

THE RELATIONSHIP BETWEEN TOURISM DEMAND AND HOTEL BUSINESS REVENUES: A CASE STUDY OF MINGACHEVIR

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Summary. As a multifaceted economic activity, tourism plays a crucial role in regional development by increasing income levels, stimulating investment, and generating employment through strong multiplier effects across related sectors. In this context, the hotel industry constitutes a central element of local tourism economies, as hotel revenues are directly influenced by tourism demand. This study examines the relationship between tourism demand and hotel revenues in Mingachevir, Azerbaijan, with a particular focus on the comparative effects of domestic and foreign overnight stays. Annual data from official statistical sources are analyzed using the Autoregressive Distributed Lag (ARDL) approach and Fully Modified Ordinary Least Squares (FMOLS) estimation techniques. The ARDL bounds test indicates a statistically significant long-run cointegration relationship among hotel revenues, domestic overnight stays, and foreign overnight stays. The error correction term is negative and significant, confirming convergence toward long-run equilibrium. FMOLS results show that both domestic and foreign tourism positively affect hotel revenues; however, domestic tourism has a substantially stronger impact. Specifically, a 1% increase in domestic overnight stays leads to an approximate 2.98% rise in hotel revenues, compared to 0.50% for foreign overnight stays. These findings underscore the dominant role of domestic tourism in shaping hotel performance and provide policy-relevant implications for regional tourism development and revenue optimization strategies.

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1. Introduction

Tourism supports regional development through employment, business activity, and multiplier effects across construction, agriculture, trade, and services (Motsa et al., 2021; Bassil et al., 2023), while growing visitor flows can stimulate investment in transport, utilities, digital infrastructure, accommodation, and recreation, consistent with Butler's Tourism Area Life Cycle (Corbos et al., 2024; Butler, 2024). Hotels are central to these linkages because visitor expenditure extends beyond accommodation to complementary services and local suppliers (Garcia-Delgado et al., 2020; Solmaz, 2024), although revenues remain sensitive to seasonality and visitor composition (Cosmin and Nistoreanu, 2021).

Tourism demand directly influences hotel occupancy and RevPAR (Ismail et al., 2002; Lee et al., 2019), while stronger demand can support higher ADR (Hikmawati and Ramdhani, 2024), with financial effects varying across visitor segments (Le et al., 2026). Demand itself responds to income, prices, and exchange rates (Martins, Gan, & Ferreira-Lopes, 2017), and long-run relationships are well established through cointegration approaches (Song, Romilly, & Liu, 2000). Nevertheless, hotel-specific demand research remains relatively limited (Wu, Song, & Shen, 2017), despite advances in econometric specification (Dogru, Bulut, & Sirakaya-Turk, 2021; Song, Qiu, & Park, 2023) and evidence linking hotel performance to consumer confidence, tourism flows, occupancy, ADR, inflation, wages, and energy costs (Chen et al., 2019; Chu, 2025), alongside broader links between tourism-led growth and demand elasticity (Stauvermann & Kumar, 2017).

Recent research has expanded toward data-driven forecasting (Kaya et al., 2022), technology and sustainability (Sampaio, Sebastião, & Farinha, 2024), and digital tools that can stimulate tourism demand and revenues (Hao, Ouyang, & Yao, 2026). COVID-19 further highlighted the importance of pricing, revenue management, resilience, and regional recovery (Agbola, Dogru, & Gunter, 2020; Denizci Guillet & Chu, 2021; Boto-García & Mayor, 2022; Singh & Corsun, 2023), while accommodation infrastructure remains important for regional tourism development (Matyakubov, Allonazarov, & Farudz, 2026). Yet medium-sized destinations remain understudied, making Mingachevir—with its natural and cultural tourism resources (ATB, 2026) and nine hotel-type establishments—a relevant setting for examining how visitor flows translate into hotel revenues.

2. Data and methodology

This study examines the relationship between tourism demand and hotel revenues in Mingachevir using annual data from the World Bank (WB, 2026) and the State Statistical Committee of the Republic of Azerbaijan (SSCRA, 2026). Figure 1 indicates that hospitality growth has been driven mainly by steadily increasing domestic overnight stays, while foreign demand is more volatile, underscoring the importance of domestic tourism for hotel revenue stability.

