AN ANALYSIS OF THE ROLES OF TOURISM ON THE ECONOMY: EMPIRICAL STUDIES IN TOURISM DEMAND PERSPECTIVE

THANCHANOK KHAMKAEW

DOCTOR OF PHILOSOPHY
(ECONOMICS)

THE GRADUATE SCHOOL
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A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (ECONOMICS)

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Thanchanok Khamkaew

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บทคัดย่อ

การศึกษาสองเรื่องแรกในวิทยานิพนธ์นี้ได้หาทางที่จะตอบคำถามที่เกี่ยวกับความสัมพันธ์เชิงพหุลักษณ์ระหว่างการท่องเที่ยวและการเจริญเติบโตทางเศรษฐกิจโดยทำการทดสอบการมีอยู่ของผลของขีดจำกัดในความสัมพันธ์ดังกล่าว ในการศึกษาแรก วัตถุประสงค์หลักคือการตรวจสอบหาผลกระทบของการท่องเที่ยวที่มีต่อการเจริญเติบโตทางเศรษฐกิจในหลายกลุ่มตัวอย่างที่ถูกจำแนกบนพื้นฐานของระดับความชำนาญในการท่องเที่ยว ผลการศึกษาชี้ชัดว่า กลุ่มตัวอย่างถูกแบ่งออกเป็นสามกลุ่มย่อยตามขีดจำกัดภายในสองค่าที่ได้ ในบรรดากลุ่มย่อยทั้งสามนี้ความสัมพันธ์ระหว่างการท่องเที่ยวและการเจริญเติบโตทางเศรษฐกิจที่มีนัยสำคัญเชิงบวกเกิดขึ้นเฉพาะสองกลุ่มย่อยเท่านั้น ซึ่งสองกลุ่มย่อยนี้เป็นกลุ่มที่มีระดับความชำนาญในการท่องเที่ยวค่อนข้างต่ำและปานกลาง

เมื่อใดก็ตามที่ปัญหาความเกี่ยวข้องกันของตัวแปรในระบบเป็นสิ่งที่คำนึงถึง วิธีการที่มีประสิทธิภาพควรที่จะถูกนำมาใช้ในการตรวจสอบหาผลของขีดจำกัดในความสัมพันธ์ระหว่างการท่องเที่ยวและการเจริญเติบโตทางเศรษฐกิจ ผลการศึกษาแสดงให้เห็นว่าความสัมพันธ์ที่มีนัยสำคัญ

เชิงบวกระหว่างการท่องเที่ยวและการเจริญเติบโตทางเศรษฐกิจไม่เปลี่ยนไปตามการนิยามตัวแปรความเชี่ยวชาญในการท่องเที่ยวและการวัดค่าของตัวแปรผลิตภัณฑ์มวลรวมภายในประเทศที่แตกต่างกันออกไป อย่างไรก็ดี ผลกระทบที่มีค่ามากของการท่องเที่ยวที่มีต่อการเจริญเติบโตทางเศรษฐกิจถูกค้นพบในกลุ่มย่อยระดับล่าง โดยไม่คำนึงถึงตัวแปรขีดจำกัดที่ใช้ ผลการศึกษาบ่งบอกว่าประเทศที่มีระดับของขนาดการเปิดประเทศ สัดส่วนการลงทุนต่อผลิตภัณฑ์มวลรวมภายในประเทศ และสัดส่วนการบริโภคของภาครัฐต่อผลิตภัณฑ์มวลรวมภายในประเทศค่อนข้างต่ำ มีแนวโน้มที่จะได้รับผลกระทบที่สร้างขึ้นโดยภาคการท่องเที่ยวอย่างมาก

วัตถุประสงค์ของการศึกษาที่สามได้แก่การประมาณค่าแบบจำลองความผันผวนอย่างมีเงื่อนไขหนึ่งตัวแปรและหลายตัวแปร และพิจารณาความเกี่ยวข้องซึ่งกันและกันของอุปสงค์การท่องเที่ยวนานาชาติซึ่งวัดจากจำนวนนักท่องเที่ยวต่างชาติสำหรับประเทศที่เป็นจุดหมายปลายทางของการท่องเที่ยวในเอเชียตะวันออกเฉียงใต้ ได้แก่ อินโดนีเซีย มาเลเซีย สิงคโปร์ และไทย แบบจำลองความผันผวนอย่างมีเงื่อนไขและแบบจำลองสหสัมพันธ์อย่างมีเงื่อนไขต่างๆ ได้ถูกใช้การประมาณความผันผวนและผลข้างเคียงของความผันผวนที่มีผลกระทบสมมาตรและไม่สมมาตรและสหสัมพันธ์อย่างมีเงื่อนไขในอุปสงค์การท่องเที่ยวนานาชาติสำหรับประเทศเหล่านี้ ผลการศึกษาเชิงประจักษ์จากแบบจำลองวาร์มาการ์ชและวาร์มาเอการ์ชแสดงให้เห็นถึงการขึ้นอยู่แก่กันของความผันผวนอย่างมีเงื่อนไขของอุปสงค์การท่องเที่ยวนานาชาติในหลายคู่ประเทศ อย่างไรก็ตาม ผลของการขึ้นอยู่ซึ่งกันและกันเกิดขึ้นเฉพาะคู่ของประเทศไทยกับสิงคโปร์ ดังนั้นความร่วมมือในระดับภูมิภาคในการพัฒนาการท่องเที่ยวเป็นสิ่งที่ควรได้รับการสนับสนุน

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Degree	Doctor of Philosophy (Economics)

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ABSTRACT

The first two studies in this dissertation seek to contribute in resolving questions on the heterogeneous relationship between tourism and economic growth by testing the existence of threshold effect in such casual relationship. In the first study, the main objective is to investigate the contribution of tourism to the economic growth of economies, classified according to the degree of tourism specialization. The results indicate that the entire sample is divided into three regimes based on two endogenous cut-off points. Of these, there exists a significantly positive relationship between tourism and economic growth only in two regimes, where the degree of tourism specialization is relatively low and moderate.

As far as the endogeneity problem is concerned, the powerful methodology should be adopted to investigate the threshold effect in the relationship between tourism and economic growth. The results show that the significantly positive impact of tourism specialization on economic growth is robust to different specifications of tourism specialization, as well as to different GDP measurement. However, a higher impact is found in the lower regime, that is irrespective to the changes in the threshold variables. The findings imply that countries with relatively low trade openness, investment share to GDP, and government consumption share to GDP tend to experience substantial impacts that is created by the tourism sector.

The purposes of the third study are to estimate univariate and multivariate conditional volatility models, and to examine the interdependence of international tourism demand, as measured by international tourist arrivals, for four leading destination in South-East Asia, namely Indonesia, Malaysia, Singapore and Thailand. A wide range of conditional volatility models and conditional correlation models had been used to estimate volatility and volatility spillovers with symmetric and asymmetric effect, and conditional correlations in international tourism demand for these countries. The empirical results from the VARMA-GARCH and VARMA-AGARCH models provide evidence of cross-country dependence in most country pairs. However, the interdependent effect occurs only in a pair of Thailand and Singapore. Therefore, regional cooperation in tourism development among these countries should be encouraged.

Chapter 1

Introduction

1.1 Overview

During the full course of economic development, the absolute and relative size of the service sector seems destined to grow faster than agriculture and industry, and eventually to dominate the entire economy. The predictions of the inevitable structural transformation from an agricultural potential has played a fundamental role in economic development to an industrial and finally to a service economy (Johnston & Mellor, 1961; S. S. Kuznets, 1965; S. S. Kuznets, 1966; S. S. Kuznets, 1971; Mellor, 1976) have been validated by econometric and non-parametric techniques by Chenery, Syrquin, and others (Chenery, 1960; Chenery & Syrquin, 1989; Chenery & Syrquin., 1975; Chenery & Taylor, 1968; Maizels, 1963; Prakash & Robinson, 1979). These studies have shown that, depending upon their initial level of GDP/capita and the rate or reduction of the percentage of the labour force engaged in agriculture, countries move either slowly or rapidly through two consecutive structural shifts called "industrialization" and "post industrialization." It is during the latter that the absolute and relative size of the service sector comes to dominate valued added and employment generation.

What is true for nations may not always be true for specific regions within nations, however. The state of Hawaii has never been heavily industrialized, yet the economy is largely specialized in the service sector. The northern city of Chiang Mai and the southern islands of Thailand also seem to have significantly reduced the length and intensity of the industrialization stage, virtually leap-frogging from the pre-industrial to the post-industrial service stages of economic development. The reason is obvious: the natural and cultural beauty that has destined certain places on the planet to serve, at least potentially, as prime tourist destinations. There has thus been what could be termed a "specialization" into tourism within the entire movement into the tertiary stage of the economy. The advantages, risks, contributing factors, and growth impacts of such specialization are the subject of this dissertation.

It should be noted at the outset that tourism is typically regarded as one of the most dynamic economic sectors and a key driver in creating much needed growth and employment. Although tourism has been seriously affected by the global crisis, it is rebounding more quickly ad strongly than other export sectors (UNWTO, 2010). This means that specialization in tourism must be simultaneously analyzed through the optics of ecology, medical science, the remainder of businesses in the service sector, government policy, sociology, art, and of course economics. The tourist sector can therefore never stand alone as an object of scientific study or of government policy. For example, its employment potential and source of human capital formation stem from the labour-intensive nature of meeting the physical and transportation needs of the client; and the frequent, wide-scale interaction between host country agents and foreign country nationals.

On the demand side, foreign country nationals accept to invest their time, energy, and money in foreign travel in order to experience not only a new culture, climate or natural setting; but also to enjoy recreation, leisure, shopping, or business at lower prices than in their home country. Their motivations are thus both tangible and intangible. The complexity of tourism is attributed to the high degree of vertical and horizontal coordination and interaction among the host- and home-country agents involved on the supply side; as well as the major personal, cultural, medical, and or religious transformations that the tourist will undergo on the demand side.

The international conference on Travel and Tourism Statistics in Ottawa, Canada in 1991, organized by the World Tourism Organization (UNWTO) and the Government of Canada, proposed a set of resolutions and recommendations relating to tourism concepts, definitions, and classifications. Based on the UNWTO definitions and classifications, tourism is defined as "the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business, and other purposes" (UNWTO, 1995). While the standardized definition of tourism was defined, further technical terminology were defined in an attempt to make a clear distinction between different types of visitors. In the tourism context, visitor is defined as "any person travelling to a place other than that of his/her usual environment for less than 12 months and whose main purpose of visit is other than the exercise of an activity remunerated from within the place visited" (UNWTO, 2005). Based on the length of stay at the destination, a tourist is defined as a "visitor staying at least one night in a collective or private accommodation in the place being visited" (UNWTO, 1995).

The study of tourism economics involves detailed analysis at the micro level. The study includes the behaviour of tourists and their associated decision-making process study. In addition it also looks at the cost and benefits for the tourism supplier. Furthermore, in the macro level, the study contains the evaluation on the impact of tourism, as well as forecasting the demand and spending. The findings from study often results in business planning and public policies that are favourable to the development of tourism.

Economics as Applied to Tourism: Microeconomic and Macroeconomic perspective

Applied economics as a method for studying the tourism market can provide a better understanding of the forces that trigger the ebb and flow in the demand and supply of products/services. Economics can also be utilized to assess the impact for the purpose of establishing a policy to control the negative effects that are deemed as detrimental to the tourism industry as well as on other social factors such as community health, environmental sustainability, and illicit activities (smuggling of forbidden items, narcotics, human trafficking, etc.,). If economics is taken from a micro perspective, the study on tourism would be concentrated on trying to understand the behavioural side that portrays the various profiles of tourism demand. Microeconomics allows the research to see how choices and decisions are made on maximizing the value of purchasing such a product from an individual. Individuals who are engaged in the travel and tourism sector can offer an abundance detail of information on how one arrives at planning, managing and marketing of a certain product or service while at the same illustrates why they purchase such a product or service. Microeconomics refers to tourism as the analysis of the markets in which the elementary items composing of the tourism product are supplied, in demand, and exchanged among the tourist and tourism provider. These items include such things as accommodation, package tours, and transportation. On the other side, macroeconomics deals with the performance, structure, behaviour and decision making from the big picture of the economy as a whole. From a macro perspective tourism is put under the microscope to analyze the aggregate demand and production as well as the impacts on the national income, balance of payments, growth and development.

1.2 The Signification of the Problem and Research Motivation

Based on the information from the World Tourism Organization, an affiliate of the United Nations, tourism since the 1960s has experienced a dramatic global expansion. The World Tourism Organization maintains that tourism has become one of the important sources for generating foreign exchange earnings, creating employment, promoting private sector growth, as well as infrastructure development (UNWTO, 1997). Tourism has evidently experienced continued growth and diversification to become one of the most diverse industries, as well as one of the largest and fastest growing economic sectors that has a strong influence on the social and economic activities of today's world (Edgell, 1990; Laws, 1995; UNWTO, 1997, 2009). Tourism development is consequently encouraged in many countries. It is encouraged particularly among the developing countries around the world as the alternative mean of achieving development when the establishment of manufacturing or exportation of natural resources have become unable to be commercially viable (UNWTO, 1997). Tourism development is a major contributor to trade and economic growth; it accounts for a significant 45 percent share of developing countries' service exports and 65 percent for least developed countries (LDCs)) (UNCTAD, 2007).

The increasing importance of tourism in the global economy is firmly confirmed by the worldwide tourism statistics. The number of international arrivals has evolved over the passing decades from a mere 25 million in 1950, to 277 million in 1980, to 438 million in 1990, to 684 million in 2000, and reaching 922 million in 2008 (UNWTO, 2009). This information could easily be considered as a natural outcome in a world that is increasingly interconnected through new modes of transportation and communication. According to the UNWTO's World Tourism Barometer, the results through August 2010 clearly showed that the number of international tourist arrivals worldwide grew by 7%. The positive current trend during 2010 indicates that international tourist arrivals continue to grow in the range of 5%-6% over the full year. The assessment for 2011 points out an expected growth rate of international tourist arrivals will continue to grow gradually at around the long-term average of 4% (UNWTO, 2010). Moreover, the forecast from UNWTO's "Tourism 2020 Vision" expects the figures for international arrivals to reach near the 1.6 billion mark by the year 2020. It is projected that these 1.2 billion worldwide arrivals will be intraregional while 378 million will be long-haul travellers. Having considered the roles of travel and tourism in the economy in the highest regards due to the value that it contributes towards the overall GDP of a nation or region as well as reducing the number of unemployment, it is estimated that tourism's contribution to the world GDP will be approximately at 5%. The contribution to employment tends to be just slightly higher. It has been estimated to be in the order of 6-7% of the overall number of jobs (direct and indirect) worldwide (UNWTO, 2000).

Given the fact that the role of tourism is of a significant essence, on a global basis, the primary attention is initially paid to the assessment in contribution of tourism to the economic development of destination economies. On a global scale, tourism has been regarded as one of the feasible means to promote economic development of destination areas through a variety of economic benefits. It generates foreign exchange earnings and employment; in return there is an increase in social well-being and stability. There have been evidences that can be used to illustrate the role of tourism in being a tool for developing destination regions in many developing and developed countries. Government policy at a variety levels has been accordingly used to direct tourism to less economically developed areas (Weaver & Opperman, 2000). These issues are discussed as examples in literature. (Blair, 1995; Bull, 1995; Clewer & Sinclair, 1995; Goeldner, Ritchie, & McIntosh, 2000; Mathieson & Wall, 1982; Pearce, 1989; Tosun & Jenkins, 1996; Tribe, 1996).

In many destinations, an increasing significant contribution of tourism to the host economy has led governments to focus more in increasing the number of visitors by promoting mass tourism and large-scale production in the tourism sector itself as well as in other tourism-related sectors. The aim is on receiving a large amount of taxes from the successful private tourism businesses with little participation in collaborative tourism planning. The excessive rapid and unplanned development of tourism unintentionally creates benefitting results that are derived by communities (Ashley, 1998; Poultney & Spenceley, 2001). From this point of view, local residents may directly and indirectly gain benefits from additional development programs, such as the construction of infrastructure, or an introduction to anti-crime measures, This primarily aims at promoting a destination itself to be more attractive to tourists and improving the country's international competitiveness (A. Hashimoto, 2004).

However, despite the benefits to both the destination and tourists offered, the economic consequences and employment can be somewhat distorted if tourism development is limitedly concentrated in some particular areas of a country, while the corresponding development in other parts has not been significantly promoted (UNWTO, 1994). Criticism focused specifically on the problems associated with the development of tourism is widespread and taken into high consideration (Croall, 1995; Poon, 1993). It is primarily concerned with optimizing the benefits of tourism to the destination areas and to tourists, whilst minimizing the negative consequence of tourism (Smith & Eadington, 1992). Also, there is an attempt to allow host communities to be socially and economically involved in the decision-making process in tourism development; which is often made by multinational tour companies and service providers (D.J. Timothy & Ioannides, 2002; Wilkinson, 1997). The alternative form of tourism development, with an emphasis on the involvement of local communities and local residents as a key resource in tourism planning and management, has become an important issue for debate and discussion in the tourism literature since the 1980s (Blank, 1989; Hardy, Beeton, & Pearson, 2002; Haywood, 1988). Community participation in tourism involves the psychological satisfaction of business ownership, a feeling of taking responsibility in decision-making, implementing and identifying local problems (France, 1998) introducing something that is adapted to the local needs (Lea, 1988), and having practical involvement in various forms of business participation. Opportunities for local residents to own businesses, to work in various industry-related jobs, to receive appropriate training, and to be well educated for tourism expansion are some characteristic form of participation (D. J. Timothy, 1999). As a result, the quality of life for the local people should be improved through the creation of employment, increased level of income, a better level of social welfare, and decreasing dependence on external agents and suppliers.

There are many case studies on the issue of capacity-building and training programs. In South Africa, these programs have provided the Makuleke community members benefits in employment opportunities and accessibility to communal land which was taken away from them during the apartheid years (Ashley & Roe, 2002), Also, in Costa Rica where it is often regarded as one of the most community-friendly destinations, 70% of the hotels are small and locally owned (Griffin, 1998). In addition, community-based ecotourism in the southeast region of Thailand has contributed to the communities in Phuket and its neighboring provinces by making direct payment to individuals and local suppliers (Kontogeorgopoulos, 2005). Furthermore, in Campbelltown, Australia, the existing tourism coupled with potential new products offers the local community benefits while natural resources and historical sites are conserved (Dwyer & Edwards, 2000), Thus these examples provide the fortunate benefits of countries being involved in the tourism development process. However, the level and types of benefits to the host countries/communities will vary from destination to destination. It depends on the kind of participation that takes place.

While tourism significantly contributes apparent benefits to destinations, it is often argued that tourism can also generate negative impacts on the natural, social, and cultural environments of that destination. In many destinations, there are concerns about social changes such as gender empowerment, family structure, and traditional values. (see (Bruner, 1995; A. Hashimoto, 2000; Leontidou, 1994; McCarthy, 1994; Mignolo, 1998; Momsen, 1994; Patterson, 1993; Staudt, 1998), for example) Tourism also creates a specific awareness on the significance of natural and living environments as tourism assets, particularly with environmental pollution and resource depletion (see (Croall, 1995; Jenner & Smith, 1992; Lovatt-Smith, 1993; Mieczkowski, 1995; Southgate & Hulme, 2001), for example).

In summary, tourism provides an overall quality of life and well-being in that destination. But at the same time, tourism itself can sometimes become a double-edged sword for governments to handle. On the beneficial side some of the things that tourism does is promoting new tourism-related activities, increasing the production of indirect suppliers to tourism business owners, creating additional employment and extra income for earning, and stimulating consumption for new goods and services. Simultaneously, the impacts of tourism, (particularly on the social, cultural, and environmental issue) make changes that are not always considered as positive (A. Hashimoto, 2004). What makes it compelling to analyze the developmental roles of tourism in the economy is addressed on whether tourism is an applicable development option for all destination areas. The content should be addressed on the influential factors/conditions that potentially determine the extent to which tourism can provide effective consequences on the host economies. There should also be a review on whether the extent of a country's relevance to tourism (or alternatively a country's specialization in tourism) significantly causes a differential impact, which is principally referred to as "economic benefits".

Taking economic growth as the fundamental indicator of economic development, the first two studies in this dissertation is therefore concerned about the success of any economic growth attributed to the tourism sector, which is depended upon the country's different. In other words, the extent of a country's specialization in tourism may have a differential effect on economic growth with respect to the conditional variables that tourism has an influence on. In this respect, the first study in this tripartite dissertation identifies whether and to what numerical extent that tourism actually leads to economic growth in various economies; it is classified according to the degree of tourism specialization. The second study further examines whether specialization in tourism has the same impact on economic growth in countries that are different in their degrees of trade openness, investment share to GDP, and government consumption as a percentage of GDP. To conduct this study, the analysis is undertaken with different threshold variables. As far as the presence of the potential contribution of tourism to development is a prime concern, there is an important reason to quantify the apparent relationship between tourism specialization, economic growth, and correction for biasness that has arisen from the endogeneity problem in the economic growth model by applying an instrument variable estimation.

The continuing growth of worldwide tourism demand has also stimulated stronger interest in studies using time-series modelling. The focus of the third study is on the time-series tourism modelling, which particular pays attention to exploring the historic trends and patterns. The changes in tourism demand have been recognized as an important potential mean for achieving economic development. Substantial research has been conducted to evaluate the role of international tourism, and its associated volatility, within and across various economies. However, there has been minimal effort in exploring the interdependence between tourism demand in leading tourism countries such as South-East Asia; which is considered as one of the strongest performing sub-regions of Asia and the Pacific. Each country could obtain a benefit as well as a shock that could occur from an affected country. If such condition continues on, this should increase and stabilize the demand from those neighbouring countries. For example, negative shocks, which can be alleged as political instability, terrorism, violent criminal behaviour, and natural disasters, generally have the potential to reduce the stipulation and increase volatility in tourism demand. The topic of the third study verifies whether the impact of shocks to tourism demand in one destination would likely be volatile to the demand for international tourism in other neighbouring destination.

1.3 Objectives of the Study

The influence of tourism specialization on economic growth has received great attention in recent studies (see (Adamou & Clerides, 2010; Algieri, 2006; Arezki, Cherif, & Piotrowski, 2009; Brau, Lanza, & Pigliaru, 2007; Figini & Vici, 2010; Lanza & Pigliaru, 2000; Po & Huang, 2008)Furthermore, the existence of nonlinearity and threshold effects has been increasingly recognized as a critical issue for tourism and economic growth, with a more complex and heterogeneous relationship. The main objective of the first and second study is to identify nonlinearity and threshold effects in the tourism and economic growth relationship conditional on the various macroeconomic variables. In the first study, the travel and tourism (T&T) economy GDP (in which the role of domestic tourism as well as international tourism are included) is used as a threshold variable in tourism and economic growth relationship. In the second study special attention is given to identify the relationship between tourism specialization and economic growth, with different possible threshold variables which are highly related to tourism development, namely degree of trade openness, investment share to GDP, and government consumption expenditure as a percent of GDP, as well as to correct for potential endogeneity problem that is likely to happen in the relationship between tourism specialization and economic growth. To the best of my knowledge, there has not been any analysis that identifies the existence of threshold effects of tourism specialization on economic growth with a correction for potential endogeneity.

The purpose of the third study is to estimate the conditional variance, or volatility, of monthly international tourist arrivals to four tourism leading South-East Asia economies, namely Indonesia, Malaysia, Singapore and Thailand. The purpose is to also determine the interdependence of international tourism demand of leading ASEAN destinations for the period of January 1997 to July 2009. The modeling and analysis of volatility in tourism demand can provide a useful tool for tourism organization and government agencies that are concerned with travel and tourism. This is especially for encouraging regional co-operation in tourism development among ASEAN member countries and to mobilize international and regional organizations to provide an appropriate policy for action.

The separate but complementary objectives of the three empirical studies are briefly concluded as followed:

1. To investigate whether the relationship between tourism and economic growth is different in each sample that is grouped on the basis of certain threshold, which is the travel and tourism (T&T) economy GDP, in the 131 cross-country panel dataset.

2. To identify nonlinearity and threshold effects in the tourism and economic growth relationship, conditional on the degree of trade openness, investment share to GDP, and government consumption expenditure as a percent of GDP, with a correction for potential endogeneity in the 159 cross-country panel dataset and pure cross-section dataset.

3. To estimate the conditional variance, or volatility, of monthly international tourist arrivals to four tourism-leading South-East Asia countries, namely Malaysia, Thailand, Singapore, and Indonesia, and to determine the interdependence of international tourism demand of these countries.

1.4 Contribution of the literature

There are at least three areas of novelty or connection in the present dissertation:

- No previous studies have been rigorously evaluated in the nonlinear relationship between tourism and economic growth through two powerful methods, namely the panel threshold model (Hansen, 1999) and instrumental variable (IV) estimation of a threshold model (Caner & Hansen, 2004). These two models have advantages over traditional approaches and are used to deal with the potential endogeneity of the level of tourism specialization in empirical growth regressions.

- No previous studies have investigated the existence of the heterogeneity in the tourism and economic growth relationship and the extent of tourism's contribution conditioning on the various key variables, namely the degree of trade openness, investment share to GDP, and government consumption as a percentage of GDP. To achieve this objective, the analysis is undertaken with different threshold variables and regimes through the panel threshold regression model of Hansen (1999) and IV threshold model of Caner and Hansen (2004).

- The analysis of uncertainty in monthly international tourism arrival to major destinations in South-East Asia has not been empirically investigated in the tourism literature. The results will indicate the existence of tourism interdependence among those countries.

1.5 Policy Relevance

Recognition of the existence of the heterogeneity in the tourism and economic growth relationship yields important implications for the development of tourism, trade and associated macroeconomic policy. Tourism's contribution to economic growth exhibits either an increasing or diminishing rate after reaching a certain threshold. The findings could provide a useful partial guidance in devising a plan for the economy's resource allocation. For example, if it is found that the contribution of tourism to economic growth lessens as the country attains high level of specialization, reallocation of resources in the tourism sector to other high potential economic sectors would lead countries to being better off. Moreover, if countries closely monitor the level of three important key variables (degree of trade openness, investment share to GDP and the government consumption expenditure as a percent of GDP) they can keep them at an appropriate level that would ensure that the extent of tourism's contribution will not be less significant to their economy beyond some certain level of such factors.

The estimates from tourism demand volatility analysis provide an indication of the relationship between shocks to the growth rate of monthly international tourist arrivals in each major destination in South-East Asia through the multivariate GARCH framework. This should provide useful guidance for government as well as for entrepreneurs in the tourism sector of these countries in implementing proper policies and business plans which would lead to great benefits gained from tourism volatility linkages.

1.6 Structure of the Dissertation

Chapter 2 provides a study of tourism specialization and economic growth within the econometric models. The macroeconomic variables are incorporated to verify whether the heterogeneity relationship between these two variables varies across the samples classified by the level of tourism specialization which is defined by the degree of tourism relevance to the economy.

Chapter 3 assesses the determinants of growth, where the focus is on the role of tourism specialization within the neoclassical framework. In this study, panel threshold regression method as well as the instrumental variable threshold model is used to investigate threshold effect in the relationship between tourism specialization and economic growth. Three macroeconomic variables related to tourism variables, namely the degree of trade openness, investment share to GDP and the government consumption expenditure as a percent of GDP, are used as threshold variables in this study.

Chapter 4 identifies the multivariate conditional volatility of international tourism demand, as measured by international tourist arrivals, and its associated volatility in the four leading destinations in ASEAN, namely Indonesia, Malaysia, Singapore and Thailand. The estimates provide an indication of the relationship between shocks to the growth rate of monthly international tourist arrivals in each major destination in South-East Asia through the multivariate GARCH framework.

Chapter 5 provides conclusions from the three studies. Recommendations are also made for future research.

Chapter 2

A Panel Threshold Model of Tourism Specialization And Economic Development

The significant impact of international tourism specialization in stimulating economic growth is especially important from a policy perspective. For this reason, the relationship between international tourism and economic growth would seem to be an interesting empirical issue. In particular, if there is a causal link between tourism specialization and economic growth, then appropriate policy implications may be developed. The purpose of this chapter is to investigate whether tourism specialization is important for economic growth in East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, North America, South Asia, and Sub-Saharan Africa, over the period 1991-2008.

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A Panel Threshold Model of Tourism Specialization And Economic Development

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Abstract

The impact of the degree of tourism specialization, which is incorporated as a threshold variable, on economic growth is examined for a wide range of countries at different stages of economic development. The empirical results from threshold estimation identify two endogenous cut-off points, namely 14.97% and 17.50%. This indicates that the entire sample should be divided into three regimes. The results from panel threshold regression show that there exists a positive and significant relationship between economic growth and the growth rate of tourism in two regimes, the regime with the degree of tourism specialization lower than 14.97% (regime 1) and the regime with the degree of tourism specialization between 14.97% and 17.50% (regime 2). However, the magnitudes of the impact of the growth rate of tourism on economic growth in those two regimes are not the same, with the higher impact being found in regime 2. An insignificant relationship between economic growth and the growth rate of tourism is found in regime 3, in which the degree of tourism specialization is greater than 17.50%. The empirical results suggest that tourism growth does not always lead to economic growth.

2.1 Introduction

Tourism has grown enormously as a result of the globalization process. Tourism is described as a movement in the direction of increasing world economic integration through the reduction of natural and human barriers to exchange and increase international flows of capital and labour. Improvements in transportation include the introduction of low-cost air carriers, the emergence of new markets such as China and India, and diversification into new market niches, such as cultural tourism and ecotourism, are considered as key factors supporting tourism.

According to the World Tourism Organization, international tourist arrivals figures reached 924 million. This was an increase of 16 million from 2007, thereby representing a growth of 2% for the full year, but down from 7% in 2007 (see Figure 2.1). The demand for tourism slowed significantly throughout the year under the influence of an extremely volatile world economy, such as the financial crisis, price rises in commodities and oil, and a sharp fluctuation in the exchange rate. Based on these events, it seems that the world tourism situation is likely to become more difficult under the current global economic and financial crises (UNWTO, 2009).

Figure 2.2 shows that, while Europe ranks first in terms of world arrivals, with the Americas close behind, its share of world total arrivals has decreased. Africa, Latin America and the Caribbean are at the bottom of the list. On the other hand, the Asia-Pacific region has outperformed the rest of the world, with its share of international tourist arrivals having increased rapidly. Some of the strong growth appeared in South-East Asia and East and North-East Asia, especially in Macau and China. Similar evidence is found in the market shares in international tourism receipts (see Figure 2.3). Europe accounts for about 50% of world international tourism receipts, followed by Asia and the Pacific region. Once again, Africa, Latin America and the Caribbean remain far behind the other three regions (UNESCAP, 2009).

In general, the growth in international tourism arrivals significantly outpaced growth in economic output, as measured by Gross Domestic Product (GDP) (see Figure 2.4). In years when world economic growth exceeded 4 per cent, the growth in tourism volume has tended to be higher. When GDP growth falls below 2 per cent, tourism growth tends to be even lower. In the period 1975-2000, tourism increased at an average rate of 4.6 per cent per annum (UNWTO, 2008).

The roles of travel and tourism activity in the economy are considered in terms of its contribution towards the overall GDP of the region, and its contribution towards overall employment. In many developing regions the travel and tourism sectors have contributed a relatively larger total share to GDP and employment than the world average (World Travel and Tourism Council, 2009a). The travel and tourism economy GDP, the share to total GDP, the travel and tourism economy employment for all regions in 2009, as well as the future tourism in real growth forecasted by the World Travel and Tourism Council for the next ten years, are given in Table 2.1 (World Travel and Tourism Council, 2009b).

In general, some of the impacts of tourism on the economy have not always been regarded as beneficial. Tourism may also be a negative factor related to increased income inequality, damage to the environment, an increase in cultural repercussions, inefficient resource allocation, and other harmful externalities. In order to determine the true impacts of tourism on the economy, the approach to economic evaluation should be more rigorous, and should not ignore the existence of the possible costs related to tourism development. Regardless of the net benefit of tourism, there is a possibility that tourism does not always lead to economic growth. This study will identify whether tourism growth leads to economic growth in various economies, classified according to the degree of tourism specialization, and measures the overall impact.

The main contributions of the study are as follows. First, no previous studies have rigorously evaluated the relationship between economic growth and tourism growth in which the roles of domestic and international tourism have been included simultaneously. Most empirical studies have taken the share of international tourism receipts to national GDP to account for influencing economic growth, which leads to the contribution of domestic tourism on the national economy being ignored. In this study, the travel and tourism (T&T) economy GDP, which is obtained from the World Travel & Tourism Council database, is used as a threshold variable in the economic growth-tourism linkage. Second, the nonlinear relationship between economic growth and tourism growth when using the share of T&T economy GDP to national GDP as a threshold variable is examined. Finally, two of three regimes are shown to exhibit a positive and significant relationship between economic growth and tourism growth. For the remaining regime, countries with a degree of tourism specialization over 17.50 %, do not exhibit such a significant relationship.

The remainder of the study is organized as follows. Section 2 presents a literature review. Section 3 describes the data, methodology and empirical framework. The empirical results are analyzed in Section 4. Section 5 gives some concluding remarks.

2.2 Literature Review

In the economic growth literature, tourism's contribution to economic development has been well documented, and has long been a subject of interest from a policy perspective. The economic contribution of tourism has usually been considered to be positive to growth (see, for example, (Khan, Phang, & Toh, 1995; C.-K. Lee & Kwon, 1995; Lim, 1997; Oh, 2005).

The empirical literature on a reciprocal causal relationship between tourism and economic development may be considered in several classifications, depending on the techniques applied. Most historical studies have been based on various time series techniques, such as causality and cointegration, and have relied mainly on individual country or regional analysis. While this allows a deeper conception of the growth process for each country, it also creates difficulties in generalizing the results. Some of the interesting research using this approach include (Balaguer & Cantavella-Jordá, 2002; Brida, Carrera, & Risso, 2008; Dritsakis, 2004; Gunduz & Hatemi-J, 2005; Kim, Chen, & Jang, 2006; Louca, 2006; Oh, 2005). Even though the possible causal relationship between tourism and economic growth has been empirically analyzed in previous studies, the direction of such relationships has not yet been determined.

Using panel data, there is evidence of an economic growth-tourism nexus in the empirical work of Lee and Chang (C.-C. Lee & Chang, 2008), Fayissa et.al (Fayissa, Nsiah, & Tadasse, 2008), and Eugenio-Martin et.al (Eugenio-Martin, Morales, & Scarpa, 2004). Nevertheless, there has been little research on the effect on economic growth of the degree of tourism specialization. Sequeria and Campos (2005) used tourism receipts as a percentage of exports and as a percentage of GDP as proxy variables for tourism. A sample of 509 observations for the period 1980 to 1999 was divided into several smaller subsets of data. Their results from pooled OLS, random effects and fixed effects models showed that growth in tourism was associated with economic growth only in African countries. A negative relationship was found between tourism and economic growth in Latin American countries, and in the countries with specialization in tourism. However, they did not find any evidence of a significant relationship between tourism and economic growth in the remainder of the groups (Sequeira & Campos, 2005).

Brau et al. (2007) investigated the relative economic performance of countries that have specialized in tourism over the period 1980-2003. Tourism specialization and small countries are simply defined as the ratio of international tourism receipts to GDP and as countries with an average population of less than one million during 1980-2003, respectively. They used dummy regression analysis to compare the growth performance of small tourism countries (STCs) as a whole, relative to the performance of a number of significant subsets of countries, namely OECD, Oil, Small, and LDC. They found that tourism could be a growth-enhancing factor, at least for small countries. In other words, small countries are likely to grow faster only when they are highly specialized in tourism. Although the study considered the heterogeneity among countries in terms of the degree of tourism specialization and country size, the selection of such threshold variables was not based on any selection criteria. It would be preferable to use selection criteria to separate the whole sample into different subsets in which tourism may significantly affect economic growth (Brau, Lanza, & Pigliaru, 2007).

