

Exploring the Impact of Socioeconomic Factors on the Consumption of Spa Services in Slovakia

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Abstract: Spa tourism in Slovakia represents a significant component of the country's tourism industry, attracting both domestic and international visitors thanks to its unique natural healing resources. This study aims to analyze the impact of selected socioeconomic factors—specifically the number of treated patients, life expectancy at birth, and average disposable income on the consumption of spa services. A regression analysis revealed a statistically significant positive effect of the number of treated patients and disposable income on spa services consumption, whereas life expectancy at birth exhibited a statistically significant negative effect. The validity and robustness of the model were confirmed through stationarity and heteroskedasticity tests. The findings can serve as a basis for effective planning and development of spa services in line with current trends and market needs.

Keywords: Spa Service Consumption, Socioeconomic Factors, Spa Tourism

JEL Classification codes: L83, I15

INTRODUCTION

Spa tourism represents a unique intersection of healthcare and tourism, offering both therapeutic and preventive services that contribute to public health and economic development. Traditionally, spa destinations have provided therapeutic treatments aimed at improving physical well-being, but their role has evolved over time to encompass preventive healthcare and wellness tourism, attracting a diverse range of visitors. The economic relevance of spa tourism extends beyond direct revenues, contributing to regional development, employment, and public health infrastructure (Smith & Puczkó, 2014). However, despite its growing importance, the factors influencing spa service consumption remain insufficiently explored in empirical research. Understanding the socioeconomic drivers of spa tourism demand is essential for both tourism and public health policies. Economic prosperity, demographic trends, and healthcare accessibility all shape consumer behavior in this sector. Although spa tourism has played a historical role in Slovak's healthcare systems, the research focuses mostly on market trends and consumer behavior.

Given the increasing importance of data-driven decision making for tourism and healthcare policy, this study aims to examine the relationship between selected socioeconomic indicators and spa service consumption in Slovakia. Using time-series regression analysis, the research investigates how the number of cured patients, life expectancy at birth, and gross disposable income influence the consumption of spa services. The findings of this study are expected to

provide empirical insights for tourism strategists, healthcare policymakers, and economic planners, contributing to the sustainable development of the spa tourism sector.

1 LITERATURE REVIEW

Medical tourism involves traveling for medical care, including surgeries and health services, while wellness tourism focuses on health promotion and preventive care (Lopes & Rodríguez-López, 2022). Spa tourism is defined within health tourism and represents a unique blend of health, wellness, and recreational services, closely tied to natural healing resources, favorable environmental conditions, and cultural heritage. Its primary function is to promote health improvement, regeneration, and relaxation (Novacká et al., 2014). Beyond its health benefits, spa tourism is widely acknowledged as a significant contributor to the economy, stimulating employment, infrastructure development, and revenue generation (Smith & Puczkó, 2014). Understanding the consumption of spa services is essential for evaluating their economic impact. In tourism and health economics, consumption is viewed as a process that extends beyond the mere purchase of a service, encompassing pre-purchase decisions, service experience, and post-consumption evaluation (Ekinici et al., 2011). The Slovak's Tourism Satellite Account (TSA) defines tourism expenditure as the amount paid by the visitor for the acquisition of consumer goods and services, as well as valuables for his own consumption or for the consumption of others, before or during the stay. Tourism consumption has the same formal definition as visitor spending, but is a broader concept. In fact, in addition to tourism expenditure, it includes, for example, services related to holiday accommodation on own account, social transfers within tourism and other imputed consumption. The concept of visitor consumption is the basis for the compilation of direct tourism gross value added and direct tourism GDP (TSA, 2022). According to TSA, spa service consumption in Slovakia in 2022 accounted for 4.3% of total tourism consumption, amounting to €219,896,000.

Demographic trends play a significant role in shaping the demand for spa services. Research suggests that life expectancy and population aging are among the key factors influencing health-related tourism (Müller & Lanz-Kaufmann, 2001). As the global population ages, the need for preventive and rehabilitative treatments increases, making spa services a critical part of health tourism strategies (Voigt et al., 2011). Studies indicate that in regions with longer life expectancy, individuals are more likely to seek wellness and therapeutic services, although the impact on overall consumption patterns varies (Smith & Diekmann, 2017). Furthermore, the increasing focus on preventive healthcare policies has contributed to a growing preference for spa-based wellness treatments, particularly in Europe and Asia (García-Altés, 2005). However, higher life expectancy is often associated with better overall healthcare systems and preventive medical care, potentially reducing the need for spa treatments later in life (Wang & Wang, 2021). In the context of Slovak spa tourism, available demographic data support this trend; while the average life expectancy in Slovakia in 2022 is 78.18 years, the largest group of spa patients falls within the 55-64 age category (ŠÚ SR, 2022; NCZI, 2022). This suggests that spa services are primarily utilized by individuals in pre-retirement and early retirement, rather than by the oldest segments of the population.

