On modelling of the development of share of inbound tourism on GDP in Slovakia

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Abstract

Slovakia is a country with a high unemployment rate (10.63% 12/2015) and with the regional disparities which are a real social problems. However, there is a high potential for increased employment, particularly in the most affected regions. Slovakia is popular adventure destination with quality offer which is oriented to culture and traditions, natural resources, recreation, health and relaxation in Central Europe. Currently, the share of inbound tourism on GDP in European Union is 4 - 5%, but in Slovakia it is just 2.5%. The strategic goal for Slovakia until the year 2016 is to increase the share of inbound tourism on GDP to 2.8% and until the year 2020 is to increase it to 3.2%. The aim of this paper is modelling of the development of share of inbound tourism on GDP using exponential smoothing and Box - Jenkins methodology. It has been shown that long-term strategy of the Slovak government is achieved slowly. Barrier to the tourism industry development is particularly low readiness of human resources (low level of qualification, low level of language skills, lack of motivation of these employees and the lack of modern managerial quality improvement tools in tourism). Available education programs are often professionally and practically inconvenient, or provided to a small target group. Therefore, it is necessary to create professionally oriented education programs, which take into account the needs and specificities of tourism. In order to achieve the tourism development in Slovakia, it should be educated not only future tourism workers, but also current managers and tourism workers, which are providing a tourism services.

Key words: unemployment, gross domestic product, tourism, ARIMA models, exponential smoothing

JEL Code: C53, J24, Z32

Introduction

The global tourism industry is in a state of dynamic developing. As we are mentioned below, many studies have confirmed that if the tourism is developed properly, a country can expect a

number of economic benefits from it. For instance GDP growth, the creation of new jobs, regional development and so on.

Europe's tourism industry is created by 1.8 million small and medium-sized enterprises. These companies employ about 5.2% of the total workforce, which in the European Union produces more than 5% of GDP (Slovakia 2013).

According to Rusinko (2011), the presence of small and medium-sized business enterprises in regional tourism stimulates business opportunities and this sector employs the most people. These businesses also typically employ people who have achieved lower levels of educational. Profits from this sector remain in the region. This helps to increase the quality of cultural sites and the level of service offered by these regions, which in turn improves the quality of life of their residents. In addition, support for infrastructure development, contributes to export, which makes it a driving force for socio - economic development. Therefore, tourism is one of the most important tools for reducing unemployment, increasing regional development and contributing to the overall economic health of the state.

The remainder of the paper is structured as follows. Section 1 specifies related literature. Section 2 presents used data. Section 3 describes used methodology. In Section 4 are discussed results. Finally, we conclude in Section 5.

1 Related Literature

Experts from the World Tourism Organization say that tourism is ever growing in importance for the business sector worldwide and will one day be one of the leading industries, if not the most important one (Slovakia, 2013). This is also demonstrated by extensive studies that deal with the phenomenon of tourism. For example, Cruz-Chavez-Hernandez Trejo and Avilés-Polanco, et al. (2016), discussed the impact of foreign tourism on the economic growth in Mexico. Aslan (2015) examined how international tourist arrivals in the Southern and Eastern Mediterranean impacted tourism, detailing how expenditures affected long term economic growth in Turkey. Kumar, Loganathan, Patel (2015) investigated the nexus between tourism earnings and economic growth in Malaysia. Jaforullah (2015) examined whether international tourism markets boosted economic growth in New Zealand. Perez-Rodriguez, Ledesma-Rodriguez, Santana-Gallego (2015) were testing dependence between gross domestic product and tourism growth rates in the United Kingdom, which has a non-tourist oriented economy, and in Spain, which has a tourist oriented economy.

As we mentioned, tourism is an activity that can enhance growth in a country, thus increasing employment and contributing to economic and social development. At present, domestic tourism is an accelerator of regional development. For example, Inchausti-Sintes (2015) in his work says that tourism promotes economic growth and reduces unemployment.

Slovakia has significant untapped economic strength in general, but especially in this sector. The strategic objective of developing the tourism industry by the year 2020 (by increasing its competitiveness) is to reduce regional disparities and create new jobs. According to this strategy it is expected that in 2016 the share of tourism on GDP will be 2.8% and this share will increase to 3.2% by 2020 (Slovakia, 2013).

The aim of this paper is to model the evolution of the share of tourism on GDP using exponential smoothing and Box - Jenkins methodology.

