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Tourism price normalities in two Adriatic east coast 'euro' countries

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ABSTRACT

This debut work offers a stunning look at real vs nominal prices that consider more than just inflation. The inadequate examination of hospitality price comparison is investigated between two non-neighbouring Adriatic east coast countries – Slovenia and Montenegro – using the euro. Hospitality prices are an essential indicator in hospitality markets, destination marketing and management planning. Using 73 monthly time-series data for the economic crisis period from December 2008 to December 2014, this period covers one shock in a series. One of the key managerial features of cointegrated spatial hospitality price spread was that Montenegro followed Slovenian hospitality prices. Hospitality prices in Montenegro and Slovenia tend to be weakly integrated into the long term and seasonally driven in the short term. In addition, the econometric experimentation has given a theoretical novelty for underpinned and undermined tourism economy modelling in normalities. This state-of-the-art econometric feature is included in a customary vector error correction model (VECM). Robust applied results recognise that hospitality prices in Montenegro are domestic driven and in Slovenia Eurozone driven. This finding is relevant for applied economics on obtaining a normally distributed price model. Its theoretical and managerial implications are vital for hospitality economics, marketing and tourism management.

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1. Introduction

The contribution of economic researches to global science is significant. Looking over the attempts made by using different methods, some further implications are required. Therefore, the proposal for the normal distribution of data errors in variables is perceived (Juselius, 2021; Karadzic & Pejovic, 2020). The purpose of this research is to contribute to space econometric price investigation between European tourism destinations, which has now been more vital than ever. The first aim is to

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introduce the novel econometric methodology corresponding to the miss-specified normality in vector autoregressive (VAR) tourism modelling. The second aim is to develop and test the econometric model on the robustness of the two non-neighbouring Adriatic east coast tourism countries using the euro.

The first objective corresponds to investigating the theoretical values of skewness and kurtosis in modelling time-series data. Therefore, it investigates whether the residuals of the data are normally distributed, and the model has the same speculation. The second objective is to investigate the market integration hypothesis on Montenegrin catching up of hospitality prices to a level of Slovenian ones, as the poorer European countries follow richer countries price patterns.

Adriatic east coast countries (Pikelj et al., 2013), excluding Albania, share a common history as part of former Yugoslavia (Hall, 2003) and compose one such region of mainland Europe where travellers can enjoy great value adventures. The managerial proximity between Montenegro and Slovenia is a starting point for the present study of space price integration between the former federal republics. Former Yugoslav republics, Slovenia and Croatia, commonly embrace Western tourism and have firmly established popular European Union (EU) holiday hot spots. A second Adriatic gateway is just waiting to be enjoyed, Montenegro, looking beyond EU holiday destinations. Putnik (2016) and Naef and Ploner (2016) argued that main cultural tourism differences made those countries ideal for cultural and economic research destinations once united in socialist Yugoslavia. Countries are recently independent and foreseen to be again market integrated into the EU. Since the end of the Yugoslav succession, the Adriatic east coast region has become one of the fastest-growing and recognised macro-tourism destinations with potential for its sustainable development (Krivokapić & Panajoti, 2018; Skare & Kukurin, 2020). This region's tourism economy can be an essential driver contributing to global competitiveness (Marčeta & Bojnec, 2020). World Bank (2021) reports that in 2019 yearly international tourist arrivals accumulated to around 966 million within the EU countries. This number includes 60.0 million in Croatia and 4.7 million in Slovenia. Additionally, non-EU Adriatic east coast tourist destinations, Montenegro, had 2.5 million, and Albania 6.4 million tourist arrivals in the same year.

Researches based on normally distributed time-series data in tourism have been neglected. Therefore, the motivation for this article is to address the gaps in tourism research by producing a contemporary applied time-series econometric approach to nominal vs real tourism prices in a VAR modelling. Previous studies concerning tourism time-series and addressing real price issues have directly dealt with consumer price index (CPI) (Gričar & Bojnec, 2019; Papatheodorou & Song, 2005), destination average prices (Athanasopoulos et al., 2011) or exchange rate (Salman et al., 2007). Additionally, there have been other calculations concerning nominal vs real prices, usually without normality processing (Kim, 2002; Tica & Kozic, 2015). Montenegro and Slovenia are used as case studies, with Montenegro as a candidate for EU membership and Slovenia as the EU member state. Tourism prices are used, while they are an essential determinant in an organisational output process and a marketing mix of tourist destinations. The analyses of hospitality prices and spatial integration between Montenegro and Slovenia are relevant for Adriatic east coast tourism

research. In this region, tourism is a crucial component of the national culture and economy. The study contributes to rare advanced empirical research on tourism prices in these two countries. In both countries, special research attention has been given to coastal tourism.

The robust VAR model testing requires the normalities in a model. To avoid transfer costs of money exchange, countries must be using the same currencies. The volatilities in the exchange rate could occur as an obstacle in the residuals when using differentiated cross-country currencies. For example, this could happen if Slovenia and Croatia or Slovenia and Albania would be investigated. On the contrary, Slovenia adopted the euro in 2007, and Montenegro has used the euro as a de-facto currency since 2002. Despite the rapid growth in tourist arrivals in both analysed countries, tourism-led economic growth in domestic tourist arrivals has been confirmed for Montenegro but not for Slovenia (Gričar et al., 2021).

