ÁLVARO MATIAS
PETER NIJKAMP
MANUELA SARMENTO
Editors

Tourism Economics

Impact Analysis

Physica-Verlag
A Springer Company

Tourism Economics

Álvaro Matias • Peter Nijkamp •
Manuela Sarmento
Editors

Tourism Economics

Impact Analysis

Physica-Verlag
A Springer Company

Editors
Prof. Dr. Álvaro Matias
Universidade Lusíada de Lisboa
School of Economics and Business
Rua da Junqueira 188-198
1349-001 Lisboa
Portugal
amatias@lis.ulusiada.pt

Prof. Dr. Peter Nijkamp
Free University
Faculty of Economics
and Business Administration
Department of Spatial Economics
De Boelelaan 1105
1081 HV Amsterdam
Netherlands
pnijkamp@feweb.vu.nl

Prof. Dr. Manuela Sarmento
Universidade Lusíada de Lisboa
School of Economics and Business
Head of the Tourism Department
Rua da Junqueira 188-198
1349-001 Lisboa
Portugal
manuela.sarmento@edu.ulusiada.pt

apidt
Associação Portuguesa para a Investigação
e Desenvolvimento em Turismo

Publication sponsored by the Portuguese Association for Tourism Research and Development

ISBN 978-3-7908-2724-8 e-ISBN 978-3-7908-2725-5
DOI 10.1007/978-3-7908-2725-5
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011931966

Cover design: eStudio Calamar S.L.

Printed on acid-free paper

Physica-Verlag is a brand of Springer-Verlag Berlin Heidelberg
Springer-Verlag is a part of Springer Science+Business Media (www.springer.com)

Editorial Preface

Tourism has moved from an elitarian leisure activity to a democratic mass movement. Open borders, the rise of welfare societies, free exchange of information on exotic destinations, the emergence of the ICT sector and the decline in the costs of travelling have led to a prominent position of tourism – and more generally, leisure activities – in modern economics. Tourism is supposed to spur economic growth, but may also mean a serious challenge to sustainable development, both locally and globally. World-wide, tourism has become a new vehicle for international and interregional competition. Consequently, smart marketing and creative positioning of the attractiveness of tourist destinations has become an art in itself.

Clearly, the tourist market has turned into a complex niche market with many heterogeneous products in order to satisfy the pluriform needs of visitors. As a result, nature, culture, entertainment, local identity, socio-cultural atmosphere may all be spearheads in tourist policy, depending on the target groups concerned. The economic and broader societal impacts of tourism may be manifold, and depend on both supply and demand conditions in a heterogeneous tourist product market. Against this background we see also the emergence of new marketing and information tools in the tourist market, such as advanced e-services.

The assessment of local, regional or national impacts of an influx of tourists – of different kind and origin – has in recent years become a new challenge for economics research in the tourism sector. The present volume brings together a set of recent impact studies – of both a theoretical-methodological and an applied policy-oriented nature – which have been selected on the basis of their originality or novel contribution to the research in this field. Various chapters in this volume were the offspring of papers presented at the third international conference on Advances in Tourism Economics, held in Lisbon (2009). All papers selected for publication went through a thorough review procedure and are now presented in a polished and revised form.

Additionally, the editors would like to take this opportunity to thank Ellen Woudstra and Sandra d'Afonso Matias for their important assistance during the editorial stage.

Álvaro Matias
Peter Nijkamp
Spring 2011 Manuela Sarmento

Contents

Chapter 1
Impact of Tourism

Álvaro Matias, Peter Nijkamp, and Manuela Sarmento

1.1 Tourists as Contemporary Argonauts

In the ancient history, the Argonauts were symbolizing man's unrestricted desire to seek for something unique, under difficult and unknown circumstances. The Argonauts sailed in their ship, named Argo, through the Bosporus to the Black Sea. On board were many well-known Greek heroes, amongst others, Heracles, Nestor, Orpheus and Theseus, while the captain in charge was Jason. Their discovery tour led to spectacular adventures, but at the end they managed to fetch the Golden Fleece. This episode of Greek mythology took place several years before the Trojan War, but illustrates clearly the drive of mankind to explore the unknown.

In modern times, we also have our kind of Argonauts; they are now better known as tourists. Their desire to visit unknown places, or at the very least to enjoy unexpected experiences, is well known. The main difference with earlier Argonauts is that tourism has become an emancipated activity, so that almost anyone can be a tourist in one way or another. This emancipation of tourism was part of a maturity process made possible as a major result of economic progress and the combined rise of the welfare-leisure society. Of course, the process was facilitated through the rise of efficient transport technologies, the consequent declining transport costs, as well as the ultimate globalization trends towards a world without borders, together with the emergence and development of ICT systems.

As a consequence, the tourist sector has become one of the most rapidly growing economic sectors, and many countries and regions regard tourism as a strategic vehicle for gaining prosperity. Prestigious tourism development projects are undertaken in many places, in the hope that soon the revenues will outperform the costs.

Á. Matias (✉) • M. Sarmento
School of Economics and Business, Lusíada University, Lisbon, Portugal
e-mail: amatias@lis.ulusiada.pt; manuela.sarmento@edu.ulusiada.pt

P. Nijkamp
Department of Spatial Economics, VU University Amsterdam, Amsterdam, The Netherlands
e-mail: p.nijkamp@vu.nl

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_1,

Often such investment plans are based on speculation rather than on hard economic facts. Caveats in assessing the economic importance of tourism are inter alia: the tourist sector is not a uniform sector, but comprises a multitude of actors with significantly different behaviours and spending patterns; tourism creates a variety of negative external effects, such as destruction of a local climate, feelings of crowdedness for the natives, or significant reductions in environmental quality; tourism is a seasonal and fashionable economic activity, – as a consequence of the "floating" character of tourists' preferences and perceptions – , so that tourism does not easily generate a robust flow of structural income; tourism is also highly dependent on the economic cycle and is often the first sector affected by an economic downturn.

Consequently, the evaluation of tourism policies and activities has to be carefully assessed. Henceforth, there is a clear need to develop solid methodologies through which the socio-economic impacts of tourism can be assessed. The diversity in the tourist sector (visitors, facilities, institutional frameworks) poses a real challenge to economic researchers in designing appropriate methodologies for tourism impact assessment. There are many aspects to be considered: the national balance of payment, the consequences for regional or local development in terms of additional income and employment, the public revenues from the sector, the financial returns of tourist investments (private or public), the seasonal component in tourist revenues, etc. An important role is also played by the organization of the tourist sector, which has shown clear signs of industrial concentration (large hotel chains, international tour operators, international airline alliances). And more recently, we have seen the increasing popularity of e-tourism, through internet information on places of destination, on-line booking systems, local digital tourist information amenities, and so on. Tourism impact assessment – as a systematic approach to the estimation of socio-economic effects of tourism on relevant parts of the economy – has become a timely response to the need for appropriate information for stakeholders, both public and private. The present volume presents recent advances in tourism impact assessment, mainly from an operational perspective.

1.2 Organization of the Book

This volume on tourism impact assessment is systematically organized in five parts. All these parts contain a set of recently developed impact models for the tourist sector. These parts have the following systematic sequence: destination impact analysis, demand impact analysis, growth impact analysis, economic performance analysis, and local impact analysis.

Part A, on *destination impact analysis*, opens with a contribution by Sánchez Cañizarez, López-Guzmán and Reis on the relevance of human capital as a source of competitiveness in tourist places. Human resources are a sine qua non for a high and professional service quality that generates tourist satisfaction. The authors investigate the educational levels of workers in hotels in two tourist areas

(Andalusia and the Algarve) in order to assess the impact of education on overall job satisfaction and organizational commitment of workers. They find that a higher job satisfaction and organizational commitment in Andalusia are found among workers without a university education, while in the Algarve the highest average levels of job satisfaction are related to the possession of diplomas. To explain these differences, the authors then estimate a logit model. They arrive at the conclusion that other background factors, such as existence of work shifts, marital status, work organization, and type of contract offer a more significant explanation. The final conclusion is that human capital is a valuable asset in the tourist sector, as it may generate commitment and offer good services to the clients, provided it is well implemented and managed.

The next contribution to tourism impact analysis is written by Zirulia. The author presents an operational model that addresses the interplay of competition within and between tourist destinations. This study focuses on the relationship between the degree of (exogenous) differentiation between tourist destinations and the (endogenous) degree of competition within the tourist destination. The main result is that an increase in the intensity of competition between destinations induces destination authorities to increase competition within the destination. This implies that an increase in the intensity of competition between destinations redistributes wealth from destination places to origin places through two effects: a direct effect (for a given number of firms in each destination) and an indirect (induced) effect, operating through variation in the number of firms, which reinforces the direct effect. Clearly, various extensions of the model are possible. For example, one could imagine enriching both the description of competition among destinations, and the nature of destination as a system of multiple firms. At the level of competition among destinations, one could also design a dynamic model in which the degree of vertical and horizontal differentiation is endogenous. And finally, at the level of the destination system, it might be interesting to study the behaviour of firms offering different types of goods and services (accommodation, meals, entertainment, etc.). There is clearly still a rich scope for further study on competition among tourist destinations.

The next contribution is written by Zhang, Ebbers and Zhou. These authors try to identify the interwoven impact of international flows of goods, foreign direct investment and tourists, followed by an empirical application to China as a destination country. Their study investigates the long-run equilibrium and causal relations in China between three types of cross-border flows: people, goods and capital. Using time series econometric techniques and data from 1978 to 2005, their study finds that in the long run, these three flows are positively correlated, while in the short run, interactive causal relationships appear to exist between international commodity trade, international tourism and foreign direct investment. Specifically, there are bi-directional causal links between commodity trade, imports and exports, and tourism, and a one-way causal link from foreign direct investment to tourism. The study suggests that globalization is a multifaceted process; the interaction between commodity trade, investment and tourism offers ample chance for further development.

Next, Part B is devoted to *demand impact analysis* and offers various studies that aim to model the behaviour and impact of tourist visitors. The first chapter in this part, written by Brida and Risso, seeks to investigate the main determinants of the German demand for tourism in South Tyrol. The dominant share of Germans in the South-Tyrolean market with more than 80% of the total of international tourism arrivals in the region is an interesting phenomenon. The authors introduce a dynamic data panel model and apply it to a panel data set collected from 116 tourism destinations in South Tyrol. They use annual data (from 1987 to 2007) on per capita GDP of Germany (measuring income), the number of German tourists in each destination (measuring the volume of tourism), the relative prices between Italy and Germany (measuring tourism price) and the price of crude oil (as a proxy of travel costs). Their model results of this study show that the demand for tourism in a previous period has a positive and relevant effect on actual demand, reflecting essentially a general loyalty of German tourists. Furthermore, the study finds that the cost of travel and the relative prices have a negative and significant impact on the tourism demand.

Tourism demand is a volatile phenomenon and may exhibit various types of fluctuations. Daniel and Rodrigues model in a subsequent chapter of this volume the dynamics of tourism demand in Portugal. Their point of departure is that non-stationarity and conditional heteroscedasticity (high and low volatility movements) are two main characteristics of many economic and financial time series, including tourism series. Volatility is considered by many researchers as an unpredictable measure of the intensity of variation. These variations are normally associated with unexpected events typically known as “news shocks”. For instance, factors responsible for changes in tourism are global terrorism, economic changes in the tourism source countries, exchange rate volatility, tourist health and safety in destinations, and unexpected national and international political changes. The authors seek to apply recently developed econometric techniques in order to model and forecast tourism demand volatility in Portugal. They aim to account for factors that may affect tourism demand fluctuations and to model the impacts of those shocks on the tourism industry. It is, therefore, necessary to analyse how demand volatility evolves over time by paying explicit attention to so-called volatility clustering. Their study uses both a symmetric and two asymmetric models. The main advantage of these models is that they consider simultaneously the conditional mean and conditional variance. Finally, the authors address explicitly seasonality in tourism demand.

In recent years, the notion of tourism sustainability has gained increasing importance. This means that socio-economic growth of tourist areas has to be in balance with sustainable development. This interface is addressed by Bimonte and Punzo, who provide an analytical framework of two internally homogeneous populations as a starting point for studying host-guest interaction on the basis of theories on multi-population dynamics and evolutionary game theory. A sufficient condition for sustainable tourism to emerge is that the two populations share a common interest and, thus, are willing to strategically cooperate in the sustainable exploitation of local resources. The public good or common-pool nature of these resources creates known problems of potential conflict. This may even lead to “perversely” cooperative behaviour with hosts and guests joining forces in overharvesting. The authors employ a simple game setting to show that tourism sustainability may be an equilibrium property associated with a supporting social agreement, and they pinpoint conditions for its emergence. In a more realistic context, one may assume heterogeneity between the two populations as to preference structures and social norms. It is then possible to find the conditions for the emergence of the desired virtuous outcome from an initially conflicting situation. One such necessary condition is the repeated encounter between the two populations, whereby fear of punishment drives an evolutionary process of strategy modification towards cooperative behaviour. As this condition is hardly realized in the tourism sector, alternative policy mechanisms and procedures have to be designed to induce reciprocal adaptation.

In the subsequent Part C of this volume the attention is focused on *growth impact analysis* and opens with a chapter by Gheasi, Nijkamp and Rietveld, who address the question of international tourism and migration as a double causality issue. They study the relationship between VFR trips (visits to friends and relatives) and migration by using panel data from the UK, and aim to find an answer to the question whether (inbound and outbound) tourism is a result of immigration. The model developed in this study demonstrates that there is a strong relationship between the stock of migrants and VFR tourism. Various other variables, such as GDP per capita and distance between country of original and destination, appear to play a significant role as well.

A next chapter, written by Leon and Eeckels, looks into the income generated by tourism over a longer time period. The authors offer a dynamic correlation approach to the Swiss tourism income. To that end, they apply cross-spectral methods, a dynamic correlation index of co-movements and a VAR model to study the cyclical components of GDP and tourism income in Switzerland on the basis of annual data for the period 1980–2007. They find evidence of four dominant cycles for GDP and an average duration between 9 and 11 years. Tourism income is characterized by more cycles, giving an average cycle of about 8 years. There appears to be also common cycles, both in the typical business cycle and in the longer-run frequency bands. A lead/lag analysis shows that the two cyclical components are roughly synchronized. Finally, simulations with the help of a VAR model show that the maximum effect of a 1% GDP shock on tourism income is higher than the maximum effect of a 1% tourism income shock on GDP. The effects of these shocks last for about 12–14 years, although most of the shocks are absorbed within 5–6 years.

The final chapter in Part C offers a dynamic economic growth model for a small tourism-driven economy. The authors, Schubert and Brida, study the dynamics of economic growth caused by an increase in the growth rate of tourism demand. They develop a simple dynamic model of a small open economy, which is completely specialized in the production of tourism services (an island economy model), populated by a large number of intertemporally optimizing agents, deriving utility from consuming an imported good. Tourism services are produced by means of a simple technology by using imported capital, its accumulation associated with adjustment costs. Moreover, the economy can lend or borrow at the international financial markets at the given world interest rate. Adjustments in the relative price of tourism services ensure market clearance for tourism services. The long-run growth rate of the economy is tied to the growth rate in tourism demand. An increase in the latter increases thus the economy's long-run balanced growth rate. In contrast to the standard one-good small open-economy endogenous growth model, where the economy is always on its balanced growth path, we show that there are transitional dynamics after an increase in the growth rate of tourism demand. In particular, the short-run growth rate of output rises gradually towards its higher long-run level, and the market price of tourism increases during this transition. Thus, an increase in the growth of tourism demand leads to a boom in the small open economy and increasing terms of trade.

Part D of this volume is devoted to models for *economic performance analysis*. The first chapter in this part is written by Lacagnina and Provenzano, and explores the evolution of the efficiency of a hotel chain and its implications in terms of competitiveness. A gravity model and a data envelopment analysis (DEA) are implemented in a dynamic framework. The former generates the tourism demand towards each hotel of the chain, while DEA Window analysis is used to capture efficiency changes over time. A Malmquist index is used to measure the productivity change and to decompose it into the catching-up and the frontier-shift effect. The authors find that policies implemented according to DEA Window analysis increase the efficiency scores for the hotel chain and its competitiveness.

The dynamics of the tourism sector is one of its challenging research characteristics. In the subsequent chapter, Salish and Rodriguez apply a panel seasonal root test to tourism in Portugal. The authors offer a model that is a generalization of the standard seasonal unit test procedure for heterogeneous panel data. The descriptive statistics and corresponding critical values for the t-bar and F-bar statistics are obtained using Monte Carlo simulations for different deterministic kernels.

With an increasing share of cruise tourism, it is important to assess amongst others the size of onboard sales in the cruise industry. Based on an analysis of Carnival Corporation and Royal Caribbean Cruises' financial statements on 2001–2007, Vogel derives then three stylized facts of cruise line economics: net onboard revenue is outgrowing ticket revenue; ticket prices are barely – or not – cost-covering; and real ticket prices tend to decline. His study then develops a microeconomic cruise line model to explain these stylized facts, and to shed light on the way the cruise line business is changing. The model suggests that high-margin onboard revenue is likely to be the main driver of cruise industry growth by giving cruise lines the possibility to subsidize ticket prices in order to make cruising more affordable. Lower ticket prices attract more customers who, once onboard, fuel this process with their spending. Various strategic implications are discussed as well.

The next and final chapter on economic performance analysis in the tourism industry is offered by Schubert, Matias and Costa. These authors present a model for calculating optimal revenues from casino taxation in Portugal. They develop a dynamic general equilibrium model of a small open economy, comprising an industrial sector producing an internationally traded good, a tourism sector producing tourism services offered to both foreign tourists and residents, and a casino sector supplying gambling services. Domestic residents derive their utility from consuming the traded good, tourism services, and gambling. The authors analytically derive the effects of a reduction in casino taxation and demonstrate that this is welfare improving.

The final part of this book, Part E, presents interesting examples of models for *local impact analysis* in the tourism industry. Vargas-Sánchez, Porras-Bueno and Ángeles Plaza-Mejía develop a quantitative methodology (using structural equation models) to study the residents' perceptions and their attitudes towards a set of variables such as the connection with tourism, the personal or family benefits obtained or expected from tourism development, its favourable and unfavourable effects in terms of economic, socio-cultural and environmental aspects, etc. At the same time, this research study sets out to identify the variables capable of determining these perceptions, in an attempt to construct an explanatory model of residents attitudes towards additional tourism development. This chapter addresses various gaps in the literature, and focuses attention on the attitudes of the residents of the Spanish province of Huelva and on the factors that may determine and explain their attitudes. The fact that tourism in this "enclave" is a relatively recent phenomenon, that is still in a phase of low or moderate development and, therefore, with a considerable potential for growth, gives this study added value, since that the greater part of previous studies of this type have been conducted in tourist destinations that are well-consolidated, mature or of a high level of development.

It goes without saying that seasonality management in the tourist industry is one of the greatest challenges. This phenomenon has been extensively studied in the literature, but there are relatively few studies that have carefully examined ways of quantifying and comparing empirical patterns. The chapter by De Cantis and Ferrante reviews main seasonality measures, highlights their properties in relation to different research aims, and offers a comparable efficiency measure, viz. the bed places occupancy rate of accommodation establishments (by nationality of guests and by accommodation category) in Sicily, placing particular attention to its seasonality. Seasonal adjustment procedures are used to derive seasonal factors. Through the use of these factors, several seasonality measures are compared, distinguishing between measures for amplitude and measures for pattern. Finally, this study aims to highlight various questions related to the efficiency evaluation of tourism sector in Sicily, and to provide tools for the analysis of seasonality which can be used to compare the efficiency level of tourism activity and to evaluate the efficacy of policies oriented to reduce seasonality.

The final contribution in this volume deals with an increasingly important issue, viz. hospitality management in rural areas. The author, Vecchio, investigates the performance of tourism enterprises in Southern Italy. His study raises critical issues related to the management of hospitality firms located in rural areas of the Campania Region. It is based on 30 in-depth interviews with owners and managers of agritourisms, restaurants, bed-and-breakfasts, and country houses. His findings suggest that, even though if the potential for the development of rural tourism in Campania is widely recognized, growth in the industry is inhibited by a variety of different issues. Among these, there is certainly a lack of effective marketing strategies developed by the hospitality firms. There is definitely more scope for expanding tourism, provided the supporting policies are put in place.

In retrospect, this volume offers a set of advanced and original contributions to the economics of the tourism industry, in particular to tourism impact assessment. With the increasing importance of global tourism in the years to come, tourism impact assessment will become an important analytical instrument for evaluating the socio-economic importance of tourism, against the background of the paradigm of sustainable tourism.

Part I
Destination Impact Analysis

Chapter 2
Education of Human Capital as a Source of Competitiveness in Tourist Destinations

Sandra M. Sánchez-Cañizares, Tomás J. López-Guzmán, and Helena Reis

2.1 Introduction

The importance of the study of people and their behaviour in today's organizations is unquestionable, especially when referring to the service sector.

Increasing globalization has made it necessary to search for new strategies in order to gain competitive advantage and, once products and services are easily imitable by competitors, the customer's loyalty has to be supported by distinct factors rather than just tangible attributes of the service.

Thus, the increasing necessity to adapt to the new world tourist scene makes human capital an essential and differentiating element, capable of introducing durable competitive advantages. We can define tourist human capital as the amount of know-how and skills that the staff in this sector have, originally gained through formal education and professional training (Lillo et al. 2007).

Furthermore, the importance of the value of the workers' education in competitiveness in the tourism sector is highlighted through indicators such as the Competitiveness Monitor developed by the World Tourism and Travel Council in cooperation with the University of Nottingham. This Monitor has developed an index of tourist competitiveness combining eight groups of indicators, one of which is specifically Human Resources. This indicator evaluates the quality of the factor

S.M. Sánchez-Cañizares (✉)
Facultad de Derecho y CC, Empresariales, c/Puerta Nueva s/n, 14071 Córdoba, Spain
e-mail: sandra.sanchez@uco.es

T.J. López-Guzmán
Facultad De Ciencias, Universidad de Córdoba, Edificio de Gobierno (Campus de Rabanales), 14071 Córdoba, Spain
e-mail: tomas.lopez@uco.es

H. Reis
Escola Superior de Gestao, Hoteleria y Turismo, Campus da Penha, Faro, Algarve, Portugal
e-mail: hreis@ualg.pt

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_2,

work according to the Education Index of the United Nations, because it is assumed that staff training is directly related to the quality of tourist service.

On the other hand, not all employees are capable of generating skills and resources that may result in organizational productivity. Thus, Messmer (1999) maintains that the human capital has to be highly adaptable to the company's philosophy and Camisón (1996) indicates that qualified Human Resources, identified and committed to the company policy, is a part of the organization's skill set. Therefore, elements like the employee's job satisfaction, that indicates a degree of the level of well-being towards his or her task, or organizational commitment, showing a sense of belonging and identification with the organization, are two fundamental variables that need to be analyzed for the measurement and correct management of the company's human capital.

Nevertheless, aspects such as job satisfaction of the staff (that implies the degree of well-being related to their tasks) or the organizational commitment (as a feeling of belonging and identification with the organization) are variables of essential analysis for the accurate measurement and correct management of the human capital of the organization.

From all that has been said above, the purpose of this chapter is to focus on the analysis of the educational level, job satisfaction and the organizational commitment of the employees of certain types of organizations that have considerable weight in the service sector: hotel establishments. The fieldwork has been developed in two destinations in the Iberian Peninsula and of undeniable competitive significance in the tourism sector: the Algarve (Portugal) and Andalusia (Spain). By means of distinct statistical techniques we will study the differences of the educational levels of the human capital at both destinations and the influence of the workers' education on their job satisfaction, plus their level of commitment towards the organization.

The obtained results will permit a broadening of knowledge of the human component of this branch of hotel management due to its significant relevance in this sector, because of its direct interrelation with clients, without any intermediaries. The conclusions reached will indicate the steps of human resources management needed for the implementation of strategies that will permit it to identify, maintain and develop the resources and potential capabilities that the human capital of the organizations has to offer.

2.2 Theoretical Stage

At this stage, we will make a revision of the variables of overall job satisfaction and organizational commitment followed by an analysis of the influence of educational level on those variables, according to specialized literature.

2.2.1 Job Satisfaction

Based on the numerous definitions of this element that can be found in organizational behaviour studies, overall job satisfaction may be considered a "multi-dimensional and multi-disciplinary concept that assumes the emotional state, attitude, sensation or degree of well-being experienced by the individual towards his or her job, as a consequence of a larger or smaller discrepancy found in their past and present expectations, regarding the rewards and the role played by their jobs and to what degree these expectations are effectively achieved (Sánchez et al. 2007).

The revision of literature highlighted the repercussion of this construct over variables such as staff turnover (Sousa-Poza and Henneberger 2004; Harrison et al. 2006); absenteeism (Johansson and Palme 1996; Engström et al. 2003; Harrison et al. 2006); performance (Iaffaldano and Muchinsky 1985; Organ and Ryan 1995; Hwang and Chi 2005); and client satisfaction (Ugboro and Obeng 2000; Judge et al. 2001; Arnett et al. 2002). Being so, Gallup's studies (Cornfield 1999) have verified that departments with better working environments and higher employee satisfaction register higher productivity, profitability and client satisfaction. Therefore, the analysis of employee satisfaction has to be considered a priority by the Human Resources management of organizations, once it is assumed as a factor of improvement of work quality that directly influences clients' satisfaction.

In Tourism, the competitive advantages of organizations must include the search for excellence in the intangible elements of the services, once the remaining tangible attributes are easily imitable.

The human capital of organizations is one of the supports for the competitiveness of the destination, so in organizations where the clients' perception regarding the service depends on direct contact with employees of the organization – such as hotel establishments – it is crucial to ensure the workers' degree of job satisfaction, once it directly influences their productivity and the quality of their performance.

The present study will provide an analysis of variables that lead to a higher or lower degree of overall job satisfaction, in relation to the workforce's educational level.

2.2.2 Organizational Commitment

The literature presents varied definitions of "commitment" (Porter et al. 1974; Blay and Boal 1987; Price 1997; Testa 2001; Meyer and Herscovitch 2001). Nevertheless, all these definitions point to the idea that a committed worker will share the objectives and values of the organization in a way that heor she wishes to progress in hisor her professional career inside the organization and will put a lot of effort in (Mowday et al. 1979). The organizational commitment then becomes a "psychological link" that influences the worker into acting according to the organization's targets. (Porter et al. 1974). But one should not confuse commitment and satisfaction. The worker may feel satisfaction in his or her job and still not experience that here she belongs to the organization in a sense that would make him or her stay there. From an organizational point of view, commitment is a more global attitude, constant in time, and which reflects a general affective response towards the organization while satisfaction is directly connected to a job position and certain aspects of the work (Baker and Baker 1999) with more immediate reactions to tangible aspects of certain tasks related to the job.

In relation to the consequences that result from organizational commitment as well as from overall job satisfaction, research studies have been essentially based on the effects on turnover (Lin and Ma 2004; Van Breukelen et al. 2004) and the intention to leave (Gellatly 1995; Powell and Meyer 2004), as well as on productivity or performance of the workers committed to the organization (Ward and Davis 1995; Leung et al. 1996). Therefore, it can be assumed that committed employees remain loyal and will perform close to their optimal level indirectly contributing to client loyalty. In consequence, higher profitability and development of the business can be achieved, based on client loyalty. Consequently, it is easy to understand how Human Resources managers may benefit from perceiving the organizational commitment: they may act in a way that induces the employees' commitment in order to benefit the organization.

Organizational commitment has to be bidirectional, i.e., not only from the workforce towards the organization but also vice versa. CEOs have to create job environments that help generate the commitment required by those professionals that belong to the organization. Thus, the following question is raised: what makes an employee feel committed to his work and organization?

The present research will make an analysis of the influence that some elements of the work that was carried out have on the level of organizational commitment, according to the worker's educational level.

2.2.3 Educational Levels

The evaluation of the educational level of individuals involved in tourist activities has become an appropriate indicator to quantify the quality of a workforce. Thus, as mentioned in the introduction of this chapter, the Competitiveness Monitor which was created to measure the tourist competitiveness of a destination includes a Human Resources indicator in which the Education Index of the UN is applied, in order to evaluate its efficiency, once it is considered directly related to the quality of the tourist product.

The Education Index used by the UN points to four staff categories: no studies (no reading or writing); primary, secondary and tertiary studies.

In the present empirical research we will use a similar four levelled structure. Nevertheless, and according to employee's profiles in hotel establishments, our levels are as follows: higher-secondary study or below; vocational study; diploma course (university); superior university degree.

Concerning the influence that the educational level may have on satisfaction and commitment, it is possible to find a negative effect on satisfaction, according to some works (Clark and Oswald 1996; Sloane and Williams 1996; Grund and Slivka 2001; Gazioglu and Tansel 2002). This may be justified by the higher expectations of better qualified staff. And it is implied that if the level of education is not suitable for the job category – if the employee is over-educated or has a higher level than required -overall job satisfaction can be negatively affected, causing demoralization and eventually lower productivity. This situation occurs frequently in the tourist industry where it is frequent to find above average employees performing low exigent tasks, not corresponding to their education. In their research on the Finnish hospitality industry, Kokko and Guerrier (1994) found an inverse relation between the two variables: over-education and job satisfaction.

According to Lam et al. (2001), hotel establishments require workers with above average education levels. In fact, in their empirical analysis of hotels in Hong-Kong, the authors found that employees with the highest qualifications were not happy in their jobs, which can be explained by their high expectations and ambition. The authors suggest that the hotel management should motivate the type of workers that show higher potential, by enriching their professional positions giving them more autonomy and involving them in decision making processes. Meanwhile, workers with primary education declared themselves to be very happy with their colleagues and their duties, but somewhat unsatisfied with their own professional performance and the opportunities for job progression.

Furthermore, if salary expectations, incentives and negotiations (that generate tension when not accomplished) could be fulfilled, the levels of satisfaction would rise in the category of workers with the highest educational levels (Lydon and Chevalier 2002; Nikolaou et al. 2005).

In our present study, we will analyze the differences concerning satisfaction and commitment according to four categories of education, as well as labour issues that lead both variables to each of those four categories.

2.3 Methodology

The methodology used throughout our empirical research is based on a questionnaire answered by the employees of hotel establishments located in the areas which we are studying: Andalusia (Spain) and the Algarve (Portugal).

No one can ignore the tourist relevance of these two destinations. The Algarve receives more than 25% of tourists who visit Portugal, with a percentage of overnight stays around 38.89% (source: INE Portugal). Attractions like the mild climate, well-known golf courses and sun and sea tourism, together with the implementation of low cost airlines flying to the International Faro Airport, have contributed to attracting many tourists from several countries, mainly Germany, Spain and UK.

In 2006, Andalusia has welcomed over 25.1 million tourists with a total of 43.8 million overnight stays and an estimated average daily expenditure of 53.03 € per tourist (Junta de Andalucía 2007). These numbers clearly indicate the weight that tourism represents in the economy of this Autonomous Community.

The universal population of our research comprises workers from any department in establishments of all types of categories, located in both areas: 9,138 individuals working in 154 hotels in the Algarve (source: INE Portugal) and 30,548 individuals working in 1,490 hotels in Andalusia (source: Encuesta de Ocupación Hotelera para la Comunidad Andaluza).

The population was selected through a stratified random sample based on the total number of hotels in each category and on the number of hotel beds in each one.

To be precise, in Andalusia,[1] a total of 3,382 questionnaires were allocated to 165 hotels. 2,064 valid questionnaires were received, giving a response rate of 61.03%.

According to the hotel category, the distribution was as follows: 87 (4.22%) for one star hotels; 186 (9.01%) to three star hotels; 1.090 (52.81%) to four star hotels and 111 (5.38%) to five star hotels.

In the Algarve, 730 questionnaires were distributed among 23 establishments and 461 valid responses were obtained (63.15% response rate). As there are no one star hotels in this region of Portugal, the distribution of categories was the following: 13 (2.82%) for two star hotels; 189 (41%) for three star hotels; 216 (46.85%) for four star hotels and 43 (9.33%) for five star hotels.

The questionnaire covers four issues: (a) employment data about the worker (type of contract, commitment, hours of work, shifts, department, salary, etc.); (b) advantages and inconveniences of the work, degree of satisfaction in distinct aspects of the job, global overall satisfaction; (c) level of organizational commitment, using the OCQ Questionnaire by Porter et al. (1974); (d) sociologic data of the worker: sex, marital status, age, etc.

The statistical techniques applied to obtain these results were based upon bivariant analysis: the chi-square test, the ANOVA test and bivariant correlations, multivariant analysis and a logit model.

2.4 Results

Below we present the main results of the study, showing, in the first place, a description of the educational level of the hotel employees in each zone. Afterwards, we analyze the differences detected according to the educational level.

2.4.1 Educational Level

The predominant level is higher secondary study or below for both geographic zones (Fig. 2.1), being that the percentage of the workforce in this level is much higher in the Portuguese region.

---

[1]These data come from the Project "*Análisis de la satisfacción laboral como índice de calidad del servicio: aplicación empírica en el sector hotelero andaluz*" partially funded by the *Dirección General de Calidad, Innovación y Prospectiva Turística (Consejería de Turismo, Comercio y Deporte de la Junta de Andalusia)* (Ref. CO-10/06).

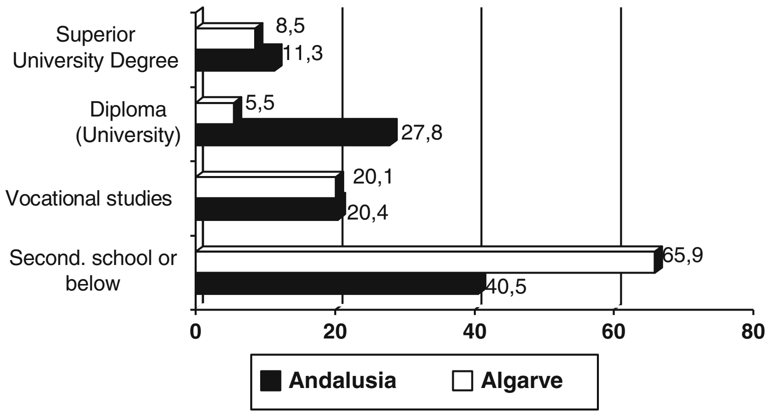

Fig. 2.1 Percentage of employees in each educational level (Andalusia and Algarve)

Another relevant data is the percentage of employees with university studies, (medium or superior). For the Algarve, the result is 14%, whilst it is almost 40% for Andalusia (39.1%). We can conclude, therefore, that the educational level is more superior in the Spanish region, which suggests a basis for a strong competitive advantage for the establishments located in this area.

2.4.2 The Relationship Between the Educational Level and Social and Working Characteristics

The chi-square test was applied to the educational level, socio-demographic characteristics (sex, age) and labour characteristics (salary, type of contract and department).

The results for Andalusia (see Table 2.1) lead to the rejection of the hypothesis of the independence of educational level and all of the studied variables.

Thus, we can notice that there is a higher percentage of women in the low grade of studies compared to men, yet the percentage of women with university studies is slightly superior. The relation to age is the inverse, so that the younger the employees are, the higher level of advanced studies they have, and, similarly, among employees over 50 years of age, there is not one case of university studies.

Not surprisingly, when analyzing salary, in those who earn less than 1,000 € net per month, studies are inferior, even when there is a percentage of almost 30% of individuals with university level. In addition, practically all of those who have a salary superior to 2,500 € per month, have a superior university degree. Anyway, it is necessary to emphasize that salaries in the hospitality sector are extremely reduced. In the sample obtained for Andalusia, 67% of respondents declare a salary under 1,000 €, and 94% earn a salary below 1,500 € per month.

The type of contract also presents a dependence on the educational level. Thus, 64.5% of temporary workers do not have a university degree. The number is 10%

Table 2.1 Chi-square test: level of education and social and working characteristics of employees in Andalusia

	Andalusia					
Variable	Categories	Secondary or lower (%)	Vocational studies (%)	Diploma (university) (%)	University degree (%)	χ^2 (*p*-value)
	Men	35.9	26.8	25.6	11.7	58.671
Sex	Women	45.7	13.3	30.2	10.8	(0.000*)
	16–29	27.8	15.2	49.3	7.7	
	30–39	38.9	26.2	18.3	16.6	
	40–49	64.8	18.8	11.8	4.6	
	50–59	92.3	7.7			156.367
Age (years)	>60		100			(0.000*)
	<1,000	51.7	19.1	24.0	5.2	
	1,000–1,500	17.9	24.4	39.0	18.7	
	1,500–2,500	37.8	23.3	25.6	13.3	460.339
Salary (€)	>2,500	5.7			94.3	(0.000*)
Type of contract	Temporary	48.4	16.1	28.5	7.0	71.697
	Permanent	33.2	21.5	28.7	16.6	(0.000*)
	Admin.		6.5	41.9	51.6	
	Accounting			42.1	57.9	
	Restaurant	59.4	30.2	2.7	7.7	
	Reception	13.7	9.4	56.7	20.2	
	Maintenance	36.7	63.3			
	Cleaning	90.0	9.5	0.5		
	Managerial		48.8	51.2		
Depart. of work	Kitchen	35.6	64.4			1,557.27
	Others	17.4	16.8	60.0	5.8	(0.000*)

Own source
*Significant at 0.01 level

inferior for those with a permanent contract (54.7%). Nevertheless, it is necessary to point out that the percentage for temporary employees in the sample from Andalusia is very high (52%).

Finally, relating to the work department, it is clearly observed that the workforce in the areas of restaurants, maintenance and especially cleaning, are the ones with lower educational levels. Departments where it is possible to find a higher percentage of graduates are administration, accounting and reception.

Table 2.2 shows the results for the same analysis in the Portuguese region. The hypothesis of independence among variables, except for the case of the type of contract, is refused, where there is no relation between the employee's educational level and the type of contract held with the hotel establishment. It is necessary to point out that in the Algarve, 73.7% of the polled workforce hold a permanent contract. This suggests a notable difference compared to the case of Andalusia.

For the variable sex, women again show an inferior level of studies. Nevertheless, this difference is lower at university levels.

For age, the reduced percentage of university studies in all the categories above 40 years is remarkable.

Table 2.2 Chi-square test: level of education and social and working characteristics of employees – the Algarve

	Algarve					
Variable	Categories	Secondary or lower (%)	Vocational studies (%)	Diploma (university) (%)	University degree (%)	χ^2 (*p*-value)
	Men	55.1	30.2	5.1	9.6	18.454
Sex	Women	72.7	13.6	5.7	8.0	(0.000*)
	16–29	61.5	16.5	5.5	16.5	
	30–39	56.9	20.7	103	12.1	
	40–49	77.2	18.0	2.4	2.4	
	50–59	65.0	30.0	3.3	1.7	35.256
Age (years)	>60	80.0	20.0			(0.000*)
	<1,000	69.8	21.2	4.0	5.0	
	1,000–1,500	46.7	15.6	13.3	24.4	
	1,500–2,500	36.4	18.2	18.2	27.2	59.141
Salary (€)	>2,500		20.0	20.0	60.0	(0.000*)
Type of contract	Temporary	66.7	24.2	5.1	4.0	4.503
	Permanent	65.2	18.7	5.9	10.2	(0.212)
	Administr.	37.5	12.5	31.3	18.7	
	Accounting	62.0	19.0		19.0	
	Restaurant	67.6	27.5	4.9		
	Reception	54.7	24.3	10.5	10.5	
	Maintenance	62.5	25.0		12.5	
	Cleaning	91.1	6.7	1.1	1.1	
	Managerial	11.1	33.3	11.1	44.4	
Work department	Kitchen	33.3	66.7			104.556
	Others	63.0	16.4	2.7	17.9	(0.000*)

Own source
*Significant at 0.01 level

The relation to salary is direct, so the higher the monthly salary is, the higher the educational level. However, as in the case of Andalusia, it is necessary to point out that only 3.6% of polled Portuguese employees declare a salary over 1,500 € net per month. In fact, the average wage in Portugal is lower than in Spain.

As far as work departments are concerned, several of them show a high percentage of employees with no university studies, such as kitchen and restaurant work and cleaning. However, in contrast to Andalusia, this is also the case with reception and accounting, where there are very few employees with a university degree. It is only possible to find a significant percentage of workers with a university diploma of higher education among executives in administration departments.

2.4.3 Perceptions of Work in each Educational Level

The ANOVA test analyzes the differences in relation to the seniority and distinct perceptions of employees of their work in each level of studies. Seniority is measured in years and the other variables present the mean of satisfaction with several labour facets according to Likert's scale of 5 points (1 – very unsatisfied, 5 –very satisfied). The last variable represents the organizational commitment in a continuous scale of 1–5, obtained according to arithmetical mean of the 15 items of OCQ questionnaire (inverting the scale for items written up in a negative way: 3, 7, 9, 11, 12 and 15).

For Andalusia (Table 2.3), all the differences prove to be statistically significant.

Seniority has a direct relation to the educational level with a notably superior mean, (over 5 years) for employees with university bachelor degrees. This fact is especially relevant taking into account the high levels of turnover in the hospitality sector in Andalusia. In fact, the mean of years working at the same establishment for the entire sample is only of 3.3 years.

Overall job satisfaction is higher for those employees with a low level of studies. This can be explained by these worker's lower expectations. As for salary, employees with a degree show a notably inferior level of satisfaction, since they do not consider the remuneration reasonable compared to the salary they expect.

However, satisfaction with autonomy reveals the lowest result in graduates and the higher mean score in workers with degrees. It is possible that in the first case, a direct supervisor controls their work, so their freedom at work is reduced, while many of employees with degrees are managers themselves.

For professional development, the possibility for promotion and further training, employees with university studies show the lowest satisfaction, as they do not feel that they are fulfilling their expectations at work.

Finally, commitment, which leads to a loyalty toward the organizational objectives and which usually corresponds to a lower level of turnover and absenteeism, shows a higher score in employees with secondary school or below. In this case, employees consider that the feedback they receive from the organization is enough to respond to their ambitions according to their formative levels. On the other hand, for graduate workers, similarly to what happened with global satisfaction, the mean score is lower, whilst they have more advanced studies, and they do not think their efforts at work are rewarded.

Table 2.4 shows the results for the Algarve where there are not statistically significant differences in mean scores for overall job satisfaction, organizational commitment, satisfaction with autonomy, professional development and training received according to the employee's educational level.

Seniority shows very different scores for each case. Thus, employees with vocational courses remain 10 years on average and workers with a secondary school education or below, nearly 9 years. Neither individuals with a diploma nor the ones with a degree remain more than 4 years at the same hotel establishment, especially the latter, who stay for 3.5 years on average. Nevertheless, it is necessary to highlight that the seniority mean for the entire sample in the Portuguese region is 8.63 years, which is a very different situation compared to Andalusia, where the levels of turnover are much higher. This fact must be taken into account as an additional advantage for the Algarve's hotels, where the unwanted costs provoked by this aspect are reduced.

Table 2.3 ANOVA test for level of studies – seniority, satisfaction and commitment

	Andalusia					
	Seniority (years)	F (p-value)	Overall satisfaction	F (*p*-value)	Satisfied salary	F (*p*-value)
Secondary or lower	3.05		3.81		2.33	
Vocational study	3.09		3.62		2.28	
Diploma	3.15		3.43	21.557 (0.000*)	2.34	
Degree	5.13	12.836 (0.000*)	3.59		2.11	2.817 (0.038*)
	Satisfaction with the autonomy	F (*p*-value)	Sat. profess. development	F (*p*-value)	Sat. possib. promotion	F (*p*-value)
Secondary or lower	3.85		3.51		3.29	
Vocational study	3.92		3.62		3.03	
Diploma	3.46		3.33	20.230 (0.000*)	2.93	20.243 (0.000*)
Degree	3.95	24.427 (0.000*)	2.90		2.63	
	Satisf. formation	F (*p*-value)	Organizational commitment	F (*p*-value)		
Secondary or lower	3.53		3.81			
Vocational study	3.10		3.62			
Diploma	2.69		3.52	21.300 (0.000*)		
Degree	2.71	54.370 (0.000*)	3.61			

Own source
*Significant at 0.01 level

Table 2.4 ANOVA test for level of studies – seniority, satisfaction and commitment

	Algarve					
	Seniority (years)	F (*p*-value)	Overall satisfaction	F (*p*-value)	Satisfied salary	F (*p*-value)
Secondary or lower	8.73		3.35		2.16	
Vocational study	10.02		3.46		2.01	
Diploma	4.72		3.65		2.87	
Degree	3.53	6.939 (0.000*)	3.38	0.999 (0.393)	2.67	6.677 (0.000*)
	Satisfaction with the autonomy	F (*p*-value)	Sat. profess. development	F (*p*-value)	Sat. possib. promotion	F (*p*-value)
Secondary or lower	3.54		3.24		2.70	
Vocational study	3.41		3.36		2.51	
Diploma	3.86		3.43		3.22	
Degree	3.75	1.477 (0.220)	3.60	1.344 (0.260)	3.14	4.161 (0.006*)
	Satisf. formation	F (*p*-value)	Organizat. commitment	F (*p*-value)		
Secondary or lower	2.96		3.40			
Vocational study	3.13		3.41			
Diploma	3.00		3.57			
Degree	2.98	0.561 (0.641)	3.31	0.735 (0.532)		

Own source
*Significant at 0.01 level

The other two variables where a significant difference is found are satisfaction with salary and possibility for promotion. In the first one, as opposed to Andalusia, employees without university studies are more dissatisfied since, as it is indicated previously, the average wage is much lower in Portugal and this implies that those with lower salaries are the less satisfied. Regarding the possibility for promotion, also the higher scores appear for workers with a diploma and degree, who, precisely because of their educational level, are more likely to develop a future professional career.

2.4.4 Advantages and Disadvantages at Work

The main advantages and disadvantages of work according to the employee's formative level do not present important differences.

For Andalusia's sample, all the workers in every grade of studies indicate that salary followed by workshifts are the most important disadvantages. The main advantages are their relationships with colleagues followed by how interesting the work is, except for individuals with diplomas, for whom the order between these two variables is inverted and for employees with vocational studies, for whom holidays are the second advantage.

In Algarve there are almost no variations, the two fundamental inconveniences also being reduced salary and workshifts and, in this case, how interesting the work is and relationships with colleagues are the most important advantages indicated in all the educational levels.

2.4.5 Logit Model for Overall Satisfaction

Several models of logistic regression have been estimated to analyze the dependence of hotel employees' job satisfaction for different demographic and labour variables, distinguishing two models for each zone: one for employees with no university studies (secondary education or inferior and vocational studies) and another one for employees with a university education (diploma or degree).

In order to do that, we had to recode the endogenous variable, overall job satisfaction, into a dichotomous one: we set 1 to represent satisfaction at work in the 5-items Likert scale (4 and 5), and 0 to represent dissatisfaction at work (from 1 to 3 in the 5-items Likert scale). The predetermined variables are as follows:

- Sex: 1 – male, 0 – female.
- Marital status: 1 – unmarried men, 0 – rest of statuses.
- The respondent's age.
- Type of contract (contract): 1 – permanent contract, 0 – temporary contract.

- Work shift, tabulated as five dichotomic variables: morning, afternoon, night, rotatory and morning and afternoon. The referential variable is the last one.
- Wage.
- Department, tabulated as nine dichotomic variables: Administration, accounting, restaurant, reception, maintenance, cleaning, other departments, managerial and kitchen. The referential variable is the kitchen department.

Tables 2.5 and 2.6 show the results for each zone and group.

Analyzing the results obtained, we can appreciate several significant coefficients in both educational levels. For workers with no university studies, the variables sex, marital status and type of contract have a positive and statistically significant coefficient. That is, there is a higher probability to be satisfied at work if the employee is a male, unmarried man and has a permanent contract, relating to an employee without family responsibilities.

Table 2.5 Overall satisfaction binary logit for each educational level

	Andalusia			
	No university studies		University studies	
Variable	Coefficient	*p*-value	Coefficient	*p*-value
Sex	2.474	(0.000*)	1.561	(0.000*)
Marital status	1.078	(0.000*)	−3.341	(0.000*)
Age	−0.055	(0.746)	−2.762	(0.000*)
Contract	0.680	(0.001*)	0.852	(0.000*)
Morning shift	−10.689	(0.638)	2.078	(0.000*)
Afternoon shift	−8.731	(0.700)	−1.335	(0.046**)
Night shift	−6.696	(0.768)	−0.395	(0.506)
Rotating shift	−8.393	(0.711)	−1.776	(0.000*)
Wage	0.059	(0.808)	−0.245	(0.197)
Administration	−5.830	(0.921)	−7.709	(0.550)
Accounting	–	–	2.222	(0.864)
Restaurant	1.529	(0.961)	−13.364	(0.549)
Reception	0.239	(0.994)	−3.799	(0.768)
Maintenance	1.574	(0.960)	–	–
Cleaning	4.673	(0.882)	−10.184	(0.809)
Other departments	10.184	(0.762)	−5.346	(0.678)
Managerial	0.184	(0.835)	1.589	(0.765)
Constant	4.905	0.822	10.295	(0.425)
	Goodness of fit index			
−2Log Likelihood	848.676		644.361	
Chi-square	397.52 (0.000*)		325.765 (0.000*)	
R^2 of Cox y Snell	0.347		0.372	
R^2 of Nagelkerke	0.471		0.496	

Own source

−2Log likelihood, R^2 of Cox–Snell, and R^2 of Nagelkerke are for guidance only since they can take moderate or low values, even when the estimated model could be appropriate and useful, due to the fact that the dependent variable is categorical (Pardo and Ruiz 2002)

*Significant at 0.01 level; **Significant at 0.05 level

Table 2.6 Overall satisfaction binary logit for each educational level

	Andalusia			
	No university studies		University studies	
Variable	Coefficient	*p*-value	Coefficient	*p*-value
Sex	−0.457	(0.156)	0.129	(0.878)
Marital status	0.070	(0.820)	1.424	(0.137)
Age	−0.022	(0.876)	−0.258	0.643
Contract	0.569	(0.064***)	−0.142	(0.891)
Morning shift	−0.171	(0.642)	0.418	(0.681)
Afternoon shift	0.312	(0.588)	−0.785	(0.629)
Night shift	0.964	(0.108)	−0.832	(0.687)
Rotating shift	0.007	(0.983)	−1.425	(0.271)
Wage	0.774	(0.029**)	1.646	(0.029**)
Administration	−0.040	0.979	−0.054	(0.973)
Accounting	−0.356	0.803	−2.196	(0.207)
Restaurant	0.193	(0.883)	−0.156	(0.934)
Reception	−0.194	(0.885)	1.568	(0.392)
Maintenance	0.461	(0.747)	4.394	(0.906)
Cleaning	−1.176	(0.384)	2.431	(0.370)
Other departments	−0.796	(0.551)	0.273	(0.871)
Managerial	−0.628	(0.708)	3.289	(0.421)
Constant	−1.055	(0.473)	−2.946	(0.272)
	Goodness of fit index			
−2Log likelihood	393.059		57.996	
Chi-square	30.426 (0.023**)		15.005 (0.524)	
R^2 of Cox y Snell	0.093		0.247	
R^2 of Nagelkerke	0.126		0.330	

Own source

−2Log likelihood, R^2 of Cox–Snell, and R^2 of Nagelkerke are for guidance only since they can take moderate or low values, even when the estimated model could be appropriate and useful, due to the fact that the dependent variable is categorical (Pardo and Ruiz 2002)

*Significant at 0.01 level; **Significant at 0.05 level; ***Significant at 0.1 level

There are more statistically interpretable coefficients for workers with university studies. Thus, sex and type of contract present positive and significant results as is the case with employees with no university studies. The differences between the two groups are in the remaining significant coefficients. In this way, the morning shift shows a positive value that implies a higher probability of satisfaction when the worker develops his or her tasks in this work shift. On the contrary, for marital status, age and afternoon and rotating shifts, coefficients are negative. It supposes a decrease in the probability to be satisfied at work when the worker is older, or an unmarried man or working on one of these shifts. In this case, the interpretation shows that those individuals with a university education who do not have family responsibilities have higher expectations, which increase with age. Hence, the probability of satisfaction is inferior in these cases, especially if the work shift is rotating because, as we saw before, this aspects one of the most important inconveniences indicated by employees.

2.4.6 Correlation Among Several Aspects of Work and Organizational Commitment

To end this empirical study we have analyzed the Spearman's correlation coefficient (since the data are qualitative) among the level of satisfaction with several aspects of work and organizational commitment. Tables 2.7 and 2.8 show the results obtained.

In Andalusia, all analyzed aspects present a positive and significant correlation with the level of commitment of the worker with the organization. Nevertheless, we have indicated the three more important aspects for each group of employees according to their level of study (university or not university).

Thus, it is noticed that for workers without advanced studies, the aspects that influence the expectation of a higher level of commitment are the material conditions of work, overall satisfaction and the relationship that they maintain with their direct supervisors. Aspects such as the level of remuneration or further training come next.

For workers with university studies, overall satisfaction and their relationship with supervisors are also essential, although in this case, the aspect that correlates more with commitment is the organization of the hotel. Thus, while an employee with a lower level of education hopes to develop his other work with adequate material conditions since it probably consists of routine tasks, a worker with superior formation higher education is more interested in working for an adequate

Table 2.7 Spearman correlation coefficient among several aspects of work and organizational commitment

Andalusia			
No university studies		University studies	
Job facet	Correlation	Job facet	Correlation
Material conditions	0.667*	Organization of the hotel	0.813*
Overall satisfaction	0.651*	Relationship with supervisors	0.778*
Relationship with supervisors	0.563*	Overall satisfaction	0.672*

Own source
*Significant at 0.01 level

Table 2.8 Spearman correlation coefficient among several aspects of work and organizational commitment

Algarve			
No university studies		University studies	
Job facet	Correlation	Job facet	Correlation
Overall satisfaction	0.576*	Overall satisfaction	0.600*
Organization of the hotel	0.575*	Satisfaction with the autonomy	0.598*
Sat. with professional development	0.516*	Organization of the hotel	0.514*

Own source
*Significant at 0.01 level

organization, since his or her work is involved in this task. However, the remuneration level is not one of the most influential aspects on employee commitment in this case either.

For the Algarve, there are also positive and significant correlations between commitment and all of the analyzed job aspects. The most influential aspect, in both employee groups is overall satisfaction. Specialized literature suggests a causal relationship between both variables (organizational commitment and job satisfaction) (García del Junco and Brás 2008). In addition, the hotel organization is a variable of positive influence in both employee groups.

There is only one difference in one of the labour facets. Thus, for workers without advanced studies, the satisfaction with their future professional development is of higher importance, while workers with university studies have a higher degree of commitment, the higher their satisfaction with the autonomy to develop the work is. So, ambitions and expectations in the way of working are different in both employee groups.

2.5 Conclusions

In recent years, organizations in the tourism sector have been facing unprecedented changes in the broadening scene. Pressure from new markets, the existence of competitors all around the world, the impact of the Internet and the speed in changes of consumer preferences presume the need for organizations to develop strategies for a faster response, better capacity to adapt and, more than ever, strategies which understand and meet client expectations.

Hence, there is no doubt that the human factor is a differentiating element in tourist services and plays a fundamental role in the achievement of adequate levels in quality of service. Nevertheless, it is necessary to state that only satisfied, motivated, committed and educated human capital will, in fact, correctly provide the professional quality of service which generates tourist satisfaction.

It is therefore necessary for institutions and organizations of this sector to enhance research and to improve their own human capital. Our study presents an analysis of the educational levels of workers of hotel establishments located in two well-known tourist areas which occupy highly competitive positions amongst tourist destinations (Andalusia and the Algarve, both located in the South of the Iberian Peninsula), concentrating on the differences that educational levels show in overall job satisfaction and its distinct issues, as well as in the organizational commitment of workers.

Evident differences were found between these two tourist locations and their formative levels. Therefore, although there is a predominance of workers with lower education in both regions, it is also possible to find a much higher percentage of university graduates in Andalusia (39.1 vs. 14% in the Algarve). Furthermore, we may observe a dependency between education and sex, age, salary and work departments in both samples. Certainly, in Andalusia there is an association between the education level and the type of contract with more temporary employees among the lower educational levels, whilst in the Algarve this aspect is not perceived; besides a much higher percentage of permanent contracts is found there.

There were also different perceptions concerning some labor issues analyzed in relation to workers' educational levels. Therefore, in Andalusia, age is much higher among graduates, while in the Portuguese region the highest average corresponds to professional training/secretarial studies. Being so, we have to emphasize that, in general, the number of years that a worker remains in the organization is very low in Andalusia, where turnover is a serious problem.

Undoubtedly, the higher global levels of overall job satisfaction and organizational commitment in Andalusia correspond to workers without university studies while in the Algarve the highest averages are among people with diplomas.

Extending our research to social and labour variables that influence the probability of finding satisfaction or non-satisfaction at work, according to the logit model, it is not possible to detect too many differences between workers with or without university studies. In Andalusia, discrepancies are shown in marital status (singles are happier in lower education but unhappier among graduates), as well as in workshifts, which is a source of dissatisfaction among workers with superior education. In the Algarve, there are no differences, except for in the type of contract, which is statistically significant and which implies a larger probability of satisfaction in the case of workers with no superior degrees and who are on permanent contracts.

Finally, in Andalusia, the issues that more strongly influence organizational commitment are global satisfaction and relationships with superiors in both groups of workers, although one can observe how workers with lower educational levels value above all the material conditions of the job while graduates emphasize hotel administration as the main correlation with commitment. In the Portuguese region, global satisfaction and hotel administration also appear in both educational levels; but non-graduates point out their satisfaction with their professional development while graduates highlight their satisfaction with the autonomy to carry out work duties.

This research and analysis will help management teams make better decisions about future action strategies. Many organizations acknowledge human capital as their most precious asset but their practice does not reflect this finding and does not lead to excellence in managing individuals. Thus, as we mentioned in the Theoretical Stage, the commitment should not just be from the workers toward the organization but the organization must also make an effort towards quality-management.

In conclusion, the formation of human resources has to be considered a valuable asset, which may generate commitment and good services for clients, but only when it is well implemented and managed. Otherwise, skills and talent, which belong to individuals and not to the organization, may disappear with the high turnover of highly qualified professionals.

References

Arnett DB, Laverie D, Mclane C (2002) Using job satisfaction and pride as internal marketing tools. Cornell Hotel Restaur Adm Q 43(2):87–96

Baker JG, Baker DF (1999) Perceived ideological differences, job satisfaction and organizational commitment among psychiatrists in a community mental health center. Community Ment Health J 35(1):85–95

Blay GJ, Boal KR (1987) Conceptualizing how job involvement and organizational commitment affect turnover and absenteeism. Academy of Management Review, april, 290.

Camisón C (1996) La empresa turística: un análisis estratégico. In: Pedreño A, Momfort V (eds) Introducción a la economía del turismo en España. Civitas, Madrid

Clark AE, Oswald AJ (1996) Satisfaction and comparison income. J Public Econ 61:359–381

Cornfield D (1999) Guest Schollar Poll Review, Shifts In Public Approval of Labor Unions in the United States, 1936-1999. The Gallup Organization http://www.gallup.com/poll/gs990902.asp.

Engström T, Westnes P, Westnes SF (2003) Evaluating intellectual capital in the hotel industry. J Intellect Capital 4(3):287–303

García del Junco J, Brás JM (2008) Satisfacción profesional y compromiso organizativo: un meta-análisis. Rev Eur Dirección Economía Empresa 17(3):61–78

Gazioglu S, Tansel A (2002) Job satisfaction in Britain: individual and job related factors. ERC Working Papers in Economics 03/03, ERC, Ankara.

Gellatly I (1995) Individual and group determinants of employee absenteeism: test of a causal model. J Org Behav 16(5):469–485

Grund C, Slivka D (2001) The impact of wage increases on job satisfaction-Empirical evidence and theoretical implications. IZA Discussion Papers 387, IZA, Bonn.

Harrison DA, Newman DA, Roth PL (2006) How important are job attitudes? Meta-analytic comparisons of integrative behavioural outcomes and time sequences. Acad Manage J 2:305–325

Hwang IS, Chi DJ (2005) Relationships among internal marketing, employee job satisfaction and international hotel performance: an empirical study. Int J Manage 22(2):285–293

Iaffaldano MT, Muchinsky PM (1985) Job satisfaction and job performance: a meta-analysis. Psychol Bull 97:251–273

Johansson P, Palme M (1996) Do economic incentives affect work absence? Empirical evidence using Swedish micro data. J Public Econ 59:195–218

Judge TA, Bono JE, Thoresen CJ, Patton GK (2001) The job satisfaction–job performance relationship: A qualitative and quantitative review. Psychological Bulletin 127(3):376

Junta de Andalucía (2007) Balance del año turístico en Andalucía 2006. Servicio de Publicaciones de la Consejería de Turismo, Deporte y Comercio, Sevilla

Kokko J, Guerrier Y (1994) Overeducation, underemployment and job satisfaction: a study of Finnish hotel recepcionists. Int J Hospitality Manage 13(4):375–386

Lam T, Zhang H, Baum T (2001) An Investigation of Employees' Job Satisfaction: The Case of Hotels in Hong Kong. Tourism Manage 22:157–165

Leung K, Smith HPB, Wang Z, Sun H (1996) Job satisfaction in joint venture hotels in China: an organizacional justice analysis. J Int Bus Stud 27(5):947–962

Lillo A, Ramón AB, Sevilla M (2007) El capital humano como factor estratégico para la competitividad del sector turístico. Cuad Turismo 19:47–69

Lin CP, Ma HC (2004) Career commitment as a moderator of the relationship among procedural justice, perceived organizational support, organizational commitment, and turnover intentions. Asia Pac Manage Rev 9(3):519–538

Lydon R, Chevalier R (2002) Estimates of the effect of wages on job satisfaction. CEP-LSE Discussion Papers 0531. CEP, London.

Messmer M (1999) Culture wars – corporate culture. J Accountancy 188:53–56

Meyer JP, Herscovitch L (2001) Commitment in the workplace: Toward a general model. Hum Resour Manage Rev 11:299–326
Mowday RT, Steers RM, Porter LW (1979) The measure of organizational commitment. J Vocat Behav 14:224–247
Nikolaou A, Theodossiou I, Vasileiou EG (2005) Does job security increase job satisfaction? A study of the European experience. 2nd World Conference SOLE/EALE, European Association of Labour Economists, San Francisco.
Organ DW, Ryan K (1995) A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. Pers Psychol 48:775–800
Pardo A, Ruiz M (2002) SPSS 11: Guía para el análisis de datos. McGraw-Hill, Madrid
Porter LW, Steers RM, Mowday RT, Boulian PV (1974) Organizational commitment, job satisfaction and turnover among psychiatric technicians. J Appl Psychol 59:603–609
Powell D, Meyer JP (2003) Side-bet theory and the three component model of organizational commitment. J Vocat Behav 65:157–177
Price JL (1997) Handbook of organizational measurement. Int J Manpow 18:303–558
Sánchez S, López-Guzmán TJ, Millán G (2007) La satisfacción laboral en los establecimientos hoteleros. Análisis empírico provincia Córdoba Cuad Turismo 20:223–249
Sloane P, Williams H (1996) Are overpaid workers really unhappy? A test of the theory of cognitive dissonance. Labour 10:3–15
Sousa-Poza A, Henneberger F (2004) Analyzing job mobility with turnover intentions: an international comparative study. J Econ Issues 38:113–137
Testa MR (2001) Organizational commitment, job satisfaction, and effort in the service environment. J Psychol 135(2):226–236
Ugboro IO, Obeng K (2000) Top management leadership, employee empowerment, job satisfaction and customer satisfaction in TQM organizations: an empirical study. J Qual Manage 5:247–272
Van Breukelen W, van der Vlist R, Steensma H (2004) Voluntary employee turnover combining variables from the traditional turnover literature with the theory of planned behavior. J Organ Behav 25(7):893–914
Ward ED, Davis E (1995) The effect of benefit satisfaction on organizationalcommitment. Compens Benefits Manage 11(3):35–40

Chapter 3
Competition Between and Within Tourist Destinations

Lorenzo Zirulia

3.1 Introduction

In tourism, competition occurs at two levels. First, competition occurs among tourist destinations, countries or regions. If we consider countries as the level of analysis, recent years have witnessed a significant increase in the degree of international competition, triggered by factors like the reduction of transportation costs and the ICT revolution. New destinations have emerged, leading to a sharp reduction in the concentration of international arrivals. In 1950, the top five countries in terms of international tourist arrivals (USA, Canada, Italy, France and Switzerland) accounted for around 71% of international tourist arrivals worldwide. In 2006, the corresponding value was 33%, and the list of "top five destinations" changed as well (in that year, they were France, Spain, USA, China and Italy).[1] Second, competition occurs among firms offering similar goods or services and located in the same tourist destination. This chapter will focus on accommodation, which in recent years has witnessed an increase in supply in most countries which can be interpreted as an increase of competition within each destination.[2] The aim of this chapter is to analyze theoretically the interplay between the two levels of competition, between and within tourist destinations.

In the model, two destinations compete for tourists from the rest of the world. The destinations are differentiated both vertically and horizontally.[3] Differentiation

[1]The source for these data is the World Tourism Organization (www.unwto.org).

[2]For instance, focusing on Europe (EU 27 countries), the number of bed places in hotels has risen from 10,050,487 in 1998 to 11,717,241 in 2007. The increase is common to all large countries except France. Data are taken from Eurostat (epp.eurostat.ec.europa.eu).

[3]Following Lancaster (1979), a product (a good or a service) can be described as a list of characteristics to which consumers attach positive value. Two products are vertically differentiated if one product is superior to the other in all characteristics, while they are

L. Zirulia
Department of Economics, University of Bologna, Piazza Scaravilli, 2, 40126 Bologna, Italy
e-mail: lorenzo.zirulia@unibo.it

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_3,

is related to natural and cultural attractions that are present in the destination and to geographical distance from tourists' place of origin. We assume that the degree of differentiation between destinations is exogenous. In each destination, tourists consume a single "good", i.e. hospitality. Within each destination, hospitality is a homogeneous good offered by hotels located in the destination. Homogeneity implies that hotels within each destination face the same price, are of the same size and obtain the same profits. However, given differentiation between destinations, price, hotel size and profits differ between destinations. A destination authority in each destination chooses the number of hotels, in order to maximize hotels' total profits in the destination in a simultaneous-move game. Choosing the number of firms, the destination authority determines the intensity of competition within the destination, and ultimately the price of accommodation.

The focus of this chapter lies in the relationship between the degree of (exogenous) differentiation between destinations and the (endogenous) degree of competition within the destination. Our main result is that an increase in the intensity of competition between destinations induces destination authorities to increase competition within the destination. When the intensity of competition between destinations increases, the incentives to increase the intensity of competition within the destination are higher, since the subsequent increase in price leads to a larger gain in market shares. However, this strategy is followed by both destinations, with the consequence that hotel profits in both destinations are dispersed in a "prisoner's dilemma" scenario.

Recent papers have investigated each single level of competition in isolation. For instance, Cellini and Candela (2006) consider a dynamic model of competition between tourist destinations, which are taken as the sole unit of analysis. Strategic pricing of hotels has been considered by Mudambi (1994), while Pintassilgo and Silva (2007) modelled the effect of hotels' entry and environmental quality in a single destination. Calveras (2007) models the formation of hotel chains in the case of two destinations, but he takes as given the initial number of hotels. Some papers have considered types of relations between tourist firms other than competition. Calveras and Vera-Hernandez (2005) investigate the vertical relations between tour operators and hotels, and their impact on environmental qualities, within a destination. Wachsman (2006) models the strategic interaction between hotels and airlines, when two destinations compete, and one hotel and one airline operate in each destination. To our knowledge, this present study is the first to consider the interaction between the two levels of competition.[4] In this respect, our model must be seen as a contribution to the emerging literature in tourism economics

horizontally differentiated if a product is superior to the other in some characteristics, and inferior in others.

[4]With respect to the international trade literature, our model shows similarities with Richardson (1999). This author considers the competition between two countries, whose firms offer homogeneous products. Government chooses trade policies (the level of trade tariffs) and competition policies (the number of firms in each country). To this set-up, we add horizontal and vertical differentiation between the "products" offered by the firms in each country.

that views the *destination* as the object of study that characterizes the field (Candela and Figini, 2009).

The rest of the chapter is organized as follows. In Sect. 3.2 the model is introduced and solved. In Sect. 3.3, we describe the main implications of the model, and we discuss them in Sect. 3.4. Section 3.5 concludes and points to further extensions of the model.

3.2 The Model

Our model considers competition between two destinations (Destinations 1 and 2) for attracting tourists from the rest of the world. Tourists consume a single good, i.e. hospitality, which is offered by competing hotels in each destination, and the destination authorities decide the number of hotels in their managed destination.

The model assumes two stages. In the first stage, destination authorities (i.e. policy makers in charge of the tourist sector) choose simultaneously the number of hotels in the destination. The assumption that the exact number of firms in the accommodation sector is chosen is clearly a simplifying one. What we intend to capture here is the idea that policy at the local level can in some form influence the intensity of competition in the destination, for instance because operating a hotel usually requires an authorization, or because the destination authority has the power to influence an extension of the area in which hotels can be built. In the second stage, hotels compete *à la* Cournot, choosing quantities (i.e. their size). Following Kreps and Scheinkman (1983), we interpret the Cournot game as the reduced form of a game where firms choose first their productive capacity and then compete in prices. Since capacity constraints are relevant for hotels, Cournot competition appears as a reasonable assumption. From the tourists' point of view, the good is homogeneous within the destination but differentiated across destinations.[5] The interpretation of this assumption is that, while the accommodation services offered by hotels are homogeneous, destinations are vertically and horizontally differentiated for non-traded characteristics, such as natural or cultural attractions, and horizontally differentiated according to the geographical distance from the tourists' place of origin.

In the second stage, the number of firms in each destination is given. I is the set of firms in Destination 1, n_1 is the number of firms and $i \in I$ the generic firm. Similarly, J is the set of firms in Destination 2, n_2 is the number of firms and $j \in J$ the generic firm. Firms (independent of their location) have identical cost functions with zero fixed costs and marginal costs normalized to zero as well.

Inverse demand function in Destinations 1 and 2 are assumed to be linear, and they are respectively:

[5] In the international trade literature, the hypothesis of differentiation by country of origin is known as "Armington's hypothesis", following Armington (1969).

$$p_1 = A_1 - \sum_{i \in I} q_i - \lambda \sum_{j \in J} q_j \tag{3.1}$$

$$p_2 = A_2 - \sum_{j \in J} q_j - \lambda \sum_{i \in I} q_i \tag{3.2}$$

A_1 and A_2 are positive parameters related to consumer willingness to pay for each destination, i.e. to destination quality. We allow for asymmetries between destinations (while assuming, without loss of generality, that $A_1 > A_2$), and then $A_1 - A_2$ can be conceived as a measure of degree of vertical differentiation. $\lambda \in [0; 1)$ is a measure of substitutability between products offered in the two destinations, i.e. an inverse measure of horizontal differentiation and a direct measure of intensity of competition.

In the first stage, destination authorities choose simultaneously the number of hotels in their destination. Their objective function is given by destination hotel total profits in the second stage (which are correctly predicted), i.e. $W_1(n_1) = \sum_{i \in I} \Pi_i$ and $W_2(n_2) = \sum_{j \in J} \Pi_j$. This hypothesis is justified by tourists not being citizens of their destinations, so that consumer surplus does not enter the "social welfare" that is relevant for the destination authority.

3.2.1 The Second Stage

We solve the model backwards. In the second stage, generic firms i and j choose q_i and q_j in order to maximize their profits, which are respectively:

$$\Pi_i \equiv \left(A_1 - \sum_{i \in I} q_i - \lambda \sum_{j \in J} q_j \right) q_i \tag{3.3}$$

$$\Pi_j \equiv \left(A_2 - \sum_{j \in J} q_j - \lambda \sum_{i \in I} q_i \right) q_j \tag{3.4}$$

The first order conditions are:

$$\frac{\partial \Pi}{\partial q_i} \equiv \left(A_1 - \sum_{i \in I} q_i - \lambda \sum_{j \in J} q_j \right) - q_i = 0 \tag{3.5}$$

$$\frac{\partial \Pi}{\partial q_j} \equiv \left(A_2 - \sum_{j \in J} q_j - \lambda \sum_{i \in I} q_i \right) - q_j = 0 \tag{3.6}$$

Invoking symmetry, i.e. $q_i = q_1 \ \forall i \in I$, and $q_j = q_2 \ \forall j \in J$ we obtain:

$$A_1 - n_1 q_1 - \lambda n_2 q_2 - q_1 = 0 \tag{3.7}$$

$$A_2 - n_2 q_2 - \lambda n_1 q_1 - q_2 = 0 \tag{3.8}$$

In equilibrium, the quantity produced by the representative firm in each destination is:

$$q_1^* = \frac{A_1 + n_2(A_1 - \lambda A_2)}{1 + n_1 + n_2 + n_1 n_2 (1 - \lambda^2)} \tag{3.9}$$

$$q_2^* = \frac{A_2 + n_1(A_2 - \lambda A_1)}{1 + n_1 + n_2 + n_1 n_2 (1 - \lambda^2)} \tag{3.10}$$

Plugging (3.9) and (3.10) into (3.3) and (3.4), we obtain equilibrium profits for the representative firm in Destinations 1 and 2 as $\Pi_1^* = (q_1^*)^2$ and $\Pi_2^* = (q_2^*)^2$.

Comparative statistics on (3.10) and (3.11) give expected results. Focusing on Destination 1 (the case for Destination 2 is symmetric), we find that an increase in destination quality, as measured by A_1, has a positive effect on hotel size in equilibrium:

$$\frac{\partial q_1^*}{\partial A_1} = \frac{1 + n_2}{1 + n_1 + n_2 + n_1 n_2 (1 - \lambda^2)} > 0 \tag{3.11}$$

since an increase in A_1 leads to higher marginal revenues for any level of q_1. For a symmetric argument, an increase in the quality of the other destination (an increase in A_2) has a negative effect, unless $\lambda = 0$:

$$\frac{\partial q_1^*}{\partial A_1} = \frac{-\lambda n_2 A_2}{1 + n_1 + n_2 + n_1 n_2 (1 - \lambda^2)} < 0 \tag{3.12}$$

An increase in the intensity of competition, both within Destination 1 (increase in n_1) and in the other Destination 2 (increase in n_2) leads to a lower size in equilibrium:

$$\frac{\partial q_1^*}{\partial n_1} = \frac{-(1 + n_2(1 - \lambda^2))(A_1 + n_2(A_1 - \lambda A_2))}{1 + n_1 + n_2 + n_1 n_2 (1 - \lambda^2)} < 0 \tag{3.13}$$

$$\frac{\partial q_1^*}{\partial n_2} = \frac{-\lambda(A_1 + n_2(A_1 - \lambda A_2))}{1 + n_1 + n_2 + n_1 n_2 (1 - \lambda^2)} < 0 \tag{3.14}$$

Finally, we consider the effect of variation of λ on hotel size in equilibrium:

$$\frac{\partial q_1^*}{\partial \lambda} = \frac{-n_2[(1+n_2)(A_2-\lambda A_1) - \lambda n_1(A_1 + n_2(A-\lambda A_2))]}{1+n_1+n_2+n_1 n_2(1-\lambda^2)} \tag{3.15}$$

Equation (3.15) has an ambiguous sign. In order to interpret it more easily, consider a symmetric situation where $n_1 = n_2 = n$. This means that the sign of $\frac{\partial q_1^*}{\partial \lambda}$ is the sign of $(1+n) - \lambda n > 0$, that is $\frac{\partial q_1^*}{\partial \lambda} > 0$ if $\lambda < \frac{n}{1+n}$. The relationship between hotel size and the intensity of competition is U-shaped. This result comes from two opposing effects. An increase in λ means a lower price for a given quantity offered by foreign hotels, which has a negative effect on q_1^*; however, it also increases the demand elasticity of the individual firm, leading to a larger output by each hotel. It turns out that the sum of the two effects is minimized at an intermediate value of λ.

3.2.2 The First Stage

In the first stage, destination authorities choose simultaneously the number of firms active in the destination. We assume that the destination authority maximizes the total profits of hotels in the destination:

$$\max_{n_1} W_1(n_1) = n_1(q_1^*)^2 \tag{3.16}$$

$$\max_{n_2} W_2(n_2) = n_2(q_2^*)^2 \tag{3.17}$$

The first order conditions are:

$$\begin{aligned}\frac{\partial W_1}{\partial n_1} \equiv & \left(\frac{A_1 + n_2(A_1 - \lambda A_2)}{1+n_1+n_2+n_1 n_2(1-\lambda^2)}\right)^2 \\ & - 2n_1 q_1 \frac{A_1 + n_2(A_1 - \lambda A_2)}{1+n_1+n_2+n_1 n_2(1-\lambda^2)}(1+n_2(1-\lambda^2)) = 0\end{aligned} \tag{3.18}$$

$$\begin{aligned}\frac{\partial W_2}{\partial n_2} \equiv & \left(\frac{A_2 + n_1(A_2 - \lambda A_1)}{1+n_1+n_2+n_1 n_2(1-\lambda^2)}\right)^2 \\ & - 2n_2 q_2 \frac{A_2 + n_1(A_2 - \lambda A_1)}{1+n_1+n_2+n_1 n_2(1-\lambda^2)}(1+n_1(1-\lambda^2)) = 0\end{aligned} \tag{3.19}$$

Those conditions can be simplified and become:

$$\frac{\partial W_1}{\partial n_1} \equiv \left(1+n_1+n_2+n_1 n_2(1-\lambda^2)\right) - 2n_1(1+n_2(1-\lambda^2)) = 0 \tag{3.20}$$

$$\frac{\partial W}{\partial n_2} \equiv \left(1+n_1+n_2+n_1 n_2(1-\lambda^2)\right) - 2n_2(1+n_1(1-\lambda^2)) = 0 \tag{3.21}$$

Equations (3.20) and (3.21) implicitly define the best response function for each destination authority, i.e. the number of hotels which maximize hotel total profits given the number of hotels in the other destination. In an explicit form, the best response functions respectively appear as:

$$n_1 = BR_1(n_2) = \frac{1 + n_2}{1 + n_2(1 - \lambda^2)} \tag{3.22}$$

$$n_2 = BR_2(n_1) = \frac{1 + n_1}{1 + n_1(1 - \lambda^2)} \tag{3.23}$$

We then analyze the slopes of best response functions. Considering Destination 1 and deriving, we obtain:

$$\frac{dn_1}{dn_2} = \frac{\lambda^2}{1 + n_2(1 - \lambda^2)} \tag{3.24}$$

which is always positive. In the terminology of Bulow et al. (1985), the game played by the destination authorities is a game with strategic complements. Figure 3.1 shows the two best response functions. The Nash equilibrium is given by their intersection. The graphical representation, together with economic intuition, suggests that the equilibrium is symmetric. Then, imposing symmetry ($n_1 = n_2 = n^*$) in (3.20) and (3.21), we obtain[6]:

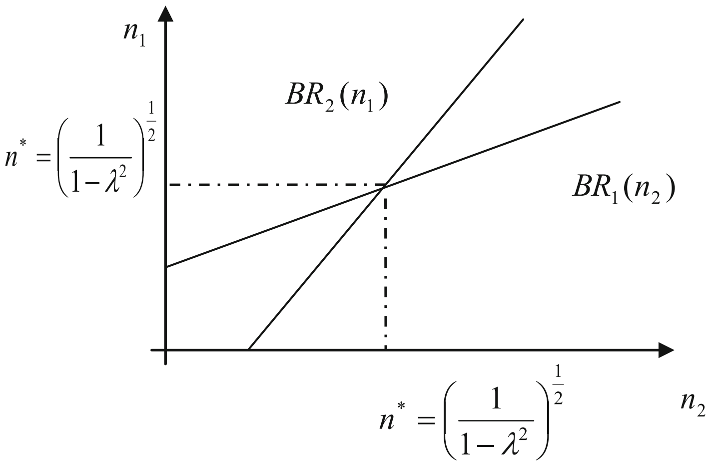

Fig. 3.1 Best response functions and equilibrium

[6]It can be verified that second order conditions are satisfied. We shall assume that parameters are such that an interior equilibrium is guaranteed in both destinations.

$$n^* = \left(\frac{1}{1-\lambda^2}\right)^{\frac{1}{2}} \tag{3.25}$$

3.3 Between and Within Destination Competition

In this chapter, our focus lies in the relation between the intensity of competition between destinations (which is assumed to be exogenous) and the intensity of competition within a destination, which is endogenous and measured by the number of firms which operate in that destination.

The first thing we note from (3.25) is that the number of hotels active in each destination is independent of A_1 and A_2. This leads to our first proposition:

Proposition 1. *The number of firms active in each destination is the same and independent of destination quality.*

A_1 and A_2 affect the size of hotels in equilibrium (the larger the market size of a destination, the larger is the size of hotels in equilibrium), but not the number of hotels.

In order to understand the intuition underlying the result, consider the case of $\lambda = 0$ (i.e. destinations are local monopolists). In this case, $n^* = 1$. Independent of market size, a destination authority willing to maximize industry profit would choose monopoly, because any market structure would disperse profits. The same logic extends to $\lambda > 0$. Thus, the assumption of identical hotels is crucial. In the presence of within-destination product differentiation, hotels are able to create their own demand, with limited "business stealing" effects on the other hotels.

From (3.25) we see instead that the number of hotels chosen by the destination authority is increasing in λ, since:

$$\frac{dn^*}{d\lambda} = \lambda(1-\lambda^2)^{-\frac{3}{2}} > 0 \tag{3.26}$$

Proposition 2. *The number of hotels active in each destination, and then the intensity of competition within the destination increases with the intensity of competition between the destinations.*

The intuition behind this result is the following. We first note that the equilibrium number of hotels results from an interaction of two forces operating in opposite directions. First, there is a "profit dissipating" effect: when a destination authority increases the number of hotels, some of the profits within the destination are dispersed because of the increase in competition. Second, there is a "market share" effect. An increase in the number of firms in one destination, given the number of firms in the other destination, leads to a reduction in prices, and then an increase in destination market share.

When the horizontal differentiation between the two destinations is low, a given reduction in price has a significant effect on destination "sales". For this reason, destination authorities find aggressive price strategies attractive, exactly as firms do in standard models of oligopoly interaction (Tirole, 1988). The way in which destination authorities "control" prices is through the intensity of competition within the destination: the higher the intensity, the lower the price. Thus, an increase in λ leads to an increase in the number of firms. From the point of view of overall welfare in the world tourism market, Proposition 2 implies that an increase in the intensity of competition between destinations redistributes wealth from destination places to origin places through two effects: a direct effect (for a given number of firms in each destination) and an indirect (induced) effect, operating through a variation in the number of firms, which *reinforces* the direct effect.

3.4 Discussion

In this section we discuss some implications of the results we have obtained, and, at the same time, we discuss how results could vary if some assumptions are relaxed.

The main point of this chapter is that an increase in competition between destinations leads destination authorities towards a policy intervention (increasing the intensity of competition within the destination) that in fact worsens firm performance overall in the destination, although maximizing firm profit is the destination authority's objective. This apparently paradoxical result can be understood if one considers that destination authorities are not concerned with incumbent (i.e. before the increase in competition) hotels only, but with potential entrants as well. In fact, one could argue that for "political economy" considerations, incumbent hotels could "lobby" to avoid an increase in the number of firms. In any case, the first lesson we have learnt from our model is that the ability of destination authorities to commit to a given number of firms in the face of increased competition would benefit the destination, by increasing welfare as we defined it.

A second point relates to the possible presence of externalities that we rule out by assumption. The first type of externality is dynamic, and it refers to the negative effect of the number of firms on environmental quality, as in Pintassilgo and Silva (2007). If destination authorities fail to internalize this effect, our model suggests that increased competition between destinations can harm tourism sustainability in the long run, with negative consequences for tourists as well. As a consequence, "collusion" between destination authorities could be beneficial not only to the firms, but also to the consumers, at least over a long term horizon. Another type of externality could occur with respect to destination residents. In principle, negative or positive externalities could exist, which would imply a number of hotels which is higher or lower than the social optimum, if governments fail to consider the effects on residents.

Third, our model suggests possible coordination if the two destinations belong to the same political entity. The prisoner's dilemma type of game, indeed, implies that in this case destinations would be better off if the choice of competition intensity within each destination were centralized in a single authority. Therefore, our model suggests that the level at which tourism policies are formulated is crucial.

Finally, our model focused on price competition, with prices being controlled by destination authorities "manipulating" the level of competition in their destinations. Price competition, however, tends to harm firms (in favour of consumers), and we showed that this is true for tourist destinations as well. In other words, destination authorities should be cautious about using aggressive price strategies in an attempt to improve their competitive position. If tourism competition can be influenced by investments in destination quality or characteristics, destination authorities should in fact try to reduce the intensity of price competition by increasing the "artificial" level of differentiation among destinations.

3.5 Conclusions

In this chapter we have presented a model that investigates the interplay of competition within and between tourist destinations. The focus lies in the relationship between the degree of (exogenous) differentiation between destinations and the (endogenous) degree of competition within the destination. Our main result is that an increase in the intensity of competition between destinations induces destination authorities to increase competition within the destination. This implies that an increase in the intensity of competition between destinations redistributes wealth from destination places to origin places through two effects: a direct effect (for a given number of firms in each destination) and an indirect (induced) effect, operating through variation in the number of firms, which *reinforces* the direct effect. Several extensions of the model are possible, some of them mentioned in the previous section. In general, one could imagine enriching both the description of competition among destinations, and the nature of destination as a system of firms. At the level of competition among destinations, one could have a dynamic model in which the degree of vertical and horizontal differentiation is endogenous. At the level of the destination system, an interesting study could be an analysis of firms offering different types of goods and services (accommodation, meals, entertainment, etc.), in line with Candela et al. (2008).

Acknowledgments The author wishes to thank two anonymous referees for useful comments and suggestions. This research has been conducted within the project "Competition within and between tourist destinations", funded by the Polo di Rimini – University of Bologna. The usual disclaimer applies.

References

Armington PS (1969) A theory of demand for products distinguished by place of production. IMF Staff Papers 16(1):170–201

Bulow JI, Geanakoplos JD, Klemperer PD (1985) Multimarket oligopoly: strategic substitutes and complements. J Polit Econ 93(3):488–511

Calveras A (2007) Expansion of a hotel chain and environmental quality. Investigaciones Económicas 33(2):263–295
Calveras A, Vera-Hernandez M (2005) Quality externalities among hotel establishments: what is the impact of tour operators? Tourism Econ 11(4):571–593
Candela G, Figini P (2009) Destination unknown. Is there any economics beyond tourism areas? RCEA Working Paper 36-09
Candela G, Figini P, Scorcu A (2008) The economics of local tourist systems. In: Brau R, Lanza A, Usai S (eds) Tourism and sustainable economic development: macroeconomic models and empirical methods. Edward Elgar, Cheltenham
Cellini R, Candela G (2006) Investment in the tourism market: a dynamic model of differentiated oligopoly. Environ Resour Econ 35:41–58
Kreps D, Scheinkman J (1983) Quantity precommitment and Bertrand competition yield Cournot outcomes. Bell J Econ 14:326–337
Lancaster K (1979) Variety, equity and efficiency. Blackwell, Oxford
Mudambi R (1994) A Ricardian excursion to Bermuda: an estimation of mixed strategy equilibrium. Appl Econ 26(9):927–937
Pintassilgo P, Silva JA (2007) Tragedy of the commons in the tourism accommodation industry. Tourism Econ 13(2):209–224
Richardson M (1999) Trade and competition policies: *concordia discors*? Oxf Econ Paper 51:649–664
Tirole J (1988) Theory of industrial organization. MIT, Cambridge, MA
Wachsman Y (2006) Strategic interactions among firms in tourist destinations. Tourism Econ 12 (4):531–541

Chapter 4
Flows of Tourists, Commodities and Investment: The Case of China

Jianhong Zhang, Haico Ebbers, and Chaohong Zhou

4.1 Introduction

Globalization's impact on the world economy has made it one of the most popular points of discussion in the past two decades. It not only causes drastic changes in trade relations, capital flows and tourist flows across the world but also creates a web of connections between national economies. No country can escape from this influence, and no country intends to exclude itself from the process of globalization. Even countries that once maintained an inward orientated strategy are making commitments to connect their economies with the world network by liberalizing the movement of good, services, labor and capital across borders. This trend greatly changes these countries' pace of development. This study aims to use macro data to reveal the relationships between three cross-border flows: people, goods and capital.

