in the tourism sector, especially housing, creates incentives to accelerate the development of other sectors (trade, transport infrastructure, construction and others). These indicators are very sensitive to economic fluctuations. Any analysis will allow for the cross-sectional statistical data to establish relationships and dependencies of these quantities. The result will be the definition of needs for further development and the ability to create tools for improving these services.

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AMS Classification: 62P20, 62J12, 91B70

1 Introduction

In the last years, the development of tourism. Tourism is the main sectors involved in the economic development of the country, but it also has meaning. Not only is an important component of foreign trade in recent years to create a positive balance, creating working conditions not only in the travel industry, but also associated industries. The development of tourism is needed lately to pay attention to tourism through the implemented residents (It is estimated that with jobs in tourism tied 6-8 jobs tied to tourism). Tourism development has since 2004 fluctuating trend

Negative effects caused in the tourism market growth in supply over demand, which creates pressures to reduce prices, which may be beneficial for many companies liquidation. To maintain and attract a customer tries to individual facilities creating different types of promotions from various pricing advantage, service packages and other incentives. The problem is that the menu structure and targeting specific audiences is correct.

One of the possible causes of the decline in tourism can be caused due to:

- safety in the locality,
- environmental load, disaster,
- economic situation, price,
- legislative restrictions,
- standards of service.

Criteria for assessment of the situation in the tourism sector are the numbers of each occupancy accommodation or overnight stays. Accommodation facilities in the CZ since 2010 are classified according to a common European system, which integrates the services provided by businesses, facilities, and other criteria. Individual property is divided into hotels 1 to 4 three star hotels, motels and guest houses, camps and other cottage. European system classification works under the auspices of the Union Hotel Stars, owned by the Association of Hotels and Restaurants, hotels have classified this way to gain a competitive advantage such as promotion in all coun-

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tries registered in the system. Categorization for statistical surveys of the CSO then defines Hotels 4 and 3 star hotels, guesthouses, campsites, cottages and cottage settlements and others.

Current situation in tourism is associated with the crisis period, although the crisis was the cause of the collapse in demand for accommodation in 2008.2009, fluctuating trends have been observed since 2004, as evidenced by changes in the number of residents in each guest accommodation. If we came out of the above, then, if safety and environmental load can not be assumed reasons for reducing the demand for accommodation. CZ does not deal with other countries such as riots, strikes and is not associated with any serious environmental or natural disasters. The problem might seem economical and social situation of residents and standards of service.

The assumption is that domestic tourism will be bound to the exchange rate is correct. Number of residents in 2006 and 2007 the upward trend. Exchange rates at the time declined to strengthen the crown.

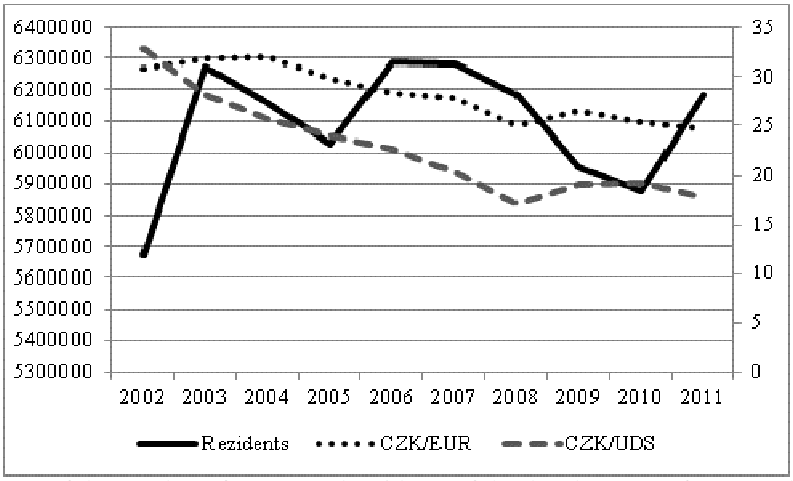

Figure 1 Development of the number of guests and residents of the development of UDS and the euro exchange rate [1]

1.1 Factors affecting interest in tourism

Evaluate the success of tourism is possible in the number of guests and overnight stays in different categories. Our goal is to determine what factors act on the selection of different types of accommodation. As described above for the decline in tourism can affect economic and social situation of residents exchange rates of CZK against the euro or dollar, or safety

In determining the occupancy dependence of individual accommodation facilities and exchange rate value of each course were recalculated on the basis of the values observed rate of the Czech National Bank (as the value of 2 consecutive, excluding weekend days) and converted to values of the quarter or annual averages, so that they are compatible with value for the number of guests for the period, overnight. The values of CZ and unemployment data on safety, based on the values of the Czech Statistical Office (CSO) [1].