Disposable income and financial accessibility are widely regarded as crucial factors affecting tourism consumption (Dolnicar & Leisch, 2004). Research by Hall and Williams (2019) demonstrates that higher gross disposable income correlates with increased participation in wellness-related activities. However, studies also highlight that spa service consumption exhibits varying degrees of price elasticity, depending on whether services are financed through private spending or health insurance systems (Koncul, 2012). Additionally, evidence from the Global Wellness Institute (2018) suggests that economic fluctuations can significantly influence consumer spending on non-essential health services, including spa tourism, particularly during periods of economic downturns.

The number of cured patients in spa facilities has been used in previous research as an indicator of medical tourism demand. Studies suggest that state-funded spa treatments and insurance-based reimbursements play a critical role in determining patient volume and revenue generation (Dimitrovski & Todorović, 2015). The relationship between health status and spa service consumption has been explored in various studies, emphasizing that government-supported treatments significantly impact the economic sustainability of the spa industry (Song et al., 2012). Furthermore, empirical research indicates that the structure of health insurance policies influences consumer behavior, with countries that provide partial or full reimbursements for spa treatments experiencing higher demand (Johnston et al., 2010).

2 METHODOLOGY

This study aims to analyze the impact of selected socioeconomic factors on the consumption of spa services in Slovakia. Firstly, the relationships between the number of cured patients, life expectancy at birth, and gross disposable income as independent variables and the consumption of spa services as the dependent variable are identified. The analysis is based on annual data for the period 2012 – 2022, sourced from publicly available statistical records from the Statistical Office of the Slovak Republic (ŠÚ SR) and Slovak National Health Information Centre (NCZI):

- consumption of spa services (monetary value in EUR);
- number of cured patients (domestic visitors);
- life expectancy at birth (years);
- gross disposable income (EUR per capita).

Consumption of spa services is derived from the Tourism Satellite Account, compiled by ŠÚ SR. TSA categorizes internal tourism consumption by product, with spa service consumption classified as a characteristic tourism service specific to Slovakia. Data on the number of treated patients are collected by NCZI, which gathers records directly from spa enterprises. The dataset distinguishes between domestic and international patients, as well as between those whose treatments are covered by health insurance and self-paying patients. For the purpose of this analysis, we consider only domestic patients, regardless of whether their stay was insurance-funded or self-paid. Life expectancy at birth and gross disposable income per capita are sourced from ŠÚ SR, specifically from DataCube database.

The study follows a hypothesis-driven approach, where the following hypotheses, grounded in the theoretical framework, are tested:

- H0: Socioeconomic factors do not have an impact on the consumption of spa services.
- H1: Socioeconomic factors have an impact on the consumption of spa services.

The empirical model is constructed using the Ordinary Least Squares (OLS) regression, with the general equation specified as:

$$Y = \beta_0 + \sum_{i=1}^n \beta_i X_{it} + \varepsilon_t \quad (1)$$

where:

Y_t - dependent variable;

X_{it} - independent variables;

β_0 – intercept;

β_i – regression coefficients measuring the impact of each independent variable;

ε_t – error term.

Before estimating the regression model, a unit root test (Augmented Dickey-Fuller Test – ADF) was conducted to assess the stationarity of the time series data. The results indicated that the variables were non-stationary in their level form, which could potentially lead to spurious regression results. To address this issue, first differencing was applied, after which the stationarity of all variables was confirmed through a second ADF test. This step ensured that the model was built on reliable and econometrically robust data.

For further validation, the Breusch-Pagan test for heteroskedasticity was applied to check for non-constant variance in residuals. The results showed no presence of heteroskedasticity, allowing for standard error interpretations without adjustments. Additionally, the Durbin-Watson test was used to assess the autocorrelation, confirming that first-order autocorrelation was not significantly affecting the model. The F-test for overall model significance indicated that the regression equation is statistically meaningful.

The entire econometric analysis was conducted using Gretl software, which facilitated efficient handling of time series data and statistical testing. The findings from this study provide valuable insights into the relationship between socioeconomic determinants and spa service consumption in Slovakia.

3 RESULTS AND DISCUSSION

Spa tourism plays a crucial role in the economic landscape of the Slovak Republic, contributing to its development through employment creation, infrastructure improvements, and increased revenue generation. Due to its year-round appeal, spa tourism also helps stabilize visitor numbers during non-peak seasons, making it a sustainable component of the national economy. Understanding key economic and social indicators related to spa tourism allows policymakers and stakeholders to develop strategies that support its long-term sustainability and economic viability.

