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Essays on Tourism, Trade and Exchange Rates

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Chapter 1
Introduction

1.1 Motivation and structure

International economics, among other issues, deals with economic interactions between countries such as international flows of goods, services, capital and people. In particular, many researches have been focused on the analysis of the effect of currency unions on trade.

In fact Jeffrey Frankel (2008) holds that *Andrew Rose's 2000 paper, "One Money, One Market…" was perhaps the most influential international economics paper of the last ten years.* Although this assertion could be debatable, this article was revealing and motivated a set of research questions addressed in this thesis. In that sense, this research tries to contribute to the existing literature on this topic by:

i) Considering new dimensions on the effect of currency unions, i.e. the effect on international tourism. The impact of a common currency on merchandise trade has been extensively investigated but we still know very little on the effect of a common currency on tourism flows.

ii) Recognizing that not only currency unions but also some intermediate exchange rate regimes may promote trade and tourism. In fact empirical analysis on the effect of exchange rate volatility provides mixed results, so the "de facto" exchange rate regime may be more suitable to explore the impact of exchange rates on trade and tourism.

iii) Considering the effect that sharing a common currency has on citizen's income in the debate on the benefits and costs of currency unions. By joining to a currency union, countries are expected to promote their trade and tourism flows which could imply an increase in their income.

Four main research questions are tacked in this thesis. First, is there a relationship between trade and tourism? Second, do exchange rate regimes affect trade and tourism flows? Third, does a common currency affect countries' growth via trade and tourism? And fourth, does tourism reduce the estimated impact of common currency on trade? These four questions are tried to be answered in each chapters of the thesis.

The first question is addressed in Chapter 2 where the relationship between trade and tourism flows is explored. This analysis would shed light on the link between movement of goods and tourists and can be considered as an introductory analysis supporting the idea that trade is a relevant factor explaining tourism and *viceversa*. Chapter 3 deals with a general question: Do exchange rate regimes affect trade and tourism flows? It is expected that a single currency promote trade and tourism but the impacts of other exchange rate regimes that imply low volatility are also explored. Chapter 4 focuses on the impact that sharing a common currency has on countries' income via trade and tourism. The trade and tourism induced effects of common currency are estimated. Then, the effects of openness to trade and tourism on economic growth are obtained and finally, these two results are put together to find out the potential effect that joining to a currency union would have on countries' income. Finally, Chapter 5 tries to answer a puzzle of the international economic, i.e., the very large impact that currency unions have on international trade. To that end, the new Helpman, Melitz and Rubistein's (2008) approach is followed to study whether after including tourism as explanatory variable of trade flows, the magnitude of the currency unions on trade is reduced.

1.2 Objectives and contributions

Four questions on international trade, tourism and exchange rates are addressed in this thesis. Each chapter is devoted to deal with each research question formulated. In the following subsections these questions are introduced and the main contributions to the existing literature are presented.

1.2.1 Is there a relationship between trade and tourism?

In last decades, both international trade and tourism have presented a spectacular increase. However, regardless of this evidence, the potential relationship between trade and tourism flows has been scarcely explored in the literature. In Chapter 2 the link between flows of goods and tourists is empirically explored. First, different reasons found in the literature supporting this nexus are presented. Moreover, an additional channel to explain the link in the sense "tourism causes trade" is given by using the Integrated World Economy approach. Second, the relationship is empirically analysed following both a time series approach and a panel data perspective.

Time series analysis is used when trade and tourism data are available for a particular country or region and for a long time period. This is the approach traditionally followed in the literature to explore the nexus between trade and tourism by applying cointegration and Granger causality test. The added value of this analysis is the study of the long and short run relationship between trade and tourism for two different scenarios that have not been previously considered. First, United Kingdom is both a main source and destination of tourists as well as a highly open economy in terms of international trade flows. Second, a small island region such as the Canary Islands is considered to analyse the link between trade and tourism. The Canary Islands is a small tourist economy highly dependent on trade, so interactions between trade and tourism could be expected. An additional motivation for using the islands as a case of study is the political implications for the regions which could be derived from this analysis.

The second methodology considered in this chapter is the panel data approach. As far as we are concerned, there is not any study dealing with the analysis of the relationship between trade and tourism from a panel data perspective. Few studies found in the literature such as Kulendran and Wilson (2000), Shan and Wilson (2001) or Khan and Lin (2002) use time series techniques and focus their analysis on a specific country. This analysis contributes to the existing literature by exploring the link between trade and tourism adding a cross section perspective. To that end, OECD countries are used as the third scenario since this group of countries concentrates around 75% of worldwide flows of goods and tourists.

In the following chapters of the thesis, gravity equations for trade and tourism are estimated. Thus, given the findings of Chapter 2, tourism is introduced as an explanatory variable in trade equation and the other way round. The estimates of Chapter 3, 4 and 5 suggest that tourism and trade are complementary and significant variables in trade and tourism equations respectively which reinforce the results obtained in Chapter 2.

In this thesis trade in goods and tourism are considered separately. There has been no academic debate on the interesting question of the differences and similarities between tourism and trade. Unfortunately, this issue lies beyond the scope of our study. The basic difference between these flows is that tourism implies the international movement of consumers, while international trade moves goods. This fact suggests that the two activities involve different economic tasks. Information problems and non-economic factors such as psychological, sociological and historical features seem to be more relevant in accounting for tourism flows. For instance, this difference leads us to expect different magnitudes regarding the effect of a negative shock (such as the September 11 attacks) and regarding the sharing of the same currency by trade and tourism.

1.2.2 Do exchange rate regimes affect trade and tourism flows?

Research on the effect of exchange rate regimes has mainly been focused on issues of growth, inflation and stabilization (Bailliu et al, 2003; Ghosh et al, 2003; and Husain et al, 2005). However, much less attention has been paid to the question of whether the choice of exchange rate regime matters for the volume of trade and tourism between countries. There is an extensive literature, started by the controversial paper by Rose (2000), on the effect of currency unions on trade. Moreover, there is a growing interest in the analysis of sharing a currency union on tourism, i.e. Gil-Pareja et al (2007). Nevertheless, currency unions represent only one possible exchange rate regime. Other regimes that imply low volatility are also expected to promote both flows. In Chapter 3 the following question is addressed: Do exchange rate regimes affect trade and tourism flows?

It is generally accepted that fixed exchange rates promote trade and tourism by reducing exchange rate uncertainty and transaction costs. However, the empirical evidence as well as the theoretical results about the effect of less exchange rate volatility on trade and tourism are mixed depending on the model specification, the sample considered and the measure of the exchange rate volatility used.

In contrast to this inconclusive result, a considerable effect of a currency union on trade and tourism has been estimated. So, although there seem to exist mixed results about the effect of exchange rate volatility on trade and tourism, a volatility of zero, i.e. a common currency, is a major determinant of the volume of these flows. This last result could be suggesting that the measures of exchange rate volatility may not be a good proxy for exchange rate risk and other variables such as the exchange rate regime may be more suitable to analyse the effect of exchange rates on trade and tourism.

The main objective of Chapter 3 is to explore the impact of different exchange rate regimes on trade and tourism. A large data set which includes 113 countries over the period 1995-2006 is used to estimate the effect of five exchange rate regimes which involve different degree of exchange rate volatility. Furthermore, as a sensitive analysis and considering the 30 OECD countries, the particular effect of the euro on intra-EMU tourism flows is estimated for the same period. This last analysis allows us to better compare our results with the ones estimated in previous papers.

Two gravity equations for trade and tourism are evaluated where dummies for five different exchange rate regimes, namely common currency, currency board, currency peg, crawling peg and managed floating, are included. Moreover, based on the results obtained in Chapter 2, tourism and trade are accordingly incorporated in each equation as explanatory variables.

As a sensitivity analysis and in order to compare our results with previous studies, the main analysis of Chapter 3 is complemented by studying the effect of the euro on trade and tourism flows for the OECD countries.

1.2.3 Does a common currency affect countries' growth via trade and tourism?

In Chapter 3 it is proven how currency unions promote trade and tourism flows. By sharing a common currency, countries reduce barriers to trade and tourism. For instance, a single currency means the elimination of currency conversion costs and uncertainty about the evolution of exchange rates and supposes that countries have the same unit of accounts which enhance price transparency. In Chapter 4, the specific impact that currency unions have on countries' growth via trade and tourism is estimated.

Frankel and Rose (2002) deal with the hypothesis that a monetary union increases the income of a country via trade. That is, currency unions promote trade and such trade induced by currency union may in turn have a beneficial effect on income.

To that respect, the authors hold that the unique effect of currency unions on growth comes via international trade. However, despite being proven that common currency promotes tourism and the role of tourism as a way of enlarging the market size, the tourism-induced effect of currency unions on income has been neglected.

Another important point to pay attention to is the heterogeneity within the countries considered in this study. Frankel and Rose (2002) estimates rely on small and poor countries because the case of the euro is not being included. However, the authors doubt whether the results can be extended to large and rich countries. This concern seems reasonable since in chapter 3, a differentiated impact of euro and other cases of currency unions is found. Based on this argument, up-to-date data including the case of the euro are considered in the analysis presented in Chapter 4. Moreover, the sample is divided into three groups according to levels of income. Hence, another contribution of this work is the choice of samples according to low, middle and high income economies which provides more accurate results and allows the identification of similarities and differences across countries worldwide.

Summarizing this research contributes to the question posed by Frankel and Rose (2002) in at least three ways: (i) tourism is included as an additional channel for a common currency to promote growth, (ii) the heterogeneity of countries is addressed by dividing the sample into three groups classify by their level of income, and (iii) up-to-date data, including the case of the euro, are considered.

The empirical analysis follows three stages. First, the effects of a common currency on tourism and trade are obtained. Second, the effect of both openness to trade and tourism on the economic growth of the destination countries are estimated. Third, combining the results from the two previous stages the potential effects of common currencies on tourism, trade and income are calculated.

1.2.4 Does tourism reduce the estimated impact of common currency on trade?

As mentioned above, in a seminal paper, Rose (2000) estimates a surprising large effect of a currency union on trade. His results suggest that members of currency unions seemed to trade over three time as much as otherwise pair of countries. However, these results has received little acceptance in the literatures and it still remains as a *puzzle* in the International Economics.

In this chapter, Rose's debate about the effect of currency unions on trade is revisited in two ways. The first contribution is the use of the new methodology proposed by Helpman, Melitz and Rubistein (2008). This approach presents a theoretical framework to study bilateral trade across countries considering zero trade flows between pairs of countries. The HMR approach holds that by disregarding countries that do not trade with each other, important information is not being considered and hence estimates could be biased.

The second contribution is to deal with the challenge from Rose and Van Wincoop (2001), i.e. *to find some omitted factor that drives countries to both participate in currency unions and trade more*. In that sense, tourism has been a traditionally omitted variable in the explanation of trade flows. In Chapter 2 a link in the sense tourism causes trade is found. Moreover, in Chapters 3 and 4 it has been empirically proven how tourist arrivals appear to be significant in gravity equations for international trade. Thus, tourism is proposed as a suitable candidate to explain the possible overvalued estimate of the impact of a common currency on trade. Moreover, tourism is theoretically justified to be included in the HMR approach via reduction of fixed and variable costs of exporting.

Chapter 2
On the relationship between trade and tourism

2.1 Motivation

In recent decades, international tourism has increased greatly. Data from World Tourism Organization indicate that the total number of international tourist arrivals in the period from 1950 to 2008 leapt up from 25 million to 922 million. At the same time, World Trade Organisation data show that per capita exports grew from 24 US$ in 1950 to 2400 US$ in 2005. This, therefore, provides a good reason to investigate whether there is a significant relationship between tourism and trade.

International trade theory studies the causes of international flows of goods when factors are internationally immobile. Several extensions have allowed to address the main new features of the international economy. However, the issue of consumers travelling to another country and consuming goods and services there has received less consideration. The lack of attention in mainstream literature in this area is another important factor motivating this chapter.

It is generally understood that countries which increase their international trade become more open and as a consequence travel more and vice versa. In recent years, there has been a growing interest in analysing the relationship between international trade and tourism and the literature proposes several explanations for the links between them.

On the one hand, the relationship whereby tourism affects trade can take several paths. For instance, the development of the tourism industry in the destination country will increase its imports, which will be reflected in the trade balance. Moreover, tourist visits generally provide information and may improve the image of the tourist destination as well as its products around the world and hence create new opportunities for trade. On the other hand, the causality nexus in the sense trade causes tourism can appear since transactions between countries may create interest among consumers about the source countries and stimulate international visits. Furthermore, an increase of imports directed at satisfying tourists' needs can have a positive influence on their visits.

The analysis of the relationship between tourism and trade is also relevant for at least another two reasons. Firstly, recent research finds that trade and tourism have encouraged the economic development in many countries[1]. For that reason, the study of the potential complementary relationship between flows of goods and international tourism is of major interest, as it can promote economic growth. Secondly, this relationship reflects the importance of business strategies that capture the benefits from the complementarity between tourism and trade.

The main objective of this chapter is to study the relationship between tourism and trade. To that end, Section 2.2 explores the different ways through this relation can go. In the empirical analysis of this connection, two complementary approaches are followed.

[1] See, for instance, Ahmed and Kwan (1991), Kwan and Cotsomotis (1991), Marin (1992), Jin (1995) and Thornon (1997) for the relationship between trade and growth. Balaguer and Cantavella-Jordá (2002), Oh (2005), Nowak et al (2007) and Lee and Chang (2008) analyse the effect of tourism on economic development.

The time series approach presented in Section 2.3 studies both the long term equilibrium relationship between trade and tourism and the short-run causality direction. In Section 2.3.2 the relationship is analysed for the case of a single country, namely United Kingdom. This country is an interesting case of study because United Kingdom is one of the main world travel destinations, as well as a major source of tourists.

Furthermore, this approach is complemented in Section 2.3.3 by studying the long and short term relationship for a small tourist economy such as the Canary Islands. These islands are a region highly dependent on trade. This feature along with the specialisation of the economy in the tourism sector makes the Canary Islands an interesting case study for the analysis of the link between trade and tourism flows on small island regions.

The panel data approach is presented in Section 2.4. The cross-country relationship for a group of countries, namely the OECD countries, is studied. There are no papers that study this relationship considering a panel data perspective. In that case, panel data techniques are applied to prove whether a cross-country relationship between trade and tourism exists.

2.2 Background

In this section the antecedents on the relationship between tourism and trade are presented. First, previous papers in the issue are reviewed in order to provide some channels which could explain the causes of the relationship between trade and tourism. Then, the *so-called* Integrated World Economy approach is used to describe two basic effects of tourism on trade: a *shifting-consumption* and a *biased consumption* effect.

Figure 2.1. Tourism-Trade links

Tourism causes Trade

- Business visitors travel to a tourist destination to buy or sell certain products which may create a flow of exports and/or imports.

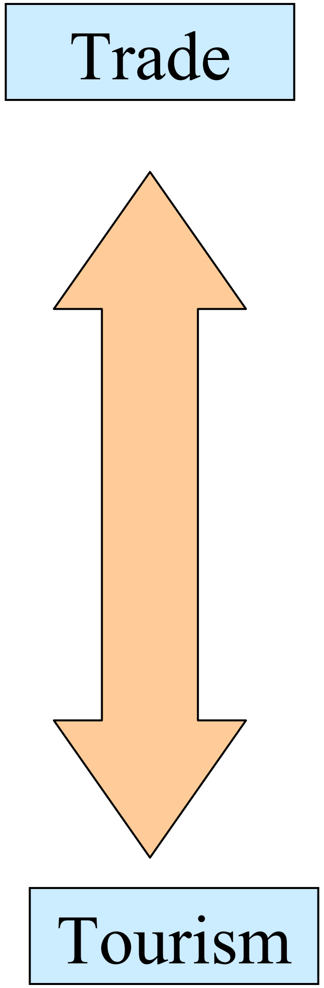
- International visitors could identify business opportunities that could lead to either exports or imports.

- International tourism requires infrastructures and conditions, such as transport, currency exchange, knowledge of the language, etc., which also promote trade.

- Tourists may consume certain types of goods that are not produced in the tourist destination and, therefore they need to be imported.

- Tourism implies a shift in consumption from the country of origin to the tourist destination. Thus, tourism and trade can present a relationship of complementarity or substitutability depending on the good being importable or exportable.

- Consumption pattern in tourism destinations is often different from the consumption in the country of origin, which could affect the volume of international trade.



Trade causes Tourism

- International trade between countries creates interest among consumers about the source countries of the goods and this may subsequently lead to a surge in the flow of holiday visits to these countries.

- Tourists may want to find the same products that they consume in their own country in the tourist destination. So, the availability of these products attracts tourist and hence imports could promote tourist arrivals.

- Business travel is required to maintain the international trade of goods and services.

- Visitors, who travel mainly for business purposes, may motivate other people, particularly friends and relatives, to take holiday or pleasure trips to these destinations.

2.2.1 The links between trade and tourism

In this subsection the literature about the relationship between tourism and trade flows is summarised. Previous papers are reviewed in order to present some channels through the relationship between these flows can go. Firstly, several explanations for the causal nexus between trade and tourism are presented and summarised in Figure 2.1.

Focusing our attention on the relationship whereby tourism can promote trade, there are various reasons which may support this nexus. Concentrating on business trips, Khan and Lin (2002) suggest that this type of trips is required to begin and to maintain the international trade of goods and services. Therefore, successful business trips directly encourage exports and/or imports in subsequent periods. With respect to leisure visitors, they also may identify business opportunities that could lead to international transactions in following periods. In that sense, tourism may allow to overcome information problems

Tourism could contribute to promote international trade by reducing trade costs. For instance, tourism may improve the knowledge about foreign culture and, as a consequence, about business habits and practices in other countries. Furthermore, tourism facilitates and stimulates to learn other languages, making bilateral trade easier. Finally, international tourism needs good basic facilities, services, and infrastructure such as transportation and communication systems that are also necessary for trade activity to function.

Other channel comes via an increase of demand since tourists may consume goods and services that are not produced in the tourist destination and as a consequence require being imported. The latter reason is a direct effect that can be illustrated by any international trade model in which consumers are allowed to consume abroad. Indeed the volume of trade is affected by both the shift of consumption abroad and the change in the consumption pattern in the destination with respect to the one in the country of origin. This nexus is presented in more detail in subsection 2.2.2.

Regarding the opposite relationship, i.e., “trade promotes tourism”, several explanations for this link can be also provided. Again, Khan and Lin (2002) fold that, first international trade not only needs but also influences business trips. Second, transactions between countries may create interest among consumers about the source countries and stimulate international visits. Third, intense international trade between countries increases the availability of products for visitors. This trade allows them to find, for instance, goods that they usually consume in their countries of origin.

What is more, the relationship where trade causes tourism is encouraged by repeated visits and pleasure trips of friends and relatives getting information about a destination country[2]. In spite of the evidence that trade may promote tourism, according to Lim (1997) business travel is one of the most frequently omitted variables when the determinants of tourist demand are analysed.

Secondly, the literature testing the empirical one-way or two-way link between tourism and trade can be classified into three groups. First, some papers have focused specifically on the empirical analysis of this relationship. The results suggest empirical evidence in favour of a bilateral relationship between these flows. For instance, Kulendran and Wilson (2000) study the long-run relationship between international trade and tourism for the case study of Australia. By using cointegration techniques, they find support for a bilateral connection between both flows. Similarly, Khan et al (2005) analyse the empirical link between trade and tourism using data from Singapore. Their results show a strong relationship for the case of business visits and imports. Finally, Shan and Wilson (2001) apply Granger causality techniques for the case of China. The authors identify the direction of the nexus finding a two-way relationship.

The second group of papers estimates models for tourist demand where international trade is considered as an additional regressor. Chul et al (1995), Goh

[2] Ledesma et al (2001, 2005) argue that tourism markets are characterized by asymmetrical information. Therefore repeated visit may be a consequence of adverse selection problems. Furthermore, the relevance of previous visits and relatives and friends as sources of information about the destination is empirically proved.

and Law (2003) and Eilat and Einav (2004) find that international trade is a relevant variable to explain tourist demand and hence find a relationship in the sense “international trade causes tourism”. Turner and Witt (2001) also analyse tourist demand and find that international trade is one of the main determinants for business trips.

