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Economic conditions and tourism development: The case of Greece

Members of committee: Dr. Ch.Christou (Supervisor)
Dr. A.Antzoulatos
Dr. G.Skiadopoulos

KATSIROUMPA EVGENIA
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1 ABSTRACT

Tourism includes a wide array of economic activities on an international scale and is directly related with the development of every modern society.
In this study we examine the causal relationship between:

- tourism development and economic conditions in Greece,
- tourism development in Greece and economic conditions in regions that represent its main important sources of tourism (USA, Europe, Italy, Germany, Great Britain and France)

Granger causality test is performed to reveal the existence and the direction of the relationship between economic growth and tourism development.

2 INTRODUCTION

The purpose of this study is to examine the ability to which economic variables can predict the level of tourism development and on the other side the level that tourism development can influence the whole economy. The variables we use to measure tourism development are tourist arrivals and tourist receipts while the variables that represent the economy are GDP (Gross Domestic Product), Industrial production and Stock market Index. Our main target is to seek the existence of dependence between both of them and hereupon to find the direction of this dependence.

In the *third* chapter of this thesis we try to give a theoretical explanation about tourism, tourism demand and tourism's influence so as to understand the interdependence between tourism and overall society or economy.

In the *fourth* chapter we present extensively relative to our subject articles that help us to our theoretical and econometrical approach.

The *fifth* chapter describes the data and the econometric method. For the conduction of our research we use the Vector Autoregressive Method (VAR) model and Granger causality test in order to identify relationships between the variables that we have under investigation.

Empirical research is conducted for tourism development and economic conditions in Greece as well as for tourism development in Greece and economic conditions in USA, Europe, Italy, Germany, Great Britain and France that constitute the most popular sources of tourism for Greece. In the same chapter we comprehend the empirical results of our research.

Finally, the *sixth* chapter provides some data about the current economic and financial conditions in the examined countries and additionally some aspects about the future trends in Greek tourism product.

3 TOURISM AND ECONOMY

3.1 Definition of tourism

Tourism refers to the activities of visitors and their role in the acquisition of goods and services. A visitor is a traveler who takes a trip to a destination outside his residence for less than a year and for any purpose (business, leisure or other personal reason)[1].

Another definition of tourism according to the World Tourism Organization (WTO) is the following: International tourism includes the activities of visitors who make temporary visits across international borders, outside the usual place of work and residence, and remain for more than 24 hours. The main purpose of travel can be leisure, visiting friends and relatives, business, sports, education, meetings but in any case can't have as motivation the exercise of anyone speculative activity[2].

The last decades, tourism has become one of the largest and fastest growing economic sectors in the economy of nearly all countries that have strong basis in the field of tourism. Over time, more and more countries have invested in tourism development turning tourism to a social, cultural and economic phenomenon, important for economic progress and crucial in diminishing peripheral inequities. One could certainly claim that tourism has become one of the most remarkable success stories of modern times. The tourism industry, which only began on a massive scale in the 1960's, has grown rapidly and steadily for the past 30 years in terms of the income it generates and number of people who travel abroad. It has proved to be resilient in times of economic crisis and will continue to grow at a rapid pace of almost 4 per cent a year in the years to come[3].

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[1] Norbert Vanhove (2005), *The economics of tourism destinations*, Butterworth-Heinemann, pages 1-8.

[2] Technical Manual (No2) (1995), *Collection of Tourism Expenditure Statistics,* World Tourism Organization, pages 1-14.

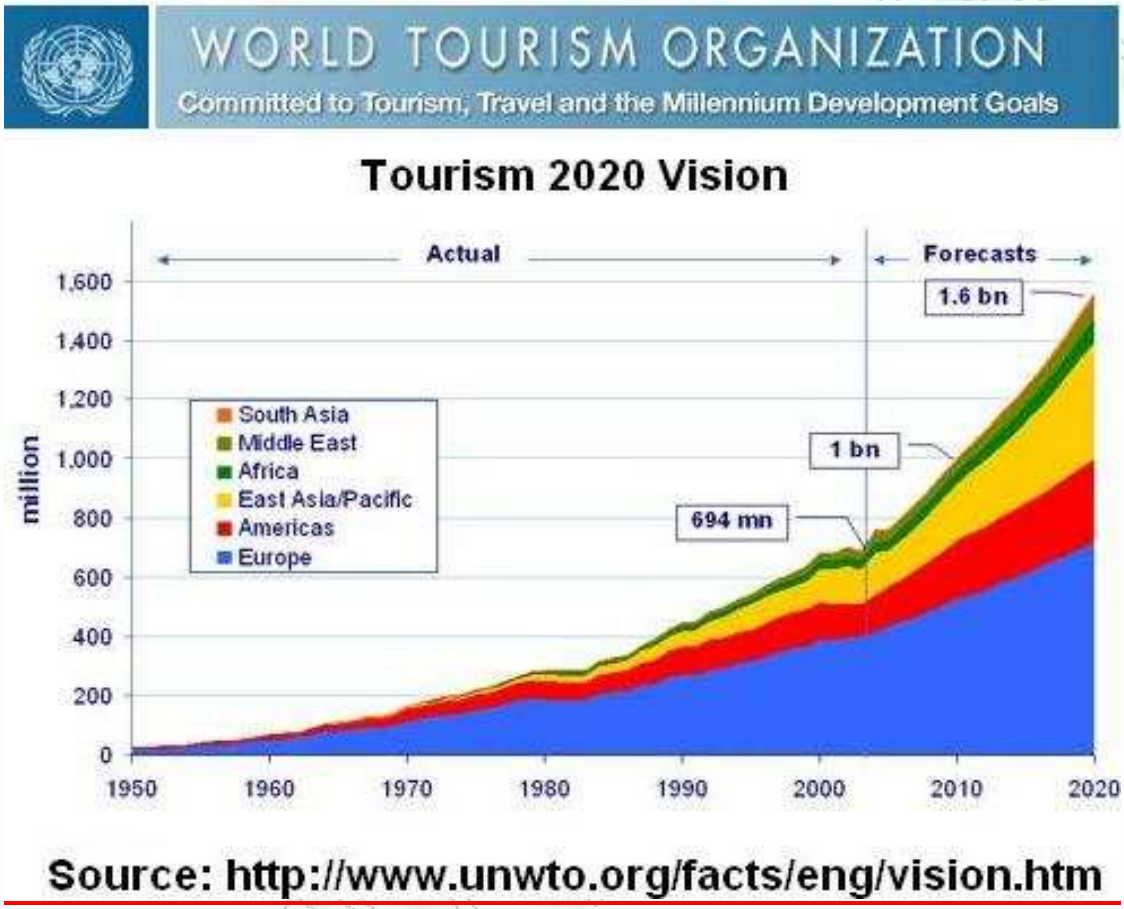
[3] William F. Theobald (1998), *Global tourism*, Butterworth-Heinemann, page 7.

Tourism has also become one of the major international trade categories. The income generated by international tourism ranks fourth after fuels, chemicals and auto motive products. It is one of the main income sources and primal export category, creating employment and opportunities to development. Thus, governments, entrepreneurs and policy makers should assess and measure the tourist demand so as to settle properly their investments. As more and more governments recognize the important role that tourism can play in generating foreign exchange earnings, creating jobs and contributing to tax revenues, the competition for tourist spending is becoming more and more intense. Pressure on national and local governments to rapidly develop their tourism potential to meet demand and produce benefits, makes it more essential than ever to plan carefully and consider the human and environmental impacts of tourism development.

The necessity of such actions can also be outpointed in numbers. According to World Tourism Organization (WTO) forecasts, 1.6 billion international tourists will be travelling by the year 2020, spending more than US$2 trillion annually – or US$5 billion every day[4].

[4] Francesco Frangialli (Secretary General of World Tourism Organization) (1998), Foreward in William F. Theobald's, *Global tourism*, Butterworth-Heinemann, page 8. And data available at the United Nations World Tourism Organization Site at the following link: http://www.unwto.org/facts/eng/vision.htm

Figure 1:


WORLD TOURISM ORGANIZATION
Committed to Tourism, Travel and the Millennium Development Goals
Tourism 2020 Vision
Actual
Forecasts
1.6 bn
1 bn
694 mn
South Asia
Middle East
Africa
East Asia/Pacific
Americas
Europe
million
1,600
1,400
1,200
1,000
800
600
400
200
0
1950
1960
1970
1980
1990
2000
2010
2020
Source: http://www.unwto.org/facts/eng/vision.htm

3.2 Tourist demand

The term "tourist demand" may be defined for a particular destination as the quantity of the tourism product (that is, a combination of tourism goods and services) that consumers are willing to purchase during a specified period under a given set of conditions. The time period may be a month, a quarter, or a year. The conditions that relate to the quantity of tourism demand include tourism prices for the destination (tourists' living costs in the destination and travel costs to the destination), tourist prices in competing (substitute) destinations, potential consumers' incomes, advertising expenditure, tastes of consumers in the origin (generating) countries, and other social, cultural, geographic and political factors.

It is therefore easy to form a demand function for the tourism product in destination ***m*** by residents of origin ***n*** and this can be given by the following:

$$Q_{mn} = f(P_m, P_s, Y_n, T_n, A_{mn}, \varepsilon_{mn})$$

where Q_{mn} is the quantity of the tourism product demanded in destination ***m*** by tourists from country ***n***; P_m is the price of tourism for destination ***m***; ***Ps*** is the price of tourism for substitute destinations; Y_n is the level of income in origin country ***n***; T_n is consumer tastes in origin country ***n***; A_{mn} is advertising expenditure on tourism by destination ***m*** in origin country ***n***; ε_{mn} is the disturbance term that captures all other factors which may influence the quantity of the tourism product demanded in destination ***m*** by residents of origin country ***n***.

Many analysts see tourist demand as the foundation on which all tourist-related business decisions ultimately rest. Governments and companies such as airlines, tour operators, hotels, cruise ship lines, and recreation facility providers are interested in the demand for their products by tourists. The success of many businesses depends on the state of tourist demand, and

ultimate management failure is quite often due to the failure to meet market demand.

Because of the key role of demand as a determinant of business profitability, estimates of expected future demand constitute a very important element in all planning activities[5].

Considering the data availability, tourism forecasting techniques fall into two major categories: quantitative and qualitative forecasting. If little or no quantitative information is available, but sufficient qualitative knowledge exists, qualitative forecasting approaches are appropriate. When sufficient quantifiable information about the past is available and the objective numerical measurements are consistent over the historical period, quantitative forecasting should be adopted.

Considering the number of published studies, quantitative forecasting dominates the tourism literature. Quantitative forecasting methods can be further divided into two subcategories: causal and non-causal methods, depending on if there are any explanatory variables included or not in the models. Causal methods, principally the econometric models, can not only predict the trends of future tourism demand, but also interpret the causes of variations in tourism demand. Hence, causal forecasting methods can provide useful information for both policy evaluation in the public sector and strategy formulation in various tourism businesses[6]. Both quantitative and qualitative methods use certain variables that most of the times determine the tourist demand negatively or positively. Some of them have already been referred in the above demand function but some additional determinant variables are the following:

- National income per capita is generally included as a key explanatory variable, and usually indicates the ability of consumers to travel. A steady increase of income creates more wealth, and gives people the opportunity to leisure and travel more. On the other hand a tightening

[5] Haiyan Song, Stephen F. Witt, Gang Li (2008), *The Advanced Econometrics of Tourism Demand,* Routledge, pages 14-48.