Po and Huang (2008) use cross section data (1995-2005 yearly averages) for 88 countries to investigate the nonlinear relationship between tourism development and economic growth when the degree of tourism specialization (defined as receipts from international tourism as a percentage of GDP) is used as the threshold variable. The result of the nonlinear threshold model indicated that the data for 88 countries should be divided into three regimes to analyze the tourism-growth nexus. The results of the threshold regression showed that, when the degree of specialization was below 4.05% (regime 1) or above 4.73% (regime 3), there existed a significantly positive relationship between tourism growth and economic growth. However, when the degree of specialization was between 4.05% and 4.73% (regime 2), they were unable to find a significant relationship between tourism and economic growth (Po & Huang, 2008).

A number of empirical studies, as pointed above, have suggested that there exist thresholds in the effect of tourism on economic growth. However, the endogenous threshold regression technique introduced by Hansen (Bruce E. Hansen, 1999) has not been widely used to identify a nonlinear relationship in the endogenous economic growth model in which the degree of tourism specialization is used as a threshold variable over cross-country panel data sets. Special attention is paid in this study to establish a new specification of a country's tourism specialization, which is defined as the share of the travel and tourism economy GDP (T&T economy GDP) to national GDP. T&T economy GDP measures direct and indirect GDP and employment associated with travel and tourism demand. This is the broadest measure of travel and tourism's contribution to the domestic economy. The T&T ratio to GDP is used as a criterion for identifying the impact of tourism on economic growth under different conditions.

2.3 Data

Subject to the availability of data, 131 countries are used in the sample, as given in Table 2.2. Annual data for the period 1991 to 2008 are organized in panel data format. The countries in the sample were selected based on data availability. Real GDP per capita (y), inflation (π), and the percentage of gross fixed capital formation (k) as a proxy for the capital stock are taken from the World Development Indicator (WDI) database (World Bank, 2009). The tourism data are obtained from the World Travel &Tourism Council website (World Travel and Tourism Council, 2009b) namely the ratio of real Travel &Tourism GDP to real national GDP (q), and the ratio of real government expenditure in tourism activities to GDP (g).

2.4 Methodology

The main purpose of this study is to use a threshold variable to investigate whether the relationship between economic growth and tourism growth is different in each sample grouped on the basis of certain thresholds. In order to determine the existence of threshold effects between two variables is different from the traditional approach in which the threshold level is determined exogenously. If the threshold level is chosen arbitrarily, or is not determined within an empirical model, it is not possible to derive confidence intervals for the chosen threshold. The robustness of the results from the conventional approach is likely to be sensitive to the level of the threshold. The econometric estimator generated on the basis of exogenous sample splitting may also pose serious inferential problems (for further details, see (Bruce E. Hansen, 1999)).

Critical advantages of the endogenous threshold regression technique over the traditional approach are that: (1) it does not require any specified functional form of non-linearity, and the number and location of thresholds are endogenously determined by the data; and (2) asymptotic theory applies, which can be used to construct appropriate confidence intervals. A bootstrap method to assess the statistical significance of the threshold effect, in order to test the null hypothesis of a linear formulation against a threshold alternative, is also available.

For the reasons given above, the panel threshold regression method developed by Hansen (1999) is applied to search for multiple regimes, and to test the threshold effect in the tourism growth and economic growth relationship. The possibility of endogenous sample separation, rather than imposing a priori an arbitrary classification scheme, and the estimation of a threshold level are allowed in the model. If a relationship exists between these two variables, the threshold model can identify the threshold level and test such a relationship over different regimes categorized by the threshold variable.

Panel Threshold Model

Hansen (1999) developed the econometric techniques appropriate for threshold regression with panel data. Allowing for fixed individual effects, the panel threshold model divides the observations into two or more regimes, depending on whether each observation is above or below the threshold level.

The observed data are from a balanced panel $(y_{it,} \mathrm{q}_{\mathrm{it}}, \mathrm{x}_{\mathrm{it}}: 1 \leq \mathrm{i} \leq \mathrm{n}, 1 \leq \mathrm{t} \leq \mathrm{T})$. The subscript *i* indexes the individual and *t* indexes time. The dependent variable y_{it} is scalar, the threshold variable q_{it} is scalar, and the regressor x_{it} is a *k* vector. The structural equation of interest is

$$y_{it} = \mu_i + \beta_1' x_{it} I(q_{it} \leq \gamma) + \beta_2' x_{it} I(q_{it} > \gamma) + e_{it} \qquad (1)$$

where $I(\cdot)$ is an indicator function. An alternative intuitive way of writing (1) is

$$y_{it} = \begin{Bmatrix} \mu_i + \beta_1' x_{it} + e_{it,} & q_{it} \leq \gamma \\ \mu_i + \beta_2' x_{it} + e_{it,} & q_{it} > \gamma \end{Bmatrix}$$

Another compact representation of (1) is to set

$$x_{it}(\gamma) = \begin{Bmatrix} x_{it} I(q_{it} \leq \gamma) \\ x_{it} I(q_{it} > \gamma) \end{Bmatrix}$$

and $\beta = (\beta_1' \quad \beta_2')'$, so that (1) is equivalent to

$$y_{it} = \mu_i + \beta' x_{it}(\gamma) + e_{it} \qquad (2)$$

The observations are divided into two regimes, depending on whether the threshold variable q_{it} is smaller or larger than the threshold γ. The regimes are distinguished by differing regression slopes, β_1 and β_2. For the identification of β_1 and β_2, it is required that the elements of x_{it} are not time-invariant. The threshold variable q_{it} is not time-invariant. μ_i is the fixed individual effect, and the error e_{it} is assumed to be independently and identically distributed (iid), with mean zero and finite variance σ^2.

It is easy to see that the point estimates for the slope coefficients β_s' are dependent on the given threshold value γ. Since the threshold value is not known and is presumed to be endogenously determined, Hansen (1999) recommends a grid search selection of γ that minimizes the sum of squared errors (SSE), denoted $S_1(\gamma)$, which is obtained by least squares estimation of (1):

$$\hat{\gamma} = argmin\ S_1(\gamma) \tag{3}$$

Given an estimate of γ, namely $\hat{\gamma}$, β_1 and β_2 can then be estimated, and the slope coefficient estimate is $\hat{\beta} = \hat{\beta}(\hat{\gamma})$. The residual variance is given by $\hat{\sigma}^2 = \frac{1}{n(T-1)} S_1(\hat{\gamma})$.

It is not desirable for a threshold estimate, $\hat{\gamma}$, to be selected which sorts too few observations into one regime or another. This possibility can be excluded by restricting the search in (3) to values of γ such that a minimal percentage of the observations lies in both regimes. The computation of the least squares estimate of the threshold $\hat{\gamma}$ involves the minimization problem (3).

It is important to determine whether the threshold effect is statistically significant. The null hypothesis of no threshold effects (that is, a linear formulation) against the alternative hypothesis of threshold effects, is given as follows:

$$H_0: \beta_1 = \beta_2$$

$$H_1: \beta_1 \neq \beta_2$$

Under the null hypothesis, the threshold effect γ is not identified, so classical tests such as the Lagrange Multiplier (LM) test do not have the standard distribution. In order to address this problem, a bootstrap procedure is available to simulate the asymptotic distribution of the likelihood ratio test. He showed that a bootstrap procedure attains the first-order asymptotic distribution, so p-values constructed from the bootstrap are asymptotically valid.

After the fixed effect transformation, equation (2) becomes:

$$y_{it}^{*} = \beta' x_{it}^{*}(\gamma) + e_{it}^{*} \tag{4}$$

Under the null hypothesis of no threshold effect, the model is given by:

$$y_{it} = \mu_i + \beta_1' x_{it} + e_{it} \tag{5}$$

After the fixed effect transformation, equation (5) becomes:

$$y_{it}^{*} = \beta_1' x_{it}^{*} + e_{it}^{*} \tag{6}$$

The regression parameter β_1 is estimated by OLS, yielding $\hat{\beta}_1$, residuals $\hat{e}_{it}^{*}$, and sum of squared errors, $S_0 = \hat{e}_{it}^{*}{}' \hat{e}_{it}^{*}$. The likelihood ration test of H_0 is based on:

$$F_1 = \frac{S_0 - S_1(\hat{\gamma})}{\hat{\sigma}^2} \tag{7}$$

where S_0 and S_1 are the residual sum of squared errors obtained from equation (1) without and with threshold effects (or panel threshold estimation), respectively, and $\hat{\sigma}^2$ is the residual variance of the panel threshold estimation.

Hansen (1999) recommended the following implementation of the bootstrap for the given panel data. Treat the regressors x_{it} and threshold variable q_{it} as given, holding their values fixed in repeated bootstrap samples. Take the regression residuals $\hat{e}_{it}^{*}$, and group them by individual, $\hat{e}_{i}^{*} = \hat{e}_{i1}^{*}, \hat{e}_{i2}^{*}, \hat{e}_{i3}^{*}, \ldots, \hat{e}_{iT}^{*}$. Treat the sample $\{\hat{e}_1^{*}, \hat{e}_2^{*}, \ldots, \hat{e}_n^{*}\}$ as the empirical distribution to be used for bootstrapping. Draw (with replacement) a sample of size n from the empirical distribution, and use these errors to create a bootstrap sample under H_0.

Using the bootstrap sample, estimate the model under the null hypothesis, equation (6), and alternative hypothesis, equation (4), and calculate the bootstrap value of the likelihood ratio statistic F_1 (equation (7)). Repeat this procedure a large number of times and calculate the percentage of draws for which the simulated statistic exceeds the actual. This is the bootstrap estimate of the asymptotic p-value for F_1 under H_0. The null hypothesis of no threshold effect will be rejected if the bootstrap estimate of the asymptotic p-value for likelihood ratio statistic F_1 is smaller than the desired critical value.

Having established the existence of a threshold effect, $\beta_1 \neq \beta_2$, it is questionable whether $\hat{\gamma}$ is consistent for the true value of γ (γ_0). This requires the computation of the confidence region around the threshold estimate. While the existence of threshold effect is well accepted, the precise level of the threshold variable is subject to debate. Under normality, the likelihood ratio test statistic, $LR_{n(\alpha)} = n\frac{S_n(\alpha)-S_n(\hat{\alpha})}{S_n(\hat{\alpha})}$, is commonly used to test for particular parametric values. Hansen (2000) proves that, when the endogenous sample-splitting procedure is used, $LR_{n(\alpha)}$ does not have a standard χ^2 distribution. As a result, he suggested that the best way to form confidence intervals for γ is to form the "no-rejection region" using the likelihood ratio statistic for a test of γ. In order to test the null hypothesis $H_0: \gamma = \gamma_0$, the likelihood ratio test reject for large values of $\mathrm{LR}_1(\gamma_0)$, where

$$LR_1(\gamma) = \frac{S_1(\gamma)-S_1(\hat{\gamma})}{\hat{\sigma}^2}. \qquad (8)$$

Note that the statistic (equation (8)) is testing a different hypothesis from the statistic (7), that is, $LR_1(\gamma)$ is testing $H_0: \gamma = \gamma_0$ while F_1 is testing $H_0: \beta_1 = \beta_2$. The likelihood ratio statistic in equation (8) has the critical values, under some technical assumptions, of 5.9395, 7.3523, and 10.5916 at the significance level 10%, 5% and 1%, respectively. The asymptotic confidence interval for γ at a (1-α) confidence level is found by plotting $LR_1(\gamma)$ against γ and drawing a flat line at the critical level. The null hypothesis will be rejected if the likelihood ratio test statistic exceeds the desired critical value. After the confidence interval for the threshold variable is obtained, the corresponding confidence interval for the slope coefficient can also be easily determined as the slope coefficient and the threshold value are jointly determined, $\hat{\beta} = \hat{\beta}(\hat{\gamma})$.

In some applications, there may be multiple thresholds. Similar procedures can be extended in a straightforward manner to higher-order threshold models. This method represents another advantage of threshold regression estimation over the traditional approach, which allows for only a single threshold.

The multiple thresholds model may take, for example, the form of the double threshold model:

$$y_{it} = \mu_i + \beta_1' x_{it} I(q_{it} \leq \gamma_1) + \beta_2' x_{it} I(\gamma_1 < q_{it} \leq \gamma_2) + \beta_3' x_{it} I(\gamma_2 < q_{it}) + e_{it} , \quad (9)$$

where thresholds are ordered so that $\gamma_1 < \gamma_2$. In the panel threshold model, Hansen also extended a similar computation to multiple thresholds (B.E. Hansen, 2000). The general approach is similar to the case of only a single threshold (or the 2 regime case). The method works as follows. In the first stage, let $S_1(\gamma)$ be the single threshold sum of squared error of equation (1), and let $\hat{\gamma}_1$ be the threshold estimate, which minimizes $S_1(\gamma)$. The second stage refers to the estimate of the second threshold parameter, $\hat{\gamma}_2^r$, by fixing the first stage estimate, $\hat{\gamma}_1$. The second stage threshold estimate is given by:

$$\hat{\gamma}_2^r = argmin\ S_2^r(\gamma_2) \quad (10)$$

Bai (1997) showed that $\hat{\gamma}_2^r$ is asymptotically efficient, but that $\hat{\gamma}_1$ is not, because the estimate $\hat{\gamma}_1$ is obtained from a sum of squared errors function which was contaminated by the presence of a neglected regime. The asymptotic efficiency of $\hat{\gamma}_2^r$ suggests that $\hat{\gamma}_1$ can be improved by a third stage estimation. Bai (1997) suggests the following refinement estimator. Fixing the second stage estimate, $\hat{\gamma}_2^r$, the refined estimate of $\hat{\gamma}_1$, that is $\hat{\gamma}_1^r$, is given by:

$$\hat{\gamma}_1^r = argmin\ S_1^r(\gamma_1) \tag{11}$$

This three stage sequential estimation yields the asymptotically efficient estimator of the threshold parameters, $\hat{\gamma}_1^r$ and $\hat{\gamma}_2^r$ (Bai, 1997).

In the context of model (9), there is either no threshold, one threshold, or two thresholds. F_1 in equation (7) is used to test the hypothesis of no threshold against one threshold, and a bootstrapping method is used to approximate the asymptotic p-value. If F_1 rejects the null of no threshold, a further step based on the model in equation (9) is to discriminate between one and two thresholds.

The minimizing sum of squared errors from the second stage threshold estimate is $S_2^r(\hat{\gamma}_2^r)$, with a variance estimate, $\hat{\sigma}^2 = \frac{S_2^r(\hat{\gamma}_2^r)}{n(T-1)}$. Thus, an approximate likelihood ratio test of one versus two thresholds can be based on the statistic:

$$F_2 = \frac{S_1(\hat{\gamma}_1) - S_2^r(\hat{\gamma}_2^r)}{\hat{\sigma}^2} \tag{12}$$

where $S_1(\hat{\gamma}_1)$ is the sum of squared errors (SSE) obtained from the first stage threshold estimation, $S_2^r(\hat{\gamma}_2^r)$ is the SSE obtained from the second stage threshold estimation, and $\hat{\sigma}^2$ is the residual variance of the second stage threshold estimation. The hypothesis of one threshold is rejected in favour of two thresholds if F_2 is large.

Note that the threshold estimators, $\hat{\gamma}_1^r$ and $\hat{\gamma}_2^r$, have the same asymptotic distributions as the threshold estimate in a single threshold model. This suggests that confidence intervals can be constructed in the same way as described above.

The panel specification of economic growth regression, in which the ratio of real government expenditure in tourism activities to GDP, the ratio of real capital expenditures by direct Travel & Tourism industry service providers and government agencies to GDP, inflation, and the percentage of gross fixed capital formation as the explanatory variables, together with the tourism variable, the growth rate of real Travel &Tourism GDP to real national GDP, are incorporated, takes the following form:

$$\left(\frac{\dot{y}}{y}\right)_{it} = \beta_1 \left(\frac{\dot{y}}{y}\right)_{i,t-1} + \beta_2 g_{it} + \beta_3 \pi_{it} + \beta_4 k_{it} + \delta_1 \left(\frac{to\dot{u}r}{tour}\right)_{it} I(q_{it} \leq \gamma_1)$$
$$+\delta_2 \left(\frac{to\dot{u}r}{tour}\right)_{it} I(\gamma_1 < q_{it} \leq \gamma_2) + \delta_3 \left(\frac{to\dot{u}r}{tour}\right)_{it} I(q_{it} > \gamma_2) + v_{it} \quad (13)$$

where

$\left(\frac{\dot{y}}{y}\right)_{it}$ is the growth rate of real GDP per capita at time t,

$\left(\frac{\dot{y}}{y}\right)_{i,t-1}$ is the growth rate of real GDP per capita at time t-1,

g_{it} is log of ratio of real government expenditure in tourism activities to GDP at time t,

π_{it} is inflation at time t,

k_{it} is log of the share of capital formation to GDP at time t,

$\left(\frac{to\dot{u}r}{tour}\right)_{it}$ is the growth rate of real Travel &Tourism GDP to real national GDP at time t,

q_{it} is the ratio of real Travel &Tourism GDP to real national GDP at time t,

υ_{it} $= \mu_i + \eta_t + \varepsilon_{it}$, μ_i is an individual (country) effect, η_t is a time effect, and ε_{it} is independently and identically distributed across countries and years.

2.5 Empirical Results

The descriptive statistics, namely means, standard deviation, minimum values, and maximum values of the variables for the full sample are summarized in Table 2.3. By construction, the panel identifier, *country*, does not vary within the panel; i.e. it is time-invariant, reporting the within standard deviation is zero. Any variable with a within standard deviation of zero will be dropped from the fixed effect model. The coefficients on variables with small within standard deviations are not well defined. Similarly, the between standard deviation of *year* is zero by construction.

The results of economic growth and tourism growth are first examined using a linear specification. In this study, a data set is organized in the form of a panel data format, so a variety of different models for panel data is examined. This approach allows inclusion of country-specific effects, as well as time-specific effects on the formulation. Various estimation methods, such as pooled ordinary least squares (pooled OLS), fixed effect model, and random effect model, are used to estimate the relationship between economic growth. The regression results are given in Table 2.4.

According to the benchmark pooled OLS regression, only two variables, namely the growth rate of real GDP per capita in the previous year and log of share of real government expenditure in tourism activities to GDP, are significant. Furthermore, only the growth rate of real GDP per capita in the previous year is significant, with the expected sign. The estimated coefficient of the growth rate of real

Travel &Tourism GDP to real national GDP is positively, but insignificant. The insignificance of the estimated coefficients is obvious in the case of the inflation rate, and the share of capital formation to GDP.

The growth equation is re-estimated by the fixed effects and random effects model. A one-way fixed effects model permits each cross-sectional unit to have its own constant term while the slope estimates are constrained across units resulting in the structure;

$$y_{it} = x_{it}\beta_k + z_i\delta + \mu_i + \varepsilon_{it}$$

Rather than considering the individual-specific intercept as a fixed effects of that country, the random effects model specifies the individual effect as a random draw that is uncorrelated with the regressors and the overall disturbance term.

$$y_{it} = x_{it}\beta + z_i\delta + (\mu_i + \varepsilon_{it})$$

The fixed effects and random effects model display the estimates of σ_u^2 (labeled sigma_u), σ_ϵ^2 (labeled sigma_e), and *rho*; the fraction of variance due to μ_i. Stata fits a model in which the μ_i are taken as deviations from one constant term, displayed as *_cons*. The empirical correlation between μ_i and the fitted value is also displayed as *corr(u_i, Xb)*.

From the start, the individual-specific heterogeneity μ_i across countries is tested. When the μ_i are correlated with some of the regressors in the model, the fixed effects method becomes proper. The fixed effects model modestly relaxes the assumption that the regression function is constant over time and space. *F* statistic reported in fixed effects model is a test of the null hypothesis that the constant terms are equal across units (*F* test that all *u_i=0* is 59.77). A rejection of the null hypothesis indicates that pooled OLS would produce inconsistent estimates. The *F* test following the regression indicates that there are significant individual (country level) effects, implying the fixed effects model is superior to pooled OLS regression.

All explanatory variables are highly significant in both models, with the growth rate of real Travel &Tourism economy GDP per capita, and the growth rate of real GDP per capita in the previous year, having a positive effect on growth rate of real GDP per capita. That is , in fixed effects model, when the growth rate of real Travel &Tourism economy GDP per capita and the growth rate of real GDP per capita in previous year increases by 1%, growth rate of real GDP per capita increase 0.05272% and 0.03642%, respectively. In the random effects model, the effect of these two explanatory variables on the growth rate of real GDP per capita is indifferent. That is, when the growth rate of real Travel &Tourism economy GDP per capita and the growth rate of real GDP per capita in the previous year increases by 1%, the growth rate of real GDP per capita increase 0.05274% and 0.03629%, respectively.

Similar to the results from pooled OLS, the estimated coefficient of the share of real government expenditure in tourism activities to GDP remains having negative effect on the growth rate of real GDP per capita. The estimated coefficients of the inflation rate and gross fixed capital formation have the expected signs. This means that when the inflation rate increases by 1%, the growth rate of real GDP per capita under the fixed effects model and the random effects model decreases 0.00882% and 0.00882%, respectively. The estimates of *rho* in both models, suggest that almost all the variation in the growth rate of real GDP is related to inter-country differences in the growth rate of real GDP.

The Hausman test is a useful test for determining the most appropriate specification of the common effects model. If the regressors are *correlated* with μ_i, the fixed effects estimator is consistent but the random effects estimator is not. If the regressors are *uncorrelated* with the μ_i, the fixed effects estimator is still consistent, albeit inefficient, whereas the random effects estimator is consistent and efficient. If both the fixed effects and the random effects models generate consistent point estimates of the slope parameters, they will not differ meaningfully. This means that if the null hypothesis of the Hausman test is rejected-that the random effects estimator is consistent-one can, in that event, expects to see the difference between the two set of coefficients estimated by the fixed effects and the random effects models. The results from the Hausman test are reported in Table 2.5, and they do not resoundingly reject the null hypothesis. The country-level individual effects do not appear to be correlated with the regressors, so the random effects model is the preferred specification for these data. Anyway, the estimators generated by the fixed effects and the random effects model are slightly different. Both models are found to be consistent.

In summary, the effect of the growth rate of real Travel &Tourism economy GDP per capita on the growth rate of real GDP per capita is positive and significant across all models. Furthermore, the regression coefficients of government expenditure, inflation rate, gross fixed capital formation, and real GDP per capita in the previous period are generally consistent with standard results in the economic growth literatures.

Panel Threshold Regression Estimates

Before applying the threshold regression model, a test for the existence of threshold effect between economic growth and tourism growth is applied. This study uses the bootstrap method to approximate the *F* statistic, and then calculates the bootstrap p-value. Table 2.6 presents the empirical results of the test for a single threshold, multiple threshold and triple threshold effects. Through 1,200 bootstrap replications for each of the three bootstrap tests, the test statistics F_1, F_2 and F_3, together with their bootstrap p-values, are also reported. The test statistic for a single threshold is highly significant, with a bootstrap p-value of 0.042, the test statistic for a double threshold is also significant, with a p-value of 0.054, but the test statistic for a triple threshold is statistically insignificant, with a p-value of 0.220. Thus, this may be concluded that there is strong evidence that there are two thresholds in the relationship between economic growth and tourism growth.

Given a double threshold effect between economic growth and tourism growth, the whole sample is split into 3 regimes, where q_{it} is used as a threshold variable. Table 2.7 reports the point estimates of the two thresholds and their asymptotic confidence intervals. These results are useful to see how the threshold variable divides the sample into different regimes.

Figures 2.5-2.8 show the threshold estimates from plots of the concentrated likelihood ratio function, $LR_1(\gamma)$, corresponding to the first stage estimate of $\hat{\gamma}_1$, and $LR_2^r(\gamma)$ and $LR_1^r(\gamma)$, corresponding to the refined estimators, $\hat{\gamma}_2^r$ and $\hat{\gamma}_1^r$, respectively. The 95% confidence intervals for γ_2 and γ_1 can be found from $LR_2^r(\gamma)$ and $LR_1^r(\gamma)$ by the values of γ for which the likelihood ratio lies beneath the dotted line. In addition, the threshold estimates are the respective values of γ at which the likelihood ratio touches the zero axis.

As mentioned above, where a double threshold is found, a three stage procedure is used to estimate two threshold parameters. The first stage refers to the same estimation procedure as presented for the single threshold model, which yields the first estimate $\hat{\gamma}_1$, namely 24.66. Fixing this threshold parameter, the second stage estimates the second threshold paramete , $\hat{\gamma}_2^r$, which is 14.97. As the estimate $\hat{\gamma}_1$ is obtained with neglected regimes, a refinement is needed in this case. The estimate $\hat{\gamma}_1$ is improved by a third stage estimation, which yields the refinement estimator of $\hat{\gamma}_1$ (or $\hat{\gamma}_1^r$) of 17.50. The bootstrap p-value obtained from this double threshold model is 0.061. With respect to the threshold estimation results, the null hypothesis of a double threshold is not rejected. As a result, there are three regimes in the economic growth and tourism relationship, that is, the observations can be grouped into three regimes for analysis, based on the threshold levels of q_{it} as 14.97% and 17.50%.

Table 2.8 shows that the first category indicated by the first point estimates includes countries with a degree of tourism specialization lower than 14.97. The percentage of countries in this group ranges from 80% to 85% of the sample over 18 years. The second group is considered as a medium degree of tourism specialization. The countries in this group are not greater than 5 % of the entire sample, and the degree of tourism specialization for this group is relatively tight. A high degree of tourism specialization refers to countries with a degree of tourism specialization in excess of 17.50%. The percentage of countries in this group ranges from 12% to 16%.

The estimated model in the empirical framework is as follows:

$$g_{it} = \beta_1 g_{i,t-1} + \beta_2 gov_{it} + \beta_3 \pi_{it} + \beta_4 k_{it} + \delta_1 tour_{it} I(q_{it} \leq 14.9726\ )$$
$$+\delta_2 tour_{it}\, I(14.9726 < q_{it} \leq 17.4972) + \delta_3 tour_{it} I(q_{it} > 17.4972) + \upsilon_{it}$$

The threshold regression estimates for the economic growth-tourism model, conventional OLS standard errors and White's corrected standard errors for the three regimes are given in Table 2.9.

The first conclusion to be drawn is that the effect of government expenditure in tourism activity has the same sign as in the linear specification. The negative and insignificant results for all regimes, and absolute value of the coefficient for government expenditure, were found to be relatively low. This means that the government expenditure associated with travel and tourism, both directly and indirectly linked to individual visitors, such as tourism promotion, aviation, and administration, does not have an efficient result in tourism development. Second, the estimated coefficient of inflation is found to be negative and significant. The growth-inflation trade-off is a matter of some controversy. Therefore, the growth-inflation trade-off exists with lower inflation that promotes higher growth, and vice-versa. Third, the share of gross fixed capital formation to GDP, which is a proxy variable for investment in fixed capital assets by enterprises, government and households within the domestic economy, has a positive effect on economic growth.

Focusing on the coefficients of growth rate of real Travel &Tourism economy GDP per capita, the results for three regimes indicate that there is a significant and positive relationship between the growth rate in real Travel &Tourism economy GDP per capita and the growth rate in real GDP per capita in regimes 1 and 2, although the effects in both regimes are different. From Table 9, the positive and significant effect of the growth rate in real Travel &Tourism economy GDP per capita on the growth rate in real GDP per capita in regime 2 is higher, though less significant, than in regime 1. If q_{it} is greater than 14.97% and less than 17.50%, a 1% increase in the growth rate in real Travel &Tourism economy GDP per capita may contribute to an increase of 0.2637% in the growth rate in real GDP per capita, while the same 1% increase in the growth rate in real Travel &Tourism economy GDP per capita may account for an increase of only 0.0579% in the growth rate in real GDP per capita if q_{it} is not greater than 14.97% (namely, regime 1).

The evidence presented seems to show that tourism development in most destination economies (accounting for 80-85% of the sample) does not provide a substantial contribution to economic growth. This is frequently the case in developed and developing countries that are able to build their competitiveness and development on more valued-added industries. It can be observed that there exists no significant relationship between the growth rate in real Travel &Tourism economy GDP per capita and the growth rate in real GDP per capita in regime 3. In short, when q_{it} exceeds 17.50%, tourism growth does not lead to economic growth.

Based on these results, there might be some doubt as to why tourism development could make a significant contribution to GDP as a catalyst for favourable changes in some countries, while others do not have such substantial impacts. The data displayed in Table 2.10 clarify this issue.

It is evident that regime 3 has the highest average percentage of government spending in the tourism sector and percentage of capital investment in tourism activities. This implies that countries in regime 3 tourism development are promoted by, and are supported with, investment in tourism infrastructure and superstructure. Significant levels of capital investment are typically required, so the percentage of capital investment in travel and tourism activities is relatively higher than in the other two regimes. Since a time lag exists between invested inputs and generated output in the form of tourism earnings, the contribution of tourism to the overall economy has not been well recognized. In this case, tourism development during this stage may not contribute to economic growth in the local economies. Furthermore, there is supporting evidence to suggest that many destinations, particularly emerging tourism countries, have attempted to overcome the lack of financial resources to speed up the process of tourism-specific infrastructure development.

With limited opportunities for local public sector funding, these countries have been offered funding by international development organizations or international companies to make themselves more attractive as tourism destinations. Although foreign capital investment can generate extra income and growth from international tourist earnings for the host country, it can generate greater leakages than domestic capital investment from local private and government sources. In addition to the leakages being remitted to the source of international funds, more imported goods may be used to support tourism businesses. As a result, these factors could cause the contribution of tourism to GDP to be less than expected.

On the other hand, countries in regimes 1 and 2 have relatively low government spending and capital investment in the tourism and tourism-related sectors. The countries in these two regimes are possibly developed or developing, and their economies may not be so heavily dependent on the tourism sector. Conversely, they might be able to develop other non-tourism sectors that could make a greater contribution to overall economic growth. Even though it is obviously seen that tourism development in some countries, especially in regime 1, may not have a great impact on economic growth, these countries may nevertheless achieve economic growth through their higher valued-added non-tourism sectors.

2.6 Concluding Remarks

Tourism development has significant potential beneficial economic impacts on the overall economy of tourism destinations. This study has not investigated the direction of the relationship between economic growth and tourism growth, but whether tourism has the same impact on economic growth in countries that differ in their degree of tourism dependence.

This study examined a nonlinear relationship between economic growth and tourism growth by applying the panel threshold regression model of Hansen (1999) to a panel data set of 131 countries over the period 1991-2009. A share of T&T economy GDP to national GDP was defined as the degree of tourism specialization, and was used as a threshold variable in the model. The main purpose of the study was to examine whether economic growth was enhanced through tourism development when the sample was split endogenously and, if so, whether such impacts were different across various sub-samples.

The results from threshold estimation identified two endogenous cut-off points, namely 14.97% and 17.50%. This indicated that the entire sample should be divided into three regimes. The results from panel threshold regression showed that, when the degree of tourism specialization was lower than 14.97%, or was between 14.97% and 17.50%, there existed a positive and significant relationship between economic growth and tourism growth. Although such a relationship was found to be significant in both regimes, the magnitudes of those impacts were not the same. It was found that tourism had substantial effects on economic growth in regime 2, but yielded a slightly lower impact in regime 1. However, there exists an insignificant relationship between economic growth and tourism growth in regime 3, in which the degree of tourism specialization was greater than 17.50%. This could be explained by the fact that there are leakages in those economies where many tourism infrastructure projects have been developed, or where more imported goods are invested in order to support tourism expansion.

In order to summarize the empirical results, tourism growth does not always lead to economic growth. If the economy is too heavily dependent on the tourism sector, tourism development may not lead to impressive economic growth since the overall contribution of tourism to the economy could be reduced by many factors. It is important to consider the overall balance between international tourism receipts and expenditures, the degree of development of domestic industries, and their ability to meet tourism requirements from domestic production. Should these issues be constantly ignored, then such a country would likely experience lower benefits than might be expected, regardless of whether they are considered to be a country with a high degree of tourism specialization.

Table 2.1 Contribution of Tourism towards the Overall Economy GDP and Employment in 2009, and Projection of Travel & Tourism Economy Real Growth, by Global Regions

Regions	2009 Travel &Tourism Economy GDP (US$ Mn)	2009 Travel &Tourism Economy GDP % share	2009 Visitor Exports (US$ Mn)	2009 Travel &Tourism Economy Employment (Thous of jobs)	Travel & Tourism Economy Real Growth (2010-2019)
Caribbean	39,410.668	30.312	24,154.262	2,042.512	3.568
Central and Eastern Europe	142,439.966	9.580	36,940.472	6,797.150	5.741
European Union	1,667,656.460	10.716	423,685.250	23,003.960	3.808
Latin America	176,954.984	8.729	30,223.315	12,421.720	4.031
Middle East	158,112.740	11.457	50,738.918	5,130.767	4.564
North Africa	62,893.900	12.164	25,622.089	5,440.087	5.417
North America	1,601,235.000	10.492	188,517.700	21,130.230	4.031
Northeast Asia	1,053,780.332	18.333	114,400.124	70,512.123	5.488
Oceania	115,902.843	18.558	38,403.241	1,701.315	4.394
Other Western Europe	150,082.280	10.207	42,694.005	2,277.688	2.642
South Asia	84,223.460	14.846	14,904.677	37,174.593	4.970
South-East Asia	155,158.492	10.478	65,765.366	23,231.522	4.415
Sub-Saharan Africa	65,866.259	9.047	23,392.256	8,948.552	4.718
World	5,473,717.384		1,079,441.62	219,812.220	

Source: World Travel and Tourism Council (2009)

Table 2.2 Countries in the Sample

Countries in the sample		
Albania	Guinea	Papua New Guinea
Algeria	Haiti	Paraguay
Angola	Honduras	Peru
Antigua and Barbuda	Hong Kong	Philippines
Argentina	Hungary	Poland
Armania	Iceland	Portugal
Australia	India	Qatar
Austria	Indonesia	Romania
Azerbaijan	Iran	Russia
Bahamas	Ireland	Saudi Arabia
Bahrain	Israel	Senegal
Bangladesh	Italy	Singapore
Barbados	Jamaica	Slovakia
Belgium	Japan	Slovenia
Belize	Jordan	South Africa
Benin	Kazakstan	Spain
Bolivia	Kenya	Sri Lanka
Botswana	Korea Republic	Swaziland
Brazil	Kuwait	Sweden
Bulgaria	Kyrgyzstan	Switzerland
Burkina faso	Laos	Syria
Cambodia	Latvia	Tanzania
Cameroon	Lebanon	Thailand
Canada	Ligya	Tunisia
Chile	Lithunia	Turkey
China	Luxembourg	Uganda
Colombia	Macedonia	U.K.
Congo	Madagascar	Ukrain
Costa Rica	Malaysia	United Arab Emirates.
Croatia	Maldives	U.S.A.
Cyprus	Mali	Uruguay
Czech Republic	Malta	Venezuela
Denmark	Mauritius	Vietnam
Dominican Republic	Mexico	Zambia
Ecuador	Moldova	
Egypt	Morocco	
Elsalvador	Mozambique	
Estonia	Namibia	
Ethiopia	Nepal	
Fiji	Netherlands	
Finland	New Zealand	
France	Nicaragua	
Germany	Nigeria	
Ghana	Norway	
Greece	Oman	
Grenada	Pakistan	
Guatemala	Panama	

Table 2.3 Summary Statistics

VARIABLES			FULL SAMPLE SUMMARY STATISTICS				
			MEAN	STD.DEV.	MINIMUM	MAXIMUM	OBSERVATIONS
RATIO OF REAL TRAVEL &TOURISM GDP TO REAL NATIONAL GDP	q_{it}	OVERALL		11.64668	1.32169	96.26073	N=2358
		BETWEEN	12.36536	11.33690	2.35479	83.32783	N=131
		WITHIN		2.83669	-5.35055	68.52476	T=18
GROWTH RATE OF REAL GDP PER CAPITA	$\dot{y}_{it}$	OVERALL	0.840181	1.00010	-0.52356	2.42251	N=2358
		BETWEEN		1.00253	-0.019801	2.35019	N=131
		WITHIN		0.04878	0.24956	1.37504	T=18
GROWTH RATE OF REAL GDP PER CAPITA AT PREVIOUS TIME	$y_{i,t-1}$	OVERALL		1.54701	4.63436	11.12611	N=2358
		BETWEEN	7.92891	1.54323	4.84609	10.65793	N=131
		WITHIN		0.16987	7.15912	8.950286	T=18
GROWTH RATE OF REAL TRAVEL &TOURISM GDP TO REAL NATIONAL GDP	$\dot{tour}_{it}$	OVERALL		0.162411	-1.36645	2.36925	N=2358
		BETWEEN	0.03405	0.033051	-0.02397	0.17627	N=131
		WITHIN		0.159037	-1.30843	2.27192	T=18
SHARE OF REAL GOVERNMENT EXPENDITURE IN TOURISM ACTIVITIES TO GDP	$\frac{G_{it}}{Y_{it}}$	OVERALL		0.87781	0	7.70128	N=2358
		BETWEEN	0.79379	0.84863	0.03102	5.94578	N=131
		WITHIN		0.23572	-0.82036	4.84453	T=18
	g_{it}	OVERALL		0.87627	-4.18572	2.04139	N=2358
		BETWEEN	-0.61925	0.84867	-3.61961	1.76885	N=131
		WITHIN		0.22978	-1.97926	2.02238	T=18
INFLATION RATE	π_{it}	OVERALL		1.37265	-4.09176	8.46272	N=2358
		BETWEEN	1.74439	0.95786	-0.48304	5.03489	N=131
		WITHIN		0.98654	-3.48918	7.38377	T=18
SHARE OF CAPITAL FORMATION TO GDP	$\frac{K_{it}}{Y_{it}}$	OVERALL		7.71568	3.61769	210.97330	N=2358
		BETWEEN	22.40727	5.05850	13.42123	46.76865	N=131
		WITHIN		5.84299	4.62633	206.25890	T=18
	k_{it}	OVERALL		0.28601	1.28584	5.35173	N=2358
		BETWEEN	3.06672	0.20625	2.58849	3.81526	N=131
		WITHIN		0.19892	1.55822	5.48806	T=18
COUNTRY	*I*	OVERALL		37.82336	1	131	N=2358
		BETWEEN	66	37.96051	1	131	N=131
		WITHIN		0	66	66	T=18
YEAR	*T*	OVERALL		5.189228	1991	2008	N=2358
		BETWEEN	1999.5	0	1999.5	1999.5	N=131
		WITHIN		5.189228	1991	2008	T=18

Source: Author calculations based on 131 countries for the period 1991 to 2008.