2 Data

Our study models development of share of inbound tourism on GDP in Slovakia. Our dataset consist of quarterly data from third quarter in 2004 to second quarter in 2014. These dataset was calculated from dataset of balance of payment of Slovak republic, which was obtained from database of The National Bank of Slovakia and from seasonally not adjusted data of GDP of Slovak republic in current prices. These data was obtained from Eurostat database.

3 Metodology

The basis objective of this paper is to model current and forecast future development of share of inbound tourism on GDP in Slovak Republic. We use two most widely used models. First one is the exponential smoothing model and second one is the Box - Jenkins Seasonal Autoregressive Integrated Moving Average (SARIMA) model.

3.1 Holt-Winters additive seasonal model for exponential smoothing

Application of exponential smoothing to forecasting time series are most common. In this paper, we have chosen additive seasonal model. This model is the basis of Holt - Winters' additive method and is given as:

$$y_t = l_{t-1} + b_{t-1} + s_{t-m} + \varepsilon_t , \tag{1}$$

where s_t is the local seasonal component, l_t is the local level and b_t is growth component and these components are defined as:

$$l_t = l_{t-1} + b_{t-1} + \alpha\varepsilon_t , \tag{2}$$

$$b_t = b_{t-1} + \beta\varepsilon_t , \tag{3}$$

$$s_t = s_{t-m} + \gamma\varepsilon_t , \tag{4}$$

where m is the number of seasons in a year, and $0 \le \alpha \le 1$, $0 \le \beta \le \alpha$, $0 \le \gamma \le 1-\alpha$. The smoothing parameters α, β, γ were set to fixed values which are determined subjectively by users on the basis of own experience (Winters, 1960; Billah, King, Snyder, and Koehler, 2006).

For determination of validity of our model, we use criterion of the mean absolute percentage error (MAPE).

3.2 Box-Jenkins SARIMA model

According to Teneja, Ahmad, Ahmad, and Attri (2016), Box et al. (1994), a simple equation to define the autoregressive moving average (ARMA)(p, q) model for a stationary time series is given below:

$$Y_t = \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + ... + \phi_p Y_{t-p} + \varepsilon_t + \varepsilon_t - \theta_1\varepsilon_{t-1} - \theta_2\varepsilon_{t-2} - ... - \theta_q\varepsilon_{t-q} . \tag{5}$$

The first term in ARIMA model represents an autoregressive (AR) part of the order *p* having the form of

$$Y_t = \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + ... + \phi_p Y_{t-p} + \varepsilon_t . \tag{6}$$

This (AR) term refers to the current time series values Y_t as a function of past time series values Y_{t-1}, Y_{t-2},..., Y_{t-p}. The ϕ_1, ϕ_2, ϕ_3 are autoregressive coefficients that relates Y_t to Y_{t-1}, Y_{t-2},..., Y_{t-p}. The moving average MA(q) term of the model is represented as,

$$Y_t = \varepsilon_t - \theta_1\varepsilon_{t-1} - \theta_2\varepsilon_{t-2} - ... - \theta_q\varepsilon_{t-q} \tag{7}$$

where, $\varepsilon_{t-1}, \varepsilon_{t-2}, ..., \varepsilon_{t-q}$ are the past random shocks or independent white noise sequence with mean = 0 and variance = σ^2; $\theta_1, \theta_2, ..., \theta_q$ are the moving average coefficients relating Y_t to $\varepsilon_{t-1}, \varepsilon_{t-2}, ..., \varepsilon_{t-q}$.

When the (AR) and (MA) specifications are combined together with integration (differencing) term, they constitute an ARIMA (p,d,q) model, where p, d and q indicate orders of autoregression, differencing and moving average. The model is mathematically given as

$$(1-B)^d Y_t = \frac{\theta(B)}{\phi(B)}\varepsilon_t \tag{8}$$

where, *t* denotes the time indices, *B* is the backshift operator, ie., $BY_t = Y_{t-1}$. $\phi(B)$ and $\theta(B)$ are the autoregressive and moving average operators respectively and can be written as

$$\phi(B) = 1 - \phi_1 B^1 - \phi_2 B^2 - ... - \phi_p B^p \tag{9}$$

$$\theta(B) = 1 - \theta_1 B^1 - \theta_2 B^2 - \ldots - \theta_p B^q . \quad (10)$$

