

Exploring the Relationship Between Tourism Development, Energy Consumption and Carbon Emissions: A Case Study of Tunisia

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ABSTRACT

Tourism is viewed increasingly as an essential sector to local, regional and national reconstruction and development for economies at various scales. However, its contribution on environmental quality degradation is more important. Indeed, any increase in the number of tourism requires amounts of growing energy, which increases CO₂ emissions. The objective of this article is to empirically investigate the relationship between tourism development, energy consumption and carbon emissions in Tunisia over the period of 1974-2014. To recognize this relationship, a bonds test of co-integration, ARDL model and Granger Causality Tests have been employed. After having confirmed that the existence of co-integration relationship between energy consumption tourism demand and CO₂ emission, the results indicate that tourism has a direct impact and statistically significant effect on the consumption of energy for the future of the Tunisian economy. The short-term results indicate bidirectional causality between energy consumption and emissions of CO₂ and also between the consumption of energy and tourism, meanwhile the absence of any causal relationship between the emissions of CO₂ and tourism. Tourism affects the quality of the environment indirectly through the consumption of energy. So, the protection measures in the tourism sector should be laid down in Tunisia. Sustainability in the tourism sector is one of the major axis of debate on tourism development integrated in the environment.

KEYWORDS

ARDL Model, Economic Growth, Energy Consumption, Environmental Quality, International Tourism

1. INTRODUCTION

Over the past three decades, there have been many attempts in the economical literature of energy in order to clarify the effects of energy consumption and emissions of CO₂ on the economic growth. The CO₂ emissions used in literature as a proxy for the extent of climate change are the main concern of both the developing and the developed countries. The consumption of energy is considered as the main source of pollution and environmental degradation (Ang, 2008; Soytas and Sari, 2009; Apergis and Payne, 2010; Arouri, Ben Youssef, Me Henni & Rault, 2012). However, the relationship

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between energy and climate change deserves more attention considering taking into account the sectoral distribution of the economy. In such a perspective, the tourism sector can be a field of study. In this sense, nowadays tourism presents one of the largest and most vibrant industries of the world. Besides, the recipe of international tourism in 2012 has reached a total of 1075 Billions of dollars generated by 1035000000 arrivals of international tourists (UNWTO, 2013). Furthermore, the World Tourism participates in the creation of 1 to 11 jobs and generates loans of 9% of gross domestic product (GDP) (World Tourism and Travel Council (WTTC), 2013). For the Tunisian case, investments in tourism sector have experienced a remarkable increase. The average annual growth rate of hotels has reached 5% during the years 2002-2006, and the rate of annual occupation reached 57%. The accommodation capacity has evolved from 231838 beds in 2006 to more than 241.528 beds in 2010. To ensure and structure its market share of the Mediterranean, Tunisia seeks to reach a capacity of 400000 beds in 2020. However, despite the fact that the tourism sector represents a very large part of the Tunisian economy; it is considered one of the giant energy consumers. Thus, the development of tourism strengthens the Tunisian energetic balance deficit. In 2012, 80% of the total energy consumption is supplied by imports (Ministry of Industry 2014). For the impact of the energy sector on the environment, the inventory on greenhouse gas emissions shows a major part of the energy sector that contributes at 60% of total emissions (19.6 million of CO₂ tep).

In Tunisia, tourism sector increased the number of tourists. Indeed, from the beginning of the year until 20 August 2012, Tunisia has welcomed nearly 3.7 million of tourists from different nationalities against 2.8 million in 2011 and 4.6 million in 2010. This increase in the number of arrived tourists still remains with European dominance by a proportion of 50.6%. The European tourists increased by one million 309 thousand in 2011 to a million 972 thousand tourists in 2012. For the movements of tourists from Arab Maghreb and North America, the data published by the National Office of the Tunisian tourism (ONTT) indicate that they are rising, reaching, respectively, a million 621 thousand tourists in 2012 against 1 239 978 in 2011.

The increase in the influx of tourists, from 1 January to 20 August 2012, towards Tunisia has also concerned the Japanese (169.3% with 4 thousand 379 tourists), Brazilians (76% with a thousand 320 tourists) and Australians (38.5% with 1011 tourists). On the other hand, a decrease was recorded during the same period, at the level of the influx of oriental tourists (-74,9%) with 23 thousand 406 tourists, Africans (-60,6%), or 22 thousand 732 tourists and Chinese (-78,8%), namely 2 thousand 296 tourists.

The development of Tunisian tourist sector increased the entrance of foreign currency from 945 million DT in 1992 to 2340,6 million DT in 2001 and 3471,9 in 2009. From 1st January to 20 August 2012, tourist revenues have improved, rising by 35.3% compared to the same period of 2011. But it falls to 14.9%, in comparison with the first eight months of 2010, as stated in the figures recently published by the Department of Tourism. The data of the Central Bank of Tunisia indicates that the cash receipts from tourism sector have reached 1.804,3 million dinars, during the first eight months of 2012, against 1.333,8 dots in the same period of 2011 and 2.121,4 MDT during 2010.

In this regard, any increase in the number of international tourists leads not only to economic growth but also requires the consumption of additional quantities of energy (Liu, Feng, & Yang, 2011). However, the development of tourism is also likely to make changes to the climate. In addition, the increase in tourism activities can contribute to the increase in the demand for energy in various ways, such as transport, catering, accommodation and management of tourist attractions (Becken, Simmons & Frampton, 2003; Becken, Frampton & Simmons, 2001; Gössling, 2002), which is also likely to lead to a degradation of the environment and the creation of pollution. In Tunisia, we must mention that energy generation and the transport sector have been considered as major contributors to air pollution with 31% and 30%, respectively between 1994 and 2002. In fact, Achour & Balloumi (2016) analyzed the factors corresponding measure in the transport and energy consumption for the Tunisian case using the method of the index average logarithmic Divisia (LMDI) over the period from 1985 to 2014. They broke down transportation related energy consumption in energy intensity,

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