Table 2.4 Linear Model Estimates

Variable	POLS	Fixed Effect	Random Effect
$y_{i,t-1}$	0.0481***	0.0364***	0.0363***
	(3.21)	(6.20)	(6.21)
$tour_{it}$	0.1510	0.0527***	0.0527***
	(1.19)	(8.81)	(8.82)
g_{it}	-0.0909***	-0.0154***	-0.0155***
	(-3.67)	(-3.66)	(-3.70)
π_{it}	0.0176	-0.0088***	-0.0088***
	(1.07)	(-9.10)	(-9.10)
k_{it}	0.0433	0.0562***	0.0562***
	(0.59)	(11.50)	(11.51)
con_s	0.2335	0.3830***	0.3840***
	(0.88)	(8.38)	(3.86)
sigma_u		1.00137	1.014933
sigma_e		0.04584	0.04584
rho		0.99791	0.99796
R^2	0.0087	within: 0.1674	within: 0.1674
		between: 0.0024	between: 0.0024
		overall: 0.0028	overall: 0.0028
Adjusted R^2	0.0066	-	-
F statistic	4.14	38.68	-
F test that all u_i=0	-	59.77	-
Wald chi2	-	-	447.82
Prob > F	0.0010	0.0000	0.0000
Number of observations	2358	2358	2358
Number of groups	-	131	131
Corr(u_i,Xb)	-	-0.0098	0 (assumed)

Note: ***, **, * denote significance at the 1%, 5% and 10% levels, respectively. t-statistics are given in parentheses.

Table 2.5 Hausman Test Results

Variables	Coefficients		Difference	sqrt (diag(V_b-V_B)
	Fe (b)	Re (B)	(b-B)	S.E.
$y_{i,t-1}$	.0364215	.036288	.0001335	.0006424
$\dot{tour}_{it}$	.0527214	.0527437	-.0000223	.0002325
g_{it}	-.0154018	-.0155513	.0001494	.0002607
π_{it}	-.0088247	-.0088206	-4.14e-06	.0000394
k_{it}	.0562243	.0562201	4.18e-06	.0002186

Ho: difference in coefficients not systematic, chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 0.36, Prob>chi2 = 0.9963.

Table 2.6 Test for Threshold Effects

Test	F statistics	Bootstrap p-value	Critical values (10%,5%,1% critical values)
Single Threshold	*20.4055*	0.0420**	(13.4295, 17.9914, 31.5974)
Double Threshold	20.1857	0.0540*	(16.2184,20.5159, 101.1189)
Triple Threshold	8.4478	0.2200	(14.0185, 22.3348,38.9682)

Note: **, * denote significance at the 5% and 10% levels, respectively.

Table 2.7 Threshold Estimates

Test	Threshold estimate	Confidence region	Sum of Squared Errors
Single Threshold	*24.6586*	[18.2679 ,26.6774]	3.9006
Double Threshold			
First iteration:	14.9726	[13.8469 ,15.5572]	3.8656
Fixed threshold 24.6586	Thresholds: 14.9726 24.6586		
Second iteration:	17.4972	[16.4665 ,24.6586]	3.8553
Fixed threshold 14.9726	Thresholds: 14.9726 17.4972		
Triple Threshold			
Fixed thresholds:	24.6586	[6.4159 ,69.3503]	3.8407
14.9726 17.4972	Thresholds: 14.9726 17.4972 24.6586		

Table 2.8 Percentage of Countries in the Three Regimes across Years

Regime	Year																	
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
$q_{it} \leq 14.9726$	83	85	81	83	85	82	83	83	85	82	82	80	82	80	83	79	79	80
$14.9726 < q_{it} \leq 17.4972$	5	2	4	1	1	5	3	2	1	3	4	4	4	5	0	5	5	4
$q_{it} > 17.4972$	12	13	15	16	15	13	14	15	15	15	14	16	15	15	17	16	16	16
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 2.9 Endogenous Threshold Regression for Double Threshold Model

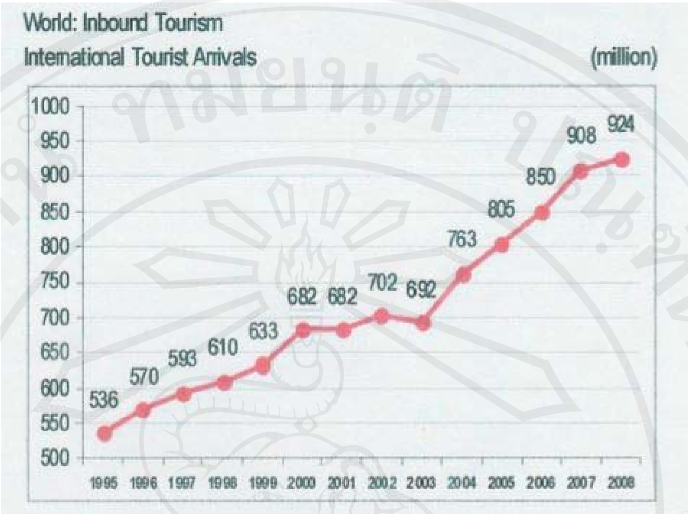
Regressors	Coefficient Estimates	OLS S.E.	White S.E
$y_{i,t-1}$	0.0233***	0.0061	0.0084
	(2.787)		
g_{it}	-0.0109*	0.0043	0.0059
	(-1.849)		
π_{it}	-0.0103***	0.0009	0.0013
	(8.0078)		
k_{it}	0.0535***	0.0049	0.0075
	(7.1004)		
$\dot{tour}_{it}I(q_{it} \leq 14.9726)$	0.0579***	0.0064	0.0102
	(5.6876)		
$\dot{tour}_{it}I(14.9726 < q_{it} \leq 17.4972)$	0.2637***	0.0359	0.0886
	(2.9763)		
$\boldsymbol{\dot{tour}_{it}I(q_{it}} > 17.4972)$	0.0027	0.0168	0.0343
	(0.0780)		

Note: ***, **,* indicate significance at the 1%, 5% and 10% levels, respectively. t-statistics are given in parentheses.

Table 2.10 Average share of real T&T Economy GDP, Government Expenditure in T&T, and Capital Investment in T&T in the Three Regimes

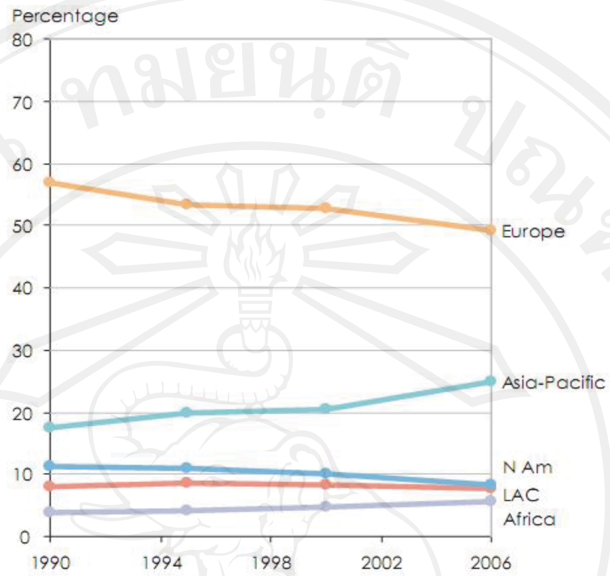
Regime	Share of real T&T economy GDP to national GDP (%)	Government expenditure in T&T activities (%)	Capital investment in T&T activities (%)
Regime 1			
1991	7.4068	0.5047	2.1203
1992	7.8389	0.5294	2.3278
1993	7.9017	0.5185	2.1725
1994	8.0327	0.5443	2.1576
1995	8.2525	0.5280	2.2226
1996	8.3262	0.5129	2.2174
1997	8.3912	0.5139	2.2677
1998	8.5691	0.4965	2.3603
1999	8.8774	0.5133	2.3181
2000	8.8029	0.5074	2.2175
2001	8.9258	0.5339	2.2024
2002	8.7334	0.5119	2.2274
2003	8.7633	0.5202	2.1965
2004	8.6424	0.5150	2.1942
2005	8.9432	0.5143	2.2772
2006	8.6445	0.4993	2.2640
2007	8.5787	0.4864	2.3082
2008	8.5157	0.4833	2.2490
average	**8.4526**	**0.51299**	**2.23896**
Regime 2			
1991	16.6349	1.0807	3.9583
1992	16.6349	1.0807	3.9583
1993	16.4542	1.6503	4.8336
1994	16.3098	0.9885	5.1155
1995	16.4665	1.2148	4.1081
1996	16.5037	1.1253	5.2113
1997	16.4629	1.0479	5.0210
1998	16.4712	1.1764	3.8771
1999	15.7195	1.2163	3.5854
2000	16.1261	1.6043	3.5029
2001	16.0737	1.1242	3.8655
2002	16.2984	1.2753	4.4813
2003	15.9190	1.5520	4.5139
2004	15.8353	0.7495	4.1083
2005	-	-	-
2006	15.7999	0.7249	3.0856
2007	15.9831	0.8390	3.2117
2008	16.6521	0.9503	5.4546
average	**16.2556**	**1.141239**	**4.22900**
Regime 3			
1991	35.0274	2.5356	8.3858
1992	34.1860	2.4402	8.2951
1993	32.1864	2.3555	8.0852
1994	31.3978	2.3831	8.3702
1995	30.8079	2.3361	8.0110
1996	32.8733	2.2550	7.7172
1997	32.9462	2.2600	7.7512
1998	31.9584	2.3144	7.8555
1999	31.8463	2.2663	7.4633
2000	32.2201	2.0916	7.4033
2001	32.8163	2.2172	7.6275
2002	32.4652	2.2841	7.4957
2003	35.2794	2.1983	8.0589
2004	34.1546	2.1811	7.4892
2005	29.9342	1.9120	7.2290
2006	33.9788	2.0128	9.2495
2007	33.9435	2.0217	9.1027
2008	35.3307	2.1873	8.7882
average	32.9641	2.23629	8.02107

Figure 2.1 World Inbound International Tourist Arrivals



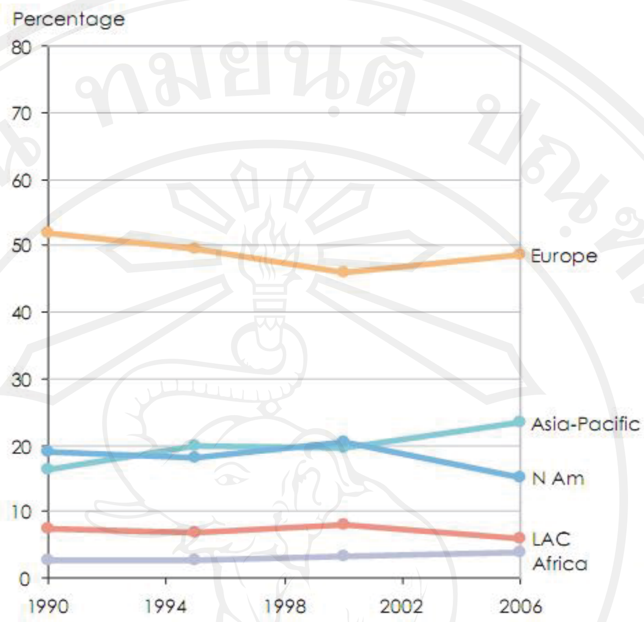
Source: World Tourism Organization (2009)

Figure 2.2 Shares in International Tourist Arrivals, Global Regions, 1990 to 2006



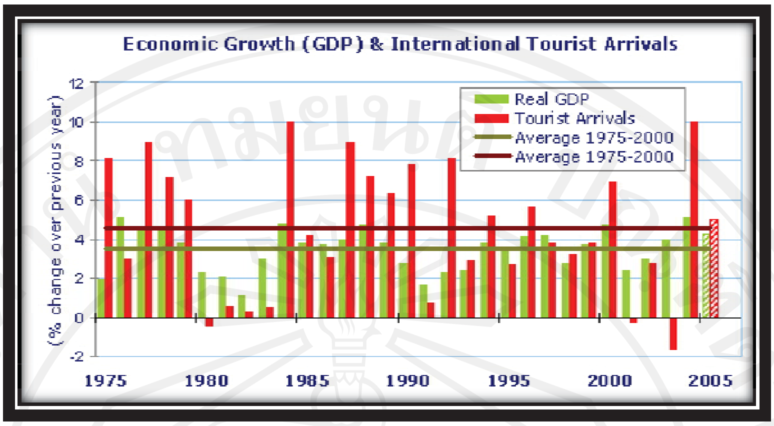
Source: Statistical Yearbook for Asia and the Pacific (2009)

Figure 2.3 Market Shares in International Tourism Receipts, by Global Region, 1990 to 2006



Source: Statistical Yearbook for Asia and the Pacific (2009)

Figure 2.4 Economic Growth and International Tourist Arrivals, 1975-2005



Source: World Tourism Organization (2008)

Figure 2.5: Confidence Interval Construction for Single Threshold

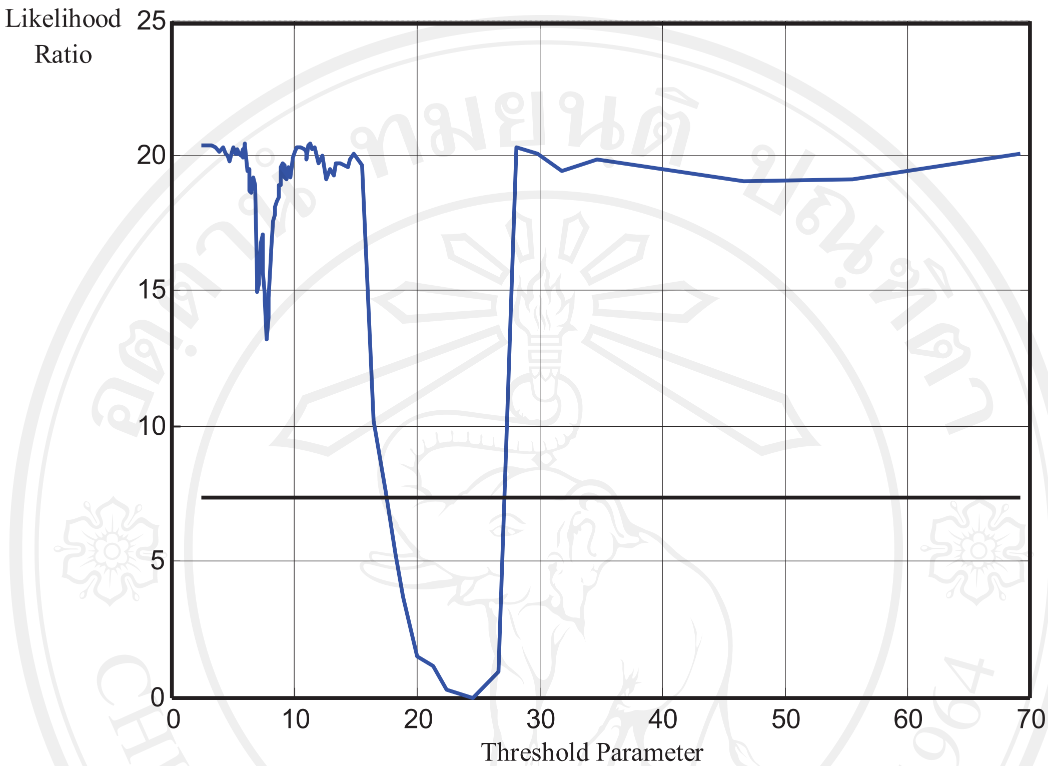


Figure 2.6 Confidence Interval Construction for Double Threshold

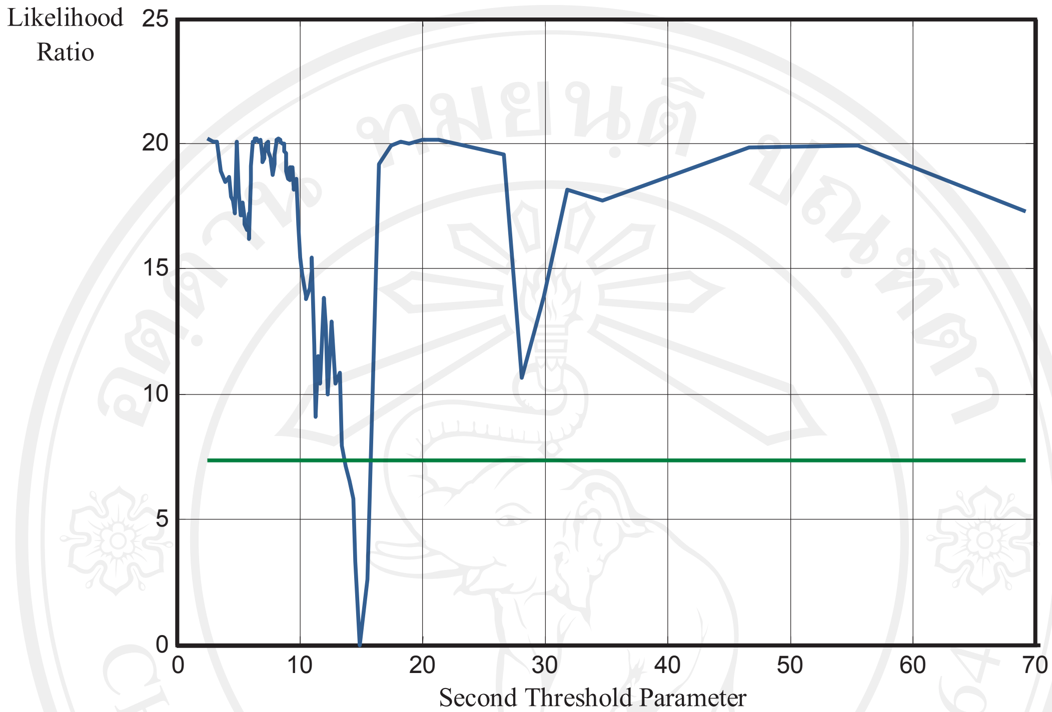


Figure 2.7 Confidence Interval Construction for Double Threshold

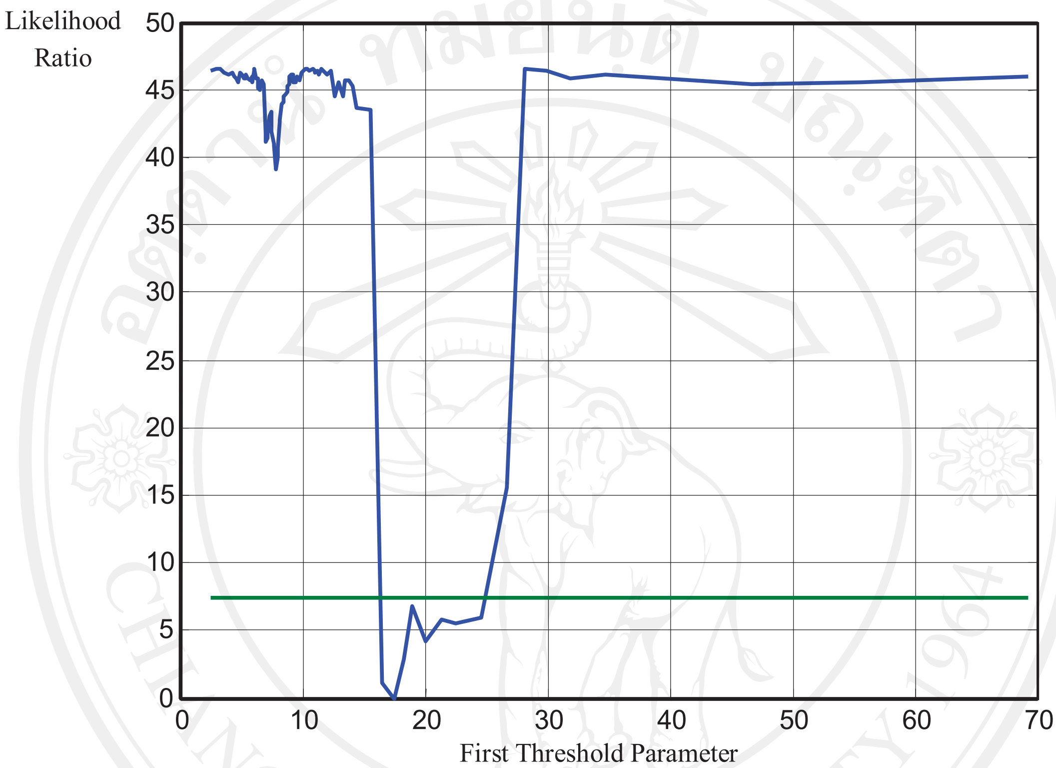
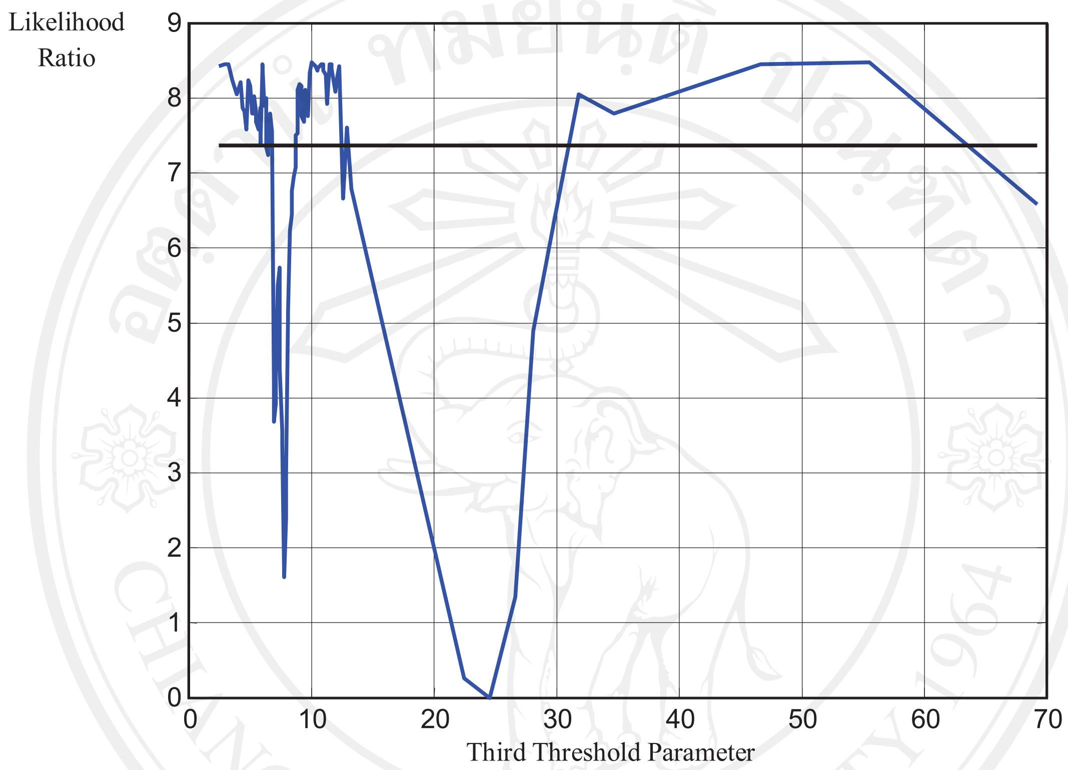


Figure 2.8 Confidence Interval Construction for Triple Threshold



Chapter 3

IV Estimation of a Panel Threshold Model of Tourism Specialization and Economic Development

Taking into account that the effect of tourism specialization in economic growth gives rise to the possibility of endogeneity problem, the powerful method is needed to deal with such a problem to get the unbiased regression coefficients and to detect the threshold effect of tourism specialization on economic growth. In this regard, instrument variable estimation of the cross-section threshold model introduced by Caner and Hansen (2004) is also applied in this study, apart from the panel threshold model of Hansen (1999).

The purpose of this chapter is to analyze the causal interrelationship amongst the variables of interest within the neoclassical economic growth framework. Special attention is given to identify whether the impacts of tourism specialization on economic growth is identical across the subsamples grouped by different possible threshold variables which are highly related to tourism specialization.

This chapter is based on the paper that was presented at the 2010 Asia Tourism Forum Conference, May 7th-9th, 2010 at Hualien, Taiwan and was recently accepted for publication by the Tourism Economics Journal.

IV Estimation of a Panel Threshold Model of Tourism Specialization and Economic Development

Chia-Lin Chang, Thanchanok Khamkaew and Michael McAleer

Abstract

The significant impact of tourism specialization in stimulating economic growth is especially important from a policy perspective. For this reason, the relationship between tourism specialization and economic growth would seem to be an interesting and topical empirical issue. The study investigates whether tourism specialization is important for economic growth in 159 countries over the period 1989-2008. The results from panel threshold regressions show a positive relationship between economic growth and tourism specialization. Instrumental variable estimation of a threshold regression is used to quantify the contributions of tourism specialization to economic growth, while correcting for endogeneity between the regressors and error term. The significant impact of tourism specialization on economic growth in most regressions is robust to different specifications of tourism specialization, as well as to differences in real GDP measurement. However, the coefficients of the tourism specialization variables in the two regimes are significantly different, with a higher impact of tourism specialization on economic growth found in the low regime. These findings do not change with changes in the threshold variables. The empirical results suggest that tourism specialization does not always lead to substantial economic growth.

3.1 Introduction

A compelling reason to analyze tourism is its purported positive effect on economic development. On a global scale, tourism has become one of the major international trade categories that generate foreign exchange earnings, which leads to a positive contribution to the national balance of payments and in the travel account. Tourism is also an effective source of income and employment. The contribution of tourism to world GDP is estimated to be approximately 5%. Tourism's contribution to employment tends to be slightly higher, and has been estimated in the order of 6-7% of the overall number of jobs (direct and indirect) worldwide. For advanced and diversified economies, the contribution of tourism to GDP ranges from approximately 2% for countries where tourism is a comparatively small sector, to over 10% for countries where tourism is an important pillar of the economy. For small islands and developing countries, or specific regional and local destinations where tourism is a key economic sector, the importance of tourism tends to be even higher (UNWTO, 2009).

According to the World Travel and Tourism Council (WTTC), in many developing regions the travel and tourism sectors have contributed a relatively larger total share to GDP and employment than the world average (World Travel and Tourism Council, 2009a). The travel and tourism economy GDP, the share to total GDP, the travel and tourism economy employment for all regions in 2009, as well as future tourism in real growth that has been forecast by the WTTC for the next ten years, are presented in Table 3.1(World Travel and Tourism Council, 2009b).

The success of economic development attributed to the tourism sector depends on different aspects. More precisely, the extent of a country's specialization in tourism may have a different effect on economic growth. In this respect, this study aims to examine empirically whether tourism specialization's contribution to economic growth can be characterized by three different macroeconomic threshold variables.

The relationship between tourism and development, and implications for an understanding of the potential contribution to the development of destination areas, are conceptualized in the model of Sharpley and Telfer (Sharpley & Telfer, 2002). The model demonstrates not only the interdependence between tourism and the broad socio-culture, but also the political and economic context within which it operates. The relationship between the potential developmental role of tourism and the consequences of development are recognized as a dynamic tourism-development system in which a multi-directional relationship exists (Sharpley & Telfer, 2002). Therefore, an essential issue is the potential endogeneity associated with the purported contribution of tourism to development. In this scenario, it is important to clarify the relationship between tourism specialization, economic development, and the correction for statistical bias that arises from the endogeneity problem in economic growth models. Therefore, the instrumental variable estimation method is used to accommodate this potentially serious problem.

The main contributions of this study are as followed. First, no previous studies have rigorously evaluated whether the relationship between economic growth and tourism specialization is different in each sample grouped on the basis of three macroeconomic variables, namely the degree of trade openness, investment share to GDP, and government consumption as a percentage of GDP. Second, the nonlinear relationship between economic growth and tourism specialization is examined through two powerful methods, namely the panel threshold model of Hansen (Hansen, 1999) and instrumental variable (IV) estimation of a threshold model of Caner and Hansen (Caner & Hansen, 2004). These two models are used to deal with the potential endogeneity of the level of tourism specialization in empirical growth regressions.

The remainder of the study is organized as follows: Section 2 presents a literature review, Section 3 describes the growth model, Section 4 describes the data, Section 5 presents the empirical specification and methodology, Section 6 reports the empirical results from the panel threshold and IV threshold models, Section 7 gives some concluding remarks.

3.2 Literature Review

In the economic growth literature, tourism's contribution to economic development has been well documented, and is important from a policy perspective. There are two main steams of thought stemming from the Export-Led Growth (ELG) hypothesis. The strong association between tourism and economic growth is often attributed to two main economic channels. Nowak et al. explained the so called "two-gap" hypothesis, whereby tourism export promotion permits accumulation of foreign exchange that can be used to import essential inputs and capital goods not produced domestically. This can, in turn, be used to expand the host nation's production possibilities, which is generally known as Tourism Capital Imports to Growth (TKIG) (Nowak, Sahli, & Cortés-Jiménez, 2007). The importance of the two-link chain between tourism and growth through imports of capital goods has typically not been well explored in previous empirical research.

Second, the influence of tourism activities can generate additional demand of goods and services, incomes and new employment opportunities. The direct effect of increasing international tourism promotes economic growth as a non-traditional export, which is known as the Tourism-Led-Growth (TLG) hypothesis. Balaguer and Cantavella-Jordá were the first to consider this concept. International tourism can be treated as either a non-traditional export which implies a source of receipts, or as a potential strategic factor to development and economic growth (Balaguer & Cantavella-Jordá, 2002). The empirical literature on a reciprocal causal relationship between tourism and economic development may be considered in several classifications, depending on the techniques applied. Most historical studies have been based on various econometric techniques, such as causality testing, application of the cointegration and error correction models, and relying mainly on regional analysis. Various results might be obtained according to the method used, period analyzed, and the variables selected.

Empirical research which demonstrates that tourism is considered as a main factor in economic growth include the studies of Balaguer and Cantavella-Jordá for Spain (Balaguer & Cantavella-Jorda, 2004; Balaguer & Cantavella-Jordá, 2002), Dritsakis for Greece (Dritsakis, 2004), Durbarry for Mauritius (Durbarry, 2004), Gunduz and Hatemi for Turkey (Gunduz & Hatemi-J, 2005), Oh for Korea (Oh, 2005), Kim et al. for Taiwan (Kim, Chen, & Jang, 2006), Louca for Cyprus (Louca, 2006), Brida et al. for Mexico (Brida, Carrera, & Risso, 2008), Ishikawa and Fukushige for the Amami Islands in Japan (Ishikawa & Fukushige, 2007), Gani for some South Pacific islands (Gani, 1998), Cortés-Jiménez for Spanish and Italian regions (Cortés-Jiménez, 2008), and Cortes-Jimenez and Pulina for Spain and Italy

(Cortes-Jimenez & Pulina, 2010). It is worth mentioning that Durbarry (2004) is innovative when considering tourism as one type of export. This study, which was inspired by the Export-Led Growth (ELG) hypothesis, attempted to verify both the ELG and TLG hypotheses for Mauritius. The relationship between disaggregated exports, including international tourism, and economic growth is investigated through a production function, where economic growth is explained by physical and human capital, and is compatible with the new growth theory (Durbarry, 2004).

Several recent studies have delved deeper into cross-sectional analysis. Eugenio-Martín et al. investigated the impact of the tourism industry on economic growth and development in seventeen Latin American countries within the framework of the conventional neoclassical growth model, from 1995 to 2004. The empirical results show that revenues from the tourism industry made a positive contribution to the current level of GDP and economic growth of LACs (Eugenio-Martín, Morales, & Scarpa, 2004). Sequeria and Campos used tourism receipts as a percentage of exports and as a percentage of GDP as proxy variables for tourism. A sample of 509 observations from 1980 to 1999 was divided into several smaller subsets of data. Their results from pooled OLS, random effects and fixed effects models showed that growth in tourism was associated with economic growth only in African countries. A negative relationship was found between tourism and economic growth in Latin American countries, and in the countries with specialization in tourism. However, they did not find any evidence of a significant relationship between tourism and economic growth in the remainder of the groups (Sequeira & Campos, 2007)

Lee and Chang applied the heterogeneous panel cointegration technique to investigate the long-run comovements and causal relationships between tourism development and economic growth for OECD and non-OECD countries for the 1990-2002 period. A cointegrated relationship between GDP and tourism development was substantiated. Furthermore, the panel causality test provided an unidirectional causality relationship from tourism development to economic growth in OECD countries, and bidirectional relationships in non-OECD countries (Lee & Chang, 2008).

Regarding previous research on the importance of tourism as a significant growth-enhancing factor, there is a general agreement on the association between tourism and economic growth, but no consensus on a causal link between them. In other words, evidence regarding whether tourism actually causes economic growth remains contentious and inconclusive. Testing the validity of two hypotheses stemming from the Export-Led Growth (ELG) hypothesis has been a major concern in previous empirical tourism studies. However, investigation of the empirical tourism and growth relationship supported by either the Tourism Capital Imports to Growth (TKIG) or Tourism-Led-Growth (TLG) hypothesis deserves greater attention.