In effect, we focus on the largest developing or emerging economy of all: China. Applying time series techniques, we unravel the causality and direction of travel-trade and travel-FDI linkages for the Chinese economy in the period 1978–2005 period.

In 1978, China ended its isolation with the adoption of an open door policy. China has since gradually become involved in the international production network with the liberalization of policies toward international trade, investment and tourism. Given its huge market potential, rapid growth, deepening economic reform and outward-oriented strategy, China is not only influenced by the treads of globalization, but has also become a powerful player in the current globalization process. China has experienced dramatic growth in international trade and foreign direct

J. Zhang (✉) • H. Ebbers
Europe China Institute, Nyenrode Business Universiteit, Straatweg 25, 3621 BG Breukelen, The Netherlands
e-mail: j.zhang@nyenrode.nl

C. Zhou
University of Utrecht, Duivenkamp 687, 3607 VB Maarssen, The Netherlands

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_4, © Springer-Verlag Berlin Heidelberg 2011

investment (FDI). In 2004, for instance, the trade to GDP ratio was about 75% for China, compared to only approximately 20% for the US, and 27% for the EU (The Economist 2005, 376/8437: 61–63). At the same time, China has become more and more open to FDI, leading other developing countries. As a result, China's inward FDI increased from nearly zero in 1978 to 72.4 billion US dollars in 2005, ranking as the world's third largest FDI recipient (UNCTAD 2006).

Tourism is also an important and fast growing industry in China. Before economic reform commenced in 1978, tourism was not considered an industry in China, rather it was treated as an aspect of the country's foreign affairs, serving the purpose of special political activities. In the first 20 years of economic reform, the nature of tourism, from the government's point of view, gradually changed from politics to economics: tourism was declared to be an economic activity with the direct purpose of gaining foreign exchanges to benefit China's modernization (Zhang et al. 2007). Since 1992, China has accelerated economic reform and opened its door to the world market even wider, allowing the market mechanism to begin to function in China's economy. Consequently, tourism further opened doors to foreign tourists and investors, and domestic market started developing. Foreign tourist arrivals increased from 71,600 in 1978 to 49.6 million in 2006, making China the fourth largest international tourist destination in the world in 2006.[1]

The development of the Chinese tourism industry is obviously affected by the open door policy and globalization processes in China. As international trade and FDI are the two pillars of the outward Chinese economy, there should be close connections between tourism, international trade and investment. But whether and how they are linked have not been sufficiently analyzed by previous empirical studies. This paper, along with a few studies reviewed in the next section, aims to investigate the interrelations of travel, trade and FDI. It is worth noting that trade in this paper refers to commodity trade and does not include service trade. We use the cointegration approach and vector error correction model (VECM) to analyze the long-run equilibrium and two-direction causality relations between a) international travel and international commodity trade and b) international travel and FDI. Estimations using annual data over the whole transition period (1978–2005) in China confirm our theoretical predictions indicating *interaction between commodity trade, investment and tourism.*

This paper adds to the existing literature in two ways: First, our analysis uses the aggregate data of trade, investment and travel flows to explore the travel-trade investment linkages. This way, we can provide a more complete picture of travel-trade investment relations, while previous studies only focused on the interrelations reflected by bilateral trade, investment and travel data with specific countries. Second, this study investigates not only the short run causalities but also the long run equilibriums. Previous studies, to the best of our knowledge, have not done this.

This paper is structured as follows: The next section briefly reviews the literature and develops the theoretical framework. Section 4.3 explains the method in detail,

[1] *Source*: China National Tourism Administration.

which is followed by showing the empirical evidence in Sect. 4.4. Section 4.5 presents a conclusion and discusses the policy and development implications of this study.

4.2 Literature Review and Theoretical Framework

The idea that international travel links to international trade and investment is anything but new. Marco Polo's travels from Italy to Asia seven centuries ago and Zheng He's series of seven naval expeditions from east China to south Asia and Africa six centuries ago have been thought of as historical events that promoted trade between the countries involved. Despite these old stories, few researchers have investigated the relationship between international trade and international travel. Among the few studies that have been done on this topic, Kulendran and Wilson (2000) investigated the long-run equilibrium and short-run bidirectional causality relation between international trade and international travel, using data of bilateral travel and trade flows between Australia, the United States, the United Kingdom, New Zealand and Japan separately. They found that cointegrated and causal relations between international trade and international travel existed in some cases. Khan et al. (2005) replicated the approach of Kulendran and Wilson (2000) with bilateral trade and travel data between Singapore and its major trade partners. They found, however, that cointegration between tourism and trade exists but is not common; Granger causality is even rarer. Shan and Wilson (2001) applied the Granger no-causality procedure and found two-way Granger causality existed in bilateral trade and travel between China and three major countries where tourists originate, Australia, Japan and United States. Fischer (2004) explored the connection between bilateral food imports and bilateral tourist flows by using an error-correction model. The results show that, while aggregate food import demand is inelastic with regard to international travel, the estimated average elasticities for imports of certain food products (wine, cheese and processed/preserved vegetables) are consistently higher. Aradhyula and Tronstad (2003) used US Arizona agribusiness data and a simultaneous bivariate qualitative choice model to show that cross-border business trips have a significant and positive effect on the agribusinesses' propensity to trade with the cross-border state of Sonora in Mexico. Turner and Witt (2001) used the structural equation model to investigate the tourism demand of New Zealand from Australia, Japan, the UK and USA. The empirical results showed that international trade plays a major role in influencing business tourism demand. With respect to FDI and travel relations, there are a few published empirical studies; however, many of them focused their analysis on international hotel FDI and tourism (Dunning and Kundu, 1995).[2] One exception is the work of Tang et al (2007), which investigated the causal link between FDI and tourism in China.

[2]For an extensive review of this issue, see Goldberg et al. (2005).

Using the Granger causality test under a VAR framework and data between 1985 and 2001, Tang and the colleagues found only one-directional causality from FDI to tourism in China's case.

This short survey of existing literature indicates that some previous studies were concerned with one-way relations, whereas some of them focused on the cointegrated and two-way causality relations. All of these studies were designed to reveal travel-trade investment relations between two countries. The results of these studies shed light on the relations between travel, trade and investment on a bilateral basis. However, the research on the bilateral basis may not provide a complete picture of travel-trade investment relations. For example, business people traveling from country A to country B do not necessarily only deal with the trade between the two countries. They may buy products from B and sell them to a third country C, or buy products from a third country C and sell them in country B. On the other hand, increased trade between countries A and B is also likely to increase the travel between countries A and C. For example, when companies based in country B increase their presence (e.g. product market share, investment, business activities, etc.) in China (country A), competitors or business partners of these companies based in country C may follow these companies in expanding their business in China, since the increasing business activities between A and B signal good business opportunities in China (country A). Subsequently, the business travel from country C to China (country A) will increase. Therefore, analysis based on aggregate travel, trade and investment data is needed to provide a complete picture of the relationships between these three series. This paper intends to meet this need.

The linkages are conceptually formalized as follows and summarized in Fig. 4.1.

4.2.1 Causality from Exports to Travel (Arrow 1)

Direct effect: Expansion of exports can induces increasing business travel. The argument runs as following: the popularity of Chinese products in the world market reflects the comparative advantages (in particular lower prices) of Chinese

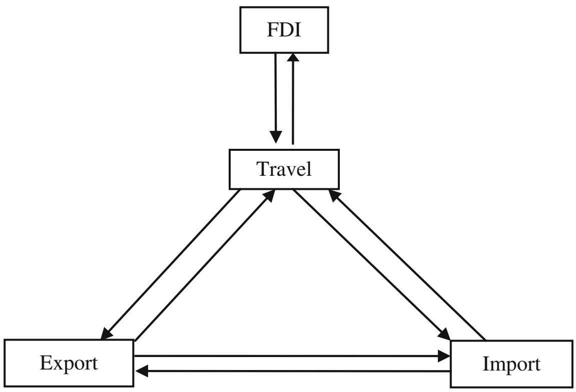

Fig. 4.1 Relationships between travel, trade and FDI

products. These comparative advantages attract profit- or opportunity-seeking business people to travel to China.

Indirect effect: Greater exports may raise consumers' awareness and interests in the source country, hence increasing holiday travel based on increased consumer interest (Kulendran and Wilson 2000).

4.2.2 Causality from Travel to Exports (Arrow 2)

Direct effect: Business travel can promote business coordination, contracting and deals that result in increased exports.

Indirect effect: Holiday travel may stimulate entrepreneurial discoveries. For example, as result of holiday travel, tourists may realize the potential of selling Chinese products in other countries.

4.2.3 Causality from Imports to Travel (Arrow 3)

Direct effect: Increasing imports show the growth potential of the country's import market. The growth can be driven by trade liberalization or increase in purchasing power of the import country. In both cases, the increasing demand stimulates more business travel to explore this country's market.

Indirect effect: Increasing imports may lead to competition for a position in this market which attracts more business travel. In addition, the success of foreign merchants in a host country can promote this country's image, with regard to its business environment and culture. As a result, the successful merchants may encourage their family members and social contacts to visit this country for cultural or business tours.

4.2.4 Causality from Travel to Imports (Arrow 4)

Direct effect: First, as in the discussion of the export case, business travel often promotes business coordination and deals, which increases imports. Second, holiday travel also may generate increased imports due to an increased demand for famous international products (Vellas and Becherel 1995) or home country products. For example, local tourism enterprises, such as hotels, may need to purchase more foreign products to appeal to foreign visitors' preferences for international brands or own home country products.

Indirect effect: As with exports, holiday travel may also increase the awareness of business opportunities regarding imports. During cultural tours, holiday travel or studying in a host country, foreign visitors realize the potential demand for some foreign products in this country and consequently create imports.

4.2.5 Causality from Travel to FDI (Arrow 5)

Direct effect: Travel, which allows for face-to-face interaction, could play a role in the decision of where and how much to invest. Increased personal contact has a positive impact on project selection and monitoring. This face-to face contact helps investors obtain information about the available investment opportunities and find good investment projects. After investment, it can also reduce the information asymmetry between foreign and domestic investors, hence reducing moral hazard (Goldberg et al. 2005). Therefore, business travel can increase the continuity and growth of an investment project.

Indirect effect: An increase in tourists would generate greater demand for hotels and other tourism services, and more FDI would follow. Therefore it is expected that increased travel induces more FDI.

4.2.6 Causality from FDI to Travel (Arrow 6)

Direct effect: After investment, investors have to monitor and coordinate business processes, which may generate follow-up international business travel. Also, foreign investment in the tourism industry would lead to improved infrastructure of tourism, which could in turn induce a greater inflow of tourist.

Indirect effect: Due to the policy orientation and motivation of Multinationals, a large part of FDI in China is export-oriented, which leads to greater trade; an increase in trade is likely to lead to a growth in international travel directly and indirectly.

4.3 Methodology

In this study we utilize the cointegration approach and vector error correction model (VECM), to show not only two-way causality relation but also the long equilibrium between trade, travel and FDI. The methodological details are explained below:

4.3.1 Granger-Causality Test

The Granger-causality analysis is often used in investigating causal relationships between variables. The basic principle of the Granger-causality analysis (Granger 1969) is testing whether lagged values of one variable help to improve the explanation of another variable. Simple Granger-causality tests are operated on a single equation in which variable y is explained by lagged values of itself and lagged values of another variable x. Then one sees whether the coefficients of the lagged x variables are equal to zero. If the hypothesis that the coefficients of the lagged values of x are equal to zero is rejected, it is said that variable x Granger-causes variable y.

This study will test for two-way Granger-causality relationships between exports, imports, travel and FDI, so a single-equation specification cannot fulfill the aim of such a study. A vector autoregression (VAR) system is commonly used for this purpose. The conventional Granger-causality test based on a standard VAR system is, however, defined conditionally on the basis of stationarity. If the time series are non-stationary, the stability condition for a VAR system is not met, implying that the Wald test statistics for Granger-causality are invalid. In cases such as this, the cointegration approach and vector error correction model (VECM) are recommended to investigate the relationships between non-stationary variables (e.g., Toda and Phillips 1993, 1994). Engle and Granger (1987) pointed out that when a linear combination of two or more non-stationary time series is stationary, then the stationary linear combination–the so-called cointegrating equation – can be interpreted as a long-run equilibrium relationship between the variables. The long-run equilibrium relationship between two economic series suggests that the two economic variables are correlated to each other in time, and the presence of causality.

4.3.2 Cointegration Approach

This long-run equilibrium relationship implies causality in at least one direction, but it cannot determine which one, or both. The direction can be obtained by estimating a VECM that explicitly includes the cointegrating relations. In a VECM, long- and short-run parameters are separated, which gives an appropriate framework for assessing the validity of the long-run implications of a theory as well as estimating the short-run dynamic processes involved. The short-run dynamics of the model are studied by analyzing how changes in each variable in a cointegrated system respond to the lagged residuals or errors from the cointegrating vectors and the lags of the changes of all variables. Therefore, by adopting the cointegration approach and corresponding VECMs, we can detect both long-run and short-run relationships between non-stationary variables.

In this study, we estimate the following three-equation VECM (hereafter noted as VECM (1)) to analyze causality between export, import and travel:

$$\Delta EX_t = \alpha_1 + \alpha_E ect_{t-1} + \sum_{i=1}^{n-1} \beta_{1i} \Delta EX_{t-i} + \sum_{i=1}^{n-1} \gamma_{1i} \Delta IM_{t-i} + \sum_{i=1}^{n-1} \delta_{1i} \Delta TRAVEL_{t-i} + \theta_1 D_{89} + \phi_1 D_{03} + \varepsilon_{1t} \quad (4.1a)$$

$$\Delta IM_t = \alpha_2 + \alpha_I ect_{t-1} + \sum_{i=1}^{n-1} \beta_{2i} \Delta EX_{t-i} + \sum_{i=1}^{n-1} \gamma_{2i} \Delta IM_{t-i} + \sum_{i=1}^{n-1} \delta_{2i} \Delta TRAVEL_{t-i} + \theta_2 D_{89} + \phi_1 D_{03} + \varepsilon_{2t} \quad (4.1b)$$

$$\Delta TRAVEL_t = \alpha_3 + \alpha_T ect_{t-1} + \sum_{i=1}^{n-1} \beta_{3i} \Delta EX_{t-i} + \sum_{i=1}^{n-1} \gamma_{3i} \Delta IM_{t-i} + \sum_{i=1}^{n-1} \delta_{3i} \Delta TRAVEL_{t-i} + \theta_3 D_{89} + \phi_3 D_{03} + \varepsilon_{3t} \quad (4.1c)$$

where ΔEX_t, ΔIM_t and $\Delta Travel_t$ are first differences of commodity export, import and international tourism earnings respectively[3]; the error-correction term ect_{t-1} is a vector of residuals lagged one period in the long-run equilibrium relationships[4]; D_{89} and D_{03} are dummy variables for 1989 and 2003, to be discussed below; α, β, γ, δ, θ *and* are parameters; and the ε's are error terms which is an unobservable zero mean white noise process.

Two aspects of the VECM (1) deserve special attention. First, the error-correction term consists of the linear combinations of our three variables, which are stationary. Below, we will apply the Johansen cointegration test to determine the rank, or the number of cointegration vectors (r). The error-correction terms reveal the deviations from the long-run relationships between the three variables. The coefficients of ect, α_E, α_I and α_T, reflect the speed of adjustment of EX, IM and TRAVEL toward the long-run equilibrium. For example, q larger α_T, imdicates a greater the response of TRAVEL to the previous period's deviation from the long-run equilibrium relations. Conversely, if the elements of α_T are equal to zero, TRAVEL does not respond to lagged deviations from the long-run equilibrium relationships. In this case, TRAVEL is weakly exogenous to the system. So, non-causality in the case of cointegrated variables requires the additional condition that the speed-of-adjustment coefficients are equal to zero. For example, for the $TRAVELl_t$ sequence to be unaffected by EX, not only must all the β_{3i} be equal to zero but also the elements of vector α_T.

Second, three deterministic components – a constant, a trend and two step dummy variables, D_{89} and D_{03} – may enter VECM (1). The constant and the trend enter the VECM is as part of the cointegration estimation strategy. The step dummy variables control the two most important events that occurred during the investigation period: Tiananmen in June 1989 and the SARS plague in 2003, both of which caused tourism to China to fall significantly (see Fig. 4.2).

[3]The measures and sources of three variables can be found in next section.

[4]There could be more than one equilibrium relationships. In our study, there are two equilibrium relationships. In this case, ect, α_E, α_I and α_T, are all vectors with two elements.

To analyze the relationship between FDI and travel, we use the same approach, estimating the following VECM system (hereafter noted as VECM (2)) to analyze long-run equilibrium and short-run causality between FDI and travel.[5] In the VECM (2) we add the dummy variables D_{89} D_{03} and D_{92}. The dummy variables D_{89} and D_{03} are the same as in VECM system (1). D_{92} controls for the important role that the Chinese government policies have played in the process of China's FDI inflows. China's liberalization policies followed a gradual step-by-step approach prior to 1992 (Zhang and Witteloostuijn 2004). In that period, FDI increased steadily. Since 1992, however, China has sped up the pace of liberalization impressively. The Chinese trade system has been adapted to reflect international norms better, and incentive measures have been launched to attract inward FDI. Consequently, China's FDI inflow has increased tremendously (due to these policy changes) (Fig. 4.2). The growth rate of FDI in 1992 and 1993 is above 50%.

$$\Delta Travel_t = \alpha_1 + \alpha_T ect_{t-1} + \sum_{i=1}^{n-1} \beta_{1i} \Delta FDL_{t-i} + \sum_{i=1}^{n-1} \delta_{1i} \Delta Travel_{t-i} + \theta_1 D_{89} + \phi_1 D_{03} + \gamma_1 D_{92} + \varepsilon_{1t} \tag{4.2a}$$

$$\Delta FDI_t = \alpha_2 + \alpha_F ect_{t-1} + \sum_{i=1}^{n-1} \beta_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n-1} \delta_{2i} \Delta Travel_{t-i} + \theta_2 D_{89} + \phi_2 D_{03} + \gamma_1 D_{92} + \varepsilon_{2t} \tag{4.2b}$$

4.3.3 Estimation Procedure

The estimation comes in three steps. First, we test whether the variables involved are stationary with the augmented Dickey-Fuller (ADF) unit root test. When the null hypothesis of non-stationarity is not rejected by these two tests, we move to the second step: the cointegration test in Johansen's (1991, 1995) framework. If the first two steps indicate that the three variables are non-stationary and cointegrated, we take the third step: estimating the VECM (2) and testing for weak exogeneity of the variables and non-causality between the variables.

[5]In this study, we do not explore the relation between tourism, export, import and FDI within a single specification, instead we investigate the relation by using two VECM systems. The main considerations for this are as follows. First, we only have 28 data points, including more variables in a single VECM will lower the degree of freedom, and disable the model applying optimal lags in estimation. Second, we do not explore the relation between trade and FDI because exact study has been done by Zhang et al (2007). In this study we only focus the relation between tourism on one side and trade, FDI on the other side.

4.3.4 Data

The current study examines the relationships between travel, exports, imports and FDI for China using annual data from 1978 to 2005, implying 28 (annual) data points. Most previous studies use the total of foreign tourist arrivals to measure the inbound international travel, but this study uses international tourism receipts as a proxy. The reason is that during the research period, we found the average spending per tourist also increased significantly. The average exchange earning per trip/person increased from US$ 208 in 1981 to US$ 616 in 2004.[6] This increase implies that tourists tend to stay longer and spend more during each trip. We expect that economic effect of travel not only depends on the number of tourists but also the duration and expenditure of the trips. The receipts include the dimensions of both the number of tourists and numbers of days spent by tourists at the individual destination. Therefore we think that foreign tourism earning is a better measurement for the development of tourism than foreign tourist arrivals.

The four time series are deflated by using a GDP deflator and converted to constant US dollars (2,000 = 100). All variables are transformed to natural logs before estimation. GDP deflators are obtained from the OECD. Export[7] and import information is from the Customs of General Administration of the People's Republic of China. Tourism earnings are collected from China National Tourism Administration. Annual realized FDI values are collected from the Ministry of Commerce of the People's Republic of China (MOC) and the Chinese Ministry of Foreign Trade and Economic Cooperation (MOFTEC). Figure 4.2 shows travel, exports, imports, and FDI in logarithms from 1978 to 2005.

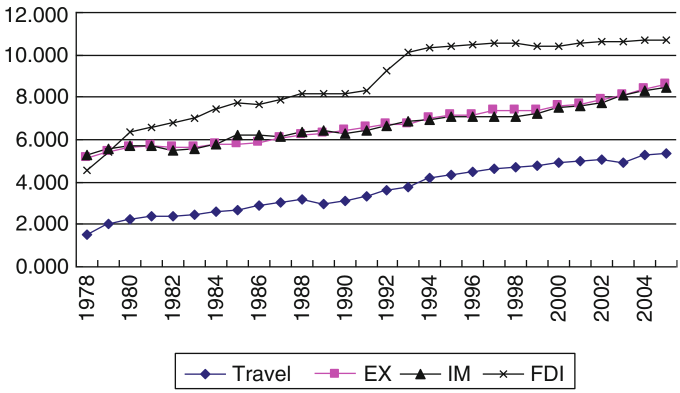

Fig. 4.2 China's exports, imports, travel and FDI 1978–2005. Travel, EX, IM and FDI stand for logarithms of international tourism receipts, exports, imports and FDI respectively

---

[6]*Source*: China National Tourism Administration.

[7]Export in this paper refers to commodity export, excluding foreign exchange earnings from tourism.

4.4 Evidence

4.4.1 Unit Root Tests

Table 4.1 reports the results of the unit root tests for travel, exports, imports and FDI using the ADF test. Two models with different deterministic components are considered: the model with only a constant, and a model with a constant and a trend. It is clear that all the log-variables have a unit root in their levels. However, the null hypothesis of a unit root in first difference of the variables is rejected at the 1%-level in the model with only a constant and in the model with a constant and a trend. Therefore, according to the ADF test we can treat travel, exports, imports and FDI as integrated of order one in our sample, denoted I (4.1). These results permit us to proceed with the next step, the cointegration test, in order to investigate the long-run relationships between travel, exports, imports and FDI.

4.4.2 Cointegration Test and Long-Run Relationships

The purpose of the cointegration test is to determine whether the non-stationary time series are cointegrated – that is, whether long-run equilibrium relationships exist among the variables – and if so, how many. We test the relationship between travel and trade with VECM (1), and test the relationship between travel and FDI with VECM (2). As noted previously, we include the step dummies D_{89} D_{03} in VECM (1), and D_{89} D_{03} and D_{92} in VECM (2) as exogenous variables. We test for cointegration using the methodology developed by Johansen (1991, 1995). First, we use lag-exclusion Wald tests to determine the optimal lag length in both VEC models. The optimal lag length is three lags. With this optimum number of lags, we move on to choose the appropriate specification of the constant and the trend. We estimate the five models considered by Johansen (1995: 80–84). The results indicate a model without a trend and with an intercept in correct error, and without an

Table 4.1 Augmented Dickey-Fuller unit root test

	Level		First difference	
	With constant only	With constant and trend	With constant only	With constant and trend
EX	1.297(0)	−0.675(0)	3.999(0)***	−4.510(0)***
IM	0.635(0)	−2.939(1)	−4.715(1)***	−5.170(1)***
Travel	−1.209(0)	−2.481(0)	−5.569(0)***	−5.416(0)***
FDI	−1.748(2)	−1.856(1)	−4.288(1)***	−4.682(1)***

EX, IM, travel and *FDI* denote the logs of exports, imports, travel earning and FDI, respectively
Figures in parentheses are the number of lags that were selected by the Schwarz information criterion (SIC)
***Significant at the 1%-level

Table 4.2 Johansen's cointegration tests: travel, exports and imports (with three lags)

$H_0 = r$	Eigenvalue	λ_{max}	5% critical value	λ_{trace}	5% critical value
0	0.820	41.13***	22.30	75.52***	35.19
1	0.688	27.96***	15.89	34.38***	20.26
2	0.248	6.42	9.16	6.42	9.16
Normalized cointegrating coefficients (standard error in parentheses)					
One cointegrating equation: log-likelihood = 107.38					
Normalized cointegrating coefficient (standard error in parentheses)					
	EX	*IM*	*Travel*	*C*	
	1.00	1.46	−1.68	−9.46	
β		(0.498)	(0.317)	(2.05)	
Two cointegrating equations: log likelihood = 121.35					
Normalized cointegrating coefficient (standard error in parentheses)					
β	*EX*	*IM*	*Travel*	C	
	1.00	0.00	−0.77	−3.53	
			(0.017)	(0.065)	
	0.00	1.00	−0.62	−4.06	
			(0.012)	(0.044)	

***, **, and * are significant at the 1, 5 and 10%-level, respectively
D_{92} is included as an exogenous variable

intercept in var is recommended for VECM (1). A model without a trend and with a intercept in correct error, and with an intercepts in var is recommended for VECM (2). These are the models tested for cointegration.

Table 4.2 reports the results of the cointegration test for VECM (1). Trace statistics and λ_{max} statistics indicate that the null hypotheses of no cointegration, $r = 0$, and one cointegration vector, $r = 1$, are rejected at the 1%-level. However, the null hypothesis of two cointegrating vectors, $r = 2$, is not rejected. Consequently, we conclude that there are two cointegrating relationships among the three selected variables in the model.

Based on the normalization used in Table 4.2, the two cointegration vectors are (t-statistics in parentheses):

$$\text{ect1} = EX - 0.77 Travel - 3.35, \tag{4.3}$$

$$(-43.1)(-53.9)$$

$$\text{ect2} = IM - 0.62 Travel - 4.06 \tag{4.4}$$

$$(-50.7)(-91.0)$$

Both cointegration vectors are included in the *error correct* term of VECM (1). The results indicate (a) a long-run positive correlation between travel and exports, and (b) a long-run positive correlation between travel and imports. These

Table 4.3 Johansen's cointegration tests: travel and FDI (with three lags)

H_0=r	Eigenvalue	λ_{max}	5% critical value	λ_{trace}	5% critical value
0	0.524	17.81**	14.26	18.10**	15.49
1	0.011	0.278	3.84	0.28	3.84
Normalized cointegrating coefficients (standard error in parentheses)					
One cointegrating equation: log-likelihood = 53.10					
	Travel	*FDI*	*C*		
	1.00	−0.96	4.96		
β		(0.104)			

**Significant at the 5%-level

relationships imply that China's inbound foreign travel inflow is positively associated with China's exports and imports in the long run.

Table 4.3 reports the results of the cointegration test for VECM (2). Trace statistics and λ_{max} statistics indicate that the null hypotheses of no cointegration, $r = 0$, is rejected at the 5%-level. However, the null hypothesis of one cointegrating vectors, $r = 1$, is not rejected. Consequently, we conclude that there is one cointegrating relationship between the two selected variables in the model.

Based on the normalization used in Table 4.3, the cointegration vector is (t-statistics in parentheses):

$$Travel - 0.96FDI + 4.96 \tag{4.5}$$

$$(-9.233)$$

This relationship implies that China's inbound international travel is positively associated with China's FDI inflow in the long run.

We must exercise caution, however, when interpreting this result. Although the cointegration implies positive relations between the variables, cointegration tests cannot determine the direction in which causality flows. The causality relationships can be ascertained from performing Granger-causality tests that incorporate the cointegrating relation. This is our next step.

4.4.3 VECM and Short-Run Relationships

Given the existence of two cointegrating relationships between travel, exports and imports, we must test for weak exogeneity and non-causality by using the VECM (1)[8] (see Table 4.4). In line with the outcomes of the cointegration test, the order of

[8]When variables are non-stationary at their levels but stationary at their first differences, some studies employ a vector autoregression (VAR) in first differences to detect the causality relation (e.g., Liu et al. 2002). However, when non-stationary variables are cointegrated, then a VAR in first differences is misspecified (Engle and Granger 1987). In the current study, two cointegration vectors are found. Therefore, a VECM is used.

Table 4.4 Weak exogeneity test with VECM (1)

	χ^2	*p*-value
ΔEX weakly exogenous	21.17	0.0017
ΔIM weakly exogenous	14.83	0.0216
$\Delta Travel$ weakly exogenous	25.46	0.0003

Table 4.5 VECM Granger-causality test with VECM (1)

	Wald test statistics (χ^2)		
Dependent variable	ΔEX	ΔIM	$\Delta Travel$
ΔEX		16.72***	14.36***
ΔIM	10.53**		12.44***
$\Delta Travel$	21.92***	12.82***	

*** and ** are significant at the 1 and 5%-level, respectively. Null hypothesis is no causality

the VECM is three and cointegrating relations with constants are included in the model. Again, D_{89} and D_{03} included as exogenous variables. The result of vector error correction estimations shows that D_{89} and D_{03} both are negatively significant at 1% level in travel equation, which indicates that the two events have a negative impact on international tourism. The two dummy variables are not highly significant in the export and import equations, which implies that these two events do not have significant negative impact on export and import.[9]

Weak exogeneity is rejected for exports, imports and travel at the 1, 5 and 1%-level. Therefore, there could be weak causation among travel, exports and imports. This conclusion is complemented by the result of the VECM Granger-causality test, as displayed in Table 4.5. The first column defines the equations of VECM (1). The other columns display χ^2 (Wald) statistics for the joint significance of each of the other lagged endogenous variables. In the exports (4.1a), the hypothesis that travel does not Granger-cause exports is rejected at the 1%-level, and the hypothesis that imports does not Granger-cause exports is rejected at the 1%-level. In the imports (4.1b), the hypothesis that exports does not Granger-cause imports is rejected at 5%-level, and the hypothesis that travel does not Granger-cause imports is rejected at 1%-level. In the travel equation (4.1c), the hypothesis that exports does not Granger-cause travel is rejected at the 1%-level, and the hypothesis that import does not Granger-cause travel is rejected at the 1%-level. In summary, the Wald test statistics indicate that bi-directional causal links in the short-run exist between exports, imports and travel.

Using the same approach, we test for non-causality by using the VECM (2).[10] Consistent with the outcomes of the cointegration test, the order of the VECM is three, and a linear trend and cointegrating relations with constants are included in

[9]The result of vector error correction estimations is in Appendix 1.

[10]There are only two variables in the equation, the granger-causality indicates endogeneity, therefore we do not need to test weak exogeneity.

Table 4.6 VECM Granger-causality test with VECM (2)

	Wald test statistics (χ^2)	
Dependent variable	*ΔFDI*	*ΔTravel*
ΔFDI		*1.160*
ΔTravel	*8.806***	

**significant at the 5%-level. Null hypothesis is no causality

the model. D_{89}, D_{03} and D_{92} are taken on board as exogenous variables. The result of vector error correction estimations again show that D_{89} and D_{03} both are negatively significant at 1% level in travel equation, but they are not significant in the FDI equations. D_{92} is positively significant in the FDI equation at 1% level and positively significant in travel equation at 10%, which confirms a significant effect of the openness policy on FDI and tourism.[11]

Table 4.6 shows the result of the VECM Granger-causality test. The hypothesis that FDI does not Granger-cause travel is rejected at the 5%-level, and the hypothesis that travel does not Granger-cause FDI is not rejected. Therefore, the Wald test statistics indicate that an one-way causal link runs from FDI to travel.

4.5 Conclusion and Discussion

This paper investigates the long-run equilibrium and causal relations in China between three cross-border flows: people, goods and capital. Using time series econometric techniques and data from 1978 to 2005, the paper confirms that long-run positive correlations and interactive causality relationships exist between (a) China's international commodity trade and international tourism, and (b) China's FDI inflow and international tourism, as summarized in Fig. 4.1.

The present study finds evidence in support of relationships between the cross-board movements of goods and people as well as capital, which are in line with findings in the existing literature. Shan and Wilson (2001) found two-way Granger causality in bilateral trade and travel between China and its three major tourism source countries, Australia, Japan and United States. Tang et al (2007) found one-directional causality from FDI to tourism in the case of China. Moving beyond previous studies, this study investigates not only the short run causalities but also the long run equilibriums. We find that, in the long run, international tourism, exports and imports positively relate to each other at the aggregate level. This result implies that mobility of people is associated with the mobility of goods and capital. In the short run, the VECM framework reveals bi-directional causal links between travel, imports and exports, and one-way casual link from FDI to travel. The causality from travel to FDI is absent. Below, we will further explore the findings of our study:

[11]The result of vector error correction estimations is in Appendix 2.

First, the causal link from exports to international travel suggests that the increasing presence of Chinese products in a foreign market bolsters business people and customers' interests in visiting China. On the other hand, the causal link from travel to exports demonstrates that business and holiday travel creates business opportunities and increases customers' interests in Chinese products.

Second, the positive causality link from imports to travel confirms that growing imports and a developing market indeed attract more people seeking opportunities to visit China, whereas the positive causality link from travel to imports implies that travel generates demands for foreign products and creates opportunities to introduce and import foreign products into China.

Third, the positive causality link from FDI to travel verifies that the investors need more personal contact to monitor and coordinate business and that foreign investment in tourism industry would improve Chinese tourism services and attracts more tourists. The lack of statistical evidence for the causal link from travel to FDI is in line with the findings of Tang et al (2007), even though we used a different time frame.[12] This empirical result can be interpreted as follows. First, theoretically, face to face interaction between business people would increase the possibility of investment. However, due to the data availability, this study does not distinguish between business travel and holiday travel in their analysis. According to statistics, foreign tourists with the purpose of sightseeing and holiday have accounted for the majority international arrivals.[13] Holiday travel does not influence investment decision directly, and the indirect impact of holiday travel on investment is not as significant as that of holiday travel on trade because investment decisions require more caution than trade decisions. Second, one could expect that increased demand for tourism may attract more investment in the tourism industry, but this study does not break down the FDI into different industries. Furthermore, China's tourism industry has only been opened to foreign investors gradually,[14] so increase of a demand of tourism could not immediately induce foreign investment due to investment barriers.

Fourth, three positive long run equilibriums – travel-export, travel-import and travel-FDI – indicate that China integrates into world economy through different channels, and that the mobility of people, goods and capital are positively interrelated with each other. This result has two implications. First, during the economic transition period, market mechanism functions and liberalization allows the three factors to interact as the theories predicted. Second, these relations reflect Chinese

[12]Tang et al. use quarterly data from 1987 to 2001, this study uses annual data from 1978 to 2005.

[13]For example, according the data released by Ministry of Public Security, in 2006, 51.8% of foreign arrivals came to China for sightseeing and holiday, 25.0% for business (http://www.cnto.org/chinastats.asp).

[14]In the Catalogue for the Guidance of Foreign Investment Industries, hotels and travel agencies have been listed in the catalogue as restricted foreign investment industries, although they have been gradually opened to foreign investors. For example, foreign investors could not establish a wholly foreign-owned travel agency, or a joint venture with the foreign investment proportion exceeding 49% before 2003.

policies targeted toward "setting up an all-dimensional, multi-tiered and wide-ranging opening pattern" (Jiang 2006).

Summarizing, the findings of this study indicate a virtuous process of FDI – travel – trade development in China's outward-oriented economy during the period of 1978–2005. As shown in Fig. 4.1, more FDI leads to more travel, more travel leads to more exports and imports, and more exports and imports lead to more travel. This finding implies that the trends in FDI and international trade can be used to predict the international tourist inflow and vice versa.

More importantly, the findings shed light on China's development of an outward economy and high economic growth. China has achieved remarkable economic growth since economic reforms commenced in 1978. The literature unanimously deems trade and FDI to be two of the most powerful engines of this growth (Wei 1995; Wei et al. 2001; Dees 1998; Liu et al. 2002; Yao 2006; Zhang 2006). International tourism is also considered as an important activity that has made a significant contribution to China's economic development. For example, according to Tourism Satellite Accounting (TSA) research by the World Trade and Tourism Council (WTTC), travel and tourism's contribution to China's economy is illustrated by the direct industry impact of 2.3–2.9% of total GDP during the 1988–2006, and the travel and tourism industry is expected to account for 1.8–2.3% of total employment in the same period.[15] By using an input–output model, Oosterhaven and Fan (2006) found that 1.64% of GDP, 1.40% of household income and 1.01% of employment is dependent on international tourism. The virtuous process of the FDI – travel – trade development indicates that the high growth pattern of China is not only achieved by opening these sectors up, but also benefit from the interaction among the sectors. Specifically, international tourism has not only direct impact on the economic development but also has a far-reaching indirect impact through international trade and FDI. If we say that the international trade and FDI are the two engines of China's economic growth, the international tourism could be regarded as the third. These are the three pillars characterizing the outward Chinese economy.

Given the evidence found in this study, we conclude that globalization is a multifaceted process that embraces not only economic integration in terms of commodity trade and investment but also tourism and the cultural and social aspects of human activities. The interaction between these multiple dimensions offers ample opportunities for development. Therefore, in the course of globalization, a country should explore the potentials of globalization from multiple dimensions to maximize the benefits from this process. This conclusion has important policy implications not only for China but also for other emerging countries that are implementing an outward development strategy.

Currently, China is accelerating the speed of integration into the world tourism market. We expect that tourism will play an increasingly prominent role in China's outward economy. For example, opening-up the Chinese domestic market even

[15] http://www.wttc.travel/eng/WTTC_Research/Tourism_Satellite_Accounting_Tool/index.php

more for foreign tourists and investors will enhance China's international tourism by stimulating aggregate travel demand and improving Chinese management of the tourism industry. Furthermore, the emergence of China as a major source of tourist spending will also have far-reaching effect on China's economy and global economy. On the other hand, relaxing the restrictions on travel abroad, increasing the number of approved destination status (ADS) and rapidly rising urban incomes will have a great impact on the Chinese outbound travel. What impacts will these trends have on China's international trade and FDI? What are their development implications for China? These questions point to areas for further research.

Appendix 1: Estimation of VECM (1)

Cointegrating Eq:	CointEq1	CointEq2	
EX(−1)	1.000000	0.000000	
IM(−1)	0.000000	1.000000	
	−0.774851	−0.619903	
	(0.01796)	(0.01223)	
Travel(−1)	[−43.1503]	[−50.6833]	
	−3.531062	−4.055082	
	(0.06546)	(0.04459)	
C	[−53.9432]	[−90.9506]	
Error correction	D(EX)	D(IM)	D(Travel)
	−0.346304	0.381991	0.235540
	(0.18501)	(0.36898)	(0.21809)
CointEq1	[−1.87176]	[1.03525]	[1.08000]
	1.391619	1.092104	1.086351
	(0.27185)	(0.54217)	(0.32046)
CointEq2	[5.11898]	[2.01431]	[3.38998]
	−0.834225	−0.859528	−1.221912
	(0.24889)	(0.49638)	(0.29339)
D(EX(−1))	[−3.35174]	[−1.73159]	[−4.16477]
	−1.056032	−1.346510	−1.353071
	(0.27431)	(0.54708)	(0.32336)
D(EX(−2))	[−3.84973]	[−2.46128]	[−4.18445]
	−0.392124	−1.696912	−0.742453
	(0.28749)	(0.57336)	(0.33889)
D(EX(−3))	[−1.36394]	[−2.95958]	[−2.19081]
	−0.785614	−1.025040	−0.688504
	(0.26970)	(0.53788)	(0.31792)
D(IM(−1))	[−2.91292]	[−1.90572]	[−2.16566]
	−0.618780	−0.875118	−0.520847
	(0.19930)	(0.39748)	(0.23494)
D(IM(−2))	[−3.10473]	[−2.20167]	[−2.21697]

(*continued*)

Cointegrating Eq:	CointEq1	CointEq2	
	−0.067516	−0.512263	0.066771
	(0.16464)	(0.32834)	(0.19407)
D(IM(−3))	[−0.41009]	[−1.56015]	[0.34405]
	0.477910	0.938734	0.524352
	(0.14008)	(0.27936)	(0.16512)
D(Travel(−1))	[3.41176]	[3.36026]	[3.17555]
	0.410934	0.585757	0.800714
	(0.13896)	(0.27714)	(0.16381)
D(Travel(−2))	[2.95720]	[2.11361]	[4.88822]
	0.285447	0.643973	0.207673
	(0.17365)	(0.34632)	(0.20470)
D(Travel(−3))	[1.64379]	[1.85946]	[1.01453]
	−6.69E−05	−0.022588	−0.236325
	(0.08129)	(0.16212)	(0.09583)
D89	[−0.00082]	[−0.13933]	[−2.46620]
	0.007288	0.313403	−0.424520
	(0.07940)	(0.15835)	(0.09359)
D03	[0.09179]	[1.97922]	[−4.53580]
R-squared	0.830470	0.676802	0.880278
Adj. R-squared	0.645527	0.324223	0.749671
Log likelihood	43.21594	26.64830	39.26823
Determinant resid covariance (dof adj.)		8.45E-08	
Determinant resid covariance		8.14E-09	
Log likelihood		121.3571	

Standard errors in parenthesis and *t*-statistics in square bracket

Appendix 2: Estimation of VECM (2)

Cointegrating Eq:	CointEq1	
Travel(−1)	1.000000	
	−0.956647	
	(0.10361)	
FDI(−1)	(−9.23336)	
C	4.956478	
Error correction:	D(Travel)	D(FDI)
	−0.114710	0.151344
	(0.04171)	(0.07880)
CointEq1	[−2.75035]	[1.92059]
	−0.386963	0.211717
	(0.15689)	(0.29642)
D(Travel(−1))	[−2.46645]	[0.71424]

(*continued*)

Cointegrating Eq:	CointEq1	
	−0.340568	0.096734
	(0.19040)	(0.35973)
D(Travel(−2))	[−1.78873]	[0.26891]
	−0.181501	0.280235
	(0.20653)	(0.39022)
D(Travel(−3))	[−0.87880]	[0.71815]
	0.170095	0.697617
	(0.10002)	(0.18897)
D(FDI(−1))	[1.70062]	[3.69162]
	0.097027	−0.349605
	(0.09565)	(0.18071)
D(FDI(−2))	[1.01443]	[−1.93460]
	0.074452	0.061372
	(0.09492)	(0.17934)
D(FDI(−3))	[0.78434]	[0.34220]
	0.186131	0.010761
	(0.03698)	(0.06987)
C	[5.03355]	[0.15403]
	−0.284126	−0.274011
	(0.09488)	(0.17925)
D89	[−2.99471]	[−1.52861]
	0.207107	0.714876
	(0.11416)	(0.21569)
D92	[1.81421]	[3.31441]
	−0.316941	−0.089104
	(0.08477)	(0.16015)
D03	[−3.73899]	[−0.55636]
R-squared	0.812458	0.805371
Adj. R-squared	0.668194	0.655657
Log likelihood	33.88228	18.61249
Determinant resid covariance (dof adj.)		0.000140
Determinant resid covariance		4.10E-05
Log likelihood		53.10443

Standard parenthesis and *t*-statistics in square bracket

References

Aradhyula S, Tronstad R (2003) Does tourism promote cross-border trade? Am J Agri Econ 85 (3):569–79

Dunning JH, Kundu SK (1995) The Internationalization of the Hotel Industry. Management International Review 35(2):101–103

Dees S (1998) Foreign direct investment in China: determinants and effects. Econ Plann 31 (2):175–94

Engle RF, Granger CWJ (1987) Co-integration and error correction: Representation, estimation, and testing. Econometrica 55(2):251–76
Fischer C (2004) The influence of immigration and international tourism on the demand for imported food products. Food Econ 1(1):21–33
Goldberg MA, Heinkel RL, Levi MD (2005) Foreign direct investment: the human dimension. J Int Money Finance 24(6):913–34
Granger CWJ (1969) Investigating causal relations by econometric models and cross spectral methods. Econometrica 37(3):424–38
Jiang Z (2006) The Selected Works of Jiang Zemin, volume I. People press, Beijing
Johansen S (1991) Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. Econometrica 59(6):1551–80
Johansen S (1995) Likelihood-Based Inference in Cointegrated Vector Autoregressive Models. Oxford University Press, Oxford
Khan H, Toh RS, Chua L (2005) Tourism and trade: cointegration and granger causality tests. J Travel Res 44(2):171–6
Kulendran N, Wilson K (2000) Is there a relationship between international trade and international travel? Appl Econ 32(8):1001–9
Liu X, Burridge P, Sinclair PJN (2002) Relationships between economic growth, foreign direct investment and trade: evidence from China. Appl Econ 34(11):1433–40
Oosterhaven J, Fan T (2006) Impact of international tourism on the Chinese economy. Int J Tourism Res 8(5):349–54
Shan J, Wilson K (2001) Causality between trade and tourism: empirical evidence from China. Appl Econ Lett 8:279–83
Tang S, Selvanathan EA, Selvanathan S (2007) The relationship between foreign direct investment and tourism: empirical evidence from China. Tourism economics 13(1):25–39
Toda HY, Phillips PCB (1993) Vector autoregression and causality. Econometrica 61(6):1367–93
Toda HY, Phillips PCB (1994) Vector autoregression and causality: a theoretical overview and simulation study. Econometric Rev 13(2):259–85
Turner LW, Witt SF (2001) Factors influencing demand for international tourism: tourism demand analysis using structural equation modeling. Tourism Econ 7(1):21–38
UNCTAD (2006) World Investment Report 2006
Vellas F, Becherel L (1995) International Tourism: an Economic Perspective. St. Martin's Press, New York
Wei S (1995) The open door policy and China's rapid growth: evidence from city-level data, in Growth Theories in Light of the East Asian Experience (Ed.) T. Ito and A. Krueger, London and Chicago: The University of Chicago Press.
Wei Y, Liu X, Song H, Romilly P (2001) Endogenous innovation growth theory and regional income convergence in China. J Int Dev 13(2):153–68
Yao S (2006) On economic growth, FDI and exports in China. Appl Econ 38(3):339–51
Zhang J, Witteloostuijn A (2004) Economic openness and trade linkages of China: An empirical study of the determinants of Chinese trade intensities in 1993 and 1999. Rev World Econ Weltwirtschaftliches Arch 140(2):254–81
Zhang J, Jacobs J, Witteloostuijn A (2007) MNEs, FDI and trade in China, A cointegration and Granger-causality approach. Journal of Asia Business Studies2(1): 48–57.
Zhang KH (2006) Does international investment help poverty reduction in China? Chinese Economy 39(3):79–90

Part II
Demand Impact Analysis

Chapter 5
An Econometric Study of German Tourism Demand in South Tyrol

Juan Gabriel Brida and Wiston Adrián Risso

5.1 Introduction

South Tyrol is the first province in Italy in number of overnight stays (2008) and this reveals that the region is one of the most important destinations in Italy. Tourism is an important sector of the South Tyrolean's economy with more than 10,000 tourist establishments and 27,146,242 overnight stays in 2007 derived from 5,239,775 arrivals (7.5% of the total arrivals in Italy). The output of the tourism industry in South Tyrol increased from less than 5% of the region's GDP in 1970 to 12% in 2007. As a consequence, the South Tyrolean economy is strongly dependent on tourism. Income from tourism industry has exhibited constant growth during the last 40 years. The increase in overnight stays in the same period was from 11 million to more than 27 million. In the last 15 years, the rate of growth of the number of overnight stays was around 1% but in the last 30 years there was a decrease in the average number of overnight stays from 9 to 5 days. In average per year, around 30,000 persons are employed in the tourism sector, accounting for more than 12% of total employments in South Tyrol, where women are 58% of the total employees in the sector.

This study investigates the main determinants of the German demand for tourism in South Tyrol. The important share of Germans in the South Tyrolean market with more than 80% of the total of international tourism arrivals in the region is the reason for studying this market. We introduce the dynamic data panel model proposed by Arellano and Bond and apply it to a panel data set collected from 116 tourism destinations of South Tyrol. We use annual data from 1987 to 2007 of the per capita GDP of Germany (measuring income), the number of German tourists in

J.G. Brida (✉) • W.A. Risso
School of Economics and Management, Competence Centre in Tourism Management and Tourism Economics (TOMTE), Free University of Bolzano, Piazza Università, 1, 39100 Bolzano, Italy
e-mail: JuanGabriel.Brida@unibz.it; Wiston.Risso@unibz.it

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_5,

each destination (measuring the volume of tourism), the relative prices between Italy and Germany (measuring tourism price) and price of crude oil (as a proxy of travel costs). The main results of this study are: (1) the demand for tourism in the previous period has a positive and relevant effect on actual demand, reflecting loyalty of the German tourists; (2) the cost of travel and the relative prices have a negative and significant impact on the demand.

The rest of the chapter is organized as follows. Section 5.2 is devoted to describe the tourism demand in South Tyrol. Section 5.3 describes the data and the econometric methods used for estimation. Section 5.4 presents the empirical results and their interpretation. Some concluding remarks are including in Section 5.5.

5.2 Tourism Demand in South Tyrol

The present section describes the characteristics of the tourism demand in South Tyrol focusing on the German tourists. Figure 5.1 shows that Italy has been the second preferred destination in the last 3 years by the German tourists.

Garín-Muñoz (2007) asserted that like most European holidaymakers, Germans prefer to use their own cars for travelling. Table 5.1 shows that in 2007 the percentage share of travels by car was 47.1% of total trips. The second place is taken by the airplane, increasing the share in the period 2002–2007.

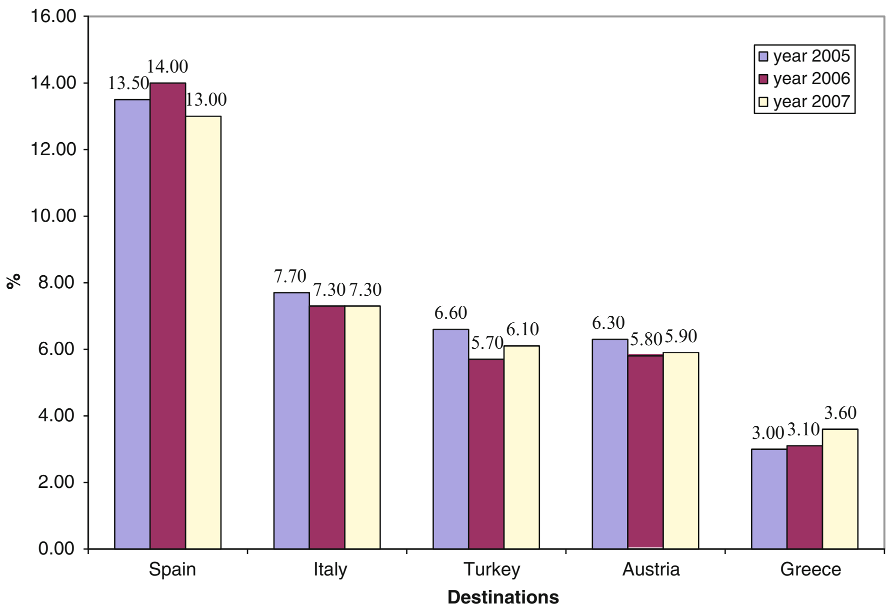

Fig. 5.1 Main destinations of the German tourist in % of all holiday trips
Source: Reyseanalyse (2006–2008)

Table 5.1 Means of transport used by the German tourists 2002–2007

Means of transport	2002	2003	2004	2005	2006	2007
Car	50.80	49.20	46.70	45.20	46.50	47.10
Plane	31.50	32.30	35.80	36.80	37.20	36.40
Coach	10.30	10.30	9.50	10.00	9.40	9.30
Train	5.80	6.10	5.90	6.10	5.00	4.90

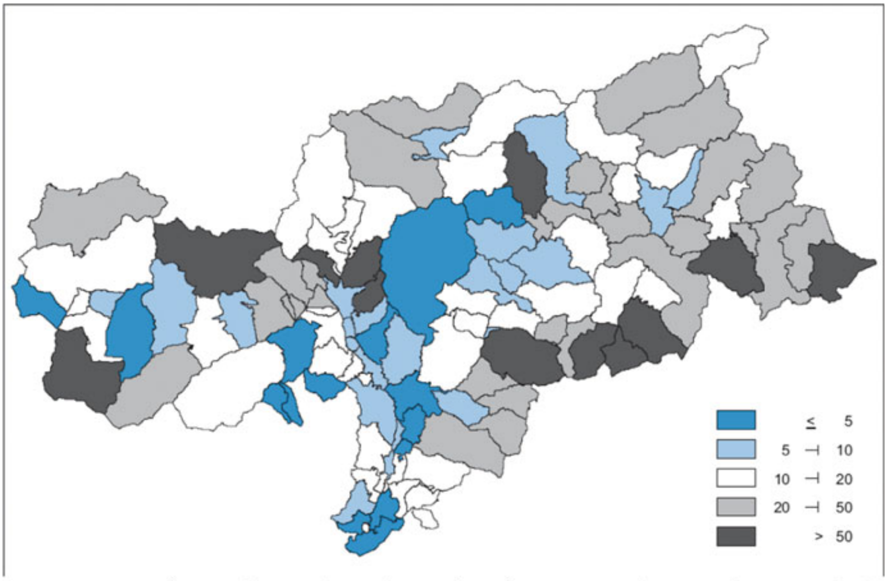

Fig. 5.2 Index of tourism intensity by town in South Tyrol (Touristic year 2006/2007)
Source: ASTAT (2008)

Figure 5.2 shows the Index of Tourism Intensity by town for 2006/2007. This index is the ratio between the total of overnights stays in each town over the product of the population and the total days in each town. On the one hand, the index is very high (more than 50) in the following towns: Stelvio, Senales, Tirolo, Scena, Avelengo, Rio di Pusteria, Castelrotto, Selva V.G., Corvara I.B., Badia, Braies and Sesto. On the other hand, Bozen-Bolzano (the capital city) belongs to the lowest levels of intensity with an index less than 5.

Table 5.2 shows the percentage of German tourists in South Tyrol in the last two touristic years. It represents the 47.8% and 46.9% (2005/2006 and 2006/2007 respectively) of the total tourists, and 75.87 and 74.44% of the total international tourists measured as overnights stays.

Table 5.3 shows that most of the German tourists arrive from Bayern. Germans from Bayern are the main tourists in the Dolomites, Aurina and the other regions, both in winter and summer seasons. The second place is taken by Nordrhein-Westfalen.

Table 5.2 Origin of the tourist in the South Tyrol in the last 2 years (in percentage)

Country	2005/2006	2006/2007
Germany	47.80	46.90
Italy	36.90	37.00
Austria	2.60	2.70
Switzerland	3.60	3.70
Benelux	3.20	3.50
Other Countries	5.80	6.20

Source: ASTAT (2008)

Table 5.3 German tourists of 2006/2007 according to destination, season and German region

German Region	Dolomites	Other	Winter	Summer
Baden-Wurttemberg	15.30	15.80	8.30	19.70
Bayern	31.30	29.20	35.80	26.70
Berlin	3.40	2.40	2.50	2.90
Brandenburg	0.60	0.90	0.70	0.90
Bremen	0.00	0.60	0.30	0.50
Hamburg	0.80	1.00	0.70	1.00
Hessen	12.10	8.20	12.40	7.90
Mecklenburg-Vorpommern	1.40	0.60	0.70	0.90
Niedersachsen	5.60	6.40	6.10	6.20
Nordrhein-Westfalen	19.10	22.60	19.70	22.40
Rheinland-Pfalz	4.10	3.00	3.20	3.40
Saarland	1.30	1.80	2.70	1.10
Sachsen	1.20	2.50	2.40	1.90
Sachsen-Anhalt	1.00	0.80	0.70	1.00
Schleswig-Holstein	0.70	1.10	1.00	1.00
Thuringen	2.00	3.00	2.80	2.60
Total	100%	100%	100%	100%

Source: ASTAT (2008)

5.3 Literature Review

Tourism demand has been studied from different points of view, using both quantitative and qualitative methods. As pointed out in a very recent review (Song and Li 2008), the majority of the published studies used quantitative methods, in particular time-series and econometric models. Structural econometric techniques used in tourism demand modeling include panel data models (Garín-Muñoz 2006, 2007; Ledesma-Rodríguez et al. 2001; Naude and Saayman 2005) that simultaneously take into account tourism flows between a range of destinations over a period of time and AIDS models (Durbarry and Sinclair 2003; Cortés-Jiménez et al. 2009) that takes into account tourism flows from a single origin to more than one destination over a period of time. The structural time-series (Vu 2006; Blake et al. 2006), among others, combines analysis of time-series relationships with the advantages of being able to estimate structural relationships between dependent and independent variables. These types of models are able to estimate if and how seasonality has changed.

In spite of its advantages, the panel data approach has rarely been applied to tourism demand analysis. Song and Li (2008) in their recent review of the published studies on tourism demand modelling and forecasting, founded only four exceptions in the post-2000 literature. (1) Ledesma-Rodrguez et al. (2001) used the panel data method to estimate short-run and long-run elasticities for tourists visiting the island of Tenerife. (2) The paper by Naude and Saayman (2005) uses both cross-section data and panel data for the period 1996–2000 to identify the determinants of tourism arrivals in 43 African countries, taking into account tourists' country of origin. (3) Roget and Gonzalez (2006) employ panel data models to examine the demand for rural tourism in Galicia (Spain). Finally, Sakai et al. (2000) used the panel data approach to analyse the effects of demographic change on Japanese people's travel propensity. We extended the review of Song and Li to the last 2 years finding six more papers modeling tourism demand by using panel data models. For instance, the paper of Kuo et al. (2008) investigates the impacts of infectious diseases including Avian Flu and severe acute respiratory syndrome (hereafter SARS) on international tourist arrivals in Asian countries using panel data procedures. Eilat and Einav (2004) used a generalization of the multinomial logit model and panel data set to estimate the demand of international tourism. Eugenio-Martin et al. (2008) introduces a cross-sectional time series model which deals with autocorrelation and heteroskedasticity in the error term that is applied to a worldwide panel data set of destination countries for tourists from Australia, France, Germany, Japan, Spain, the UK and the USA to examine whether economic development of a particular destination is relevant for tourism demand. Khadaroo and Seetanah (2007) uses panel data to investigate the importance of transport on the demand for tourism of Mauritius, showing that international tourists are particularly sensitive to the island´s transport infrastructure. Maloney and Montes Rojas (2005) uses dynamic panel data analysis of tourist flows from 8 origin countries to 15 Caribbean destinations. In Garín-Muñoz (2007), the dynamic model GMM-IFF proposed by Arellano and Bond is applied to a panel data set consisting of inbound German tourism in each of the 17 Spanish destinations for the period 1991–2003 to examine German demand for tourism in Spain. This paper is very close to our study, both for the methodology and the results. It also coincides.

As for South Tyrol, most of the international tourism arriving in Spain comes from Germany. Garín-Muñoz (2006) is similar to the previous paper. In this case the application of the GMM-DIFF dynamic model uses the panel structure of the dataset for the 15 most important countries of origin of tourists over the period 1992–2002 and other models are also shown for comparison. The results of the study suggests that tourism demand to Canary Islands must be considered as a luxury good and is highly dependent on the evolution of relative prices and cost of travel between origin and destination country. Finally, also the study Garín-Muñoz and Montero-Martín (2007) uses a dynamic model estimated with a panel data set to identify and measure the impact of the main determinants of the inbound international tourism flows in the Balearic Islands. Less attention has also been paid to the dynamics of tourism demand systems. Most of the models are static regressions, not permitting to consider time as a fundamental variable of the process. Dynamic econometric models are specified for modeling short-term impacts as well as long-term dynamics. The observed significance of the lagged dependent variable in such models indicates that time is likely to be a necessary variable of the model specifications (Fujii and Mak 1981; Garin-Muñoz 2006). Although the importance of including explicit dynamic adjustments in demand analysis has generally been recognized, specific research in tourism demand using dynamic systems is not abundant, and only a few authors have addressed these issues in empirical studies. Some papers have tried to find alternative tourism demand specifications including previous consumption in the model (Ledesma-Rodriguez et al. 2001, Garín-Muñoz 2006, Witt and Martin 1987). These models permit to handle the dynamic structure of preferences. According to (Garín-Muñoz 2006) there are two main reasons for including previous consumption as an explanatory variable of the model: first, there is less uncertainty associated with a previous country where you travel than an unvisited country; second, people with knowledge about the visited destination talks about their holidays reducing the uncertainty for potential visitors. If people are satisfied with the destination there is a larger probability of coming back and tell other peoples about their experiences. Hence, the coefficient of the lagged dependent variable may be interpreted as a measure of habit formation and independent preferences.

5.4 Econometric Methodology and Dataset

This study employs a panel data model to estimate short-run and long-run elasticities for tourists visiting the province of South Tyrol. Panel data analysis has rarely been used in previous empirical research. Panel data permit the use of a complete database in order to explain the influence of several variables in decisions made by tourists. The possibility of using a large number of observations provides more degrees of freedom in the estimation process. This approach also reduces the problem of multicollinearity and provides more degrees of freedom in the model estimation. Panel data also allow a better representation of adjustment dynamics. Dynamic panel methodology, based on both cross-section and time series data, have the advantage that they take account of all of the information relating to the dataset under consideration. In the present study we consider the past consumption as an explanatory variable and some traditional demand variables. It means, we consider income of the German tourist and price-type factors. From a theoretical point of view, the demand for tourism is a function of the quantity of German tourism demanded in the past, the relative cost of living between the Italy region and Germany, the price of travel and the income of the tourists.

The main objective of this paper is to introduce a model to investigate the German demand for tourism in South Tyrol. We have in mind two main properties that our model must verify: it must be a dynamic model and employ a panel data set. The model utilized in this study is the dynamic data panel model proposed by Arellano and Bond (1991) and we apply it to a panel data set collected from 116 different tourism destinations of South Tyrol. The available data consists of the annual overnights stays of international tourists in 116 different tourism destinations of South Tyrol (that coincides with 116 communes of the province) from 1987 to 2007. Then we have 2,436 observations, which is a large dataset. Using a panel allow us to use annual data and avoids the problems of seasonality. The availability of panel data will allow us to measure the effects of variables with little changes within cities and more variability across cities. This represents a major advantage when compared with the utilization of time series. Tourism demand is the amount of tourist goods that a customer is willing and able to buy at a certain time, certain destination and under certain conditions. Tourism demand is a function of several variables that are to be selected, together with the particular form of the function. Once the variables and the functional form of the demand are selected, we have to choose the estimation procedure to determine the parameters of the model.

5.4.1 Variables

The different variables included in the tourism demand models vary from paper to paper but certain measures of tourism demand variables in modeling and forecasting tourism demand have been less controversial (see Song and Li 2008). The dependent variable of the model represents the demand for tourism and it is basically represented in three forms in the literature: tourist arrivals, the number of overnights stays of visitors and tourism receipts. Other dependent variables used in the literature include tourism revenues. Tourism and tourism import and export (Song and Li 2008).The most significant representation is using tourism receipts but generally this data is not available and this is the case of this study. In this paper, the tourism demand is measured in terms of the number of overnights stays of international visitors in hotels and apartments in each one of the 116 destinations of South Tyrol. We use this variable to represent German tourism demand. This is motivated by the fact that the more than 60% of the total number of international tourists corresponds to Germans. This is true for the period covered in this study. The function of several variables defining the tourism demand gives causal relationships between the tourism demand (dependent) variable and its influencing factors (explanatory or independent variables). The literature suggests several possible independent variables to model tourism demand. The most commonly used are income, relative prices, exchange rates and transportation costs but variables of time trend, marketing expenditure and special events are also included (Song and Li 2008). The use of these variables, however, depends on the availability of data and its quantitative measurement, the non-existence of collinearity between explanatory factors and the form of the model. This paper chose as explanatory or independent variables income, relative prices and transportation costs to investigate how adequately these variables can explain the German demand for tourism in South Tyrol.

5.4.2 Data

Data for our study was selected based on data availability, reliability of data sources, ability to represent the theoretical considerations. The data utilized in this study are annual time series data for the period 1987–2007. Data for the number of overnights stays of international visitors in hotels and apartments in each one of the 116 destinations of South Tyrol are taken from the Provincial Statistics Institute (ASTAT) of Bolzano. Income is represented by the German per capita GDP at constant price of 2000 and the relative prices were estimated using the ratio between the consumer index price of Italy and Germany. Both series were obtained from the International Monetary Fund (IMF). Several studies sustain that German tourists prefer to travel to the North of Italy by car and this is the motivation to proxy transportation costs by the average of Dated Brent, West Texas Intermediate and the Dubai Fateh price of crude oil. This time series was also obtained from the IMF.

5.4.3 Model Specification

The tourism demand function is expressed in the form:

$$Q_{i,t} = f(Q_{i,t-1}, PT_{i,t}, PCO_{i,t}, GDP_{i,t}), \tag{5.1}$$

where $Q_{i,t}$ is the presence of foreign tourists arriving to the destination i during the year t; $PT_{i,t}$ is the relative cost of living of German tourist in Italy; $PCO_{i,t}$ is the price of crude oil; and $GDP_{i,t}$ is the real per capita gross domestic product in Germany. Equation (5.1) is a theoretical relationship among the variables under consideration. However, in practice we need to specify the functional form of the model. In the present study the tourism demand model has adopted the double-logarithmic form. Then the model to be estimated is

$$\ln Q_{i,t} = \alpha + \beta_1 \ln Q_{i,t-1} + \beta_2 \ln PT_{i,t} + \beta_3 \ln PCO_{i,t} + \beta_4 \ln GDP_{i,t} + \lambda_t + \mu_i + \varepsilon_{i,t}. \tag{5.2}$$

In (5.2), $\nu_{i,t}=\lambda_t+\mu_t+\varepsilon_{i,t}$ is the fixed effects decomposition of the error term, in which λ_t and μ_i are the time and destination-specific effects, respectively. The error component $\varepsilon_{i,t}$ is assumed to be serially uncorrelated with zero mean and independently distributed across destinations, but heteroskedasticity across time and destinations is allowed for. Moreover, $\varepsilon_{i,t}$ is assumed to be uncorrelated with the initial condition $\ln Q_{i,t}$, for $t=2, 3, \ldots, T$, and with the individual effects μ_i with for any t.

When a model for panel data includes lag dependent explanatory variables, the simple estimation procedures are asymptotically valid only when there is a large number of observations in the time dimension (T), in our case $T = 21$ is not enough. The current available response to this problem (Arellano and Bond 1991; Holtz-Eakin 1988; Hsiao 2003) is to first difference the equation to remove the individual effects and then estimate by instrumental variables (IV), using as instruments the values of the dependent variable. This treatment leads to consistent but not efficient estimates, because it does not make use of all the available moment conditions. In the present study we used the generalized method of moments (GMM) framework proposed by Arellano and Bond (1991) and we estimate the simple linear model to compare the coefficients. The dynamic model to be estimated will therefore be

$$\Delta \ln Q_{i,t} = \beta_1 \Delta \ln Q_{i,t-1} + \beta_2 \Delta \ln PT_{i,t} + \beta_3 \Delta \ln PCO_{i,t} + \beta_4 \Delta \ln GDP_{i,t} + \Delta\varepsilon_{i,t}, \quad (5.3)$$

where $i = 1, \ldots, 116;\ t = 1987, \ldots, 2007$; and all the variables are in first differences. That means $\Delta \ln X_{i,t} = \ln X_{i,t} - \ln X_{i,t-1}$ for all the variables.

Because of the double-logarithmic form of the model, the parameters may be interpreted as elasticities. The parameter β_1 indicates to what degree current tourism purchase are determined by the value of previous consumption. As it is a dynamic model, the estimated coefficients are the short-run elasticities. Long-run elasticities can be obtained by dividing each of the coefficients by $(1 - \beta_1)$. As Garín-Muñoz and Montero-Martín (2007) assert, one of the advantages of using a dynamic model is that both short-run and long-run elasticities may be obtained. A further advantage relates to the fact that, by differencing data, we avoid the problem of non-stationarity and this method will give us confidence in the reported coefficient and standard errors.

5.5 Empirical Results

This section presents the estimation of (5.3) using the GMM-DIFF estimator of Arellano and Bond and the linear regression to compare. We have used STATA v.9.0 econometric software to estimate the model. The hypothesis of no second order autocorrelation in the errors is tested as the methodology assumes. We conducted a test of autocorrelationand the Sargan test of over-identifying restrictions as derived by Arellano and Bond (1991). Failure to reject the null hypothesis in both tests gives support to the model. The empirical results in Table 5.4 show that the model performs satisfactorily. Note that as in the linear model the coefficient are significant and the signs are the expected.

The coefficients are the short-run demand elasticities, to obtain the long-run elasticities we assume (as in Garín-Muñoz and Montero-Martín, 2007) that in the long-run equilibrium $\ln Q_{i,t} = \ln Q_{i,t-1}$ and then, the long-run elasticities have been calculated by dividing each of the estimated coefficients by $(1-\beta_1)$. The long-run elasticity values are income elasticity = 1.92; cost of living = −4.36 and price

Table 5.4 Estimation results for the linear and dynamic model (1987–2007)

Variable	Linear model	GMM-DIFF estimator of Arellano Bond
$\ln Q_{i,t-1}$	*0.9889*	*0.7588*
	(501.34)	(34.74)
$\ln GDP_{i,t}$	*1.2855*	*0.4639*
	(6.31)	(2.19)
$\ln PT_{i,t}$	*−1.0047*	*−1.0529*
	(−5.14)	(−4.83)
$\ln PCO_{i,t}$	*−0.0483*	*−0.0458*
	(−4.24)	(−3.54)
Autocorrelation 2		$0.14, p = 0.886$
Sargan (d.f.)		$115.88, p = 0.357$
Wald test		*28300000*
No. observations	*2204*	*2204*

Dependent variable: logarithm of the number of overnights stays ($\ln Q_{i,t}$). t-statistics in parenthesis – the estimates are obtained by using the instruments $\ln Q_{i,t}$ lagged up to 7 periods

travel elasticity = −0.19. Notice that the habit of persistence is important for explaining the German tourism demand in South Tyrol. Actually, 76% of the German tourism demand is attributable to habit of persistence. This result is consistent with our expectations because of the large number of repeat visitors observed in South Tyrol. The estimated coefficient for the income variable has the expected sign. The elasticity value (0.46) indicates that South Tyrol is considered as a non-luxury service in the short-run. However, the long-run income elasticity (1.92) means that the tourism in South Tyrol is a luxury, remarking the importance of the economic conditions in Germany. The short-run (−1.05) and long-run (−4.36) price-elasticities indicate that the tourism in the region is elastic, being sensitive to a variation of prices. This may be the reflection of numerous alternatives in the region (Austria, Switzerland and Southern Germany). Consequently, care must be taken by the industry to maintain or improve price competitiveness. Special efforts need to be made in order to avoid competition from several destinations that can be considered as substitutes for the South Tyrol. In contrast to the cost of living, the short-run (−0.04) and long-run (−0.19) cost of travel-elasticities suggest that tourism is inelastic to variations in the cost of travel.

5.6 Conclusions

We have estimated a dynamic panel data model for the German demand of tourism in South-Tyrol. Dynamic methodology, based on both cross-section and time series data, have the advantage that they take account of all of the information relating to the dataset under consideration. In spite of its advantages, the panel data approach has rarely been applied to tourism demand analysis. Knowing the main determinants of the demand generated by the German market may be very important given the contribution of this source market in the South-Tyrol. Describing the tourism demand in South Tyrol and focusing on the German tourists we observe the following facts. Italy is the second market for the German tourists and they prefer to travel by car. South Tyrol is the first province in Italy in number of overnight stays (2008) showing that the region is one of the most important destinations in Italy. Studying the intensity of tourism in the 116 destinations in South Tyrol, we note that 12 destinations have the largest intensity but the city of Bolzano is one of the least intense. Analyzing the origin of the German tourists, most of them arrive from Bayern and Nordrhein-Westfalen.

The estimated model shows that the habit of persistence is important for explaining the German tourism demand in South Tyrol. In fact, according to the estimated model 76% of the tourism demand is attributable to habit of persistence. This is consistent with the large number of repeat visitors observed in South Tyrol. The long-run income elasticity of 1.92 indicates that tourism in South Tyrol is a luxury and the short-run (−1.05) and long-run (−4.36) price-elasticities indicate that the tourism in the region is very sensitive to variation of prices. The latter may reflect the numerous alternatives in the region. In particular, Austria, Switzerland and Southern Germany offer similar and substitute products. South Tyrol should give importance to maintain or improve price competitiveness. On the contrary, the elasticity of the cost of travel is less than one both in the short-run and long-run (−0.04 and −0.19 respectively). The results of our study are in line with previous similar research (including Garín-Muñoz and Montero-Martín 2007; Garín-Muñoz 2006, 2007).

The results obtained may be valuable for helping professionals and policy-makers in the decision making process. The fact that habit persistence is very important when explaining the German demand for tourism in South Tyrol implies that provision of high-quality services is crucial for earning a good reputation and attracting new and repeat tourists. Given that the estimated elasticity for the price variable is lower than minus one, suppliers must be careful with prices in order to maintain the competitiveness of their products with those of emergent competitor destinations that are making major efforts to improve the quality/price relationship of their products. Another recommended measure of tourism policy suggested by our study is the diversification of promotion.

The methodology used in this paper can be applied to other studies. Future research can include the estimation of a similar model for some other markets of tourism to South Tyrol or to study other Italian regions. The results of this study could be used to test if there are differences in patterns of demand depending on the origin market. From the other hand, the results of this study could be generalized by the inclusion of prices of alternative destinations in the model and testing which ones can be considered as substitute markets.

Acknowledgements Our research was supported by the Competence centre in Tourism Management and Tourism Economics (TOMTE) of the Free University of Bolzano, project: "Tourism, growth, development and sustainability. The case of the South Tyrolean region". We would also like to thank the helpful comments of anonymous referees.

References

Arellano M, Bond S (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev Econ Stud 58:277–297

ASTAT (2008) Tourism in south Tyrol: year 2006/07. ASTAT-Bolzano, Italy

Blake A, Durbarry R, Eugenio-Martin JL, Gooroochurn N, Hay B, Lennon J, Sinclair TM, Sugiyarto G, Yeoman I (2006) Integrating forecasting and CGE models: the case of tourism in Scotland. Tourism Manage 27:292–305

Cortés-Jiménez I, Durbarry R, Pulina M (2009) Estimation of outbound italian tourism demand: a monthly dynamic EC-LAIDS model. Tourism Econ 15(3):547–565

Durbarry R, Sinclair MT (2003) Market shares analysis: the case of french tourism demand. Ann Tourism Res 30(3):927–941

Eilat Y, Einav L (2004) Determinants of international tourism: a three dimensional panel data analysis. Appl Econ 36(12):1315–1327

Eugenio-Martin JL, Martín-Morales N, Sinclair MT (2008) The role of economic development in tourism demand. Tourism Econ 14(4):673–690

Fujii E, Mak J (1981) Forecasting tourism demand: some methodological issues. Ann Reg Sci 15 (2):359–380

Garín-Muñoz T (2006) Inbound international tourism to Canary Islands: a dynamic panel data model. Tourism Manage 27(2):281–291

Garín-Muñoz T (2007) German demand for tourism in Spain. Tourism Manage 28(1):12–22

Garín-Muñoz T, Montero-Martín L (2007) Tourism in the Balearic Islands: a dynamic model for International demand using panel data. Tourism Manage 28(2):1224–1235

Holtz-Eakin D (1988) Testing for individual effects in autoregressive models. J Econom 39:297–308

Hsiao C (2003) Analysis of panel data, 2nd edn. Cambridge, Cambridge University Press

Khadaroo J, Seetanah B (2007) Transport infrastructure and tourism development. Ann Tourism Res 34(4):1021–1032

Kuo HI, Chen CC, Tseng WC, Ju LF, Huang BW (2008) Assessing impacts of SARS and Avian Flu on international tourism demand to Asia. Tourism Manage 29(5):917–928

Ledesma-Rodriguez FJ, Navarro-Ibanez M, Perez-Rodrguez JV (2001) Panel data and tourism: a case study of Tenerife. Tourism Economics 7(1):75–88

Maloney WF, Montes Rojas GV (2005) How elastic are sea, sand and sun? Dynamic panelestimates of the demand for tourism. Appl Econ Lett 12(5):277–280

Naude WA, Saayman A (2005) Determinants of tourist arrivals in Africa: a panel data regression analysis. Tourism Econ 11:365–391

Roget FM, Gonzalez XAR (2006) Rural tourism demand in Galicia, Spain. Tourism Econ 12 (1):21–31

Sakai M, Brown J, Mak J (2000) Population aging and Japanese international travel in the 21st century. J Travel Res 38(2):212–220

Song H, Li G (2008) Tourism demand modeling and forecasting – a review of recent research. Tourism Manage 29(2):203–220

Vu JC (2006) Effect of demand volume on forecasting accuracy. Tourism Econ 12(2):263–273

Witt S, Martin C (1987) Econometric models for forecasting international tourism demand. J Travel Res 25(3):23–30

Chapter 6
Modelling Tourism Demand in Portugal

Ana C.M. Daniel and Paulo M.M. Rodrigues

6.1 Introduction

Tourism is an important economic activity of Portugal. According to preliminary data from the Portuguese Office for National Statistics (INE 2009), tourism generated in 2008 about 5% of the Economy's Added Gross Value, corresponding to approximately 7.3 billion Euros. The 2008 Report on Competitiveness of Travel and Tourism, ranked Portugal 15th from a list of 130 countries in terms of tourism industry competitiveness. Overall, Portugal climbed 7 positions in relation to 2007 and 4 positions among all 27 EU countries (Portugal Digital 2008). Amador and Cabral (2009) present a detailed analysis of the services industry in Portugal and show that this positive evolution has occurred in this sector in general and reveals a comparative advantage in the travel and tourism industry.

The main source countries of tourists to Portugal include Germany, Spain, France, The Netherlands and the United Kingdom, with these countries accounting for more than 80% of total inbound tourists. Spain is responsible for almost half of foreign tourism. In 2008, these countries represented over 65% of total tourism revenue, in 1990, 58% and in 1970, 44%. The United Kingdom was the main generator of revenue in 2008 having reached 1,640,375,000 €, followed by France with 1,200,581,000 €. Domestic tourism demand has shown growing interest and an important focus of the 2006–2015 National Strategic Plan for tourism is precisely to "accelerate the growth of domestic tourism".

A.C.M. Daniel (✉)
ESTG – Instituto Politécnico da Guarda and CASEE, Av. Dr. Francisco Sá Carneiro, 50, 6300-559 Guarda, Portugal
e-mail: adaniel@ipg.pt

P.M.M. Rodrigues
Department of Economic Research, Banco de Portugal, Av. Almirante Reis, 71-6th floor, 1150-012 Lisbon, Portugal
e-mail: pmrodrigues@bportugal.pt

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_6,

Seasonality is an important feature of tourism and in particular of Portuguese tourism (Baum and Lundtorp 2001). It is in the warmer months that the country is most sought by tourists and the number of nights spent in hotel establishments increases. However, although the tourism industry looks to diversification in terms of supply, seasonality is an important feature of tourism and should be taken into account when developing this area of research.

In addition, nonstationarity and conditional heteroscedasticity (high and low volatility movements) are other important characteristics of tourism series. Volatility is considered by many researchers as an unpredictable measure of variation intensity. These variations are normally associated to unexpected events typically known as 'news shocks' (Shareef and McAleer 2005; Kim and Wong 2006). For instance, among the several factors responsible for changes in tourism patterns, are global terrorism, economic changes in the tourism source countries, exchange rate volatility, tourist health and safety in the destination and unexpected national and international political changes.

The main objective of this chapter is to analyse and model tourism demand series. Based on a range of existing models, we apply a symmetric model – the GARCH model (Engle 1982; Bollerslev 1986) and two asymmetric models, the GJR (Glosten et al. 1993) and the EGARCH (Nelson 1991). The inclusion of the latter two is due to the fact that volatility may exhibit asymmetric behavior, i.e., different responses to positive and negative shocks. The information that can be drawn from the application of these methodologies, especially in the current context of economic and financial instability we are experiencing, can be useful for macroeconomic analysis and forecasting.

This chapter is structured as follows. Section 6.2 provides a brief overview of the volatility models used in the chapter. Section 6.3 presents a description of the data and Sect. 6.4 the results of the estimation of the volatility models. Section 6.5 summarizes the main conclusions.

6.2 Descriptions of Volatility Models

An important characteristic of the behaviour of volatility in tourism demand series (similar to what happens in financial series) is that periods of high volatility may be followed by periods of low volatility and vice-versa. This type of behaviour is known in the literature as 'volatility clustering'. This characteristic is directly related to leverage and asymmetry effects, i.e., the response of volatility to shocks. The asymmetry effect indicates that the volatility of a series is affected differently whether the news are positive or negative and the leverage effect indicates that volatility gets higher and more persistent as a response to negative shocks than to positive shocks. According to McAleer (2005): "A favourable comment can increase happiness momentarily, but a negative comment can last forever" (p. 237).

As we will see below there are models that are appropriate for situations where volatility shows a symmetric behaviour, and there are models that fit situations in which volatility presents asymmetric behaviour. Consider the first group of models.

The Autoregressive Conditionally Heteroskedasticity (ARCH) model introduced by Engle (1982) looks to model the autoregressive structure of the linear time dependence that exists in the error variance in a series of interest. An ARCH model of order q can be specified as follows:

$$\sigma_t^2 = \omega + \alpha_1 \varepsilon_{t-1}^2 + \cdots + \alpha_q \varepsilon_{t-q}^2 \tag{6.1}$$

where $\omega > 0$ and $\alpha_i \geq 0$, $i = 1, \ldots, q$, $\sigma_t{}^2$ is the conditional variance, $\varepsilon_t = u_t \sigma_t$ and u_t is an independent and identically distributed (iid) random variable.

This equation considers that the volatility of a series is a random variable influenced by past variability. It is a model that presents however limitations, such as the imposition of non-negativity of its parameters and the need to include a large number of lags to capture the volatility of the process.

Given these limitations, Bollerslev (1986) proposed a new structure known as generalized ARCH (GARCH). The general GARCH (p, q) model can be presented as

$$\sigma_t^2 = \omega + \sum_{j=1}^{q} \beta_j \sigma_{t-j}^2 + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 \tag{6.2}$$

where $\omega > 0$, $\alpha_j \geq 0$ and $\beta_j \geq 0$ are sufficient conditions to ensure that the conditional variance, $\sigma_t{}^2$, is positive. The first sum corresponds to the GARCH component of order q and the second to the ARCH component of order p. The GARCH (1,1) model has proven to be sufficient to model the variance and has been widely used in the literature. In this case, (6.2) reduces to

$$\sigma_t^2 = \omega + \beta \sigma_{t-1}^2 + \alpha \varepsilon_{t-1}^2 \tag{6.3}$$

where α measure the persistence of shocks in the short-run, and $(\alpha + \beta)$ reveals the degree of persistence of volatility in the long-run. To ensure that $\sigma_t{}^2$ is positive, $\omega > 0$, and α and β must be non-negative (i.e., $\alpha \geq 0$ and $\beta \geq 0$). The sum of α and β has to be below one to ensure the stationarity conditions (i.e., $\alpha + \beta < 1$).

The ARCH and GARCH models assume that volatility has symmetric behaviour i.e., that it has the same behaviour for positive or negative shocks (good or bad news). However, in practice this is not always the case. This led Nelson (1991) to introduced the exponential GARCH model known in the literature as EGARCH model. The EGARCH (1,1) model has the following specification:

$$\log \sigma_t^2 = \omega + \beta \log \sigma_{t-1}^2 + \alpha \left| \frac{\varepsilon_{t-1}}{\sigma_{t-1}} \right| + \gamma \frac{\varepsilon_{t-1}}{\sigma_{t-1}} \tag{6.4}$$

In this case, because the left-hand side of the equation is the logarithm of the conditional variance it is not necessary to impose non-negativity constraints on the α

and β parameters. This model considers a multiplier effect (leverage effect) through the term $\varepsilon_{t-1}/\sigma_{t-1}$, that seeks to capture different impacts of positive and negative shocks on volatility. The leverage effect occurs if $\gamma < 0$. The asymmetric effect, which is also considered by this term, is used to determine whether the market differentiates positive and negative effects. The asymmetric effect occurs if $\gamma \neq 0$ and is symmetric if $\gamma = 0$. The persistence of the shock in this model is measured through β.

Glosten et al. (1993) and Zakoian (1994) introduced the Threshold ARCH model or TARCH[1] model, which also considers the asymmetric effect of volatility. The most common model is the TARCH(1,1) that has the following specification:

$$\sigma_t^2 = \omega + \beta\sigma_{t-1}^2 + \alpha\varepsilon_{t-1}^2 + \gamma\varepsilon_{t-1}^2 d_{t-1} \tag{6.5}$$

In this model $d_t = 1$ if ε_t is negative and 0 otherwise. Again it is necessary that $\omega > 0$, $\alpha \geq 0$, $\beta \geq 0$, and $\alpha + \gamma \geq 0$ to ensure that σ_t^2 is positive. Regarding the impact of news on volatility, it tends to increase with negative shocks (when $\varepsilon_{t-1} < 0$) and decrease with positive shock (when $\varepsilon_{t-1} > 0$). As in the previous model the shock is asymmetric if $\gamma \neq 0$ and is symmetric if $\gamma = 0$, but unlike the previous model the leverage effect occurs if $\gamma > 0$. The short-run effect of positive shocks (good news) is measured through α and that of negative shocks (bad news) through $\alpha + \gamma$. The persistence of the shock in the short run is measured as $\alpha + \gamma/2$ and in the long-run by $\alpha + \beta + \gamma/2$.

For a more detailed review of these models and others associated to the same topic see, for example, Bollerslev et al. (1994); Li et al. (2002); McAleer (2005); and for applications to tourism see Chan et al. (2005), Shareef and McAleer (2007) and Divino and McAleer (2008), among others.

6.3 Data

The data used in this chapter is monthly and covers the period from January 1976 to December 2006, constituting a sample of 372 observations for each of the inbound countries of tourists to Portugal, i.e., Germany, Spain, France, The Netherlands and the United Kingdom. We also consider domestic demand. To measure tourism demand we have chosen the 'Number of nights spent in hotel establishments'. The time series were obtained from one of the main publications of the ex-Direcção Geral do Turismo – 'O Turismo em . . ..' (several years) and from INE (the Portuguese Office for National Statistics) 'Estatísticas do Turismo' (several years). Graphical representation of the series is presented in Fig. 6.1 and in Fig. 6.2 the graphs of the natural logarithms of the series.