[6] Gang Li, Haiyan Song (2007), *New Forecasting Models*, The Hong Kong Polytechnic University, pages 1-2.

of the income will result on a decrease of tourism spending. Rising income is the most powerful generator of tourism flows.

- The exchange rate for a period is also one of the most significant influence factors for the tourism. Exchange rates affect the willingness to travel. Depreciation of currency in one country reduces the number of tourists from this country to travel, whereas appreciation of the same currency reduces the travel costs for these tourists to travel abroad, increases their travel demand, and in turn, increases the number of tourists from this particular country to travel abroad. The justification for including a separate exchange rate variable in international tourism demand functions is that consumers are more aware of exchange rate than destination costs of living for tourists; hence they are driven to use it as a proxy variable. However, the use of exchange rates alone in the demand functions can be very misleading because even though the exchange rate in a destination may become more favourable, this could be counterbalanced by a relatively high inflation rate.
- Transportation costs are assessed for all tourists. Although the theoretical justification for including transport cost as a demand determinant does not appear to be disputed, many empirical studies exclude this variable from the demand function on the grounds of potential multicollinearity problems, lack of data availability, and the price gap between high and low seasons. Some studies clearly don't prefer using this variable as a key variable in tourism modeling procedure[7]. However, it is possible to obtain an approximate measure of transport (planes, trains, boats, or coaches) cost using representative airfares between origin and destination for air travel, and representative petrol costs and/or ferry fares for surface travel. Concluding we could mention that an increase in petrol prices directly

[7] Sung Soo Pyo, Muzaffer Uysal, John T. Warner (1996), *Sure Estimation of Tourism Demand System Model: United States Case*, in Daniel R. Fesenmaier, Joseph T. O'Leary, Muzaffer Uysal, *Recent advances in tourism marketing research*, Haworth Press, pages 145 - 159.

affects the travel costs of tourists and as a result, they are less willing to travel abroad.

- Consumer Price Index (CPI) is usually taken to be a proxy for the cost of tourism in a destination country. The problem of using the CPI as the cost of tourism in the destination is that the cost of living of the local residents does not always reflect the cost of living of foreign visitors to that destination, especially in poor countries. However this procedure is adopted on the grounds of lack of more suitable data, that is, an index "defined over the basket of goods purchased by tourists, rather than over the usual typical consumer basket"[8]. Potential tourists base their decisions on tourism costs in the destination measured in terms of their local currency, and therefore the destination price variable should be adjusted by the exchange rate between the origin and destination currencies.
- Marketing: National tourist organizations engage in sales-promotion activities specifically to attempt to persuade potential tourists to visit the country, and these activities may take various forms, including media advertising, official participation in major Tourism Exhibitions around the globe and public relations. Hence, promotional expenditure is expected to play a role in determining the level of international tourism demand.
- Taxation of travel and tourism: When tourists travel, they encounter a large array of taxes. They may have to pay an entry tax when they visit another country or an exit tax when they leave. During their stay, they may encounter more taxes levied on their purchases ranging from hotel room rentals, restaurant meals, gifts and souvenirs, car rentals, admission to visitor attractions and others. Taxing tourism is one way for tourist destinations to reap the economic gains from tourism development. There of course sound economic reasons for taxing tourism beyond simply collecting revenues to provide public services to

[8] M.L.Kliman (1981). A quantitative analysis of Canadian overseas tourism. *Transportation Research*, 15A (6), pages 487-497.

tourists and their suppliers. A well-designed system of tourism taxation can benefit the residents of destinations in a number of ways; it can broaden and increase the revenue elasticity of the destination's tax base, extract economic rents, and protect the environment. It can also benefit tourism by making more money available for tourism promotion and for the construction and operation of convention centers[9].

- Social, demographic or environmental factors that also determine the tourist demand (such as sex, age, education, marital status, eco-friendly tourism activities and others). A typical example of such a wide variety of reasons that determine the tourist demand are tourism destinations like Ibiza in Spain, Agia Nappa in Cyprus, Faliraki in Greece that attract only music based tourists that have a particular attitude and lifestyle as tourists.
- Political factors, Special Events, Travel Restrictions/Directives[10]: It is easy to understand that in times of political instability some of the most attractive travelling destinations could become a very hostile place to be i.e. Jerusalem in time of conflict with the Palestine's. We could claim exactly the opposite when we refer to special events such as an Olympiad when a huge amount of tourists visit the host country and the tourism product explodes.

Tourist demand is measured most of the times by tourist arrivals and tourist receipts but definitions of both of them will be given in the 5.1 chapter where we describe explicitly our data.

[9] James Mak (2006), Taxation of travel and tourism, in Larry Dwyer, Peter Forsyth International handbook on the economics of tourism, Edward Elgar Publishing, pages 251-266

[10] Kevin K.F. Wong, Haiyan Song (2003), *Tourism forecasting and marketing* Haworth Press, page 87.

3.3 Influence of tourism

Tourism development, if well organized, boosts the economy and gives the possibility to many people of the destination country to improve their way of living. Tourism affects not only the economy but also the society and the environment too.

According to P.G.Sadler and B.H.Archer, tourism brings economic advantages and disadvantages, the most significant of those are the following:

1. Foreign exchange earnings
2. Income
3. Employment
4. Infrastructural changes
5. Effects on domestic prices
6. Environmental and ecological effects
7. Social effects

1. The effects of foreign exchange earnings

Tourism brings in foreign exchange which can be used to import capital goods in order to produce goods and services, leading in turn to economic growth (Mc Kinnon, 1964) .If those imports are capital goods or basic inputs for producing goods in any area of the economy, then in can be said that earnings from tourism are playing a fundamental role in the economic development.

Tourism receipts consists a part of the total foreign exchange receipts which in turn are a part of the current account and generally a part of the balance of payments.

2. **Income effects**

It has been shown in previous studies that tourism development brings growth in the tourist income and by means of income multiplier the growth of the national income. But the primary aim of tourism is the opportunity to create investment plans (through the obtaining of foreign exchange) in order to create greater income and wealth in the future.

3. **Employment effects**

Tourism is labor intensive and can absorb a large number of semi-skilled and unskilled workers creating new jobs in the local regions. The workers come not only from the tourist sector, whose main purpose is to serve tourists, but also from other areas of the economy, like farmers, communications companies, road engineers, and telephone services etc who contribute indirectly to meeting the need of tourists.

4. **Infrastructural changes**

The growth of tourism creates a need for infrastructure in the local economies. Hotels and other accommodation units, local shops, restaurants, transportation system, water supplies and sanitation roads, airports, and other public utilities need improvement. Many of these services are simultaneously available to local residents.

5. **The effect of domestic price levels**

The expansion o tourism creates an increased demand both for imported goods and for local products and factors of production

6. **Environmental and ecological effects**

Tourist effects in the environment are sometimes positive and other times negative. Uncontrolled tourist development can damage environmental conditions and this should be taken into account in cost-benefit analysis. On the other hand however in many cases tourism consists a major factor that preserves environmental and ecological heritage.

7. **Social effects**

One of the most demonstrative effect of tourism is that stimulates the native population to work harder and to improve their living standards in their regions. In other words, tourism contributes to decentralization and gives incentives to local people to work and live to islands or mountain villages.

Another social benefit is that tourism brings a better understanding and goodwill between nations, especially in terms of religious coexistence and understanding.

Another important effect that tourism brings to a society which is not included in the above list is the **tax revenue**. Tourist investments and the development of many small tourist shops and firms lead to the increase of tax revenues. Also, in many cases people who are involved in tourism have high levels of income and respectively governments collect high levels of taxes.

In the next chapter we analyze the influence of tourism by economic circumstances and vice versa. Thus, there will be an extended presentation of researchers that have argued upon this issue and some times they have concluded in conflicting results.
The most significant articles concerning this issue are to be presented on the following part of our research.

4 Literature Review

2008: Revisiting the tourism-led- growth hypothesis for Turkey using the bounds test and Johansen approach for cointegration

Salih T.Katiciorglou

The data that Salih Katiciorglou used in this study are annual figures covering the period 1960-2006 and the variables are real gross domestic product (GDP), total number of international tourists visiting and real exchange rates. He suggest that real exchange rates be included in the discussion of international tourism in order to deal with potential omitted problems .All the variables are in their natural logarithm where the GDP variable is at 2000 constant US dollar prices. Data were taken from World Bank Development Indicators (World Bank, 2006) and Turkish Institut of Statistics (TURKSTAT, 2007)

This paper investigates long-term equilibrium relationship between international tourism and real GDP by the bounds test (developed by Pesaran et all) and Johansen technique for cointegration in the case of Turkey, which is a large destination country in a strategic region of the world.

The above mentioned techniques show that that no cointegration exists between real GDP, international tourist arrivals and real exchange rates in Turkey since trace statistics are not statistically significant.

2008: The impact of crisis events and macroeconomic activity on Taiwan's international inbound tourism demand

Yu-Shan Wang

This paper intends to establish a demand model of inbound tourism in Taiwan, and to analyze the relationship between macroeconomic variables and inbound tourism demand.

Data are used from the period of 1996: Q1 to 2006: Q2 and collected from IMF international financial statistics.

Tourism demand variables can be measured with tourist flows (the number of inbound tourists, the total number of tourist stays, or the average numbers of days of a tourist stay) and tourist expenditures. (Coshall 2000).On the other hand the variables that determine the economy are the level of income , price, exchange rate, oil prices , past tourist arrivals and dummy variables.

To explore the influence of the above variables this paper uses the auto-regression distributed lag model (ARDL) by Pesaran, Shin and Smith and bounds testing approaches to the analysis of their long run relationship.

The number of inbound tourism arrivals directly impacts the tourism industry and the government agencies, therefore policymakers need to improve their understanding of how crisis events affect the demand for inbound tourism. This paper finds that income, exchange rates, prices, transportation costs, and the number of inbound tourist arrivals in the previous period affect the willingness of Japanese tourists to come to Taiwan. This paper also examines the impact of four major disasters: The Asian financial crisis in 1997, the 21st September 1999 earthquake, the 11th September 2001 attacks in the United State and the outbreak of SARS in 2003 and found that tourism industry is more susceptible to disaster, crisis, and shock events and that any impact on safety, whether domestic or international, negatively affects tourism demand. Thus, the influence of economic crises on the number of tourists is slower.

2007: The tourism economy causality in the United States: A sub-industry level examination

Chun-Hung (Hugo) Tang ,SooCheong(Shawn) Jang

The US tourism industries are among the largest employers in the country and generate the largest tourism receipts in the world (World Tourism Organization, 2006).Thus , the tourism industry is more of a system that incorporates a variety of different types of businesses and organizations, such us lodging establishments, airlines, restaurants and casinos(American Hotel & Lodging Association, 2006).Therefore, investigating the tourism – economy relationship on the sub-industry level could generate more precise outcomes on the dynamism between economic and tourism development. In measuring the performance of tourism industries he adopted a more direct approach by aggregating industry sales revenue to avoid the possible distortion caused by the prediction of future cash flows and discount rate. Also for measuring the general economic development in the US they used the gross domestic product. Both the GDP and aggregate industry sales revenue are not adjusted for seasonality because they want to keep as much information as possible and they are also interested in short term causality.