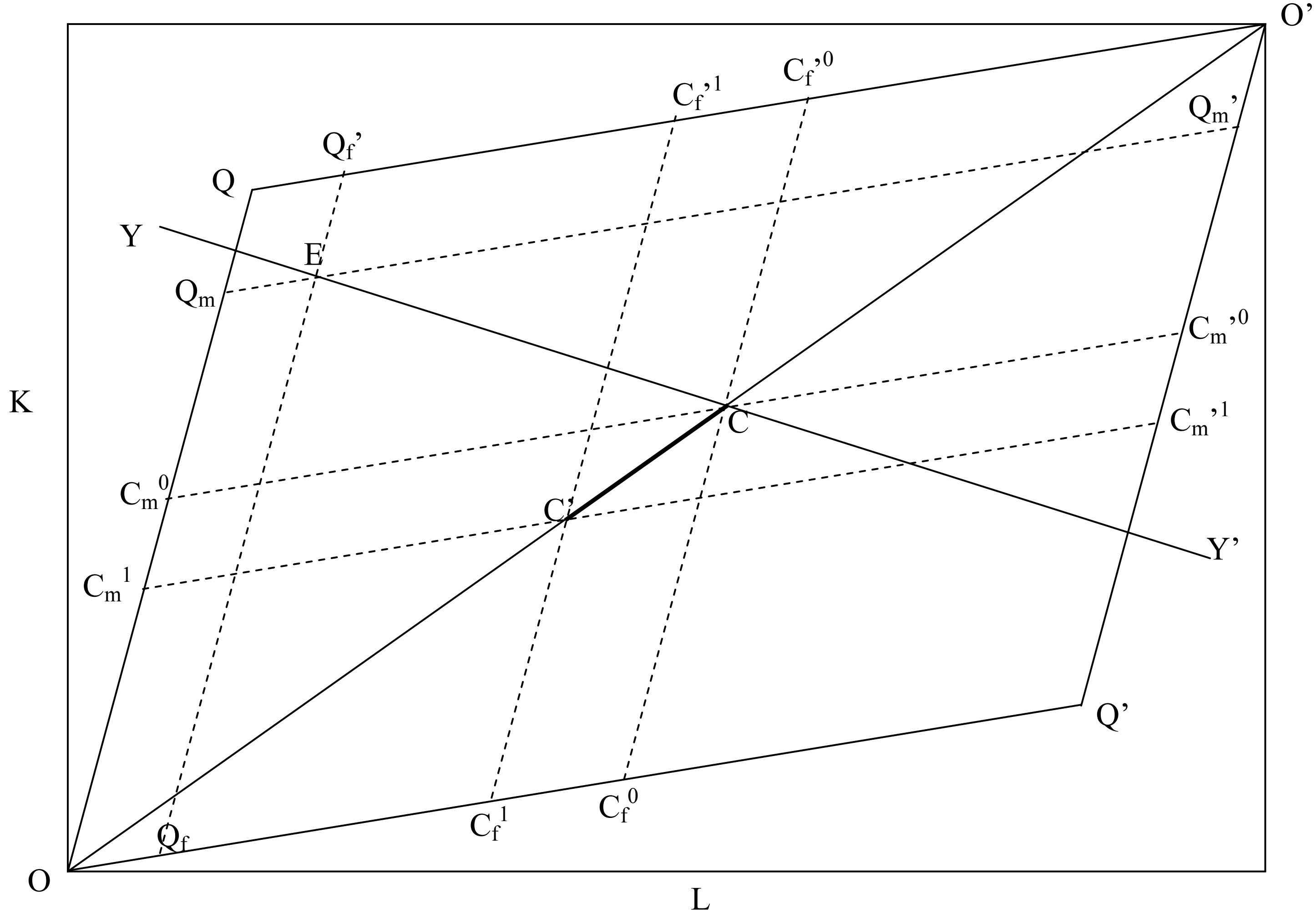
Finally, the third group of papers studies this relationship for specific products or regions by using disaggregated data. The results obtained by Aradhyula and Tronstad (2003) indicate that there is a role for government agencies to play in overcoming imperfect information related to trade opportunities through facilitating exploratory business venture and tourist visits. Easton (1998) studies the case of Canadian trade and tourism, obtaining a relationship of substitutability between Canadian exports and tourist excursions to Canada. Whereas, Fischer and Gil-Alana (2005) focus on the case of German imports of Spanish wines, finding that tourism promotes imports.

In summary, although several papers propose reasons and provide evidence supporting a relationship between trade and tourism, these papers focus their analyses on a specific products or countries and they mainly use time series techniques. As mentioned in Section 2.1, there are no papers that study this relationship using a panel data approach for a group of countries and then incorporating a cross-sectional perspective.

2.2.2 An illustration of the relationship between trade and tourism

As mentioned above, in this subsection the *so-called* Integrated World Economy (IWE) approach is presented. This theory is used to describe two basic effects of tourism on trade: a *shifting-consumption* and a *biased-consumption* effect.

Figure 2.2. The shifting-consumption effect of tourism on trade



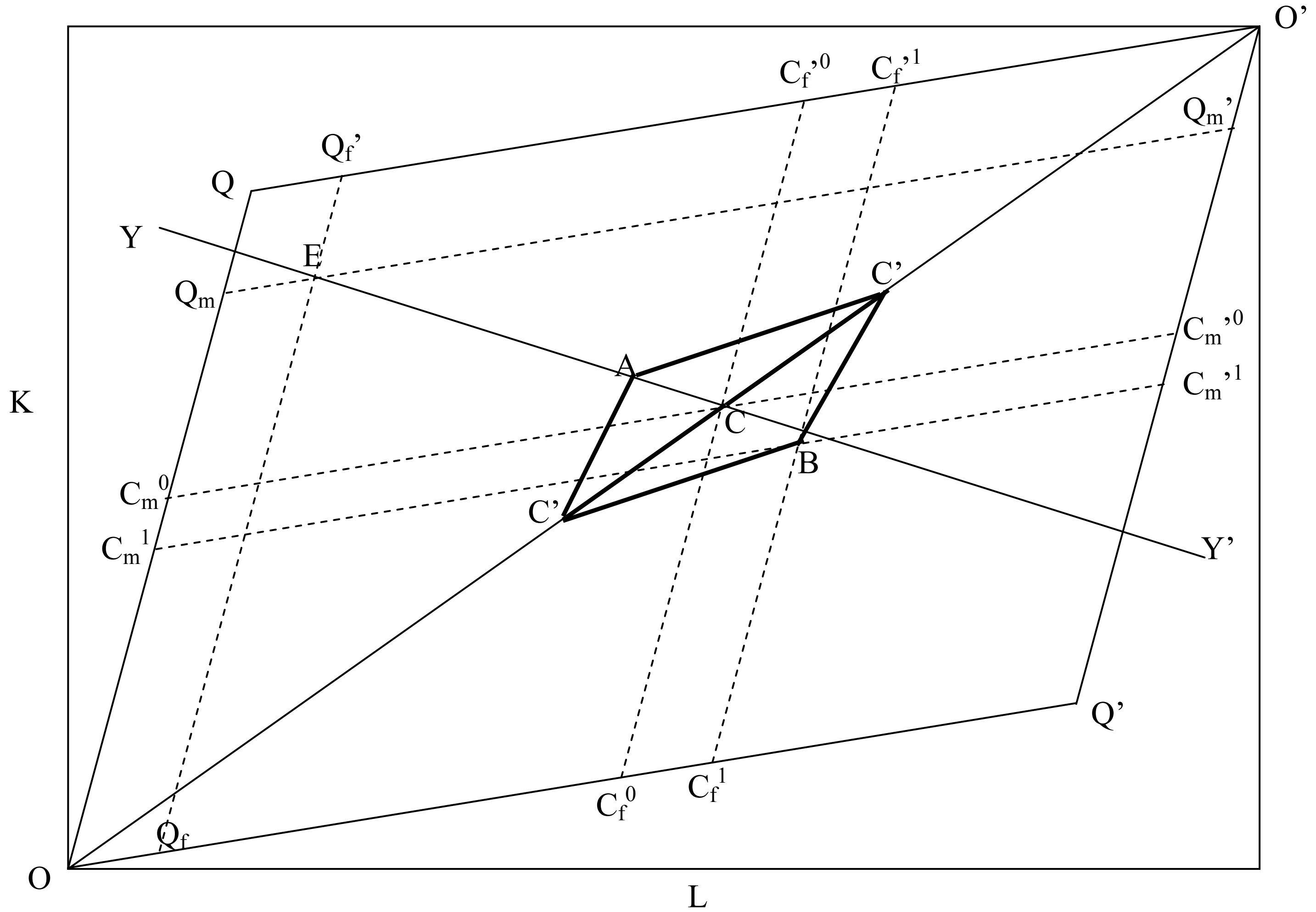
Turning to a direct influence of tourism on international trade, it can be recognized that tourism implies a shift of consumption from the country of origin of visitors to the tourist destination. Considering that, two direct effects of tourism on trade are presented: (i) the *shifting-consumption* effect which provides both complementarity and substitutability nexus between trade and tourism. If consumption switches from the home country to the foreign country, tourism increases the supply excess in exportable goods and reduces the demand excess in importable goods in the home country. Thus, tourism and trade can present a relation of complementarity or substitutability depending on the good being importable or exportable. (ii) The *biased-consumption* effect captures a switch in the consumption pattern in tourism destinations. In order to illustrate these effects the *IWE* approach is used[3]. Both the integrated world equilibrium and the trading equilibrium in a 2x2x2 model are represented in Figure 2.2. The dimensions of the box diagram are the world factor endowments, labour and capital. The integrated world equilibrium is given by a vector of prices and an allocation of resources OQ=O'Q' to the most capital-intensive good (manufactures) and O'Q=OQ' to the most labour-intensive good (food).

Then, let the lower-left corner at O is the origin for representing factor endowments of the home country, and the upper-right corner at O' is the origin for representing available quantities of factors of foreign country. Suppose that point E measures the distribution of factor endowments in the international economy. In this way, the home country is capital-rich and the foreign country is labour-rich. Factor price equalization (FPE) takes place in the parallelogram OQO'Q'.

If YY' represents the budget restraint with slope w/r, i.e. the relative price of labour, the intersection point C of YY' with the diagonal of the box divides the diagonal in two parts, being OC/O'C the relative GDP of the home country. Provided that preferences are assumed to be identical and homothetic, both parts of the diagonal represent the factor content of consumption in both countries. The factor content of net trade is given by vector EC. So the pattern of trade in terms of goods is easily obtained by drawing the vectors parallel to OQ and QO'.

[3] See Dixit and Norman (1980), Helpman and Krugman (1985), and Krugman (1995) for a description of this approach used in the international trade theory.

Figure 2.3. The biased-consumption effect of tourism on trade



through E (and C). The exports of manufactures (net if it is a differentiated good in a monopolistic competition model) of the home country are measured by vector $Q_mC_m^0$, and its imports of food are measured by $Q_fC_f^0$. Therefore the pattern of trade is explained by the factor proportions theory, i.e. the home country is relatively capital-rich and exports manufactures that are capital-intensive.

Now, assuming one-way tourism from the home country to the foreign country and maintaining the assumption of identical preferences, we can examine tourism by measuring the consumption of visitors from the home country in the foreign country through the vector, say C'C. So, people of home country consume a factorial content OC' in their own country and C'C as visitors in the foreign country. Obviously the total consumption of both goods in the home country is reduced and it is increased in the foreign country.

$O'C_m'^1$ and $O'C_f'^1$ represent consumption of manufactures and food in the foreign country, both by residents ($O'C_m'^0$ and $O'C_f'^0$) and non-residents ($C_m'^0$ $C_m'^1$ and $C_f'^0$ $C_f'^1$). The result is that the registered trade in the home country is characterized by smaller imports of food $Q_fC_f^1$ and greater exports of manufactures $Q_mC_m^1$ than in the non-tourism equilibrium. Now the factor content of trade is given by EC'[4].

Again the pattern of trade can be explained by the factor proportions theory, but the volume of imports and exports are modified by tourism flows. For the country of origin of tourists, tourist departures are revealed as complementary for exports and substitutive for imports. For the foreign country, the direction of the relationship is the opposite.

The *biased-consumption* effect is presented in Figure 2.3. In order to focus on this effect, this figure is built assuming balanced flows of tourists (i.e. C''C=CC'). Let point A be the division of world consumption between residents in the home

[4] If tourism occurs in both directions these influence of tourism on trade are diminished. In the limiting case of balanced tourism, trade data would reveal independence between tourism and trade

country and residents in the foreign country. Therefore C'A=BC'' measures the factor content of consumption by home-country people in the foreign country, and C''A=C'B represents the consumption by foreign-country people in the home country[5]. The sum of both vectors equals C''C', assuring clearing of markets.

Contrary to point A, point B shows the distribution of world consumption according to a territorial criterion (i.e. between consumption within the home country and consumption within the foreign country). This last division must be taken into account in order to determine exports and imports of each country.

As can be observed in Figure 2.3, both exports and imports are increased by the *biased-consumption effect*. Since tourists are biased towards goods exported from their country of origin, tourism and trade are complementary. It can be easily checked that if the bias is the contrary one, tourism and trade are substitutive. Therefore, if tourists modify their pattern of purchases in the destination, the pattern of trade is affected. This influence on trade can reinforce or reduce the *shifting-consumption* effect. Under unbalanced tourism and asymmetrical behaviour of consumers, the net result depends on the relative importance and the sign of each effect: the *shifted-consumption effect* and the *biased-consumption effect*.

In summary, this approach allows us to give an additional basic nexus from tourism to trade. In that case, tourism implies a shift in consumption from the country of origin of visitors to the tourist destination. Thus, tourism and trade can present a relationship of complementarity or substitutability depending on the good being importable or exportable. Moreover, it can be recognized that consumption pattern in tourism destinations is different thus affecting the volume of international trade.

[5] Note that both vectors have to fall into the diversification cone, since manufacture and food are consumed in the tourist destination

2.3 Tourism and trade in a time-series framework

According to Kulendran and Wilson (2000), a look to international trade and international travel data for the past 30 years in developed and newly developing industrialized economics shows how both series seems to have moved very closely. Moreover, countries that have increased their international trade, and hence become more open, have as well increased their international travels flows and vice versa. In that sense, a nexus between flows of goods and tourist could be expected.

In this section, the link between tourism and trade is studied for the case of United Kingdom, i.e., one of the most important origins and destinations of world tourism. A long dataset allows to study whether trade and tourism are co-integrated and the causality may be tested in a long and short-run perspective. This analysis can be complemented with the study of the relation between trade and tourism for a small economy where the tourist sector shows an important weight in its GDP. Some small economies have become highly dependent on tourism being a main source of income and a major component of the balance of payments such as the case of the Canary Islands.

In both cases, a common methodology is followed. Firstly, the statistical properties of each variable are analysed by applying unit root tests. Then, Granger causality test augmented with the Error Correction Mechanism (ECM) is used to study the relationship between trade and tourist. The ECM implies the existence of a cointegration relationship between the variables. Hence, the long run equilibrium relationship and short-run causality can be tested. Moreover, the impulse-response functions which help to support the findings of the Granger causality test are presented.

This subsection is organised as follows. First the common methodology is described, second the analysis for the case of United Kingdom is presented and third the analysis for the case of the Canary Islands is studied.

2.3.1 Methodology

The first step of the analysis is the study of the statistical properties of each variable individually. For this purpose, the descriptive statistics are presented jointly with their plots and correlograms. A look to these figures would suggests whether the series present a unit root and a common trend. Second, to investigate if the series are stationary [I(0)] or non-stationary [I(1)] some classic methods are implemented. In particular, the Augmented Dickey-Fuller (ADF) approach to formally test the non-stationarity of tourism (y_{1t}) and trade (y_{2t}) flows is carried out.

To analyse the presence of a unit root in the variable $y_{jt,} j = 1,2$, this test takes the following form

$$\Delta y_{jt} = c + \eta t + \pi y_{jt-1} + \sum_{i=1}^{p-1} \gamma_i \Delta y_{jt-i} + \varepsilon_{jt} \qquad [2.1]$$

where Δ denotes first differences, c is a constant, t denotes a deterministic trend, and ε_{jt} is the error term. The ADF test is given by

$$\begin{aligned} H_0 &: \pi = 0 \\ H_a &: \pi < 0 \end{aligned} \qquad [2.2]$$

where the null hypothesis implies a presence of a unit roots in the variable considered. Unit roots analysis is carried out by using Eviews 6.0.

With respect to the causality analysis, a time series y_{1t} Granger causes another time series y_{2t} if present value of y_{2t} can be better predicted by using past values of y_{1t} than by not doing so, considering also that other relevant information are used in either case (including the past values of y_{2t}). In that sense, the classical model to study the causality is the vector autoregression model (VAR) which can be written as follows

$$\Delta y_{1t} = \sum^{p} \phi_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p} \zeta_{1i} \Delta y_{2t-i} + u_{1t} \quad [2.3]$$

$$\Delta y_{2t} = \sum_{i=1}^{p} \phi_{2i} \Delta y_{1t-i} + \sum_{i=1}^{p} \zeta_{2i} \Delta y_{2t-i} + u_{2t} \quad [2.4]$$

where y_{1t} and y_{2t} are the endogenous variables (trade and tourism, respectively), both integrated of order 1, p is the lag length and u_{1t} and u_{2t} are the residuals.

However, if variables are integrated [I(1)] and cointegrated, the traditional Granger causality test should not be used. Proper statistical inference can be obtained by analysing the causality relationship on the basis of the ECM. According to the Granger Representation Theorem in Engle and Granger (1987), if y_{1t} and y_{2t} are both non-stationary [I(1)] and are cointegrated, then an error correction term must exist which describes the short-run dynamics. The omission of *ECM* term from the VAR would lead to misspecification and the OLS estimates would be biased.

For this reason, the VAR should be redefined as a dynamic multi-equation model augmented with the error correction mechanism (VECM). Equations [2.3] and [2.4] are rewritten as a new system of equations such as

$$\Delta y_{1t} = \varphi_1 + \tau_1 t + \sum_{i=1}^{p} \alpha_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{1i} \Delta y_{2t-i} + \gamma_1 ECM_{t-1} + u_{1t} \quad [2.5]$$

$$\Delta y_{2t} = \varphi_2 + \tau_2 t + \sum_{i=1}^{p} \alpha_{2i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{2i} \Delta y_{2t-i} + \gamma_2 ECM_{t-1} + u_{2t} \quad [2.6]$$

In equations [2.5] and [2.6], constants and linear trends are also allowed. The model is represented in differences, so constants φ_1 and φ_2 implies a linear time trend in the levels and the linear trends τ_{1t} and τ_{2t} means a quadratic trend in the levels. Moreover, an error correction term is defined as $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$ where a constant (μ) and a linear trend (λt) are also allowed. The VECM is estimated by using Johansen's (1995) maximum likelihood method without restrictions being placed on the trend parameters. The VECM for both case of study, United Kingdom and Canary Islands, are estimated by using

STATA 10.0. Equation [2.5], and similarly for equation [2.6], allows to test three different hypotheses.

i. The first hypothesis is related to cointegration where the null-hypothesis in equation [2.5] is $H_0 : \gamma_1 = 0$ (or $H_0 : \gamma_2 = 0$ in equation [2.6]. A chi-square statistic as $\chi^2(p)$ is used where p is the number of coefficients estimated in each equation, in this case $p = 1$ because the significance of the error correction term is studied. The rejection of the null hypothesis suggests that both variables are cointegrated. Sims et al (1990) interpret this hypothesis as long-run neutrality, while Corradi et al (1990) consider the rejection of the null hypothesis as the existence of long-run causality. Thus, this test analyses not only the presence of cointegration between the series but also indicates long-run equilibrium relationship.

ii. The second hypothesis is related to the significance of the long-run elasticity defined by. $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$. The null-hypothesis is $H_0 : \beta = 0$ and implies that the elasticity between each tourist and trade variable is statistically significant. Moreover, the sign of this parameter suggests the sense of the relationship. If β is negative, it implies that the long run relationship between trade and tourism flow is complementary whereas, if the coefficients are positive, a substitutability relationship between the variables exists. Furthermore, the significance of parameter β strengthens the evidence for cointegration among the variables. The t-statistics of the β coefficients are sufficient for this purpose.

iii. The third hypothesis that can be tested is the presence of short-run causality. So, in equation [2.5] the null hypothesis is: $H_0 = \eta_{11=...=}\eta_{2p} = 0$ ($H_0 = \eta_{21=...=}\eta_{2p} = 0$ in equation [2.6]). In this case, the statistic is distributed as a $\chi^2(p)$ being p the lag length of the VECM[6]. The rejection of the null hypothesis indicates the existence of a short-run causality in the sense of Granger (1981).

2.3.2 Case study of United Kingdom

United Kingdom (UK) is one of the main travel destinations, as well as a major source of tourists. So the main reasons for choosing this country are (i) availability of data for a long run analysis and (ii) UK is a very open economy with a noticeable tourist sector. According to the National Statistic Office the travel and tourism industry contributed directly 3.4 per cent to GDP of UK in 2008. At the same time, the share of this sector in the total employment was 8.6 per cent.

With regard to tourist data, monthly *tourist arrivals* (A_t), *tourist departures* (D_t) and *total tourism* (Tou_t), as the sum of arrivals and departures, from January 1980 to February 2007 are used. These data are obtained from "International Passenger Survey" (IPS). Regarding trade data, *exports* (E_t), *imports* (I_t) and *total trade* (T_t) are considered in the analysis. Trade data are obtained from "Direction of Trade Statistics" of the International Monetary Fund (IMF)[7]. All data are seasonally adjusted applying X12ARIMA and all variables are expressed in logs. Table 2.1 presents the descriptive statistics of all variables.

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[6] In order to define the VAR, it is necessary to determine the optimum number of lags to assure that residuals are white noise. A reduced number of lags could impede the adequate capturing of the dynamics of the series. An excessive number of lags could lead to a loss of degrees of freedom in the estimation. The number of lags varies depending on the variables analysed and they are decided according to the Schwarz Information Criterium (SBIC) and the Hannan and Quinn Criterium (HQIC).

[7] Data from IMF does not include trade in services. The main drawback of this exclusion is that any potential complementarity between tourism and certain services, (e.g. transport services) cannot be addressed. However its inclusion would provide spurious results since tourist arrival (departure) is near the same variable that tourism receipts (expenditures).