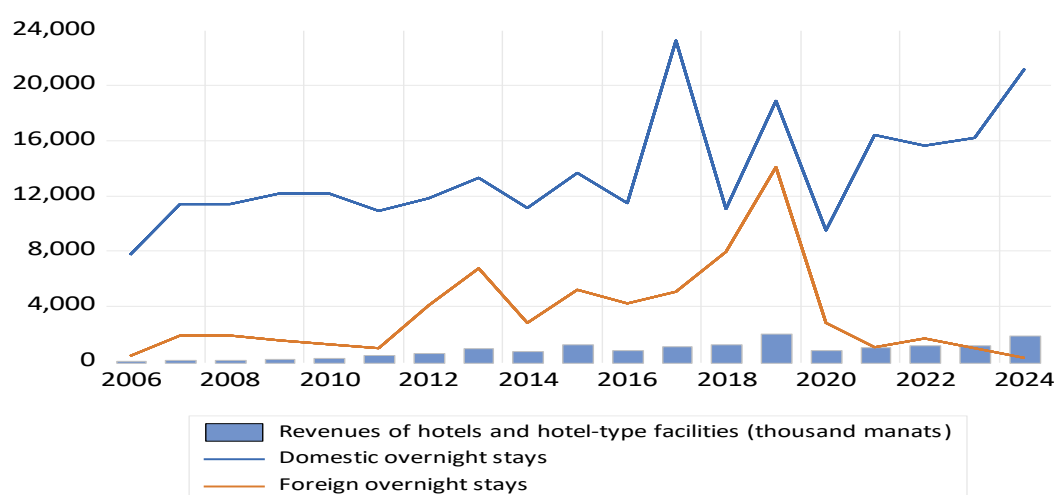


Fig. 1. Time-Series Evolution of Tourism Demand and Hotel Revenues in Mingachevir

Hotel revenue (LREV) and domestic (LDOM) and foreign (LFORE) overnight stays were log-transformed, allowing coefficient interpretation as elasticities. Table 1 indicates approximate normality and greater stability of domestic tourism, reinforcing its dominant role in Mingachevir's hotel demand.

Table 1

Descriptive Statistics of the Variables

Statistic	LREV	LFORE	LDOM
Mean	6.360	7.681	9.484
Median	6.71	7.526	9.409
Maximum	7.618	9.553	10.054
Minimum	4.166	5.552	8.954
Std. Dev.	1.038	1.03	0.276
Skewness	-0.87	-0.25	0.431
Kurtosis	2.433	2.596	2.777
Jarque-Bera	2.680	0.34	0.628
Probability	0.261	0.842	0.730

The Augmented Dickey–Fuller (ADF) test was applied to determine the variables' integration orders and confirm the absence of $I(2)$ series. Given the potential mixture of $I(0)$ and $I(1)$ variables, the ARDL bounds-

testing approach of Pesaran, Shin, and Smith (2001) was then used to assess long-run cointegration. The unrestricted error correction representation of the ARDL model is specified as follows:

$$\Delta LREV_t = \alpha_0 + \sum_{i=1}^p \beta_i \Delta LREV_{t-i} + \sum_{j=0}^{q_1} \gamma_j \Delta LDOM_{t-j} + \sum_{k=0}^{q_2} \theta_k \Delta LFORE_{t-k} + \phi_1 LREV_{t-1} + \phi_2 LDOM_{t-1} + \phi_3 LFORE_{t-1} + \varepsilon_t \quad (1)$$

To obtain robust long-run estimates while addressing issues of endogeneity and serial correlation in cointegrated systems, the Fully Modified Ordinary Least Squares (FMOLS) estimator developed by Phillips and Hansen (1990) was applied. The FMOLS estimator can be expressed as:

$$\hat{\beta}_{FMOLS} = \left(\sum_{t=1}^T (X_t - \bar{X})(X_t - \bar{X})' \right)^{-1} \sum_{t=1}^T (X_t - \bar{X})(Y_t - \hat{\Omega}_{21} \hat{\Omega}_{22}^{-1} \Delta X_t) \quad (2)$$

where Y_t denotes the bias-corrected dependent variable, while Ω_{21} and Ω_{22} represent the long-run covariance components used to correct for endogeneity and serial correlation. Following the ADF stationarity and ARDL bounds cointegration tests, FMOLS was employed to estimate robust long-run elasticities of domestic and foreign tourism demand with respect to hotel revenues in Mingachevir.