This paper contributes to tourism science in two ways—a foundational adding novel procedure in VAR modelling methodology of time-series spatial price normalities. Second, by checking the robustness in analysing price integration and patterns in price changes, which do not directly respond to exogenous shocks. Understanding price processes are also helpful when identifying the causes underlying price dynamics in the tourism market. Relevant studies of spatial econometric patterns are by Romão and Nijkamp (2019), spatial driven effectiveness is by Niavis and Tsiotas (2019) and spatial tourism prices by other researchers (Sánchez-Pérez et al., 2019). They found that a country's tourism patterns, such as customer experience and competition on hotel pricing in different countries, affect hotel pricing competitiveness, whilst hotel spatial concentration positively affects the price. Additionally, Lee (2015) suggests that competition in spatial hospitality prices with more distant neighbours is based on similar quality goods and services than quality-differentiated ones. On the other hand, Južnik-Rotar and Kozar (2017) found that price is critical for customer satisfaction.

The rest of the paper is divided into six sections. The following two sections review the empirical research to date and derive a hypothesis. The fourth section provides data and the methodology used with a conceptual, theoretical model and visual tests. The fifth section with the main body of the paper provides results on normality and conceptual spatial distribution. The sixth section discusses the results and findings and provides implications with study limitations. The final part of the paper derives conclusions.

2. Literature review

The investigation of spatial product market integration using time-series data assumes that there are n space variability and volatility in prices on the tourism market (where n is large enough) (Vasiliadis & Kobotis, 1999). The formation of the theoretical model should be imposed upon the econometric research determinants (e.g., normal distribution). The choice of structure to enforce differentiated tourism markets vary between studies (Riddington, 2002). A few general models approach this research question. Most applied models of spread product markets are part of the agri-food

sector (Bakucs et al., 2015). Spatial market integration models within manufacturing subject literature are set in a choice discrete of structure or a field of relationships between tourism and agricultural prospects. Pinkse et al. (2002) anticipate that their results concerning the oil market competition are highly limited. A research hypothesis assumes that each neighbour competes on prices directly. The distance between terminals is insignificant, depending on which is the nearest country. Sánchez-Pérez et al. (2019) found that tourist hotel room category and country of tourist destination play an essential role in spatial tourism pricing.

Previous research on spatial price formation argues that prices can be tactical and prudent variables that derive a corporation's best reaction functions (Hassouneh et al., 2015). These functions are the groundwork for our applied approach within the cointegration methods and theoretical consideration that calculated the matrix of slopes of the best response function. Among other strands in the literature concerning regression functions can be mentioned ordinary market-boundary measures (Feenstra & Levinsohn, 1995), geographically weighted regression (G) (Soler & Gemar, 2018), VAR (Konstantakis et al., 2017), the (global) Euclidian-interval measures (Davis, 2006), and nonlinear multivariate adaptive regression splines which can be used for evaluation of the pricing behaviour and the nature of price competition.

The number of tourist arrivals and overnight stays determines the standing of the tourism economy and its outlook for a country. Tourist arrivals and experiences are crucial for hospitality industries, which play an increasing role in national and global tourism (Jiménez-Guerrero et al., 2021; Marrocu & Paci, 2013). Tourist spending on shopping, overnight stays, food services, transfers, sightseeing, cultural heritage, and recreation can create jobs and generate incomes. Governments can encourage the development of international tourism because of their positive impacts from public and private investments, economic expansion, and progress (Brida et al., 2016).

Understanding the price integration process is useful when identifying the causes underlying cross-border dynamics and economic integration. This process can provide refined price forecasts and identify functions of relevant markets (Goodwin & Holt, 1999; Sánchez-Lozano et al., 2020). A fundamental target is to differentiate spatial hospitality price integration (Zhang et al., 2011). There are current researches between Mediterranean countries (Niavis & Tsiotas, 2019; Vrana & Zafiroopoulos, 2011) and Adriatic east coast countries and their tourism market destinations (Naef & Ploner, 2016; Šerić & Gil-Saura, 2012). Vukonić (1986) investigated foreign tourist expenditures in former Yugoslavia, whereas Marrocu and Paci (2013) examined flows of different tourists to different destinations. Finally, Arnaud (2016) examined lessons from Croatia concerning changes in tourism, in particular the research conducted by Skare and Kukurin (2020) on a VAT shock.

Hitherto there are few studies regarding price transmissions from a multi-country perspective. Bukenya and Labys (2005) assert that despite improvements in communication technologies and the globalisation of economies, results have not supported the convergence of commodity prices in spatially dispersed markets during the 1930–1998 period.

Balaguer and Pernias (2013) analysed the spatial hospitality price integration in Spain. Their findings imply a lower average and less dispersion of local prices. The local effect on average prices is significantly lower at weekends. Successively, there is

a greater exchange in hotel locations for tourists than for trade consumers within the metropolitan area. Falk et al. (2019) explain similar findings regarding specific attributes in determining prices of Airbnb listings in rural and urban locations of Switzerland and Vinogradov et al. (2020) of Norway. Sánchez-Pérez et al. (2019) research multi-country perspectives on hotel room pricing for four Western EU countries.

