Evaluating the Direct and Indirect Impacts of Tourism on the Health of Local Communities

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Tourism brings with it both positive and negative health impacts on local communities. Although the topic of health in tourism is traditionally associated with tourists' health, there are potential opportunities to study the influence of tourism on residents' health as well. This study aims at exploring the direct and indirect effects of tourism development on residents' health through income and environmental pollution in the case of several European countries. The long-term and short-term relationships among tourism arrivals, emissions, residents' income, and health were estimated using a generalized least squares (GLS) approach. The results demonstrate that tourism arrivals bring significant short-term and long-term impacts on residents' health directly and indirectly through environmental pollution and residents' income. Several important theoretical and practical implications are related to considering the long-term health impacts as more important outcomes of tourism development and providing recommendations for destination management organizations and governmental authorities.

Keywords: tourism, impacts, health, well-being, income, emissions

Introduction

Tourism brings with it both positive and negative impacts on tourist destinations. The traditionally described domains of tourism impacts are economic, socio-cultural, and environmental dimensions (Sharpley, 2018; Woo et al., 2018). The economic impacts of tourism include higher revenues, new employment opportunities, investments, and lower levels of poverty (Johnson et al., 1994; Seetanah, 2011).

However, the negative impacts are associated with an increase in the cost of living, chronic stress, higher prices of goods and services, dependence on seasonality, and economic inequality, as well as the socio-cultural and environmental costs of tourism develop-

ment (Postma & Schmuecker, 2017; Uysal et al., 2016).

At the same time, the main values in human life are described as health and well-being rather than income or welfare (Bowling, 1995). The topic of health in tourism is traditionally associated with medical tourism experiences (Connell, 2006). However, there are potential direct and indirect avenues of research on the effects of tourism on residents' health. Tourism can positively impact the health of local citizens through better access to medical services or better food, while the transmission of diseases from tourists to residents, road accidents, poor working environments, or pollution brings about negative effects on local communities (Bauer, 2008; Postma & Schmuecker, 2017).

Residents' health can be also impacted by positive experiences, novelty, and social interactions with tourists, which also demands empirical attention in tourism research. Several studies in positive psychology and neuroscience suggest that positive emotions influence blood pressure and vagal tone, decrease the levels of blood sugar, and increase longevity (Fredrickson et al., 2008). At the same time, the emotional components of tourism experiences are widely described in the previous tourism literature (e.g. Hosany et al., 2015; Godovykh & Tasci, 2020a; 2020b). As tourism activities are inseparably connected with providing positive experiences and interaction between tourists and residents, tourism may bring better health and well-being outcomes for both tourists and residents.

The effects of tourism development on residents' health might have different valence and power in in the short and long run (Godovykh & Ridderstaat, 2020). Although the short-term impacts may be associated with spreading viruses or increasing stress levels of local people, the long-term effects might be attributed to psychological, social, and physical resources associated with social interactions, novelty, and positive emotions (Fredrickson & Joiner, 2018). This study aims at exploring the direct and indirect effects of tourism development on residents' health through income and environmental pollution in the case of several European countries. Several important theoretical and practical implications of the study are related to determining the balance between the negative short-term impacts and positive long-term

impacts of tourism development on residents' health, considering the long-term health impacts as more important outcomes of tourism development, and providing recommendations for destination management organizations and governmental authorities on developing new programmes and policies aimed at improving the health and well-being of local communities.

Literature Review
Indirect Health Impacts of Tourism

The health impacts of tourism can be associated with residents' income and environmental concerns. On the one hand, increased revenues allow local people to afford medical care and better food (Bauer, 2008). Tourism is traditionally described as a contributor to Gross Domestic Product (GDP) that generates revenues, creates new employment opportunities, attracts investments, and reduces poverty (Sharpley & Telfer, 2015). The traditionally applied evaluations of tourism economic impacts are collected from border statistics and tourist accommodation establishments for the number of tourist arrivals and expenditures. The secondary data on tourist arrivals, departures, nights spent, expenditures, receipts, employment, and other indicators of tourism statistics can be collected from the United Nations World Tourism Organization (UNWTO, 2020), the World Bank Development Indicators,[1] and OECD tourism statistics,[2] as well as from national tourism offices and other sources.