Despite the existence of stages of growth and decline, all series exhibit a strong seasonal pattern. In the case of Portugal, the values of the first 2 years are slightly overstated. This is due to the fact that many individuals returning from the

[1]This model is also commonly known in the literature as GJR model.

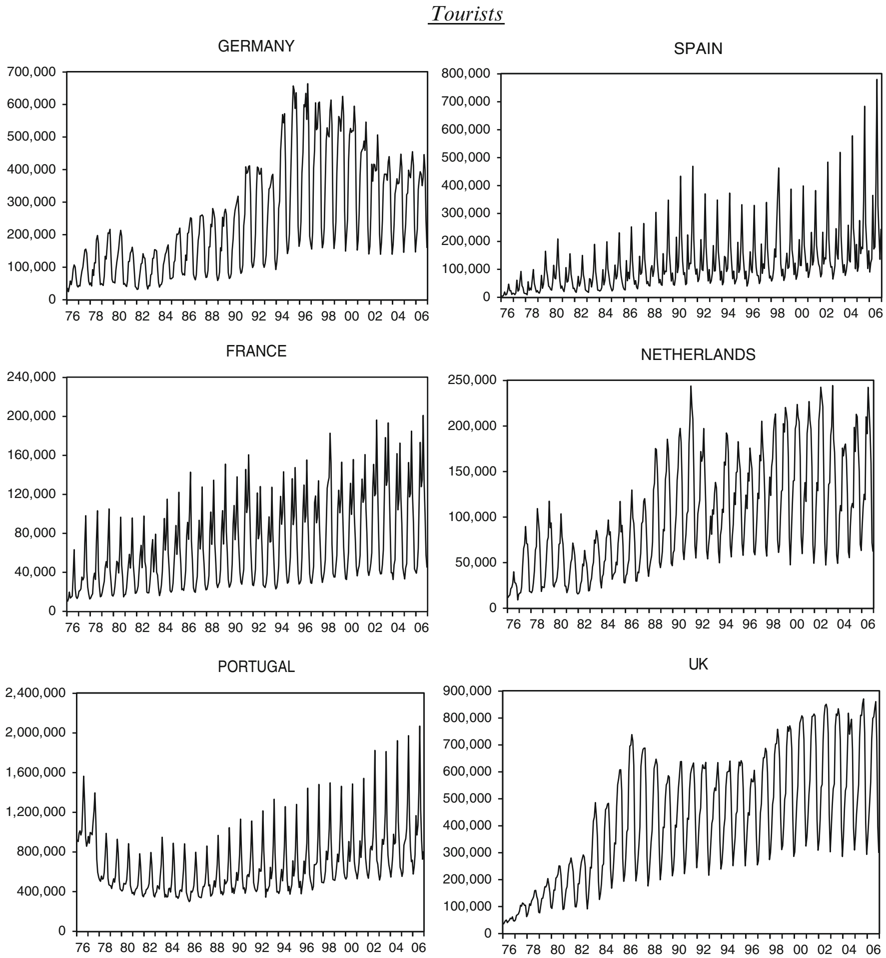

Fig. 6.1 Tourism demand of the main source
Source: Direcção Geral do Turismo and Portuguese Office for National Statistics (INE)

ex-Portuguese colonies in the decolonization process had been temporarily housed in hotels. Table 6.1 presents some descriptive statistics of the series under study.

From Table 6.1, it can be observed that the standard deviation is high when compared to the mean (coefficient of variation). In this regard, Portugal is the country that has the lowest coefficient of variation, meaning that data are less dispersed indicating a more stable demand. The asymmetry and kurtosis are typically analyzed with reference to the normal distribution. The normal distribution is symmetrical (for which the value of the measure of asymmetry is 0) and mesocurtic (i.e., the value of the measure of kurtosis is 3). Hence, taking these values as reference and considering the results obtained for the various countries under analysis in Table 6.1, we conclude that asymmetry is always positive and from the value of the kurtosis we can conclude

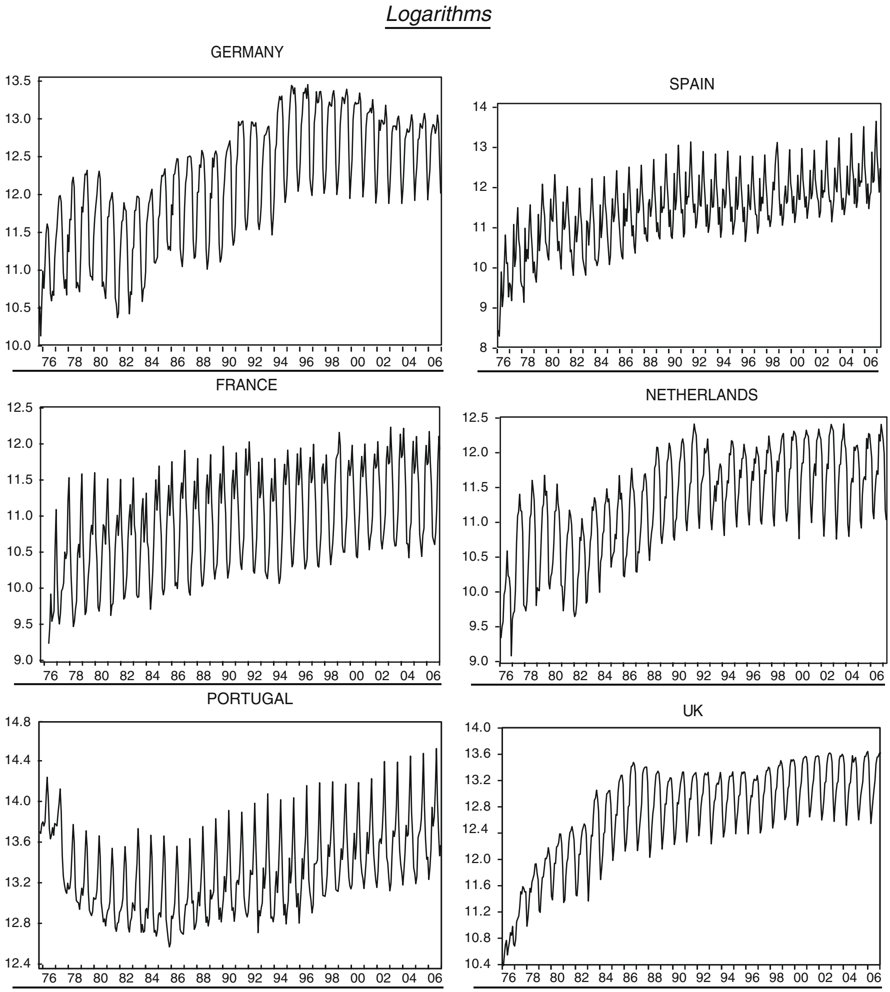

Fig. 6.2 Logarithms of tourism demand of the main source countries
Source: Direcção Geral do Turismo and Portuguese Office for National Statistics (INE)

for a platicurtic distribution (a flatter distribution than the normal, i.e., the values are more scattered from the average) for Germany, France, The Netherlands and the United Kingdom and a leptokurtic distribution (distribution presents a greater concentration of observations around the mean than the normal) in the case of Spain and Portugal. The Jarque–Bera statistic (a measure of deviations from normality which is calculated considering the skewness and kurtosis of the series) suggests rejection of the null hypothesis that the series are normally distributed.

To highlight the importance of seasonality, in Table 6.2 the seasonal indices for the series under study are presented, according to the country of origin. These indices measure the degree of seasonal variation in the series.

Table 6.1 Descriptive statistics of the representative series of tourism demand in Portugal (units: number of overnight stays)

Statistic/country	Germany	Spain	France	The Netherlands	Portugal	UK
Mean	233,047	106,282	62,340	94,005	639,348	390,246
Median	173,912	87,492	49,050	78,663	554,839	376,851
Maximum	664,129	483,759	196,305	243,869	1,824,096	851,087
Minimum	24,715	3,876	9,998	8,980	298,841	34,218
Standard deviation	172,031	86,365	39,025	58,138	268,700	215,659
Asymmetry	0.8569	1.8481	0.8279	0.6446	1.4047	0.1890
Kurtosis	2.5344	7.0391	2.8867	2.4320	5.0437	1.9442
Jarque–Bera	42.5813	404.6841	37.1872	26.7939	162.9393	16.9765
Prob (J–B)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0002)

Source: Authors calculations

Table 6.2 Seasonal indices of the representative series of tourism demand in Portugal

Month/country	Germany	Spain	France	The Netherlands	Portugal	UK
January	0.483	0.445	0.479	0.595	0.723	0.594
February	0.558	0.450	0.596	0.707	0.759	0.747
March	0.942	1.020	0.811	0.898	0.906	0.932
April	1.144	1.422	1.430	0.957	1.014	0.955
May	1.435	0.888	1.759	1.413	0.937	1.228
June	1.507	0.972	1.298	1.463	1.071	1.368
July	1.663	1.752	1.668	1.842	1.377	1.371
August	1.706	3.189	2.479	1.651	1.926	1.441
September	1.709	1.587	1.391	1.524	1.382	1.426
October	1.256	1.068	0.955	1.124	0.923	1.226
November	0.579	0.603	0.536	0.537	0.769	0.813
December	0.452	0.697	0.448	0.478	0.758	0.537

Note: To obtain these indices moving averages for each month were first calculated – using the multiplicative method. These figures isolate the cyclical and seasonal components of the series. The seasonal indices result from the division of the original series by the moving averages, resulting in 12 indices. When this index exceeds the value of 1 this indicates that tourism demand exceeds the monthly components of trend and cycle that identifies the presence of seasonality
Source: Authors calculations

As shown in Table 6.2 it is in the summer months (particularly July and August) that the indices are higher. It should be noted that some countries also report high values in other months of the year (see the case of Spain, the months that coincide with the Easter holidays, i.e., March and April). The winter months (particularly December and January) are those that, in general, have lower indices (again Spain is an exception showing lower values in January and February).

In addition to seasonality, the series have patterns of volatility as shown in Fig. 6.3. To analyse volatility we used the squared residuals, $\hat{\varepsilon}_t^2$, of the following regression:

$$\Delta \log T_t = ARMA(1,1) + \sum_{i=1}^{12} \phi_i D_{it} + \varepsilon_t \tag{6.6}$$

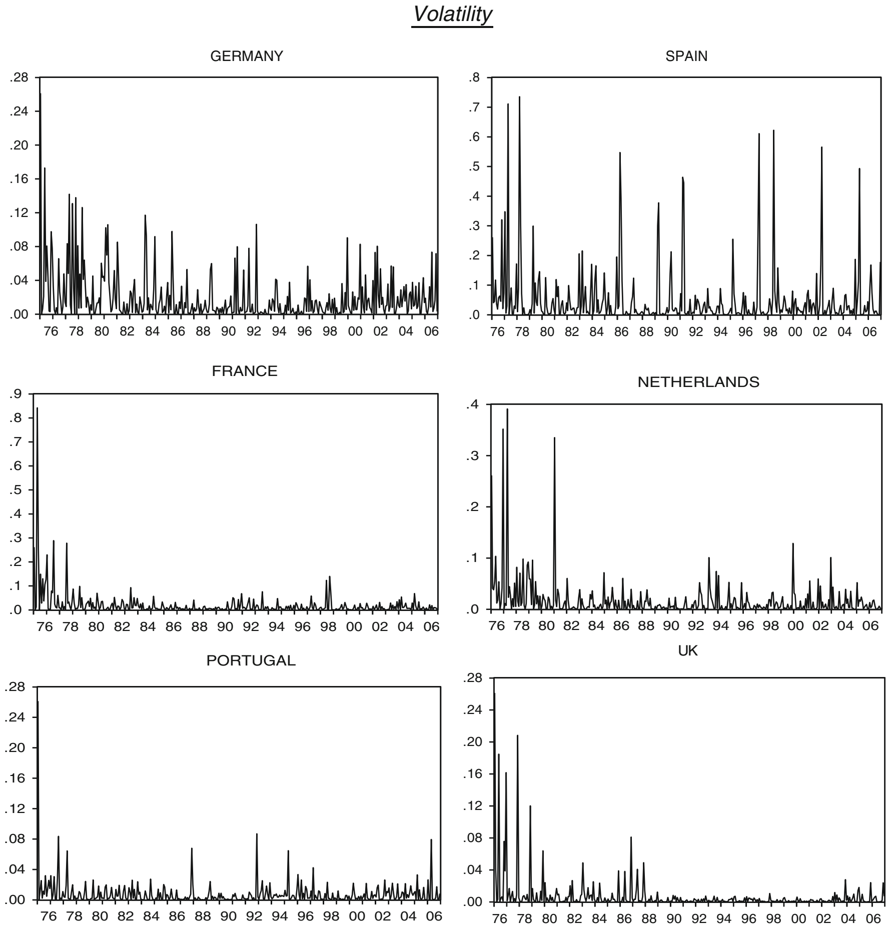

Fig. 6.3 Volatility of tourism demand of the main source
Source: Authors calculations

where T_t is tourism demand from the countries under analysis, D_{it}, $i = 1,\ldots,12$, corresponds to a seasonal dummy that takes value 1 in month i and 0 otherwise, and ARMA(1,1) refers to a component of this type that was estimated for each series.

As shown in Fig. 6.3, Portugal and the UK have the lowest levels of volatility and Germany and Spain, the highest levels. The Netherlands, France and the United Kingdom, in the early years, have higher volatility, which however declines from 1980 onwards. These results were confirmed using the test for ARCH effects proposed by Engle (1982), based on which we found significant results for Germany, Spain and France and weak evidence for The Netherlands, Portugal and the United Kingdom. These results suggest that tourism demand from these latter countries appears to be more resilient to unanticipated shocks. A possible explanation for this phenomenon is related to the fact that the 1980s correspond to the statement of this sector. Although tourism started to gain importance in the 1960s, it is in fact only in the 1980s that it consolidates, particularly in these markets.

6.4 Modelling Seasonality and Volatility of Tourism Demand in Portugal

For modelling purposes, the first differences of the logarithms of the series were considered. The graphs of the series are presented in Fig. 6.4 and all appear to be stationary. Stationarity of these series was also confirmed using formal unit root tests (see Appendix).

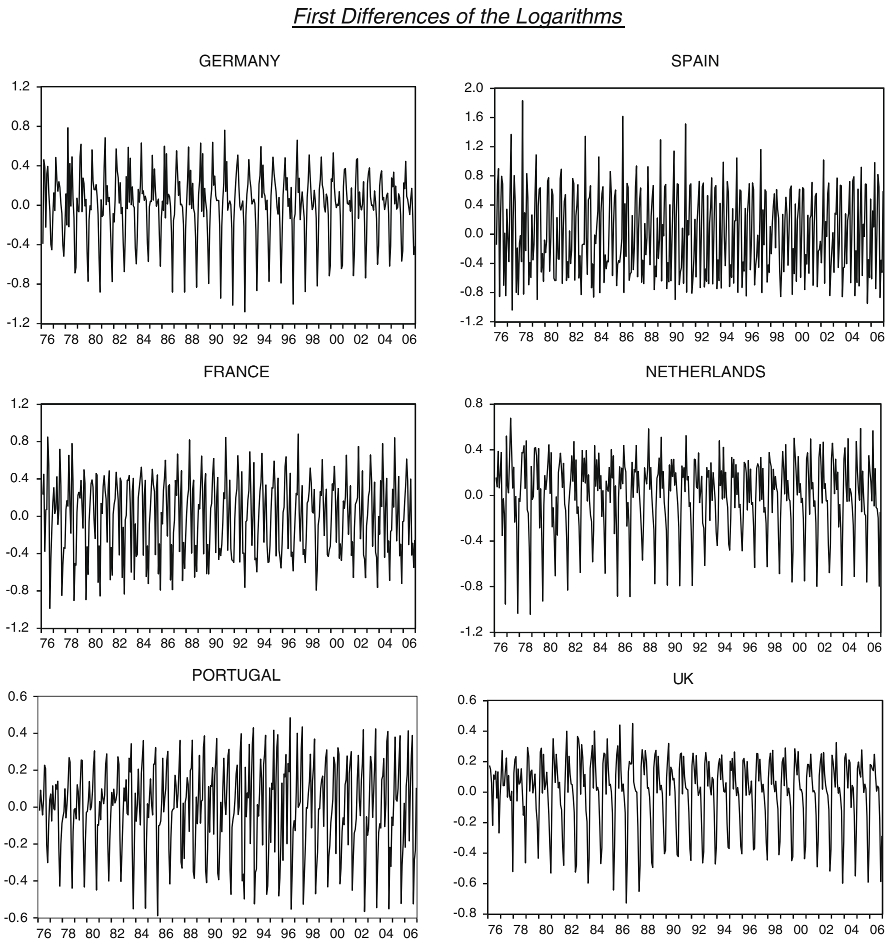

Fig. 6.4 First differences of the logs of tourism demand of the main source countries
Source: Authors calculations

6.5 Results

Given the importance of achieving an appropriate model for the conditional mean, several ARMA models have been tested to determine the most appropriate to obtain estimates of the parameters of the mean equation. The results of the models estimated for each country, are presented in Table 6.3. Table 6.3 presents the results for the mean equation considering a GARCH(1,1)[2] as the model for volatility and Table 6.4 the results for the variance equations for the countries under analysis.

Table 6.3 Conditional mean of first differences of logarithms of tourism demand in Portugal – GARCH(1,1) model

Dependent variable: ΔLogT

Country	Germany	Spain	France	The Netherlands	Portugal	UK
Parameters						
AR(1)	0.5490*** (0.0803)	–	0.3909*** (0.0823)	0.6454*** (0.0483)	–	0.9592*** (0.0511)
MA(1)	−0.8637*** (0.0436)	−0.7586*** (0.0391)	−0.8980*** (0.0333)	−0.8917*** (0.0337)	0.5444*** (0.0641)	0.9340*** (0.0607)
January	0.1019*** (0.0289)	−0.4383*** (0.0566)	–	0.2808*** (0.0197)	−0.0430** (0.0168)	0.1392*** (0.0092)
February	0.2099*** (0.0279)	–	0.2225*** (0.0287)	0.2199*** (0.0173)	–	0.2235*** (0.0149)
March	0.5190*** (0.0278)	0.7405*** (0.0426)	0.3101*** (0.0225)	0.2285*** (0.0249)	0.2139*** (0.0172)	0.2152*** (0.0111)
April	0.1841*** (0.0215)	0.5113*** (0.0386)	0.6489*** (0.0265)	–	0.1217*** (0.0144)	0.0472*** (0.0136)
May	0.2378*** (0.0195)	−0.5043*** (0.0612)	0.2489*** (0.0278)	0.4205*** (0.0192)	−0.0757*** (0.0292)	0.2635*** (0.0112)
June	–	–	−0.3132*** (0.0228)	–	0.1244*** (0.0328)	0.0997*** (0.0149)
July	0.0709*** (0.0236)	0.6565*** (0.0932)	0.1531*** (0.0232)	0.2038*** (0.0236)	0.2599*** (0.0324)	–
August	–	0.6177*** (0.1184)	0.3869*** (0.0322)	−0.0755*** (0.0212)	0.3426*** (0.0211)	–
September	–	−0.7256*** (0.1109)	−0.4771*** (0.0248)	−0.0802** (0.0323)	−0.3662*** (0.0170)	–
October	−0.2260*** (0.0286)	−0.3837*** (0.0853)	−0.3560*** (0.0343)	−0.2887*** (0.0332)	−0.3883*** (0.0290)	0.1551*** (0.0152)
November	−0.7736*** (0.0214)	−0.5547*** (0.0824)	−0.6026*** (0.0234)	−0.7179*** (0.0204)	−0.1941*** (0.0201)	0.4601*** (0.0071)
December	−0.2796*** (0.0247)	0.1941*** (0.0632)	−0.1841*** (0.0253)	−0.1475*** (0.0202)	–	0.3839*** (0.0113)

Source: Authors calculations
The results in *brackets* are the robust standard deviations of Bollerslev and Wooldridge (1992)
** and *** means statistical significance for 5 and 1%, respectively
– Indicates that the variable is not statistically significant

[2]The parameter estimates using an EGARCH or a TGARCH are qualitatively similar to those presented in Table 6.3 and are therefore omitted.

Table 6.4 Conditional variance of first differences of logarithms of tourism demand in Portugal

Dependent variable: ΔLogT

	Germany GARCH (1,1)	Spain EGARCH (1,1)	France GARCH (1,1)	The Netherlands EGARCH (1,1)	Portugal GARCH (1,1)	UK GARCH (1,1)
ω	0.0002* (0.0001)	3.2269*** (0.3148)	0.0006*** (0.0002)	−0.0338 (0.0455)	0.0044 (0.0037)	0.00005*** (0.00001)
GARCH α	0.0195 (0.0162)	–	0.0471** (0.0203)	–	0.1078 (0.0673)	0.0104 (0.0099)
GARCH β	0.9635*** (0.0190)	–	0.8974*** (0.0210)	–	0.3844 (0.4487)	0.9668*** (0.0096)
EGARCH α	–	0.9813*** (0.1139)		−0.0136 (0.0324)	–	–
EGARCH β	–	0.2193** (0.0985)		0.9911*** (0.0051)	–	–
EGARCH γ	–	0.1309 (0.0836)		−0.0071 (0.0189)	–	–
Log-Likelihood	229.3550	69.3288	271.2198	235.3283	389.2318	475.2967
AIC	−1.1641	−0.2928	−1.3796	−1.3623	−2.0228	−2.4935
BIC	−1.0160	−0.1345	−1.2103	−1.1747	−1.8750	−2.3454

Source: Authors calculations

In *brackets* robust standard deviations of Bollerslev and Wooldridge (1992)

** and *** indicate statistical significance at 5 and 1%, respectively

Table 6.3 presents the results for the conditional mean of the first differences of logarithms of tourism demand in Portugal. All estimates of the ARMA(1,1) parameters are significant for all countries. The results for the AR(1) model, are higher for The Netherlands and the United Kingdom, although in this last case they show an opposing sign compared to all other countries. The MA(1) estimates are also high for all countries, particularly in the case of France, The Netherlands and the United Kingdom, although once again for the United Kingdom they present a different sign to all other countries. From the mean equations we also conclude that seasonality is indeed one of the main characteristics of tourism.

With regard to volatility, with the exception of Spain and The Netherlands, the GARCH(1,1) model seems to be the most appropriate. Estimates of conditional volatility suggest generally that there is no asymmetry, so that positive and negative shocks have similar effects on the volatility of the series of tourism under analysis.

With respect to the GARCH(1,1) model, in case of Germany, all parameters are significant and positive and the sum of α and β is less than 1, satisfying in this way the conditions to ensure that σ_t^2 is positive and the stationarity of the model (i.e., existence of finite unconditional variance). The persistence of the shock in the long run is 0.983, very close to 1, meaning that an unanticipated shock will have a strong impact on tourism demand of these tourists to Portugal and which will persist for a considerable period of time. The same conclusion can be reached in the case of France and the United Kingdom. For Germany and for the United Kingdom, α is not significant (i.e., shocks have no impact in the short term).

The EGARCH(1,1) model, when compared to the three models considered (GARCH, EGARCH and TARCH), is the one that best fits the volatility of Spain and The Netherlands. However, for these countries there is evidence of asymmetric effects (i.e., the hypothesis $\gamma = 0$ is not rejected). The persistence of shocks measured through β, is significant for both countries and is strong in the case of The Netherlands and small in the case of Spain (0.9911 and 0.2193, respectively).

6.6 Conclusion

The study and modelling of volatility in tourism demand is an issue whose research is still limited. The results for the conditional mean of the first differences of logarithms of tourism demand in Portugal show that all estimates of the ARMA (1,1) parameters are significant for the three models and for all countries. On the other hand, it is possible to observe that seasonality is indeed one of the main characteristics of tourism. The last months of the year show negative signs, and coincide with the winter months, and it is the inverse in the warmer months.

The results suggest that in general the GARCH(1,1) model provides an appropriate measure of conditional volatility of most of the series considered. Based on this model, it was noted that for Germany, the persistence of the shock in the long run is 0.983, very close to 1, meaning that a no anticipated shock will have a strong impact on tourism demand of these tourists to Portugal and that will continue for a considerable period of time. The same conclusion can be reached in the case of France and the United Kingdom. However, for Germany and for the United Kingdom, α is not significant suggesting that shocks have especially a long-run impact. For domestic demand evidence of volatility is very low suggesting some resistance to this demand shocks.

Since tourism is a relevant economic activity, it is important to note that an unanticipated shock, will have implications on the tourism demand for Portugal. In addition to the economic impacts on employment and investment within the sector, other activities directly related to tourism, such as for example, construction, agriculture, etc., will also be affected. On the other hand, it is necessary to ascertain the extent to which a shock, may divert demand to other countries that offer the same type of products. Since Germany, Spain, France, The Netherlands, Portugal and the United Kingdom are the main source countries of tourists, it is increasingly necessary to improve the competitiveness of the sector, developing new products for new centres of attraction, as well as new markets and not least, look for the growing need of qualified services and human resources. These and other measures are necessary for this sector to remain an important sector of the economy.

Appendix

The ADF unit root test was applied to these series to test for the presence of unit roots. Test regressions with 12 seasonal dummies only and with 12 seasonal dummies and a time trend were considered, i.e.,

$$\Delta X_t = \gamma X_{t-1} + \sum_{i=1}^{12} \phi_i D_{it} + \sum_{i=2}^{p} \beta_i \Delta X_{t-i-1} + \varepsilon_t \tag{6.7}$$

$$\Delta X_t = \gamma X_{t-1} + \varphi t + \sum_{i=1}^{12} \phi_i D_{it} + \sum_{i=2}^{p} \beta_i \Delta X_{t-i-1} + \varepsilon_t \tag{6.8}$$

The critical values for 372 observations were obtained by Monte Carlo simulation in GAUSS(9.0) and the results for 1, 2.5, 5 and 10% are presented in Table 6.5.

Table 6.5 Critical values for Dickey and Fuller (1979) test with 12 seasonal dummies and with 12 seasonal dummies and a time trend for 372 observations

Deterministics	Percentiles	Value
	0.010	−3.381
	0.025	−3.090
	0.050	−2.806
Seasonal dummies	0.100	−2.508
	0.010	−3.864
	0.025	−3.554
	0.050	−3.320
Seasonal dummies and trend	0.100	−3.039

Source: Authors calculations

Table 6.6 Results of the Dickey and Fuller (1979) unit root test

		T	LogT	ΔLogT
	SD	−1.088 (13)	−1.143 (13)	−4.104 (12)***
Germany	SD + t	−1.879 (13)	−2.334 (13)	–
	SD	−1.374 (13)	−2.881 (12)	−6.101 (12)***
Spain	SD + t	−2.960 (13)	−3.215 (12)*	–
	SD	−1.361 (13)	−1.621 (12)	−6.284 (12)***
France	SD + t	−4.617 (13)***	−3.451 (12)**	–
	SD	−1.223 (12)	−2.245 (13)	−4.766 (12)***
The Netherlands	SD + t	−2.612 (12)	−3.140 (13)*	–
	SD	−2.931 (13)**	−2.816 (14)**	−3.953 (13)***
Portugal	SD + t	−5.018 (13)***	−5.535 (14)***	–
	SD	−1.686 (12)	−4.108 (12)***	−4.479 (12)***
UK	SD + t	−1.713 (12)	−3.503 (13)**	–

Source: Authors calculations

T Tourism demand (original series); *LogT* logarithms of tourism demand; Δ*LogT* first differences of logarithms of tourism demand

The number of lagged terms (p) are in *brackets*

*, ** and *** indicate rejection of the null hypothesis at the 1, 5 and 10% level, respectively

The results of the test are shown in Table 6.6.

The results of the test, and the graphical representation of the series (Fig. 6.4), show that the first differences of logarithms of the series are stationary.

References

Amador J, Cabral S (2009) O Comércio Internacional de Serviços na Economia Portuguesa, Banco de Portugal. Boletim Económico, Outono 229–249

Baum T, Lundtorp S (2001) Seasonality in tourism. Pergamon, London

Bollerslev T (1986) Generalized autoregressive conditional heteroskedasticity. J Econom 31:307–327

Bollerslev T, Wooldridge JM (1992), Quasi Maximum Likelihood Estimation and Inference in DynamicModels with Time Varying Covariances. Econometric Reviews 11:143–172

Bollerslev T, Engle RF, Nelson DB (1994) ARCH models. In: Engle R, McFadden D (eds) Handbook of econometrics, vol IV. North Holland, Amsterdam

Chan F, Lim C, McAleer M (2005) Modelling multivariate international tourism demand and volatility. Tourism Manage 26:459–471

Dickey DA, Fuller WA (1979) Distribution of the estimators for autoregressive time series with a unit root. J Am Stat Assoc 74:427–431

Direcção Geral do Turismo (different years). O Turismo em ...., Direcção Geral do Turismo, Lisbon

Divino JA, McAleer M (2008) Modelling sustainable international tourism demand to the Brazilian Amazon. EI Report 2008-22, Erasmus University, Rotterdam

Engle RF (1982) Autoregressive conditional heteroskedasticity with estimates of the variance of UK inflation. Econometrica 50:987–1008

Glosten LR, Jagannathan R, Runkle DE (1993) On the relation between the expected value and the volatility of the nominal excess return on stocks. J Finance 48:1779–1801

Instituto Nacional de Estatística (2009) Conta Satélite do Turismo (2007–2009). Informação à Comunicação Social, Destaque

Instituto Nacional de Estatística (different years) Estatísticas do Turismo. Instituto Nacional de Estatística, Lisbon

Kim S, Wong KF (2006) Effects of news shock on inbound tourist demand volatility in Korea. J Trav Res 44:457–466

Li WK, Ling S, McAleer M (2002) Recent theoretical results for time series models with GARCH errors. J Econ Surv 16:245–269

McAleer M (2005) Automated inference and learning in modeling financial volatility. Economet Theor 21:232–261

Nelson DB (1991) Conditional heteroskedasticity in asset returns: a new approach. Econometrica 59:347–370

Portugal Digital (1998) Portugal Ocupa o 15° Lugar, numa Lista de 130 Países, no Ranking de Competitividade do Turismo. Publication [online]. Portugal Digital, 2008 in URL http://www.ccilb.net.pt>03/2008

Shareef R, McAleer M (2005) Modelling international tourism demand and volatility in small island tourism economics. Int J Tourism Res 7:313–333

Shareef R, McAleer M (2007) Modelling the uncertainty in monthly international tourist arrivals to the Maldives. Tourism Manage 28:23–45

Zakoian JM (1994) Threshold heteroskedasticity models. J Econ Dyn Control 18:931–944

Chapter 7
Instruments of Structural Policies for Tourism Sustainability

Salvatore Bimonte and Lionello F. Punzo

7.1 Introduction

The point of departure of our analysis is that tourism is the encounter of two populations, a temporary as opposed to a permanent resident on a given territory (Bimonte 2006; Bimonte and Punzo 2006; Smith 1989). Their needs, interests and expectations not necessarily being either convergent or even just similar (Hardy et al. 2002), heterogeneity has to be taken into account as a fundamental analytical feature. Moreover, encounter in a given 'destination' implies an added demand to share local resources from the part of the visitors (in the language of biology, acting like *invaders*), and the residents' territory has to 'double up' and perform an additional, or even a new principal role of, other people's temporary home. Local resources have a record of locally historical usages (hence, basically, they are to be accounted as heritage goods), but at one point they have drifted into the sphere of interest of (mostly) leisure-motivated visitors.

Sustainability in tourism is about a new development path that should emerge from the stipulations among its various stakeholders, the residents with their industry and institutions, as well as the tourists. In this paper, we will look at various settings and forms of interaction between them from the narrow viewpoint of the economist. The ambitious program of tourism as total social science (Graburn and Jafari 1991) can, at least partially, be realized within game theory, and in particular within the setting of evolutionary game theory, actors being *cultural* populations, often internally structured (Bimonte 2008a; Bimonte and Punzo 2006).

Sustainable tourism can therefore be seen to imply the satisfaction of a twofold condition: on one side, a path of sustainable utilization of local, natural and man-made, resources; on the other, and at the same time, the minimization of the costs of

S. Bimonte (✉) • L.F. Punzo
Department of Economics, Osservatorio per il Turismo Sostenibile, University of Siena, Piazza S. Francesco 7, 53100 Siena, Italy
e-mail: bimonte@unisi.it; punzo@unisi.it

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_7,

conflict over their usage between the involved populations of residents (as *hosts*) and visitors (as *guests*). The former requirement can be thought of as being, mainly though by no means uniquely, determined by certain physical constraints (e.g., resource endowments at a certain date and location). The likelihood of the latter condition also being satisfied, however, depends upon characteristics that are specific to each destination and resident population and, therefore, are fundamentally *locally* defined. Thus, we may find a whole set of qualitatively distinct outcomes of the game of interaction, depending upon the way(s) the two social counter-parts may and actually succeed (at times, as a result of sheer accident) to interact with each other (Bimonte and Punzo 2006). Although tourism and development sustainability share many aspects, the former presents also specificities that can be encountered neither in the latter, nor in any seemingly related fields (e.g., biology) as they include but go beyond just population heterogeneity.

Thus, in the sequel, a game-theoretic conceptual framework is introduced to re-examine tourism sustainability in this light, and we will look at some of the logical implications for policy design.

7.2 The Resident as a Host

As said, we believe to be novel to the economist the viewpoint according to which the challenge in tourism economics is to deal with populations that are culturally heterogeneous, not simply sets of preference- or endowment-differentiated agents of an otherwise homogenous population. In other words, in the language of biology, there we are dealing with distinct species, and not just with different individuals of the same species. This is rather well known to the anthropologist, though (see the classic Smith 1989). In homage to a classic text, we will often refer the two populations as the *hosts* (the resident population) and the *guests* (the visitors, akin to the biological *invaders*).

Since the 1970s, a growing attention has been devoted to the perception and attitude of the residents with respect to the impact of tourism development upon their own welfare (Butler 1974; Doxey 1975). Among the reasons for such interest is of course the increasing evidence that, though generating positive effects, tourism development too may and often has negative implications on social cohesion, cultural heritage, social values and the like, in the long if not already in the short run (Liu and Var 1986; Robinson 2000). Huang and Stewart (1996), for example, show how tourist development alters the web and quality of relations among residents and, more generally, between the individual resident and the community to which she belongs. Moreover, a number of studies (see, e.g., De Kadt 1977; Mathieson and Wall 1982; Font 1995; Snaith and Haley 1994) have highlighted the potential for conflict over the sharing of local resources between hosts and guests. Thus, residents' perceptions and attitudes should be considered as crucial factors while trying to construct successful tourism-driven plans of local development (Bimonte and Pratelli 2007a, b; Punzo 2004; Ap 1990, 1992).

In this scenario, the *appearance* of *the* tourist (and of tourism) changes the rules of social co-existence with local resources. It acts as a strong structural shock, initializing a process of search for a new nature–society equilibrium. In the classical life cycle theory of product/destination, the history of a typical tourist destination is told as a one-way, deterministic avenue through an orderly chain of phases (Cooper et al. 1993) characterized by the adaptation of local conditions to tourists' demand (Cohen 1988). Such a view of a really complex process tends to skip over social and environmental impacts and costs of tourism associated with a progressively widening gap between, private and social, costs and benefits (Sinclair 1991).

It may appear that there is practically little or nothing new in this story, as we are recalling a tragedy-of-commons-type of setting. But the mere fact that we deal with two populations makes the difference. In tourism, commons (or common-pool resources) *belong* to one of the two contending populations, at least in the sense that one of them may have a claim for a bigger stake in them. The contention on 'usage and property rights' over local resources can ignite a process of 'negotiation' or even open confrontation. The life cycle story could be better told within the frame of an evolutionary bargaining process with uncertain exits.

Our approach falls within a property rules (as opposed to the liability) system (Bimonte 2006).[1] The acceptance of the property rule approach implies that the final equilibrium and, therefore, any sort of *feasible sustainability*, so to say, in tourism becomes the outcome of human decision (a well specified *social contract*). Within a delimited spatial-temporal scale, this would select specific characteristics of the material and immaterial system to be preserved and the modalities to intervene on the causes of undesired changes. One such approach yields uncertain outcomes, as a consequence of a number of factors only a few of which with clear-cut influence (as may be e.g., the diversity across populations, general cultural factors, location specificities, and the like). Even with a well identified set of influencing factors, their mere blending in different locations at different times can lead to outcomes that appear and are altogether different. Such possibility renders even more interesting an 'open' theoretic setting where several, qualitatively distinct equilibrium outcomes may emerge (as in the pioneering work of Axelrod 1984). At the cost of the renouncing precise and easily intelligible predictions, we gain a fuller understanding of the various mechanisms and the complexity of the social situation that tourism implies. We also discover a framework more suitable to accommodate an adaptive approach to policy design.

In tourism perhaps more than elsewhere, there is a compelling case for the need of policy action to coordinate individual choices over commonly shared resources

[1]The liability paradigm asks for a transcendent or an external imposed and unanimously accepted equilibrium. The prerequisite for the latter paradigm to be applied is the initial allocation of the entitlement to one of the two 'negotiators', that means that the court decides which right is preeminent. Once this has been done, it merely has to prevent its violation. The injunction is removed only if and when the party entitled to the right consents to some degree of violation or to totally or partly transfer her entitlement to others (Coase 1960). In the absence of a clear initial allocation of such entitlement, it is *de facto* allocated to that party that can seize it more easily. To the authors' knowledge such an approach cannot be found in the literature.

with alternative uses. Tourism and tourists increases pressure on local resources, and, in general, also generate demand of types of them and levels that are different from those expressed by residents. Unless restrained in some way, tourists will tend to over-use resources that are not *theirs*, for whose services they assume to be paying in full.[2] They may be encountering a host population jealous of its historically preserved culture values and long-established rules of environmental management. We may also find cases where it is the resident who is willing to sacrifice them for the short term advantages from intensive exploitation, whereas the tourist instead would like to see them preserved.[3]

The *quality* of the outcome of the interaction between hosts and guests is crucial for sustainability. It may turn out to be a sort of social agreement (when they share a view over the administration of territorial resources) or else a complete disagreement.[4] Agreement would generate a stable social support for a path of tourism-driven or tourism-related development. This would minimize the costs involved in the breaking up of the potential conflict between the two populations and it would also be environmentally-sustainable. In the opposite case, an unstable situation would arise which may be surmised to end up igniting an evolutionary dynamics: the hunt for a stable equilibrium would be driven by the same pressure to minimize social conflict with its implied costs.

Unfolding the variety of outcome scenarios is therefore a key exercise for their better understanding, both in analysis and in policy designing. An issue, this, that is too often underestimated if not completely overlooked. We look at game theory for aid.

7.3 Tourism May Imply a Social Dilemma

Through tourism, a *stable* and an *unstable* or *temporarily resident* populations meet, which have in general different preference structures, cultural values and habits etc. They also rely on different time horizons and/or different inter-temporal discount rates when deciding their course of action and estimating their implications, and this is particularly evident when it takes place on the site of their encounter. The key to sustainability lies therefore in ingenuously devising policy schemes that contribute for the convergence of the two towards one another,

[2] This is not always the case and may also depends on the typology of tourist. For a comparative study see Bimonte (2008b).

[3] Island communities are generally strongly attached to their own cultures, until a cultural or economic *catastrophe* brings about a new generation of short-sighted speculators, keen to cash in on their fathers' inherited patrimony. This is not a rare history; as it is the case for, e.g., many Mediterranean islands.

[4] It may also lie somewhere between these two extremes. Recent cases involving infrastructure in trendy tourist destinations, where visitors reject services (e.g., electricity) that residents demand, are illustrative of the extreme disagreement about how to manage an at least partially shared territory.

a scope so broad that it needs to be spelled out by means of examples before any serious theoretic thinking be attempted.

The game setting we are about to briefly introduce, belongs to the wide category of the social dilemmas, situations where the working of individual rationality ends up generating a collectively irrational outcome (see Olson 1965). One such dilemma arises when e.g., due to free riding behavior or imperfect information, rational action on the part of all actors ends up generating a socially sub-optimal outcome (Bimonte 2008a). Games of Social dilemmas show at least one equilibrium, a state where nobody has incentives to unilaterally modify her behavior, which is inefficient as there is at least one outcome with everybody better off. Though aware of facing a social dilemma, a group of people might still find it impossible to avoid collective disaster due to uncoordinated choices.

Often such inefficient equilibrium is associated with the presence of a dominating strategy (a strategy that is the best for any agent whatever the choices of the opponents). The perverse nature of the situation is in that social welfare would be prejudiced by all actors implementing dominating strategies (more of this later).

Here is how this links up with our argument. One of the many peculiarities of tourism as a social phenomenon descends from the very characteristics of some of the goods and services entering the *tourist product*. These are, both tangible and intangible, economically valuable goods whose conservation can be threatened by the very activities that make for their valorization, tourism being one such activity. Their (rate of) usage may often have critical tapping values, beyond which their use and often economic values drastically diminish, or even disappear altogether.

Unfortunately, unlike in the *classical* social dilemmas, their sustainable uses require the cooperation of two users, the resident/host and the tourist/guest. Not only *do they not look alike*; most often, they are in the practical impossibility of establishing reciprocal long run commitments. Therefore, even when both of them happen to prefer sustainability to overexploitation, they may find it better not to contribute to resource preservation. Over exploitation of the to-be-shared resources may in fact be the outcome of a perverse cooperation between hosts and guests, unless an agreement to otherwise be reached and 'under-signed'. Of course, this is no easy task.

The political engineering of how to design and write, how to reach and finally how to enforce one such agreement, is the real challenge of devising policies for tourism sustainability.

7.4 Rules of (Some) Games

A game-theoretic setting has many an advantage in the representation of the social encounter of distinct players with possibly conflicting interests, as is the case in our argument about tourists and. Among them, is the fact that the pay off matrix of the game, in extensive form, shows in an immediate way the structure and characteristics of situations of social dilemma. It is, on the other hand, natural to an economist to resort to the theory of non-cooperative games to analyse the necessary conditions for the emergence of cooperative equilibria, with the two populations[5] choosing to play the same strategy. With a suitably defined objective of cooperative behaviour (i.e., cooperation in the sustainable exploitation of local resources), a *cooperation outcome* may support a path of sustainable tourism.[6]

It is at this point important to make explicit a notion that has been used so far. A *Tourist-relevant resource* is any resource (whether natural or man-made, material or immaterial) upon which a potential for conflict in usages exists between resident/hosts and tourists/guests. Identification of such type of resources, which may be a subset of all those available in a given location, is preliminary to any discussion. For simplicity we will limit ourselves to the case of a single, all-encompassing relevant resource: a *space-resource* as a collective, largely metaphorical, denomination meant to stress the empirical fact that (almost) any tourist relevant resource has the character of a *common*. Since it may be used by either or both guests and hosts, problems arise as to who should use it, how and how much. In a sense, it is a resource that belongs to one side only, the hosts who have been tilling, cultivating, preserving etc. (and have, in fact, shaped it) all the time up to the recent, generally peaceful, arrival of the tourist invaders. While space is a common for the hosts, the market and other relations and institutions extend it to guests, for a limited time and under certain conditions. The novelty with respect to the classical situation leading to the *tragedy of commons* lies in these *limiting conditions*.

To further simplify, take one tourist and one resident only, as *representatives* of their respective populations, so that any conflict may arise only among the two (but not within the communities they belong to). Potential conflict may, of course, only over the use of space, the only *contestable* resource.[7] We may have expansion paths that are (defined as) *sustainable* or *unsustainable* with respect to the exploitation of resources, on which the two populations may or may not agree upon. In the same vein of simplifying, we will also allow for two possibilities only (each being by definition an individual's strategy) well fitting our metaphorical single resource: the tourist (the host, respectively) may act in a non cooperative way trying to maximise her own benefits from the use of the common resource, or else she may opt for proposing cooperation on the project of its preservation-cum-valorisation.[8] We may refer to the previous as the *free access* case while the latter is the *private property* case.[9]

---

[5]We leave aside the issues connected with the fact that in general each population would be internally structured in communities.

[6]On the other hand, the non-cooperative one in fact may be represented also as implying a sort of perverse 'cooperation' in the accelerated exploitation of local resources.

[7]In some few cases tourist resources are exclusively used by tourists or else are preserved for residents. But this is not the case with what we defined space-resource.

[8]It is worth noting that the reverse would apply if the parties cooperate in a project of exploitation-cum-deterioration.

[9]The term *private property* has not to be understood in its strict term. This result may well be obtained through a community management regime or a state-controlled resource.

Fig. 7.1 Payoff matrix

		Host	
		C	**NC**
Guest	**C**	a,a	b,c
	NC	c,b	d,d

Let the former strategy be denoted by the symbol NC, the latter by C in the matrix below. With the (NC, NC) outcome we associate a path with the *dreaded* resources exploitation (the player *eating out* space or trying to crowd out the opponent); while the (C, C) outcome is associated with the desired sustainable path. Indeed, the latter combines the minimum level of social conflict with a sustainable exploitation path of resources (Fig. 7.1).

7.4.1 Playing the Game

With tourist's and host's strategies matching (i.e., with (C, C) or (NC, NC)) and it is known ex ante that they will be actually played, the two representative players share the same social norms and preferences even in conflicting uses over the resource. Therefore, an equilibrium emerges where the inter-population conflict is minimised. Of course, with (C, C), the host makes willingly room for the guest, who tries not to be *too* invasive, she is a *soft tourist* who sees *intrinsic* value (possibly, with overflowing benefits) in the preservation of the local cultural and natural, environment. Akin to symbiotic cohabitation of biology, this *cooperative equilibrium* is a Pareto-optimum. It is also *the case* in which sustainable tourism emerges: the resource exploitation path is sustainable with long run social welfare being maximised with minimal conflict costs.

With (NC, NC) prevailing, both players exhibit the same tendency to over-utilisation, which can also be interpreted as an instance of speculative behaviour. Though conflict is minimised, common resources are being unsustainably exploited by mutual consent. Tourism cannot be *sustainable,* with of course lower than maximal social welfare levels.

Off the main diagonal of the payoff matrix, outcomes can be neither a sustainable path nor an equilibrium state: at least one of the players can improve her position by implementing a different strategy, and the state of the game will move towards one of the two equilibrium outcomes.[10]

[10]Which of the latter will eventually prevail, will depend on the preference rankings and the bargaining powers of players, of course. Here imitation mechanisms may play an important role, and their formalization will yield classical equations of evolutionary dynamical systems (see Accinelli et al. 2008).

7.4.2 Meeting Just Once: the One Shot Game as a Parable of the Encounter with an Excursionist

In the simple though classical prisoner's dilemma setting, suppose tourist and resident to have the same preference ordering over the payoffs, i.e., $c \succ a \succ d \succ b$, but each player acts in the *ignorance* of simultaneous, *and past*, decisions of its opponent (technically denominated a *one-shot* game). Although perhaps difficult to imagine, as some ex-ante information is always available, the case helps us to illustrate a point.[11]

As said, simultaneous cooperation is a necessary (albeit, by no means, sufficient) condition for the sustainable use of resources. Thus, for each player the best strategy is defecting in face of cooperation, i.e., play NC against C. As said before, the next result is via (C, C), followed by (NC, NC). Finally, the worst outcome is associated with playing C against NC, because the conflict is at its maximum and, due to the public good and/or common pool nature of the resources involved, sustainable exploitation would be prejudiced. Thus, NC is a dominating strategy whatever the opponent's choice, and both will be playing it, ending up in the lower, non cooperative equilibrium (NC, NC). Moreover, with an eye to reducing the costs of the interaction she is involved in, an agent may decide to alter her own behaviour and even go as far as to change her normative standards (Graefe and Vaske 1987).

In such 'tragedy of commons' type of outcome (after Hardin 1968), both guest and host find it optimal to over-utilise the relevant resource: the host pushing the expansion of tourist related operations at the expense of other, possibly traditional, productive activities and skills; the tourist demanding the full surrender of traditionally community space for its conversion to suit her needs. A Nash equilibrium as this state is, is also self-enforcing: for, there are no intrinsic motivations in the agent's own interests to move away. Individual rationality, indeed, dictates choices that lead to lower welfare levels for both the tourist and the resident. Were they playing empathically the (C, C) pair of strategies, by e.g., accepting to restrict or control their pressure over available space resource, both tourist and resident would find themselves better off.

Eventually, the resident will remain with whatever will be left of that encounter, while the tourist will always have the opportunity to move on to a new destination (she has an exit option) and/or to inform other fellow tourists about that place (she has both an exit *and* an voice option). The resident is, therefore, bound to have a greater tendency to see beyond her immediate interest and to consider a longer time span in her decisions and actions. The policy issue is then how to induce the tourist into a cooperative behaviour for sustainability (for example, by making it more costly to play otherwise).[12]

[11]Outcomes are symbolised in the payoff matrix representing, at any given date, the non-cooperative game setting in strategic form. Symbols in the bi-matrix stand as usual for gains for each player in whatever measure is appropriate.

[12]This does not mean that the residents are always characterized by a long run view (low discount rate) and that the opposite is true for the tourists.

In the one-shot game of the previous type, lacking a system of selective incentives to the effect of e.g., changing payoffs and/or affecting individuals' preferences, one can only end up with the worst possible of all social results. Therefore, a priority policy issue turns out to be precisely to design an adequate system of incentives or other mechanisms able to alter the *structure* of the game favourably for the *right outcome*.

7.4.3 Repeated Encounters

Whenever repeated encounters may take place, the variety of equilibrium outcomes likely to emerge is even greater (as the Folk Theorem confirms, see e.g., Gibbons 1992; Taylor 1987).[13] Repetitiveness by itself generates, for example, also in the simplest prisoner's dilemma setting the possibility of a cooperative equilibrium, the rationale for which, though intuitively obvious, can be spelled out as follows.

In selecting interaction strategies, the tourist (the host, respectively) will take into account the likelihood that her current action be remembered (directly or through accessible information) and, thus, she will anticipate any punishment that might be await her the next round. However, whereas the resident may punish the tourist increasing the level of conflict (i.e., exploiting the tourist and reducing the quality of tourist experience), we have seen that the tourist may punish the resident by exercising her own options. As a result, in the case of a 'hostile' resident, tourist inflows may come to an end or else adverse selection would send in *bad* tourists while crowding out *good* ones (Bimonte and Punzo 2006).

Repeated interaction teaches players to trust (or not to trust) the conditions of their no longer fortuitous encounters. Thus, at times and places, one or the other side (or even both of them) may find an additional incentive to play fair, i.e., cooperatively, when this appears to be a way to induce an analogous behaviour on the one side.

While we have no explanatory theory in a causal sense, we can still look at some likely long run scenarios with the unfolding of such strategic games. For example, a situation may arise where the tourist (or the resident) begins with and sticks to cooperation as long as this is being matched by a similar behaviour of the part of the opponent, to later opt for a selfish, non cooperative behaviour the moment and as long as that opponent defects. In such *Tit for Tat* game setting is relatively simple, the Folk theorem naturally applies: at any one point of time, the tourist as well as the resident will look at the discounted stream of benefits from either strategy, and choose accordingly.

---

[13]See for instance Binmore (1992:373–376). The possibility of repeating the encounter is the first of the three necessary conditions for the emergence of cooperative solutions in non cooperative games, as argued by Axelrod (1984). The second requires that players recognise each other. The third condition requires each player to retain memory of the past opponent's move. Stabilising population within small groups, Axelrod's argument for enhancing the chances of an emerging cooperative solution, still makes sense.

Unfortunately, except for some specific tourism typologies (e.g., residential tourism), repeated encounters take place neither always nor oftentimes. Therefore, one way to promote sustainability is through promoting the repeated encounters between agents, or to act as this were the case. Together with the prescriptions of the property rules approach, this implies to select the side to which allocate the entitlement to the relevant resource. On consideration of the typology of interaction and the nature of the resources tourism flows are attracted by, the entitlement is to be thought to be *de facto* allocated to the hosting community, at least in the mature destinations grown out of an already existing productive structure. Therefore, the whole burden of making a first move is on the local community. The only way the resident has to induce the tourist into cooperating, is to invest in reputation and make it costly for the non cooperative tourist to visit.

7.5 Non-Technical Tools for Sustainable Tourism

The unsustainable use of resources is generally associated with market failures and simple application of traditional economic analysis and instruments is thought to cure them. Much of resource and environmental economics is about devising instruments and policies to promote a more efficient (sustainable) use of the environment.

Very much the same happens in tourism economics. Here, the sustainability issues have been tackled with technical instruments, largely within the framework of the *liability approach* and demand management. Thus, to reduce consumption of energy and resources efforts have focused on sanctions, economic incentives (taxes or subsidies), management regimes (see, for example, Bramwell 2003), and technological innovations, while legal prohibitions would ban tourism when need arose to safeguard local culture.

Though needless to say useful in general, such batch of technical tools falls short of some specific themes that need to be dealt. One of the important issues, for instance, is associated with the relevance of qualitative dimensions in many aspects, which forces us to design management techniques to select the ‘right’ tourists and to influence their behaviours, rather than looking for a number to answer the dry question ‘how many are too many’ (Bimonte and Punzo 2006).

Likewise, in almost all cases, impacts need to be analyzed in terms of qualitative rather than quantitative changes that are generated, but the ‘impacting’ sources (the tourists themselves) are neither well-defined nor as homogeneous as are the natural ones. Selecting and separating sources according to their behavioural patterns or modifying their behaviour or perception of the problems, could be an enduring and costly process entailing modification of reference values, a huge amount of (hidden) information to be gathered, and, finally, it demands a widespread, enforceable territorial control. Traditional technical instruments are not only inadequate to the task, they also raise issues of equity (exclusion based on census) and/or of resources efficient allocation (numeric quota systems).

Since tourism development may be supply-led and/or demand-driven, the definition of shared rules and the adjustment of the supply side to those rules become effective tools. Provision of facilities and services conforming to agreed norms may also contribute to stimulating and selecting a coherent tourist demand. Restructuring and adaptation of the supply side to the body of shared norms would, in fact, trigger processes of auto-selection of tourists and activities.[14] In order to achieve such results, a brave choice in fundamental policies is required, together with a significant cultural and organizational leap. Technical tools may help at the very beginning, but they have to aim to generate a modification in reference values, the real ultimate objective.

Thus, a consensus is growing that an understanding of communities is needed and non-technical policies have to be developed to define a correct sustainability policy scheme.[15]

To such an end, participation has to be interpreted in a broad sense. It involves a clear allocation of entitlements to the local community, which means the active involvement of locals in tourism planning and development. But, more than anything, it requires participation in the identification process (of choices), access to information, and participation in the allocation of the wealth produced (equitable development): a broader meaning than envisaged by the Local Agendas 21 programme. An inclusive process of development prevents conflicts and aids the change in the preferences of individuals that is necessary in order to modify lifestyles and choices, i.e., to shift social preferences away from private toward public goods.

Shared rules, improvement in the conditions of poverty and better distribution of monetary benefits and of entitlements all represent necessary conditions for sustainability (Bimonte 2006).

7.6 Concluding Remarks

In repeated games, players have to be recognisable to each other and this is the key to their cooperation. It is such condition that is amiss in general when the players are the tourist and the resident. Cooperative solutions are therefore hard to emerge for ‘structural reasons’, and thus policies for sustainability in tourism have to promote structural changes of a kind. They have to aim at altering inter-temporal preferences and/or time horizons of the two sides, and encouraging their convergence, force all players to internalize the future effects of their current interaction. Developing policies for increasing direct and/or indirect fidelization; reinforcing

[14]That is a kind of qualitative Law of Say, i.e., a system in which the supply would spontaneously create its own demand.

[15]According to Hardin, “a technical solution may be defined as one that requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality” (Hardin 1968). Coherently, a non-technical solution occurs only when it generates changes in human values or beliefs.

the cohesion of communities; building a set of efficient and efficacious tools to expel free riding behaviours is the way to push into this direction.

A policy agenda for sustainable tourism has, however, to look also at the intra-community effects, hence at the (dis)equilibrium within the host (or guest) population. The persistence of cooperative equilibrium within an isolated population explains both the emergence of social shared norms as well as the environment-production equilibrium characterising generally traditional communities (see e.g., Henrich and Boyd 2001). Tourism brings about a structural change by changing the rules of the game and admitting new players to the green cloth.

The interaction with an often anonymous visitor breaks down long established norms together with the social homogeneity that had been reached in the past. We know that internally less homogeneous communities have a lower capacity of reaching cohesion about a common project and therefore tend to produce less of public goods, and/or find it more difficult to manage common resources (Alesina and La Ferrara 2000; Esteban and Ray 1999). Some of those resources are indispensable ingredients of virtually all tourist products.

Game theory reminds us that a great care for enhancing and preserving social inclusion and cohesion whenever it exists, and for promoting or restoring them wherever it does not, rightly belong to the agenda for a tourism sustainability policy.[16]

References

Accinelli E, Carrera E, Punzo LF (2008) Emergence of long run behaviours in a game theoretic setting with host and guest populations: residents and tourists. Papeles Poblac 58(14):166–179

Alesina A, La Ferrara E (2000) Participation in heterogeneous communities. Q J Econ 115:847–904

Ap J (1990) Residents' perceptions research on the social impacts of tourism. Ann Tourism Res 17(4):610–616

Ap J (1992) Residents' perceptions on tourism impacts. Ann Tourism Res 19(4):665–690

Axelrod R (1984) The evolution of cooperation. Basic Books, New York

Bimonte S (2006) Sustainable tourism and management tools. In: Brebbia CA, Pineda FD (eds) Sustainable tourism II. WIT press, Southampton, pp 325–334

Bimonte S (2008a) The "tragedy of tourism resources" as the outcome of a strategic game A new analytical framework. Ecol Econ 67:457–464

Bimonte S (2008b) Park visitors vs beach tourists: a comparative study in an Italian coastal region. Eur J Tourism Res 1(2):112–127

Bimonte S, Pratelli T (2007a) Turismo e turisti a Follonica. In: Punzo LF, Usai S (eds) Un'estate al mare. Residenti e turisti in alcune destinazioni italiane. MacGraw Hill, New York

Bimonte S, Pratelli T (2007b) Cittadini di una città moderna. In: Punzo LF, Usai S (eds) Un'estate al mare. Residenti e turisti in alcune destinazioni italiane. MacGraw Hill, New York

Bimonte S, Punzo LF (2006) The evolutionary game between tourist and resident populations and tourist carrying capacity. Int J Technol Global 3(1):73–87

Binmore K (1992) Fun and games. DC Heath and Company, Lexington

Bramwell B (2003) Selecting policy instruments for sustainable tourism. In: Theobald WF (ed) Global tourism. Butterworth Heinemann, Oxford, pp 361–379

[16]See "Agenda for a more sustainable and competitive European Tourism", COMM(2007)621, European Commission 2007.

Butler RW (1974) Social implications of tourism development. Ann Tourism Res 1974:100–111
Coase R (1960) The problem of social cost. J Law Econ 3:1–44
Cohen E (1988) Authenticity and commoditization in tourism. Ann Tourism Res 15:371–386
Cooper C, Fletcher J, Gilbert D, Wanhill S (1993) Tourism: principles and practice. Pitman Publishing, London
De Kadt E (1977) Tourism: passport to development? World Bank-Unesco Study. Oxford University Press, New York
Doxey GV (1975) A causation theory of visitor-resident irritants: methodology and research inferences. In: Proceedings of the travel research association, 6th annual conference, San Diego, pp 195–198
Esteban J, Ray D (1999) Conflict and distribution. J Econ Theory 87:379–415
European Commission (2007) Agenda for a more sustainable and competitive European tourism, COMM(2007)621, Brussels
Font X (1995) Community-driven tourism in heritage destinations: marketing planning and management implications. University of Surrey, Guildford
Gibbons R (1992) A primer on game theory. Harvester Wheatsheaf, Hemel Hempstead
Graburn NHH, Jafari J (1991) Introduction: tourism social science. Ann Tourism Res 18:1–11
Graefe AR, Vaske JJ (1987) A framework for managing quality in the tourist experience. Ann Tourism Res 14:390–404
Hardin G (1968) The tragedy of the commons. Science 162:1243–1248
Hardy AL, Beeton RJS, Pearson L (2002) Sustainable tourism: an overview of the concept and its position in relation to conceptualizations of tourism. J Sustain Tourism 10(6):475–496
Henrich J, Boyd R (2001) Why people punish defectors: weak conformist transmission can stabilize costly enforcement of norms in cooperative dilemmas. J Theor Biol 208:79–89
Huang Y, Stewart WP (1996) Rural tourism development: shifting basis of community solidarity. J Trav Res 36(4):26–31
Liu JC, Var T (1986) Resident attitudes toward tourism impacts in Hawaii. Ann Tourism Res 13(2):193–214
Mathieson A, Wall G (1982) Tourism: economic physical and social impacts. Longman, Harlow
Olson M (1965) The logic of collective action: public goods and the theory of groups. Harvard University Press, Cambridge
Punzo FL (2004) Sustentabilidad del turismo y desarrollo económico local: El caso de la región Toscana. Rev Econ 13(4):32–50
Robinson M (2000) Collaboration and cultural consent: refocusing sustainable tourism. In: Bramwell B, Lane B (eds) Tourism collaboration and partnerships: politics, practice and sustainability. Channel View Publications, Clevedon, pp 295–313
Sinclair MT (1991) The economics of tourism. Progr Tourism Recreat Hospit Manag 3:1–27
Smith VL (1989) Hosts and guests: the anthropology of tourism. University of Pennsylvania Press, Pennsylvania
Snaith T, Haley AJ (1994) Tourism's impact on host lifestyle realities. In: Season AV (ed) Tourism, the state of the art. Wiley, Chichester
Taylor M (1987) The possibility of cooperation. Cambridge University Press, Cambridge

Part III
Growth Impact Analysis

Chapter 8
Migration and Tourist Flows

Masood Gheasi, Peter Nijkamp, and Piet Rietveld

8.1 Introduction

Both immigration and tourism have increased significantly in recent decades. International migration in the world has increased from 154 million per year in 1990 to 175 million in 2000 (United Nation 2002). A common perception is that most migrants are moving from poor countries to rich countries, but in reality half of the migrations take place within the developing countries. One cause of this growth is the globalization process that enhanced mobility and improved accessibility to different places (Poot et al. 2008). In comparison, the growth in tourism was even stronger with 700 million worldwide tourist trips in 2000 as compared to 25 million in 1950 (Fischer 2007). The globalization process and the related tourism together spread further the information regarding economic prospects and tend to encourage people to move to places where they can find better economic opportunities. For example: prosperous places like London and Paris attract vast numbers of tourists, while some of these tourists become subsequently temporary or permanent migrants in the host country. So, tourism encourages migration. Conversely, migrants travel back to their home countries for short visits and their friends and relatives visit them in the host country. Therefore, migration boosts tourism. Thus, migration and tourism tend to become mutually interacting geographic phenomena whose importance is rapidly growing. Migration-related tourism seems to become an important segment of global tourism.

The visiting friends and relatives (VFR) market needs to be understood from a wider perspective of immigration and consumer trends. This can help us to figure out the size and importance of this subject and also forms the reason for further applied research. This can be illustrated by some UK figures. In the UK both the emigration of UK residents to abroad and the immigration of other countries'

M. Gheasi (✉) • P. Nijkamp • P. Rietveld
Department of Spatial Economics, VU University Amsterdam, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands
e-mail: mgheasi@feweb.vu.nl; p.nijkamp@vu.nl; prietveld@feweb.vu.nl

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_8,

Table 8.1 Inflow, outflow and balance of migration in the UK

Year	Inflow (000)	Outflow (000)	Balance (000)
2001	479	306	+173
2002	513	358	+154
2003	508	361	+147
2004	586	342	+244
2005	563	359	+204
2006	591	400	+191

Source: ONS: International migration

Table 8.2 The UK related VFR visits, duration and expenditure

Year	Total VFR visits (000)	Total nights (000)	Total expenditure (million £)
Inflows			
2001	5,898	65,183	2,273
2002	6,398	70,806	2,514
2003	6,978	76,439	2,643
2004	7,861	86,717	3,026
2005	8,687	94,393	3,218
2006	9,406	102,169	3,562
Outflows			
2001	7,727	115,566	2,512
2002	7,870	121,947	2,741
2003	8,527	124,747	2,910
2004	9,799	146,297	3,413
2005	10,648	161,049	3,748
2006	11,963	175,923	4,286

Source: Author's calculation based on ONS data

residents to the UK had an upward trend from 2001 to 2006. Table 8.1 shows the inflow, outflow and balance of immigration from 2001 to 2006.

The percentage of foreign residence in the UK as a percentage of total population increased from 4.0 in 2000 to 6.5 in 2007 (ONS: Population Trends 2007), given the UK a net gain of 2.5% in just over 7 years. As there is a very close relationship between immigration and VFR tourism, inbound and outbound VFR tourism has increased significantly during the same period in the UK. Table 8.2 demonstrates the inflows and outflows of VFR visits.

The UK Office for National Statistics (ONS) in its series of 'Travel Trends' publications indicated that the number of VFR visits accounted 19% of all visits to the UK in 1996, but in 2006 VFR visits accounted 29% of all visits to the UK (Travel Trends 2006).

The UK is one of few countries with a rather rich data system on tourism and migration. This chapter studies the relationship between migration and VFR inbound and outbound tourism to and from the UK. Furthermore, it tries to answer the question whether demographic characteristics have an influence on VFR tourism to and from the UK. It is not easy to analyze this question, because the stock of the UK residents overseas is expected to increase the outbound tourism, while at the same time people who originated in the UK and who live in the countries being studied tend to return to their country of origin for short visits. This has also an impact on the flow of visitors to the UK. A panel from 2001 to 2006 with a cross section of 24 countries is used for the inbound flows and 18 countries are used for the outbound flows to study whether an increase in the number of immigrants from a particular country increases the number of VFR visits from that source to the UK and vice versa.

This chapter is organized as follows: Sect. 8.2 offers some definitions and a literature review on various studies that explore the relationship between migration and tourism and in particular visiting friends and relatives (VFR). Section 8.3 describes next the methodology and data used. In Sect. 8.4, we present the results and their policy implications, and, last but not least, Sect. 8.5 presents the conclusions.

8.2 Literature Review

Migration and tourism have been studied independently of one another up to the second half of the twentieth century (Bell and Ward 2000). This lack of attention to the interrelationships between migration and tourism may be due to the lack of appropriate data and the absence of a solid theoretical framework. The interrelationships between immigration and tourism are complicated and intertwined. The difficulty comes from the core of these two subjects since there is no unambiguous definition for both migration and tourism (Hall and Williams 2000). Migration is defined spatially "as movement across the boundary of an areal unit" (Boyle et al. 1998:34), and "it is generally agreed that there will be some permanence to a move described as migration" (Boyle et al. 1998:35). This definition, however, describes some characteristics of migration, but it does not provide a clear-cut definition, since it does neither cover internal migration which happens inside the areal unit nor temporary migration.[1] Meanwhile, the World Tourism Organization defines tourism as "all travel away from home which involves a stay of at least one night but not more than one year".

The above statement represents a lack of a resilient and transferable definition of tourism and migration. The absence of an operational definition may be due to the complicated and intertwined behavioral natures of both tourism and migration. However, the recent literature which studies the relationship between migration and tourism suggests a new conceptual nexus which exists between these two subjects in both theoretical and empirical studies (Boyne et al. 2002). Hall and Williams (2000) divide tourism – related migration into different migration flows:

- Production-led migration: this is also called labor migration which is generated by the tourist service.

[1]For more discussion on the definition of migration and tourism we refer to Hall and Williams (2000).

- Consumption-led migration: this includes second-home owners, seasonal migration, and permanent migration.

Based on the above two categories of migration flows, Hall and Williams (2000) present five categories of interrelationships between tourism and migration: tourism and labor migration, tourism and return migration, tourism and entrepreneurial migration, tourism and retirement, and second-home owners. Some of these five categories of tourism and migration presented by Hall and Williams (2000) have been studied more extensively; there are plenty of publications, for example, on retirement migration (Murphy 1981; Hall 1990; King et al. 1998, 2000; Rodriguez 2001; Haug et al. 2007; Oliver 2007), on second-home owners (Haldrup 2002; Hall and Muller 2004; Williams et al. 2004; Dijst et al. 2005), on tourism and labor migration (Lundmark 2006), and related to immigration and international tourism on the import demand for consumer goods (Fischer 2007).

The above conceptualization explores mainly tourism related to migration; this subject is predominantly present in VFR tourism. Boyne et al. (2002) identify this domain as migration-related tourism. This kind of tourism is a result of geographical expansion of family and friends' networks (capital relationship). The internationalization of different forms of migration induces families and friends to maintain contact with each other. The result is a growing body of research on VFR tourism. There is a host of literature on travels with the purpose of VFR (Dwyer et al. 1993; King 1994; Cohen and Harris 1998; Morrison et al. 1995; Poel et al. 2004). Some studies like McCann et al. (2009) investigated both theoretically and empirically the psychological cost of being away from friends and relatives. They indicated theoretically that the optimized travel frequency is inversely related to distance and transportation cost, and positively related to psychological cost. Dwyer et al. (1993) found that a 10% increase in migration in Australia will lead to an increase in the arrival of VFR tourists of 5.5%. They also suggested that immigration does not have an impact on other types of tourism. Seetaram (2008) found that the effect of immigration on tourism demand in Australia is relatively higher than that of growth in trade flows and population growth.

The interrelationship between migration and VFR tourism in the UK is an underdeveloped area in the field of tourism economics. A small number of studies has looked into some aspects of VFR tourism; for instance, Hay (1996) on domestic VFR tourism. Seaton and Palmer (1997) empirically illustrated a number of features for domestic VFR tourism in the UK and they also noted from the 5 years of the UK Tourism Survey that the VFR was heavily biased toward young, single people or, if older, couples with children under the age of 15 years. Cohen and Harris (1998) studied mainly VFR trips domestically. Their aim was to show the people's choice in selecting the mode of transportation between private and public modes. The Civil Aviation Authority (CAA) of the UK (2009) very recently studied the international VFR tourism. The CAA study finds that there is not a strong relationship between UK GDP and VFR trips; however, it shows that there is a link between UK GDP and migration.

Our study is different from the above-mentioned VFR studies in the UK, in particular, from the recent CAA study. Firstly, we have taken into account general VFR inbound and outbound flows without any particular indication of the mode of transportation, while this is not the case in the CAA study. Secondly, our study aims to reveal the relationship between migration and VFR tourism from both a migration and tourism perspective. This study aims to answer also the question whether migration has an impact on the duration of VFR visits, total VFR visits and total number of visits.

8.3 Data and Methodology

8.3.1 Introductory Remarks

A gravity model of trade will be used in estimating the relationship between immigration and international tourism to and from the UK. Tourism is essentially a form of international trade. The gravity model of international trade was developed by Tinbergen (1962) and Poyhonen (1963). This model takes into account that the amount of trade between two countries assumed to be increasing in their sizes (measured by their national incomes) and decreases in cost of transportation between them (measured by distance).

The present study covers inbound and outbound VFR tourism between the UK and various countries,[2] for which detailed and consistent annual data on VFR visits, stock of immigrants, population and GDP per capita are available for the period of 2001–2006. Consequently, we have in our database 6 time periods and 24 cross-sectional units for inbound. However, for the outbound tourism from the UK due to lack of data on the stock of UK immigrants the number of cross-section decreases to 18 cross-sectional units.

We will use a regression analysis to analyze the relationship VFR-migration. The models are estimated for VFR visits, duration of VFR trips and total number of visits. Annual data on VFR visits, VFR duration and total number of visits stem from the UK Office for National Statistics (ONS). International Passenger Survey (IPS) defines a visit as "those entering or leaving the United Kingdom more than once in the same period are counted on each visit. The count of visits relate to UK residents returning to this country and to overseas residents leaving it" (Travel Trends: Appendix C, 2001:195). This survey refers to number of visit not the number of visitors and they excluded people migrating (to or from the UK) or travelling as crew of aircraft, ships or trains from analyses. Table 8.3 shows the description of variables used in this empirical study.

The data have been collected from the series of Travel and Trends publications. This publication contains the main findings from the International Passenger Surveys (IPS) which collects information from the passengers to and from the UK. There are

[2]Most of these countries are OECD countries.

Table 8.3 Dependent and independent variables in the study

Dependent variables	
VFRv	Total number of friends and relatives visits (in thousands per year) to and from the UK
VFRd	The duration of visiting friends and relatives in thousands of nights per year
Tvisits	The total number of visits (in thousands per year) by nationality to and from the UK
Independent variables	
Migrant stock	The number of migrants (in thousands) from various countries living in the UK and the number of the UK residents living in these countries. The expected sign for this variable is > 0
Population	The total population (in thousands) of countries (base year = 2000). The expected sign for this variable is > 0
GDP/capita	Gross domestic product per capita in 1,000US$ (base year = 2000). The expected sign for this variable is > 0
Dis	Distance is measured in kilometers, between the UK capital and the capital of home country. The expected sign for this variable is < 0, but for duration per visit the expected sign is > 0
λ_t	Time dummy (2001–2006). 2001 is the base year for inbound and outbound models
Γ_i	Cross-section dummy for each country. Sweden is the reference country for inbound and outbound models

also specific data on the nationality of visitors who visited the UK. Besides, our study contains also data from other reliable sources, such as the Organization for Economic Co-operation and Development (OECD) database on the stock of immigrants and the World Bank database for GDP per capita, on total population of observed countries. Data on number of visitors to the UK were readily available from ONS. Finally, the stock of immigrants rather than immigrant flows is used in this empirical study, as it is plausible that the effect of immigration on VFR tourism is more prominent for those who immigrated before (stock of immigrants) than for the flow of immigrants.

8.3.2 Regression Model Specification

This study uses an OLS regression model (with and without dummy variables) with the variables as indicated in Table 8.3. These variables are used to estimate the effect of immigrant's links to VFR tourism. Gujarati (2003) indicates that the use of a panel methodology has advantages, as it uses more informative data and it accounts for unmeasured time-invariant determinants. Our balanced pooled panel (a pooling of times series and cross-sectional data) is estimated for 24 countries for inbound flows and 18 countries for outbound flows over 6 years from 2001 to 2006. The regression estimation is applied to gravity for tourism to and from the UK.

We have first formulated an OLS regression equation without time and country-specific dummies, because dummy (fixed-effect) variables preclude the use of variables that do not vary over time (e.g., distance). Secondly, we used a dummy variable technique to test jointly time and cross-sectional effects. The equation for the OLS regression is the following:

$$\log(Y_{it}) = \beta_0 + \beta_1 \log(stock_{it}) + \beta_2 \log(pop_{it}) + \beta_3 \log\,(GDP/capita)_{it} + \beta_4 \log(dis_i) + \mu_{it} \quad (8.1)$$

where i refers to the origin country in the inbound flows and to the UK itself in the outbound flows. Y_{it} may have different meanings (as indicated in Table 8.3); $stock_{\mathrm{it}}$ is the immigration variable measured by the stock of immigrants from country i at time t, while (GDP/capita) it and pop_{it} are GDP per capita and population of country i at time t. In these ((GDP/capita) it and pop_{it}) variables i[3] refers to the origin country in inbound flows and to the destination country in outbound flows. Dis_i is the distance in thousands of kilometers between the UK and the relevant countries.

Next we take advantage of the panel data and estimate the model with fixed effects for country and time effects. The distance variable is omitted from the model for the reason indicated above. The regression equation including time effect and cross-section effect can be written as:

$$\log(Y_{it}) = \lambda_0 + \lambda_t + \Gamma_i + \beta_1 \log(stock_{it}) + \beta_2 \log(pop_{it}) + \beta_3 \log\,(GDP/capita)_{it} + \mu_{it} \quad (8.2)$$

where λ_t is a time-dummy and Γ_i is a cross-section-dummy. They are used to capture the time-effect and cross-section effect; all other variables are previously defined. The model is next regressed by using different dependent variables (see Table 8.3), while each model has immigration as an explanatory variable along with other explanatory variables that economic theory suggests as driving forces.

8.4 Model Results and Discussion

8.4.1 Results for VFR Visits

Our regression analysis uses two regression models. These refer to (8.1) and (8.2) respectively. The regression results[4] for the VFR visits show that the models explain 69 and 95% of the variation in the dependent variable for the inbound flows, respectively. These results are slightly higher for the outbound flows with

[3]We do not use the UK population and GDP/capita in the outbound flows, because these variables remain constant across countries in our panel data (pooling of times series and cross-sectional). Therefore it is not possible to measure their coefficients in the fixed effect.

[4]See Appendix 1 for inbound and Appendix 2 for outbound flows for the second equation results.

Table 8.4 Regression results for VFR visits

	Inbound		Outbound	
	Regression result			
Variables	Coefficient	T-statistic	Coefficient	T-statistic
Constant	−0.928	−0.96	1.943	1.43
Pop	0.221	4.19*	0.133	1.72***
Migrant stock	0.688	13.33*	0.459	8.43*
GDP/capita	0.320	6.17*	0.292	3.51*
Distance	−0.258	−6.79*	−0.370	−6.81*
	R-square: 0.69 Obs. 131 W-test Prob > F = 0.558		R-square: 0.73 Obs. 99 W-test Prob > F = 0.271	
	Regression result with time and country effects			
Constant	4.248	0.96	2.791	1.42
Pop	0.011	0.10	0.098	0.83
Migrant stock	0.368	2.88**	0.370	3.28*
GDP/capita	−0.161	−0.38	0.005	0.05
Time effect	Yes		Yes	
Country effect	Yes		Yes	
	R-square: 0.95 Obs. 131 W-test Prob > F = 0.638		R-square: 0.98 Obs. 99 W-test Prob > F = 0.498	

*Significant at 1%
**Significant at 5%
***Significant at 10%

73 and 98% respectively. In addition, our chapter uses the Wooldridge test to see whether there is serial correlation in the regression. The Wooldridge test shown at the bottom of each regression model is higher than the test level $\alpha = 0.05$ for each model, and therefore the results reject the presence of serial correlation. Table 8.4 represents a summary of the empirical results for the inbound and outbound VFR visits.

The estimated coefficients have the expected signs in the first equation. The stock of immigrant is positively related to VFR visits and is highly significant at 1% in the first equation for both inbound and outbound flows. This indicates that as the stock of immigrants increases at 1%, the UK experiences a 0.69% increase in VFR tourist flows while the outbound flows of VFR from the UK increases at 0.46%, respectively. Meanwhile, the migrant stock is also significant at 5 and 1% and positively related to the dependent variable in the lower part of Table 8.4[5] for both inbound and outbound flow of tourists, respectively. This confirms the robustness of our result in the link between migration and VFR flows.[6]

[5]Adding dummy variables decreased degree of freedom and captured all other effects in the second equation. Therefore, GDP/capita and population are statistically insignificant in both directions.

[6]The low outcomes for this elasticity in the second estimation means that part of the effect of migrant stock is already incorporated in the country dummy coefficients.

Population is also significant at a 1 and 10% level in the first equation inbound and outbound VFR flows, respectively. It is positively related to the dependent variable. GDP per capita is significant at 1% level in the first equation for both inbound and outbound VFR flows. It indicates that with 1% increase in GDP/capita of original country, the UK receives 0.32% increase in VFR visits. The result for outbound VFR flows indicates that as GDP/capita of destination countries increases by 1% the UK residents' VFR visits increases by 0.29%. This result confirms the previous empirical findings that income is an important determinant of tourism. Meanwhile, the CAA (2009) report also finds that GDP/capita is significant and positively related to inbound and outbound VFR visits.

The geographical distance between the UK and respective countries, reduces both inbound and outbound VFR flows. Distance is significant at a 1% level in the first equation in both directions of VFR visits. The regression indicates that an increase in distance by 1% will decrease the inbound VFR visits by 0.26% and outbound VFR visits by 0.37%, respectively. The higher value of the distance parameter for the outbound VFR visits suggests that the UK residents tend to travel shorter distances than their counterparts.

8.4.2 Results for the Duration of VFR

The regression results[7] for the duration of VFR visits show that 65 and 92% of the variation in the dependent variable for the inbound is explained by our regression estimates. These results are higher for the outbound flows with 75 and 95% respectively. The Wooldridge test shown at the bottom of each regression model is higher than the test level $\alpha = 0.05$ for each model, and therefore we may reject the hypothesis of serial correlation.

The estimated coefficients have the expected signs in the first equation. Distance is positively related to the dependent variable as it was expected in both inbound and outbound duration of VFR visits. However, this variable is not significant for the outbound duration of VFR visits. The explanation is that the total duration of VFR trips is the product of the total number of VFR trips and the duration per trip; when distances are longer, the duration of the trips is also longer, and this compensates for the smaller number of trips. Moreover, in the inbound duration of VFR visit we can see from the cross-section coefficient that countries like Australia, Canada and USA which have long distance with the UK have high coefficients and they are statistically significant at 1%. Table 8.5 offers a summary of models for inbound and outbound flows related to VFR duration.

The regression result for the stock of migrants is significant at a 1% level in both inbound and outbound duration of VFR visits in the first equation, respectively. The results indicate that a 1% increase in the stock of migration increases the inbound duration of VFR by 0.80% and outbound VFR duration by 0.44%, respectively.

[7]See Appendix 1 for inbound and Appendix 2 for outbound flows for the second equation results.

Table 8.5 Regression results for duration of VFR visits

	Inbound		Outbound	
	Regression result			
Variables	Coefficient	T-statistic	Coefficient	T-statistic
Constant	−0.241	−0.19	0.519	0.36
Pop	0.207	3.82*	0.215	2.90**
Migrant stock	0.795	13.30*	0.435	7.87*
GDP/capita	0.166	2.48***	0.317	3.44*
Distance	0.124	2.91*	0.017	0.32
	R-square: 0.65		R-square: 0.75	
	Obs. 131		Obs. 99	
	W-test Prob > F = 0.723		W-test Prob > F = 0.084	
	Regression result with time and country effects			
Constant	6.336	1.08	1.938	0.51
Pop	−0.069	−0.44	0.258	1.13
Migrant stock	0.429	2.33***	0.261	1.19
GDP/capita	−0.201	−0.33	0.207	1.09
Time effect	Yes		Yes	
Country effect	Yes		Yes	
	R-square: 0.92		R-square : 0.95	
	Obs. 131		Obs. 99	
	W-test Prob > F = 0.470		W-test Prob > F = 0.109	

*Significant at 1%
**Significant at 5%
***Significant at 10%

Meanwhile, there is a positive relationship between population and GDP/capita with the duration of visits. They are both positively related to the dependent variable and they are significant. This shows that increase in population and GDP/capita tends to positively affect the duration of VFR visits.

8.4.3 *Results for Total Number of Visits*

Table 8.6 presents results[8] for the total number of visits, entering and leaving the UK, thus including VFR as one of the components. The share of VFR in the total number of inbound flows from 2001 to 2006 is 27.9% and for outbound flows it is 14.9%. The regression shows that 70 and 92% of the variation in the dependent variable for the inbound flows is explained by our models and for the outbound flows it is 39 and 98%, respectively. The Wooldridge test is higher than the (0.05) significance level for all models, and therefore we may again reject the serial correlation.

[8]See Appendix 1 for inbound and Appendix 2 for outbound flows for the second equation results.

Table 8.6 Regression results for total number of visits

	Inbound		Outbound	
	Regression result			
Variables	Coefficient	T-statistic	Coefficient	T-statistic
Constant	−2.546	−2.31***	5.981	2.66**
Pop	0.294	5.76*	0.093	0.73
Migrant stock	0.658	11.77*	0.460	4.62*
GDP/capita	0.534	8.90*	0.192	1.35
Distance	−0.254	−6.74*	−0.799	−5.17*
	R-square: 0.70		R-square: 0.39	
	Obs. 136		Obs. 99	
	W-test Prob > F = 0.305		W-test Prob > F = 0.060	
	Regression result with time and country effects			
Constant	7.975	1.39	5.906	4.59*
Pop	−0.023	−0.16	−0.013	−0.17
Migrant stock	0.300	2.08***	0.069	0.93
GDP/capita	−0.362	−0.65	−0.041	−0.64
Time effect	Yes		Yes	
Country effect	Yes		Yes	
	R-square: 0.92		R-square: 0.98	
	Obs. 136		Obs. 99	
	W-test Prob > F = 0.324		W-test Prob > F = 0.162	

*Significant at 1%
**Significant at 5%
***Significant at 10%

All variables in the first equation appear to have the expected signs for the parameters in both directions of flows. The stock of migrants is significant at a 1% level in the first equation in inbound and outbound flow of visits, respectively. These results means that if the stocks of migrants rise by 1%, short-term inflows will increase by 0.66% and outflow increases by 0.46%, respectively. The stock of migrants in the second equation in inbound flows became smaller. This is similar to the case in Table 8.4 we find that part of the effect of migrant stock may be incorporated in the country dummy coefficients. This result confirms that immigration is a crucial determinant of short visits in both inbound and outbound trips. Meanwhile, the population has a positive sign and is also significant at a 1% in the inbound flows, indicating that ceteris paribus higher values for this variable imply a higher probability of short term visits from original countries to the UK.

The estimated coefficient for the distance is significant at a 1% and this indicates that a 1% increase in distance decreases the inbound short term visits by 0.25%. The impact of distance for the outbound of short-term visits is higher compared to the inbound visits. The coefficient indicates that a 1% increase in distance decreases the outflow of short-term visits by 0.64%. Meanwhile GDP per capita is significant in the first equation in inbound. This means that an increase in

GDP per capita of origin countries, ceteris paribus increases the inbound flows of short visits.

The cross-section effect shows that the UK residents tend not to travel a lot to Scandinavian countries, because the coefficient of Finland and Denmark has negative sign and Norway is statistically not significant.

The comparison between the regression result from VFR visits and the total number of visits shows that the migrant stock is significant and positively related to the dependent variables. In addition, the distance is also significant and negatively related to the dependent variables.

8.5 Conclusion

In this chapter we have analyzed the relationship between VFR visits and migration by using panel data from the UK. The aim of this chapter was to answer the question whether immigration has an impact on the increase of VFR tourism (inbound and outbound) to and from the UK. The regression supports the hypothesis that there is a strong relationship between stock of migrants and VFR tourism. Our results confirm the findings from previous studies (Dwyer et al. 1993; Seetaram 2008; CAA 2009) which have also shown that there is a clear relationship between migration and VFR tourism. The empirical result from the present chapter shows that as the stock of immigrants increase from a certain country ceteris paribus the number of VFR visits from that particular country rises. The regression also points out that GDP per capita, which determines the ability to travel, has a positive impact on VFR visits. Next, the distance is, as expected, negatively related to VFR visits and the total number of visits and positively related to the duration of VFR visits.

This chapter has presented part of the broad relationship between migration and tourism. There are many other interesting topics such as those presented by Williams and Hall (2002) that need further research. One of the primary challenges in studying empirically the relationship between tourism and migration is the lack of an extensive consistent database on these two subjects. Very few studies have focused empirically on the link between migration and international tourism. This prompts significant challenges in empirical studies. Another big challenge is of course building a database. There are unfortunately, only a few countries which traditionally focus on producing data on foreign residents. This refers to a person born abroad and who retained the nationality of their country of origin, but it should also address the second and the third generations born in the host country, like European Union members. Some other countries like Australia, Canada and the US, focus on producing data on foreign-born population which refers to the first-generation migrants, and may consist of both foreign and national citizens. This difference in collection of data can produce different numbers and certainly has consequences for empirical results.

Acknowledgement The authors wish to thank Thomas de Graaff, Jacques Poot and Ferdinand Paraguas for their invaluable comments.