Overall, some previous empirical and theoretical researches on six subject sections are: (i) spatial transmission (Bjørnstad & Grenfell, 2008; Riley, 2007), (ii) price transmission analysis (Bakucs et al., 2015; Taltavull et al., 2017), (iii) time-series spatial properties in price transmission (Esposti & Listorti, 2013; Serra & Zilberman, 2013), (iv) spatial integration (Abdulai, 2000; Varela et al., 2013; (v) spatial transmission in tourism (Gan et al., 2021; Lee et al., 2013), and (vi) price spatial transmission in tourism (Balaguer & Pernias, 2013).

3. Development of hypothesis

While the global tourism market and modernisation have been increasingly concentrated since 1950, regional tourism competition has also been a critical component in tourism destination development. This article tests spatial market integration hypothesis within two Adriatic east coast countries using euro (Krivokapić & Panajoti, 2018), for example, Montenegro mainly focuses on summer tourism, while Slovenia has developed both winter (Tranos & Davoudi, 2014) and summer tourism (Farmaki, 2012).

Our study primarily contributes to the quantitative analysis of hospitality pricing behaviour in a VAR framework. Econometric research on prices and their shocks has developed a contemporary methodology on (spatial) hospitality prices (Kim et al., 2019). Sánchez-Pérez et al. (2019) reported the substitution effect in the high-priced zone in Italy, Spain, France, and the United Kingdom. Zhang et al. (2011) recognised that spatial regression and pricing are innovative methods, but they need further development. When introducing time-series econometric modelling in tourism, some scholars elect the action that responds efficiently to their non-neighbour model (Ellison, 1993). Following this strand in literature, this paper estimates preeminent functions for common stochastic trends (i.e., second-order integrations) (Juselius, 2021). These methods could be used to estimate market integration for differentiated countries on second-order conditions. Literature reports that prices are integrated into nearly second-order (Juselius, 2009).

We test the hypothesis for the validity of the strong and weak variants of spatial market integration:

H1: The spatial market integration exists in tourism prices between Montenegro and Slovenia.

The econometric modelling in a cointegration framework is not without critics (Barrett & Li, 2002). The normally distributed modelling is vital for this study, while McNew and Fackler (1997) already show that the degree of cointegration among prices is not a valuable measure of the strength of the interregional market integration and not linearly related prices. The state-of-the-art VAR procedure to avoid such

nonstationarity in time-series is scrutinised by looking for the extraordinary events and introducing dummies, and the second is by implementing the real vs. nominal price process or procedure.

4. Methodology and data

4.1. Theoretical model

Researchers (Brochado et al., 2017; Tranos & Davoudi, 2014) of the spatial tourism market integration have often applied tests for the coherence of the markets. First, the price volatility and variance differential between two space markets could equal the transfer costs of transportation and cultural differences. Second, the volatility and variance differential percentage between two non-tradable spatial markets is smaller than the transfer costs (Bakucs et al., 2015), identical to arbitrage costs with transportation charges between the markets for tourists. Lee (2015) and Falk et al. (2019) argue that location is the dominant hotel product. Price in the tourism industry reflects quality and location (Šerić & Gil-Saura, 2012). Therefore, substitution in tourism demand comes from spatial decisions argued by Farmaki (2012), Sánchez-Pérez et al. (2019) and Tranos and Davoudi (2014) in recent European cross-country researches. Therefore, geographic boundaries in the hospitality industry can be conditional on price differentiation.

The market arbitrage confirms that prices of equal goods traded on the spread international markets equalise. Literature on applied economics and tourism tests the validity of spatial market integration by dealing with the following equation, where price indices are transformed in logarithmic form:

$$\ln P_{MNE_t}^r = \alpha + \beta_1 \cdot \ln P_{SI_t}^r + \varepsilon_t, \quad (1)$$

where P_{MNE_t} is the price of a specified product on the Montenegrin market (MNE). Time (t) and price (P_{SI_t}) of this given product on the Slovenian market (SI) in time t . The strong version of spatial market integration states that prices of a specified product on spatially segmented international areas are equal and shift in correlation. Applying the coefficients of Equation (1), the necessary conditions are $\alpha = 0$ and $\beta_1 = 1$. Juselius (2009) argues that the strong version of spatial market integration seldom occurs. As a result, the weak variant of spatial market integration is specified. The weak variant of spatial market integration states that only the price rate is constant. It also suggests that the true price level is differentiated due to the costs of transportation. Again, in Equation (1), the necessary restrictions are $\alpha \neq 0$ and $\beta_1 = 1$.

Balcombe et al. (2007) argue that with the progress of unit root econometrics, researches of market efficiency could have a broader notation to the parallel integration of spatially separated international markets. In this case, the long-term co-movement of prices are analysed. Our empirical strategy follows the outlined hypothesis and is tested within the unit root framework. After deciding the integration order of the time-series, we employ the VAR model and a single equation cointegration test. Following these stages, we estimate the vector error correction (VEC) models. We apply cointegration analysis to investigate the existence of the long-term relationship.