The most widely applied measure of residents' income is gross domestic product (GDP), which includes consumption expenditures, gross investment, and government spending. The annual residents' income can be measured by GDP per capita from the World Bank Indicators and national statistics. The direct, indirect, and induced effects of tourism can be analysed by using Input-Output analysis and Tourism Satellite Account statistics based on all goods and services consumed by tourists (Baggio, 2019). The economic impacts of tourism also include employment, which can be evaluated by the number of jobs in tourism or full-time equivalent employment. The pri-

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[1] https://data.worldbank.org

[2] https://www.oecd.org/cfe/tourism/tourism-statistics.htm.

mary data collection can also include survey questions about residents' income, as well as perceived positive and negative economic benefits from tourism.

At the same time, the increased usage of destination resources brings negative environmental impacts that also influence residents' health. The environmental outcomes include air pollution, wildlife destruction, water pollution, plant destruction, etc. (Andereck, 1995; Postma & Schmuecker, 2017). These environmental impacts of tourism can be quantitatively assessed through the data on greenhouse gas emissions, PM 2.5 pollution, air quality indexes, ecological footprint, human-wildlife conflict monitoring, land management metrics, and a variety of other techniques (Mikayilov et al., 2019).

Direct Health Impacts of Tourism

Negative health impacts of tourism are mostly associated with the transmission of diseases from tourists to residents. The recent situation with the COVID-19 pandemic demonstrated the potentially harmful impacts of tourism on residents' health. Other health risks for local communities from tourism include road accidents, poor working environments, substance use disorders, and other physical health conditions (Bauer, 2008; Doocy et al. 2007; Godovykh et al., 2021; Walker & Page, 2004).

At the same time, human health has a dynamic nature affected by the mix of biological, social, and psychological factors (George & Engel, 1980; Sarafino & Smith, 2014). Among the main psychological factors are social skills, family relationships, mental health state, self-esteem, etc., while social factors are related to social interactions with family members, peers, and other people (Bolton & Gillett, 2019; Lehman et al., 2017). The positive role of psychological factors affecting health can be also conceptualized within the broaden-and-build theory of positive emotions (Fredrickson, 2001; Fredrickson & Joiner, 2018). Based on the broaden-and-build theory, positive emotions bring physical, psychological, intellectual, and social resources that increase people's well-being and contribute to health by regulating the levels of hormones, reducing autonomic nervous system activity, fostering immune responses, and eliminating negative outcomes of stress. Tourism activities are connected with positive experiences and interaction between tourists and residents. Therefore, tourism may bring better health outcomes for residents through positive emotions, novelty, and social interactions with new people. Considering the previously discussed health impacts of tourism on local communities together with the potential effects of psychological factors on residents' health, this study suggests that the number of tourism arrivals influences residents' health directly and indirectly through environmental pollution and residents' income.

Methodology

The study used data on national tourism arrivals, income, CO_2 emissions, well-being, and health in three neighbouring countries, Slovenia, Croatia, and Hungary, which are member countries of the EU and have common borders. The panel data on national tourism statistics, arrivals, income, CO_2 emissions, well-being, and health were used in the study. The data on tourism arrivals, departures, and receipts were obtained from the United Nations World Tourism Organization (UNWTO, 2020). Tourism arrivals are the number of tourists who travel outside their usual country of residence, for business, leisure, or other personal purposes, for less than 12 months for a purpose not related to employment (UNWTO, 2010). Tourism departures are the number of departures people make from their country of residence to any other country for a purpose not related to earning money.