The quarterly sales data was collected from tourism related companies was collected from the COMPUSTAT database for the most recent 25 year period(Quarter 1, 1981 to Quarter 4, 2005) to measure the development of tourism related industries.

The interrelationship among the four industries (airlines, casinos, hotels, and restaurants) and GDP in the USA were then examined by the Granger causality test. This method is best suited to determine whether the lags of one variable enter into the equation for another variable (Enders, 1995).The results indicated a unidirectional causality from GDP to the four tourism industries. Three uni-directional causality relationships were observed between industries: from AIR to CASINO, from AIR to HOTEL, and from HOTEL to REST. A bi-directional causality exists between HOTEL and CASINO .The results suggest that tourism industries in the USA generally

benefit from economic development in the short term while lacking long –term equilibrium with the economy due to the lack of cointegration between series. Since extant studies have focused on the relationship between overall tourism growth and economic development, this study fills a gap in the literature by investigating both the tourism economy causality on the sub-industry level. The unidirectional causality from GDP to industry performance may reflect the small contribution of the overall economy to these industries in the short run. By improving the general economic/ business environment, tourism related industries could benefit from the favorable economic situation and offer better service and goods, which may in turn strengthen the pull factors of the country as a destination and eventually benefit the overall economy.

2007: Modeling international tourism and country risk spillovers for Cyprus and Malta

Suhejla Hoti, Michael McAleer and Riaz Shareef

This paper provides a comparison of tourism growth, country risk returns and their associated volatilities for Cyprus and Malta .Since these economies depend primarily on tourism earnings as a source of foreign exchange and employment, a careful examination of volatility of tourist arrivals is important for a government's macroeconomic policy.

Sites (small island tourism economies) usually find difficulties in borrowing in commercial markets or in obtaining information because they are considered to be high risk. Consequently it is essential to analyze the risk ratings and risk returns of these SITES which influence direct the tourist growth of a country.

Country risks refers to the likelihood that a sovereign state or borrower from a particular country fail to meet their obligations towards foreign lenders and investors. Country risk assessment evaluates economic, financial and political factors, and their interactions in determing the risk associated with a particular country.

Monthly data are used for both international tourism growth and composite country risk ratings compiled by the International Country Risk Guide (2004) for the period 1986- 2002.

The analysis in this paper is based on Engle (1982) development of time-varying volatility using the autoregressive conditional heteroscedasticity (ARCH) model. Two other correlation models are the symmetric VARMA – GARCH model of Ling and McAleer(2003) and the asymmetric VARMA-GARCH model of McAleer et al.(2005).

Small island tourism economies (SITES) are developing sovereign countries that rely on tourism as a source of exports, and need a consistent inflow of foreign investment in order to facilitate economic growth. This paper presents a novel analysis of fluctuations and volatility in country risk and tourism growth. Perceptions of the determinants of country risk are important because they affect both the supply and cost of international capital flows. As tourism is a service export, tourism earnings are accommodated in current account balance which is one of the variables in all the rating systems. Therefore, higher tourism earnings lead to a higher current account balance, higher economic and financial risk ratings, and hence higher composite risk ratings. The higher the composite risk rating, the higher is the creditworthiness of a country, the higher are the inflows of foreign capital and investment which in turn will lead to the country's development.

2007: Tourism expansion, tourism uncertainty and economic growth: New evidence from Taiwan and Korea

Ching-Fu Chen, Song Zan Chiou-Wei

The causal relationship between tourism expansion and economic growth in two Asian countries: Taiwan and South Korea is also examined.

The data used in this paper are real GDP, real exchange rates relative to the US dollar, tourism receipts, tourist arrivals that are obtained from various sources such us the financial database of the Taiwan Economic Journal (TEJ), the International Financial Statistics of the International Monetary Fund

(IMF), the Korean National Tourism Organization, and the Taiwan Tourism Bureau.

This study investigates the links between tourism, tourism uncertainty and economic growth using quarterly observations over the period of 1975 Q1-2007 Q1 for Taiwan and South Korea.

To estimate this relationship, they adopt the GARCH in mean (E-GARCH-M) model of economic growth and tourism expansion. The results from this model give us the causal relationship between economic growth and tourism expansion, as well as provide information about the impacts of uncertainty or volatility of both variables.

The feature of uncertainty is often present in many time series including tourism demand .More specifically tourism demand is sensitive to news related to security and health, including disease, war, natural disaster, terrorism and political instability. Surprisingly the issue of uncertainty has been neglected in previous studies

The results indicate that the tourism –led economic growth hypothesis is supported for Taiwan while a reciprocal causal relationship is found for South Korea which are different from the previous country-specific studies (reciprocal relationship for Taiwan by Kim and economic driven tourism growth hypothesis for South Korea by Oh).The results of the causality provide governments with useful information to examine their economic development policy, to adjust priorities regarding economic investment , and to boost national economic growth given limited sources.

2007: Tourism development and economic growth: A closer look at panels

Chien-Chiang Lee and Chun-Ping Chang

This paper applies the new heterogeneous panel co integration technique to reinvestigate the long run co movements and causal relationship between tourism development and economic growth for 23 OECD countries and 32 non OECD countries for the 1990-2002 period .The multivariate model will

use as variables: tourism real receipts per capita, the number of international tourist arrivals per capita, real effective exchange rate, a proxy variable for external competitiveness, and real GDP per capita.

On the global scale , after allowing for the heterogeneous country effect, a cointegrated relationship between GDP and tourism development is substantiated .It is also determined that tourism development has a grater impact on GDP in non OECD countries than in OECD countries, Additionally, the real effective exchange rate has significant effects on economic growth. Finally, in the long run, the panel causality test shows unidirectional causality relationships from tourism development to economic growth in OECD countries, bidirectional in non OECD countries, but only weak relationships in Asia.

2005: German demand for tourism in Spain

Teresa Garin Munoz

According to World Tourism Organization (WTO),the Spanish economy is heavily dependent on tourism .The most of the tourists, arriving from United Kingdom and Germany but in this study only the German market is examined. To determine the German demand for tourism in Spain a model is constructed which includes the below variables:

As dependent variable is used the number of visitors arriving in a destination , and particularly the number of overnight stays in hotels and other establishments.

The first explanatory variable that is tested is the lagged dependent variable that in this case is the previous tourist arrivals. Including lagged variables reduces the uncertainty associated with holidays and furthermore the conclusion of the impact of past tourism excludes the overestimating of the effects of the relevant variables. Another explanatory variable is the income as defining by the Gross Domestic Product of Germany. When Germany's income increases, the number of nights spent in Spain will also increase.

In order to include price variable as another explanatory factor in this study, an index is constructed. This index expresses the cost of living of tourists in the destination country relative to the cost of living in the origin country adjusted by the exchange rate.

Other important explanatory variables are the cost of travel as expressed with the price of crude oil and finally some special factors that may influence the demand for international tourism.

The dynamic model used in this study provides short and long-run elasticities for the variables of interest and is thus valid for short term and long term predictions and also uses the method GMM-DIFF of Arellano and Bond through which the problem of non-stationarity is avoided.

One of the main conclusions of this study is the significant value of the lagged tourist arrivals which shows the importance of word-of-mouth effect. Another one is that economic conditions in Germany directly affect tourism demand in Spain, therefore policy makers should monitor the economic cycles in the German economy. Additionally, German tourists are very sensitive to prices, and to the cost of travel. Finally, external shocks, like political or natural instability may reduce the desire of German people to travel.

2005: **Tourism expansion and economic development**:**The case of Taiwan**

Hyun Jeong Kim, Ming –Hsiang Chen and SooCheong Jang

They used data on GDP to measure the value of the economic development and total tourist arrivals (TOUR) as a proxy of tourism expansion. The GDP information has been obtained from the financial database of the Taiwan Economic Journal (TEJ), and the time series data of total tourist arrivals were taken from various issues of the annual report on tourism. Quarterly and yearly data were chosen to ensure consistent empirical evidences regarding a relationship between tourism expansion and economic growth in Taiwan.

They performed the Granger causality test by Engle and Granger (1987) and Granger (1988) that noted that if two time series variables are cointegrated,

then at least one –directional Granger –causation exists. The result of this model was the coexistence of the tourism led economic growth and the economic led tourism expansion that indicates a reciprocal relationship between the two variables.

The most significant reasons why the reciprocal relationship between the two variables is true for Taiwan are the level of openness of the country, included travel as well as the level of travel restrictions. Taiwan begun implementing tariff reductions to further open the market for international trade beginning in the early 1970's. No strict travel regulations have ever existed in Taiwan. Also, private and government policy makers and authorities because of the long –run equilibrium and bidirectional relationship between tourism and economic growth should enliven the tourism sector paying attention not only to the tourism segment but also to other major industries. One of the most outstanding programs of Taiwanese government is the Doubling Tourists Arrivals Plan (DTAP) which was designed to reinforce Taiwan's overall economy. The goal of the DTAP is to double the number of foreign tourists arriving in Taiwan in order to stimulate the overall production value of the domestic economy and enliven the job market. In the case of Taiwan, because of the exist of reciprocal relationship, resources should be equally allotted to tourism and other major industries

2005: Small island tourism economies and country risk ratings

Riaz Shareef and Suhejla Hoti

This paper examines the economies of developing countries which need a consistent inflow of foreign direct investment to maintain economic growth. They have limited resources, suffer from natural disasters, being susceptible to adverse macroeconomic shocks and the international financial community consider them to be risky entities. The fundamental aim of tourism development in SITES is to increase foreign exchange earnings to finance imports and to sustain the tourism industry. The high volatility in economic growth rate is because they have a narrow productive base, are heavily reliant

on exports and imports and are susceptible to changes in the external environment.

International tourism earnings consists a significant proportion of GDP in these economies. For this reason this paper provides a comparison of monthly risk ratings and analyses the relationship between country risk and economic growth for six SITES using annual data from1985-2000. They combine a range of qualitative and quantitative alternative measures of economic, financial and political risk into associated composite risk ratings. The economic growth rate is positively correlated with risk ratings in only 13 of the 24 cases. This is a surprising result as the country literature asserts that increases in risk ratings are noticeably influenced by higher economic growth rates and vice versa.

2005: Is the tourism-led growth hypothesis valid for Turkey?

Lokman Gunduz and Abdulnaser Hatemi-J

Tourism is the second source of foreign currency after exports and thus this study investigates whether tourism really contributed to the economic growth in Turkey.

To measure the volume of tourism, tourist arrivals are used. To measure respectively economic growth real gross domestic product is also included. Moreover, real exchange rate is included in the model in order to deal with the potential omitted variable problem. Real gross domestic product is measured in 1995 local currency unit (Turkish lira), real exchange rate (TL per USD) is calculated by multiplying TL per USD and consumer price index (1995=100) in the USA, and then dividing it by consumer price index in Turkey. Annual data on all variables are available from 1963 to 2002, and consumer price indices are obtained from IMF's International Financial Statistics (2003).The rest of the variables including GDP, tourist arrivals, and foreign exchange rate are collected from the Statistical Indicator Yearbook (2003) and Main Economic Indicators (2003) of the State Planning Organization.