1.2 Finding a suitable model

The evaluation will be based variable number of variables in each guest accommodation establishments regressors individual factors that are, according to the above-mentioned possible causes of the decline in tourism:

- the average wage,
- unemployment,
- rate CZK / EUR,
- CZK / USD exchange.

We use multiple regression model to determine the dependence between the variables.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + ...$$

The dependence between the number of guests in each accommodation and individual factors.
The regression model (1) was determined on the basis of explored values of guests of "*****" hotels and salary:

$$HOTEL\ 5* = -100\ 251 + 26.25 * pay \qquad (1)$$

The following values indicate that the regression model is chosen correctly. The coefficient of determination $R^2 = 0.51$, which indicates what proportion of the variance in the dependent variable observations. Regression was able to explain. Use the R^2 measure described tightness depending regression functions. The larger the value of R^2, ie value approaching to 1, the mean regression greater success and vice versa [5]. At the same time the value of the parameter $\beta 1 = 2.44\ E\text{-}07$ shows the significance factor wages (see Table1).

RESULT						
Regression statistics						
Correlation coefficient R	0.712931					
The coefficient determination R^2	**0.508271**					
Adjusting coefficient deternation R^2	0.495331					
Error mean	86072.343332					
Observation	40					
ANOVA						
	Unlike	*SS*	*MS*	*F*	*Significance F*	
Regresion	1	2.9099E+11	2.9099E+11	39.278307	**2.44893E-07**	
Residues	38	2.8152E+11	7,4084E+09			
Total	39	5,7251E+11				
	Coefficients	*Error mean*	*t Stat*	*p Value*	*Low 95%*	*Up 95%*
Limit	-100250.749	85822.45908	-1.1681179	0.250035984	-273989.23324	73487.734375
pay	26.2540538	4.189093	6.267241	**2.44893E-07**	17.773679	34.734429

Table 1 MS Excel regression analysis

For better explanation of the regression model will be examined in relationship to the unemployment figures. We assume that the unemployed persons, the accommodation of disinterest. The reason for this postponement is high and unnecessary financial costs. After inclusion of the variable unemployment there was a small increase in $R^2 = 0.508617$, $\beta_1 = 0.872609$ Parameter is insignificant, so it disposes of the variables.

Another variable regression model for improvement is to use the exchange rate CZK / EUR. We assume that both residents and nonresidents will move according to prefer accommodation at home or abroad. Again, there was only a slight improvement in the coefficient of determination $R^2 = 0.50965$, for reasons of immateriality parameter $\beta^1 = 0.749225$ is the elimination of variable exchange rate CZK / EUR.

Also, the variable exchange rate CZK / USD showed little growth and the insignificance of the parameter β_1, you see Table 2.

RESULT						
Regression statistics						
Correlation coefficient R	0.735326					
The coefficient determination R^2	**0.540704**					
Adjusting coefficient deternation R^2	0.515877					
Error mean	84302.0333					
Observation	40					
ANOVA						
	Unlike	*SS*	*MS*	*F*	*Significance F*	
Regresion	2	3.0956E+11	1.5478E+11	21.779007	**5.6069E-07**	
Residues	37	2.6295E+11	7106832822			
Total	39	5.7251E+11				
	Coefficients	*Error mean*	*t Stat*	*p Value*	*Low 95%*	*Up 95%*
Limit	390433.803709	314990.259151	1.239511	0.222961	-247797.080378	1028664.687796
pay	12.938552	9.202997	1.405906	**0.168095**	-5.708491	31.585595
CZK/UDS	-9776.229147	6048.174046	-1.616393	**0.114505**	-22030.993718	2478.535425

Table 2 MS Excel regression analysis

The final model of the relationship between the number of guests and the average wage in the CZ expresses the model (1).