The data on income were collected from the World Bank indicators in the form of GDP per capita. GDP per capita is the gross domestic product or a sum of gross value added by all a country's residents, divided by the country's population. The GDP per capita is often applied as a proxy for income. The data on CO_2 emissions, which include carbon dioxide produced during consumption of liquid, solid, and gas fuels and gas flaring, were collected from the World Bank indicators. The data on residents' wellbeing were collected from the *World Happiness Report* (Helliwell et al., 2021) that uses data from the Gallup World Poll. The data on health was represented as the life expectancy at birth, which is considered an impor-

tant indicator of health status on a national level.

The data analysis consisted of several phases. The initial phase of the study provides descriptive statistics of the collected data. The data were also visualized by using line charts and GIS maps. Descriptive statistics and data visualization helped in understanding data trends and to conduct comparisons at different time points. In the second phase, the applied variables were decomposed into trend and cycle components by using the Christiano-Fitzgerald filter (Christiano & Fitzgerald, 2003). The logarithm transformation was used to control for data skewness and narrow the range of the data. In the third phase, the variables were tested for stationarity by using unit root tests. The final phase of data analysis applies a generalized least squares (GLS) approach to estimate a set of structural equations since the GLS estimator is considered more efficient than the ordinary least squares in the case of heteroscedasticity, as well as serial and cross-sectional correlations (Bai et al., 2021). The estimated equations can be indicated as follows:

$$health_{it} = \alpha_1 \times arrivals_{it}$$
$$+ \alpha_2 \times emissions_{it}$$
$$+ \alpha_3 \times income_{it} + \varepsilon_{1it} \qquad (1)$$
$$emissions_{it} = \alpha_4 \times arrivals_{it} + \varepsilon_{2it} \qquad (2)$$
$$income_{it} = \alpha5 \times arrivals_{it} + \varepsilon_{3it}, \qquad (3)$$

where i = cross-section, t = time, α = coefficient, and ε = error term.

Results

The recent data on tourism arrivals, departures, income, health, and well-being for Slovenia, Croatia, and Hungary in 2018 are provided in Figure 1. Hungary and Croatia demonstrate the highest numbers of international tourism arrivals (57.67 million visitors in 2018). The biggest number of international tourism departures is in Hungary (22.81 million departures in 2018). At the same time, Slovenia shows the highest levels of GDP per capita (26,116 USD), happiness score (6.25), and average life expectancy (81.4 years).

The graphical representation of the standardized panel data for 1995–2019 is shown in Figures 2–4. The charts generally show increasing trends for tourism
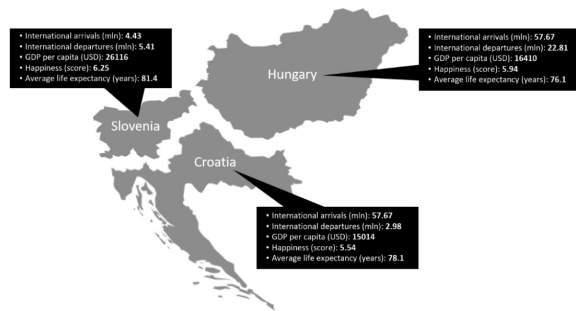

Figure 1   Tourism Arrivals, Departures, Income, Health, and Well-Being in Slovenia, Croatia, and Hungary
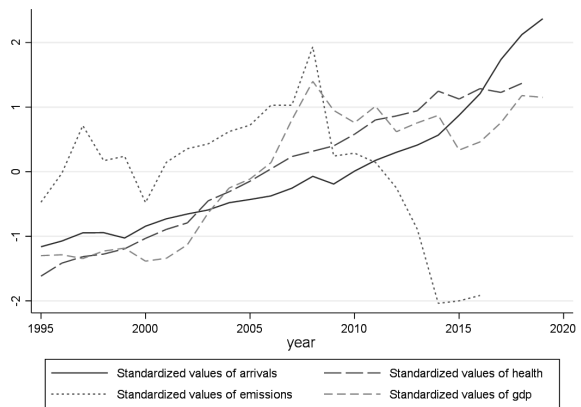

Figure 2   Tourism Arrivals, Health, Emissions, and Income in Slovenia in 1995–2019

arrivals in 1995–2019. The level of health in Slovenia, Croatia, and Hungary is constantly growing between 1995–2019. The level of income demonstrates an increasing linear trend in 1995–2007 with fluctuations after 2007, which can be explained by the consequences of the economic and financial crisis. The levels of CO_2 emissions have been decreasing in Hungary from 2004 and in Slovenia and Croatia from 2008, which can be associated with the EU legislation to reduce greenhouse gas emissions.