To evaluate the influence of socioeconomic factors on spa service consumption, econometric modeling using OLS method was applied. The model investigates whether selected socioeconomic factors significantly impact the consumption of spa services. The regression model was formulated as follows:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \varepsilon \quad (2)$$

where:

y = consumption of spa services,

x_1 = number of cured patients in Slovak spas,

x_2 = life expectancy at birth,

x_3 = gross disposable income,

β = intercept,

$\beta_1, \beta_2, \beta_3$ = regression coefficients estimated using the least squares method,

ε = error term.

The correlation analysis (Tab. 1) examines the relationships between selected socioeconomic indicators and spa service consumption. The results show a weak positive correlation (0.2082) between the number of cured patients and spa service consumption, suggesting a slight connection. A moderate negative correlation (-0.4221) between life expectancy at birth and spa service consumption implies that higher life expectancy is associated with lower demand

for spa services. The correlation between gross disposable income and spa service consumption (0.1146) is minimal, indicating that income has little impact. Similarly, the number of cured patients and gross disposable income (-0.1614) show a weak negative relationship. The strongest correlation is between the number of cured patients and life expectancy at birth (0.707), highlighting a link between healthcare treatments and longevity. Overall, the correlation analysis confirms that while some socioeconomic factors influence spa service consumption, their impact is not substantial. The relatively weak correlations suggest that these factors alone do not fully explain the variability in spa service consumption. To gain a deeper understanding of these relationships, a regression analysis is conducted to examine the combined effects of multiple variables and their statistical significance in predicting spa service demand.

Tab. 1 Correlation analysis of socioeconomic factors on spa service consumption in Slovakia

| | Consumption of spa services | Number of cured patients | Life expectancy at birth | Gross disposable income |
|-----------------------------|-----------------------------|--------------------------|--------------------------|-------------------------|
| Consumption of spa services | 1.0000 | 0.2082 | -0.4221 | 0.1146 |
| Number of cured patients | | 1.0000 | 0.7070 | -0.1614 |
| Life expectancy at birth | | | 1.0000 | 0.1038 |
| Gross disposable income | | | | 1.0000 |

Source: own processing

The R-squared value (0.854) suggests that approximately 85.4% of the variability in spa service consumption is explained by the independent variables included in the model. More relevant for research is the adjusted R-squared value (0.781), which accounts for the number of predictors in the model; this means that 78.1% of the variation in spa service consumption can be attributed to the examined independent variables while adjusting for the complexity of the model. The standard error of the regression (15,088.35) provides insight into the accuracy of predictions, indicating the average deviation of observed values from the regression line. Additionally, the Durbin-Watson statistic (1.972268) suggests that autocorrelation in the residuals is not a concern, supporting the validity of the regression assumptions. The log-likelihood value, along with information criteria such as Akaike (223.7041) and Schwarz (224.7041), helps assess the model's fit compared to alternative specifications. These results indicate that the selected socioeconomic factors have significant explanatory power in determining spa service consumption, providing a strong foundation for further predictive analysis and policy recommendations.

Tab. 2 Regression Statistics

| | |
|--------------------|-----------|
| R Squared | 0.854103 |
| Adjusted R Squared | 0.781154 |
| Standard Error | 15,088.35 |
| Log-likelihood | -107.852 |
| Durbin-Watson | 1.972268 |
| Akaike criterion | 223.7041 |
| Schwarz criterion | 224.9144 |

Source: own processing

To further assess the validity of the regression model, an analysis of variance (ANOVA) test was conducted. The ANOVA test decomposes the total variability in spa service consumption into explained and unexplained components. The F-statistic (11.70828) and its significance level (p-value = 0.0064) indicate that the model as a whole is statistically significant, confirming that the independent variables jointly contribute to explaining the variance in spa service consumption. The results provide strong evidence that the regression model is appropriate for analyzing the impact of socioeconomic factors on spa service consumption.

Tab. 3 ANOVA test results

| | df | SS | MS | F | Significance F |
|------------|----|------------------|--------------------|----------|----------------|
| Regression | 3 | 8020186227.26992 | 2673395409.0899734 | 11.70828 | 0.00641 |
| Residual | 6 | 1370000000.0 | 228333333.33333334 | | |
| Total | 9 | 9390186227.26992 | | | |

Source: own processing

The regression analysis examines the impact of selected socioeconomic factors on the consumption of spa services. The estimated regression equation is expressed as follows:

$$y = 3.25e + 06 + 1.5755x_1 - 46,580.9x_2 + 82.7947x_3 \quad (3)$$

To test the statistical validity of the model, a hypothesis testing approach was applied. The p-values of the independent variables were examined to determine statistical significance.