Secondly, we assume common stochastic trends supported by the Johansen (1988) Maximum Likelihood trace test.

4.2. Data

The monthly tourism prices for Montenegro and Slovenia are used in the empirical analysis. The Slovenian data sources include SI-STAT from the Statistical Office of the Republic of Slovenia SORS (2021). Price data¹ for Montenegro is obtained from the Statistical Office of Montenegro MONSTAT (2020). In addition, tourism prices in the euro area are obtained from the Eurostat database (Eurostat, 2020). The data collected is for consumer price indices and hospitality price indices in Montenegro, Slovenia and the euro area. The retrieved data are recalculated from chain indices to indices with a constant base in December 2008 = 100, where the data vector consists of 73 observations for each variable. Such converted data is used in the empirical analysis that applied an econometric approach. The decision on the length of the data vector was defined to include the economic crisis period in 2009–2014 and exclude other previous and subsequent shocks (SISTAT, 2021).

Table 1 shows that the hospitality industry price index for Montenegro increased between December 2008 and December 2014 by 24.51%. In comparison, hospitality industry price indices for Slovenia and the euro area increased slightly more than 10%.

Figure 1 compares consumer price indices, where the highest index, 110.76, represents Montenegro, 109.82 for Slovenia and 108.31 for the euro area.

The research is related to time-series prices. Assuming hospitality industry prices are the best reflection of overall price movements in tourism, we transform nominal price indices into real price indices (Juselius, 2009). The transformation from nominal to real tourism prices require finding common stochastic trends between variables, confirmed by normally distributed (iid.) residuals (Table 2). An addressed procedure does not mean transformation from nominal to real prices whilst dealing with weakly stationary processes. Thus, we use two different price calculations of real-time-series tourism prices, which formal deviation and explanation are presented in Equations (2) and (3).

Table 1. Summary statistics, December2008-December2014 (monthly data, base period December 2008 = 100).

Year	$IPHIMNE_t$	$IPHISI_t$	$IPHIEA_t$	$\ln\left(\frac{IPHISI_{t-1}}{IPHIEA_{t-1}}\right)$	$\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right)$
2008M12	100	100	100	0	0
2009M12	115.97	102.52	101.27	.0018	.0570
2010M12	118.41	97.17	103.34	.0021	.0631
2011M12	121.95	99.22	105.31	.0033	.0638
2012M12	124.44	108.47	107.46	.0061	.0514
2013M12	124.32	110.10	108.58	.0041	.0501
2014M12	124.51	110.86	110.58	-.0030	.0510

Source: Authors compilation from MONSTAT, 2020; SORS, 2021.

Note: IPHIMNE – Montenegrin price index in the hospitality industry, IPHISI – Slovenian price index in the hospitality industry, IPHIEA – euro area price index in the hospitality industry, $\ln\left(\frac{IPHISI_{t-1}}{IPHIEA_{t-1}}\right)$ – real (second-order integration) Slovenian price index in the hospitality industry, and $\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right)$ – real (second-order integration) Montenegrin price index in the hospitality industry, where CPIMNE is the Montenegrin consumer price index.

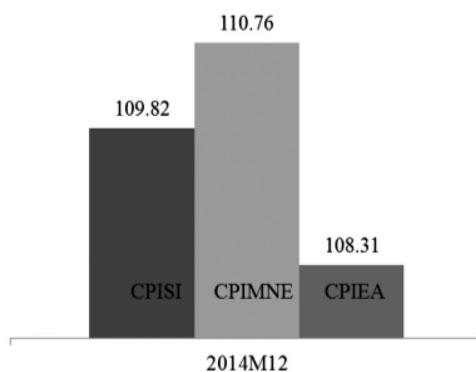


Figure 1. Consumer price index, cumulative from December 2008–December 2014.

Note: CPI – consumer price index in Slovenia, CPIMNE – consumer price index in Montenegro, and IPHIEA – consumer price index in euro area (monthly data, base period December 2008 = 100).

Source: Authors' calculations based on data from (SORS 2021) and MONSTAT (2020).

Table 2. VEC model analysis, unit root test and cointegration test, December 2008–December 2014 (monthly data, base period December 2008 = 100).