Table 2.1. Descriptive Statistics. United Kingdom

Variable	Obs	Mean	Std. Dev.	Min	Max
(E_t)	326	9.4838	0.2405	8.9676	10.1952
(I_t)	326	9.6352	0.2845	9.1078	10.3274
(T_t)	326	10.2566	0.2618	9.7328	10.9604
(A_t)	326	14.2934	0.3125	13.6841	14.8886
(D_t)	326	14.9294	0.4276	14.1068	15.6239
(Tou_t)	326	15.3572	0.3847	14.6451	15.9947

Figure 2.4 plots the original series of *total tourism* in UK. A look at the figure suggests the variable presents a positive trend. The same feature can be observed in the series of *total trade*, presented in Figure 2.5. This pattern could indicate that both variables are integrated of order 1 [I(1)].

Figure 2.4. Total Tourism-United Kingdom

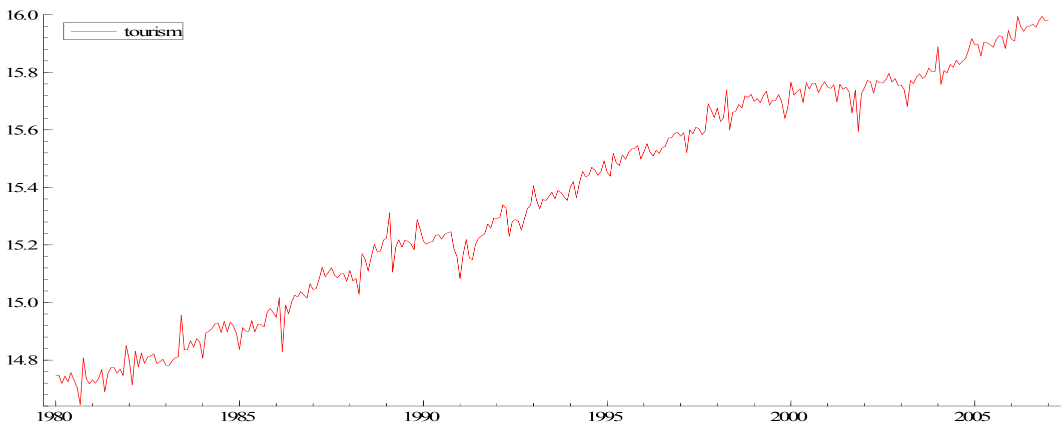


Figure 2.5. Total trade-United Kingdom

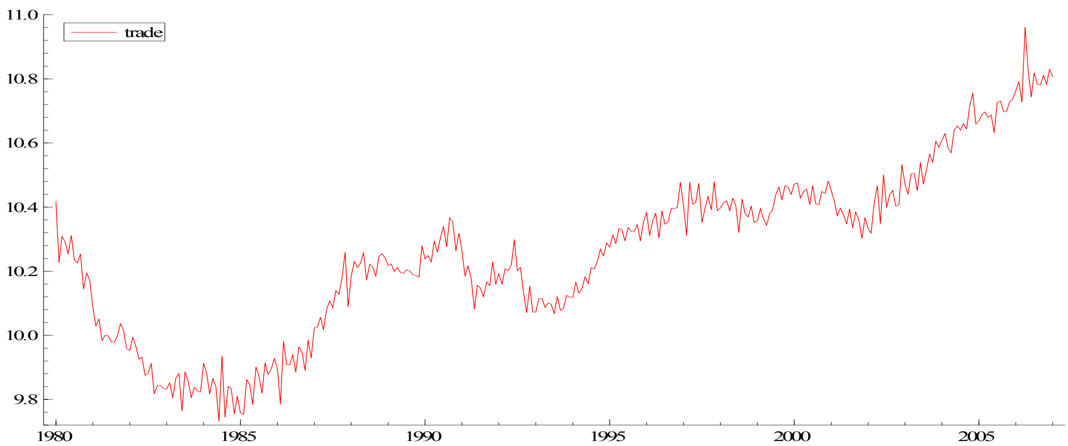


Table 2.2. Augmented Dickey-Fuller Test.
United Kingdom

Variable	Constant	Trend
(E_t)	0.84	0.01
(I_t)	0.95	0.15
(T_t)	0.91	0.03
(A_t)	0.90	0.14
(D_t)	0.74	0.43
(Tou_t)	0.90	0.52

Note: MacKinnon approximate *p*-value

To analyse the stationary properties of the series considered in the analysis, the ADF test is applied with intercept and trend. As can be observed in Table 2.2, where the MacKinnon approximate *p*-value are presented, the null hypothesis of a unit root cannot be rejected at 1% significance level for all variables. This result implies that all series are integrated of the same order, and hence cointegration between variables can be studied.

Tables 2.3, 2.4 and 2.5 present the results of the estimation of the VECM for tourism and trade flows. Specifically, Table 2.3 shows the link between tourism variables, namely tourist arrivals (A_t) and departures (D_t), and exports (E_t). Table 2.4 present the link between tourist arrivals and departures and imports (I_t) while Table 2.5 shows the nexus between tourism variables and total trade (T_t). These tables contain the estimations of VAR parameters, the ECM parameter, the long-run parameter and the χ^2-test statistics.

Regarding hypothesis (i), the ECM is significant in all cases in at least one-way. These results imply that tourism and trade variables are cointegrated, and hence a long-run equilibrium relationship exists between them. Furthermore, according to hypothesis (ii), coefficients β obtained from *ECM* are significant and negative in all cases apart from the link between total trade and tourist departures where it is not. As a consequence, tourism and trade seems to be complementary.

Table 2.3. Cointegration and causality between exports and tourism. United Kingdom

$$\text{Eq1: } \Delta y_{1t} = \varphi_1 + \tau_1 t + \sum_{i=1}^{p} \alpha_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{1i} \Delta y_{2t-i} + \gamma_1 ECM_{t-1} + u_{1t}$$

$$\text{Eq2: } \Delta y_{2t} = \varphi_2 + \tau_2 t + \sum_{i=1}^{p} \alpha_{2i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{2i} \Delta y_{2t-i} + \gamma_2 ECM_{t-1} + u_{2t}$$

	Eq1	Eq2		Eq1	Eq2		Eq1	Eq2
ΔA_{t-1}	-0.5994	-0.0246	ΔD_{t-1}	-0.7118	-0.0022	ΔTou_{t-1}	-0.6742	-0.0164
	(-10.31)	(-0.68)		(-12.48)	(-0.05)		(-11.58)	(-0.31)
ΔA_{t-2}	-0.3248	0.0105	ΔD_{t-2}	-0.4185	0.0097	ΔTou_{t-2}	-0.3967	0.0197
	(-5.20)	(0.27)		(-6.54)	(0.20)		(-6.22)	(0.34)
ΔA_{t-3}	-0.0776	-0.0200	ΔD_{t-3}	-0.1710	-0.0222	ΔTou_{t-3}	-0.1257	-0.0295
	(-1.43)	(-0.59)		(-3.18)	(-0.53)		(-2.32)	(-0.59)
ΔE_{t-1}	0.0331	-0.2691	ΔE_{t-1}	0.1971	-0.2762	ΔE_{t-1}	0.1628	-0.2662
	(0.37)	(-4.84)		(2.81)	(-5.09)		(2.72)	(-4.86)
ΔE_{t-2}	0.1525	-0.0035	ΔE_{t-2}	0.0619	-0.0229	ΔE_{t-2}	0.1073	-0.0135
	(1.70)	(-0.06)		(0.86)	(-0.41)		(1.76)	(-0.24)
ΔE_{t-3}	0.1110	0.2239	ΔE_{t-3}	-0.1044	0.2078	ΔE_{t-3}	-0.0157	0.2087
	(1.33)	(4.28)		(-1.55)	(3.97)		(-0.27)	(4.00)
Trend	-1.18E-05	-8.29E-06	Trend	-3.47E-05	-1.54E-06	Trend	-2.59E-05	-2.08E-06
	(-0.41)	(-0.46)		(-1.48)	(-0.09)		(-1.31)	(-0.12)
Constant	0.0060	0.0043	Constant	0.0139	0.0006	Constant	0.0112	0.0008
	(1.02)	(1.16)		(2.89)	(0.15)		(2.76)	(0.22)
ECM	-0.0490	0.0697	ECM	-0.0029	0.0656	ECM	-0.0076	0.0947
	(-1.70)	(3.85)		(-0.14)	(4.11)		(-0.32)	(4.34)
β	-1.592173	-	β	-1.607872	-	β	-1.291041	-
	(-4.59)	-		(-3.94)	-		(-4.59)	-
S-R causality	3.60	1.86	S-R causality	12.07	0.73	S-R causality	9.04	1.43
	[0.3086]	[0.6028]		[0.0072]	[0.8655]		[0.0287]	[0.6976]

Note: t-Student appears between parenthesis and p-values between brackets. A_t, D_t, Tou_t and E_t refer to arrivals, departures, total tourism and exports respectively. In Eq1 the dependent variable is arrivals, departures and total tourism accordingly whereas, in Eq2 it is exports. $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$

Table 2.4. Cointegration and causality between imports and tourism. United Kingdom

Eq1: $\Delta y_{1t} = \varphi_1 + \tau_1 t + \sum_{i=1}^{p} \alpha_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{1i} \Delta y_{2t-i} + \gamma_1 ECM_{t-1} + u_{1t}$

Eq2: $\Delta y_{2t} = \varphi_2 + \tau_2 t + \sum_{i=1}^{p} \alpha_{2i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{2i} \Delta y_{2t-i} + \gamma_2 ECM_{t-1} + u_{2t}$

	Eq1	Eq2		Eq1	Eq2		Eq1	Eq2
ΔA_{t-1}	-0.6336	0.0162	ΔD_{t-1}	-0.7463	-0.0482	ΔTou_{t-1}	-0.6393	-0.0063
	(-11.75)	(0.50)		(-12.92)	(-1.17)		(-11.90)	(-0.14)
ΔA_{t-2}	-0.3533	0.0002	ΔD_{t-2}	-0.4541	-0.1373	ΔTou_{t-2}	-0.3323	-0.0919
	(-5.84)	(0.01)		(-6.98)	(-2.95)		(-6.39)	(-2.05)
ΔA_{t-3}	-0.0894	-0.0042	ΔD_{t-3}	-0.1653	-0.0228	ΔTou_{t-3}		
	(-1.68)	(-0.13)		(-2.98)	(-0.57)			
ΔI_{t-1}	0.0856	-0.2119	ΔI_{t-1}	0.1106	-0.2077	ΔI_{t-1}	0.1231	-0.2130
	(0.93)	(-3.84)		(1.49)	(-3.90)		(1.98)	(-3.97)
ΔI_{t-2}	0.1827	0.1070	ΔI_{t-2}	0.1076	0.1000	ΔI_{t-2}	0.0777	0.0560
	(1.96)	(1.92)		(1.43)	(1.85)		(1.28)	(1.07)
ΔI_{t-3}	0.1898	0.1396	ΔI_{t-3}	0.1428	0.1374	ΔI_{t-3}		
	(2.12)	(2.61)		(1.98)	(2.66)			
Trend	-1.11E-05	-6.68E-06	Trend	-3.42E-05	7.29E-06	Trend	-2.23E-05	-4.74E-06
	(-0.39)	(-0.39)		(-1.44)	(0.43)		(-1.13)	(-0.28)
Constant	0.0059	0.0038	Constant	0.0125	-0.0027	Constant	0.0100	0.0021
	(1.01)	(1.09)		(2.42)	(-0.73)		(2.47)	(0.60)
ECM	-0.0142	0.0237	ECM	0.0149	0.0698	ECM	-0.0152	0.0715
	(-1.23)	(3.44)		(0.68)	(4.49)		(-0.67)	(3.66)
β	-3.431026	-	β	-1.30508	-	β	-1.051085	-
	(-3.75)	-		(-4.09)	-		(-3.43)	-
S-R causality	6.73	0.38	S-R causality	6.54	11.74	S-R causality	4.46	5.34
	[0.0811]	[0.9448]		[0.0882]	[0.0083]		[0.1076]	[0.0692]

Note: t-Student appears between parenthesis and p-values between brackets. A_t, D_t, Tou_t and I_t refer to arrivals, departures total tourism and imports respectively. In Eq1 the dependent variable is arrivals, departures and total tourism accordingly whereas, in Eq2 it is imports. $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$

Table 2.5. Cointegration and causality between trade and tourism. United Kingdom

Eq1: $\Delta y_{1t} = \varphi_1 + \tau_1 t + \sum_{i=1}^{p} \alpha_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{1i} \Delta y_{2t-i} + \gamma_1 ECM_{t-1} + u_{1t}$

Eq2: $\Delta y_{2t} = \varphi_2 + \tau_2 t + \sum_{i=1}^{p} \alpha_{2i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{2i} \Delta y_{2t-i} + \gamma_2 ECM_{t-1} + u_{2t}$

	Eq1	Eq2		Eq1	Eq2		Eq1	Eq2
ΔA_{t-1}	-0.6258	-0.0023	ΔD_{t-1}	-0.7347	-0.0235	ΔTou_{t-1}	-0.6929	-0.0150
	(-11.33)	(-0.08)		(-12.81)	(-0.68)		(-12.17)	(-0.36)
ΔA_{t-2}	-0.3465	0.0033	ΔD_{t-2}	-0.4435	-0.0658	ΔTou_{t-2}	-0.4202	-0.0493
	(-5.68)	(0.11)		(-6.87)	(-1.69)		(-6.66)	(-1.08)
ΔA_{t-3}	-0.0888	-0.0125	ΔD_{t-3}	-0.1610	-0.0257	ΔTou_{t-3}	-0.1218	-0.0279
	(-1.66)	(-0.47)		(-2.96)	(-0.78)		(-2.26)	(-0.71)
ΔT_{t-1}	0.0823	-0.1777	ΔT_{t-1}	0.2473	-0.1852	ΔT_{t-1}	0.2084	-0.1772
	(0.76)	(-3.29)		(2.86)	(-3.54)		(2.85)	(-3.35)
ΔT_{t-2}	0.2303	0.1461	ΔT_{t-2}	0.1046	0.1232	ΔT_{t-2}	0.1596	0.1318
	(2.13)	(2.71)		(1.19)	(2.32)		(2.16)	(2.46)
ΔT_{t-3}	0.1999	0.2540	ΔT_{t-3}	-0.0076	0.2534	ΔT_{t-3}	0.0739	0.2525
	(1.91)	(4.87)		(-0.09)	(4.95)		(1.04)	(4.89)
Trend	-1.12E-05	-7.57E-06	Trend	-3.37E-05	5.12E-06	Trend	-2.65E-05	-1.45E-07
	(-0.39)	(-0.53)		(-1.42)	(0.36)		(-1.35)	(-0.01)
Constant	0.0055	0.0040	Constant	0.0129	-0.0019	Constant	0.0108	0.0001
	(0.94)	(1.36)		(2.55)	(-0.63)		(2.65)	(0.03)
ECM	-0.0257	0.0381	ECM	0.0086	0.0568	ECM	-0.0004	0.0662
	(-1.37)	(4.07)		(0.43)	(4.73)		(-0.02)	(4.65)
β	-2.603984	-	β	-1.778559	-	β	-1.633635	-
	(-4.59)	-		(0.00)	-		(-4.79)	-
S-R causality	6.58	0.43	S-R causality	8.49	3.13	S-R causality	10.83	1.30
	[0.0865]	[0.9331]		[0.0369]	[0.3724]		[0.0127]	[0.7294]

Note: t-Student appears between parenthesis and p-values between brackets. A_t, D_t, Tou_t and T_t refer to arrivals, departures, total tourism and total trade respectively. In Eq1 the dependent variable is arrivals, departures and total tourism accordingly whereas, in Eq2 it is total trade. $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$

Related to hypothesis (iii), Granger tests are applied to study the short-run causal nexus between tourism and trade flows. Table 2.3 shows the results of the analysis of short-run causality between tourism and exports. There seems to exits a short-run relationship in the sense exports generate departures and total tourism. As presented in Table 2.4, the causal link runs from departures to imports and from tourist arrivals and total tourism to imports. Finally, Table 2.5 reflects the analysis of the causal nexus between tourism and total trade. The results suggest that trade causes arrivals, departures and hence total tourism.

In general, the short-run analysis supports a link between trade and tourism. However the most frequent way in this relationship is from trade to tourism. For almost all the cases study (7 of 9), there is a short-run causal relationship in the sense "trade causes tourism". For the opposite relationship, just it is only found for the case, "tourist departures cause imports".

Figure 2.6. Impulse (Trade)-Response (Total Tourism). United Kingdom

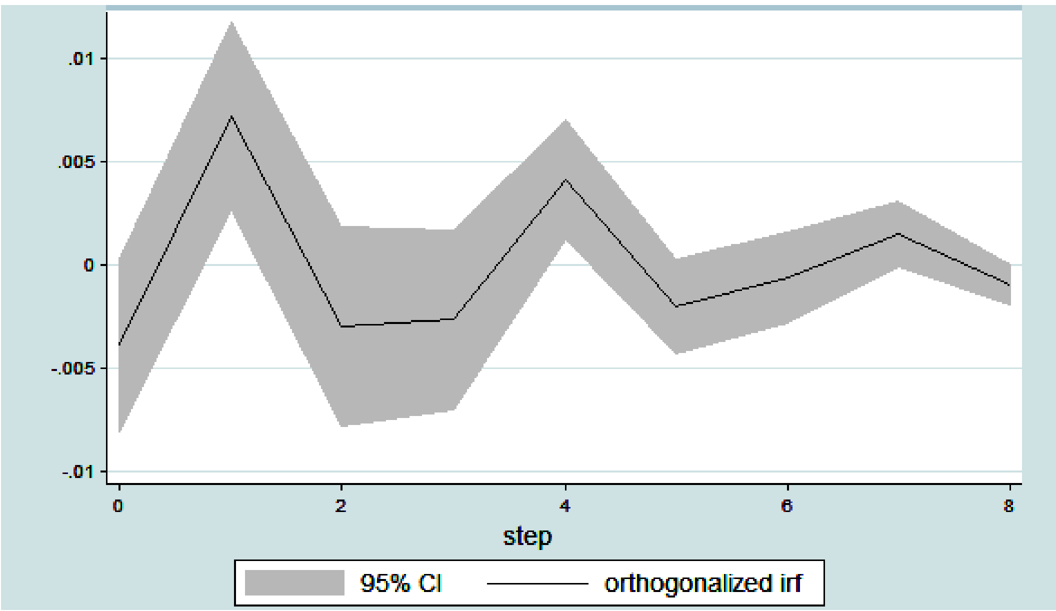
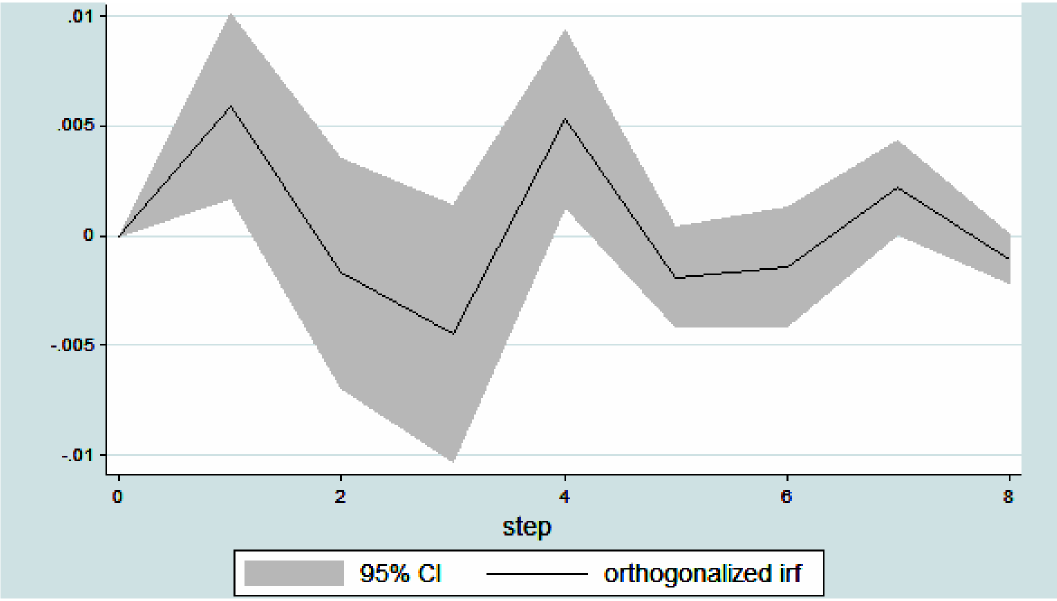


Figure 2.7. Impulse (Total Tourism)-Response (Trade). United Kingdom



In order to complement the results obtained from the Granger causality test, the impulse-response functions are estimated. Impulse-response functions are computed to give an indication of the system's dynamic behaviour. Also an impulse-response function shows how a variable in the VECM system responds to a single 1% exogenous change in another variable of interest.

