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FACULTY OF ECONOMICS – PRILEP

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PROCEEDINGS

18-19 September 2026, Prilep, North Macedonia

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CONTENTS

THE PARADOX OF EARLY - STAGE ENTREPRENEURSHIP IN BOSNIA AND HERZEGOVINA AND THE CONSTRAINS OF TRANSITION TO ESTABLISHED ENTREPRENEURSHIP *Bahrija Umihanić, Umihana Umihanić Bukvić*	1
CORPORATE GOVERNANCE IN BUSINESS LAW: THE EXPERIENCE OF NORTH MACEDONIA AND TÜRKIYE *Emilija Gjorgjioska, Mustafa Yasan*	13
LEVEL OF AWARENESS AND PRACTICES REGARDING PACKAGING WASTE SELECTION IN NORTH MACEDONIA *Aleksandar Mateski, Filip Ivanovski, Emilija Gjorgjioska, Violeta Gligorovski*	30
ADVANCED HIGH-RISK INTERNET BANKING IN CROATIA: PREDICTORS AND INSIGHTS *Sandra Pepur, Mario Pepur, Dujam Kovač*	44
IMPROVING THE SUSTAINABILITY OF FOOD WASTE MANAGEMENT IN THE HOSPITALITY SECTOR: EVIDENCE FROM PRISHTINA, REPUBLIC OF KOSOVO *Flutra Mestani, Miroslav Gverovski, Aneta Risteska Jankuloska, Mergim Mestani*	56
INSTITUTIONAL MECHANISMS FOR LOCAL TAX COLLECTION *Emil Mutafov*	71
THE IMPACT OF DIGITAL TRANSFORMATION ON BUSINESS PERFORMANCE: A CASE STUDY OF SMEs IN THE VARDAR REGION *Mensure Hodja, Miroslav Gveroski, Aneta Risteska-Jankuloska*	82
PRAGMATISAM VERSUS IDEALISM IN MARITIME BOUNDARY DELIMITATION: EXPLORING CORRELATIONS, CONTRADICTIONS AND COMPETING APPROACHES IN THE EASERN MEDITERRANEAN *Nikolaos Paounis, Lefteris Topaloglou*	97
JUST ENERGY TRANSITION & LABOR MARKET TRANSFORMATION IN THE REGION OF WESTERN MACEDONIA *Lefteris Topaloglou, Despoina Kanteler, Maria Sambrakou, Pavlidou Sofia & Fenia Pliatsika*	103

REGIONAL VALIDATION OF ENERGY POVERTY INDICATORS IN JUST TRANSITION REGIONS: EVIDENCE FROM WESTERN MACEDONIA, SILESIA & STARA ZAGORA *Maria Sambrakou, Despoina Kanteler, Lefteris Topaloglou, Panayotis Pantazis*	110
ERASMUS+ STUDENTS AS CONSUMERS: ATTITUDES, INTENTIONS AND LOCAL PRODUCT PURCHASING BEHAVIOUR IN CROATIA *Ivana Jadrić*	116
STRATEGIC MANAGEMENT AND FDI IN THE DIGITAL ECONOMY: EMPIRICAL EVIDENCE FROM THE WESTERN BALKANS *Elvis Elezaj, Sokol Berisha, Halit Shabani*	130
FINANCIAL INVESTEMENTS IN RESEARCH, DEVELOPMENT AND INNOVATION: GROWTH ELASTICITY ACROSS INCOME GROUPS *Dance Nikolovska Vrateovska, Snezhana Mojsoska, Ljupco Davcev*	142
CASHLESS PAYMENTS AND CONSUMER SPENDING BEHAVIOUR IN THE BALKANS: EVIDENCE BEFORE AND AFTER COVID-19 *Ivica Tomovski, Gordana Serafimovic, Viktorija Trajkov, Filip Simonovski*	153
LOCAL GOVERNMENTS AND FOREIGN DIRECT INVESTMENT *Rositsa Raykova*	163
THE FISCAL MULTIPLIER OF TOURISM TAXATION IN BULGARIA *Violetka Zheleva*	173
INNOVATIVE MODELS IN RURAL TOURISM: THE SHARING ECONOMY AND DIGITAL NOMADISM *Elena Gospodinova, Violetka Zheleva*	182
DIGITAL TRANSFORMATION IN THE INSURANCE INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE DEVELOPMENT OF INSURANCE MARKETS IN DEVELOPING ECONOMIES *Halit Shabani, Ibish Mazreku*	192
THE ROLE OF AI TOOLS IN MODERN WEB DESIGN: A COMPARATIVE OVERVIEW *Dejan Zdraveski, Kosta Sotiroski, Petar Avramovski, Margarita Janeska*	205