Appendix 1: Complete Report of (8.2) for Inbound Flows[9]

	VFR visit	Duration of VFR	Total visit
Constant	4.248 (0.96)	6.834 (1.08)	7.975 (1.39)
Pop	0.011 (0.10)	−0.069 (−0.44)	−0.023 (−0.16)
Migrant stock	0.368 (2.88)**	0.429 (2.33)***	0.300 (2.08)***
GDP/capita	−0.161 (−0.38)	−0.201 (−0.33)	−0.362 (−0.65)
Dum02	−0.115 (−1.12)	−0.204 (−1.37)	−0.083 (−0.63)
Dum03	0.170 (1.09)	0.122 (0.55)	0.252 (1.27)
Dum04	0.260 (1.29)	0.237 (0.82)	0.398 (1.55)
Dum05	0.335 (1.47)	0.282 (0.86)	0.529 (1.81)***
Dum06	0.425 (1.71)***	0.373 (1.04)	0.607 (1.89)***
Australia	−0.161 (−0.38)	2.618 (7.84)*	0.784 (2.56)***
Belgium	1.274 (5.49)*	1.181 (3.37)*	1.350 (4.43)*
Canada	1.195 (4.91)*	2.751 (6.81)*	1.042 (2.84)**
China	−0.559 (−0.39)	1.544 (0.74)	−1.364 (−0.74)
Denmark	0.958 (2.98)*	1.355 (2.93)*	1.044 (2.70)**
Finland	0.109 (0.23)	0.757 (1.12)	0.253 (0.46)
France	2.141 (8.60)*	2.432 (6.78)*	2.221 (6.73)*
Germany	2.002 (6.66)*	2.526 (5.84)*	2.155 (5.41)*
Greece	0.450 (1.16)	1.280 (2.29)***	−0.067 (−0.13)
India	0.152 (0.09)	2.143 (0.83)	−0.731 (−0.32)
Ireland	2.305 (8.47)*	2.293 (5.85)*	2.316 (6.84)*
Italy	0.886 (3.04)*	1.551 (3.70)*	1.248 (3.24)*
Japan	−0.057 (−0.11)	1.028 (1.34)	0.659 (0.99)
Luxembourg	−1.362 (−0.80)	−1.369 (−0.56)	−3.712 (−1.66)***
Netherlands	1.689 (7.91)*	1.859 (6.05)*	1.804 (6.53)*
New Zealand	−0.149 (−0.50)	1.701 (3.94)*	−0.603 (−1.53)
Pakistan	0.418 (0.24)	2.658 (1.06)	−1.191 (−0.53)
Poland	0.831 (1.10)	1.768 (1.62)	−0.124 (−0.13)
Portugal	−0.668 (−1.68)***	0.133 (0.23)	−0.821 (−1.59)
South Africa	−0.054 (−0.06)	1.571 (1.14)	−0.296 (−0.24)
Spain	1.392 (4.30)*	2.210 (4.74)*	0.905 (2.14)***
Turkey	−0.320 (−0.38)	1.223 (1.00)	0.931 (0.84)
USA	2.174 (5.10)*	3.137 (5.11)*	2.423 (4.29)*
R2	0.95	0.92	0.93
Obs	131	131	136

T-statistics are in parentheses
*Significant at 1%
**Significant at 5%
***Significant at 10%

[9]Sweden is the base country and 2001 is the base year in inbound flows.

Appendix 2: Complete Report of (8.2) for Outbound Flows[10]

	VFR visit	Duration of VFR	Total visit
Constant	2.791 (1.42)	1.938 (0.51)	5.906 (4.59)*
Pop	0.098 (0.83)	0.258 (1.13)	−0.013 (−0.17)
Migrant stock	0.370 (3.28)*	0.261 (1.19)	0.069 (0.93)
GDP/capita	0.005 (0.05)	0.207 (1.09)	−0.042 (−0.64)
Dum02	−0.054 (−0.93)	−0.135 (−1.20)	0.028 (0.74)
Dum03	0.023 (0.37)	−0.249 (−2.02)***	0.075 (1.79)***
Dum04	0.068 (0.93)	−0.255 (−1.81)***	0.118 (2.46)***
Dum05	0.126 (1.79)***	−0.160 (−1.18)	0.160 (3.50)*
Dum06	0.207 (2.56)***	−0.047 (−0.30)	0.191 (3.62)*
Australia	−0.942 (−1.91)***	0.761 (0.80)	0.268 (0.83)
Belgium	0.237 (2.07)***	−0.279 (−1.26)	1.723 (23.04)*
Czech Rep	−0.022 (−0.07)	0.396 (0.60)	0.973 (4.39)*
Denmark	−0.179 (−1.68)***	−0.327 (−1.59)	−0.124 (−1.78)***
Finland	−0.701 (−3.21)*	−0.501 (−1.19)	−0.677 (−4.74)*
Germany	0.646 (1.98)***	0.385 (0.61)	1.821 (8.53)*
Greece	0.227 (1.56)	0.898 (3.21)*	2.253 (23.81)*
Hungary	0.134 (0.39)	0.290 (0.43)	0.049 (0.21)
Italy	0.797 (3.62)*	0.656 (1.54)	2.164 (15.06)*
Japan	−1.416 (−4.76)*	−0.546 (−0.95)	−1.276 (−6.56)*
Luxembourg	−1.736 (−5.47)*	−1.693 (−2.76)**	−1.388 (−6.69)*
Netherlands	0.598 (3.71)*	0.227 (0.73)	1.833 (17.42)*
Norway	−0.446 (−3.44)*	−0.386 (−1.54)	0.041 (0.48)
Portugal	0.027 (0.23)	0.508 (2.22)***	1.739 (22.48)*
Spain	0.778 (2.40)***	1.060 (1.69)***	3.639 (17.18)*
Switzerland	0.140 (1.22)	−0.051 (−0.23)	1.102 (14.64)*
USA	−0.015 (−0.03)	0.462 (0.42)	2.343 (6.25)*
R2	0.98	0.95	0.99
Obs	99	99	99

T-statistics are in parentheses
*Significant at 1%
**Significant at 5%
***Significant at 10%

[10]Sweden is the base country and 2001 is the base year in outbound flows.

References

Bell M, Ward G (2000) Comparing temporary mobility with permanent migration. J Tourism Geogr 2:87–107

Boyle OJ, Halfacree KH, Robinson V (1998) Exploring contemporary migration. Pearson Education Limited, Harlow

Boyne S, Carswell F, Hall D (2002) Reconceptualising VFR tourism: friends, relatives and migration in a domestic context. In: Hall CM, Williams AM (eds) Tourism and migration: new relationship between production and consumption. Kluwer Academic, Dordrecht, pp 241–256

Civil Aviation Authority (2009) International relations: the growth in air travel to visit friends or relatives. The Stationery Office, London. http://www.caa.co.uk/docs/33/CAP787.pdf

Cohen AJ, Harris NG (1998) Mode choice for VFR journeys. J Transp Geogr 6:43–51

Dijst M, Lanzendorf M, Barendregt A, Smit L (2005) Second homes in Germany and the Netherlands: ownership and travel impact explained. Tijdschr Econ Soc Geogr 96:139–152

Dwyer LI, Burnley I, Murphy P, Forsyth P (1993) The impact of migration on tourism flows to and from Australia. Centre for Economic Policy Discussion Paper No.282, Australian National University, Canberra

Fischer C (2007) The influence of immigration and international tourism on the import demand for consumer goods – theoretical model. In: Matias A, Nijkamp P, Neto P (eds) Advances in modern tourism research: economic perspectives. Physika, Heidelberg, pp 37–49

Gujarati ND (2003) Basic econometrics, 4th edn. McGraw-Hill, New York

Haldrup M (2002) Laid-back mobilities: second-home holidays in time and space. Tourism Geogr 6:434–454

Hall CM (1990) From cottage to condominiums: tourism, recreation and regional development in northern New South Wales. In: Walmsely DJ (ed) Change and adjustment in northern New South Wales. University of New England, Armidale, pp 85–99

Hall CM, Muller DK (2004) Introduction: second homes, curse or blessing? Revisited. In: Hall CM, Muller DK (eds) Tourism, mobility and second home: between elite landscape and common ground. Channel View Publications, Clevedon, pp 3–14

Hall CM, Williams AM (2000) Tourism and migration: a new relationship between production and consumption. Tourism Geogr 2:5–27

Haug B, Dann GMS, Mehemtoglu M (2007) Little Norway in Spain from tourism to migration. Ann Tourism Res 34:202–222

Hay B (1996) An insight into the European experience: a case study on domestic VFR tourism within the UK. In: Yaman HR (ed) VFR tourism: issues and implications. Victoria University of Technology, Melbourne, pp 51–65

King B (1994) What is ethnic tourism? An Australian perspective. Tourism Manage 15:173–176

King R, Warnes AM, Williams AM (1998) International retirement migration in Europe. Int J Popul Geogr 4:91–112

King R, Warnes AM, Williams AM (2000) Sunset lives: British retirement migration to the Mediterranean. Berg International Publishers, Oxford

Lundmark L (2006) Mobility, migration and seasonal tourism employment: evidence from Swedish mountain municipalities. Scand J Hospit Tourism 6:197–213

McCann P, Poot J, Sanderson L (2009) Migration, relationship capital and international travel: theory and evidence. J Econ Geogr 10:361–387

Morrison AM, Hsieh S, O'Leary JT (1995) Segmenting the visiting friends and relatives market by holiday activity participation. J Tourism Stud 6:48–63

Murphy PA (1981) Patterns of coastal retirement migration. In: Howe A (ed) Towards an older Australia: reading in social gerontology. University of Queensland, Queensland, pp 301–314

Office for National Statistics (ONS) (2001–2006) Travel trends. HMSO, London

Office for National Statistics (ONS) (2007) Population trends. HMSO, London

Oliver C (2007) Retirement migration: paradoxes of ageing. Routledge, New York

Poel P, Masurel E, Nijkamp P (2004) The importance of friends and relations in tourist behavior: a case study of heterogeneity in Surinam. In: Giaoutzi M, Nijkamp P (eds) Tourism and regional development: new pathways. Ashgate, Aldershot, pp 219–238

Poot J, Waldorf B, van Wissen L (eds) (2008) Migration and human capital. Edward Elgar, Cheltenham

Poyhonen P (1963) A tentative model for the volume of trade between countries. Weltwirtsch Arch 90:93–99

Rodriguez V (2001) Tourism as a recruiting post for retirement migration. J Tourism Geogr 3:52–63

Seaton AV, Palmer C (1997) Understanding VFR tourism behaviour: the first five years of the United Kingdom tourism survey. Tourism Manage 18:345–355

Seetaram N (2008) Immigration and tourism demand: evidence from Australia. Unpublished paper presented at the CAUTHE 2008 conference, Sydney, Feb 2008

Tinbergen J (1962) Shaping the world economy: suggestions for an international economic policy. The Twentieth Century Fund, New York

United Nations (2002) International migration report. Department of Economic and Social Affairs ST/ESA/SER.A/220, New York

Williams AM, Hall CM (2002) Tourism and migration: new relationship between production and consumption. Kluwer, Dordrecht

Williams AM, King R, Warnes T (2004) British second homes in southern Europe: shifting nodes in the scapes and flows of migration and tourism. In: Hall CM, Muller DK (eds) Tourism, mobility and second homes. Between elite landscape and common ground. Channel View Publications, Clevedon, pp 97–112

Chapter 9
A Dynamic Correlation Approach of the Swiss Tourism Income

Costas Leon and Bruno Eeckels

9.1 Introduction

The tourism sector is one of the most significant sectors in the modern world economy. However, despite its significance, the economics of tourism has not been given much attention, at least when compared with more core economics areas such as macroeconomics or econometric theory and methods, (Papatheodorou 1999). Furthermore, within the economics of tourism literature, econometric tools are rather limited, for example, in comparison to those applied in macroeconomics. However, in recent years, the number of papers using econometric methods and tools in tourism research has increased significantly. Several authors already employ standard econometric tools such as ARIMA modeling, Cointegration and Error Correction Mechanisms for forecasting purposes and to measure the long-run relationship between tourism and GDP, and when data is not available, or of low quality, Computable General Equilibrium models are implemented to assess the impact of tourism on other sectors. See, inter alia, Ballaguer and Catavella-Jorda (2002), Dritsakis (2004), Durbarry (2004), Papatheodorou and Song (2005), Narayan (2004), Sugiyarto et al. (2003), Wyer et al. (2003). Reviewing the relevant literature one can realize that the vast majority of econometric research in tourism is conducted almost exclusively in the time domain while frequency-domain (spectral and cross-spectral) methods are rather the exception. For example, out of 121 studies referring to modeling and forecasting of the tourism demand, only one (Coshall 2000) apart from seasonality modeling, applied frequency-domain analysis, as it is evident from a review made by Song and Li (2008) of post 2,000 research papers on the issue. In his research, Coshall (2000) found that cycles of passenger

C. Leon (✉)
DCT University Center, 6354 Vitznau, Switzerland
e-mail: c.leon@dct.edu

B. Eeckels
Les Roches International School of Hotel Management, 1815 Bluche, Switzerland

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_9,

flows from UK to France, Belgium and The Netherlands depend on cycles in exchange rates, not on the GDP cycle.

Frequency-domain methods are valuable in that they allow the decomposition of an economic time series into several periodic components with different weights, providing, thereby, a clearer picture within a particular frequency band, which otherwise would not be visible had classical time-domain methods been employed.

In this paper we would like to contribute to tourism research by studying the relationship between GDP and tourism income (international tourism receipts) in Switzerland in the business cycle frequency and longer-run bands (i.e. cycles of 1.5–10, or even more years), by means of classical spectral methods, and the recently introduced dynamic correlation analysis, as well as that of classical time-domain methods with Vector Autoregressive (VAR) models. To our knowledge, the literature for Switzerland does not include any study that applies frequency-domain methods to investigate the relationship between macroeconomy and tourism. Dynamic correlation, developed by Croux et al. (2001), is an index of comovement within the cross-spectral methods and measures the percentage of shared variance between two time series at a particular frequency band of interest. In particular, we seek to identify which individual cycles in both GDP and tourism income are important in terms of duration within the business cycle band. Further, we ask which of these individual cycles are more intensively correlated, and study the lead/lag relationships between these two cycles. Finally, since frequency-domain and time-domain methods are considered to be two alternative representations of the same stochastic process, highlighting different aspects of the process in question, we also experiment with a VAR model, to investigate the interaction of GDP with tourism income by means of impulse response functions, in terms of magnitude, trajectory path and time required for the system to return to the long-run equilibrium. Our findings are: First, average cycles of 9 or 11 years (depending on the method of computation) for GDP, of 8 years for tourism income, and common cycles positively correlated in the business cycle and in the longer-run frequency bands. The dominant cycles of both variables are roughly synchronized. Second, the maximum effect of 1% GDP shock on tourism income is higher than the maximum effect of 1% tourism income shock on GDP. The effects of these shocks last for about 12–14 years, although most of the shocks are absorbed within 5–6 years.

The remainder of the paper is organized as follows: In Sect. 9.2 we present a short description of the Swiss tourism sector. Section 9.3 deals with the statistical methodology (spectral analysis and VAR models) and in Sect. 9.4 we perform a series of preliminary tests and present the spectral estimates. Section 9.5 refers to the estimates of the VAR model, simulation of shocks and the corresponding transmission mechanisms. Section 9.6 concludes the paper. Tables and Figures are given in the Appendix. A brief exposition of spectral methods and VAR models can be provided to the interested readers upon request.

9.2 A Short Description of the Swiss Tourism Sector

Tourism is an important sector for Switzerland. It accounts for 5–6% of the GDP of the Confederation and employs a workforce corresponding to 335,000 full time employees, accounting for 10% of total employment. In some cantons, the importance of tourism is particularly high. For example, in the canton of Grison, tourism accounts for 30% of the cantonal GDP and 30% of the employment. In the canton of Valais, the figures are 25 and 27% for the cantonal GDP and employment, respectively (Swiss Tourism in Figures 2008). The multiplier effect of tourism on the total economy is particularly high in Switzerland. This can be ascribed to the fact that the country has specialized in tourism for more than a century, leading to high productivity per employee. Indeed, in Switzerland there are many natural beauties (e.g. the Alps and the lakes) along with high quality resort centers, and probably, in these areas, not many alternatives for development, beyond tourism, exist. At the word level, Switzerland still holds one of the top positions on the basis of many indices of tourism. According to a new index compiled by the World Economic Forum, Switzerland has been recognised as the most competitive travel and tourism sector in the world. As an example, in the World Economic Forum's first Travel and Tourism Competitiveness Index (TTCI), and according to the Travel & Tourism Competitiveness Report 2007, Switzerland outranked 124 other countries based on its safety record and high quality staff in the tourism sector (http://www.weforum.org/en/knowledge/KN_SESS_SUMM_21316?url=/en/knowledge/KN_SESS_SUMM_21316). This is a very positive evaluation for the tourism sector of the country, despite the fact that Swiss tourism has lost much of the dominant position it enjoyed in its heyday of the "belle époque" in the nineteenth century. Due to the importance of the tourism sector for the country, the Swiss government and parliament decided to consider tourism as a strategic sector of the economy again during the parliament's summer session in June 2000 (OECD 2000).

9.3 Methodology: Spectral Analysis and VAR Models

Spectral analysis has not been very frequently met in economic literature as in other disciplines, such as engineering or physics. However, spectral analysis has been a subject of a growing interest among economists during the last decades. See, for example, Granger and Hatanaka (1964), Granger and Watson (1984), Granger (1966), Baxter and King (1995), Levy and Dezhbakhsh (2003), Iacobucci (2005). On the other hand, VAR models both in their 'atheoretical' form (e.g. see Sims 1980) and in their connection to economic theory (e.g. the cointegration variants, see inter alia, Johansen (1988) and Johansen and Juselius (1990, 1992, 1994)), have been employed for a long time in economics and are now considered standard tools in economic analysis.

9.4 Data, Descriptive Statistics, Stationarity Tests and Spectral Estimates

9.4.1 Data

Annual GDP and tourism income data, expressed in logarithms, covering the period 1980–2007 at constant 2,000 prices (in Swiss Francs), deflated by the GDP deflator, are used in our analysis and have been obtained from the OECD and the Swiss National Bank websites (http://www.oecd.org and http://www.snb.ch, respectively). Each of theses series, denoted by y_t, is decomposed as $y_t = Tr_t + C_t + u_t$, where Tr_t, C_t, u_t are the (unobserved) long-run trend, the cyclical and the irregular (noise) components of the series, respectively. Therefore, it holds that *cyclical component + noise = actual data − estimated trend.* The long-run trends have been estimated by the Hodrick–Prescott (HP) filter (Hodrick and Prescott 1997) with smoothing parameter $\lambda = 100$, considered to be the optimal value for yearly data and it is the value that the majority of applied researchers adopt. Since the HP filter has been applied in the logarithms of the series y_t (the actual series), the difference *actual data − estimated trend* expresses, approximately, the percentage change of each observation at time t from the estimated trend (extracted by the HP filter) at time t. The long-run developments of the variables are presented in Fig. 9.1 and the cyclical components in Fig. 9.2. It seems from Figs. 9.1 and 9.2 that the HP filter captures quite well all the recessions of the past decades since 1980. In general, the Swiss business cycle follows the same path as the European cycle. See Parnisari (2000) for the recessions in Switzerland and their connections with the European business cycle.

9.4.2 Descriptive Statistics

Descriptive statistics of these series are presented in Table 9.1. From these statistics we observe that the volatility (measured by the standard deviation) of the tourism income cycle is almost double that of the volatility of GDP cycle. This reflects the higher uncertainty tourism income exhibits, relative to GDP, and it is a well-established fact in the literature. Further, the minimum points (the troughs) of the cycles also differ: tourism income cycle has reached even 5.6% below the trend line whereas GDP cycle has reached at 2.9% below the trend line. Both cycles follow the normal distribution, as this is evident from the Jarque–Bera (JB) statistics which indicate that the null hypothesis of normality cannot be rejected at any conventional significance level (1, 5, 10%). The mean of both series is zero, since the cycles have been constructed as deviations from the flexible HP trend line. Last, but not least, cross-correlation coefficients, displayed in Table 9.2, show that the maximum correlation 0.65 occurs at zero lag/lead, while the correlations at other leads and lags are quite lower. On the basis of the cross-correlation coefficients, this is an indication that the tourism income cycle is mainly procyclical.

9.4.3 Stationarity Tests

The above tests are meaningful only if both cycles are stationary. Although we expect them to be stationary on theoretical grounds, statistical tests are required to verify the stationarity properties of the variables. We initially employ the ADF test (Dickey and Fuller 1979) and the SIC, i.e. the Schwarz information criterion (Schwarz 1978) for the determination of the integration order of these two series. However, since we use a VAR model for the study of the transmission mechanism of the stochastic shocks, we also employ the Johansen (op.cit.) cointegration test to determine the integration order of the series. Tables 9.3 and 9.4a, 9.4b display the ADF test and the Johansen (op.cit.) cointegration test (with trace and maximum eigenvalues statistics), for which the lag length has been determined according to SIC, shown in Table 9.5. Finally, as a further indication of the integration order, we provide in Table 9.6 the roots of the inverse characteristic polynomial of the VAR model. From the ADF test we conclude that the null hypothesis of a unit root process is rejected for both series at 5 and 10% significance levels. Hence, on the basis of this test, both series are stationary. Table 9.4a, 9.4b present the Johansen (op.cit.) cointegration test with a constant in the cointegration space and no trend in the data. Both trace and maximum eigenvalue statistics confirm that the cointegrating rank equals 2, implying that the VAR model is stationary. Table 9.5 presents several information criteria for the determination of the optimal lag length. According to Likelihood Ratio (LR), Final Prediction Error (FPE) (see Patterson 2000), and SIC criteria, the optimal lag length is 2, whereas according to AIC (Akaike 1974), and HQ (Hannan and Quinn 1979), the optimal lag length is 8. Given the small sample (28 observations), we decided to consider that optimal lag length is 2 and not 8, in order to save valuable degrees of freedom, required for better statistical properties of the estimators. The selection of two lags still ensures the statistical adequacy of the VAR model, see Table 9.11 and Figs. 9.9 and 9.10. The stationarity of the VAR can also be confirmed from the inverse roots of the characteristic polynomial of the VAR, shown in Table 9.6 and Fig. 9.3, where all roots are inside the unit circle of the complex plane. All inverse roots are complex and have modulus less than 1, a fact that verifies the stationarity of the VAR.

From all these tests concerning the integration order of our processes, we conclude that both processes are of zero integration order, that is, they are stationary. Therefore, the information concerning the descriptive measures, displayed in Tables 9.1 and 9.2, is statistically valid and meaningful from an economic point of view. Stationarity is also required for meaningful spectral estimates, given in the following Sect. 9.4.4.

9.4.4 Spectral Estimates and Reconstruction of the Cycles

9.4.4.1 Univariate Spectral Analysis

We now proceed to spectral estimates. Figure 9.4 shows the univariate spectral densities of GDP and tourism income. Table 9.7a, 9.7b display the amplitudes of cosine and sine terms, the periodogram values and the spectral density both for GDP and tourism income, respectively. The spectral window used here, which acts as a filter in the periodogram in order to produce consistent estimates of the power intensities, is the one suggested by Bartlett (Oppenheim and Schafer 1999), whose $M = 11$ weights and shape are given in Fig. 9.5. The number of weights M has been determined as $M = 2\sqrt{T}$, where T is the number of observations in the sample, (Chatfield 1989). From these cycles, four have been identified as the most significant ones, accounting for about 85% of the total variance of the GDP cycle. They are cycles of 9.3 years (45%), 14 years (24%), 5.6 years (9.8%) and 7 years (5.3%). The relative importance of each of these cycles has been calculated on the basis of the periodogram values, but the picture is roughly the same with the spectral density values instead of the periodogram (see Table 9.7a and Fig. 9.8). Despite the dominant cycle being 9.3 years, all four cycles are required to reconstruct the original GDP cycle in such a way, that the simulated and the original cycles are in phase as much as possible. From these estimates, the average cycle is about 9 years (from the periodogram), and about 11 years from the spectral density.

Using the same reasoning above, we identify the cycles of tourist income. Here we have many cycles of almost equal importance, in contrast with the GDP cycle. We reconstruct the cycle of the tourism income by cycles of 7, 9.3, 14, 5.6, 4.7, 4, 3.5 and 3.1 years, all having equal importance of about 10%, with the exception of one having importance of approximately 4%. Overall, these cycles account for about 74% of the total variance (on the basis of the spectral density estimates). The average cycle is about 8 years. The relevant information is given in Table 9.7b and Fig. 9.8.

On the basis of these cycles and their relative importance, the GDP and income cycles are reconstructed in Fig. 9.8. Both simulated cycles capture fairly well the troughs and the peaks of the actual cycles in most of the cases. In some other cases (GDP cycle in 1996, 2003 and the tourism income in 1982 and 1987) the simulated peaks or troughs deviate about 1 year from the actual peaks or troughs.

9.4.4.2 Cross-Spectral Analysis and Dynamic Correlation

The next step is to identify the relationship between GDP and tourism income in business cycle frequencies. Cross-spectral analysis reveals some interesting characteristics of the relationship of two variables in the frequency domain. In particular, Fig. 9.6 displays the cross-spectral densities and the squared coherency estimates, while Fig. 9.7 presents the phase spectrum and the dynamic correlation estimates. In addition, Table 9.8a, 9.8b show the same, plus other relevant information in numerical form. According to these estimates, cycles existing in the band of 5.6 up to 14 years are common in both cycles. This is evident from the fact that squared coherency, Fig. 9.8, takes the highest values in this frequency band. The common cycles account for about 72% of the common variance. These estimates offer support for the view that GDP and tourism income cycles are linked together both in the typical business cycle frequencies (cycles of 5.6–9.3 years) and in the longer-run (the cycle of 14 years). Knowing the phase spectrum, we can also find the lead/lag relationship between GDP and tourism income. The time of lead or lag (in months) for a particular period is computed as $\frac{Phase \times Period}{2\pi} \times 12$. If phase is negative, then GDP leads tourism income and if it is positive then GDP lags tourism income. Thus, the cycles of 9.3 and 14 years have negative phase, meaning that GDP cycles at these frequencies lead the tourism income cycles by 1.9 and 2.7 months, respectively. On the contrary, the cycles of 5.6 and 7 years have positive phase, implying that GDP lags tourism income by 1.2 and 0.3 months, respectively. Therefore, on average, the lead/lag effect is small and GDP and tourism income can be considered rather synchronized at these frequencies, which account for most of the common variance (72%). This also verifies the evidence provided by the cross-correlation coefficient at zero lead/lags (0.65) that tourism income is procyclical.

The dynamic correlation sheds light on the relationship between two variables for individual frequencies or for frequency bands and serves as an index of comovement. Figure 9.8b presents the dynamic correlation which, in all frequencies, is between 0.65 and 0.79. Especially, in the frequency band of 5.6–14 years (the frequency of interest in this paper) dynamic correlations take values from 0.69 to 0.77, and this is an indication that the two series are correlated to a high degree both in the business cycle and the longer-run frequency bands.

9.5 VAR Model and Transmission Mechanisms

9.5.1 Estimates and Diagnostics

The estimated VAR model and some diagnostics are given in Tables 9.9 and 9.10. The estimates are meaningful only if the model is statistically adequate. Indeed, a well-specified model must be free of residual autocorrelation, ARCH effects (Engle 1982), non-normality and must exhibit stability in its estimated parameters. Table 9.11 shows the diagnostics for autocorrelation, ARCH effects and normality. Figures 9.9 and 9.10 present two types of stability tests: the Cusum and the Cusum of Squares Test (Brown et al. 1975), both at 5% significance level, and the recursive coefficients tests. The autocorrelation tests (Portmanteau test and Lagrange Multiplier test) cannot reject the no-autocorrelation null hypothesis at any conventional significance level. The same applies to ARCH effects and the normality tests: the null hypothesis cannot be rejected at the conventional significance levels. Also, stability analysis, based on the Cusum and the Cusum of Squares test shows no evidence of structural instability within the sample. Given this picture, we hold that the VAR model is suitable for simulations.

9.5.2 Shocks and Simulations

We now examine the transmission of stochastic shocks generated in GDP and tourism income. We simulate two specific shocks, which correspond to two scenarios described below, and we trace the trajectory path of the transmission by impulse response functions. In particular, Scenario 1 generates a positive stochastic structural shock in the GDP equation of 1% in magnitude for one period (1 year) and no shock to tourism income equation. However, due to the interdependence of the two variables, both variables will be affected by the GDP shock. The trajectory path of GDP is the Transmission Mechanism 1 (TM1) and the trajectory path of tourism income is the Transmission Mechanism 2. Scenario 2 generates a positive stochastic structural shock in the tourism equation of 1% in magnitude for one period (1 year) and no shock to GDP equation. The trajectory path of GDP is the Transmission Mechanism 3 (TM3) and the trajectory path of tourism income is the Transmission Mechanism 4 (TM4). Again, due to the interdependence of the variables in the VAR system, both variables will be affected by the tourism shock. Table 9.12 presents the scenarios and the four corresponding transmission mechanisms, and Fig. 9.11 shows the trajectory path that each variable follows under the four transmission mechanisms. All trajectories have an oscillating pattern due to the complex roots in the inverse characteristic polynomial of the VAR (Tables 9.13 and 9.14).

TM1 shows that the effect of the GDP shock to itself has a maximum 1% and lasts about 13–14 years, but most of the shock is absorbed within the first 4 years.

TM2 and TM3 are interesting since they capture the effects of two shocks, from GDP to tourism income and from tourism income to GDP, respectively. TM2 shows a maximum 0.62%, the duration of the cycle is about 12–13 years, and most of the shock is absorbed within the first 5 years.

TM3 shows that the response of GDP cycle to tourism income shock is zero for the first 2 years and it reaches a maximum 0.15% on the fourth year. From that year onwards the effect on GDP declines, it reaches a minimum −0.05% on the seventh year and the whole cycle decays within 13–14 years. Most of the shock is absorbed within the first 6 years.

Lastly, TM4 shows that the effect of the tourism income to itself has a maximum of 1%, it lasts about 6 years and most of the shock is absorbed within the first 3 years. It is interesting to note that the maximum effect of the GDP shock on tourism income is higher (0.62%) than the effect of the tourism income shock on GDP (0.15%).

9.6 Concluding Remarks

In this paper we have studied the spectral properties of the cyclical components of the Swiss GDP and tourism income and their interaction by means of a VAR model during the period 1980–2007. We found that the Swiss GDP is dominated by four cycles, listed in descending order of significance, of 9.3, 14, 5.6 and 7 years. These cycles account for about 85% of the total variation of the cyclical component of the GDP. The average GDP cycle is 9 or 11 years (according to the periodogram or the spectral density, respectively).

The tourism income is dominated by seven cycles of 7, 9.3, 14, 5.6, 4.7, 4, 3.5 and 3.1 years, all having equal importance of about 10%, with the exception of one having importance approximately of 4%. The average duration of the tourism income cycle is about 8 years. Overall, these cycles account for about 74% of the total variance (on the basis of the spectral density estimates). The average tourism cycle is about 8 years.

Cycles existing in the band of 5.6 up to 14 years are common in both GDP and tourism income cyclical components, and the comovements of these (and all of the remaining) cycles are strong, on the basis of both squared coherency and dynamic correlation indices. The common cycles account for about 72% of the common variance. For the common cycles of 9.3 and 14 years, it has been shown that GDP leads the tourism income by 1.9 and 2.7 months, respectively, whereas for the common cycles of 5.6 and 7 years, the GDP lags the tourism income by 1.2 and 0.3 months, respectively. Thus, on average, the lead lag effect is small and the two cycles are synchronized in the sense that their simulated peaks and troughs do not deviate very much from the original ones.

Further, and as the VAR analysis shows, all trajectory paths are oscillatory. This is due to the complex roots of the inverse characteristic polynomial of the VAR.

The findings of the TM2 and TM3 are interesting from a tourism policy point of view. The implications are that a negative GDP shock affects the tourism income negatively and vice-versa. In a hypothesized (though not tested) symmetry of shocks, the implication of TM2 is that 1% negative GDP shock will result in 0.62% (at maximum) negative growth in tourism income and this lasts for a period of about 13–14 years, although most of the negative shock is absorbed within the first 5 years. Further, and according to the findings of TM3, a negative 1% shock in tourism income results in 0.15% (at maximum) negative growth in GDP, lasting 12–13 years, but most of the negative shock will be absorbed within the first 6 years.

Our estimates are based on a set of assumptions that are implicitly built into the methods used (the HP filter, the sinusoid basis functions of Fourier transform/spectral analysis, and the identification scheme of the VAR model). It is probable that different filtering procedures, different identification schemes especially in case of VAR models of higher dimension and different basis functions for spectral estimates (e.g. in a wavelet analysis context) may produce different findings. In this sense, our conclusion should be considered as indicative and tentative.

Acknowledgements We want to thank B. Black, academic Dean of DCT, and S. Landtwing, lecturer in Tourism at DCT, for their useful hints and comments. All remaining errors are ours. We would also like to thank DCT and Les Roches for their financial support for our participation in the Advances of Tourism Economics (ATE) conference of the Portuguese Association for Tourism Research and Development, Lisbon, Portugal, 23–24 April, 2009.

Appendix

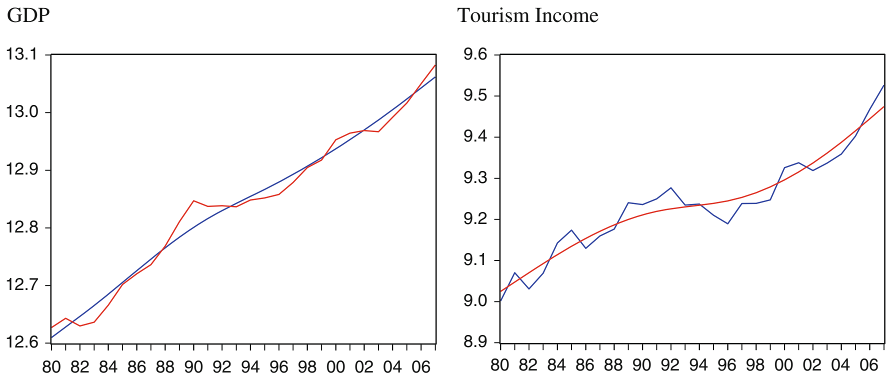

Fig. 9.1 Actual data and long-run trends. *Note:* GDP, Tourism Income: logarithms of GDP and Tourism Income, respectively. The long-run trends have been estimated by the HP filter with smoothing parameter $\lambda = 100$. The *smoothed line* is the trend

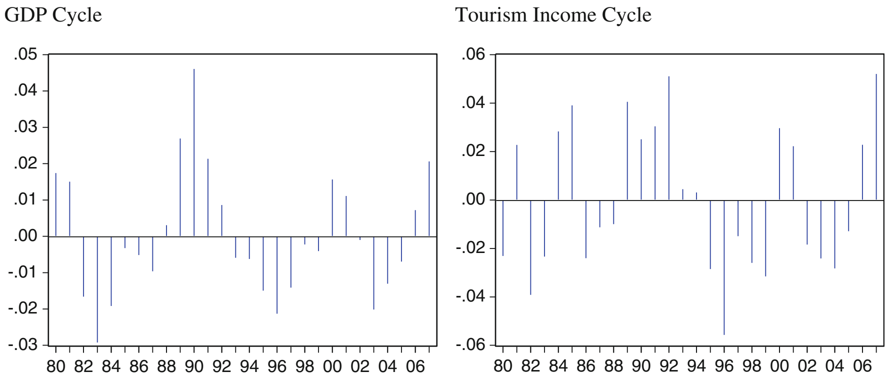

Fig. 9.2 GDP and tourism income cycles

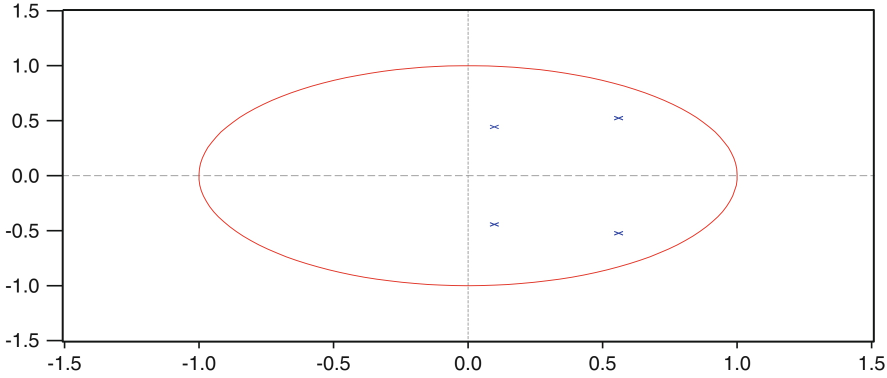

Fig. 9.3 Roots of the inverse characteristic polynomial. *Note*: All roots are inside the unit circle of the complex plain. VAR is stationary

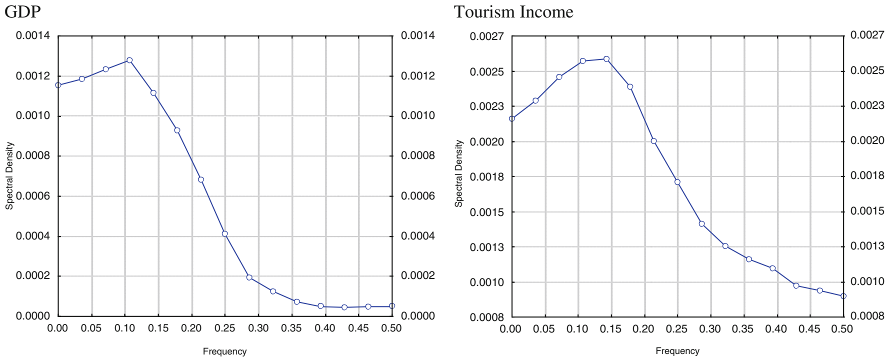

Fig. 9.4 Spectral densities: GDP and tourism income

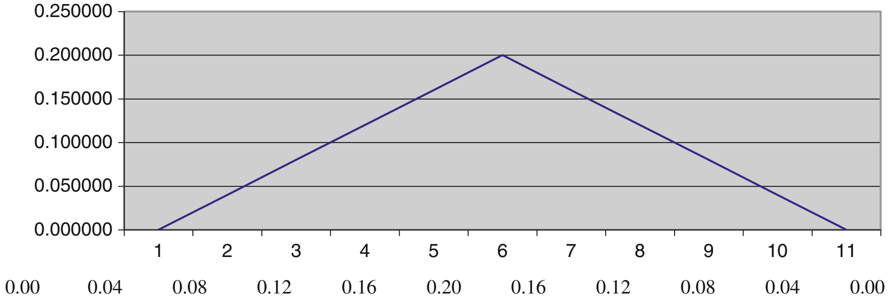

Fig. 9.5 Bartlett window ($M = 11$). *Note*: The *figures* in the bottom are the 11 weights of the Bartlett window

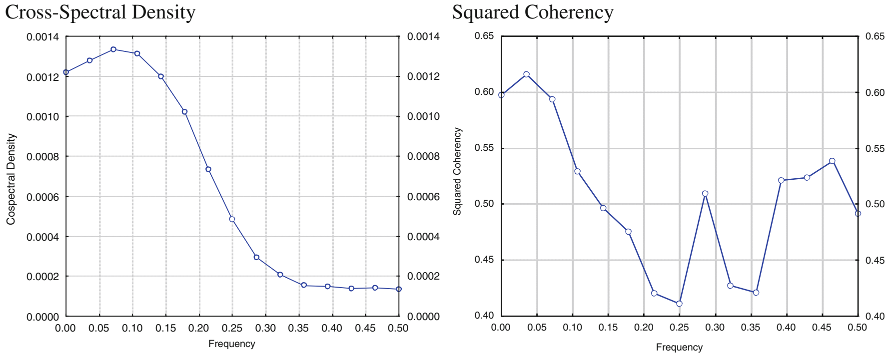

Fig. 9.6 GDP and tourism income cycles: cross-spectral density and squared coherency

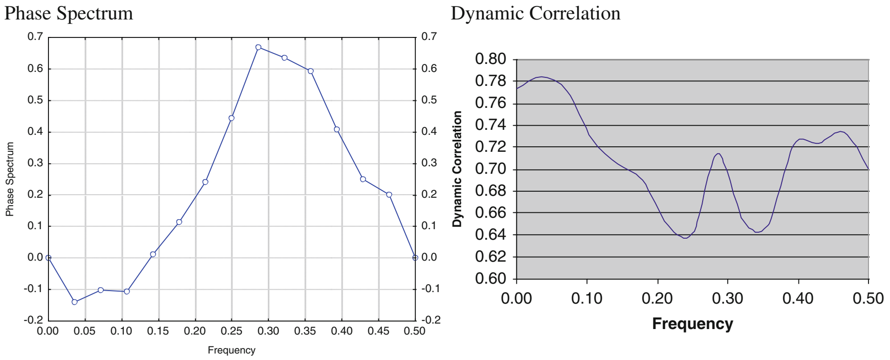

Fig. 9.7 Phase spectrum and dynamic correlation

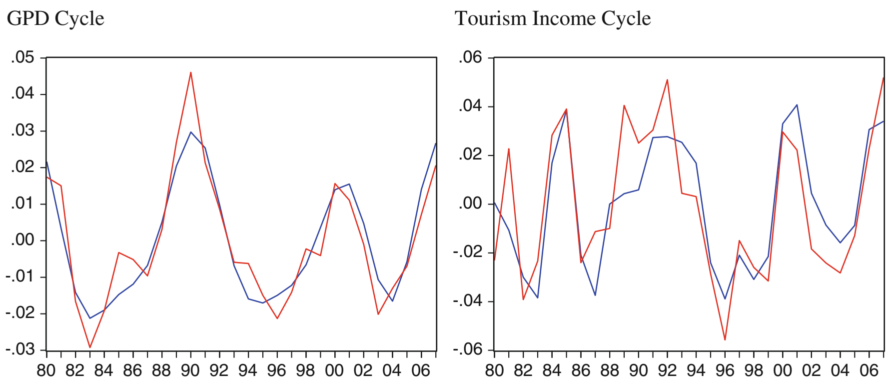

Fig. 9.8 Actual and simulated cycles. *Note*: The continuous line is the simulated cycle and the *(dashed)line* is the actual cycle

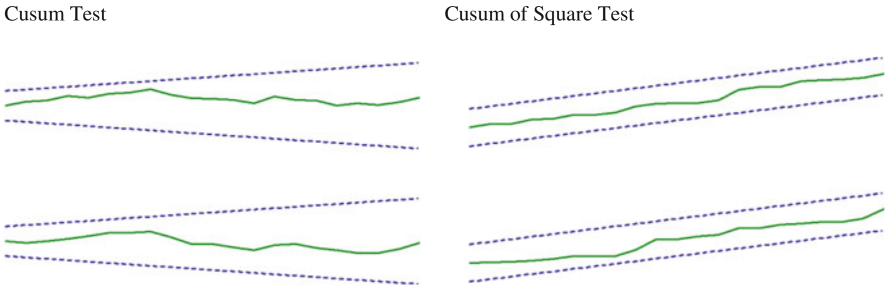

Fig. 9.9 VAR model stability analysis: cusum and cusum of squares test. *Note*: Both tests verify the structural stability of the model within the sample. The *external lines* define a 95% confidence interval

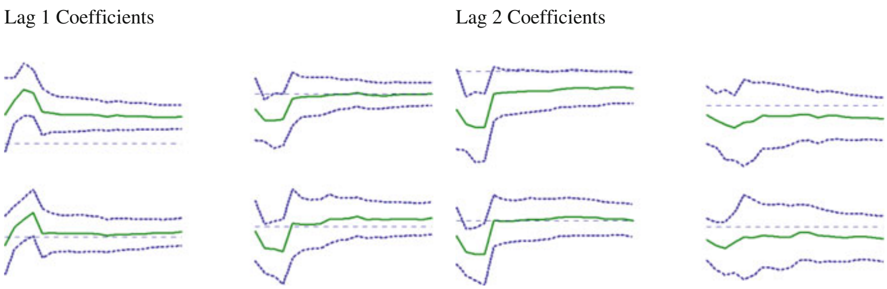

Fig. 9.10 VAR model stability analysis: recursive coefficients. *Note*: Lag 1 Coefficients: *Top, from left to right*: coefficients of the first equation: GDP and tourism income. Lag 1 Coefficients: *Bottom, from left to right*: coefficients of the second equation: GDP and tourism income. Lag 2 Coefficients: *Top, from left to right*: coefficients of the first equation: GDP and tourism income. Lag 2 Coefficients: *Bottom, from left to right*: coefficients of the second equation: GDP and tourism income. All recursive coefficients verify structural stability of the model within the sample. The *external lines* define a 95% confidence interval

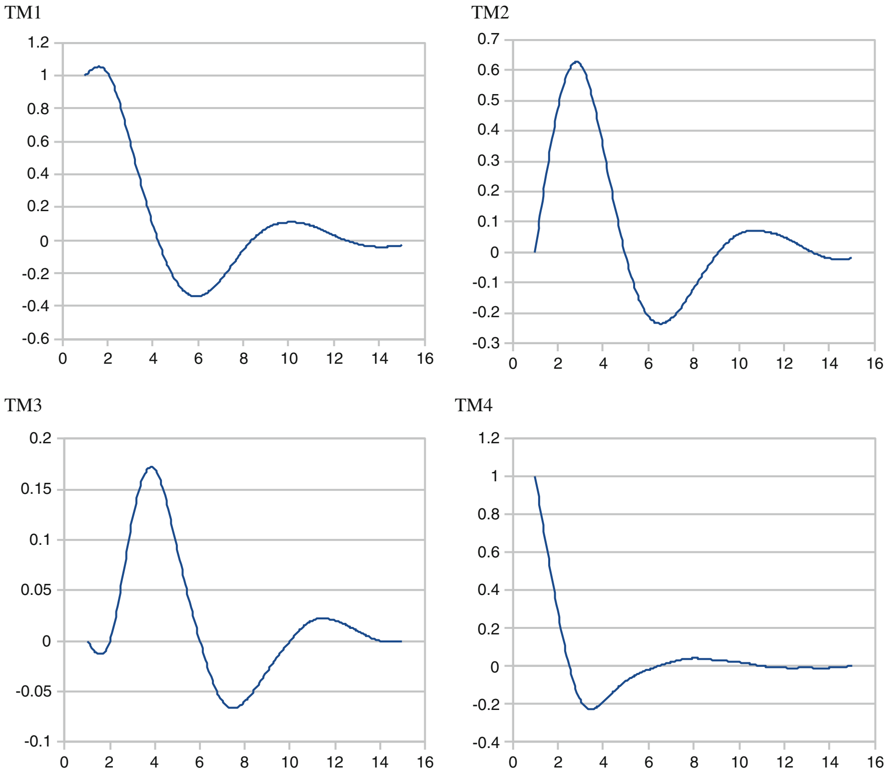

Fig. 9.11 Transmission mechanisms (impulse response functions). *Note:* Transmission Mechanisms (TMs): TM1 refers to the response of GDP to its own stochastic shock. TM2 refers to the response of tourism income to the GDP shock. TM3 refers to the response of GDP to the tourism income shock. TM4 refers to the response of tourism income to its own stochastic shock

Table 9.1 Descriptive statistics of the GDP and the tourism income cycles

Variable	Mean	Standard deviation	Maximum	Minimum	Normality JB statistics
GDP cycle	0	0.017	0.046	−0.029	1.905, *p*-value: 0.385
Tourism income cycle	0	0.030	0.052	−0.056	1.864, *p*-value: 0.413

Table 9.2 Cross-correlation coefficients between GDP and tourism income cycles

Lag/lead$i$	$Corr(y_{1t}, y_{2t-i})$ Lag	$Corr(y_{1t}, y_{2t+i})$ Lead
0	0.65	0.65
1	0.35	0.33
2	−0.04	0.16
3	−0.22	0.13

Note: y_1 is the GDP cycle, y_2 is the tourism income cycle

Table 9.3 ADF test

Variable	ADF t statistic	SIC lag length
GDP cycle	−3.771998	1
Tourism income cycle	−3.229050	0

Note: MacKinnon et al. (1999) one-sided *p*-values: 1%: −3.699871, 5%: −2.976263, 10%: −2.627420

Table 9.4a Cointegration test with trace statistic

Hypothesized number of equations	Eigenvalue	Trace statistic	5% CV	1% CV
$k = 0$	0.412526	23.18650	15.49471	0.0029
$k \leq 1$	0.326682	9.888420	3.841471	0.0017

Note: Trace statistic suggests that cointegrating rank equals 2. VAR is stationary at both 5 and 1% significance levels
CV Critical value

Table 9.4b Cointegration test with maximum eigenvalue statistic

Hypothesized number of equations	Eigenvalue	Maximum eigenvalue	5% CV	1% CV
$k = 0$	0.412526	15.39606	14.26460	0.0330
$k \leq 1$	0.326682	9.614142	3.841466	0.0019

Note: Maximum eigenvalue statistic suggests that cointegrating rank equals 2. VAR is stationary at both 5 and 1% significance levels
CV Critical value

Table 9.5 Determination of optimal lag length

Lag	Logl	LR	FPE	AIC	SIC	HQ
0	104.9472	NA	1.16e-07	−10.29472	−10.19515	−10.27529
1	111.3482	10.88157	9.16e-08	−10.53482	−10.23610	−10.47650
2	119.3572	12.01353	6.24e-08	−10.93572	−10.43785	−10.83853
3	120.9218	2.034026	8.29e-08	−10.69218	−9.995169	−10.55612
4	122.0710	1.264055	1.19e-07	−10.40710	−9.510937	−10.23216
5	131.4858	8.473323	7.92e-08	−10.94858	−9.853270	−10.73476
6	133.3653	1.315698	1.23e-07	−10.73653	−9.442081	−10.48384
7	139.4938	3.064239	1.47e-07	−10.94938	−9.455782	−10.65781
8	153.1038	4.083013	1.17e-07	−11.91038	−10.21764	−11.57994

Note: *LogL* log likelihood; *LR* likelihood ratio; *AIC* Akaike information criterion; *FPE* Final Prediction Error; *SIC* Schwarz information criterion; *HQ* Hannan–Quinn information criterion

Table 9.6 Inverse roots of the characteristic polynomial of the VAR

Roots	Moduli
0.559381 − 0.523355i	0.766034
0.559381 + 0.523355i	0.766034
0.097614 − 0.443933i	0.454539
0.097614 + 0.443933i	0.454539

Note: All moduli are less than 1. VAR is stationary

Table 9.7a GDP: cosine and sine terms, periodogram and spectral density

Frequency	Period	Cosine coefficients	Sine coefficients	Periodogram	Perio-dogram (%)	Spectral density	Spectral density (%)
0.000000	NA	0.000000	0.000000	0.000000	NA	NA	NA
0.035714	28.0000	−0.001803	0.003618	0.000229	2.9	0.001186	16.0
0.071429	14.0000	−0.000767	−0.011788	0.001954	24.4	0.001232	16.6
0.107143	9.33333	0.015460	0.004383	**0.003615**	45.2	**0.001280**	17.2
0.142857	7.00000	0.003598	−0.004152	0.000423	5.3	0.001117	15.0
0.178571	5.60000	0.003343	−0.006712	0.000787	9.8	0.000930	12.5
0.214286	4.66667	0.003921	0.003723	0.000409	5.1	0.000682	9.2
0.250000	4.00000	−0.002203	0.004202	0.000315	3.9	0.000411	5.5
0.285714	3.50000	0.001152	−0.000192	0.000019	0.2	0.000196	2.6
0.321429	3.11111	−0.001034	−0.000486	0.000018	0.2	0.000126	1.7
0.357143	2.80000	−0.001676	0.000904	0.000051	0.6	0.000073	1.0
0.392857	2.54545	0.000025	−0.000946	0.000013	0.2	0.000050	0.7
0.428571	2.33333	−0.001585	0.001270	0.000058	0.7	0.000046	0.6
0.464286	2.15385	−0.001959	0.000870	0.000064	0.8	0.000049	0.7
0.500000	2.00000	0.001883	−0.000000	0.000050	0.6	0.000050	0.7

Note: The dominant frequency of 0.107 cycles (9.3 years), the corresponding periodogram values and the spectral density are displayed in *bold*. The average cycle is 9 years, from the periodogram, and 11 years from the spectral density

Table 9.7b Tourism income: cosine and sine terms, periodogram and spectral density

Frequency	Period	Cosine coefficients	Sine coefficients	Periodogram	Periodogram (%)	Spectral density	Spectral density (%)
0.000000	NA	0.000000	0.000000	0.000000	NA	NA	NA
0.035714	28.0000	0.000607	0.012164	0.002077	8.3	0.002289	9.6
0.071429	14.00000	0.000200	−0.014296	0.002862	11.5	0.002461	10.4
0.107143	9.33333	0.007351	0.011630	0.002650	10.6	0.002570	10.8
0.142857	7.00000	0.001944	−0.018410	**0.004798**	19.2	**0.002587**	10.9
0.178571	5.60000	0.001644	−0.015123	0.003240	13.0	0.002391	10.1
0.214286	4.66667	0.002733	−0.004664	0.000409	1.6	0.002004	8.4
0.250000	4.00000	0.003465	0.009826	0.001520	6.1	0.001711	7.2
0.285714	3.50000	−0.002246	0.001671	0.000110	0.4	0.001414	6.0
0.321429	3.11111	−0.012363	−0.002341	0.002217	8.9	0.001256	5.3
0.357143	2.80000	−0.006049	0.009230	0.001705	6.8	0.001160	4.9
0.392857	2.54545	−0.006064	−0.006333	0.001076	4.3	0.001099	4.6
0.428571	2.33333	−0.001977	0.001673	0.000094	0.4	0.000972	4.1
0.464286	2.15385	−0.007753	0.003677	0.001031	4.1	0.000941	4.0
0.500000	2.00000	−0.009233	−0.000000	0.001193	4.8	0.000900	3.8

Note: The dominant frequency of 0.143 cycles (7 years), the corresponding periodogram values and the spectral density are displayed in *bold*. The average cycle is 8 years (on the basis of the spectral density)

Table 9.8a Periodogram and cross-spectral density

Frequency	Period	Periodogram (real)	Periodogram (imaginary)	Cross spectral density	Cross quadratic spectrum	Cross amplitude
0.000000	NA	0.000000	0.000000	0.001220	0.000000	0.001220
0.035714	28.00000	0.000601	0.000338	0.001280	−0.000180	0.001293
0.071429	14.00000	0.002357	−0.000187	**0.001335**	−0.000136	0.001342
0.107143	9.33333	0.002305	−0.002066	0.001312	−0.000140	0.001320
0.142857	7.00000	0.001168	0.000814	0.001198	0.000013	0.001198
0.178571	5.60000	0.001498	0.000553	0.001022	0.000117	0.001029
0.214286	4.66667	−0.000093	0.000399	0.000736	0.000181	0.000758
0.250000	4.00000	0.000471	0.000507	0.000486	0.000231	0.000538
0.285714	3.50000	−0.000041	−0.000021	0.000294	0.000233	0.000375
0.321429	3.11111	0.000195	0.000050	0.000209	0.000154	0.000260
0.357143	2.80000	0.000259	0.000140	0.000155	0.000104	0.000186
0.392857	2.54545	0.000082	0.000083	0.000150	0.000065	0.000163
0.428571	2.33333	0.000074	0.000002	0.000138	0.000035	0.000142
0.464286	2.15385	0.000257	0.000006	0.000142	0.000029	0.000145
0.500000	2.00000	0.000000	−0.000000	0.000134	0.000000	0.000134

Note: The highest cross-spectral estimates are in the frequency of 0.07 cycles (14 years), displayed in *bold*

Table 9.8b Squared coherency, phase spectrum, lead /lag time and dynamic correlation

Frequency	Period	Squared coherency	Phase spectrum	Lead/lag time in months	Dynamic correlation
0.000000	NA	0.60	0.000000	NA	0.77
0.035714	28.00000	0.62	−0.139691	−7.5 Ld	0.78
0.071429	14.00000	0.59	−0.101799	−2.7 Ld	0.77
0.107143	9.33333	0.53	−0.106436	−1.9 Ld	0.73
0.142857	7.00000	0.50	0.010825	0.1 Lg	0.70
0.178571	5.60000	0.48	0.113528	1.2 Lg	0.69
0.214286	4.66667	0.42	0.241527	2.2 Lg	0.65
0.250000	4.00000	0.41	0.444370	3.4 Lg	0.64
0.285714	3.50000	0.51	0.669736	4.5 Lg	0.71
0.321429	3.11111	0.43	0.636078	3.8 Lg	0.65
0.357143	2.80000	0.42	0.592255	3.2 Lg	0.65
0.392857	2.54545	0.52	0.408985	2.0 Lg	0.72
0.428571	2.33333	0.52	0.250606	1.1 Lg	0.72
0.464286	2.15385	0.54	0.201688	0.8 Lg	0.73
0.500000	2.00000	0.49	0.000000	0.0	0.70

Note: *Ld* GDP leads tourism income; *Lg* GDP lags tourism income

Table 9.9 VAR model estimates

$$\begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix} = \begin{pmatrix} -0.001 \\ +0.001 \end{pmatrix} + \begin{pmatrix} 1.023 & 0.003 \\ 0.468 & 0.291 \end{pmatrix} \begin{pmatrix} y_{1t-1} \\ y_{2t-1} \end{pmatrix} + \begin{pmatrix} -0.446 & -0.128 \\ 0.009 & -0.269 \end{pmatrix} \begin{pmatrix} y_{1t-2} \\ y_{2t-2} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix}$$

where: y_1 is GDP, and y_2 is tourism income. Sample range: [1982, 2007], effective number of observations $T = 26$, $corr(u_{1t}, u_{2t}) = 0.069$

Table 9.10 Diagnostics of the VAR model

R^2	0.63	0.21
Adjusted R^2	0.56	0.06
Residual sum of squares	0.002750	0.018395
Standard error of error term	0.011443	0.029596
F-statistic	8.897186	1.409434
Log likelihood	82.11291	57.40695
AIC Akaike	−5.931763	−4.031304
SIC Schwarz	−5.689821	−3.789362

VAR model statistics: Log likelihood: 147.9865, AIC: −10.61435, SIC: −10.13047, Determinant of the residuals covariance matrix (d.o.f adj.): 5.98E-08. Determinant of the residuals covariance matrix: 3.90E-08

Table 9.11 VAR model: autocorrelation, ARCH and normality diagnostics

Autocorrelation tests	ARCH effects test	Normality test
Pormanteau adj. test statistic (16 lags): 56.6144, *p*-value: 0.4519	Multivariate ARCH-LM test statistic (5 lags): 47.5341, *p*-value: 0.3698	JB test statistic for the GDP equation: 0.0638, *p*-value: 0.9886
LM test statistic (5 lags): 24.8379, *p*-value: 0.2077		JB test statistic for the tourism income equation: 0.6723, *p*-value: 0.7145

Note: No autocorrelation, ARCH effects and non-normality are evident. VAR is a well-behaved model, suitable for simulation

Table 9.12 Shocks and transmission mechanisms

Scenario	Shock/variable	Transmission mechanisms (TMs)
1	1% Shock in GDP and no shock in tourism income	TM1: effect on GDP TM2: effect on tourism income
2	No shock in GDP and 1% shock in tourism income	TM3: effect on GDP TM4: effect on tourism income

Table 9.13 Transmission mechanisms (impulse response functions)

Year	TM1	TM2	TM3	TM4
1	1.00	0.00	0.00	1.00
2	1.02	0.47	0.00	0.29
3	0.60	0.62	0.12	−0.18
4	0.10	0.35	0.17	−0.19
5	−0.24	−0.01	0.09	−0.08
6	−0.34	−0.21	0.00	−0.02
7	−0.24	−0.22	−0.06	0.02
8	−0.06	−0.12	−0.06	0.04
9	0.07	−0.01	−0.03	0.03
10	0.11	0.06	0.00	0.02
11	0.09	0.07	0.02	0.00
12	0.03	0.05	0.02	−0.01
13	−0.02	0.01	0.01	−0.01
14	−0.04	−0.02	0.00	−0.01
15	−0.03	−0.02	0.00	0.00

Note: Transmission mechanisms (TMs): TM1 refers to the response of GDP to its own stochastic shock. TM2 refers to the response of tourism income to the GDP shock. TM3 refers to the response of GDP to the tourism income shock. TM4 refers to the response of tourism income to its own stochastic shock. Duration is estimated approximately on visual inspection

Table 9.14 Dynamic convergence to equilibrium: trajectory path, maximum magnitude and duration

Transmission mechanisms	Trajectory path	Maximum magnitude	Maximum duration (in years)
TM1	Oscillating	1.00%	13–14
TM2	Oscillating	0.62%	12–13
TM3	Oscillating	0.15%	13–14
TM4	Oscillating	1.00%	6

Note: Transmission mechanisms (TMs) as defined in Table 9.13. Duration is estimated approximately on visual inspection.

References

Akaike H (1974) A new look at the statistical model identification. IEEE Trans Autom Control 19(6):716–723

Ballaguer J, Catavella-Jorda M (2002) Tourism as a long-run economic growth factor: the Spanish case. Appl Econ 34:877–888

Baxter M, King RC (1995) Measuring business cycles: approximate band-pass filters for economic time series. NBER Working Papers, No. 5022

Brown RL, Durbin J, Evans JM (1975) Techniques for testing the constancy of regression relationships over time. J R Stat Soc Series B 37:149–162

Chatfield C (1989) The analysis of time series. Chapman and Hall, London

Coshall JT (2000) Spectral analysis of international tourism flows. Ann Tourism Res 27:577–589

Croux C, Forni M, Reichlin L (2001) A measure of co-movement for economic variables: theory and empirics. Rev Econ Stat 83(2):232–241

Dickey DA, Fuller WA (1979) Distributions of the estimators for autoregressive time series with a unit root. J Am Stat Assoc 74:427–431

Dritsakis N (2004) Tourism as long-run growth factors: an empirical investigation for Greece using causality analysis. Tourism Econ 10(3):305–316

Durbarry R (2004) Tourism and economic growth: the case of Mauritius. Tourism Econ 10 (4):389–401

Engle RF (1982) Autoregressive conditional heteroscedasticity with estimates of variance of United Kingdom inflation. Econometrica 50:987–1008

Granger CWJ (1966) The typical spectral shape of an economic variable. Econometrica 34 (1):150–161

Granger CWJ, Hatanaka M (1964) Spectral analysis of economic time series. Princeton University Press, Princeton

Granger CWJ, Watson MW (1984) Time series and spectral methods in econometrics, vol II, Handbook of econometrics. North Holland and Elsevier Science, New York

Hannan EJ, Quinn BG (1979) The determination of the order of an autoregression. J R Stat Soc 41:190–195

Hodrick R, Prescott E (1997) Postwar US business cycles: an empirical investigation. J Money Credit Bank 29:1–16

Iacobucci A (2005) Spectral analysis for economic time series. In: Leskow J, Puchet M, Punzo LF (eds) New tools of economic dynamics, Lecture notes in economics and mathematical systems No. 551. Springer, Heidelberg, pp 203–219

Johansen S (1988) Statistical analysis of cointegration vectors. J Econ Dyn Control 12:231–254

Johansen S, Juselius K (1990) Maximum likelihood estimation and inference on cointegration. With applications to the demand of money. Oxf Bull Econ Stat 52:169–210

Johansen S, Juselius K (1992) Testing structural hypothesis in a multivariate cointegration analysis in PPP and the UIP for UK. J Econom 53:169–209

Johansen S, Juselius K (1994) Identification of the long-run and the short-run structure. An application of the ISLM model. J Econom 63:7–36

Levy D, Dezhbakhsh H (2003) On the typical spectral shape of an economic variable. Appl Econ Lett 10:417–423

MacKinnon JG, Haug AA, Michelis L (1999) Numerical distribution functions of likelihood ratio tests for cointegration. J Appl Econom 14:563–577

Narayan PK (2004) Economic impact of tourism on Fiji's economy: empirical evidence from the computable general equilibrium model. Tourism Econ 10(4):419–433

Oppenheim AV, Schafer RW (1999) Discrete-time signal processing. Prentice-Hall, Upper Saddle River, pp 468–471

Organisation for Economic Co-operation and Development (2000) Swiss Tourism Policy – a synthesis. http://www.oecd.org/dataoecd/39/50/33649503.pdf. Accessed 5 Feb 2009

Papatheodorou A (1999) The demand for international tourism in the Mediterranean region. Appl Econ 31:619–630

Papatheodorou A, Song H (2005) International tourism forecasts: time-series analysis of world and regional data. Tourism Econ 11(1):11–23

Parnisari B (2000) Does Switzerland share common business cycles with other European countries. Z Volkswirtsch Stat 136(1):45–78

Patterson K (2000) An introduction to applied econometrics. Palgrave, London

Schwarz G (1978) Estimating the dimension of a model. Ann Stat 6(2):461–464

Sims C (1980) Macroeconomics and reality. Econometrica 48:1–48

Song H, Li G (2008) Tourism demand modelling and forecasting – a review of recent research. Tourism Manage 29:203–220

Sugiyarto G, Blake A, Sinclair T (2003) Tourism and globalization: economic impact in Indonesia. Ann Tourism Res 30(3):683–702

Swiss Tourism in Figures (2008) Schweizer Tourismus Verband. http://www.swisstourfed.ch/index.cfm/fuseaction/sprachewechseln/id_sprache/3/path/1-6-87-343. Accessed 6 Feb 2009

World Economic Forum (2011), Tourism competitiveness: taking flight? http://www.weforum.org/en/knowledge/KN_SESS_SUMM_21316?url=/en/knowledge/KN_SESS_SUMM_21316. Accessed 5 Feb 2009

Wyer L, Forsyth P, Spurr R (2003) Inter-industry effects of tourism growth: implications for destination managers. Tourism Econ 9(2):117–132

Chapter 10
Dynamic Model of Economic Growth in a Small Tourism Driven Economy

Stefan F. Schubert and Juan G. Brida

10.1 Introduction

International tourism is one of the fastest growing industries, accounting for more than 10% of total international trade and almost half of total trade in services, and can be considered as one of the world's largest export earners. In many countries, foreign currency receipts from tourism exceeds currency receipts from all other sectors together. Thus, tourism, which is an alternative form of exports, contributes to the balance of payments through foreign exchange earnings and proceeds generated from tourism expansion.

Over the past decades, the importance of the tourism sector for the economy has been steadily increasing. International tourism is recognized to have a positive effect on the increase of long-run economic growth through different channels. First, tourism is a significant foreign exchange earner, allowing to pay for imported capital goods or basic inputs used in the production process. Second, tourism plays an important role in spurring investments in new infrastructure and competition between local firms and firms in other tourist countries. Third, tourism stimulates other economic industries by direct, indirect and induced effects. Fourth, tourism contributes to generate employment and to increase income. Fifth, tourism causes positive exploitation of economies of scale in national firms. Finally, tourism is an important factor of diffusion of technical knowledge, stimulation of research and development, and accumulation of human capital. These believes that tourism can promote or cause long-run economic growth it is known in the literature as the Tourism Led Growth Hypothesis (TLGH). This term was first introduced by Balaguer and Cantavella-Jordá (2002), but there are several previous studies of the TLGH, see Shan and Wilson (2001) and the references therein.

S.F. Schubert (✉) • J.G. Brida
Competence Centre in Tourism Management and Tourism Economics (TOMTE), School of Economics and Management, Free University of Bolzano, Piazza Università 1, 39100 Bolzano, Italy
e-mail: StefanFranz.Schubert@unibz.it

Á. Matias et al. (eds.), *Tourism Economics*,

DOI 10.1007/978-3-7908-2725-5_10,

Tourism is the leading source of foreign exchange in at least every third developing country. These counties have made tourism to be a priority sector, and this holds specially for small islands (see Durbarry 2004). In fact, there are several examples of small islands that depend heavily on international tourism revenue and where the tourism sector has received strong support from the government (see Louca 2006). The top ten nations ranked according to the contribution of tourism to GDP are all small islands (see WTTC 2008). Tourism has become a common development focus for many countries, and a large quantity of small tropical island economies reoriented their strategy of production from traditional export staples like sugar and bananas toward mass tourism development, related construction and financial services. It is not surprising that these microstates have chosen tourism as the engine of development because they suffer many limitations. These include lack of diversification because of resource scarcity, income volatility because of extreme openness and export concentration, small market size, and high transport costs. Mihalic (2002) shows several advantages of tourism as a development strategy compared to the export of goods and traditional services. Some of these advantages are (a) natural and socio-cultural attractiveness, (b) products produced locally can command a higher price sold locally to tourists than when exported, and (c) some perishable goods can only be sold to tourists in the domestic market.

As pointed out by Croes (2006), tourism provides advantages in overcoming the smallness of a country in three ways. First, it provides the volume to overcome insufficient market demand enabling greater efficiency and providing economies of scale for more goods and services which decreases the unit costs of production. Second, it increases competition by encouraging new entrants in the market place, which provides a positive impact on the price level of goods and services. Third, tourism, by providing scale and competition together with greater consumer choice and trade openness, can raise the standard of living and thus improve the quality of life in a small country.

Some empirical studies present strong evidence of a positive relationship between tourism and economic growth (see Durbarry (2004) for Mauritius; Louca (2006) for Cyprus; Noriko and Mototsugu (2007) for the Amami islands in Japan; and Vanegas and Croes (2000, 2003) for Aruba). McElroy (2003, 2006) presents empirical evidence suggesting that successful tourism-driven small islands represent a special insular development case and an alternative to migration, remittances, aid and bureaucracy. The link between the growth of the tourism industry and overall economic growth has attracted considerable interest from economic researchers, at both theoretical and empirical levels. The dominant view is that the tourism industry may require major investments in basic infrastructure such as transport, accommodation, water supply and health care. The seminal study of Sinclair (1998) points out that countries potentially benefit from increasing expenditures on tourism. Research in this topic is very recent and non-conclusive. Most of the papers are empirical studies investigating the TLGH for a particular country using econometric techniques like the Granger causality test or Johansen cointegration (see Balaguer and Cantavella-Jordá 2004; Corténez-Jiménez and

Pulina 2006; Dritsakis 2004; Gunduz and Hatemi 2005; Katircioglu 2009; Durbarry 2004; Louca 2006; Noriko and Mototsugu 2007; Oh 2005; Kim et al. 2006; Soukiazis and Proença 2008; Shan and Wilson 2001). The majority of this papers supports the TLGH. In a comprehensive study, Brau et al. (2007) found that in small countries, specialization in tourism is beneficial for growth. An econometric study done by Lanza et al. (2003) suggests that growth of real incomes may be supported by specializing in tourism, as the terms of trade shift in favor of the specializing country.

Despite the arguments and believes presented in favor of the important impacts of tourism on economic growth, there are very few growth models including tourism as a sector and analyzing the impacts of changes in tourism growth on long-run economic growth. The following are some of the few exceptions.

Hazari and Sgro (1995) investigate the relationship between growth in tourism, capital accumulation, per capita consumption and the terms of trade in a dynamic setting. They show that an increase of the international demand for tourism produces a positive effect on long-run economic growth, and that in the small country case welfare necessarily increases with the growth in tourist consumption of non-traded goods. Hazari and Sgro (2004:Chap. 12) use a Ramsey type model with tourism demand depending on tourism services' price and foreign income, where tourism revenues are exclusively used to buy foreign capital, and where the economy comprises two sectors, one producing a traded capital good and the other producing non-traded services, consumed by domestic residents and tourists. They show that tourism enables the host country to import growth from abroad. However, do not analyze any transitional dynamics, focussing solely on the steady state, where the price of tourism grows at a constant rate. Chao et al. (2005) examine the impact of tourism on welfare in a cash-in-advance economy showing that an expansion in tourism produces an increase in the price of the non-traded good. This gives rise to a terms-of-trade improvement. When the gain from the terms-of-trade improvement dominates (does not dominate) the loss from the consumption distortion, tourism is welfare-improving (welfare-reducing). Nowak et al. (2007) provide a theoretical explanation of the tourism-led growth hypothesis. The key link are capital imports, financed with tourism earnings. However, they restrict their analysis solely on the balanced growth steady-state equilibrium. A recent paper by Chao et al. (2008) examines the effects of tourism on employment, capital accumulation and resident welfare for a small open economy with unemployment, showing that a tourism boom improves the terms of trade and increases employment, but lowers capital accumulation. This is due to shifts of resources between sectors; see also Schubert and Brida (2008). In Chao et al. (2006) the authors have demonstrated that an expansion of tourism may reduce the capital stock, thereby lowering welfare in a two-sector model with a capital-generating externality.

All these models abstract from the possibility of lending/borrowing abroad[1] and thus any current account dynamics by requiring that imports of foreign capital have

[1]An exception is Schubert and Brida (2008).

to be immediately financed with tourism earnings. While this is a useful simplification in the process of modeling, it is of course a severe restriction. Moreover, most of the models so far concentrate on steady-state growth and abstract from transitional dynamics. The economy is thus always assumed to be on its balanced growth path. While this assumption has its merits and allows to address important issues in a tractable way, is obviously implausible and inconsistent with the empirical evidence to convergence speeds[2] that suggest that economies spend most of their time adjusting to structural changes. In this paper, we overcome these two shortcomings. While our model is a variant of the class of tourism-led growth models, it allows for foreign borrowing (or lending) on the international financial market to finance investment and consumption expenditures, and addresses the empirically important issue of transitional dynamics.

To analyze the effects of an increase in economic growth abroad on a tourism country or region, we develop a simple model of a small open economy, which is completely specialized in the production of tourism services, using a simple AK technology. We explicitly incorporate the economy's current account and impose a solvency condition, ruling out Ponzi schemes of unsustainable development.

Because the economy is completely specialized, this model is often referred to as an 'island economy'. The assumption of complete specialization is of course an extreme one, but it allows us to use a one-sector model to highlight the dynamic effects of tourism growth and to keep the analysis as simple as possible. Despite its simplicity, our model is able to replicate the stylized facts reported above.

We find that in contrast to standard endogenous growth models of small open economies, our model shows transitional dynamics. Following an increase in the growth rate of foreign income, which translates in a faster growing demand for the economy's tourism services, investment in the tourism industry rises, thus raising the growth rates of the capital stock and of tourism output. However, the increase in the capital stock's and thus output's growth rate falls short of the increase in tourism demand's growth, calling for a gradually increasing price of tourism services to balance supply and demand. The terms of trade of the tourism country improve. The growing price in turn increases the return on capital and boosts investment, speeding thus up economic growth in the island economy. Thus, the model is able to replicate the sluggish adjustment of tourism economies and increasing terms of trade to an increase in the growth rate of tourism demand.

The rest of the paper is structured as follows. The following section sets up the model of a small island economy and describes the economic framework. We then turn to the discussion of the macroeconomic equilibrium. The next section describes the dynamic properties of the equilibrium and discusses the economy's steady-state, followed by a detailed analysis of an increase in the growth rate of tourism demand. Finally, our main findings are summarized.

---

[2]The benchmark speed of adjustment is around 2–3% per annum (see Mankiw et al. 1992; Barro and Sala-i-Martin 1992; and others). Of course, these estimates have been challenged, but the consensus remains that the speed of adjustment may be somewhat higher than originally suggested, but probably less than 6% per annum; see, e.g., Islam (1995) and Evans (1997).

10.2 The Model

The small open economy comprises a large number of identical households and competitive firms, which are completely specialized in the production of tourism services. Households supply a fixed amount of labor, $l = \bar{l}$, and consume an imported good. Firms produce tourism services, T, using capital, K, and labor, l, as factor inputs, using a simple AK technology, i.e., $T = AK$.[3] The imported good can be used for consumption, C, and investment, I, including installation costs, resulting in the investment cost function $\Phi(I, K)$. Both households and firms shall be represented by a representative household and a representative firm, respectively. The economy is small in the world financial markets, taking the world interest rate r as given.[4] However, tourism services produced in the economy are different from tourism services supplied elsewhere. Therefore, foreign demand Z for domestically produced tourism services is a decreasing function of the relative price of domestically produced tourism services in terms of the import good, p, i.e., the terms of trade of the domestic economy. Furthermore, Z increases with foreign's income, Y. For analytical purposes, we assume the following iso-elastic tourism demand function:

$$Z = \alpha Y^{\sigma} p^{-\varepsilon},$$

where σ is the foreign income elasticity and ε the price elasticity of tourism demand, respectively.[5] α represents a demand shift parameter. Since the country is small, it cannot influence the rest of the world's income Y, but takes its evolution as given. World's income grows over time at the constant rate n according to $\dot{Y}/Y \equiv n$.[6]

Without loss of generality we can consolidate households and firms into a representative consumer-producer, called representative agent. The agent accumulates traded foreign bonds (assets), B, denoted in terms of the imported good, that pay the

[3]The constant supply of labor of domestic households is contained in the A expression. The AK technology can be justified by referring to the replication argument. Of course, the use of more capital (hotels, resorts, etc.) will require more labor, too. As domestic residents supply labor at a fixed quantity, increasing labor demand will be met by employing foreign workers, as can be frequently observed in reality. To keep the model as simple as possible, one can think K as being broadly defined, including foreign labor supply. This too justifies assuming an AK technology. We also assume away externalities in production (which can also serve as a justification of the AK model), because they are not relevant for the issue at hand. For more on the AK technology, see, e.g., Turnovsky (2003).

[4]While this assumption may not be reasonable for some developing countries, it clearly holds for a region within a country, to which the model applies equally well.

[5]There is a lot of empirical evidence that the income elasticity of tourism demand is well above unity (see, e.g., Syriopoulos (1995), and Lanza et al. (2003), reporting income elasticities in the range between 1.75 and 7.36), and that the price elasticity is quite low (Lanza et al. 2003) derived price elasticities in the range between 1.03 and 1.82). See also the comparison of different studies on elasticities in Garín-Muños (2007).

[6]Time derivatives will be denoted by dots above the variable concerned, $\dot{x} \equiv \frac{dx}{dt}$.

exogenously given world interest rate, r. The agent's flow budget constraint in terms of the foreign (imported) good is thus given by

$$\dot{B} = pAK - C - \Phi(I,K) + rB. \tag{10.1a}$$

Since the domestic economy is completely specialized in tourism production, both the consumption good and physical capital must be imported from abroad. Capital formation (investment) is associated with convex adjustment costs of the Hayashi (1982) type, expressed in terms of the foreign good, i.e.,

$$\Phi(I,K) = I\left(1 + \frac{h}{2}\frac{I}{K}\right). \tag{10.1b}$$

The linear homogeneity of the investment function in I and K is necessary to sustain an equilibrium of ongoing growth. Given the depreciation rate δ, which may be quite high as hotels and resorts require constant refurbishing, the change in the capital stock and investment are related by

$$\dot{K} = I - \delta K. \tag{10.1c}$$

The representative agent chooses the level of consumption of the imported good, C, the rates of investment, I, and of bond accumulation, to maximize his intertemporal utility function

$$W \equiv \int_0^\infty \frac{1}{\gamma} C^\gamma e^{-\beta t} dt, \quad -\infty < \gamma < 1, \tag{10.2}$$

subject to the constraints (10.1) and the historically given initial stocks of capital $K(0) = K_0$ and traded bonds $B(0) = B_0$. The instantaneous utility function is of the constant elasticity of substitution form, with elasticity $1/(1-\gamma)$. β is the rate of consumer time preference, taken to be constant. The Hamiltonian of the agent's optimization problem can be written as

$$H \equiv \frac{1}{\gamma} C^\gamma + \lambda[pAK - C - \Phi(I,K) + rB] + \zeta[I - \delta K],$$

where λ is the shadow value of wealth in the form of traded foreign bonds and can be interpreted as the marginal utility of wealth in the form of traded bonds, and ζ measures the shadow value of capital. Performing the optimization gives rise to the following optimality conditions:

$$C^{\gamma-1} = \lambda, \tag{10.3a}$$

$$1 + h\frac{I}{K} = \frac{\zeta}{\lambda} \equiv q, \tag{10.3b}$$

$$\beta - \frac{\dot{\lambda}}{\lambda} = r, \tag{10.3c}$$

$$\frac{pA}{q} + \frac{\dot{q}}{q} + \frac{(q-1)^2}{2qh} - \delta = r, \tag{10.3d}$$

together with the transversality conditions

$$\lim_{t\to\infty} \lambda B e^{-\beta t} = \lim_{t\to\infty} \lambda q K e^{-\beta t} = 0. \tag{10.3e}$$

Equation (10.3a) equates the marginal utility of consumption of the imported good to the marginal utility of wealth in the form of foreign bonds. Equation (10.3b) gives rise to a Tobin q theory of investment. It equates the marginal cost of investment (new capital) to its market price, both expressed in terms of the foreign good.[7] Equations (10.3c) and (10.3d) are dynamic no-arbitrage conditions. They equate the rates of return on consumption and of investment in capital to the rate of return on bonds, i.e., the interest rate. The rate of return on capital comprises four elements: The first is the dividend yield (marginal value product of capital over its market price), the second the capital gain, the third reflects the fact that an additional benefit of a higher capital stock is to reduce the installation costs, which depend on (I/K), associated with new investment, whereas the forth represents a loss due to the depreciating capital stock.

Taking the time derivative of (10.3a) and combining with (10.3c) gives the consumption growth rate

$$\frac{\dot{C}}{C} = \frac{\beta - r}{\gamma - 1} \equiv \psi_C \tag{10.4a}$$

which is solely determined by the preference parameters β and γ and the world interest rate r. The agent's consumption evolves therefore according to

$$C(t) = C(0)e^{\psi_C} \tag{10.4b}$$

where the initial rate of consumption $C(0)$ is to be endogenously determined in macroeconomic equilibrium.

[7] Note that q is the ratio of the marginal utility of an additional unit of installed capital, γ, over the marginal utility of traded bonds, λ, which can also be interpreted as the marginal cost of an additional unit of uninstalled capital, because one unit of uninstalled capital trades for one foreign bond.

10.3 Macroeconomic Equilibrium

The macroeconomic equilibrium of this intertemporal general equilibrium model is defined to be a situation in which all the planned supply and demand functions are derived from optimization behavior, the economy is continually in equilibrium, and all anticipated variables are correctly forecasted. We will call this concept a "perfect foresight equilibrium".[8] In particular, macroeconomic equilibrium requires the market for domestically produced tourism services to be continuously cleared, that is

$$AK = \alpha Y^{\sigma} p^{-\varepsilon}, \tag{10.5}$$

what is guaranteed by proper adjustments of the relative price p.

The equilibrium dynamics of the capital stock follow from (10.1c) and (10.3b) as

$$\frac{\dot{K}}{K} = \frac{I}{K} - \delta = \frac{q-1}{h} - \delta.$$

Continuous goods market clearance (see (10.5)) implies

$$\frac{\dot{K}}{K} = \sigma \frac{\dot{Y}}{Y} - \varepsilon \frac{\dot{p}}{p}.$$

Hence, the capital stock evolves according to

$$\frac{\dot{K}}{K} = \frac{q-1}{h} - \delta = \sigma \frac{\dot{Y}}{Y} - \varepsilon \frac{\dot{p}}{p}, \tag{10.6}$$

which can be solved for the rate of change in the relative price p. Thus, (10.6) and (10.3d) give the following equilibrium dynamics for the relative price p and the market price of installed capital, q:

$$\frac{\dot{p}}{p} = \frac{1}{\varepsilon}\left(\sigma n + \delta - \frac{q-1}{h}\right) \tag{10.7a}$$

$$\frac{\dot{q}}{q} = r + \delta - \frac{pA}{q} - \frac{(q-1)^2}{2qh}, \tag{10.7b}$$

where we have made use of the fact that $\dot{Y}/Y \equiv n$. System (10.7) implies constant steady-state values, denoted by a tilde "~", for p and q, hence the steady-state growth rate of the capital stock is

[8] See, e.g., Brock and Turnovsky (1981:180).

$$\frac{\dot{\tilde{K}}}{\tilde{K}} = \sigma n.$$

The linearized version of system (10.7) is

$$\begin{pmatrix} \dot{q} \\ \dot{p} \end{pmatrix} = \begin{pmatrix} (r - \sigma n) & -A \\ -\dfrac{\tilde{p}}{\varepsilon h} & 0 \end{pmatrix} \begin{pmatrix} q - \tilde{q} \\ p - \tilde{p} \end{pmatrix}. \tag{10.8}$$

Because the determinant of the matrix in (10.8) is negative, the system has one negative and one positive eigenvalue, denoted by $\mu_1 < 0$ and $\mu_2 > 0$, and is therefore saddle-path stable. The stable root μ_1 is the economy's speed of convergence during transition to steady state. The eigenvalues satisfy $\mu_1 + \mu_2 = r - \sigma n > 0$.[9] The stable solutions for the relative price, p, and the market price of capital, q, are:[10]

$$p(t) - \tilde{p} = (p_0 - \tilde{p})e^{\mu_1 t}, \tag{10.9a}$$

$$q(t) - \tilde{q} = \frac{A}{r - \sigma n - \mu_1}(p_0 - \tilde{p})e^{\mu_1 t}, \tag{10.9b}$$

from which the stable saddle-path

$$q(t) - \tilde{q} = \frac{A}{r - \sigma n - \mu_1}(p(t) - \tilde{p}), \tag{10.10}$$

follows. It is a positively sloped line in (p, q)-space.

Because along the equilibrium balanced growth path $\tilde{K}$ and $\alpha \tilde{Y}^{\sigma} \tilde{p}^{-\varepsilon}$ (tourism demand) grow at rate σn, it is useful to define the "scale-adjusted" variables

$$k \equiv \frac{K}{Y^{\sigma}}, \quad c \equiv \frac{C}{Y^{\sigma}}, \quad b \equiv \frac{B}{Y^{\sigma}}.$$

Written in scale-adjusted form, the dynamics for the capital stock are

$$\dot{k} = \left(\frac{q-1}{h} - \delta - \sigma n\right)k. \tag{10.11}$$

Linearizing around the steady state and using (10.9b) results in

---

[9]Note that the transversality condition $\lim_{t\to\infty} \lambda q K e^{-\beta t} = 0$ requires $r > \sigma n$.