Test	Variable	$IPHIMNE_t$	$IPHISI_t$	$\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right)_{p=2}$	$\ln\left(\frac{IPHISI_{t-1}}{IPHIEA_{t-1}}\right)_{p=2}$
Test of integration (ADF test)		$I(2)_{(-3.07)}^{***}$	$I(2)_{(.03)}$	$I(1)_{(-2.97)}^{**}$	$I(1)_{\{-1.36\}}^*$
Test of autocorrelation (portmanteau test)		$(18.35)_{\{.11\}}^*$	$(0.55)_{\{1.00\}}$	$(5.06)_{\{.96\}}$	$(11.55)_{\{.48\}}$
Test of heteroscedasticity (ARCH test)		$(5.25)_{\{.07\}}^{**}$	$(0.18)_{\{.91\}}$	$(1.68)_{\{0.43\}}$	$(2.64)_{\{.27\}}$
Test of normality (Jarque-Bera test)		$(15.36)_{\{.00\}}^{***}$	$(1281.3)_{\{.00\}}^{***}$	$(2.99)_{\{.22\}}$	$(0.36)_{\{.84\}}$
Skewness		-.21	.10	.37	.16
Kurtosis		5.45	25.64	3.81	3.21
Johansen Trace test (cointegration test)		$r_0^{***} \{44.52\}$			
VECM		-.064 $_{(-5.63)}^{***}$.059 $_{(19.133)}^{***}$	
$VECM_{\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right)}^{\beta}$		1.000		-1.438 $_{(1.41)}^*$	
Δs_d January		.00 $_{(.46)}$			
Δs_d February		.05 $_{(3.50)}^{***}$			
Δs_d March		.04 $_{(2.91)}^{***}$			
Δs_d April		.03 $_{1.85}^{**}$			
Δs_d May		-.03 $_{(-1.91)}^{**}$			
Δs_d June		-.13 $_{(-8.53)}^{***}$			
Δs_d July		-.00 $_{(-.23)}$			
Δs_d August		.08 $_{(4.95)}^{***}$			
Δs_d September		.04 $_{(2.74)}^{***}$			
Δs_d October		.07 $_{(4.56)}^{***}$			
Δs_d November		-.06 $_{(-4.10)}^{***}$			
Constant		.004 $_{(3.92)}^{***}$		-.004 $_{(-14.06)}^{***}$	

Note: T = 73; {x} – significance value; (x) – t or χ^2 statistics value; sd – seasonal dummy; 2 – two lags based on Swarz Criterion; *** significant at 1%; ** significant at 5%; * significant at 10%; VECM – vector error correction model; $VECM_{\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right)}^{\beta}$ – restrictions on the beta of time-series of real (second-order integration) Montenegrin price index in the hospitality industry; $\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right)$ – real (second-order integration) Montenegrin price index in the hospitality industry; $\ln\left(\frac{IPHISI_{t-1}}{IPHIEA_{t-1}}\right)$ – real (second-order integration) Slovenian price index in the hospitality industry, $p = 2$ – two lags.

Source: Authors' calculations based on data from (SORS 2021) and MONSTAT (2020).

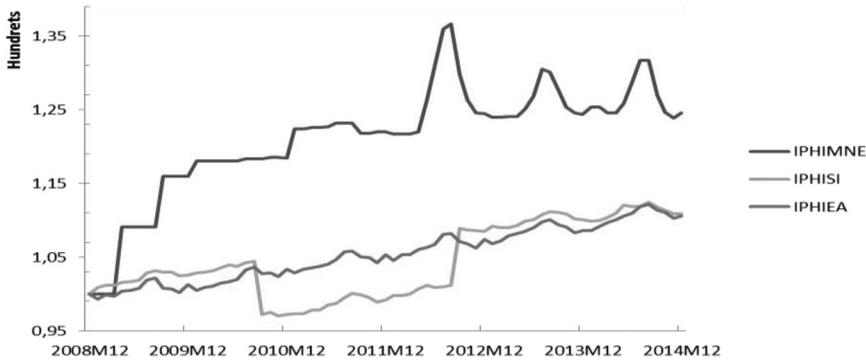


Figure 2. Dynamics of tourism prices, December 2008-December 2014.
 Note: IPHIMNE – Montenegrin price index in the hospitality industry, IPHISI – Slovenian price index in the hospitality industry, and IPHIEA – euro area price index in the hospitality industry (monthly data, base period December 2008 = 100).
 Source: Authors’ calculations based on data from (SORS 2021) and MONSTAT (2020).

$$\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right), \tag{2}$$

and, log IPHISI_IPHIEA – real (second-order integration) Slovenian price index in the hospitality industry captured first, by logarithms, and second, Slovenian price index in the hospitality industry is divided by euro area price index in the hospitality industry (base period December 2008 = 100), following the equation:

$$\ln\left(\frac{IPHISI_{t-1}}{IPHIEA_{t-1}}\right), \tag{3}$$

whereas X_{t-1} relates to time-series data, and X is a time-series variable of weak stationary process $\{X_t|X_0|X_{t-1}\}$.

4.3. Visual test of market integration

As shown in Figure 2, the pattern in the evolution of hospitality prices in Montenegro and Slovenia is indistinguishable over time that may reject the validity of H1. The co-movement between Slovenian and euro area hospitality prices has minor differences following Slovenian accession to the EU and the euro adoption in Slovenia.

Hospitality prices in Montenegro have increased faster and have explored significant instabilities over time than in Slovenia or the eurozone. The visual analysis shows that price indices should be treated as a non-stationary variable. Unit root testing usually includes a stochastic trend. The time perspective of our study is the medium run when most macroeconomic variables exhibit considerable inertia. The latter point is consistent with non-stationary behaviour. Figure 3 illustrates that different hospitality prices in the first integration look stationary, despite crossing the mean line more frequently. The detailed misspecification test is considered in the next section.