The data were transformed into logarithms, and the Christiano-Fitzgerald decomposition approach was applied to estimate the trend and cyclical components of tourism arrivals, income, emissions, and health. The trend and cycle components for health, arrivals, emissions, and income in Slovenia, Croatia, and Hungary are presented in Figures 5–8 (pp. 48-49). While residents' health and income, and tourist
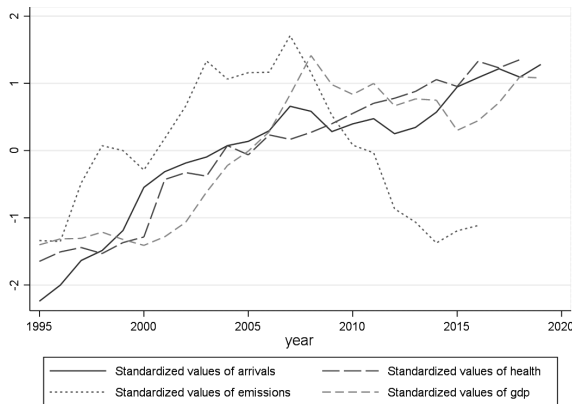
Figure 3 Tourism Arrivals, Health, Emissions, and Income in Croatia in 1995–2019
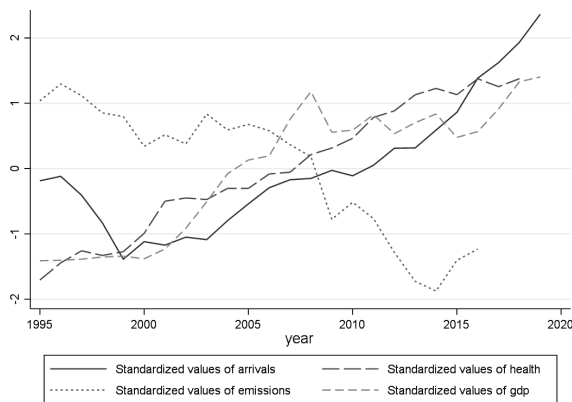

Figure 4 Tourism Arrivals, Health, Emissions, and Income in Hungary in 1995–2019

Table 1 Test for Cross-Sectional Dependence

	Long-Run (trend)	Short-Run (cycles)
Arrivals	7.40***	0.20
Income	8.10***	7.69***
Emissions	3.66***	5.85***
Health	8.07***	0.83

Notes Under the null hypothesis of cross-section independence. The symbol *** indicates the 1% significance level.
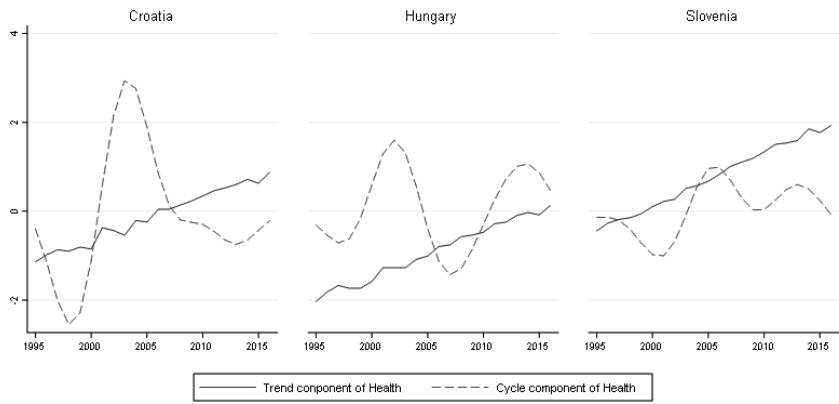
pendence in the case of correlation across the panel (De Hoyos & Sarafidis, 2006).