[10]Note that because of goods market clearance (10.5) $p(0)$ cannot change upon a change in the growth rate of foreign income, which leaves the time $t = 0$ level of demand constant. Hence, $p(0) = p_0$ is historically given. In contrast, the market price of installed capital, q, is free to jump upon arrival of new information.

$$\dot{k} = \frac{\tilde{k}}{h}(q - \tilde{q}) = \frac{\tilde{k}A}{h(r - \sigma n - \mu_1)}(p_0 - \tilde{p})e^{\mu_1 t}.$$

Thus, k evolves according to

$$k(t) = \tilde{k} + \frac{\tilde{k}A}{\mu_1 h(r - \sigma n - \mu_1)}(p_0 - \tilde{p})e^{\mu_1 t} \tag{10.12}$$

The agent's flow budget constraint (10.1a), i.e., the current account, becomes[11]

$$\dot{b} = (r - \sigma n)b + \left(pA - \frac{q^2 - 1}{2h}\right)k - c. \tag{10.13}$$

Linearizing around steady state, solving and invoking the transversality conditions gives the stable evolution for scale-adjusted bonds b (see the Appendix) and the initial level of scale-adjusted consumption $c(0)$

$$b(t) = \frac{L}{\mu_1 - r + \sigma n}e^{\mu_1 t} - \frac{c(0)}{\psi_C - r}e^{(\psi_C - \sigma n)t} - \frac{M}{r - \sigma n} \tag{10.14a}$$

$$c(0) = (r - \psi_C)\left(b(0) + \frac{L}{r - \sigma n - \mu_1} + \frac{M}{r - \sigma n}\right). \tag{10.14b}$$

Equation (10.14b) is effectively the economy's intertemporal budget constraint and reflects the present value of resources available for initial consumption after the investment needs along the transitional path have been met. The term $M/(r - \sigma n)$ reflects the resources available for consumption if the economy were to reach the new steady state instantaneously, while $L/(r - \sigma n - \mu_1)$ reflects an adjustment due to the fact that the new steady state is reached only gradually. We observe from (10.14a) that traded bonds are subject to transitional dynamics, in the sense that their growth rate $\dot{b}/b$ varies through time. There are two cases. First, if $\psi_C < \sigma n$, $b \to -M/(r - \sigma n)$ so that asymptotically bonds $B(t)$ grow at the same rate as capital, σn. Second, if $\psi_C > \sigma n$, the scale-adjusted stock of traded bonds grows at the rate $\psi_C - \sigma n$, with the aggregate stock of traded bonds, B, growing at the rate ψ_C. Which case is relevant depends critically upon the size of the consumer rate of time preference relative to the rate of return on investment opportunities, among other parameters.[12]

Finally, we turn to the growth rate of the capital stock,

$$\frac{\dot{K}}{K} \equiv \psi_K = \sigma n - \frac{\dot{p}}{p} = \frac{q - 1}{h} - \delta.$$

[11] See the Appendix.

[12] This issue is discussed in detail in Turnovsky (1996).

Linearizing around the steady state, using the stable solution (10.9b) for q, we obtain

$$\psi_K = \tilde{\psi}_K + \frac{A}{h(r - \sigma n - \mu_1)}[p_0 - \tilde{p}]e^{\mu_1 t} \tag{10.15}$$

with $\tilde{\psi}_K = \sigma n$. Thus we have $\text{sgn}(\psi_K - \tilde{\psi}_K) = \text{sgn}[p_0 - \tilde{p}]$. If the initial relative price p_0 falls below its steady-state level, the growth rate of the capital stock during transition is lower than along the steady-state balanced growth path.

10.4 Analysis of an Increase in Foreign Income Growth

10.4.1 Steady State Changes

Since our model assumes perfect foresight, the dynamic evolution of the economy and hence the transitional adjustment is determined in part by agents' expectations of the ultimate steady-state. It is therefore convenient to start our analysis with the investigation of the long-run steady-state effects of an increase in the growth rate of foreign income, $\dot{Y}/Y \equiv n$. The balanced growth rate of the capital stock (and thus of tourism production, $\tilde{\psi}_T$) changes according to

$$\frac{d\tilde{\psi}_K}{dn} = \sigma > 0, \tag{10.16a}$$

whereas the consumption growth rate ψ_C remains constant.

Since the relative price of tourism remains constant in steady state, (10.6) immediately gives the steady state value of the market price of capital

$$\tilde{q} = 1 + h(\sigma n + \delta).$$

Hence, the steady-state change of q is

$$\frac{d\tilde{q}}{dn} = h\sigma > 0. \tag{10.16b}$$

Differentiating the no-arbitrage condition (10.3d) at steady state, using (10.16b), the steady-state change of the relative price of tourism immediately follows as

$$\frac{d\tilde{p}}{dn} = \frac{h\sigma}{A}(r - \sigma n) > 0. \tag{10.16c}$$

The intuition about these steady-state changes is straightforward: An increase in tourism demand growth leads to an equal increase in steady-state tourism production growth, requiring an equal increase in the balanced growth rate of the capital stock, too, because $\psi_T = \psi_K$. In turn, a faster growing capital stock requires an increase in the market price of installed capital, $\tilde{q}$. Finally, a permanently booming tourism demand leads to a higher relative price $\tilde{p}$ of tourism production, i.e., to an improvement of the economy's terms of trade. The reason for this can be found in the transitional dynamics and is described below.

As can be seen from the steady-state changes, the effects of a change in foreign income growth n on the small island economy are the more pronounced the higher the income elasticity of tourism demand σ. On the other hand, the price elasticity ε does not affect the steady state, but the speed of convergence, μ_1. It can be shown that an increase in price elasticity ε lowers the speed of convergence.[13]

10.4.2 Impact Effects

Having described the long-run effects of higher tourism demand growth, we turn to the short-run (impact) effects.

Since the capital stock K_0 and hence tourism production is historically given and because only the growth rate n changes, but not the level of Y, the impact effect on tourism production as well as on the price of tourism is zero, i.e.,

$$\frac{dT(0)}{dn} = \frac{dK(0)}{dn} = \frac{dp(0)}{dn} = 0. \tag{10.17a}$$

But the expectation of a higher long-run price of tourism services increases the expected future dividend yield, resulting in an increase in the market price of installed capital, as for investors the capital stock becomes more valuable. This can be seen by differentiating (10.9b) at time 0, inserting the steady-state changes and simplifying

$$\frac{dq(0)}{dn} = \frac{d\tilde{q}}{dn} - \frac{A}{r - \sigma n - \mu_1}\frac{d\tilde{p}}{dn} = -\mu_1 h\sigma > 0. \tag{10.17b}$$

Note that this initial reaction is entirely forward-looking, as it depends on the new steady-state of the economy. The adjustment of q at time $t = 0$ ensures no-arbitrage between capital and traded bonds thereafter. Equation (10.9a) implies that the relative price of tourism will rise over time, as $\dot{p}(0) > 0$. Since q increases, investment expenditures and thus capital accumulation both rise. The impact on the capital stock's (and thus tourism production's) growth rate can be derived from (10.15).

[13] To see this, consider the characteristic equation of (10.16), $\mu^2 - \mu(r - \sigma n) - A\tilde{p}/(\varepsilon h) = 0$, from which it follows $d\mu_1/d\varepsilon = -A\tilde{p}/[\varepsilon^2 h(2\mu_1 - (r - \sigma n))] > 0$, where $\mu_1 < 0$. Hence μ_1 becomes smaller in absolute terms.

$$\frac{d\psi_K(0)}{dn} = \frac{d\psi_T(0)}{dn} = \frac{d\tilde{\psi}_K}{dn} - \frac{A}{h(r - \sigma n - \mu_1)}\frac{d\tilde{p}}{dn} = -\frac{\sigma\mu_1}{r - \sigma n - \mu_1} > 0. \quad (10.17c)$$

The initial response of scale-adjusted consumption $c(0)$ follows from (10.14b), and is given by

$$\frac{dc(0)}{dn} = (r - \psi_C)\left[\frac{1}{r - \sigma n - \mu_1}\frac{dL}{dn} + \frac{1}{r - \sigma n}\frac{dM}{dn}\right]. \quad (10.17d)$$

The effect of an increase in the growth rate of foreign income on initial consumption is ambiguous and depends upon the net effect of the overall resources after investment needs have been met. This stands in sharp contrast to the consumption response upon an increase in the level of tourism demand rather than its growth rate, where it can be shown that agents increase their consumption, see Schubert and Brida (2009).

10.4.3 Dynamic Transition

We now turn to the transitional dynamics of the economy. Since the increase in foreign income growth does not affect the consumption growth rate ψ_C, after its impact level response consumption continues to grow at the same rate as before the shock emerged. However, as (10.15) reveals, the growth rate of the capital stock, although its increase on impact, is lower than in the new steady state. Thus, higher foreign income growth transmits slowly to the economy. The time path of the growth rate of the capital stock, ψ_K, is shown in Fig. 10.1. After its initial upward jump from point A to point B, it approaches the new balanced growth rate $\tilde{\psi}_K$ monotonically from below.

Because the capital stock and thus production of tourism services grow at a rate lower than the growth rate of demand induced by foreign income growth ($\psi_K(t) = \psi_T(t) < \sigma n$), goods market clearance requires the price of tourism services and thus the terms of trade to increase over time to maintain tourism demand on the level of tourism production. The gradually rising relative price of tourism services follows formally from (10.9a). In light of (10.6), the growing price of tourism services introduces a drag on the capital growth rate. As p rises over time, the value of the marginal product of capital in terms of the foreign good, pA, increases, making capital more attractive and thus raising its market price q. In turn, the gradually increasing q raises investment expenditures and speeds up the growth rate of the capital stock and hence of tourism production. As thus tourism production growth becomes higher over time, the gap between ψ_T and σn becomes smaller, slowing down the growth rate of the relative price of tourism services, $\dot{p}/p$, to keep tourism demand in line with supply. These dynamic adjustments are illustrated in Fig. 10.2. At time 0, when n rises, the market price of installed capital, q, jumps from the original steady state, point C, up to point D, located the new saddle-path SS.

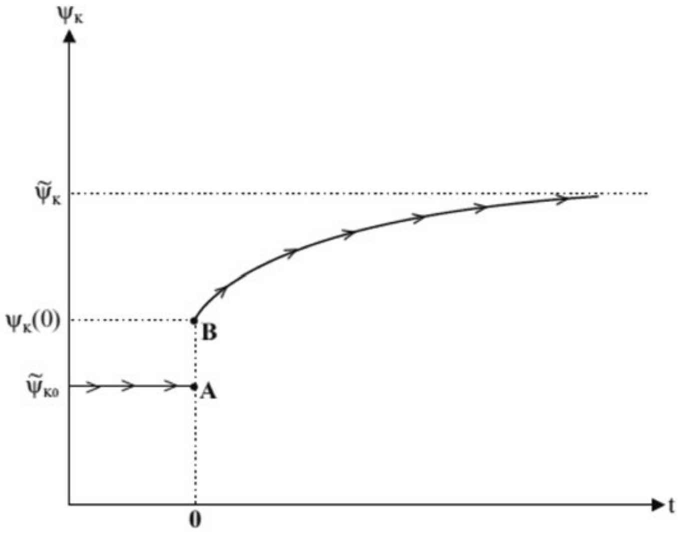

Fig. 10.1 Growth rate of capital stock

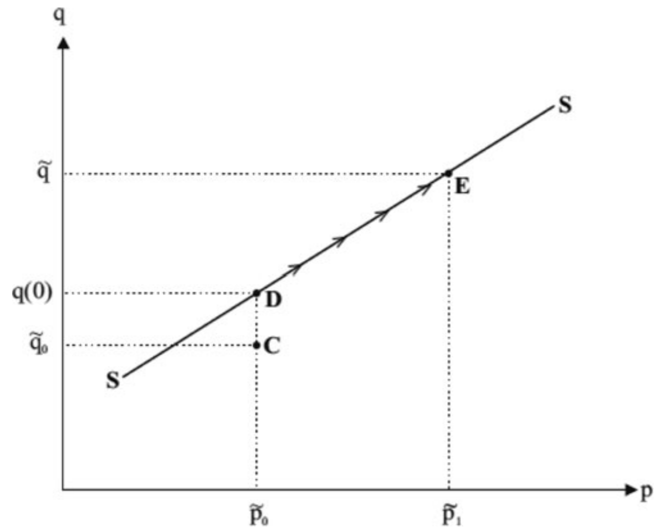

Fig. 10.2 Dynamics of *p* and *q*

From thereon, the economy moves along *SS*, with gradually increasing prices q and p. Eventually, the small island economy settles down at the new steady state, point E, where all transitional adjustments are completed and the economy grows with rate $\tilde{\psi}_K = \sigma n$ along its balanced growth path.

It is worth investigating the reason why the small island economy, producing tourism services, shows transitional dynamics, which stands in sharp contrast to the standard endogenous growth small open economy model, see, e.g., Turnovsky (1996), in which the economy is always on its balanced growth path. To understand why there are transitional dynamics in our model, suppose on the contrary that the economy instantaneously grows at its new balanced growth rate, implying thus via goods market clearance a constant and unchanged relative price of tourism services, $p = p_0$. For a higher growth rate of capital to be attractive, a higher market price of installed capital is required. But without transitional dynamics, q would be always at steady state. Thus, given the constancy of the tourism price p, the no-arbitrage condition (10.3d) would be violated, and the resulting situation would not be an equilibrium. In other words, without an increasing price p, the return on capital would not change, and investors would not have an incentive to increase the investment rate, which would be necessary to support faster growth. Hence, because goods market clearance requires that on impact the relative price of tourism services, p, cannot change, but the economy must ultimately reach its new balanced growth path, transitional dynamics necessarily emerge. Intuitively, it takes time to meet an increase in the growth rate of tourism demand, because it is costly to rise the speed at which tourism facilities are constructed. Therefore, a booming tourism demand will lead to transitional dynamics, where higher production growth is accompanied by price increases (terms of trade improvements), as one can observe in reality.

Note also that adjustments in the relative price of tourism services, p, are not able to isolate the economy from foreign income growth changes. This would require p to grow at rate $(\sigma/\varepsilon)n$, to keep tourism demand growth in line with the (given) growth in tourism production. But then, because of ongoing changes in p, the marginal value product of capital pA changes, thus, given unchanged capital stock growth and hence a constant q, violating again the no-arbitrage condition for capital. Hence, contrary to conventional wisdom, a flexible relative price (real exchange rate) is not able to protect the island economy from changes in foreign growth, as long as they show up in changes in tourism demand growth.

We can thus summarize that our simple model is able to support the tourism led growth hypothesis (TLGH). Ongoing growth in tourism demand enables the small island economy to grow, too, as the revenues from higher future exports of tourism services relax the economy's intertemporal budget constraint. The small country can thus increase it's investments, resulting in a faster growing capital stock, which in turn raises tourism service production. The model also confirms the theoretical and empirical findings of earlier papers (cited in the introduction, e.g., Lanza et al. 2003) that the country's terms of trade increase during transition.

10.5 Conclusion

In this chapter we studied the effects of an increase in foreign income growth, translating in an increase in the growth rate of tourism demand, on economic key variables of a small island economy that is completely specialized in the production tourism services by means of an AK technology. We found that an increase in the growth rate of foreign income initiates transitional dynamics, as the economy cannot (1) immediately move along its new balanced growth rate and (2) be isolated from the rest of the world's developments via proper price adjustments. The increase in foreign income growth, leading to a boom in tourism demand, is met by a higher rate of capital accumulation and thus tourism production and a gradually increasing price of tourism services (i.e., the terms of trade), to keep demand in line with supply. The increasing price of tourism services makes investments into tourism production more attractive, speeding thus up its growth rate. Hence, as time passes, the island economy experiences a phase of increasing growth. Eventually, the economy reaches its new balanced growth path, on which prices remain constant and where the economy's growth rate is proportional to the growth rate abroad.

Despite the simplicity of the model, it highlights the dynamic effects and the transmission of changes in growth abroad and replicates some stylized facts. It thus can serve as a starting point for more sophisticated models, in which e.g., a second (industrial) sector to the tourism sector may be added.

Of course, it will be important to contrast the model with data, that is to test if growth in tourism demand really causes economic growth in a small island economy. While this is an interesting topic on its own, it is beyond the scope of this paper and left for further research.

Appendix

Derivation of $\dot{b}(t)$

Time differentiating $b \equiv B/Y^{\sigma}$ gives

$$\dot{b} = \frac{\dot{B}}{Y^{\sigma}} - \sigma \frac{B}{Y^{\sigma}} \frac{\dot{Y}}{Y} = \frac{\dot{B}}{Y^{\sigma}} - \sigma n b. \tag{10.18}$$

Dividing (10.1a) by Y^{σ}, noting that from (10.3b) we can write $\Phi(I, K) = \frac{q^2-1}{2h} K$, we get

$$\frac{\dot{B}}{Y^{\sigma}} = pA \frac{K}{Y^{\sigma}} - \frac{C}{Y^{\sigma}} - \frac{q^2 - 1}{2h} \frac{K}{Y^{\sigma}} + r \frac{B}{Y^{\sigma}}. \tag{10.19}$$

Inserting (10.19) into (10.18), applying the definitions

$$k \equiv \frac{K}{Y^{\sigma}}, \quad c \equiv \frac{C}{Y^{\sigma}}, \quad b \equiv \frac{B}{Y^{\sigma}}$$

and rearranging terms results in

$$\dot{b} = (r - \sigma n)b + \left(pA - \frac{q^2 - 1}{2h}\right)k - c, \tag{10.20}$$

which is (10.13) in the text.

Solution of $b(t)$

Linearizing (10.13) around a hypothetical steady-state, noting that $\dot{\tilde{b}} = 0$, we get

$$\begin{aligned} \dot{b} - (r - \sigma n)(b - \tilde{b}) = A\tilde{k}(p - \tilde{p}) - \left(\tilde{p}A - \frac{\tilde{q}^2 - 1}{2h}\right)(k - \tilde{k}) \\ - \frac{\tilde{q}\tilde{k}}{h}(q - \tilde{q}) - (c - \tilde{c}). \end{aligned} \tag{10.21}$$

Using $c(t) = c(0)\exp[(\psi_C - \sigma n)t]$, the stable solutions for k, (10.12) and q, (10.9b), and the definition of the steady-state of b,

$$-(r - \sigma n)\tilde{b} = \left(\tilde{p}A - \frac{\tilde{q}^2 - 1}{2h}\right)\tilde{k} - \tilde{c},$$

Equation (10.21) can be written as

$$\dot{b} - (r - \sigma n)b = Le^{\mu_1 t} - c(0)e^{(\psi_C - \sigma n)t} + M. \tag{10.22}$$

L and M are defined as

$$L \equiv \left[A\tilde{k} + \left(\tilde{p}A - \frac{\tilde{q}^2 - 1}{2h} + \mu_1\tilde{q}\right)\frac{\varepsilon\tilde{k}}{\tilde{p}}\right](p_0 - \tilde{p}) \tag{10.23}$$

$$M \equiv \left[\tilde{p}A - \frac{\tilde{q}^2 - 1}{2h}\right]\tilde{k} \tag{10.24}$$

where for notational convenience we have made use of the fact that from the system's eigenvectors it follows that

$$-\frac{\mu_1 \varepsilon h}{\tilde{p}} = \frac{A}{r - \sigma n - \mu_1} > 0.$$

L denotes the difference between output and investment costs along the stable saddle path. M measures the difference between steady-state production and steady-state investment costs.

Multiplying (10.22) by the integrating factor $e^{-(r-\sigma n)t}$, and performing the integration yields

$$\begin{aligned} b(t) = & \left[b_0 - \frac{L}{\mu_1 - r + \sigma n} + \frac{c(0)}{\psi_C - r} + \frac{M}{r - \sigma n}\right] e^{(r-\sigma n)t} \\ & + \frac{L}{\mu_1 - r + \sigma n} e^{\mu_1 t} - \frac{c(0)}{\psi_C - r} e^{(\psi_C - \sigma n)t} - \frac{M}{r - \sigma n} \end{aligned} \tag{10.25}$$

The transversality condition for B, $\lim_{t\to\infty} \lambda B e^{-\beta t} = 0$, can be rewritten as $Y_0^\sigma \lambda(0) \lim_{t\to\infty} b(t) e^{(\sigma n - r)t} = 0$. Inserting (10.25), this is met if

$$b_0 - \frac{L}{\mu_1 - r + \sigma n} + \frac{c(0)}{\psi_C - r} + \frac{M}{r - \sigma n} = 0 \tag{10.26}$$

$$\psi_C < r. \tag{10.27}$$

Equation (10.26) is the economy's intertemporal budget constraint and determines $c(0)$ and thus $\lambda(0)$. Equation (10.27) introduces an upper bound on $\psi_C \equiv \dfrac{r-\beta}{1-\gamma}$ and can be rewritten as $\gamma < \frac{\beta}{r}$, and defines thus an upper bound on the intertemporal elasticity of substitution $1/(1-\gamma)$. Hence, the solution of b consistent with long-run solvency becomes

$$b(t) = \frac{L}{\mu_1 - r + \sigma n} e^{\mu_1 t} - \frac{c(0)}{\psi_C - r} e^{(\psi_C - \sigma n)t} - \frac{M}{r - \sigma n}. \tag{10.28}$$

References

Balaguer J, Cantavella-Jordá M (2002) Tourism as a long-run economic growth factor: the Spanish case. Appl Econ 34:877–884

Balaguer J, Cantavella-Jordá M (2004) Structural change in exports and economic growth: cointegration and causality analysis for Spain (1961–2000). Appl Econ 36:473–477

Barro RJ, Sala-i-Martin X (1992) Public finance in models of economic growth. Rev Econ Stud 59:645–661

Brau R, Lanza A, Pigliaru F (2007) How fast are small tourism countries growing? Evidence from the data for 1980–2003. Tourism Econ 13:603–613

Brock WA, Turnovsky SJ (1981) The analysis of macroeconomic policies in perfect foresight equilibrium. Int Econ Rev 22:179–209

Chao CC, Hazari BR, Sgro PM (2005) Tourism and economic development in a cash-in-advance economy. Res Int Bus Finance 19:365–373

Chao CC, Hazari BR, Laffargue JP, Sgro PM, Yu ESH (2006) Tourism, Dutch disease and welfare in an open dynamic economy. Jpn Econ Rev 57:501–515

Chao CC, Hazari BR, Laffargue JP, Sgro PM, Yu ESH (2008) Tourism, jobs, capital accumulation and the economy: a dynamic analysis. In: Lanza RB, Usai S (eds) Tourism and sustainable economic development. Edward Elgar, Cheltenham, UK, pp 105–123
Corténez-Jiménez I, Pulina M (2006) A further step into the ELGH and TLGH for Spain and Italy. Fondazione Eni Enrico Mattei, Working Paper 118.2006
Croes RR (2006) A paradigm shift to a new strategy for small island economies: embracing demand side economics for value enhancement and long term economic stability. Tourism Manage 27:453–465
Dritsakis N (2004) Tourism as a long-run economic growth factor: an empirical investigation for Greece using causality analysis. Tourism Econ 10:305–316
Durbarry R (2004) Tourism and economic growth: the case of Mauritius. Tourism Econ 10:389–401
Evans P (1997) How fast do economies converge? Rev Econ Stat 79:219–225
Garín-Muños T (2007) German demand for tourism in Spain. Tourism Manage 28:12–22
Gunduz L, Hatemi JA (2005) Is the tourism-led growth hypothesis valid for Turkey? Appl Econ Lett 12:499–504
Hayashi F (1982) Tobin's marginal q and average q: a neoclassical interpretation. Econometrica 50:213–224
Hazari BR, Sgro PM (1995) Tourism and growth in a dynamic model of trade. J Int Trade Econ Dev 4:243–252
Hazari BR, Sgro PM (2004) Tourism, trade and national welfare. Contributions to economic analysis. Elsevier, Amsterdam, The Netherlands
Islam N (1995) Growth empirics: a panel data approach. Q J Econ 110:1127–1170
Katircioglu ST (2009) Revisiting the tourism-led-growth hypothesis for Turkey using the Bounds test and Johansen approach for cointegration. Tourism Manage 30:17–20
Kim HJ, Chen MH, Jang SS (2006) Tourism expansion and economic development: the case of Taiwan. Tourism Manage 27:925–933
Lanza A, Temple P, Urga G (2003) The implications of tourism specialisation in the long run: an econometric analysis for 13 OECD economies. Tourism Manage 24:315–321
Louca C (2006) Income and expenditure in the tourism industry: time series evidence from Cyprus. Tourism Econ 12:603–617
Mankiw NG, Romer D, Weil DN (1992) A contribution to the empirics of economic growth. Q J Econ 107:407–437
McElroy JL (2003) Tourism development in small islands across the world. Geogr Ann 85:231–242
McElroy JL (2006) Small island tourist economies across the life cycle. Asia Pac Viewp 47:61–77
Mihalic T (2002) Tourism and economic development issues. In: Sharply R, Telfer DJ (eds) Tourism and development: concepts and issues. Channel View Publications, Clevedon, UK, pp 81–111
Noriko I, Mototsugu F (2007) Impacts of tourism and fiscal expenditure to remote islands: the case of the Amami islands in Japan. Appl Econ Lett 14:661–666
Nowak JJ, Sali M, Cortés-Jiménez I (2007) Tourism, capital good imports and economic growth: theory and evidence for Spain. Tourism Econ 13:515–536
Oh CO (2005) The contribution of tourism development to economic growth in the Korean economy. Tourism Manage 26:9–44
Schubert SF, Brida JG (2008) Dynamic effects of subsidizing the tourism sector. Tourism Econ 14:57–80
Schubert SF, Brida JG (2009) Macroeconomic effects of changes in tourism demand: a simple dynamic model. Tourism Econ 15:591–613
Shan J, Wilson K (2001) Causality between trade and tourism: empirical evidence from China. Appl Econ Lett 8:279–283
Sinclair MT (1998) Tourism and economic development: a survey. J Dev Stud 34:1–51

Soukiazis E, Proença S (2008) Tourism as an alternative source of regional growth in Portugal: a panel data analysis at NUTS II and III levels. Port Econ J 7:43–61

Syriopoulos TC (1995) A dynamic model of demand for mediterranean tourism. Int Rev Appl Econ 9:318–336

Turnovsky SJ (1996) Fiscal policy, growth, and macroeconomic performance in a small open economy. J Int Econ 40:41–66

Turnovsky SJ (2003) Old and new growth theories: a unifying structure? In: Salvadori N (ed) Old and new growth theories: an assessment. Edward Elgar, Cheltenham, UK, pp 1–43

Vanegas M, Croes RR (2000) Evaluation of demand: Us tourists to Aruba. Ann Tourism Res 27:946–963

Vanegas M, Croes RR (2003) Growth, development and tourism in a small economy: evidence from Aruba. Int J Tourism Res 5:315–330

WTTC (2008) Country League Tables. World Travel and Tourism Council. http://www.wttc.org/bin/pdf/original_pdf_file/newleaguetablesummary.pdf. Accessed 4 Mar 2009

Part IV
Economic Performance Analysis

Chapter 11
Hotel Chain Performance: A Gravity-DEA Approach

Valerio Lacagnina and Davide Provenzano

11.1 Introduction

Generally speaking, competitiveness is a comparative concept of the ability and performance of a firm, sub-sector or country to sell and supply goods and/or services in a given market. At an operational level, instead, competitiveness is viewed in terms of the size of the market share secured by the firm, sub-sector or country considered. Moreover, in an operational context, while identifying that efficiency is a vital factor in competitive markets, it should also be acknowledged that it is, by itself, an insufficient determinant of competitiveness. Indeed, while competitiveness has more to do with "pursuing the correct strategy" towards the conservation and/or increase of the market share, operational efficiency is mainly a measure of how well the firm, sub-sector or country under study processes inputs to achieve its outputs, as compared to its maximum potential for doing so as represented by its production possibility frontier.

Looking at a hotel chain performance, competitiveness can be expressed as the ability of the hotels belonging to the chain to attract potential customers: the more the hotel chain is competitive in the lodging market, the more customers it will attract. On the efficiency side, instead, the analysis has to be carried out comparing the efficiency scores of the hotels of the chain with the production efficient frontier.

The literature dealing with the issue of valuing the efficiency in the hotel sector is rich of examples where data envelopment analysis (DEA) is the preferred methodology (Anderson et al. 1999; Hwang and Chang 2003; Barros 2005; Barros and Mascarenhas 2005; Lacagnina and Provenzano 2009).

At the same time, gravitational models, have been largely used in the economics of tourism to study the level of attractiveness of destinations with respect to economic and service-related factors, the latter focusing mainly on the quality and price of tourism services (Gat 1998).

V. Lacagnina (✉) • D. Provenzano
Faculty of Economics, University of Palermo, Palermo, Italy
e-mail: ricopa@unipa.it

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_11,

The empirical analysis presented in this chapter uses a gravity model to reproduce the historical tourism flows towards each hotel of an international chain and DEA Window analysis to value the efficiency of the chain over a time horizon of 9 years. A Malmquist index is computed to decompose productivity change into the efficiency change (diffusion) and the technological change (innovation).

In this study, the gravity model and the DEA have two managerially controllable variables in common: the room price and the hedonistic basket. Every decision to increase the economic efficiency of the hotel chain according to the DEA analysis will influence the attractiveness of the hotels and, therefore, their competitiveness in the lodging industry in the future. In this dynamic framework we will be able to study how, and up to which extent, the operational efficiency of a hotel chain goes well with its competitiveness (attractiveness).

The study is carried out by making use of real macroeconomic data and data related to the hotels belonging to a very important international chain operating in Italy. We study a panel of five countries over the time horizon 1998–2006. The dynamic panel data methodology adopted in this chapter accounts for the possibility of endogeneity and dynamism in tourism. Countries in the sample are modelled as tourism originating countries.

The study shows that policies implemented in accordance with the DEA Window results push the hotels of the chain towards a higher efficiency while increasing the total competitiveness of the chain.

The structure of this chapter is as follows. Section 11.2 reviews the literature related to gravity models, DEA Window analysis and Malmquist productivity index. Section 11.3 describes our model and its parameters. Section 11.4 shows the empirical results. Finally, Sect. 11.5 concludes.

11.2 Literature Review

11.2.1 The Gravity Model

In the empirical research, methods used to estimate tourism demand and to forecast international tourism arrivals can be divided into two broad groups: those that focus on non-causal techniques, mainly time-series modelling, and those that focus on causal techniques (Song et al. 2003).

Non-causal time-series models are useful tools for tourism demand forecast, but they can not be used for policy purposes, since they are not based on the theory that underlines the tourist's decision-making process. Causal models, instead, are carefully constructed in accordance with the economic theory and thus they allow the researcher to assess how tourists would respond to changes in the determining factors by examining the estimated demand elasticities (Song et al. 2003).

In the broad category of causal models, Witt and Witt (1995) also include gravity models representing a particular class of multiple regression models. Gravity models are based on the gravity law of spatial interaction, which states (in the travel context) that the degree of interaction between two geographic areas varies directly with the degrees of concentration of people in the two areas and inversely with the distance separating them.

Gravity model takes its popularity from its success in empirical applications. In addition, several authors have also provided an economic theoretical foundation of the model (Bergstrand 1985; Deardorff 1998; Földvári 2006).

To estimate gravity models, most researchers nowadays use panel data (Mátyás 1997; De Grauwe and Skudelny 2000; Wall 2000; Glick and Rose 2002; Carrère 2006). One reason is that the extra time series observations result in more accurate estimates. Moreover, with panel data the effects of trade determinants that are country-pair specific can be modelled by including constant terms to avoid source of inconsistency.

A few researchers (De Grauwe and Skudelny 2000; Bun and Klaassen 2002; Naudé and Saayman 2005; Khadaroo and Seetanah 2008) also add one or more lagged variables as regressors in their gravity models to cater the possibility of endogeneity and dynamism in tourism, namely to take persistence/reputation effects that apply over time in tourist decisions into consideration.

11.2.2 Data Envelopment Analysis Window and Malmquist Index

DEA is a linear programming based technique very useful for measuring the relative efficiency of relatively homogeneous units (authority departments, schools, hospitals, shops, banks, and so on) in the presence of multiple inputs and outputs related to different resources, activities and environmental factors.

A DEA Window analysis works on the principle of moving averages (Charnes et al. 1994) and is useful to detect performance trends of a unit over time. From the DEA Window analysis scores Malmquist indexes (Caves et al. 1982; Fare and Grosskopf 1992 and Fare et al. 1994) can be computed to measure the productivity change of the system.

The productivity index can be decomposed into an index of technical efficiency change between two time periods, also called *catching-up*, and a geometric mean reflecting the change in the frontier of the production possibility set, also called *frontier-shift*.[1]

11.3 The Empirical Analysis

11.3.1 The Model

Countries in the study are modelled as tourism generating regions. Since leisure tourism is only considered in the present work and since leisure tourism is

[1] For a review of the theoretical developments and applications of the Malmquist index see Fare et al. (1994) and Shephard (1953).

essentially a luxury good, the tourism generating regions considered in this study are indeed high income ones. Coherently with this choice and consistently with the main literature in this research area, which considers the level of income in developed country not a very significant determinant in explaining its demand for a region as a tourism destination, we have not considered the GDP of the origin country among the determinants of tourism demand. We have better preferred to compare the cost of living in the origin and destination country by computing the ratio between the consumer price index of the two regions (the variable CPI_Ratio in the model).

We consider a panel of five European countries (France, Germany, the Netherlands, Spain and United Kingdom) and 32 hotels over a time horizon of 9 years (1 Jan 1998–31 Dec 2006). The hotel chain considered in the present study reproduces the characteristics of a real international hotel chain operating in Italy. The hotels of the chain are labelled with the name of the Italian city where they are located. All monetary variables refer to year 2005 as base year and data used to run the model are real quarterly data. We use the total number of arrivals from country i to the hotel h at time t, A_{iht}, as dependent variable. The magnitude of this variable has been calculated using information available on the web page of the hotel chain combined with information available on the ISTAT (Italian National Institute of Statistics) web page.

The tourism arrival function is specified as follows:

$$A_{iht} = f(A_{ih(t-1)}, Pop_{it}, CPI\_Ratio_{iIt}, Beds_{ht}, Dist_{ih}, Hedo_{ht}, Tot\_Price_{ht}) \quad (11.1)$$

where:

- Pop_{it} stays for population of country i at time t. Origin countries' population is based on data from EUROSTAT.
- CPI_Ratio_{iIt} stays for consumer price index ratio. It is used as a proxy of the cost of living in the origin country i compared with the cost of living in the destination country I (*Italy*) at time t based on data from EUROSTAT.
- $Beds_{ht}$ stays for the number of bed places available in the hotel h at time t based on data from the hotel chain web page.
- $Dist_{ih}$ stays for geographical distance. It represents the distance in kilometres between the capital of the country i, considered like the centroid of origin, and the city where the hotel h is located. Geographical distance is introduced in the model as a proxy for transportation costs. This choice is justified for the relative difficulty to get all the costs of transport for the period of analysis.
- $Hedo_{ht}$, stays for hedonistic basket and represents the quality of the service offered by hotel h at time t . The hedonistic basket is calculated looking at any relevant facility offered by the hotel to its guests as shown in the web page of the hotel chain (hotel services like babysitting, restaurants and bars, shuttle service, disabled facilities, etc., in-room services like satellite TV, toiletries kit, wireless internet access, etc., leisure services like swimming pool, fitness centre, video games, etc.). This variable is under the control of the decision maker.

- Tot_Price_{ht} stays for total price and is calculated as the sum of the single plus the double room price in the hotel h at time t based on data available on the hotel chain web page. This variable is under the control of the decision maker.

In order to take the possibility of endogeneity and dynamism in tourism into consideration we have introduced the lagged dependent variableA_{iht-1}in the functional of our gravity function.

Table 11.1 shows the variables included in the gravitational function along with the supporting reference and the data source.

Since we are interested in the tourism demand from a specific set of countries, we have specified a fixed effect model. The corresponding econometric model for (1) is written as follows:

$$a_{iht} = \beta_0 + \beta_1 a_{ih(t-1)} + \beta_2 pop_{it} + \beta_3 cpi\_ratio_{iIt} + \beta_4 beds_{ht} + \beta_5 dist_{ih} + \beta_6 hedo_{ht} + \beta_7 tot\_price_{ht} + \varepsilon_{iIt} \tag{11.2}$$

The specification is log linear and the small letters denote that the variables are in natural logarithm; β_0 is an unknown constant; βs 1–7 are unknown response coefficients; ε_{iIt} is an individual error term which is distributed i.i.d. across country

Table 11.1 Variables of the gravity model and the relative data source

Variable	Description	Supporting reference	Data source
A_{iht}	Total number of tourist arrivals from country i to the hotel h at time t	Witt and Witt (1995), Lim (1997), Gat (1998)	Hotel chain web page, ISTAT
$A_{ih(t-1)}$	Lagged dependent variables	De Grauwe and Skudelny (2000), Bun and Klaassen (2002), Naudé and Saayman (2005), Khadaroo and Seetanah (2008)	Hotel chain web page, ISTAT
Pop_{it}	Size of population of country i at time t	Witt and Witt (1995), Lim (1997), Loree and Guisinger (1995)	EUROSTAT
CPI_Ratio_{iIt}	Ratio between the consumer price index of the origin and destination country (Italy) at time t	Witt and Witt (1995), Lim (1997), Eilat and Einav (2004), Naudé and Saayman (2005)	EUROSTAT
$Dist_{ih}$	Distance in kilometres between the capital of the origin country i and the city where the hotel h is located	Witt and Witt (1995), Lim (1997), Crouch (1995)	Google Maps
$Beds_{ht}$	Number of beds places available in the hotel h at time t	Witt and Witt (1995), Lim (1997)	Hotel chain web page
$Room\ price_{hrt}$	Price in EURO per day in the hotel h for room type r at time t	Gat (1998)	Hotel chain web page
$Hedonistic\ basket_{ht}$	Quality of the service offered by hotel h at time t	Gat (1998)	Hotel chain web page

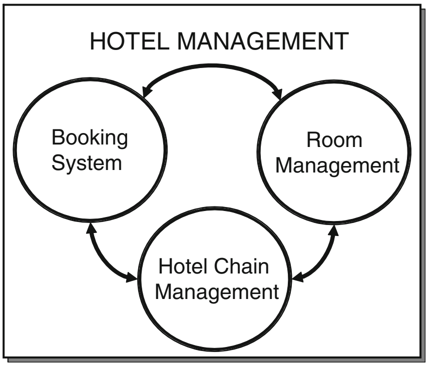

Fig. 11.1 The hotel chain's management system

pairs and over time; $i = 1, \ldots, 5; j = 1, \ldots, 32, t = 0, \ldots, 36$ (4 quarters per year, from 1 Jan 1998 to 31 Dec 2006). The data set used for the empirical analysis constitutes a balanced panel data of 5,600 observations.

11.3.2 The Dynamic Panel Data Regression Analysis

In order to estimate (11.2) both the standard first-differenced generalised method of moments (GMM) estimator (Arellano and Bond 1991) and the extended GMM estimator (Arellano and Bover 1995; Blundell and Bond 1998) have been used. The comparison between the results of the two procedures shows that the extended GMM outperforms the standard method both in terms of producing a smaller bias and a lower standard deviation of the estimate.[2] All the determinants are seen to concur with the existing literature in general.

11.3.3 The Hotel Chain's Management System

Figure 11.1 depicts the structure of the hotel chain's management system as composed of the booking system, the room management and the hotel chain management.

In a dynamic framework implemented in this study with System Dynamics (Powersim Studio 2005), the number of tourism arrivals per hotel per day generated by the gravity model is converted into number of rooms to book per day per hotel by a random draw among all the possible distributions of the total number of tourism arrivals in single, double and triple rooms.

[2]The complete set of results of the standard and augmented GMM estimator and the other econometrics are available from the authors upon request.

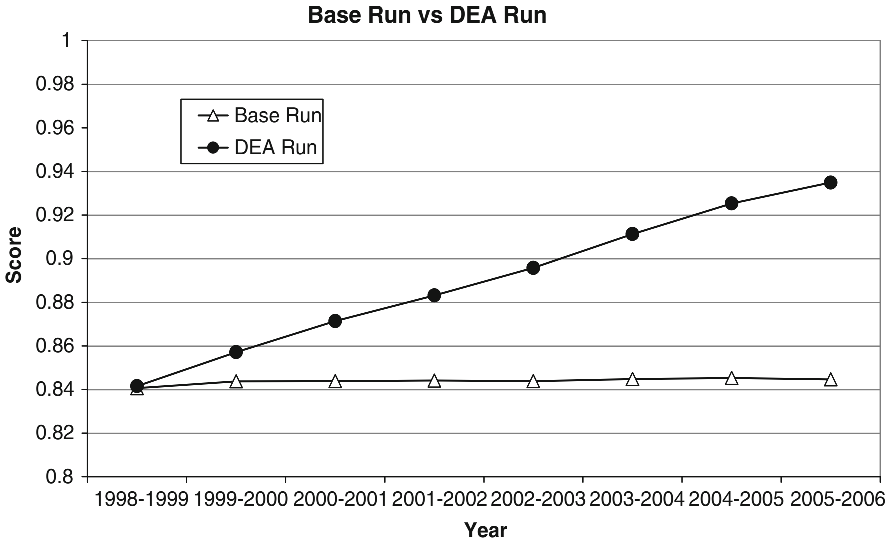

Fig. 11.2 The hotel chain scores – variations through Window

The actual number of rooms to book will therefore be the minimum between the vacancies of the hotel and the rooms needed to completely meet the tourism demand as previously determined.

For each of the room booked, the length of stay has been calculated by a uniform distribution with mean equal to the average length of stay per country of origin reported in the "Annuario del turismo" yearly published by ISTAT.

Once the booking system has recorded the rooms to book, the room management system updates the vacancies of the hotel and keeps each room busy until the length of stay has expired.

Finally, the hotel chain management computes the gross utilization index as:

$$GUI_t = \frac{P_t}{B \times d} \times 100$$

where P_t is the number of presences in hotel chain in year t; B is the total number of beds of the chain; d is the number of days in the year. This index is used to value the competitiveness of the chain: the more the chain is attractive (competitive) in the lodging market the more the potential guests will be willing to stay in its hotels (tourism pressure towards that hotel), the higher the gross utilization index will be.

The CEO of the hotel chain (the decision maker) periodically runs a DEA Window analysis[3] and compute Malmquist indexes in order to value productivity changes. She/he may decide to modify prices (single and double room prices) and

[3]The number of hotels in the chain respects the DEA convention by which the minimum number of DMUs must be greater than three times the sum of the number of inputs and outputs (Raab and Lichty 2002).

the hedonics of the inefficient hotels according to their score to improve the efficiency of the hotels and, as a consequence, the efficiency of the whole chain.

A dual, variable return to scale, input oriented, radial model Window analysis is run in this study.

11.4 Results and Discussion

The objective of this section is to explore the efficiency and the productivity of the hotel chain under analysis. Figure 11.2 shows the evolution of the average value of the hotel chain efficiency score for the free runs (Base Run) and the DEA-controlled runs (DEA Run). As in Oliveira et al. (2009), the hotel chain efficiency has been

Table 11.2 Average through Window scores of each hotel belonging to the chain

	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006
Agrigento	0.8050	0.8199	0.8354	0.8493	0.8621	0.8741	0.8852	0.8954
Bergamo	0.9766	0.9994	0.9974	0.9964	0.9967	0.9941	0.9999	0.9991
Bologna_1	0.9507	0.9444	0.9483	0.9527	0.9571	0.9612	0.9648	0.9682
Bologna_2	0.9996	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Brescia	0.9123	0.9242	0.9319	0.9382	0.9439	0.9491	0.9539	0.9582
Caserta	0.8803	0.8932	0.9034	0.9122	0.9202	0.9275	0.9377	0.9542
Catania_1	0.9879	0.9988	0.9973	0.9977	1.0000	0.9984	0.9994	0.9981
Catania_2	0.9123	0.9242	0.9319	0.9382	0.9439	0.9491	0.9539	0.9582
Firenze	0.6880	0.6993	0.7209	0.7533	0.8062	0.8478	0.8836	0.9140
Genova_1	0.9430	0.9397	0.9453	0.9504	0.9551	0.9594	0.9632	0.9667
Genova_2	0.7918	0.9178	0.9844	0.9940	0.9918	0.9924	0.9983	0.9982
La spezia	0.6878	0.7049	0.7267	0.7470	0.7664	0.7846	0.8018	0.8243
Lecco	0.7555	0.7706	0.8095	0.8479	0.8910	0.9693	0.9951	0.9982
Messina	0.9814	0.9953	0.9958	0.9969	0.9962	0.9986	0.9998	0.9997
Milano_1	0.8874	0.9099	0.9220	0.9227	0.9254	0.9291	0.9329	0.9360
Milano_2	0.9417	0.9862	0.9846	0.9706	0.9714	0.9673	0.9677	0.9711
Milano_3	0.8924	0.8972	0.9065	0.9149	0.9227	0.9299	0.9364	0.9423
Milano_4	0.6912	0.7081	0.7298	0.7500	0.7691	0.7872	0.8042	0.8201
Napoli	0.6858	0.7012	0.7230	0.7435	0.7657	0.7929	0.8235	0.8566
Palermo	0.8579	0.8645	0.8763	0.8873	0.8973	0.9065	0.9150	0.9228
Parma	0.8661	0.8795	0.8908	0.9005	0.9095	0.9177	0.9252	0.9321
Pisa	0.8050	0.8199	0.8354	0.8493	0.8621	0.8746	0.8880	0.9001
Ravenna	0.7421	0.7523	0.7739	0.8048	0.8420	0.8835	0.9483	0.9858
Roma_1	0.5654	0.5786	0.6040	0.6288	0.6529	0.6763	0.6989	0.7205
Roma_2	0.7688	0.7845	0.8022	0.8183	0.8333	0.8474	0.8604	0.8725
Roma_3	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Roma_4	0.8165	0.8240	0.8387	0.8524	0.8651	0.8769	0.8877	0.8977
Salerno	0.8661	0.8795	0.8908	0.9005	0.9095	0.9177	0.9252	0.9321
Siena	0.7478	0.7579	0.7766	0.7943	0.8109	0.9095	0.9908	0.9965
Siracusa	0.9775	0.9978	0.9995	0.9995	0.9998	0.9998	0.9995	0.9997
Torino_1	0.9362	0.9312	0.9373	0.9424	0.9479	0.9528	0.9573	0.9613
Torino_2	0.8561	0.8627	0.8713	0.8769	0.8848	0.8951	0.9045	0.9131

computed using the geometric mean of the scores of each hotel (see Table 11.2). From 1998 to 2006 a steady increase in efficiency can be observed in the DEA-controlled runs against the free ones. Therefore, policies implemented according to DEA result effective to increase the total efficiency of the chain.

In order to go deeper in the determinants of efficiency, the productivity change of the chain has been decomposed in the efficiency change and technological change. Figure 11.3 illustrates that, the variation in the Malmquist index related

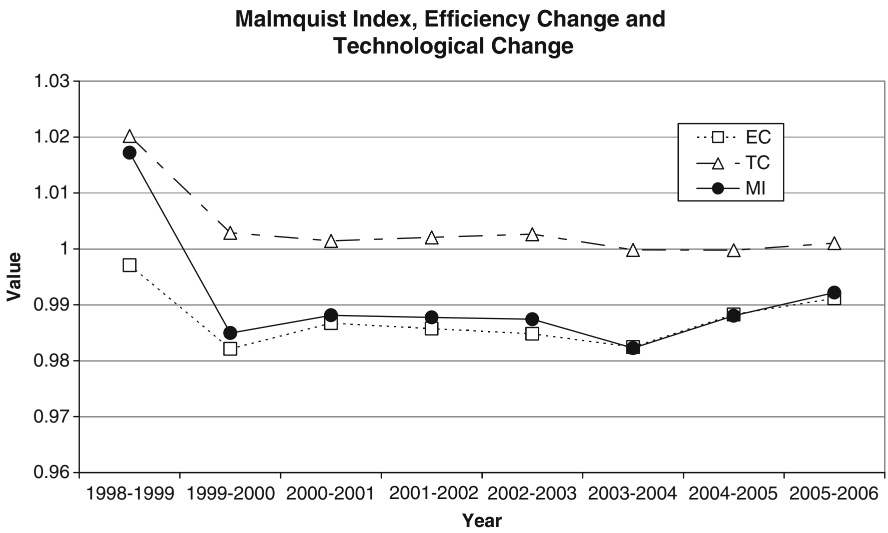

Fig. 11.3 Productivity change for the DEA-controlled runs

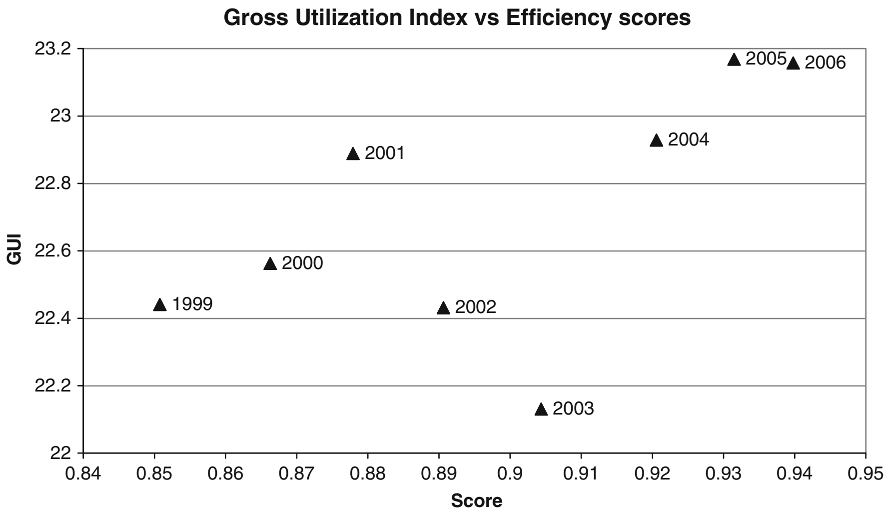

Fig. 11.4 Gross utilization index versus efficiency scores

with the DEA Window shown is mainly due to changes in the economic efficiency. Indeed, while the technological change stays constant from 1999 to 2006, the productivity changes because of the dynamics of the economic efficiency.

Finally, the hotel chain efficiency over time has been compared with its gross utilization index.

Figure 11.4 shows the comparison between the efficiency and the competitiveness of the chain. In general, policies implemented according to DEA increase the efficiency and the competitiveness of the chain over time. Indeed, we assume that a higher GUI can be associated with a higher attractiveness of the hotel chain. The GUI values in 2002 and 2003 justify because of a general decrease in the tourism demand caused by a negative variation in the ratio between the cost of living in the tourism generating countries and Italy (the CPI_Ratio variable in the model).

11.5 Conclusions

This chapter presents an empirical analysis where a gravity model and a DEA Window are implemented in the same dynamic framework. The study shows that policies implemented in accordance with DEA push the hotels of the chain towards a higher efficiency. Moreover, Malmquist index shows that, for the hotel chain under study, the improvement in productivity is mainly due to the economic efficiency change. Finally, the comparison between gross utilization index (used as a competitiveness measure) and the efficiency scores demonstrates that DEA Window policies are effective to increase the total competitiveness of the chain as well.

References

Anderson RI, Lewis D, Parker M (1999) Another look at the efficiency of corporate travel management departments. J Trav Res 37:267–272

Arellano M, Bond S (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev Econ Stud 58:277–297

Arellano M, Bover O (1995) Another look at the instrumental variable estimation of error-components models. J Econometrics 68:29–51

Barros CP (2005) Measuring efficiency in the hotel sector. Ann Tourism Res 32(2):456–477

Barros CP, Mascarenhas MJ (2005) Technical and allocative efficiency in a chain of small hotels. J Hospit Manag 24:415–436

Bergstrand JH (1985) The gravity equation in international trade: some microeconomic foundations and empirical evidence. Rev Econ Stat 67:474–481

Blundell R, Bond S (1998) Initial conditions and moment restrictions in dynamic panel-data models. J Econometrics 87:115–143

Bun JG, Klaassen FJGM (2002) The importance of dynamics in panel gravity models of trade. Working paper, University of Amsterdam

Carrère C (2006) Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. Eur Econ Rev 50:223–247

Caves D, Chistensen LR, Diewert W (1982) The economic theory of index numbers and the measurement of input, output, and productivity. Econometrica 50(6):1393–1414

Charnes A, Cooper WW, Seiford LM (1994) Extension to DEA models. In: Charnes A, Cooper WW, Lewin AY, Seiford LM (eds) Data envelopment analysis: theory, methodology and applications. Kluwer, Dordrecht

Crouch GI (1995) A meta-analysis of tourism demand. Ann Tourism Res 22(1):103–118

Deardorff AV (1998) Determinants of bilateral trade: does gravity work in a neoclassical world? In: Frankel JA (ed) The regionalization of the world economy. University of Chicago Press, Chicago

de Grauwe P, Skudelny F (2000) The impact of EMU on trade flows. Weltwirtschaftliches Arch 136(3):381–402

Eilat Y, Einav L (2004) Determinants of international tourism: a threedimensional panel data analysis. Appl Econ 36:1315–1327

Fare R, Grosskopf S (1992) Malmquist productivity indexes and Fisher ideal indexes. Econ J 102:158–160

Fare R, Grosskopf S, Norris M, Xhang Z (1994) Productivity growth, technical progress, and efficiency change in industrialized countries. Am Econ Rev 84:66–83

Földvári P (2006) The economic impact of the European integration on the Netherlands. A quantitative analysis of foreign trade and foreign direct investments. PhD Dissertation, Utrecht University, the Netherlands

Gat D (1998) Toward a theory of the intra-urban market for hotel services. J R Estate Finance Econ 17(2):199–211

Glick R, Rose AK (2002) Does a currency union affect trade? The time-series evidence. Eur Econ Rev 46:1125–1151

Hwang S, Chang T (2003) Using data envelopment analysis to measure hotel managerial efficiency change in Taiwan. Tourism Manag 24:357–369

Khadaroo J, Seetanah B (2008) The role of transport infrastructure in international tourism development: a gravity model approach. Tourism Manag 29:831–840

Lacagnina V, Provenzano D (2009) An optimized system dynamics approach for a hotel chain management. In: Matias A, Nijkamp P, Sarmento M (eds) Advances in tourism economics – new developments. Springer, Berlin, pp 35–49

Lim C (1997) Review of international tourism demand models. Ann Tourism Res 24(4):835–849

Loree DW, Guisinger SE (1995) Policy and non-policy determinants of US equity foreign direct investment. J Int Bus Stud 26(2):281–299

Mátyás L (1997) Proper econometric specification of the gravity model. World Econ 20:363–368

Naudé WA, Saayman A (2005) The determinants of tourist arrivals in Africa: a panel data regression analysis. Tourism Econ 11(3):365–391

Oliveira MM, Gaspar MB, Paixão JP, Camanho AS (2009) Productivity change of the Artisanal Fishing Fleet in Portugal: a Malmquist index analysis. Fish Res 95:189–197

Powersim Studio (2005) Academic Kit, Powersim Software – The Business Simulation Company, http://www.powersim.com

Raab R, Lichty R (2002) Identifying sub-areas that comprise a greater metropolitan area: the criterion of county relative efficiency. J Reg Sci 42:579–594

Shephard RW (1953) Cost and production functions. Princeton University Press, Princeton

Song H, Witt SF, Jensen TC (2003) Tourism forecasting: accuracy of alternative econometric models. Int J Forecasting 19:123–141

Wall HJ (2000) Gravity model specification and the effects of the Canada-U.S. border. Working Paper, Federal Reserve Bank of St. Louis

Witt SF, Witt CA (1995) Forecasting tourism demand: a review of empirical research. Int J Forecasting 11:447–475

Chapter 12
Panel Seasonal Unit Root Tests: An Application to Tourism

Nazarii Salish and Paulo M.M. Rodrigues

12.1 Introduction

Several studies indicate that seasonal variation is an important component of economic variables (see, inter alia, Ghysels et al. 2000), favouring therefore the use of seasonally undajusted data in empirical work. Seasonality is not necessarily fixed over time, despite the fact that the calendar does not change. Thus, for example, the impact of Christmas on consumption or of the summer holiday period on production may evolve over time, despite the timing of Christmas and the summer remaining fixed. Hence, depending on the nature of the series under study, seasonality in economic time series may be essentially stochastic or may be essentially deterministic. In particular, determining whether the seasonal pattern in economic time series changes over time due to the presence of unit roots at the zero and seasonal frequencies has been of considerable interest. It is frequently the case that seasonal economic time series exhibit nonstationary stochastic seasonality, which is a characteristic that has prompted the development of several seasonal unit root tests in the econometric literature (see, inter alia, Breitung and Franses 1998; Dickey et al. 1984; Hylleberg et al. 1990; Osborn et al. 1988; Taylor 1998; Osborn and Rodrigues 2001; Rodrigues 2002; and Rodrigues and Taylor 2004a, b).

A growing literature has recently developed in response to the characteristically low power, particularly when deterministic (trend) variables are involved, of the widely used unit root tests of Dickey and Fuller (DF) (1979, 1981). Similar concerns arise in the seasonal context where DF-type tests (with OLS de-trending) for unit roots at the zero and seasonal frequencies have been developed by Hylleberg, Engle, Granger and Yoo (HEGY) (1990) for quarterly data and generalised to other seasonal periodicities by Beaulieu and Miron (1993); Taylor (1998);

N. Salish (✉)
University of Algarve, Campus de Gambelas, Faro 8005-138, Portugal
e-mail: salish@ua.fm

P.M.M. Rodrigues
Economic Research Department, Banco de Portugal, Lisbon, Portugal

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_12, © Springer-Verlag Berlin Heidelberg 2011

and Smith and Taylor (1999a, b), inter alia. Seasonal patterns in economic time-series tend to evolve slowly over time (see, inter alia, Hylleberg et al. 1993), a characteristic shared by seasonal unit root processes. However, as Ghysels and Osborn (2001, p 90) (GO) note, most empirical applications of seasonal unit root tests have lead to non-rejection of the non-seasonal unit root but to rejections of the unit root hypothesis at some, but rarely all, of the seasonal frequencies, implying the inappropriateness of either taking annual differences of the data or of commonly used seasonal adjustment procedures which assume the presence of unit roots at all of the seasonal frequencies (GO 2001, Chap. 4). The fact that unit roots cannot be rejected at all of the seasonal frequencies might be attributable to the low power of the OLS de-trended HEGY tests. This suggests that more powerful seasonal unit root tests are needed in order to better establish whether or not seasonal unit roots are indeed an appropriate mechanism for modeling the seasonal patterns in economic series.

Parallel to macroeconomic variables and with direct implications on a country's macroeconomic performance, tourism activity has revealed itself as one of the world's largest and fastest growing industries, playing a key role in the economic growth of many countries, lending itself to other economic sectors through direct and indirect multiplier effects. Portugal heavily relies on this industry as an important means of (economic) resource, catering largely to the European market. In 2006, the country was visited by 12.8 million tourists, being responsible for 5% of the GDP and 10% of the employment. The increasing number of tourists and its strategic importance, in terms of revenue and employment, as well as in terms of direct and indirect effects on several other economic sectors, have led economic agents to adopt important dynamic measures in relation to supply. Portugal has been able to keep its international market share despite the growing number of competing markets that are once again attracting tourists to traditional destinations.

The strategic importance of tourism has contributed decisively to a huge research on its effects on the Portuguese economic performance, whose reliability imposes a careful analysis of the statistical properties of the series.

This chapter considers an extension of the panel unit root test procedure proposed by Im, Pesaran and Shin (IPS) (2003) to test for the presence of seasonal unit roots (in the lines of HEGY) in an heterogeneous panel of tourism data; see also Otero et al. (2005) and Dreger and Reimers (2005). Based on Monte Carlo simulations we compute, for different samples sizes, standardized average test statistics from a HEGY type test regression. The results are then used to test for seasonal nonstationarity in tourism data. In particular, in the empirical analysis, we consider the number of nights in hotel accommodation and similar establishments in Algarve occupied by tourists from the main source markets (the UK, Germany, the Netherlands, Portugal, Spain and Ireland). The region of Algarve relies heavily on tourism as an important means of (economic) resource, catering largely to the European market. The sample period considered is from the first quarter of 1987 to the first quarter of 2008.

The plan of this chapter is as follows. Section 12.2 briefly reviews the seasonal unit root test proposed by HEGY and introduces the IPS approach generalized to test for seasonal unit roots in heterogeneous panels. Section 12.3 describes the Monte Carlo simulations and provides results for different specifications. Section 12.4 presents the empirical application to tourism data and Section 12.5 concludes the chapter.

12.2 The Seasonal Unit Root Tests

12.2.1 The Seasonal Model

Using the set-up of Smith and Taylor (1999a, b) and Rodrigues and Taylor (2004a, b, 2007), consider the process $\{x_{Sn+s}\}$, observed with constant seasonal periodicity S, which can be written as the sum of a purely deterministic component, $\mu_{Sn+s} = \beta' z_{Sn+s}$, and a purely stochastic process; viz.,

$$x_{Sn+s} = y_{Sn+s} + \mu_{Sn+s}, \quad s = 1 - S, \ldots, 0, \quad n = 1, 2, \ldots, N, \tag{12.1}$$

$$\alpha(L) y_{Sn+s} = v_{Sn+s} \tag{12.2}$$

where $\alpha(L) \equiv 1 - \sum_{j=1}^{S} \alpha_j^* L^j$ in (12.2) is an Sth order polynomial in the conventional lag operator, L. The disturbance process $\{v_{Sn+s}\}$ is a mean-zero covariance stationary process which admits the moving average representation $v_{Sn+s} = \psi(L)$ u_{Sn+s} where $\{u_{Sn+s}\}$ is IID(0,σ^2) with finite fourth moments and the lag polynomial $\psi(z) \equiv 1 + \sum_{i=1}^{\infty} \psi_i z^i$ satisfies the following conditions: (1) $\psi(\exp\{\pm i2\pi k/S\})$ $\neq 0$, k=0, ..., [S/2], and (2) $\sum_{j=1}^{\infty} j|\psi_j| < \infty$. These conditions ensure that the spectral density function of v_{Sn+s} is bounded and is strictly positive at both the zero and seasonal spectral frequencies, $\omega_k = 2\pi k/S$, $k = 0, \ldots, [S/2]$, and [.] denoting the integer part of its argument.

Regarding the deterministic kernel, we consider three cases of interest for $\mu_{\mathrm{Sn+s}}$ in (**12.1**), where $S^* = [(S–1)/2]$:

Case 1: no deterministics.

Case 2: zero and seasonal frequency intercepts: $z_{Sn+s} \equiv z_{Sn+s,3} = [1, \cos(2\pi (Sn+s)/S), \sin(2\pi(Sn+s)/S), \ldots, \cos(2\pi S^*(Sn+s)/S), \sin(2\pi S^*(Sn+s)/S), (-1)^{Sn+s}]'$, $s = 1-S, \ldots, 0 n = 1, 2, \ldots, N$ with, $\beta \equiv (\gamma_0, \gamma_1', \ldots, \gamma_{S^*}', \gamma_{S/2})'$, and *where* $\gamma_k = (\gamma_{k,\alpha}, \gamma_{k,\beta})'$, $k = 1, \ldots, S^*$.

Case 3: zero and seasonal frequency intercepts, zero-frequency trend: $z_{Sn+s} \equiv z_{Sn+s,5} = (z_{Sn+s,3}', Sn+s)'$, $s = 1-S, \ldots, 0$, $n = 1, 2, \ldots, N$, with $\beta \equiv (\gamma_0, \gamma_1, \ldots, \gamma_{S^*}, \gamma_{S/2}, \delta_0)'$.

Note that in the analysis below we consider seasonal demeaned or seasonal demeaned and detrended data, $\hat{x}_{Sn+s}$, where i = 1, 2, 3 refers to Case 1, 2 or 3 just described.

12.2.2 The Seasonal Unit Root Hypotheses

Denoting $i \equiv \sqrt{(-1)}$, we may factorize the polynomial $\alpha(L)$ at the seasonal spectral frequencies, $\omega_k = 2\pi k/S$, $k = 1,\ldots,[S/2]$, as $\alpha(L) = \prod_{k=0}^{[S/2]} \omega_k(L)$, where the lag polynomial $\omega_0 \equiv (1 - \alpha_0 L))$ associates the parameter α_0 with the zero frequency $\omega_0 = 0$, the lag polynomial $\omega_k(L)$ corresponds to the conjugate (harmonic) seasonal frequencies $(\omega_k, 2\pi - \omega_k)$, and is defined by $\omega_k(L) \equiv [1 - 2(\alpha_k \cos\, \omega_k - \beta_k \sin\, \omega_k)L + (\alpha_k^2 + \beta_k^2)L^2]$, with associated parameters α_k and β_k, $k = 1,\ldots,S^*$, together with $\omega_{S/2}(L) \equiv (1 + \alpha_{S/2}L)$, with parameter $\alpha_{S/2}$ corresponding to the Nyquist frequency $\omega_{S/2\,=}\, \pi$, when S is even.

Consequently, following HEGY ($S = 4$) and Smith and Taylor (1999a) we consider testing the ($[S/2] + 1$) unit root null hypotheses

$$H_{0,0} : \alpha_0 = 1, \quad H_{0,S/2} : \alpha_{S/2} = 1 \quad (S\ even), \tag{12.3}$$

$$H_{0,k} : \alpha_k = 1, \quad \beta_k = 0, \quad k = 1, \ldots, S^*. \tag{12.4}$$

The hypothesis $H_{0,0}$: $\alpha_0 = 1$ corresponds to a unit root at the zero-frequency while, for S even, $H_{0,S/2}$: $\alpha_{S/2} = 1$ yields a unit root at the Nyquist frequency. A pair of complex conjugate unit roots at the harmonic seasonal frequencies $(\omega_k, 2\pi - \omega_k)$ is obtained under $H_{0,k} : \alpha_k = 1 \cap \beta_k = 0$, $k = 1,\ldots,S^*$.

12.2.3 The HEGY Test

Consider again (12.1)–(12.2) and further assume that $\psi(z)$ is invertible with (unique) inverse $\phi(z)$, such that an autoregressive approximation is valid. Following Smith and Taylor (1999a, Equation (11), p 6), our second stage consists of expanding $\alpha(L)$ in (1) around the seasonal unit roots $\exp\{\pm i2\pi k/S\}$, $k = 0,\ldots,$ $[S/2]$, to yield the auxiliary regression equation,

$$\begin{aligned} \Delta_S \hat{x}^i_{Sn+s} = {} & \pi_0 \hat{x}^i_{0,\,Sn+s-1} + \sum_{j=1}^{S^*} \left(\pi_k \hat{x}^i_{j,\,Sn+s-1} + \pi_k^{\beta} \hat{x}^{\beta,\,i}_{j,\,Sn+s-1} \right) \\ & + \pi_{S/2} \hat{x}_{S/2,\,Sn+s-1} + \sum_{p=1}^{p^*} \phi_p \Delta_S \hat{x}^i_{Sn+s-p} + \varepsilon_t, \end{aligned} \tag{12.5}$$

omitting the term $\pi_{S/2}\hat{x}^i_{S/2,\,Sn+s-1}$ if S is odd, and where the regressors corresponding to the zero and seasonal frequencies $\omega_k = 2\pi k/S, k = 0,\ldots,[S/2]$, $\hat{x}^i_{0,\,Sn+s}$, $\hat{x}^i_{S/2,\,Sn+s}$, $\hat{x}^i_{k,\,Sn+s}$, $\hat{x}^{\beta,\,i}_{k,\,Sn+s}$, $k = 1, \ldots, S^*$ are linear combinations of $\hat{x}^i_{Sn+s-j}$ such that,

$$\hat{x}^i_{0,Sn+s} \equiv \sum_{j=0}^{S-1} \hat{x}^i_{Sn+s-j},\ \hat{x}^i_{S/2,\,Sn+s} \equiv \sum_{j=0}^{S-1} \cos[(j+1)\pi]\hat{x}^i_{Sn+s-j},$$
$$\hat{x}^i_{k,Sn+s} \equiv \sum_{j=0}^{S-1} \cos[(j+1)\omega_k]\hat{x}^i_{Sn+s-j},\ \hat{x}^{\beta,i}_{k,Sn+s} \equiv -\sum_{j=0}^{S-1} \sin[(j+1)\omega_k]\hat{x}^i_{Sn+s-j}, \tag{12.6}$$

$k = 1, \ldots, S^*$, together with $\Delta_S \hat{x}^i_{Sn+s} \equiv \hat{x}^i_{Sn+s} - \hat{x}^i_{S(n-1)+s}$. For quarterly, $S = 4$, data the relevant transformations are

$$\hat{x}^i_{0,\,Sn+s} \equiv (1+L+L^2+L^3)\hat{x}^i_{Sn+s}, \quad \hat{x}^i_{2,\,Sn+s} \equiv -\left(1-L+L^2-L^3\right)\hat{x}^i_{Sn+s},$$

$$\hat{x}^i_{1,\,Sn+s} \equiv -L(1-L^2)\hat{x}^i_{Sn+s}, \quad \hat{x}^{\beta,\,i}_{1,\,Sn+s} \equiv -(1-L^2)\hat{x}^i_{Sn+s}.$$

The existence of unit roots at the zero, Nyquist and harmonic seasonal frequencies imply that $\pi_0 = 0$, $\pi_{S/2} = 0$ (S even) and $\pi_k = \pi^\beta{}_k = 0$, $k = 1, \ldots, S^*$, in (12.5) respectively; see Smith and Taylor (1999a). In order to test for these null hypotheses following HEGY, Beaulieu and Miron (1993) and Smith and Taylor (1999a), inter alia, the following regression statistics in (12.5) can be considered: $\hat{t}_0$ (left-sided) for the exclusion of $\hat{x}^i_{0,\,Sn+s-1}$; $\hat{t}_{S/2}$ (left-sided) for the exclusion of $\hat{x}^i_{S/2,\,Sn+s-1}$ (S even); $\hat{t}_k$ (left-sided) and $\hat{t}^\beta_k$ (two-sided) for the exclusion of $\hat{x}^i_{k,\,Sn+s-1}$ and $\hat{x}^{\beta,\,i}_{k,\,Sn+s-1}$, respectively, and $\hat{F}_k$ for the exclusion of *both* $\hat{x}^i_{k,\,Sn+s-1}$ and $\hat{x}^{\beta,\,i}_{k,\,Sn+s-1}$, $k = 1, \ldots, S^*$. Following Ghysels et al. (1994), Taylor (1998), and Smith and Taylor (1998, 1999a) we also consider the joint frequency F-statistics, $\hat{F}_{1\ldots[S/2]}$, for the exclusion of $\left\{\hat{x}^k_{j,Sn+s-1}\right\}_{j=1}^{[S/2]}$ and $\{\hat{x}^{\beta,\,i}_{j,\,Sn+s-1}\}_{j=1}^{S^*}$, and $\hat{F}_{0\ldots[S/2]}$, for H_0, the exclusion of $\{\hat{x}^i_{j,\,Sn+s-1}\}_{j=0}^{[S/2]}$ and $\{\hat{x}^{\beta,\,i}_{j,\,Sn+s-1}\}_{j=1}^{S^*}$.

12.2.4 The HEGY–IPS Type Test

In order to generalize de HEGY test to the Panel context, consider a Panel of N countries. Rearranging (12.5) in a panel context with N cross-sections and T time periods gives:

$$\begin{aligned}\Delta_S \hat{x}^v_{i,\,Sn+s} =& \pi_{0i}\hat{x}^v_{0i,\,Sn+s-1} + \sum_{j=1}^{S^*}\left(\pi_{ki}\hat{x}^v_{ji,\,Sn+s-1} + \pi^\beta_{ki}\hat{x}^{\beta,\,v}_{ji,\,Sn+s-1}\right) \\ &+ \pi_{S/2,\,i}\hat{x}^v_{S/2i,\,Sn+s-1} + \sum_{p=1}^{p^*}\phi_{pi}\Delta_S\hat{x}^v_{i,\,Sn+s-p} + \varepsilon_{it},\end{aligned} \tag{12.7}$$

where $i = 1, \ldots, N$, $t = 1, \ldots, T$, and ε_{it} is an iid random variable with zero mean and finite hereogeneous variances σ_i^2.

The original IPS procedure is based on the mean of the Dickey-Fuller statistics. Hence, following a similar approach in the seasonal context we first need to obtain the HEGY test statistics from (12.7) for each individual. Thus, using OLS, the individual specific t-statistics are computed as:

$$t_{ji,T} = \frac{\widehat{\pi}_{ji}}{se(\widehat{\pi}_{ji})} \tag{12.8}$$

where $j = 0, S/2$, $i = 1, \ldots, N$ and the F-tests corresponding to, $F_{ki,T}$, $F_{1\ldots S/2,iT}$, and $F_{0\ldots S/2,iT}$ are,

$$F_{ji,T} = \frac{(R_j\widehat{\pi}_i - q_j)'(R_j\widehat{V}_{\widehat{\pi}}R_j')}{}{-1}(R_{j_i}\widehat{\pi}_i - q_j)r \tag{12.9}$$

where r corresponds to the number of restrictions being tested, $i = 1, \ldots, N$, $j = 1, \ldots, S^*$, $1 \ldots S/2$, $0 \ldots S/2$; R_j corresponds to the necessary matrix of restrictions, such that,

$$R_k = \begin{bmatrix} 0 & \cdots & 1 & 0 & \cdots & 0 \\ 0 & \cdots & 0 & 1 & \cdots & 0 \end{bmatrix}, \; R_{S-1} = \begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ 0 & 0 & 0 & \cdots & 1 \end{bmatrix}, \; R_S = I_S;$$

where $k = 1, ..., S^*$, I_S is an $S \times S$ identity matrix, $\hat{\pi}_i$ is a vector of estimators $(\hat{\pi}_{oi}, \hat{\pi}_{1i}, ..., \hat{\pi}_{S^*i}, \hat{\pi}^{\beta}_{1i}, ..., \hat{\pi}^{\beta}_{S^*i}, \hat{\pi}_{S/2i})'$ and q_j is a zero vector of length j. Note that the position of the 2×2 identity matrix in R_k will depend on the $\hat{\pi}_{ki}$, $\hat{\pi}^{\beta}_{ki}$ parameters being tested. The average t and F test statistics across N are computed as,

$$\bar{t}_{j,NT} = \frac{1}{N}\sum_{i=1}^{N} t_{jiT}, \; for \; j = 0, \; S/2 \tag{12.10}$$

and

$$\bar{F}_{j,NT} = \frac{1}{N}\sum_{i=1}^{N} F_{jiT}, \quad for \; j = 1, ..., S^*, 1...S/2, 0...S/2. \tag{12.11}$$

Hence, based on (12.10) and (12.11), the seasonal IPS type test statistics are provided next:

- For the zero and semi-annual frequencies the IPS unit root test statistics are

$$W_{\bar{t}_j} = \frac{\sqrt{N}(\bar{t}_{j,NT} - \frac{1}{N}\sum_{i=1}^{N} E[t_{jiT}(p_i)|\pi_{ji} = 0])}{\sqrt{\frac{1}{N}\sum_{i=1}^{N} Var[t_{jiT}(p_i)|\pi_{ji} = 0]}} = > N(0, \; 1), \tag{12.12}$$

where p_i are lag orders; $j = 0, S/2$, $E[t_{jiT}(p_i)/\pi_{ji} = 0]$ and $Var[t_{jiT}(p_i)/\pi_{ji} = 0]$ are the mean and variance of the zero and Nyquist frequencies t-statistics under the null hypothesis, respectively.

In the case of homogeneous panels a simplified version of (12.12) can be used, i.e.,

$$W_{\bar{t}_j} = \frac{\sqrt{N}(\bar{t}_{j,NT} - E[t_{jT}|\pi_j = 0])}{\sqrt{Var[t_{jT}|\pi_j = 0]}} => N(0,\ 1). \tag{12.13}$$

- For the annual frequency null hypothesis, $H_{0,ki} \ : \ \pi_{ki} = \pi^{\beta}_{ki} = 0,\ i = 1, \ldots, N$ the test statistics is,

$$W_{\overline{F}_k} = \frac{\sqrt{N}(\overline{F}_{k,NT} - \frac{1}{N}\sum_{i=1}^{N} E[F_{kiT}|H_{0,ki}])}{\sqrt{N^{-1}\sum_{i=1}^{N} Var[F_{kiT}|H_{0,ki}]}}, \tag{12.14}$$

where $E[F_{k,iT} \mid H_{0,ki}]$ and $Var[F_{k,iT} \mid H_{0,ki}]$ are the mean and variance of the $F_{k,iT}$ statistics.

- To test for the null hypothesis of unit roots at all seasonal frequencies ($H_{0,1\ldots S/2,i} \ : \ \pi_{1i} = \pi^{\beta}_{1i} = \cdots = \pi_{S^*i} = \pi^{\beta}_{S^*i} = \pi_{S/2,i} = 0$), an IPS test based on the $F_{1\ldots S/2,iT}$ statistic is proposed,[1]

$$W_{\overline{F}_{1\ldots S/2}} = \frac{\sqrt{N}(\overline{F}_{1\ldots S/2,NT} - \frac{1}{N}\sum_{i=1}^{N} E[F_{1\ldots S/2,iT}|H_{0,1\ldots S/2,i}])}{\sqrt{N^{-1}\sum_{i=1}^{N} Var[F_{1\ldots S/2,iT}|H_{0,1\ldots S/2,i}]}}. \tag{12.15}$$

- Finally, regarding the overall null hypothesis, H_0, the following test procedure is considered,

$$W_{\overline{F}_{0\ldots S/2}} = \frac{\sqrt{N}(\overline{F}_{0\ldots S/2,NT} - \frac{1}{N}\sum_{i=1}^{N} E[F_{0\ldots/2,iT}|H_0])}{\sqrt{N^{-1}\sum_{i=1}^{N} Var[F_{0\ldots S/2,iT}|H_0]}}. \tag{12.16}$$

[1]The statistics in (12.12), (12.14) and (12.15) have also been proposed by Otero et al. (2005) and Dreger and Reimers (2005) for a quarterly case.

12.3 Finite Sample Critical Values

In this section, using Monte Carlo simulations, the finite sample properties of the HEGY–IPS tests for quarterly data are investigated. In addition, for empirical purpose critical values for the HEGY statistics were also computed. All simulations were divided into three sets of experiments.

In order to apply the HEGY test statistics for our data set, critical values for the $t_{ji,T}$-statistics, $j = 0, S/2$, and for the $F_{ji,T}$ statistics, $j = 1,\ldots,S^*, 1\ldots S/2, 0\ldots S/2$, (see (12.8) and (12.9)) were computed. The following data generation process (DGP) was considered,

$$\Delta_4 y_t = \varepsilon_t, \quad \text{for } t = 5, ..., T,$$

where $\varepsilon_t \sim N(0,1)$, and $y_t = \varepsilon_t$ for $t = 1,\ldots,4$ (initial conditions). The sample sizes is $T = 85$. We obtained critical values for the HEGY test at the 1, 5 and 10% significance levels, based on 100,000 replications. Table 12.3 (see Annex) reports the results for different combinations of deterministic components considered in the HEGY test regression (12.5).

The second set of experiments provides the descriptive statistics (expectation and variance) for the HEGY test statistics that are required for the panel unit root tests. To compute the mean and variance of the zero and Nyquist frequencies t-statistics, $E[t_{jiT}(p_i)/\pi_{ji} = 0]$ and $Var[t_{jiT}(p_i)/\pi_{ji} = 0]$, the mean and variance of the $F_{k,iT}$ statistics, $E[F_{k,iT} \mid H_{0,ki}]$ and $Var[F_{k,iT} \mid H_{0,ki}]$, and the mean and variance of the $F_{1\ldots S/2,iT}$ and $F_{0\ldots S/2,iT}$ statistics, 100,000 replications were used. This set of simulations is carried out for tree combinations of deterministic components and $T \in (25, 50, 75, 100, 150, 300, 500)$. We also allow for augmentation of the test regression considering $p^* = 0,\ldots,4$ (see (12.7)). Table 12.4 (see Annex) presents these results.

In the third set of experiments we generated critical values for the HEGY–IPS tests. The finite sample power and size of these statistics was analyzed by Otero et al. (2005) and Dreger and Reimers (2005). Our analysis focuses on the benchmark model given in (12.7) with presence of heterogeneity in the residuals. This means that the ε_{it} are generated as iid normal random variables with zero mean and heterogeneous variances σ_i^2. The component representation of the DGP is based on the following model:

$$\Delta_4 y_{it} = \mu_{it}^k + \pi_{1i} y_{1i,\,t-1} + \pi_{2i} y_{2i,\,t-1} + \pi_{3i} y_{3i,\,t-2} + \pi_{4i} y_{3i,\,t-1} + \varepsilon_{it}, \tag{12.17}$$

$$\varepsilon_{it} \sim N[0,\, \sigma_i^2]; \quad \sigma_i^2 \sim N[0.5,\, 1.5], \tag{12.18}$$

where σ_i^2 are generated independently of $\varepsilon_{it,}$ and μ_{it}^k is defined in (12.7). We used 100,000 replications to compute the 1, 5% and 10% significance levels. The simulations are conducted for $N \in (6, 10, 15)$ and $T \in (25, 50, 75, 100, 150, 300, 500)$. The results are presented in Table 12.5 (see Annex).

Remark: In order to avoid initial values effects, we generated samples of T + 50 observations and discarded the first 50. Data points were generated using pseudo iid normal random variables using the RNDN function of GAUSS.

12.4 Empirical Application

In this section we apply the HEGY and the HEGY–IPS procedures to test for nonstationarity of the tourism panel data for Algarve. In our analysis, we considered the six main tourism source countries to this region (the UK, Portugal, Germany, the Netherlands, Ireland and Spain).

The number of tourists from these countries exceeds 84% of the total number of tourist that visit Algarve. Figure 12.1 illustrate the country share for the year of 2008. In the analysis, the natural logarithm of the series was considered. The data was obtained from the Portuguese Office for National Statistics and our sample of quarterly data covers the period from 1987:1 to 2008:1, i.e. a sample of 85 observations.

Figure 12.2 illustrates the behavior of the natural logarithm of the data for all countries considered. The HEGY test procedure was applied to each country to formally analyse the individual nonstationarity properties.

For practical purposes we consider two specifications of (12.7), (1) with seasonal dummies only and (2) with seasonal dummies and a time trend. All hypotheses were tested at a 5% significance level. Critical values were taken from Table 12.3 (see Annex). The test results are provided in Tables 12.1 and 12.2.

All time series considered, except for the Netherlands, have unit roots at the zero frequency. A different conclusion was obtained for the seasonal unit roots at the semi-annual frequencies. For Germany, the Netherlands and Portugal, we found evidence of annual seasonal unit roots. However, additional testing ($H_{0,4}$) shows strong evidence of seasonal unit roots only for Germany and Portugal. Furthermore, hypothesis $H_{0,5}$ was only not rejected for Germany.

Turning to the panel, no evidence of seasonal unit roots can be found. In the specification of the test regression with seasonal dummies only, we only

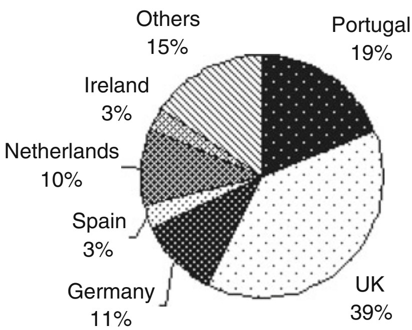

Fig. 12.1 Shares of tourist flows to Algarve

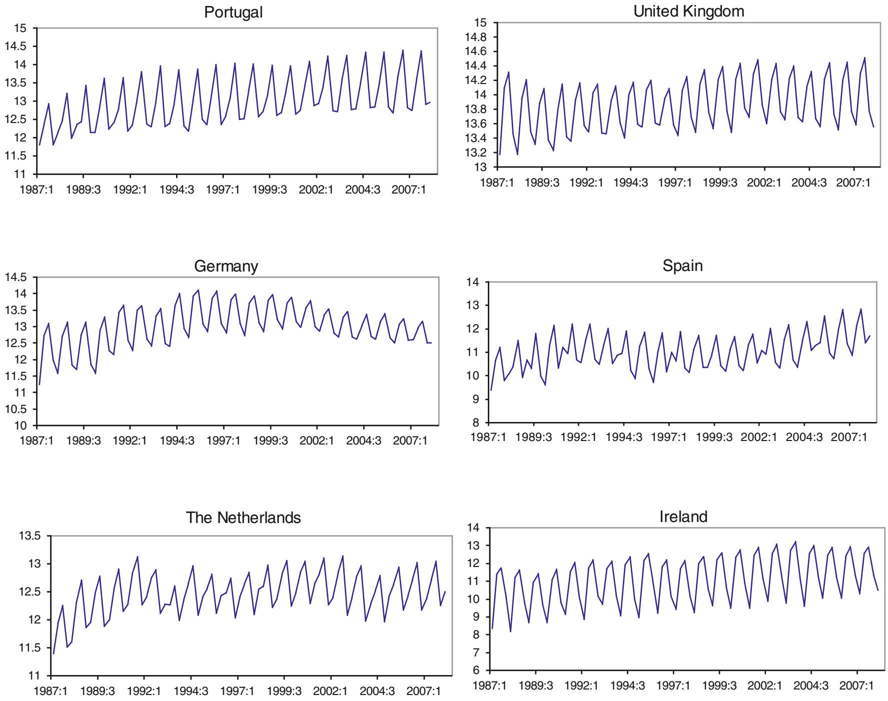

Fig. 12.2 Logarithms of quarterly overnight stays in hotel accommodation

Table 12.1 HEGY test results computed from a test regression with seasonal dummies only

	Lags	$H_{0,1}$	$H_{0,2}$	$H_{0,3}$	$H_{0,4}$	$H_{0,5}$
Germany	4,8	−2.399	−4.174**	3.196	2.469	1.900
Ireland	4	−1.029	−2.502	12.676**	9.664**	8.479**
Netherlands	0	−3.195*	−5.469**	6.057	26.332**	29.395**
Portugal	4	−2.339	−3.295*	3.869	2.960	8.811**
Spain	0	−0.902	−5.085**	8.182*	6.675*	19.771**
United Kingdom	0	−1.106	−3.973**	11.775**	8.396**	8.360**
Panel tests		−0894	−7.683**	5.703**	9.312**	15.917**

"*" and "**" denote significance at 5 and 1%

Table 12.2 HEGY test results computed from a test regression with seasonal dummies and a time trend

	Lags	$H_{0,1}$	$H_{0,2}$	$H_{0,3}$	$H_{0,4}$	$H_{0,5}$
Germany	1,2,4,6,8	−2.070	−0.929	3.074	2.307	1.752
Ireland	5,7	−3.156	−3.234*	22.436**	15.346**	13.568**
Netherlands	0	−3.121	−5.467**	5.762	24.592**	27.029**
Portugal	4	−3.033	−3.346*	5.840	4.202	7.081*
Spain	0	−1.731	−5.131**	9.091*	7.417*	20.670**
United Kingdom	4	−3.359	−5.349**	19.637**	14.529**	12.646**
Panel tests		−2.003*	−7.088**	9.755**	12.037**	15.288**

Column "Lags" indicates the number of lags included in the test regression to control for serial correlation
"*" and "**" denote significance at 5 and 1%

found evidence of a unit root at zero frequency. However, when seasonal dummies and a time trend are considered, only weak evidence of zero frequency unit roots is found.

12.5 Conclusion

The main aim of this chapter is to develop panel seasonal unit root tests and use them in tourism research. The HEGY seasonal unit root test is generalized in this chapter in line with the IPS test (see also Otero et al. 2005 and Dreger and Reimers 2005). The work of Otero et al. (2005) was extended with the $W_{\bar{F}_4}$ test in order to test the panel for common unit roots ($H_{0,5}$). All standardize statistics and tools for analyzing data with different specifications are obtained by simulation.