Figures 2.6 and 2.7 illustrate the estimated impulse-response function for 8 months. Figure 2.6 represents response of total tourism to a one per cent exogenous shock in total trade while Figure 2.7 represents the opposite relationship. It can be observed how in both cases, an exogenous shock has an effect on the other variable and also that this effect appears to die out very quickly. Specifically, the shock in trade has a greater influence on total tourism the next months rather than over longer term horizons. The same happens for the case of a shock in total tourism. Generally the results of the impulse response functions for the variables in this study are consistent with the results obtained from the Granger causality test that suggests a nexus between trade and tourism.

In summary, systematic relationships between tourism and trade are found. Also, the coefficients provide evidence in favour of not only a relationship between trade and tourism, but also a positive link between both variables. These results imply that international tourism increases international trade and vice versa, supporting the presence of a virtuous circle which can increase the market size and, as a consequence, promotes growth.

When the short-run causal relationship is analysed, the relationship is mainly in the direction trade causes tourism. In section 2.2 of the present chapter, some channels through which this relationship can go are given. For instance, transactions and dealings between countries create interest among consumers about the source countries of the goods and these may subsequently lead to a surge in the flow of holiday visits to these countries.

2.3.3 Case study of Canary Islands

About three-quarters of small countries are islands of less than one million inhabitants. Small island regions suffer from limitations on economic performance, which include lack of diversification because of resource scarcity, income volatility due to extreme openness and export concentration, and an inability to generate self-sustained growth because of capital shortage and small market size (Demas, 1965). These facts have made small island regions highly dependent upon international trade. At the same time, these regions are often specialised in tourism due to the availability of accessible natural resources such as beaches, natural areas and sunny weather. In many cases, this type of region presents a comparative advantage in tourism, and therefore its economy is often based on this industry.

However, tourism can lead to a concentration of resources in the service industry and an increase in revenue from raw material exports, which divert resources away from industrial and agricultural sectors to this tourism industry and to the service sector. This fact may lead to a deterioration of the conditions for the manufacturing and agricultural sectors, sending them into a decline. In the literature, these circumstances have often been named as the Dutch disease[8]. The concept was first developed by Corden and Neary (1982) and Corden (1984) and refers to the reaction of the economy when a boom in exports occurs through the discovery of natural resources or a new use for them. The presence of signs of Dutch Disease could result in a negative relationship between tourist arrivals and exports.

Nevertheless, most of the literature suggests several channels for a positive link. A closer look at trade and tourism data in many countries reveals that both flows very often move together. Moreover, countries that have increased their international trade become more open and have also increased their international tourism and viceversa. As a consequence, a positive relationship is expected. It is also worth mentioning that both flows could provoke an increase in market size, not only in a direct but also in an indirect way. As indicated in Section 2.1, a virtuous circle of trade and tourism could facilitate economic growth in these territories. This could have relevant policy implications since any policy diminishing transaction costs for trade and tourism would increase the market size, promoting economic growth.

Whether a positive or negative link exists, this could shed light on the presence of a virtuous circle in the nexus between trade and tourism, or if there is evidence of Dutch disease. The case of the Canary Islands is explored to analyse the existence of this nexus.

Canary Islands is a Spanish archipelago comprised of a group of islands with a total population of 2 million inhabitants in 2007 and a total surface area of 7,446 square kilometers. The availability of natural resources and special weather during the whole year turn into the Canary Islands one of the main travel destinations in Spain. Specifically, it was the third Spanish region in terms of international tourist arrivals after Catalonia and the Balearic Islands in 2007 with over 9 million visitors travelling to the region that year.

[8] Nowak and Sahli (2007) and Capó-Parrilla et al (2005) analyse “Dutch disease” for small islands tourism economies

According to the *Tourism Satellite Account* of the Instituto Canario de Estadística, the tourism sector represents around 31.09% of regional GDP and 30.47% of total employment on the islands in 2007. At the same time, the Canary Islands are a highly dependent region in terms of trade, which means a high intensity of trade flows, but also trade imbalances. The openness and the commercial coverage rate for trade, including trade with mainland Spain, were around 48% and 18% respectively. So imports are five times greater than exports, which give rise to a negative trade balance.

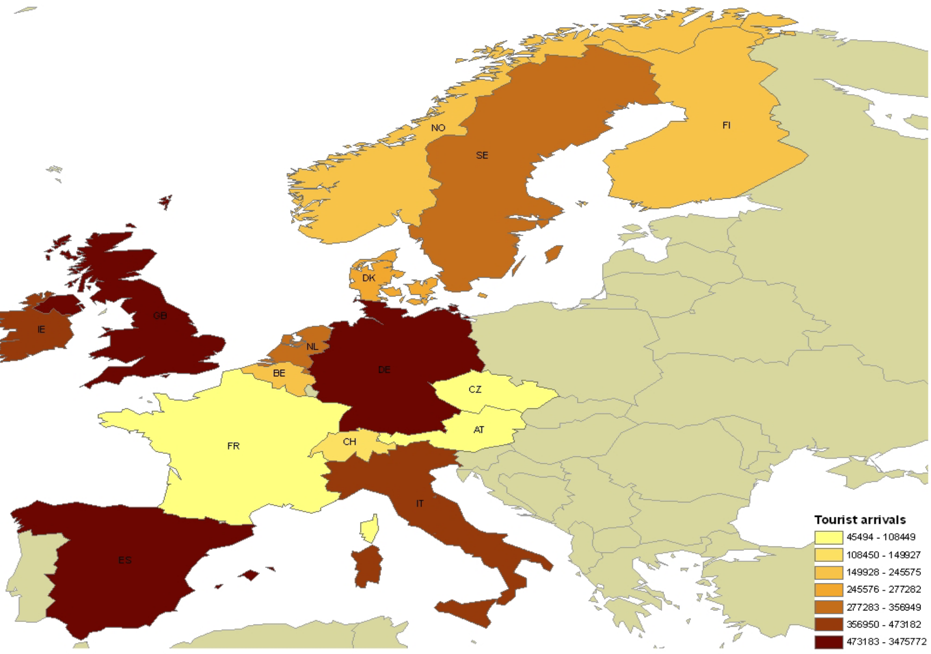
The high openness and low coverage rates have traditionally been associated with the *small island problem*: small size of the domestic market and lack of competition; disadvantages in reaching economies of scale in productions for the local market; export specialisation and/or dependency on imports of intermediate, consumer and capital goods (Hernández-Martín, 2004). These features along with the specialisation of the economy in the tourism sector make the Canary Islands an interesting case study for the analysis of the link between trade and tourism flows on small island regions. Furthermore, our work provides an additional view of the causal nexus by simultaneously studying the short and long-run relationship.

The analysis of other features of the tourism sector in the Canary Islands can be found in the literature. In this sense, Ledesma et al (2001) and Garín (2006) analyse tourism demand for Tenerife and the Canary Islands respectively. Results suggest a high elasticity with respect to the real income per capita, showing the luxurious nature of tourism. Moreover, the introduction of the endogenous lagged variable as an explanatory variable and its significance could indicate the importance of the reputation captured by the high degree of repetition of the tourists to the region. Some other papers that study tourism in the Canary Islands are Moreno (2003), Hernández-López (2004), Díaz-Pérez et al. (2005), Hoti et al. (2006) and Cuñado and Gil-Alana (2007) among others. These papers are mainly focused on analysing the tourist demand in the islands, however they are not considering the effect of tourism on trade.

An antecedent in the study of the relationship between trade and tourism for the case of Canary Islands is Hernández-Martín (2004). However this paper studies the relationship in an indirect way, since studies the impact of tourism on GDP. His results suggest that imports are leakages that reduce the economic impact of tourism because consumption by tourists in the Canary Islands generated high levels of direct imports.

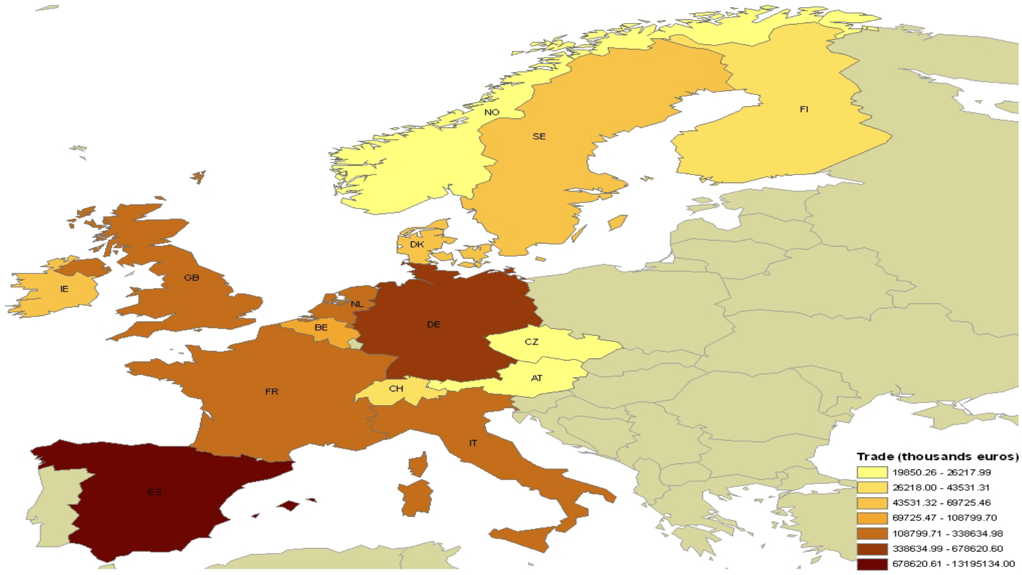
Figure 2.8 presents tourist arrivals to the region by country of origin, and it can be observed how the main sources of tourists to the islands are the United Kingdom, Germany and mainland Spain. Indeed, about three-quarters of the total tourists arriving to the Canary Islands come from these origins.

Figure 2.8. Main origins of tourist arrivals to the Canary Islands



Regarding trade, as shown in Figure 2.9, the most important commercial partner of the region is mainland Spain representing more than 60% of total trade. The main international trade partners are Germany, United Kingdom and some African countries such as Morocco, Cameroon and Equatorial Guinea (*Anuario Económico Canarias* 2007).

Figure 2.9. Main trading partners of the Canary Islands



Tourism data used in this research are monthly *tourist arrivals* (A_t) by country of origin over the period January 1995 to March 2007. Monthly *exports* (E_t), *imports* (I_t) and *total trade* (T_t) of goods by partner country in thousands of euro are considered for the same period. The analysis is carried out for the main tourism markets of the Canary Islands, i.e., United Kingdom, Germany, France, Netherlands and Sweden, and additionally for the total international tourist arrivals. Moreover, due to the special geographical features of the region, it is possible and also relevant to analyse trade and tourism flows with mainland Spain (including the Balearic Islands).

Tourism data and trade data with mainland Spain were obtained from *Instituto Canario de Estadística* (ISTAC) and international trade data were taken from *"Estadísticas de Comercio Exterior"* (DATACOMEX). Trade data are deflated by using Spanish monthly consumer price index, obtained from the *Instituto Nacional de Estadística*, and all series are seasonally adjusted and expressed in logarithms.

Figure 2.10 plots the series of tourist arrivals, exports, imports and total trade from the mainland Spain in logarithms. A close look at these series suggests that the four variables seem to present a positive trend. This pattern could indicate that trade and tourism variables are integrated.

Figure 2.10. Mainland Spain tourist arrivals, exports, imports and total trade. Canary Islands.

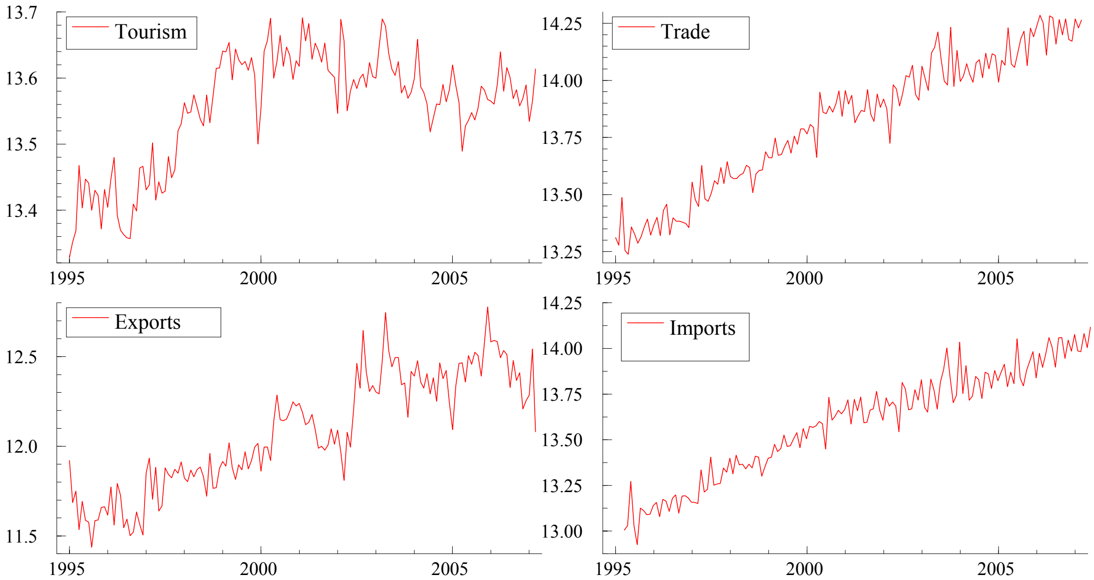
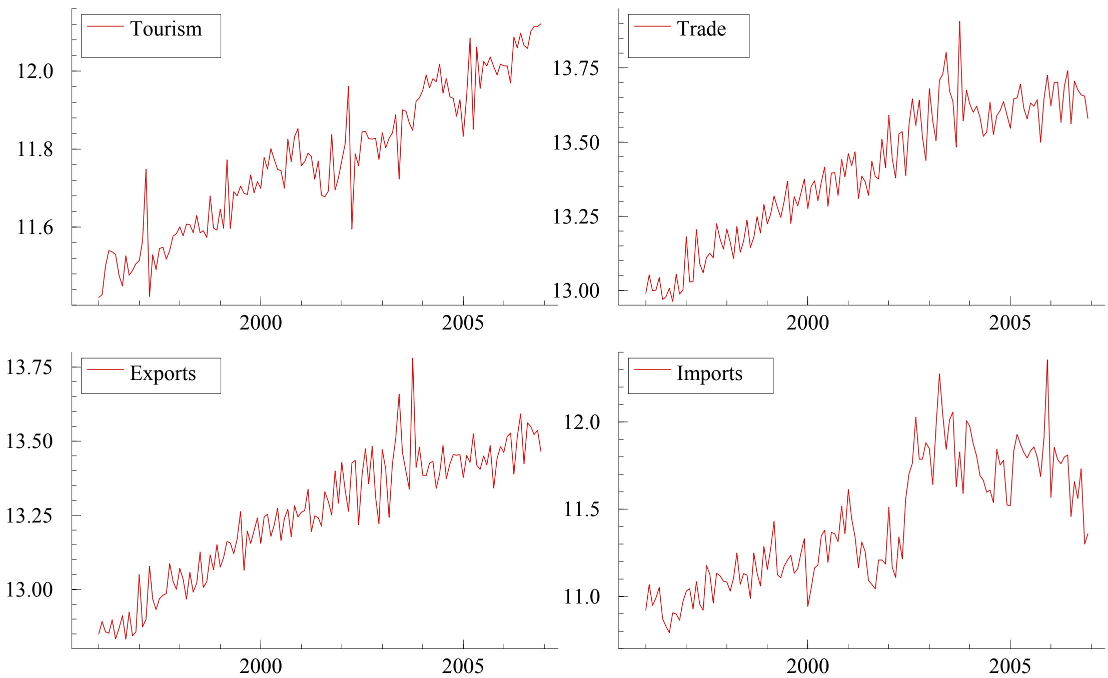


Figure 2.11. International tourist arrivals, exports, imports and total trade. Canary Islands



Similarly, Figure 2.11 plots the series of total international tourist arrivals, exports, imports and total trade to Canary Islands. Again all series seem to be increasing with time, which could indicate that trade and tourism are non-stationary.

As in Subsection 2.3.2, the first step of the analysis is the study of the statistical properties of each variable. For this purpose, we implement some classic methods to investigate whether the series are stationary [I(0)] or non-stationary [I(1)]. In particular, we carry out the Augmented Dickey-Fuller (ADF) statistic to formally test the non-stationarity of trade and tourism flows with intercept and trend.

Table 2.6. ADF Unit roots tests. Canary Islands

Series		Mainland Spain	Total International	Germany	United Kingdom	France	Netherlands	Sweden
(A_t)	lags	5	8	7	11	8	9	12
	cte	[0.9628]	[0.0173]	[0.3082]	[0.2872]	[0.7124]	[0.2778]	[0.5159]
	trend	[0.0854]	[0.6424]	[0.3147]	[0.9339]	[0.0277]	[0.9354]	[0.5328]
(E_t)	lags	9	9	12	12	3	12	11
	cte	[0.3338]	[0.6795]	[0.2452]	[0.0000]	[0.0141]	[0.0664]	[0.1174]
	trend	[0.7316]	[0.2848]	[0.3154]	[0.0000]	[0.0675]	[0.0868]	[0.2966]
(I_t)	lags	8	12	12	12	12	11	12
	cte	[0.4350]	[0.6879]	[0.4959]	[0.4175]	[0.1062]	[0.4594]	[0.3221]
	trend	[0.8300]	[0.6283]	[0.6425]	[0.2659]	[0.0759]	[0.1568]	[0.0043]
(T_t)	lags	9	12	12	3	12	11	12
	cte	[0.2582]	[0.8375]	[0.6393]	[0.0124]	[0.1480]	[0.2152]	[0.2548]
	trend	[0.9315]	[0.2076]	[0.6229]	[0.0095]	[0.0439]	[0.4177]	[0.0025]

Nota: MacKinnon approximate p-value between brackets

As can be observed in Table 2.6, the null hypothesis of a unit root cannot be rejected at 1% significance level for almost all cases, except for exports and total trade to the United Kingdom. This result implies that all series are integrated of the same order, and hence cointegration between variables can be explored, although exports and trade with the United Kingdom are dropped from the analysis. Specifically, a summary of the results for the three hypotheses described in Subsection 2.3.1 is presented.