The coefficient for the number of cured patients has a standard error of 0.30321, a t-ratio of 5.196, and a p-value of 0.002. Given that $p < 0.05$, the null hypothesis is rejected, indicating that the number of cured patients has a statistically significant and positive impact on spa service consumption. The magnitude of the t-ratio suggests a strong effect within the model.

The coefficient for life expectancy at birth has a standard error of 8,187.03, a t-ratio of -5.69, and a p-value of 0.0013. The negative sign of the coefficient indicates an inverse relationship, meaning that higher life expectancy is associated with lower spa service consumption. As $p < 0.05$, the null hypothesis is rejected, confirming that this variable plays a significant role in the model.

The coefficient for gross disposable income has a standard error of 33.6403, a t-ratio of 2.461 and a p-value of 0.049. While this p-value is slightly above the conventional 5% threshold, it remains statistically significant at the 10% level ($p < 0.10$), indicating that disposable income

has a moderate influence on spa service consumption. The positive coefficient suggests that higher income levels contribute to increased demand for spa services, albeit with a weaker effect compared to other variables.

Table 4 presents the regression output, highlighting the coefficients, standard errors, t-ratios, and p-values of the model variables.

Tab. 4 Regression analysis results

| | Coefficients | Standard Error | t-ratio | p-value |
|--------------------------|--------------|----------------|---------|---------|
| Constant | 3,25e+06 | 587,553 | 5.528 | 0.0015 |
| Number of cured patients | 1.5755 | 0.30321 | 5.196 | 0.002 |
| Life expectancy at birth | -46,580.9 | 8,187.03 | -5.69 | 0.0013 |
| Gross disposable income | 82.7947 | 33.6403 | 2.461 | 0.049 |

Source: own processing

The regression findings confirm that among the tested socioeconomic factors, the number of cured patients and life expectancy at birth exhibit the strongest statistical influence on spa service consumption. The role of disposable income, while statistically relevant, is less pronounced in comparison.

CONCLUSION

The study explored the impact of selected socioeconomic factors on the consumption of spa services in Slovakia. Contributing to a deeper understanding of the economic and demographic determinants shaping consumption in this sector. By applying the time-series regression analysis, the research identified key relationships between the number of cured patients, life expectancy at birth, and gross disposable income, offering empirical insights relevant to both tourism economics and healthcare planning.

The results indicate that the number of cured patients has a statistically significant positive impact on spa service consumption, confirming that the volume of visitors undergoing treatment remains a key driver of consumption. This finding aligns with expectations, as higher patient numbers reflect both medical necessity and growing consumer interest in spa-based treatments. In contrast, life expectancy at birth negatively influences consumption, suggesting that populations with longer lifespans may rely less on traditional spa services, possibly due to increased access to alternative healthcare options or shifting preferences toward other forms of wellness tourism. Gross disposable income also emerged as a significant determinant, reinforcing the idea that economic stability enhances the affordability and accessibility of spa services. These findings emphasize the interconnectedness of economic conditions and consumer behavior in spa tourism.

From a policy perspective, the results highlight the need for strategic investment in spa tourism infrastructure and targeted marketing efforts that consider the evolving demographic and economic landscape. Expanding accessibility to spa services through insurance incentives or public health initiatives could further enhance consumption, particularly among aging populations. Additionally, supporting innovation in spa tourism and modernizing spa facilities to cater to a broader audience may strengthen the sector's resilience to economic fluctuations.

While the study provides valuable insights, certain limitations should be acknowledged. The analysis is based on national-level data, which may not fully capture regional disparities or individual consumer preferences. Future research could benefit from a microeconomic approach, integrating survey-based data or qualitative insights to complement the econometric findings. Additionally, examining external factors such as healthcare policies, cross-border medical tourism, or seasonal variations in spa service demand could provide a more comprehensive understanding of the sector's dynamics. Future research could explore whether the method of financing a spa stay influences the relationship between socioeconomic factors and spa service consumption. Incorporating this distinction into future models could provide a more nuanced understanding of the determinants of spa tourism.

Overall, this research contributes to the quantitative assessment of spa tourism consumption, reinforcing the role of economic and demographic factors in shaping consumer behavior. The findings have practical implications for tourism policymakers, healthcare strategists, and business stakeholders, supporting the sustainable development of the spa tourism sector. By integrating data-driven approaches into decision making, the sector can adapt to changing economic conditions and demographic trends, ensuring its continued growth and long-term viability.

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