During the Monte Carlo simulations the following observation were made. The theory proposed by Im et al. (2003) posed that the $W_{\bar{t}_j}$, $j = 1, 2$ test statistics are asymptotically normal. The behavior of the critical values for $W_{\bar{t}_j}$, given in the appendix, support this fact. The theoretical extension of the IPS framework proposed by Otero et al. (2005) and by Dreger and Reimers (2005) states that the $W_{\bar{F}_2}$ tests are also normally distributed asymptotically. However, the finite sample set of critical values given in Table 12.5 (see Annex) do not support this fact. As we can see, higher time series or cross section dimension do not make the critical values become closer to the critical values of a normal distribution. The same issue can be noticed for $W_{\bar{F}_3}$ and $W_{\bar{F}_4}$. We leave this problem as an open question for future research.

The panel seasonal unit root tests are applied for pre-testing the tourism data. Interestingly, only a panel unit root at the zero frequency is detected in the case of a test regression with seasonal dummies. The null hypothesis of panel seasonal unit roots is rejected.

Appendix

Table 12.3 Critical values for HEGY test statistics (T = 85)

	No SD, No *t*	SD, No *t*	SD, t
Statistics for zero frequency unit root			
1%	−2.547	−3.446	−3.965
5%	−1.905	−2.846	−3.371
10%	−1.580	−2.542	−3.075
Statistics for semi-annual frequency unit root			
1%	−2.542	−3.446	−3.482
5%	−1.905	−2.845	−2.873
10%	−1.580	−2.541	−2.568

(continued)

Table 12.3 (continued)

	No SD, No *t*	SD, No *t*	SD, t
Statistics for annual frequency unit root			
90%	2.370	5.647	5.690
95%	3.095	6.732	6.781
99%	4.813	9.139	9.211
Statistics for joint test of all seasonal unit roots			
90%	2.207	5.285	5.353
95%	2.765	6.178	6.252
99%	4.069	8.132	8.229
Statistics for joint test of unit roots			
90%	2.101	5.085	5.859
95%	2.572	5.868	6.698
99%	3.655	7.569	8.528

SD indicates Seasonal Dummies and *t* a zero frequency time trend

Table 12.4 Mean and variance of HEGY test statistics

p			T = 25	T = 50	T = 75	T = 100	T = 150	T = 300	T = 500
Statistics for zero frequency unit root									
0	–	Mean	−0.251	−0.334	−0.364	−0.381	−0.397	−0.413	−0.419
		Var	1.050	0.994	0.987	0.976	0.973	0.965	0.962
	D	Mean	−1.500	−1.529	−1.531	−1.532	−1.535	−1.534	−1.533
		Var	0.607	0.639	0.661	0.671	0.684	0.695	0.700
	D and T	Mean	−2.087	−2.149	−2.169	−2.175	−2.180	−2.182	−2.181
		Var	0.514	0.478	0.497	0.511	0.526	0.545	0.552
1	–	Mean	−0.267	−0.339	−0.365	−0.382	−0.395	−0.412	−0.416
		Var	1.021	0.994	0.984	0.977	0.973	0.966	0.965
	D	Mean	−1.33	−1.462	−1.491	−1.504	−1.514	−1.525	−1.527
		Var	0.511	0.606	0.643	0.658	0.675	0.692	0.699
	D and T	Mean	−1.855	−2.067	−2.122	−2.144	−2.158	−2.172	−2.177
		Var	0.391	0.427	0.466	0.491	0.513	0.538	0.549
2	–	Mean	−0.27	−0.343	−0.368	−0.383	−0.399	−0.412	−0.419
		Var	1	0.99	0.981	0.979	0.974	0.964	0.965
	D	Mean	−1.289	−1.446	−1.481	−1.495	−1.51	−1.522	−1.526
		Var	0.471	0.584	0.628	0.648	0.668	0.688	0.696
	D and T	Mean	−1.785	−2.055	−2.117	−2.14	−2.158	−2.171	−2.177
		Var	0.358	0.403	0.448	0.477	0.503	0.534	0.545
3	–	Mean	−0.278	−0.344	−0.369	−0.382	−0.396	−0.412	−0.417
		Var	0.959	0.985	0.981	0.979	0.973	0.966	0.961
	D	Mean	−1.083	−1.353	−1.426	−1.455	−1.484	−1.51	−1.52
		Var	0.37	0.544	0.602	0.634	0.661	0.683	0.694
	D and T	Mean	−1.464	−1.921	−2.035	−2.082	−2.121	−2.154	−2.165
		Var	0.248	0.344	0.407	0.447	0.485	0.523	0.541
4	–	Mean	−0.166	−0.292	−0.337	−0.359	−0.383	−0.404	−0.414
		Var	1.122	1.029	1.003	0.993	0.979	0.967	0.963
	D	Mean	−1.362	−1.483	−1.506	−1.514	−1.522	−1.528	−1.531
		Var	0.604	0.566	0.605	0.628	0.655	0.681	0.691

(continued)

Table 12.4 (continued)

p			T = 25	T = 50	T = 75	T = 100	T = 150	T = 300	T = 500
	D and T	Mean	−1.869	−2.108	−2.155	−2.17	−2.177	−2.182	−2.182
		Var	0.506	0.401	0.432	0.458	0.487	0.525	0.54
Statistics for semi-annual frequency unit root									
0	–	Mean	−0.251	−0.334	−0.364	−0.381	−0.398	−0.413	−0.418
		Var	1.050	0.997	0.983	0.978	0.972	0.967	0.962
	D	Mean	−1.500	−1.530	−1.532	−1.531	−1.535	−1.533	−1.534
		Var	0.608	0.639	0.661	0.67	0.683	0.695	0.699
	D and T	Mean	−1.570	−1.562	−1.555	−1.548	−1.545	−1.538	−1.536
		Var	0.609	0.646	0.662	0.672	0.684	0.695	0.699
1	–	Mean	−0.266	−0.337	−0.368	−0.38	−0.397	−0.41	−0.417
		Var	1.017	0.994	0.983	0.979	0.973	0.968	0.962
	D	Mean	−1.329	−1.461	−1.491	−1.503	−1.514	−1.523	−1.528
		Var	0.512	0.605	0.643	0.66	0.676	0.692	0.696
	D and T	Mean	−1.319	−1.437	−1.474	−1.489	−1.505	−1.519	−1.525
		Var	0.468	0.6	0.638	0.659	0.676	0.692	0.696
2	–	Mean	−0.27	−0.343	−0.369	−0.383	−0.396	−0.411	−0.417
		Var	1	0.991	0.983	0.981	0.973	0.965	0.96
	D	Mean	−1.288	−1.446	−1.48	−1.494	−1.508	−1.52	−1.527
		Var	0.47	0.585	0.628	0.649	0.669	0.689	0.694
	D and T	Mean	−1.337	−1.471	−1.5	−1.508	−1.518	−1.525	−1.53
		Var	0.453	0.59	0.628	0.65	0.67	0.689	0.694
3	–	Mean	−0.277	−0.345	−0.37	−0.379	−0.394	−0.41	−0.415
		Var	0.959	0.982	0.981	0.98	0.973	0.964	0.965
	D	Mean	−1.082	−1.356	−1.425	−1.453	−1.482	−1.508	−1.519
		Var	0.37	0.543	0.603	0.633	0.66	0.684	0.692
	D and T	Mean	−1.084	−1.338	−1.41	−1.441	−1.474	−1.504	−1.516
		Var	0.363	0.537	0.599	0.631	0.66	0.684	0.692
4	–	Mean	−0.166	−0.294	−0.335	−0.361	−0.383	−0.403	−0.413
		Var	1.119	1.03	1.007	0.991	0.979	0.968	0.965
	D	Mean	−1.363	−1.483	−1.506	−1.515	−1.523	−1.529	−1.531
		Var	0.606	0.565	0.606	0.628	0.655	0.681	0.691
	D and T	Mean	−1.432	−1.514	−1.528	−1.531	−1.533	−1.533	1.534
		Var	0.622	0.576	0.608	0.63	0.656	0.681	0.691
Statistics for annual frequency unit root									
0	–	Mean	1.090	1.048	1.046	1.049	1.053	1.054	1.057
		Var	1.561	1.164	1.110	1.095	1.081	1.066	1.067
	D	Mean	2.916	3.005	3.017	3.021	3.024	3.020	3.028
		Var	4.455	3.997	3.916	3.870	3.843	3.797	3.784
	D and T	Mean	3.054	3.058	3.048	3.043	3.039	3.028	3.032
		Var	4.969	4.082	3.959	3.901	3.858	3.804	3.788
1	–	Mean	1.122	1.053	1.047	1.049	1.049	1.052	1.057
		Var	1.712	1.179	1.111	1.096	1.075	1.065	1.07
	D	Mean	2.803	2.954	2.985	2.991	3.005	3.013	3.017
		Var	4.284	3.943	3.894	3.842	3.819	3.793	3.779
	D and T	Mean	2.936	3.01	3.018	3.015	3.021	3.02	3.021
		Var	4.77	4.034	3.939	3.875	3.835	3.8	3.783

(continued)

Table 12.4 (continued)

p			T = 25	T = 50	T = 75	T = 100	T = 150	T = 300	T = 500
2	–	Mean	1.01	1.027	1.037	1.042	1.046	1.054	1.055
		Var	1.315	1.12	1.09	1.079	1.066	1.065	1.063
	D	Mean	2.267	2.732	2.847	2.897	2.944	2.981	2.998
		Var	3.07	3.529	3.651	3.684	3.719	3.741	3.748
	D and T	Mean	2.254	2.702	2.821	2.875	2.93	2.974	2.994
		Var	3.151	3.482	3.618	3.661	3.701	3.734	3.744
3	–	Mean	1.029	1.03	1.035	1.042	1.047	1.052	1.052
		Var	1.446	1.127	1.088	1.076	1.071	1.063	1.056
	D	Mean	1.987	2.605	2.77	2.837	2.908	2.964	2.99
		Var	2.705	3.298	3.519	3.578	3.675	3.722	3.73
	D and T	Mean	2.008	2.586	2.748	2.819	2.896	2.957	2.985
		Var	2.741	3.254	3.492	3.56	3.66	3.715	3.726
4	–	Mean	1.196	1.071	1.055	1.049	1.048	1.050	1.054
		Var	2.13	1.222	1.126	1.089	1.069	1.059	1.058
	D	Mean	2.475	2.766	2.862	2.902	2.946	2.986	2.999
		Var	4.648	3.498	3.567	3.606	3.665	3.713	3.741
	D and T	Mean	2.651	2.852	2.907	2.931	2.966	2.994	3.003
		Var	5.21	3.622	3.64	3.657	3.689	3.723	3.747
Statistics for joint test of all seasonal unit roots									
0	–	Mean	1.125	1.084	1.081	1.082	1.084	1.085	1.085
		Var	1.153	0.823	0.774	0.759	0.742	0.728	0.725
	D	Mean	3.102	3.094	3.077	3.066	3.059	3.044	3.044
		Var	3.909	2.970	2.777	2.683	2.607	2.524	2.496
	D and T	Mean	3.277	3.166	3.121	3.098	3.080	3.053	3.050
		Var	4.488	3.086	2.834	2.723	2.629	2.534	2.501
1	–	Mean	1.142	1.087	1.082	1.083	1.082	1.083	1.085
		Var	1.219	0.83	0.776	0.76	0.739	0.728	0.728
	D	Mean	2.817	2.976	3.006	3.012	3.023	3.027	3.03
		Var	3.31	2.799	2.689	2.616	2.561	2.508	2.485
	D and T	Mean	2.9	2.992	3.012	3.014	3.024	3.028	3.03
		Var	3.551	2.808	2.686	2.614	2.557	2.505	2.484
2	–	Mean	1.08	1.073	1.076	1.078	1.079	1.083	1.083
		Var	1.079	0.81	0.767	0.75	0.735	0.725	0.722
	D	Mean	2.622	2.896	2.955	2.977	3	3.015	3.024
		Var	3.194	2.733	2.645	2.593	2.542	2.498	2.475
	D and T	Mean	2.697	2.911	2.96	2.979	3.001	3.015	3.024
		Var	3.471	2.773	2.662	2.605	2.548	2.501	2.476
3	–	Mean	1.085	1.073	1.074	1.078	1.079	1.081	1.082
		Var	1.159	0.811	0.765	0.75	0.736	0.723	0.718
	D	Mean	2.117	2.691	2.832	2.887	2.945	2.989	3.009
		Var	2.288	2.406	2.47	2.465	2.48	2.466	2.458
	D and T	Mean	2.109	2.652	2.797	2.86	2.928	2.979	3.003
		Var	2.239	2.339	2.426	2.436	2.461	2.457	2.453
4	–	Mean	1.227	1.105	1.089	1.083	1.08	1.080	1.083
		Var	1.632	0.861	0.784	0.755	0.735	0.721	0.719
	D	Mean	2.62	2.848	2.922	2.951	2.984	3.011	3.019
		Var	4.059	2.562	2.517	2.495	2.481	2.466	2.462

(continued)

Table 12.4 (continued)

p			T = 25	T = 50	T = 75	T = 100	T = 150	T = 300	T = 500
	D and T	Mean	2.806	2.941	2.976	2.988	3.008	3.021	3.025
		Var	4.625	2.691	2.589	2.544	2.506	2.477	2.468
Statistics for joint test of unit roots									
0	–	Mean	1.159	1.109	1.104	1.102	1.103	1.100	1.100
		Var	0.967	0.652	0.605	0.586	0.57	0.555	0.55
	D	Mean	3.221	3.153	3.117	3.097	3.083	3.059	3.054
		Var	3.598	2.447	2.210	2.096	2.003	1.906	1.870
	D and T	Mean	3.944	3.780	3.728	3.699	3.672	3.638	3.627
		Var	4.981	2.957	2.594	2.443	2.318	2.195	2.149
1	–	Mean	1.173	1.113	1.105	1.103	1.101	1.1	1.1
		Var	1.013	0.657	0.605	0.587	0.567	0.555	0.552
	D	Mean	3.028	3.075	3.072	3.063	3.058	3.049	3.044
		Var	3.322	2.372	2.174	2.071	1.98	1.899	1.866
	D and T	Mean	3.698	3.686	3.675	3.662	3.645	3.625	3.619
		Var	4.568	2.849	2.55	2.413	2.293	2.182	2.146
2	–	Mean	1.134	1.104	1.1	1.1	1.099	1.098	1.099
		Var	0.956	0.65	0.601	0.582	0.566	0.552	0.548
	D	Mean	2.829	2.996	3.021	3.027	3.035	3.036	3.038
		Var	3.165	2.304	2.129	2.044	1.961	1.89	1.857
	D and T	Mean	3.455	3.607	3.627	3.628	3.625	3.614	3.614
		Var	4.397	2.794	2.505	2.388	2.273	2.178	2.139
3	–	Mean	1.139	1.104	1.099	1.099	1.098	1.098	1.097
		Var	1.046	0.654	0.599	0.583	0.566	0.551	0.545
	D	Mean	2.388	2.822	2.92	2.954	2.992	3.015	3.027
		Var	2.552	2.086	2.016	1.964	1.927	1.869	1.849
	D and T	Mean	2.905	3.379	3.49	3.529	3.565	3.587	3.595
		Var	3.556	2.508	2.358	2.278	2.221	2.148	2.121
4	–	Mean	1.27	1.13	1.11	1.103	1.099	1.096	1.098
		Var	1.443	0.686	0.612	0.585	0.564	0.549	0.545
	D	Mean	2.711	2.904	2.963	2.984	3.008	3.026	3.031
		Var	3.717	2.108	2.002	1.949	1.903	1.862	1.845
	D and T	Mean	3.269	3.517	3.575	3.592	3.603	3.608	3.607
		Var	4.989	2.526	2.34	2.261	2.196	2.142	2.120

Table 12.5 Critical values for HEGY–IPS test statistics (No SD, No t)

N	T	Zero frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−2.286	−1.630	−1.265	−0.011	1.285	1.659	2.378
	50	−2.271	−1.614	−1.268	−0.016	1.291	1.674	2.370
	75	−2.242	−1.615	−1.271	−0.016	1.288	1.667	2.404
	100	−2.258	−1.617	−1.270	−0.016	1.286	1.672	2.409
	150	−2.238	−1.608	−1.269	−0.017	1.294	1.670	2.390
	300	−2.259	−1.607	−1.266	−0.016	1.293	1.673	2.377

(continued)

Table 12.5 (continued)

N	T	Zero frequency panel unit root						
	500	−2.243	−1.616	−1.275	−0.017	1.299	1.678	2.414
10	25	−2.301	−1.625	−1.273	−0.01	1.291	1.663	2.375
	50	−2.275	−1.622	−1.270	−0.011	1.286	1.663	2.378
	75	−2.278	−1.622	−1.274	−0.007	1.293	1.662	2.392
	100	−2.259	−1.627	−1.276	−0.016	1.291	1.670	2.394
	150	−2.262	−1.619	−1.269	−0.014	1.287	1.667	2.388
	300	−2.284	−1.635	−1.279	−0.011	1.293	1.665	2.370
	500	−2.260	−1.622	−1.275	−0.013	1.284	1.668	2.386
15	25	−2.307	−1.627	−1.273	−0.004	1.276	1.645	2.358
	50	−2.314	−1.638	−1.279	−0.009	1.292	1.667	2.365
	75	−2.300	−1.631	−1.276	−0.007	1.292	1.665	2.369
	100	−2.267	−1.624	−1.266	−0.011	1.280	1.656	2.354
	150	−2.279	−1.629	−1.278	−0.01	1.293	1.663	2.352
	300	−2.282	−1.624	−1.280	−0.006	1.290	1.666	2.373
	500	−2.270	−1.623	−1.276	−0.009	1.287	1.663	2.358
25	25	−2.306	−1.629	−1.280	−0.007	1.288	1.661	2.364
	50	−2.291	−1.623	−1.282	−0.004	1.279	1.649	2.346
	75	−2.294	−1.643	−1.278	−0.003	1.284	1.663	2.346
	100	−2.290	−1.631	−1.276	−0.008	1.289	1.660	2.355
	150	−2.291	−1.628	−1.268	−0.01	1.285	1.663	2.350
	300	−2.301	1.621	−1.273	−0.008	1.281	1.652	2.356
	500	−2.289	−1.636	−1.275	−0.009	1.285	1.660	2.360
50	25	−2.286	−1.630	−1.276	−0.005	1.280	1.652	2.353
	50	−2.306	−1.633	−1.279	−0.008	1.290	1.654	2.346
	75	−2.302	−1.631	−1.282	−0.008	1.289	1.664	2.358
	100	−2.307	−1.638	−1.276	−0.003	1.284	1.650	2.338
	150	−2.310	−1.638	−1.284	0	1.289	1.656	2.345
	300	−2.286	−1.625	−1.270	−0.004	1.277	1.645	2.360
	500	−2.283	−1.632	−1.275	−0.007	1.288	1.658	2.355

N	T	Semi-annual frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−2.282	−1.625	−1.264	−0.012	1.281	1.659	2.391
	50	−2.280	−1.624	−1.276	−0.013	1.286	1.672	2.390
	75	−2.266	−1.615	−1.270	−0.018	1.298	1.672	2.412
	100	−2.259	−1.613	−1.263	−0.015	1.290	1.671	2.394
	150	−2.266	−1.620	−1.271	−0.013	1.286	1.678	2.404
	300	−2.234	−1.613	−1.271	−0.016	1.291	1.670	2.423
	500	−2.255	−1.619	−1.261	−0.02	1.291	1.667	2.409
10	25	−2.271	−1.628	−1.268	−0.009	1.284	1.652	2.397
	50	−2.283	−1.631	−1.277	−0.009	1.287	1.661	2.376
	75	−2.310	−1.641	−1.280	−0.011	1.301	1.677	2.384
	100	−2.272	−1.629	−1.277	−0.014	1.295	1.667	2.378
	150	−2.282	−1.627	−1.277	−0.017	1.297	1.683	2.396
	300	−2.262	−1.629	−1.273	−0.013	1.289	1.664	2.390
	500	−2.261	−1.624	−1.275	−0.013	1.288	1.657	2.374

(continued)

Table 12.5 (continued)

N	T	Semi-annual frequency panel unit root						
15	25	−2.303	−1.633	−1.275	−0.009	1.285	1.656	2.358
	50	−2.289	−1.628	−1.279	−0.009	1.285	1.655	2.368
	75	−2.294	−1.636	−1.279	−0.009	1.284	1.659	2.350
	100	−2.282	−1.625	−1.281	−0.009	1.289	1.670	2.371
	150	−2.280	−1.627	−1.276	−0.011	1.294	1.661	2.359
	300	−2.292	−1.623	−1.280	−0.01	1.287	1.654	2.386
	500	−2.274	−1.620	−1.272	−0.006	1.287	1.659	2.359
25	25	−2.314	−1.634	−1.276	−0.008	1.284	1.656	2.373
	50	−2.287	−1.629	−1.281	−0.008	1.284	1.648	2.358
	75	−2.285	−1.642	−1.284	−0.004	1.295	1.666	2.362
	100	−2.285	−1.622	−1.270	−0.013	1.287	1.663	2.373
	150	−2.295	−1.633	−1.279	−0.008	1.286	1.659	2.369
	300	−2.277	−1.633	−1.276	−0.01	1.293	1.669	2.377
	500	−2.284	−1.630	−1.276	−0.006	1.285	1.655	2.343
50	25	−2.343	−1.648	−1.285	0.002	1.281	1.653	2.332
	50	−2.308	−1.651	−1.279	−0.005	1.285	1.663	2.343
	75	−2.314	−1.642	−1.278	−0.006	1.287	1.665	2.354
	100	−2.297	−1.638	−1.285	−0.006	1.289	1.656	2.343
	150	−2.290	−1.638	−1.279	−0.006	1.286	1.657	2.358
	300	−2.286	−1.629	−1.274	−0.004	1.280	1.655	2.351
	500	−2.319	−1.643	−1.275	−0.006	1.284	1.658	2.357

N	T	Annual frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.557	−1.279	−1.091	−0.176	1.308	1.871	3.189
	50	−1.673	−1.355	−1.144	−0.147	1.332	1.849	2.973
	75	−1.704	−1.374	−1.159	−0.138	1.334	1.856	2.946
	100	−1.720	−1.386	−1.164	−0.133	1.337	1.846	2.917
	150	−1.724	−1.381	−1.160	−0.131	1.335	1.846	2.881
	300	−1.731	−1.392	−1.170	−0.13	1.336	1.834	2.908
	500	−1.740	−1.394	−1.165	−0.13	1.337	1.828	2.877
10	25	−1.706	−1.366	−1.147	−0.141	1.315	1.834	3.004
	50	−1.811	−1.420	−1.176	−0.112	1.326	1.805	2.813
	75	−1.838	−1.433	−1.184	−0.109	1.328	1.800	2.819
	100	−1.851	−1.449	−1.198	−0.106	1.331	1.808	2.829
	150	−1.861	−1.450	−1.198	−0.101	1.331	1.804	2.748
	300	−1.877	−1.454	−1.202	−0.103	1.331	1.814	2.782
	500	−1.871	−1.452	−1.199	−0.098	1.322	1.795	2.770
15	25	−1.807	−1.406	−1.163	−0.12	1.312	1.813	2.883
	50	−1.903	−1.463	−1.202	−0.093	1.328	1.788	2.763
	75	−1.925	−1.476	−1.211	−0.092	1.323	1.789	2.733
	100	−1.944	−1.483	−1.211	−0.089	1.326	1.780	2.704
	150	−1.938	−1.483	−1.208	−0.085	1.324	1.778	2.681
	300	−1.939	−1.484	−1.216	−0.089	1.321	1.773	2.693
	500	−1.959	−1.490	−1.216	−0.086	1.320	1.774	2.726
25	25	−1.907	−1.458	−1.193	−0.095	1.312	1.772	2.784
	50	−1.994	−1.509	−1.220	−0.076	1.318	1.757	2.654

(continued)

Table 12.5 (continued)

N	T	Annual frequency panel unit root						
	75	−2.018	−1.515	−1.230	−0.071	1.318	1.765	2.655
	100	−2.035	−1.527	−1.243	−0.068	1.322	1.766	2.626
	150	−2.016	−1.514	−1.226	−0.068	1.306	1.743	2.591
	300	−2.026	−1.528	−1.230	−0.066	1.316	1.749	2.634
	500	−2.040	−1.522	−1.231	−0.066	1.322	1.751	2.611
50	25	−2.031	−1.513	−1.221	−0.07	1.309	1.749	2.670
	50	−2.099	−1.550	−1.242	−0.055	1.312	1.737	2.576
	75	−2.110	−1.552	−1.248	−0.045	1.304	1.717	2.524
	100	−2.097	−1.565	−1.244	−0.049	1.305	1.723	2.534
	150	−2.116	−1.560	−1.247	−0.047	1.306	1.722	2.536
	300	−2.117	−1.558	−1.247	−0.048	1.314	1.733	2.537
	500	−2.114	−1.563	−1.242	−0.045	1.304	1.720	2.512
N	T	Joint test of all seasonal panel unit roots						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.639	−1.324	−1.117	−0.154	1.297	1.839	3.105
	50	−1.777	−1.411	−1.170	−0.125	1.338	1.825	2.876
	75	−1.807	−1.426	−1.186	−0.114	1.330	1.821	2.837
	100	−1.831	−1.437	−1.192	−0.112	1.340	1.813	2.799
	150	−1.839	−1.436	−1.185	−0.108	1.327	1.806	2.787
	300	−1.857	−1.444	−1.190	−0.105	1.324	1.801	2.784
	500	−1.860	−1.447	−1.194	−0.106	1.332	1.805	2.768
10	25	−1.784	−1.395	−1.160	−0.122	1.304	1.812	2.939
	50	−1.900	−1.459	−1.196	−0.095	1.318	1.778	2.724
	75	−1.932	−1.483	−1.210	−0.086	1.318	1.778	2.729
	100	−1.946	−1.487	−1.214	−0.088	1.323	1.781	2.712
	150	−1.945	−1.487	−1.214	−0.084	1.318	1.775	2.703
	300	−1.970	−1.491	−1.213	−0.084	1.322	1.780	2.716
	500	−1.949	−1.495	−1.216	−0.084	1.325	1.779	2.650
15	25	−1.870	−1.441	−1.179	−0.101	1.310	1.790	2.821
	50	−1.974	−1.494	−1.219	−0.081	1.312	1.770	2.702
	75	−1.985	−1.506	−1.221	−0.079	1.318	1.759	2.680
	100	−2.014	−1.515	−1.226	−0.07	1.316	1.763	2.634
	150	−2.000	−1.516	−1.226	−0.073	1.317	1.759	2.648
	300	−2.019	−1.518	−1.229	−0.068	1.315	1.744	2.617
	500	−2.020	−1.528	−1.227	−0.072	1.326	1.773	2.622
25	25	−1.960	−1.487	−1.209	−0.083	1.313	1.766	2.722
	50	−2.048	−1.533	−1.231	−0.063	1.308	1.746	2.587
	75	−2.066	−1.538	−1.243	−0.058	1.315	1.741	2.597
	100	−2.084	−1.552	−1.243	−0.055	1.311	1.741	2.587
	150	−2.068	−1.542	−1.239	−0.056	1.311	1.722	2.550
	300	−2.074	−1.548	−1.248	−0.057	1.307	1.733	2.561
	500	−2.089	−1.546	−1.243	−0.054	1.312	1.730	2.563
50	25	−2.067	−1.533	−1.226	−0.059	1.304	1.736	2.610
	50	−2.133	−1.569	−1.253	−0.044	1.306	1.720	2.543
	75	−2.140	−1.575	−1.253	−0.042	1.304	1.710	2.503

(continued)

Table 12.5 (continued)

N	T	Joint test of all seasonal panel unit roots						
	100	−2.149	−1.578	−1.256	−0.038	1.299	1.707	2.513
	150	−2.142	−1.574	−1.257	−0.04	1.301	1.698	2.483
	300	−2.151	−1.578	−1.260	−0.039	1.307	1.714	2.500
	500	−2.171	−1.580	−1.256	−0.033	1.296	1.695	2.504
N	T	Joint test of panel unit roots						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.697	−1.344	−1.127	−0.147	1.301	1.844	3.093
	50	−1.844	−1.435	−1.185	−0.111	1.330	1.808	2.847
	75	−1.883	−1.458	−1.193	−0.102	1.321	1.794	2.780
	100	−1.896	−1.465	−1.200	−0.1	1.325	1.803	2.785
	150	−1.898	−1.467	−1.200	−0.095	1.319	1.779	2.747
	300	−1.926	−1.471	−1.204	−0.091	1.319	1.782	2.722
	500	−1.917	−1.474	−1.206	−0.091	1.333	1.796	2.718
10	25	−1.830	−1.420	−1.171	−0.114	1.295	1.805	2.875
	50	−1.946	−1.476	−1.201	−0.084	1.318	1.769	2.709
	75	−1.989	−1.502	−1.220	−0.079	1.321	1.762	2.672
	100	−1.980	−1.505	−1.225	−0.077	1.323	1.780	2.661
	150	−2.001	−1.508	−1.228	−0.072	1.316	1.766	2.674
	300	−2.015	−1.515	−1.225	−0.07	1.319	1.776	2.672
	500	−2.001	−1.509	−1.227	−0.072	1.319	1.755	2.635
15	25	−1.897	−1.447	−1.183	−0.098	1.310	1.780	2.775
	50	−2.012	−1.516	−1.226	−0.07	1.316	1.755	2.658
	75	−2.028	−1.524	−1.227	−0.068	1.320	1.755	2.603
	100	−2.062	−1.532	−1.231	−0.064	1.316	1.737	2.616
	150	−2.061	−1.530	−1.230	−0.06	1.313	1.733	2.592
	300	−2.077	−1.541	−1.243	−0.061	1.310	1.728	2.588
	500	−2.077	−1.535	−1.238	−0.057	1.313	1.741	2.573
25	25	−1.988	−1.502	−1.215	−0.081	1.313	1.774	2.676
	50	−2.085	−1.552	−1.239	−0.054	1.310	1.734	2.586
	75	−2.104	−1.555	−1.247	−0.052	1.302	1.731	2.573
	100	−2.126	−1.558	−1.244	−0.048	1.314	1.727	2.539
	150	−2.118	−1.563	−1.241	−0.049	1.307	1.720	2.530
	300	−2.114	−1.566	−1.250	−0.048	1.310	1.726	2.542
	500	−2.131	−1.564	−1.248	−0.043	1.310	1.720	2.539
50	25	−2.077	−1.536	−1.236	−0.058	1.307	1.738	2.602
	50	−2.155	−1.572	−1.257	−0.043	1.308	1.719	2.522
	75	−2.168	−1.585	−1.264	−0.035	1.302	1.704	2.476
	100	−2.178	−1.591	−1.258	−0.032	1.304	1.694	2.493
	150	−2.174	−1.584	−1.257	−0.036	1.297	1.696	2.478
	300	−2.192	−1.588	−1.260	−0.031	1.300	1.703	2.479
	500	−2.188	−1.592	−1.259	−0.033	1.300	1.696	2.457
N	T	Zero frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−2.457	−1.664	−1.277	0.021	1.256	1.599	2.244
	50	−2.322	−1.642	−1.275	0.0003	1.276	1.641	2.344
	75	−2.331	−1.645	−1.278	−0.005	1.281	1.659	2.386

(continued)

Table 12.5 (continued)

N	T	Zero frequency panel unit root						
	100	−2.303	−1.632	−1.274	−0.004	1.285	1.664	2.372
	150	−2.286	−1.623	−1.268	−0.012	1.284	1.666	2.377
	300	−2.274	−1.618	−1.272	−0.012	1.286	1.659	2.383
	500	−2.282	−1.625	−1.269	−0.018	1.290	1.681	2.409
10	25	−2.432	−1.677	−1.290	0.019	1.271	1.616	2.263
	50	−2.319	−1.640	−1.271	0.002	1.274	1.639	2.315
	75	−2.314	−1.645	−1.280	−0.005	1.283	1.659	2.352
	100	−2.295	−1.629	−1.270	−0.009	1.286	1.655	2.360
	150	−2.291	−1.628	−1.272	−0.009	1.283	1.651	2.358
	300	−2.303	−1.642	−1.277	−0.009	1.287	1.664	2.381
	500	−2.288	−1.620	−1.271	−0.005	1.284	1.649	2.360
15	25	−2.390	−1.662	−1.277	0.014	1.267	1.618	2.275
	50	−2.329	−1.646	−1.282	−0.0006	1.284	1.647	2.339
	75	−2.334	−1.641	−1.274	−0.001	1.279	1.644	2.329
	100	−2.329	−1.639	−1.280	−0.003	1.284	1.651	2.361
	150	−2.299	−1.645	−1.281	−0.008	1.290	1.659	2.368
	300	−2.298	−1.632	−1.280	−0.008	1.285	1.661	2.351
	500	−2.290	−1.632	−1.280	−0.006	1.290	1.654	2.365
25	25	−2.393	−1.673	−1.292	0.016	1.277	1.622	2.274
	50	−2.335	−1.636	−1.275	−0.002	1.275	1.641	2.327
	75	−2.339	−1.645	−1.285	−0.003	1.289	1.656	2.343
	100	−2.313	−1.632	−1.279	−0.008	1.291	1.663	2.348
	150	−2.300	−1.626	−1.273	−0.01	1.283	1.653	2.353
	300	−2.288	−1.630	−1.273	−0.004	1.280	1.646	2.349
	500	−2.289	−1.624	−1.271	−0.007	1.284	1.657	2.350
50	25	−2.356	−1.657	−1.291	0.004	1.285	1.638	2.313
	50	−2.323	−1.652	−1.286	0.001	1.283	1.650	2.336
	75	−2.326	−1.640	−1.275	−0.002	1.288	1.648	2.344
	100	−2.301	−1.630	−1.270	−0.004	1.283	1.646	2.335
	150	−2.313	−1.642	−1.276	−0.002	1.283	1.650	2.346
	300	−2.313	−1.630	−1.276	0	1.282	1.651	2.346
	500	−2.304	−1.635	−1.276	−0.004	1.284	1.651	2.350

N	T	Semi-annual frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−2.442	−1.673	−1.280	0.02	1.255	1.602	2.257
	50	−2.336	−1.638	−1.277	−0.004	1.280	1.652	2.356
	75	−2.314	−1.633	−1.274	−0.013	1.286	1.652	2.356
	100	−2.308	−1.629	−1.267	−0.007	1.286	1.661	2.359
	150	−2.301	−1.626	−1.271	−0.012	1.286	1.659	2.359
	300	−2.288	−1.627	−1.265	−0.013	1.286	1.675	2.396
	500	−2.269	−1.613	−1.264	−0.014	1.287	1.671	2.387
10	25	−2.430	−1.677	−1.283	0.012	1.266	1.613	2.260
	50	−2.331	−1.645	−1.276	0.0003	1.275	1.642	2.327
	75	−2.323	−1.640	−1.275	−0.005	1.278	1.647	2.344
	100	−2.305	−1.634	−1.273	−0.008	1.285	1.668	2.381
	150	−2.296	−1.631	−1.283	−0.006	1.291	1.666	2.370

(continued)

Table 12.5 (continued)

N	T	Semi-annual frequency panel unit root						
	300	−2.289	−1.631	−1.276	−0.005	1.284	1.647	2.349
	500	−2.282	−1.629	−1.275	−0.016	1.286	1.655	2.398
15	25	−2.394	−1.668	−1.285	0.015	1.268	1.608	2.265
	50	−2.318	−1.639	−1.277	−0.004	1.283	1.646	2.346
	75	−2.307	−1.641	−1.280	−0.006	1.286	1.657	2.367
	100	−2.314	−1.647	−1.285	−0.004	1.288	1.654	2.348
	150	−2.310	−1.625	−1.266	−0.008	1.286	1.654	2.331
	300	−2.286	−1.633	−1.277	−0.006	1.289	1.654	2.362
	500	−2.278	−1.628	−1.270	−0.013	1.280	1.655	2.368
25	25	−2.385	−1.667	−1.288	0.013	1.275	1.632	2.281
	50	−2.338	−1.647	−1.281	−0.001	1.286	1.647	2.323
	75	−2.304	−1.643	−1.279	−0.001	1.276	1.648	2.346
	100	−2.303	−1.632	−1.275	−0.004	1.281	1.646	2.338
	150	−2.318	−1.638	−1.283	0.002	1.281	1.650	2.352
	300	−2.304	−1.640	−1.277	−0.003	1.288	1.654	2.344
	500	−2.308	−1.638	−1.277	−0.005	1.281	1.654	2.356
50	25	−2.360	−1.652	−1.276	0.003	1.280	1.633	2.297
	50	−2.323	−1.646	−1.280	0.003	1.274	1.641	2.302
	75	−2.332	−1.636	−1.273	−0.004	1.282	1.643	2.314
	100	−2.332	−1.640	−1.280	−0.003	1.288	1.657	2.344
	150	−2.322	−1.636	−1.282	−0.002	1.283	1.645	2.334
	300	−2.313	−1.642	−1.285	−0.004	1.289	1.653	2.342
	500	−2.300	−1.636	−1.279	−0.005	1.288	1.656	2.350

N	T	Annual frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.847	−1.430	−1.174	−0.111	1.298	1.796	2.853
	50	−1.964	−1.494	−1.215	−0.08	1.319	1.771	2.721
	75	−1.990	−1.507	−1.228	−0.074	1.318	1.764	2.649
	100	−2.012	−1.509	−1.221	−0.073	1.317	1.758	2.641
	150	−2.018	−1.513	−1.232	−0.067	1.316	1.750	2.633
	300	−2.021	−1.518	−1.232	−0.07	1.314	1.751	2.615
	500	−2.028	−1.529	−1.232	−0.069	1.315	1.748	2.617
10	25	−1.934	−1.472	−1.199	−0.089	1.303	1.777	2.797
	50	−2.035	−1.530	−1.235	−0.06	1.312	1.732	2.623
	75	−2.055	−1.530	−1.233	−0.06	1.313	1.749	2.594
	100	−2.075	−1.540	−1.238	−0.051	1.298	1.723	2.551
	150	−2.060	−1.542	−1.238	−0.059	1.302	1.730	2.570
	300	−2.093	−1.552	−1.231	−0.055	1.310	1.722	2.541
	500	−2.099	−1.555	−1.240	−0.052	1.311	1.724	2.555
15	25	−2.006	−1.502	−1.219	−0.079	1.310	1.763	2.715
	50	−2.103	−1.554	−1.245	−0.052	1.307	1.727	2.537
	75	−2.118	−1.565	−1.250	−0.049	1.310	1.725	2.546
	100	−2.108	−1.563	−1.254	−0.047	1.311	1.732	2.539
	150	−2.143	−1.569	−1.255	−0.041	1.310	1.713	2.518
	300	−2.139	−1.565	−1.254	−0.045	1.310	1.720	2.529
	500	−2.144	−1.578	−1.260	−0.043	1.308	1.725	2.523
25	25	−2.060	−1.531	−1.230	−0.064	1.308	1.750	2.611

(continued)

Table 12.5 (continued)

N	T	Annual frequency panel unit root						
	50	−2.146	−1.577	−1.253	−0.043	1.312	1.719	2.524
	75	−2.169	−1.583	−1.254	−0.037	1.300	1.705	2.482
	100	−2.153	−1.581	−1.255	−0.035	1.299	1.701	2.476
	150	−2.181	−1.582	−1.258	−0.034	1.299	1.700	2.477
	300	−2.183	−1.590	−1.266	−0.036	1.317	1.719	2.488
	500	−2.172	−1.591	−1.260	−0.033	1.302	1.696	2.474
50	25	−2.119	−1.564	−1.246	−0.044	1.305	1.707	2.535
	50	−2.184	−1.590	−1.258	−0.028	1.300	1.696	2.460
	75	−2.216	−1.605	−1.266	−0.027	1.295	1.692	2.443
	100	−2.210	−1.598	−1.264	−0.028	1.308	1.692	2.438
	150	−2.209	−1.600	−1.263	−0.027	1.295	1.693	2.441
	300	−2.224	−1.611	−1.269	−0.025	1.299	1.687	2.434
	500	−2.224	−1.601	−1.264	−0.026	1.294	1.687	2.424
N	T	Joint test of all seasonal panel unit roots						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.856	−1.420	−1.169	−0.108	1.301	1.785	2.862
	50	−1.996	−1.510	−1.223	−0.074	1.311	1.769	2.690
	75	−2.037	−1.527	−1.230	−0.067	1.316	1.752	2.630
	100	−2.038	−1.521	−1.228	−0.066	1.315	1.742	2.600
	150	−2.058	−1.530	−1.238	−0.057	1.321	1.744	2.585
	300	−2.060	−1.551	−1.242	−0.057	1.315	1.732	2.577
	500	−2.079	−1.545	−1.237	−0.059	1.310	1.740	2.582
10	25	−1.934	−1.470	−1.194	−0.093	1.303	1.773	2.763
	50	−2.056	−1.529	−1.236	−0.058	1.306	1.739	2.584
	75	−2.079	−1.547	−1.236	−0.052	1.313	1.734	2.567
	100	−2.104	−1.549	−1.241	−0.052	1.308	1.728	2.551
	150	−2.111	−1.558	−1.246	−0.049	1.306	1.720	2.557
	300	−2.115	−1.555	−1.239	−0.046	1.306	1.713	2.523
	500	−2.147	−1.573	−1.254	−0.045	1.310	1.726	2.513
15	25	−2.004	−1.502	−1.218	−0.074	1.315	1.752	2.672
	50	−2.137	−1.566	−1.251	−0.048	1.298	1.716	2.554
	75	−2.141	−1.570	−1.254	−0.038	1.310	1.713	2.515
	100	−2.152	−1.580	−1.258	−0.036	1.306	1.709	2.508
	150	−2.167	−1.585	−1.257	−0.037	1.307	1.709	2.467
	300	−2.158	−1.570	−1.245	−0.038	1.302	1.704	2.485
	500	−2.163	−1.581	−1.258	−0.033	1.299	1.706	2.467
25	25	−2.058	−1.532	−1.236	−0.059	1.309	1.736	2.610
	50	−2.158	−1.574	−1.255	−0.041	1.301	1.710	2.496
	75	−2.193	−1.589	−1.263	−0.026	1.303	1.695	2.465
	100	−2.186	−1.586	−1.255	−0.032	1.294	1.695	2.460
	150	−2.196	−1.590	−1.253	−0.036	1.302	1.701	2.450
	300	−2.199	−1.595	−1.267	−0.03	1.308	1.700	2.463
	500	−2.187	−1.593	−1.259	−0.029	1.298	1.693	2.440
50	25	−2.130	−1.569	−1.246	−0.044	1.306	1.712	2.530
	50	−2.203	−1.599	−1.262	−0.03	1.300	1.694	2.459
	75	−2.244	−1.603	−1.266	−0.022	1.298	1.692	2.432
	100	−2.227	−1.604	−1.261	−0.025	1.299	1.682	2.431

(continued)

Table 12.5 (continued)

N	T	Joint test of all seasonal panel unit roots						
	150	−2.239	−1.613	−1.273	−0.023	1.292	1.687	2.412
	300	−2.254	−1.619	−1.274	−0.021	1.306	1.688	2.433
	500	−2.240	−1.610	−1.264	−0.016	1.285	1.673	2.419
N	T	Joint test of panel unit roots						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.859	−1.428	−1.169	−0.111	1.307	1.800	2.861
	50	−2.035	−1.509	−1.216	−0.072	1.316	1.754	2.665
	75	−2.061	−1.529	−1.235	−0.062	1.317	1.748	2.619
	100	−2.063	−1.540	−1.239	−0.056	1.308	1.740	2.588
	150	−2.080	−1.542	−1.239	−0.054	1.313	1.732	2.570
	300	−2.098	−1.557	−1.247	−0.05	1.309	1.727	2.524
	500	−2.113	−1.552	−1.248	−0.049	1.303	1.735	2.536
10	25	−1.940	−1.472	−1.192	−0.092	1.301	1.772	2.741
	50	−2.073	−1.539	−1.237	−0.054	1.309	1.726	2.574
	75	−2.109	−1.555	−1.237	−0.047	1.303	1.725	2.545
	100	−2.118	−1.559	−1.248	−0.049	1.315	1.727	2.531
	150	−2.141	−1.570	−1.249	−0.043	1.299	1.704	2.530
	300	−2.142	−1.569	−1.250	−0.041	1.301	1.708	2.510
	500	−2.165	−1.580	−1.256	−0.039	1.311	1.716	2.481
15	25	−2.002	−1.502	−1.213	−0.077	1.308	1.762	2.684
	50	−2.136	−1.578	−1.250	−0.043	1.310	1.727	2.545
	75	−2.161	−1.579	−1.253	−0.039	1.302	1.722	2.526
	100	−2.170	−1.584	−1.258	−0.037	1.303	1.709	2.490
	150	−2.171	−1.577	−1.258	−0.034	1.302	1.706	2.477
	300	−2.173	−1.583	−1.252	−0.033	1.305	1.694	2.471
	500	−2.179	−1.585	−1.260	−0.034	1.294	1.699	2.457
25	25	−2.070	−1.539	−1.236	−0.06	1.311	1.749	2.614
	50	−2.169	−1.580	−1.254	−0.039	1.304	1.705	2.502
	75	−2.190	−1.597	−1.267	−0.035	1.300	1.704	2.475
	100	−2.210	−1.592	−1.260	−0.026	1.296	1.695	2.484
	150	−2.217	−1.587	−1.261	−0.026	1.298	1.697	2.443
	300	−2.216	−1.601	−1.266	−0.023	1.299	1.687	2.426
	500	−2.210	−1.600	−1.264	−0.028	1.291	1.682	2.424
50	25	−2.144	−1.565	−1.249	−0.043	1.310	1.718	2.529
	50	−2.208	−1.591	−1.262	−0.026	1.294	1.692	2.430
	75	−2.231	−1.606	−1.264	−0.023	1.296	1.689	2.429
	100	−2.225	−1.600	−1.267	−0.025	1.291	1.683	2.429
	150	−2.217	−1.615	−1.272	−0.018	1.294	1.684	2.406
	300	−2.255	−1.621	−1.276	−0.017	1.293	1.682	2.408
	500	−2.244	−1.611	−1.266	−0.016	1.285	1.669	2.375
N	T	Zero frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−2.570	−1.733	−1.303	0.054	1.237	1.543	2.097
	50	−2.445	−1.678	−1.292	0.029	1.259	1.607	2.211
	75	−2.384	−1.673	−1.293	0.014	1.267	1.622	2.260
	100	−2.384	−1.659	−1.281	0.013	1.268	1.625	2.281

(continued)

Table 12.5 (continued)

N	T	Zero frequency panel unit root						
	150	−2.362	−1.649	−1.280	0.006	1.273	1.635	2.319
	300	−2.326	−1.652	−1.281	0	1.278	1.646	2.351
	500	−2.345	−1.644	−1.282	−0.001	1.285	1.644	2.346
10	25	−2.524	−1.711	−1.300	0.044	1.238	1.561	2.128
	50	−2.408	−1.672	−1.287	0.015	1.264	1.612	2.245
	75	−2.397	−1.660	−1.281	0.013	1.270	1.624	2.287
	100	−2.387	−1.667	−1.278	0.007	1.271	1.624	2.300
	150	−2.361	−1.650	−1.282	0.006	1.273	1.629	2.313
	300	−2.322	−1.647	−1.281	0.003	1.285	1.644	2.315
	500	−2.321	−1.638	−1.281	0	1.280	1.644	2.340
15	25	−2.484	−1.698	−1.295	0.035	1.252	1.581	2.169
	50	−2.403	−1.673	−1.296	0.019	1.270	1.602	2.255
	75	−2.376	−1.653	−1.282	0.007	1.273	1.622	2.272
	100	−2.361	−1.671	−1.290	0.013	1.275	1.626	2.303
	150	−2.343	−1.646	−1.283	0.007	1.277	1.634	2.290
	300	−2.322	−1.647	−1.277	0	1.282	1.640	2.328
	500	−2.320	−1.644	−1.281	0.003	1.281	1.644	2.337
25	25	−2.439	−1.690	−1.293	0.026	1.263	1.589	2.196
	50	−2.372	−1.677	−1.291	0.012	1.278	1.632	2.283
	75	−2.381	−1.667	−1.292	0.008	1.287	1.651	2.309
	100	−2.354	−1.649	−1.284	0.003	1.282	1.642	2.314
	150	−2.338	−1.651	−1.280	0.004	1.276	1.641	2.314
	300	−2.325	−1.652	−1.288	0.001	1.282	1.651	2.334
	500	−2.318	−1.636	−1.274	−0.001	1.280	1.647	2.331
50	25	−2.424	−1.684	−1.295	0.023	1.273	1.618	2.241
	50	−2.355	−1.651	−1.274	0.01	1.270	1.627	2.284
	75	−2.350	−1.650	−1.286	0.004	1.275	1.631	2.317
	100	−2.372	−1.660	−1.289	0.005	1.284	1.644	2.340
	150	−2.345	−1.643	−1.279	0.002	1.280	1.644	2.320
	300	−2.312	−1.644	−1.278	0	1.279	1.650	2.320
	500	−2.330	−1.643	−1.283	0.003	1.279	1.644	2.339
N	T	Semi-annual frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−2.467	−1.684	−1.286	0.026	1.255	1.595	2.229
	50	−2.350	−1.642	−1.277	−0.003	1.279	1.646	2.349
	75	−2.316	−1.637	−1.275	−0.009	1.286	1.648	2.355
	100	−2.314	−1.632	−1.267	−0.007	1.284	1.657	2.358
	150	−2.304	−1.629	−1.272	−0.011	1.285	1.660	2.356
	300	−2.288	−1.627	−1.265	−0.012	1.286	1.675	2.395
	500	−2.268	−1.613	−1.265	−0.014	1.287	1.672	2.387
10	25	−2.444	−1.684	−1.292	0.023	1.260	1.603	2.232
	50	−2.345	−1.649	−1.277	0.003	1.271	1.641	2.334
	75	−2.325	−1.643	−1.276	−0.004	1.278	1.644	2.342
	100	−2.304	−1.636	−1.274	−0.007	1.283	1.665	2.375
	150	−2.298	−1.634	−1.284	−0.005	1.291	1.665	2.366
	300	−2.294	−1.630	−1.276	−0.004	1.284	1.646	2.345

(continued)

Table 12.5 (continued)

N	T	Semi-annual frequency panel unit root						
	500	−2.282	−1.630	−1.274	−0.016	1.286	1.656	2.395
15	25	−2.423	−1.678	−1.291	0.021	1.268	1.602	2.245
	50	−2.320	−1.634	−1.274	−0.003	1.284	1.649	2.339
	75	−2.312	−1.641	−1.281	−0.005	1.284	1.655	2.369
	100	−2.316	−1.646	−1.288	−0.004	1.287	1.654	2.352
	150	−2.311	−1.623	−1.268	−0.008	1.287	1.655	2.329
	300	−2.285	−1.634	−1.277	−0.005	1.290	1.652	2.364
	500	−2.276	−1.628	−1.270	−0.013	1.279	1.655	2.365
25	25	−2.399	−1.671	−1.287	0.015	1.273	1.620	2.254
	50	−2.339	−1.646	−1.284	0	1.284	1.647	2.315
	75	−2.308	−1.643	−1.281	0.001	1.276	1.647	2.345
	100	−2.305	−1.634	−1.276	−0.004	1.280	1.646	2.333
	150	−2.318	−1.639	−1.284	0.001	1.280	1.649	2.349
	300	−2.307	−1.639	−1.277	−0.004	1.288	1.654	2.342
	500	−2.308	−1.638	−1.275	−0.005	1.280	1.654	2.356
50	25	−2.382	−1.664	−1.277	0.007	1.273	1.625	2.281
	50	−2.323	−1.646	−1.281	0.002	1.274	1.640	2.304
	75	−2.331	−1.642	−1.272	−0.004	1.283	1.641	2.313
	100	−2.329	−1.640	−1.279	−0.003	1.286	1.654	2.341
	150	−2.319	−1.641	−1.283	−0.002	1.282	1.646	2.335
	300	−2.315	−1.643	−1.285	−0.004	1.287	1.651	2.345
	500	−2.296	−1.636	−1.279	−0.005	1.288	1.655	2.349
N	T	Annual frequency panel unit root						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.824	−1.413	−1.164	−0.113	1.301	1.798	2.911
	50	−1.969	−1.491	−1.211	−0.082	1.316	1.780	2.722
	75	−1.992	−1.507	−1.227	−0.074	1.320	1.765	2.653
	100	−2.006	−1.507	−1.221	−0.073	1.316	1.758	2.643
	150	−2.020	−1.514	−1.232	−0.068	1.317	1.749	2.622
	300	−2.018	−1.519	−1.231	−0.07	1.315	1.755	2.618
	500	−2.028	−1.529	−1.233	−0.069	1.318	1.748	2.613
10	25	−1.916	−1.459	−1.192	−0.092	1.300	1.779	2.817
	50	−2.033	−1.528	−1.233	−0.062	1.307	1.732	2.624
	75	−2.057	−1.534	−1.234	−0.06	1.314	1.752	2.594
	100	−2.074	−1.536	−1.239	−0.05	1.300	1.726	2.558
	150	−2.061	−1.545	−1.240	−0.058	1.302	1.732	2.570
	300	−2.094	−1.553	−1.231	−0.056	1.310	1.722	2.544
	500	−2.100	−1.554	−1.240	−0.052	1.310	1.723	2.556
15	25	−1.990	−1.491	−1.216	−0.082	1.311	1.770	2.734
	50	−2.108	−1.552	−1.246	−0.05	1.307	1.724	2.539
	75	−2.122	−1.567	−1.253	−0.048	1.312	1.729	2.549
	100	−2.114	−1.563	−1.253	−0.048	1.312	1.732	2.535
	150	−2.143	−1.569	−1.256	−0.041	1.309	1.714	2.519
	300	−2.140	−1.565	−1.255	−0.044	1.311	1.722	2.532
	500	−2.146	−1.578	−1.259	−0.043	1.307	1.721	2.523
25	25	−2.045	−1.523	−1.226	−0.066	1.315	1.740	2.613

(continued)

Table 12.5 (continued)

N	T	Annual frequency panel unit root						
	50	−2.138	−1.571	−1.252	−0.043	1.309	1.718	2.536
	75	−2.167	−1.583	−1.253	−0.036	1.300	1.706	2.491
	100	−2.155	−1.582	−1.255	−0.038	1.297	1.701	2.475
	150	−2.181	−1.580	−1.259	−0.033	1.301	1.697	2.491
	300	−2.182	−1.590	−1.266	−0.035	1.317	1.718	2.487
	500	−2.173	−1.590	−1.262	−0.032	1.303	1.697	2.474
50	25	−2.117	−1.559	−1.242	−0.049	1.310	1.725	2.543
	50	−2.184	−1.588	−1.263	−0.032	1.301	1.695	2.468
	75	−2.212	−1.604	−1.268	−0.027	1.294	1.688	2.454
	100	−2.204	−1.599	−1.265	−0.028	1.306	1.688	2.439
	150	−2.215	−1.599	−1.263	−0.026	1.295	1.694	2.437
	300	−2.226	−1.610	−1.269	−0.024	1.298	1.686	2.438
	500	−2.223	−1.600	−1.265	−0.025	1.296	1.687	2.422
N	T	Joint test of all seasonal panel unit roots						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.833	−1.409	−1.158	−0.113	1.297	1.799	2.876
	50	−1.995	−1.506	−1.223	−0.073	1.314	1.773	2.696
	75	−2.039	−1.524	−1.230	−0.066	1.310	1.756	2.637
	100	−2.037	−1.519	−1.232	−0.067	1.315	1.740	2.601
	150	−2.057	−1.532	−1.237	−0.057	1.322	1.740	2.586
	300	−2.063	−1.550	−1.243	−0.058	1.314	1.733	2.577
	500	−2.079	−1.546	−1.239	−0.059	1.309	1.740	2.584
10	25	−1.925	−1.459	−1.187	−0.093	1.294	1.774	2.773
	50	−2.046	−1.528	−1.236	−0.06	1.306	1.739	2.586
	75	−2.070	−1.548	−1.236	−0.053	1.314	1.736	2.558
	100	−2.100	−1.550	−1.242	−0.053	1.307	1.727	2.550
	150	−2.107	−1.559	−1.248	−0.049	1.305	1.721	2.561
	300	−2.116	−1.556	−1.241	−0.046	1.306	1.714	2.524
	500	−2.147	−1.573	−1.253	−0.045	1.311	1.725	2.512
15	25	−1.993	−1.501	−1.216	−0.079	1.311	1.766	2.718
	50	−2.132	−1.566	−1.249	−0.048	1.303	1.717	2.553
	75	−2.143	−1.573	−1.253	−0.04	1.309	1.715	2.521
	100	−2.151	−1.578	−1.258	−0.036	1.304	1.704	2.507
	150	−2.165	−1.584	−1.258	−0.037	1.307	1.711	2.472
	300	−2.160	−1.571	−1.245	−0.039	1.302	1.707	2.483
	500	−2.163	−1.581	−1.258	−0.033	1.299	1.706	2.468
25	25	−2.052	−1.529	−1.230	−0.063	1.311	1.734	2.606
	50	−2.160	−1.572	−1.256	−0.041	1.297	1.713	2.499
	75	−2.189	−1.593	−1.263	−0.028	1.300	1.700	2.464
	100	−2.182	−1.586	−1.256	−0.031	1.296	1.697	2.469
	150	−2.193	−1.587	−1.253	−0.036	1.302	1.705	2.454
	300	−2.200	−1.597	−1.267	−0.031	1.308	1.699	2.459
	500	−2.186	−1.591	−1.260	−0.029	1.299	1.692	2.448
50	25	−2.130	−1.564	−1.242	−0.046	1.308	1.719	2.531
	50	−2.202	−1.598	−1.258	−0.027	1.300	1.694	2.448
	75	−2.242	−1.602	−1.267	−0.022	1.296	1.690	2.433

(continued)

Table 12.5 (continued)

N	T	Joint test of all seasonal panel unit roots						
	100	−2.226	−1.603	−1.261	−0.024	1.297	1.679	2.438
	150	−2.237	−1.612	−1.272	−0.024	1.293	1.686	2.414
	300	−2.257	−1.618	−1.275	−0.021	1.308	1.688	2.433
	500	−2.239	−1.608	−1.264	−0.015	1.284	1.672	2.419
N	**T**	**Joint test of panel unit roots**						
		1%	5%	10%	50%	90%	95%	99%
6	25	−1.837	−1.412	−1.168	−0.111	1.302	1.803	2.881
	50	−2.016	−1.510	−1.218	−0.073	1.313	1.770	2.684
	75	−2.064	−1.540	−1.238	−0.061	1.319	1.741	2.601
	100	−2.075	−1.537	−1.238	−0.053	1.307	1.726	2.562
	150	−2.095	−1.547	−1.243	−0.051	1.310	1.727	2.549
	300	−2.109	−1.562	−1.247	−0.051	1.302	1.719	2.527
	500	−2.121	−1.562	−1.252	−0.045	1.308	1.714	2.500
10	25	−1.931	−1.459	−1.192	−0.088	1.293	1.772	2.761
	50	−2.072	−1.541	−1.240	−0.053	1.307	1.733	2.567
	75	−2.101	−1.556	−1.242	−0.051	1.307	1.725	2.535
	100	−2.142	−1.567	−1.249	−0.04	1.307	1.718	2.529
	150	−2.149	−1.575	−1.249	−0.041	1.300	1.712	2.520
	300	−2.160	−1.577	−1.253	−0.042	1.299	1.695	2.514
	500	−2.167	−1.578	−1.254	−0.04	1.302	1.698	2.490
15	25	−1.988	−1.494	−1.212	−0.077	1.305	1.754	2.718
	50	−2.131	−1.565	−1.247	−0.046	1.302	1.709	2.541
	75	−2.158	−1.584	−1.257	−0.039	1.308	1.713	2.497
	100	−2.182	−1.587	−1.262	−0.04	1.305	1.707	2.484
	150	−2.190	−1.585	−1.255	−0.032	1.300	1.698	2.477
	300	−2.183	−1.588	−1.254	−0.03	1.292	1.689	2.465
	500	−2.194	−1.592	−1.256	−0.029	1.287	1.688	2.452
25	25	−2.050	−1.530	−1.228	−0.061	1.301	1.738	2.595
	50	−2.173	−1.586	−1.259	−0.035	1.308	1.711	2.489
	75	−2.187	−1.593	−1.260	−0.03	1.299	1.694	2.468
	100	−2.199	−1.602	−1.265	−0.025	1.294	1.683	2.430
	150	−2.209	−1.594	−1.258	−0.026	1.294	1.691	2.452
	300	−2.221	−1.606	−1.274	−0.026	1.305	1.692	2.431
	500	−2.220	−1.610	−1.266	−0.022	1.293	1.681	2.429
50	25	−2.129	−1.576	−1.249	−0.045	1.307	1.718	2.545
	50	−2.192	−1.592	−1.264	−0.028	1.296	1.686	2.439
	75	−2.248	−1.614	−1.263	−0.022	1.294	1.677	2.415
	100	−2.233	−1.607	−1.265	−0.017	1.290	1.679	2.423
	150	−2.244	−1.613	−1.272	−0.018	1.299	1.679	2.413
	300	−2.261	−1.620	−1.277	−0.019	1.297	1.677	2.391
	500	−2.250	−1.618	−1.263	−0.014	1.284	1.664	2.386

References

Beaulieu JJ, Miron JA (1993) Seasonal unit roots in aggregate US data. J Econometrics 55:305–328

Breitung J, Franses PH (1998) On Phillips-Perron type tests for seasonal unit roots. Econometric Theory 14:200–221

Dickey DA, Fuller WA (1979) Distribution of the estimators for autoregressive time series with a unit root. J Am Stat Assoc 84:427–431

Dickey DA, Fuller WA (1981) Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica 49:1057–1072

Dickey DA, Hasza HP, Fuller WA (1984) Testing for unit roots in seasonal times series. J Am Stat Assoc 79:355–367

Dreger C, Reimers H (2005) Panel seasonal unit root test: further simulation results and an application to unemployment data. Allgemeines Statistisches Archiv 89:321–337

Ghysels E, Osborn DR (2001) The econometric analysis of seasonal time series. Cambridge University Press, Cambridge

Ghysels E, Lee H, Noh J (1994) Testing for unit roots in seasonal time series: some theoretical extensions and a Monte Carlo investigation. J Econometrics 62:415–442

Ghysels E, Osborn DR, Rodrigues PMM (2000) Seasonal nonstationarity and near-nonstationarity. In: Batagi B (ed) In a companion to theoretical econometrics. Blackwell, Oxford

Hylleberg S, Engle RF, Granger CWJ, Yoo BS (1990) Seasonal integration and cointegration. J Econometrics 44:215–238

Hylleberg S, Jørgensen C, Sørensen NK (1993) Seasonality in macroeconomic time series. Empirical Econ 18:321–335

Im KS, Pesaran MH, Shin Y (2003) Testing for unit roots in heterogeneous panels. J Econometrics 115:53–74

Osborn DR, Rodrigues PMM (2001) The asymptotic distributions of seasonal unit root tests: a unifying approach. Econometric Rev 21:221–241

Osborn DR, Chui APL, Smith JP, Birchenhall CR (1988) Seasonality and the order of integration for consumption. Oxf Bull Econ Stat 50(4):361–377

Otero J, Smith J, Giulietti M (2005) Testing for seasonal unit roots in heterogeneous panels. Econ Lett 86:229–235

Rodrigues PMM (2002) On LM-type tests for seasonal unit roots in quarterly data. Econometrics J 5:176–195

Rodrigues PMM, Taylor AMR (2004a) Alternative estimators and unit root tests for seasonal autoregressive processes. J Econometrics 120:35–73

Rodrigues PMM, Taylor AMR (2004b) Asymptotic distributions for regression-based seasonal unit root test statistics in a near-integrated model. Econometric Theory 20:645–670

Rodrigues PMM, Taylor AMR (2007) Efficient tests of the seasonal unit root hypothesis. J Econometrics 141(2):548–573

Smith RJ, Taylor AMR (1998) Additional critical values and asymptotic representations for seasonal unit root tests. J Econometrics 85:269–288

Smith RJ, Taylor AMR (1999a) Regression-based seasonal unit root tests. Discussion paper, Department of Economics, University of Birmingham, pp 99–15

Smith RJ, Taylor AMR (1999b) Likelihood ratio tests for seasonal unit roots. J Time Ser Anal 20:453–476

Taylor AMR (1998) Testing for unit roots in monthly time series. J Time Ser Anal 19:349–368

Chapter 13
Monopolies at Sea: The Role of Onboard Sales for the Cruise Industry's Growth and Profitability

Michael P. Vogel

13.1 Introduction

For 15 years or more, cruise ship tourism has been referred to as the fastest growing segment of the tourism sector (e.g. Charlier and McCalla 2006; Dickinson and Vladimir 2007; Dowling 2006; Hobson 1993; Petrick 2004b; Wie 2005; Yarnal and Kerstetter 2005), echoing a claim that is renewed annually by the Cruise Lines International Association (CLIA) in their "market overview". According to CLIA, which represents over 80% of the ocean cruise capacities globally, the number of passengers travelling with their member lines has grown by 7.4% per year between 1980 and 2008 to 13.2 million (CLIA 2009).

A range of different possible causes of this growth phenomenon have been proposed. On the demand side, no single dominant cause has yet been identified and substantiated. Inter alia, cruising seems to benefit from demographic trends such as the ageing of the "baby-boomer" generation (Dowling 2006), and the rising number of "double income, no kids" couples. Social trends like experience orientation (Pine and Gilmore 1999) and hedonism (Duman and Mattila 2005) also favor cruises. Another demand-side factor is the high repeater rate: three-quarters of today's U.S. cruise passengers have taken at least one cruise before (CLIA 2008; Petrick 2004a). But far more important for the growth of cruising over the past 3 decades has been the supply side. It was the industry's ability to make cruises affordable that led to the tenfold increase in passenger numbers over the last 30 years. To be sure, innovative and eye-catching ship design, the development of new destinations (Douglas and Douglas 2004), powerful branding (Kwortnik 2006) and a number of other factors have also contributed to this success. Yet without affordability, the market potential of cruises would have remained tiny.

Cruises have become affordable due to various kinds of scale effects (Papatheodorou 2006; Toh et al. 2005). First, excess scale in the dying ocean

M.P. Vogel
Bremerhaven University of Applied Sciences, Bremerhaven, Germany
e-mail: mvogel@hs-bremerhaven.de

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_13,

liner business in the 1960s resulted in the creation of a number of cruise lines, using the second-hand tonnage that had originally been built for scheduled passenger services to offer leisure cruises to the Caribbean (Cartwright and Baird 1999; Hobson 1993). Then, the 1970s saw the transition from single-ship cruise lines to the formation of fleets, bringing down the costs of marketing, distribution, personnel, training, purchasing, and administration per unit of available capacity, and leading to a decline in ticket prices.

Since the early 1980s, scale effects were increasingly realized at the level of the individual ship. Larger purpose-built vessels did not only make cruising more comfortable and convenient for the passengers but also reduced investment, crew expenses and other ship operating expenses per berth (Di Giorgio 2008). Between 1990 and 2010, the average gross tonnage of cruise ship newbuilds increased from 30,000 to 110,000 (Mäkinen 2008). The year 2009 has seen the launch of the "Oasis of the Seas" with 220,000 gross tons and a capacity for 5,400 passengers. Further economies of scale have been pursued through mergers and acquisitions since the early 1990s, leaving 16 major brands and over two-thirds of the cruise capacity worldwide in the hands of only two companies, Carnival Corporation & plc (Carnival) and Royal Caribbean Cruises Ltd. (RCL). So scale at ship, fleet, and corporate level is the single most important reason why today over 13 million passengers per year choose to spend their vacation on a cruise ship.

Yet cruise lines do not only generate revenue by selling passenger tickets. They also offer a wide range of additional products and services which are not included in the ticket price and have to be paid extra. Examples include shore excursions, spas, beauty parlors, casinos, bars, certain specialty restaurants, shops, photo service, art auctions, communication services, and insurance products. Klein (2002), for instance, describes in detail the cruise lines' elaborate practices of maximizing bar revenue and onboard sales in general. According to him, bars and casinos are the biggest contributors of revenue on cruise ships (Klein 2005). In order to induce passengers to spend time and money on board rather than in ports, cruise lines design and promote cruise ships increasingly as travel destinations, rather than as floating hotels or means of transportation (Weaver 2005b).

This paper examines the role of onboard revenue for the economics of cruise lines. By developing an empirically-informed microeconomic cruise line model, it aims to shed light on the relationships between onboard revenue, onboard attractions, passenger ticket pricing, cruise capacity, profit, and industry growth prospects. Klein's (2005) point that "Cruise pricing tempts people to sail. [. . .] They can spend relatively little and enjoy what is sold as a luxury, all-inclusive vacation. [. . .] The catch with a cruise is that the extra costs can exceed the cruise fare" (27) is confirmed by the theoretical model as a characteristic of the cruise lines' optimal ticket pricing strategy. The paper argues that onboard sales are likely to have become the main driver of cruise industry growth, and that cruise line business models are increasingly geared toward exploiting passengers as a captive market.

The paper is organized as follows. Section 13.2 establishes three stylized facts about the economics of cruise lines on the basis of Carnival and RCL's financial reports. Section 13.3 formulates the cruise line model which is explored in detail in

Sect. 13.4 using comparative statics. Section 13.5 adds dynamics to the model to demonstrate various growth effects. In particular, this dynamic model reproduces the three stylized facts of Sect. 13.2. Section 13.6 concludes the paper by pointing out some strategic implications of the model for the management of cruise lines.

13.2 Three Stylized Facts of Cruise Line Economics

The two leading players of the cruise industry, Carnival and RCL, control 46 and 22% of the global cruise ship capacities in gross tons, respectively (Mäkinen 2007). In 2007, Carnival's fleet consisted of 85 ships with a capacity of 158,352 lower berths. The company reported revenues of $13.0 billion, a total of 7.7 million passengers, and assets worth $34.2 billion (Carnival 2008). RCL operated 35 ships with a capacity of 71,200 berths, and reported revenues of $6.1 billion, 3.6 million passengers, and assets worth $15.0 billion (RCL 2008). Both companies are stock-listed. Their annual reports for the financial years 2001–2007 provide the data on which this section is based. This period has been chosen for practical reasons: before 2001, RCL did not publish the revenues and costs of ticket and onboard sales separately, and Carnival's financial statements are available online only from 2001 onwards.

Figure 13.1 depicts the development of passenger ticket revenue, net onboard revenue, and total cost excluding the cost of onboard revenue for both companies. Ticket revenues include revenue from the sale of cruise tickets and air transportation to and from the ships. Net onboard revenue consists of the cruise lines' own sale of

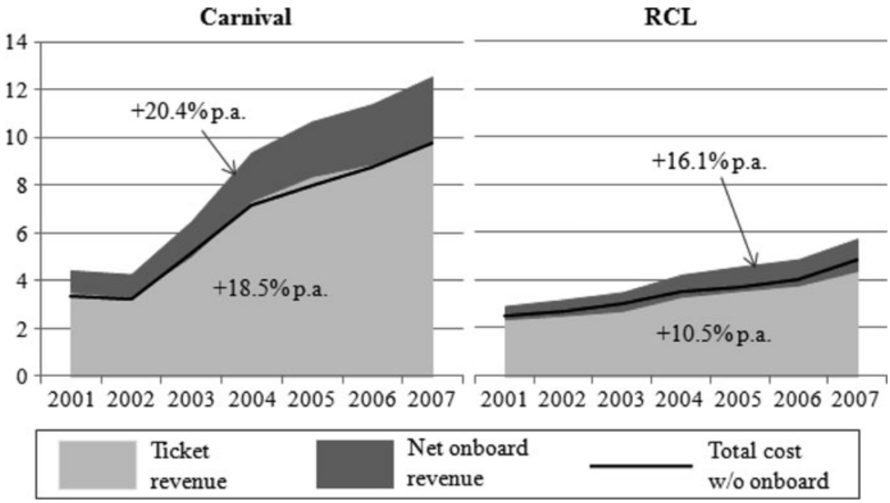

Fig. 13.1 Carnival and RCL's revenues and operating cost 2001–2007 in billions of nominal US$
Source: annual reports

products and services not included in the ticket price, plus the revenues which the cruise lines receive from concessionaires in exchange for the right to offer goods and services onboard the ships, minus the direct costs associated with onboard and other revenues. Note that not all onboard revenue is actually generated on board. Vacation protection insurance can only be bought before the cruise; shore excursions may be bought before the cruise; and cancellation fees exclude a stay onboard.

Net onboard revenue is of special importance in this paper. According to Carnival and RCL's income statements it typically represents about 75–85% of gross onboard revenue. The cost share is so low for two reasons. Firstly, the revenue received from concessionaires is already net revenue, as the costs of this revenue are borne by the concessionaires. And secondly, the cruise lines' own onboard sale is a high-margin business. Klein (2006) speaks of direct cost shares in excursion sales revenue of 33% and in bar revenue of 20% (263–264).

Between 2001 and 2007, the annual growth rate of Carnival's ticket revenue amounted to 18.5%, and net onboard revenue grew even two percentage points faster per year. The extraordinary growth between 2002 and 2004 was largely the result of a merger of Carnival with P&O Princess Cruises (Coleman et al. 2003; Langenfeld and Li 2008). RCL's growth, by contrast, was mostly organic. While their ticket revenue grew by 10.5% annually, their net onboard revenue rose by an average of 16.1% year after year between 2001 and 2007. These observations allow establishing a first stylized fact of current cruise line economics.

Fact no. 1: *Net onboard revenue is outgrowing ticket revenue*.

Figure 13.1 also shows that both cruise companies' ticket revenues were matched closely by costs. But while Carnival's cost curve coincides with the upper limit of the ticket revenue area in most years, RCL's cost curve lies in the net onboard revenue area. This means that, without onboard revenue, Carnival would generate no earnings before interest and taxes (EBIT), and RCL would even incur an operating loss.

Figure 13.2 puts the financial year 2007 under a magnifying glass. The waterfall diagrams visualize the revenue and cost structures of both cruise companies in greater detail. Carnival's ticket revenue was hardly enough to cover the operating cost. Their EBIT of 28% of ticket revenue resulted exclusively from net onboard revenue, indicated by the difference (Δ) between onboard revenue and onboard cost. For RCL, the cost waterfall descends below the horizontal axis. One might say that RCL's net onboard revenue paid for food costs and a part of depreciation, and on top of that provided the entire EBIT.

2007 was no exceptional year regarding the cruise companies' dependence on onboard sales. Table 13.1 documents that between 2001 and 2007, Carnival's net onboard revenue exceeded EBIT 3 times and, on average, reached 96% of EBIT. At RCL, net onboard revenue exceeded EBIT every single year, averaging at 126% of EBIT.

Table 13.1 leaves no doubt about the second stylized fact of cruise line economics.

Fact no. 2: *Ticket prices are barely or not cost-covering*.

Revenues and costs in Fig. 13.1 are given in billions of nominal U.S. dollars. Changes in these numbers over time may result from several different

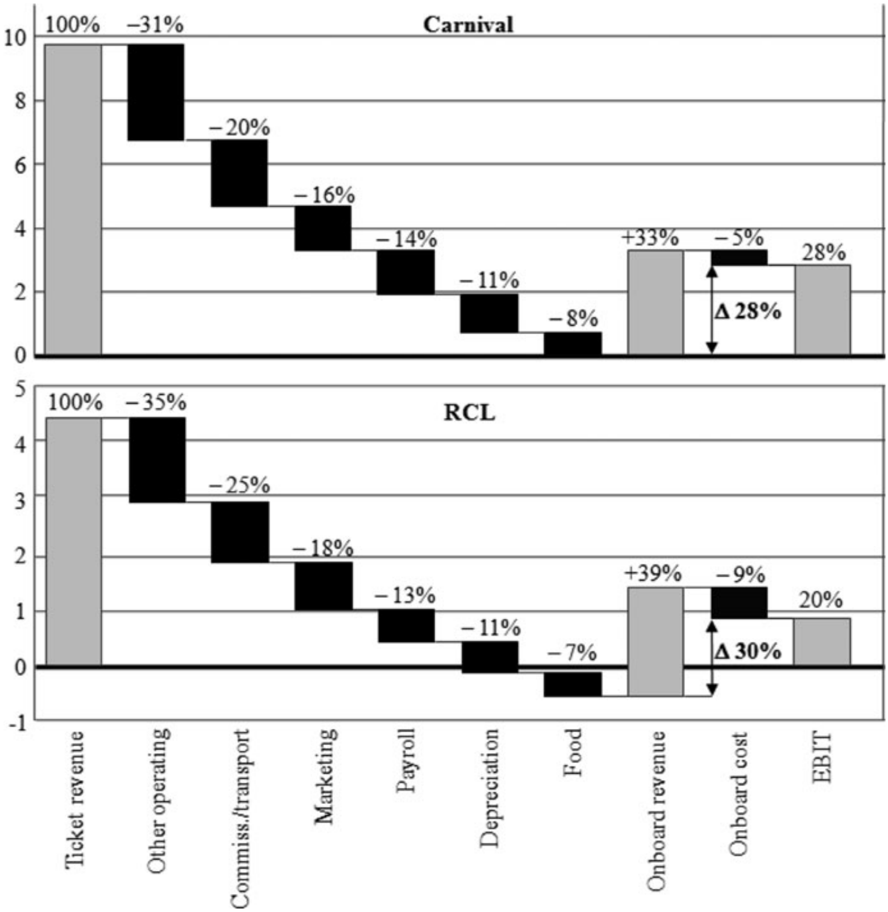

Fig. 13.2 Revenue and operating cost structures 2007 in billions of nominal US$
Source: annual reports

Table 13.1 Net onboard revenue in relation to EBIT

Net onboard revenue/EBIT		
Year	Carnival (%)	RCL (%)
2001	101	118
2002	88	115
2003	105	144
2004	95	119
2005	87	113
2006	95	123
2007	101	146
Mean	96	126

Source: annual reports

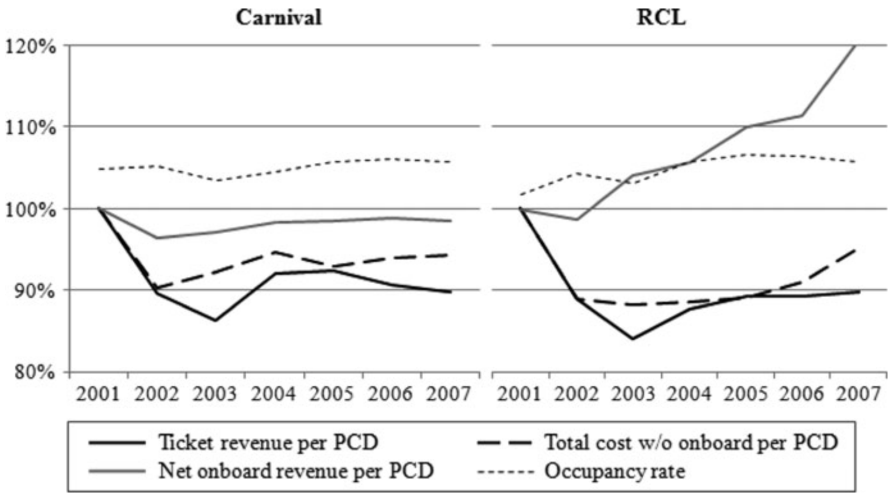

Fig. 13.3 Evolution of revenues and cost per PCD (US CPI-adjusted)
Source: annual reports

factors – changing passenger numbers, changing cruise durations, changing prices, changing value of money, or any combination of these factors – making it hard to draw conclusions. Thus it makes sense to eliminate the first two factors by dividing ticket revenue, net onboard revenue and cost by the passenger cruise days (PCDs)[1] of the respective years. The result is depicted in Fig. 13.3. Ticket revenue per PCD is the mean ticket price per cruise day. The data series are expressed in percent of their 2001 values to stress their rates of change rather than their dollar values. Moreover, the data have been adjusted for changes in the U.S. consumer price index (CPI) which rose by an average of 2.66% per year between 2001 and 2007 (Bureau of Labor Statistics 2008). Figure 13.3 also depicts the occupancy rates over this period.

Three aspects are worth highlighting. First of all, the impact of the terrorist attacks of 11th September 2001 is reflected by the sharp drop of ticket revenues per PCD in 2002 and 2003, and of costs per PCD in 2002. Ticket prices were discounted in order to fill the ships in times of crisis, with the consequence that both companies' occupancy rates remained above 100% all the time.[2] Costs per PCD follow a similar pattern as ticket prices, partly due to lower commission payments to travel agents associated with lower prices, partly as a result of management decisions to cut expenses for marketing, selling and administration (RCL 2003).

[1]PCDs are "the number of passengers carried for the period multiplied by the number of days of their respective cruises" (RCL 2008, 14).

[2]Occupancy rates are calculated by dividing sold PCDs by available PCDs. In accordance with cruise industry practice, available PCDs are obtained as follows: number of passenger cabins x 2 passengers per cabin x number of cruise days. Occupancy rates in excess of 100% indicate that some cabins were occupied by more than two passengers (Carnival 2008, 43; RCL 2008, 14).

Secondly, both cruise companies' ticket revenues per PCD have been lagging behind the increase in U.S. consumer prices and have not even kept pace with costs per PCD. In 2007, Carnival and RCL's CPI-adjusted ticket revenues per PCD were practically the same as in 2002 and 10% below their 2001 levels. Given the time span of seven years during which this phenomenon was observable, it can be taken to reflect a systematic trend rather than an exceptional phenomenon, and a third stylized fact of cruise line economics can be formulated:

Fact no. 3: *Real ticket prices tend to decline*.

And thirdly, while ticket revenues per PCD plunged in 2002, both companies' net onboard revenues per PCD took only a small dip. Between 2002 and 2007, Carnival's CPI-adjusted net onboard revenue per PCD grew by 0.4% per year, and at RCL this figure rose even by 4.1% per year.

The three stylized facts, along with the other data presented, form the silhouette of a cruise line business model which seems to have emerged in the 1990s, and which has been refined since. Judging by the success of Carnival and RCL, versions of this business model can be expected to shape the cruise industry for decades to come. The logic of its inner workings, however, cannot be fully understood on the basis of the very limited publicly available information. The approach of this paper is to develop a theoretical cruise line model that is compatible with the stylized facts, plausible in terms of its assumptions, and rigorous due to its high degree of formalization. This theoretical model will provide insights into the relationships between important variables, and may be a reasonable approximation of the actual business model.

13.3 A Cruise Line Model

There are two different types of markets in the cruise industry: markets for cruises and markets for the products and services sold on board cruise ships. These two market types differ with respect to place (shore vs. ship), time (before vs. during the cruise), accessibility (access to onboard markets requires a previous purchase on a cruise market, but not vice versa), and especially degree of competition.

In onboard markets, competition is nonexistent, and the cruise lines respectively their concessionaires enjoy monopoly positions. Passengers are captive customers (Chesworth 2006; Klein 2005; Weaver 2005a). Lack of alternatives may force them to accept higher prices than they would ashore, and often they accept those prices happily due to the additional experiential and emotional element of onboard consumption, the special setting, the general leisure atmosphere, and the company of other like-minded passengers. Therefore, demand for products and services on board is only weakly price elastic. To keep the model simple, it will be assumed that just one representative type of product or service is offered on board, called "cocktails". Its price response is described by the iso-elastic function

$$y = a{p_y}^{-\varepsilon}, \tag{13.1}$$

where y is the number of "cocktails" a passenger purchases per cruise day, $a \geq 0$ reflects "cocktail" attractiveness, $p_y > 0$ is the "cocktail" price, and $-\varepsilon$ is the constant price elasticity with $1 < \varepsilon << \infty$, which means that ε is "small".

By contrast, with many competing cruise lines, occasional market entries and exits of players, many customers, and comparable but differentiated products, competition in the cruise markets can be characterized as monopolistic. Product differentiation takes place at the levels of hardware, itinerary, onboard attractions, service, communication etc. in order to avoid pure price competition. Nevertheless, consumers do have a choice of alternatives and regard different cruises at least as partial substitutes. Small changes in the ticket price can thus have important consequences for a cruise line's ticket sales by inducing potential customers to switch to or from competitors. Therefore, demand especially for mass market cruises is highly but finitely price elastic. Finite elasticity implies that cruise lines are no price takers, but that –within certain limits – they use pricing as an instrument to maximize profit. For simplicity, assume that also ticket-price response is iso-elastic, taking the form

$$x = (p_x + b)^{-\delta}, \tag{13.2}$$

where x is the number of cruise days demanded, $p_x > 0$ is the ticket price per cruise day, and $-\delta$ is the constant price elasticity with $1 < \delta << \infty$, i.e. δ is "large". While consumers know p_x from cruise line advertisements or travel agents, they can only guess or estimate the onboard price level or their onboard spending beforehand. In (13.2), the parameter $b \geq 0$ represents the consumers' way of taking this aspect into account when making their purchasing decision. To different passengers, b can mean different things, for instance a closed budget which they set aside for this purpose and do not want to exceed; a vague idea of how much they want or may have to spend onboard; or some form of onboard price-benefit ratio based on expected "cocktail" price and attractiveness. In any case, $p_x + b > 0$ is the consumers' perceived total sacrifice per cruise day.

All marginal costs are assumed constant, so are no cost-related scale effects. Let $c_x > 0$ be the marginal cost of a PCD, and $c_y > 0$ the marginal cost of a "cocktail". Then net ticket revenue and net onboard revenue per PCD are given by

$$r_x = p_x - c_x \tag{13.3}$$

$$r_y = (p_y - c_y)y. \tag{13.4}$$

Cruise capacity measured in *available* PCDs is the product of ship capacity $k \geq 0$ in berths and the number of cruise days $w \geq 0$ per year. Capacity cost can be written as $(c_v + c_w w)k$ where c_v and $c_w k$ are the marginal capacity costs of an additional berth and an additional day at sea, respectively. But since w cannot be increased at will due to essential drydock periods and the fact that a year has only 365 days, nothing will be lost by assuming it to be fixed. Defining the marginal cruise capacity cost as $c_k = c_v + c_w w$, total capacity cost can be written as $c_k k$. Profit then equals

$$\pi = (r_x + r_y)x - c_k k, \tag{13.5}$$

which a cruise line aims to maximize with respect to p_x and p_y, subject to its capacity constraint

$$k \geq x. \tag{13.6}$$

Although capacity is under cruise line control, adjusting it takes much longer than adjusting prices, which is why price decisions are made under the assumption of a given capacity. Optimal capacity choice will be considered in a second step.