The interaction between tourism and economic growth is proved by conducting a bootstrap causality test with leveraged adjustments as introduced by Hacker and Hatemi-J (2003) .This method is robust to the existence of non normality and ARCH effects.
The results she that the tourism led growth hypothesis is supported empirically in the case of Turkey.

2004: Tourism and economic development in cash-in-advance economy
Chi-Chur Chao, Bharat Hazari and Pasquale Sgro

Tourism has been very important for many countries and often is deemed as a solution to their economic problems and is seen as an important source of foreign exchange earnings, employment and a contributor to economic growth. In the era of globalization promoting tourism and liberalizing the financial markets are necessary for development. Since most tourists arrive and consume the goods that are not traded internationally, an expansion of tourism is equivalent to an increase in the exports of the non traded goods. As a result of the expansion in tourism, the prices of the non traded goods increases which gives rise to a terms of trade improvement but also worsens the distortion in consumption caused by cash-in-advance. If the gain from the terms of trade improvement dominates the loss from the consumption distortion, then tourism is welfare – improving in a distorted monetary economy.

2004: Modeling multivariate international tourism demand and volatility
Felix Chan, Christine Lim and Michael McAleeer

The tourist arrivals rate to Australia from foreign countries has experienced dramatic changes in previous years, so variations in tourism demand, specifically variance and volatility are investigated for the first time in this study. Understanding the impact of volatility can help tourism management to

devise appropriate recovery activities in its business strategic planners and decision- making process. This paper modeled the time-varying means and conditional variances, and constant conditional correlations, of the logarithm of the monthly arrival rate from leading tourism source countries to Australia, namely New Zealand, UK, Japan and USA, using the CCC-MGARCH, vector ARMA-GARCH and vector ARMA-AGARCH models, with a sample size of 312 observations from Jul 1975 to 2000. The empirical results provided evidence of interdependent and dependent effects in the conditional variances between the different countries.

The modeling and analysis of volatility in tourist arrivals in Australia's major tourism inbound markets can provide a useful tool for tourism organizations and government agencies concerned with travel and tourism.

2003: Cointegration analysis of German and British tourism demand for Greece

Nikolaos Dritsakis

Greece is a populate destination for the most European countries but Germany and Great Britain are traditionally the most important sources of tourism. The purpose of this paper is to investigate the long-run demand for tourism by these two countries using a cointegration analysis of multivariate time series.

In the analysis of tourism demand to Greece from Germany and Great Britain the following variables are used: tourist arrivals from every origin countries, real income per capita, exchange rates between the origin and destination countries, transportation cost and tourism prices.

Annual data covering the period from 1960 to 2000 are employed.

Augmented Dickey –Fuller test for unit root is examined in the univariate framework and Johansen's maximum likelihood procedure is used to test the cointegration method and to estimate the number of cointegrating vectors of VAR model.

The results confirm the existence of o long run equilibrium relationship among tourism demand and all the aforementioned variables.

2002: Tourism as a long run economic growth factor: the Spanish case
Jacint Balaguer and Manuel Cantavella- Jorda

This paper examines the role of tourism in the Spanish long-run economic development during the period 1975-1997.
Thus the objective of this article is to prove that tourism is the major determinant of a long run growth. The model includes gross domestic product, tourism (international tourist earnings) and exchange rate (a proxy variable of external competitivity).
Since the variables included in the model are non stationary and present a unit root, the Johansen technique has been applied in order to obtain a cointegrating relationship among the variables which represent indicators of Spanish economic growth, international tourism income and external competitivity. The cointegration results provide evidence of the existence of a unique cointegrating vector. Causality testing confirms the existence of that relationship in Granger sense and, moreover, it provides necessary arguments to support the tourism led growth hypothesis.
The earnings from tourism have represented an importance source of compensation for the Spanish current account and more specifically for its trade imbalances .In addition tourism industry has become a fundamental source of employment in Spain given that it is mostly a labour-intensive sector. Also, tourism brings foreign exchange which can be used to import capital goods and services for producing goods in any area of the economy and thus contributing to the financial development.

2002: The contribution of tourism development to economic growth in the Korean economy.

Chi-Ok Oh

The model variables were derived from real aggregate tourism receipts (Tour) adjusted by the consumer price index as a proxy of tourism growth and real GDP for economic expansion. Since there is a concern of removing important information while adjusting for seasonality, unadjusted data were used from Korean National Tourism Organization and the Bank of Korea.

A test of stationarity is important to set up the specification and estimation of the correct model (Engle & Granger, 1987), since a wrong choice of transformation of the data gives biased results and has consequences for wrong interpretation. Therefore, contrary to the general belief, long run equilibrium did not exist between tourism receipts and the GDP series, indicating that a linear combination of two variables is not cointegrated in the long-run. Additionally the three hypotheses-tourism growth affects economic expansion, economic expansion affects tourism growth and both demonstrate a reciprocal relationship- was tested using the Granger causality approach. The results from the Granger causality test show that: The hypothesis of tourism led economic growth was not accepted based on the failure to found causation of tourism growth to economic development. In opposite he found that economic development leads to international travel and an increase in tourism growth as the coefficient value denoted that 1% increase of GDP produce 0.9% growth of tourism in Korean economy. However this relationship maintained only in the short run .Since tourism growth did not influence increases in the economy in the short run, there was no reciprocal feedback between two series. The combination of results pointed to a one way causality for economic driven tourism growth in the Korean economy. This consequence is supported by testing the sensitivity of causality test under different lag selections along with the optimal lag.

A cointegration between tourism and economic growth did not exist in Korea and therefore the long run equilibrium relation was found to be invalid. In addition, causality tests did not support the hypothesis of tourism driven

economic growth in the short run. As a result, the testing results imply that the rapid economic expansion in Korea tends to attract more international travel only in the short run. Since it is well known that international trade is closely tied to economic expansion, it is rational to believe that tourism is strongly affected by economic increases although there are surprisingly no long-run effects.

2001: The economic contribution of tourism in Mauritius.

Ramesh Durbarry

Mauritius is a small and densely populated island with an ethnically diverse and highly literate population which its economy was heavily dependent on one agricultural commodity (sugar) for the bulk of its income, employment and export revenue until the 60's. After then there was a stagnation of economic growth deriving from sugar thus the government decided to boost the economy through other means. First the Export Processing Zone (EPZ) which was the availability of cheap and skilled labor, attractive to foreign investors and second, the government became actively involvement to the development of tourism, by capitalizing on the country's scenic diversity and beauties. Tourist arrivals and tourism receipts suddenly increased and tourism became a source of jobs and economic growth being the second largest foreign exchange earner, after manufacturing with sugar in the third place. Available figures on direct employment in the industry, such us hotels, restaurants and tourism businesses, show some significant increases and also direct (generated from hotel and restaurant sectors) and indirect (airport charges, fuel duties, value added taxes, and other duties on goods and services) revenues have also improved successfully. So, the development of tourism in Mauritius had as consequence the economic expansion.

2000: An econometric model of tourist demand: The case of Greece

Nikolaos Dritsakis, Spiros Athanasiadis

The present study focuses to the influence of foreign tourism to the social and economic structure of the tourist host country. Except the contribution of tourism to a country's needs in foreign currency, it also influences other sector such us: The employment sector (through the creation of new employment opportunities), the business sector (through the expansion of industrial, agricultural, transportation, banking, telecommunication sectors), the income sector (through it's contribution to the country's aggregate income), the cultural sector (through the significant improvement in cultural standards) and the fiscal sector (through the influence in public economics, especially at local level)

The main variable that influences tourism is the Gross National Product (GNP) .GNP increases disposable income hence the consumption of goods and services and finally the increase in tourism demand.

Other model's variables are the following:

- ✓ Number of tourists in Greece from country of origin, that constitutes the dependent variable of the model and supplied by the National Statistical Service of Greece (from 1960-1995)
- ✓ Population of country of origin that is supplied by the European Economy
- ✓ Disposable national income of country of origin, which is supplied by the National account of the OECD
- ✓ Average total cost of a 10-day stay in Greece from country of origin
- ✓ Average cost for a 10-day stay in other competitive Mediterranean countries from country of origin
- ✓ Exchange rate from country of origin
- ✓ Gross investment in fixed assets in Greece with a 2 year lag
- ✓ Advertising expenditures in the country of origin which was disposal of the Greek Tourist Organization
- ✓ A dummy variable that measures the political stability in Greece.

The method of OLS was employed in order to estimate the separate demand functions of each country of origin and the Durbin –Watson d-statistic was employed to test for autocorrelation f residuals.

In the econometric model used, was found that disposable income doesn't influence so much tourism demand which means that Greece attracts tourists without reference to the income's decline. Total cost was found to have a minimum impact on tourism demand .Average stay cost in other competitive countries seems to be of greater importance. The currency exchange rate of the country of origin does not appear to apply an important role. Gross investment in fixed assets in Greece, and advertising expenditures had a big influence on tourist demand. And last the dummy variables measuring the effect of political stability found to be an important factor in tourist demand in all countries of the model.

1997: The contribution of tourism to the economy of Ireland in 1990 and 1995

E W Henry and B Deane

The contribution of tourism to overall economy is evident in four areas:

- ✓ The impact of tourism on GNP
- ✓ The impact of tourism on employment
- ✓ The contribution tourism makes to the Balance of payments credit and
- ✓ The contribution tourism makes to government revenue. In each of these areas the impact of tourism on the economy of Ireland is measured by an input- output analysis(I-O) during 1990 and 1995.

Tourism is not a self contained industry and this causes difficulties to measuring economic impact. This problem can be solved by an I-O model which is the best available world wide use approach.

For levels of impacts are measured:

- ✓ Direct impact: At this level is measured the impact of direct recipients of tourism expenditure, such us catering and transport , on GNP, employment and government revenue

- ✓ Direct+ indirect: At this level the economic activity that results from supplying the operators at the direct level is also included.
- ✓ Direct+ indirect+ induced: the incomes and profits that are spent by operators and suppliers, on domestically produced goods and services , give rise to further impacts on GNP, employment and government revenue, and these impacts are added to the direct and indirect levels.
- ✓ Government interacting :Government , through the taxation revenue it receives, has the option to spend some or all of the money , in which case it purchases goods and services and adds further to the impact on GNP , employment and government revenue. At each level there has been an increase in the contribution that tourism has made to four areas (GNP, employment, government revenue, balance of payments credit) indicating that tourism has played an important role in the rapid expansion of the Irish economy.

1995: Importance of tourism for the economy in Bermuda

Brian Archer

The aim of the following paper is to compare the results of three separate input-output studies carried out to measure the contribution of international tourism to the economy of Bermuda in comparison with the impacts made by other export sectors, like international business and finance.

Input –output models were constructed for each of the three base years 1985, 1987, and 1992 (years identified by the government of Bermuda). In all three years, the data covered at least 90% of total economic activity in the country. Most of these data were obtained from field surveys carried out in cooperation with the Statistical Department, the Bermuda International Business Association, and the International Companies Division of the Chamber of Commerce. Tourism expenditure data were obtained from the computer print-outs of the Airport Exit Survey.