E-COMMERCE TRENDS: NORTH MACEDONIA VIS-À-VIS OTHER EUROPEAN COUNTRIES *Marjan Angeleski, Olivera Kostoska*	220
INNOVATIONS IN DIGITAL BANKING SERVICES *Marina Blazhekovikj Toshevski, Stevcho Dimeski*	231
ACCESSIBILITY IN CULTURAL TOURISM: INCLUSIVE EDUCATIONAL PRACTICES IN GREEK MUSEUMS FOR DEAF AND HARD OF HEARING VISITORS *Athina Tsakiridou*	243
THE IMPACT OF ARTIFICIAL INTELLIGENCE ON INNOVATION PERFORMANCE IN GLOBAL PHARMACEUTICAL COMPANIES *Marjan Gjurikj, Marjan Angeleski*	254
DIGITAL ECOSYSTEM AND COOPERATIVES: DIGITAL MARKETPLACES FOR WOMEN'S COOPERATIVES *Burçin Başaran, Nilüfer Serinikli, Yasemin Oraman*	271
THE INFLUENCE OF DIGITAL SOCIAL PROOF ON ONLINE PURCHASE DECISION *Radoslav Nastasijevikj Vardjiski, Karolina Ilieska, Snezana Obednikovska*	283
STRATEGIES AND INITIATIVES TO REDUCE THE RISKS OF USING GENERATIVE ARTIFICIAL INTELLIGENCE SYSTEMS *Natalia Marinova, Lora Parvanova*	296
BULGARIA'S TRADE IN AGRICULTURAL PRODUCTS: CHALLENGES, OPPORTUNITIES AND DEVELOPMENT PROSPECTS *Iskra Nencheva, Nikolay Penev*	303
REGIONAL READINESS FOR THE AGENT ECONOMY: An ASSESSMENT OF TURKISH PROVINCES *Bige Küçükefe*	314
ANALYSIS OF THE PERFORMANCE OF A BUSINESS ENTITY USING ARTIFICIAL INTELLIGENCE *Mimoza Mijoska*	331
CORRELATION ANALYSIS OF NET WAGES AND THE MINIMUM CONSUMER BASKET IN THE REPUBLIC OF NORTH MACEDONIA AND THE REPUBLIC OF SERBIA *Meri Spirkoska*	346

OPPORTUNITIES AND CHALLENGES OF ARTIFICIAL INTELLIGENCE FOR WOMEN ENTREPRENEURS: EXAMPLES OF WOMEN ENTREPRENEURS IN TÜRKIYE *Nilüfer Serinikli, Burçin Basaran*	359
GLOBALIZATION AS A DRIVER OF COMPETITIVE DYNAMICS: EMPIRICAL EVIDENCE FROM NORTH MACEDONIA *Meri Boshkoska, Emilija Gjorgjioska, Monika Angeloska - Dichovska, Margarita Janeska, Tatjana Spaseska*	369
COST MANAGEMENT AS A BASIS FOR STRATEGIC DECISION-MAKING IN PRICING *Igor Zdravkoski, Pece Nikolovski, Ljupce Markuseski, Miroslav Andonovski*	385
THE IMPACT OF ARTIFICIAL INTELLIGENCE ON REAL-TIME CONSUMER PERSONALIZATION IN E-MARKETING *Goran Kotevski, Karolina Ilieska, Margarita Janeska*	396
A CORPORATE GOVERNANCE MODEL ORIENTED TOWARD ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS *Angel Sarov, Filip Elenov*	411
BANK-SPECIFIC AND MACROECONOMIC DETERMINANTS ON MARKET CAPITALIZATION: EVIDENCE FROM MACEDONIAN LISTED BANKS *Tatjana Spaseska, Vera Karadjova*	421
FINANCIAL AUTONOMY AND MUNICIPAL PERFORMANCE IN PRISHTINA BASED ON DOCUMENTARY EVIDENCE FROM 2015 TO 2025 *Gjeni Imami, Milaim Mehmeti, Fanka Risteska*	436
QUALITATIVE RESEARCH METHODS IN BANKING RESEARCH: CONTENT ANALYSIS AND CASE STUDY *Milaim Mehmeti, Gjeni Imami, Fanka Risteska*	451
THE ROLE OF EU FUNDS ON SUSTAINBLE DEVELOPMENT IN CROATIA - CASE STUDY ON KRAPINA ZAGORJE COUNTY *Dalibor Hržica, Katarina Svažić, Nikola Sinković*	461
DOMESTIC TOURISM SEASONALITY: IMPACTS OF SCALE AND GEOGRAPHIC CONCENTRATION IN A SMALL ECONOMY *Vera Karadjova, Aleksandar Trajkov*	475