Table 2. 7. Cointegration and Causality analysis. Tourist arrivals –Exports. Canary Islands

$$\text{Eq1: } \Delta y_{1t} = \varphi_1 + \tau_1 t + \sum_{i=1}^{p} \alpha_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{1i} \Delta y_{2t-i} + \gamma_1 ECM_{t-1} + u_{1t}$$

$$\text{Eq2: } \Delta y_{2t} = \varphi_2 + \tau_2 t + \sum_{i=1}^{p} \alpha_{2i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{2i} \Delta y_{2t-i} + \gamma_2 ECM_{t-1} + u_{2t}$$

	Mainland Spain		**Total International**		**Germany**		**France**		**Netherland**		**Sweden**	
	Eq1	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**
ΔA_{t-1}	-0.3249	0.0163	-0.2947	0.5346	-0.4943	-0.7175	-0.3508	-2.7121	-0.4303	-0.0259	-0.5776	1.0010
	(-2.57)	(0.10)	(-3.77)	(1.90)	(-5.41)	(-1.37)	(-3.17)	(-3.51)	(-5.37)	(-0.06)	(-6.90)	(2.62)
ΔA_{t-2}	-0.0764	0.1015	-0.1908	0.6863	-0.3449	-0.1657	-0.3151	-2.3194	-0.3217	0.6288	-0.1242	1.0970
	(-0.83)	(0.81)	(-2.44)	(2.43)	(-4.24)	(-0.36)	(-2.71)	(-2.86)	(-4.01)	(1.43)	(-1.48)	(2.87)
ΔA_{t-3}							0.1503	-1.8716				
							(1.29)	(-2.29)				
ΔA_{t-4}							0.0256	-1.7188				
							(0.22)	(-2.07)				
ΔA_{t-5}							0.2512	-2.8899				
							(2.45)	(-4.04)				
ΔA_{t-6}							0.2563	-1.3040				
							(2.93)	(-2.13)				
ΔE_{t-1}	-0.0213	-0.7513	0.0662	-0.3357	-0.0190	-0.4049	-0.0260	-0.6281	0.0052	-0.0001	0.0249	-0.1099
	(-0.36)	(-9.38)	(2.76)	(-3.88)	(-1.25)	(-4.67)	(-2.10)	(-7.27)	(0.28)	(0.00)	(1.07)	(-1.03)
ΔE_{t-2}	-0.0087	-0.4966	0.0287	-0.1778	-0.0066	-0.1863	-0.0158	-0.3480	0.0289	0.0677	0.0037	-0.1299
	(-0.15)	(-6.22)	(1.29)	(-2.22)	(-0.45)	(-2.21)	(-1.12)	(-3.54)	(1.87)	(0.80)	(0.20)	(-1.54)
ΔE_{t-3}							-0.0431	-0.1524				
							(-2.97)	(-1.50)				
ΔE_{t-4}							-0.0366	-0.2268				
							(-2.45)	(-2.17)				
ΔE_{t-5}							-0.0640	-0.2285				
							(-4.45)	(-2.27)				
ΔE_{t-6}							-0.0119	-0.1809				
							(-0.90)	(-1.97)				
Trend	-6.88E-06	-1.10E-04	-9.15E-05	7.66E-06	3.56E-05	6.57E-06	4.93E-04	1.69E-04	-1.81E-04	-1.42E-06	-2.51E-04	2.05E-05
	(-0.05)	(-0.59)	(1.54)	(0.04)	(0.30)	(0.01)	(2.40)	(0.12)	(-1.24)	(0.00)	(-0.89)	(0.02)
Constant	0.0042	0.0178	0.0110	0.0008	-0.0007	0.0015	-0.0662	-0.0129	0.0156	-0.0022	0.0226	-0.0037
	(0.40)	(1.25)	(1.89)	(0.04)	(-0.07)	(0.03)	(-3.61)	(-0.10)	(1.27)	(-0.03)	(0.96)	(-0.03)
ECM	-0.6712	0.0419	-0.0161	-0.1921	-0.2155	1.1679	-0.4136	1.2042	-0.0040	0.5078	-0.0380	-0.4655
	(-4.83)	(0.22)	(1.01)	(3.36)	(-2.93)	(2.78)	(-4.14)	(1.72)	(-0.26)	(6.08)	(-2.03)	(-5.44)
β	-0.0037		1.25609		-0.1053		-0.0379		-1.3591		1.4350	
	(-0.03)		(3.59)		(-1.94)		(-1.18)		(-6.52)		(5.83)	
S-R causality	0.13	1.1	7.64	7.68	2.09	1.58	28.62	24.41	4.47	2.37	1.48	9.93
	[0.9357]	[0.5756]	[0.0219]	[0.0215]	[0.3514]	[0.4529]	[0.0001]	[0.0004]	[0.1068]	[0.3051]	[0.4775]	[0.007]

Note: Eq1 and Eq2 represent the first and second equation in the VECM respectively. In Eq1 the dependent variable is tourist arrivals (A_t) whereas, in Eq2 it is exports (E_t), t-student statistic appears between parenthesis and p-values appear between brackets. $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$

Table 2. 8. Cointegration and Causality analysis. Tourist arrivals-Imports. Canary Islands

Eq1: $\Delta y_{1t} = \varphi_1 + \tau_1 t + \sum_{i=1}^{p}\alpha_{1i}\Delta y_{1t-i} + \sum_{i=1}^{p}\eta_{1i}\Delta y_{2t-i} + \gamma_1 ECM_{t-1} + u_{1t}$

Eq2: $\Delta y_{2t} = \varphi_2 + \tau_2 t + \sum_{i=1}^{p}\alpha_{2i}\Delta y_{1t-i} + \sum_{i=1}^{p}\eta_{2i}\Delta y_{2t-i} + \gamma_2 ECM_{t-1} + u_{2t}$

	Mainland Spain		Total International		Germany		United Kingdom		France		Netherlands		Sweden	
	Eq1	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**
ΔA_{t-1}	-0.3878	0.9015	-0.1349	-0.4497	-0.0420	-0.1415	-0.3643	-0.9603	-0.6959	-0.2648	-0.4428	-0.1583	-0.5929	0.0396
	(-3.18)	(2.67)	(-1.57)	(-2.72)	(-0.31)	(-0.33)	(-3.96)	(-2.25)	(-8.24)	(-1.27)	(-5.36)	(-0.68)	(-6.97)	(0.20)
ΔA_{t-2}	-0.1071	0.3411	-0.0771	0.0205	-0.1112	-0.1284	-0.1513	-1.2029	-0.4908	-0.0610	-0.3150	-0.3344	-0.1219	-0.1916
	(-1.19)	(1.37)	(-0.88)	(0.12)	(-0.93)	(-0.34)	(-1.55)	(-2.66)	(-5.22)	(-0.26)	(-3.83)	(-1.43)	(-1.43)	(-0.98)
ΔA_{t-3}			-0.0124	-0.1042	0.1070	-0.1905	0.0151	-0.7016	0.0538	-0.3181				
			(-0.15)	(-0.63)	(1.09)	(-0.62)	(0.15)	(-1.54)	(0.65)	(-1.55)				
ΔA_{t-4}			-0.1463	0.1880	-0.0430	0.0673	-0.0669	-0.3171						
			(-1.82)	(1.22)	(-0.54)	(0.27)	(-0.77)	(-0.79)						
ΔI_{t-1}	0.0897	-0.4765	-0.1339	-0.3336	-0.1537	-0.8048	0.0168	-0.0525	-0.0164	-0.3359	0.0342	-0.5047	-0.0371	-0.1716
	(2.94)	(-5.65)	(-1.47)	(-1.90)	(-2.96)	(-4.94)	(0.46)	(-0.31)	(-0.31)	(-2.58)	(0.96)	(-4.98)	(-0.70)	(-1.41)
ΔI_{t-2}	0.0572	-0.2902	-0.0644	-0.4153	-0.0635	-0.6213	-0.0238	-0.0763	0.0155	-0.2119	0.0264	-0.3852	-0.0320	-0.0666
	(1.82)	(-3.34)	(-0.82)	(-2.77)	(-1.25)	(-3.90)	(-0.76)	(-0.53)	(0.33)	(-1.85)	(0.93)	(-4.76)	(-0.87)	(-0.79)
ΔI_{t-3}			-0.0110	-0.3203	0.0189	-0.4075	0.0222	-0.0939	0.0120	-0.1215				
			(-0.18)	(-2.78)	(0.43)	(-2.99)	(0.87)	(-0.79)	(0.34)	(-1.40)				
ΔI_{t-4}			0.0303	-0.1428	0.0337	-0.1318	0.0078	0.0646						
			(0.73)	(-1.78)	(1.15)	(-1.43)	(0.42)	(0.74)						
Trend	1.53E-04	-8.71E-05	-9.56E-05	-3.89E-05	-8.21E-06	-1.21E-05	-8.47E-05	-1.15E-06	-1.80E-05	-5.37E-06	-1.66E-04	-1.54E-05	-2.44E-04	1.38E-06
	(1.10)	(-0.23)	(-1.64)	(-0.35)	(0.08)	(-0.04)	(-1.11)	(0.00)	(-0.09)	(-0.01)	(-1.12)	(-0.04)	(-0.86)	(0.00)
Constant	-0.0014	0.0077	0.0160	0.0118	0.0065	0.0142	0.0087	0.0005	-0.0099	0.0003	0.0147	0.0031	0.0212	0.0028
	(-0.14)	(0.27)	(2.57)	(0.99)	(0.76)	(0.53)	(1.36)	(0.02)	(-0.59)	(0.01)	(1.21)	(0.09)	(0.89)	(0.05)
ECM	-0.5991	-1.0537	-0.1878	0.4619	-0.8396	0.5686	-0.0110	0.8046	-0.0911	0.3047	0.0104	-0.1121	0.0005	0.0809
	(-4.54)	(-2.89)	(-3.26)	(4.17)	(5.31)	(1.15)	(-0.34)	(5.33)	(-2.45)	(3.33)	(0.92)	(-3.52)	(0.08)	(6.10)
β	0.0731		-1.6986		-0.2974		-1.2380		-1.4853		3.3444		-10.9553	
	(1.65)		(-8.49)		(8.63)		(-7.23)		(-4.49)		(3.70)		(-6.08)	
S-R causality	9.16	7.76	4.93	11.59	0.98	21.04	11.5	8.78	0.87	4.99	1.1	2.09	0.76	1.68
	[0.0103]	[0.0207]	[0.2944]	[0.0207]	[0.9124]	[0.0003]	[0.0215]	[0.0668]	[0.8334]	[0.1727]	[0.5774]	[0.3511]	[0.6824]	[0.4313]

Note: Eq1 and Eq2 represent the first and second equation in the VECM respectively. In Eq1 the dependent variable is tourist arrivals (A_t) whereas, in Eq2 it is imports (I_t), t-student statistic appears between parenthesis and p-values appear between brackets. $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$

Table 2. 9 Cointegration and Causality analysis. Tourist arrivals-Total Trade. Canary Islands

$$\text{Eq1: } \Delta y_{1t} = \varphi_1 + \tau_1 t + \sum_{i=1}^{p} \alpha_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{1i} \Delta y_{2t-i} + \gamma_1 ECM_{t-1} + u_{1t}$$

$$\text{Eq2: } \Delta y_{2t} = \varphi_2 + \tau_2 t + \sum_{i=1}^{p} \alpha_{2i} \Delta y_{1t-i} + \sum_{i=1}^{p} \eta_{2i} \Delta y_{2t-i} + \gamma_2 ECM_{t-1} + u_{2t}$$

	Mainland Spain		**Total International**		**Germany**		**France**		**Netherland**		**Sweden**	
	Eq1	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**	**Eq1**	**Eq2**
ΔA_{t-1}	-0.8146	0.0567	-0.2118	-0.1795	-0.0173	-0.4031	-0.7398	-0.2194	-0.4293	0.0650	-0.5960	0.0806
	(-10.34)	(0.90)	(-2.59)	(-1.18)	(-0.13)	(-1.01)	(-8.74)	(-1.11)	(-5.26)	(0.28)	(-7.03)	(0.43)
ΔA_{t-2}	-0.5097	0.0473	-0.1665	0.3065	-0.0854	-0.3279	-0.4981	-0.0939	-0.3039	-0.1666	-0.1208	-0.1214
	(-6.50)	(0.75)	(-1.99)	(1.98)	(-0.72)	(-0.94)	(-5.15)	(-0.42)	(-3.74)	(-0.73)	(-1.42)	(-0.65)
ΔA_{t-3}			-0.1018	0.0976	0.1266	-0.2555	0.0621	-0.3068				
			(-1.21)	(0.63)	(1.28)	(-0.89)	(0.73)	(-1.54)				
ΔA_{t-4}			-0.2020	0.3745	-0.0338	0.0039						
			(-2.50)	(2.50)	(-0.42)	(0.02)						
ΔE_{t-1}	0.1787	-0.3233	0.0749	-0.5401	-0.1808	-0.6957	-0.0002	-0.2537	0.0410	-0.2934	-0.0372	-0.2190
	(1.14)	(-2.57)	(1.05)	(-4.08)	(-3.22)	(-4.25)	(-0.00)	(-1.99)	(1.14)	(-2.89)	(-0.67)	(-1.81)
ΔE_{t-2}	0.1339	-0.0679	0.0890	-0.4419	-0.0824	-0.5608	0.0338	-0.1357	0.0434	-0.3524	-0.0382	-0.0860
	(1.17)	(-0.74)	(1.30)	(-3.48)	(-1.52)	(-3.55)	(0.70)	(-1.21)	(1.47)	(-4.25)	(-0.99)	(-1.02)
ΔE_{t-3}			0.0725	-0.2155	0.0021	-0.3437	-0.0003	-0.0569				
			(1.24)	(-1.98)	(0.04)	(-2.55)	(-0.01)	(-0.66)				
ΔE_{t-4}			0.0588	-0.0423	0.0208	-0.1379						
			(1.35)	(-0.52)	(0.66)	(-1.50)						
Trend	-0.0001	0.0000	-0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0002	0.0000	-0.0002	0.0000
	(-0.79)	(0.33)	(-1.49)	(-0.21)	(0.28)	(0.10)	(0.08)	(0.01)	(-1.16)	(-0.04)	(-0.88)	(0.01)
Constant	0.0164	-0.0019	0.0120	0.0059	0.0041	0.0089	-0.0135	-0.0005	0.0145	0.0018	0.0215	0.0020
	(1.23)	(-0.18)	(1.92)	(0.51)	(0.48)	(0.36)	(-0.79)	(-0.01)	(1.20)	(0.05)	(0.91)	(0.04)
ECM	-0.0183	-0.0543	-0.0469	0.1797	-0.8545	0.8527	-0.0196	0.1042	0.0042	-0.0494	0.0011	0.0434
	(-1.26)	(-4.66)	(-1.64)	(3.39)	(-5.51)	(1.89)	(-1.75)	(3.98)	(0.99)	(-4.09)	(0.33)	(5.78)
β	12.0672		-2.425856		-0.3396		-5.1782		9.2009		-18.9727	
	(5.23)		(-4.14)		(-9.17)		(-4.56)		(4.16)		(-5.79)	
S-R causality	0.9	1.57	2.34	12.68	1.57	19.62	1.44	3.86	2.3	0.83	0.98	1.26
	[0.6374]	[0.4564]	[0.6731]	[0.0129]	[0.814]	[0.0006]	[0.6967]	[0.2766]	[0.3171]	[0.6588]	[0.6113]	[0.5333]

Note: Eq1 and Eq2 represent the first and second equation in the VECM respectively. In Eq1 the dependent variable is tourist arrivals (A) whereas, in Eq2 it is trade (T). $ECM = y_{it} - \mu - \lambda t - \beta y_{2t}$, t-student statistic appears between parethesis and p-values appear between brackets.

Tables 2.7, 2.8 and 2.9 present a summary of the cointegration and causality analyses. The three tables show the details of the results of the estimation for different pairs of relationships. In particular, Table 2.7 refers to the analysis of the relationship between tourist arrivals and exports, Table 2.8 refers to the causal nexus between tourist arrivals imports and finally, Table 2.9 shows the results for the relationship between tourist arrivals and total trade. Moreover, these tables present the estimations of VAR parameters, the ECM parameter, the β parameter and the χ^2-test for the analysis of the short run causality.

As shown in Tables 2.7, 2.8 and 2.9, along with hypothesis (i), the ECM is significant in all cases. These results may imply that trade and tourism variables are cointegrated and hence, a long-run relationship between these flows exists. According to hypothesis (ii), the long-run coefficient β is significant in almost all cases and the sign of the coefficients is mainly negative implying that the relationship is essentially complementary[9]. That is, trade flows promotes tourism and viceversa.

With regard to hypothesis (iii) where the short-run causal nexus is tested, the results show that short-run relationships exist in around half of the cases (10 of 19) analysed. Among these 10 cases, the relationship is bidirectional in 4 cases, whereas it is unidirectional and mainly in the sense that tourism generates trade, namely imports, exports or total trade, in 5 out of the 10 cases.

Let focus the attention on the results for the aggregate flows, that is trade and tourism with mainland Spain and total international. The analysis shows that a bidirectional link between imports and tourist arrivals with the mainland Spain exists, while for total international visitors there is a bidirectional causal nexus between exports and tourism and a link in the sense tourist arrivals lead to imports and total trade. In this sense, the presence of a short-run link is found and the

[9] It is worth noting that in the case of Sweden a substitutability link between exports and tourism is found. However, this nexus could hardly indicate the presence of Dutch disease for two main reasons: (i) this is a specific result for a minor tourism market of the Canary Islands. The aggregate arrivals regardless of specific origin is a better variable to find an indication of Dutch Disease, and this is never concluded; (ii) a negative sign could be due to other causes different from the Dutch Disease such as a reduction of exportable surplus due to consumption by tourists.

nexus mainly runs in the sense that tourism causes trade. This result is also in someway replicated when the causality is analysed by countries.

Figure 2.12, Impulse-Response Functions.
Tourism and Trade of Canary Islands and Mainland Spain

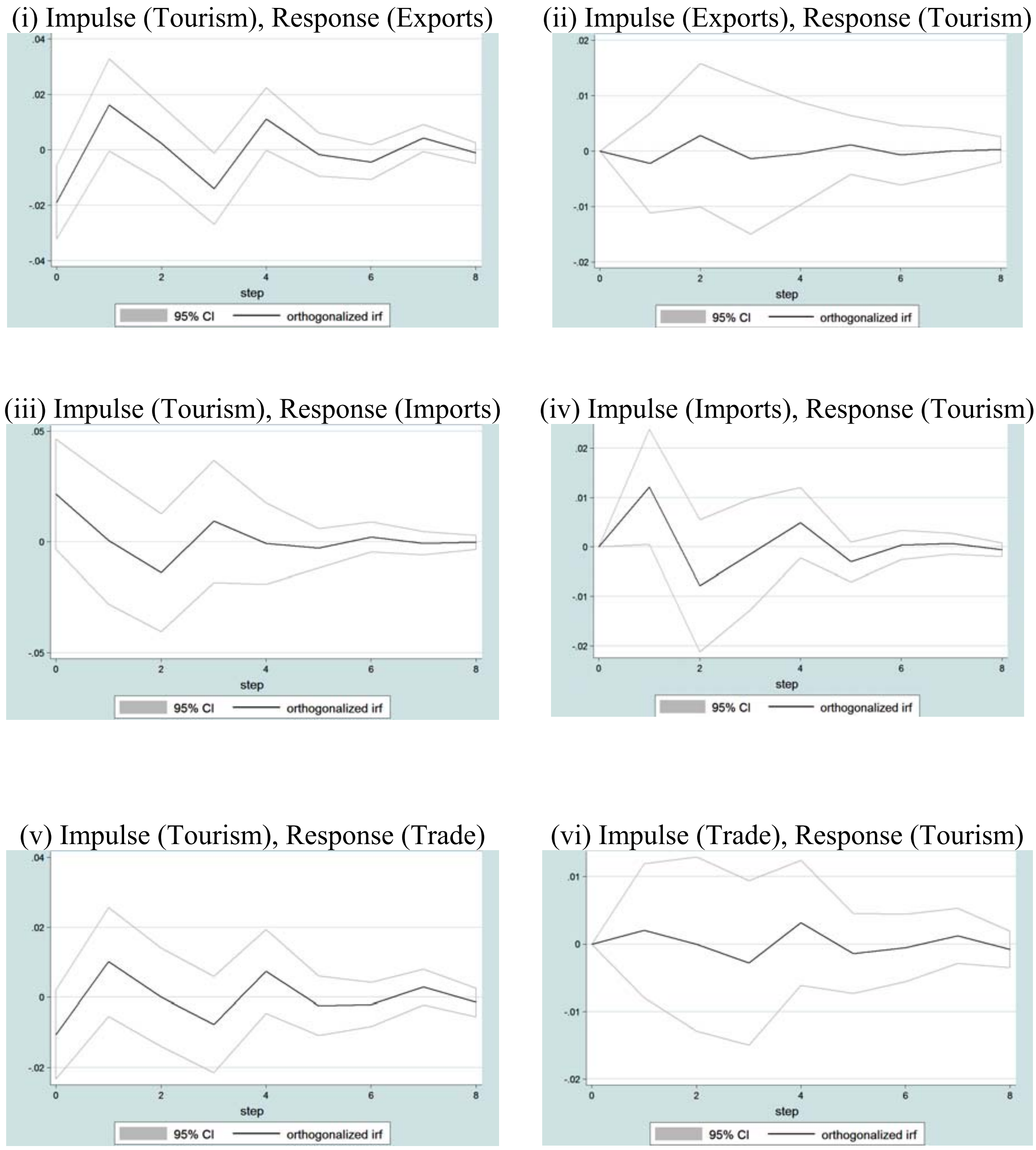
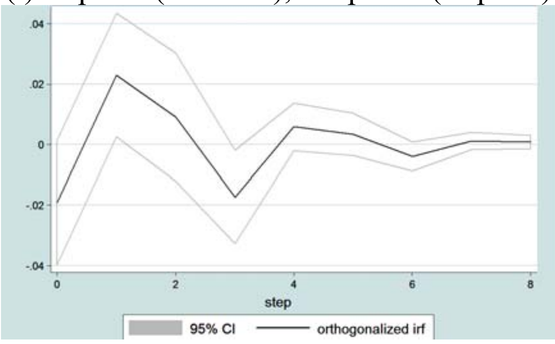
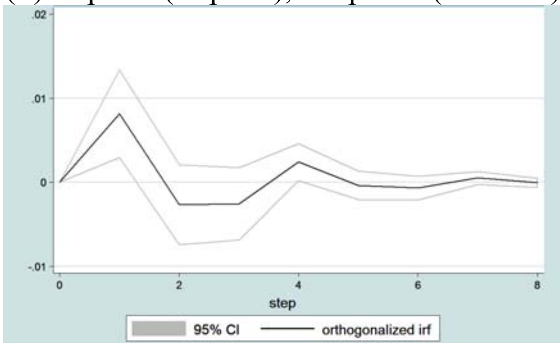


Figure 2.13, Impulse-Response Functions.
International Tourism and Trade of Canary Islands

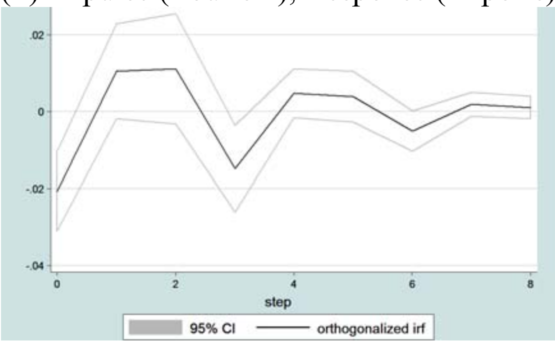
(i) Impulse (Tourism), Response (Exports)



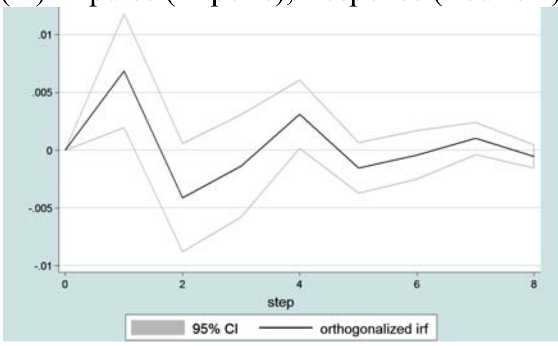
(ii) Impulse (Exports), Response (Tourism)



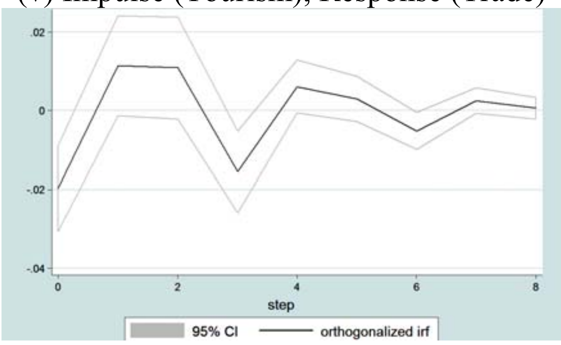
(ii) Impulse (Tourism), Response (Imports)



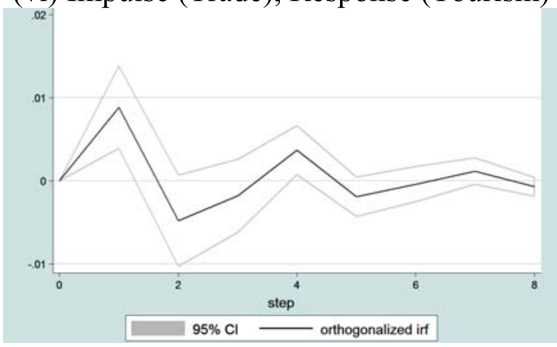
(iv) Impulse (Imports), Response (Tourism)



(v) Impulse (Tourism), Response (Trade)



(vi) Impulse (Trade), Response (Tourism)



Finally, to complement the results obtained from the Granger causality test, the impulse-response functions are estimated. Impulse-response functions are computed to give an indication of the system's dynamic behaviour and also to show how a variable in the VECM system responds to a single one percent exogenous change in another variable of interest.

