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Tourism and Economic Growth in Greece: 1970-2015

by

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Τουρισμός και Οικονομική Ανάπτυξη στην Ελλάδα: 1970-2015

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Summary

The dissertation offers a modern approach to tourism-led growth and investigates the long-run and short-run relationships between tourism, cultural tourism and economic growth for Greece over the period of 1970-2015. The stationary analysis is conducted by applying Zivot-Andrews unit root test while for co-integration we apply the ARDL bounds testing approach developed by Perasan-Shin-Smith. The analysis of vector error correction model (VECM) showed that international tourism and cultural tourism are catalysts for economic growth. Finally, we used forecast error variance decomposition (FEVD) in vector autoregressive (VAR) growth using Cholesky technique to test the strength of causal relationship between real gross domestic product per capita, international tourist arrivals and visits in archaeological sites and museums. The main finding in this dissertation is the TLG hypothesis can be accepted in Greece.

Key words: Economic growth, tourism, cultural tourism, Greece

Περίληψη

Η μεταπτυχιακή εργασία προσφέρει μια σύγχρονη προσέγγιση στην τουριστική ανάπτυξη και διερευνά τις μακροχρόνιες και βραχυχρόνιες σχέσεις μεταξύ τουρισμού, πολιτιστικού τουρισμού και οικονομικής ανάπτυξης για την Ελλάδα κατά την περίοδο 1970-2015. Η ανάλυση στασιμότητας διεξάγεται εφαρμόζοντας τη δοκιμή μοναδιαίας ρίζας Zivot-Andrews ενώ για την συνολοκλήρωση εφαρμόζουμε την προσέγγιση ελέγχου ορίων ARDL που αναπτύχθηκε από τους Perasan-Shin-Smith. Η ανάλυση του μοντέλου διόρθωσης σφάλματος (VECM) έδειξε ότι ο διεθνής τουρισμός και ο πολιτιστικός τουρισμός αποτελούν καταλύτες για την οικονομική ανάπτυξη. Τέλος, χρησιμοποιήσαμε την διακύμανση απόκλισης των σφαλμάτων πρόβλεψης (FEVD) στην ανάπτυξη αυτοπαλίνδρομου διανυσματικού υποδείγματος (VAR) με τη χρήση της τεχνικής Cholesky για να εξετάσουμε τη δύναμη της αιτιώδους σχέσης μεταξύ του πραγματικού ακαθάριστου εγχώριου προϊόντος ανά κάτοικο, των διεθνών αφίξεων τουριστών και των επισκέψεων σε αρχαιολογικούς χώρους και μουσεία. Το κύριο εύρημα αυτής της μεταπτυχιακής εργασίας είναι ότι η υπόθεση TLG μπορεί να γίνει αποδεκτή στην Ελλάδα.

Λέξεις-κλειδιά: οικονομική ανάπτυξη, τουρισμός, πολιτιστικός τουρισμός, Ελλάδα

Περιεχόμενα

1. Introduction

Sometimes, tourism has been viewed as a non-productive sector that is less likely to contribute to economic growth because it involves nothing more than fun and leisure (Vanhove, 2011). However, this view has changed and tourism has become one of the largest and most rapidly growing service sectors in the world during economic crisis periods (McIntoch, Goeldner & Ritchie, 1995; Tang & Tan, 2017). Tourism has also been acknowledged as a means to generate economic growth (Belloumi, 2010; Clancy, 1999) and a leading driver of socio-economic progress (Shahzad, Shahbaz, Ferrer & Kumar, 2017). Therefore, expansion of tourism industry is considered as an engine of economic development across the world (Brida & Risso, 2009; Tang & Tan, 2013; Paramati, Alam & Chen, 2017).

According to the World Tourism Organization (UNWTO 2015, 2017) international tourism is a key to development, prosperity and well-being. It can help promoting economic growth by creating jobs, generating income, diversifying the economy, contributing to the balance of payments, increasing government revenues in the form of profits and taxes, stimulating investment in new infrastructure, labour and competition, enhancing the efficiency of local firms by increasing competition, promoting the transfer of technology and information, improving the living standards of citizens and facilitating the exploitation of economies of scale and scope. Moreover, tourism is a dynamic means of knowing and understanding the country's inhabitants and history, thus enhancing social capital.

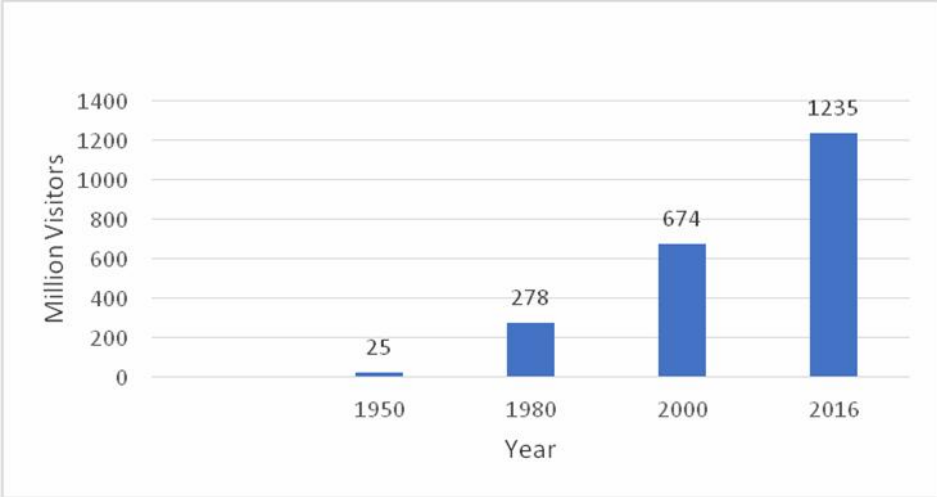
On the other hand, international tourism has negative impacts, such as on local environment, native culture, raw material consumption, pollution and waste production – related, the imitation of xenophobic models by local residents, the alteration of civilization, etc. Recognition of the problems caused by the most prevalent type of tourism, the conventional tourism, has increased the interest of researchers and planners in alternative forms of tourism (Järviluoma, 1992). Alternative tourism also incorporated soft tourism, small-scale tourism, green tourism, nature tourism and integrated tourism, developed by local people and based in local nature and culture (Moscando, 2001; Järviluoma, 1992). It grows rapidly and it used as a hope for proving consistency with natural, social and community values, as alternative tourism could have less negative effects on destination areas, environment and population without diminishing the positive economic effects, such as the livelihoods of local communities (Smith & Eadington, 1992). McKercher (2016) provides an overview of alternative forms of tourism product categorizations including Adventure, Agrotourism, Attractions, Battlefield, Business, Culinary, Cultural/heritage, Dark Tourism, Educational, Events, Marine, Medical, Memory, Nature-based, Poverty, Recreational, Sex, Sport, Theme Parks, Urban and Wellness. With these, also distinguishes more than 330 tourist products.

For this reason, public administrations tend to assign a large proportion of their budget to tourism promotion and tourism development programs in recognition of the fact that the tourism industry can boost macroeconomic performance: economic growth, exports, employment and foreign currency (Abeyratne, 1999; Blancas, Caballero, Gonzalez, Lozano-Oyola & Perez, 2010; Ivanov & Webster, 2007; Saenz-de-Miera & Rosselló, 2014).

According to the World Tourism Organization (UNWTO, 2017), international tourism sector has been ranked third after chemicals and fuels and ahead of

automotive products and food. Moreover, in many developing countries, tourism is the top export category. Globally, international tourism represents 7% of the world's exports in goods and services, accounted for US$ 1.4 trillion, 292 million jobs, and 10% of the world's gross domestic product (GDP) in 2016, the tourism sector if well managed can foster inclusive economic growth, social inclusiveness and the protection of cultural and natural assets (UNWTO, 2017). International tourist arrivals have increased from 25 million globally in 1950 to 278 million in 1980, 674 million in 2000 and 1,235 million in 2016 (UNWTO, 2017). It is expected to increase by 3,3% a year between 2010 and 2030 to reach 1.8 billion by 2030 according to UNWTO's long term forecast report Tourism Towards 2030.

Figure 1: The Trend of World Tourist Arrivals



Source: Hellenic Statistical Authority

Although international tourist arrivals have undergone an exponential growth pattern since the 1950s, there have been periods of negative growth due to several political, economic and health crises, such as the oil price crisis in the mid-1970s, the global recession in the mid-1980s, the Persian Gulf War in 1991, the Asian financial crisis in late 1997, the terrorist attacks at the World Trade Centre in New York and the Pentagon in the United States in 2001, the Iraq disarmament crisis war in 2003, the outbreak of Severe Acute Respiratory Syndrome (SARS) and avian flu in 2003, the global financial crisis in late 2007, the Arab Spring in 2011, the Syrian Civil war in 2011, the crisis of Crimea and Ukraine in early 2014 and the European migrant crisis in early 2015.

International tourism is recognized to have a positive effect on the increase of long-run economic growth through different channels. First, tourism is a significant foreign exchange earner, allowing paying for imported capital goods or basic inputs used in the production process. Second, tourism plays an important role in spurring investments in new infrastructure and competition between local firms and firms in other tourist countries. Third, tourism stimulates other economic industries by direct, indirect and induced effects. Fourth, tourism contributes to generate employment and increase income. Firth, tourism can cause positive exploitation of economies of scale in national firms (Andriotis, 2002; Croes, 2006; Fagance, 1999; Lin & Liu, 2000; Schubert, Brida & Risso, 2011). Finally, tourism is an important factor of diffusion of

technical knowledge, stimulation of research and development and accumulation of human capital (Schubert, Brida & Risso, 2011).

The argument that tourism can promote or cause long-run economic growth through various channels is referred in the literature as the Tourism-Led Growth Hypothesis (TLGH) (Shan & Wilson, 2001). Tourism provides foreign exchange that is necessary for importing capital goods for production of goods and services, in turn, to economic growth (McKinnon, 1964). Theoretically, the tourism-led growth hypothesis (TLGH) was directly derived from the export-led growth hypothesis that postulates that economic growth can be generated not only by increasing the amount of labour and capital within an economy, but also by expanding exports (Brida, Cortes-Jimenez & Pulina, 2016). According to the seminal work of the Spanish economy by Balaguer and Cantavella-Jordá (2002), published in Applied Economics, the TLGH poses that a country's economic growth must benefit from the income provided from the tourism activity. Another recent review conducted by Brida et al. (2016) shows that with few exceptions, the TLGH is confirmed for the countries it is considered. It can be inferred that countries can promote their tourism activity as a means to achieving economic growth. However, some authors also identify the need to further expand the validation of the TLGH not only with the use of innovative methodological approaches such as taking into account possible non-linearity between tourism and growth, but also by analyzing different types of tourism and other countries that do not specialize in tourism (Brida et al., 2016: 424).

