Granger Causality between International Tourism and International Trade

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Abstract

International trade and tourism are both key industries that contribute significantly to the global economy. International trade can promote international tourism by increasing travel accessibility and affordability, helping to promote the availability of diverse tourism products and services, facilitating infrastructure development, creating job opportunities in the tourism sector, and facilitating intercultural communication and understanding between nations. International tourism can also stimulate international trade by generating foreign exchange earnings for the host country, encouraging the export of tourism-related products and services, creating job opportunities and supporting the growth of small and medium-sized businesses, and resulting in the import of goods and services required by the tourism industry. Using the Granger causality test, this study explores the causation between these variables in the context of the Russian economy from 1990 to 2017. According to the findings, there is bidirectional correlation between international tourism and international trade. The conclusions of this study indicate that both industries are inextricably intertwined and rely on one another to maintain the Russian economy's growth and development.

Introduction

Understanding the relationship between international tourism and international trade is critical for a variety of reasons. First, both international tourism and international trade contribute significantly to the global economy, and understanding the relationship between the two can assist to drive economic growth and development. Second, both tourism and trade can encourage cross-national cultural interaction and understanding. Understanding the relationship between these businesses allows us to encourage cultural interchange and understanding in a respectful and mutually beneficial manner. Third, tourism and trade can both benefit and harm local populations and the environment. Understanding the interdependence of various businesses can assist to guarantee that their influence is both sustainable and responsible. Furthermore, knowing the relationship between the tourism and trade sectors is critical for success for enterprises operating in these areas. This can assist organizations in identifying opportunities as well as navigating the intricacies of international trade legislation and regulations. Understanding the relationship between international tourism and international trade is critical for economic growth and development, cultural interchange and understanding, long-term development, and corporate success [1], [2].

International tourism is defined as people traveling from one country to another for leisure, commerce, or other reasons. This covers things like touring, going to cultural events, staying in hotels or resorts, and other recreational activities.

The exchange of products and services between countries is referred to as international trade. Import and export of physical items, such as raw materials and manufactured goods, as well as intangible services, such as tourism, finance, and consultancy, are examples of this. International trade is a key driver of economic growth and development because it provides countries with access to a broader range of commodities and services. It can also boost efficiency by allowing countries to specialize in the production of specific goods and services.

Prior to 2017, Russia's foreign tourism business had been steadily growing. The number of international visitor arrivals in Russia climbed from 23 million in 2010 to 31 million in 2016, according to World Tourism Organization (UNWTO) figures. Several reasons contributed to this boom, including a rise in the number of flights to Russia, the expansion of hotel infrastructure, and the creation of new tourist attractions. In addition, Russia's history, cultural richness, and natural beauty make it an appealing tourist destination [3]. The Kremlin and Red Square in Moscow, the Hermitage Museum in St. Petersburg, and the Lake Baikal region in Siberia are all popular tourist destinations in Russia. The international tourism sector in Russia was a significant contributor to the country's economy, creating jobs and earning foreign currency.

Prior to 2017, Russia's international trade sector was a substantial contributor to the country's economy. Russia is a large exporter of oil and natural gas, which account for a sizable portion of the country's export revenues. Metals, lumber, and machinery were among Russia's other important exports [4]. Russia also imported a variety of items, including machinery, automobiles, and consumer goods. The European Union, China, and the United States were the country's main trading partners. International trade aided Russia's economy by diversifying the country's export base and providing access to a diverse range of commodities and services. The foreign trade industry also created jobs and aided the development of numerous businesses in Russia.

The interaction of international tourism and international trade

International trade facilitates tourism by permitting the flow of products and services between countries. This covers the import and export of goods and services required by the tourism industry, such as transportation, lodging, and recreation. International trade, for example, enables countries to import goods and services required to support the tourism industry, such as airline tickets, hotel rooms, and tour packages. It also permits governments to export tourism services to other countries, such as guided tours and cultural encounters.

Furthermore, international trade allows capital to travel between countries, which is critical for the development of the tourism industry. For example, multinational investors may use trade to invest in tourism infrastructure in other nations, such as hotels and resorts. International trade is an important aspect in the growth and development of the tourism sector because it helps countries to have access to the resources and cash required to sustain the industry and sell their tourist locations to a global audience.