The variables were tested for stationarity using both the Levin-Lin-Chu and the Harris-Tzavalis tests (Tables 2 and 3 on p. 49). The null hypothesis in both tests is that all the panels contain a unit root. Taking into account the cross-sectional dependency, the data were initially corrected for their cross-sectional mean in order to control for correlation (Levin et al., 2002). The results demonstrate that all variables are stationary at the level forms, which means that they have a constant mean, variance, and covariance. Therefore, the study used the level forms of the variables for further analysis.

The study estimated the long-term and short-term relationship among tourism arrivals, emissions, residents' income, and health using a generalized least squares (GLS) approach. The GLS estimator is considered more efficient than the ordinary least squares in the case of heteroscedasticity and cross-sectional correlations (Bai et al., 2021). The generalized least squares approach's results are demonstrated in Table 4 (p. 49).

The results show that tourism negatively influences residents' health in the short term. More specifically, a 1% growth in tourism arrivals negatively impacts residents' health by 0.28%. At the same time, tourism arrivals, emissions, and residents' income significantly influence the health of local people in the long run. A 1% growth in tourism arrivals leads to a 0.19% increase in residents' health, while a 1% growth increase in residents' income has a 0.76% increase in health. However, emissions have negative long-term effects on health. A 1% growth in emissions leads to a 0.77% decrease in residents' health.

arrivals showed an increasing pattern in the discussed time frame (with varying cycle distributions), the trend of CO_2 emissions showed a decreasing long-term shape, indicating that the CO_2 releases were gradually reducing.

The study applied the cross-sectional dependency (CD) test to evaluate the level of correlation of the units in the same cross-sections (Pesaran, 2021). The test results provide enough evidence to reject the null hypothesis of the lack of cross-sectional dependence (Table 1). The cross-sectional dependence means that units in the same cross-section are correlated, which can be caused by the effects of some unobserved factors common to all units, such as an economic or financial crisis. The literature suggests that the data should be demeaned to control for cross-sectional de-
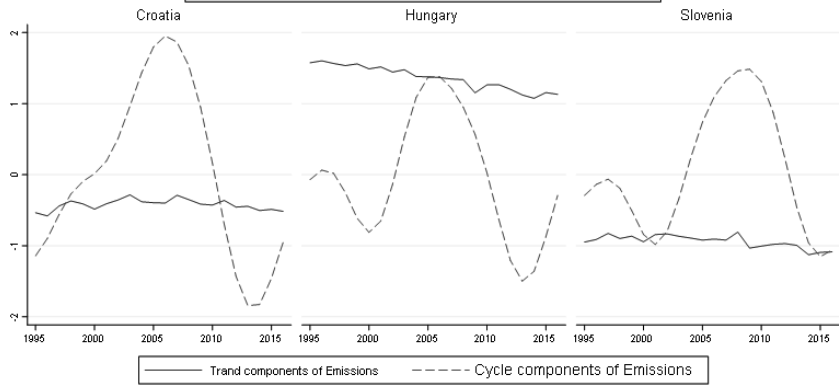
Figure 5
Trend and Cycle Components
of Residents' Health

Figure 6
Trend and Cycle Components
of Tourism Arrivals
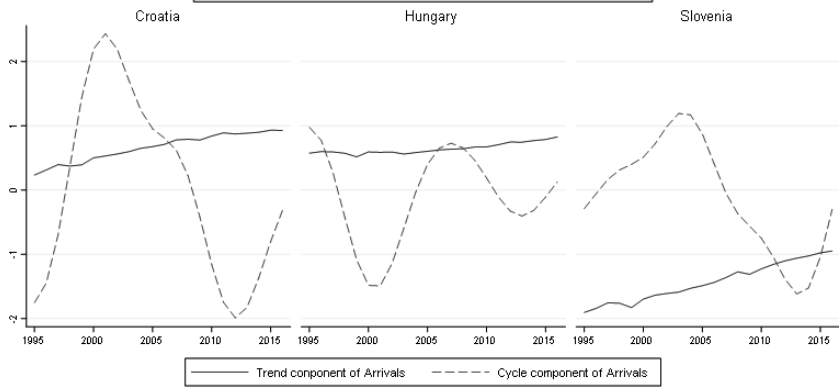
Figure 7
Trend and Cycle Components
of CO_2 Emissions