The dynamic growth of cultural tourism in the last decades of the twentieth century must be viewed in the content of the issues of globalisation (Jovicic, 2016). According to Richards (2002, 2007), cultural tourism is the movement of people towards cultural attractions, somewhere other than their habitual place of residence, in order to obtain information and knowledge to fulfil their own cultural demands. Di Pietro, Guglielmetti Mugion and Renzi (2013, p.1) suggest that 'culture plays a fundamental role in human development and in the creation of identities and habits of individuals, as well as communities'. Heritage is recognizes as being among the most universal resources for tourism (Di Pietro, Guglielmetti Mugion and Renzi, 2018 ; Lee & Chhabra, 2015 ; Timothy & Boyd, 2003). Some researchers have considered the influence of cultural attractions such as the built heritage, museums and monuments, on the image of tourist destinations (Richards & Wilson, 2007 ; Carballo & Leon, 2018). Some authors have argued that the image of a place can "represented by its cultural heritage" (Mackay & Fesenmaier, 2000), since the cultural identity of a place is an important part of its identity (Mazilu, 2012). Cultural itineraries can also be a means of linking together creative enterprises and events, stimulating visitors to see a number of different activities in a specific region (Richards, 2011b). Tourist experiences usually emphasize active involvement in local culture, rather than the highlights of global culture (Richards, 2011a).

The aim of this dissertation is to investigate the possible causal relationship among international tourist arrivals, the volume of visitors in archaeological sites and museums and economic growth measured by real GDP per capita in Greece through the application of different econometric techniques.

In this dissertation, we employed four econometric models to investigate the validity of TLGH in Greece. First, part of the conventional unit root tests, including augmented Dickey-Fuller (ADF), Phillips-Perron (PP), Kwiatkowski-Phillips-Schmidt-Shin (KPSS) and DF-GLS by Elliott et al., we also apply the structural

breaks unit root Zivot-Andrews (1992) test. Second, we investigate the existence of the short – run and long - run relationship between tourism, cultural tourism and economic growth using cointegration analysis of the autoregressive - distributed lag (ARDL) approach by Perasan et al. Third, we estimate a dynamic vector error correction model in order to infer the causal relationship between the variables. Finally, we test the strength of the causal relationship between the tourism, the cultural tourism and economic growth, by employing the model Variance Decomposition Analysis using Cholesky technique.

The remainder of the dissertation is organized as follows: section 1 provides an overview of the previous literature on the nexus between tourism and economic growth. Section 2 investigates Greece's performance. Section 3 presents the data, and specification models. Section 4 presents the econometric methods. Section 5 presents the results. Section 6 summarizes and concludes the study.

2. Literature Review

Tourism has been one of the fastest-growing economic activities in the world. Tourism economy theory argues that tourism-led growth may take place when tourism has stimulating impact on the economy through spillover and other externalities (Marin, 1992; Balaguer and Cantavella-Jordá, 2002). A great number of researchers have investigated the relationship between tourism and economic growth with a particular focus on countries in which the tourist sector plays a more significant role. Based on the empirical evidence presented in this work, four different strands of literature regarding the causal relationship between tourism and economic growth can be found, as follows: (1) tourism-led economic growth (2) economic-driven tourism growth (3) feedback relationship between tourism and economic growth and (4) no causal relationship.

Tourism-led economic growth suggests that a unidirectional causality runs from tourism development to economic growth, that is, a positive long-run association between the expansion of tourism activities and economic growth. Past empirical studies widely support the perspective of tourism-led economic growth. Specifically, Lanza and Pigliaru (2000) was first empirically investigated the causal relationship between tourism and economic growth. The literature can be grouped into two parts, based on the types of the data set employed in the previous studies. The first branch of literature includes studies that investigate the causal relationship between tourism and economic growth by employing cointegration and Granger causality test. Balaguer and Cantavela - Jordá (2002) were pioneers in examining the validity of the TLGH hypothesis for Spain using the quarterly data of real gross domestic product (GDP), real effective exchange rate and international tourism earnings in real terms over the period 1975-1997 and demonstrated that tourism positively affects economic growth. Odhiambo (2011) examined the relationship between annual data of GDP, tourism receipts and exchange rate for Tanzania and demonstrated that there is a unidirectional relationship from tourism to economic growth. Kreishan (2011) examined the relationship between tourism revenues and GDP over the period 1970-2009 in Jordan and argued that there is unidirectional relationship from tourism to economic growth. Katircioglu (2011) examined the relationship between tourism arrivals, exchange rate and GDP over the period 1960-2007 for Singapore and argued that there is unidirectional relationship from tourism to economic growth. Surugiu and Surugiu (2013) examined the short-run and long-run relationship between GDP, internal travel and tourism consumption, domestic travel and tourism spending and real exchange rate over the period 1988-2009 for Romania and found out that there is a unidirectional relationship between tourism and economic growth. Other studies, which support the existence of TLGH hypothesis, are: Brida and Risso (2009) for Chile, Akinboade and Braimoh (2010) for South Africa, Belloumi (2010) for Tunisia, Katircioglu (2010b) for North Cyprus, Li, Mahmood, Abdullah and Chuan (2013) for Malaysia. In addition, some researchers also found bidirectional causal relationship between tourism and economic growth. For example, Kim, Chen and Jang (2006) found bidirectional causality between tourism and economic growth for Taiwan, which means both TLGH hypothesis and reciprocal relationship between tourism and economic growth, using the variables tourist arrivals and GDP over the quarterly period 1971-2003. Other studies are Dritsakis (2004) for Greece, Nowak et al. (2007) for Spain, Jackman (2012) for Barbados, Ghartey (2013) for Jamaica and Tang (2013) for Malaysia. Moreover, some researchers also found unidirectional causality from

economic growth to tourism and some others found out that tourism has no effect on economic growth. For example, Narayan (2004) examined the tourism-led growth, using the variables tourist variables, disposable income, relative hotel substitute prices and transport cost over the period 1980-2010 for Fiji and determined that TLGH hypothesis does not exist, as a unidirectional causality running from economic growth to tourism. Katircioglu (2009c) examined the relationship between tourist arrivals, GDP, exchange rate over the period 1960-2006 for Turkey and Brida, Punzo and Risso (2011) examined the international tourism earnings, GDP and real exchange rate over the period 1965-2007 for Brazil, found no causality between tourism and economic growth, respectively. Lorde, Francis and Drakes (2011) analyzed the relationship between real GDP (and real GDP per capita), tourist arrivals and real exchange rate for Barbados, over the period 1974-2004. They found out that, in the short run, there is bidirectional causality between tourism development and economic growth, using real GDP per capita. On the other hand, a unidirectional causality runs from tourism development to economic growth, using real GDP. They found out that, in the long run, there is a unidirectional causality between tourism development and economic growth. Other studies are Jackman and Lorde (2010) for Barbados, Kasimati (2011) for Greece and Cortés-Jiménez, Nowak and Sahli (2011) for Tunisia.

The second strand of the literature is composed of studies that analyze the relationship between tourism and economic growth using cross-section or panel data. Lee and Chang (2008) examined the relationship between tourism receipts, tourism arrivals, exchange rate and GDP over the period 1990-2002 for a number of OECD and non-OECD countries. Their results demonstrated that there is a unidirectional causality running from tourism to economic growth for OECD countries, Asia and Africa while a bidirectional causality running between tourism and economic growth for Latin America. Soukiazis and Proenca (2008) analyzed the effect of tourism on economic growth using Portuguese regional data and found that tourism positively affected economic growth. Cortes-Jimenez (2008) found that international and domestic tourism affects economic growth in coastal regions while in island only domestic tourism appears to be relevant. Other studies include Po and Huang (2008) for 88 countries, Dritsakis (2012) for seven Mediterranean countries, Lee and Brahmasrene (2013) for European Union, Apergis and Payne (2012) for Nine Carribean countries, Chou (2013) for 10 Transition countries, Aslan (2013) for 10 Mediterranean countries, Tugcu (2014) for Mediterranean Region and Tang and Tan (2017) for 167 countries.

Empirical studies were also conducted for Greece and Mediterranean countries analyzing tourism's contribution to the country's economic growth. Dritsakis (2004) analyzed the relationship between tourism earnings, GDP and exchange rate for Greece for the quarterly period 1960-2000, using VECM (Johansen) - Granger causality method. He found out cointegrated vector among GDP, real effective rate and tourism earnings and concluded that international tourism earnings and real exchange rate cause economic growth with a "strong causal" relationship, whereas economic growth and real exchange rate cause international tourism earnings with a "simply causal" relationship. Kasimati (2011) analyzed the relationship between tourist arrivals, GDP and real effective exchange rate for Greece over the period 1960-2010, using VECM (Johansen) - Granger Causality method. She found out that there is no causality between the variables. Dritsakis (2012) analyzed the relationship between tourist arrivals per capita, real effective exchange rate and real GDP per capita for seven Mediterranean countries: Spain, France, Italy, Greece, Turkey,

Cyprus and Tunisia, over the period 1980-2007, using panel cointegration and fully modified ordinary least squares. He found out that a unidirectional causality runs from tourism development to economic growth in the long run. Aslan (2013) analyzed the relationship between tourist receipts, exchange rate and GDP for twelve Mediterranean countries: Portugal, Israel, Spain, Italy, Greece, Turkey, Cyprus, Tunisia, Croatia, Bulgaria, Malta, Egypt over the period 1995-2010, using panel cointegration and fully modified ordinary least squares. He found out that there is no causality runs from tourism development to economic growth for Malta and Egypt. Also, there is a bidirectional causality runs from tourism and economic growth for Portugal, Israel and Turkey. Finally, there is a unidirectional causality runs from economic growth to tourism for Spain, Italy, Tunisia, Cyprus, Croatia, Bulgaria and Greece.

3. Characteristics of the Greek Economy

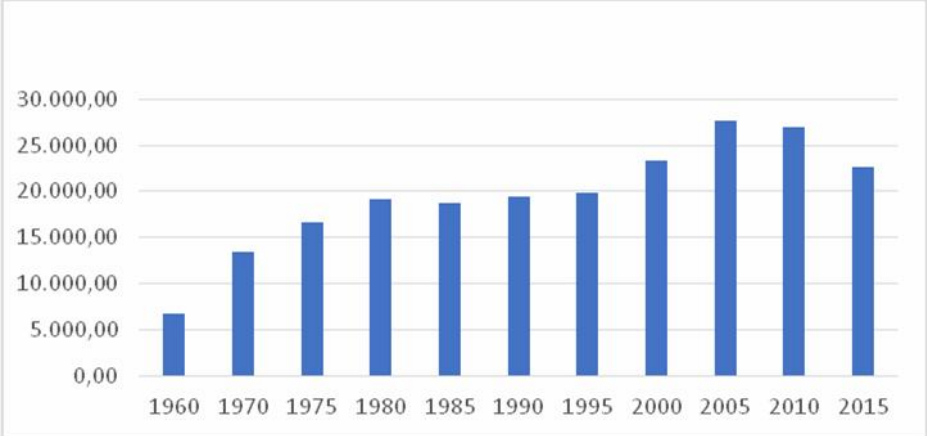
Greece is located in Southern Europe, on the southern end of the Balkan Peninsula and at the crossroads of Europe, Asia and Africa, with a population of approximately 11 million as of 2016. Athens is the nation's capital and largest city. Greece consists of three main geographic areas: a peninsular mainland, the Peloponnese peninsula and around 6.000 islands and islets, scattered in the Aegean and Ionia Sea, most of them grouped in clusters, which constitute the unique Greek archipelago. Some of the famous and popular islands and island clusters are Crete, Rhodes, Corfu, the Dodecanese and the Cyclades. Eighty percent of Greece is mountainous, with Mount Olympus being the highest peak at 2.918 metres. The country consists of nine geographic regions: Macedonia, Central Greece, Peloponnese, Thessaly, Epirus, the Aegean Islands (including the Dodecanese and Cyclades), Thrace, Crete and Ionian Islands.