Several studies have examined empirically the "aggregate relationship" between tourism and economic growth, with the implicit assumption that tourism uniformly affects economic growth. Although such research sheds light on an even better understanding of the empirical relationship between tourism and economic growth, it is worth considering whether there are differences in the contingent effect in the tourism-economic growth linkage across countries. It is highly probable that the tourism-economic growth relationship involves heterogeneity. Specifically, the relationship between tourism and economic growth is contingent in nature, involving nonlinearity and threshold effects. That is, tourism affects economic growth differently given different levels of conditional factors.

There have been few studies which have examined the tourism and economic growth relationship. Differences in comparative advantage in a less productive sector, such as tourism, might lead the country to grow at a different rate. For example, Lanza and Pigliaru used an analytical framework based on Lucas's two-sector endogenous growth model, in which the growth-effect of different specialization can easily be compared. Based on their work, the model pointed to an important reason as to why tourism specialization is not harmful to growth. They noticed that countries with relatively high tourism specialization are likely to grow fast, and are generally small. Moreover, their analysis suggested that what matters for explaining specialization in tourism is a country's relative endowment of the natural resources, rather than its absolute size. Therefore, countries with relative abundance of a natural resource will be more specialized in tourism, and are likely to grow faster (Lanza & Pigliaru, 2000).

Brau et al. investigated the relative economic performance of countries that have specialized in tourism, from 1980 to 2003. Tourism specialization and small countries are defined simply as the ratio of international tourism receipts to GDP and to countries with an average population of less than one million, during 1980-2003. They found that tourism could be a growth-enhancing factor for small countries, which are likely to grow faster only when they are highly specialized in tourism. Although the study considered the heterogeneity among countries in terms of the degree of tourism specialization and country size, the threshold variables were not based on any selection criteria. It would be preferable to use selection criteria to separate the whole sample into different subsets in which tourism may significantly affect economic growth (Rinaldo Brau, Lanza, & Pigliaru, 2007).

Algieri analyzed the linkages between economic growth and tourism-based economies. The results showed that tourism can be a significant engine of economic growth when the elasticity of substitution between manufacturing goods and tourism services is less than 1. There are two stylized facts: (1) countries that specialized in tourism register good economic performance; (2) these same countries have small dimensions, as defined by international trade theory (Algieri, 2006). Po and Huang use cross-section data (1995-2005 yearly averages) for 88 countries to investigate the nonlinear relationship between tourism development and economic growth when the degree of tourism specialization (defined as receipts from international tourism as a percentage of GDP) is used as the threshold variable. The results of the nonlinear threshold model indicate that data for 88 countries should be divided into three regimes to analyze the tourism-growth nexus. The results of the threshold regression show that a significantly positive relationship between tourism and economic growth is found only in the low and high regimes. However, the potential endogeneity is not taken into account in their economic growth regression (Po & Huang, 2008).

Arezki et al. quantified the relationship between tourism specialization and growth while correcting for endogeneity by using the instrumental variables technique (IV) for a cross-section of up to 127 countries, over the period 1980 to 2002. The instrument for tourism is the number of UNESCO sites per 100,000 inhabitants in 2002. They showed that the gains from tourism specialization can be significant, and that the result holds against a large array of robustness checks (Arezki, Cherif, & Piotrowski, 2009). Adamou and Clerides investigated the relationship between tourism and specialization, and economic growth. It was found that tourism specialization is associated with higher rates of economic growth at relatively low levels of specialization. The contribution of tourism will become minimal at high levels of specialization, and tourism can even become a hindrance to further growth (Adamou & Clerides, 2010). Finally, Figini and Vici provided an empirical assessment of the relationship between tourism specialization and economic growth. They found that tourism-based countries did not grow at a higher rate than non-tourism based countries, except for the 1980-1990 period (Figini & Vici, 2010).

Thus, the influence of tourism specialization on economic growth has received great attention in recent studies. Furthermore, the existence of nonlinearity and threshold effects has been increasingly recognized as critical issues for tourism and economic growth, with a more complex and heterogeneous relationship. In this study nonlinearity and threshold effects is identified in the tourism specialization and economic growth relationship, conditional on the degree of trade openness, investment share to GDP, and government consumption expenditure as a percent of GDP. To the best of our knowledge, there has not been any analysis that identifies the existence of threshold effects of tourism specialization on economic growth, with a correction for potential endogeneity.

Unlike previous studies, this study uses endogenous threshold regression analysis rather than arbitrarily assuming a cut-off point. The endogenous threshold regression technique has advantages over traditional approaches. First, it does not require any specific functional form for nonlinearity. Second, the number and cut-off points are endogenously determined by the data. Finally, it provides an asymptotic distribution theory to construct confidence intervals for the estimated parameters.

These econometric techniques are more appropriate to this study because endogenous sample splitting leads to the heterogeneous nature of countries in the sample. Furthermore, special attention is given to identify the relationship between tourism specialization, with different possible threshold variables which are highly related to tourism specialization.

Recognition of the existence of the heterogeneity in the tourism specialization and economic growth relationship gives the important implications for the development of tourism, trade and relevant macroeconomic policy. Tourism specialization's contribution to economic growth exhibits either increasing or diminishing rate after reaching a certain threshold. The findings could provide the useful guidance for economy's resource allocation. For example, if it is found that the contribution of tourism specialization to economic growth turns to be less as the country being at high level of specialization, reallocation the resources in tourism sector to other high potential economic sectors leads countries to be better off. Moreover, the countries should closely monitor the level of three important key variables, which are degree of trade openness, investment share to GDP and the government consumption expenditure as a percent of GDP, to be at the appropriate level in order to ensure that the extent of tourism specialization's contribution will not be less significant to their economy beyond some certain levels of such factors.

The Growth Model

This study assesses the determinants of growth, where the focus is on the role of tourism specialization based upon the Cobb-Douglas production function within the neoclassical framework. The augmented version of the Solow-Swan neoclassical growth model, developed by Mankiw, Romer and Weil, hereafter MRW, is of interest (Mankiw, Romer, & Weil, 1992). Adopting the MRW neoclassical approach has one advantage in which a simple theoretical framework for empirical growth regression is explicitly derived. Hence, following the MRW framework is a foundation for empirical works on economic growth.

Although the Solow model, in which the rates of saving and population growth are taken as exogenous, accurately predicts the direction of the effects of saving and population growth, the magnitude of such effects is too large. MRW extended the Solow model by considering a broader measure of the capital stock that includes both human and physical capital, in which both are augmented by investment of a fraction of GDP, while maintaining the assumptions of exogenous technological progress and diminishing returns to all capital. The exclusion of human capital from the Solow model can potentially explain why the estimated influences of saving and population growth appear too large. MRW gave two reasons regarding this point. They found that accumulation of human capital is, in fact, correlated with saving and population growth. Including human capital in an aggregate production function as a separate factor of production lowers the estimated effects of saving and population growth roughly to the value predicted by the augmented Solow model. This slows the rate of convergence to the steady state, thereby allowing the transitional dynamics to be more important in explaining differences in growth. However, the MRW model still suggests that when economies have reached their steady states, they will experience the same growth rates in output per worker; which is equal to the common exogenously determined rate of technological progress (Mankiw et al., 1992).

Including human capital can potentially alter not only the theoretical modeling, but also the empirical analysis of economic growth. At the theoretical level, properly accounting for human capital may change the nature of the growth process. At the empirical level, the existence of the human capital can alter the analysis of cross-country differences. Thus, the empirical results are likely to be biased from the omitted variable problem.

MRW start from a Cobb-Douglas production function with constant returns to scale:

$$Y_t = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \tag{1}$$

where *Y* is output, *K* is physical capital, *H* is human capital, *L* is labor supply and *A* is the level of technology.

MRW assume that investment rates in physical and human capital are constant at s_k and s_h respectively, and that both types of capital depreciate at a common rate δ. Technology grows at the same exogenous rate *g* across countries, while the labor force grows at differing rates *n*. The initial level of efficiency, *A(0)*, is assumed to vary randomly across countries and this can be used to justify the error term. In addition, $\alpha + \beta < 1$ is assumed to represent the decreasing returns to all capital.

The dynamic equations for *k* and *h* are given by

$$\dot{k}_t = s_k y_t - (n + g + \delta) k_t \tag{2}$$

$$\dot{h}_t = s_h y_t - (n + g + \delta) h_t \tag{3}$$

where $y = \frac{Y}{AL}$, $k = \frac{K}{AL}$, and $h = \frac{H}{AL}$ are the level of output per effective unit of labor, the stock of physical capital per effective unit of labor and the stock of human capital per effective unit of labor, respectively.

Equation (2) and (3) imply that k and h converge to their steady state values, k^* and h^*, defined by

$$k^* = \left(\frac{s_k^{1-\beta}\, s_h^{\beta}}{n+g+\delta}\right)^{1/(1-\alpha-\beta)}$$

$$h^* = \left(\frac{s_k^{\alpha}\, s_h^{1-\alpha}}{n+g+\delta}\right)^{1/(1-\alpha-\beta)} \qquad (4)$$

Substituting (4) into the production function and taking logarithm gives the following expression for steady state income per capita:

$$\ln\left(\frac{Y_t}{L_t}\right) = lnA(0) + gt - \frac{\alpha+\beta}{1-\alpha-\beta}\ln(n+g+\delta) + \frac{\alpha}{1-\alpha-\beta}\ln(s_k) + \frac{\beta}{1-\alpha-\beta}ln(s_h) \qquad (5)$$

This equation shows how income per capita depends on population growth and accumulation of physical and human capital. In empirical growth literature, the physical capital saving rate was approximately by the investment share in GDP, while the human capital is essentially a linear function of the rate of secondary school enrolment. Nonetheless, there is an alternative way to express the role of human capital in determining income in this model. Combining (5) with the equation for the steady-state level of human capital given in (4) yields an equation for income as a function of the rate of investment in physical capital, the rate of population growth, and the *level* of human capital:

$$\ln\left(\frac{Y_t}{L_t}\right) = lnA(0) + gt - \frac{\alpha}{1-\alpha}\ln(n+g+\delta) + \frac{\alpha}{1-\alpha}\ln(s_k) + \frac{\beta}{1-\alpha}ln(h^*) \qquad (6)$$

Equation (5) and (6) are almost identical except that the level of human capital is a component of the error term in (5). Because the saving rate and population growth rates influence h^*, human capital should be expected to be positively correlated with the saving rate and negatively correlated with population growth. The model with human capital provides two possible ways to estimate the steady-state of income per capita. One can choose either (5) or (6) depending on whether the available data on human capital correspond more closely to the rate of accumulation (s_h) or to the level of human capital (h).

After developing and testing the augmented Solow model, MRW examined the dynamics of the economy when it is not in steady state. Let y^* be the steady state level of income per effective worker given by equation (5), and let y_t be the actual value at time *t*. Approximating around the steady state, the pace of convergence is given by

$$\frac{dln(y_t)}{dt} = \lambda[\ln(y^*) - ln(y_t)] \tag{7}$$

where $\lambda = (n + g + \delta)(1 - \alpha - \beta)$

The model suggests a natural regression to study the rate of convergence. Equation (7) implies that,

$$ln(y_t) = (1 - e^{-\lambda\tau})\ln(y^*) + e^{-\lambda\tau}ln(y_{t0}) \tag{8}$$

where y_{t0} is income per effective worker at some initial point of time and $\tau = t - t_{t0}$.

Subtracting $ln(y_{t0})$ from both sides so as to obtain a partial adjustment process,

$$ln(y_t) - ln(y_{t0}) = \left(1 - e^{-\lambda\tau}\right)\ln(y^*) - \left(1 - e^{-\lambda\tau}\right)ln(y_{t0}) \tag{9}$$

Equation (9) can be rearranged as follows:

$$ln(y_t) - ln(y_{t0}) = \left(1 - e^{-\lambda\tau}\right)[\ln(y^*) - ln(y_{t0})] \tag{10}$$

Let $\theta = \left(1 - e^{-\lambda\tau}\right)$ and substitute $\ln(y^{*})$ with equation (5):

$$\ln(y_t) - \ln(y_{t0})$$

$$= \theta lnA(0) + gt - \theta\frac{\alpha + \beta}{1 - \alpha - \beta}\ln(n + g + \delta) + \theta\frac{\alpha}{1 - \alpha - \beta}\ln(s_k)$$

$$+\theta\frac{\beta}{1-\alpha-\beta}ln(s_h) - \theta\ln(y_{t0}) \qquad (11)$$

It is obviously that in the augmented Solow model or MRW model the growth of income is a function of the determinants of the ultimate steady state and the initial level of income. The negative coefficient of the initial income implies the convergence process. In contrast to endogenous growth models, the MRW model predicts that countries with similar technologies and rate of accumulation and population growth should converge in income per capita. Yet this convergence occurs more slowly than the Solow model suggests.

Equation (11) can be expressed in the form of panel specification as $\theta lnA(0)$ is treated as time-invariant individual country-effect term and *gt* is as the time specific effect. Islam (1995) noted that equation (11) was based on approximation around the steady state and was supposed to capture the dynamic toward the steady state. If the character of getting close to the steady state of convergence process remains unchanged over the period as a whole, then considering that process in consecutive shorter time interval should reflect the same dynamic process as well.

As noted in Temple (1999), in the absence of a suitable proxy for technical efficiency, A, the only way to obtain consistent estimates of a conditional convergence regression is to use panel data methods, as it fundamentally allows one to control for the effects of omitted variables that persist over time. By moving to a panel data framework, at least unobserved heterogeneity in the initial level of efficiency can be controlled. Moreover, several lags of the regressors can be used as instruments, where required, which can alleviate measurement error and endogeneity biases. The panel specification of growth model is generally expressed as follows:

$$g_{it} = \alpha y_{i,t-1} + \beta X_{it} + \eta_t + \mu_i + \upsilon_{it} \quad (12)$$

where g_{it} is the average growth rate of income per effective worker over shorter time interval which is normally 5-year or 10-year average. $y_{i,t-1}$ is an initial level of income per effective worker (5-year average of income per effective worker from the previous period). X_{it} is a vector of control variables. μ_i is a country specific effect. η_t is time specific effect, υ_{it} is transitory error term that varies across countries and time period (a serially uncorrelated measurement error), sub-index i denotes different country, and sub-index t refers to different time periods (Temple, 1999).

3.3 Data

The countries in the sample were selected based on data availability. Tourism data cause the main constraint in this study. Subject to such criteria, 159 countries are used in the sample, as given in Table 3.2. Annual data from 1989 to 2008 for 159 countries and 20 annual observations were organized in a five-year averaged panel data format in order to smooth out business cycle fluctuations and the effects of particular events. The empirical literature on economic growth usually emphasizes the reduction in measurement errors, as well as avoiding problems associated with missing observations in a specific year for a country in the sample. There are four periods, namely 1989-1993, 1994-1998, 1999-2003, and 2004-2008, in which the procedure of directly averaging the values of the variables has been taken. In addition to a broad panel of 159 countries, a pure cross-section averaged over the same period is organized in order to identify the threshold effects in the tourism specialization and growth relationship through a cross-sectional instrument variable (IV) threshold approach.

Economic growth is specified using the growth rates of three different GDP measurements, namely real GDP chain per worker (rgdpwok), real GDP chain per capita (rgdpch), and real GDP per capita (Constant Prices: Chain series), and real GDP Laspeyres per capita (rgdpl) or real GDP per capita (Constant Prices: Laspeyres), derived from the growth rates of c, g and i. These variables are obtained from the Penn World Tables version 6.3, which is available online at the Center for International Comparisons of Production, Income and Prices, University of Pennsylvania (Heston, Summers, & Aten, 2009). Initial income is defined as the 5-year average of real GDP per capita in the previous period in the case of panel threshold analysis, and as the real GDP per capita in the initial year (1989) in the case of cross-sectional instrumental variable threshold analysis. This variable is used to capture the convergence process in the economic growth model.

The physical investment variable comes from the investment share of real GDP per capita (ki); population (POP), and openness in current prices (OPENK), which is total trade (the value of exports plus imports) as a percentage of GDP, and is used as a proxy for the trade openness variable. These are also obtained from the Penn World Tables version 6.3. Public expenditure in education is used as a proxy for human capital, government consumption as a percentage of GDP, surface area (sq. km), and three tourism specialization variables, tourist arrivals, and tourism receipts as a share of exports of goods and services, tourism receipts as a share of exports of

GDP, as an indication of the degree of tourism specialization, are obtained from the World Bank's World Development Indicators (WDI) database (World Bank, 2009).

For the institutional variables, they are obtained from the "Worldwide Governance Indicators (WGI) project" for 1996-2008 from the World Bank (World Bank Institute, 2009). It consists of six different indicators of institutional quality referring to six dimensions of governance, namely voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. These indicators are available biannually since 1996, and annually since 2002. In this study, the first available data (that is, 1996) are used for the values in the initial 5-year averaged period (1989-1993).

The descriptions for all six institutional variables are as follows (World Bank Institute, 2009);

(1) Voice and accountability: captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

(2) Political stability and absence of violence: captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.

(3) Government effectiveness: captures perceptions of the quality of public services, the quality of the civil service and the degree of interdependence from political pressures, the quality of policy formation and implementation, and the credibility of the government's commitment to such policies.

(4) Regulatory quality: captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

(5) Rule of law: captures perceptions of the extent to which agents have confidence in and abide by the rules of society and, in particular, the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence.

(6) Control of corruption: captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the impact on the state by the elite and private interests.

The UNESCO World Heritage List (WHL) per country is obtained from an official website of UNESCO (http://whc.unesco.org/en/list). The World Heritage List includes 890 properties forming part of the cultural and natural heritage, which the World Heritage Committee considers as having outstanding universal value. This includes 689 cultural, 176 natural and 25 mixed properties in 148 States Parties. As of April 2009, 186 States Parties had ratified the World Heritage Convention (UNESCO, 2009). The details of the variables and data sources are provided in Table 3.3.

3.4 Methodology

Panel Threshold Model

The main purpose of this section is to use a threshold variable to investigate whether the relationship between tourism specialization and economic growth is different in each sample grouped on the basis of certain thresholds. This is to determine if the existence of threshold effects between two variables is different from the traditional approach, in which the threshold level is determined exogenously. If the threshold level is chosen arbitrarily, or is not determined within an empirical model, it is not possible to derive confidence intervals for the chosen threshold. The robustness of the results from the conventional approach is likely to be sensitive to the level of the threshold. The econometric estimator generated on the basis of exogenous sample splitting may also pose serious inferential problems (for further details, see (Hansen, 1999, 2000)).

The critical advantages of the endogenous threshold regression technique over the traditional approach are as follows: (1) it does not require any specified functional form of non-linearity, and the number and location of thresholds are endogenously determined by the data; and (2) asymptotic theory applies, which can be used to construct appropriate confidence intervals. A bootstrap method to assess the statistical significance of the threshold effect is also available in order to test the null hypothesis of a linear formulation against a threshold alternative.

For the reasons given above, the panel threshold regression method developed by Hansen (1999) is employed to search for multiple regimes, and to test the threshold effect in the tourism specialization and economic growth relationship within a 5-year panel data set. The possibility of endogenous sample separation, rather than imposing a priori an arbitrary classification scheme and the estimation of a threshold level, are allowed in the model. If a relationship exists between these two variables, the threshold model can identify the threshold level and permit testing of such a relationship over different regimes categorized by the threshold variable (Hansen, 1999).

Although the Hansen (2000) approach is commonly used in cross-sectional analysis, it can also be extended to a fixed effect panel, provided that no endogenous problem exists. Specifically, the method requires that all explanatory variables are exogenous (Hansen, 2000). In some circumstances, especially in empirical growth models, the key variables for economic growth are likely to be endogenous. In an economic model, a variable is endogenous when there is a correlation between the variable and the error term. Endogeneity can arise as a result of measurement error, autoregression with auto correlated errors, simultaneity, omitted variables, and sample selection errors. The problem of endogeneity occurs when one or more regressors are correlated with the error term in a regression model, which implies that the regression coefficient in an OLS regression is biased. Thus, the Hansen (2000) approach will no longer be applicable. In order to overcome the endogeneity problem, instrumental variable estimation of the cross-sectional threshold model introduced by Caner and Hansen (2004) is also used (Caner & Hansen, 2004).

Hansen (1999) developed econometric techniques appropriate for threshold regression with a panel data. Allowing for fixed individual effects, the panel threshold model divides the observations into two or more regimes, depending on whether each observation is above or below a threshold level. The observed data are from a balanced panel $(y_{it,} q_{it}, x_{it}: 1 \leq i \leq n, 1 \leq t \leq T)$. The subscript i indexes the individual and t indexes time. The dependent variable, $y_{it,}$, is scalar, the threshold variable q_{it} is scalar, and the regressor x_{it} is a k vector. The structural equation of interest is

$$y_{it} = \mu_i + \beta_1' x_{it} I(q_{it} \leq \gamma) + \beta_2' x_{it} I(q_{it} > \gamma) + e_{it} \tag{13}$$

where $I(\cdot)$ is an indicator function.

The observations are divided into two regimes, depending on whether the threshold variable, q_{it}, is smaller or larger than the threshold, γ. The regimes are distinguished by different regression slopes, β_1 and β_2. For the identification of β_1 and β_2, it is necessary that the elements of x_{it} are not time-invariant. The threshold variable, q_{it}, is not time invariant. μ_i is the fixed individual effect, and the error e_{it} is assumed to be independently and identically distributed (iid), with mean zero and finite variance σ^2 (Hansen, 1999).

The threshold value (γ) is estimated using the least squares method developed by Hansen (2000). A bootstrap procedure is used to obtain approximate critical values of the test statistics which allows one to perform the hypothesis test for the threshold effect. If the bootstrap estimate of the asymptotic p-value is smaller than the desire critical value, then the null hypothesis of no threshold effect is rejected. After a threshold value is found, the confidence intervals for the threshold value and slope coefficients are then estimated. A similar procedure can also be conducted to deal with the case of multiple thresholds. The possibility of existence of more than one threshold represents another advantage of this method over the traditional approach (Hansen, 1999, 2000). The focus in this study is to assess the role of tourism specialization on economic growth. The economic growth regression based on the neoclassical growth model described in the previous session is augmented with the tourism specialization variables in order to investigate empirically the relationship between tourism specialization and economic growth varies across subsamples grouped on the basis of various threshold variables. The empirical specification of the economic growth regression, with tourism specialization within the panel threshold model framework, is represented as follows:

$$g_{it} = \delta_1 Tour_{it} I(q_{it} \leq \gamma) + \delta_2 Tour_{it} I(q_{it} > \gamma) + \beta X_{it} + \mu_i + \eta_t + \upsilon_{it} \qquad (14)$$

where $I(\cdot)$ is the indicator function;

g_{it} is the growth rate of real GDP chain per worker (rgdpwok). The different definitions for income, namely real GDP chain per capita (rgdpch) and real GDP Laspeyres per capita (rgdpl) is also used to check whether the result is robust to the different specifications of the real GDP growth rate;

$Tour_{it}$ is the tourism specialization variable that is widely used as a proxy for the influence of international tourism in most empirical tourism studies. There are several alternatives to measure the volume of tourism specialization discussed by Gunduz and Hatemi (Gunduz & Hatemi-J, 2005). One is tourism receipts, which is the volume of earnings generated by foreign visitors, a second is the number of nights spent by visitors from abroad, and a third is the number of tourist arrivals. Depending on the availability of data for most countries in the sample, the second cannot be considered. As a result, three measures of tourism specialization are used to check whether the impact on economic growth is sensitive to different specifications of tourism measurement.

The selected tourism specialization variables are as follows (Sequeira & Campos, 2007):

(1) tourist arrivals as population proportion (TA);

(2) tourism receipts as a share of exports of goods and services (TRE);

(3) tourism receipts as a share of real GDP (TRG).

q_{it} is the threshold variable used to examine whether tourism specialization plays a different role in the growth process due to the differing regimes endogenously categorized by three criteria, namely degree of trade openness ($Trade_{it}$), investment share to GDP (K_{it}), and the government consumption expenditure as a percent of GDP (Gov_{it}). These threshold variables are highly related to international tourism policies. Specifically, the degree of trade openness could be used to capture the relevance of a country to international trade. Clearly, international tourism and international trade are two major sources of foreign currency for small, as well as larger economies. Trade openness is considered as the criteria to verify whether the impact of tourism specialization on economic growth differs across regimes. The investment share to GDP is also used as a threshold variable as investment is an important factor to support tourism expansion. The extent of government consumption involvement in the economy represents government-induced distortions. In this study, whether the impact of tourism specialization at different levels of government-induced distortions is different across countries are under consideration.

X_{it} represents the vector of other explanatory variables and control variables which are:

$y_{i,t-1}$ is the 5-year average of real GDP chain per worker for panel threshold analysis (and real GDP chain per capita and real GDP Laspeyres per capita, depending on which specification is used as the dependent variable) from the previous period, which is used to capture the convergence process. It is also defined as the real GDP chain per worker (or real GDP chain per capita and real GDP Laspeyres per capita) in the initial year (1989) for instrumental variable threshold analysis (a negative sign is expected);

K_{it} is the investment share of real GDP per capita, which is used as a proxy for physical capital investment (a positive sign is expected);

H_{it} is the stock of human capital (currently, a common proxy is the average years of schooling in the population, but there might be a problem with this proxy due to excluding the quality of education: omitting the quality may decrease human capital accumulation, and bias the results, so an alternative proxy for human capital, which is public spending on education as a percentage of GDP, is used and can be used to capture the quality of education as well as human capital investment);

n_{it} is the population growth rate (a negative sign is expected);

$Trade_{it}$ is trade openness in constant prices, which is used to measure the impact of openness of the economy in its growth performance, and is consistent with the current emphasis on the export-led growth hypothesis (a positive sign is expected);

Gov_{it} is the ratio of government consumption to GDP, which measures the extent of government involvement in the economy, and can also capture the effects of distortions induced by government);

The six institutional variables used in the model are as follows:

(1) Acc_{it} is an indicator of voice and accountability;

(2) Pol_{it} is an indicator of political stability and absence of violence;

(3) Eff_{it} is an indicator of government effectiveness;

(4) Reg_{it} is an indicator of regulatory quality;

(5) Law_{it} is an indicator of the rule of law;

(6) Cor_{it} is an indicator of the control of corruption.

The inclusion of institutional variables in empirical growth studies has recently been taken into consideration because the quality of institutions is regarded as a pre-condition to exploit natural and/or historical endowments which tourism development relies on (Rinaldo Brau, Liberto, & Pigliaru, 2009); moreover, the inclusion of such an important explanatory variable identifies a further possible channel whereby tourism specialization could affect economic growth through institutions (a positive impact is expected);

μ_i is the individual (country) effect, η_t is a time effect, and υ_{it} is independently and identically distributed across countries and years.

Instrumental Variables (IV) Threshold Model

Next, the Instrumental Variable (IV) threshold model developed by Caner and Hansen (2004) is briefly introduced. This approach is carried out with the pure cross-sectional data averaged over 1989-2008, such that there is one observation per country.

The observed sample is $\{y_i, z_i, x_i\}_{i=1}^{n}$, where y_i is real valued, z_i is a m-vector, and x_i is a k-vector, with $k \geq m$. The threshold variable,$q_i = q(x_t)$, is an element or a function of the vector x_i, and must have a continuous distribution. The data are either a random sample or a weakly dependent time series, so that unit roots and stochastic trends are excluded (Caner & Hansen, 2004).

The structural equation of interest is

$$y_i = \theta_1' z_i + e_i, \qquad q_i \leq \gamma$$
$$y_i = \theta_2' z_i + e_i, \qquad q_i > \gamma$$

which may also be written in the form

$$y_i = \theta_1' z_i I \cdot (q_i \leq \gamma) + \theta_2' z_i I \cdot (q_i > \gamma) + e_i \tag{15}$$

The threshold parameter is $\gamma \epsilon \Gamma$, where Γ is a strict subset of the support of q_i. This parameter is assumed to be unknown and is to be estimated.

The reduced form is a model of the conditional expectation of z_i, given x_i:

$$z_i = g(x_i, \pi) + \mu_i$$
$$E(\mu_i | x_i) = 0$$

where $(x_i, \pi) = \pi_1' x_i I \cdot (q_i \leq \rho) + \pi_2' x_i I \cdot (q_i > \rho) + e_i$

The parameter π is unknown. The reduced form threshold parameter, ρ, may equal the threshold, γ, in the structural equation, but this is not necessary, and this restriction will not be used in estimation. Caner and Hansen (2004) estimate the parameter sequentially. First, they estimate the reduced form parameter π by OLS. Second, they estimate the threshold, γ, using predicted values of the endogenous variable, z_i. Third, the slope parameters, θ_1 and θ_2, are estimated by 2SLS or GMM on the split samples implied by the estimate of γ (Caner & Hansen, 2004).

It is widely perceived that the effect of tourism specialization on economic growth gives rise to the possibility of both endogeneity and thereby a reverse relationship. Unobservable variables such as managerial skills that are crucial inputs in tourism activities, could directly explain both high economic growth and a high level of tourism specialization. Moreover, security and health issues, such as political stability, criminality and malaria, are detrimental to both tourism and growth (Arezki et al., 2009). The instrumental variable estimation of a threshold model proposed by Caner and Hansen (2004) is then applied to avoid the endogeneity problem and to investigate the threshold effect of tourism specialization on economic growth. The IV threshold regression takes the form:

$$g_i = (\alpha_1 Tour_i + \beta_1 X_i)I \cdot (q_i \leq \gamma) + (\alpha_2 Tour_i + \beta_2 X_i)I \cdot (q_i > \gamma) + \mu_i \quad (16)$$

$$Tour_i = (\delta_1 Unesco_i + \theta_1 X_i)I \cdot (q_i \leq \gamma) + (\delta_2 Unesco_i + \theta_2 X_i)I \cdot (q_i > \gamma) + \nu_i \quad (17)$$

where $I\,(\cdot)$ is the indicator function, X_i is the vector of keys variables which are y_{1989}, K_i, H_i, n_i, $Trade_i$, Gov_i, Acc_i, Pol_i, Eff_i, Reg_i, Law_i, Cor_i, and q_i is the threshold variable, which is also contained in X_i, namely investment share to GDP (K_i), degree of trade openness ($Trade_i$), and the level of government consumption (Gov_i), $Unesco_i$ is the number of the UNESCO World Heritage List per surface area, which is an instrumental variable, γ is the threshold value, and α_1, β_1 and α_2, β_2 are two sets of slope parameters corresponding to the low and high regimes, respectively.

Equation (17) is estimated using OLS by substituting the fitted values of the endogenous variable, $Tour_i$, into (16). Then the threshold parameter, γ, is estimated using OLS. Finally, the slope coefficients are estimated using GMM on the split samples.

3.5 Empirical Results

The main objective is to investigate the threshold effect of tourism specialization on economic growth by applying endogenous threshold regression techniques rather than arbitrarily assuming cut-off points through a theoretical specification within the panel and cross-sectional growth regression frameworks. In both frameworks, three key variables as threshold variables for tourism specialization and growth relationship are selected. Specifically, the selected threshold variables are the degree of trade openness, investment share to GDP, and the government consumption expenditure as a percentage of GDP.

The robustness of the tourism specialization and growth relationships is checked by using different definitions of tourism specialization and the growth rate of real GDP per capita. Three tourism specialization definitions are used to quantify the impact of international tourism specialization on economic growth, namely tourist arrivals as a proportion of the population (TA), tourism receipts as a share of exports of goods and services (TRE), and tourism receipts as a share of real GDP (TRG). Various measurements of real GDP per capita, namely growth rate of real GDP chain per capita (rgdpch), growth rate of real GDP chain per worker (rgdpwok), and growth rate of real GDP (Laspeyres) per capita (rgdpl), which are obtained from the Penn World Table 6.3 (PWT) is also used.

Results from panel threshold regression

The descriptive statistics for the variables used in the 5-year panel threshold model are reported in Table 3.4. The panel threshold analysis is first conducted, in which the slope estimates of the tourism specialization variables switch between regimes over different thresholds. The other variables are omitted as their coefficients do not change significantly from the linear specification model. Any results discussed in this section but not presented are available from the authors upon request.

Before estimating the threshold regression model, the existence of a threshold effect between economic growth and tourism specialization is tested. This study uses the bootstrap method to approximate the F statistic, and then calculates the bootstrap p-value. The results are estimated over three economic growth specifications, with three different tourism specialization measures over three possible thresholds. The test statistic for a single threshold is significant for all models, while the test statistics for double and triple thresholds are insignificant. Thus, one may conclude that there is strong evidence that there is a single threshold in the relationship between economic growth and tourism specialization within the 5-year panel data context. Given a single threshold effect between economic growth and tourism specialization, the whole sample is split into two regimes, where three variables, namely degree of trade openness, investment share to GDP and government consumption as a percentage of GDP, are used as the threshold variables. When a threshold is found, a simple regression can be used to yield consistent estimates.

Results from IV threshold regression

In order to examine the contribution of tourism specialization to economic growth with different thresholds and regimes, the potential endogeneity of the level of tourism specialization in the growth regression needs to be taken into account. Ignoring this issue can lead to biased estimates of the coefficient associated with tourism specialization in the growth regression, in which several explanatory variables are likely to be endogenous. Therefore, the instrumental variable estimation of an endogenous threshold model, as recently developed by Caner and Hansen (2004), is applied to the pure cross-sectional data averaged over 1989-2008. The possible threshold effect of tourism specialization on economic growth is estimated, while the endogeneity problem is mitigated. The estimator for the threshold value involves two stage least squares (2SLS), and the estimates of the slope parameters are obtained by using generalized method of moment (GMM). Following Arezki et al., the number of UNESCO sites for each country's surface area is used as the instrumental variable. [In their study, the instrument for tourism is the number of UNESCO sites per 100,000 inhabitants in the year 2002, kilometers of coastal area, and related interactions as additional instruments. They further test the robustness of the results by using different versions of the UNESCO World Heritage List, and the number of sites per surface area is also included in their analysis (Arezki et al., 2009).]

The descriptive statistics for the variables used in the cross-sectional IV threshold model are reported in Table 3.5. Tables 3.6-3.8 report the results from the IV threshold model. Three different growth specifications, with three alternative measures of degree of tourism specialization, as well as the set of control variables in the economic growth literature, are investigated in the threshold effect of tourism specialization on economic growth. The two regimes are based on different threshold variables, namely the degree of trade openness, investment share to GDP, and government consumption as a percentage of GDP. In contrast to the panel threshold analysis in the previous session, the slope coefficients of the tourism specialization variables, as well as other control variables, switch between regimes. Whether or not the coefficients of these key variables change between regimes after taking account of endogeneity in the cross-sectional regression is in a great concern.

Tables 3.6-3.8 show the results from three different definitions of the economic growth regressions, namely growth rate of real GDP chain per capita (rgdpch), growth rate of real GDP chain per worker (rgdpwok), and growth rate of real GDP (Laspeyres) per capita (rgdpl). The whole sample is grouped by the degree of trade openness, the investment share to GDP, and the ratio of government consumption to GDP. In each table, regressions (1a)-(1c) are growth regressions of rgdpch augmented with three tourism specialization variables, namely tourist arrivals as a proportion of population (TA), tourism receipts as a share of exports of goods and services (TRE), and tourism receipts as a share of real GDP (TRG), respectively. Regressions (2a)-(2c) and (3a)-(3c) are organized in the same manner for the rgdpwok and rgdpl growth regressions, respectively.