In addition to the direct impacts of tourism arrivals on residents' health, the study revealed significant relationships between tourism arrivals and CO_2 emissions, as well as between tourism arrivals and residents' income. A 1% growth in tourism arrivals leads to a 0.39% increase in CO_2 emissions in the short term and a 0.29% increase in CO_2 emissions in the long term. At the same time, tourism arrivals have not demonstrated significant short-term impacts on

residents' income but showed significant impacts on income in the long term. A 1% increase in tourists' arrivals leads to a 0.50% increase in residents' income in the long run.

Discussion
The results indicate that tourism brings both short-run and long-run impacts on residents' health. The study found that tourism development negatively in-
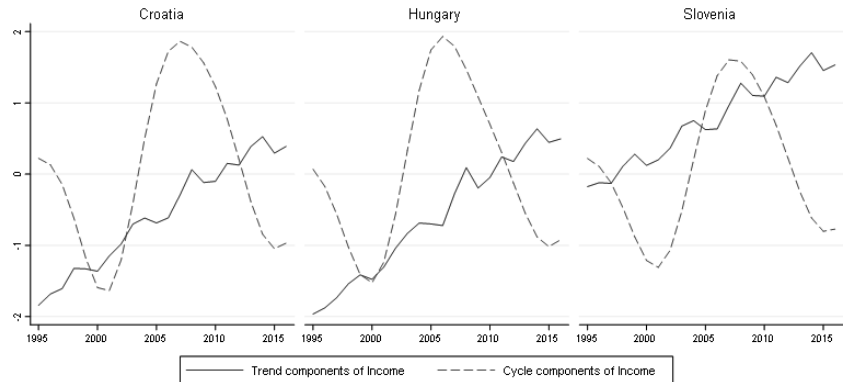
Figure 8
Trend and Cycle Components
of Residents' Income

Table 2   Stationarity Test Results for Trend Components

Item	LLC		HT		Integration
	Level	First difference	Level	First difference	
Arrivals	−6.7075***	−69.00***	0.8778	−13.1968***	I(0) or I(1)
Income	−4.6532***	12.4168	0.1195	−17.3846***	I(0)
Emissions	−1.6742***	1.4288	−1.3366*	−15.4438***	I(0) or I(1)
Health	−8.4947***	94.2606	−4.5159***	−18.5289***	I(0) or I(1)

Table 3   Stationarity Test Results for Cyclical Components

Item	LLC		HT		Integration
	Level	First difference	Level	First difference	
Arrivals	−18.2159***	−9.6280***	−0.2498	−0.4314	I(0) or I(1)
Income	−9.0666***	−14.6856***	0.1473	−0.5628	I(0) or I(1)
Emissions	−39.7573**	−12.7601***	0.4324	0.5850	I(0) or I(1)
Health	−12.0917***	−13.8619***	−0.1000	−01.1012	I(0) or I(1)

Table 4   The Influence of Tourism Arrivals on Health

Item	Health		Income		Emissions	
	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term
Arrivals	0.1882***	−0.2829**	0.5003**	−0.0303	0.2967*	0.3883***
Income	0.7693***	−0.0958				
Emissions	−0.7693***	0.0839				

Notes   The symbols ***, **, and * indicate the 1%, 5%, and 10% significance levels.

fluences residents' health in the short run and has positive impacts in the long run. These short-term results are consistent with the previous studies by Godovykh and Ridderstaat (2020) and can be explained by res-

idents' negative feelings and stress from overcrowding, noise, environmental pollution, traffic congestion, crime rates, etc. The recent situation with the COVID-19 pandemic also demonstrates that tourism

mobility is associated with the spreading of disease. At the same time, the long-term positive health effects of tourism can be related to positive experiences received by residents and the social interactions between residents and visitors (Chida & Steptoe, 2008; O'Connor & Gartland, 2019).