Greece is considered the cradle of Western civilization, being the birthplace of democracy, Western philosophy, the Olympic Games, Western literature, historiography, political science, major scientific and mathematical principles and Western drama. The country is a member of the European Union since 1981 and of Eurozone since 2001. It is also a member of numerous other international institutions, including the United Nations, the Council of Europe, the North Atlantic Treaty Organization (NATO), the Organization for Economic Co-operation and Development (OECD), the World Trade Organization (WTO), the Organization for Security and Co-operation in Europe (OSCE) and the Organization internationale de la Francophonie (OIF).

3.1 Structural features of growth in Greece

The economy of Greece is the 48th largest in the world with a nominal gross domestic product (GDP) of $204.299billion per annum (WDI, 2017). As of 2016, Greece is the sixteenth largest economy in the 28-member European Union (Eurostat, 2017). The most significant development in the modern history of the Greek economy happened after 1960, when large public investments projects of the post-war era came in operation.

Figure 2: Real GDP per capita in Greece



Data Source: Hellenic Statistical Authority

In particular, the high levels of economic growth that followed from 1950 to 1973 have been called the Greek economic miracle. During this period, the Greek economy grew by 7.7%, second in the world only to Japan (Binda, 2013, p. 177) due to rapid industrialization that followed the civil war and the effects of a number of measures, including the Marshall Plan, drastic devaluation of the currency and the construction of major infrastructure projects. Over the period 1953-1971, the growth rate of GDP was around 7% per annum, with fluctuations. In the period of 1957-1971, there was an investment boom, which until 1966 financed by 87% of domestic resources, while the remaining 13% foreign capital. The secondary sector as a whole accounted for it 33.5% of GDP in 1972. In 1974, GDP was reduced severely for the first time since 1960 as an aftermath of the energy crisis and the political turmoil of that time and registered a recession of 6.4%. The general government budget balance left the surpluses of the previous decade behind and started registering increasing deficits after 1973. Until the second energy crisis in 1979-80, growth was partially restored but the economy was now growing at lower rates which averaged 5%. After the second energy crisis, the productivity of capital started declining and labour costs rising.

In the eighties, a great shift from primary and secondary economic sectors to the tertiary sector and services was evident. In 1981, Greece entered the European Union, but its economy was once again entering a period of recession which lasted for three years following the second oil price shock in 1979 and a policy shift with a special emphasis on public spending. the relatively successful implementation of the stabilization program 1985-1987 had begun to yield results: in 1988 it was increased GDP ratio of 3.5%, which was the highest since the 1980s, while the deficit of the country's current foreign transactions as a percentage of GDP, fell to the lowest level of the last 25 years and was funded by the autonomous influx of private capital. The increase in the primary sector was 6%, in the secondary sector was 5% (manufacturing 5% and constructions 7.3%), while in the third-only 2.1%.

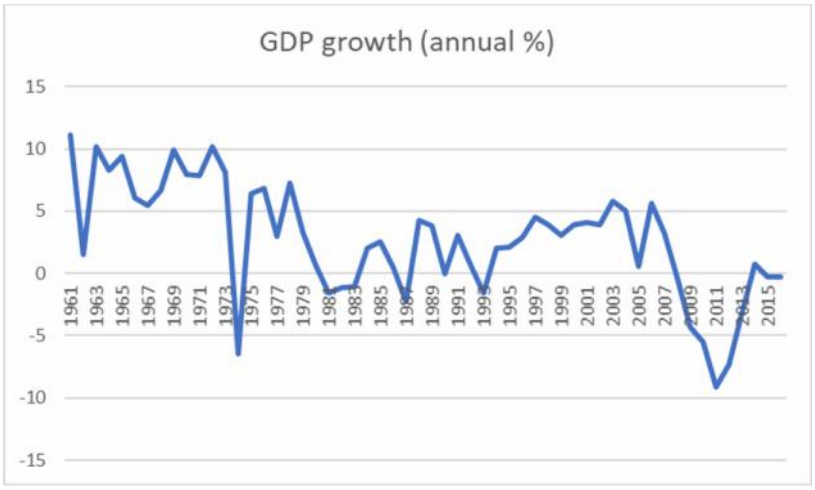
In the early nineties, the already poor GDP growth performance worsened even more and the low average growth of 2.4% annually. The period from the mid-nineties was marked by the escalation of efforts, in the context of economic and monetary policy, to surprise conditions for Greece's accession to the European Economic and Social Committee Monetary union. The period after the mid-nineties, growth in Greece started to increase gradually until 2008 when the global financial crisis set the ground for one of the most serious recessions the country's economy. After the Greek government-debt crisis, a central focus of the wider European debt crisis, plunged the economy into a sharp downturn, with real GDP growth rates of −0.3% in 2008, −4.3% in 2009, −5.5% in 2010, −9.1% in 2011, −7.3% in 2012, −3.2% in 2013, +0.7% in 2014, -0.3% in 2015 and -0.2% in 2016 (See, among others, Eurostat, 2017; Psalidopoulos, 2014; Bank of Greece, 2016; Hellenic Statistical Authority, 1996, 2013; WDI, 2016).

In 2010, the country's public debt reached €356 billion (172% of nominal GDP) (Eurostat, 2015). After negotiating the biggest debt restructuring in history with the private sector, Greece reduced its sovereign debt burden to €280 billion (137% of GDP) in the first quarter of 2012 (Eurostat, 2013).

In 2012, the contribution of construction as well as agriculture, forestry and fishing to GDP was smaller by more than 65% compared to 1995. Furthermore, the

contribution of manufacturing was smaller by almost 21% at the same period compared to 1995. Moreover, the contribution of the tertiary sector larger by 18%. In 2015, economy was based on the service (82.8%) and industrial sectors (13.3%). The agricultural sector contributed 3.9% of national economic output in 2015. Important Greek industries include tourism and shipping (Hellenic Statistical Authority, 2016). With almost 25 million international tourists in 2016, Greece was the 14th most visited country in the world (UNWTO, 2017).

Figure 3: GDP growth (annual %)

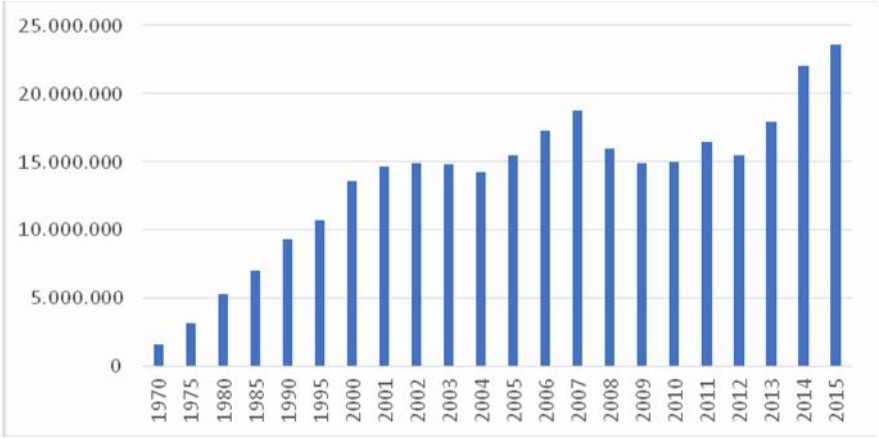


Source: World Bank

3.2 Structural features of tourism in Greece

The tourism sector in Greece has undergone substantial changes over the past four decades. According to the latest statistics released by the Hellenic Statistical Authority (2016), there were 23.60 million visitors in 2015 of whose 14.98 million visitors by air, 632.141 overseas visitors, 5.339 visitors by train and 7.9 million visitors by car and these numbers are expected to rise in the following decade. Moreover, from 23.60 million visitors in 2015, 20.72 million visitors come from European Union, 1.1 million come from Asia, 61.685 visitors come from Africa, 1,1 million come from countries of America and 211.970 from Oceania, respectively.

Figure 4: International Arrivals in Greece



Source: Hellenic Statistical Authority

Tourism development brings about a number of benefits such as revenue income, job chances and improvement of image. According to the report of Travel Tourism Economic impact 2017, the tourism sector's direct contribution to Greece's GDP was 13.2 billion Euro (USD14.7bn) or 7.5% of GDP, whilst its total contribution to GDP was 32.8 billion Euro (USD36.6bn) or 18.6% of GDP. The report also predicted that the direct and total contribution of the tourism sector to GDP is expected to rise by 4.5% and 4.6% annually to 22.1billion Euro (USD24.6bn) and 54.7billion Euro (USD61.1bn) respectively, from 2017-2027 (in constant 2016 prices). Additionally, the tourism sector contributed 423.000 jobs directly and 860.500 jobs indirectly. Furthermore, travel and tourism investment in 2016 was 3.3 billion Euro (USD3.5bn) or 15.7% of total investment. It is estimated that the travel and tourism investment would increase at a rate of 4.8% annually from 2017-2027.

3.3 Structural features of cultural tourism in Greece

The dynamic growth of cultural tourism can be explained by the rapid growth and fragmentation of demand for trips to various cultural attractions and amenities, by education, by the development of technology (Internet) and by the content of the issues of the globalization. Tourism and culture are closely linked and cultural tourism is an important segment of worldwide tourism (Richards & Munsters, 2010; Carballo & León, 2018). Cultural tourism represents one of the alternative forms of tourism, opposed to mass tourism and implies travel with a primary goal to discover and learn more about monuments and places of historical and artistic interest (Jovicic, 2016). For Timothy and Boyd (2006, p.1), heritage tourism falls under the purview of cultural tourism, and it is "one of the most notable and widespread types of tourism and is among the very oldest forms of travel", which permeates many other forms of tourism, provides a wide range of visitor attractions and is one of the most encompassing categories of visitor experiences. One of the main reasons for travelling is arts, heritage and other cultural activities (Constantin & Mitrut, 2009; Carballo & León, 2018). Cultural tourism can provide a boost to Greek tourism (Kasimati & Vagionis, 2017). Therefore, tourism is a sector that is able to transform cultural values into economic ones (Nocca, 2017). According to Richards (2007), tourism is becoming one of the flows through which economic, cultural and social exchange is realized, and the increased pace of such exchange is manifested as a stimulus for further tourism growth. Cultural tourism can produce many benefits for local communities (ICOMOS, 1976, 1999) and they are trying to create a new identity, and preserve and promote the heritage of its own. The construction of a new identity, image, and the preservation and promotion of languages, traditions, and other feature of local community form is a good basis for creating a quality tourist supply (Jovicic, 2016). It offers a great potential for economic growth and sustainable development but, at the same time, can represent a cost (ICOMOS, 1976, 1999).