3. Results

The Augmented Dickey–Fuller (ADF) results in Table 2 show that LREV, LFORE, and LDOM are non-stationary at levels but become stationary after first differencing, confirming that all variables are integrated of order one, $I(1)$. The absence of $I(2)$ variables satisfies the integration-order requirement for the ARDL bounds-testing approach, while the $I(1)$ properties of the series also support the subsequent application of FMOLS for estimating their cointegrating long-run relationship.

Table 2

Augmented Dickey–Fuller (ADF) Unit Root Test Results

Variable	Level (t-stat)	Prob.	First Difference (t-stat)	Prob.	Order of Integration
LREV	-2.290	0.185	-5.466 ***	0.000	$I(1)$
LFORE	-1.853	0.344	-3.941 ***	0.009	$I(1)$
LDOM	-1.388	0.562	-4.240 ***	0.006	$I(1)$

*** denotes statistical significance at the 1% level, and “Prob.” indicates MacKinnon (1996) one-sided p-values.

Figure 2 reveals a positive relationship between both domestic and foreign overnight stays and hotel revenues in Mingachevir, although the stronger and more consistent association observed for domestic stays suggests that domestic tourism is the more stable contributor to revenue growth.

The ARDL bounds test results in Table 3 yield an F -statistic of 5.4425**, exceeding the 1% upper critical bound ($I(1) = 5.00$)** and therefore providing strong evidence against the null hypothesis of no long-run relationship. Accordingly, **LREV, LDOM, and LFORE are cointegrated**, indicating that hotel revenues and domestic and foreign overnight stays share a stable long-run equilibrium relationship and move together systematically over time.

The error-correction term ($ECT = -0.1622$, $p < 0.01$) reported in Table 4 is negative and statistically significant, confirming convergence toward a stable long-run equilibrium. Its magnitude indicates that approximately 16.2% of short-run disequilibrium is corrected annually, while changes in foreign overnight stays ($\Delta LFORE$) exert a positive but only weakly significant short-run effect on hotel revenues at the 10% level.

The Variance Inflation Factor (VIF) results presented in Table 5 indicate that multicollinearity is not a significant issue in the estimated model. All centered VIF values for the explanatory variables, including LDOM, LFORE, and their lagged terms, are well below both the conservative threshold of 5 and the conventional upper limit of 10. This confirms the absence of strong linear interdependencies among the regressors, ensuring that the estimated coefficients remain stable and are not affected by redundancy in the explanatory variables. Consequently, the individual impacts of domestic and foreign overnight stays on hotel revenues in Mingachevir can be reliably interpreted. Overall, the model satisfies the multicollinearity diagnostic requirement, thereby reinforcing the robustness and validity of the ARDL estimation results.