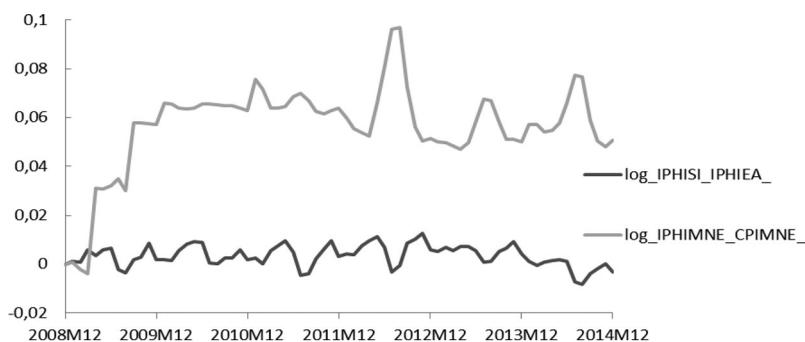


Figure 3. Dynamics of tourism prices in logarithms (in the first differences), December 2008–December 2014.

Note: log IPHIMNE_CPIMNE – real (second-order integration) Montenegrin price index in the hospitality industry captured first, by logarithms, and second, Montenegrin price index in the hospitality industry divided by Montenegrin consumer price index (base period December 2008 = 100).

Source: Authors' calculations based on data from (SORS 2021) and MONSTAT (2020).

5. Econometric results

The econometric testing of tourism price integration between Montenegro and Slovenia has been performed in three stages. The starting point was to assess the volatilities of the data over time. Secondly, we estimated a VAR model to check the specification of the model and its unit root. We established that prices are integrated of the second order, as presented below in Figure 3 and Equations (2) and (3). Finally, we estimated the long-term cointegration relation and VEC model, enabling us to assess the existence of the spatial market integration (H1) and deterministic components.

Hsu et al. (2021) and Grekou (2019) distinguish between real and nominal values. The real value² was chosen based on a non-normality test reported in Table 2. The real variable provides an obligatory stable time-series. A novel procedure of real price values is preferable to provide a well-defined empirical model of spatial market integration. Therefore, Equations (2) and (3) nominal vs real values are calculated. The Montenegrin price index in the hospitality industry is divided by the Montenegrin consumer price index in Equation (2). Slovenian price index in the hospitality industry is divided by euro area price index in the hospitality industry in Equation (3), which has a strong impact. The process was conducted instead of de-seasonalising, which leads to loss of information in time-series. These two calculation procedures provide essential normally distributed variables for a well-specified empirical model in the data vector. Juselius (2009) reported that time-series variables are integrated in an explicit order; thus, all variables were initially transformed into logarithm form. Secondly, indices of hospitality industry prices are modified to become real or constant base prices (Figure 3). These integers are conducted under the assumption that inflation is integrated of order one, which is consistent with empirical results by Juselius (2021), and that nominal shock is cumulated twice to give an account of a second-order stochastic trend in prices.

The tourism price levels in Montenegro and Slovenia are tested for unit roots using misspecification tests. They are reported in the upper position of Table 2.

Results of the misspecification test are reported firstly for the time-series in levels. At a 5% significance level, the null hypothesis of a unit root cannot be rejected for tourism price in levels for Slovenia, irrespective of the deterministic specifications (seasonal dummies). Contrary to this, at a 1% level of significance, there is no unit root for tourism price levels for Montenegro.

Secondly, we tested price levels for the autocorrelation, stability, and normality in the second difference. These steps were followed by iid., skewness and kurtosis. The Jarque-Bera normality test method confirms our theoretical expectation that prices in levels do not match variance and mean conditions of normal distribution. The second differences of the time-series indicate that time-series (upper right side of Table 2) contains neither autocorrelation nor heteroscedasticity and are iid., followed by deterministic components or seasonal dummies. Additionally, skewness statistics, which are in a range of zero and kurtosis statistics in a range of three, indicate that the time-series are iid., followed by an integration of the same order from both time-series. This result is consistent with theoretical literature.

The cointegration VAR framework is acceptable for an advanced empirical approach. This information confirms that the VAR model is identified; thus, residuals do not sustain from serial autocorrelation, and residuals are iid. Initially, we were testing time-series in a linear cointegration. The Johansen trace test rejected no cointegration hypothesis at a 1% significance level when applying the VEC model. Therefore, we obtained one vector of Montenegrin and Slovenian tourism price series, and the null hypothesis of a single cointegration vector cannot be rejected (middle part of Table 2).

Applying cointegration test results, a linear VEC model was considered in the second step. Two lagged autoregressive short terms were selected from the information criteria. The middle section of Table 2 represents our results. Thus, the long-term cointegration relationship between Montenegrin and Slovenian tourism prices in Equation (1) can be re-written as:

$$\ln\left(\frac{IPHIMNE_{t-1}}{CPIMNE_{t-1}}\right)_{p=2} = \begin{matrix} -0.004 \\ (-3.92)_D \end{matrix} + \begin{matrix} 1.438 \\ (1.41)_{\beta_1} \end{matrix} \cdot \ln\left(\frac{IPHISI_{t-1}}{IPHIEA_{t-1}}\right)_{p=2} + stat.error \quad (4)$$

with t-statistics in parenthesis.