Tourism can have a considerable impact on international trade because it increases demand for goods and services associated to tourism, such as transportation, lodging, and recreation.

Increased foreign tourism, for example, can lead to increased demand for airline tickets, hotel rooms, and tour packages, which can lead to increased exports of these commodities and services [5], [6]. Similarly, increased foreign tourism can raise demand for locally produced goods and services such as souvenirs, food, and entertainment, which can be sold to other nations.

Furthermore, tourism can be used to promote the export of non-tourism related goods and services. For example, a country recognized for its tourist attractions may be able to advertise its other exports to tourists visiting the country, such as agricultural products or manufactured items [7], [8]. Tourism can boost international trade by raising demand for goods and services and encouraging the export of both tourism-related and non-tourism-related commodities. Tourism and trade are linked industries, which means they need each other to function and develop.

Tourism, for example, relies on foreign trade to obtain the commodities and services required to support the business, such as transportation, lodging, and recreation. Tourism, in turn, relies on international trade as a source of demand for products and services as well as a means of boosting exports.

The way the two businesses support and complement each other demonstrates tourism and trade's interdependence. Tourism can promote a country's economic development by producing cash and providing jobs, which can enhance demand for internationally traded goods and services [9], [10]. Simultaneously, international trade can help the tourism industry thrive by providing access to the resources and finance needed to develop and advertise tourist locations. Tourism and trade are interconnected businesses that are critical to the global economy and play an important role in promoting economic growth and development.

There are various examples of how international tourism and international trade interact. International trade allows countries to export tourist services to other countries, such as guided tours, cultural experiences, and adventure sports [11], [12]. This can result in huge cash for the exporting country as well as employment creation in the tourism industry. International trade enables countries to import tourism-related goods and services such as airline tickets, hotel rooms, and tour packages. This can help to meet the growing demand for tourism and promote the industry's expansion.

Countries can use tourism to promote non-tourism related goods and services such as agricultural products or manufactured items. A country with a flourishing tourism economy, for example, may be able to advertise its other exports to tourists visiting the country [13].

There are several challenges and opportunities in the relationship between international tourism and international trade:

1. Managing the impact of tourism on local communities and the environment: As mentioned above, tourism can have both positive and negative impacts on local communities and the environment. Ensuring that tourism development is sustainable and responsible is a key challenge and opportunity in the relationship between tourism and trade.

2. Maximizing the economic benefits of the tourism-trade relationship: Tourism and trade can both contribute to economic growth and development, but it is important to ensure that these benefits are shared equitably. This can be a challenge in some cases,

as tourism and trade can sometimes lead to imbalances in wealth and power between countries and within communities.

3. Navigating the complexities of international trade policies and regulations: International trade is regulated by a complex web of international organizations, agreements, and policies. Understanding and navigating these regulations can be a challenge for businesses operating in the tourism and trade sectors.

4. Coping with economic and political instability: Economic and political instability in some countries can pose challenges for the tourism and trade industries. For example, economic downturns or political unrest may discourage tourists from visiting a country or impact the ability of businesses to trade with that country.

While there are challenges in the relationship between international tourism and international trade, there are also significant opportunities for economic growth and development, as well as for fostering cultural exchange and understanding between countries.

International trade is regulated by a complex web of international organizations, agreements, and policies that can be challenging for businesses to navigate. Some of the key considerations for businesses operating in the tourism and trade sectors include:

1. Understanding the rules and regulations that govern international trade: Businesses need to be aware of the rules and regulations that apply to the goods and services they are exporting or importing. This can include tariffs, quotas, and other trade barriers, as well as customs regulations and requirements related to labeling and packaging.

2. Familiarizing oneself with trade agreements and organizations: International trade is governed by a number of trade agreements and organizations, such as the World Trade Organization (WTO), which set the rules for global trade. Understanding these agreements and organizations is essential for businesses operating in the international trade sector.