The resulting Lagrangean is given by $L = (r_x + r_y)x - c_k k + \lambda(k - x)$, where λ is the multiplier associated with the capacity constraint. Substitution from (13.1)–(13.4) yields $L = [p_x - c_x + (p_y - c_y)ap_y^{-\varepsilon} - \lambda]\ (p_x + b)^{-\delta} - k\ (c_k - \lambda)$. The first-order conditions read

$$p_y = \frac{\varepsilon c_y}{\varepsilon - 1}, \tag{13.7}$$

$$p_x = \frac{\delta(c_x - r_y + \lambda) + b}{\delta - 1}. \tag{13.8}$$

Additionally, the Kuhn-Tucker complementary slackness conditions

$$k - x \geq 0, \quad \lambda \geq 0, \quad \lambda(k - x) = 0 \tag{13.9}$$

must be fulfilled. Appendix A proves that the first-order conditions are sufficient for a local profit maximum. Net onboard revenue per PCD is obtained by substituting from (13.1) and (13.7) into (13.4):

$$r_y = \varepsilon^{-\varepsilon} a \left(\frac{c_y}{\varepsilon - 1}\right)^{1-\varepsilon}. \tag{13.10}$$

Due to the earlier assumption that $p_x + b > 0$, condition (13.8) requires that

$$r_y < c_x + b + \lambda. \tag{13.11}$$

Condition (13.9) implies a distinction between two cases. The first case is characterized by $k > x$ and $\lambda = 0$, so that (13.8) reduces to

$$p_x = \frac{\delta(c_x - r_y) + b}{\delta - 1}. \tag{13.12}$$

Substitution into (13.5) yields

$$\pi(k) = \delta^{-\delta}\left(\frac{c_x - r_y + b}{\delta - 1}\right)^{1-\delta} - c_k k. \tag{13.13}$$

In the second case, $\lambda > 0$ and therefore $k = x$. Solving (13.8) for λ shows that

$$\lambda = \frac{\delta - 1}{\delta} p_x - c_x + r_y - \frac{b}{\delta}. \tag{13.14}$$

Since $k = x$, (13.2) can be written as

$$p_x = k^{-1/\delta} - b. \tag{13.15}$$

Substituting from this into (13.5) and considering that $k = x$ leads to

$$\pi(k) = (k^{-1/\delta} - c_x - c_k + r_y - b)k, \tag{13.16}$$

which has its maximum at

$$k^* = \left[\frac{\delta(c_x + c_k - r_y + b)}{\delta - 1}\right]^{-\delta}. \tag{13.17}$$

At this optimal level of capacity,

$$\lambda^* = c_k \tag{13.18}$$

and

$$\pi^* = \pi(k^*) = \delta^{-\delta}\left(\frac{c_x + c_k - r_y + b}{\delta - 1}\right)^{1-\delta}, \tag{13.19}$$

which is strictly positive due to (13.11) and (13.18), and can be shown to be the global profit maximum.

13.4 Impacts of Onboard Sales

In this section, the cruise line model will be interpreted and discussed with an emphasis on pricing, profit, and capacity choice.

13.4.1 Impact of Onboard Sales on Scarcity

The distinction between scarce capacity and overcapacity is a fundamental issue for pricing. Scarcity in the model of this paper means that at a given passenger ticket price, demand for cruises is sufficient to fill all available capacity and allow cruise lines to make a profit. Scarce capacity is indicated by $\lambda > 0$. The Lagrangean multiplier λ can be interpreted as the shadow price of capacity, i.e. as the hypothetical value of marginally relaxing the capacity restriction (13.6), and as a measure of scarcity.

In the model, not only scarce capacity and overcapacity can be distinguished, but also two kinds of scarcity, which will be referred to as "primary" and "subsidized" scarcity. Primary scarcity is given when capacity is scarce ($\lambda > 0$) irrespective of the value of r_y. Subsidized scarcity, on the other hand, is scarcity which depends on $r_y > 0$. To see this better, consider (13.14). If

$$\frac{\delta - 1}{\delta} p_x - c_x - b > 0, \tag{13.20}$$

then $\lambda > 0$, no matter whether r_y is positive or zero. Thus (13.20) is the condition for primary scarcity. However, if $\lambda > 0$ even though (13.20) does not hold, it follows that $r_y > 0$. Hence jointly, the conditions

$$\frac{\delta - 1}{\delta} p_x - c_x - b \leq 0 \quad \text{and} \quad \frac{\delta - 1}{\delta} p_x - c_x + r_y - b > 0, \tag{13.21}$$

define subsidized capacity. It will prove convenient not only to distinguish between primary and subsidized scarcity of capacity, but also to define the thresholds between them. Equating (13.20) with zero, substituting from (13.15) for p_x, and rearranging yields the threshold capacity between primary and subsidized scarcity

$$\breve{k} = \left[\frac{\delta(c_x + b)}{\delta - 1}\right]^{-\delta}. \tag{13.22}$$

Reworking the same steps for the second condition of (13.21) leads to the threshold between subsidized scarcity and overcapacity

$$\widehat{k} = \left[\frac{\delta(c_x - r_y + b)}{\delta - 1}\right]^{-\delta}. \tag{13.23}$$

Substitution from (13.23) and (13.15) into (13.16) shows that $\lambda = 0$ when $x = \widehat{k}$. Hence (13.11) implies that $\widehat{k}$ is positive and finite. From (13.22) and (13.23) it follows that:

- $0 < \breve{k} \leq \widehat{k} < \infty$;
- if $0 \leq k < \breve{k}$, there is primary scarcity of cruise capacity;
- if $\breve{k} \leq k < \widehat{k}$ there is subsidized scarcity of capacity;
- if $\widehat{k} \leq k$ there is overcapacity.

13.4.2 Impact of Onboard Sales on Pricing

On their ships where there is neither competition nor a shortage of "cocktails", cruise lines practice mark-up pricing as shown by (13.7). The less price-elastic the passengers' demand for "cocktails", the higher is the mark-up $c_y/(\varepsilon - 1)$ that is added to marginal cost c_y, and the higher is r_y according to (13.10). The assumption of a "small" ε therefore implies that onboard sales are typically a high-margin business for cruise lines. This is confirmed by Klein's (2006) reports of mark-ups of 400% on the direct cost of drinks at the bar, and of 200% on the purchase price of shore excursions (see Sect. 13.2). Note also that r_y is increasing in the attractiveness a of "cocktails". This is an incentive for any cruise line to mix even more attractive "cocktails".

The principle of passenger ticket pricing depends on whether or not cruise capacity is scarce. In the case of scarcity ($\lambda > 0$), the optimal price (13.15) is the highest price the cruise line can charge without ending up with unsold capacity. This relationship between ticket price and available capacity is reflected by the inverse dependence of p_x on k.

Another inverse relationship in (13.15) exists between p_x and b. The more the passengers expect to pay on board, the higher is their expected total price of the cruise and the shorter will be the cruise they purchase. This effect is taken into account by cruise lines in their pricing decisions. Given their need to fill their cabins, they cannot afford a decline in demand and therefore compensate a higher b with a lower p_x. In practice p_x, however, cruise lines do not take b simply as given.

Suppose, for instance, that $b = e(p_y)/e(a)$, where $e(\cdot)$ represents the consumers' expectation. Then the cruise lines may raise their potential customers' expectation $e(a)$ of "cocktail" attractiveness through their marketing communication, whilst reducing expected "cocktail" prices $e(p_y)$ by not publishing any onboard prices beforehand. Both strategies lead to a lower b and are actually pursued by cruise lines. For simplicity, however, marketing communication is not modeled as a cruise line decision variable in this paper.

Equation (13.15) seems to suggest that when capacity is scarce, p_x should be based on the two variables just discussed, k and b, but not on r_y. This would imply that r_y directly adds to the cruise lines' bottom line. In this case, selling cruises and selling additional products and services onboard could be regarded as two separate businesses, each of which has to be profitable. However, closer inspection reveals that p_x is only independent from r_y in situations of primary scarcity, since this scarcity is itself independent from r_y (see (13.20)). Subsidized scarcity, on the other hand, depends on r_y (see (13.21)). So if the optimal p_x is given by (13.16) due to $r_y > 0$, it is clear that p_x cannot be independent from r_y.

The term "subsidized" scarcity reflects that fact that, at capacity levels between $\breve{k}$ and $\overset{\frown}{k}$, it is optimal for cruise lines to cross-subsidize their ticket prices with a share of the net onboard revenue they can expect to earn. The subsidized, lower-priced tickets induce additional demand, making capacity scarce which otherwise would have been idle. This explains why in (13.22), the threshold capacity between (subsidized) scarcity of capacity and overcapacity is increasing in r_y: the more net onboard revenue is available to subsidize ticket prices in order to stimulate demand, the more capacity can be filled.

The rationale for subsidizing is that lower ticket prices attract more cruise customers and thus enlarge the captive and lucrative market for goods and services onboard. As Bull (2006) notes, “suppliers may select a non profit-optimal strategy for their core product, but one that maximizes sales volume in order to maximize the captive market to which they can sell monopoly products at high profit” (150). And Gibson (2006) confirms that “The current trend for vessels over recent years has been to maximize occupancy rates by reducing prices while increasing yield though the combination of volume sales of cruise vacations and revenue generated on board” (129). In this case, selling tickets and selling “cocktails” are not anymore treated as separate businesses. Note that the optimality of subsidizing passenger ticket prices provides an explanation of the stylized fact no. 2: *Ticket prices are barely or not cost-covering*.

This insight suggests a provocative, but perfectly reasonable interpretation of the cruise business: cruises are not offered as an end but rather as a means to generate onboard revenue. The ticket price subsidy may then be understood as a sort of “commission payment” by the profit centers on board to the cruise line for providing them with a supply of captive customers. In the extreme case, the subsidy may equal or exceed the full regular ticket price, allowing the cruise line to distribute its cruises for free in order to attract a maximum of passengers whose onboard spending then has to pay for all costs. A ticket price of zero or less emerges as optimal outcome if capacity k is “large enough”, i.e. $k > b^{-\delta}$ according to (13.15).

The discussion so far was limited to situations of scarce capacity. When capacity is not scarce ($\lambda = 0$), the optimal price given by (13.12) is a mark-up price similar to the one for “cocktails”. Due to the assumption that δ is “large”, however, the mark-up is only small. It is further reduced by the ticket price subsidy which is now based on the full amount of net onboard revenue the cruise lines can expect to earn. Passenger tickets priced in accordance with (13.12) allow selling a capacity share equal to $\widehat{k}$, as can be seen by substituting from (13.12) into (13.1) and comparing the result with (13.23). The remaining capacity $k - \widehat{k}$ stays empty. Reducing ticket prices below (13.12) would fill more capacity, but the gain in revenue from a price decrease would be smaller than the additional cost.

13.4.3 Impact of Onboard Sales on Capacity and Profit

According to (13.17) and (13.23), the profit-maximizing cruise capacity k^* and the threshold capacity $\widehat{k}$ are increasing functions of r_y. Also cruise line profit, given by (13.13) for the overcapacity case and by (13.19) for the scarce-capacity case, is increasing in r_y. These and further relations are illustrated by Fig. 13.4. The upper diagram shows the graph of profit $\pi(k)$, the lower part depicts ticket price $p_x(k)$ per PCD. The solid and dashed lines represent scenarios with $r_y = 0$ and with $r_y > 0$, respectively.

As Fig. 13.4 shows, $r_y > 0$ leads to more profit at any given capacity (the dashed curve is always above the solid curve); it increases the profit-maximizing capacity

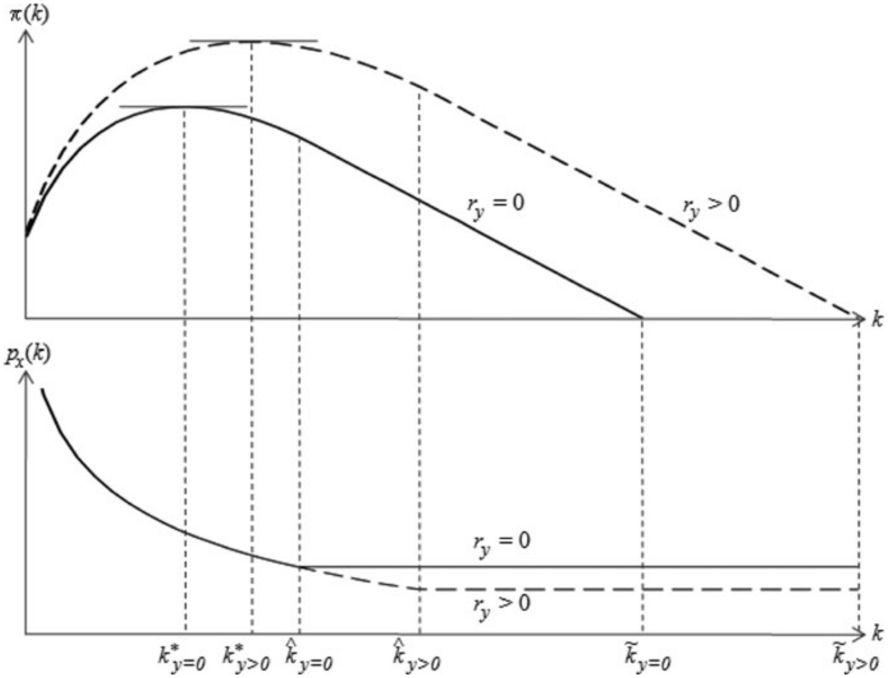

Fig. 13.4 Optimal ticket price and profit as functions of capacity for $r_y = 0$ and $r_y > 0$

($k^*_{y>0} > k^*_{y=0}$); it raises the level of capacity that can be filled ($\widehat{k}_{y>0} > k^*_{y=0}$); and it expands the capacity that can be operated without running into losses ($\tilde{k}_{y>0} > \widehat{k}_{y=0}$). The lower diagram depicts the impact of r_y on p_x. To the left of $\widehat{k}_{y=0}$ there is primary scarcity of capacity, which is why the two price curves coincide. To the right of $\widehat{k}_{y=0}$, the solid price curve becomes horizontal because lowering the price further would lead to a loss per capacity unit sold. Thus $\widehat{k}_{y=0}$ is the maximum capacity that can be filled economically when $r_y = 0$. If $k > \widehat{k}_{y=0}$, the residual capacity remains unsold. The dashed price curve, on the other hand, continues falling until it hits its floor at $\widehat{k}_{y>0}$. The vertical distance between the solid and the dashed curves represents the value of the ticket price subsidy per PCD. To the right of $\widehat{k}_{y=0}$ and $\widehat{k}_{y>0}$, profit is linearly decreasing in (over-) capacity as a result of growing capacity-related fixed cost c_kk and no extra revenue.

13.5 Cruise Line Growth

It has been shown how net onboard revenue leads to more profit per PCD, and how it makes operating at higher capacity levels optimal. From this insight it is only a small step to a cruise line growth model. This section proposes such a growth model which is capable of reproducing the three stylized facts of cruise line economics proposed in Sect. 13.3. The discussion of the model will also provide explanations for these facts.

Profit and optimal capacity are increasing in net onboard revenue per PCD; but what causes net onboard revenue per PCD to increase? Equation (13.10) offers two answers: the price elasticity $-\varepsilon$ of demand for "cocktails", and the perceived "cocktail" attractiveness $a$which affects the passengers' willingness to pay for them. But the price elasticity of demand is largely beyond the cruise lines' control, whereas the perception of "cocktail" attractiveness can be influenced directly by cruise lines in many ways (e.g. through the selection of "cocktails" offered, the quality of their ingredients, their presentation and promotion, the design of the bar, the training of service personnel etc.). Therefore, cruise lines are likely to focus their efforts on enhancing perceived "cocktail" attractiveness, with the result that $da/dt > 0$, where $t$denotes time. The rate increase of $a(t)$, the cost of increasing $a(t)$, and the specific mechanism behind the increase are of no interest here. Growth in $a(t)$ is taken to be exogenously determined. All other parameters of the model (δ, ε, c, c_k, c_x, c_y) are assumed fixed. Suppose further that the cruise lines set k, p_x and p_y optimally in accordance with (13.17), (13.15) and (13.7). This assumption captures the attempt of real-world cruise lines to come close to this theoretical ideal.

Defining the constant $\varphi = \varepsilon^{-\varepsilon}\ [c_y/(\varepsilon - 1)]^{1-\varepsilon} > 0$ allows rewriting (13.10) as $c_y(t) = \varphi a(t)$. Since according to (13.17), $k^* = k^*(r_y) = k^*(\varphi a)$ with $dk^*/da > 0$, it follows that $dk^*/dt = (dk^*/da)(da/dt) > 0$. This establishes the growth of optimal capacity $k^*[a(t)]$ over time as a result of increasing "cocktail" attractiveness. It now remains to derive the effects which growing capacity has on the rest of the model.

Differentiation of (13.15) shows that p_x is strictly decreasing and convex in k^* (that is, $dp_x/dk^* < 0$ and $d^2p_x/dk^{*2} > 0$). Multiplying (13.15) by k^* yields total passenger ticket revenue $p_xk^* = k^{*1-1/\delta} - bk$, which is strictly concave (i.e. $d^2\,(p_xk^*)/dk^{*2} < 0$), increasing in k^* up to the point $k^* = [\delta b/(\delta - 1)]^{-\delta}$ where it reaches its global maximum, and decreasing thereafter. As noted earlier, p_x is negative for $k^* > b^{-\delta}$. Total net onboard revenue is strictly increasing and convex in k^* (i.e. $d(r_yk^*)/dk^* > 0$ and $d^2(r_yk^*)/dk^{*2} > 0$; see appendix B). Finally, total cost excluding onboard cost equals $(c_x + c_k)k^*$ which is linear in k^*. These relations are visualized in the upper graph of Fig. 13.5. The horizontal axis shows units of k^*. The lower graph in Fig. 13.5 depicts the same magnitudes but divided by k^*, that is, per PCD.

The most important feature of Fig. 13.5, however, is that it displays the three stylized facts of cruise line economics in Sect. 13.2. Stylized fact no. 1 (*Net onboard revenue is outgrowing ticket revenue.*) is reflected in the upper diagram by the decreasing share of ticket revenue p_xk^* in total revenue $(p_x + r_y)k^*$ over time. Stylized fact no. 2 (*Ticket prices are barely or not cost-covering.*) can be seen in both diagrams of Fig. 13.5 around and to the right of point A. In the upper diagram, ticket revenue p_xk^* falls short of total cost $(c_x + c_k)k^*$, and in the lower diagram, the per diem ticket price p_x drops below its cost-covering level $c_x + c_k$. Stylized fact no. 3 (*Real ticket prices tend to decline.*), finally, is expressed by the negative slope of the solid ticket price curve p_x in the lower diagram.

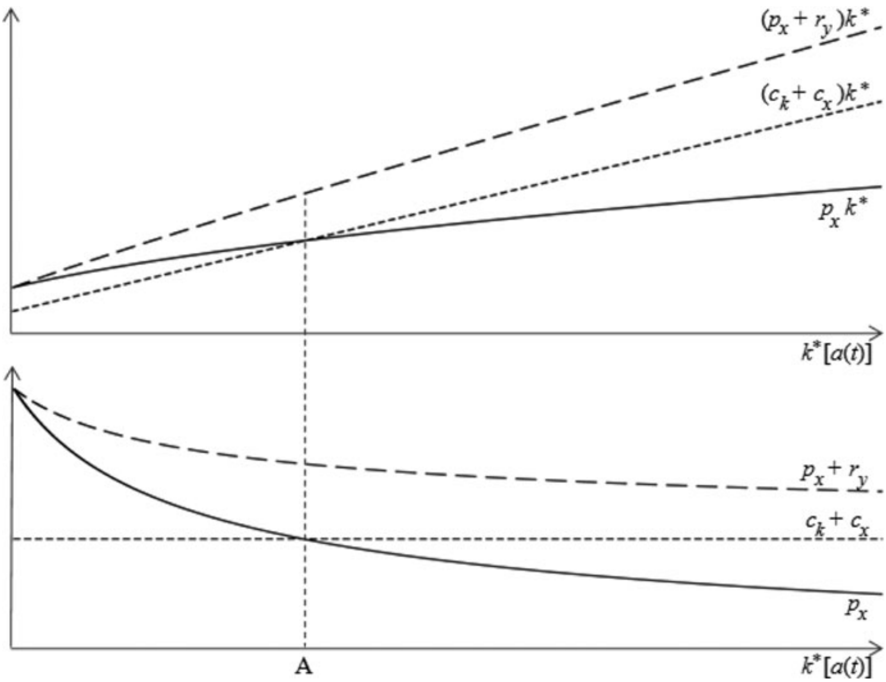

Fig. 13.5 Optimal revenue, price and cost trajectories as functions of capacity

13.6 Strategic Implications

The argument of this paper runs as follows: The rising attractiveness of products and services offered on board cruise ships raises the passengers' willingness to pay for them, fuelling onboard sales which yield high net revenue due to the passengers' low price elasticity of demand. Through this, the economic value of each additional passenger increases. To capture more of this value, cruise lines expand their capacities and attract additional passengers by subsidizing ticket prices with the net onboard revenue they expect to earn. Over time, this process drives down ticket prices to levels where they are not anymore cost-covering. Even in absence of cost-related scale effects, and with unchanging consumer price-response, cruise lines keep growing as long as their onboard offers are perceived as increasingly attractive and worth paying for.

If this argument is accurate and reflects the essence of the leading cruise lines' business models, it has important strategic implications. The revenue-optimized design of cruise ships, the development of new revenue-generating onboard attractions, and onboard revenue management have become functions so business-critical, that no cruise line which commissions newbuilds and operates large ships can afford to depend on suppliers for their performance. Internal capacity building for these functions and the protection of the associated knowhow from competitors can form a basis of strategic advantage in markets where pressure on ticket prices is rising due to a process of commodification of cruises.

A second strategic implication is the need of cruise lines to maximize their share of passenger wallet not only on board but also shore-side. It is well known that restaurants and shops in many major cruise destinations pay substantial commissions to cruise lines in order to be endorsed to passengers. Cruise lines have also started operating private beaches and islands as controlled, revenue-capturing environments (Weaver 2005b). The model of this paper suggests that cruise lines will attempt to expand their revenue capturing spheres even further, unless they find ways to keep their passengers on board during the entire cruise.

The theoretical model stresses the optimality of cross-subsidizing ticket prices with net onboard revenue. The subsidy, however, does not need to take the form of a financial compensation. Removing certain products and services from the "cruise package" which the ticket price includes, and asking passengers to pay for them separately achieves practically the same effect. Therefore, and because no travel agency commission is paid on onboard revenue (Young 2004), the marketing strategy of unbundling is likely to become more and more widespread also in cruising.

Yet shifting the profit zone (Slywotzky and Morrison 2002) completely on board is not without risk. As mentioned earlier, their growing dependence on onboard sales provides a growing incentive to cruise lines to oversell their onboard attractions, to under-inform about the full price of a cruise, to exert subtle social pressure on passengers to spend more money, and to manipulate them into using their credit cards to their limits. Not only can the cruise industry's reputation be seriously damaged by such practices – Garin (2005), Klein (2002; 2005) and other have already started publicizing them – also the high repeater rates may crumble and passengers might become reluctant to play the cruise lines' onboard game.

Appendix A: Proof of Sufficiency of First-Order Conditions

The first-order conditions (13.7)–(13.9) are sufficient for a local maximum of the Lagrangean $L = [p_x - c_x + (p_y - c_y)ap_y^{-\varepsilon} - \lambda]\ (p_x + b)^{-\delta} - k\ (c_k - \lambda)$ if the (bordered) Hessian determinant

$$|H| = \begin{vmatrix} \frac{\partial^2 L}{\partial \lambda^2} & \frac{\partial^2 L}{\partial \lambda \partial p_x} & \frac{\partial^2 L}{\partial \lambda \partial p_y} \\ \frac{\partial^2 L}{\partial \lambda \partial p_x} & \frac{\partial^2 L}{\partial {p_x}^2} & \frac{\partial^2 L}{\partial p_x \partial p_y} \\ \frac{\partial^2 L}{\partial \lambda \partial p_y} & \frac{\partial^2 L}{\partial p_x \partial p_y} & \frac{\partial^2 L}{\partial {p_y}^2} \end{vmatrix},$$

evaluated in the optimum is positive (Chiang and Wainwright 2005). Since $\partial^2 L/\partial\lambda^2 = \partial^2 L/(\partial\lambda\partial p_y) = 0$, the condition reduces to

$$|H| = -\left(\frac{\partial^2 L}{\partial\lambda\partial p_x}\right)^2 \frac{\partial^2 L}{\partial {p_y}^2} > 0.$$

It is clear that $[\partial^2 L/(\partial\lambda\partial p_x)]^2 > 0$. Upon substitution from (13.7), $\partial^2 L/\partial {p_y}^2 = (1-\varepsilon)/\varepsilon$. Since by assumption, $\varepsilon > 1$, it follows that $\partial^2 L/\partial {p_y}^2 < 0$ and that that (13.7)–(13.9) are indeed sufficient for a local maximum.

Appendix B: Derivatives of Net Onboard Revenue

Solving (13.17) for r_y yields

$$r_y = c_x + c_k + b - \frac{\delta - 1}{\delta} k^{*-1/\delta},$$

so that total net onboard revenue can be written as

$$k^* r_y = (c_x + c_k + b)k^* - \frac{\delta - 1}{\delta} k^{*1-1/\delta},$$

which has the first and second-order derivatives

$$\frac{d(r_y k^*)}{dk^*} = c_x + c_k + b - \left(\frac{\delta - 1}{\delta}\right)^2 k^{*-1/\delta} = r_y + \frac{\delta - 1}{\delta^2} k^{*-1/\delta} > 0$$

$$\frac{d^2(r_y k^*)}{dk^{*2}} = \frac{(\delta - 1)^2}{\delta^3} k^{*-1-1/\delta} > 0$$

References

Bull AO (2006) Industrial economics and pricing issues within tourism enterprises and markets. In: Dwyer L, Forsyth P (eds) International handbook on the economics of tourism. Edward Elgar, Cheltenham

Bureau of Labor Statistics (2008) Consumer Price Index. U.S. Department Of Labor, Washington DC

Carnival (2008) 2007 Annual Report. Carnival Corporation & plc

Cartwright R, Baird C (1999) The development and growth of the cruise industry. Butterworth-Heinemann, Oxford

Charlier JJ, McCalla RJ (2006) A geographical overview of the world cruise market and its seasonal complementarities. In: Dowling RK (ed) Cruise ship tourism. CABI, Wallingford/UK

Chesworth N (2006) The cruise industry and Atlantic Canada: a case study. In: Dowling RK (ed) Cruise ship tourism. CABI, Wallingford/UK

Chiang AC, Wainwright K (2005) Fundamental methods of mathematical economics, 4th edn. McGraw-Hill, Boston/MA

CLIA (2008) Cruise Market Profile Study. Cruise Lines International Association, Fort Lauderdale

CLIA (2009) The State of the Cruise Industry in 2009: Well-Positioned for Challenging Times. http://www.cruising.org/cruisenews/news.cfm? NID = 384. Accessed 15 January 2009
Coleman MT, Meyer DW, Scheffman DT (2003) Economic analyses of mergers at the FTC: the cruise ships mergers investigation. Rev Ind Organ 23:121–155
Di Giorgio L (2008) Cruise vessels: notes on possible lines of development. Paper presented at the European Cruise Council conference, 28 February, Brussels
Dickinson B, Vladimir A (2007) Selling the sea: an inside look at the cruise industry, 2nd edn. Wiley, Hoboken/NJ
Douglas N, Douglas N (2004) Cruise ship passenger spending patterns in Pacific island ports. Int J Tourism Res 6(4):251–261
Dowling RK (2006) The cruising industry. In: Dowling RK (ed) Cruise Ship Tourism. CABI, Wallingford/UK
Duman T, Mattila AS (2005) The role of affective factors on perceived cruise vacation value. Tourism Manage 26:311–323
Garin KA (2005) Devils on the deep blue sea: the dreams, schemes and showdowns that built America's cruise-ship empires. Viking Penguin, London
Gibson P (2006) Cruise operations management. Butterworth-Heinemann, Oxford
Hobson JSP (1993) Analysis of the US cruise line industry. Tourism Manage 14:453–462
Klein RA (2002) Cruise ship blues. New Society Publishers, Gabriola Island, The Underside of the Cruise Industry
Klein RA (2005) Cruise ship squeeze: the new pirates of the seven seas. New Society Publishers, Gabriola Island
Klein RA (2006) Turning water into money: the economics of the cruise industry. In: Dowling RK (ed) Cruise ship tourism. CABI, Wallingford/UK
Kwortnik RJ (2006) Carnival cruise line – burnishing the brand. Cornell Hotel Restaur Adm Q 47:286–300
Langenfeld J, Li W (2008) Price discrimination and the cruise line industry: implications for market definition, competition, and consumer welfare. Int J Econ Bus 15:1–25
Mäkinen E (2007) Shipbuilding and cruise industry. ECC Cruise Industry Conference on 6 February, Brussels
Mäkinen E (2008) Cruise shipbuilding – a very specialized Niche. ECC Cruise Industry Conference on 28 February, Brussels
Papatheodorou A (2006) The cruise industry: an industrial organization perspective. In: Dowling RK (ed) Cruise ship tourism. CABI, Wallingford/UK
Petrick JF (2004a) Are loyal visitors desired visitors? Tourism Manage 25:463–470
Petrick JF (2004b) First timers' and repeaters' perceived value. J Travel Res 43:29–38
Pine J, Gilmore J (1999) The experience economy. Harvard Business School Press, Boston/MA
RCL (2003) 2002 Annual Report. Royal Caribbean Cruises Ltd., Miami
RCL (2008) 2007 Annual Report. Royal Caribbean Cruises Ltd., Miami
Slywotzky AJ, Morrison DJ (2002) The profit zone: how strategic business design will lead you to tomorrow's profits. Three Rivers Press, New York
Toh RS, Rivers MJ, Ling RW (2005) Room occupancies: cruise lines out-do the hotels. Hospitality Manage 24:121–135
Weaver A (2005a) The McDonaldization theses and cruise tourism. Ann Tourism Res 32:346–366
Weaver A (2005b) Spaces of containment and revenue capture: 'super-sized' cruise ships as mobile tourism enclaves. Tourism Geographies 7:165–184
Wie B-W (2005) A dynamic game model of strategic capacity investment in the cruise line industry. Tourism Manage 26:203–217
Yarnal CM, Kerstetter D (2005) Casting off an exploration of cruise ship space, group tour behavior, and social interaction. J Travel Res 43:368–379
Young SJ (2004) Onboard Spending by cruise guests soars, but are agents getting their fair share? Travel Agent, 7 June, 12

Chapter 14
Optimality of Casino Taxation – The Case of Portugal

Stefan F. Schubert, Álvaro Matias, and Carlos M.G. Costa

14.1 Introduction

In Portugal, casinos are taxed at a 50% rate, and the tax receipts are allocated to "Turismo de Portugal", which can use it in different ways, e. g., subsidizing tourism firms, advertising, and so on. A recent study (Matias et al. 2010) recently demonstrated that casino demand in mainland Portugal is mainly derived from residents rather than tourists. Hence, there is a debate about (1) the level of the tax levied on casinos, and (2) if casinos should be taxed at all.

At a first glance, the answer seems to be trivial. In the absence of externalities, the reduction in the tax rate levied on casinos increases disposable income, allows higher consumption and should thus be preferable. However, one has to take the government's budget constraint into account. Referring to the current Portuguese tax system, lower casino tax revenues mainly imply a tighter budget of "Turismo de Portugal". As a consequence, its activities would have to be reduced, and this may cause a fall in foreigners' tourism demand for Portuguese tourism services, and thus lower tourism service production, which in turn reduces disposable income, ceteris paribus. On the other hand, any reduction in tourism service production liberates resources which can be used elsewhere, and this may lead to higher production and income in other sectors of the economy (e.g. the industrial sector). Thus, a sound answer to the question if a tax cut is good or not has to take all these effects into account.

S.F. Schubert (✉)
Competence Centre in Tourism Management and Tourism Economics (TOMTE), Free University of Bozen-Bolzano, School of Economics and Management, Bolzano, Italy
e-mail: StefanFranz.Schubert@unibz.it

Á. Matias
Universidade Lusíada de Lisboa, School of Economics and Business, Lisbon, Portugal

C.M.G. Costa
Estoril-Sol, Casino Lisboa, Lisbon, Portugal

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_14,

In this paper, we address the effects of a change in Portugal's casino taxation within a general equilibrium framework. We develop a dynamic general equilibrium model of a small open economy, comprising three sectors – an industrial sector, a tourism sector, and a casino sector –, the firms of which produce an internationally traded industrial good, the price of which is exogenously given, tourism services, and gambling services. The model is an extension of the well-known dynamic two-sector dependent economy model (see, e.g. Turnovsky 1997, Chap. 4), which was already applied to tourism by Schubert and Brida (2008), who use this type of model to analyze the effects of subsidizing the tourism sector). In contrast to Turnovsky (1997), Chap. 4, in this paper we treat investment as being traded, giving rise to degenerate dynamics, which is a convenient feature, as the economy is always in steady-state, thus simplifying the analysis. The model is further augmented by introducing a tourism demand function, as in Schubert and Brida (2009). Tourism services are demanded by domestic residents and foreign tourists, the demand of the latter depending on the relative price of tourism and the level of marketing. The third sector, casinos, displays a very simple structure; its production is demand determined and does not require resources. The economy can borrow/lend on the international financial markets at the given world interest rate. This is a realistic extension of a lot of models dedicated to tourism, which abstract from the possibility to access the international financial market (see, e.g., Hazari and Sgro 1995, 2004, chap. 12; Chao et al. 2005, 2006; Nowak et al. 2007; Gómez et al. 2008). Finally, the government taxes casino revenues to finance a tourism authority's marketing activities.

After discussing the model and its steady-state, we show that an abandonment of casino taxation is welfare improving, but leads to a change in the structure of the economy. Tourism production will fall, whereas industrial production will increase. The economy will increase its overall capital stock and reduce its net foreign asset position, requiring an improvement in the trade balance to adjust for lower net interest earnings. Our analysis thus supports the view that Portugal's tax policy should be changed, if the given policy objective is the maximization of domestic residents' welfare.

The rest of the paper is structured as follows. Section 14.2 sets up the macroeconomic model, whereas the resulting equilibrium is derived and discussed in Sect. 14.3. The effects of an abandonment (or reduction) of casino taxation are investigated in Sect. 14.4. Finally, Sect. 14.5 summarizes our findings and concludes with some caveats.

14.2 The Model

The small open economy we shall consider comprises three sectors: (1) an industrial sector, producing a homogenous and internationally traded good, Y_I, labeled industrial good, used for consumption, investment, and export, (2) tourism services, Y_T, and (3) casino gambling services, Y_G, which are only consumed by domestic households. The industrial good is broadly defined, representing everything else than tourism and gambling services. The traded good sector and the tourism sector are perfectly competitive, whereas the gambling sector is noncompetitive. Domestic households own firms, consume both the traded industrial good, and tourism and gambling services, and supply labor to firms. The economy is assumed to be small in the world financial market and faces a given world interest rate, r. However, as tourism services produced in the economy are different from tourism services supplied elsewhere, the relative price of domestically produced tourism services is endogenously determined. The price of gambling offered by casinos is exogenously set by casinos (or some related authority) and assumed to be constant. This price can be interpreted as the consumers' expected loss from one unit of gambling.

14.2.1 Households

The economy is populated by a large number of identical households. Each household consists of a continuum of agents with measure one. Members of a household care only about utility. Thus, individual risks in consumption are completely smoothed within each household. The representative household is endowed with a fixed quantity of labor, L, normalized to unity, which is supplied to firms. The household owns firms and consumes the industrial good, C_I, domestically produced tourism services, C_T, and gambling services, C_G, the relative prices of which in terms of the traded industrial good are p_T and p_G, respectively. Its income comprises interest income on traded bonds, rB, profits distributed by firms, Π, and labor income, w. The household accumulates net foreign bonds (assets), B, that pay the exogenously given world interest rate, r. The household's flow budget constraint is thus

$$\dot{B} = rB + \Pi + w - C_I - p_T C_T - p_G C_G \qquad (14.1a)$$

The representative household chooses his consumption levels, C_I, C_T and C_G, and the rate of bond accumulation, to maximize the intertemporal utility function

$$W \equiv \int_0^\infty U(C_I, C_T, C_G) e^{-\beta t} dt, \qquad (14.1b)$$

subject to the constraint (14.1a) and the historically given initial stock of traded bonds $B(0) = B_0$. β is the rate of consumer time preference, taken to be constant. The instantaneous utility function $U(C_I, C_T, C_G)$ is assumed to be concave, and the three consumption goods are assumed to be Edgeworth complements, i.e., the cross partial derivatives $U_{C_iC_j} > 0, i \neq j$.[1] The Hamiltonian of the household's optimization problem is

$$H = U(C_I, C_T, C_N) + \lambda[rB + \Pi + w - C_I - p_T C_T - p_G C_G]$$

where λ is the shadow value of wealth in the form of traded bonds and can be interpreted as the marginal utility of wealth in terms of the traded industrial good. The optimality conditions are therefore

$$U_I(C_I, C_T, C_G) = \lambda \tag{14.2a}$$

$$U_T(C_I, C_T, C_G) = \lambda p_T \tag{14.2b}$$

$$U_G(C_I, C_T, C_G) = \lambda p_G \tag{14.2c}$$

$$\beta - \frac{\dot{\lambda}}{\lambda} = r \tag{14.2d}$$

together with the transversality condition

$$\lim_{t \to \infty} \lambda B e^{-\beta t} = 0. \tag{14.2e}$$

Equations (14.2a), (14.2b) and (14.2c) equate the marginal utilities of consumption of the industrial good, tourism services and gambling to the marginal utility of wealth in terms of traded bonds, λ, tourism services, λp_T, and gambling services, λp_G, respectively. Their ratios give the familiar condition that in an optimum the marginal rate of substitution between goods/services i and j must be equal to their relative price. Equation (14.2d) is a dynamic no-arbitrage condition and equates the rate of return on consumption to the rate of return on bonds, i.e., the interest rate. To obtain an interior solution, we require $\beta = r$, implying a time-constant marginal utility of wealth $\lambda = \bar{\lambda}$, see, e.g., Turnovsky (1997), chap. 2. The constancy of λ has important consequences, as the steady state becomes dependent on initial conditions. The transversality condition (14.2e) ensures that the household remains intertemporally solvent.

14.2.2 Firms

The economy comprises also a large number of small firms, producing the industrial good and tourism services, and a few casinos, offering gambling services. The

[1]Where no ambiguity can arise we shall adopt the convention of letting primes denote total derivatives and appropriate subscripts partial derivatives. Thus, we shall let $f'(x) \equiv \frac{df}{dx}$; $f_i(x_1, \ldots, x_n) \equiv \frac{\partial f}{\partial x_i}$, $f_{ij} \equiv \frac{\partial^2 f}{\partial x_i \partial x_j}$. Time derivatives will be denoted by dots above the variable concerned, $\dot{x} \equiv \frac{dx}{dt}$.

production sector can be consolidated. The industrial good and tourism services are produced by combining capital K_I, K_T and labor L_I, L_T by means of linear homogenous neoclassical production functions $F(K_I, L_I)$, and $H(K_T, L_T)$, respectively, with $F_{K_I} \equiv F_K > 0, F_{L_I} \equiv F_L > 0, F_{K_I K_I} \equiv F_{KK} < 0, F_{L_I L_I} \equiv F_{LL} < 0, F_{K_I L_I} \equiv F_{KL} > 0$. The function $H(K_T, L_T)$ displays analogous properties. Empirically the share of casino gambling "production" in Portugal's GDP is extremely small (less than 0.25%). For the sake of simplicity we can thus safely assume that the production of gambling services, Y_G, does not require resources, and that is completely demand determined. The production sector accumulates capital according to

$$\dot{K} = I - \delta K. \tag{14.3a}$$

where I denotes gross investment and δ is the depreciation rate of capital. Labor and capital can freely move across sectors. The constraints for the allocation of labor and capital between the two sectors are

$$L_I + L_T = L \tag{14.3b}$$

$$K_I + K_T = K \tag{14.3c$'$}$$

where capital K consists of the traded industrial good.

Without loss of generality, firms are consolidated into multi-sector firms, which maximize their value V by choosing the allocation of labor and capital and the rate of capital accumulation,

$$V \equiv \int_0^\infty \Pi(t) e^{-rt} dt, \tag{14.3d}$$

subject to (14.3a) and the historically given stock of capital, $K(0) = K_0$, where net profits Π in terms of the industrial good are given as

$$\Pi = [F(K_I, L_I) - wL_I] + [p_T H(K_T, L_T) - wL_T] + p_G Y_G - I \tag{14.3e}$$

where τ_G is the tax rate charged on casino gambling. Because there is a large number of firms in the tourism sector, each firm takes the price of tourism services p_T as given when making its decisions. On the other hand, there are only a few casinos. However, we assume that the price for casino gambling services is exogenously set by casinos (or some authority). Hence, in our simple model the casino sector does not face a profit maximization problem.

The first order conditions for maximizing V are given as

$$F_{L_I}(K_I, L_I) = w = p_T H_{L_T}(K_T, L_T) \tag{14.4a}$$

$$F_{K_I}(K_I, L_I) - \delta = r = p_T H_{K_T}(K_T, L_T) - \delta \tag{14.4b}$$

together with the transversality condition

$$\lim_{t\to\infty} Ke^{-rt} = 0. \tag{14.4c}$$

These are standard static optimality conditions. Equation (14.4a) equates the marginal product of labor in the industrial sector to the wage rate w, expressed in terms of the industrial good, which in turn has to be equal to the marginal value product of labor in the tourism sector. Equation (14.4b) equates the rates of return of capital, comprising the marginal (value) product of capital less depreciation, in the two sectors to the given world interest rate. The analysis of the production side can be simplified by working with production functions in intensive form, i.e.,

$$f(k_I) \equiv F(K_I, L_I)/L_I; \quad h(k_T) \equiv H(K_T; L_T)/L_T.$$

where $k_I \equiv K_I/L_I$ and $k_T \equiv K_T/L_T$. Thus, the production block (14.4a) and (14.4b) can be written as

$$k_I + (k_T - k_I)L_T = K \tag{14.3c$'$}$$

$$f(k_I) - f'(k_I)k_I = p_T[h(k_T) - h'(k_T)k_T] = w \tag{14.4a$'$}$$

$$f'(k_I) - \delta = p_T h'(k_T) - \delta = r \tag{14.4b$'$}$$

where the first equation (14.3c′) combines the labor constraint (14.3b) and the capital allocation constraint (14.3c′).

14.2.3 Government

The government is the third agent in the small open economy, playing a simple role. It collects taxes τ_G from the casino sectors' operating profits to finance its expenditures on marketing activities for the tourism sector, a_T, measured in terms of the traded industrial good. For the sake of simplicity and without changing results[2], we assume that the government maintains a balanced budget. Its budget constraint is therefore

$$\tau_G p_G Y_G = a_T \tag{14.5}$$

Note that any change in marketing expenditures a_T requires a change in the tax rate τ_G. Thus, the government can either set the tax rate and let marketing

[2]The introduction of government bonds would not change results, because according to the Ricardian equivalence proposition, government bonds in a model like ours do not constitute part of agents' net wealth. See the seminal work of Barro (1974).

expenditures be endogenously determined, or vice versa. The government (or some other authority) also sets the price of gambling equal to $p_G = \bar{p}_G$.

14.3 Macroeconomic Equilibrium

The macroeconomic equilibrium of this intertemporal general equilibrium model is defined to be a situation in which all the planned supply and demand functions are derived from optimization behavior, the economy is continually in equilibrium, and all anticipated variables are correctly forecasted.

Markets have to clear at any time, requiring appropriate adjustments of production, consumption, relative prices and rates of investment and bond accumulation. In particular, the market for tourism services has to be in equilibrium,

$$Y_T(K_T, L_T) = C_T + Z_T(p_T, a_T) \tag{14.6}$$

i.e., tourism production has to equal tourism service demand from domestic residents, C_T, and foreign tourists, where $Z_T(p_T, a_T)$ is the foreigners' tourism demand function, which depends negatively on the relative price of tourism services, p_T, and positively on tourism marketing activities, a_T, of the marketing authority.

We assume that the production of gambling services Y_G is completely demand determined and that only domestic residents consume gambling services offered by casinos.[3] Thus, the gambling market equilibrium reads:

$$Y_G = C_G \tag{14.7}$$

This equation asserts that the demand for casino services exercised from domestic residents, C_G, determines the supply of these services.

Inserting the capital accumulation (14.3a), the labor allocation constraint (14.3b), the firm's profits (14.3e), and the government's budget constraint (14.5) into the households' flow budget constraint (14.1a) gives the economy's current account, $\dot{B}$, i.e.

$$\dot{B} = rB + [Y_I + p_T Y_T + p_G Y_G - C_I - p_T C_T - p_G C_G - \dot{K} - \delta K - a_T] \tag{14.8}$$

where the terms in brackets define the trade balance, TB.

It can be rigorously demonstrated that the dynamics degenerate (see, e.g., Turnovsky 1997, chap. 4), implying that the economy is always in steady-state equilibrium, that is $\dot{B} = \dot{K} = 0$. The reason for this is that investment is a traded good and not associated with investment adjustment costs. Thus, the economy can always immediately adjust to its steady state by a one-time swap of traded bonds for

[3] A recent inspective study by Matias et al. (2010) showed that casino demand in Portugal is predominantly originated in the domestic market.

capital, i.e., $dK = dB$. We can therefore concentrate on the steady state, which is given by the following set of equations, where steady-state values are denoted by a tilde:

$$U_I(\tilde{C}_I, \tilde{C}_T, \tilde{C}_G) = \bar{\lambda} \tag{14.9a}$$

$$U_T(\tilde{C}_I, \tilde{C}_T, \tilde{C}_G) = \bar{\lambda}\tilde{p}_T \tag{14.9b}$$

$$U_G(\tilde{C}_I, \tilde{C}_T, \tilde{C}_G) = \bar{\lambda}\bar{p}_G \tag{14.9c}$$

$$f(\tilde{k}_I) - f'(\tilde{k}_I)\tilde{k}_I = \tilde{p}_T[h(\tilde{k}_T) - h'(\tilde{k}_T)\tilde{k}_T] \tag{14.9d}$$

$$f'(\tilde{k}_I) - \delta = \tilde{p}_T h'(\tilde{k}_T) - \delta \tag{14.9e}$$

$$f'(\tilde{k}_I) - \delta = r \tag{14.9f}$$

$$f(\tilde{k}_I) - f'(\tilde{k}_I)\tilde{k}_I = \tilde{w} \tag{14.9g}$$

$$\tilde{k}_I + (\tilde{k}_T - \tilde{k}_I)\tilde{L}_T = \tilde{K} \tag{14.9h}$$

$$\tilde{L}_T h(\tilde{k}_T) = \tilde{C}_T + Z_T(\tilde{p}_T, a_T) \tag{14.9i}$$

$$\tilde{Y}_G = \tilde{C}_G \tag{14.9j}$$

$$\begin{aligned} r\tilde{B} + (1 - \tilde{L}_T)f(\tilde{k}_I) + \tilde{p}_T\tilde{L}_T h(\tilde{k}_T) + \bar{p}_G\tilde{Y}_G - \tilde{C}_I - \tilde{p}_T\tilde{C}_T - \bar{p}_G\tilde{C}_G \\ - \delta(1 - \tilde{L}_T)\tilde{k}_I - \delta\tilde{L}_T\tilde{k}_T - a_T = 0 \end{aligned} \tag{14.9k}$$

$$B_0 - \tilde{B} = -(K_0 - \tilde{K}) \tag{14.9l}$$

$$\tau_G\bar{p}_G\tilde{Y}_G = a_T \tag{14.9m}$$

Equations (14.9a)–(14.9c) are the steady-state optimality conditions for consumption, whereas equations (14.9d)–(14.9f) equate the steady-state rates of return to labor, capital and bonds (interest rate) of the industrial and the tourism sector. Equation (14.9g) determines the steady-state wage rate. Equation (14.9h) is the steady-state capital-labor constraint, and (14.9i) and (14.9j) are the steady-state goods market clearing conditions for tourism services and casino gambling. Equation (14.9k) is the economy's balanced (zero) current account, stating that any steady-state trade balance deficit has to be financed by net interest earnings, or that any debt service has to be financed by a trade balance surplus. Equation (14.9l) represents the economy's intertemporal budget constraint and makes the steady state dependent on the economy's initial conditions. It describes the one-time swap of traded bonds for capital. Finally (14.9m), repeats the government's budget constraint.

These equations can be solved as follows: The consumption block (14.9a)–(14.9c) can be solved for $\tilde{C}_I, \tilde{C}_T, \tilde{C}_G$ as functions of $\tilde{p}_T$, $\bar{p}_G$ and $\bar{\lambda}$, respectively. Next, from the production block (14.9d)–(14.9f) we obtain the sectors' capital-labor ratios, $\tilde{k}_I$, $\tilde{k}_T$, and the relative price of tourism services, $\tilde{p}_T$. Equation (14.9g) gives then the steady-state wage rate (labor income). Note that these do not depend on demand conditions. Equations (14.9h)–(14.9l) then jointly determine the labor allocation $\tilde{L}_T$ and $\tilde{L}_I = 1 - \tilde{L}_T$, the economy-wide capital stock, $\tilde{K}$, the marginal utility of wealth, $\bar{\lambda}$, casino gambling services $\tilde{Y}_G$, and the stock of traded bonds (foreign assets) $\tilde{B}$, which all depend on the historically given initial values B_0 and K_0. Knowing $\bar{\lambda}$ and $\tilde{p}_T$, $\bar{p}_G$, steady-state consumption rates then follow immediately from (14.9a)–(14.9c). Finally (14.9m), repeats the government's budget constraint.

From the steady-state system (14.9) we can derive further insights regarding the effects of casino taxation. Because of the gambling sector's simple structure, taxation of casinos' profits does not have any allocative effects, working rather like a lump-sum tax. However, a change in the tax rate affects marketing activities, which in turn impinge on foreigners' tourism demand, requiring changes in the economy's structure. These are discussed in the next section.

14.4 Effects of a Change in Casino Taxation

We assume that the government reduces casino taxation, thus requiring – via the government's budget constraint – a change in marketing activities. As a polar case, we may assume that casino taxation is abandoned, i.e., $\tau_G = 0$ and thus $a_T = 0$. Also, we realistically assume that the industrial sector produces always with a higher capital intensity than the tourism sector, i.e., $k_I > k_T$.

To derive the effects of a change in casino taxation and marketing spending, we solve the steady-state system (14.9) stepwise.

First, the consumption block (14.9a)–(14.9c) can be solved for the consumption rates as functions of the marginal utility of wealth and the relative prices,

$$\tilde{C}_I = C_I(\bar{\lambda}, \tilde{p}_T, \bar{p}_G), \quad \frac{\partial C_I}{\partial \bar{\lambda}} < 0, \frac{\partial C_I}{\partial \tilde{p}_T} < 0, \frac{\partial C_I}{\partial \bar{p}_G} < 0 \tag{14.10a}$$

$$\tilde{C}_T = C_T(\bar{\lambda}, \tilde{p}_T, \bar{p}_G), \quad \frac{\partial C_T}{\partial \bar{\lambda}} < 0, \frac{\partial C_T}{\partial \tilde{p}_T} < 0, \frac{\partial C_T}{\partial \bar{p}_G} < 0 \tag{14.10b}$$

$$\tilde{C}_G = C_G(\bar{\lambda}, \tilde{p}_T, \bar{p}_G), \quad \frac{\partial C_G}{\partial \bar{\lambda}} < 0, \frac{\partial C_G}{\partial \tilde{p}_T} < 0, \frac{\partial C_G}{\partial \bar{p}_G} < 0 \tag{14.10c}$$

where the signs of the partial derivatives follow from the properties of the utility function.

Second, as discussed in the last section, the sectoral capital intensities $\tilde{k}_I$, $\tilde{k}_T$, and the relative price of tourism $\tilde{p}_T$ are determined by the production block (14.9d)–(14.9f) and remain therefore constant.

Third, from equations (14.9h)–(14.9m), using the expressions (14.10) for consumption levels and the constancy of sectoral capital intensities and prices, given $\tilde{k}_I > \tilde{k}_T$, we derive

$$\frac{d\tilde{a}_T}{d\tau_G} = \bar{p}_G \tilde{C}_G \left(\frac{\frac{\partial C_I}{\partial \bar{\lambda}} + \tilde{p}_T \frac{\partial C_T}{\partial \bar{\lambda}}}{\frac{\partial C_I}{\partial \bar{\lambda}} + \tilde{p}_T \frac{\partial C_T}{\partial \bar{\lambda}} + \tau_G \bar{p}_G \frac{\partial C_G}{\partial \bar{\lambda}}} \right) > 0 \tag{14.11a}$$

$$\frac{d\tilde{L}_T}{d\tau_G} = \frac{\bar{p}_G \tilde{Y}_G}{\Delta} \left[\frac{\partial C_T}{\partial \bar{\lambda}} - \frac{\partial Z_T}{\partial a_T} \left(\frac{\partial C_I}{\partial \bar{\lambda}} + \tilde{p}_T \frac{\partial C_T}{\partial \bar{\lambda}} \right) \right] > 0 \tag{14.11b}$$

$$\frac{d\tilde{K}}{d\tau_G} = (\tilde{k}_T - \tilde{k}_I) \frac{d\tilde{L}_T}{d\tau_G} < 0 \tag{14.11c}$$

$$\frac{d\tilde{Y}_T}{d\tau_G} = h(\tilde{k}_T) \frac{d\tilde{L}_T}{d\tau_G} > 0 \tag{14.11d}$$

$$\frac{d\tilde{Y}_I}{d\tau_G} = -f(\tilde{k}_I) \frac{d\tilde{L}_T}{d\tau_G} < 0 \tag{14.11e}$$

$$\frac{d(\tilde{Y}_I + \tilde{p}_T \tilde{Y}_T)}{d\tau_G} = f'(\tilde{k}_T - \tilde{k}_I) \frac{d\tilde{L}_T}{d\tau_G} < 0 \tag{14.11f}$$

$$\frac{d\tilde{Y}_G}{d\tau_G} = \frac{d\tilde{C}_G}{d\tau_G} = \frac{\partial C_G}{\partial \bar{\lambda}} \frac{d\bar{\lambda}}{d\tau_G} < 0 \tag{14.11g}$$

$$\frac{d\bar{\lambda}}{d\tau_G} = \frac{h(\tilde{k}_T) \bar{p}_G \tilde{Y}_G}{\Delta} > 0 \tag{14.11h}$$

$$\frac{d\tilde{B}}{d\tau_G} = -\frac{d\tilde{K}}{d\tau_G} > 0 \tag{14.11i}$$

$$\frac{d\widetilde{TB}}{d\tau_G} = r \frac{d\tilde{K}}{d\tau_G} < 0 \tag{14.11j}$$

Where

$$\Delta \equiv -h(\tilde{k}_T) \left(\frac{\partial C_I}{\partial \bar{\lambda}} + \tilde{p}_T \frac{\partial C_T}{\partial \bar{\lambda}} + \tau_G \bar{p}_G \frac{\partial C_G}{\partial \bar{\lambda}} \right) > 0$$

The steady-state consumption responses follow then directly from (14.10) as

$$\frac{d\tilde{C}_I}{d\tau_G} < 0, \quad \frac{d\tilde{C}_T}{d\tau_G} < 0, \quad \frac{d\tilde{C}_G}{d\tau_G} < 0 \tag{14.12}$$

Note that in our case the tax rate is reduced or abandoned, i.e., $d\tau_G < 0$. Thus all the variables change in opposite direction to that indicated in (14.11) and (14.12).

The reduction in the casino tax reduces government's revenues and requires a cut in marketing expenditures a_T, as (14.11a) shows.[4] In turn, lower marketing activities implicate a decline in foreigners' tourism demand Z_T, which consequently falls. Because the relative price of tourism services, p_T, is determined solely by production parameters which are not affected by the casino tax or marketing expenditures, tourism production Y_T has to fall to clear the tourism market (see (14.11d). Maintaining the capital intensity k_T, the tourism sector lays off labor L_T ((14.11b)[5]) and capital K_T, which both move into the industrial sector. However, as the industrial sector is assumed to be more capital intensive than the tourism sector, to maintain a constant capital-labor ratio k_I, an increase in the economy's overall capital stock K is necessary, as (14.11c) tells us, which is financed on the international financial market, reducing therefore the economy's net foreign asset position B (see (14.11i). The reallocations of labor and capital and the increased overall capital stock (due to the Rybczynski (1955) effect) lead to lower tourism service production $\tilde{Y}_T$ and to higher industrial production $\tilde{Y}_I$ (see (14.11d) and (14.11e). In sum the increase in $\tilde{Y}_I$ more than offsets the drop in $\tilde{p}_T\tilde{Y}_T$, hence agents' income from the industrial and tourism sectors is raised (given $\tilde{k}_I > \tilde{k}_T$, see (14.11f) in addition to higher net casino revenues. Hence, GDP and disposable income increase. This causes a positive wealth effect, and the marginal utility of wealth, $\bar{\lambda}$, falls, as (14.11h) shows. Because relative prices remain unchanged, due to the wealth effect agents increase their consumption expenditures on all three goods and services, as (14.12) states. In particular, domestic residents gamble more, raising thus casino production $\tilde{Y}_G$. As tourism production falls and domestic residents consume more tourism services, the share of domestic residents' tourism consumption in tourism production rises. Finally, because the net foreign asset position deteriorates, the trade balance has to improve (see (14.11j) to maintain a zero steady-state current account. Because tourism service exports fall, net exports of industrial goods Y_I have to increase sufficiently.

[4]Note that a_T and τ_G always move in tandem, despite the fact that the tax rate τ_G and the tax base Y_G (C_G) move in opposite directions.

[5]The sign of $d\tilde{L}_T/d\tau_G$ is not unambiguous per se. Under the mild sufficient condition that the product of the advertising elasticity of foreigners' tourism demand, η_a, and the ratio of the value of foreigners' tourism demand and advertising, $p_T Z_T / a_T$, is at least unity, we have $d\tilde{L}_T/d\tau_G < 0$. Using Portuguese numbers of the year 2007, under the assumption that "Turismo de Portugal" spends its whole budget for marketing, the ratio $p_T Z_T / a_T$ can be found to be roughly 70, hence the sufficient condition is clearly met. If not the whole budget is spent on marketing, the statement that the sufficient condition is met will be reinforced.

Beside the changes in the economy's structure, the most important question is if agents' welfare increases due to the cut of casino taxation. Higher consumption rates $\tilde{C}_I, \tilde{C}_T, \tilde{C}_G$ raise instantaneous utility $U(C_I, C_T, C_G)$. Evaluating the change in the welfare integral (14.1b), we see that overall welfare moves in opposite direction to the casino tax rate,

$$\frac{dW}{d\tau_G} = \frac{1}{\beta}\frac{dU}{d\tau_G} < 0 \tag{14.13}$$

Hence, a reduction or an abandonment of casino taxation is welfare improving. It is worth noting that this result holds independently from sectoral capital intensities, whereas changes in the economy's capital stock and other variables depend on whether $\tilde{k}_I \rightleftarrows \tilde{k}_T$. Additionally, it should be stressed that the welfare improvement is the result of complex interactions and adjustments within the economy and cannot be deduced immediately from the tax cut itself, as common-sense may suggest.

14.5 Conclusions

In this paper we have addressed the question if Portuguese casinos should be taxed or if the tax rate levied on them should be reduced. For that purpose, we have used a three-sector small open economy model, comprising an industrial sector, the tourism industry, and casinos. In our model, the government can use tax receipts from casinos to finance marketing activities for tourism purposes, which positively affect foreigners' demand for domestic tourism services. Key feature of our model is that the relative price of tourism and sectoral capital intensities are solely determined by the economy's production structure and do not depend on demand conditions, and that there are no equilibrium dynamics. We show that a reduction or an abandonment of casino taxation, despite the fact that this reduces foreign tourism demand, is welfare improving. The economy's structure changes; as a result, the industrial sector grows, whereas the tourism sector shrinks.

Despite our promising result that a policy change is favorable, we want to address some concluding caveats. First, the model shows degenerate dynamics, and the economy is always in steady-state equilibrium. While this is a convenient property from an analytical point of view, it should be clear that in reality an economy's capital stock cannot adjust instantaneously. Depending on the speed of adjustment, taking transitional dynamics into account may change the results of our analysis. Second, the model does not provide quantitative results, that is, how much welfare could be improved by reducing or stopping casino taxation, given the fact that the share of casinos in GDP is very small. To answer this question, a calibration of the model and numerical simulations would be necessary. Third, the gambling sector could be explicitly modeled rather than assuming that it is completely demand determined and uses no resources. Possible extensions of our work are therefore obvious and open gates for future research.

References

Barro RJ (1974) Are government bonds net wealth? J Polit Econ 82(6):1095–1117

Chao C-C, Hazari BR, Sgro PM (2005) Tourism and economic development in a cash-in-advance economy. Res Int Bus Finance 19:365–373

Chao C-C, Hazari BR, Laffargue J-P, Sgro PM, Yu ESH (2006) Tourism, Dutch disease and welfare in an open dynamic economy. Jpn Econ Rev 57:501–515

Gómez CM, Lozano J, Rey-Maquieira J (2008) Environmental policy and long-term welfare in a tourism economy. Span Econ Rev 10(1):41–62

Hazari BR, Sgro PM (1995) Tourism and growth in a dynamic model of trade. J Int Trade Econ Dev 4:243–252

Hazari BR, Sgro PM (2004) Tourism, trade and national welfare. In: Contributions to economic analysis. Elsevier, Amsterdam

Matias Á, Costa CMG, Gil-Alana L (2010) The economics of casino gambling: evidence for Portugal. J Tourism Dev 13:119–120

Nowak J-J, Sali M, Cortés-Jiménez I (2007) Tourism, capital good imports and economic growth: theory and evidence for Spain. Tourism Econ 13(4):515–536

Rybczynski TM (1955) Factor endowment and relative commodity prices. Economica 22:336–341

Schubert SF, Brida JG (2008) Dynamic effects of subsidizing the tourism sector. Tourism Econ 14(1):57–80

Schubert SF, Brida JG (2009) Macroeconomic effects of changes in tourism demand: a simple dynamic model. Tourism Econ 15(3):591–613

Turnovsky SJ (1997) International macroeconomic dynamics. MIT, Cambridge, MA

Part V
Local Impact Analysis

Chapter 15
Explaining the Residents' Attitudes Towards Tourism Development in the Spanish Province of Huelva

Alfonso Vargas-Sánchez, Nuria Porras-Bueno, and María de los Ángeles Plaza-Mejía

15.1 Introduction

The development of the tourism industry in the province of Huelva, situated the extreme southwest of Spain, with a population of around half a million inhabitants, is a recent phenomenon but one that is beginning to impinge palpably on the physiognomy of the area and the way of life of the communities that are affected by the rapid growth of this economic activity.

Although still in a early stage, the development of the tourist sector in this area has been characterized during the last years by a more than favourable dynamic evolution that has served to consolidate its traditional segment of "sun and beach" holidays and also to commence a diversification process to confront one of its main qualitative challenges: the seasonality of tourist supply and demand during the year and its concentration in the coastline.

A comprehensive base of information about the various different agents involved is crucial for decision-making in the planning of tourism for the provincial territory. In this respect, a key stakeholder had been forgotten until now: the local community, whose support is fundamental for implementing any sustainable tourism strategy. In fact, it is not disputed now that any sustainable tourist development must be participative in character, and must count on the opinion of the local population, which has right to express its preference for the type of model desired for its community.

Facing this clear research need and the evident lack of findings, this chapter uses a quantitative methodology (using structural equation models) to study the residents' perceptions and attitudes towards additional tourism development, in an attempt to construct an explanatory model.

A. Vargas-Sánchez (✉) • N. Porras-Bueno • M. de los Ángeles Plaza-Mejía
GEIDETUR, Departamento de Dirección de Empresas y Marketing, University of Huelva, Huelva, Spain
e-mail: vargas@uhu.es

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_15,

The chapter presented here addresses these gaps in the literature, and focuses attention on the attitudes of the residents of the Spanish province of Huelva and on the factors that may determine and explain those attitudes.

To sum up, the relevance of the study is based on the understanding that a well-balanced (or sustainable) tourism development cannot be constructed on the margin of the autochthonous population, which makes it essential to obtain reliable information about the collective perception of the phenomenon. For this reason we set out to determine the opinions and attitudes of the receiving population about this phenomenon, in particular regarding the effects of the presence of tourists, increasingly more numerous, on the economy, the culture, the landscape and each of the principal aspects that make up the quality of life in the various parts of the province.

In addition, the fact that tourism in this area is a relatively recent phenomenon, that is still in a phase of low or moderate development and, therefore, with a considerable potential for growth, gives this study added value, since that the greater part of previous studies of this type have been conducted in tourist destinations that are well-consolidated, mature or of a high level of development.

15.2 State of the Art

It is now assumed that the perceptions and attitudes of residents towards the impacts of any proposed tourism development model have to be considered in the planning phase of policies for tourism (Ap 1992). A deeper understanding of the reasons why the residents do or do not support the tourism industry and its growth will help to establish models for such developments that minimise their negative impacts and maximise the social support for these initiatives. This is why research conducted in this field is relevant.

As indicated by Jackson and Inbakaran (2006), the factors that influence the attitude of the resident towards tourism and towards its development can be classified succinctly under the following headings: demographic factors, personal factors, social factors and factors related to tourism. These same factors, but under other names and with different groupings of variables, are also indicated in the theoretical study made by Harril (2004), who refers to *socioeconomic factors, spatial factors* and *factors of economic dependence*.

Among the *demographic factors*, the principal independent variables analysed are gender, age, occupational situation, educational level, level of income and the place of residence, urban or rural.

The conclusions drawn by researchers from their analyses of the influence of such factors (as independent variables) on the attitude of the resident towards tourism (as the dependent variable) are not conclusive. Whereas the results of some studies discount the existence of any causal relationship between the two variables (Liu and Var 1986; Williams and Lawson 2001), others have found significant relationships between them, and Jackson and Inbakaran (2006) are bold enough to offer a sociodemographic profile of the resident who shows more favourable attitudes towards tourism. This profile, however, does not coincide with that proposed by Iroegbu and Chen (2001), Mason and Cheyne (2000) or Harrill and Potts (2003).

In the case of the age variable, different conclusions are also observed in various studies; thus, for example, older persons are linked in some studies to favourable attitudes towards tourism development (Tomljenovic and Faulkner 2000) and in others to unfavourable attitudes to this (Cavus and Tanrisevdi 2002).

In their review of theoretical studies, Mcgehee and Andereck (2004) maintain that the only sociodemographic characteristic that seems consistent in these studies is the occupation of the resident. On this point, these authors state that the proprietors of businesses appear more favourable towards tourism than those engaged in other types of activity; this could be related to the direct benefits that these proprietors expect to receive from tourism activity (Lankford 1994; Siegel and Jakus 1995; Mcgehee and Andereck 2004).

In a study on the perception of tourism in Zambia, Husbands (1989) does consider variables such as age and level of education to be relevant; however Faulkner and Tideswell (1997) attribute this finding to the fact that the study concerned a country of the third world, and so should not be extrapolated to countries with more developed economies.

Among the *social factors* analysed previously, the more notable are the time that the resident has lived in the locality (length of residence), the state of the local economy, the pattern of property ownership (home owned or rented) and the different geographic zones; the first factor seems particularly significant, being the most commonly studied in this group.

As found in the case of the demographic variables, there is no unanimity among these authors in establishing a relationship between length of residence and the attitude of the resident towards tourism development. Against those studies concluding that a significant relationship does not exist between the two variables (Liu and Var 1986; Allen et al. 1988, 1993; Clements et al. 1993) others do establish such a relationship, normally of the inverse type, concluding that the longer individuals have been living in their locality of residence, the more unfavourable their attitude towards tourism development (Um and Crompton 1987; Mansfeld 1992; Stynes and Stewart 1993; Ryan and Montgomery 1994; McCool and Martin 1994; Williams et al. 1995; Brunt and Courtney 1999; Cavus and Tanrisevdi 2002) and the shorter the length of residence the more favourable the attitude (Duffield and Long 1979; Snaith and Haley 1999). However, there are other studies that identify the recently-arrived residents as those less inclined towards tourism (Brougham and Butler 1981), perhaps because the newer resident considers that the tourism may endanger the tranquillity sought when recently deciding on the place of residence (Faulkner and Tideswell 1997).

It is these two last cited authors who express the view that the influence of the length of residence on the perceptions of tourism is conditioned by factors of motivation and adaptation: therefore, in the case of the recently-arrived residents, the attitude would depend on the reason for moving home -for life style, work, retirement, etc.-; and, in the case of the longer-standing residents, it would depend on their degree of adaptation to the place.

In their study, Snaith and Haley (1999) take into account another social variable, the pattern of property ownership; they reach the conclusion that the residents who own their own home, the property in which they live, perceive tourism development more negatively that those who live in a rented home.

The *spatial factors* related to tourism are intended to analyse the influences on the attitude of the resident attributable to the resident's degree of "physical" contact or interaction with the tourist. In previous studies this variable has been measured by means of two indicators: the physical distance between the resident's home locality and the principal tourist zones (Belisle and Hoy 1980; Mansfeld 1992; Weaver and Lawton 2001; Jurowsky and Gursoy 2004) and the concentration of tourists in a particular region (Sheldon and Var 1984; Williams and Lawson 2001).

Again, the conclusions obtained by the various researchers differ: whereas some studies find that the shorter the distance to the tourist centre or the greater the density of tourism, the more favourable are both the perceptions of the effects of tourism and the attitudes towards the development of the tourism displayed by the resident, others find evidence of precisely the opposite (Pizam 1978; Belisle and Hoy 1980; Madrigal 1993; Williams and Lawson 2001; Gursoy and Jurowski 2002; Harrill and Potts 2003).

Other spatial factor considered, which, as we saw above, some authors classify as demographic, concerns the urban-rural duality and its influence on the attitude of the resident towards tourism. In this respect, both Pearce (1980) and Sheldon and Var (1984) conclude that the residents living in rural areas appear less favourable to tourism that those living in urban zones.

With regard to the *economic dependence factor*, the hypothesis that is most generalised and most supported suggests that the greater the economic dependence on tourism of an individual resident or a community, the more favourable the individual or collective attitude towards tourism (Pizam 1978; Vesey and Dimanche 2000; Harrill 2004), and towards its further development – which does not necessarily represent support for the tourism planning in progress- (McGehee and Andereck 2004), whereas the absence of economic dependence on tourism-related activity is associated with a lack of support for its further development (Martin et al. 1998; Snaith and Haley 1999).

However, the conclusion reached by Smith and Krannich (1998) in their study is precisely the opposite: they observe that the residents of communities dependent on tourism prefer less tourism development and perceive the impacts of tourism as more negative than the residents of communities that depend less on this activity (McGehee and Andereck 2004). Also Teye et al. (2002) in a study undertaken in two African cities cast doubt on the existence of a direct relationship between dependence on tourism and positive attitude towards it, to the extent that the results of their study indicate that the inhabitants who work in businesses related to the tourism industry possess negative attitudes towards that industry.

Harrill and Potts (2003) combine spatial factors and factors of economic dependence when they state that "the residents of neighbourhoods who suffer the most adverse impacts and who do not depend economically on tourism will have more negative attitudes toward tourism development than will other residents" (Harrill and Potts 2003; 262), while Faulkner and Tideswell (1997) consider that those persons whose employment is tied directly or indirectly to the tourism sector will display more tolerance of its impacts, independently of where they may live, but that, among the residents not linked to tourism, the intensity of their adverse reactions will be inversely proportional to the distance that separates them from the tourist centre.

In any case, and independently of these factors that affect the perception of the effects of tourism and the attitude towards its development, it must be taken into account that the literature shows that low-to-moderate tourism development is perceived as beneficial to the community, but as development increases, residents' perceptions can quickly turn negative (Allen et al. 1988; Long et al. 1990; Allen et al. 1993; Smith and Krannich 1998; Harrill 2004). This appreciation leads us to another aspect to bear very much in mind when analysing the attitude of the resident towards tourism development: we refer to the dynamic aspect, since the attitude of residents changes over time, as the *cycle of tourism development* evolves.

However, some authors question whether the model of saturation proposed by Doxey (1975) is valid in all situations. Thus, Lepp (2004), in a research study conducted among the residents of a rural villa in Uganda, states that they did not react to the initial phases of tourism development in the locality with "euphoria", but rather with fear, anxiety and suspicion regarding the risk of destruction of their ecosystem, and that this later evolved towards other stages. Similarly, the study of Moisey et al. (1996) reveals that, in situations where tourism is a relatively novel phenomenon, the initial reaction of the residents can be negative, especially if they think that the tourist is not going to pay a fair price for the use of public services or if they consider that tourism may harm the peace and tranquillity of the place (Faulkner and Tideswell 1997).

Faulkner and Tideswell (1997) consider that the residents' attitude towards tourism in mature destinations does not always have to be adverse, to the extent that, in those zones, the community may become adapted to the tourism by experience and by selective migration of those opposed to it.

Allen et al. (1993) indicate that the attitude of the resident towards further tourism development is in function of two variables: the degree of dependence on tourism, and the level of economic activity. These authors find that the attitude of the population towards the expansion of the tourism industry is more favourable in those cases where both factors are either high or low.

Further, it is not only the phase of tourism development that determines the attitude of the residents towards the tourism, but the actual model of tourism development proposed, as in the analysis of Andereck and Vogt (2000). On the same lines, Johnston and Tyrrell (2005) propose a dynamic model of sustainable tourism to illustrate potential conflicts existing in sustainable and non-sustainable models of tourism development, and demonstrate that, except in rare circumstances, there is not a single and universal optimum of sustainability, and that a policy of environmental quality that is too strict may be so difficult to sustain (from the perspective of the residents or of the tourism industry) as a policy that it causes excessive environmental degradation.

Beyond all these factors or variables external to the resident, demographic, spatial, social, of economic dependence etc., several authors have recently underlined the need to consider *new variables of internal nature* that may condition the attitude of the individual. Thus, Harrill (2004) invites researchers to explore the ways by which the sentiment or solidarity of the community influences its attitudes towards tourism development.

Similarly, new variables that are taken into account and incorporated in theoretical models put forward in recent studies, and that may also condition the attitudes and perceptions of the resident, are the type of tourist that visits the zone, and seasonality – with the negative effects in terms of concentration of people, traffic congestion, rubbish, etc., that this latter factor can imply. Thus, negative attitudes are expected in communities that reside in mature tourist destinations, with a high tourist ratio, emphasis on international tourism, and high seasonality, whereas, to the contrary, the attitude will be more positive in destinations of incipient tourism development, with a lower tourist ratio, predominance of domestic, i.e. national, visitors, and low seasonality (Faulkner and Tideswell 1997).

The idea of integrating in a systemic way all these factors that condition the perception by the residents of the positive and negative impacts linked to tourism, and their attitudes towards its development, is adopted in a recent study by Faulkner and Tideswell (1997).

To close this epigraph we underline that there are few studies that analyse:

- The impacts derived from tourism perceived by the residents prior to any kind of tourism development or when tourism has not been perceived yet as economically important for a particular region (Keogh 1990; Hernández et al. 1996).
- The relationship between the impacts of tourism perceived by residents and their degree of satisfaction with their community (Ko and Stewart 2002).

15.3 Objectives

The focus of this project is the attitude of the residents in the Spanish province of Huelva with respect to tourism, and the variables that determine this attitude towards tourism development. The variables used by Ko and Stewart (2002) were taken, as well as a set of socio-demographic factors and others representing the interaction with tourism and tourists. Finally, three objective variables were included in the analysis carried out: tourist density, tourist index, and index of economic activity.

15.4 Methodology

15.4.1 Sitings of the Study

The development of the tourism industry in the province of Huelva, situated the extreme southwest of Spain, with a population of around half a million inhabitants, is a recent phenomenon but one that is beginning to impinge palpably on the physiognomy of this territory and the way of life of the communities that are affected by the rapid growth of this economic activity.

Its expansion is becoming evident over a considerable part of the geography of the province, in its different modalities, and is transcending the initial seaside holidays (known as "beach and sun" tourism).

15.4.2 Sample

The sample surveyed is comprised of 400 residents of the province being studied. The sampling applied is the random, multistage type, by quotas of age, sex and locality of residence (the 15 most important tourist localities were selected). This method ensures that the sample is statistically representative of the population at the provincial level, with a margin of error of $\pm 5\%$, a 2σ (95.5%) level of confidence, and a population variance of 50%.

15.4.3 Instrument of Measurement

The questionnaire (administrated in January and February 2008) consists of a total of 68 items organized in five blocks, as shown in Table 15.1.

15.4.4 Techniques Applied

A quantitative analysis, organised in three parts, has been conducted:

The first part, of the univariate type, examines the principal statistical characteristics (central trend and dispersion) of each variable treated.

The second part, of the bivariate type, involves treating pairs of variables with the object of identifying and analysing correlations between them, seeking statistically significant differences in relation to each of the factors of identification considered. For performing this second part we make use of the most appropriate tests for differences of means, in function of the nature of each variable.

Table 15.1 Variables and items in the questionnaire

Variables (blocks)	Items in the questionnaire (*)
Personal characteristics	1–8 (demographic profile: gender, age, civil status, place of residence, length of residence, place of birth, final educational level reached, occupational situation)
	12 (ecocentrism)
	52–53 (community attachment)
	54 (implication in the local community)
Perception of. . .	11 (personal benefit)
	13–51 (effects: economic, socio-cultural and environmental impacts, both positive and negative)
	57–59 (tourists)
Relation with tourism/tourists	9–10 (employment: personal, and any member of their family, occupational connection)
	55 (knowledge of tourist projects)
	56 (contact, use of tourist resources)
	62 (level of tourism development)
Local community	63–68 (community satisfaction: public services, formal education system, environment, recreation opportunities, economy, citizen involvement and social opportunities)
Attitude towards additional tourism development	60–61

(*) Items from n. 11 to 68 have been measured using a Likert or differential semantic scale of 1–5. 9 and 10 are dichotomic variables. Most of the items have been extracted from the review of previous studies published by various authors, mainly those by: Johnson et al. (1994), Williams and Lawson (2001), Ko and Stewart (2002), and Kuvan and Akan (2005)

In the third and last part, we apply multivariate analysis techniques using structural equation models (SEM) with AMOS 7.0. SPSS 15.0 was also used.

15.5 Results

Referring to the 38 impacts considered, the principal component analysis (determinant of the correlation matrix = 1.68 E-13; KMO = 0.926; significant Bartlett test at 0.000 level) grouped them in 8 factors, with a total variance explained of 72.2%. They are:

- Positive effects: economic benefits, F1; cultural enrichment and stronger sense of belonging, F2; social, cultural and environmental benefits, F3.
- Negative effects: economic damage (increasing prices), F4; economic damage (unfair distribution of generated wealth), F5; social dysfunctions (thefts, vandalism, etc.), F6; problems of coexistence (living together) and identity, F7; environmental damage, F8.

Before proceeding to construct the structural model aimed to help us to explain the attitude of the local community towards further tourism development, the

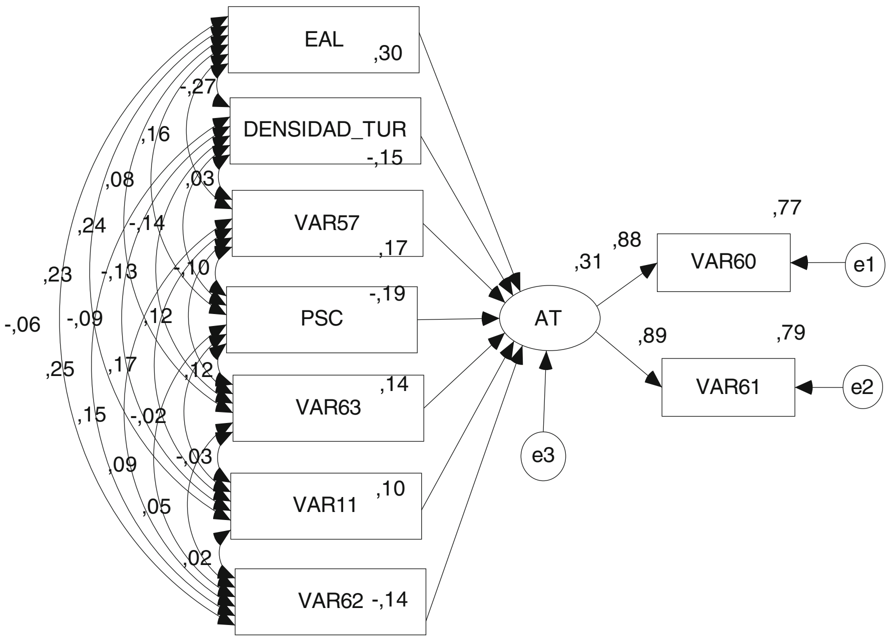

Fig. 15.1 Model (chi-square = 8,640; df = 6; $p = 0.195$; RMSEA = 0.033; NFI = 0.987; CFI = 0.996)

multiple linear regression technique was used to identify the variables acting as a significant predictor. These variables were included in the structural model shown in Fig. 15.1, namely: EAL = F2 (positive effects linked to the cultural enrichment and a stronger sense of belonging); DENSIDAD_TUR = tourist density[1]; VAR57 = perception of tourists behavior (in terms of respect); PSC = F6 (social dysfunctions -thefts, vandalism, etc.); VAR62 = level of tourism development; VAR63 = satisfaction with the community (exactly with public services); VAR11 = personal benefit derived from tourism development.

As for the variable to be explained, the latent variable AT (attitude towards additional tourism development) has been measured by two observable variables: VAR60 = inclination towards further development of tourism; VAR61 = inclination towards increasing the number of tourists. Although both observable variables have shown a high level of correlation (0.784), we consider necessary, conceptually, to maintain individualized treatment, as people could be in favour of further development of tourism in the area but not to models that will lead to an increasing number of tourists.

[1]Number of beds/total population.

15.6 Conclusions

The results show (in parentheses the standardized regression weights) that the perception of certain positive effects from tourism -particularly those linked to cultural enrichment and stronger sense of belonging- (0.30) and certain negative impacts -social dysfunctions- (−0.19) are the most powerful predictors of the resident's attitude, especially the former. Next in importance is the perception about the behavior of tourists (0.17). However, this study highlights the relevancy of tourism density (−0.15), for its negative influence on that attitude. Variables related to the local community -level of tourism development (−0.14) and satisfaction with public services (0.14)- appears as drivers but with an opposite influence, as well as the perceived personal benefit (0.10).

With all of this, the model of Ko and Stewart (2002), taken as a reference, can be enriched with new variables able to explain, until certain extent, the dependent variable, as reflected in Fig. 15.2. The correlation coefficients confirm the meaning and nature of the statistically significant relationship between explanatory variables and attitudinal variables (with a continuous line in the figure). Also, the relationships between predictor variables have been added (in discontinuous lines); their senses have been based on well known theories. In this model, the influence of the negative effects of tourism development with other variables is not determined, representing, therefore, a research area that remains open to further contributions.

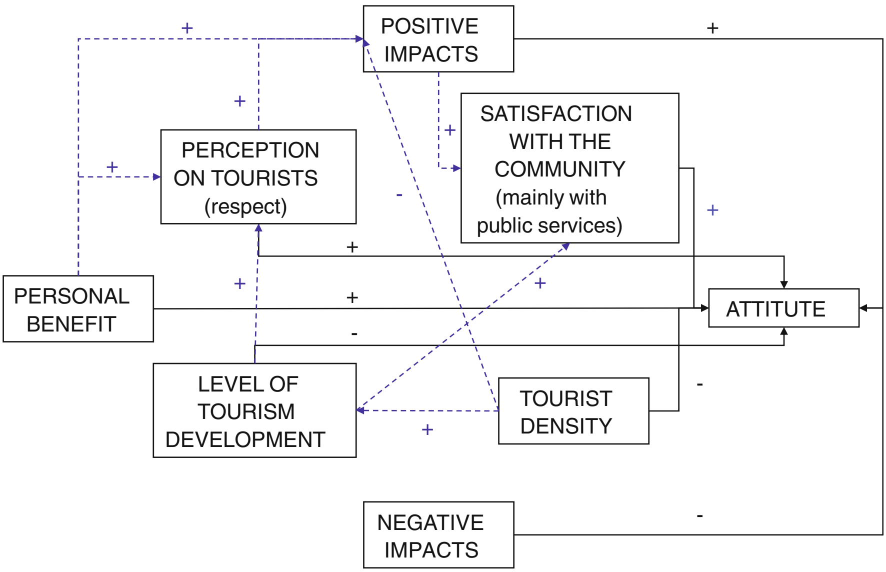

Fig. 15.2 Local community's attitude and its predictors

Table 15.2 Clusters of residents

Cluster	Denomination Residents with an attitude	*N*	VAR60's mean (over 5)	VAR61's mean (over 5)
1	Fully in favour	144	5	5
2	Very favourable	111	4.20	3.98
3	Lightly favourable	109	3.28	3.12
4	Not in favour	36	2.08	1.72

A final aspect has to be emphasized: in general, the residents' attitude towards additional tourism development has came up as quite positive (means of 4.05 and 3.91 for VAR60 and VAR61, respectively). This general insight has been detailed after performing a hierarchical cluster analysis (using the Ward method). Four clusters have been identified as a result (see Table 15.2).

Therefore, those without a positive inclination towards further development and accepting more tourists in the area are the very minority in this community of residents. Nevertheless, the fact that the willingness to accept an increasing number of tourists is always lower than the approval of additional development attracts the attention. This recognition, in our opinion, is relevant with regard to the model of tourism development able to be accepted by the local community under study: a model much more based on quality and sustainability than in the traditional and old fashion mass tourism.