A 1% increase in Slovenian tourism prices induce a 1.438% increase in Montenegrin tourism prices. The significant weekly coefficient does not support strong versions of spatial market integration, whilst β_1 the coefficient is not statistically significant at a 5% level, thus rejecting the validity of H1 null. This finding confirmed previous findings in the empirical literature. For example, with one-dimensional spread models, whether linear, circular, or vertical (Gabszewicz & Thisse, 1979; Salop, 1979), each supplier contends only with their direct neighbours. Before the culmination of the results, there is a need for additional explanation. Montenegro may not border Slovenia directly, but they share historical-cultural proximity for most of the 20th century. Montenegro aims to follow Slovenian policy decisions as an example of a progressive country (Crnogorac & Lago-Peñas, 2019). Our results report that hospitality policy decisions have no strong spatial market integration. The result at a 1.41 significance

level confirms a weak version of spatial market integration between non-neighbouring Montenegrin and Slovenian tourism destinations.

Sánchez-Pérez et al. (2019) confirmed spatial integration in a long run. Distortions in expected prices, asymmetrical information, and geographically located hotels and destinations can affect epitopes, which can affect spatial market integration. Our Equations (2) and (3) suggest that Slovenian prices in the hospitality industry follow European spatial integration, whilst this is not valid for Montenegrin prices.

The final step in the scenario estimation describes how the system responds when exogenous shocks are induced in the identified short-term relation away from their equilibrium values. Using the determined cointegration relation reported in Table 2, we estimated a VEC model for the system. Our deterministic components in the model are seasonal dummies, of which several are positively related and statistically significant. These seasonal dummies include February, March, August, September, and October. There are three negative and statistically significant declines in the pre-season months (May, June, and November). The most significant decline is observed in June, which was 0.13% compared to the previous month. The value of constant (-0.004) reports a slight decrease in the autonomous hospitality process in Slovenia. For Montenegro, there is a tendency to increase, reported in their tourism prices by its value of 0.004. The constant term shows that real hospitality industry prices for Montenegro, on average, are lower than the implied value as given by determinants.

6. Discussion

In addition to the scientific contribution of our study, along with applied advanced statistical-econometric methods and credible empirical results of the analysed time-series data, the study contributes to the investigation of tourism development and research with implications for price management in rapidly changing an enabling socio-economic environment with historical-cultural proximity.

Applied advanced econometric methods provided robust results on spatial tourism price transmission. We applied a cointegration test for the evaluation of the price links between Montenegro and Slovenia. We tested whether the market integration stayed concurrent among two Adriatic east coast countries tourist destinations. Our cointegration test depicted a weak, long-term relationship between Montenegrin and Slovenian tourism prices. The method we employed rejected the strong spatial market integration hypothesis (H1) but confirmed weak market integration between non-neighbour Adriatic east coast countries tourist destinations. This result demonstrates important international tourism business, as well as travel and marketing price mix implications. It also correlates with the applied empirical approaches, which failed to display spatial market integration in a single tourist area/multi-region setting.

Although the shared geographic location of Adriatic east coast destinations, the long-term cointegration, euro currency, and former historical proximity within the former Yugoslavia, the spatial market integration between non-neighbouring Montenegrin and Slovenian tourism markets have sustained only in a weak version.

This finding coincides with the spatial disintegration process on the former Yugoslav markets explained by previous authors (Hall, 2003). Regional and EU market developments, monopolistic competition and market segmentation could explain tourism demand and supply responses and adjustments to regional and global tourism competition. Initially, this may not be surprising, considering that Slovenian tourism price actions inspire Montenegro. At the same time, upward price adjustments and catching-up can also drive prices in poorer countries to the level of prices in more developed countries. Considering the competitiveness of the Adriatic east coast and global tourism markets, we may conclude that hospitality suppliers are price takers in the international tourism market regardless of both countries' importance in the Adriatic east coast and European destinations. Considerably more popular Mediterranean tourism destinations could support this finding. Finally, tourism prices are seasonally driven over a short-term basis.

Conclusively, the study results indicate seasonal characteristics of short-term tourism prices with implications for hospitality management and practice. Findings support contemporary literature on seasonal concentration, arguing that seasonal patterns associated with seasons differ significantly.

While the number of tourist arrivals and overnight stays has increased, tourists have become increasingly aware of their travel and tourism expenditure decisions. With new information and communication technology, travel agencies and tourists can compare tourism prices between different destinations and cultures. As part of this study, the consideration of tourism prices over time for Montenegro and Slovenia is developed. On a macro level, these two tourist destinations can function as substitutes for international tourism markets.

Concerning the implications of our results for tourism research, tourism prices are one of the elements for management planning. Tourism prices are essential for hospitality services providers and travel agencies, and tourists are searching for a specific tourist destination. Our empirical results confirm weak spatial market integration between the two analysed countries. Therefore, higher differentials in the level of tourism prices can function as push-away factors in tourist demand with higher Slovenian prices, and the role of pull factors for tourist demand with lower Montenegrin prices for similar quality of hospitality services.