To measure the tourism expansion he uses the visitor arrivals and tourist expenditures that were declined from 1985-1993. The Bermuda government

is very concerned about this decline in visitor's numbers and their implications for the economy. Unlike most small island economies, in addition to tourism, Bermuda has succeeded in developing other major foreign currency sectors. International financial and business activity has prospered and now makes a major contribution to exports, incomes, jobs and public sector revenue of the economy.

Whereas this paper shows that these shortfalls can be partially offset by the growth of other sectors such us international business and finance, the Bermuda government recognizes that tourism still forms the essential bedrock of its economy and that none of the other existing export sectors can generate a sufficient flow of foreign currency to compensate adequately for the fall in real tourism receipts.

1985: Foreign tourism in Greece: An economic analysis

Socrates I.Papadopolos, Hafiz Mirza.

This study examines the importance of tourism on the national economy of Greece and especially on the above sectors:

Balance of payments: Foreign exchange earnings from tourism, tourism receipts, consists a large part of total foreign exchange receipts, and contribute to the deficit in the balance of merchandise trade.

Export industry: Tourism in Greece is an export industry which contributes to the foreign exchange earnings and the balance of payments.

Share in GDP: Tourism has a potential role in the economic development of the country especially in local economies of islands where the production of any other income is impossible.

Employment: Tourism affects the income of people who work not only in the tourist industry but also the income those who are involved in other relates services such as transport, travel agencies, accommodation, supply of goods and beverage, construction firms etc. Thus, tourism benefits the whole economy through the multiplier effect.

The above benefits from tourism can only be positive for the economy only if they are compatible with sociocultural, political, and environmental objectives.

1974: **Tourism as a mode of development**

Paul E.Jursa and James E. Winkates.

Areas of the world classified as less than developed tend to have a relative inflexible economic system (low level of productivity in the agricultural and industrial sector, semi-literate population, rigid social system, high level of unemployment, limited infrastructure) whose characteristics contribute to low economic development (low real per capital income, difficulties in finding export markets, and economic stagnation).A variety of routes have been followed by economic planners and policy makers but in this paper are analyzed the advantages and disadvantages of tourism sector to the economic development. If the tourist industry is well organized it would bring increased employment, opportunities outside the agricultural sector, rising per capita income, and increased foreign exchange reserves.

5 METHODOLOGY AND RESULTS

5.1 Data

As a proxy of tourism development we use the variables of tourist arrivals and tourist receipts which were obtained respectively from the National Statistical Service of Greece and Bank of Greece.

Tourist arrivals are referred to the number of tourists that visit a country in a specific time. Data are available for the period of 1980-2007 on annually, quarterly and monthly bases.

T*ourist receipts* are the expenditures of visitors on accommodation, food and drink, local transport, entertainment, shopping and others that constitute the total volume of earnings generated by foreign visitors. These data cover different time periods according to their frequency .Annually data were available for the period 1980-2008 and quarterly and monthly data were available from 1995 to 2008.

On the other hand, regarding economic variables, we use *Real Gross Domestic Product (GDP),* calculated with the prices that prevailed in 1995, as a proxy of general economic development .GDP has been used by many researchers in other models (Balageur and Cantavella, Katircioglou, Gunduz and Hatemi, Chi Ok Oh, Hyun Jeong Kim, Ming-Hsiang Chen and SooCheong Jang etc.). GDP is a basic measure on an economy's economic performance as it is the market value of all final goods and services made in the borders of a nation in a year[11].

Due to the absence of monthly GDP we also use *Industrial production* as another measurement of economic development. Industrial production is an economic report that measures changes in output for the industrial sector of the economy, like manufacturing, mining and utilities. Although these sectors contribute only a small portion of GDP, they are highly sensitive to interest

[11] From http://en.wikipedia.org/wiki/Gross_domestic_product

rates and consumer demand and this makes Industrial production an important tool for forecasting future GDP and economic development[12].

Finally another variable that we utilize is the *Stock market National Index* which represents the performance of the stock market of a given nation and reflects investor sentiment on the state of its economy[13].

The data of the above mentioned economic and financial variables, seasonally adjusted, are obtained from DataStream in annual, quarterly and monthly frequency.

Observations for GDP, Industrial production and National Stock market Indexes were available for all countries of our sample and the whole Europe for the period of 1980-2008 and data for Stock market Index in Greece covered the period 1989-2008 .

As far as the collection of our data is concerned, we want to make some *comments.*

As our aim is to examine how economic conditions in foreign countries affect on the decision of their residents to travel to Greece, we should have collected tourist arrivals data from each country of origin (England, France, Italy and Germany) to Greece. However, for the period from 1986 to 1996, data were reported as total tourist arrivals from EEC countries. After 1996 tourist arrivals data were available for each country of our sample. Thus, in our analysis regarding the relationship between tourism in Greece and economic conditions in each country of origin, we were enforced to use only monthly data, covering the period 1996-2007. Quarterly and annual data were not used due to the small number of observations.

Because of the short examined period we add also in our study the examination of the correlation between inbound tourism in Greece and economic conditions in Europe, where the tourist arrivals data were available for the whole period from1980 to 2007.

The second problem that we encountered in our research is that although, for the year 1999, tourist receipts data were available in quarterly frequency they were absent in monthly basis. To cope with this problem we found the

[12] From http://en.wikipedia.org/wiki/Industrial_production
[13] From http://en.wikipedia.org/wiki/Stock_market_index

percentage of each month in its quarter for each year of the period 1995-2008, and then we multiplied the average of these ratios with the respectively quarterly tourism receipts for 1999.

Another last elucidation that we want to make concerning our variables is the following: Tourist receipts were reported in the balance of services, obtained from Bank of Greece. Hence, we had only a total number for each period without information about the country that these receipts were coming from. So, when we analyze the interdependency between tourism development in Greece and economic conditions in countries of our sample, we use only tourist arrivals as a proxy of tourism.

Additionally we also want to emphasize the difficulties that we faced while aggregating the tourist variables data as they were not available in DataStream. So we collected them from the appropriate services and converted them to electronic form as most of them were only in handwritten copies.

Closing the description of our data, not forget to mention that in this study we don't process annual data as we had only 27 observations (1980-2007), too small sample to lead to confident results.

5.2 Econometric Methodology

5.2.1 Stationarity

Before the estimation of cointegration and VAR, is required to examine the stationarity of the variables in order to avoid spurious regression .Stationarity means that the mean and the variance of the series are constant through time and the autocovariance of the series is not time varying. (Enders, 1995). Dickey-Fuller, Augmented Dickey Fuller (ADF) and Phillips – Perron (PP) are some of the tests that most frequent are used to examine for stationarity, but we will use only the first one.

Augmented Dickey-Fuller (ADF 1979) tests are used to infer the order of integration for the log level and the log of the difference of each variable. Since a wrong choice of transformation of the data gives biased results and has consequences for wrong interpretation, a test for stationarity is important to set up the estimation and specification of the correct model (Engle & Granger, 1987).

Stationarity could be achieving by appropriate differencing and this appropriate number of differencing is called order of integration. We used Augmented Dickey-Fuller (ADF) test to check the stanionarity of the variables.

Consider the equation:

$$Y_t - Y_{t-1} = \alpha + \beta Y_{t-1} - Y_{t-1} + \varepsilon_t \Rightarrow \Delta Y_{t-1} = \alpha + (\beta - 1) Y_{t-1} + \varepsilon_t \Rightarrow \Delta Y_{t-1} = \alpha + \theta Y_{t-1} + \varepsilon_t$$

Where Y_t is our variable of interest (GDP, Industrial production, Stock market index, tourist arrivals and tourism receipts), Δ is the differencing operator, t is the time trend and ε is the white noise residual of zero mean and constant variance. $\{\alpha, \beta\}$ is a set of parameters to be estimated .Both the null and alternative hypothesis in unit root tests are :

H_0 : θ=0 (Y_t is non-stationary, that means that there is a unit root test)

$H1$: θ< 0 (Y_t is stationary that means the no existence of a unit root test)

The value of the probability can be used to test this hypothesis. If probability is less than 0.05 then the null hypothesis is rejected, meaning that the time series is stationarity. Otherwise, if the probability is greater than 0.05 then the null hypothesis can not be rejected and the time series is not stationary at the level. In this case we take the first differences in order to establish stanionarity.

When we ensure the stationarity of our series we continue with the application of the VAR model.

5.2.2 The VAR Model

The purpose of this study is to analyze the relationship between economic growth and international tourism. Our main target is to define the existence and then the direction of the dependence between tourism and economic variables.

This study aims to answer the following two questions. First, is there an equilibrium relationship between tourism expansion and economic growth, and if there is, what is the direction of this relationship.

Recognition of causal relationship between international tourism and economic growth will have important implications for the development of different tourism marketing and policy decisions. If there is an unidirectional causality from tourism growth to economic expansion, then tourism – led economic growth is practical and more resource should be allocated to travel and tourism industry. If results show the opposite causality, then the economic development may be necessary for the expansion of the tourism industry which in its turn will be benefit for the overall economic growth. Next, if the causative process is bi-directional, meaning that tourism growth and economic growth have a reciprocal causal relationship, then a push in both areas would be beneficial. Finally, if there is no causal relationship between tourism and economic development, then strategies such as enthusiastic tourism promotion may not be as effective as tourism managers and decision – makers believe[14].

In order to give an answer in the above question we will use the Vector Autoregressive model (VAR). Vector Autoregressive (VAR) is an econometric model used to show the interdependencies between multiple time series, generalizing the univariate AR models. All the variables in a VAR are treated symmetrically by including of each variable an equation explaining its behavior based on its own lags and the lags of all the other variables in the model.

[14] Chi-Ok Oh (2005). The contribution of tourism development to economic growth in the Korean economy. *Tourism Management.Vol.26, Issue1 , Pages 39-44 .*

A VAR model can be written as: $\begin{pmatrix} Y_t \\ X_t \end{pmatrix} = \begin{pmatrix} \alpha_{11} \\ \alpha_{21} \end{pmatrix} + \begin{pmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{pmatrix} \begin{pmatrix} Y_{t-1} \\ X_{t-1} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix}$.

If we have one lag and two variables it is a VAR (1) model. If $Z_t = \begin{pmatrix} Y_t \\ X_t \end{pmatrix}$ then the above equation is equivalent with $Z = A + BZ_{t-1} + U_t$, where $A = \begin{pmatrix} \alpha_{11} \\ \alpha_{21} \end{pmatrix}$, $B = \begin{pmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{pmatrix}$ and $U_t = \begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix}$.More generally a VAR model has the form:

$$Z_t = A + B_1 Z_{t-1} + B_2 Z_{t-2} + \ldots\ldots\ldots + B_p Z_{t-p} + U_t = A + \sum_{i=1}^{p} B_i + U_t$$

The optimal lag length k for all variables is based on the Akaike information criteria (AIC) and the Schwartz Bayesian Criteria (SBC) which give as the optimal lags that we should use.