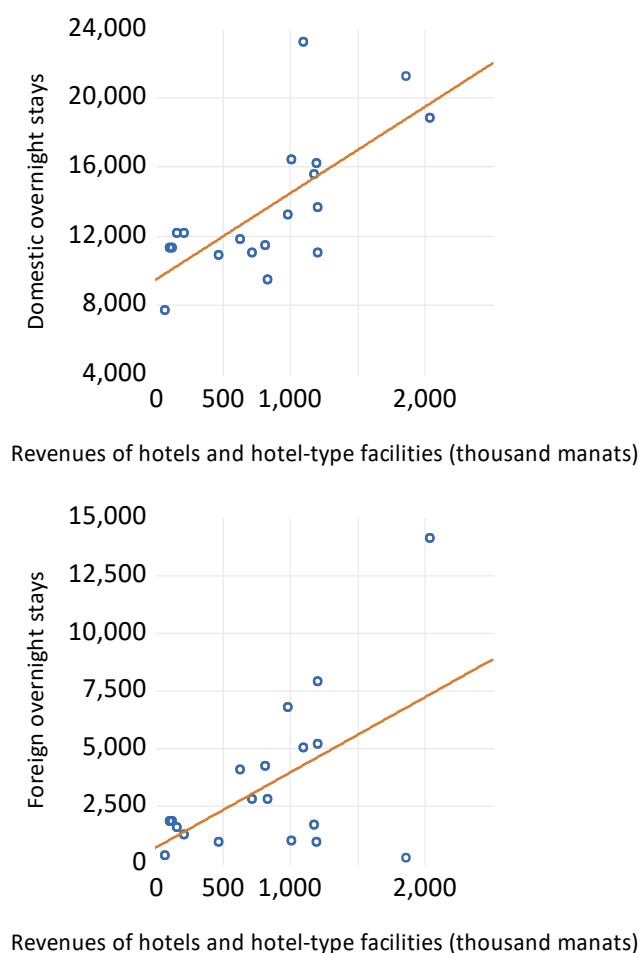


Fig. 2. Scatter plot of domestic and foreign tourism vs hotel revenues

Table 3

ARDL (1,1,0) Bounds Test Results for Cointegration

Test Statistic	Value	Significance Level	I(0) Lower Bound	I(1) Upper Bound	Decision
F-statistic	5.4425	10%	2.63	3.35	Reject H ₀
		5%	3.10	3.87	Reject H ₀
		2.5%	3.55	4.38	Reject H ₀
		1%	4.13	5.00	Reject H ₀

Note: H₀: No long-run (cointegration) relationship exists.

Table 4

Error Correction Model (ECM) Results

Variable	Coefficient	Std. Error	t-Statistic	Probability	Interpretation
D(LFORE)	0.1376	0.0706	1.9487	0.0732	Positive, weakly significant (10%)
CointEq(-1)	-0.1622	0.0313	-5.1763	0.0002	Negative, highly significant (1%)

Note: CointEq(-1) represents the error correction term (ECT), capturing the speed of adjustment toward long-run equilibrium.

Table 5

Multicollinearity Diagnostic Results (VIF)

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LREV(-1)	0.009253	89.78245	2.206698
LFORE	0.007365	107.9794	1.546178
LFORE(-1)	0.014050	206.7822	2.671581
LDOM	0.091942	1988.612	1.312321
C (Constant)	8.773253	2095.243	NA

The diagnostic results in Table 6 confirm the adequacy of the estimated ARDL model, as the Breusch–Godfrey test ($p = 0.4588$) indicates no evidence of serial correlation, while the Breusch–Pagan–Godfrey test ($p = 0.8918$) suggests homoskedastic residuals. These findings indicate that the model is free from these key residual specification problems, supporting the reliability of statistical inference regarding the effects of domestic and foreign overnight stays on hotel revenues in Mingachevir.

Table 6

Model Diagnostic Results

Test Type	Statistic	Value	p-value	Result
Breusch-Godfrey LM	Obs*R-squared	0.548896	0.4588	No Serial Correlation
Breusch-Pagan-Godfrey	Obs*R-squared	1.115703	0.8918	Homoskedasticity

The CUSUM and CUSUM of Squares results presented in Figure 3 support the structural stability of the estimated model, as the recursive statistics remain within the 5% critical boundaries throughout the sample period. This suggests no evidence of parameter instability and supports the reliability of the ARDL short- and long-run estimates for interpreting the relationship between overnight stays and hotel revenues in Mingachevir.

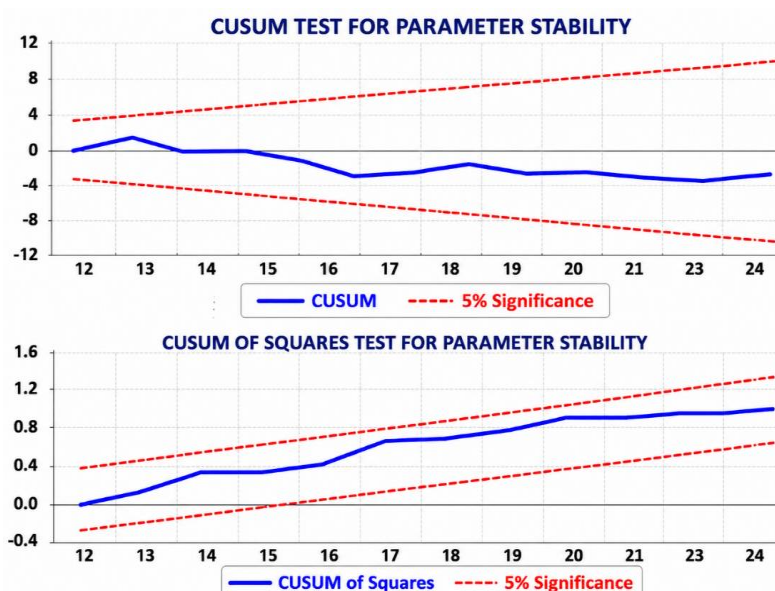


Fig. 3. Model Stability Diagnostics Using CUSUM and CUSUM of Squares Tests

The FMOLS (Fully Modified Least Squares) results reported in Table 7 indicate that both foreign and domestic overnight stays have a positive and statistically significant influence on hotel revenues in Mingachevir, at the 5% and 1% significance levels, respectively. The estimated coefficients further suggest that domestic tourism has a substantially stronger effect, as a 1% increase in LDOM leads to an approximate 2.98% increase in revenues, whereas the corresponding effect of LFORE is comparatively smaller, at around 0.50%.