In the evaluation of links between the number of guests in 4-star hotels and various factors was followed by analogy. In the first phase was interviewed by the dependence between the number of guests in the hotel paid. The regression model was created, the results of regression analysis, see Table 3:

$$HOTEL\ 4* = -1\,809\,144.35 + 176.69 * pay \qquad (2)$$

RESULT						
Regression statistics						
Correlation coefficient R	0.848870					
The coefficient determination R^2	**0.720581**					
Adjusting coefficient deternation R^2	0.713228					
Error mean	366735.051690					
Observation	40					
ANOVA						
	Unlike	*SS*	*MS*	*F*	*Significance F*	
Regresion	1	1.3180E+13	1.3180E+13	97.996477	**4.519547E-12**	
Residues	38	5.1108E+12	1.3449E+11			
Total	39	1.8291E+13				
	Coefficients	*Error mean*	*t Stat*	*p Value*	*Low 95%*	*Up 95%*
Limit	-1809144.346509	365670.350627	-4.947473	1.564156E-5	-2549405.263946	-1068883.429073
pay	176.690833	17.848790	9.899317	**4.519547E-12**	140.557846	212.823819

Table 3 MS Excel regression analysis

The value of coefficient of determination is sufficient enough and the model explains the dependence of data.As in previous cases, the regression model improved by gradually adding the variables of unemployment and exchange rates. Based on the values of Table 4 the variable from the model excluded employment, the parameter $\beta_1 = 0.916166$.

RESULT						
Regression statistics						
Correlation coefficient R	0.848920					
The coefficient determination R^2	**0.720666**					
Adjusting coefficient deternation R^2	0.705567					
Error mean	371601.486336					
Observation	40					
ANOVA						
	Unlike	*SS*	*MS*	*F*	*Significance F*	
Regresion	2	1.318155E+13	6.590774E+12	47.728912	**5.666253E-11**	
Residues	37	5.109244E+12	1.380877E+11			
Total	39	1.829079E+13				
	Coefficients	*Error mean*	*t Stat*	*p Value*	*Low 95%*	*Up 95%*
Limit	-1869798.193264	681758.469414	-2.742611	0.009339	-3251172.054919	-488424.331610
pay	177.662530	20.276733	8.761892	**1.480027E-10**	136.577968	218.747092
unymploed	114.641747	1081.670831	0.105986	**0.916166**	-2077.031520	2306.315015

Table 4 MS Excel regression analysis

For complete model of exchange rate CZK / EUR was a slight improvement in the coefficient of determination $R^2 = 0.764326$, and the parameter is statistically significant because the variable is included and the model will have the form (3) sp - value for β_1 *0.047701* and p - value for β_2 *0.012657*.

Regression statistics						
Correlation coefficient R	0.874258					
The coefficient determination R^2	**0.764326**					
Adjusting coefficient deternation R^2	0.751587					
Error mean	341327.226379					
Observation	40					
ANOVA						
	Unlike	*SS*	*MS*	*F*	*Significance F*	
Regresion	2	1.398013E+11	6.990067E+12	59.998371	**2.442053E-12**	
Residues	37	4.310658E+12	504275467.666E			
Total	39	1.829079E+13				
	Coefficients	*Error mean*	*t Stat*	*p Value*	*Low 95%*	*Up 95%*
Limit	3625648.897594	2101564.892065	1.725214	0.092834	-632526.014358	7883823.809546
pay	81.675678	39.880750	2.047998	**0.047707**	0.869604	162.481753
CZK/EURO	-124653.549786	47565.660425	-2.620663	**0.012657**	"-221030.731694	-28276.367878

Table 5 MS Excel regression analysis

Also refine the model using a variable exchange rate CZK / USD for the coefficient of determination was increased to 0.773751. There was, however, for including this variable in the regression model, the parameter is β_1

appears to be statistically insignificant (p-rank of the individual t-test 0.228691). Factor CZK / USD will be removed for reasons multicollinearity (CZK / EUR and CZK / UDS correlation coefficient 0.872949038).

Regressive model of dependence between factors will have the form (see Table 5):

$$HOTEL\ _{4*} = 3\,625\ \ 649 + 81.68 * pay - 12\ \ 465\ CZK\ / EUR \tag{3}$$

The evaluation of the relationship between the number of guests in hotels and other wages were created model (4, see Table 6). Given the very low leakage, $R^2 = 0.155951$ is needed to improve the model by adding another variable.

RESULT						
Regression statistics						
Correlation coefficient R	0,394906					
The coefficient determination R^2	**0.155951**					
Adjusting coefficient deternation R^2	0.133739					
Error mean	600495.599773					
Observation	40					
ANOVA						
	Unlike	*SS*	*MS*	*F*	*Significance F*	
Regresion	1	2.5317694E+12	2.531768E+12	7.021087	**0.011674**	
Residues	38	1.370261E+13	3.605950E+11			
Total	39	1.6234377E+13				
	Coefficients	*Error mean*	*t Stat*	*p Value*	*Low 95%*	*Up 95%*
Limit	4859966.609408	598752,247725	8,116824	**8.008878E-10**	3647856.06378	6072077.155036
pay	-77.440539	29.225786	-2.649733	**0,011674**	-136.605049	-18.276030