In addition to the direct effects of tourism arrivals on residents' health, tourism may have indirect effects on the health of local people through environmental and economic impacts. The study found significant relationships between tourism arrivals and CO_2 emissions, as well as between tourism arrivals and residents' income. The influence of tourism arrivals on carbon dioxide emissions can be explained by the intense transportation and increased demand for energy from hotels, restaurants, and tourist attractions (Katircioglu et al., 2014; Paramati et al., 2017). The effects of tourism arrivals on residents' income are consistent with the previous studies that describe the direct, indirect, and induced economic impacts of tourism on local economies (e.g. Eeckels et al., 2012; Chatziantoniou et al., 2013; Qin et al., 2018). Tourism brings new jobs, attracts investments, increases tax revenues, etc. which positively affects the welfare of local people (Comerio & Strozzi, 2019).

These results bring important theoretical, methodological, and managerial implications. The recent situation with the new coronavirus disease reveals the negative health outcomes of tourism, while there are potential long-term benefits of tourism development for public health. Destination stakeholders should analyse the effects of tourism development on residents' health and develop new programmes and policies aimed at improving the health and well-being of local communities. The balance between the negative short-term impacts and positive long-term impacts of tourism development on residents' health can be determined to develop strategic plans for destination development. However, long-term health outcomes that are different from short-term impacts should be considered as more important effects of tourism and be taken into account by tourism statistics, tourism bodies, and destination management organizations. The proposed methods and models will also be useful in increasing the resilience and sustainability of tourist

destinations and allow community decision-makers to model and pretest sustainable interventions and policies during and after the COVID-19 outbreak. The current pandemic situation makes it possible to explore the impacts of tourism progressively at different levels of tourism development as tourism destinations will reopen and attract more visitors. The optimal level of tourism development for each type of destination can be determined based on the maximum positive impacts on residents' quality of life, health, and well-being.

Exploring both the long-term and short-term impacts of tourism makes it possible to better understand the impacts of tourism in comparison with considering undecomposed results. The decomposed trend and cycle components represent the long-term and short-term behaviour of the data on tourism arrivals, CO_2 emissions, income, and health. The tourist destinations' characteristics, tourist density and intensity, growth rate, tourism contribution to GDP, the intensity of transportation, etc. can also be included in the proposed models. In addition to measuring destination community residents' outcomes, tracking techniques can be pretested to receive information on visitors' behaviour based on geopositioning data, geolocation devices, geo-referenced photos, and the analysis of specific sites in a tourist destination (Padrón-Ávila & Hernández-Martín, 2020). The new composite metrics of tourism impacts on residents' health and well-being can be developed based on the secondary data from the national, regional, and local statistics and primary data collected from residents' surveys and social media analytics.

The selection of independent variables can be considered as a limitation of the study as it was limited by the availability of data. First of all, the average life expectancy does not represent the whole spectrum of health evaluations, including its physical, mental, social, and well-being components. Future studies of residents' health might include subjective, self-reported evaluations of residents' general health, physical distress, and mental distress, as well as additional psychophysiological and psychosocial indicators. Second, the GDP index as a measure of income can be influenced by government policies, unemployment levels,

inflation, and other causes (Aitken, 2019). Therefore, the distribution of income can also be taken into account in the case of the availability of the data. Third, future studies can also investigate the effects of additional determinants of residents' health, including access to health services, governmental policies, and residents' healthy behaviours. It will also be useful to apply subjective self-reported indicators of residents' health and income by conducting surveys of local people. Additionally, similar studies should be conducted in different countries and tourism destinations to explore the effects of destination types and cultural dimensions.

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