Figures 2.12 and 2.13 illustrate the estimated impulse-response function for 8 months. Figure 2.12 represents impulse-response for the case of mainland Spain trade and tourism, while Figure 2.13 shows the relationship between these variables for the case of total international tourist arrivals[10]. It can be observed how in all cases an exogenous shock has an effect on the other variable and also that this effect appears to die out very quickly. Specifically, the shocks both in trade and tourism have a greater influence on total tourism and trade variables, respectively, between the first and third month rather than over longer term horizons. Moreover, it can also be observed how a unitary shock in tourism has a greater impact on trade variables, and it is more persistent than for the opposite case.

In general, the results of the impulse response functions for the variables in this study are consistent with the results obtained from the Granger causality test that suggest a causal nexus between trade and tourism variables.

2.4 Tourism and trade in a panel data framework

As mentioned in section 2.2 of this chapter, there are several papers that analyse causality between flows of goods and tourists such as Kulendran and Wilson (2000), Shan and Wilson (2001) and Khan et al (2005). These authors explore the relationship between trade and tourism for the case study of specific countries or regions and are mainly focused on time series analysis. However, there are no papers dealing with the short and long-run relationships between trade and tourism using a cointegrating panel data approach. Following Pesaran et al. (1999)'s dynamic heterogeneous panel data methodology, the empirical relationship between tourism and trade for the case study of the OECD countries is explored in this section. To that end, a cointegration vector for the OECD countries is estimated and causality is analysed.

In connection with this framework, several papers that study causality between variables in a heterogeneous panel data context can be taken as a reference. For

[10] Impulse-response functions for the rest of the countries considered in the analysis have been carried out and are presented in figures A2.1, A2.2, A2.3, A2.4 and A2.5 in the Appendix.

instance, Funk and Strauss (2000) investigate the long-run relationship between productivity and capital. The authors carry out panel cointegration techniques showing that there exists a long-run relationship between both variables. Moreover, dynamic ordinary least squares (DOLS) and fully-modified OLS (FMOLS) are used to estimate a causal nexus between these variables. Maeso-Fernandez et al (2004) analyse cointegration and causality in dynamic heterogeneous panel models. By using pooled mean group (PMG), DOLS and FMOLS estimates, the authors analyse the long-run relationship between exchange rate gap and per capita income.

Our present analysis contributes to the literature in two ways. First, the causality between trade and tourism is studied in a general perspective for a group of countries instead of focusing on a specific region or product. Second, dynamic heterogeneous panel cointegration techniques are applied to study the short and long-run causal nexus between trade and tourism variables.

2.4.1 Methodology

As mentioned above, it has been widely recognised that trade as well as tourism variables are mostly non-stationary. This fact implies that the variables must be modelled in a suitable econometric framework in order to avoid drawing conclusions based on spurious results. Accordingly, in this section the existence of unit roots is tested, the long-run parameters are estimated and causality in a dynamic panel data cointegration framework is analysed.

Panel unit root tests are similar to unit root tests carried out on a single series. In the panel data framework, two types of tests can be used. Firstly, the panel unit root tests which assume independence across countries are applied. These tests are based on the ADF model, and the ADF equation for panel data may be expressed as

$$\Delta y_{it} = \rho_i y_{it-1} + \sum_{j=1}^{p} \delta_i \Delta y_{it-j} + x'_{it}\beta + \varepsilon_{it}, \qquad [2.7]$$

where y_{it} is the series of interest being $i = 1,2,...,N$ cross-section units over periods $t = 1,2,...,T$, x_{it} represents a column vector of exogenous variables, including any fixed effects or individual trends, ρ_i is the mean-reversion coefficient, p is the lag length of the autoregressive process and ε_{it} a idiosyncratic disturbance assumed to be a mutually independent. If $|\rho_i| < 1$, y_{it} is said to be weakly (trend-) stationary, and if $\rho_i = 1$, then y_{it} presents a unit root.

Two natural assumptions may be made about ρ_i in the ADF model for panel data. Firstly, one can assume that the persistence parameters are common across countries, so that $\rho_i = \rho$ for all i. Using this assumption, the Breitung (2000) and Levin et al (2002) approaches (both testing for a null hypothesis of a unit root against the alternative of no unit root), and the Hadri (2000) one (which tests the null of no unit root against the alternative hypothesis of a unit root) can be applied. Second, one can allow ρ_i to be freely varying across units, allowing for individual unit root processes. This is the case of ADF and PP tests proposed by Maddala and Wu (1999) and Choi (2001) and IPS test proposed by Im et al. (2003). The three of them test the null hypothesis of a unit root against the alternative hypothesis of some individuals without unit roots. In general, the possible deterministic components employed are fixed effects, and individual effects and individual trend.

Secondly, the panel unit root tests which allow dependence across countries are applied. All the above panel unit root tests assume independence across countries. However, this assumption is restrictive, and if violated, it can lead to over-rejection of the null hypothesis (Bai and Ng, 2004). In this sense, the so-called "second-generation" tests that account for cross-section dependence should be used (for example Bai and Ng (2004) or Moon and Perron (2004), and Breitung and Pesaran (2008) for a survey). In order to test for a unit root allowing for cross-section dependence through a common-factor structure, the set of procedures developed by Bai and Ng (2004, PANIC) are adopted[11].

[11] The main reason for using this approach is because it is more general than other tests (i.e., Moon and Perron, 2004).

First, in this procedure a preliminary PANIC analysis on each variable y_{it} to extract common factors is conducted. The factor model can be written as $y_{it} = c_i + \lambda_i' F_t + e_{it}$, where c_i is a specific constant, F_t indicates an r×1 vector of common factors, λ_i is a vector of loading factors and e_{it} is an idiosyncratic error. Second, ADF test for unit roots are performed on both the common factors and the idiosyncratic components for each i, as follows: (1) If r=1, the ADF can be used (with an intercept) such as $\Delta F_t = c + \gamma_0 F_{t-1} + \sum_{i=1}^{p} \gamma_i F_{t-i} + v_t$, for testing the null of I(1) [$H_0 : \gamma_0 = 0$] common factor. (2) Then, the ADF can be used (with no deterministic terms) such as $\Delta \hat{e}_{it} = \delta_0 \hat{e}_{it-1} + \sum_{j=1}^{p} \delta_j \Delta \hat{e}_{it-j} + \varpi_{it}$, for testing the null of I(1) [$H_0 : \delta_0 = 0$] in the idiosyncratic error. And third, to test the non-stationarity of the idiosyncratic component, Bai and Ng (2004) propose to pool individual ADF t-statistic based on results of (2). More specifically, based on P-values of ADF t-statistic for i-th cross-section units, they obtain a standardized Choi's type statistic ($BN_{\hat{e}}$) which converge when $N, T \to \infty$ to N(0,1).

Similarly than in Section 2.3, after analyse the stationary properties of the variables, the cointegration and causality between trade and tourism flows are studied. A particular way to estimate the long-run parameters and the speed of adjustment to the long-run equilibrium (or ECM) is the dynamic panel data framework proposed by Pesaran et al. (1999). This approach is modelled as an autoregressive distributed lag model (ARDL). The classic specification for two variables, in our case trade and tourism flows, can be written as

$$y_{it} = \mu_i + \sum_{j=0}^{p} \lambda_{ij} y_{it-j} + \sum_{j=0}^{q} \delta_{ij} x_{it-j} + v_{ij} \qquad [2.8]$$

where μ_i are fixed-effects, and p and q are the autoregressive and distributed polynomial lags, respectively.

The ECM panel data model, which is a re-parameterization of the equation [2.8], can be defined as the following general expression

$$\Delta y_{it} = \phi_{1i} y_{it-1} + \gamma_{1i} x_{it} + \sum_{j=1}^{p_i} \alpha_{1,ij} \Delta y_{it-j} + \sum_{j=1}^{q_i} \beta_{1,ij} \Delta x_{it-j} + \nu_{1i} + \vartheta_{1i} t + u_{1,it} \qquad [2.9]$$

where i =1…N indicate countries, $t = 1,...,T_i$ is the sample period for each i-th group, y_{it} and x_{it} are I(1) variables, ϕ_{1i} is the error correction coefficient for i-th group, γ_{1i} is the long-run parameter for i-th group, p_i and q_i are the lag length of the autoregressive distributed lag model for i-th group, $\alpha_{1,ij}$ and the row vector $\beta_{1,ij}$ represents the country-specific coefficients of the short-term dynamics, ν_{1i} and ϑ_{1i} represent the country-specific intercepts and time trend parameters respectively, and $u_{1,it}$ is an iid innovation. A similar equation can be derived for Δx_{it}

$$\Delta x_{it} = \phi_{2i} x_{it-1} + \gamma_{2i} y_{it} + \sum_{j=1}^{p} \alpha_{2,ij} \Delta y_{it-j} + \sum_{j=1}^{q} \beta_{2,ij} \Delta x_{it-j} + \nu_{2i} + \vartheta_{2i} t + u_{2,it} \qquad [2.10]$$

with $u_{2,it}$ as iid error term, uncorrelated with $u_{1,it}$ and ϕ_{1i} and ϕ_{2i} denote speeds of adjustment. According to Engle and Granger (1987), the existence of cointegration implies causality between the set of variables as expressed by $|\phi_{1i}| + |\phi_{2i}| > 0$.

Therefore, if cointegration between y_{it} and x_{it} exists, an error correction term is required to test Granger causality, and hence cointegration can be viewed as an indirect test of long-run equilibrium

Pesaran et al. (1999) propose the estimation of [2.9] and [2.10] by the mean-group (MG, where N separate regressions are estimated and the coefficient means are calculated) and the pooled mean-group estimators (PMG, which constrains the long-run coefficients to be identical). This last estimator is an intermediate procedure between MG and the fixed or random effects estimators where the intercepts are allowed to differ across groups while all other coefficients and error variances are constrained to be the same.

More specifically, equations [2.9] and [2.10] are estimated using the maximum likelihood procedure to get the PMG estimator where the long-run coefficients γ_1 or γ_2, are defined to be the same across countries . These regressions can also be estimated with individual specific γ_{1i} or γ_{2i}, which are then averaged over N to obtain a MG estimator. This last procedure is the natural background to test for the presence of slope homogeneity based on a Hausman test[12].

Equations [2.9] and [2.10] allow us to test three different hypotheses by assuming that all parameters are equals for the different groups and $p_i = q_i \equiv p$. For equation [2.9], and similarly for equation [2.10], these hypotheses can be defined as follows:

i. The first hypothesis is related to cointegration where the null-hypothesis in equation [2.9] is $H_0 : \phi_1 = 0$ (or $H_0 : \phi_2 = 0$ in equation [2.10]) and a Wald test distributed as a chi square with one degree of freedom (χ_1^2), where one is the number of restrictions under the null hypothesis, is used. The rejection of the null hypothesis indicates that both variables are cointegrated.

ii. The second hypothesis related to the significance of the long-run elasticity in equation [2.9] is $H_0 : \gamma_1 = 0$ (or $H_0 : \gamma_2 = 0$ in equation [2.10]). The rejection of this null hypothesis implies that the elasticity between each tourist and trade variables is statistically significant. A Wald test distributed as a chi square with one degree of freedom (χ_1^2) is again employed.

[12] MG approach provides consistent estimates of the mean of the long-run slope coefficients (though it suffers from a lagged dependent variable bias for small T), but it is inefficient if slopes are homogeneous.

iii. The third hypothesis tests the presence of short-run causality. This is a test for the condition of zero adjustment for all countries. In this case, the null hypothesis in equation [2.9] is $H_0 : \beta_{1,.1} = ... = \beta_{1,.p} = 0$ (or $H_0 : \alpha_{2,.1} = ... = \alpha_{2,.p} = 0$ in equation [2.10]) assuming that parameters are equal for all groups. The Wald statistic is distributed as a χ_p^2, p being the lag length. The rejection of the null hypothesis implies the existence of short-run causality in the sense of Granger (1981).

Considering that the MG estimator is always consistent, a Hausman test is constructed to test for slope homogeneity. Under the null hypothesis of homogeneity, the PMG estimator is consistent and efficient, while it is inconsistent under the alternative hypothesis.

2.4.2 Case study of OECD

Tourism, which has expanded dramatically over the last thirty years, looks set to continue growing as the economy becomes more open and prosperous. Tourism is a key component of the services sector, which is growing in most OECD countries (30% of international trade in services in the OECD area). In terms of revenues, OECD countries generate about 70% of world tourism activity while these countries represent about 75% of world international trade.

In this section, the relationship between international exports, imports and total trade and tourist arrivals and departures is investigated for the case study of the OECD countries. With this aim, a dynamic heterogeneous panel data model is estimated where the short and long-run causality between trade and tourism is explored using Granger causality test and panel data cointegration techniques.

Figure 2.14 OECD Evolution of tourist arrivals 1980-2006 (millions)

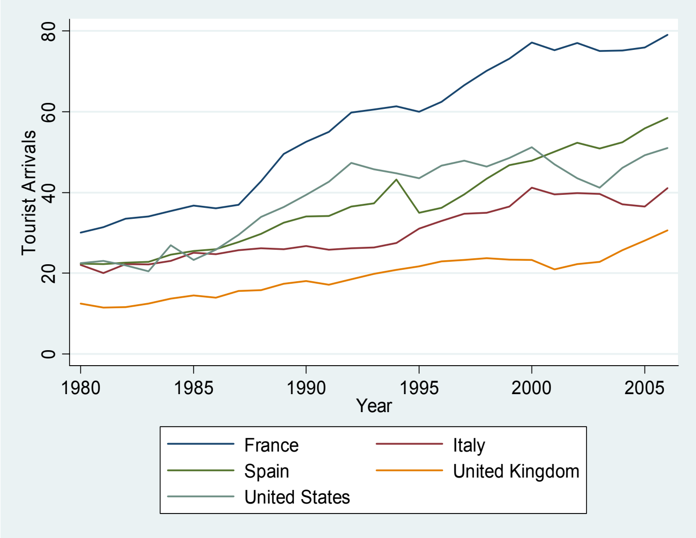


Figure 2.15 OECD Evolution of tourist departures 1980-2006 (millions)

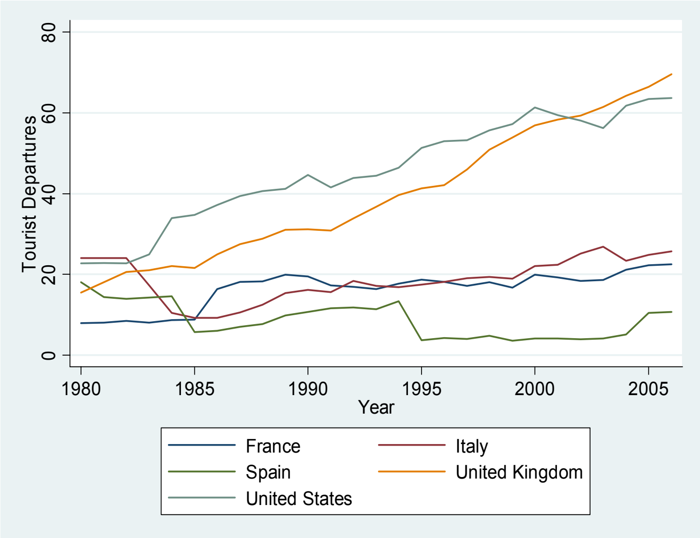
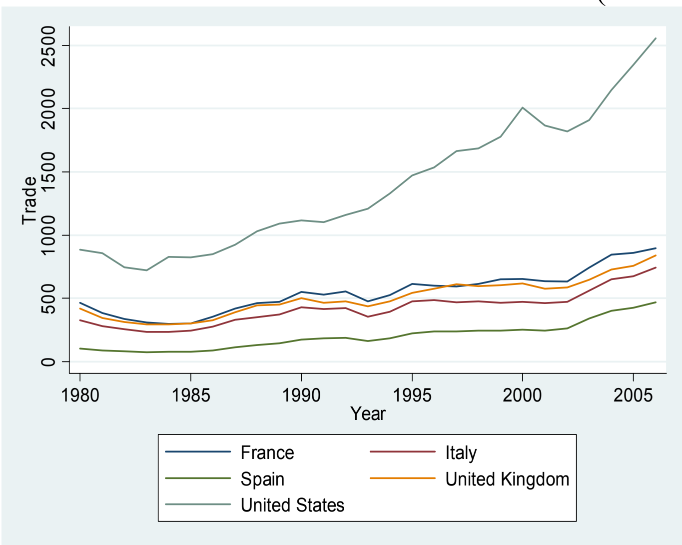


Figure 2.16 OECD Evolution of Total Trade 1980-2006 (millions of US$)



With respect to trade flows (measured in US$), annual exports, imports, and total trade, as the sum of exports and imports, over the period 1980-2006 are considered. These variables need to be converted into real terms by using US GDP deflator. Regarding the tourism variable, annual international tourist arrivals and departures for the OECD countries over the same period are included. The choice of the sample period was mainly conditioned by the availability of tourism data for OECD countries. Trade flow data were collected from the International

Monetary Fund (IMF) Trade Statistics[13] while tourism data and US GDP deflator were obtained from "World Development Indicators" of the World Bank.

The evolution of tourist arrivals, departures and total trade for a set of OECD countries are presented in Figures 2.14 to 2.16. As can be observed, these plots suggest that these variables could be non-stationary.

With respect to the study of the stationary properties of the trade and tourism variables, Table 2.10 summarizes the results of the six tests for no cross-dependence by using EViews 6.0 and the $BN_{\hat{e}}^{c}$ test by using Matlab 6.5[14]. The statistical properties of each variable are studied individually to investigate whether the series are non-stationary. On the one hand, the results of panel unit root tests that consider no cross-dependence, suggest that all the variables present a unit root.

By the other hand, when the unit root tests under cross-dependence between countries are considered, only one common factor for each variable is obtained[15].

---

[13] Data from IMF does not include trade in services. The main drawback of this exclusion is that any potential complementarity between tourism and certain services, (e.g. transport services) cannot be addressed. However its inclusion would provide spurious results since tourist arrival (departure) is nearly the same variable as tourism receipts (expenditures)

[14] We use the computer Matlab code for panel unit root and non-stationarity tests written by Serena Ng (see http://www.columbia.edu/~sn2294/research.html).

[15] Since this procedure allows the consideration of the common factors and the idiosyncratic components separately, we first use the information criteria (IC) procedure developed in Bai and Ng (2002) to determine the number of factors (i.e., the panel Bayesian information criteria (BIC), and more specifically the BIC3, pp.202). This information criteria is more robust when there is cross correlation with the idiosyncratic errors. Bai and Ng (2002) reject the modified BIC3 criterion because it does not satisfy the required condition for consistency when either N or T dominates the other one exponentially. However, in our dataset N and T have roughly the same magnitude. In this case, the BIC3 criterion performs the best among all criteria

In the case of only one common factor, Bai and Ng suggest using a standard Augmented Dickey–Fuller (ADF) test to analyse the non-stationarity. The ADF test results for the idiosyncratic error show evidence of a unit root in each variable. These results imply that all series are integrated of the same order, and hence the cointegration between variables can be studied.