The broad definition of Cultural Tourism is a kind of tourism where the cultural heritage – old and contemporary – lies in the centre of the activity. The multi-cultural meeting, which constitutes an essential characteristic of this type of tourism, has consequences to both the tourist and the reception society (Baud and Ypeij, 2009, p.3).

Most authors agree on the understanding of cultural tourists as tourists who come in contact with culture, whether more by accident, more as an adjacent activity or more specifically desired (Ashworth & Tunbridge, 1990; Mc Kercher & du Cros,

2002; McKercher, Ho & Du Cros, 2005; McKercher, Wong & Lau, 2006; Richards, 2007; Jovicic, 2016). Richards (2002) made a difference between the "specific" cultural tourist, an ordinary consumer of culture, and the "general" cultural tourist, who is a sporadic and incidental consumer.

Cocossis, Tsartas & Grimpa (2011) identified the primary cultural tourism resources including those related to history (locations, built environments, parks, landscapes and farms); material articles; the intangible characteristics of local traditions; the physical characteristics related to the natural environment; festival and event tourism; and large or small sport events as well as the routes that connect resources or themes across regions. According to the broad typology, there are five types of cultural tourists: (1) the highly motivated cultural tourist; (2) the sightseeing tourist (whose interest lies in visiting only the main tourist attractions); (3) the causal cultural tourist (culture is an element of little importance); (4) the incidental cultural tourist (culture is not an element of interest and contact/experience is therefore superficial); and (5) the accidental cultural tourist (culture is not an interest but, by contrast, where there is contact he or she achieves a great experience) (Mc Kercher & du Cros (2002). Jovicic (2016) there are two key groups of cultural tourists: tourists who consume culture because it is their main motivation, and those for whom culture is only a complement, secondary or even accidental.

Country's rich historical legacy is reflected on its 18 UNESCO world heritage sites, such as Acropolis (1987), Archaeological Site of Aigai (1996), Archaeological site of Delphi (1987), Archaeological site of Mystras (1989), Archaeological site of Olympia (1989), Archaeological site of Philippi (2016), Archaeological site of Mycenae and Tiryns (1999), Delos (Kyklades) (1990), Medieval City of Rhodes (1988), Monasteries of Daphni, Hosios Loukas and Nea Moni of Chios (1990), Historic Centre (Chora) with the Monastery of Saint John the Theologian and the Cave of the Apocalypse on the island of Patmos (1999), Old Town of Corfu (2007), Paleochristian and Byzantine monuments of Thessalonika (1988), Pythagoreion and Heraion of Samos (1992), Sanctuary of Asklepios at Epidaurus (1988), Temple of Apollo Epicurius at Bassae (1986), Meteora (1988) and Mount Athos (1988). Moreover, there is a tentative list of sites such as Petrified Forest of Lesvos (2014), Gorge of Samaria National Park (2014), Fortress of Spinalonga (2014), Minoan Palatial Centres (Knossos, Phaistos, Malia, Zakros, Kydonia) (2014), the Area of Prespes Lakes: Megali and MikriPrespa which includes Byzantine and Post-Byzantine monuments (2014), e.tc.[1]

The cultural tourism market has become flooded with new cultural attractions and heritage centres as culture is utilized as a means of social and economic regeneration (Richards & Wilson, 2006; Smith, 2005; Carballo & León, 2018). New attractions, events and spectacles are created by utilizing the cultural and symbolic capital attached to specific places (Britton, 1991). For example, the Museum of Acropolis is an archaeological museum which focused on the findings of the archaeological site of the Acropolis.

It was established in 2008 and it opened to the public on 20 June 2009. In the first two months since the museum opened, it was visited by 523.540 people (an average of 9.200 a day). Of these, 60% were foreign visitors. Moreover, Acropolis

[1] Unesco, 2018, https://whc.unesco.org/en/statesparties/gr).

Museum ranked 8th in the Trip Advisor's Travellers Choice Awards of the 25 best museums of the world for 2017.[2]

Cultural tourism industry in Greece is not negligible. Its archaeological sites have been receiving from 6 to 10 million visitors every year during the last 15 years. Moreover, the museums have been receiving from 2 to 4.4 million visitors, respectively.

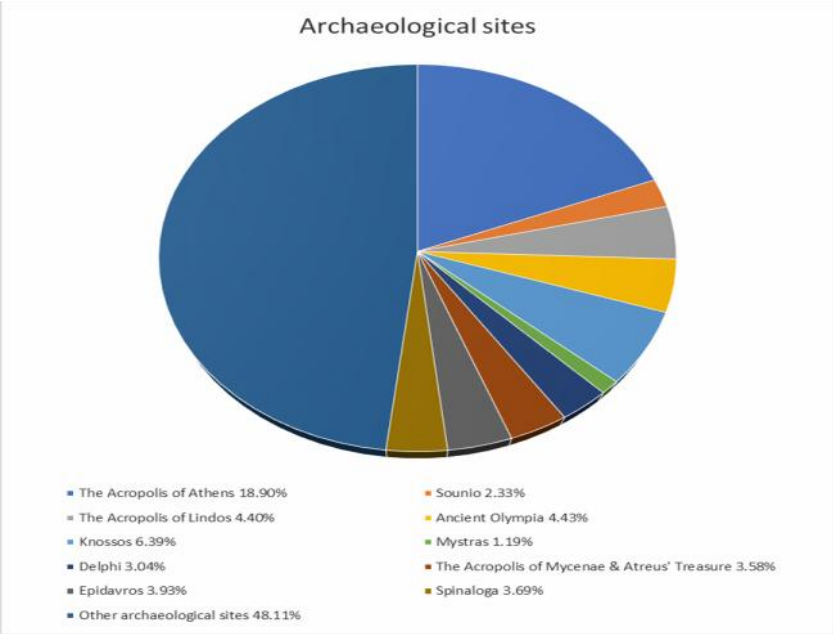
Figure 5: Visitors in Archaeological sites and Museums

Data Source: Hellenic Statistical Authority

Archaeological sites and museums are scattered over almost all regions of Greece. According to the Hellenic Statistical Authority, during the twelve-month period from January to December 2016, archaeological sites have been receiving 9.6 million visitors. The number of visitors includes visitors who buy a ticket and the visitors with free admission ticket. For example, in 2016, Attica received some 4 million visitors to 15 archaeological sites. The Dodecanese received 0.8 million visitors to seven sites, Heraklion, in Crete, hosted about 0.9 million to eight sites; while Argolida received 0.9 million visitors to five sites. Tourism is however very seasonally dependent as some 50 per cent of visits occur in just three months: July, August and September (Kasimati & Vagionis, 2017).

[2] Wikipedia, 2018, https://en.wikipedia.org/wiki/Acropolis_Museum).

Figure 6: Percentage distribution of visitors by Archaeological Sites, 2016

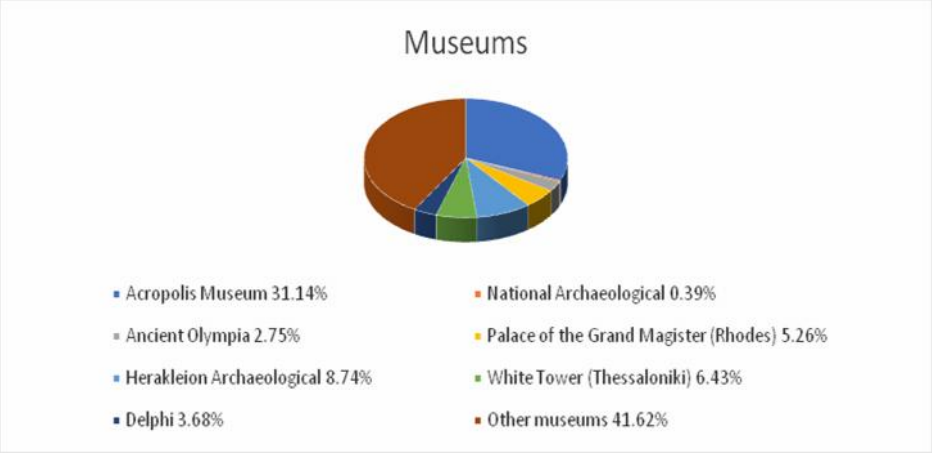


Data Source: Hellenic Statistical Authority

According to the Hellenic Statistical Authority, museums, from January to December 2016, have been receiving 4.5 million visitors. The number of visitors includes visitors who buy a ticket and the visitors with free admission ticket. All regions have at least one museum. In Attica, there are 20 major museums catering to some 2.2 million visitors, while in the Cyclades there are 18 with 111.608 visitors and in Dodecanese there are 15, with 317.786 visitors. Museums are not as reliant on seasonality as open archaeological sites and they are a very useful business asset for promoting cultural tourism (Kasimati & Vagionis, 2017).

These enterprises (museums and archaeological sites) may run at a loss during certain periods of the year, but they serve important educational and cultural purposes (Kasimati & Vagionis, 2017).

Figure 7: Percentage distribution of visitors by Museum, 2016



Data Source: Hellenic Statistical Authority

4. Data and model specification

The Tourism Led-Growth hypothesis (TLGH) posits a positive relation between the growth of the tourism sector and overall economic growth. The objective of this paper is to analyze the role of tourism and cultural tourism for the economic growth in Greece. The hypothesis that tourism and cultural tourism in Greece are the major determinants of long-run growth is then tested.

Data

The variables used in this study for Greece are real gross domestic product per capita measured (***GDP***) in constant 2000 US$ expressed in logarithms, the volume of international tourist arrivals (***tourism***) expressed in logarithms and the volume of visits in museums and archaeological sites (***culture***) expressed in logarithms. The data used in this paper are annual figures covering the period 1970-2015. The data of visits in museums and archaeological sites include the tickets free of charge from the period of 2002-2015. The number of international arrivals, museums, archaeological sites come from the Hellenic Statistical Authority (official website: www.statistics.gr) and the variable real gross domestic product per capita come from the World Development Indicators (WDI) (official website: https://data.worldbank.org/indicator) and they employed in their natural logarithms lGDP, lculture and ltourism.

Model

In equation form, the relationship between international visitors, visitors in archaeological sites and museums and the real gross domestic product per capita in Greece can be expressed as follows:

$$\{GDP\}_t = f(\{tourism\}_t, \{culture\}_t) \quad (1)$$

where GDP is real gross domestic product per capita (*GDP*) (measured in constant 2000 US$) used as a proxy of economic growth, *tourism* is the volume of international tourist arrivals (measure of tourism activity) (Wang & Godbey, 1994) and *culture* is the volume of visitors in museums and archaeological sites (measure of cultural activity).