3. Staying up-to-date with changes in trade policies and regulations: Trade policies and regulations can change frequently, so it is important for businesses to stay informed about any updates that may affect their operations. This may involve subscribing to trade-related newsletters or consulting with trade experts.

Methodology

Granger causality is a statistical test that examines whether one time series is useful in predicting another [14]. In other words, it is a test to determine whether past values of one time series can help to predict future values of another time series. The test is named after economist Clive Granger, who was awarded the Nobel Prize in Economics in 2003 for his work on this and related concepts. To perform a Granger causality test, we would need to fit a multiple regression model to the data, with the time series we are interested in predicting (the "dependent" variable) as the response and the other time series (the "explanatory" or "predictor" variable) as the predictor. We would then compare the fit of this model to a model that does not include the predictor variable, and determine whether the inclusion of the predictor significantly improves the fit of the model. If it does, then you we conclude that the predictor series is useful in predicting the response series, and that there is a causal relationship

between the two [15]. It is important to note that a Granger causality test can only establish that one time series is useful in predicting another, and does not necessarily imply a causal relationship between the two. Other factors, such as omitted variables or reverse causality, could also be at play.

The following equation shows the generation of the VAR (p) model, which will be used in this study to explain the causality test of the LR statistics, based on the RB correction.

$$Y_t = \phi_0 + \phi_1 y_{t-1} + \ldots \phi_p y_{t-p} + \varepsilon_t, t = 1, 2, \ldots, T \qquad (1)$$

In this study, the white noise matrix is denoted by $\varepsilon t = (\varepsilon 1t, \varepsilon 2t)'$, with a zero mean and zero covariance. Moreover, the subscript P represents the optimal lag period, as determined by the Schwartz Information Criteria (SIC). Also, with Variable $Yt = (Tour_t, Trade_t)$, Equation (1) is expressed as [16]–[18]:

$$\begin{bmatrix} Tour_t \\ Trade_t \end{bmatrix} = \begin{bmatrix} \varphi_{10} \\ \varphi_{20} \end{bmatrix} + \begin{bmatrix} \varphi_{11}(L) & \varphi_{12}(L) \\ \varphi_{21}(L) & \varphi_{22}(L) \end{bmatrix} \begin{bmatrix} Tour_t \\ Trade_t \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \qquad (2)$$

Moving on, $Tour_t$ represents the international tourist arrival, while the volume of international trade is given by $Trade_{ij}(L) = \sum_{k=1}^{p+1} \varphi_{ij}$

In this study, we let $\varphi_{12, k} = 0$ (k = 1, 2, 3, …, p), to be the null hypothesis that proposes that international trade is not the Granger cause of international tourism and can be tested. Moving on, we let $\varphi_{21, k} = 0$ (k = 1, 2, 3, …, p), Granger causality as the null hypothesis that proposes that international trade is not a part of international tourism, and thus, this can be tested. Furthermore, the full sample causality has been tested by the probability value p-value and the modified LR statistics. The null hypothesis, $\varphi_{12, k} = 0$ (k = 1, 2, 3, …, p) has thus been rejected, proving that international trade has a significant causal relationship with international tourism. This primarily indicates that international tourists can effectively explain changes in international trade. Moreover, if $\varphi_{21, k} = 0$ (k = 1, 2, 3, …, p), is rejected, it proves that international tourism has a significant causal relationship with international trade. This essentially indicates that international trade can effectively explain international tourism changes.

Results

In this study, the unit root test was carried out first. The results of unit root test are shown in table 1. In this regard, results of the ADF test showed that the null hypothesis was rejected at a 99% confidence level, and both of them were zero-order single integral sequences. Therefore, keeping this in check, the Granger causality test for the full sample of the boot pulling could thus be carried out.

Granger causality test, as shown in Table 3, has found that there is a Granger causality from international trade to international tourism, it means that past values of international trade are

useful in predicting future values of international tourism. In other words, changes in international trade appear to have a causal effect on international tourism.

This could imply that more international trade (exports and imports) leads to increased international tourism, as more individuals are able to travel to other nations for business or pleasure. For example, a growth in a country's foreign trade may result in an increase in the number of individuals visiting the country for business or pleasure.