COMMUNICATION AS A SOCIAL CONSTRUCT: DEVELOPING THE COMMUNICATION MATRIX *Violeta Gligorovski, Nikola Dimeski, Tatjana Spaseska, Aneta Risteska Jankuloska, Dragica Odzaklieska*	489
PRODUCTIVITY GAINS AND HERD DECLINE IN MACEDONIA'S DAIRY SECTOR: A NATIONAL AND REGIONAL DECOMPOSITION *Aleksandar Trajkov, Gordana Dimitrovska, Elena Joshevska, Vera Karadjova*	502
FROM DIGITAL DIVIDE TO SMART INTEGRATION: RECONFIGURING TOURISM-AGRICULTURE VALUE CHAINS IN RURAL DESTINATIONS OF NORTH ALBANIA *Sead Baraku, Elidiana Bashi*	510
BUDGET CONSTRAINT IMPACT ON FOOD PREFERENCES IN ECONOMIC UNCERTAINTY *Georgi Aleksiev, Violetka Zheleva*	522
DRAWDOWNS AND RECOVERY PERIODS: AN ALTERNATIVE METHODOLOGICAL PERSPECTIVE ON INVESTMENT RISK *Alexander Ganchev*	534
THE EVOLUTION OF ECONOMIC PLANNING FROM STATIC TO DYNAMIC MODELS IN THE CONTEXT OF DIGITAL TRANSFORMATION *Nadezhda Veselinova*	539
COMMERCIAL ENTREPRENEURIAL NICHES FOR THE DEVELOPMENT OF RURAL TOURISM IN BULGARIA *Tsvetelina Kabakchieva*	548

DOMESTIC TOURISM SEASONALITY: IMPACTS OF SCALE AND GEOGRAPHIC CONCENTRATION IN A SMALL ECONOMY

Vera Karadjova[1], Aleksandar Trajkov[2]

Abstract

Tourism seasonality represents a structural characteristic of tourism systems with significant macroeconomic implications for employment stability, capacity utilization, and regional income distribution. This study examines the seasonal structure of domestic tourism in North Macedonia over the period 2011–2025, with a comparative focus on the Municipality of Ohrid and the national aggregate. Using multiplicative time-series decomposition and normalized seasonal indices, the analysis evaluates seasonal intensity through Peak-to-Trough Ratios and summer concentration shares, while also assessing the structural weight of Ohrid within national domestic tourism.

The results reveal pronounced spatial differentiation. At the national level, domestic tourism is strongly summer-oriented, with 56% of arrivals and 74.8% of overnight stays concentrated between July and September. However, seasonality is substantially more intense in Ohrid, where 63.4% of annual arrivals and 84.5% of overnight stays occur during the same period. Peak-to-Trough Ratios confirm extreme asymmetry, particularly for overnight stays. Furthermore, Ohrid consistently accounts for roughly one-third to two-fifths of national domestic arrivals and nearly half of domestic overnight stays. The findings suggest that domestic tourism does not uniformly function as a stabilizing force; instead, its impact varies across spatial scales and may amplify seasonal volatility at the destination level.

Keywords: Domestic tourism, Seasonality, Scale effects, Geographic concentration, Small economy

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1. Introduction

Seasonality represents one of the most persistent structural characteristics of tourism systems. Unlike cyclical fluctuations driven by macroeconomic shocks, tourism seasonality is embedded in climatic conditions, institutional calendars, and socio-cultural travel behavior. Its macroeconomic relevance extends beyond temporary demand volatility, as it affects employment stability, capital utilization, fiscal revenues, and regional income distribution.

While extensive literature documents the existence of tourism seasonality, empirical evidence remains predominantly concentrated at the national level and focused on international tourism flows. Tourism systems, however, are spatially heterogeneous, and aggregate indicators may obscure substantial intra-national asymmetries, particularly in countries where tourism activity is geographically concentrated.

Domestic tourism constitutes a specific analytical category within this framework. In macroeconomic discussions, domestic demand is often implicitly treated as a stabilizing component of tourism systems, capable of smoothing external shocks and reducing vulnerability to international market fluctuations. Yet, this assumption warrants closer examination. If domestic travel behavior is synchronized with the same climatic and institutional patterns that drive international tourism, it may reinforce rather than mitigate seasonal volatility.

This study addresses this analytical gap by examining the seasonal structure of domestic tourism in North Macedonia at two spatial levels: the Municipality of Ohrid and the national aggregate. The objective is not merely to measure seasonal intensity but to evaluate how seasonality differs across spatial scales and whether domestic demand functions as a stabilizer or amplifier within the tourism system.