Table 2.10. Unit Root tests. OECD countries

Vbles	Levin-Lin-Chun (LLC) t*-modified		Breitung t-stat	Hadri Z-stat		Im-Pesaran-Shin (IPS) W-stat		ADF – Fisher Chi-Square		PP – Fisher Chi-Square		Bai & NG
	Fixed	Trend	Trend	Fixed	Trend	Fixed	Trend	Fixed	Trend	Fixed	Trend	No fixed & trend
(A_t)	4.14	2.35	0.16	18.55	7.00	8.52	1.01	15.21	62.84	13.30	51.20	-3.945
	[1.00]	[0.99]	[0.56]	[0.00]	[0.00]	[1.00]	[0.84]	[1.00]	[0.38]	[1.00]	[0.78]	[0.99]
(D_t)	7.60	2.22	-0.83	15.51	10.95	7.46	1.57	27.54	60.84	25.63	44.00	-1.997
	[1.00]	[0.99]	[0.20]	[0.00]	[0.00]	[1.00]	[0.94]	[1.00]	[0.31]	[1.00]	[0.88]	[0.98]
(E_t)	16.94	7.71	12.41	19.38	8.13	20.31	5.85	0.91	49.44	0.63	33.23	0.801
	[1.00]	[1.00]	[1.00]	[0.00]	[0.00]	[1.00]	[1.00]	[1.00]	[0.83]	[1.00]	[1.00]	[0.21]
(I_t)	16.89	6.73	10.51	18.88	9.05	19.31	4.90	0.25	39.68	0.29	27.56	0.277
	[1.00]	[1.00]	[1.00]	[0.00]	[0.00]	[1.00]	[1.00]	[1.00]	[0.98]	[1.00]	[1.00]	[0.39]
(T_t)	17.54	6.59	11.32	19.38	8.99	20.81	5.94	0.57	38.38	0.22	28.12	1.046
	[1.00]	[1.00]	[1.00]	[0.00]	[0.00]	[1.00]	[1.00]	[1.00]	[0.99]	[1.00]	[1.00]	[0.15]

Note: In the table appear different unit root tests. First, the table shows the tests which assume no cross-dependence between countries. In this case, we consider two types of tests. By the one hand, we consider the null hypothesis of common unit root process (LLC t*-modified, Breitung t-stat, and Hadri Z-stat). And, by the other hand, we consider the null hypothesis of individual unit root processes (IPC W-stat, ADF and PP – Fisher Chi square). Moreover, we apply a test which assumes cross-dependence between countries (Bai and Ng). Fixed and Trend represent the deterministic components of the tests: fixed indicates individual effects and trend indicates individual effects and individual linear trends. No fixed and trend indicates that the Bai and Ng test for idiosyncratic errors do not include the constant term and trend. p-values appears between brackets.

PMG and MG are applied using an ARDL(3,3) specification for tourist arrivals and an ARDL(2,2) for tourist departures. These orders are selected by using Akaike information criteria.

Tables 2.11, 2.12 and 2.13 present the panel PMG and MG estimates by using Stata 10.0. Each table has two panels, Panel A refers to tourist arrivals while Panel B refers to tourist departures, and each panel shows the results of the causality in the two directions (equations (7) and (8) indicate the causal link. These tables present the short-run parameters estimates and their t-statistics, the parameter of error correction mechanism (ϕ_1 and ϕ_2) and the long-run parameters (γ_1 and γ_2) with their chi-square statistics. Also the short-run causality test χ_p^2 and the Hausman test with their associated p-values are presented.

Table 2.11: Panel estimation results from the PMG and MG estimators and Granger causality test. Exports and arrivals / Exports and departures. OECD countries

$$Eq.3: \Delta y_{it} = \phi_{1i} y_{it-1} + \gamma_{1i} x_{it} + \sum_{j=1}^{p_i} \alpha_{1,ij} \Delta x_{it-j} + \sum_{j=1}^{q_i} \beta_{1,ij} \Delta x_{it-j} + \nu_{1i} + \vartheta_{1i} t + u_{1,it}$$

$$Eq.4: \Delta x_{it} = \phi_{2i} x_{it-1} + \gamma_{2i} y_{it} + \sum_{j=1}^{p} \alpha_{2,ij} \Delta y_{it-j} + \sum_{j=1}^{q} \beta_{2,ij} \Delta x_{it-j} + \nu_{2i} + \vartheta_{2i} t + u_{2,it}$$

Variables	**PMG**	**MG**	**PMG**	**MG**
Panel A	**Eq.3: Exports**		**Eq.4: Arrivals**	
Constant	2.2608	3.1369	-0.0613	1.2673
	(4.21)	(2.06)	(-0.67)	(1.00)
ΔE_{it-1}	0.2265	0.3633	-0.1111	-0.1886
	(2.46)	(2.51)	(-1.47)	(-2.55)
ΔE_{it-2}	0.0438	0.1343	-0.1428	-0.147
	(0.71)	(1.15)	(-1.34)	(-1.57)
ΔE_{it-3}	0.1244	0.1944	0.059	0.0616
	(2.24)	(1.97)	(0.41)	(0.44)
ΔA_{it-1}	-0.0705	-0.1915	0.1236	0.1487
	(-0.66)	(-2.14)	(1.73)	(2.40)
ΔA_{it-2}	-0.1401	-0.2475	-0.0174	0.0525
	(-1.85)	(-3.17)	(-0.29)	(0.93)
ΔA_{it-3}	-0.1677	-0.3021	-0.0017	0.0826
	(-2.07)	(-3.27)	(-0.03)	(1.15)
ϕ	-0.2547	-0.4549	0.1845	0.2192
	(-16.17)	(-24.7)	(6.66)	(7.24)
γ	1.0399	0.5425	1.5843	1.7102
	(40.50)	(1.03)	(49.17)	(2.60)
χ_p^2	5.59	17.98	8.87	13.31
	[0.13]	[0.00]	[0.03]	[0.00]
Hausman test	0.65		0.03	
	[0.42]		[0.87]	
Panel B	**Eq.3: Exports**		**Eq.4: Departures**	
Constant	0.1392	3.4078	-0.3577	-8.4131
	(2.96)	(2.99)	(-3.52)	(-1.08)
ΔE_{it-1}	0.0895	0.1189	-0.0286	0.0551
	(1.50)	(2.18)	(-0.26)	(0.69)
ΔE_{it-2}	0.0170	0.0686	0.2365	0.4104
	(0.32)	(1.26)	(1.64)	(1.56)
ΔD_{it-1}	-0.0604	-0.0719	0.0339	0.0635
	(-0.96)	(-1.16)	(0.51)	(0.72)
ΔD_{it-2}	-0.0304	-0.0247	-0.0422	-0.0279
	(-0.67)	(-0.51)	(-1.03)	(-0.45)
ϕ	-0.057	-0.2662	0.1486	0.5838
	(6.66)	(14.52)	(25.00)	(2.22)
γ	1.4738	0.7929	1.4057	0.3274
	(12.82)	(1.86)	(14.71)	(0.80)
χ_p^2	1.0700	1.3500	4.5200	4.5300
	[0.59]	0.51	[0.10]	[0.10]
Hausman test	1.9900		2.6600	
	[0.16]		[0.10]	

Note: t-Student for the short-run coefficients and constant term appear between parentheses. Chi-squared for ϕ_1, ϕ_2, γ_1 and γ_2 appear enclosed between parentheses while p-values appear enclosed between brackets. ΔE, ΔA and ΔD refer to exports and tourist arrivals and departures in first differences, respectively.

Table 2.12: Panel estimation results from the PMG and MG estimators and Granger causality test. Imports and arrivals / Imports and departures. OECD countries

$$Eq.3: \Delta y_{it} = \phi_{1i} y_{it-1} + \gamma_{1i} x_{it} + \sum_{j=1}^{p_i} \alpha_{1,ij} \Delta x_{it-j} + \sum_{j=1}^{q_i} \beta_{1,ij} \Delta x_{it-j} + \nu_{1i} + \vartheta_{1i} t + u_{1,it}$$

$$Eq.4: \Delta x_{it} = \phi_{2i} x_{it-1} + \gamma_{2i} y_{it} + \sum_{j=1}^{p} \alpha_{2,ij} \Delta y_{it-j} + \sum_{j=1}^{q} \beta_{2,ij} \Delta x_{it-j} + \nu_{2i} + \vartheta_{2i} t + u_{2,it}$$

Variables	**PMG**	**MG**	**PMG**	**MG**
	Eq.3: Imports		**Eq.4: Arrivals**	
Constant	1.4294	3.5629	-0.6053	0.2123
	(4.60)	(2.62)	(-4.05)	(0.22)
ΔI_{it-1}	0.2448	0.3412	-0.1014	-0.1368
	(6.27)	(5.50)	(-1.14)	(-1.50)
ΔI_{it-2}	-0.0559	0.0494	-0.0350	-0.0629
	(-1.53)	(0.87)	(-0.61)	(-1.10)
ΔI_{it-3}	0.0315	0.1327	-0.0423	-0.0318
	(1.07)	(4.29)	(-1.21)	(-0.80)
ΔA_{it-1}	-0.1459	-0.2928	0.0506	0.0755
	(-1.37)	(-3.38)	(0.86)	(1.29)
ΔA_{it-2}	-0.0241	-0.1752	-0.0034	0.0404
	(-0.28)	(-1.64)	(-0.07)	(0.75)
ΔA_{it-3}	-0.2165	-0.2871	-0.0588	-0.0221
	(-2.85)	(-3.17)	(-1.14)	(-0.41)
ϕ	-0.2157	-0.4394	0.1117	0.1556
	(19.27)	(42.64)	(16.48)	(12.25)
γ	1.1717	1.4699	1.2336	0.9707
	(43.56)	(4.08)	(38.66)	(1.19)
χ^2_p	8.12	15.11	2.41	3.26
	[0.04]	[0.00]	[0.49]	[0.35]
Hausman test	0.57		0.08	
	[0.4494]		[0.7796]	
Panel B	**Eq.3: Imports**		**Eq.4: Departures**	
Constant	0.8230	4.4142	0.9620	-6.5263
	(2.63)	(3.61)	(6.75)	(-1.16)
ΔI_{it-1}	0.1288	0.2092	0.0406	0.0409
	(2.18)	(4.91)	(0.48)	(0.53)
ΔI_{it-2}	-0.0228	0.0647	0.1893	0.1809
	(-0.46)	(1.02)	(1.80)	(1.41)
ΔD_{it-1}	-0.0569	-0.1142	0.0677	0.0381
	(-0.61)	(-1.94)	(0.79)	(0.44)
ΔD_{it-2}	0.0011	0.0325	-0.1092	-0.0805
	(0.02)	(0.59)	(-2.62)	(-1.74)
ϕ	-0.1387	-0.3748	0.1138	0.488
	(6.40)	(25.50)	(39.94)	(3.28)
γ	1.2460	2.5702	2.0879	1.0640
	(25.54)	(1.59)	(10.39)	(1.58)
χ^2_p	0.41	4.59	4.52	3.16
	[0.81]	[0.10]	[0.10]	[0.20]
Hausman test	0.44		1.37	
	[0.5057]		[0.2413]	

Note: t-Student for the short-run coefficients and constant term appear between parentheses. Chi-squared for ϕ_1, ϕ_2, γ_1 and γ_2 appear enclosed between parentheses while p-values appear enclosed between brackets. ΔI, ΔA and ΔD refer to imports and tourist arrivals and departures in first differences, respectively.

Table 2.13: Panel estimation results from the PMG and MG estimators and Granger causality test. Trade and arrivals / Trade and departures. OECD countries

$$Eq.3: \Delta y_{it} = \phi_{1i} y_{it-1} + \gamma_{1i} x_{it} + \sum_{j=1}^{p_i} \alpha_{1,ij} \Delta x_{it-j} + \sum_{j=1}^{q_i} \beta_{1,ij} \Delta x_{it-j} + \nu_{1i} + \vartheta_{1i} t + u_{1,it}$$

$$Eq.4: \Delta x_{it} = \phi_{2i} x_{it-1} + \gamma_{2i} y_{it} + \sum_{j=1}^{p} \alpha_{2,ij} \Delta y_{it-j} + \sum_{j=1}^{q} \beta_{2,ij} \Delta x_{it-j} + \nu_{2i} + \vartheta_{2i} t + u_{2,it}$$

Variables	**PMG**	**MG**	**PMG**	**MG**
Panel A	**Eq.3: Trade**		**Eq.4: Arrivals**	
Constant	2.3155	7.2845	-0.4497	0.9628
	(4.86)	(1.56)	(-4.10)	(0.59)
ΔT_{it-1}	0.2780	0.4277	-0.1691	-0.2147
	(7.38)	(4.10)	(-2.21)	(-3.89)
ΔT_{it-2}	0.0092	0.0957	-0.0470	-0.0928
	(0.22)	(1.45)	(-0.78)	(-1.42)
ΔT_{it-3}	0.0967	0.1613	-0.0492	-0.0158
	(2.41)	(3.81)	(-0.92)	(-0.26)
ΔA_{it-1}	-0.0917	-0.2568	0.0713	0.0795
	(-0.94)	(-3.41)	(1.24)	(1.30)
ΔA_{it-2}	-0.0988	-0.2409	-0.0238	0.0267
	(-1.19)	(-2.18)	(-0.45)	(0.45)
ΔA_{it-3}	-0.2044	-0.2894	-0.0277	0.0386
	(-2.63)	(-3.40)	(-0.57)	(0.73)
ϕ	-0.2362	-0.5636	0.1371	0.153
	(22.37)	(9.73)	(22.37)	(4.58)
γ	1.0224	1.4533	1.4177	1.7288
	(33.27)	(3.24)	(39.63)	(3.15)
χ^2_p	7.29	17.38	5.16	18.09
	[0.06]	[0.00]	[0.16]	[0.00]
Hausman test	0.75		0.23	
	[0.3854]		[0.6286]	
	Eq.3: Trade		**Eq.4: Departures**	
Constant	0.1390	4.1529	-1.1502	-8.0257
	(2.72)	(3.37)	(-5.11)	(-1.17)
ΔT_{it-1}	0.1048	0.1847	-0.0194	0.0457
	(2.04)	(3.41)	(-0.21)	(0.52)
ΔT_{it-2}	0.0319	0.1090	0.2020	0.3181
	(0.62)	(1.80)	(1.34)	(1.58)
ΔD_{it-1}	-0.0913	-0.1355	0.0823	0.0664
	(-1.36)	(-1.79)	(0.87)	(0.74)
ΔD_{it-2}	-0.0401	-0.0059	-0.0503	-0.0516
	(-0.66)	(-0.11)	(-1.21)	(-1.01)
ϕ	-0.082	-0.3286	0.1838	0.5516
	(7.02)	(20.52)	(31.36)	(2.89)
γ	1.5772	0.5890	1.2219	-62.4246
	(15.16)	(1.99)	(22.94)	(-0.99)
χ^2_p	1.9	3.52	2.09	3.43
	[0.38]	[0.17]	[0.35]	[0.18]
Hausman test	8.4		0.47	
	[0.0038]		[0.4938]	

Note: t-Student for the short-run coefficients and constant term appear between parentheses. Chi-squared for ϕ_1, ϕ_2, γ_1 and γ_2 appear enclosed between parentheses while p-values appear enclosed between brackets. ΔT, ΔA and ΔD refer to trade and tourist arrivals and departures in first differences, respectively.

As can be observed, the results obtained from both PMG and MG procedures are similar. The Hausman test shows in all cases, apart from the relationship "total trade causes tourist departures", that the null hypothesis of homogeneity cannot be rejected and hence PMG estimates are efficient and consistent. For this reason, the results are discussed focusing on the PMG estimates.

Related to the hypothesis (i) which studies the cointegration between variables, the results indicate that coefficients are significant in all cases, suggesting a long-run equilibrium relationship between trade and tourism. The significantly negative coefficient of the adjustment term ϕ_1 on equation (7) and the significantly positive coefficient ϕ_2 on equation (8) imply mean reversion to a long-run equilibrium.

According to hypothesis (ii) the long-run coefficients (γ_1 and γ_2) are significant in all cases and this strengthens the evidence of cointegration among the variables[16]. Moreover, it always presents a positive sign suggesting that a complementary relationship exists between trade and tourism.

Regarding the hypothesis (iii), Table 2.11 presents the results associated with Granger tests for the short-run relationship between exports and tourism variables. Specifically, at 10% of significance, there is a unidirectional causal nexus in the sense "exports cause tourist arrival and departures". As mentioned in Section 2.2, this result can be explained as international trade not only promotes business trips but also increases the availability of products for visitors which could attract tourist to visit the country.

As shown in Table 2.12 and 2.13, the short-run causal analysis highlights that causation runs from tourist arrivals to imports while related to total trade, a unidirectional short-run relationship in the sense "tourist arrivals cause trade" is found. These results suggest that tourist arrivals promote imports and total trade

[16] In a preliminary version of this research, cointegration was also studied by using different procedures in a panel data context. For instance, Pedroni (1999, 2004) and Kao (1999) based on Engle-Granger two-step (residual-based) cointegration tests, or Maddala and Wu (1999) using Fisher-type test based on an underlying Johansen methodology. The results confirm that all variables are cointegrated and they are available upon request.

and may be explained considering that many of the products that tourists consume abroad are not produced in the tourist destination and hence needs to be imported. That is, tourism promotes imports directed at satisfying visitors' needs. Furthermore the development of a tourist industry in a destination country could increase its openness to trade, so business travels are required to begin and to maintain the international trade of goods and services.

Finally, cointegration vector can also be estimated by using the fully modified OLS (FMOLS) derived by Pedroni (1996, 2000) and the dynamic OLS (DOLS) based on panel estimator pooled along the within-dimension proposed by Kao and Chiang (2000). DOLS and FMOLS are carried out as a robustness analysis for estimating the long-run elasticity.

Table 2.14 Comparing different panel data estimates for long-run parameters.

Methods	Arrivals vs. Exports		Arrivals vs. Imports		Arrivals vs. Trade		Departures vs. Exports		Departures vs. Imports		Departures vs. Trade	
	γ	t-stat	γ	t-stat	γ	t-stat	γ	t-stat	γ	t-stat	γ	t-stat
FMOLS	0.78	44.14	0.76	39.19	0.76	43.7	1.12	36.93	1.18	36.75	1.15	38.8
DOLS	0.77	89.84	0.8	82.0	0.76	69.13	1.06	89.13	0.96	66.97	1.02	106.25
MG	1.71	2.60	0.97	1.19	1.73	3.15	0.33	0.80	1.06	1.58	-62.4	-0.99*
PMG	1.58	49.17	1.23	38.66	1.42	39.63	1.41	14.71	2.09	10.39	1.22	22.94
	Exports vs. Arrivals		**Imports vs. Arrivals**		**Trade vs. Arrivals**		**Exports vs. Departures**		**Imports vs. Departures**		**Trade vs. Departures**	
	γ	t-stat	γ	t-stat	γ	t-stat	γ	t-stat	γ	t-stat	γ	t-stat
FMOLS	1.29	45.08	1.32	40.11	1.31	44.64	0.69	37.84	0.7	37.18	0.7	38.98
DOLS	1.64	95.85	1.67	89.74	1.65	55.73	0.76	15.88	0.87	81.6	0.84	107.86
MG	0.54	1.03	1.47	4.08	1.45	3.24	0.79	1.86	2.57	1.59	0.59	1.99
PMG	1.04	40.50	1.17	43.56	1.02	33.27	1.47	12.82	1.25	25.54	1.58	15.16

Note: t-stat is the t-statistic for the null hypothesis, $H_0 : \gamma = 0$. (*) This estimate is not statistically significant.

Table 2.14 shows panel DOLS, FMOLS, PMG and MG estimates of the long-run parameter. Although there are differences in the results depending on the estimation method, the parameter is significant and positive in almost all cases. PMG, MG, panel DOLS and FMOLS estimates reveal that a 1% increase in tourism arrivals significantly increases trade by 0.76–1.73%; whereas, a 1% increase in trade generates an 1.02 to 1.65% increase in tourist arrivals. As for the relationship between trade and tourist departures, results show that a 1% increase in tourist departures significantly increases trade by around 1.02-1.22% while a 1% increase in trade generates a 0.59 to 1.58% increases in tourist departures. Similar conclusions can be obtained for the relationship between tourism and exports and imports.

2.5 Summary and conclusions

The main objective of this chapter is to analyse the relationship between flows of goods and tourists. To that end, several ways through which this link can go are described. Furthermore, an additional explanation for the nexus "tourism causes trade" is presented using the *so-called* Integrated World Economy (IWE) approach. In that sense, tourism implies shifting the consumption from the country of origin of visitors to the tourist destination. Moreover, tourists modify the consumption pattern with respect to the one of their countries. This could directly change the volume of trade.

The empirical analysis used two approaches. On the one hand, the link between trade and tourism flows is explored from a time series perspective and considering two different cases study: United Kingdom, because is one of the main world travel destinations as well as being a major source of tourists and the Canary Islands, because is a small island region highly dependent on trade and specialised in the tourism sector. On the other hand, the cross-sectional nexus is explored for the case study of the OECD countries.

Related to the United Kingdom analysis, results suggest a long-term relationship between tourism and trade. With respect to the short-run causality, although evidence of a two-way relationship is found, it is mainly in the direction trade causes tourism. This result could be explained since international trade not only promotes business trips but also increases the availability of products for visitors which could attract tourist to visit the country.