Seasonality is a pattern which is repeating itself over a fixed time interval. Here, the quarterly dataset is presenting a seasonal period of 4 quarter. In order to obtain a stationarity, seasonal differencing is performed by taking difference between the present and corresponding observation from the previous year. Taking into consideration the seasonality of our time series, a seasonal ARIMA denoted as SARIMA (p, d, q) x $(P, D, Q)_s$, is used, where P,D,Q represent seasonal autoregressive, differencing and moving average orders respectively and *s* is number of seasons. For the present study, *s* = 4. SARIMA(p, d, q)$(P, D, Q)_s$ built for the time series is defined as:

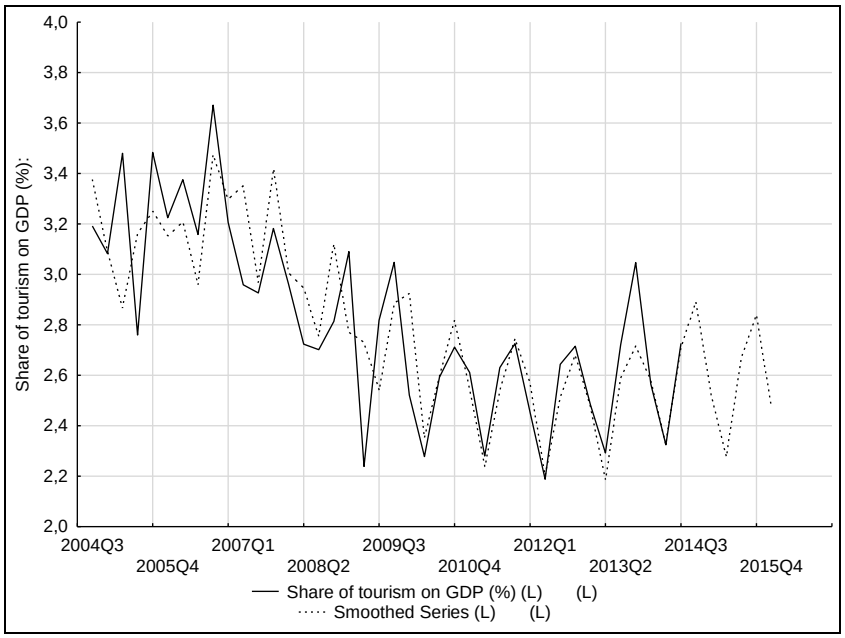
$$\phi_p(B)\Phi_p(B^s)(1-B)^d Y_t = \theta_q(B)\Theta_Q(B^s)\varepsilon_t . \quad (11)$$

where, *B* is the backshift or lag operator, *s* is the seasonal lag (in 'quarter' for present study); ε_t represents error variables; *d* and *D* are non-seasonal and seasonal differences; ϕ and Φ are the non-seasonal and seasonal autoregressive parameters; θ and Θ are the non-seasonal and seasonal moving average parameters respectively.

4 Results

As the result of exponential smoothing of our data we obtain model which is shown in Fig. 1. We can see here observed time series of share of inbound tourism on GDP in % and smoothed series, too. Besides that we can see forecast for six quarters (since third quarter 2014 to fourth quarter 2015). The parameters for this model are $\alpha = 0.264$, $\beta = 0.00$ and $\gamma = 0.527$, additive season = 4. The value of MAPE, which is criterion for determination of validity of our model, is 5.5976%. The forecast value of share of tourism on GDP in fourth quarter 2015 is 2.47%.