In Table 3.6, the threshold values for trade openness are as follows: 91.872 for the *rgdpch* per capita growth regression (model 1), where 97 countries have a smaller value and 62 countries have a larger value; 105.486 for the *rgdpwok* per capita growth regression (model 2), where 115 countries have a smaller value and 44 countries have a larger value; and 74.056 for the *rgdpl* per capita growth regression (model 3), where 74 countries have a smaller value and 85 countries have a larger value.

The relationship between tourism specialization and economic growth is found empirically. The coefficients associated with the tourism development variables range from 0.0145 to 0.029 in the lower trade openness regime, from 0.0051 to 0.00948 in the higher trade openness regime, and are significant across different growth rate specifications. These results suggest that tourism development has a positive growth-boosting effect on the open economy, though this contribution may not be sustained as the economy reaches very high trade openness. According to Brau et al., a group of states with a degree of tourism specialization greater than 8%, on average, over the period 1980-2004 is defined as tourism countries (Rinaldo Brau et al., 2009), the results here suggest that 33 countries can be characterized as "tourism countries". Most of these tourism specialized countries have a degree of trade openness higher than the estimated threshold value for trade openness, particularly the small tourism specialized countries. About 41.07% (or 34.92%) of countries with trade openness greater than 105.49% (or 91.87%) are tourism countries. In other words, several countries with a relatively high degree of tourism specialization (tourism country) generally involve a higher degree of trade openness, yet they have not been able to achieve the desired consequences of this particular characteristic of economic growth.

The results obtained by Adamou and Clerides are supportive in this respect. They find that specialization in tourism adds to a country's rate of economic growth, but it does so at a diminishing rate. This means that, at high levels of specialization the independent contribution of tourism specialization to economic growth becomes minimal, and tourism specialization can even become a hindrance to further growth (Adamou & Clerides, 2010). This interesting finding can be explained by the fact that the tourism destinations which have already achieved higher tourism specialization may import capital goods in order to support tourism expansion which, in turn, leads to a higher degree of trade openness. Furthermore, a sub-optimal use of natural resources of a country with relative endowment of natural resources might induce the country's loss of comparative advantage in tourism specialization with a lower contribution of tourism, and possibly also cause unsustainable economic growth in the long run.

The negative sign associated with initial income (the natural logarithm of real GDP per capita in 1989) supports the convergence hypothesis, some of which are significant. Regarding the influence of initial income on the growth rate, two estimation methods yield substantially different results. Such differences arise because initial income is measured differently based on alternative estimation methods. The initial income in a 5-year panel (a fixed effect panel), for instance, is defined as the 5-year average of income from the previous period. However, the initial income commonly used to check for convergence in the growth process in a pure cross-sectional analysis is income in the initial year. The difference in the coefficients of initial income in both methods emerges from differences in specification.

Trade openness provides evidence of the positive impact on economic growth. Note that the slightly greater magnitude is found in the higher-trade opening regime, which implies that the more open countries exert a powerful impact on economic prosperity. Investment share to GDP is found to be positive across all three models, but only a few are found to be statistically significant. The regressions also provide evidence of the negative impact of the population growth rate, the negative impact of government consumption, and the positive impact of six measures of institutional quality on economic growth. The coefficients of public investment in education for economic growth are found to be significantly positive for most regressions. This confirms that human capital plays a crucial role for economic growth, and that the inclusion of public expenditure in education in the economic growth regression is an accurate measure of human capital. The finding that human capital accumulation promotes economic growth is supported by several studies (see, for example, (Barro, 1991; Barro & Lee, 2001).

Differences in the coefficients of the key variables between regimes are of particular interest. It is observed that the coefficients of all variables in the low regime are similar in magnitude to those in the high regime for each corresponding economic growth specification. This empirical finding does not change as the threshold variable under consideration changes.

In Table 3.7, investment share to GDP is used as a threshold variable. The threshold values for the three growth specifications are similar. The threshold value for the *rgdpch* per capita growth regression (model 1) is 17.526, where 62 countries have a smaller value and 97 countries have a larger value; 13.1726 for the *rgdpwok* per capita growth regression (model 2), where 39 countries have a smaller value and 120 countries have a larger value; and 13.0743 for the *rgdpl* per capita growth regression (model 3), where 38 countries have a smaller value and 121 countries have a larger value. The estimates in each model are in line with the economic growth literature. Initial GDP has the expected negative coefficient, and the magnitude is similar to those obtained from Table 3.6. With respect to the sign of the other coefficients, trade openness, investment share to GDP, and institutional variables have a positive impact on economic growth, while population growth and government consumption have a negative impact. As in Table 3.6, public investment in education typically has a positive impact on economic growth. It is observed that the coefficients of all variables in the low regime are similar in magnitude to those in the high regime for each corresponding economic growth specification.

The impact of tourism specialization and economic growth seems consistent with the results in Table 3.6. The three tourism variables yield similar impacts on economic growth in each model. This implies that the impact of tourism specialization on economic growth is robust to the various specifications of tourism specialization. Although the significantly positive impact on economic growth is found, such impacts in different regimes are not the same. Tourism specialization has a slight effect on economic growth in the high-investment share countries, while the lower-investment share countries have a higher impact. The coefficients associated with the three tourism specialization variables range from 0.0129 to 0.025 for the low-investment share regime, and from 0.00402 to 0.0062 for the high-investment share regime. Examining the list of countries with the investment share to GDP is greater than the estimated threshold value, it is found that 23.71% (or 21.66%) of countries with investment share to GDP greater than 17.5268% (or 13.1726%), for example, are identified as "tourism countries".

The results from three different growth specifications with government consumption expenditure as a percent of GDP as a threshold variable, are reported in Table 3.8. The crucial role of tourism expansion has been quantified through three different growth regressions. The empirical evidence from most regressions (a)-(c) in each economic growth specification strongly confirms the significantly positive impact of tourism specialization and economic growth. Only a few regressions are insignificant. The estimates of all three tourism specialization effects range from 0.0175 to 0.0198 for the lower-government spending regime, and from 0.0044 to 0.00593 for the higher-government spending regime. All the tourism specialization variables used to measure the reliance of a country on tourism yield similar findings for each empirical growth model.

Overall, the sign of the coefficients of the common regressors for economic growth are consistent with those reported in the previous tables. Moreover, similar magnitudes of the coefficients of all the variables across the two regimes in each corresponding economic growth specification are observed. In addition, it is found that government consumption has a largely negative impact in the high-government spending regime, while the low-government spending regime experiences lower negative impact on economic growth. This finding is of interest in the government spending and economic growth relationship. Economic theory does not automatically generate strong conclusions about the impact of government outlays on economic performance. Indeed, there are circumstances in which lower levels of government spending might enhance economic growth and other circumstances in which higher levels of government spending would be desirable.

The "Rahn Curve" measures the relationship between different levels of government spending and economic performance. The growth-maximizing point on the Rahn Curve is the subject of considerable research. Experts generally conclude that this point is somewhere between 15%-20% of GDP, although it is possible that these estimates are too high since statistical studies are constrained by a lack of data for countries with limited governments (Larson, 2007). The threshold estimates for government spending in this case are 21.7132 for the *rgdpch* per capita growth regression (model 1), 17.6995 for the *rgdpwok* per capita growth regression (model 2), and 15.2363 for the *rgdpl* per capita growth regression (model 3). Therefore, countries in the high government-spending regime can be considered as countries where higher government spending leads to a lower growth performance.

3.6. Concluding Remarks

Tourism specialization has significant potential beneficial economic impacts on the overall economy of tourism destinations. This study investigated whether tourism specialization has the same impact on economic growth in countries that differ in their degree of trade openness, investment share to GDP, and government consumption as a percentage of GDP. In order to examine the contribution of tourism specialization to economic growth, the analysis is undertaken with different threshold variables and regimes through the panel threshold regression model of Hansen (2000) and IV threshold model of Caner and Hansen (2004). A 5-year averaged panel data set and a pure cross-sectional data set of 159 countries over the period 1989-2008 were used.

The results obtained from the panel threshold model showed that economic growth is boosted by means of trade openness, investment share, public investment in education, and institutional variables, while population growth and government consumption have negative effects. Initial income, trade openness, and public investment in education are significant in most regressions, and this remains unchanged as the threshold variable changes. However, the degree of influence of tourism specialization on economic growth in different regimes does not hold for several regressions or for different threshold variables. As a result, there is no consensus regarding whether tourism specialization has the same impact on economic growth for different values of the threshold variables.

The instrumental variable estimation of a threshold regression approach is applied to quantify the contributions of tourism specialization on economic growth, while correcting for endogeneity. The number of UNESCO World Heritage List per surface area is used as the instrumental variable. The results of the instrumental variable threshold estimation reveal that the estimates in each model are similar to those found in the economic growth literature. Initial GDP has the expected negative effect, implying the existence of conditional convergence in the economic growth process. Trade openness, investment share to GDP, and institutional variables have a positive impact on economic growth, while population growth and government consumption have a negative impact, and are insignificant in most regressions. Public investment in education typically has a positive impact on economic growth. It is observed that the coefficients of all variables in the low regime are similar in magnitude to those in the high regime for each corresponding economic growth specification. These empirical findings do not change as the threshold variable under consideration changes.

Focusing on the coefficients of tourism specialization, namely TA, TRE and TRG, the results for the three economic growth models indicate that there is a significant and positive relationship between tourism specialization and three economic growth specifications. The robustness of such a relationship is illustrated by the qualitatively unchanged direction of the coefficients associated with the tourism specialization variables. The significant impact of tourism specialization on economic growth in most regressions is robust to the different specifications of tourism specialization, as well as to the different real GDP measures. However, the coefficients of these tourism specialization variables in the two regimes are significantly different, with the higher impact of tourism specialization on economic growth found in the lower regime. These findings do not change as the threshold variables under consideration change.

Greater reliance on tourism through three tourism specialization definitions increases the economic growth rate, but relatively less than for countries in the lower-trade openness or lower-investment regimes. Countries with a higher degree of trade openness and investment are tourism countries. By listing countries with trade openness and investment share to GDP greater than the threshold values, about

41.07% with trade openness greater than 105.486%, and 23.71% with investment share to GDP greater than 17.5268%, are identified as "tourism countries". Moreover, as the threshold variable is changed to government consumption expenditure as a percentage of GDP, countries in the high government-spending regime can be considered as countries where the higher government spending leads to a lower growth performance.

Countries with a very high degree of trade openness and investment share to GDP are likely to experience lower benefits from tourism development on economic growth. This could be explained by the fact that the development of the tourism sector in these countries possibly relies on investment in fixed capital formation in order to provide the necessary supply of tourism. Furthermore, there is supporting evidence to suggest that many destinations, particularly emerging tourism countries, have attempted to overcome the lack of financial resources to speed up the process of tourism-specific infrastructure development. With limited opportunities for local public sector funding, these countries have been offered funding by international development organizations, or international companies, to make them more attractive as tourism destinations. Although foreign capital investment can generate extra income and growth from international tourist earnings for the host country, it can also generate greater leakages than domestic capital investment from local private and government sources. In addition to the leakages being remitted to the source of international funds, more imported goods may be used to support the tourism industry. As a result, these factors could cause the contribution of tourism specialization to GDP to be lower than expected.

On the other hand, countries with relatively low trade openness, investment share to GDP, and government consumption share to GDP, are possibly developed or developing, and their economies may not be so heavily dependent on the tourism sector. The overall value added, created in response to consumption in both tourism and other sectors of the economy, may be higher as a result of the involvement of the non-tourism or industrial sectors. Moreover, they might be able to develop other non-tourism sectors that could make a greater contribution to overall economic growth. The higher level of development of these host economies is a significant factor in achieving an economically favourable stage of tourism development.

In summary, tourism specialization does not always lead to substantial impacts on economic growth. If the economy is too heavily dependent on the tourism sector, tourism development may not lead to impressive economic growth as the overall contribution of tourism specialization to the economy could be reduced by many factors. It is important for governments to consider the overall balance between international tourism receipts and expenditures, the structure of the ownership of tourism and related industries, the degree of development of domestic industries, their ability to meet tourism requirements from domestic production, and natural and socio-cultural impacts of tourism development, to develop appropriate policies at a variety of levels or regions. Should these issues be constantly ignored, then such a country would likely experience lower benefits than might be expected, regardless of whether they are considered to be a country with a high degree of tourism specialization.

Tourism is widely justified on the basis of its potential contribution to economic development. Even if it is considered to be an effective source of foreign exchange earnings and employment for many countries or destinations, there remains serious doubt whether tourism specialization can help to eliminate the widening gap between developed and developing countries, and to establish a more even and equitable income distribution within any particular country or destination. More specifically, tourism development has the potential to generate impressive economic growth. On the other hand, tourism can also exacerbate inequalities if both public and private investment is injected into selected areas that are deemed suitable for tourism development. In looking ahead, not only the role of tourism specialization on economic growth, but also its consequences on poverty and income inequality, must be put into perspective.

In order to derive concrete policy implications for any region, empirical analysis would be carried out to verify if the common findings for tourism specialization and economic growth are generally applicable. Future analysis on the nonlinear causal relationship between tourism specialization and economic growth should be done across different regions, classified on the basis of income class, level of economic development, and geographical area. This will lead to an even better understanding of the tourism specialization and economic growth relationship.

Table 3.1: Contribution of Tourism to the Overall Economy GDP and Employment in 2009, and Projection of Travel & Tourism Economy Real Growth, by Global Regions

Regions	2009 Travel &Tourism Economy GDP (US$ Mn)	2009 Travel &Tourism Economy GDP % share	2009 Visitor Exports (US$ Mn)	2009 Travel &Tourism Economy Employment (Thous of jobs)	Travel & Tourism Economy Real Growth (2010-2019)
Caribbean	39,410.668	30.312	24,154.262	2,042.512	3.568
Central and Eastern Europe	142,439.966	9.580	36,940.472	6,797.150	5.741
European Union	1,667,656.460	10.716	423,685.250	23,003.960	3.808
Latin America	176,954.984	8.729	30,223.315	12,421.720	4.031
Middle East	158,112.740	11.457	50,738.918	5,130.767	4.564
North Africa	62,893.900	12.164	25,622.089	5,440.087	5.417
North America	1,601,235.000	10.492	188,517.700	21,130.230	4.031
Northeast Asia	1,053,780.332	18.333	114,400.124	70,512.123	5.488
Oceania	115,902.843	18.558	38,403.241	1,701.315	4.394
Other Western Europe	150,082.280	10.207	42,694.005	2,277.688	2.642
South Asia	84,223.460	14.846	14,904.677	37,174.593	4.970
South-East Asia	155,158.492	10.478	65,765.366	23,231.522	4.415
Sub-Saharan Africa	65,866.259	9.047	23,392.256	8,948.552	4.718
World	5,473,717.384		1,079,441.62	219,812.220	

Source*:* World Travel and Tourism Council (2009).

Table 3.2 Countries in the Sample

Countries		
Albania	Guinea	Paraguay
Angola	Guinea-Bissau	Peru
Antigua and Barbuda	Guyana	Philippines
Argentina	Haiti	Poland
Armania	Honduras	Portugal
Australia	Hong Kong	Romania
Austria	Hungary	Russia
Azerbaijan	Iceland	Rwanda
Bahamas	India	Samoa
Bahrain	Indonesia	Sao Tome and Principe
Bangladesh	Iran	Saudi Arabia
Barbados	Ireland	Senegal
Belarus	Israel	Seychelles
Belgium	Italy	Sierra Leone
Belize	Jamaica	Singapore
Benin	Japan	Slovak Rep.
Bolivia	Jordan	Slovenia
Bosnia and Herzegovina	Kazakstan	Solomon Islands
Botswana	Kenya	South Africa
Brazil	Korea Rep.of	Spain
Brunei Darussalam	Kuwait	Sri Lanka
Bulgaria	Kyrgyzstan	St.Lucia
Burkina Faso	Laos PDR.	St.Vincent&Grenadines
Burundi	Latvia	Sudan
Cambodia	Lebanon	Suriname
Cameroon	Lesotho	Swaziland
Canada	Libya	Sweden
Cape Verde	Lithunia	Switzerland
Chile	Luxembourg	Syrian Arab Rep.
China	Macao	Tanzania
Colombia	Macedonia, FYR	Thailand
Congo Rep.	Madagascar	Togo
Costa Rica	Malawi	Tonga
Croatia	Malaysia	Trinidad&Tobago
Cyprus	Maldives	Tunisia
Czech Rep.	Mali	Turkey
Denmark	Malta	Uganda
Dominica	Mauritania	U.K.
Dominican Rep.	Mauritius	Ukraine
Ecuador	Mexico	United Arab Emirates
Egypt	Moldova	United States
Elsalvador	Mongolia	Uruguay
Eritrea	Morocco	Vanuatu
Estonia	Mozambique	Venezuela
Ethiopia	Namibia	Vietnam
Fiji	Nepal	Yemen Rep.of
Finland	Netherlands	Zambia
France	New Zealand	
Gabon	Nicaragua	
Gambia	Niger	
Georgia	Nigeria	
Germany	Norway	
Ghana	Oman	
Greece	Pakistan	
Grenada	Panama	
Guatemala	Papua New Guinea	

Table 3.3 Data Description and Sources

Variables	Definition	Description	Data source
Dependent Variables: Growth Variables			
g_{it}	growth rate of real GDP chain per worker	log difference of real GDP chain per worker at time t and t-1	PWT 6.3
g_{it}	growth rate of real GDP chain per capita	log difference of real GDP per capita (Constant Prices: Chain series) at time t and t-1	PWT 6.3
g_{it}	growth rate of real GDP Laspeyres per capita	log difference of real GDP per capita (Constant Prices: Laspeyres), derived from growth rates of c, g, i, at time t and t-1	PWT 6.3
Explanatory Variables:			
	Tourism variables		
TA	tourist arrivals	tourist arrivals as a percentage of total population	WDI 2008
TRE	tourism receipts	tourism receipts as a percentage of exports of goods and services	WDI 2008
TRG	tourism receipts	tourism receipts as a percentage of GDP	WDI 2008
	Control variables		
$y_{i,t-1}, y_{1989}$	initial income	5-year average of real GDP per capita in the previous period (panel threshold analysis) or real GDP per capita 1989 (IV threshold)	PWT 6.3
K_{it}, K_i	physical capital investment	investment share of real GDP per capita	WDI 2008
H_{it}, H_i	public spending on education	public spending on education as a percentage of GDP	WDI 2008
n_{it}, n_i	growth rate of population	log difference of population at time t and t-1	PWT 6.3
$Trade_{it}, Trade_i$	trade openness	openness in current prices (% in current prices); total trade (export plus imports) as a percentage of GDP	PWT 6.3

Table 3.3 Data Description and Sources (Continued)

Variables	Definition	Description	Data source
Explanatory Variables (continued)			
Gov_{it}, Gov_i	government consumption	government consumption as a percentage of GDP	WDI 2008
Acc_{it}, Acc_i	voice and accountability*	see details on page 82	World Bank2008
Pol_{it}, Pol_i	political stability and absence of violence*	see details on page 82	World Bank2008
Eff_{it}, Eff_i	government effectiveness*	see details on page 82	World Bank2008
Reg_{it}, Reg_i	regulatory quality*	see details on page 82	World Bank2008
Law_{it}, Law_i	rule of law*	see details on page 82	World Bank2008
Cor_{it}, Cor_i	control of corruption*	see details on page 82	World Bank2008
Threshold variables:			
$Trade_{it}, Trade_i$	1. trade openness	openness in constant price	PWT 6.3
K_{it}, K_i	2. physical capital investment	investment share of real GDP per capita	WDI 2008
Gov_{it}, Gov_i	3. government consumption	government consumption as a percentage of GDP	WDI 2008
Instrument variable:			
UNESCO	UNESCO	number of UNESCO World Heritage List (WHL) per surface area**	UNESCO 2009

Note: *The six governance indicators are measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better governance outcomes. **surface area (sq.km) is obtained from WDI 2008 database.

Table 3.4 Summary Statistics: 5-year Panel Dataset

Variables	Full Sample Summary Statistics				
	Mean	Std.Dev.	Minimum	Maximum	Observations*
g_{it} (rgdpwok)	0.0249	0.4165	-3.3670	8.8020	N=636, n=159, T=4
g_{it} (rgdpch)	0.0288	0.1347	-0.221	2.2170	N=636, n=159, T=4
g_{it} (rgdpl)	0.0304	0.3570	-1.9410	7.9450	N=636, n=159, T=4
$Tour_{it}$ (TA)	54.4223	13.3426	0.0390	2082.955	N=636, n=159, T=4
$Tour_{it}$ (TRE)	15.2337	16.3920	0.0530	76.7100	N=636, n=159, T=4
$Tour_{it}$ (TRG)	3.1792	5.5017	0.003	46.534	N=636, n=159, T=4
$y_{i,t-1}$ (rgdpwok)	9.5248	1.0725	6.8550	11.987	N=636, n=159, T=4
$y_{i,t-1}$ (rgdpch)	8.6443	1.1264	5.8840	11.0610	N=636, n=159, T=4
$y_{i,t-1}$ (rgdpl)	8.6418	1.1274	5.8840	11.0610	N=636, n=159, T=4
K_{it}	21.3671	11.4698	-2.3420	84.2340	N=636, n=159, T=4
H_{it}	4.4079	1.8508	0.8310	13.574	N=636, n=159, T=4
n_{it}	0.0193	0.0251	-0.369	0.2210	N=636, n=159, T=4
$Trade_{it}$	86.5657	50.4278	14.3770	443.1870	N=636, n=159, T=4
Gov_{it}	16.4026	6.4296	3.8450	54.9830	N=636, n=159, T=4
Acc_{it}	0.0506	0.9129	-2.0380	1.6330	N=636, n=159, T=4
Pol_{it}	0.0218	0.8894	-2.5000	1.6300	N=636, n=159, T=4
Eff_{it}	0.0913	0.9561	-1.763	2.3360	N=636, n=159, T=4
Reg_{it}	0.1193	0.8663	-2.1500	2.4130	N=636, n=159, T=4
Law_{it}	0.0450	0.9416	-1.8500	2.0420	N=636, n=159, T=4
Cor_{it}	0.0678	0.9739	-1.7568	2.4649	N=636, n=159, T=4
UNESCO	0.000124	0.00082	0	0.0093	N=636, n=159, T=4

Table 3.5 Summary Statistics: Cross-sectional Dataset

Variables	Full Sample Summary Statistics				
	Mean	Std.Dev.	Minimum	Maximum	Observations*
g_i (rgdpwok)	0.0249	0.2329	-1.6725	2.2594	159
g_i (rgdpch)	0.0289	0.0704	-0.0609	2.5904	159
g_i (rgdpl)	0.0303	0.1838	-0.4989	2.0532	159
$Tour_i$ (TA)	54.4223	131.4667	0.0559	1376.0350	159
$Tour_i$ (TRE)	15.2337	16.0551	0.4479	72.8091	159
$Tour_i$ (TRG)	3.1792	5.4034	0.0136	35.0176	159
y_{1989} (rgdpwok)	9.5248	1.0653	7.1821	11.7081	159
y_{1989} (rgdpch)	8.6443	1.1184	6.4326	10.8721	159
y_{1989} (rgdpl)	8.6442	1.1191	6.4368	10.8739	159
K_i	21.367	10.5891	4.3893	69.6619	159
H_i	4.4079	1.66431	0.83944	11.2392	159
n_i	0.0193	0.01565	-0.0192	0.0637	159
$Trade_i$	86.5657	47.8855	20.9003	359.7687	159
Gov_i	16.4026	5.9844	4.8312	39.9588	159
Acc_i	0.05059	0.9011	-1.7828	1.5972	159
Pol_i	0.02184	0.8597	-2.2944	1.4487	159
Eff_i	0.09132	0.9406	-1.3772	2.3677	159
Reg_i	0.1193	0.8290	-1.7719	1.8854	159
Law_i	0.0450	0.9254	-1.5362	1.9756	159
Cor_i	0.0679	0.95621	-1.3186	2.3498	159
UNESCO	0.000124	0.00082	0	0.00938	159

Table 3.6 Results from Cross-section Instrumental Variable (IV) Threshold Model

Threshold Variable: Trade Openness

Model	Model 1: growth rate of rgdpch per capita						Model 2: growth rate of rgdpwok per capita						Model 3: growth rate of rgdpl per capita					
variable	1a		1b		1c		2a		2b		2c		3a		3b		3c	
	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
TA	**0.016**	0.006					**0.019**	0.010					**0.016**	0.005				
	(0.008)	(0.013)					(0.010)	(0.006)					(0.007)	(0.004)				
TRE			**0.021**	**0.005**					**0.022**	**0.009**					**0.019**	**0.006**		
			(0.009)	(0.002)					(0.011)	(0.006)					(0.008)	(0.003)		
TRG					**0.022**	**0.005**					**0.015**	**0.008**					**0.026**	**0.007**
					(0.015)	(0.003)					(0.008)	(0.004)					(0.007)	(0.004)
y_{1989}	**-0.007**	**-0.022**	**-0.013**	**0.027**	**-0.013**	**-0.024**	**-0.016**	**-0.026**	-0.013	-0.010	-0.015	-0.018	-0.011	-0.005	-0.011	-0.006	0.017	**-0.007**
	(0.002)	(0.002)	(0.004)	(0.003)	(0.002)	(0.006)	(0.002)	(0.016)	(0.017)	(0.066)	(0.019)	(0.019)	(0.028)	(0.006)	(0.017)	(0.005)	(0.019)	(0.002)
$Trade_i$	**0.003**	**0.005**	0.004	**0.004**	0.004	**0.005**	**0.0035**	**0.004**	0.003	**0.004**	0.004	**0.004**	0.003	**0.004**	0.004	**0.005**	0.003	**0.004**
	(0.001)	(0.002)	(0.012)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.018)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.000)	(0.003)	(0.002)
K_i	0.003	0.003	0.009	0.005	0.002	**0.003**	0.007	0.005	0.005	0.006	**0.006**	0.004	0.007	0.003	0.005	0.001	0.006	**0.003**
	(0.003)	(0.005)	(0.016)	(0.078)	(0.003)	(0.001)	(0.005)	(0.007)	(0.006)	(0.070)	(0.004)	(0.008)	(0.007)	(0.018)	(0.004)	(0.002)	(0.006)	(0.001)
n_i	**-0.630**	-0.199	-0.381	-0.360	**-0.620**	-0.333	-0.578	-0.298	-0.549	-0.251	-0.579	-0.243	-0.319	-0.197	-0.367	-0.186	-0.368	-0.247
	(0.288)	(0.379)	(0.441)	(0.459)	(0.234)	(0.472)	(0.372)	(0.525)	(0.407)	(0.546)	(0.402)	(0.543)	(0.638)	(0.746)	(0.691)	(0.889)	(0.644)	(0.557)
H_i	**0.005**	**0.011**	**0.023**	**0.018**	0.023	**0.009**	**0.044**	**0.045**	**0.042**	**0.047**	**0.046**	**0.040**	**0.012**	**0.017**	0.011	0.009	0.010	**0.018**
	(0.002)	(0.007)	(0.003)	(0.008)	(0.019)	(0.005)	(0.021)	(0.016)	(0.025)	(0.020)	(0.025)	(0.016)	(0.005)	(0.006)	(0.014)	(0.007)	(0.013)	(0.006)
Gov_i	-0.006	**-0.049**	-0.010	**-0.049**	0.007	-0.046	-0.011	**-0.024**	-0.006	-0.021	-0.007	**-0.030**	0.016	-0.044	-0.008	-0.048	-0.009	-0.041
	(0.008)	(0.027)	(0.014)	(0.025)	(0.016)	(0.225)	(0.035)	(0.007)	(0.031)	(0.017)	(0.030)	(0.008)	(0.010)	(0.055)	(0.047)	(0.053)	(0.005)	(0.052)
Acc_i	**0.024**	0.015	0.011	0.020	0.011	0.012	0.019	0.047	0.016	0.044	0.049	0.036	0.099	0.012	0.097	**0.157**	0.082	0.016
	(0.013)	(0.012)	(0.011)	(0.017)	(0.008)	(0.012)	(0.034)	(0.041)	(0.043)	(0.882)	(0.039)	(0.059)	(0.123)	(0.012)	(0.092)	(0.018)	(0.089)	(0.013)
Pol_i	**0.013**	0.032	**0.023**	0.054	**0.010**	**0.163**	**0.205**	0.071	**0.156**	0.472	**0.158**	0.103	**0.154**	**0.032**	**0.123**	0.012	**0.123**	**0.048**
	(0.006)	(0.028)	(0.009)	(0.065)	(0.005)	(0.069)	(0.029)	(0.079)	(0.026)	(0.502)	(0.028)	(0.141)	(0.070)	(0.019)	(0.059)	(0.035)	(0.059)	(0.018)
Eff_i	**0.054**	0.017	**0.106**	0.009	0.042	**0.282**	**0.178**	0.232	**0.231**	0.453	**0.206**	0.171	0.111	**0.150**	0.131	**0.181**	0.110	**0.199**
	(0.018)	(0.071)	(0.035)	(0.110)	(0.110)	(0.088)	(0.054)	(0.165)	(0.069)	(1.087)	(0.060)	(0.256)	(0.102)	(0.076)	(0.111)	(0.061)	(0.104)	(0.084)
Reg_i	**0.029**	0.041	**0.113**	0.006	**0.191**	0.030	0.056	0.048	**0.183**	**0.175**	**0.141**	**0.199**	0.090	**0.173**	**0.173**	0.051	**0.146**	0.180
	(0.015)	(0.037)	(0.017)	(0.034)	(0.033)	(0.035)	(0.067)	(0.070)	(0.039)	(0.068)	(0.042)	(0.114)	(0.102)	(0.062)	(0.066)	(0.061)	(0.056)	(0.059)
Law_i	0.062	**0.109**	0.074	**0.273**	**0.027**	0.015	0.005	0.177	0.011	0.229	**0.237**	0.223	**0.226**	0.054	**0.375**	0.291	0.167	0.072
	(0.046)	(0.040)	(0.049)	(0.059)	(0.008)	(0.049)	(0.041)	(0.129)	(0.038)	(0.710)	(0.037)	(0.190)	(0.103)	(0.284)	(0.210)	(0.337)	(0.121)	(0.329)
Cor_i	0.018	0.013	0.014	0.005	0.005	0.066	0.073	0.048	0.067	0.010	0.072	0.096	0.150	0.052	0.095	0.043	0.099	0.053
	(0.012)	(0.057)	(0.020)	(0.064)	(0.008)	(0.056)	(0.056)	(0.209)	(0.047)	(0.345)	(0.052)	(0.229)	(0.143)	(0.044)	(0.096)	(0.065)	(0.105)	(0.041)
No.of obs.	97	62	97	62	97	62	115	44	115	45	115	45	74	85	74	85	74	85
Threshold	91.872		91.872		91.872		105.486		105.486		105.486		74.057		74.057		74.057	

Note: Robust standard errors in parentheses. Boldface values indicate statistical significance at the 1% level.

Table 3.7: Results from Cross-section Instrumental Variable (IV) Threshold Model

Threshold Variable: Investment Share to GDP

Model	Model 1: growth rate of rgdpch per capita						Model 2: growth rate of rgdpwok per capita						Model 3: growth rate of rgdpl per capita					
variable	1a		1b		1c		2a		2b		2c		3a		3b		3c	
	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
TA	**0.018**	**0.006**					**0.025**	**0.005**					**0.018**	**0.004**				
	(0.005)	(0.003)					(0.007)	(0.002)					(0.008)	(0.002)				
TRE			**0.018**	**0.006**					**0.015**	**0.005**					**0.024**	**0.004**		
			(0.002)	(0.004)					(0.008)	(0.002)					(0.012)	(0.002)		
TRG					**0.025**	0.005					**0.018**	0.004					**0.013**	0.005
					(0.011)	(0.014)					(0.009)	(0.024)					(0.007)	(0.046)
y_{1989}	**-0.012**	**-0.020**	**-0.0118**	-0.010	**-0.019**	**-0.016**	**-0.029**	-0.007	**-0.014**	**-0.018**	**-0.026**	**-0.012**	**-0.029**	**-0.021**	-0.080	**-0.020**	**-0.020**	-0.006
	(0.003)	(0.006)	(0.002)	(0.016)	(0.002)	(0.004)	(0.003)	(0.007)	(0.001)	(0.002)	(0.006)	(0.008)	(0.010)	(0.004)	(0.062)	(0.006)	(0.006)	(0.004)
$Trade_i$	**0.002**	**0.00057**	**0.000**	0.000	**0.005**	**0.001**	0.009	0.000	**0.000**	**0.003**	**0.010**	**0.003**	**0.003**	**0.000**	**0.013**	**0.003**	0.010	**0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.014)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.006)	(0.001)	(0.008)	(0.000)
K_i	0.002	0.0074	0.001	0.007	**0.002**	0.008	0.002	0.009	0.002	0.013	0.004	**0.009**	0.002	0.015	0.002	0.020	0.002	0.017
	(0.002)	(0.021)	(0.003)	(0.010)	(0.001)	(0.023)	(0.172)	(0.007)	(0.002)	(0.049)	(0.072)	(0.005)	(0.035)	(0.021)	(0.003)	(0.063)	(0.003)	(0.062)
n_i	**-0.222**	-0.176	-0.145	-0.183	-0.126	-0.102	**-0.418**	-0.176	-0.293	-0.326	**-0.462**	-0.317	-0.145	-0.181	-0.120	-0.126	-0.142	-0.170
	(0.035)	(0.859)	(0.219)	(0.456)	(0.218)	(0.273)	(0.154)	(0.287)	(0.315)	(0.208)	(0.120)	(0.212)	(0.342)	(0.376)	(0.971)	(0.588)	(0.520)	(0.380)
H_i	**0.026**	**0.013**	**0.006**	0.009	**0.021**	**0.010**	**0.010**	**0.030**	0.014	**0.021**	**0.020**	**0.008**	**0.014**	**0.023**	**0.026**	**0.016**	**0.027**	**0.007**
	(0.005)	(0.002)	(0.002)	(0.031)	(0.003)	(0.003)	(0.005)	(0.010)	(0.010)	(0.006)	(0.008)	(0.004)	(0.004)	(0.004)	(0.008	(0.006)	(0.012)	(0.003)
Gov_i	**-0.004**	-0.017	-0.002	-0.017	**0.011**	-0.001	**-0.011**	-0.005	-0.001	-0.013	0.056	-0.005	**-0.017**	-0.009	-0.034	-0.001	-0.055	-0.001
	(0.001)	(0.016)	(0.014)	(0.038)	(0.004)	(0.016)	(0.004)	(0.004)	(0.002)	(0.110)	(0.065)	(0.003)	(0.009)	(0.013)	(0.053)	(0.002)	(0.062)	(0.001)
Acc_i	**0.044**	0.011	**0.016**	0.037	**0.066**	**0.039**	**0.089**	**0.032**	0.027	0.074	0.024	0.013	0.046	**0.016**	0.447	0.016	0.235	**0.013**
	(0.016)	(0.011)	(0.005)	(0.033)	(0.005)	(0.013)	(0.013)	(0.017)	(0.021)	(0.064)	(0.321)	(0.028)	(0.314)	(0.008)	(0.460)	(0.021)	(0.335)	(0.010)
Pol_i	**0.010**	0.081	**0.008**	0.073	**0.141**	0.006	0.014	0.040	0.018	**0.057**	**0.043**	0.038	0.024	**0.022**	**0.041**	0.013	**0.041**	**0.023**
	(0.007)	(0.111)	(0.004)	(0.363)	(0.005)	(0.013)	(0.047)	(0.030)	(0.022)	(0.027)	(0.009)	(0.028)	(0.831)	(0.014)	(0.010)	(0.057)	(0.010)	(0.014)
Eff_i	**0.123**	0.265	**0.057**	0.149	**0.135**	**0.107**	0.143	0.170	0.070	0.104	0.352	0.187	**0.133**	0.041	0.046	0.043	0.041	0.050
	(0.024)	(0.441)	(0.012)	(0.766)	(0.012)	(0.057)	(1.720)	(0.115)	(0.064)	(0.280)	(0.480)	(0.125)	(0.065)	(0.054)	(0.064)	(0.175)	(0.058)	(0.060)
Reg_i	**0.074**	**0.142**	**0.025**	0.084	**0.129**	0.098	0.070	0.059	0.044	**0.082**	0.032	0.057	0.119	0.007	0.046	0.012	0.041	0.008
	(0.024)	(0.023)	(0.009)	(0.253)	(0.008)	(0.029)	(0.093)	(0.048)	(0.043)	(0.049)	(0.416)	(0.044)	(1.753)	(0.027)	(0.368)	(0.033)	(0.368)	(0.027)
Law_i	**0.056**	**0.089**	**0.049**	0.024	**0.017**	0.017	**0.159**	0.042	0.019	**0.043**	0.475	0.030	0.039	0.043	0.022	0.041	0.032	0.049
	(0.017)	(0.036)	(0.010)	(0.112)	(0.010)	(0.043)	(0.090)	(0.055)	(0.032)	(0.011)	(0.559)	(0.051)	(0.020)	(0.050)	(0.368)	(0.080)	(0.558)	(0.055)
Cor_i	0.020	0.030	**0.049**	0.004	0.011	0.020	0.012	0.0160	0.017	0.016	0.034	0.016	0.008	0.009	0.018	0.011	0.010	0.010
	(0.014)	(0.027)	(0.012)	(0.219)	(0.012)	(0.028)	(0.046)	(0.011)	(0.0591)	(0.510)	(0.054)	(0.011)	(0.434)	(0.024)	(0.663)	(0.060)	(0.539)	(0.025)
No.of obs.	62	97	62	97	62	97	392	120	39	120	39	120	38	121	38	121	38	121
Threshold	17.5268		17.5268		17.5268		13.1726		13.173		13.173		13.074		13.074		13.074	

Note: Robust standard errors in parentheses. Boldface values indicate statistical significance at the 1% level.