The causality is tested by making a hypothesis test on the coefficients of X_t and Y_t respectively. For example if the optimal lag is k=2 then:

$$\begin{pmatrix} Y_t \\ X_t \end{pmatrix} = \begin{pmatrix} \alpha_{11} \\ \alpha_{21} \end{pmatrix} + \begin{pmatrix} \beta_{11} & \beta_{12} \\ \beta_{21} & \beta_{22} \end{pmatrix} \begin{pmatrix} Y_{t-1} \\ X_{t-1} \end{pmatrix} + \begin{pmatrix} \beta^*_{11} & \beta^*_{12} \\ \beta^*_{21} & \beta^*_{22} \end{pmatrix} \begin{pmatrix} Y_{t-2} \\ X_{t-2} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix}$$

$$Y_t = \alpha_{11} + \beta_{11} Y_{t-1} + \beta_{12} X_{t-1} + \beta^*_{11} Y_{t-2} + \beta^*_{12} X_{t-2} + u_{1t}$$

Granger causality test test the restriction that all lags of the variable do not enter significantly into VAR model specification. In other words to test whether Y_t Granger causes X_t in the above system, we examine if the null hypothesis, $H_0 : \beta_{12} = \beta^*_{12} = 0$ is accepted .If that happens then X_t do not Granger causes Y_t.By making the same thing with the equation X_t we are testing the opposite Granger causality. Additionally, we can say that if the null hypothesis is accepted, Prob › 0.05, then it can be concluded that the independent variable do not cause dependent variable. On the other hand if Prob < 0.05, then we reject the null hypothesis and we accept the existence of the alternative which implies that there is causality between the two data series.

5.3 Empirical results

In this paper we finally examine only the tourism development in Greece in relation with its economy and the economy of the countries of our sample, as we encountered difficulties to find tourist variables data for other countries and for a long period of time.

Our econometric study is described in four parts. *In the first part,* we examine tourist variables (tourist receipts, tourism arrivals) and economic variables (GDP, industrial production, and Stock market Index) in Greece, so as to reach the possible existence of a relationship between them. The above mentioned economic variables reflect the status of Greek economy which in its turn influences the desire of foreign people to travel to Greece. Furthermore, inbound tourism contributes positively to an economy's development.

In next three parts we examine the relationship of tourist arrivals in Greece derived from specific countries (USA, England, Italy, France, Germany and whole Europe) and their respective economic variables (GDP, Industrial production, Stock market Index). In this case we want to examine how economy in countries of origin, impacts on the tendency of people to travel in Greece. This sequence is rational to happen because when economies grow; levels of disposable income and thus income that is spent on traveling will also rise. On the other hand a tightening in the economic situation will lead to the decrease of tourism.

Before the interpretation of the results we remark that all variables for all countries are non stationary in the levels but stationary in first differences. Dickey – Fuller unit root test is employed to test for the stationarity of the macroeconomic series at level and the first difference of each series. The optimal lag length criteria for all countries are determined by (AIK) Akaike Information Criterion.

The results support the absence of unit root in all the series in first differences. This is confirmed by the fact that the null hypothesis is rejected as the probability is less than 0.05.

As we mentioned before, Granger causality test shows the existence or not of the direction of the relationship between series. We mention again that when the probability of the Granger causality test is more than 0.05, we accept the null hypothesis, meaning that we accept the absence of causal relationship between variables.

Except of the correlation in the returns of the variables we examine also the relationship of their volatility. Volatility refers to the degree of unpredictable change over time of a certain variable and most frequently refers to the standard deviation of continuously compounded returns of a financial instrument and reflects the degree of risk faced by someone with exposure to that variable. Hence, it is important to know if volatility in economy affects on the volatility of tourist development and vice versa.

In tables below, we present the results of Granger causality tests.

PART 1: The relationship between tourism development and economic activity in Greece: Empirical results

In tables 1.1, 1.2, we report the causality between tourist development as proxied by tourist arrivals and economic activity as proxied by Gross Domestic Product. The data that we have collected are in a quarterly basis and cover the period 1980 Q1-2007Q4 .The optimal lags are determined by (AIC) Akaike information Criterion, as 4 in both tables. According to our results in the below statistical tables there is not any reciprocal relationship between the two variables neither in their returns either in their volatilities .This is proved by the fact that probability in both cases is more than 0.05, so the null hypothesis is supported. The null hypothesis of the below tables is that GDP in Greece does not Granger cause total tourist arrivals on the one hand, and that GDP in Greece does not Granger cause total tourist arrivals on the other.

Table 1.1: Causality results between total quarterly tourist arrivals- quarterly GDP

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRGDPRET≠ ARRIVALSRET	107	1.44483	0.2162	5.779325
ARRIVALSRET≠ GRGDPRET		1.18320	0.3158	4.732816

Note: *GRGDPRET* stands for Gross Domestic Product in Greece
ARRIVALSRET stands for total tourist arrivals

Table 1.2: Causality results between volatility of total quarterly tourist arrivals - Volatility of quarterly GDP.

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRGDPVOL≠ ARRIVALSVOL	107	0.44263	0.7779	1.77051
ARRIVALSVOL≠GRGDPVOL		0.39131	0.8150	1.565236

Note: *GRGDPVOL* stands for volatility of Gross Domestic Product in Greece
ARRIVALSVOL stands for volatility of total tourist arrivals

In the next two tables 1.3, 1.4 we report again the same variables but in a monthly basis. Namely, we use tourist arrivals as a proxy of tourism development and Industrial Production as a proxy of economic activity. As GDP is not measured every month we use Industrial production as the most representative measurement of economic growth. The examined period is also Jan.1980 – Dec.2007, and the optimal lags are 5 and 3 respectively. The probability of our results equals to 0.00, thus the null hypothesis does not stand. Thus, the Granger causality test suggests bidirectional causality between tourist development and economic growth and is different from the no cointegration that was found in tables 1.1, 1.2.

Table 1.3: Causality results between total monthly tourist arrivals - Monthly industrial production

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRIPRET →ARRIVALSRET	330	39.6126	0.000	198.0632
ARRIVALSRET →GRIPRET		31.7531	0.000	158.7653

Note: *GRIPRET* stands for Industrial Production in Greece
ARRIVALSRET stands for total tourist arrivals

Table 1.4: Causality results between volatility of total monthly tourist arrivals - Volatility of total monthly industrial production.

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRIPVOL → ARRIVALSVOL	332	79.8720	0.000	239.6161
ARRIVALSVOL →GRIPVOL		9.22740	0.000	27.68221

Note: *GRIPVOL* stands for volatility of Industrial production in Greece
ARRIVASLVOL stands for volatility of total tourist arrivals

In the next two tables we show the relationship between Gross Domestic Product in Greece, as a proxy of economic activity, and tourist receipts, as a proxy of tourism development. We explore this relationship in returns (Table 1.5) and in volatilities (Table 1.6). The period that we examine is Q1 1995- Q4 2008. The optimal lags are 5 and 3 respectively.
Although there is not any causality between GDP and tourist receipts, as probability of Granger causality test is more than 0.05, we find causality in their volatilities (Table 1.6).
This means that any instability in one of the two variables affect immediately the other.

Table 1.5: Causality results between total quarterly tourist receipts - Quarterly GDP.

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRGDPRET ≠ RECEIPTSRET	52	0.37630	0.7701	1.128900
RECEIPTSRET ≠ GRGDPRET		1.21087	0.3040	3.632622

Note: *GRGDPRET* stands for Gross Domestic Product in Greece
RECEIPTSRET stands for total tourist receipts

Table 1.6: Causality results between volatility of total quarterly tourist receipts - Volatility of quarterly GDP.

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRGDPVOL → RECEIPTSVOL	52	3.87102	0.0088	11.61306
RECEIPTSVOL →GRGDPVOL		2.96805	0.0306	8.904148

Note: *GRGDPVOL* stands for volatility of Gross Domestic Product in Greece
RECEIPTSVOL stands for volatility of total tourist receipts

In the following tables 1.7 and 1.8 we present tourism development, measured by tourist receipts, and economic conditions, measured by Industrial production in a monthly basis. The data sample covers again the period 1995 until 2008. In the first table we reject the null hypothesis in both relationships as the probabilities equals to 0.0008 and 0, 0101 respectively. Hence, there is a bi-directional relationship among Industrial Production and tourist receipts .In table 1.7, no causality exists in their volatility.

Table 1.7: Causality results between total monthly tourist receipts - Monthly industrial production.

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRIPRET → RECEIPTSSRET	162	4.19987	0.0008	20.99934
RECEIPTSRET → GRIPRET		1.78896	0.0101	13.26367

Note: *GRIPRET* stands for Industrial production in Greece
RECEIPTSRET stands for total tourist receipts

Table 1.8: Causality results between volatility of total monthly tourist receipts - Volatility of monthly industrial production.

Lags: 2				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRIPVOL ≠ RECEIPTSVOL	165	2.03206	0.1311	4.064128
RECEIPTSVOL ≠GRIPVOL		0.14538	0.8647	0.290763

Note: *GRIPVOL* stands for volatility of Industrial production in Greece
RECEIPTSVOL stands for volatility of total tourist receipts

In tables 1.9 until 1.16 that follow we conclude in the existence on not of the correlation between series. On one hand we use tourist arrivals and tourist receipts to measure the volume of tourism development and on the other hand Greek Stock market Index represents financial / economic growth. The examined period is 1989-2007 in the pair of tourist arrivals and Stock market Index and 1995-2008 in the pair of tourist receipts and Stock market Index. All the conducted Granger causality tests led to the same conclusion: Stock market Index in Greece and tourism growth do not interact each other in any terms.

Table 1.9: Causality results between total quarterly tourist arrivals -Quarterly Stock market Index

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRINDEXRET ≠ ARRIVALSSRET	73	1.50784	0.2102	4.523528
ARRIVALSRET ≠ GRINDEXRET		0.46667	0.7055	1.400002

Note: *GRINDEXRET* stands for Greek Stock market Index
ARRIVALSRET stands for total tourist arrivals

Table1.10: Causality results between volatility of total quarterly tourist arrivals - Volatility of quarterly Stock market Index

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRINDEXVOL ≠ ARRIVALSVOL	72	1.18380	0.3156	4.735191
ARRIVALSVOL ≠GRINDEXVOL		0.47883	0.7513	1.915307

Note: GRINDEXVOL stands for volatility of Greek Stock market Index
ARRIVALSVOL stands for volatility of total tourist arrivals.