The results indicating a decline in short-term tourism prices between May and July and November are crucial for hotel managerial and hospitality destination management. During these periods, non-seasonal types of hospitality, particularly in larger towns or due to crisis shocks, can be developed. For example, this can be achieved by additional advertising, support by the state to domestic tourists, and (egocentric) customised tourism prices of overnight stays and other tourism services such as food and beverages.

Innovative hospitality supplies and marketing trends have provided a massive economic boost for visitor arrivals to some Central and Eastern European cities. Their possible imitation and spill-over effects could present an opportunity for tourism development in Southern Europe, including Montenegro, and to a lesser extent in Slovenia, whose former summer resorts still play crucial roles in tourism supply and hospitality marketing.

7. Conclusion

The pricing in the hospitality industry and tourism has been of core interest. So far, less attention has been given to Adriatic east coast destinations, their performances, and unique attributes, including structural breaks in time-series that reflect government, development policy, managerial decisions, and management practices.

7.1. Theoretical and managerial implications

This paper contributes novel empirical results and their implications to the theory and applied science. The theoretical implications of the econometric modelling procedure of tourism prices are vital since tourism has become the most extensive service sector. Tourism prices are integrated of nearly second order and are therefore implicated with several events and ‘extraordinary’ shocks. Such outliers provide difficulties in a research process; therefore, the novel procedure is presented in this paper from nominal to real prices. This procedure advises normal distribution following skewness and kurtosis on their errors. In short, theoretical implications are i) new econometric procedure employed/identified in the VAR model; ii) normal distribution under nominal vs real hospitality prices is acted/modelled/achieved.

Step by step, the procedure is shown on a robust example of time-series data for two Adriatic east coast countries using the euro – Montenegro and Slovenia. The econometric implication to the theory provides evidence for informed decisions that modelling in the VAR process considers linearities with variables with no sub effects. Namely, researching linearities in the cointegration framework suggests data that contain neither any autocorrelations nor heteroskedasticity and are normally distributed. The latter, normally distributed, is an outlier in most research while normality is omitted; therefore, the results could be nonlinear in a non-supported cointegration framework. The novel procedure based on the state-of-the-art modelling was presented in [Equations \(2\) and \(3\)](#).

A well-defined model on spatial tourism price transmissions provides twofold implications to the applied science: — first, the empirical test on the validity and robustness of the theoretical model. Second, the empirical result provides managerial implications: (i) The hypothesis on the spatial hospitality market integration between Montenegro and Slovenia cannot be rejected because a weak linear VEC was identified. The model depicts the long-run tourism price relationship adequately. (ii) On the other hand, hospitality prices are differently driven: in Slovenia by Eurozone and in Montenegro domestically. Therefore, hospitality prices in Montenegro should react to domestic inflation.

7.2. Limitations

Amongst the research limitation, there is a need to extend the analysis towards other tourist destinations within the Adriatic - Mediterranean region. In particular, this applies to Croatia (Arnaud, 2016; Šerić & Gil-Saura, 2012) as a popular European

tourist destination and one of the leading tourist targets in the Mediterranean (Carić & Mackelworth, 2014; Vrana & Zafirooulos, 2011).

Following Brida et al. (2016), there is also an issue to add panel Granger linear and nonlinear causality tests between the investigated countries. Finally, Adriatic east coast tourist destinations could become sustainable, including possible price premiums (Bojanic & Warnick, 2020; Naef & Ploner, 2016). Tourism sustainability – considering long term economic, social, environmental, cultural, and natural and other possible sustainability drivers – is an issue for future research.

To sum up, hospitality prices in Slovenia are Eurozone driven and in Montenegro are domestic driven. The econometric model obtained these results with tested normality using a state-of-the-art econometric procedure for the VAR model. Additionally, empirical results align with previous results by Gričar et al. (2021) that tourism-led economic growth only exists in Montenegro on domestic tourist arrivals and Juselius (2009) that poorer countries are catching up to richer ones. Second, empirical results do not confirm integration of the prices, or the Law-of-One-Price does not exist between Slovenia and Montenegro despite both countries using the euro. Based on a statistical significance of 1.41, the cointegration vector suggests a weak version of spatial market integration in tourism between Montenegro and Slovenia.

In conclusion, Slovenia and Montenegro were investigated as Adriatic east coast countries using the euro to validate the novel procedure in an econometric model with robustness in empirical results.

Notes

1. Data of this research is available on request in Excel form.
2. Inflation index selection as a deflator is based on an econometric test. The selected “deflators” have been identified from a stable time-series. Slovenian CPI did not produce a proper result, so we did not get a stable nominal vs. real time-series variable. The domestic inflation as deflator might be useful for less integrated economies, as evidenced by the time-series in the case of Montenegro. However, for EU economies such as Slovenia, time-series prices can be influenced by several non-domestic factors. Montenegrin price index in the hospitality industry was most characterised by domestic inflation. Slovenian price index in the hospitality industry is typified by deviation of euro area price index in the hospitality industry. These deviations made the price series variables stable. Other deviations, including the EU inflation, has not led to a stable distribution.

Disclosure statement

No potential conflict of interest was reported by the authors.

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