The period under analysis (2011–2025) allows observation of long-term structural patterns, including recovery phases and demand reallocation episodes. By comparing arrivals and overnight stays, the analysis differentiates between visitor volume effects and length-of-stay amplification.

The central research questions guiding this study are:

1. How intense is domestic tourism seasonality at the national and local levels?
2. Does spatial aggregation conceal higher seasonal concentration at the destination level?
3. Does domestic tourism operate as a stabilizing or amplifying force within the tourism system?
4. What is the structural weight of Ohrid in national domestic tourism flows?

By adopting a macro-structural perspective, this study conceptualizes seasonality not as a descriptive calendar phenomenon but as a systemic property of tourism within a national economic framework. The findings contribute to understanding spatial differentiation in tourism dynamics and provide insights for regionally differentiated tourism policy design.

2. Literature Review and Theoretical Foundations

Tourism seasonality is widely recognized as a persistent structural feature of tourism systems, arising from climatic conditions, institutional calendars, and socio-cultural travel patterns rather than solely from economic cycles (Baron, 1976); (Allcock, 1989). Beyond temporary fluctuations, seasonality has macroeconomic implications for employment stability, capital utilization, fiscal revenues, and regional income distribution (Butler, 2001); (Baum & Lundtorp, 2001). These studies stress that seasonality is not merely a descriptive phenomenon but a systemic property of tourism, affecting both demand and the economic capacity of destinations.

The spatial dimension of tourism seasonality has been emphasized in the context of geographically concentrated or peripheral destinations. Baum and Hagen (Baum & Hagen, 1999) highlight that destinations with high spatial concentration, such as small towns or resort areas, experience more intense seasonal peaks, requiring adaptive strategies in infrastructure, marketing, and risk management. Jang (Jang, 2004) employs quantitative decomposition methods to demonstrate that domestic tourism can either mitigate or reinforce seasonal volatility, depending on its temporal alignment with broader tourism demand.

Domestic tourism, in particular, has been frequently cited as a stabilizing factor in tourism systems, capable of offsetting international demand shocks (Crouch & Ritchie, 2006); (Mathieson & Wall, 1996). However, empirical evidence from small economies suggests that domestic travel behavior often mirrors the same climatic and institutional drivers as international flows, thereby potentially amplifying rather than mitigating peak-season pressures (Karadjova & Dicevska, 2011); (Karadjova & Dičevska, 2014); (Karadjova & Dicevska, 2026). In the case of North Macedonia, studies demonstrate that domestic tourism is highly concentrated in both temporal and spatial terms, with Ohrid accounting for a disproportionately large share of national domestic arrivals and overnight stays (Karadjova & Dicevska, 2026); (State Statistical Office, 2025).

Several studies have examined structural and economic aspects of tourism in North Macedonia. Karadjova (Karadjova V. , 2012); (Karadjova V. , 2013); (Karadjova & Angelevska-Najdeska, 2013) explores the interplay between country risk, economic development, and regional disparities, emphasizing the role of tourism in local economic structures. Karadjova and Angelevska-Najdeska (Karadjova & Angelevska-Najdeska, 2013) and Biljan et al. (Biljan, Trajkov, & Karadjova, 2022) highlight the importance of natural and cultural resources in shaping destination competitiveness. Trajkov et al. (Trajkov & Karadjova, 2007); (Trajkov, Andreeski, & Karadjova, 2021) and Trajkov, Radovic Markovic & Karadjova (Trajkov, Radovic Markovic, & Karadjova, 2022) analyze the interconnection between transportation infrastructure, pandemic-induced shocks, and seasonality, demonstrating that domestic tourism flows are sensitive to both structural and external factors.

Methodological approaches to seasonality analysis are well established in the literature. Multiplicative time-series decomposition, normalized seasonal

indices, Peak-to-Trough Ratios (PTR), and seasonal concentration shares are recommended for capturing the intensity and structural impact of seasonal patterns (Baum & Lundtorp, 2001); (Jang, 2004); (Butler, 2001). Karadjova and and Simončeska (Simonceska & Karadjova, 2006); (Simonceska & Karadjova, 2010); (Simonceska & Karadjova, 2012) examine the planning and optimization of accommodation services, highlighting how domestic demand and spatial concentration affect the functional and economic efficiency of destinations.

Collectively, these contributions underline two central insights for the present study. First, tourism seasonality is a **scale-dependent and spatially heterogeneous phenomenon**, with intensity varying across national and local levels. Second, domestic tourism cannot be automatically assumed to stabilize the system; in concentrated destinations such as Ohrid, domestic demand may amplify seasonal peaks and shape the distribution of economic benefits across regions (Karadjova & Dicevska, 2026). This study builds on these premises, offering empirical evidence on the seasonal structure of domestic tourism in North Macedonia, the intensity of peaks and troughs, and the structural weight of Ohrid within the national tourism system.