Table 6 MS Excel regression analysis

$$HOTEL\ _{next} = 4\ 859\ 967\ -77.4405 * pay \tag{4}$$

In determining the dependencies between variables unemployment and unemployment reached a value of regression model $R^2 = 0.218232$ ($adj\ R^2 = 0.175974$), where p-value of the individual t-test parameter $\beta_1 = 0.0943$ factor will be excluded from the model unemployment. Inclusion of the exchange rate CZK / EUR with values $R^2 = 0.230027$ (adj $R^2 = 0.188407$ and the value of the parameter β1 = 0.0676) and the exchange rate CZK / USD with the values of $R^2 = 0.196826$ ($adj\ R^2 = 0.153412$ and value of the parameter $\beta_1 = 0.1478255$) was elimination of the variables from the regression model and the dependence between the number of guests in hotels and other individual variables has the form (3)

Rating based on number of guests in boarding houses will be a factor in wage determination coefficient values of 0.46660 (adj. $R^2 = 0.4423$) with the β_1 *1.7619 E-06* included in the model, which will have the form:

$$HOTEL\ \ Boarding\ \ = 2\ 200\ 971.1\ -\ 62.12 * pay \tag{5}$$

Unemployment has been added to the model in order to improve its quality. This variable was also included in the model ($R^2 = 0.482938$), p - parameter *value 0.17807 β1*, appears as a parameter statistically insignificant. To further improve the model variables were gradually added in the case of exchange rate CZK / EUR was to create a model with the values of $R^2 = 0.5743$ *(R2 adj = 0.5513)* and p - values for the parameters $\beta_1 = 0.0000027$ and $\beta_2 = 0.002827$ has the form (Table 7):

$$HOTEL\ \ Boarding\ \ = 6\ \ 138\ \ 606.28\ -130.96 * pay - 90\ \ 314.42 * CZK\ / EUR \tag{6}$$

Adding the values of the variable CZK / USD has been improvement in the coefficient of determination, p - values for each parameter, they are statistically significant variables CZK / EUR and CZK / UDS, however, exhibit multicollinearity (correlation coefficient 0.872) and therefore the variable CZK / USD disabled regression model and linear model relationship will have the form (6)

RESULT						
Regression statistics						
Correlation coefficient R	0.757843					
The coefficient determination R^2	**0.574326**					
Adjusting coefficient deternation R^2	0.551317					
Error mean	202598.681776					
Observation	40					
ANOVA						
	Unlike	*SS*	*MS*	*F*	*Significance F*	
Regresion	2	2.049072E+12	1.024536E+12	24.960536	**1.373783E-07**	
Residues	37	1.518710E+12	41046225857.2908			
Total	39	3.567781E+12				
	Coefficients	*Error mean*	*t Stat*	*p Value*	*Low 95%*	*Up 95%*
Limit	6138606,28	1247407.894516	4.921090	1.799687E-05	3611117.825330	8666094.734638
pay	-130,9596302	23.671676	-5.532335	**2.699708E-06**	-178.923000	-82.996260
CZK/EURO	-90314,42071	28233.142144	-3.1988801	**0.002827**	-147520.200085	-33108.641330

Table 7 MS Excel regression analysis

This regression function was then examined in terms of heteroscedasticity using the Spearman correlation test sequence, using the Durbin-Watson test was examined first order autocorrelation. In both cases, the function appears to be satisfactory. The perimeter of the regression function is also well suited in multicollinearity.

Conclusion

As of model creation is evident in all models is lower or higher dependence on number of guests in accommodation establishments analyzed individually to pay. Probably the amount of income affects the choice of quality hotel accommodation. Already Lim (1997) confirmed in their study of tourism demand model, showed that economic factors such as income, relative prices, transportation costs and exchange rates are key factors in tourism demand [4].

In case of increase in wages only by CZK 1 occurs in 5 star hotels increased by 26 guests. In contrast, other hotels in unit wage increase causes a decrease of 77 non resident guests.

If the number of guests at hotels and guest houses 4 star depends not only on wages but also on the CZK / EUR. With the increase in wages and also to increase the exchange rate if there is a 4 star hotel to a decline in the number of guests in the case of pensions is similar.

The model shows that the movement of wages guests respond by changing preferences on the level of housing services and look for when a better salary as a stimulus for the use of a higher category of accommodation services. Increased exchange rate (devaluation of the Czech crown) can change the preferences of foreign guests, ie, increasing demand for higher categories of accommodation facilities.

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