Table 3.8 Results from Cross-section Instrumental Variable (IV) Threshold Model

Threshold Variable: Government Consumption as a Percentage of GDP

Model	Model 1: growth rate of rgdpch per capita						Model 2: growth rate of rgdpwok per capita						Model 3: growth rate of rgdpl per capita					
variable	1a		1b		1c		2a		2b		2c		3a		3b		3c	
	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
TA	**0.018**	**0.005**					**0.018**	**0.005**					**0.020**	**0.006**				
	(0.007)	(0.004)					(0.010)	(0.002)					(0.011)	(0.002)				
TRE			**0.019**	**0.005**					**0.018**	**0.005**					**0.019**	**0.006**		
			(0.009)	(0.002)					(0.008)	(0.002)					(0.008)	(0.003)		
TRG					**0.0195**	0.004					**0.020**	0.005					**0.019**	0.006
					(0.001)	(0.042)					(0.005)	(0.021)					(0.008)	(0.018)
y_{1989}	**-0.005**	**-0.020**	0.004	**-0.022**	**-0.005**	0.020	-0.019	-0.004	**-0.040**	-0.006	**-0.043**	-0.003	-0.032	**-0.010**	-0.294	-0.004	-0.030	**-0.010**
	(0.003)	(0.012)	(0.011)	(0.012)	(0.002)	(0.016)	(0.388)	(0.004)	(0.022)	(0.034)	(0.023)	(0.004)	(0.037)	(0.006)	(0.766)	(0.005)	(0.036)	(0.007)
$Trade_i$	**0.001**	**0.001**	0.001	**0.001**	0.000	**0.001**	0.004	**0.002**	**0.003**	0.001	**0.003**	0.001	**0.001**	0.001	0.003	**0.001**	0.001	**0.001**
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.021)	(0.000)	(0.001)	(0.011)	(0.001)	(0.011)	(0.001)	(0.005)	(0.005)	(0.000)	(0.001)	(0.000)
K_i	**0.006**	**0.004**	0.001	0.002	**0.004**	**0.003**	0.013	0.002	0.014	0.007	**0.014**	**0.003**	**0.028**	**0.001**	0.012	0.001	**0.006**	0.001
	(0.000)	(0.002)	(0.016)	(0.001)	(0.000)	(0.002)	(0.018)	(0.001)	(0.079)	(0.052)	(0.008)	(0.002)	(0.005)	(0.001)	(0.062)	(0.001)	(0.003)	(0.001)
n_i	-0.193	**-0.065**	-0.158	-0.066	-0.053	**-0.072**	-0.069	-0.047	-0.034	-0.111	-0.126	-0.120	-0.051	**-0.086**	-0.070	-0.074	-0.074	-0.088
	(0.523)	(0.040)	(0.404)	(0.050)	(0.269)	(0.037)	(0.049)	(0.187)	(0.175)	(0.083)	(0.089)	(0.072)	(0.215)	(0.043)	(0.060)	(0.067)	(0.068)	(0.342)
H_i	**0.047**	**0.038**	**0.011**	**0.020**	**0.063**	**0.030**	**0.073**	**0.040**	**0.078**	0.013	**0.078**	**0.012**	**0.025**	0.006	**0.016**	**0.005**	0.014	**0.006**
	(0.024)	(0.010)	(0.005)	(0.008)	(0.017)	(0.007)	(0.039)	(0.003)	(0.014)	(0.129)	(0.013)	(0.004)	(0.013)	(0.005)	(0.006)	(0.003)	(0.022)	(0.002)
Gov_i	-0.001	**-0.005**	-0.002	-0.005	-0.001	-0.004	-0.003	**-0.019**	-0.005	-0.008	-0.005	**-0.006**	-0.014	-0.005	-0.028	-0.004	-0.007	-0.005
	(0.008)	(0.003)	(0.009)	(0.005)	(0.001)	(0.005)	(0.003)	(0.009)	(0.061)	(0.008)	(0.013)	(0.003)	(0.012)	(0.012)	(0.122)	(0.019)	(0.009)	(0.021)
Acc_i	**0.012**	0.016	0.029	**0.053**	**0.011**	0.018	0.026	0.010	0.080	0.019	0.007	0.006	0.017	0.020	0.018	0.015	0.008	0.024
	(0.006)	(0.032)	(0.166)	(0.027)	(0.007)	(0.028)	(0.018)	(0.011)	(0.067)	(0.079)	(0.070)	(0.016)	(0.039)	(0.016)	(0.768)	(0.016)	(0.056)	(0.017)
Pol_i	**0.013**	**0.039**	**0.022**	0.019	**0.007**	0.031	0.015	**0.024**	0.015	0.011	**0.0190**	**0.020**	0.012	0.011	0.016	0.010	0.024	0.012
	(0.006)	(0.003)	(0.011)	(0.031)	(0.004)	(0.027)	(0.998)	(0.011)	(0.046)	(0.085)	(0.005)	(0.011)	(0.067)	(0.013)	(0.029)	(0.015)	(0.079)	(0.014)
Eff_i	0.062	**0.199**	0.062	0.087	0.037	0.053	0.042	0.038	0.027	0.032	0.024	**0.032**	0.024	0.013	0.018	0.018	0.015	0.012
	(0.516)	(0.058)	(0.532)	(0.085)	(0.025)	(0.071)	(0.347)	(0.063)	(0.141)	(0.863)	(0.123)	(0.012)	(0.176)	(0.066)	(1.317)	(0.094)	(0.153)	(0.073)
Reg_i	0.002	**0.151**	**0.251**	0.053	**0.030**	0.063	0.031	0.014	0.020	0.075	0.037	0.014	0.068	0.068	0.084	0.068	0.089	0.068
	(0.014)	(0.050)	(0.121)	(0.044)	(0.017)	(0.052)	(0.249)	(0.014)	(0.075)	(0.453)	(0.065)	(0.019)	(0.085)	(0.053)	(0.197)	(0.044)	(0.107)	(0.051)
Law_i	**0.024**	0.115	**0.385**	0.200	**0.025**	0.196	0.485	**0.333**	0.123	0.026	0.152	0.006	**0.141**	0.013	**0.125**	0.019	0.176	0.014
	(0.010)	(0.165)	(0.194)	(0.142)	(0.011)	(0.145)	(0.036)	(0.056)	(0.083)	(0.056)	(0.097)	(0.075)	(0.078)	(0.040)	(0.069)	(0.047)	(0.110)	(0.044)
Cor_i	**0.031**	0.029	0.047	0.035	0.030	0.043	0.059	0.014	0.030	0.017	0.031	0.036	0.037	0.017	0.025	0.035	0.082	0.018
	(0.012)	(0.101)	(0.150)	(0.081)	(0.013)	(0.086)	(0.635)	(0.038)	(0.143)	(0.457)	(0.149)	(0.078)	(0.097)	(0.029)	(0.064)	(0.028)	(0.101)	(0.030)
No.of obs.	133	26	133	26	133	26	95	64	95	64	95	64	73	86	73	86	73	86
Threshold	21.713		21.713		21.713		17.699		17.699		17.699		15.236		15.236		15.236	

Note: Robust standard errors in parentheses. Boldface values indicate statistical significance at the 1% level.

Chapter 4

Interdependence of International Tourism Demand and Volatility in Leading ASEAN Destinations

Being one of the important areas in tourism research, tourism demand modeling and forecasting has attracted much attention of both academics and practitioners. Time-series models have been widely used for tourism demand forecasting with the dominance of the ARMA-based model. Another extension of the time-series analysis of tourism demand has been the application of the Generalized Autoregressive Conditional Heteroscadastic (GARCH) model. The GARCH model has been widely applied in financial econometrics to investigate the volatility of the time series. Recently, the volatility concept is highly popular in applications to tourism demand analysis.

The purpose of the third study is as followed - to estimate the conditional variance, or volatility, of monthly international tourist arrivals to four tourism leading South-East Asia countries, namely Indonesia, Malaysia, Singapore and Thailand, and to determine the interdependence of international tourism demand of leading ASEAN destinations for the period January 1997 to July 2009.

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Interdependence of International Tourism Demand and Volatility in Leading ASEAN Destinations

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Abstract

International and domestic tourism are leading economic activities in the world today. Tourism has been known to generate goods and services directly and indirectly, attract foreign currency, stimulate employment, and provide opportunities for investment. It has also been recognized as an important means for achieving economic development. Substantial research has been conducted to evaluate the role of international tourism, and its associated volatility, within and across various economies. This study applies several recently developed models of multivariate conditional volatility to investigate the interdependence of international tourism demand, as measured by international tourist arrivals, and its associated volatility in the four leading destinations in ASEAN, namely Indonesia, Malaysia, Singapore and Thailand. Each of these countries has attractive tourism characteristics, such as significant cultural and natural resources. Shocks to international tourism demand volatility could affect, positively or negatively, the volatility in tourism demand of neighbouring countries. The empirical results should encourage regional co-operation in tourism development among ASEAN member countries, and also mobilize international and regional organizations to provide appropriate policy actions.

4.1 Introduction

Over the past six decades, the substantial growth in tourism activity has clearly marked tourism as one of the most remarkably important and rapidly growing sectors in the world economy. It is presently ranked fourth after fuels, chemicals and automotive products (UNWTO, 2009). For many developing countries, tourism is one of the main income sources that leads to exports of goods and services, generates employment, and creates opportunities for economic development.

According to the World Tourism Organization report 2009, international tourist arrivals have continued to grow from 438 million in 1990, to 534 million in 1995, to 684 million in 2000, reaching 922 million in 2008, with an average annual growth rate of 3.8% between 2000 and 2008 (UNWTO, 2009). While tourism has experienced continuous growth, it has nonetheless diversified world tourism destinations. Many new destinations have emerged alongside the traditional ones of Western Europe and North America, which are the main tourist-receiving regions. Both regions tend to have less dynamic growth in joint market shares, while Asia and the Pacific have outperformed the rest of the world in terms of an increasing share of international tourist arrivals, as well as market share of world international tourism receipts (see Table 4.1).

Despite the collapse of global financial markets and the subsequent recession that began in December 2007, and with much greater intensity since September 2008, international tourist arrivals in 2008 reached 922 million. This was a positive figure that had increased from 904 million in 2007, thereby representing a growth rate of 2%. This overall growth had been established on the strong results in the year proceeding the global economic recession. All regions had positive growth, except for

Europe. Asia and the Pacific saw a significant slowdown in arrivals when figures were compared to the previous bumper years, growing at just over 1% in 2008. The deceleration from 9.6% in 2007 to 1.2% in 2008 can be attributed principally to a rise in the price of tourism that was caused by an increase in aviation fuel prices. Growth in receipts in Asia outpaced that of arrivals. Year-on-year growth in receipts for the region was 2.7%, compared with 9.8% in 2007 (ASEAN, 2009).

South-East Asia and South Asia were the strongest performing sub-regions of Asia and the Pacific, growing at 3% and 2%, respectively, in 2008. In South-East Asia, countries such as Indonesia (13%), Cambodia (7%) and Malaysia (5%) grew at above average rates. Several Asia and Pacific sub-regions, especially in South-East Asia, are now reaping increasing benefits from tourism due to their own specific tourism resources, and an improvement in the supporting and facilitating factors of infrastructure and accommodation. The ASEAN tourism performance in 2006-2008 is given in Table 4.2. ASEAN attracted 61.7 million tourists in 2008, accounting for a market share of 6.7% and average annual growth rate of 6.9% (ASEAN, 2009).

As given in Table 4.2, inbound tourism to South-East Asia has been distributed to four leading destinations, namely Malaysia, Thailand, Singapore, and Indonesia. These destinations stimulate an interest since tourism data is available and very rich for the tourism demand volatility analysis, while Laos, Cambodia and Myanmar does not officially provide tourism data and Brunei does not have a rich tourism database. Therefore, this study only focuses on the study in tourism demand interdependency between Malaysia, Thailand, Singapore, and Indonesia instead of the whole ASEAN.

The trend of international tourist arrivals to these countries has been relatively increasing over time (see panel (a) in Figure 4.1). Whilst the data set illustrates the growing trends of tourism activity in the period 1998 to 2008, the impact of 'events', such as Severe Acute Respiratory Syndrome (hereafter SARS) epidemic in 2003 should not be underestimated. Although it is clear that such events are 'aberrations in the trend' the short term economic effect of such natural occurrences is of course high. After a sharp drop in tourist arrivals in 2003 due to SARS outbreak, the number of tourist arrivals was gradually recovered and continues to undergo rapid growth (see panel (b) in Figure 4.1). This favorable trend will continue forward as individuals with higher levels of disposable income and leisure time seek to visit the wonders of Asia. Other contributors to increased demand have been the aggressive marketing campaigns undertaken by many major ASEAN nations, the emergence of Low Cost Carrier Airlines and the currency leverage achieved in Asia by many Western Nation tourists.

In terms of North-East Asia, tourist arrivals to South-East Asia have accounted for over 30% of the market share in the Asia and the Pacific international tourist arrivals. In Figures 4.2 and 4.3, the intra-ASEAN[1] tourism is deemed to be important as extra-ASEAN[2] tourism in this sub-region as ASEAN member countries sustained their collaboration to increase intra-ASEAN travel and fortified the promotion of the ASEAN region as a major destination for intra-ASEAN and inter-ASEAN travel.

Sharing some similarities in climate, the archeological background and cultural influence brought from India, China, Muslim-nations and Europe have led to unification among the nations of South-East Asia. These similarities seem to have

[1] ASEAN arrivals
[2] Non-ASEAN arrivals

installed an influence on both regional tourism collaboration and regional tourism competitiveness. It is interesting to explore the interdependence between tourism in ASEAN, where each country could benefit and suffer from the shocks that occur in neighbouring countries. For example, negative shocks, which may capture political instability, terrorism, violent criminal behavior, and natural disasters, generally have the potential to generate volatility in tourism demand. Examining whether the impact of shocks to tourism demand in one destination would be volatile on the demand for international tourism in neighbouring destinations is a major aspect of the study.

Given the importance of understanding the dependence on tourism in ASEAN, this study estimates the conditional variance, or volatility, of monthly international tourist arrivals to four leading South-East Asian tourism countries, namely Malaysia, Thailand, Singapore and Indonesia. The estimates provide an indication of the relationship between shocks to the growth rate of monthly international tourist arrivals in each major destination in South-East Asia through the multivariate GARCH framework. The analysis of uncertainty in monthly international tourism arrivals to these major destinations has not been empirically investigated in the tourism literature. The results indicate the existence of tourism interdependence among these countries.

The structure of the remainder of the study is as follows. Section 2 reviews the tourism volatility research literature. Section 3 discusses the univariate and multivariate GARCH models to be estimated. Section 4 gives details of the data, descriptive statistics and unit root tests. Section 5 describes the empirical estimates and some diagnostic tests of the univariate and multivatiate models. Some concluding remarks are given in Section 5.

4.2 Literature Review

Tourism demand modelling and estimation rely heavily on secondary data. It can be divided broadly into two categories, based on non-causal time series models and causal econometric approaches. The primary difference between two is whether the forecasting model identifies any causal relationship between the tourism demand variable and its influencing factors. The focus in this study is on time series tourism modelling, which pays particular attention to exploring the historical trends and patterns in the time series ARMA-based models comprise one of the most widely used methods in time series analysis.

A recent example based on time series methods to analyze tourism demand is Lim and McAleer (Lim & McAleer, 1999), who used ARIMA models to explain the non-stationary seasonally unadjusted quarterly tourist arrivals from Malaysia to Australia from 1975(1) to 1996(4). HEGY framework was used as a pre-test for seasonal unit root (Hylleberg, Engle, Granger, & Yoo, 1990). The finding of seasonal unit root tests in international tourist arrivals from Malaysia shows evidence of a stochastically varying seasonal pattern. A deterministic seasonal model generated by seasonal dummy variables is likely to be a less appropriate univariate seasonal representation than the seasonally integrated process proposed by HEGY, and including deterministic seasonal dummy variables to explain seasonal patterns is likely to produce fragile results if seasonal unit roots are present. Lim and McAleer estimated Australian tourism demand from Asian source markets over the period 1975(1)-1984(4) by using various ARIMA models. As the best fitting ARIMA model is found to have the lowest RMSE, this model is used to obtain post-sample forecasts. The fitted ARIMA model forecasts tourist arrivals from Singapore for the period

1990(1)-1996(4) very well. Although the ARIMA model outperforms the seasonal ARIMA models for Hong Kong and Malaysia, the forecasts of tourist arrivals are not as accurate as in the case of Singapore (Lim & McAleer, 2002).

Goh and Law introduced a multivariate SARIMA (MSARIMA) model, which includes an intervention function to capture the potential spillover effects of the parallel demand series on a particular tourism demand series. They showed that MSARIMA model significantly improved the forecasting performance of the simple SARIMA as well as other univariate time-series models (Goh & Law, 2002). In a similar study, Du Preez and Witt investigated the intervention effects of the time series models on forecasting performance within a state space framework. It was found that the multivariate state space time series model was outperformed by the simple ARIMA model (Preez & Witt, 2003). The application of time-series method in tourism demand analysis can also be found in Lim and McAleer (Lim & McAleer, 2000, 2001), Cho (Cho, 2001, 2003), Kulendran and Witt (Kulendran & Witt, 2003a, 2003b), Gil-Alana et al. (Luis A. Gil-Alana, Gracia, & CuÑado, 2004), Coshall (Coshall, 2005, 2009), Gil-Alana (L.A. Gil-Alana, 2005), Kulendran and Wong (Kulendran & Wong, 2005), Oh and Morzuch (Oh & Morzuch, 2005), Lim et al. (Lim, Min, & McAleer, 2008), and Chang et.al (Chang, Lim, & McAleer, 2009; Chang, McAleer, & Slottje, 2009; Chang, Sriboonchitta, & Wiboonpongse, 2009).

Another extension of the time series analysis of tourism demand has been the application of the Generalized Autoregressive Conditional Heteroscadastic (GARCH) model. The GARCH model has been used widely in financial econometrics to investigate the volatility of the time series. Univariate models of volatility in tourism demand have been used in, for example, Shareef and McAleer (Shareef & McAleer, 2005), Chang et al. (Chang, Lim et al., 2009; Chang, McAleer et al., 2009; Chang, Sriboonchitta et al., 2009), McAleer et al. (McAleer, Hoti, & Chan, 2009), and Divino and McAleer (Divino & McAleer, 2009, 2010) at different time series frequencies, ranging from monthly to daily data. Although the volatility concept is becoming increasingly popular in tourism research, few studies have yet applied multivariate models of volatility in tourism demand. In this respect, Chan et al. applied three multivariate GARCH models to examine the volatility of tourism demand for Australia and the effect of various shocks in the tourism demand models. The results suggested the presence of interdependent effects in the conditional variances between four leading countries, namely Japan, New Zealand, UK and USA, and asymmetric effects of shocks in two of the four countries (Chan, Lim, & McAleer, 2005).

Shareef and McAleer examined the uncertainty in monthly international tourist arrivals to the Maldives from eight major tourist source countries, namely Italy, Germany, UK, Japan, France, Switzerland, Austria and the Netherlands, from 1 January 1994 to 31 December 2003. Univariate and multivariate time series models of conditional volatility were estimated and tested. The conditional correlations were estimated and examined to ascertain whether there is specialization, diversification or segmentation in the international tourism demand shocks from the major tourism sources countries to the Maldives. The estimated static conditional correlations for monthly international tourist arrivals, as well as for the respective transformed series, were found to be significantly different from zero, but nevertheless relatively low (Shareef & McAleer, 2007).

Hoti et al. compared tourism growth, country risk returns and their associated volatilities for Cyprus and Malta. Monthly data were available for both international tourist arrivals and composite country risk ratings compiled by the International Country Risk Guide (ICRG) for the period May 1986 to May 2002. The time-varying conditional variances of tourism growth and country risk returns for the two Small Island Tourism Economies (SITEs) were analyzed using multivariate models of conditional volatility. The empirical results showed that Cyprus and Malta were complementary destinations for international tourists, such that changes to tourism patterns in Cyprus led to changes in tourism patterns in Malta (Hoti, McAleer, & Shareef, 2007).

4.3 Data

This study focuses on modeling conditional volatility and examining the interdependence of the logarithm of monthly tourist arrival rate (the difference of logarithm of monthly tourist arrivals or growth rates) of four leading South-East Asian countries, namely Indonesia, Malaysia, Singapore, and Thailand. The 151 monthly observations from January 1997 to July 2009 are obtained from Reuters, whereas Indonesia is obtained from Badan Pusat Statistik (Statistics Indonesia of The Republic Indonesia, 2009). The logarithm of monthly tourist arrival rate are calculated as $r_{ij,t} = \log\left(Y_{i,t}/Y_{i,t-1}\right)$, where $Y_{i,t}$ and $Y_{i,t-1}$ are the tourist arrivals of to country i in month t and $t\text{-}1$, respectively.

4.4 Methodology

4.4.1 Univariate Conditional Volatility Models

Following Engle (1982), consider the time series $y_t = E_{t-1}\left(y_t\right) + \varepsilon_t$, where $E_{t-1}\left(y_t\right)$ is the conditional expectation of y_t at time $t-1$ and ε_t is the associated error (Engle, 1982). The generalized autoregressive conditional heteroskedastity (GARCH) model of Bollerslev (1986) is given as follows:

$$\varepsilon_t = \sqrt{h_t}\eta_t \quad , \quad \eta_t \sim N(0,1) \tag{1}$$

$$h_t = \omega + \sum_{j=1}^{p} \alpha_j \varepsilon_{t-j}^2 + \sum_{j=1}^{q} \beta_j h_{t-j} \tag{2}$$

where $\omega > 0$, $\alpha_j \geq 0$ and $\beta_j \geq 0$ are sufficient conditions to ensure that the conditional variance $h_t > 0$. The parameter α_j represents the ARCH effect, or the short-run persistence of shocks to the log arrival rate, and β_j represents the GARCH effect, where $\alpha_j + \beta_j$ measures the long run persistence of shocks to the log arrival rate (Bollerslev, 1986).

Equation (2) assumes that the conditional variance is a function of the magnitudes of the lagged residuals and not their signs, such that a positive shock $(\varepsilon_t > 0)$ has the same impact on conditional variance as a negative shock $(\varepsilon_t < 0)$ of equal magnitude. In order to accommodate differential impacts on the conditional variance of positive and negative shocks, Glosten et al. proposed the asymmetric (or threshold) GARCH, or GJR model, which is given by (Glosten, Jagannathan, & Runkle, 1993);

$$h_t = \omega + \sum_{j=1}^{r} \left(\alpha_j + \gamma_j I\left(\varepsilon_{t-j}\right)\right) \varepsilon_{t-j}^2 + \sum_{j=1}^{s} \beta_j h_{t-j} \tag{3}$$

where $$I_{it} = \begin{cases} 0, & \varepsilon_{it} \geq 0 \\ 1, & \varepsilon_{it} < 0 \end{cases}$$

is an indicator function to differentiate between positive and negative shocks. When $r = s = 1$, sufficient conditions to ensure the conditional variance, $h_t > 0$, are $\omega > 0$,

$\alpha_1 \geq 0$, $\alpha_1 + \gamma_1 \geq 0$ and $\beta_1 \geq 0$. The short run persistence of positive and negative shocks are given by α_1 and $(\alpha_1 + \gamma_1)$, respectively. When the conditional shocks, η_t, follow a symmetric distribution, the short run persistence is $\alpha_1 + \gamma_1/2$, and the contribution of shocks to expected long-run persistence is $\alpha_1 + \gamma_1/2 + \beta_1$.

In order to estimate the parameters of model (1)-(3), maximum likelihood estimation is used with a joint normal distribution of η_t. However, when η_t does not follow a normal distribution or the conditional distribution is not known, quasi-MLE (QMLE) is used to maximize the likelihood function.

Bollerslev showed the necessary and sufficient condition for the second-order stationarity of GARCH is $\sum_{i=1}^{r} \alpha_i + \sum_{i=1}^{s} \beta_i < 1$ (Bollerslev, 1986). For the GARCH(1,1) model, Nelson obtained the log-moment condition for strict stationary and ergodicity as $E\left(\log\left(\alpha_1 \eta_t^2\right) + \beta_1\right) < 0$, which is important in deriving the statistical properties of the QMLE (Nelson, 1991). For GJR(1,1), Ling and McAleer presented the necessary and sufficient condition for $E\left(\varepsilon_t^2\right) < \infty$ as $\alpha_1 + \gamma_1/2 + \beta_1 < 1$ (Ling & McAleer, 2002a, 2002b). McAleer et al. established the log-moment condition for GJR(1,1) as $E\left(\log\left(\alpha_1 + \gamma_1 I(\eta_t)\eta_t^2 + \beta_1\right)\right) < 0$, and showed that it is sufficient for consistency and asymptotic normality of the QMLE (McAleer, Chan, & Marinova, 2007).

In order to capture asymmetric behavior in the conditional variance with alternative model, Nelson (1991) proposed the Exponential GARCH (EGARCH) model, namely:

$$\log h_t = \omega + \sum_{i=1}^{r} \alpha_i \left|\eta_{t-i}\right| + \sum_{i=1}^{r} \gamma_i \eta_{t-i} + \sum_{j=1}^{s} \beta_j \log h_{t-j}\,, \quad (4)$$

where $|\eta_{t-i}|$ and η_{t-i} capture the size and sign effects of the standardized shocks, respectively. If $\gamma = 0$, there is no asymmetry, while $\gamma < 0$ and $\gamma < \alpha < -\gamma$ are the conditions for a leverage effect, whereby positive shocks decrease volatility and negative shocks increase volatility (Nelson, 1991).

As noted in McAleer et al. (McAleer et al., 2007) and Chang et al. (Chang, McAleer et al., 2009), there are some distinct differences between EGARCH and the previous two model: (1) as EGARCH uses the logarithm of conditional volatility, it is guaranteed that $h_t > 0$, so that no restrictions are required on the parameters in (4); (2) Nelson (1991) showed that $|\beta| < 1$ ensures stationarity and ergodicity for EGARCH(1,1) (Nelson, 1991); (iii) Shephard (1996) observed that $|\beta| < 1$ is likely to be a sufficient condition for consistency of QMLE for EGARCH(1,1) (Shephard, 1996); (iv) as the standardized residuals appear in equation (4), $|\beta| < 1$ would seem to be a sufficient condition for the existence of moments; (v) in addition to being a sufficient condition for consistency, $|\beta| < 1$ is also likely to be sufficient for asymptotic normality of QMLE for EGARCH (1,1); and (6) moment conditions are required for the GARCH and GJR models as they are dependent on lagged unconditional shocks, whereas EGARCH does not require moment condition to be established as it depends on lagged conditional shocks (or standardized residuals).

4.4.2 Multivariate Conditional Volatility Model

This section presents models of the volatility in tourism demand, namely the CCC model of Bollerslev (Bollerslev, 1990), VARMA-GARCH model of Ling and McAleer (Ling & McAleer, 2003), and VARMA-AGARCH of McAleer et al. (McAleer et al., 2009) in order to investigate the (inter) dependence of international tourism demand and volatility in leading ASEAN destinations. The typical specifications underlying the multivariate conditional mean and conditional variance in the log arrival rate are as follows:

$$y_t = E\left(y_t \middle| F_{t-1}\right) + \varepsilon_t \tag{5}$$

$$\varepsilon_t = D_t \eta_t$$

where $y_t = \left(y_{1t},..., y_{mt}\right)'$, $\eta_t = \left(\eta_{1t},...,\eta_{mt}\right)'$ is a sequence of independently and identically distributed (iid) random vectors, F_t is the past information available to time t, $D_t = diag\left(h_1^{1/2},..., h_m^{1/2}\right)$.

The constant conditional correlation (CCC) model of Bollerslev (Bollerslev, 1990) assumes that the conditional variance for each log arrival rate, h_{it}, $i = 1,..,m$, follows a univariate GARCH process, that is

$$h_{it} = \omega_i + \sum_{j=1}^{r} \alpha_{ij} \varepsilon_{i,t-j}^2 + \sum_{j=1}^{s} \beta_{ij} h_{i,t-j} \ , \tag{6}$$

where α_{ij} and β_{ij} represents the ARCH and GARCH effects, respectively. The conditional correlation matrix of CCC is $\Gamma = E\left(\eta_t \eta_t' \middle| F_{t-1}\right) = E\left(\eta_t \eta'\right)$, where $\Gamma = \left\{\rho_{it}\right\}$ for $i, j = 1,..., m$. From (1), $\varepsilon_t \varepsilon_t' = D_t \eta_t \eta' D_t$, $D_t = \left(\text{diag } Q_t\right)^{1/2}$, and $E\left(\varepsilon_t \varepsilon_t' \middle| F_{t-1}\right) = Q_t = D_t \Gamma D_t$, where Q_t is the conditional covariance matrix. The conditional correlation matrix is defined as $\Gamma = D_t^{-1} Q_t D_t^{-1}$, and each conditional correlation coefficient is estimated from the standardized residuals in (5) and (6). Therefore, there is no multivariate estimation involved for CCC, except in the calculation of the conditional correlations.

It is interesting that CCC does not contain any information regarding cross-country or asymmetric effect. In order to accommodate possible interdependencies, Ling and McAleer (Ling & McAleer, 2003) proposed a vector autoregressive moving average (VARMA) specification of the conditional mean in (5) and the following specification for the conditional variance:

$$H_t = W + \sum_{i=1}^{r} A_i \vec{\varepsilon}_{t-i} + \sum_{j=1}^{s} B_j H_{t-j} \;, \tag{7}$$

where $H_t = \left(h_{1t},...,h_{mt}\right)'$, $\vec{\varepsilon} = \left(\varepsilon_{1t}^2,...\varepsilon_{mt}^2\right)'$, and W, A_i for $i = 1,..,r$ and B_j for $j = 1,..,s$ are $m \times m$ matrices. As in the univariate GARCH model, VARMA-GARCH assumes that negative and positive shocks have identical impacts on the conditional variance.

In order to separate the asymmetric impacts of the positive and negative shocks, McAleer et al. (McAleer et al., 2009) proposed the VARMA-AGARCH specification for the conditional variance, namely

$$H_t = W + \sum_{i=1}^{r} A_i \vec{\varepsilon}_{t-i} + \sum_{i=1}^{r} C_i I_{t-i} \vec{\varepsilon}_{t-i} + \sum_{j=1}^{s} B_j H_{t-j} \;, \tag{8}$$

where C_i are $m \times m$ matrices for $i = 1,..,r$, and $I_t = \text{diag}\left(I_{1t},...,I_{mt}\right)$, where

$$I_{it} = \begin{cases} 0, & \varepsilon_{it} > 0 \\ 1, & \varepsilon_{it} \le 0 \end{cases}$$

If $m = 1$, (7) collapses to the asymmetric GARCH, or GJR model. Moreover, VARMA-AGARCH reduces to VARMA-GARCH when $C_i = 0$ for all i. If $C_i = 0$ and A_i and B_j are diagonal matrices for all i and j, then VARMA-AGARCH reduces to CCC. The parameters of model (5)-(8) are obtained by maximum likelihood estimation (MLE) using a joint normal density. When η_t does not follow a joint multivariate normal distribution, the appropriate estimator is defined as the Quasi-MLE (QMLE).

Figure 4.4 presents the plots of the number of tourist arrivals to each country. Only three countries, namely Malaysia, Singapore and Thailand, exhibit upward trends with cyclical and seasonal patterns. Interestingly, in 2003 the numbers of tourist arrivals in each country collapsed because of SARS. These phenomena have been affirmed by the report of the World Travel and Tourism Council (World Travel and Tourism Council, 2003) that the outbreak of the SARS disease led to the collapse of the tourism industry in the most severely affected Asian countries (for an empirical analysis using panel data, see also McAleer et al. (McAleer, Huang, Kuo, Chen, & Chang, 2010).

Since each monthly tourist arrivals series clearly present the distinct seasonal pattern. The corresponding tests for seasonal unit root extended from Hylleberg et al. (1990) (or HEGY test) were discussed by Franses (Franses, 1991) based on the auxiliary regression:

$$\begin{aligned}\phi^*(B)y_{s,t} = \pi_1 y_{1,t-1} + \pi_2 y_{2,t-1} + \pi_4 y_{3,t-2} + \pi_5 y_{4,t-1} + \pi_6 y_{4,t-2} + \pi_7 y_{5,t-1} + \\ \pi_8 y_{5,t-2} + \pi_9 y_{6,t-1} + \pi_{10} y_{6,t-2} + \pi_{11} y_{7,t-1} + \pi_{12} y_{7,t-2} + \mu_t + \varepsilon_t\end{aligned} \quad (9)$$

where $\phi^*(B)$ is a polynomial function of B and where

$$y_{1,t} = (1+B)(1+B^2)(1+B^4+B^8)y_t$$

$$y_{2,t} = -(1-B)(1+B^2)(1+B^4+B^8)y_t$$

$$y_{3,t} = -(1-B^2)(1+B^4+B^8)y_t$$

$$y_{4,t} = -(1-B^4)(1-\sqrt{3}B+B^2)(1+B^2+B^4)y_t$$

$$y_{5,t} = -(1-B^4)(1+\sqrt{3}B+B^2)(1+B^2+B^4)y_t$$

$$y_{6,t} = -(1-B^4)(1-B^2+B^4)(1-B+B^2)y_t$$

$$y_{7,t} = -(1-B^4)(1-B^2+B^4)(1+B+B^2)y_t$$

$$y_{8,t} = (1-B^{12})y_t$$

The μ_t might consist of constant, eleven seasonal dummies, and a linear deterministic time trend. The OLS is applied for (9) in order to estimate the π_i and the corresponding standard error. If π_2 through π_{12} differ from zero, there are no seasonal unit roots. Table 4.3 shows the seasonal unit tests on four tourist arrivals series, using EViews6 econometric software package. Under the null hypothesis $H_0 : \pi_2 = ... = \pi_{12} = 0$, the joint F ($\pi_2\ \pi_{12}$) value are larger than the critical values for testing for seasonal unit root in monthly data based on Franses (Franses & Hobijn, 1997) at 5% level, signifying every series rejects the presence of unit roots at all seasonal frequencies at conventional level. This means that seasonal pattern can be represented by deterministic dummies.