We convert all series in natural logarithms to avoid sharpness and variations in the data. The functional relationship in Eq (1) can be expressed in logarithmic form, so that elasticities can also be interpreted. In order to find the long-run relationship between variables, we propose the following linear logarithm form:

$$lGDP_t = \beta_0 + \beta_1 ltourism_t + \beta_2 lculture_t + u_t \quad (2)$$

where at period t, $lGDP_t$ is the natural log of the real gross domestic product per capita, $ltourism_t$ is the natural log of tourism volume, $lculture_t$ is the natural log of the volume of visits in archaeological sites and museums and u_t is the standard error term assumed to be normally distributed with zero mean and constant variance. We expect that arise in international tourist arrivals and the visits in museums and archaeological sites will increase the economic growth, so we get $\beta_1 > 0$ and $\beta_2 > 0$.

The dependent variables in eq. (2) may not immediately adjust to its long-run equilibrium level following a change in any of its determinants. Therefore, the speed of adjustment between of short-run and long-run levels of the dependent variable can be captured by estimating the following error correction models (Katircioglu, Feridun & Kilinc, 2014, p. 636):

$$\Delta lGDP_t = a_0 + \sum_{i=1}^{n} b_1 \Delta lGDP_{t-j} + \sum_{i=0}^{n} c_2 \Delta ltourism_{t-j} + \sum_{i=0}^{n} d_3 \Delta lculture_{t-j} + \gamma_4 \varepsilon_{t-1} + u_t \quad (3)$$

$$\Delta lGDP_t = a_0 + b_1 D + \sum_{i=1}^{n} c_2 \Delta lGDP_{t-j} + \sum_{i=0}^{n} d_3 \Delta ltourism_{t-j} + \sum_{i=0}^{n} e_4 \Delta lculture_{t-j} + \gamma_5 \varepsilon_{t-1} + u_t \quad (4)$$

where Δ represents a change in the GDP, tourism, culture variables, u is serially uncorrelated error term, γ is the error-correction parameter and ε_{t-1} is the one period lagged error correction term (ECT). In the equation (4), "D" represents dummy for structural break point. The ECT in eq. (3) and (4) shows the speed of adjustment and how fast the disequilibrium between short-run and the long-run values of the dependent variable is eliminated in each period. The expected sign of the ECT should have a statistically significant coefficient with a negative sign negative (Gujarati, 2003).

Descriptive statistics

Descriptive analysis shows the key features of a dataset without generating results for the population. This analysis is done using graphic and numerical methods. One method of descriptive statistics is graphical representations. The most widespread method of presenting time series data is the time-charts, which is used to visualize the evolution of sizes over the time. The second method of descriptive statistics is numerical descriptive measures, which are distinguished by statistical measures of location and dispersion. The statistical measures of location are the mean, the median and the mode, while the measures of dispersion are the range, the interquartile range, the standard deviation and the variance.[1]

The scatter diagram is a graphical method and examines whether there is a correlation between two quantitative variables. It is based on a chart that illustrates the values of the two variables, the dependent variable, denoted by Y and the independent variable X. The dependent variable (y) is the variable of which we examine the changes. The independent variable (x) is the variable that we believe affects the Y and explains the variability presented by Y. For each pair of values (xi, yi) corresponds to a point denoted by a dot, a cross or another symbol. The simple linear regression relationship expressed as follows:

$$Y = \beta_0 + \beta_1 X \quad (5)$$

If the variables are correlated then the points follow the path of a line or curve. Specifically, the correlation is called positive because as long as the variable x

increases, the y variable increases, and vice versa, when the variable x decreases, and the y variable decreases. The correlation is called negative when the variable x increases while the Y variable decreases and conversely, when the variable x decreases, the y variable increases.

The quantitative measurement of the intensity of the linear relationship between two quantitative variables is called correlation coefficient. The assessment of the Pearson correlation coefficient is denoted by r and derived from the formula:

$$r = \frac{\Sigma(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\Sigma(X_i - \bar{X})^2}\sqrt{\Sigma(Y_i - \bar{Y})^2}} \quad (6)$$

The correlation coefficient r consists of two elements, from the sign and from a numeric value, which is [-1.1]. Specifically, we want to check how strong the dependency is between the variables. Therefore, as long as the value of r is removed from zero and is approaching the positive or negative unit, the more pronounced the correlation. If two variables are not linearly correlated, the r factor is zero.

The descriptive statistics, the correlations and the line regressions of the variables lGDP, ltourism and lculture from the period of 1970-2015 are presented in Figure 8, Figure 9 and Table 1. The results of Table 1 explain that: standard deviation of GDP per capita and culture are low, which represents the stability of data. The high deviation of *tourism* shows high data volatility. The value of Jarque-Bera shows that the series of real *GDP* per capita and *tourism* are normally distributed having zero mean and constant variance. On the other hand, the series of *culture* are not normally distributed. Moreover, the correlation explains that tourist arrivals and culture are positively correlated with economic growth.

Figure 8: Time series

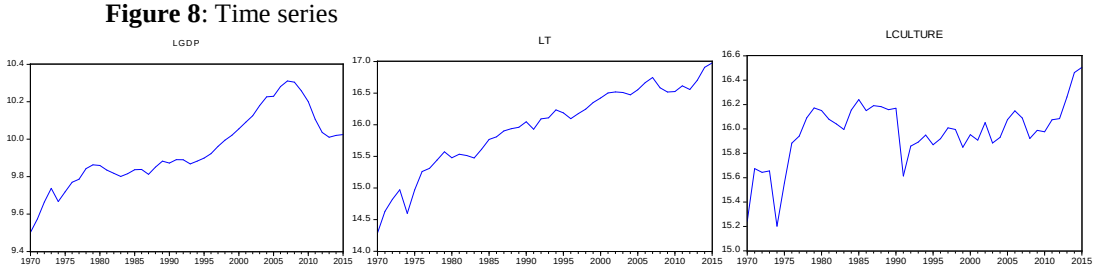
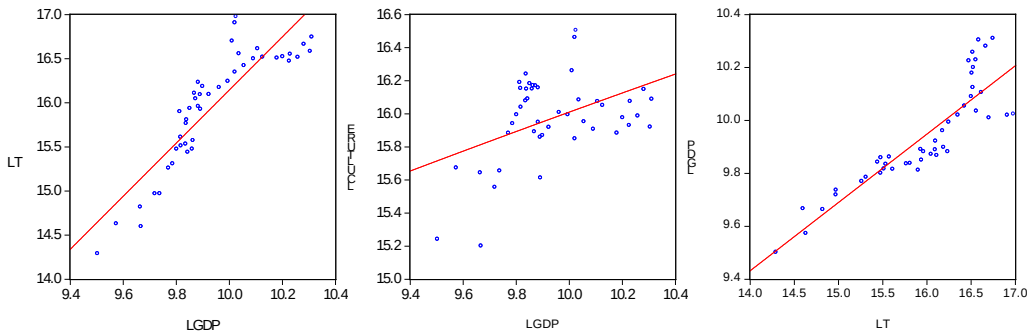


Figure 9: Line Regression

ltourism=$\beta_0 + \beta_1$lGDP lculture=$\beta_0 + \beta_1$lGDP lGDP=$\beta_0 + \beta_1$ltourism



lculture=β0 + $\beta_1$ltourism lGDP=$\beta_0 + \beta_1$lculture ltourism=$\beta_0 + \beta_1$lculture

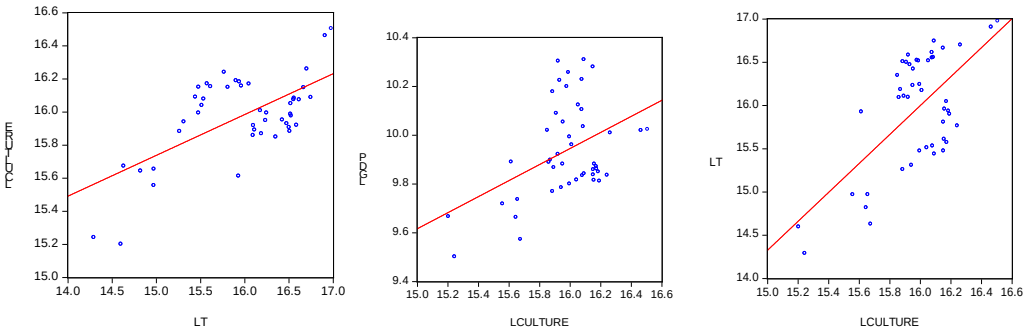


Table 1: Descriptive Statistics and Correlations

	lGDP	lculture	ltourism
Mean	9.937781	15.97509	15.95864
Median	9.886514	15.99529	16.09473
Maximum	10.31084	16.50512	16.97673
Minimum	9.502495	15.20221	14.29125
Std. Dev.	0.193459	0.253729	0.660608
Skewness	0.195269	-0.964431	-0.685940
Kurtosis	2.572970	4.840895	2.696406
Jarque-Bera	0.641845	13.62636	3.783927
Probability	0.725480	0.001099	0.150775
Sum	457.1379	734.8543	734.0975
Sum Sq. Dev.	1.684180	2.897017	19.63814
Observations	46	46	46

Correlation

	lGDP	lculture	ltourism
lGDP	1.000000	0.431643	0.881762
lculture	0.431643	1.000000	0.642477
ltourism	0.881762	0.642477	1.000000

Source: Author's calculation using eviews 9.

5. Econometric Methods

5.1 Unit Root Tests

Classical unit root testing

In empirical analysis, first we investigate stationarity of the series. We employ conventional unit root tests, Augmented Dickey-Fuller (ADF) by Dickey and Fuller (1979), Phillips-Perron (PP) by Phillips and Perron (1988), KPSS by Kwiatkowski-Phillips-Schmidt-Shin (1992) and DF-GLS by Elliott et al. (1996) tests.

The Augmented Dickey-Fuller (ADF) test constructs a parametric correction for higher-order correlation by assuming that the series follows an AR(k) process and adding lagged difference terms of the dependent variable to the right-hand side of the test regression:

$$\Delta y_t = c + \alpha y_{t-1} + \sum_{j=1}^{k} d_j \Delta y_{t-j} + \varepsilon_t \quad (7)$$

$$\Delta y_t = c + \alpha y_{t-1} + \beta t + \sum_{j=1}^{k} d_j \Delta y_{t-j} + \varepsilon_t \quad (8)$$

Equation (7) tests for the null of a unit root against a mean-stationary alternative in y_t where y refers to the time series examined and equation (8) tests the null of a unit root against a trend-stationary alternative. The term Δy_{t-j} is lagged first differences to accommodate serial correlation in the errors, k is the number of lags which are added to the model to ensure that residuals and ε_t are white noise. The model is estimated by Ordinary Least Squares (OLS) and the null hypothesis of a unit is $a = 0$ against the alternative of $a < 0$. A time trend is included to correct for the variables deterministic trend. The t-statistic does not have the common t-distribution to test zero null hypotheses for regression coefficients and critical values must be specifically generated. The optimal lag length or k is determined by minimize the Schwartz Bayesian information criterion or minimizing the Akaike information criterion or lags are dropped until the last lag is statistically significant. A non – rejection of the null hypothesis would suggest that the time series under consideration is non – stationary. (Perles et al., 2016, p.23).