References

Allen LR, Long PT, Perdue RR, Kieselbach S (1988) The impact of tourism development on residents' perceptions of community life. J Travel Res 27(1):6–21

Allen L, Hafer H, Long P, Perdue R (1993) Rural residents' attitudes toward recreation and tourism development. J Travel Res 31(4):27–33

Andereck K, Vogt C (2000) The relations between resident's attitudes toward tourism and tourism development options. J Travel Res 39(1):27–37

Ap J (1992) Residents´ Perceptions on Tourism Impacts. Ann Tourism Res 19(4):665–690

Belisle F, Hoy D (1980) The perceived impact of tourism by residents a case study in Santa Marta, Colombia. Ann Tourism Res 7(1):83–101

Brougham JE, Butler RW (1981) A segmentation analysis of resident attitudes to the social impact of tourism. Ann Tourism Res 7(4):569–590

Brunt P, Courtney P (1999) Host perceptions of socio-cultural impacts. Ann Tourism Res 26 (3):493–515

Cavus S, Tanrisevdi A (2002) Residents attitudes toward tourism: a case study of Kusadasi, Turkey. Tourism Anal 7(3–4):259–268

Clements C, Schultz J, Lime D (1993) Recreation, tourism, and the local residents: partnership or co-existence? J Park Recreat Admi 11(4):78–91

Doxey G (1975) A causation theory of visitors-residents irritants. Methodology and research inferences. In: Proceedings of the Travel Research Association, 1975, 6ª Annual Conference, Salt Lake City, pp 195–198

Duffield B, Long J (1979) Reward and conflict associated with tourism in the highlands and islands of Scotland. Paper presented at the Tenth Conference of the European Society for Sociology, Cordoba

Faulkner B, Tideswell C (1997) A framework for monitoring community impacts of tourism. J Sustainable Tourism 5(1):3–28

Gursoy D, Jurowski C (2002) Resident attitudes in relation to distance from tourist attractions. http://bibemp2.us.es/turismo/turismonet1/economia%20del%20turismo/analisis%20del%20turismo/resident%20attitudes%20from%20tourism%20destinations.pdf [Accessed on 3January 2009, 11:47]

Harrill R, Potts T (2003) Tourism planning in historic districts: attitudes towards tourism development in Charleston. J Am Plan Assoc 69(3):233–244

Harrill R (2004) Residents' attitudes toward tourism development: a literature review with implications for tourism planning. J Plan Literature 18(3):251–266

Hernández SA, Cohen J, Garcia HL (1996) Residents' attitudes towards an instant resort enclave. Ann Tourism Res 23(4):755–779

Husbands W (1989) Social Status and Perception of Tourism in Zambia. Ann Tourism Res 16 (2):237–253

Iroegbu H, Chen JS (2001) Urban residents' reaction toward tourism development: do subgroups exist? Tourism Anal 6(2):155–161

Jackson MS, Inbakaran RJ (2006) Evaluating residents' attitudes and intentions to act towards tourism development in regional Victoria, Australia. Int J Tourism Res 8(5):355–366

Johnson JD, Snepenger DJ, Akis S (1994) Residents perceptions of tourism development. Ann Tourism Res 24(3):629–642

Johnston RJ, Tyrrell TJ (2005) A dynamic model of sustainable tourism. J Travel Res 44 (2):124–134

Jurowsky C, Gursoy D (2004) Distance effects on residents' attitudes toward tourism. Ann Tourism Res 31(2):296–312

Keogh B (1990) Public participation in community tourism planning. Ann Tourism Res 17 (3):449–465

Ko DW, Stewart WP (2002) A structural equation model of residents' attitudes for tourism development. Tourism Manage 23(5):521–530

Kuvan Y, Akan P (2005) Residents' attitudes toward general and forest-related impacts of tourism: the case of Belek, Natalia. Tourism Manage 26(5):691–706

Lankford S (1994) Attitudes and perceptions toward tourism and rural regional development. J Travel Res 32(3):35–43

Lepp A (2004) Tourism in a rural Ugandan village: impacts, local meaning and implications for development. Doctoral Thesis, University of Florida

Liu J, Var T (1986) Residents attitudes toward tourism impacts in Hawaii. Ann Tourism Res 13 (2):193–214

Long P, Perdue R, Allen L (1990) Rural resident tourism perceptions and attitudes by community levels of tourism. J Travel Res 23(9):3–9

Madrigal R (1993) A tale of tourism in two cities. Ann Tourism Res 20(2):336–353

Mansfeld Y (1992) Group-differentiated perceptions of social impacts related to tourism development. Prof Geogr 44(4):377–392

Martin B, McGuire F, Allen L (1998) Retirees' attitudes toward tourism: implications for sustainable development. Tourism Anal 3(1):43–51

Mason P, Cheyne J (2000) Residents´ attitudes to proposed tourism development. Ann Tourism Res 27(2):391–411

McCool SF, Martin SR (1994) Community attachment and attitudes toward tourism development. J Travel Res 32(1):29–34

McGehee N, Andereck K (2004) Factors predicting rural residents´ support of tourism. J Travel Res 43(2):131–140

Moisey RN, Nickerson NP, McCool SF (1996) Responding to changing resident attitudes toward tourism: Policy implications for strategic planning. Paper presented at the 27th Annual Conference of the Travel and Tourism Research Association, Las Vegas

Pearce J (1980) Host community acceptance of foreign tourists: strategic considerations. Ann Tourism Res 7(2):224–233
Pizam A (1978) Tourism impacts: the social costs to the destination community as perceived by its residents. J Travel Res 16(4):8–12
Ryan C, Montgomery D (1994) The attitudes of Bakewell residents to tourism and issues in community responsive tourism. Tourism Manage 15(5):358–369
Sheldon PJ, Var T (1984) Resident attitudes to tourism in North Wales. Tourism Manage 5 (1):40–47
Siegel PB, Jakus PM (1995) Tourism as a sustainable rural development strategy: building consensus in resident attitudes. South J Rural Sociol 11(1):17–42
Snaith T, Haley A (1999) Residents' opinions of tourism development in the historic city of York, England. Tourism Manage 20(5):595–603
Smith M, Krannich R (1998) Tourism dependence and resident attitudes. Ann Tourism Res 25 (4):783–802
Stynes D, Stewart S (1993) Tourism development and recreation: some findings from a case study. J Parks Recreat Admi 11(4):30–44
Tomljenovic R, Faulkner B (2000) Retiring with the tourism in the Sunbelt: a study of the social impacts of tourism on the older residents of the Gold Coast. Ann Tourism Res 27(1):93–114
Teye V, Sonmez S, Sirakaya E (2002) Residents' attitudes toward tourism development in Ghana: comparison of two cities. Ann Tourism Res 29(3):668–688
Um S, Crompton JL (1987) Measuring resident's attachment levels in a host community. J Travel Res 26(1):27–29
Vesey CM, Dimanche F (2000) Urban residents' perceptions of tourism and its impacts. Unpublished manuscript, University of New Orleans, LA
Weaver D, Lawton L (2001) Resident perceptions in the urban-rural fringe. Ann Tourism Res 28 (2):439–458
Williams DR, McDonald CD, Riden CM, Uysal M (1995) Community attachment, regional identity and resident attitudes toward tourism development. Proceedings of the 26th annual conference proceedings of the Travel and Tourism Research Association, Acapulco, Mexico, Travel and Tourism Research Association, pp 424–431
Williams J, Lawson R (2001) Community issues and resident opinions of tourism. Ann Tourism Res 28(2):269–290

Chapter 16
Measuring Seasonality: Performance of Accommodation Establishments in Sicily Through the Analysis of Occupancy Rates

Stefano De Cantis and Mauro Ferrante

16.1 Introduction

Seasonal variations in tourism demand are a central theme, not only in tourism literature, but also in the field of policy decision making of a destination. Generally, seasonality is perceived as a problem with serious implications for all aspects of supply side behavior (Baum and Hagen 1999). For the accommodation sector, the relatively high fixed costs make seasonality a relevant issue. An extended season, lower variability in tourism demand, and high occupancy levels, are desirable goals for managers of accommodation establishments. In South of Italy the share of employees in HORECA (hotel, restaurant, and catering) sector in 2006 was of 4.7%, though the overall impact is likely to be higher if other tourism related activities would be considered. Particularly, Sicily seems to have a great potential coming from its tourism resources, and most of the recent development programmes have focused on tourism. To point out the importance of tourism for the Island, it should be considered that the Regional expenditure in tourism, from 1996 to 2006, was of €785 millions, ranking Sicily as the second region in Italy for tourism expenses, in the years considered. Market signals seem to be positive if we consider that Sicily faced a growth in terms of overnight stays, from about nine millions in 1994, to more than 14 millions in 2007. Moreover, in evaluating these numbers one should consider that there is another huge unobserved component of tourism demand that has been estimated to be equal or mayor to the official one (Vaccina and Parroco 2004). This is due to the use of second houses, and to the rented houses, for which information on tourism flows are not collected. Moreover, many problems are related to the survey methodology, some of these questions are related to the double counting effect of arrivals, to the impossibility to obtain information on multidestination trips, and so on (Leiper 1989; Lickorish 1997;

S. De Cantis (✉) • M. Ferrante
Department of Quantitative Methods for Human Sciences, Università degli Studi di Palermo, Palermo, Italy
e-mail: decantis@unipa.it

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_16, © Springer-Verlag Berlin Heidelberg 2011

Vaccina and Parroco 2004). In the following analysis we concentrate our attention mainly on the official component of tourism demand, looking in particular at the hotel sector (for reasons linked to a higher reliability of these data compared to the ones related to other collective establishments), in which the expenditure level of tourists are usually higher than for other tourism demand targets.

This paper wants to analyze seasonal variations in the performance of hotel establishments in Sicily from 1994 to 2007 by guests' nationality, looking both at the absolute values of overnight stays and at the gross bed places occupancy rates of Sicilian hotels as a comparable measure of efficiency of accommodation sector. Data come from Italian National Institute of Statistics (Istat) which collects information on guests and overnight stays, on a monthly basis, for all the official accommodation establishments in the whole Nation, according to the EU Council Directive (95/57/EC) on Tourism Statistics. In Sicily the survey covers more than 3,000 accommodation establishments of which more than 30% are hotels (Istat 2008). Data also include the major characteristics of establishments, such as number of rooms and beds, bathrooms, and category, at a geographical level of "tourism district" (administrative regions between NUTS3 and NUTS4 level). The purpose of this paper is twofold. From one way it wants to investigate the accommodation sector in Sicily (Italy) characterized by a high degree of seasonality in demand, where extending the season has been identify as a major strategic issue from both economic and social perspectives. On the other, from a broader perspective, it wants to provide a methodological framework to analyze seasonal variations in tourism related aggregates. With this aim a set of seasonal adjustment procedures, seasonality measures, and graphical tools are provided and described in terms of their properties in relation to the research aims. Results are of particular relevance for strategic planning purposes at level of tourist board (a tourism ministry) or other regional association. More specifically, it wants to provide a set of tools useful for assisting marketing and development policies in Sicily, or in other tourism destinations. Given these considerations, in Sect. 16.2 a framework for seasonal analysis in tourism is proposed and several measures of seasonality used in tourism literature are presented and discussed. Section 16.3 presents an application of the framework in the monthly series of bed places occupancy rate in Sicilian hotels, by guests nationality, from 1994 to 2007. Some final remarks and comments conclude the last section of this work.

16.2 Measuring Seasonality: A Framework for Studies in Practice

In general terms, seasonal variations, or movements, of a time series are constituted by a succession of an increase and of a decrease of observed values, which appears every year with approximately the same periodicity. This periodicity is attributable mainly to weather effects, connected to the seasons, and to social uses which determines periodic behaviors (Vianelli 1948:139, or see the analogous definition provided by Hylleberg 1992:4). In tourism, Butler (1994) defines seasonality as a "temporal imbalance in the phenomenon of tourism" which may be expressed in terms of number of visitors, traffic on highways, employment, and admission to attractions, and he points out that even if only relatively few studies analyzed carefully seasonality from a methodological point of view (Baum and Lundtorp 2001; Koenig and Bischoff 2005), it represents one of the main distinctive features in tourism.

In academic literature, seasonality in tourism has been studied from many perspectives, such as causes (Butler 1994; Butler and Mao 1997; Frechtling 2001; Lundtorp et al. 1999; Rosselló et al. 2004), economics and labour market impacts (Ashworth and Thomas 1999; Ball 1988; Krakover 2000; Manning and Powers 1984; Sutcliffe and Sinclair 1980), environmental and social impacts (Butler 1994; Hartmann 1986; Manning and Powers 1984). From a general perspective, seasonal variations in economic activities have also been a broad topic of research in terms of their measurement (in general: Falkner 1924; Gressens 1925; Hannan 1964; Kuznets 1932; Persons 1919; Spurr 1937; and in tourism: BarOn 1975; Drakatos 1987; Jeffrey and Barden 1999; Koenig and Bischoff 2003; Lundtorp 2001; Rosselló et al. 2004; Sørensen 1999; Sutcliffe and Sinclair 1980; Wall and Yan 2003; Wanhill 1980; Wilton and Wirjanto 1998; Yacoumis 1980) and modelling (Calantone et al. 1987; Goh and Law 2002; Kim and Moosa 2001; Kulendran and Wong 2005; Lim 1997; Lim and McAleer 2001; Lim and McAleer 2003). Nevertheless, Koenig and Bischoff (2005) highlighted that, even if in academic literature a wide range of approaches have been used to analyze seasonal variation on tourism demand, only a few of them made the effort to compare several seasonality measures, describing their merits and pitfalls. Moreover, the application of these measures have often been carried out without adequate attention to their properties, and independently of the research aims (De Cantis and Ferrante 2008). Given these premises, the aim of this section is to provide a methodological framework to analyze seasonal variation in tourism related aggregates (e.g. arrivals, overnight stays, average length of stay, bedspace occupancy, total tourism expenses, etc.). In our case, we focus our attention on the accommodation sector, mainly for reasons linked to the high degree of availability and comparability of data, at least within the EU countries.

Given the information on overnight stays in hotels and on bed places, occupancy rates are derived as follows. Let $x^k_{t,i,j}$ be the overnight stays in the k-category of accommodation establishments, in the t-month, of the i-year, while j represents guest country of origin. In a similar way, $b^k_{t,i}$ represents the gross monthly bed places availability (bed places times number of days in the month) for the same month, year, and category; and $z^k_{t,i,j} = x^k_{t,i,j}/b^k_{t,i}$. are the gross bed places occupancy for the k-accommodation establishments distinguished by guest country of origin j. So, $0 \leq z^k_{t,i} = \sum_{j=1}^{m} z^k_{t,i,j} \leq 1$ is the overall gross bedspaces occupancy rate in the t-month of the i-year for the k-category (by considering all the m-guest countries of origin). Once identified the aggregate for which seasonality has to be measured, several analysis can be performed as summarized in the framework proposed in

Table 16.1. From a first review of methodological and applied academic works (De Cantis and Ferrante 2008) on the topic of seasonality in tourism, although there seems to be a variety of approaches and statistical tools and techniques, it can be observed a similarity in the aims of these studies, and some of the tools and techniques used are frequently the same (such as seasonality indexes, Gini concentration index, etc.). Given these premises, we decided to propose a step by step framework to analyze seasonal variations in tourism. Under this perspective, this framework is both a synthetic review of the approaches used in tourism academic literature, and a tool for practitioners (e.g. tourism analyst, destination manager, etc.). As it can be observed in Table 16.1, each step is characterized by general and specific aims, by specific data requirements, and by graphical and analytical tools. Particularly, in the last column, the most relevant measures used in tourism academic literature are selected for each step, and, in Table 16.2, they are separately presented and analytically expressed. Graphic methods are, of course, a powerful tool to analyze seasonality, since they allow an immediate understanding of the main features of the series analyzed, and they allow simple comparisons (between different years, between destinations, between market targets). Subsequently, the first step in the analysis of time series of a tourism related aggregate is to plot the data against time (line plot).

This can give a first general idea of the main features of the series, in terms of periodicity, trend-cycle component, peak values, etc. To analyze the general pattern of the series (step 1a) specific cross-tabulation of data, such as years against months (for a sufficient large monthly series), could highlight similarities among years, and among months. A correspondent graphical representation of this tabulation is the so-called cycle plot, which can be used to highlight changes occurring in the same months during the years analyzed. To construct a cycle plot (also known as month plot) first all January values are plotted, then all February values, and so forth. With this graph one can get an idea of the trend corresponding to each month. Some indexes, such as yearly growth rates, could be calculated and analyzed to have an idea of the general trend of the series in the period considered (step 1b). Finally (step 1c), one can consider the share of values for each month in a given year. This is reasonable if absolute values are analyzed – such as overnight stays – whereas, if, for example, occupancy rate is the aggregate of interest, one can consider the ratio between the monthly value and the (weighted) average of the occupancy rate, in a given year. This ratio would indicates the contribution of each month on the average value. In this step, one can have a first idea of intra-year inequality. Moreover, it is possible to use these relative indexes for comparisons (among years, destinations, market targets, etc.). However, the proposed framework requires to pay attention to the nature of the variable analyzed. For example, in step 1c, to evaluate the intra-year inequality one could analyze the share of the aggregate for each month in a given year, if the variable analyzed is the series of actual values (such as overnight stays, number of guests, etc.. . .), but not in the case of occupancy rates. Moreover, even if for simplicity we refer the analysis to a monthly time series, the proposed frame work can be easily generalized to other

Table 16.1 A framework to analyse seasonal variations in tourism

Step	Data	General aims	Specific aims	General and graphical tools	Analytical measures (see Table 16.2)
1	Series of actual values	Main features of actual series	1a. Analysis of pattern of the series along the time interval considered	Line plot; specific data tabulation (e.g. years vs. months); cycle plot	
			1b. General trends	Yearly growth rate; line plot for each year	
			1c. Intra-year inequality, comparisons among yearly shapes of seasonality	Share of values for each month in a given year	
2	Series of actual values (or of some their transformation)	Seasonal adjustment: time series decomposition, and components estimation		Moving averages; TRAMO-SEATS; X12-ARIMA; spectral decomposition	
3	Seasonal factors	General analysis of seasonality	Simple analysis of seasonal factors	Line plot; table of values	
4	Seasonal factors	Specific facets of seasonality: pattern and amplitude	4a. Analysis of seasonal pattern	Line plot; cycle plot	Seasonal indexes
			4b. Analysis of pattern changes	Line plot; table of values; cycle plot	Coefficients of variability
			4c. Analysis of seasonal amplitude	Lorenz curve	Seasonal ratio; seasonal range; Gini concentration Index; coefficient of seasonal variation; Theil index
			4d. Analysis of amplitude changes	Changes in Lorenz curves	Changes in seasonal factor; changes in seasonal ratios; changes in seasonal ranges; changes in the concentration indexes
5	Analytical measure of seasonality and other covariates of interest	Modelling variability of seasonality measures	5a. Segmentation of tourism seasons		
			5b. Analysis of determinants of seasonality	Cluster analysis; Gini decomposition; regression models	

Table 16.2 Main seasonality measures used in tourism literature

	Analytical expression	Names
1.	$\overline{y}_t = \sum_{i=1}^{I} y_{t,i}/I \ \forall t = 1, 2, \ldots, 12$	Seasonal Index
2.	$CV_t(y_t) = \sqrt{\sum_{i=1}^{I} \left(y_{t,i} - \overline{y}_t\right)^2 / I} / \overline{y}_t = \sigma_t(y_t)/\overline{y}_t \ \forall t = 1, 2, \ldots, 12$	Coefficient of variability
3.	$\max_{(t)}(y_{t,i}) \ \forall i = 1, 2, \ldots, I$	Seasonal peak (factor)
4.	$\max_{(t)}(y_{t,i})/\min_{(t)}(y_{t,i}) \ \forall i = 1, 2, \ldots, I$	Seasonal ratio
5.	$\max_{(t)}(y_{t,i}) - \min_{(t)}(y_{t,i}) \ \forall i = 1, 2, \ldots, I$	Seasonal range
6.	$CV_i(y_i) = \sqrt{\sum_{t=1}^{12} \left(y_{t,i} - \overline{y}\right)^2 / 12} / \overline{y}_i = \sigma_i(y_i)/\overline{y}_i$ Where $\overline{y}_i = \sum_{t=1}^{12} y_{t,i}/12 \ \forall i = 1, 2, \ldots, I$	Coefficient of seasonal variation
7.	$R_i = \sum_{j=1}^{11} \left(p_{j,i} - q_{j,i}\right) \Big/ \sum_{j=1}^{11} p_{j,i}$([1]) $\forall i = 1, 2, \ldots, I$	Concentration index
8.	$T_i = \sum_{t=1}^{12} y_{t,i} \ln 12 y_{t,i} \ \forall i = 1, 2, \ldots, I$	Theil index

sort of series (e.g. quarterly series) or even of seasonality (infra-week seasonality, infra-day, etc.).

After this first exploratory analysis, in a second step, one can go in depth, by assuming a specific deterministic or stochastic structure of the series, with the aim to isolate and quantify the influence of seasonal component. It is common practice to decompose the series into a trend-cycle, a seasonal, and an irregular component. Many procedures and software have been developed with the aim to decompose the series into the above cited components. The simplest method to eliminate the influence of the trend-cycle component is to consider the ratio between monthly values and the average monthly value of a given aggregate, but the most common approach for measuring seasonality in tourism consists of estimating seasonal factors in time series using ratios of observation-to-moving average, often called “ratio-to-moving average” (Lim and McAleer 2001). However, other procedures have been proposed. Ashworth and Thomas (1999), for example, highlighted the distinction between models characterized by deterministic or stochastic seasonality. Deterministic parameters for seasonality are obtained by using dummy variables (one for each month, or quarter) in a multiple regression model. They also used the HEGY test (seasonal unit root test) (Hylleberg et al. 1990) to examine changes in the seasonality of employment in the United Kingdom. Gonzàlez and Moral (1996) used structural time series models with stochastic factors to analyse international arrivals to Spain. Koenig and Bischoff (2004), following Jeffrey (1985), used principal component analysis for investigating patterns in occupancy performance data. However, in economic applications the most widely procedures used to decompose a time series are X-12 ARIMA (mainly in US countries) and TRAMO-SEATS

[1]Where $p_{i,j} = j/12$ and $q_{j,i} = \sum_{k=1}^{j} y_{k,i} / \sum_{t=1}^{j} y_{t,i}$. For each year i, seasonal factors $y_{t,i}$ must be ordered so that each $y_{k,i}$ is minor or equal to the following months and j indicates the rank of time unit. So, $p_{j,i}$ is the share of months in which the phenomenon analyzed is less than a given limit, and $q_{j,i}$ is the share of the total amount of $y_{k,i}$. Since by definition $q_{j,i} \le p_{j,i}$, the concentration in time is higher when is bigger the difference $p_{j,i} - q_{j,i}$. For a given year i, plotting the $p_{j,i}$, and $q_{j,i}$ values the so-called Lorenz curve is obtained.

(mainly in EU countries) (Gómez and Maravall 1996), and, generally, through spectral analysis decomposition. Some of these seasonal adjustment procedures take into account for the so-called calendar effect, such as the date of Easter, the number of trading day in a month, and so on. In addition, one could also apply a transformation to the series to make stationarity assumptions plausible. The most common transformations used in seasonal time series involve the differences of the series, log-transformation, and more generally the family of Box-Cox transformations (Box and Cox 1964). These methods permit the so-called *seasonal factors* to be derived, which should represent only the seasonal component of the series. They are usually centered on the value 100, which would indicate a seasonal component in line with the trend-cycle component. Values greater (or smaller) than 100 would indicate a seasonal component above (or below) the trend-cycle component. Let $y^k_{t,i,j}$ be the seasonal factors derived from seasonal adjustment procedure. For seasonal factor analysis there are also other useful graphic tools. One of these is given by the above cited "cycle plot" which can be used to compare seasonal factor of each months of the years, and to obtain an "average shape" of the annual seasonality in the whole period considered (step 4a in Table 16.1). Some authors used other graphical representations as well, categorizing seasonal factors by distinguishing among peak season, off-season, shoulder season (Rosselló et al. 2004). Once a general idea of the seasonal pattern of the series is obtained, analytical measures can be used to synthesize and compare the burden and the features of seasonality.

Table 16.2 shows the main seasonality measures used in tourism studies, some references for each measure could be found in Koenig and Bischoff (2005). However, to classify seasonality measures in relation to their properties, further considerations are necessary.

According to some previous studies (Fernández-Morales 2003; Kuznets 1932; Sutcliffe and Sinclair 1980), analyzing seasonality it is possible to focus on several aspects, such as:

1. The pattern of seasonal swing, i.e. the distribution of seasonal factors within the months of a given year.
2. The amplitude of seasonal swing, through a measure of synthesis of seasonal factors in a given year.
3. The persistency or the variations in seasonal pattern, through some measures of variability of seasonal pattern over several years.
4. The persistency or the variations in seasonal amplitude, through some measures of variability of seasonal amplitude covering several years.

These features could be analyzed both with reference to a single destination (e.g. comparing different market targets, or evaluating changes over time), and with reference to several destinations.

Seasonal indexes, given by the mean of seasonal factors in each month over all the years considered, are a useful tool to analyse the intra-year pattern of seasonal factors. They allow the analysis of the pattern of seasonal factors (on average, during all the years considered), and several authors (Lim and McAleer 2001) used these indexes to define high and low tourism seasons (months for which seasonal indexes are below or above the rend-cycle component). However, the reliability of *seasonal indexes* is related to the values of the *coefficient of variability*, which is a measure of the variability of seasonal factors for a given month, for all the years considered. Low values of the coefficients would indicate a persistency or stability in the pattern of seasonality and conversely for high values. Looking at Table 16.2, the lasts six measures provide a synthetic index of the amplitude of seasonality on a given year. In detail, the first three indexes (i.e. *seasonal peak,*[2] *seasonal ratio*, and *seasonal range*) only take into account the extreme values of seasonal factors (of each year). This means that all three measures do not include any information regarding the other values of the annual series, providing information only on the magnitude of seasonal peaks. However, they can be used both to compare several destinations or demand market targets, and to analyse changes in the seasonal peaks for a given destination during several years. The *coefficient of seasonal variation* provides information on the variability of seasonal factors in a given year. However, since it does not take into account the natural order of months, it is not able to provide any information on the pattern of seasonality. Consequently, very different tourism seasons could produce very similar values of seasonal amplitude. The same problem occurs in one of the most used index of seasonality: the *Gini concentration index*, which has been adapted in time series as a synthetic measure of inequality between seasonal factors in a given year. The concentration index requires the ordering of seasonal factors, so it does not take into account the natural temporal order of months, so it ignores the characteristics of seasonal pattern. So, since similar Gini indexes could be obtained from very different seasonal patterns, it is necessary to understand under which circumstances a comparison between two indexes could be made properly. It is important to underline that it provides a synthetic measure of the magnitude of the inequality between seasonal factors. However, comparing two destinations (or the same destination for several years, or different market targets), to strictly define which one is characterized by a higher degree of seasonality, two conditions are necessary: (a) the ranking of months should be the same for both the series being compared; (b) the respective Lorenz curves must not intersect (see footnote 1). In the majority of academic applied works, these conditions are almost ignored in the interpretation of results. The same considerations could be made with reference to other inequality measures, such as the Theil index, which do not take into account the natural ordering of months. Besides it is important to recall one of the distinctive feature of seasonality: its regularity. In this sense, BarOn (1975) considers that it gathers "the effects occurring each year with more or less the same timing and magnitude". Timing and magnitude in our framework can be represented by pattern and amplitude, respectively.

[2]Several authors named this measure *seasonal factor*, however, we preferred the use of a different term (*seasonal peak*) to avoid confusion with seasonal factors derived from seasonal adjustment procedure.

To conclude this brief review of seasonality measures, it is important to point out that the analysis of seasonality requires conjoint study of pattern and amplitude. Particularly the pattern should be logically analysed before the amplitude, since considerations about differences in seasonal amplitude make sense only if seasonal patterns of the series analyzed are similar. Finally, the last step according to the framework proposed in Table 16.1 indicates some models for variability of seasonal measures, with several possible aims, such as: looking for the determinants of seasonality (e.g. regression models), classification of tourism seasons (e.g. cluster analysis), etc.. In many academic works (Fernández-Morales 2003; Sutcliffe and Sinclair 1980), for example, the Gini index has been modelled or decomposed (such as the additive decomposition of Gini index) in order to analyse seasonal variations "between" or "within" seasons. Given these considerations, next section will present an application to the framework proposed to monthly time series of occupancy rates in Sicilian hotels, by guests nationality, from 1994 to 2007.

16.3 Case Study: Seasonal Variations in Hotels Beds Occupancy in Sicily from 1994 to 2007

16.3.1 Tourism Potential and Challenges in Sicily: An Overview

Sicily is one of the twenty administrative regions of Italy (NUTS2 level). With a territorial expanse of 25,701 km^2 and more than five millions inhabitants it is the largest Italian region and the fifth more populated one. As in many southern Italian regions, Sicily has a high unemployment rate (13.0% vs. 6.1% in the Nation) and, in 2006, the per capita GDP was of €16,628. However, Sicily, thanks to its historical, cultural and environmental resources, has a tourism sector with considerable economic potential. Moreover, many recent development programs have focused on tourism, and between the years 1996 and 2006 the regional expenditure in Sicily was the second highest one among Italian regions. However, one of the major issues, that tourism suppliers in Sicily have to face, is seasonality in tourism demand. Even if Sicily is characterized by a combination of coastal and interior areas (with several historical sites, two mountains chains, several thermal establishments, several natural parks, and the highest active Volcano named "Etna") the predominance of sun and beach product is still the main source of tourist flows.

From this point of view, Sicily is characterized by a dual situation. On one hand, there are some well-known destinations in the international market, such as Taormina, or Cefalù which seem to have reached the stagnation or post-stagnation phase of the Butler's destination lifecycle. On the other hand, the internal parts of the Island are, in general, in the first stage of tourism development or completely outside the tourism market, even if there are many natural and cultural resources that might determine the future development of new tourism products. In a certain way, seasonality of tourism flows and the spatial concentration of tourism activities along the coasts are two interrelated features of tourism development in Sicily.

The regional law on tourism mentions the problem of seasonality and considers its reduction as a challenge (Regione Siciliana 2005). The predicament, in fact, has been widely recognized and many policy actions have been carried out in trying to enlarge tourism season but, as we will see later on, with less apparent efficiency.

16.3.2 Data

The data of the present study come from the Italian National Institute of Statistics (Istat), which collects information on guests and overnight stays on a monthly basis for all the official accommodation establishments in the whole Nation (Istat, *various years*), according to the EU Council Directive (95/97/CE) on Tourism Statistics. The information are collected by front-office personnel and communicated, on a monthly basis, to the Regional tourism bureau (in Sicily it is called: *Osservatorio turistico della Regione Siciliana*), which collects the information at regional level. The Sicilian Regional tourism bureau provided us with the monthly series of hotel overnight stays and bed places in Sicily, by guests nationality (Italian and foreign), from January of 1994 to December of 2007. Moreover, monthly series of overnight stays in collective establishments are available and almost comparable for all the European countries thanks to Eurostat databanks. They can, in fact, be downloaded at NUTS2 regional level for all the European countries.

In 2007 Sicilian hotels recorded more than 12 millions overnight stays, of which 43.6% are made by foreign guests (Table 16.3). Since 1994 overnight stays grew rapidly (+58%) with a mayor increase in the foreign component rather than in the domestic one, and with an annual average growth rate of around 4.8% for Foreigners and around 2.8% for Italians. However, it should be noted that in the years between

Table 16.3 Annual overnight stays in hotels in Sicily by guests' nationality, 1994–2007

Year	Italians	Foreigners	Total
1994	4,867,956	2,912,475	7,780,431
1995	4,800,015	3,339,980	8,139,995
1996	5,238,820	3,606,911	8,845,731
1997	5,405,344	3,648,303	9,053,647
1998	6,113,926	3,689,583	9,803,509
1999	6,318,944	4,132,739	10,451,683
2000	6,924,520	4,695,594	11,620,114
2001	6,838,259	4,857,865	11,696,124
2002	6,587,866	4,722,408	11,310,274
2003	6,651,150	4,385,002	11,036,152
2004	6,737,010	4,379,207	11,116,217
2005	6,962,316	4,485,874	11,448,190
2006	7,284,366	5,139,366	12,423,732
2007	6,952,162	5,368,002	12,320,164

Table 16.4 Annual bed places occupancy and (daily) bedplaces in hotels in Sicily, 1994–2007

Year	Occupancy rate	Bed places
1994	30.51	69,862
1995	31.85	70,013
1996	33.64	72,037
1997	33.92	73,132
1998	36.52	73,538
1999	37.99	75,369
2000	40.70	78,227
2001	38.96	82,239
2002	35.77	86,636
2003	33.49	90,272
2004	31.35	97,151
2005	30.70	102,176
2006	31.60	107,722
2007	29.46	114,583

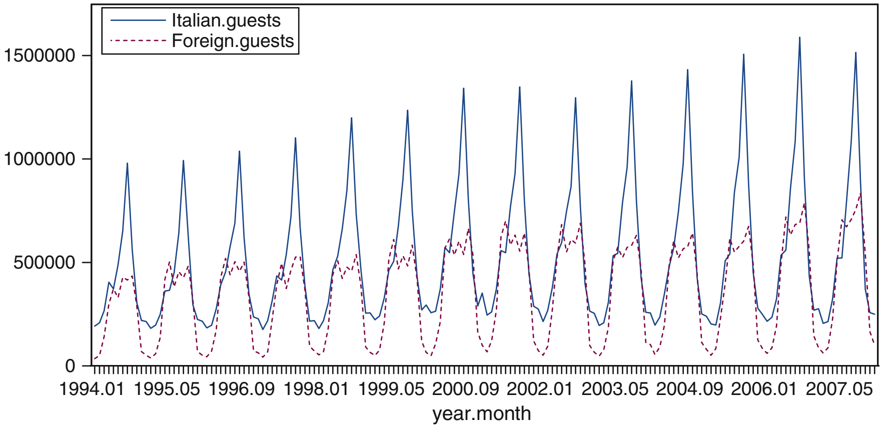

Fig. 16.1 Monthly overnight stays in Sicilian hotels by guests' nationality, Jan/1994 to Dec/2007

2001 and 2007 growth rates in overnight stays have been fluctuating. This may be due to several reasons, for example the events of 9/11 and the introduction of Euro in 2002.

In Table 16.4, bed occupancy rates (and daily bed places) are reported as a general measure of hotels efficiency. In 2007, of about 115,000 bed places less than 30% were used on average annually. However, as anticipated above, the intra-year variability of bed occupancy is very high due to a strong seasonality in the overnight stays. Moreover, in recent years the increase in the number of bed places (greater than overnight stays) caused a decrease in occupancy rates, with a loss for the efficiency of the entire accommodation system.

Figure 16.1 shows overnight stays in Sicilian hotels by guests' nationality. The graph highlights the strong seasonality of the series, which constitutes their main feature.

16.3.3 Analyzing Bed Places Occupancy Rates Seasonality in Sicily: 1994–2007

To analyse seasonality in the series of monthly bed occupancy rates, one should be able to isolate the seasonal component from the trend-cycle, and from the irregular (or random) components. For this application we used seasonal factors obtained through the application of Wiener-Kolmogorov filters, after the estimate of the most suitable SARIMA (Seasonal Autoregressive Moving Averages) model for the series. Series of overall occupancy rates and by guest nationality (for Italians, for Foreigners) have been so decomposed to derive seasonal factors. In all the cases, a SARIMA (0,1,1)(0,1,1) on the logarithm of the series, has been identified as the most suitable model. Actually, this model is well-known in academic literature as the airline model, ever since Box and Jenkins (1976) used it to analyse airline travel data. Similar results were obtained by using TRAMO-SEATS seasonal adjustment procedure. The model selected can be specified as follows:

$$(1 - B)\left(1 - B^{12}\right)w_t = (1 - \theta_1 B)\left(1 - \theta_{12} B^{12}\right)\varepsilon_t,$$

where B is the backshift (or lag) operator, w_t is the logarithm of occupancy rates, and ε_t is a white noise disturbance. In this model first differences of twelfth differences of log of original series are modelled against two moving averages parameters, of order 1 and 12. Table 16.5 synthesizes the main output of the estimation procedure coming from the application of the TRAMO step to the series.

After the identification of the appropriate SARIMA model, the Wiener-Kolmogorov filters can be used to decompose the series into a trend-cycle component, a seasonal component, and an irregular one. Seasonal factors are centred on the value 100, and they act in a multiplicative way on the trend-cycle component, so values greater than 100 would indicate a seasonal component above the trend-cycle component and vice versa for values below 100. Before considering analytical measures of seasonality, according to the framework proposed in Table 16.1, we start to analyze some useful graphic representations of seasonal variations. Figures 16.2 and 16.3, known as "cycle plot", describe in a very synthetic way our data. This useful tool analyses seasonal series showing, for each month, the mean value of seasonal factors (calculated over all the years considered, i.e. seasonal index), and the actual value of seasonal factors, for all the years considered.

Table 16.5 Parameter estimates of SARIMA models

Series	Parameter	Estimate	Std. error	t-ratio
	MA1	0.4412	0.0740	5.96
Occupancy rate (overall)	MA12	0.5360	0.0785	6.83
	MA1	0.5106	0.0703	7.26
Italian guests	MA12	0.4909	0.0791	6.20
	MA1	0.5643	0.0672	8.40
Foreign guests	MA12	0.6364	0.0750	8.48

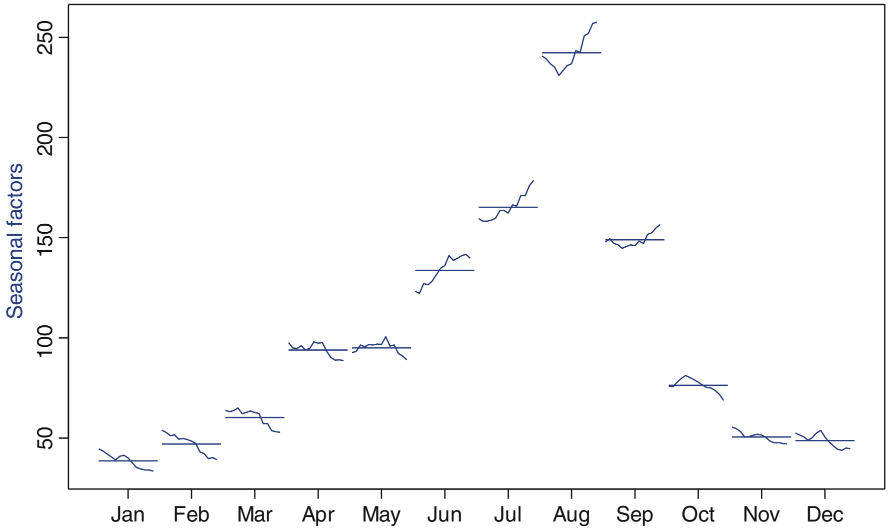

Fig. 16.2 Cycle plot of occupancy rates seasonal factors for Italian guests in Sicilian hotels, 1994–2007

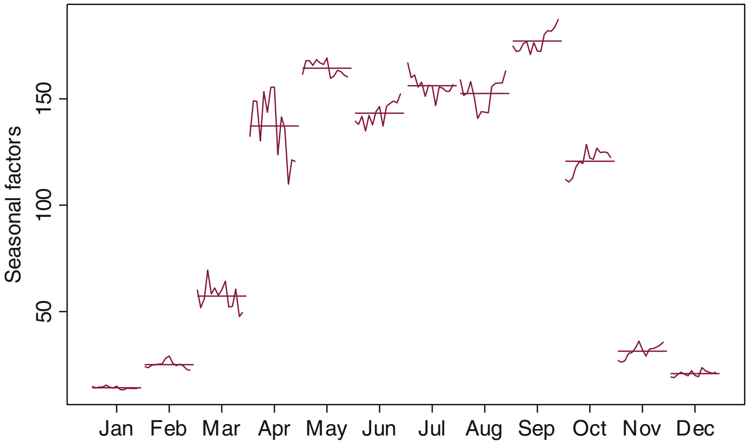

Fig. 16.3 Cycle plot of occupancy rates seasonal factors for Foreign guests in Sicilian hotels, 1994–2007

The most evident feature of both figures is linked to the shape, or the pattern, of seasonality. It is one-peak for Italian guests whereas a more extended season characterizes the foreign guest series. Seasonal peaks occur in August for Italians whereas foreign guest series high season occurs from May to September. Another distinctive feature of our results highlighted by the cycle plot is the relative stability of the shape of seasonality for all the series, along the time interval considered. For each year considered, the variability of seasonal factors within the years (infra-year variability) is much higher than their variability among the years (intra-years variability), and it seems almost constant for all the series analysed.

A deeper analysis requires the use of some of the analytical measures presented in Table 16.2. According to our framework, the starting point of the analysis is given by the study of pattern measures. Seasonal indexes – being simple averages (12: 1 for each month) of monthly seasonal factors calculated over all the years considered – are able to synthesize the pattern of seasonality. However, their reliability depends on the variability of seasonal factors among the years considered, which can be measured by the coefficients of variability. Table 16.6 shows seasonal indexes and their relative coefficients of variability for seasonal factors of each series analysed. Seasonal indexes can be used to identify tourism seasons, as proposed also by Lim and McAleer (2001). Looking at the series of seasonal indexes of overall, from April to September seasonal indexes have values greater than 100, reaching a maximum in August, where the seasonal component is more than twice the trend line. It can be observed that the Italian guest series have seasonal indexes greater than 100 from June to September with a strong peak in August which could characterizes this series as one-peak. On the contrary, the foreign guest series have a more extended tourism season (with values greater than 100), going from April to October. However, seasonal indexes should be analyzed together with their associated coefficients of variability. It can be observed that, for the Italian guest series, September and May are the months with the lowest relative variability in terms of seasonal factors, whereas February and January are the ones with highest variability. Besides, for the foreign guest series, May and September seem to be the months with less relative variations in terms of seasonal factors, whereas April and March are the months in which seasonal factors recorded the highest relative variations during the years considered. In general terms, the coefficients of variability indicate the relative variation of seasonal factors around

Table 16.6 Measures of pattern and pattern-change derived by occupancy rates' seasonal factors, by guests' nationality, 1994–2007

	Total		Italian		Foreign	
Month	Seasonal index	Coefficient of variability	Seasonal index	Coefficient of variability	Seasonal index	Coefficient of variability
January	28.91	8.53	38.67	9.49	14.21	4.20
February	38.25	8.78	47.03	10.46	25.04	6.95
March	58.99	7.58	60.24	7.07	57.25	10.16
April	111.17	6.17	93.96	3.52	137.21	10.31
May	122.76	1.94	94.98	3.05	164.36	2.01
June	137.43	4.11	133.72	5.09	143.24	3.57
July	161.39	2.04	165.2	3.90	156.16	2.92
August	205.94	3.17	242.29	3.46	152.50	4.46
September	160.28	2.52	148.91	2.36	177.14	2.79
October	94.41	2.47	76.35	4.30	120.66	4.44
November	42.93	2.60	50.57	5.17	31.39	9.74
December	37.52	5.09	48.76	6.73	20.84	6.17

their mean (i.e. seasonal index). For example, a value of 3.46 of the coefficient for the Italian series in August, would indicate that the variability around the mean in this month is about the 3.5%.

Following our framework, it is possible now to consider measures of seasonal amplitude, such as the coefficient of seasonal variation and the Gini concentration coefficient (Table 16.7). It should be recalled that the series analysed have a different pattern, making it harder to make comparisons between the series (for example, Italian vs. Foreign guests). A comparison among seasonality amplitude measures, in fact, makes sense only if the patterns of seasonality are equal or similar. In this case, a comparison of measures of seasonal amplitude over time (with reference to a single series) seems to be more appropriate. Looking at the values of the coefficient of seasonal variation, and of the concentration index an increase in the amplitude of seasonality of the Italian guest component can be observed in the last years, whereas the foreign component does not show a clear tendency, with decreasing values until 2002 and increasing again until 2007. However, despite the many works suggesting the use of a unique measure for seasonality (usually only amplitude measures, such as the concentration index) to compare several destinations, there are some risks associated with comparisons between amplitude measures for series characterized by different pattern. As an example, Fig. 16.4 shows the Lorenz curves associated to the seasonal factors for both Italian and foreign guests' series, in 2007.

The intersection between the Lorenz curves of Italian guest and foreign guest series, does not allow a direct comparison between the two associated concentration indexes. Based on these considerations, an essential requirement for comparisons among concentration indexes values is given by the not intersection among the

Table 16.7 Measures of seasonal amplitude derived by occupancy rates' seasonal factors, by guests' nationality, 1994–2007

	Total		Italian		Foreign	
Year	Coefficient of seasonal variation	Gini concentration index	Coefficient of seasonal variation	Gini concentration index	Coefficient of seasonal variation	Gini concentration index
1994	55.06	0.3377	55.54	0.3186	62.69	0.3790
1995	55.33	0.3390	56.01	0.3216	63.81	0.3823
1996	55.11	0.3386	55.76	0.3235	62.78	0.3757
1997	54.66	0.3365	55.87	0.3257	60.50	0.3669
1998	54.56	0.3356	55.77	0.3270	61.63	0.3686
1999	53.79	0.3318	55.68	0.3260	60.49	0.3634
2000	53.63	0.3301	55.69	0.3261	60.17	0.3588
2001	54.51	0.3358	56.67	0.3318	60.57	0.3617
2002	55.90	0.3451	58.76	0.3450	60.60	0.3656
2003	57.95	0.3564	61.02	0.3577	61.80	0.3675
2004	59.42	0.3652	63.23	0.3696	61.99	0.3713
2005	60.37	0.3708	64.71	0.3769	61.76	0.3759
2006	61.10	0.3748	65.82	0.3819	63.12	0.3801
2007	61.91	0.3800	66.77	0.3870	63.23	0.3819

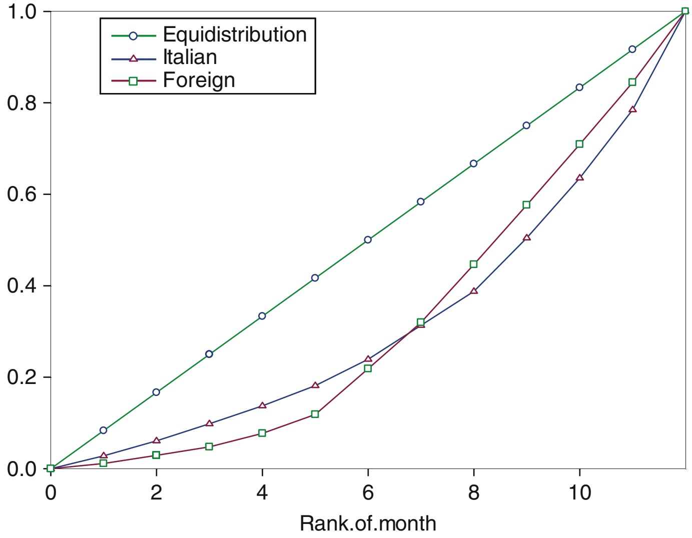

Fig. 16.4 Lorenz curves of bed places occupancy rates seasonal factors, by guests' nationality 2007

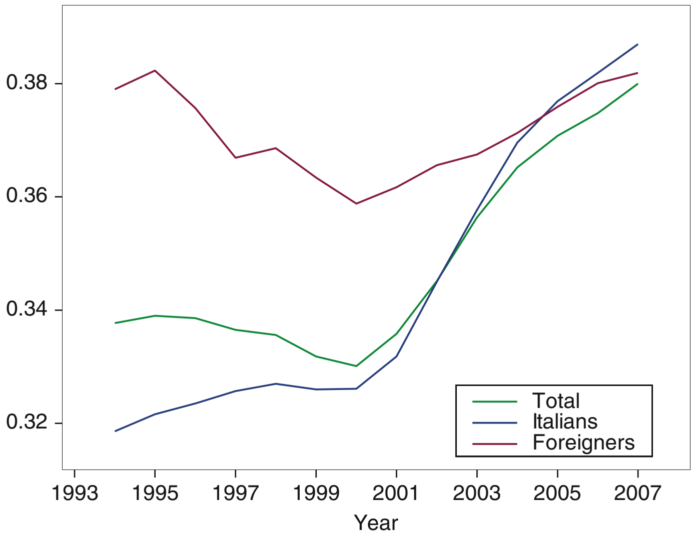

Fig. 16.5 Gini concentration index in occupancy rates seasonal factors by guests nationality (1994–2007)

associated Lorenz curves. Moreover, since the Lorenz curve requires a ranking of the months on the *X*-axis based on the value of the series, it implies a break of the natural order of time. This means that similar Lorenz curves (and concentration indexes) could be derived from very different patterns of seasonality, making it harder to make comparisons between series. Finally, Fig. 16.5 indicates the evolution of seasonal amplitude among the years considered by guests nationality. It can be observed a small increase in seasonal amplitude measure in the last years, mainly for the Italian component of tourism demand. Seasonal amplitude of the foreign component appears almost stable with only about 0.02 variation in the value of the Gini concentration index.

16.4 Final Comments and Conclusions

Many authors highlighted the negative consequences associated to an high degree of seasonality in tourism demand. In Sicily it implies certainly a low degree of efficiency of the entire accommodation sector. In academic literature, usually the room occupancy rate is used as a measure of efficiency of accommodation establishments. In our study we consider bed places occupancy, and this is due to the structure of the survey conducted by the Italian Official Statistical Institute, since more than 50 years, in the whole Nation. The difference assumes relevance since whereas the bed places occupancy rate includes information on the number of nights spent by tourists in a given establishment, the room occupancy rate uses only the number of rooms sold, independently from the number of guests. This should be taken into account when one wants to compare results coming from different studies or surveys. Our results highlighted that Sicilian hotels have a sufficiently high bed places occupancy rate only for few periods in the year, and this has consequences under several aspects: economic inefficiency; problems linked to the economic, social and environmental sustainability; inefficiency of the labour market; low degree of quality of tourism supply, due to the already cited sustainability problems. As main consequence resources are underutilized during the off-season, while capacity shortages occur at periods of peak demand.

Much attention has been paid to reducing seasonality through a variety of approaches. Because of the invisible fixed costs characteristics of many tourism products (accommodation, transportation and recreation facilities) there are only limited possibilities for tourism enterprises to adjust supply in response to seasonal variations in demand. The main strategies followed by national and local policy makers have been focused on trying to enlarge the product mix, to stimulate the use of price differentials, and on promoting Sicily in the international markets. However, a first statistical evaluation would bring us to assert, not only that these actions do not seem to be effective, but also that infra-year variations, and so seasonality of tourism demand, increased in the years considered, mainly due to the domestic component. Moreover, by considering that seasons can be seen as socially significant periods of time rather than natural events, the reduction of seasonality in tourism flow, particularly of the domestic component, cannot be achieved without structural reforms that modify the social and the economic behavior of people. The strong concentration of tourists' flows in August, in fact, is determined mainly by institutional causes rather than by weather effect, as demonstrated by the different pattern observed in the foreign component of tourism demand. The two components of tourism demand (Italian and foreign guests), in addiction to being characterized by different profiles (quality level requested, expenditure profile, motivations), show also a different behaviour in terms of seasonality, and in some ways they are complementary (even with different weights). This can help to reduce the concentration of tourism demand in summer months (August) and consequently to reduce the negative impacts of seasonality. Aggressive pricing and the promotion of new tourism product – such as food and wine-tourism, golf, nature-based tourism can bring some improvements, however, without structural interventions on institutional factors, it would be unrealistic to expect dramatic changes in the seasonal pattern of tourism demand, most of all in the Italian component.

Finally, both the framework proposed and statistical tools used to analyze seasonality in this work, despite of their simplicity, require to be carefully used in relation to the facets of seasonality (amplitude and amplitude changes, pattern and pattern changes, etc.) and in relation to the research aims (comparisons among destinations, among market targets, among different periods). By recognizing that seasonality has several features which require adequate instruments, only an integrated use of graphics and several measures would allow to analyze in detail the specificities of the phenomenon.

References

Ashworth J, Thomas B (1999) Patterns of seasonality in employment in tourism in the UK. Appl Econ Lett 6(11):735–739

Ball RM (1988) Seasonality: a problem for workers in the tourism labour market? Serv Ind J 8(4): 501–513

BarOn RV (1975) Seasonality in tourism – a guide to the analysis of seasonality and trends for policy making. Technical Series No. 2, The Economist Intelligence Unit Ltd, London

Baum T, Hagen L (1999) Seasonality in Tourism: understanding the challenges – Introduction. Tourism Econ Special Edition on Seasonality in Tourism 5(1):5–8

Baum T, Lundtorp S (eds) (2001) Seasonality in tourism. Pergamon, Oxford

Box GEP, Cox DR (1964) An analysis of transformations. J R Stat Soc B 26:211–246

Box GEP, Jenkins GM (1976) Time series analysis: forecasting and control (revised edition). Holden Day, San Francisco

Butler RW (1994) Seasonality in tourism: issues and problems. In: Seaton AV (ed) (1994) Tourism: the State of the Art. Wiley, Chichester, pp 332–339

Butler RW, Mao B (1997) Seasonality in tourism: problems an measurement. In: Murphy P (ed) Quality management in urban tourism. Wiley, Chichester, pp 9–23

Calantone RJ, Di Benedetto CA, Bojanic D (1987) A comprehensive review of the tourism forecasting literature. J Travel Res 26:28–39

De Cantis S, Ferrante M (2008) Seasonality in tourism: a critical review of its main measures. In: first join meeting of the Société Francophone de Classification and the Classification and Data Analysis Group of the Italian Statistical Society. Book of short papers, Edizioni Scientifiche Italiane, pp 265–268

Drakatos C (1987) Seasonal concentration of tourism in Greece. Ann Tourism Res 14(4):582–586

Falkner HD (1924) The measurement of seasonal variation. J Am Stat Assoc 19(146):167–179

Fernández-Morales A (2003) Decomposing seasonal concentration. Ann Tourism Res 30(4): 942–956

Frechtling DC (2001) Forecasting tourism demand: methods and strategies. Butterworth-Heinemann, Oxford

Goh C, Law R (2002) Modelling and forecasting tourism demand for arrivals with stochastic non-stationary seasonality and intervention. Tourism Manage 23:499–510

Gómez V, Maravall A (1996) Programs TRAMO (Time Series Regression with ARIMA noise, Missing observations and Outliers) and SEATS (Signal Extraction in ARIMA Time Series) Instruction for the user, Working Paper 9628, Bank of Spain, Madrid

Gonzàlez P, Moral P (1996) Analysis of tourism trends in spain. Ann Tourism Res 23:739–754

Gressens O (1925) On the measurement of seasonal variation. J Am Stat Assoc 20(150): 203–210

Hannan EJ (1964) The estimation of a changing seasonal pattern. J Am Stat Assoc 59(308): 1063–1077

Hartmann R (1986) Tourism seasonality and social change. Leis Stud 5(1):25–33

Hylleberg S (ed) (1992) Modelling seasonality. Oxford University Press, Oxford

Hylleberg S, Engle R, Granger C, Yoo B (1990) Seasonal integration and cointegration. J Econom 44:215–238

ISTAT (2008), Annuary del Turismo, online available at: www.istat.it

Istat (various years) Tourism Statistics

Jeffrey D (1985) Spatial and temporal patterns of demand for hotel accommodation. Time-series analysis in Yorkshire and Humberside, UK. Tourism Manage 6(1):8–22

Jeffrey D, Barden RRD (1999) An analysis of the nature, causes and marketing implications of seasonality in the occupancy performance of English hotels. Tourism Econ 5(1):69–91

Kim JH, Moosa I (2001) Seasonal behaviour of monthly international tourist flows: specification and implications for forecasting models. Tourism Econ 7(4):381–396

Koenig N, Bischoff E (2003) Seasonality of tourism in Wales: a comparative analysis. Tourism Econ 9(3):229–254

Koenig N, Bischoff E (2004) Tourism demand patterns in turbulent times: analysing welsh accommodation occupancy data for 1998–2001. Int J Tourism Res 6(4):205–220

Koenig N, Bischoff E (2005) Seasonality research: the state of the art. Int J Tourism Res 7(4–5): 201–219

Krakover S (2000) Partitioning seasonal employment in the hospitality industry. Tourism Manage 21(5):461–471

Kulendran N, Wong KKF (2005) Modeling seasonality in tourism forecasting. J Travel Res 44:163–170

Kuznets S (1932) Seasonal pattern and seasonal amplitude: measurement of their short-time variations. J Am Stat Assoc 27(177):9–20

Leiper N (1989) Main destination ratios: analyses of tourist flows. Ann Tourism Res 16(4): 530–541

Lickorish LJ (1997) Travel statistics – the slow move forward. Tourism Manage 18(8):491–497

Lim C (1997) Review of international tourism demand models. Ann Tourism Res 24(4):835–849

Lim C, McAleer M (2001) Monthly seasonal variations – Asian tourism to Australia. Ann Tourism Res 28(1):68–82

Lim C, McAleer M (2003) Modelling international travel demand from Singapore to Australia. CIRJE Discussion Paper, http://www.e.u-tokyo.ac.jp/cirje/research/03research02dp.html

Lundtorp S (2001) Measuring tourism seasonality. In: Baum T, Lundtorp S (eds) Seasonality in tourism. Pergamon, Oxford, pp 23–50

Lundtorp S, Rassing CR, Wanhill SRC (1999) The off-season is 'no season': the case of Danish island of Bornholm. Tourism Econ 5(1):49–68

Manning RE, Powers LA (1984) Peak and off-peak use: redistributing the outdoor recreation/ tourism load. J Travel Res 23(2):25–31

Persons WM (1919) Measurement of seasonal fluctuations. Rev Econ Stat 1(1):18–31

Regione Siciliana (2005) Norme per lo sviluppo turistico della Sicilia e norme finanziarie urgenti. Gazzetta Ufficiale della Regione Siciliana no. 9 del 16/09/2005.

Rosselló J, Riera A, Sansó A (2004) The economic determinants of seasonal patterns. Ann Tourism Res 31(3):697–711

Sørensen N (1999) Modelling the seasonality of hotel nights in Denmark by county and nationality. Tourism Econ 5(1):9–23

Spurr WA (1937) A graphic method of measuring seasonal variation. J Am Stat Assoc 32(198): 281–289

Sutcliffe CM, Sinclair MT (1980) The measurement of seasonality within the tourist industry: an application to tourist arrivals in Spain. Appl Econ 12(4):429–441

Vaccina F, Parroco AM (2004) Estimates of hidden tourism to plan local services: The Sicilian case. SCORUS 2004, Minneapolis, USA

Vianelli S (1948) Lineamenti di metodologia statistica per l'analisi economica delle serie storiche. U.P.E.B, Bologna

Wall G, Yan M (2003) Disaggregating visitor flows – the example of China. Tourism Anal 7(3/4): 191–205

Wanhill SRC (1980) Tackling seasonality: a technical note. Int J Tourism Manage 1(4):243–245

Wilton D, Wirjanto T (1998) An analysis of the seasonal variation in the national tourism indicators – a report prepared for the Canadian Tourism Commission. Department of Economics, University of Waterloo, Waterloo

Yacoumis J (1980) Tackling seasonality – the case of Sri Lanka. Int J Tourism Manage 1(2):84–98

Chapter 17
Hospitality Management in Rural Areas: An Empirical Analysis of Enterprises Located in Leader+ Territories of Campania

Riccardo Vecchio

17.1 Introduction

Many rural areas in the European Union find themselves in a state of crisis. Ageing, depopulation, out-migration of higher educated youth, and decline in agricultural employment are just a few of the many challenges facing these areas. For the same reasons the development of rural tourism has long been explored by tourism researchers, an interest which has been mainly motivated by the recognition of the importance of this activity for rural areas (Garrod et al. 2006; Briedenhann and Wickens 2004; Sharpley and Sharpley 1997; Page and Getz 1997; Greffe 1994; Gilbert 1989) and to offset the decline in mass tourism destinations (Sharpley 2002). Other studies stress the positive effects that rural tourism can bring to quality of life issues, or identify rural tourism as a vehicle for safeguarding the integrity of the countryside resource, enhancing and, at the same time, maintaining rural ways of life (Roberts and Hall 2001; Hall and Jenkins 1998; Lane 1994). Furthermore, policy makers are currently giving increasing attention to the hospitality sector as a major potential source of income for residents in rural areas (Valdès and Del Valle 2003; Yague 2002; Fleischer and Felsenstein 2000; Dernoi 1991).

Nevertheless, as effectively noted by Frochot (2005), if the designation of a rural area is complex, by extension it is equally difficult to define rural tourism. The literature contains an overabundance of definitions of rural tourism, primary due to the diversified activities associated to these areas and because the classification of rurality often includes all social and economic activities outside the immediate economic influence of urban centres. For the purpose of our study we considered rural tourism as tourism in the countryside that embraces the rural environment as pivotal to the product offered (Clarke et al. 2001). Moreover, the rural firms which we surveyed are exclusively hospitality enterprises located inside LAG territories in Campania. The current Leader+ (the acronym stands for *Liaison Entre Actions de*

R. Vecchio
Department of Economic Studies, University of Naples ‘Parthenope’, Naples, Italy
e-mail: riccardo.vecchio@uniparthenope.it

Á. Matias et al. (eds.), *Tourism Economics*,
DOI 10.1007/978-3-7908-2725-5_17,

Développement de l'Economie Rurale, or link between rural development actions) is one of four initiatives financed by European Union structural funds and is designed to help rural actors consider the long-term potential of their local region. Encouraging the implementation of integrated, high-quality and original strategies for sustainable development, it has a strong focus on partnership and networks for the exchange of experience. The final beneficiaries of assistance under Leader+ are local action groups (LAGs). These groups draw up the development strategy for their area and are responsible for implementing it on the basis of a specific development plan. The LAGs create an open local partnership which clearly allocates the powers and responsibilities to the various partners. They are made up of a balanced and representative selection of partners drawn from the various socio-economic sectors in the local area. Economic and social partners and non-profit associations must make up at least 50% of the local partnership.

However, research on rural tourism firms has been limited by a paucity of primary and secondary data and by the challenges that the variety of rural firms presents (Page et al. 1999). Despite the large numbers of such businesses, it is only in recent years that rural hospitality enterprises have begun to attract attention from researchers and a small but growing literature dealing with the characteristics and needs of this sector has emerged (Lynch 1998; Oppermann 1996; Emerick and Emerick 1994; Evans and Ilbery 1992). Even though research in this area is growing, the complexity of rural hospitality enterprises often goes unacknowledged as many researchers tend to make broad generalisations and hypotheses about the sector. Assumptions about rural enterprises' managerial problems and the perception of managers' lack of management expertise are often influenced by the general literature on small tourism firms. Although many common characteristics can be found among small tourism firms in general and rural hospitality firms, the latter have a number of specific factors that need to be acknowledged and taken into consideration when analysing their business performance, problems and failures.

In light of the recent changes in tourist market demand it is useful to investigate the approach of rural firms, whether a trend of substantial liability to the market prevails, or whether some guidelines are emerging, stimulated by strategic marketing.

In this framework, the present study seeks to contribute to a better knowledge of rural hospitality firms through an analysis of selected managerial aspects of enterprises located in the Leader+ areas of Campania. Leader projects have played an important role in promoting rural tourism since over one-third of the original projects, founded by the European Union, have been tourism-related (Nitsch and van Straaten 1995; Calatrava Requena and Avilès 1993). Particular attention is given to promotion and communication strategies developed by agritourisms,[1] country houses, bed and breakfasts and restaurants sited in four provinces in Campania.

[1]Italy is the only country in the European Union that has specific laws regulating agri-tourism, whereas elsewhere this particular type of accommodation is included under the more general sector of rural tourism. Italian Law No. 96 of 20 February 2006 defines agri-tourism as: "accommodation and hospitality supplied by farmers, through the use of their own farm in connection with crops, forestry and livestock farming".

17.2 Brief Overview of Campania and Its Tourist Flows

Campania is a region in southern Italy bounded by the Tyrrhenian Sea to the West, the region of Lazio to the North-West, Molise to the North, Apulia to the North-East and Basilicata to the East. With a population of 5,811,390 residents (National Statistics Institute – ISTAT 2007) Campania is the second most populous region in Italy and the first in population density. The regional capital is Naples (also a province), the other four provinces being Avellino, Benevento, Caserta and Salerno.

With a long coastline, picturesque islands and an extensive cultural heritage (Naples, Pompeii, Paestum, Herculaneum, just to quote the most important sites), Campania is generally associated with summer seaside and archaeology tourism. An analysis of tourist flows in Campania, in terms of total arrivals, shows that, in recent years, tourism has become an increasingly significant item in the regional economy. Indeed, the long-term trend (1995–2005) in arrivals is upward (+19.7%), reaching over 4.6 million people in 2007. Moreover, tourism employment in 2008 accounted for 5.8% of total regional employment with an increase over a 5-year period of 0.7% compared with a national rise of 0.4% (Table 17.1).

Detailed analysis at the provincial level show that most of the tourist flow is concentrated in coastal areas, namely in the provinces of Naples and Salerno, which together in 2006 accounted for 93.4% of inbound tourism in Campania, with the regional capital alone, in 2006, amassing 63.7% of total arrivals. Salerno followed with 29% of regional arrivals, and only 6.6% of the regional tourist flow reaches the other three provinces of Avellino, Benevento and Caserta.

The regional tourist hospitality system from 2000 to 2006 experienced an interesting positive dynamics: supply (number of hospitality firms) increased by an annual average rate of 7.2%; this growth in terms of local units was also accompanied by an increase in capacity with a 2% rise in the number of beds. Specifically, total accommodation units have gone from 2,157 in 2000 to 3,266 in 2006; beds in 2006 already exceeded 180,000 compared with 160,000 in 2000, an increase of 12.7%. A brief census of total structures shows the presence of 1,574 hotels and 1,692 non-hotel structures (2006). Over 85% of the total regional supply is concentrated in the two provinces of Naples and Salerno with, respectively, 43.9% and 41.7% of hospitality firms (ISTAT 2007).

The area of Campania involved in the Leader+ initiative covers about 7,548 km^2 (55.5% of the entire regional surface area), with a resident population of 602,234,

Table 17.1 Tourism employment in Campania, 2004/2008

	Tourism employment as a share of the regional total (%)					Variation (%)
	2004	2005	2006	2007	2008	2004–2008
Campania	5.1	5.0	5.8	6.5	5.8	0.7
Italy	4.6	4.7	4.8	5.0	5.0	0.4

Source: ISTAT 2010

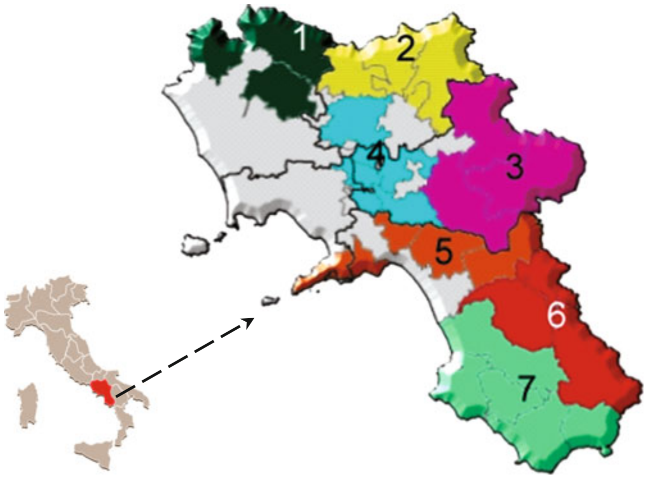

Fig. 17.1 Location of Campania in Italy and map of the seven LAGs
Source: Campania Region Agricultural Department

amounting to 10.4% of the region's inhabitants, and a population density of less than 80 inhabitants/km^2.

The seven LAG areas concerned with the Leader+ projects are (see Fig. 17.1): ADAT, Alto Casertano, Casacastra, Colline Salernitane, Partenio Valle Caudina, Titerno Fortore Tammaro and Verde Irpinia. The seven rural areas are very similar to one another except for the Colline Salernitane (Salerno hills) that have some unique peculiarities, such as the presence of Ravello, a small town renowned worldwide for its beauty and international music festival, and the proximity to other important major tourist attractions (Amalfi and Positano).

17.3 Methods

The data required to analyze marketing strategies were obtained by direct interviews with 30 managers and owners at their hospitality enterprises in the seven Leader+ areas of Campania during the summer of 2008 (June through September). The reasons for the choice of these areas primarily lay in their official classification as rural areas by the European Union and, secondarily, the areas represent very different rural dimensions (wild landscape, agricultural and farming land, mountains).

The interviews were semi-structured, including questions with a closed answer and open questions. The questionnaire was expressly kept brief in order not to tire the respondents and meet the requirement of not being too time-consuming (on average the interviews lasted 30 min). The questionnaire was constructed by studying similar previous research and a test interview with a proficient, and successful,

Table 17.2 Category and geographical distribution of the hospitality firms interviewed

LAG	Type of accomodation				Total
	Agri-tourisms	B&B's	Country houses	Restaurants	
ADAT	2	–	–	2	4 (13%)
Alto casertano	3	–	1	–	4 (13%)
Casacastra	3	–	–	1	4 (13%)
Colline salernitane	1	1	1	1	4 (13%)
Partenio – Valle Caudina	2	2	–	3	7 (24%)
Titerno Fortore Tammaro	1	–	–	1	2 (7%)
Verde Irpinia	1	1	–	3	5 (17%)
TOTAL	13	4	2	11	30

owner of a rural hospitality firm in Campania (its responses are not included in the study).

The interview was divided into three parts, the first regarding information on the clients and their motivations for selecting rural hospitality firms, the second concerning communication and promotion activities and instruments employed by the enterprises, and the third relating to the sort of marketing support that managers and owners have and would like to receive in the future.

The survey sought to cover a wide range of rural firms involved in tourism, describing possible differences between the hospitality firms involved as well as regional variations (see Table 17.2). Since in May 2008 there was no comprehensive list of rural hospitality enterprises, 84 hospitality businesses, 12 from each of the 7 LAGs in Campania, were identified as potential participants through the official tourist catalogue developed by the EU-financed project Ruralità Mediterranea.[2]

The final list was made by selecting the hospitality firms that gave their availability (response rate 36%), seeking to provide a cross-section of different tourism activities and trying to balance the number of potential respondents from each area. Despite attempts to achieve both representativeness and diversity of hospitality firms in the survey, some degree of bias was unavoidable. For instance, agritourisms and restaurants were by far the most common in the sample, nevertheless representing quite faithfully their present shares of total regional hospitality firms.[3] Moreover, the firms in one area, namely the LAG Titerno Fortore Tammaro, were so reluctant to be interviewed that the total number of respondents from the area was significantly limited (2).

[2]Ruralità Mediterranea is a transnational project, created with the support of Leader+ funds, that aggregates tourist operators in rural areas of Campania, Sicily, Malta and Greece to promote rural tourism through a quality trademark and a unified system of sales.

[3]In 2008 there were 1,307 agritourisms in Campania (Source: Campania Regional Agricultural Department) and 8,692 restaurants (Source: FIPE – Federazione Italiana Pubblici Esercizi, February 2008).

With respect to the different hospitality categories the sample comprised the following: 13 agri-tourisms, 11 restaurants, 4 bed and breakfasts and 2 country houses.

17.4 Results

First of all, the respondents were asked several questions about the characteristics and motivation of the visit of their customers. Owners and managers had to indicate their prevailing category of clients. By analyzing their responses we can see that families with children (9) are the most frequent customers of the rural firms interviewed while young couples (7), organized groups (6) and senior couples (6) followed. Making a breakdown of the responses by type of hospitality enterprise it is evident that locals are the main customers by far for restaurants, while agri-tourisms intercept many different types of customers.

On investigating the main origin of customers (Fig. 17.2) we discovered that for 26 of the respondents customers come mainly from Campania, for two enterprises from nearby regions (Lazio, Puglia), for one firm from the rest of Italy and for one from Northern Europe (UK, Germany, Sweden, Belgium, Netherlands). The feature that many small tourist firms are more likely to rely on local markets has also been identified elsewhere (Page et al. 1999; Morrison 1996). However, various hospitality enterprises, mainly located in the proximity of major tourist attractions (Ravello and Positano), have also stated that US arrivals have grown significantly in the last 2 or 3 years.

Owners and managers believe that visitors patronize their hospitality firms primarily in search of good food and wine (14), then to enjoy a holiday in the countryside (8), art and culture (4), a stay in the mountains (3), and a seaside holiday and nature (1). If we omit restaurants from the data, it being obvious that

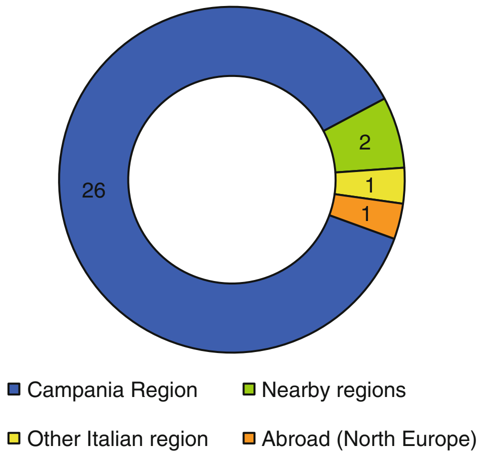

Fig. 17.2 Origin of customers

customers patronize them for good food and wine, we can see that the desire to live and enjoy the countryside is the main attraction for visitors of hospitality enterprises located in rural areas. Like most of the existing general surveys on rural tourism, it demonstrates that visitors rarely seem to reveal an interest in agriculture as a major source of motivation. Additionally, only 33% of the interviewees believe that visitors have a definite idea of the rural area in which the enterprise is located.

As regards the findings on communication and promotional instruments and strategies, 21 of the interviewees have a company website. This total comprised 11 agri-tourisms, 2 bed and breakfasts, 2 country houses and 6 restaurants. Consistent with these findings, when asked about their main communication instrument, respondents pointed to the company's website (19), followed by word of mouth (7), online advertising (2), press advertising (1) and participation in events and national fairs (1). The use and effectiveness of the Internet seems to have grown significantly in the last few years. This confirms findings elsewhere which demonstrate that potential rural tourists use this medium extensively to search for their holiday destination (Sigala 2005; Mauri 2004). However, owners and managers added that in their opinion word of mouth is actually the most effective communication and promotional mechanism, demonstrated by the fact that the most of their customers originated from advice or positive experiences of friends, colleagues and family.[4]

To clarify the efforts made by rural hospitality entrepreneurs to exploit Internet a brief analysis of the 21 websites was conducted. It was thus decided to use as a reference the 2QCV2Q model for tourism web site analysis and evaluation (Mich and Franch 2000), even though analysis was limited to only certain identified aspects and no score or weight was given to each selected attribute.[5]

The characteristics taken into consideration were as follows: the availability of the web site in other languages besides Italian; specific design or artwork features of the site making it unique and attractive to site visitors; whether the contact information is simple and fast to access; whether the web site contains updated information.

The examination was made purely through direct navigation of the web sites and responding yes or no to each of the previous queries (see Fig. 17.3). Ten web sites also had a version in a language other than Italian (6 of the 10 only in English). Nine of the rural hospitality web sites visited offered specific features on the Internet (information on the characteristics of the area, rural culture and traditions, information about the firms' awards and prizes). All the surfed web sites had full, detailed and easy-to-find contact information. On the contrary, only one-third of

[4]The same result was found in previous research (Haydam 2001; Zane 1997). Other studies demonstrate that word-of-mouth is a major communication medium that at times can successfully replace the need for formal advertising (queryeTourism 2006; Wilson 1991; Reingen and Kernan 1986).

[5]The 2QCV2Q model for assessing tourism websites assigns to each attribute of the seven dimensions (identity, content, services, management, usability) a specific weight (from 0.10 to 0.50) and a score from 0 to 4.

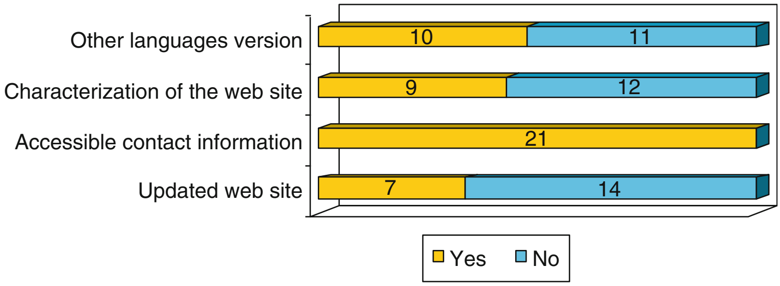

Fig. 17.3 Evaluation of hospitality firm web sites

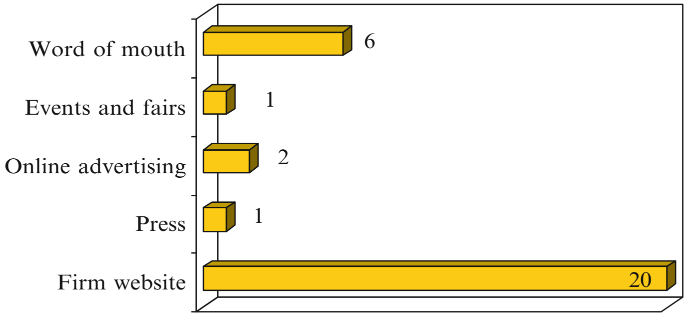

Fig. 17.4 Main communication instruments used by interviewed hospitality enterprises

the websites had updated information regarding special offers, firm news, and events taking place in the area and in the surroundings.

The use of a narrow range of advertising tools was identified from the study (see Fig. 17.4) which illustrates the complexity for rural enterprises to employ planned tourism marketing approaches mainly due to their limited budgets, as demonstrated elsewhere (Hjalager 1996; Clarke 1996). Other reasons were the lack of specific/technical competence, scarcity of time and in many cases little entrepreneurial ambition. In particular, the lack of appropriate management training seems to be a universal issue in rural tourism endeavours around the world (Marandola et al. 2006; Barke 2004; Getz and Carlsen 2000).

Two responses in particular highlight perfectly the lack of marketing planning by hospitality firms in rural Campania: the whole sample of firms stated that they had never been assisted by any professional marketer, public agency or consulting company to plan their communication and promotional activities; none of the respondents said that they chose marketing instruments according to the target. There may be three main reasons for this: (i) managers and owners do not have information on their potential clients or on tourism market trends; (ii) entrepreneurs lack specific knowledge in formal marketing techniques; (iii) these firms have extremely limited marketing budgets.

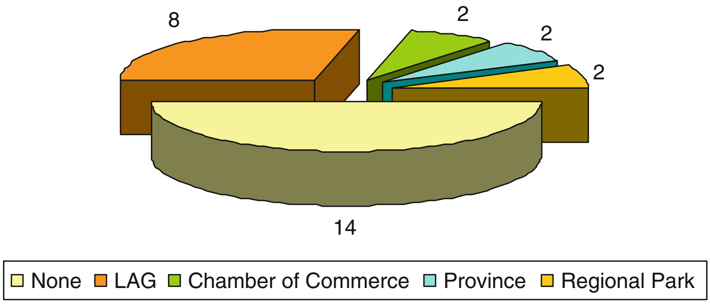

Fig. 17.5 Distribution of respondents concerning promotion of regional rural tourism

When asked on what strategic elements they relied when promoting and communicating their business, 18 interviewees mentioned the particular services and products offered by the firm, the remaining 12 the services and products offered by the rural area. These findings deserve more extensive analysis since it would be interesting to identify the specific services that rural firms use to attract visitors.

Respondents were also asked whether there were any public or private agencies promoting the area as a tourist destination: 16 answered negatively. Upon analyzing the positive answers we discovered that eight designated the LAG as the only public or private agency that actively promoted the area, the Chamber of Commerce, the Province and the Regional Park following with two each (see Fig. 17.5).

Respondents were finally posed the open question: "would you like to receive from local public/private bodies marketing help and why?". Ninety percent of the owners and managers answered positively, whereas only 10% were satisfied with their marketing efforts and did not feel the need to be helped by anyone. On analyzing those who expressed appreciation for public or private aid, over three quarters of these asked for general advertising plans and campaigns to promote tourism in their areas,[6] the remaining quarter expressed the need for specific marketing support in order to organize their communication strategies efficiently. In particular, they asked for detailed information about their potential customers and the most effective instruments to reach them. Entrepreneurs expressed their interest in knowing which variables affect customers' attitudes and whether it is feasible to influence them. They articulated the concept that, even if it may be difficult to influence the customer's attitude, with knowledge of such variables promotional resources can target consumers well disposed toward rural tourism and strengthen the effectiveness of the firm's marketing efforts.

Respondents also stated that managerial and marketing help could be crucial for rural firms to continue to operate in the area and asked for specific training provided by the regional authorities that recognized their special needs and goals. Some

[6]Interestingly, Campania regional government expenditure on tourism promotion accounted in 2006 for over 18.2 million euros and in 2007 for 20.9 million euros (Source: CNR, ISSIRFA – Istituto di Studi sui Sistemi Regionali, Federali e sulle Autonomie).

businesses (3) stressed that they faced great difficulties when selecting promotional tools and measuring their effectiveness.

The results of the interviews combined with a visit to the firms allowed several other interesting points to be noted. We briefly describe the main ones below.

(1) Managers and owners demonstrated the absolute absence of cooperation among rural business subjects. Indeed, in all the study areas, we sensed sentiments of mutual jealousy among owners and managers and the unawareness of the importance and profitability of working together to meet tourist needs and requirements. The low level of integration between local enterprises does not support the formation of a local tourist system which might enhance the ability of an area to exploit its resources and culture. Central guidance and supervision thus appears to be essential to ensure that a complete rural tourism experience can be provided. Hence it is important to ensure a critical mass of amenities and facilities to attract visitors to rural areas, to keep them there and to encourage repeated visits.

(2) Many entrepreneurs thought that tourism is not supported by residents of their own towns and villages. They felt a negative attitude amongst local communities towards the establishment of specific services for visitors and a general belief that rural tourism is not a viable economic development opportunity for rural areas.

(3) Although the majority of the owners and managers stated that demand for their type of service had increased in recent years, they were very dissatisfied with the overall level of business achieved throughout 2008 and were extremely concerned about the future health of their firms.[7]

(4) It was particularly surprising was to realize that many owners and managers (11) did not agree with extensive academic research pointing to urban, middle-class, middle-aged, highly educated people as the most effective tourist target for rural hospitality enterprises.

17.5 Discussion

The current research was exploratory and the results obtained cannot be extended to other national or foreign rural areas. No sampling techniques were used to ensure a representative sample, and only 30 owners and managers were interviewed, not ensuring the representativeness of the entire regional population. In addition, complete assessment of the effectiveness of marketing strategies of rural hospitality firms should also include input from the customer's perspective. Overall, this study offered a snapshot of the present status of marketing activities among rural hospitality enterprises in Campania. It is hoped that the results of this study will lead to improved understanding of the sector and could also impact positively on its development. We also believe that the conceptual framework of the present study provides some lessons and insights for other similar rural destinations. Furthermore,

[7]In 2008 Campania was adversely affected by massive waste accumulation and illegal dumping. These problems significantly affected tourist arrivals in the whole region.

various recommendations emerge from this research not only for hospitality entrepreneurs but also for policy makers, specifically for regional administrators that deal with legislation, public subsidies, training courses, and evaluation of rural tourist facilities.

From analysis of the collected data we found that marketing activities generally lacked formal consideration, with hardly any consumer research or strategic planning undertaken. The customer information that managers and owners had was very rudimentary and generally gathered exclusively during bookings. Some of the younger managers, however, showed more interest in taking advantage of the possibilities offered by the existing information and communication technologies. In particular, the use and effectiveness of the Internet seems to have grown significantly in the last few years, given the evidence obtained in the survey. Other findings show that communication efforts are very limited throughout the rural areas in question. Given their micro size, it is neither essential nor possible for rural hospitality enterprises to build up authentic marketing strategies and adopt sophisticated marketing instruments. For most businesses, property interests, management and day-to-day operations are delegated to one or two persons. As a result, most managers are concerned with operational management and ongoing activities, concentrating less on strategic aspects and long-term success of the business, a feature emphasized in many other studies of small tourism firms (Keller 2004; Thomas 2004; Tinsley and Lynch 2001; Wanhill 2000; Friel 1999).

In this particular industry, the owners and managers often lack the know-how, as well as the budget required, for effective and efficient marketing strategies. In addition, our findings demonstrate that rural hospitality firms do not pool their resources in any promotional or communication activity to increase the tourist potential of their area. Therefore, long-term government subsidies and marketing support and guidance are essential elements of rural tourism policy, and efforts would be better directed towards sustaining and consolidating existing rural tourism businesses.

The next few years will probably see a decrease in the number of rural B&Bs, country houses, restaurants and agri-tourisms, while the operators remaining on the market will need to enhance the quality of their product and improve the information they provide to tourists.

Acknowledgements The author gratefully acknowledges Azzurra Annunziata for her essential contribution to the research project, guidance and comments.

References

Barke M (2004) Rural tourism in Spain. Int J Tourism Res 6:137–149

Briedenhann J, Wickens E (2004) Tourism routes as a tool for the economic development of rural areas – vibrant hope or impossible dream? Tourism Manage 25:71–79

Calatrava Requena J, Avilés P (1993) Tourism: an opportunity of disadvantaged rural areas? Leader Mag 4:6–9

Clarke J (1996) Farm accommodation and the communication mix. Tourism Manage 17:611–620
Clarke J, Denman R, Hickman G, Slovak J (2001) Rural tourism in Roznava Okres: a Slovak case study. Tourism Manage 22:193–202
Dernoi LA (1991) About rural & farm tourism. Tourism Recreat Res 16:3–6
Emerick RE, Emerick CA (1994) Profiling American bed and breakfast accommodations. J Travel Res 32:20–25
Evans NJ, Ilbery BW (1992) Advertising and farm-based accommodation. Tourism Manage 13:415–422
Fleischer A, Felsenstein D (2000) Support for rural tourism. Does it make a difference? Ann Tourism Res 27(4):1007–1024
Friel M (1999) Marketing. In: Thomas R (ed) The management of small tourism and hospitality firms. Cassell, London, pp 117–137
Frochot I (2005) A benefit segmentation of tourists in rural areas: a Scottish perspective. Tourism Manage 26:335–346
Garrod B, Wornell R, Youell R (2006) Re-conceptualising rural resources as countryside capital: the case of rural tourism. J Rural Stud 22:117–128
Getz D, Carlsen J (2000) Characteristics and goals of family and owner-operated businesses in the rural tourism and hospitality sectors. Tourism Manage 21:547–560
Gilbert D (1989) Rural tourism and marketing. Tourism Manage 19:39–50
Greffe X (1994) Is rural tourism a lever for economic and social development? J Sustainable Tourism 2:23–40
Hall CM, Jenkins JM (1998) The policy dimensions of rural tourism and recreation. In: Butler R, Hall CM, Jenkins JM (eds) Tourism and recreation in rural areas. Wiley, Chichester, pp 19–42
Hjalager AM (1996) Agricultural diversification into tourism. Evidence of a European Community development programme. Tourism Manage 17:103–111
ISTAT (2007), Annuary del Turismo, online available at: www.istat.it
ISTAT (2010), Annuary del Turismo, online available at: www.istat.it
Keller P (2004) Introduction: The future of SMEs in tourism. In: Keller P, Bieger T (eds) The future of small and medium sized enterprises in tourism, 54th AIEST Congress, Petra, Jordan, 7–34
Lane B (1994) What is rural tourism? J Sustainable Tourism 2:7–21
Lynch P (1998) Female microentrepreneurs in the host family sector: Key motivations and socio-economic variables. Hosp Manage 17:319–342
Marandola D, Cannata F, De Palma P, Fragnito S, Parletta I, Raschi A (2006) Business and tourism in a rural area of Southern Italy. GEOTOUR 2006, Košice
Mauri C (2004) Product and brand management. Egea, Milano
Mich L, Franch M (2000) 2QCV2Q: a model for web sites analysis and evaluation. Proceedings Int. Conf. Information Resource Management Association (IRMA), 586–589
Nitsch B, van Straaten J (1995) Rural tourism development: using a sustainable tourism development approach. In: Coccossis H, Nijkamp P (eds) Sustainable tourism development. Avebury, Aldershot, pp 169–185
Oppermann M (1996) Rural tourism in southern Germany. Ann Tourism Res 23:86–102
Page SJ, Getz D (1997) The business of rural tourism: International perspectives. International Thomson Business Press, London
Page SJ, Forer P, Lawton GR (1999) Small business development and tourism: Terra incognita? Tourism Manage 20:435–459
Roberts L, Hall D (2001) Rural tourism and recreation: principles to practice. CABI, Wallingford
Sharpley R (2002) Rural tourism and challenge of tourism diversification: the case of Cyprus. Tourism Manage 23:233–244
Sharpley R, Sharpley J (1997) Rural tourism. An introduction. International Thomson Business Press, London
Sigala M (2005) Integrating customer relationship management in hotel operations: managerial and operational implications. Int J Hosp Manage 24:391–413

Thomas R (2004) Small tourism firms: international perspectives. Pergamon, Oxford
Tinsley R, Lynch P (2001) Small tourism business networks and destination development. Hosp Manage 20:367–378
Valdés L, Del Valle E (2003) El turismo rural en España. In: Curso Avanzado de Turismo en Áreas Rurales: Estrategias y Promoción. Instituto Agronómico Mediterráneo de Zaragoza, Zaragoza
Wanhill S (2000) Small and medium tourism enterprises. Ann Tourism Res 27:132–147
Yague RM (2002) Rural tourism in Spain. Ann Tourism Res 29:1101–1110