Table 7

FMOLS Long-Run Cointegration Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFORE	0.496448	0.209046	2.374825	0.0313**
LDOM	2.983698	0.801741	3.721522	0.0020***
C (Constant)	-25.73276	7.991632	-3.219963	0.0057***

Note: Statistical significance levels are indicated as follows: ** $p < 0.05$, and *** $p < 0.01$.

These findings reinforce the robustness of the long-run relationship identified in the model and highlight the dominant role of domestic demand in shaping revenue dynamics. While international tourism contributes positively, the domestic segment emerges as the principal driver of financial performance in the local hospitality sector.

4. Discussion

The empirical findings confirm that tourism demand significantly influences hotel revenues in Mingachevir, supporting the established relationship between visitor demand and hotel performance (Song & Li, 2008). Although both domestic and foreign overnight stays contribute positively to revenues, domestic tourism emerges as the stronger and more statistically significant driver, consistent with the heterogeneous economic effects of different visitor segments identified by Dwyer and Forsyth (2006). Mingachevir's accessibility and its Kura River-based recreational opportunities support short-stay and seasonal domestic tourism, reflecting the importance of water-based resources for tourism demand (Hall & Page, 2014), while tourism activity in Azerbaijan remains sensitive to economic conditions and external shocks such as COVID-19 (Mayis et al., 2021).

The weaker contribution of foreign overnight stays suggests that Mingachevir may function more as a supplementary or transit destination for international visitors, with limited entertainment and experience-based services potentially restricting visitor stays and expenditure (Middleton & Clarke, 2001). Overall, strengthening year-round tourism products, extending visitor stays, and developing higher-value experiences could enhance the long-term financial performance of Mingachevir's hotel sector.

5. Conclusion

Tourism and hospitality demand is shaped by economic conditions, prices, destination characteristics, seasonality, and external shocks. The literature consistently shows that income positively influences tourism demand, while higher prices generally reduce it, supporting conventional demand theory. Cointegration-based approaches, including ARDL, Johansen, and error-correction models, further demonstrate that tourism demand and its macroeconomic determinants tend to share stable long-run relationships, although temporary short-run deviations may occur. Significant error-correction mechanisms indicate that such disequilibria gradually return to their long-run paths. Meanwhile, forecasting methods have increasingly evolved from traditional econometric techniques toward hybrid and data-driven approaches that can improve predictive performance under changing market conditions. From a policy perspective, stronger tourism data systems, resilient domestic tourism, sustainable infrastructure investment, and balanced destination development are essential. At the industry level, advanced econometric and machine-learning forecasting can support more effective pricing, capacity planning, and revenue management, thereby strengthening the tourism sector's long-term competitiveness, resilience, and financial sustainability.

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ВЗАИМОСВЯЗЬ ТУРИСТИЧЕСКОГО СПРОСА И ДОХОДОВ ГОСТИНИЧНОГО БИЗНЕСА: ИССЛЕДОВАНИЕ НА ПРИМЕРЕ МИНГЯЧЕВИРА