The characteristic of tourist arrivals series in Figure 4 may be due to the level shift or the structural break. If there is a shift in the level of tourist arrivals, it should be taken into account for unit root test because the traditional ADF test has very low power if the shift is ignored (Perron, 1989). One possible approach is to include the shift function denoted $f_t(\theta)'\gamma$ to the deterministic term μ_t (see (Lanne, Lütkepohl, & Saikkonen, 2002, 2003) for further details). Hence, a model is represented as follows;

$$y_t = \mu_0 + \mu_1 t + f_t(\theta)'\gamma + x_t \qquad (10)$$

where θ and γ are unknown parameters or parameter vectors and the stochastic process x_t are generated by an AR(p) process $b(L)(1-\rho L)x_t = \varepsilon_t$ where

$\varepsilon_t \sim iid(0,\sigma^2)$ and $b(L) = 1 - b_1 L - ... - b_p L^p$ has all its zero outside the unit circle if $p > 1$, while $-1 < \rho \leq 1$. If $\rho = 1$, a unit root is present. The shift function may be (1) shift dummy variable with shift date or break date T_B (2) exponential distribution function or (3) rational function, as follows,

$$f_1^{(1)} = d_{1t} := \begin{cases} 0, & t < T_B \\ 1, & t \geq T_B \end{cases} \tag{11}$$

$$f_1^{(2)}(\theta) = \begin{cases} 0, & t < T_B \\ 1 - \exp\{-\theta(t - T_B + 1)\}, & t \geq T_B \end{cases} \tag{12}$$

$$f_1^{(3)}(\theta) = \left[\frac{d_{1,t}}{1-\theta L} : \frac{d_{1,t-1}}{1-\theta L} \right]' \tag{13}$$

Lanne et al. have defined $\hat{\omega}_t = \hat{\alpha}^*(L)\hat{x}_t$ and base the unit root test on the auxiliary regression model (Lanne et al., 2003);

$$\Delta\hat{\omega}_t = \upsilon + \phi\hat{\omega}_{t-1} + \left[\hat{\alpha}^*(L)\Delta f_t(\hat{\theta})'\right]\pi_1 + \left[\hat{\alpha}^*(L)\Delta F_t(\hat{\theta})'\right]\pi_2 + \sum_{j=1}^{p-1}\alpha_j \Delta\hat{x}_{t-j} + r_t \tag{14}$$

Based on OLS estimation of this model, the unit root test statistic is obtained as the usual t-statistic for the null hypothesis of a unit root $\phi = 1$. Table 4.4 presents the unit root tests with level shift for tourist arrivals, using JMulTi econometric software package. Based on the break date and the AR order p suggested from JMulTi (Lütkepohl & Kr¨atzig, 2006), the results show that the test statistic values of all country are not statistical significant at 5% level based on critical values for unit root with level shift of Lanne et al. (Lanne et al., 2002), meaning every tourist arrival series have unit root.

Figure 4.5 presents the graphs of the logarithm of the monthly tourist arrival rate of four countries. All countries show distinct seasonal patterns, but no time trend pattern exists. Surprisingly, while Singapore and Thailand display steady growth in the log of tourist arrival rate, Indonesia and Malaysia exhibit greater volatility, with clustering (periods of high volatility followed by periods of tranquility). Quite evidently, the volatility of tourism arrivals rate of Malaysia in the years before 2003 are higher than in subsequent years. As in the plot of the number of tourist arrivals, SARS affected the log arrival rate significantly and negatively. Figure 4.6 displays the volatilities of the log of tourist arrival rate in four countries, where volatility is calculated as the square of the estimated residuals from an ARMA(1,1) process. The plots of the volatilities in Figure 4.6 are similar in all four countries, with volatility clustering and an obvious outlier due to the outbreak of SARS in 2003.

Table 4.5 presents the descriptive statistics for the logarithm of the monthly tourist arrival rate of four countries. The averages of the log of tourist arrival rate of four countries are quite small and similar, while Malaysia has the largest average log arrival rate. The Jarque-Bera Lagrange Multiplier test statistics of the log of tourist arrival rate in each country are statistically significant, thereby indicating that the distributions of these log of tourist arrival rate are not normal, which may be due to the presence of extreme observations.

The unit root tests for all logarithm of the monthly tourist arrival rate are summarized in Table 4.6, using the EViews6. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are used to test the null hypothesis of a unit root against the alternative hypothesis of stationarity. The tests provide large negative values in all cases, such that the individual logarithm of tourist arrival rate series rejects the null hypothesis at the 5% level, thereby indicating that all logarithm of tourist arrival rate are stationary. These test results are supported by the KPSS test (the results are available on request).

4.5 Empirical Results

This section models the conditional volatility of the logarithm of the monthly tourist arrival rate from the four leading ASEAN tourism countries, namely Indonesia, Malaysia, Singapore and Thailand, using the CCC, VARMA-GARCH and VARMA-AGARCH models. As the univariate ARMA-GARCH model is nested in the VARMA-GARCH model, and ARMA-GJR is nested in the VARMA-AGARCH model, with the conditional variances specified as in (2) and (3), the univariate ARMA-GARCH and ARMA-GJR models are also estimated.

The univariate conditional volatility models, GARCH(1,1), GJR(1,1) and EGARCH(1,1), were estimated with different mean equations. Tables 4.7, 4.8 and 4.9 report the estimated parameters using QMLE and the Bollerslev-Wooldridge robust t-ratios (Bollerslev & Wooldridge, 1992). The empirically satisfactory log-moment and second moment conditions were also calculated, and are available from the authors upon request.

The univariate GARCH estimates for the logarithm of the monthly tourist arrival rate are given in Table 4.7. The coefficients in the mean equation are statistically significant for ARMA(1,1) for the log arrival rate series. Surprisingly, the coefficients in the variance equation are statistically significant, both in the short run and long run, only for Malaysia, and for Singapore only in the short run.

The results of two asymmetric GARCH(1,1) models, namely GJR(1,1) and EGARCH (1,1), are reported in Tables 8 and 9. For GJR(1,1), only the coefficients in the mean equation for AR(1) are statistically significant, whereas the ARMA(1,1) coefficients are statistically significant only for Indonesia, Malaysia and Thailand. The estimates of the asymmetric effects of positive and negative shocks of equal magnitude on the conditional volatility in the GJR(1,1) model are not statistically significant, except for Indonesia and Thailand in the AR(1)-GJR(1,1) model. Therefore, the GJR model is preferred to GARCH only for Indonesia and Thailand.

For the EGARCH model in Table 4.9, the coefficient in the mean equation is statistically significant only for ARMA(1,1). The estimates of the asymmetric effects of positive and negative shocks on the conditional volatility are also not statistically significant, except for Singapore and Thailand. Therefore, the EGARCH (1,1) model is preferred to GARCH only for Indonesia and Thailand.

Table 4.10 presents the constant conditional correlations from the CCC model, with p = q = r = s = 1, using the RATS 6.2 econometric software package. The two entries corresponding to each of the parameters are the estimate and the Bollerslev-Wooldridge robust t-ratios (Bollerslev & Wooldridge, 1992). For the four country destinations, there are six pairs of countries to be analyzed. The lowest estimated constant conditional correlation is 0.301 between Malaysia and Thailand, while the highest is 0.716 between Singapore and Thailand. This suggests that the standardized shocks in the log of the monthly tourist arrival rate for both countries are moving in the same direction. However, the CCC model does not contain any information regarding cross-country spillover or asymmetric effects.

In order to examine the interdependent and dependent effects of volatility from one country on another, and to capture the asymmetric behaviour of the unconditional shocks on conditional volatility, the VARMA-GARCH and VARMA-

AGARCH models are also estimated. The corresponding multivariate estimates of the VARMA(1,1)-GARCH(1,1) and VARMA(1,1)-AGARCH(1,1) models for each pair of countries using the BHHH (Berndt, Hall, Hall and Hausman) algorithm, and the Bollerslev-Wooldridge robust t-ratios (Bollerslev & Wooldridge, 1992), are reported in Tables 4.11 and 4.12. In Table 4.11, the ARCH and GARCH effects are significant only for the pairs Thailand_Singapore, Singapore_Indonesia and Singapore_Malaysia, while the pairs Thailand_ Malaysia and Indonesia_Malaysia have only a significant GARCH effect. In addition, volatility spillovers are found in every pair of countries, except for Thailand_Indonesia. Interestingly, a significant interdependence in the conditional volatilities between the logarithms of the monthly tourist arrival rate is evident in the pair Thailand_Singapore.

Table 4.12 presents the VARMA-AGARCH estimates and corresponding Bollerslev-Wooldridge robust t-ratios (Bollerslev & Wooldridge, 1992). The ARCH and GARCH effects are significant only in the pairs Thailand_Indonesia, Singapore_Indonesia, Singapore_Malaysia and Indonesia_Malaysia, while the pair Thailand_Singapore only has a significant GARCH effect. In addition, volatility spillovers are found in all pairs of countries, except for Thailand_Indonesia and Thailand_Malaysia. Surprisingly, as in the case of VARMA-GARCH, there is significant interdependence in the conditional volatilities between the logarithms of the monthly tourist arrival rate between Thailand_Singapore. As the asymmetric spillover effects for each log of the tourist rate are not statistically significant, except for Thailand_Singapore, it follows that VARMA-AGARCH is dominated by VARMA-GARCH.

4.6 Concluding Remarks

The purpose of this study was to estimate the conditional variance, or volatility, of monthly international tourist arrivals to the four leading tourism countries in South-East Asia, namely Indonesia, Malaysia, Singapore and Thailand, and to determine the interdependence of international tourism demand of these leading ASEAN destinations, for the period January 1997 to July 2009. The modelling and econometric analysis of volatility in tourism demand can provide a useful tool for tourism organizations and government agencies concerned with travel and tourism. This is especially important for encouraging regional co-operation in tourism development among ASEAN member countries, and for mobilizing international and regional organizations to provide appropriate policy for the tourism industry.

This study applied several recently developed models of multivariate conditional volatility, namely the CCC model of Bollerslev (1990), VARMA-GARCH model of Ling and McAleer (2003), and VARMA-AGARCH model of McAleer et al. (2009), to investigate the interdependence of international tourism demand, as measured by international tourist arrivals, and its associated volatility, in the leading tourism destinations. The constant conditional correlation between the log of the monthly tourist arrival rate from the CCC model were found to lie in the range of medium to high. The highest conditional correlation was between the pair of Thailand and Singapore.

The empirical results from the VARMA-GARCH and VARMA-AGARCH models also provided evidence of cross-country dependence in most country pairs. In addition, the results indicated that interdependent effects occur only between the pair

Thailand and Singapore. However, in the conditional variance between the different countries, there is no evidence of volatility spillovers between Thailand and Indonesia.

Table 4.1 International Tourist Arrivals by Region

Regions	International Tourist Arrivals (million)							Market share (%)	Change (%)		Average annual growth (%)
	1990	1995	2000	2005	2006	2007	2008		07/06	08/07	
Europe	**265.0**	**309.5**	**392.6**	**441.8**	**468.4**	**487.9**	**489.4**	**53.1**	**4.1**	**0.3**	**2.8**
Northern Europe	28.6	35.8	43.7	52.8	56.5	58.1	57.0	6.2	2.8	-1.9	3.4
Western Europe	108.6	112.2	139.7	142.6	149.6	154.9	153.3	16.6	3.6	-1.1	1.2
Central/Eastern Europe	33.9	58.1	69.3	87.5	91.4	96.6	99.6	10.8	5.6	3.1	4.6
Southern/Mediter.Eu.	93.9	103.4	139.9	158.9	170.9	178.2	179.6	19.5	4.3	0.8	3.2
Asia and the Pacific	**55.8**	**82.0**	**110.1**	**153.6**	**166.0**	**182.0**	**184.1**	**20.0**	**9.6**	**1.2**	**6.6**
North-East Asia	26.4	41.3	58.3	86.0	92.0	101.0	101.0	10.9	9.8	-0.1	7.1
South-East Asia	21.2	28.4	36.1	48.5	53.1	59.7	61.7	6.7	12.3	3.5	6.9
Ocenia	5.2	8.1	9.6	11.0	11.0	11.2	11.1	1.2	1.7	-0.9	1.8
South Asia	3.2	4.2	6.1	8.1	9,8	10.1	10.3	1.1	2.6	2.1	6.8
Americas	**92.8**	**109.0**	**128.2**	**133.3**	**135.8**	**142.9**	**147.0**	**15.9**	**5.2**	**2.9**	**1.7**
North America	71.7	80.7	91.5	89.9	90.6	95.3	97.8	10.6	5.2	2.6	0.8
Caribbean	11.4	14.0	17.1	18.8	19.4	19.8	20.2	2.2	1.6	2.0	2.1
Central America	1.9	2.6	4.3	6.3	6.9	7.8	8.3	0.9	12.0	7.0	8.4
South America	7.7	11.7	15.3	18.3	18.8	20.1	20.8	2.3	6.5	3.6	3.9
Africa	**15.1**	**20.0**	**27.9**	**37.3**	**41.5**	**45.0**	**46.7**	**5.1**	**8.4**	**3.7**	**6.7**
North Africa	8.4	7.3	10.2	13.9	15.1	16.3	17.2	1.9	8.5	4.9	6.7
Subsaharan Africa	6.7	12.7	17.6	23.4	26.5	28.7	29.5	3.2	8.3	3.1	6.7
Middle East	**9.6**	**13.7**	**24.9**	**37.9**	**40.9**	**46.6**	**55.1**	**6.0**	**14.0**	**18.1**	**10.5**
World	**438**	**534**	**684**	**804**	**853**	**904**	**922**	**100**	**6.1**	**2.0**	**3.8**

Source: World Tourism Organization (UNWTO), 2009.

Table 4.2 International Tourist Arrivals to Asia and the Pacific

Major destinations	International Tourist Arrivals (million)						International Tourism Receipts (%)			
	(1000)			Change (%)		Share(%)	(US$ million)			Share (%)
	2006	2007	2008	07/06	08/07	2008	2006	2007	2008	2008
North-East Asia										
China	49,913	54,720	53,049	9.6	-3.1	28.8	33,949	37,233	40,843	19.8
Hong Kong (China)	15,822	17,154	17,320	8.4	1.0	9.4	11,638	13,754	15,300	7.4
Japan	7,334	8,347	8,351	13.8	0.0	4.5	8,469	9,334	10,821	5.3
Korea, Republic of	6,155	6,448	6,891	4.8	6.9	3.7	5,788	6,138	9,078	4.4
Macao (China)	10,683	12,942	10,605	21.2	..	5.8	9,829	13,612	13,382	6.5
Taiwan (pr.of China)	3,520	3,716	3,845	5.6	3.5	2.1	5,136	5,213	5,937	2.9
South-East Asia										
Cambodia	1,591	1,873	2,001	17.7	6.8	1.1	963	1,135	1,221	0.6
Indonesia	4,871	5,506	6,234	13.0	13.2	3.4	4,448	5,346	7,345	3.6
Lao P.D.R.	842	1,142	1,295	35.6	13.4	0.7	173	233	276	0.1
Malaysia	17,547	20,973	22,052	19.5	5.1	12.0	10,424	14,047	15,277	7.4
Phillippines	2,843	3,092	3,139	8.7	1.5	1.7	3,501	4,931	4,388	2.1
Singapore	7,588	7,957	7,778	4.9	-2.2	4.2	7,535	9,162	10,575	5.1
Thailand	13,822	14,464	14,584	4.6	0.8	7.9	13,401	16,669	17,651	8.6
Vietnam	3,584	4,229	4,236	18.0	0.2	2.3	3,200	3,477	3,926	1.9
Ocenia										
Australia	5,532	5,644	5,586	2.0	-1.0	3.0	17,840	22,298	24,660	12.0
New Zealand	2,422	2,466	2,459	1.8	-0.3	1.3	4,738	5,400	4,912	2.4
Fiji	549	540	585	-1.6	8.4	0.3	480	497	568	0.3
South Asia										
India	4,447	5,082	5,367	14.3	5.6	2.9	8,634	10,729	11,832	5.7
Maldives	602	676	683	12.3	1.1	0.4	512	602	636	0.3
Nepal	384	527	500	37.2	-5.0	0.3	128	198	336	0.1
Pakistan	898	840	823	-6.6	-2.0	0.5	255	276	245	0.1
Sri Lanka	560	494	438	-11.7	-11.2	0.3	410	385	342	0.2
Asia and the Pacific	**165,989**	**181,984**	**184,104**	**9.6**	**1.2**	**100**	**157,067**	**186,789**	**206,022**	**100**

Source: World Tourism Organization (UNWTO), 2009

Table 4.3 Seasonal Unit Root Tests

	Auxiliary Regression			
***t*-Statisitics**	**Indonesia**	**Malaysia**	**Singapore**	**Thailand**
π_1	**-0.044**	**-0.031**	-0.015	-0.030
π_2	**-0.202**	-0.132	**-0.193**	**-0.241**
π_3	-0.013	-0.128	**-0.182**	-0.098
π_4	**-0.172**	**-0.252**	-0.076	**-0.248**
π_5	**-0.222**	-0.199	**-0.255**	**-0.441**
π_6	**-0.272**	**-0.277**	**-0.288**	**-0.327**
π_7	0.037	0.020	0.041	0.062
π_8	**-0.106**	**-0.062**	**-0.077**	**-0.094**
π_9	**-0.233**	-0.138	-0.094	**-0.301**
π_{10}	**-0.238**	**-0.184**	**-0.241**	**-0.560**
π_{11}	0.022	-0.048	-0.020	0.002
π_{12}	**-0.108**	-0.080	**-0.103**	-0.115
***F*-Statisitics**				
π_3, π_4	2.706	4.808	3.880	3.236
π_5, π_6	3.626	2.977	5.073	**7.554**
π_7, π_8	**7.036**	5.506	5.742	5.539
π_9, π_{10}	4.058	2.586	3.778	**8.539**
π_{11}, π_{12}	3.090	3.375	4.481	2.637
π_2, π_{12}	**5.241**	**5.413**	**5.641**	**6.102**
π_1, π_{12}	**5.582**	**5.600**	**5.858**	**6.492**

Notes: (1) The auxiliary regression contains constant, seasonal dummies and trend.

(2) Entries in bold are significant at 5%.

(3) The critical value for testing unit root with level shift are based on Franses (2002)

Table 4.4 Unit Root Tests with Level Shift

	Shift Function			Critical Value	
	$f_1^{(1)}\gamma$	$f_1^{(2)}(\theta)\gamma$	$f_1^{(3)}(\theta)\gamma$	**1%**	**5%**
Indonesia	-1.580	-1.678	-1.714	-3.48	-2.88
Malaysia	-2.202	-2.622	-2.180		
Singapore	-2.497	-2.553	-2.455		
Thailand	-0.663	-1.346	-0.540		

Notes: (1) The auxiliary regression contains constant and seasonal dummies.

(2) Shift functions are $f_1^{(1)} = d_{1t} := \begin{cases} 0, & t < T_B \\ 1, & t \geq T_B \end{cases}$, $f_1^{(2)}(\theta) = \begin{cases} 0, & t < T_B \\ 1 - \exp\{-\theta(t - T_B + 1)\}, & t \geq T_B \end{cases}$

and $f_1^{(3)}(\theta) = \left[\dfrac{d_{1,t}}{1-\theta L} : \dfrac{d_{1,t-1}}{1-\theta L}\right]'$.

(3) Entries in bold are significant at 5%.

(4) The critical value for testing unit root with level shift are based on Lanne et al. (2002)

Table 4.5 Descriptive Statistics

Commodity	Mean	Max	Min	S.D.	Skewness	Kurtosis	Jarque-Bera
Indonesia	0.003	0.323	-0.349	0.115	-0.416	3.504	5.915
Malaysia	0.012	0.284	-0.637	0.138	-1.257	7.666	175.534
Singapore	0.002	0.577	-0.011	0.141	-1.653	21.740	2263.38
Thailand	0.004	0.454	-0.608	0.141	-0.509	5.327	40.331

Table 4.6 Unit Root Tests

Country	Augmented Dicky-Fuller			Phillip-Peron			KPSS	
	N	C	C&T	N	C	C&T	C	C&T
Indonesia	**-11.660**	**-11.626**	**-11.610**	**-16.955**	**-16.952**	**-17.158**	**0.102**	**0.067**
Malaysia	**-13.170**	**-13.234**	**-13.190**	**-14.737**	**-16.399**	**-16.355**	**0.071**	**0.068**
Singapore	**-8.179**	**-8.159**	**-8.143**	**-23.739**	**-31.210**	**-37.388**	**0.500**	0.500
Thailand	**-8.446**	**-8.626**	**-8.626**	**-15.718**	**-16.243**	**-16.143**	**0.111**	**0.095**

Table 4.7 GARCH(1,1), AR(1)-GARCH(1,1) and ARMA(1,1)-GARCH(1,1) Estimates

Country	Mean equation			Variance equation			AIC	SIC
	c	AR(1)	MA(1)	$\hat{\omega}$	$\hat{\alpha}$	$\hat{\beta}$		
Indonesia	0.002			0.004	0.107	0.577	-1.463	-1.383
	0.268			0.719	0.941	1.097		
	0.003	-0.111		0.004	0.105	0.597	-1.455	-1.354
	0.305	-1.300		0.652	0.923	1.091		
	0.001	**0.682**	**-0.983**	0.002	0.077	0.728	-1.566	-1.445
	1.056	**11.01**	**-91.50**	0.575	0.978	1.781		
Malaysia	0.003			0.0004	**0.285**	**0.769**	-1.195	-1.115
	0.228			1.457	**3.392**	**17.96**		
	0.005	**-0.309**		0.0002	**0.450**	**0.713**	-1.243	-1.142
	0.612	**-2.442**		0.700	**2.925**	**13.63**		
	0.010	**0.555**	**-0.934**	0.0004	**0.485**	**0.628**	-1.243	-1.142
	10.286	**3.544**	**-31.53**	1.496	**2.145**	**6.374**		
Singapore	0.007			**0.006**	0.166	**0.511**	-1.171	-1.090
	0.899			**2.275**	1.721	**3.477**		
	0.017	**-0.254**		**0.009**	0.849	0.017	-1.209	-1.108
	1.960	**-2.921**		**4.610**	0.907	0.125		
	0.016	**-0.576**	**0.891**	**0.005**	**0.791**	0.063	-1.460	-1.339
	1.818	**-7.347**	**37.91**	**3.265**	**2.199**	0.621		
Thailand	-0.002			0.009	0.227	0.295	-1.112	-1.032
	-0.181			1.178	1.175	0.625		
	-0.004	0.102		0.008	0.227	0.369	-1.108	-1.008
	-0.380	0.970		1.290	1.206	0.955		
	-0.005	**-0.451**	**0.737**	0.007	0.266	0.332	-1.187	-1.067
	-0.396	**-2.700**	**6.021**	1.665	1.306	1.077		

Note: The two entries for each parameter are their respective parameter estimate and Bollerslev and Wooldridge (1992) robust *t*- ratios. Entries in bold are significant at the 5% level.

Table 4.8 GJR(1,1), AR(1)-GJR(1,1) and ARMA(1,1)-GJR(1,1) Estimates

Country	Mean equation			Variance equation				AIC	SIC
	c	AR(1)	MA(1)	$\hat{\omega}$	$\hat{\alpha}$	$\hat{\gamma}$	$\hat{\beta}$		
Indonesia	-0.004			0.002	-0.063	0.247	**0.766**	-	-1.369
	-0.455			0.965	-0.336	1.456	**2.769**	1.469	
	-	**-0.211**		**0.001**	**-0.183**	**0.309**	**0.996**	-	-1.369
	0.011	**-3.428**		**4.278**	**-9.534**	**12.32**	**48.31**	1.469	
	-								
	1.777								
	0.001	**0.672**	**-0.984**	**0.020**	0.132	-0.087	**-0.859**		
	1.586	**11.25**	**-106.1**	**4.452**	1.194	-0.706	**-4.514**		
Malaysia	0.004			**0.011**	-0.030	0.587	0.182	-	-
	0.356			**2.301**	-0.211	1.413	1.359	1.153	1.053
	0.008	**-0.206**		**0.012**	-0.098	0.686	0.174	-	-1.039
	0.842	**-2.559**		**2.714**	-1.094	1.437	1.508	1.160	
	0.010	**0.579**	**-0.945**	0.0005	**0.607**	-0.270	**0.636**	-	-1.233
	9.412	**4.309**	**-30.83**	1.477	**2.271**	-0.943	**5.289**	1.375	
Singapore	-			**0.006**	-0.122	2.310	**0.278**	-	-1.220
	0.009			**6.567**	-1.812	1.156	**2.532**	1.321	
	-								
	1.244								
	-	**-0.252**		**0.006**	**-0.250**	2.030	0.416	-	-1.253
	0.016	**-5.281**		**3.654**	**-5.734**	0.900	1.933	1.374	
	-								
	2.434								
	-	0.200	**-0.582**	**0.004**	**-0.210**	1.729	**0.440**	-	-1.327
	0.003	1.840	**-8.628**	**4.592**	**-3.371**	0.907	**2.552**	1.468	
	-								
	0.554								
Thailand	-			0.003	**-0.210**	**0.554**	**0.828**	-	-1.057
	0.016			1.357	**-2.870**	**2.071**	**5.978**	1.158	
	-								
	1.596								
	-	**0.196**		**0.006**	**-0.178**	**0.612**	**0.577**	-	-1.036
	0.018	**3.200**		**2.543**	**-2.829**	**2.074**	**4.055**	1.157	
	-								
	1.247								
	-	**-0.410**	**0.679**	**0.006**	**-0.149**	0.430	**0.572**	-	-1.100
	0.011	**-2.604**	**4.120**	**2.005**	**-2.001**	1.481	**3.010**	1.241	
	-								
	0.843								

Note: The two entries for each parameter are their respective parameter estimate and Bollerslev and Wooldridge (1992) robust *t*- ratios. Entries in bold are significant at the 5% level.

Table 4.9 EGARCH(1,1), AR(1)- EGARCH(1,1) and ARMA(1,1)-EGARCH(1,1) Estimates

Country	Mean equation			Variance equation				AIC	SIC
	c	AR(1)	MA(1)	$\hat{\omega}$	$\hat{\alpha}$	$\hat{\gamma}$	$\hat{\beta}$		
Indonesia	0.004			-6.425	0.136	0.191	-0.448	-	-
	0.495			-3.215	0.727	1.565	-1.027	1.457	1.356
	0.003	-0.047		**-6.520**	0.107	0.174	-0.477	-	-
	0.357	-0.559		**-2.958**	0.551	1.420	-0.985	1.440	1.319
	0.001	**0.641**	**-0.983**	**-8.147**	**0.298**	-0.012	**-0.752**	-	-
	1.647	**10.27**	**-85.76**	**-16.45**	**2.623**	-0.143	**-6.325**	1.580	1.439
Malaysia	0.012			-0.307	**0.302**	0.135	**0.978**	-	-
	1.298			-1.779	**4.810**	0.498	**28.03**	1.213	1.112
	0.012	-0.139		-2.726	0.061	**-0.305**	0.336	-	-
	1.266	-1.524		-1.369	0.270	**-2.085**	0.619	1.124	1.003
	0.011	**-0.938**	**0.984**	**-0.362**	**0.316**	0.014	**0.973**	-	-
	1.315	**-22.90**	**65.14**	**-2.812**	**4.841**	0.094	**42.34**	1.283	1.142
Singapore	**-0.029**			-0.217	-0.177	**-0.560**	**0.896**	-	-
	-3.180			-0.735	-0.842	**-2.040**	**36.43**	1.465	1.365
	-0.026	-0.050		-0.130	-0.188	**-0.556**	**0.919**	-	-
	-2.603	-0.597		-1.413	-1.492	**-2.458**	**51.79**	1.445	1.324
	0.003	**0.495**	**-0.990**	**-7.225**	0.185	**-0.668**	**-0.482**	-	-
	10.54	**9.964**	**-333.8**	**-14.35**	0.757	**-3.545**	**-4.632**	1.822	1.681
Thailand	-0.017			-0.235	-0.001	**-0.382**	**0.934**	-	-
	-1.705			-0.687	-0.009	**-2.714**	**12.04**	1.150	1.049
	-0.023	0.116		-0.428	0.076	**-0.344**	**0.901**	-	-
	-1.739	1.259		-0.787	0.581	**-2.543**	**7.619**	1.143	1.022
	-0.018	-0.392	**0.663**	-0.269	0.044	**-0.292**	**0.937**	-	-
	-1.459	-1.950	**3.782**	-0.644	0.348	**-2.144**	**10.53**	1.192	1.051

Note: The two entries for each parameter are their respective parameter estimate and Bollerslev and Wooldridge (1992) robust *t*- ratios. Entries in bold are significant at the 5% level.

Table 4.10 Constant Conditional Correlations

Country	Indonesia	t-ratio	Malaysia	t-ratio	Singapore	t-ratio	Thailand
Indonesia	1						
Malaysia	**0.318**	(3.429)	1				
Singapore	**0.534**	(6.420)	**0.405**	(3.468)	1		
Thailand	**0.455**	(5.062)	**0.301**	(3.389)	**0.716**	(11.195)	1

Note: The two entries for each parameter are their respective parameter estimate and Bollerslev and Wooldridge (1992) robust *t*- ratios. Entries in bold are significant at the 5% level.

Table 4.11 VARMA-GARCH Estimates

Panel 9a Thailand_Indonesia

Country	ω	α_{Thai}	α_{Indo}	β_{Thai}	β_{Indo}
Thailand	-0.008	0.184	-0.017	0.191	1.489
	-0.941	1.065	-0.125	0.494	1.619
Indonesia	**0.005**	0.088	0.096	-0.224	0.753
	2.261	1.271	1.026	-0.863	1.828

Panel 9b Thailand_Malaysia

Country	ω	α_{Thai}	α_{Malay}	β_{Thai}	β_{Malay}
Thailand	0.007	0.266	0.015	0.336	-0.012
	1.724	1.346	0.441	1.125	-0.391
Malaysia	**0.016**	**0.418**	0.072	**-1.215**	**0.907**
	2.402	**2.034**	1.455	**-2.289**	**12.84**

Panel 9c Thailand_Singapore

Country	ω	α_{Thai}	α_{Sing}	β_{Thai}	β_{Sing}
Thailand	**0.012**	**0.535**	**-0.129**	-0.069	**0.115**
	3.137	**2.483**	**-2.740**	-0.401	**2.573**
Singapore	**0.020**	**0.312**	**0.064**	**-1.404**	**1.014**
	320.4	**3.641**	**2.191**	**-35.73**	**17.04**

Panel 9d Singapore_Indonesia

Country	ω	α_{Sing}	α_{Indo}	β_{Sing}	β_{Indo}
Singapore	-0.001	0.631	-0.019	0.088	0.630
	-0.222	1.305	-0.154	0.432	1.179
Indonesia	**0.012**	**0.244**	**0.133**	**0.198**	**-0.762**
	4.672	**2.472**	**2.657**	**3.006**	**-14.95**

Panel 9e Singapore_Malaysia

Country	ω	α_{Sing}	α_{Malay}	β_{Sing}	β_{Malay}
Singapore	**0.009**	0.315	0.345	**0.413**	**-0.150**
	4.388	1.496	1.695	**2.339**	**-2.650**
Malaysia	0.003	**-0.059**	**0.136**	0.022	**0.833**
	1.443	**-2.746**	**2.161**	1.835	**8.547**

Panel 9f Indonesia_Malaysia

Country	ω	α_{Indo}	α_{Malay}	β_{Indo}	β_{Malay}
Indonesia	0.002	0.075	-0.011	**0.750**	-0.001
	0.648	0.999	-0.681	**2.114**	-0.065
Malaysia	0.002	**-0.247**	0.033	0.395	**0.836**
	0.113	**-5.112**	1.136	0.625	**3.318**

Note: The two entries for each parameter are their respective parameter estimate and Bollerslev and Wooldridge (1992) robust *t*- ratios. Entries in bold are significant at the 5% level.

Table 4.12 VARMA-AGARCH Estimates

Panel 10a Thailand_Indonesia

Country	ω	α_{Thai}	α_{Indo}	γ	β_{Thai}	β_{Indo}
Thailand	-0.005	**-0.144**	0.069	**0.635**	0.303	1.158
	-0.855	**-2.480**	0.562	**2.222**	1.508	1.740
Indonesia	0.001	0.040	**-0.195**	0.257	-0.046	**0.975**
	0.634	1.101	**-2.746**	1.740	-0.361	**16.61**

Panel 10b Thailand_Malaysia

Country	ω	α_{Thai}	α_{Malay}	γ	β_{Thai}	β_{Malay}
Thailand	0.008	-0.126	0.039	0.562	0.374	0.012
	2.095	-1.882	0.858	1.862	1.329	0.416
Malaysia	0.004	0.193	-0.112	0.898	0.730	-0.074
	0.422	1.238	-1.542	1.647	1.125	-0.835

Panel 10c Thailand_Singapore

Country	ω	α_{Thai}	α_{Sing}	γ	β_{Thai}	β_{Sing}
Thailand	**0.009**	-0.036	**-0.172**	**-0.722**	-0.039	**0.409**
	2.509	-0.722	**-2.595**	**2.480**	-0.190	**3.661**
Singapore	**0.017**	**0.157**	-0.155	**0.385**	**-1.044**	**0.972**
	0.017	**2.716**	-1.459	**2.472**	**-1.044**	**19.63**

Panel 10d Singapore_Indonesia

Country	ω	α_{Sing}	α_{Indo}	γ	β_{Sing}	β_{Indo}
Singapore	**0.016**	0.164	0.110	1.228	0.132	**-0.934**
	5.086	1.781	1.461	1.378	1.783	**-4.728**
Indonesia	0.001	0.012	**-0.178**	-2.565	-0.008	**0.999**
	1.915	0.430	**-2.565**	1.690	-0.260	**25.02**

Panel 10e Singapore_Malaysia

Country	ω	α_{Sing}	α_{Malay}	γ	β_{Sing}	β_{Malay}
Singapore	**0.006**	**-0.149**	0.089	1.307	**0.369**	-0.045
	5.927	**-2.374**	1.449	1.297	**2.831**	-2.424
Malaysia	**0.021**	**-0.035**	**-0.285**	0.913	**-0.030**	0.150
	5.174	**-5.033**	**-5.581**	1.840	**-2.974**	1.440

Panel 10f Indonesia_Malaysia

Country	ω	α_{Indo}	α_{Malay}	γ	β_{Indo}	β_{Malay}
Indonesia	**0.002**	-0.149	-0.031	**0.322**	**0.891**	0.013
	2.107	-1.809	-1.267	**2.834**	**12.031**	0.611
Malaysia	**0.038**	**-0.194**	**-0.324**	0.838	**-1.067**	0.223
	4.062	**-3.071**	**-5.352**	1.997	**-2.207**	1.816

Note: The two entries for each parameter are their respective parameter estimate and Bollerslev and Wooldridge (1992) robust *t*- ratios. Entries in bold are significant at the 5% level.