3. Data and Methodological Framework

3.1 Data

The empirical analysis is based on monthly data on domestic tourist arrivals and domestic overnight stays covering the period from January 2011 to November 2025. The data were obtained from the State Statistical Office of the Republic of North Macedonia and are examined at two spatial levels:

- The Municipality of Ohrid (local level)
- The Republic of North Macedonia (national level)

This dual spatial framework enables subnational comparative analysis of domestic tourism seasonality and allows assessment of whether domestic demand functions as a stabilizing or amplifying component within the national tourism system.

Two core variables are analyzed:

- Domestic tourist arrivals
- Domestic overnight stays

The distinction between arrivals and overnight stays is analytically important, as seasonal fluctuations may operate not only through variations in visitor numbers but also through changes in the average length of stay. This differentiation permits identification of a potential length-of-stay amplification effect.

To complement the seasonal analysis, annual data are used to calculate the share of Ohrid in total national domestic tourism for both arrivals and overnight stays over the period 2011–2025. This indicator provides structural context regarding the relative weight of Ohrid within the national tourism system and enables evaluation of spatial concentration dynamics.

3.2 Methodological Framework

Seasonal patterns are estimated using multiplicative time-series decomposition. The multiplicative specification is appropriate for tourism flows characterized by proportional seasonal variation relative to the annual average level of activity.

The observed series Y_t is decomposed as:

$$Y_t = T_t \times S_t \times I_t \quad (1)$$

where:

- T_t represents the trend component,
- S_t denotes the seasonal component,
- I_t captures irregular fluctuations.

Seasonal indices are normalized such that their annual mean equals unity and their sum across the twelve months equals 12. This normalization ensures comparability across spatial levels and between arrivals and overnight stays.

Three indicators are employed to measure seasonal intensity:

1. **Normalized Seasonal Index**, expressing monthly deviations from the annual average;
2. **Peak-to-Trough Ratio (PTR)**, defined as the ratio between the maximum and minimum seasonal index;
3. **Summer Share (July–September)**, measuring the cumulative proportion of annual activity concentrated within the core summer quarter.

Additionally, the structural weight of Ohrid in national domestic tourism is calculated annually as:

$$\text{Share}_{\text{Ohrid}} = \frac{\text{Ohrid}}{\text{National}} \times 100 \quad (2)$$

for both arrivals and overnight stays.

The methodological approach is descriptive-structural rather than econometric. The objective is to evaluate the systemic seasonal architecture and spatial differentiation of domestic tourism flows rather than to estimate causal determinants. This approach is consistent with the study's macro-structural perspective on tourism seasonality as a scale-dependent phenomenon.

4. Empirical Results: Seasonal Intensity and Spatial Concentration

4.1 Seasonal Structure of Domestic Tourism in Ohrid

The estimated seasonal indices reveal a highly asymmetric intra-annual distribution of domestic tourism demand in Ohrid.

Table 1. Monthly Seasonal Indices for Domestic Tourism in Ohrid (Arrivals and Overnight Stays)

Month	Raw Seasonal Index		Normalized Seasonal Index		Final Seasonal Index (%)	
	Arrivals	**Nights**	**Arrivals**	**Nights**	**Arrivals**	**Nights**
January	0.269	0.111	0.267	0.111	26.7	11.1
February	0.209	0.086	0.207	0.085	20.7	8.5
March	0.279	0.102	0.276	0.101	27.6	10.1
April	0.461	0.169	0.457	0.168	45.7	16.8
May	0.889	0.341	0.882	0.340	88.2	34.0
June	0.762	0.403	0.756	0.402	75.6	40.2
July	3.162	4.511	3.135	4.492	313.5	449.2
August	3.590	5.175	3.559	5.152	355.9	515.2
September	0.920	0.499	0.913	0.497	91.3	49.7
October	0.741	0.333	0.735	0.332	73.5	33.2
November	0.443	0.177	0.439	0.176	43.9	17.6
December	0.377	0.145	0.374	0.144	37.4	14.4
Sum	**12.102**	**12.052**	**12.000**	**12.000**		
Mean	**1.009**	**1.004**	**1.000**	**1.000**		
Maximum (Normalized)			**3.559**	**5.152**		
Minimum (Normalized)			**0.207**	**0.085**		
Peak-to-Trough Ratio (PTR)			**17.18**	**60.42**		
Summer Share (July–September)			**7.607**	**10.141**		
Summer Share (%)			**63.4%**	**84.5%**		

Source: Author's calculations based on State Statistical Office of the Republic of North Macedonia data (2011–2025), Municipality of Ohrid. Domestic tourism only (State Statistical Office, 2025)

Methodological note: Normalized seasonal indices are adjusted so that their annual mean equals 1.000 and their sum equals 12. Final Seasonal Index (%) expresses normalized indices in percentage form (annual monthly average = 100). Peak-to-Trough Ratio (PTR) is calculated as the ratio between maximum and minimum normalized seasonal index.