Fig. 1: Observed, smoothed and forecast series for share of tourism on GDP

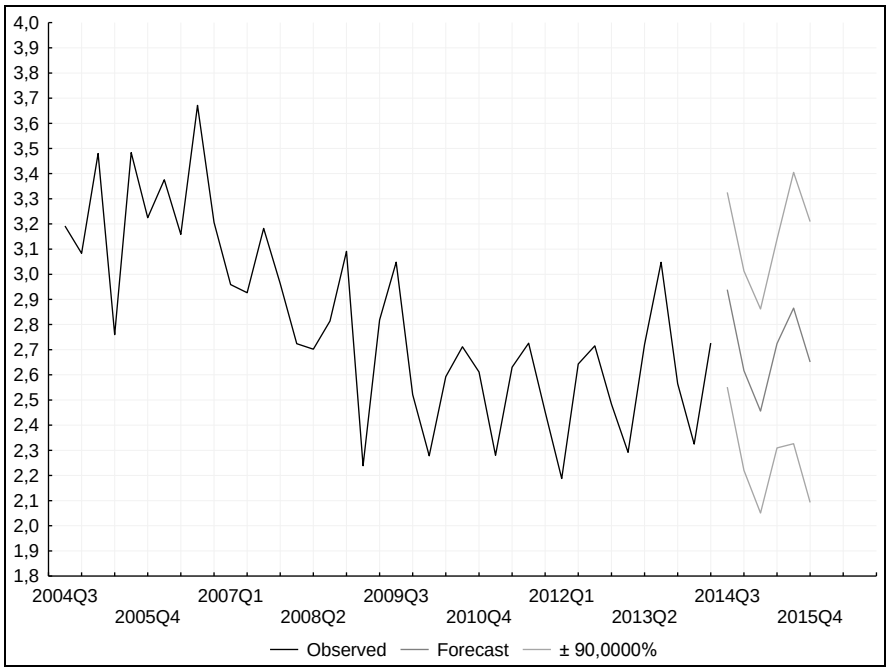


Source: own calculation in software STATISTICA 13

Resulting SARIMA model for our data is (0,1,1)(1,0,0) with seasonal lag = 4. We tried a lot of SARIMA models with various parameters. Taking into account assumptions and data fitting, we have chosen the best parsimony model. The observed series and forecast for six quarters (since third quarter 2014 to fourth quarter 2015) are shown in Fig. 2. We calculated value of MAPE which is 6.1943% in this case. The forecast value of share of tourism on GDP in fourth quarter 2015 is 2.65%. From our calculation we obtain $\theta_1 = 0.776832, \Phi_1 = 0.667218$. The particular model for this case is

$$X_t - X_{t-1} = 0.667218\ X_{t-4} - 0.667218\ X_{t-5} + a_t - 0.776832\ a_{t-1}. \qquad (12)$$

Fig. 2: Observed and forecast series for share of tourism on GDP



Source: own calculation in software STATISTICA 13

It is well-known that short time series are better fitted by using exponential smoothing in compare with ARIMA models. This fact was confirmed on our dataset with respect on above reported MAPE values. We have omitted graphs of autocorrelation and partial autocorrelation functions, tests of normality of residuals and many other considered tests and results. However, these results were always taken into account.

As we have already mentioned, according to Slovakia tourism strategy it is expected that in 2016 the share of tourism on GDP will be 2.8%. Our results show that this long-term strategy is achieved slowly. One of the tools for increasing share of tourism on GDP is supporting education of employees in this area.

Conclusion

In various studies it has been shown that the training and education of employees are important to a company. Ungureni, Kaçmazb, Kahvecic (2014) stated that Turkey's tourism industry suffers from a shortage of qualified workers. This is a major problem in this sector. This is true despite a growing number of institutions providing education in the field of tourism at the university level, i.e. at the higher education level. The result of their research is clear: in companies where the managers have special training in the field of tourism, there was recorded a positive contribution to the performance, profitability and productivity of the business, as well

as customer satisfaction. It was further found that, according to hotel managers, the level of vocational education currently provided is insufficient.

The study by Kršák, Tobisová, Sehnálková (2014) has also shown that Slovak tourism enterprises must educate their employees. This is because after the accession of Slovakia to the European Union, Slovakia has gained new opportunities for tourism development, but it was likewise in this field that there has been growing competition. Consequently, it is necessary to improve services, while improving the preparedness of staff. In the study, it was noted that another important factor that can help in the development of tourism, and improve its market share, is the effective use of information technology.

We can say that tourism is an important part of Slovakia's service sector and has a high untapped potential, especially in comparison with the tourism sectors of other countries. One of the tools for increasing revenue contributed by tourism to the GDP is to increase the readiness of human resources. This includes raising the level of qualification, language skills, information and communication skills and motivation of these workers. It is, in general, easier to upgrade existing services and improve the quality of these services. The starting point is to create professionally targeted and affordable educational programs that take into account the needs and specificities of the tourism sector. These programs will be necessary to train all relevant staff, i.e. personnel managers and service personnel. This will achieve a synergistic effect and allow development to increase the employability of people in this sector by increasing their competitiveness. Ultimately, the whole process must be aimed at increasing the contribution of tourism to the GDP.

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