Figure 4.1 Annual Tourism Arrivals and Annual Growth Rates of Leading Four

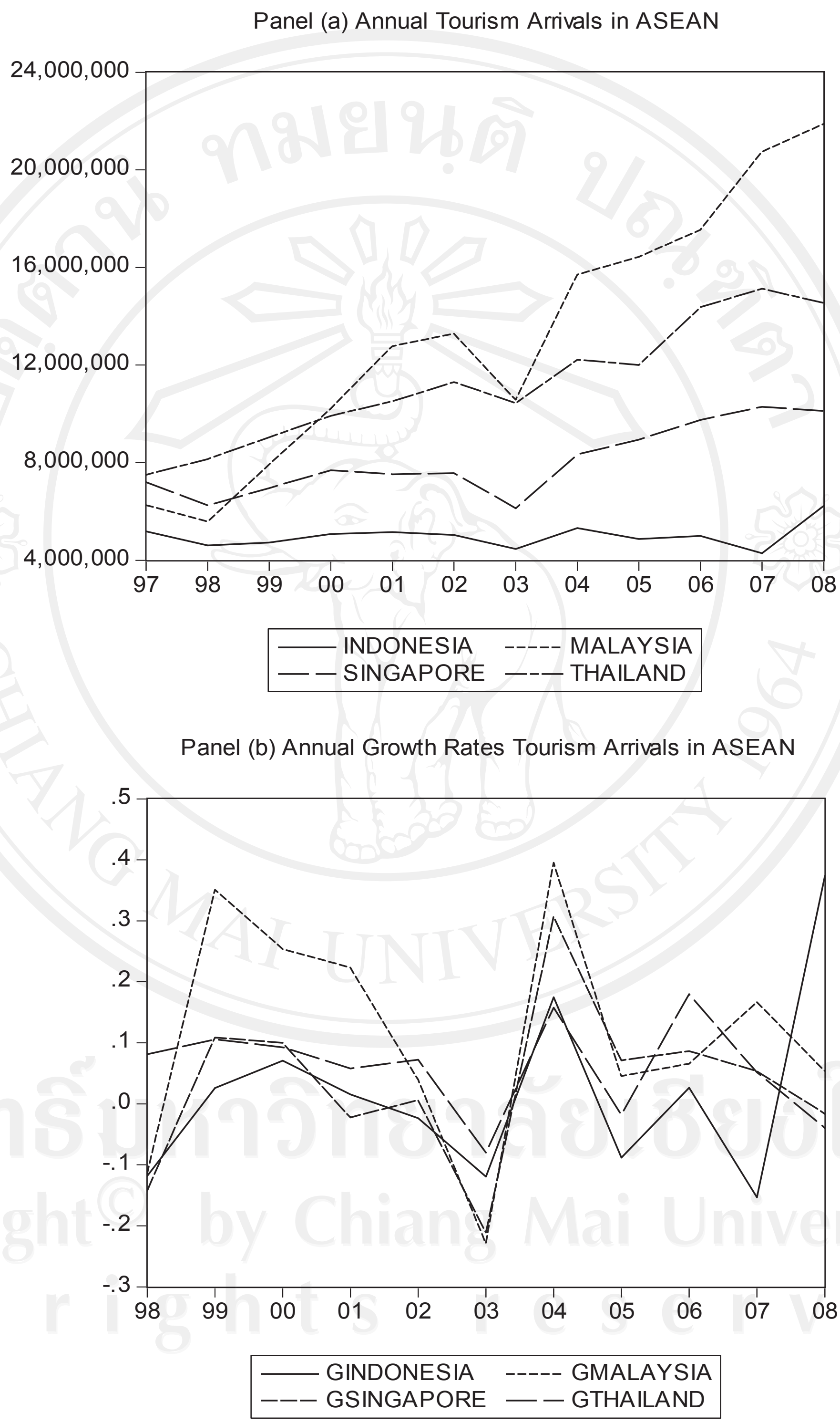
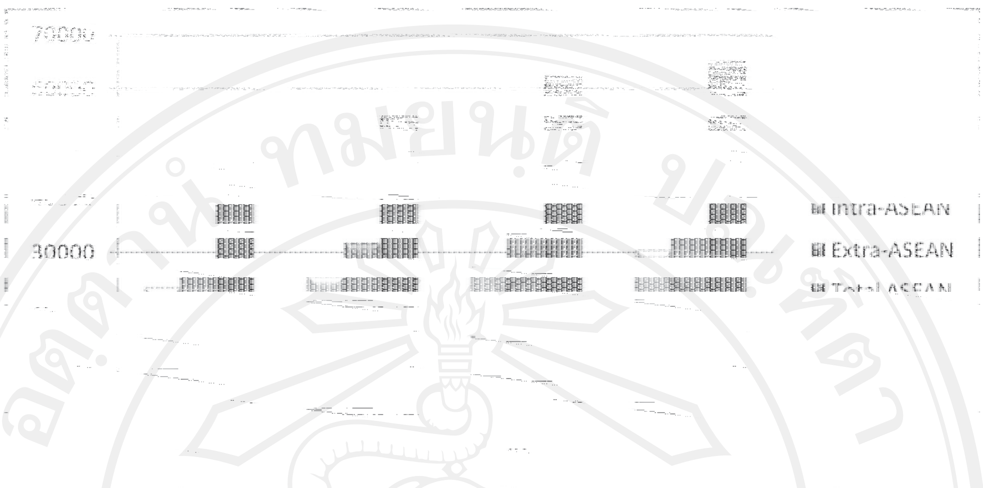
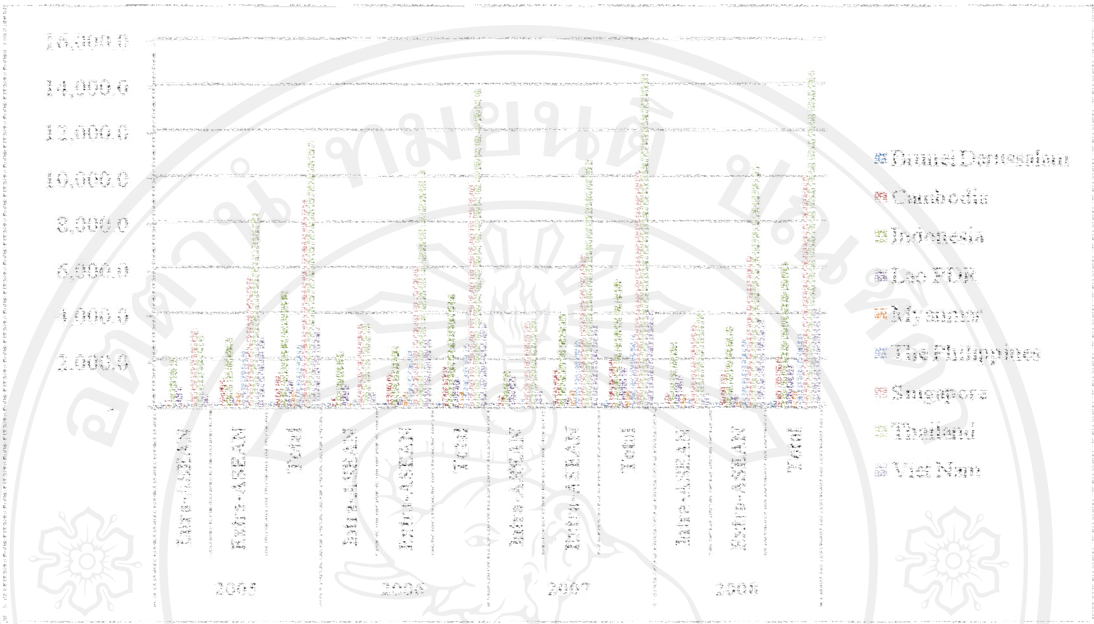


Figure 4.2Tourist Arrivals to ASEAN by Source



Source: ASEAN Tourism Statistical Database 2009.

Figure 4.3 Tourist Arrivals to ASEAN by Country and Source



Source: ASEAN Tourism Statistical Database 2009.

Figure 4.4Tourist Arrivals of Leading Four Countries

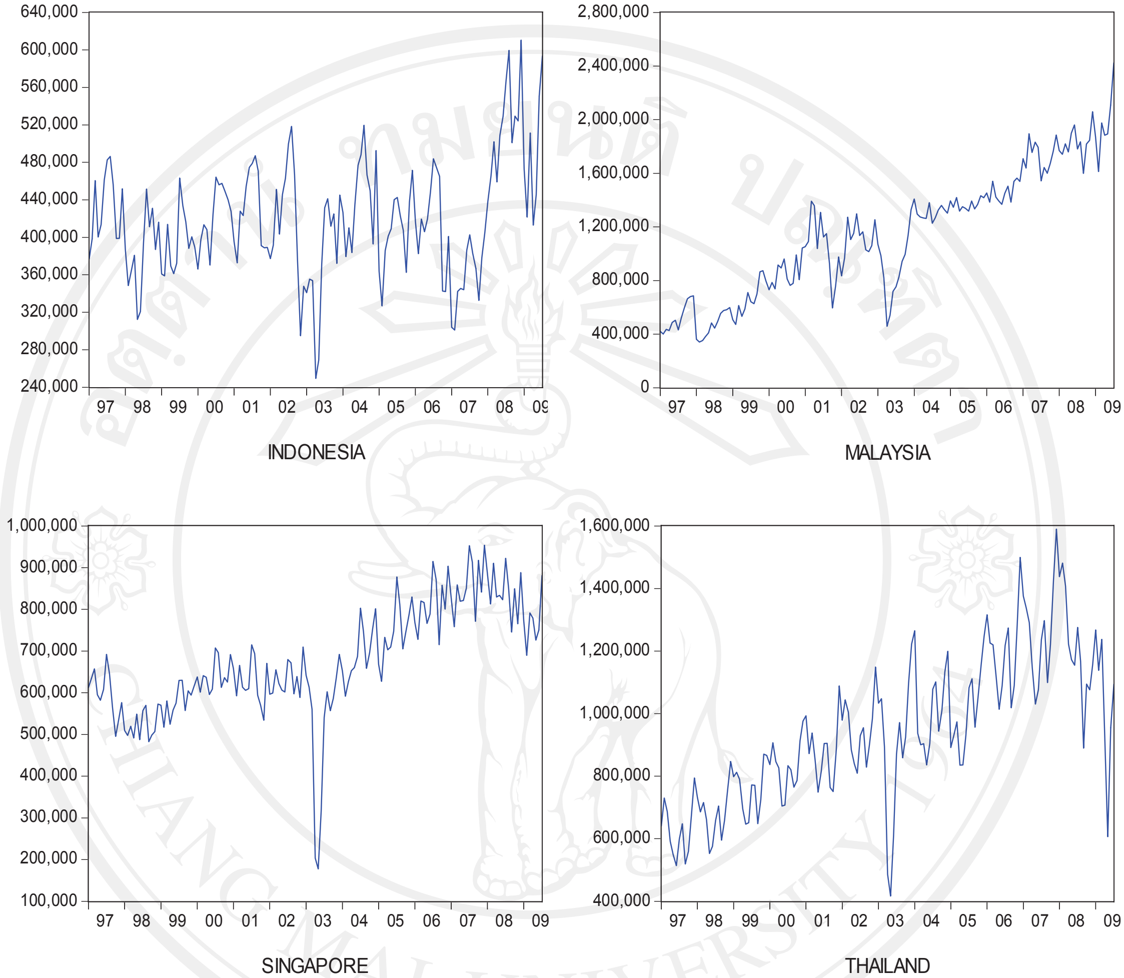


Figure 4.5 Logarithm of Tourist Arrival Rate of Leading Four Countries

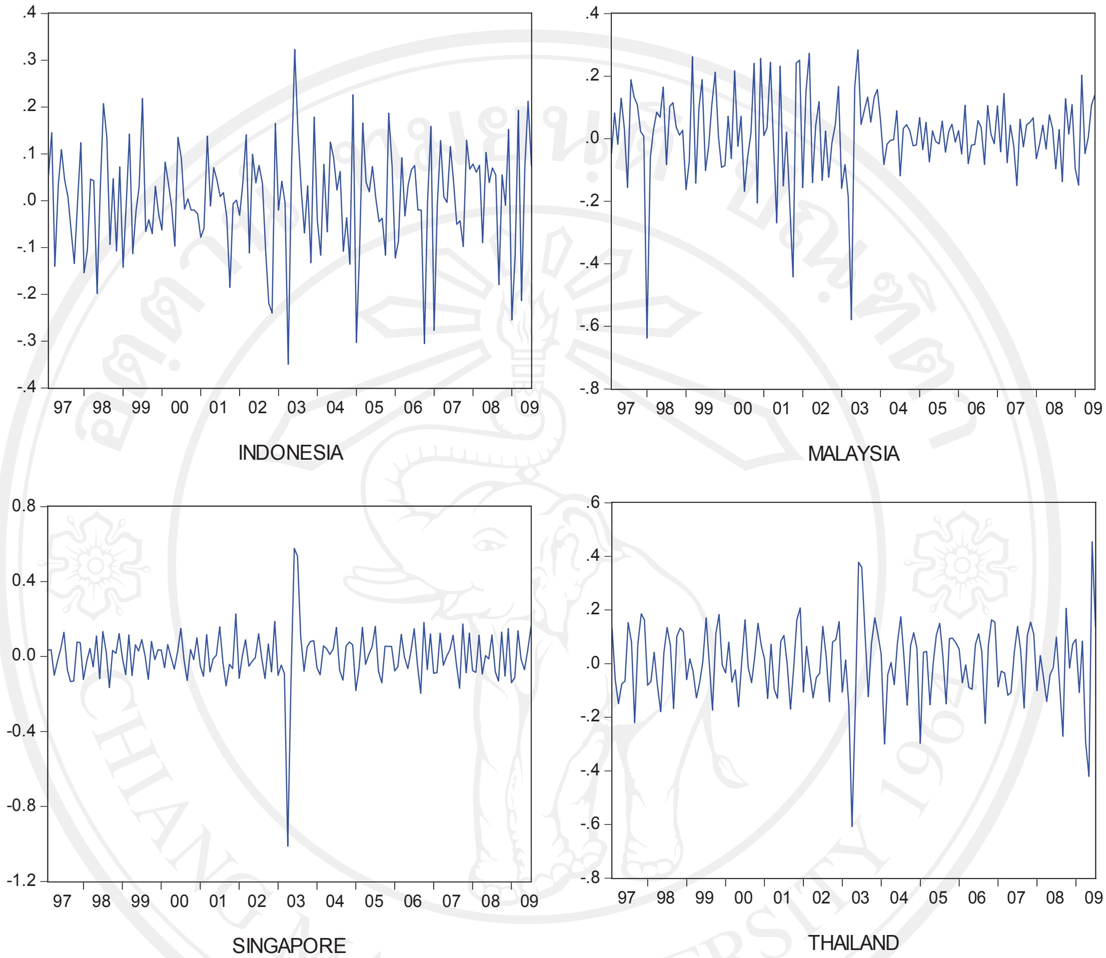
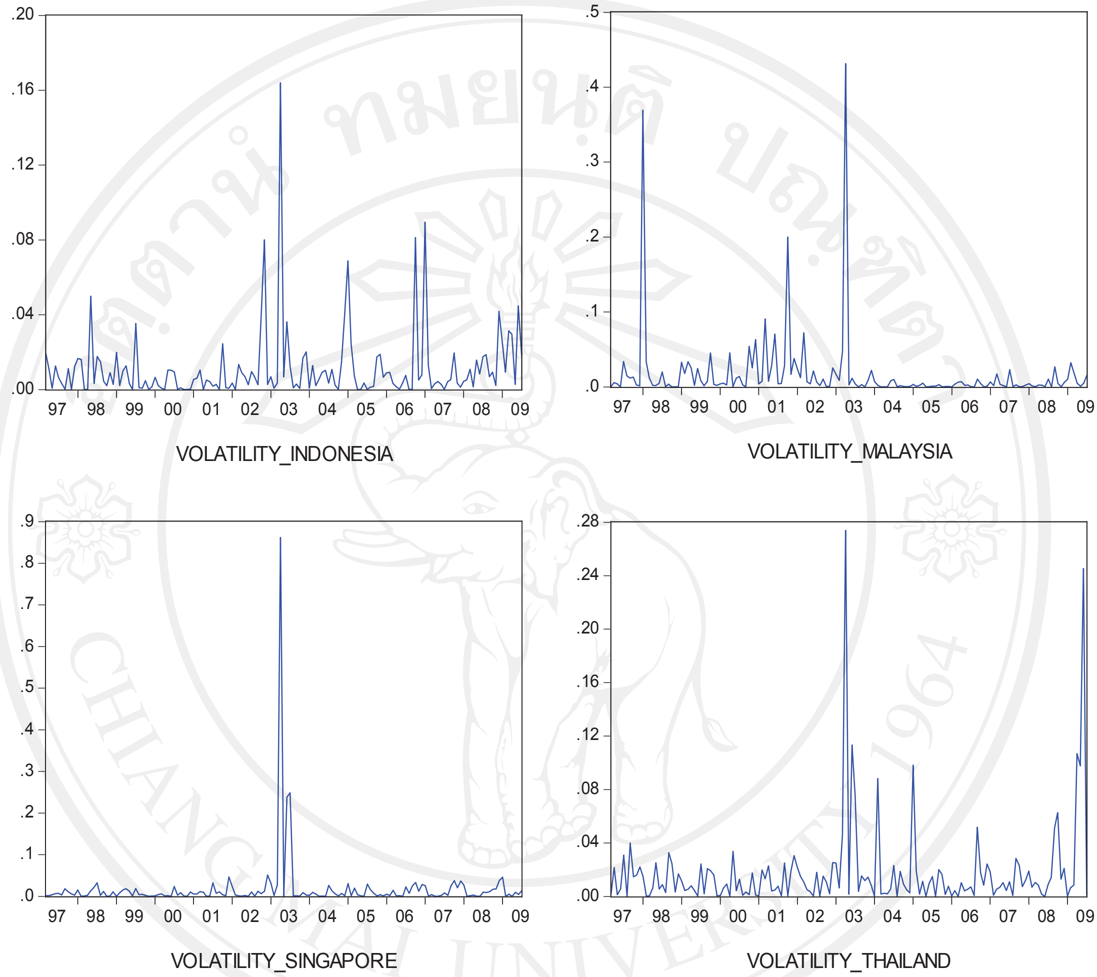


Figure 4.6 Volatility of Log Arrival Rate of Leading Four Countries



Chapter 5

Conclusion

5.1 Summary of the Study

This dissertation contributes to the three separate branches of the literature that together create the context of tourism. The first study sheds light on the heterogeneous causal relationships between tourism specialization and economic growth. The main aim of this study is to verify whether tourism specialization has actually caused identically positive impacts on economic growth across economies with different levels of tourism development. To address this question, this study has utilized the panel threshold regression model of Hansen (Hansen, 1999) as an application to selected cross-country panel data covering 131 countries over the period 1991-2009.

The importance of tourism as a significant growth-enhancing factor has received considerable interest from previous empirical studies of growth. Although there is general agreement on the association between tourism and economic growth, active debate among researchers still precludes a general consensus as to the direction, size, and significance of a precise causal link between them. In other words, evidence regarding whether tourism actually causes economic growth remains contentious and inconclusive. Having reviewed an exhaustive literature on the tourism - economic growth relationship, I found several studies that empirically examined the "aggregate relationship" between tourism and economic growth, with the implicit assumption that tourism uniformly promotes economic growth.

As far as going beyond the empirical investigation of the linear relationship between these two variables, it is worth considering whether there are differences in the contingent effect in the tourism-economic growth linkage across countries. Specifically, the relationship between tourism and economic growth is contingent in nature; it involves nonlinearity and threshold effects. It is highly probable that the tourism-economic growth relationship involves heterogeneity. If a nonlinear relationship exists between tourism and economic growth, then it should be possible to estimate the threshold values, or the endogenous cutting points, at which the sign of the relationship between two variables would probably be significantly different across the various splitting subsamples.

The findings from the first study strongly affirm the existence of nonlinearity and threshold effects within the tourism specialization- economic growth relationship. On the basis of the panel threshold model, tourism does not cause identical impacts on each subsample classified by the degree of tourism specialization, defined as the share of T&T economy GDP to national GDP and used as a threshold variable in the model. The empirical results from threshold estimation indicate that the entire sample should be divided into three regimes. A positive and significant relationship between economic growth and tourism is found only in two regimes, the regime with the degree of tourism specialization lower than 14.97% (regime 1) and the regime with the degree of tourism specialization between 14.97% and 17.50% (regime 2), while an insignificant relationship between economic growth and tourism is found in regime 3, in which the degree of tourism specialization is greater than 17.50%.

The conclusion derived from these results is that tourism significantly promotes economic growth only when the country's share of T&T economy GDP to the national GDP is low or moderate. Meanwhile, in some countries which already have a heavy dependence on tourism, further relative growth in the tourism sector could either make insignificant contributions to the economy or turn out to constitute an important restriction on the economic growth.

One implication regarding this issue is that tourism specialization evidently offers an avenue for economic growth through influx of foreign exchange earnings. Nonetheless the overall contribution of tourism to the economy may potentially be reduced by many factors. One in particular is an insufficiency of domestic financial resources for investment in tourism expansion. The other is the inability to meet tourism requirements from domestic production. As a result, the contribution of tourism to GDP tends to be less than expected.

With regard to the threshold effect in the relationship between tourism and economic growth, further analysis should be carried out on the conditioning factors, other than the degree of tourism specialization noted above, that make the effects of tourism on economic growth differ across countries. With the second study I searched for the existence of thresholds in this relation by applying the technique introduced by Hansen (1999). In addition, as far as the presence of potential endogeneity associated with the purported contribution of tourism to economic growth is mostly concerned, the correction for statistical bias that arises from the endogeneity problem in economic growth models must be handled. The instrumental variable estimation method, introduced by Caner and Hansen (Caner & Hansen, 2004), was used to accommodate this potentially serious problem.

Within this econometric context, the main aim of the second study was to examine the above issue with an emphasis on detecting a threshold level of three macroeconomic variables highly related to international tourism policies which differentially filter and modify the direct effects of tourism specialization. These three conditioning variables are the degree of trade openness, the aggregate investment share in GDP, and government consumption expenditures as a percent of GDP, Taking into account three variables as the possible threshold variables, the findings are very useful to see how each threshold variable divides the whole samples into respective regimes. It potentially could help guide policymakers to set the appropriate level in order to ensure the favorable impacts of tourism specialization on economic growth. Well, they have to monitor them for many other reasons as well; and will often face conflicting needs to increase or decrease the savings-investment rate, for instance.

The results obtained strong support the threshold effects in the relationship between tourism specialization and economic growth under different degree of trade openness regimes, investment share to GDP regimes, and government consumption expenditure share to GDP regimes. Trade openness and investment share to GDP provide evidence of the positive impact on economic growth, while government consumption share to GDP has a negative impact. The estimated results obtained in this study suggest that for countries which have already attained a higher level of trade openness, investment share to GDP, and government consumption share to GDP are likely to cause lower impacts of tourism specialization on economic growth. The conclusion derived from the results is that the threshold effects do indeed exist in the relationship between tourism specialization and economic growth. This implies that changes in degree of trade openness, investment share to GDP, and the government consumption expenditure as a percent of GDP contribute to one of the factors that cause a structural change in the relationship between tourism specialization and economic growth. Therefore, in terms of taking into account of the role of degree of trade openness, investment share to GDP and the government consumption expenditure as a percent of GDP in such relationship, there is a need to derive concrete macroeconomic policy implications to ensure that the implementation of such a policy will not be detrimental to economic growth.

The third and final study analyzed variations in tourism demand, specifically the conditional variance, or volatility, that is essential for investigating the effects of shocks in tourism demand models, in the four leading destinations in ASEAN, namely Indonesia, Malaysia, Singapore and Thailand. Analysis was also done on the presence of interdependent effects in the conditional variances between those four leading countries through several recently developed models of multivariate conditional volatility.

The results provide evidence of cross-country dependence in most country pairs. In addition, the results indicated that interdependent effects occur only between Thailand and Singapore. However, in the conditional variance between the different countries, there is no evidence of volatility spillovers between Thailand and Indonesia. This is an important result as it emphasizes interdependencies between international tourism demand in major tourism destination countries in ASEAN, as well as the asymmetric effects of positive and negative shocks in tourism demand. In addition, the estimated CCC matrices for the four models are not substantially different from each other, which confirm the robustness of the estimates to alternative specifications of the multivariate conditional variance. The lowest estimated constant conditional correlation is found between Malaysia and Thailand, while the highest is found between Singapore and Thailand. This suggests that the standardized shocks in the log of the monthly tourist arrival rate for both countries are moving in the same direction.

5.2 Suggestions for Further Study

As mentioned earlier, tourism is one of the largest and dynamically developing sectors of external economic activities, which also include international trade and foreign direct investment. In addition, tourism is closely dependent on these two other areas of external economic activities through forward and backward linkages. Its high growth and development rates, considerable volumes of foreign currency inflows, infrastructure development, and introduction of new management and educational experience actively affect various sectors of the economy, which may positively contribute to income generation, job creation, income equalization, environmental preservation and other dimensions of the overall social and economic development of the country.

Tourism development has been lauded by governments and other industrial sectors as a factor in stimulating economic growth and opportunities for developing countries. But even in this positive light, the industry itself has spilled over to the negative side in eroding the social environment. While it is hailed as an economically and savior with other industries tourism has also raised some doubts on whether or not it is the right approach for sustainable development in developing countries. Depending on the issue, certain aspects of growth in tourism growth could lead to a positive and negative impact to the recipients. With the situation at hand, the study calls for a more in-depth assessment on the impact of tourism impact through Social accounting matrices, computable general equilibrium models, multi-market models and other non-parametric tools that allow the measurement of income distributional, employment, environmental, and value-added multipliers. The objective would be on devising policies and regulations that optimize the benefits while reducing or preventing any serious problems that might occur in the long run.

The three aspects identified that can have some potential impact of tourism on the hosting nation are economic, environmental and social impact. From an economic perspective, tourism can provide a strong increase in growth to the country's GNP. Tourism opens the door for international business owners and corporations to make a foreign investment in a developing country that is in need of capital. In return these foreign investors will likely stimulate a demand for certain items to accommodate their lifestyle; these items can be food, clothing, and/or entertainment. Again, we really need a conceptual diagram here. With foreign investment employment opportunities are also created. Moreover, tourism could bring about knowledge and technology transfer to the destination region/country. While the positive economic impacts are well recognized, tourism can also become notorious for doing some damage to the economic growth of the developing nation. In one case, tourism can generate dependence on a seasonal activity (income flow is sporadic and vulnerable). Institutions or companies that are heavily dependent on tourism can lose a lot of revenue if there are a small number of tourist arrivals. The worst case scenario could be a shut down of operation as overhead costs exceed the revenues gained from a scarce number of tourists visiting that specific location.

Sometimes the industry itself underestimates the number of actual interest on the part of tourists. This underestimation drives the impulse to construct the infrastructures and projects with some outrageous financial investment. Once the capital has been invested it can sometimes be hard to recover in the short run when the number of tourists is small in demand for paying for such a service or product. By its nature, tourism is based on the appreciation and enjoyment of natural and cultural assets; and/or on the available of services (medical, sexual, recreational) at a fraction of their price in the home country. To the extent that it relies on the former, tourism can create more motivation to protect the country's natural heritage and cultural resources. Tourism revenue is then partially spent for conserving those resources instead of exploiting them. On the other hand, tourism can be the culprit in damaging the ecosystems. Certain areas that are critically considered to be conserved by the government can be exploited upon to reap the returns in the most efficient and quickest manner. This easily leads to environmental conflicts with local inhabitants or other industries.

The issue of tourism specialization, regardless of the developmental status of a nation, seems always to present itself as a solution as well as a challenge in economic growth. While there are those who gain from the impact of tourism there are also those who become victims from its bearing. The positive light shed from the impact of tourism can be on creating everlasting cultural relationship between people, importing social/political innovation towards economic growth, stimulating opportunities to make foreign investments thus leading to new business initiative and employment for individuals with specialized skills, and a mission on the part of the community to conserve their national heritage so that tourists from all over the world can enraptured at its marvel. Local entrepreneurs or small business owners can take the advantage on the dynamic needs and demands of the tourists and the tourist industry by providing a service niche which acts as a proponent in meeting with the stipulation of tourism. Such niche can be in the service area of information, health care, repairmen of a particular item, social comfort/support, or specialized meal.

On the other hand, tourism can lead to some negative social impacts. An influx of tourism can sometimes cause traffic pollution as local transportation operators compete for the time and service to bring their travelers to a certain destination. Natural scenery and exotic flora can become unattractive as small merchants assemble their equipment to cater for the whimsical behavior of tourists. Provisionary items, which are deemed as perishable, become wasted and detrimental to the environment when they don't meet with the requirements of tourism.

The inextricable advantages and disadvantages of tourism specialization pose a challenge on exploring for the right approach to obtain the greatest amount of benefit while simultaneously reducing the costs in the most efficient manner. Most often, supporters of tourism are searching for ways to tear down the barriers that impede economic progress. They state their case on how tourism can provide opportunities for all industrial and local sectors of the economy(Mowforth & Munt, 1998). Opponents of tourism do not exactly oppose the idea of allowing tourism to play the major role of stimulating economic growth. Instead, they want to implement safeguard barriers that aim on protecting the local habitat, human dignity, and the ecosystem (Boyd, 2000; Bramwell & Lane, 1993; Butler, 1999; C.Michael Hall, 2000; C. Michael Hall & Lew, 1998; Mowforth & Munt, 1998; Timothy, 1998). What is most desirable is for tourism to act as the supporting role in providing the local population with an opportunity to obtain the benefits from what is offered. From a holistic view, it is best that the ecological issues are incorporated in the scheme of tourism rather than squeezing it like a lemon until there is no more citrus left to extract of. Perhaps it is time to shift the economic paradigm of such a research on tourism and focus over the topics that are considered as non-income generating and more life-generating. Such researches are based on an analysis that deals with how tourism affects the health, mind, spirit, and lifestyle of the local people.

There should be a call for an analysis that incorporates the field of social science, ecology, health, and political administration. These disciplines will serve as a moral/philosophical guideline for major stakeholders of the tourism industry to implement a policy that will enhance sustainability and eliminate any notion of exploitation. The next challenge is to conduct a study where stakeholders of the tourism industry are able to meet their needs while being obliged to uphold the mantra of sustainable development. With sustainability tourism will be able to contain as it ensures that the benefits are easily spread out to the recipients while minimizing the role of being a burden to other people. Like clean water, sustainability can be represented as the ideology that aims to provide a nourishing life as well as a way for a healthy living. Such an idea supports the rationale for every strategy designed and decisions made. Sustainable tourism development is envisaged as leading to management of all resources in such a way that it can fulfill economic, social and aesthetic needs while maintaining cultural integrity, essential ecological process, and biological diversity and life support systems (UNWTO, 1993).

Tourism can be represented as the principal antidote for eliminating poverty in the long term. With this notion, there should be an encouragement to explore on the empirical works that deal with analyzing how tourism draws people out of the poverty hole. Such works can emphasize on the impact where tourism uplifts the mental health, produces vocational breakthrough for the local community, or inspires hope for individuals who adhere by an honest and fair living. Such a study can focus on the amount of impact that tourism has in the economy. However, it is highly critical to update the meaning of poverty and apply a critical assessment on how much or little effect that tourism has on the local population

Assessing the significant impacts of tourism on the livelihoods of many of the world's poor will provide the real-world problem recognition of how tourism development potentially enhance the benefits for the poor and minimize costs on behalf of the poor.

It is not possible to determine whether tourism is or is not a pro-poor[1] strategy. Only the situation at hand can determine the exact facts. Therefore, a case by case assessment basis needs to be executed before tourism can be considered as the rationale method for eradicating poverty. The victims of tourism are those individuals who become vulnerable to the main negative impacts, such as being in conflict with having to compete for natural resources, being duped into illicit operation under intimidating circumstances, or submissive to labor exploitation because of dire living conditions. These unfortunate individuals sadly become expendable items as they face social mockery and heavy criticism for giving tourism a black eye to economic development.

[1] Pro-poor tourism aims to expand opportunities, and places net benefits to the poor as a goal in itself, to which environmental concerns should contribute.

Not everyone is able to obtain a fair share of the economic pie in tourism. The work suggests an in-depth investigation on the income disparity of developing countries. There is a need to assess the distribution of income within that developing country for the purpose of implementing a strong and sound economic policy that will enhance the livelihood of the population as a whole. Such a policy will face a minimal amount of risk when having to address the welfare of those individuals who are having a difficult time gaining the benefits of the tourism wave. The issue on the rise of income inequality has been constantly receiving great interest as of late. Income inequality, which is measured by the Gini coefficient, has risen constantly from several significant developmental factors. The cause of an uneven distribution of income among different regions can be explained through the development of tourism. Exploring through the structure and system of how tourism develops, and then sustains or declines can bring about a great understanding of how vital it is for creating a policy for economic growth. Understanding the impacts of tourism on income distribution as well as focusing on the reliance on tourism as an economic mainstay of economy has relevance in planning a strong economic development policy. As tourism development takes place in a particular region, the community structure is probably altered and the social class is affected by both the generation of wealth and its distribution.

It is informative to have a closer look at one interesting issue in this regard. High priority must be given to examining whether or not tourism development has the potential to eliminate poverty in different samples and conditioned to different threshold variables. Different impacts of tourism development on income distribution are obviously depended on that country's circumstances (the level of development, openness, poverty incidence, political conditions, etc.) and are likely to vary when a certain level of threshold value is reached. Therefore, there should be an attempt to verify whether the relationship between tourism development and income distribution is linear, non-linear, casual or non-existent by applying threshold regression analysis.

In summary, the challenge for planning public policy with respect to tourism is to shift the focus away from the traditional goals that seems to have a lack of vision in balanced development. The impacts of tourism development should be thoroughly assessed to ensure the opportunities for employment. Income and improved local well-being are generated while all development decisions reflect the full value of the natural and cultural environment. There is clearly a need for further research to meet this challenge by doing the following:

First, there is a need for more creative theoretical justification in the role of other socioeconomic variables used as a threshold variable in affecting the relationship between tourism development and economic growth, and for research that more clearly specifies the types of tourism characterizing different roles of tourism in affecting economic growth.

In the second study, I investigated the tourism-economic growth relationship, by paying special attention to three different possible channels (through three macroeconomic variables) whereby tourism specialization may affect economic growth differently. The estimations are established separately and the corresponding policy conclusions are independently drawn. However, one needs to address the relationship between them through more additional channels, which enables us to view the effects of these three variables simultaneously. In other words, it is feasible to capture the complementary and canceling effects of trade, investment, government spending and economic growth through the types of combined-scenario modeling, for instance, with a bilinear interaction effect model, polynomial interaction effect model, and threshold-interaction effect model.

With the third part of the study, there is a need for better specifying one more tourism variable used in the model of tourism and economic growth. It is important to consider the ratio of tourist arrivals to tourist departures as one of tourism specialization variables. The incorporation of such a significant variable can allow for a more sensible, efficient outcome to be generated.

In the fourth part, there is a continued need for further research into sustainable, community-oriented, and pro-poor tourism where environmental, social, cultural, and economic concerns are in consideration. The study can be undertaken while opportunities for the poor are expanded and local communities or individual's involvement is enhanced at the same time. Focusing in the effects on such a range of strategies can develop a more complete understanding of the implications of tourism on economy. This allows the knowledge to unfold on a local and national scale, while the incorporation of stakeholder involvement in the planning process is also in a great concern.

The final suggestion that has to be mentioned is in regard to the third study. The focus should be a the study on tourism demand interdependency among the highly tourism-dependent islands in the Caribbean; where tourism has becomes a major industry and a key driver of economic growth during the past decades (Figini & Vici, 2010). In these islands, the global economic crisis has significant impacts on their economies due to their special economic and institutional characteristics as well as their vulnerability to exogenous economic and financial shocks (Seetanah, 2010).

As these islands can be regarded as either complementary or substitute destinations for world tourism, it is very interesting to estimate the conditional variance, or volatility, of monthly international tourist arrivals to these island destinations.

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