Table 1.11: Causality results between total monthly tourist arrivals–Monthly Stock market Index

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRINDEXRET ≠ ARRIVALSSRET	226	0.35857	0.8382	1.434277
ARRIVALSRET ≠ GRINDEXRET		0.64458	0.6307	2.578313

Note: *GRINDEXRET* stands for Greek Stock market Index
ARRIVALSRET stands for total tourist arrivals

Table 1.12: Causality results between volatility of total monthly tourist arrivals-Monthly Stock market Index

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRINDEXVOL ≠ ARRIVALSVOL	226	0.64062	0.6335	2.562468
ARRIVALSVOL ≠ GRINDEXVOL		0.29213	0.8833	1.168501

Note: *GRINDEXVOL* stands for volatility of Greek Stock market Index
ARRIVALSVOL stands for volatility of total tourist arrivals

Table 1.13: Causality results between total quarterly tourist receipts-Quarterly Stock market Index

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
RECEIPTSRET ≠ GRINDEXRET	48	0.67346	0.5682	2.020389
GRINDEXRETRET ≠ RECEIPTSRET		0.78810	0.50003	2.364304

Note: *RECEIPTSRET* stands for total tourist receipts
GRINDEXRET stands for Greek Stock market Index

Table1.14: Causality results between volatility of total quarterly tourist receipts–Volatility of quarterly Stock market Index

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
RECEIPTSVOL ≠ GRINDEXSVOL	46	1.69497	0.1319	8.474864
GRINDEXVOL ≠ RECEIPTSVOL		1.56294	0.1667	7.814675

Note: *RECEIPTSVOL* stands for volatility of total tourist receipts
GRINDEXVOL stands for volatility of Greek Stock market Index

Table 1.15: Causality results between total monthly tourist receipts -Monthly Stock market Index

Lags: 1				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GRINDEXRET ≠ RECEIPTSRET	154	0.36604	0.5452	0.366043
RECEIPTSRET ≠ GRINDEXRET		0.34448	0.5573	0.344475

Note: *GRINDEXRET* stands for Greek Stock market Index
RECEIPTSRET stands for total tourist receipts

Table 1.16: Causality results between volatility of total monthly tourist receipts-Volatility of monthly Stock market Index.

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
RECEIPTSVOL ≠ GRINDEXVOL	151	1.07408	0.3674	4.296328
GRINDEXVOL ≠ RECEIPTSVOL		0.45936	0.7656	1.837447

Note: *RECEIPTSVOL* stands for volatility total tourist receipts
GRINDEXVOL stands for volatility Greek Stock market Index

PART 2: The relationship between US tourism in Greece and economic activity in USA: Empirical results

In tables 2.1-2.4 we present tourist arrivals derived from USA to Greece, and economic conditions in USA as expressed by Gross Domestic Product and Industrial Production. Our main target is to see whether the economy of USA influences the decision of Americans to travel in Greece. Quarterly and monthly data cover the period from 1980 – 2007.The hypothesis of tourism led economic growth is not accepted, based on the failure to find causation of tourism growth to economic development. . However, results in table 2.3 shows the opposite causality, that economic development in USA may be necessary for the development of tourism industry in Greece. This economic – driven direction appears only in monthly data and only in the level of returns, and not in volatilities.

Table 2.1: Causality results between quarterly tourists arrivals from USA-quarterly GDP

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USGDPRET ≠ USARRIVALSRET	107	0.63616	0.6367	2.544639
USARRIVALSRET ≠ USGDPRET		0.72396	0.5754	2.895830

Note: *USGDPRET* stands for Gross Domestic Product in USA
USARRIVALSRET stands for tourist arrivals from USA to Greece

Table 2.2: Causality results between volatility of quarterly tourists arrivals from USA-Volatility of quarterly GDP.

Lags: 1				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USARRIVALSVOL ≠ USGDPVOL	110	0.36614	0.5451	0.366136
USGDPVOL ≠ USARRIVALSVOL		0.75656	0.3844	0.756559

Note: *USARRIVALSVOL* stands for volatility of tourist arrivals from USA to Greece
USGDPVOL stands for volatility of Gross Domestic Product in USA

Table 2.3: Causality results between monthly tourist arrivals from USA-Monthly Industrial production

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USARRIVALSRET ≠ USIPRET	331	0.70401	0.5384	2.544639
USIPRET → USARRIVALSRET		3.52868	0.0069	14.11470

Note: *USARRIVALSRET* stands for tourist arrivals from USA to Greece
USIPRET stands for Industrial Production in USA

Table 2.4: Causality results between volatility of monthly tourist arrivals from USA- Monthly Industrial production

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USARRIVALSVOL ≠ USIPVOL	330	0.49385	0.7811	2.469253
USIPVOL ≠ USARRIVALSVOL		1.09035	0.3633	5.451769

Note: *USARRIVALSVOL* stands for volatility of tourist arrivals from USA to Greece

USIPVOL stands for volatility of Industrial Production in USA

In tables 2.5 -2.8 the financial variable under examination is Stock market Index in USA and the tourist variable under examination is again the number of tourist arrivals from USA to Greece. Quarterly and monthly data, covering the period 1980-2007, are employed. From tables 2.5 and 2.6, we envisage that financial conditions in USA, as represented by the Stock market Index, affects on the willing of Americans to travel in Greece.

Table 2.5: Causality results between quarterly tourist arrivals from USA- Quarterly Stock market Index

Lags: 6				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USINDEXRET → USARRIVALSRET	105	2.06307	0.0109	25.95678
USARRIVALSRET ≠ USINDEXRET		1.20073	0.2901	14.16872

Note: *USINDEXRET* stands for Stock market Index in USA

USARRIVALSRET stands for tourist arrivals from USA to Greece

Table 2.6: Causality results between volatility of quarterly tourist arrivals from USA-Volatility of quarterly Stock market Index

Lags: 1				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USARRIVALSVOL ≠ USINDEXVOL	110	0.45334	0.5008	0.453345
USINDEXVOL → USARRIVALSVOL		5.52739	0.0187	5.527394

Note: *USARRIVALSVOL* stands for volatility of tourist arrivals from USA to Greece

USINDEXVOL stands for volatility of Stock market Index in USA

Table 2.7: Causality results between monthly tourist arrivals from USA-Monthly Stock market Index

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USINDEXRET ≠ USARRIVALSRET	330	0.88776	0.4881	4.438810
USARRIVALSRET ≠ USINDEXRET		0.85092	0.5134	4.254612

Note: *USINDEXRET* stands for Stock market Index in USA

USARRIVALSRET stands for tourist arrivals from USA to Greece

Table 2.8: Causality results between volatility of monthly tourist arrivals from USA-Volatility of monthly Stock market Index

Lags: 2				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
USINDEXVOL ≠ USARRIVALSVOL	333	0.08439	0.9191	0.168789
USARRIVALSVOL ≠ USINDEXVOL		0.46909	0.6256	0.938177

Note: *USINDEXVOL* stands for volatility of Stock market Index in USA
USARRIVALSVOL stands for volatility of tourist arrivals from USA to Greece

PART 3: The relationship between European tourism in Greece and economic activity in Europe: Empirical results

In this part, tables 3.1 - 3.8, we suggest the causality between tourism development as proxied by tourist arrivals from Europe to Greece and economic/financial activity as proxied by GDP, Industrial production and European Stock market Index.

Data used in this part are monthly and quarterly figures and cover the period 1980-2007.

All the effectuated tests led to the conclusion that the null hypothesis applies to all cases. Thus, there is not any bidirectional or unidirectional relationship between the variables. Thus, GDP, Industrial Production, or Stock markets of Europe do not affect on the decision of European residents to travel to Greece and on the other hand tourist arrivals and tourist receipts in Greece do not influence the economic or financial growth in Europe. The last finding is by all means expected as it is impossible the inbound tourism in Greece to determine the financial or economic conditions in another country or region.

Table 3.1: Causality results between quarterly tourist arrivals from Europe-Quarterly GDP

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUGDPRET ≠ EUARRIVALSRET	108	0.39207	0.7587	1.176211
EUARRIVALSRET ≠ EUGDPRET		1.31543	0.2673	3.9463

Note: *EUGDPRET* stands for Gross Domestic Product in Europe
EUARRIVALSRET stands for tourist arrivals from Europe to Greece

Table 3.2: Causality results between volatility of quarterly tourist arrivals from Europe- Quarterly GDP

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUGDPVOL ≠ EUARRIVALSVOL	106	0.15754	0.9778	0.787709
EUARRIVALSVOL ≠ EUGDPVOL		0.55999	0.7308	2.799962

Note: *EUGDPVOL* stands for volatility of Gross Domestic Product in Europe
EUARRIVALSVOL stands for volatility of tourist arrivals from Europe to Greece

Table 3.3: Causality results between monthly tourist arrivals from Europe- Monthly industrial production

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUIPRET≠EUARRIVALSRET	330	0.72625	0.6036	3.631226
EUARRIVALSRET ≠EUIPRET		0.49394	0.7811	2.469680

Note: *EUIPRET* stands for Industrial Production in Europe
EUARRIVALSRET stands for tourist arrivals from Europe to Greece

Table 3.4: Causality results between volatility of monthly tourist arrivals from Europe- Volatility of monthly industrial production

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUIPVOL ≠ EUARRIVALSVOL	332	0.03093	0.9927	0.092805
EUARRIVALSVOL ≠ EUIPVOL		1.23250	0.2960	3.697512

Note: *EUIPVOL* stands for volatility of Industrial Production in Europe
EUARRIVALSVOL stands for volatility of tourist arrivals from Europe to Greece

Table 3.5: Causality results between quarterly tourist arrivals from Europe- Quarterly stock market index

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUINDEXRET ≠ EUARRIVALSRET	108	1.97794	0.1149	5.933811
EUARRIVALSRET ≠ EUINDEXRET		1.91816	0.1242	5.754476

Note: *EUINDEXRET* stands for Stock market Index in Europe
EUARRIVALSRET stands for tourist arrivals from Europe to Greece

Table 3.6: Causality results between volatility of quarterly tourist arrivals from Europe-Volatility of quarterly stock market index

Lags:				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUINDEXVOL ≠ EUARRIVALSVOL	107	0.35431	0.8412	1.417241
EUARRIVALSVOL ≠ EUINDEXVOL		1.79304	0.1271	7.172160

Note: *EUINDEXVOL* stands for volatility of Stock market Index in Europe
EUARRIVALSVOL stands for volatility tourist arrivals from Europe to Greece

Table 3.7: Causality results between monthly tourist arrivals from Europe-Monthly stock market index.

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUINDEXRET ≠ EUARRIVALSRET	330	0.83331	0.5257	4.166570
EUARRIVALSRET ≠ EUINDEXRET		1.91816	0.1539	11.94022

Note: *EUINDEXRET* stands for Stock market Index in Europe
EUARRIVALSRET stands for tourist arrivals from Europe to Greece

Table 3.8: Causality results between volatility of monthly tourist arrivals from Europe- Volatility of monthly stock market index

Lags: 1				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
EUINDEXVOL ≠ EUARRIVALSVOL	334	0.88075	0.3480	0.880746
EUARRIVALSVOL ≠ EUINDEXVOL		1.02230	0.3120	1.022299

Note: *EUINDEXVOL* stands for volatility of Stock market Index in Europe *EUARRIVALSVOL* stands for volatility tourist arrivals from Europe to Greece

PART 4: The relationship between Italian, French, German and UK tourism in Greece and economic activity in these countries: Empirical results

Tables 4.1 – 4.4 report the causal relationship between tourism development in Greece as measured by tourist arrivals from Italy to Greece and economic – financial development in Italy, as measured by Industrial Production and Italian Stock market Index. The examined period is 1996-2007.

As we can see from the probability results there is not evidence running from tourism in Greece and economic circumstances(represented by Industrial Production) in Italy and vice versa.