The Phillips-Perron (PP) (1988) is a non-parametric modification of the standard Dickey-Fuller test to account for the autocorrelation and heterogeneous variance in the residuals. The PP method estimates the non-augmented DF test equation [equation (7) and (8) without $\sum_{j=1}^{k} d_j \Delta y_{t-j}$ term on rhs], and modifies the t-ratio of the coefficient so that serial correlation does not affect the asymptotic distribution of the test statistic. Elliot, Rothenberg and Stock (1996) propose a simple modification of the Augmented Dickey – Fuller (ADF) approach to construct DF-GLS test, in which the time series are detrended so that explanatory variables are “taken out” of the data prior to running the test regression. This testing procedure has the best overall performance in terms of small sample size and power. In particular, Elliot et al. find that their “DF-GLS” test “has substantially improved power when an unknown mean or trend is present” (1996, p.813).

On the other hand, the KPSS (1992) is a test in which the series y_t is assumed to be (trend-) stationary under the null. In particular, the KPSS specification is:

$$Y_t = \xi_t + r_t + \varepsilon_t \quad (9)$$

where ε_t is the stationary process and r_t is the random walk given by $r_t = r_{t-1} + \mu_t$ with $u_t \sim iid\ (0, \sigma_u^2)$. The null hypothesis is given by

$$\widehat{LM} = T^{-2} \sum_{t=1}^{T} \frac{S_t^2}{s^2(l)} \quad (10)$$

Where S_t is the partial sum of the deviations of the residuals from the sample mean, $s^2(l)$ is a consistent estimator of the long run variance (σ^2) of the regression error, l is a lag truncation parameter and $w = (s, l) = 1 - [s/(l+1)]$ is an optional weighting function used to smooth the sample autocovariance function, which ensures that $s^2(l)$ is non-negative. The null hypothesis of stationarity is accepted if the value of the KPSS test is less than its critical value computed by Kwiatkowski et al. (1992). It is often suggested that the KPSS test can be used to confirm the results of the ADF and PP tests (Perles et al., 2016, p.23).

Unit root testing in the presence of structural breaks

Testing stationarity with conventional unit root tests does not provide evidence for the consistency of structural breaks. In order to solve this problem, we apply unit root with structural breaks, based on Zivot – Andrews test. Zivot – Andrews (1992) argued that under the alternative hypothesis, the breakpoint should be treated as unknown. Zivot and Andrews proceed with three models to test for a unit root: (11) model A, which permits a one-time change in the level of the series; (12) model B, which allows for a one-time change in the slope of the trend function, and (13) model C, which combines one-time changes in the level and the slope of the trend function of the series. Hence, to test for a unit root against the alternative of a one-time structural break, Zivot-Andrews use the following regression equations corresponding to the above three models:

$$\Delta y_t = c + \alpha y_{t-1} + \beta t + \gamma DU_t + \sum_{j=1}^{k} d_j \Delta y_{t-j} + \varepsilon_t \quad (11)$$

$$\Delta y_t = c + \alpha y_{t-1} + \beta t + \theta DT_t + \sum_{j=1}^{k} d_j \Delta y_{t-j} + \varepsilon_t \quad (12)$$

$$\Delta y_t = c + \alpha y_{t-1} + \beta t + \theta DT_t + \gamma DT_t + \sum_{j=1}^{k} d_j \Delta y_{t-j} + \varepsilon_t \quad (13)$$

where DU_t is an indicator dummy variable for a mean shift occurring at each possible break-date (TB) while DT_t is corresponding trend shift variable.

5.2 Autoregressive Distributed Lag (ARDL) test

The use of the Autoregressive Distributed Lag (ARDL) was introduced in the cointegration analysis by Perasan et al. (2001). The Bound test approach has some econometric advantages over the conventional co-integration models. The Bounds testing ARDL is applicable irrespective of whether variables are I(0) or I(1) or mutually co-integrated. Furthermore, the ARDL bounds testing provides efficient and consistent empirical evidence for small sample data (Narayan & Narayan, 2004). For the Bound test analysis, we first formed the Unrestricted Error Correction Model (UECM). The UECM specification for our study is given in the following equation:

$$\Delta lGDP_t = a_0 + \sum_{i=1}^{m} a_{1,i} \Delta lGDP_{t-i} + \sum_{i=0}^{m} a_{2,i} \Delta ltourism_{t-i} + \sum_{i=0}^{m} a_{3,i} \Delta lculture_{t-i}$$

$$+ a_4 lGDP_{t-1} + a_5 ltourism_{t-1} + a_6 lculture_{t-1} + \mu_t \quad (14)$$

$$\Delta lGDP_t = a_0 + a_1 D + \sum_{i=1}^{m} a_{2,i} \Delta lGDP_{t-i} + \sum_{i=0}^{m} a_{3,i} \Delta ltourism_{t-i} + \sum_{i=0}^{m} a_{4,i} \Delta lculture_{t-i}$$
$$+ a_5 lGDP_{t-1} + a_6 ltourism_{t-1} + a_7 lculture_{t-1} + \mu_t \quad (15)$$

where lGDP is the natural log of real Gross Domestic Product per capita (GDP), ltourism is the natural log of the volume of international tourist arrivals and lculture is the natural log of the volume of the arrivals in archaeological sites and museums. In the UECM model in Equation, Δ denotes the first difference operator "μ" represents residual terms, and in equation (15) "D" represents dummy for structural break point.

The appropriate lag length is chosen by the Akaike Information Criteria (AIC). Perasan, Shin and Smith (2001) generated an F-test to define the significance of the coefficients associated with the lagged level of given variables.

Null hypothesis for F-test is established as $H_0=a_5=a_6=a_7=0$ and the alternative hypothesis for our study and calculated F – statistics is compared with the table below and upper critical levels in Perasan et al. (2001). If the computed F-statistic falls outside the critical bounds, a conclusive decision can be made regarding co-integration without knowing the order of integration of the regressors.

5.3 VECM Granger Causality

We used the vector error-correction model (VECM) Granger causality (1987) approach to test the direction of causality among the GDP, tourism and culture. According to Granger (1988), if a set of variables are cointegrated, there must be a causal relationship between variables. The VECM must be used because it takes into account the short-run and long-run elements. The VECM is a usage of Unrestricted Vector Autoregressive (UVAR) model. The long-run causal relationship can be established by the significance of the lagged ECMs in equations based on test and the short-run Granger Causality is detected by the test of significance of F-statistics of Wald test of the relevant coefficients on the first difference series. This relationship can be unidirectional (one variable causes to another variable) or/and bidirectional (the two variables cause to each other).

5.4 Variance Decomposition Approach

In order to test the strength of causal relationship between lGDP, ltourism and lculture, we use the forecast error variance decomposition (FEVD) in vector autoregressive (VAR) system. The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables (Lütkepohl, 2007, p.63). The impulse response function is alternate of variance decomposition approach and shows the reaction of one variable due to shocks stemming in other variables. Standard errors are calculated by the Monte Carlo method, with 100 repetitions (of ± 2 standard deviations).

6. Empirical Results

Firstly, we examined the stationarity characteristics of the series. We have applied ADF, by Dickey and Fuller (1979), Phillips and Perron (1988), KPSS by Kwiatkowski-Phillips-Schmidt-Shin (1992), DF-GLS by Elliott et al. (1996) tests. The results of conventional unit root tests are shown in Table 2. For getting optimal lag length and bandwidth Schwarz-Information Criterion and Newey-West bandwidth were used, respectively. Spectral estimation method is Bartlett Kernel. According to Table 2:

Table 2: Conventional unit root results

ADF test results			
lGDP	-1.934476 (1)	ΔlGDP	-4.024821 ** (0)
ltourism	-3.935017 ** (0)		
lculture	-3.309727 (0)	Δlculture	-7.919988 *** (0)
ADF critical values for ltourism and lculture 1%= -4.175640, 5%= -3.513075		ADF critical values for Δlculture 1%= -4.175640, 5%= -3.513075	
ADF critical values for lGDP 1%=-4.180911, 5%=-3.515523		ADF critical values for ΔlGDP 1%=-4.180911, 5%=-3.515523	
PP test results			
lGDP	-1.779300 (4)	ΔlGDP	-4.026916 ** (3)
ltourism	-3.952181 ** (3)		
lculture	-3.332379 (3)	Δlculture	-8.297366 *** (5)
PP critical values for lGDP, ltourism and lculture 1%= -4.175640, 5%= -3.513075		PP critical values for ΔlGDP and Δlculture 1%= -4.180911, 5%= -3.515523	
KPSS test results			
lGDP	0.071283 *** (5)		
ltourism	0.210814 *** (4)		
lculture	0.122936 *** (4)		
KPSS critical values for lGDP, ltourism and lculture 1%= 0.216000, 5%= 0.146000			
DF-GLS test results			
lGDP	-1.973874 (1)	ΔlGDP	-3.948830 *** (0)
ltourism	-2.285700 (0)	Δltourism	-6.208603 *** (0)
lculture	-2.549671 (0)	Δlculture	-6.102463 *** (0)
DF-GLS critical values for lGDP, lt and lculture 1%=-3.770000, 5%=-3.190000		DF-GLS critical values for lGDP, lt and lculture 1%=-3.770000, 5%=-3.190000	

(1) Lag lengths and bandwidths are shown in parenthesis
(2) ***, ** show significant at 1% and 5% levels, respectively

Source: Author's calculation using eviews 9.

From Table 2 we observe the following:

- For the ADF, PP and DF-GLS tests, the null hypothesis suggests that the series include unit root. The calculated "t-statistic" for the variables (lGDP, lculture) are less than the critical values in their level forms for ADF test. These variables have unit root at their levels and so, the null hypothesis cannot be rejected.
- However, the calculated "t-statistic" for variable ltourism is greater than critical value at 5% level. That means, the variable ltourism is stationary in level form, with intercept and trend. The variables lGDP and lculture become stationary at first differences with intercept and trend, as ADF test statistics for these variables

are greater than critical values at 5% level and 1% level, respectively. This indicates that the variables lGDP and lculture are stationary after differenced and they have unique order of integration I(1).

- On the contrary, the variable ltourism is stationary at the level, suggesting that the variable is integrated of order I(0), according to ADF test. For PP test, the calculated t-statistic for the ltourism is greater than critical values at 5% level, so PP test implies ltourism is stationary in level form with intercept and trend. However, the variables lGDP and lculture are less than the critical values at their levels, but the results of the first differenced variables are greater than critical value 1% and 5% with intercept and trend, respectively.
- For DF-GLS test, the calculated t-statistic for the lGDP, ltourism and lculture are greater than the critical values at their first differences with intercept and trend. This indicates that the variables become stationary at first differences and they have unique order of integration of I(1).
- For the KPSS test, the null hypothesis shows that the investigated series are stationary. The calculated t-statistics for lGDP, ltourism and lculture are less than critical values at 1% level with intercept and trend, respectively. The null hypothesis of stationary cannot be rejected, suggesting the variables are I(0).