The highest seasonal intensity is observed in August, with normalized indices of 3.56 for arrivals and 5.15 for overnight stays. This indicates that August domestic arrivals exceed the annual monthly average by approximately 256%, while overnight stays exceed it by more than 415%.

The lowest seasonal intensity occurs in February, with normalized indices of 0.21 for arrivals and 0.09 for overnight stays. Winter demand levels are therefore between 79% and 91% below the annual benchmark.

Peak-to-Trough Ratios confirm the magnitude of seasonal asymmetry:

- PTR (arrivals): 17.18
- PTR (overnight stays): 60.42

The extremely high PTR for overnight stays indicates that seasonal concentration is strongly amplified through length-of-stay dynamics. Domestic tourists not only arrive in substantially larger numbers during summer but also remain significantly longer.

The cumulative July–September share accounts for:

- 63.4% of annual domestic arrivals
- 84.5% of annual domestic overnight stays

Thus, nearly two-thirds of domestic visitors and more than four-fifths of total domestic overnight activity in Ohrid are concentrated within a three-month period, indicating extreme seasonal compression.

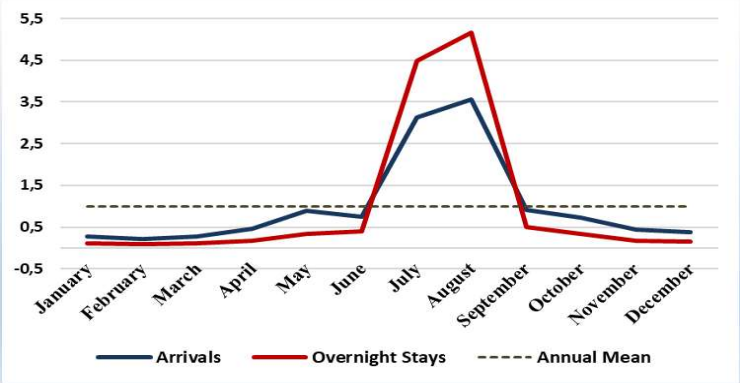


Figure 1. Seasonal Indices for Domestic Tourism in Ohrid (Arrivals and Overnight Stays)
Source: Author's calculations based on State Statistical Office data

4.2 Seasonal Structure at the National Level

At the national level, domestic tourism also exhibits pronounced summer dominance, though at lower intensity compared to Ohrid.

Table 2. Monthly Seasonal Indices for Domestic Tourism in North Macedonia (Arrivals and Overnight Stays)

Month	Raw Seasonal Index		Normalized Seasonal Index		Final Seasonal Index (%)	
	Arrivals	Nights	Arrivals	Nights	Arrivals	Nights
January	0.560	0.312	0.556	0.311	55.6	31.1
February	0.425	0.222	0.422	0.221	42.2	22.1
March	0.436	0.225	0.433	0.224	43.3	22.4
April	0.515	0.286	0.512	0.285	51.2	28.5
May	0.789	0.446	0.783	0.444	78.3	44.4
June	0.716	0.469	0.711	0.467	71.1	46.7
July	2.463	3.627	2.445	3.613	244.5	361.3
August	3.464	4.834	3.439	4.816	343.9	481.6
September	0.843	0.553	0.837	0.550	83.7	55.0
October	0.750	0.463	0.744	0.461	74.4	46.1
November	0.555	0.335	0.551	0.333	55.1	33.3
December	0.572	0.277	0.568	0.275	56.8	27.5
Sum	**12.089**	**12.047**	**12.000**	**12.000**		
Mean	**1.007**	**1.004**	**1.000**	**1.000**		
Maximum (Normalized)			**3.439**	**4.816**		
Minimum (Normalized)			**0.422**	**0.221**		
Peak-to-Trough Ratio (PTR)			**8.142**	**21.809**		

Summer Share (July–September)	**6.721**	**8.979**
Summer Share (%)	**56.0%**	**74.8%**

Source: Author's calculations based on State Statistical Office of the Republic of North Macedonia data (2011–2025), Domestic tourism only

Methodological note: Normalized seasonal indices are adjusted so that their annual mean equals 1.000 and their sum equals 12. Final Seasonal Index (%) expresses normalized indices in percentage form (annual monthly average = 100). Peak-to-Trough Ratio (PTR) is calculated as the ratio between maximum and minimum normalized seasonal index.