But on the other hand we ascertain that Stock market Index in Italy in previous months influences the desire of Italian people to travel in Greece. In tables 4.3 and 4.4 the null hypothesis in the first line is that Stock market Index in Italy(or its volatility) do not Granger cause Italian tourist arrivals in Greece. As the probability in both tables is less than 0.05 the null hypothesis is rejected and its alternative is accepted. When the stock market Index increases, the part of individual's income based on stocks increases and finally their total income reach in higher level. It is obvious, that in that case people can afford more money for tourism.

Table 4.1: Causality results between monthly tourist arrivals from Italy-Monthly Industrial production in Italy.

Lags: 6				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
ITARRIVALSRET≠ITIPRET	137	1.31759	0.2451	7.905559
ITIPRET≠ITARRIVALSRET		0.64156	0.6971	3.849380

Note: *ITARRIVALSRET* stands for tourist arrivals from Italy to Greece
ITIPRET stands for Industrial production in Italy

Table 4.2: Causality results between volatility of monthly tourist arrivals from Italy-Volatility of monthly Industrial production

Lags: 1				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
ITARRIVALSVOL≠ITIPVOL	142	0.34448	0.5573	4.818533
ITIPVOL≠ITARRIVALSVOL		1.27461	0.2589	1.274608

Note: *ITARRIVALSVOL* stands for volatility of tourist arrivals from Italy to Greece

ITIPVOL stands for volatility of Industrial production in Italy

Table 4.3: Causality results between monthly tourist arrivals from Italy-Monthly Stock market Index

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
ITINDEXRET→ ITARRIVALSRET	140	7.70649	0.0000	23.11947
ITARRIVALSRET ≠ ITINDEXRET		0.64156	0.6971	3.843980

Note: *ITINDEXRET* stands for Stock market Index in Italy

ITARRIVALSRET stands for tourist arrivasl from Italy to Greece

Table 4.4: Causality results between volatility of monthly tourist arrivals from Italy-Volatility of monthly Stock market Index

Lags: 2				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
ITINDEXVOL → ITARRIVALSVOL	141	4.97568	0.0069	9.951316
ITARRIVALSVOL≠ITIPVOL		0.39276	0.6752	0.785523

Note: *ITINDEXVOL stands* for volatility of Stock market Index in Italy
ITARRIVALSVOL stands for volatility of tourist arrivals from Italy to Greece

As in the case of Italy, in the following tables 4.5-4.8 we report again, using Granger causality tests, the interdependency between economic conditions in France and inbound tourism in Greece coming from France. The examined period is 1996-2007 and the same proxies of series are used. Thus, tourist arrivals from France to Greece measures the tourism development in Greece and Industrial production and Stock market Index in France measure the economic conditions in this particular country of origin. The optimal lags for conducting the VAR model and the Granger causality test are determined by the use of the Akaike Criteria. As we discern from the below results again we find an economy driven development as tables 4.5 and 4.6 indicate a unidirectional causality from return and volatility of Industrial Production in France to French inbound tourist arrivals in Greece . As Industrial production is a measurement of economic growth of each country we assume that economic conditions of previous months affect on the decision of people to travel.

Conversely, there is not any Granger causality between French tourism in Greece and Stock market Index in France and vice versa, as the probability is more than 0.05 and the null hypothesis (one variable does not Granger causes the other) is accepted.

Table 4.5: Causality results between monthly tourist arrivals from France-Monthly Industrial production

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
FRIPRET→FRARRIVALSRET	139	3.02553	0.0166	12.10212
FRARRIVALSRET≠FRIPRET		1.31375	0.1835	19.70630

Note: *FRARRIVALSRET* stands for tourist arrivals from France to Greece
FRIPRET stands for Industrial production in France

Table 4.6: Causality results between volatility of monthly tourist arrivals from France-Monthly Industrial production

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
FRIPVOL→FRARRIVALSVOL	139	5.45385	0.0002	21.81540
FRARRIVALSVOL≠FRIPVOL		1.18286	0.2885	14.19431

Note: *FRARRIVALSVOL* stands for volatility of tourist arrivals from France to Greece
FRIPVOL stands for volatility of Industrial production in France

Table 4.7: Causality results between monthly tourist arrivals from France-Monthly Stock market Index

Lags: 5				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
FRINDEXRET ≠ FRARRIVALSRET	138	1.17171	0.3202	5.858563
FRARRIVALSRET ≠ FRINDEXRET		1.27989	0.2693	6.399456

Note: *FRINDEXRET* stands for Stock market Index in France
FRARRIVALSRET stands for tourist arrivals from France to Greece

Table 4.8: Causality results between volatility of monthly tourist arrivals from France-Volatility of monthly Stock market Index

Lags: 1				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
FRINDEXVOL ≠ FRARRIVALSVOL	142	0.81363	0.3670	0.813630
FRARRIVALSVOL ≠ FRINDEXVOL		2.08978	0.1483	2.089778

Note: *FRINDEXVOL* stands for volatility of Stock market Index in France
FRARRIVALSVOL stands for volatility of tourist arrivals from France to Greece

In the next four tables that follow (4.9- 4.12) we show the interdependency between two series. The first one is economic/financial conditions in Germany as expressed by Industrial Production and Stock market Index and the second is tourism growth in Greece as expressed by the number on German tourist arrivals. The examined period is 1996-2007.

So, in the case of Germany we remark at first one a unidirectional causal relationship between the return and the volatility of industrial production to the return and the volatility respectively of tourist arrivals in Greece coming from Germany. And at second one we observe also a relationship coming from the German Stock market Index to the German tourist arrivals in Greece. In all the above cases the probability is less than 0.05, which means that we reject the null hypothesis and we accept the alternative one, namely the causal relationship between the variables. Hence, an economic driven tourism growth is hold between the two countries.

Table 4.9: Causality results between monthly tourist arrivals in Greece from Germany –Monthly Industrial production

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GEIPRET→GEARRIVALSRET	139	4.42101	0.0014	17.68405
GEARRIVALSRET≠GEIPRET		1.48836	0.0737	29.76712

Note: *GEARRIVALSRET* stands for tourist arrivals from Germany to Greece
GEIPRET stands for Industrial production in Germany

Table 4.10: Causality results between volatility of monthly tourist arrivals from Germany –Monthly Industrial production

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GEARRIVALSVOL≠GEIPVOL	139	3.31592	0.1076	22.00928
GEIPVOL→GEARRIVALSVOL		1.78896	0.0101	13.26367

Note: *GEARRIVALSVOL* stands for volatility of tourist arrivals from Germany to Greece
GEIPVOL stands for volatility of Industrial production in Germany

Table 4.11: Causality results between monthly tourist arrivals from Germany – Monthly Stock market Index

Lags: 4				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GEINDEXRET →GEARRIVALSRET	139	2.85188	0.0223	11.40752
GEARRIVALSRET ≠ GEINDEXRET		0.52735	0.7156	2.109381

Note: *GEINDEXRET* stands for Stock market Index in Germany
GEARRIVALSRET stands for tourist arrivals from Germany to Greece

Table 4.12: Causality results between volatility of monthly tourist arrivals from Germany –Volatility of Stock market Index

Lags: 3				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GEINDEXVOL ≠ GEARRIVALSVOL	140	0.45497	0.7138	1.364917
GEARRIVALSVOL ≠ GEINDEXVOL		1.39854	0.2411	4.195624

Note: *GEINDEXVOL* stands for volatility of Stock market Index in Germany
GEARRIVALSVOL stands for volatility of tourist arrivals from Germany to Greece

In the last four cases, 4.13 – 4.16, we appear the case of English tourists coming to Greece. So , we use as a proxy of tourism growth the number of tourist arrivals from Great Britain to Greece and as a proxy of economic development the Industrial Production and the Stock market Index in Great Britain. Monthly data are used for the same, as in the above cases, period 1996-2007. The only causal relationship that appears is that from Industrial Production in Great Britain to tourist arrivals from Great Britain to Greece. This is proved by the fact that probability equals to 0.007, thus null hypothesis is rejected and Granger causality relationship exists.

Table 4.13: Causality results between monthly tourist arrivals from UK – Monthly Industrial production.

Lags: 2				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GBIPRET→ GBARRIVALSRET	141	7.29205	0.0007	14.58409
GBARRIVALSRET≠GBIPRET		0.08233	0.9210	0.164651

Note: *GBARRIVALSRET* stands for tourist arrivals from Great Britain to Greece

GBIPRET stands for Industrial production in Great Britain

Table 4.14: Causality results between volatility of monthly tourist arrivals from UK–Volatility of monthly Industrial production

Lags: 1				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GBARRIVALSVOL ≠ GBIPVOL	142	1.26593	0.2605	1.265931
GBIPVOL ≠ GBARRIVALSVOL		0.41278	0.5206	0.412775

Note: *GBARRIVALSVOL* stands for volatility of tourist arrivals from Great Britain to Greece

GBIPVOL stands for volatility of Industrial production in Great Britain

Table 4.15: Causality results between monthly tourist arrivals from United Kingdom–Monthly Stock market Index

Lags: 6				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GBINDEXRET ≠ GBARRIVALSRET	137	0.54186	0.7767	3.251169
GBARRIVALSRET ≠ GBINDEXRET		0.97544	0.4399	5.852664

Note: *GBINDEXRET* stands for Stock market Index in Great Britain
GBARRIVALSRET stands for tourist arrivals from Great Britain to Greece

Table 4.16: Causality results between volatility of monthly tourist arrivals from United Kingdom –Volatility of monthly Stock market Index

Lags: 7				
Empirical result	Observation	F-Statistic	Probability	Chi-sq
GBINDEXVOL ≠ GBARRIVALSVOL	136	0.30859	0.9504	2.160141
GBARRIVALSVOL ≠ GBINDEXVOL		1.21364	0.2909	8.495457

Note: *GBINDEXVOL* stands for volatility of Stock market Index in Great Britain
GBARRIVALSVOL stands for volatility of tourist arrivals from Great Britain to Greece

5.4 Conclusions

The relationship of tourism development with a great variety of economic activities has fostered interest in measuring its economic contribution, and in assessing its relationship with other economic activities.

In this study we test the causal relationship among tourism development in Greece and economic conditions not only in Greece but also in regions that constitute its main sources of tourism (USA, Europe, Italy, France, Germany and Great Britain).

In the first part of our study, where we examine the case of Greece, we try to answer the following two questions. First, is there a long run equilibrium relationship between tourism development and economic growth, and if there is, what is the direction of this relationship. Test results indicate a bi-directional causality between the two factors as confirmed by the reciprocal interaction between Industrial Production and variables of economic growth.

In the other three parts where we are referred to the interdependency between tourism growth in Greece and economic conditions in regions of our sample, we deduce in general that economy of these regions have influence on the decision or the desire of their residents to travel in Greece.

It is important to mention that all the above conclusions are not strongly supported in all cases but we extract some general outcomes.

A careful empirical analysis is desirable for every country that wants to focus on tourism industry as part of its national economic policy. Based on the results, decisions on tourism matters, tourism projects or tourism budgets can be adjusted or altered.

The result of causality help a government set priorities with respect to resource allocation for national economic growth and tourism development strategies.

Concluding we emphasize that contradictory results obtained from different studies for the same country stem from a number of factors, such as the weight of tourism in respective economies, application of different methodologies or omission of important variables.

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