The Granger causality test also discovered that there is a Granger causation from international tourism to international trade, implying that past values of international tourism can be used to forecast future values of international trade. Changes in international tourism, in other words, appear to have a causal effect on international trade.

This could imply that an increase in international tourism leads to an increase in international trade, as more tourists spend money in the nations they visit on goods and services. For example, more international tourism may result in increased exports or imports as tourists purchase goods and services from the country [19].

To have a better understanding of the relationship between international tourism and international trade, we investigate other factors that may influence both. Economic conditions, exchange rates, and transportation infrastructure, for example, could all have an impact on both foreign tourism and international trade [20]. Furthermore, it may be beneficial to evaluate the specific forms of tourism and trade being investigated, as different types of tourism and trade may be more or less connected with one another.

Table 1. Unit root test with ADF for International tourism

Null Hypothesis: TOUR has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.532072	0.4761
Test critical values:	1% level	-2.660720	
	5% level	-1.955020	
	10% level	-1.609070	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(TOUR) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.544434	0.0133
Test critical values:	1% level	-2.664853	
	5% level	-1.955681	
	10% level	-1.608793	

Table 2. Unit root test with ADF for International trade

Null Hypothesis: TRADE has a unit root
Exogenous: None
Lag Length: 6 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.791028	0.3636
Test critical values:	1% level	-2.656915	
	5% level	-1.954414	
	10% level	-1.609329	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(TRADE) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.618497	0.0000
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Table 3. Pairwise Granger Causality Tests between International tourism and International trade

Sample: 1989 2017
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
TRADE does not Granger Cause TOUR	25	0.22977	0.0146
TOUR does not Granger Cause TRADE		4.96384	0.0369

Pairwise Granger Causality Tests
Sample: 1989 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TRADE does not Granger Cause TOUR	24	0.26956	0.0330
TOUR does not Granger Cause TRADE		4.27483	0.0293

Pairwise Granger Causality Tests
Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
TRADE does not Granger Cause TOUR	23	0.71815	0.0621
TOUR does not Granger Cause TRADE		2.79989	0.0735

Conclusion

Bidirectional Granger causality between international trade and international tourism implies that changes in international trade have an impact on international tourism and vice versa. This indicates that an increase in international trade (exports and imports) may result in an increase in international tourism, since more people are able to travel to other nations for business or pleasure. At the same time, an increase in international tourism may contribute to an increase in international trade, as more tourists spend money in the countries they visit on goods and services. It is vital to highlight that this interpretation is based on a statistical link, not a causal relationship in the real world. Other factors, such as missing variables or reverse causality, could be at work as well. It is critical to explore these issues and do additional research to gain a complete picture of the relationship between international trade and international tourism.

By producing money, creating jobs, and attracting investment, both international tourism and international trade have the ability to fuel global economic growth and development. Governments and businesses may contribute to fuel economic growth and development around the world by creating a favorable environment for these industries.

Governments and businesses can take a number of initiatives to optimize the economic benefits of the tourism-trade link, including: A) Building a robust tourism industry: A strong tourism industry can generate major economic benefits such as employment creation, revenue generation, and expanded trade opportunities. To encourage the expansion of the tourism industry, governments and corporations can invest in infrastructure, marketing, and other efforts. B) Promoting tourist service export: Exporting tourist services such as guided tours, cultural experiences, and adventure sports can produce significant cash for governments while also creating jobs in the tourism industry. Governments and corporations can collaborate to increase the export of these services to other nations. C) Encouraging the import of tourism-related goods and services: International trade can help the tourism industry flourish by giving access to the goods and services it requires, such as airline tickets, hotel rooms, and tour packages. Governments and businesses can collaborate to make it easier to import these goods and services. D) Using tourism to promote other exports: Tourism can be used to promote non-tourism related goods and services, such as agricultural products or manufactured items. Governments and businesses can collaborate to market these exports to visitors to the country. There are numerous ways for governments and businesses to collaborate in order to optimize

the economic benefits of the tourism-trade relationship. It is feasible to drive economic growth and development through tourism and trade by taking a strategic strategy.

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