Maximum normalized indices (August) reach 3.44 for arrivals and 4.82 for overnight stays, while minimum values (February) amount to 0.42 and 0.22, respectively.

Peak-to-Trough Ratios equal:

- PTR (arrivals): 8.14
- PTR (overnight stays): 21.81

Although national seasonality remains substantial, its amplitude is markedly lower than that observed in Ohrid. This suggests that spatial aggregation partially smooths extreme local seasonal concentration. **The magnitude of the differential between local and national PTR values provides empirical evidence of scale amplification.**

The July–September share amounts to:

- 56.0% of annual arrivals
- 74.8% of annual overnight stays

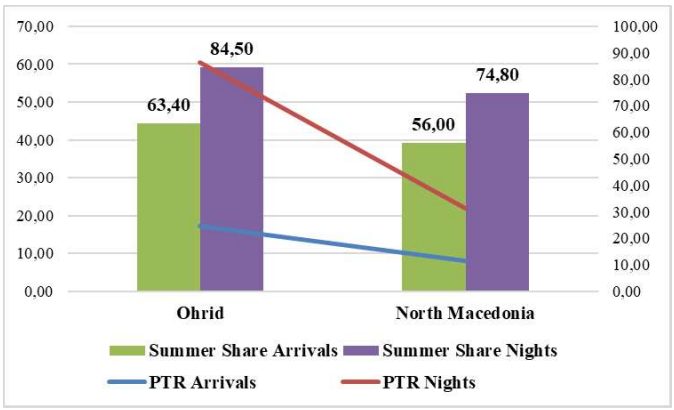


Figure 2. Comparative PTR and Summer Share – Ohrid vs. North Macedonia
Source: Author's calculations based on State Statistical Office data

The comparison confirms that seasonal intensity increases significantly at the local level, supporting the scale-dependent nature of domestic tourism seasonality.

4.3 Structural Weight of Ohrid in National Domestic Tourism

Annual calculations indicate that Ohrid constitutes a structurally dominant component of national domestic tourism.

Table 3. Share of Ohrid in National Domestic Tourism (2011–2025)

Year	Arrivals		Share (%)	Overnight stays		Share (%)
	Ohrid	National	Arrivals	Ohrid	National	Overnight stays
2011	102,730	300,923	34.14	592,886	1,325,413	44.73
2012	99,850	294,943	33.85	575,308	1,252,247	45.94
2013	92,637	284,819	32.52	522,718	1,181,446	44.24
2014	88,118	290,379	30.35	468,268	1,174,655	39.86
2015	94,476	311,984	30.28	498,517	1,269,716	39.26
2016	107,351	324,376	33.09	533,165	1,302,197	40.94
2017	115,025	348,519	33.00	557,569	1,382,582	40.33
2018	117,734	404,042	29.14	585,051	1,625,992	35.98
2019	130,643	413,080	31.63	621,390	1,658,522	37.47
2020	129,054	335,178	38.50	652,644	1,413,110	46.18
2021	142,110	396,578	35.83	677,718	1,609,930	42.10
2022	149,125	417,615	35.71	690,384	1,648,828	41.87
2023	145,416	420,808	34.56	712,917	1,684,290	42.33
2024	147,478	414,054	35.62	752,455	1,704,599	44.14
2025	154,372	385,338	40.06	738,354	1,582,910	46.65

Source: Author's calculations based on State Statistical Office data

Between 2011 and 2025, Ohrid's share in national domestic arrivals fluctuates between 29% and 40%, reaching 40.06% in 2025. The share in domestic overnight stays is consistently higher, ranging from 36% to nearly 47%, peaking at 46.65% in 2025.

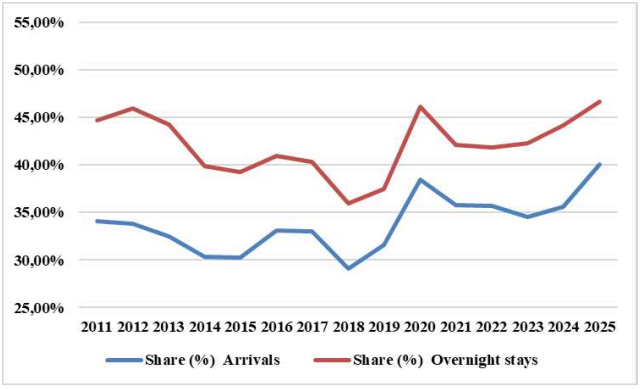


Figure 3. Share of Ohrid in National Domestic Tourism (Arrivals and Overnight Stays), 2011–2025

Source: Author's calculations based on State Statistical Office data

The consistently higher share in overnight stays relative to arrivals indicates that Ohrid exhibits a longer average domestic length of stay compared to the national average.