We also used the Zivot-Andrews unit root testing method to confirm that real GDP per capita, international tourist arrivals and the visits in archaeological sites and museums of Greece are integrated at "I(0) or I(1) or I(0)/I(1)" for a structural break point. The results of unit root test with structural breaks are given in Table 3:

Table 3: Zivot and Andrews unit root test

	Level				First Differences			conclusion
	ZA_I	ZA_T	ZA_B		ZA_I	ZA_T	ZA_B	
lGDP	-2.557526 (3)	-3.031878 (1)	-3.809300 (6)		-4.742693 (0) ***	-4.363907 (0) ***	-4.742693 (0) ***	I (1)
Break Year	1998	2008	1990		2008	2004	1994	
Lag Length	3	1	6		3	0	0	
ltourism	-4.841381***	-4.428409**	-4.528965		-7.651753*	-7.467243*	-7.571659*	I (0)
Break Year	2008	1988	2008		1980	2007	2007	
Lag Length	0	0	0		0	0	0	
lculture	-5.006939**	-3.592340	-4.617216		-8.286094*	-8.177080*	-8.369312*	I (0)
Break Year	1991	2008	1991		1980	1992	1980	
Lag Length	0	0	0		0	0	0	

ZA_I represent the model with a break in the intercept ; ZA_T represent the model with a break in the trend ; ZA_T represent the model with a break in both the trend and intercept. (k) represents lag length *, ** and *** denote the rejection of the hypothesis at the 1%, 5% and 10%, respectively. Source: Author's calculation using eviews 9.

- According to the Zivot and Andrews (1992), the null hypothesis shows that the series have a unit root. The ZA unit root tests provide mixed results for the order of integration. The null hypothesis of a unit root can be rejected in the cases of ltourism and lculture at their levels in the scenario of intercept and trend and in the

scenario of intercept, respectively. In the scenario of intercept and trend, the variables are integrated in the first differences. To conclude, lGDP are integrated of order of one, I (1) and the ltourism and lculture are integrated of order zero, I(0).

Then, we examined the ARDL testing method to research the short – term and long – term connection between variables in Greece (Tables 4 and 5)

Table 4: Bound test results

			Critical value at 1% significance level	
k	Break	F-statistics	Bottom bound	Upper bound
2	-	8.081528	5.15	6.36
Critical Value Bounds (T=38)				
Significance		I0 Bound		I1 Bound
10%		3.17		4.14
5%		3.79		4.85
1%		5.15		6.36

Notes: k denotes the lag length. Critical values are taken from Perasan (2001: 300), Table CI. Case III. Unrestricted intercept and no trend.

Variables	**Coefficient**	**T-statistics**
Error correction representation for the ARDL (8,7,8) model		
Dltourism	0.1454	1.700***
Dlculture	0.062	1.173
C	-0.2725	-0.3163
ECT_{t-1}	-0.7136	-4.8424*
R^2	0.99	
F-Statistic	119.96	
D-W	2.22	
Estimated long-term coefficients using ARDL (8,7,8) model		
ltourism	0.308	18.96*
lculture	0.334	4.553*
C	-0.381	-0.3208
X^2 ARCH	0.6742 (1)	0.4116
X^2 RESET	0.3815	1.331
X^2 Serial	1.109 (1)	0.2922
X^2 White	24.59	0.4855
X^2 normal	3.24	1.139

Notes: X^2 Normal is for normality test, X^2 Serial for LM Serial Correlation Test, X^2 Reset for Ramsey Reset Test, X^2 ARCH for Autoregressive conditional heteroskedasticity, X^2 White for white heteroskedasticity. ( ) is the order of diagnostic tests. *** significance at 1%, ** significance at 5%, * significance at 10%. Source: Author's calculation using eviews 9.

In Table 4 and 5, all estimated coefficients can be interpreted as short-run and long-run elasticity, since the variables are in natural logarithm form. Maximum lag number for the UECM model is taken as 8, so that we investigate the co-integration relationship. In table 5, we use DUM 1980, 1991, 1998, 2008 for structural breaks.

According to Table 4, F-statistics is higher than the upper bound of the critical values and the null hypothesis of no co-integration is rejected. As a result, we found a significant long-run co-integration relationship between GDP, tourism and culture by employing the Bound test analysis.

The short-run coefficient indicates a relationship between tourism and GDP growth. The variable of tourism is statistically significant, but not the culture variable in the short term. We can also see that tourism has a positive sign on GDP in 10% level of significance. The coefficients of tourism on GDP growth is estimated as 0.145.

The negative and statistically significant estimation ECM_{t-1} by 0.71% lead support to a long run relationship among the series of the examined model.

The resulting estimate of the level relationship under the ARDL specification presented as follows:

Cointeq=lGDP-(0.3080*ltourism+0.3345*lculture-0.3818)

From the long-term model, a 1 percent change in the tourism variable will lead to 0.31 percent change in real GDP per capita in the same direction. Furthermore, 1 percent change in cultural tourism will lead to 0.33 percent in real GDP per capita in the same direction. The ECM terms is (respectively -0.71) statically significant and negative. Real gross domestic product per capita (GDP) converge to its long – term equilibrium level by 0.71 percent speed of adjustment through the channels of international arrivals and visits in archaeological sites and museums. This means that approximately 71% of disequilibrium from the previous year's shock was eliminated in the current year. In addition, diagnostic statistics such as LM test, ARCH test, Ramsey test and white heteroskedasticity test explained that there is no serial correlation, residuals terms are normal distributed, no autoregressive conditional heteroskedasticity and no white heteroskedasticity.

Table 5:Bound test results

			Critical value at 1% significance level	
k	Break	F-statistics	Bottom bound	Upper bound
2	1980, 1991, 1998, 2008	11.58482	5.15	6.36

Critical Value Bounds (T=38)		
Significance	I0 Bound	I1 Bound
10%	3.17	4.14
5%	3.79	4.85
1%	5.15	6.36

Notes: k denotes the lag length. Critical values are taken from Perasan (2001,p.300), Table CI. Case II. Restricted intercept and no trend.

Variables	**Coefficient**	**T-statistics**
Error correction representation for the ARDL (8,7,8) model		
Dltourism	0.1225	1.6210***
Dlculture	0.1884	2.7921*
DUM1980,1991,1998,2008	0.060	3.041*
C	-0.8709	-1.0506
ECT_{t-1}	-0.6301	-5.8479*
R^2	0.99	
F-Statistic	151.27	
D-W	1.92	

Estimated long-term coefficients using ARDL (8,7,8) model		
ltourism	0.3160	18.52*
lculture	0.3895	5.015*
DUM1980,1991,1998,2008	0.096	3.286*
C	-1.3820	-1.077
X^2 ARCH	0.1867(1)	0.6657
X^2 White	26.92	0.3598
X^2 Reset	0.3949	1.6911
X^2 Serial	2.5328 (2)	0.2818
X^2 Normal	2.82	0.1250

Notes: X^2 Normal is for normality test, X^2 Serial for LM Serial Correlation Test, X^2 Reset for Ramsey Reset Test, X^2 ARCH for Autoregressive conditional heteroskedasticity, X^2 White for white heteroskedasticity. ( ) is the order of diagnostic tests. *** significance at 1% ** significance at 5% * significance at 10%. Source: Author's calculation using eviews 9.

According to Table 5, the short-run coefficient indicates a relationship between tourism, cultural tourism and GDP growth. The variable of tourism and cultural tourism are statistically significant in the short term. We can also see that tourism has a positive sign on GDP in 10% level of significance. The impact of cultural tourism has a positive sign on GDP in 1% level of significance. The coefficients of tourism and cultural tourism on GDP growth are estimated as 0.12 and 0.19, respectively. The negative and statistically significant estimation ECM_{t-1} by 0.63% lead support to a long run relationship among the series of the examined model.

The resulting estimate of the level relationship under the ARDL specification presented as follows:

Cointeq=lGDP-(0.3160*ltourism+0.3895*lculture+0.0965DUM-1.3820)

From the first long-term model, a 1 percent change in the tourism variable will lead to 0.32 percent change in real GDP per capita in the same direction. Furthermore, 1 percent change in cultural tourism will lead to 0.39 percent in real GDP per capita in the same direction. The ECM terms is (respectively -0.63) statically significant and negative. Real gdp per capita converge to its long – term equilibrium level by 0.63 percent speed of adjustment through the channels of international arrivals and visits in archaeological sites and museums. This means that approximately 63% of disequilibrium from the previous year's shock was eliminated in the current year. In addition, diagnostic statistics such as LM test, ARCH test, Ramsey test and white heteroskedasticity test explained that there is no serial correlation, residuals terms are normal distributed, no autoregressive conditional heteroskedasticity and no white heteroskedasticity.

The following step is the VECM analysis, which is used to find out the relationship between the variables. Table 6 reports the results on the direction of long and short run causality. The results on Table 6 reveal support three unidirectional causalities in the long-term period that run (1) from international tourism and visits in archaeological sites and museums (culture) to real GDP per capita, (2) from real GDP per capita and international tourism to visits in archaeological sites and museums (culture) and (3) from GDP per capita and visits in archaeological sites and museums (culture) to international tourism. These results prove that international tourist arrivals and the visits in archaeological sites and museums (culture) to Greece are a catalyst for real GDP per capita. On the other hand, F-tests from Table 6 also reveal some

short-term causations among tourism, cultural tourism and real GDP per capita: (1) unidirectional causality runs from visits in archaeological sites and museums (culture) to real GDP per capita ; (2) and from visits in archaeological sites and museums (culture) to international tourist arrivals. Short-term causality tests suggest that there is a feedback relationship between cultural tourism and real GDP per capita in Greece and that cultural tourism result in a higher number of tourist arrivals in the short-term period.

Table 6: VECM Granger Causality analysis

Granger causality analysis				
	F-statistics [probability values]			
	Short run			Long run
Dependent Variable	Σδlculture	ΣΔltourism	ΣΔlGDP	t-stat (prob) for ECM_{t-1}
ΔlGDP	5.7745*[0.0557]	4.0859 (0.1296)	-	-2.7382*** [0.0096]
Δlculture	-	4.0147 (0.1343)	3.9712 (0.1373)	-2.5472** [0.0154]
Δltourism	5.0993* [0.0781]	-	2.2250 (0.3287)	-2.971379*** [0.0053]

Note: *** significance at 1%, ** significance at 5%, * significance at 10%. Source: Author's calculation using eviews 9.

Table 7 presents the variance decomposition results among the series of the study. The results show that in the initial levels of the forecast error variance of real GDP per capita can be explained by exogenous shocks to its determinants, which is tourism volume and cultural tourism volume.

The empirical evidence indicates that, in period 10, a 94.47% of real GDP per capita is contributed by its own innovative shocks and one standard deviation shock in tourism explains international tourist arrivals by 0.27%. The contribution of cultural tourism to real GDP per capita is 5.26%. It is important to note that the forecast error variance of real GDP per capita due to changes in cultural tourism is higher than the forecast error variance of GDP per capita due to changes in tourism.

Also, a 39.14% of real GDP per capita is explained by one standard deviation shock in tourism and 60.18 per cent portion is contributed to tourism by its own innovative shocks. A standard deviation shock stemming in cultural tourism attribute tourism by 0.67 per cent. We can also note that the forecast error variance of tourism due to changes in real GDP per capita is higher than the forecast error variance of tourism due to changes in cultural tourism.