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Резюме. Туризм как многоаспектный вид экономической деятельности играет важную роль в региональном развитии, способствуя повышению уровня доходов, стимулированию инвестиций и созданию рабочих мест благодаря выраженным мультипликативным эффектам в смежных отраслях. В данном контексте гостиничная индустрия представляет собой ключевой элемент местной туристской экономики, поскольку доходы гостиниц непосредственно зависят от туристского спроса. В исследовании рассматривается взаимосвязь между туристским спросом и доходами гостиниц в городе Мингячевир (Азербайджан) с особым акцентом на сравнительном влиянии ночёвок внутренних и иностранных туристов. Годовые данные, полученные из официальных статистических источников, анализировались с использованием модели авторегрессии с распределёнными лагами (Autoregressive Distributed Lag – ARDL) и метода полностью модифицированных наименьших квадратов (Fully Modified Ordinary Least Squares – FMOLS). Граничный тест ARDL указывает на наличие статистически значимой долгосрочной коинтеграционной связи между доходами гостиниц, количеством ночёвок внутренних туристов и количеством ночёвок иностранных туристов. Отрицательное и статистически значимое значение коэффициента коррекции ошибок подтверждает схождение к долгосрочному равновесию. Результаты применения метода FMOLS показывают, что как внутренний, так и международный туризм оказывают положительное влияние на доходы гостиниц, однако воздействие внутреннего туризма значительно сильнее. В частности, увеличение количества ночёвок внутренних туристов на 1% приводит к росту доходов гостиниц приблизительно на 2,98%, тогда как соответствующий показатель для ночёвок иностранных туристов составляет 0,50%. Полученные результаты подчёркивают доминирующую роль внутреннего туризма в формировании показателей деятельности гостиниц и имеют важное практическое значение для разработки политики регионального развития туризма и стратегий оптимизации доходов.

Ключевые слова: туристический спрос, доходы гостиниц, внутренний туризм, иностранный туризм, ARDL, FMOLS, Мингячевир

TURİZM TƏLƏBİ İLƏ MEHMANXANA BİZNESİNİN GƏLİRLƏRİ ARASINDA ƏLAQƏ: MİNGƏÇEVİR NÜMUNƏSİNDƏ TƏDQİQAT

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Xülasə. Çoxşaxəli iqtisadi fəaliyyət növü olan turizm əlaqəli sahələrdə güclü multiplikativ təsirlər yaratmaqla gəlir səviyyəsinin yüksəldilməsi, investisiyaların stimullaşdırılması və məşğulluğun təmin edilməsi vasitəsilə regional inkişafda mühüm rol oynayır. Bu kontekstdə mehmanxana sənayesi yerli turizm iqtisadiyyatının əsas tərkib hissəsini təşkil edir, çünki mehmanxana gəlirləri birbaşa turizm tələbatından asılıdır. Tədqiqatda Azərbaycanın Mingəçevir şəhərində turizm tələbatı ilə mehmanxana gəlirləri arasındakı əlaqə araşdırılır və daxili və xarici turistlərin gecələmələrinin müqayisəli təsirlərinə xüsusi diqqət yetirilir. Rəsmi statistik mənbələrdən əldə edilmiş illik məlumatlar avtoregressiv paylanmış gecikmə (Autoregressive Distributed Lag – ARDL) modeli və tam modifikasiya olunmuş ən kiçik kvadratlar (Fully Modified Ordinary Least Squares – FMOLS) qiymətləndirmə metodları vasitəsilə təhlil edilmişdir. ARDL sərhad testi mehmanxana gəlirləri, daxili turistlərin gecələmələri və xarici turistlərin gecələmələri arasında statistik baxımdan əhəmiyyətli uzunmüddətli kointeqrasiya əlaqəsinin mövcudluğunu göstərir. Xətaların korreksiyası əmsalının mənfəi və statistik baxımdan əhəmiyyətli olması uzunmüddətli tarazlığa doğru yaxınlaşmanı təsdiqləyir. FMOLS metodunun nəticələri həm daxili, həm də xarici turizmin mehmanxana gəlirlərinə müsbət təsir göstərdiyini, lakin daxili turizmin təsirinin əhəmiyyətli dərəcədə daha güclü olduğunu göstərir. Belə ki, daxili turistlərin gecələmələrinin sayında 1% artım mehmanxana gəlirlərinin təxminən 2,98% yüksəlməsinə səbəb olduğu halda, xarici turistlərin gecələmələri üzrə müvafiq göstərici 0,50% təşkil edir. Əldə edilən nəticələr mehmanxanaların fəaliyyət göstəricilərinin formalaşmasında daxili turizmin üstün rolunu vurğulayır və regional turizmin inkişafı, eləcə də gəlirlərin optimallaşdırılması strategiyaları baxımından turizm siyasətinin formalaşdırılması üçün əhəmiyyətli nəticələr təqdim edir.

Açar sözlər: turizm tələbi, mehmanxana gəlirləri, daxili turizm, xarici turizm, ARDL, FMOLS, Mingəçevir