The increase in Ohrid's share during 2020 and 2025 suggests periods in which domestic demand became more spatially concentrated, reinforcing the systemic importance of Ohrid within the national tourism architecture.

5. Discussion: Scale Effects, Spatial Differentiation and the Stabilization Hypothesis

The empirical results provide strong evidence that domestic tourism seasonality in North Macedonia is fundamentally scale-dependent. While aggregate national indicators suggest pronounced but moderate summer concentration, the destination-level analysis for Ohrid reveals extreme seasonal compression. This confirms that spatial aggregation partially smooths temporal volatility, whereas geographically concentrated destinations experience amplified seasonal asymmetry.

These findings align with the spatial concentration arguments advanced by Baum and Hagen (Baum & Hagen, 1999) and extend the scale-sensitive perspective discussed by Jang (Jang, 2004). The results demonstrate that seasonality cannot be treated as a uniform national characteristic; rather, it emerges as a spatially differentiated structural property of tourism systems.

Importantly, the study challenges the stabilization hypothesis frequently associated with domestic tourism. At the macro level, domestic demand appears to contribute to partial smoothing due to geographic dispersion across multiple destinations. However, at the local level, particularly in highly concentrated destinations such as Ohrid, domestic tourism operates as a structural amplifier of seasonality. The synchronization of domestic travel behavior with climatic and institutional summer patterns reinforces peak accumulation instead of mitigating it.

The amplification mechanism is further intensified through length-of-stay dynamics. Seasonal asymmetry is consistently stronger for overnight stays than for arrivals, indicating that domestic tourists not only concentrate temporally but also extend their duration during peak months. This generates additional pressure on accommodation capacity, infrastructure utilization, and local labor markets.

The structural weight of Ohrid within national domestic tourism magnifies these effects. With roughly one-third to two-fifths of domestic arrivals and nearly half of domestic overnight stays concentrated in a single destination, local seasonal volatility acquires macroeconomic relevance. Fluctuations in Ohrid therefore influence national tourism stability, fiscal performance, and regional income distribution.

From a policy perspective, these findings suggest that strategies based solely on aggregate indicators may underestimate localized vulnerability. Tourism policy in small economies should incorporate spatial differentiation and destination-level seasonality metrics when designing diversification, infrastructure planning, and demand-management strategies.

Finally, several limitations should be acknowledged. The analysis is descriptive-structural and does not model causal determinants of seasonality. Additionally, the focus on one dominant destination limits generalization to other localities. Future research may integrate econometric modeling and comparative multi-destination analysis to further refine the scale-dependent framework.

6. Conclusion

This study examined the seasonal architecture of domestic tourism in North Macedonia over the period 2011–2025, comparing national dynamics with those of the Municipality of Ohrid. By applying multiplicative time-series decomposition and normalized seasonal indices, the analysis demonstrates that domestic tourism seasonality is not a uniform national phenomenon but a scale-dependent structural property of the tourism system.

The findings reveal a clear spatial asymmetry. While domestic tourism at the national level exhibits pronounced summer concentration, aggregation partially moderates extreme volatility. In contrast, the destination-level system of Ohrid displays severe seasonal compression, characterized by exceptionally high Peak-to-Trough Ratios and extreme concentration of overnight stays in the summer quarter. This confirms that spatial concentration amplifies temporal asymmetry.

The study contributes to the literature by empirically challenging the stabilization hypothesis often attributed to domestic tourism. Domestic demand does not automatically function as a counter-cyclical or smoothing mechanism. Its stabilizing capacity depends on spatial dispersion. In geographically concentrated destinations, domestic tourism may reinforce seasonal peaks rather than mitigate them, thereby intensifying capacity pressures and labor-market instability.

The distinction between arrivals and overnight stays further reveals a length-of-stay amplification effect. Seasonal asymmetry is systematically stronger for overnight stays, indicating that temporal concentration operates not only through visitor numbers but also through extended duration during peak months.

Given Ohrid's substantial structural weight within national domestic tourism flows, local seasonal volatility acquires macroeconomic relevance. In small economies with geographically concentrated tourism systems, destination-level seasonality may significantly shape national tourism performance and regional income distribution.

From a policy standpoint, these findings underscore the importance of incorporating spatial differentiation into tourism planning. Aggregate indicators may conceal localized vulnerabilities and lead to underestimation of infrastructure strain, labor instability, and regional inequality. Sustainable tourism strategies in small economies should therefore combine national diversification policies with destination-specific seasonality management.

Future research could extend this framework through econometric modeling of causal determinants, cross-destination comparisons, and integration of international tourism flows to further evaluate interaction effects between domestic and foreign demand.

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