Finally, the contribution of real GDP per capita and tourism to cultural tourism is 23.58% and 32.12% respectively and the rest is being explained by its own standard innovative shocks. It is important to mention that the forecast error variance of cultural tourism due to changes in tourism is higher than the forecast error variance of cultural tourism due to changes in real GDP per capita.

Figure 10 presents the line plots of the impulse responses functions among the series under consideration. In particular, plots the impulse responses of real GDP per capita (lGDP), international tourist arrivals (ltourism) and visits in archaeological sites and museums (lculture) over a horizon of 10 years. The response of real GDP per capita to a shock in tourism is zero and irresponsive over time. The reaction of real GDP per capita to changes in the cultural tourism volume is irresponsive in the initial periods, but starts to be positively in the longer periods. The response of tourism to real GDP per capita is positive due to innovative shocks, which is evident in economic

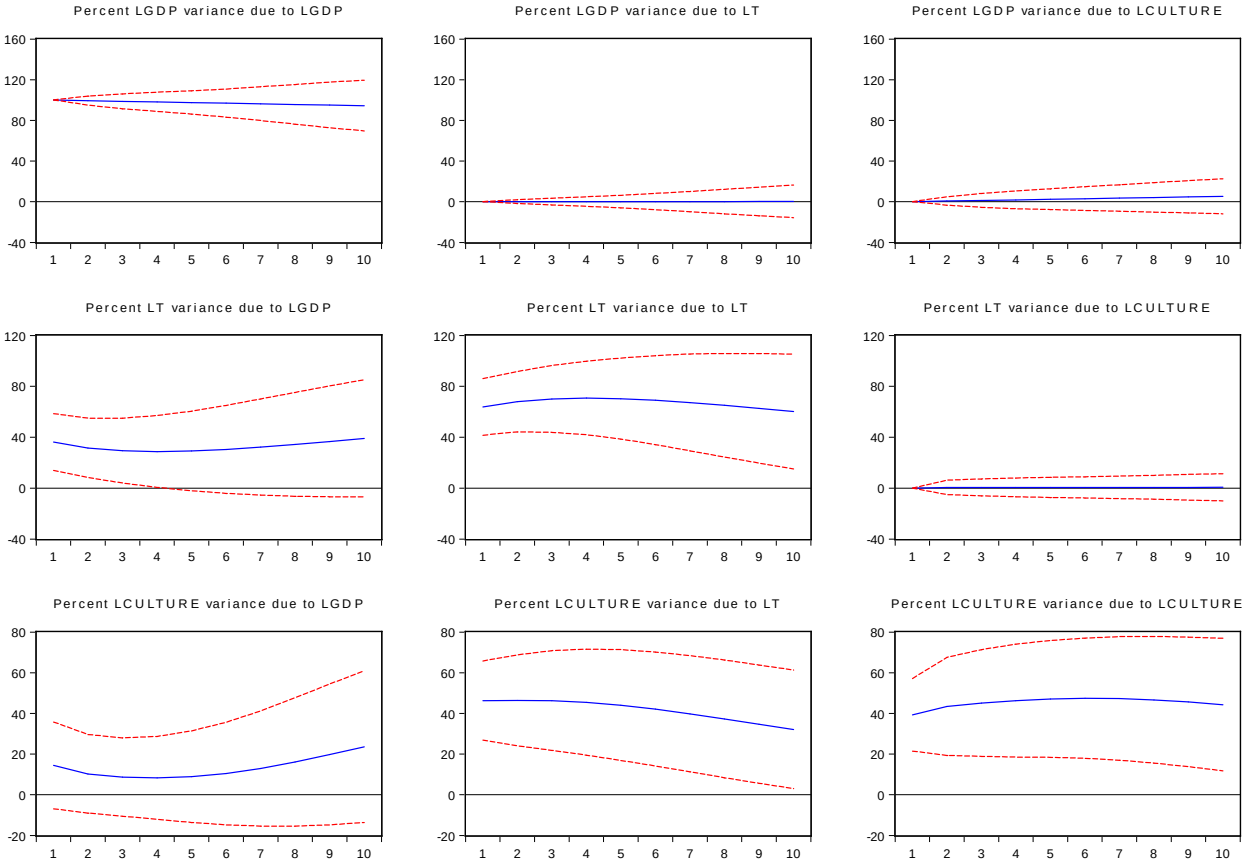
growth, while to the cultural tourism is zero and irresponsive. The response of cultural tourism to real GDP per capita is positive and leads to rapid changes in real GDP per capita in the longer periods. On the other hand, the reaction of cultural tourism to tourism is positive, but in the longer periods declines. These findings reveal that tourism and cultural development is likely to result in significant increases in variations of real GDP per capita in the longer periods in Greece.

Table 7: Variance Decomposition Approach

Variance Decomposition of lGDP:				
Period	S.E.	lGDP	ltourism	lculture
1	0.035223	100.0000	0.000000	0.000000
2	0.062642	99.27052	0.060766	0.668712
3	0.086947	98.69604	0.059081	1.244877
4	0.108141	98.13157	0.039184	1.829250
5	0.126543	97.54407	0.035346	2.420579
6	0.142623	96.93186	0.055663	3.012476
7	0.156839	96.30550	0.096657	3.597839
8	0.169582	95.67901	0.150889	4.170101
9	0.181169	95.06518	0.210751	4.724073
10	0.191844	94.47378	0.270088	5.256133
Variance Decomposition of ltourism:				
Period	S.E.	lGDP	ltourism	lculture
1	0.125667	36.19233	63.80767	0.000000
2	0.166571	31.55911	67.93765	0.503237
3	0.193641	29.38267	70.08776	0.529565
4	0.214611	28.74466	70.73025	0.525086
5	0.231981	29.18243	70.29831	0.519263
6	0.247198	30.40202	69.07682	0.521166
7	0.261111	32.17809	67.28679	0.535120
8	0.274232	34.32414	65.11186	0.563997
9	0.286854	36.68637	62.70354	0.610092
10	0.299143	39.14358	60.18131	0.675105
Variance Decomposition of lculture:				
Period	S.E.	lGDP	ltourism	lculture
1	0.163118	14.41093	46.31115	39.27792
2	0.207853	10.22896	46.38883	43.38221
3	0.234310	8.652969	46.30902	45.03801
4	0.252291	8.264138	45.47808	46.25778
5	0.265812	8.846330	44.04667	47.10700
6	0.277390	10.40258	42.11571	47.48171
7	0.288507	12.87115	39.80763	47.32121
8	0.299931	16.06591	37.27438	46.65971
9	0.311953	19.72442	34.66985	45.60573
10	0.324585	23.58200	32.12137	44.29663
Cholesky Ordering: lGDP lt lculture				

Source: Author's calculation using eviews 9.

Figure 10: Response to Cholesky One S.D. Innovations ± 2 S.E.



7. Conclusion and Policy Implications

This study empirically examined the short-run and long-run effects of real gross domestic product per capita, international tourist arrivals and visits in archaeological sites and museums over the period 1970-2015 in Greece. This is carried out in order to investigate the TLGH for Greece.

To accomplish this we examined the degree of stationary of the variables by applying conventional unit root tests and the structural unit root test, Zivot-Andrews. All variables are I(0) and I(1).

We also used the ARDL approach, Granger Causality test and impulse shocks. The empirical results of ARDL bounds testing is implied in order to find out cointegrating vectors between the variables. Our results have shown that Greece's economic growth, tourism and cultural tourism are cointegrated. Evidence of the existence of tourism-led growth has been established for Greece. The ARDL approach has obtained elasticities of economic growth with relative to tourism in the short-run and long-run.

In particular, in the first model and in the second model with structural breaks, international tourists and visits in archaeological sites and museums are in a levels with the dependent variable of real GDP per capita. Tourism has a direct and statistically significant impact on the level of economic growth in the short-term and long-term period of the economy of Greece, as we have shown in two models. On the contrary, the cultural tourism has a direct and statistically significant impact on the level of economic growth in the long-term period of the economy of Greece, but when we used dummy in the second model, the cultural tourism has a direct and statistically significant impact in the short-term period, too.

The direction of causal relationship between the variables has been examined by applying the vector error correction model (VECM). As confirmed by Granger Causality test, in the long-term period, a change in tourism and cultural tourism stimulates changes in economic growth. In the short-term period, there is a unidirectional causal relationship between visits in archaeological sites and museums (culture) and GDP per capita, as well as between visits in archaeological sites and museums (culture) and international tourist arrivals. This implies that cultural tourism plays a significant role in economic growth. The results of the impulse responses and variance decomposition analyses show that tourism development and cultural tourism leads to significant increases in variations of real GDP per capita, especially in the longer periods. Furthermore, the degree of its effects gets stronger over time.

The main finding of TLGH hypothesis can be accepted. The more prosperous the country, the more stable is the economic, social and political situation. The prospective tourists will have more confidence to visit Greece. It is therefore imperative that government institutions, tourism planners and investors recognize the implications of their actions in the interest of long term economic viability of the tourism sector. Growth in tourism based on international tourist arrivals and visits in archaeological sites and museums could also stimulate economic growth.

The results reinforce the need for more reliable tourism development strategies and programs that will be executed by the government of Greece to take full advantage of the potential of tourism for promoting economic growth. To achieve the desired growth in this sector, the country must implement policies that advance

promote enthusiastic and prudent management of talent, particularly in the development of human capital. In the international tourism market, which is an integral part of globalization, a sustainable competition or countries, companies and governments cannot be realized by allocating large amounts of capital resources to the activities such as making realistic forecasts about current tourism trends, reasons for people to travel, demand, needs and expectations of consumers, based on their income and technology, by conducting market research. Thus, the government should develop tourism sector by providing basic facilities, such as roads, infrastructural development, communication sources and good transport system. Tourism contributes in reduction of poverty by generating employment sources. The law and order, and security are other points that government should focus to improve the economic growth through tourism development. Cities need to implement a coordinated, modernized and imaginative vision of the city's image by every means to create an identity for the city.

The culture as a tourist motivation provides an essential complementary incentive that can contribute to the diversification of a destination. The development of cultural tourism can help to subsidize the process of conserving the heritage sites. Cultural tourism empowers the rural communities and makes a substantial contribution to development and the eradication of poverty. It is necessary to implement a marketing plan with specialized target groups, so that their complex needs are satisfied. Moreover, it is necessary to create interactive galleries, immersive VR environments, original museum guides, interactive children's electronic games and virtual guide of archaeological sites, so that to attract cultural tourists. The use of new technologies helps the tourists to choose routes, to visit archaeological sites and museums virtually and to be informed about places of tourist interests, such as an info kiosk at the airport and the harbour or through website, which can provide information for all tourist areas and nearby areas from the place they wish to meet.

It is recommended to pay particular attention to tourism industry in order to reach higher economic growth in Greece and country's tourism development program should be compiled in the field of economic development plan. Similarly, the authorities pay attention to growth of this industry by planning to increase the attractiveness of foreign tourists. The link between tourism, culture and technology proves to be irresponsible for the visibility of the tourist areas in Greece.

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