For the case study of The Canary Islands, results also suggest a long-term relationship between tourism and trade which is mainly positive, implying that both flows are complementary. So evidence of the Dutch Disease in terms of trade is not found. This is an important implication because it means that trade increases tourism and viceversa. With respect to the short-run causality, it is mainly in the direction “tourism causes trade”. Therefore, government policies oriented to increasing tourist arrivals not only have a direct effect on the region’s economy but also an indirect promotional effect on international trade. Hence, greater co-operation and coordination between trade and tourism authorities could be required to amplify the benefits that this positive relationship has on economic performance.

On the other hand, this chapter contributes to the study of the relationship between trade and tourism in an additional perspective by considering the analysis in a panel data context. The empirical relationship between tourism and trade for the OECD countries from a dynamic heterogeneous panel data perspective is addressed. Again, a long-term equilibrium relationship is found and it is positive.

The short-run causal analysis highlights that causation runs mainly in the sense “tourist arrivals cause imports” and hence “tourist arrivals cause trade”. These may be explained considering that many of the products that tourists consume abroad are not produced in the tourist destination and hence needs to be imported. That is, tourism promotes imports directed at satisfying visitors’ needs. Moreover, the development of a tourist industry in a destination country could increase its openness to trade, so business travels are required to begin and to maintain the international trade of goods and services.

In general, in both approaches a short and long-run positive nexus between trade and tourism is found. This is a significant finding because means that it seems to exist a complementary link between flows of goods and tourists. These results may reflect business strategies to capture benefits from the complementarity between tourism and also that this complementary relation between flows of goods and international tourism may promote economic growth.

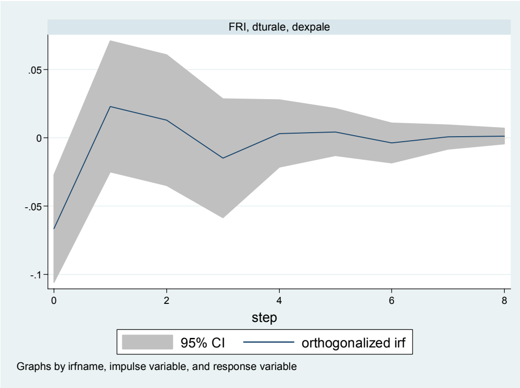
A positive nexus supports the implementation of policies promoting trade and/or tourism. Any policy reducing transaction costs for trade and/or tourism would increase the market size, strengthening growth and facilitating business strategies that capture the benefits of the nexus.

Moreover, since two-way causality is found, government policy could consider tourism as one of the channels for increasing international trade between the tourist destination and other countries. Additionally, government could also focus on promoting the international trade industry, since international trade can be considered as one of the channels for increasing tourist arrivals.

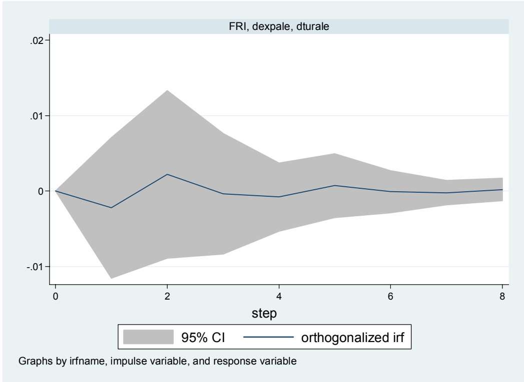
Appendix 2

Figure A2.1, Impulse-Response Functions.
Tourism and Trade. Germany

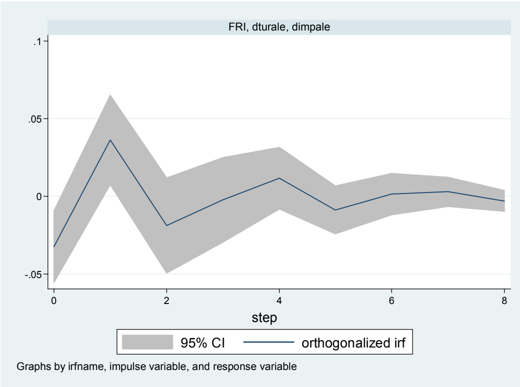
(i) Impulse (Tourism), Response (Exports)



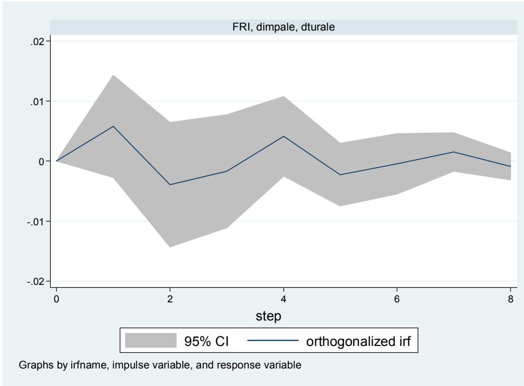
(ii) Impulse (Exports), Response (Tourism)



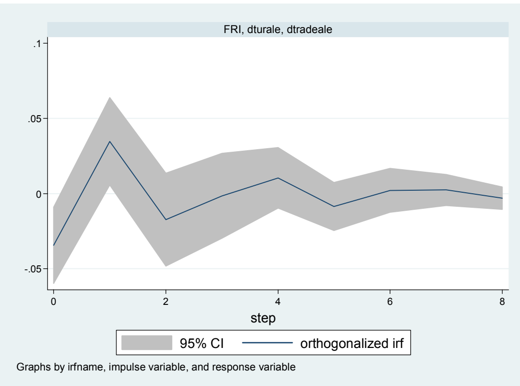
(iii) Impulse (Tourism), Response (Imports)



(iv) Impulse (Imports), Response (Tourism)



(v) Impulse (Tourism), Response (Total Trade)



(vi) Impulse (Total Trade), Response (Tourism)

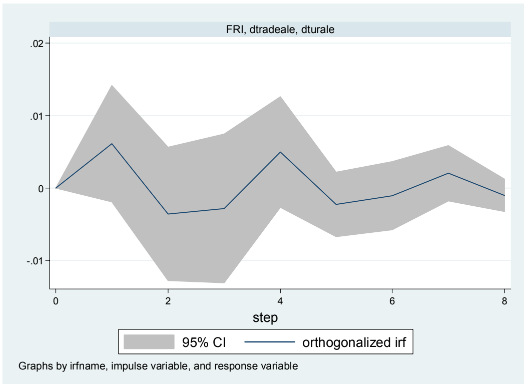
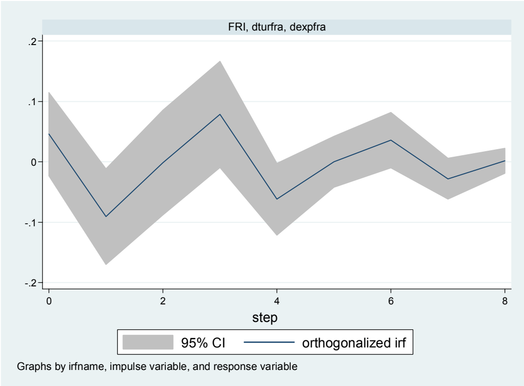
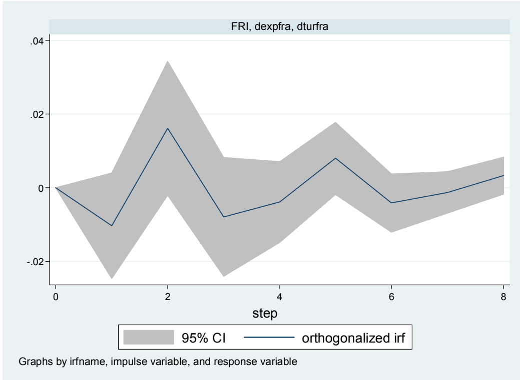


Figure A2.2, Impulse-Response Functions.
Tourism and Trade. France

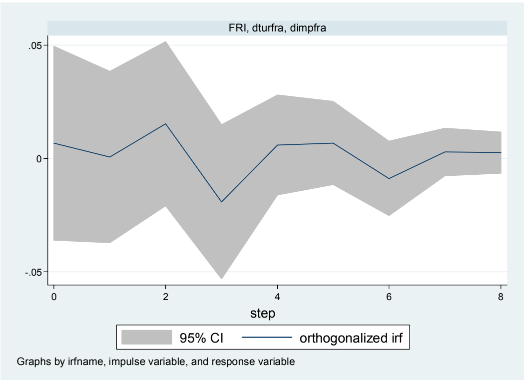
(i) Impulse (Tourism), Response (Exports)



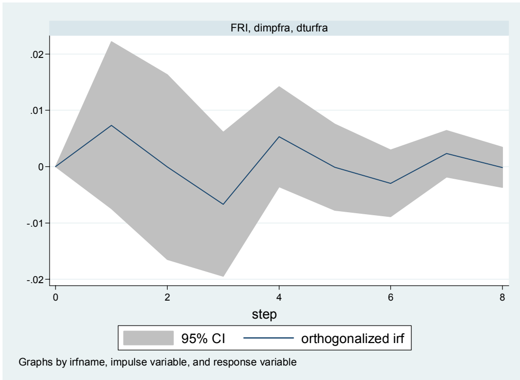
(ii) Impulse (Exports), Response (Tourism)



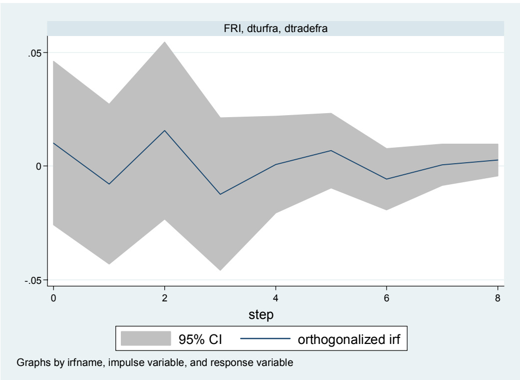
(iii) Impulse (Tourism), Response (Imports)



(iv) Impulse (Imports), Response (Tourism)



(v) Impulse (Tourism), Response (Total Trade)



(vi) Impulse (Total Trade), Response (Tourism)

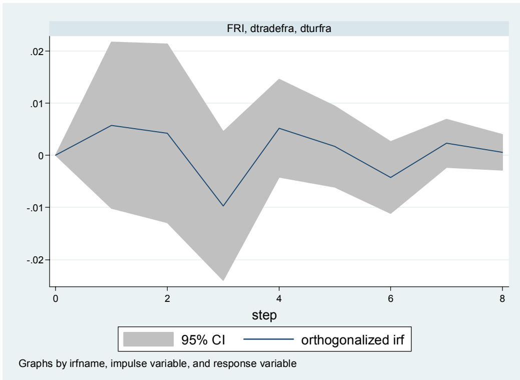
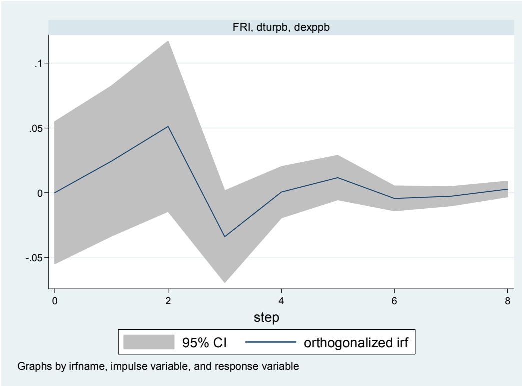
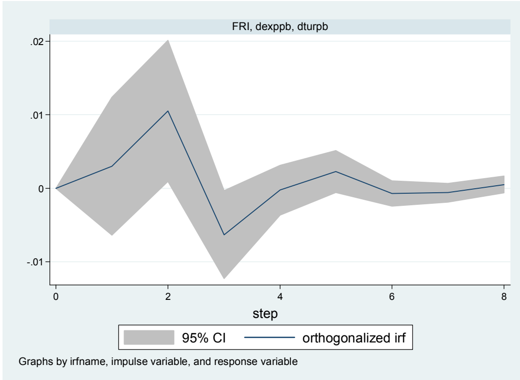


Figure A2.3, Impulse-Response Functions.
Tourism and Trade. Netherlands

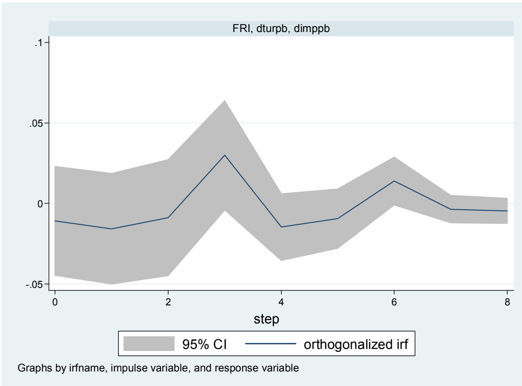
(i) Impulse (Tourism), Response (Exports)



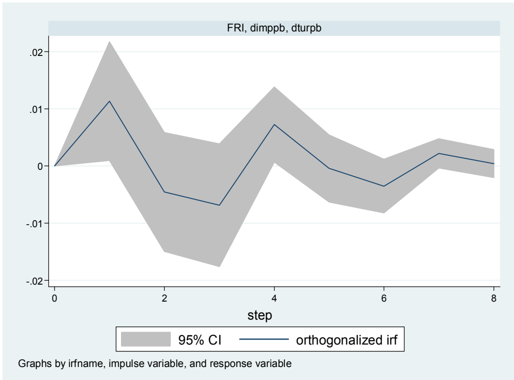
(ii) Impulse (Exports), Response (Tourism)



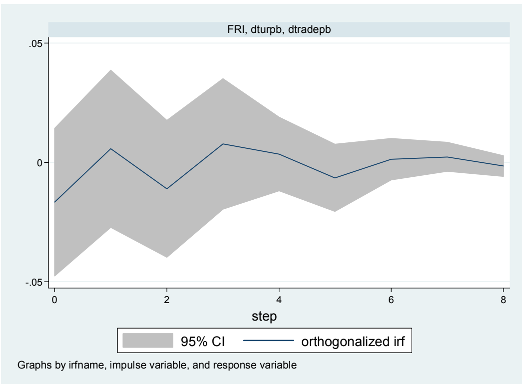
(iii) Impulse (Tourism), Response (Imports)



(iv) Impulse (Imports), Response (Tourism)



(v) Impulse (Tourism), Response (Total Trade)



(vi) Impulse (Total Trade), Response (Tourism)

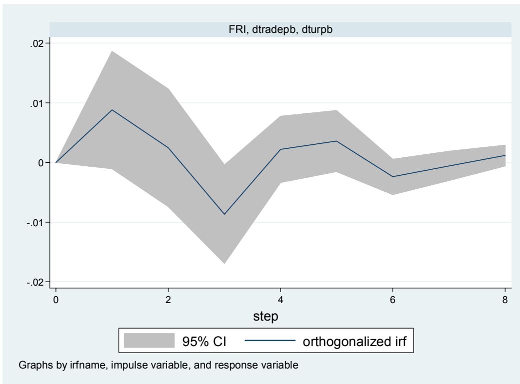
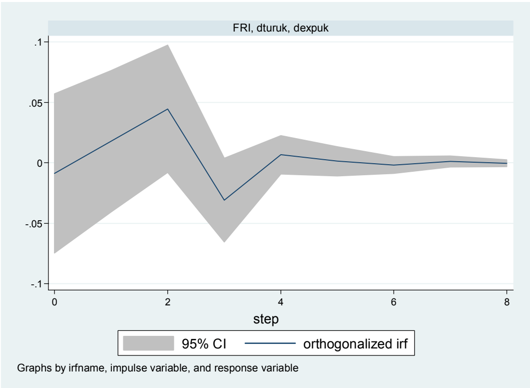
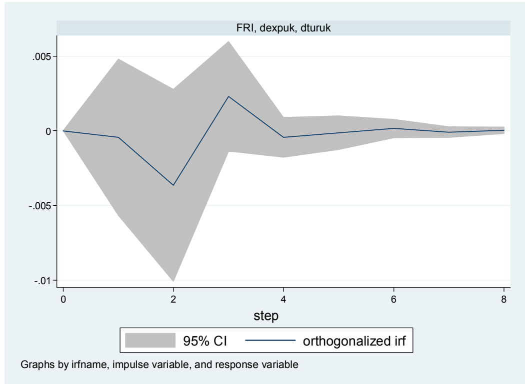


Figure A2.4, Impulse-Response Functions.
Tourism and Trade. United Kingdom

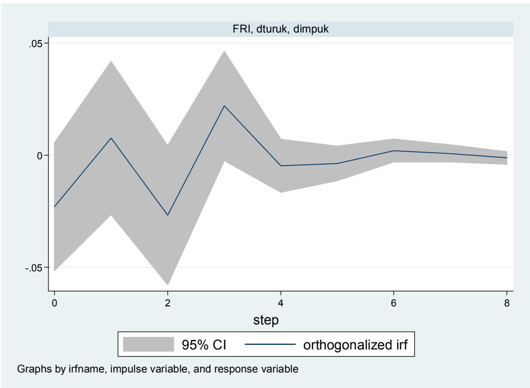
(i) Impulse (Tourism), Response (Exports)



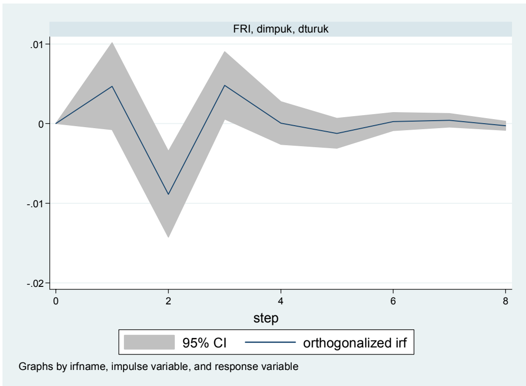
(ii) Impulse (Exports), Response (Tourism)



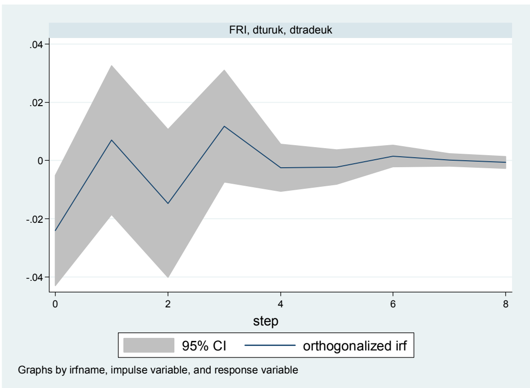
(iii) Impulse (Tourism), Response (Imports)



(iv) Impulse (Imports), Response (Tourism)



(v) Impulse (Tourism), Response (Total Trade)



(vi) Impulse (Total Trade), Response (Tourism)

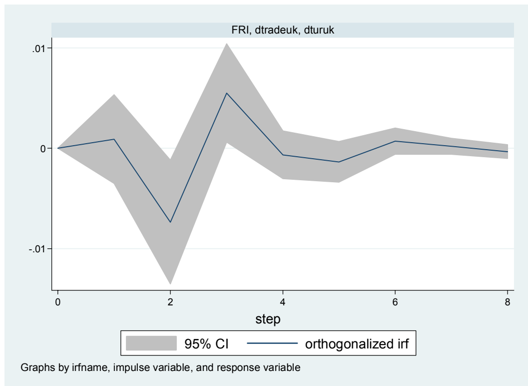
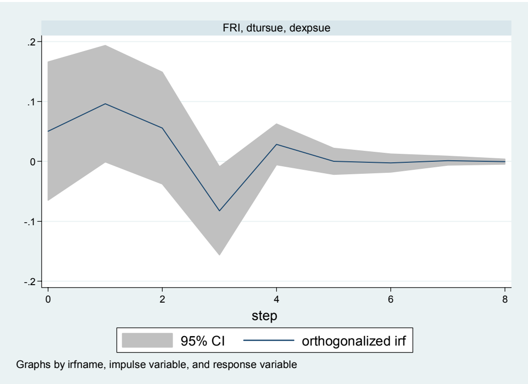
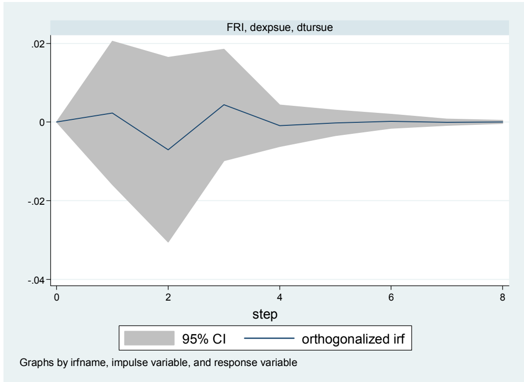


Figure A2.5, Impulse-Response Functions.
Tourism and Trade. Sweden

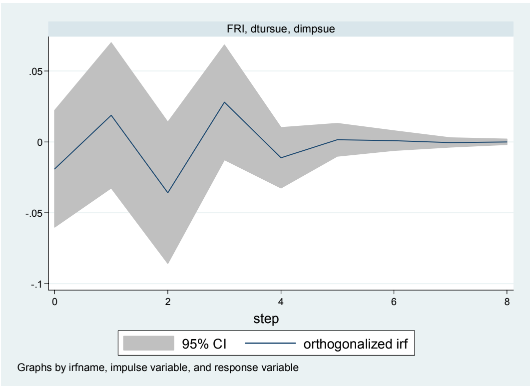
(i) Impulse (Tourism), Response (Exports)



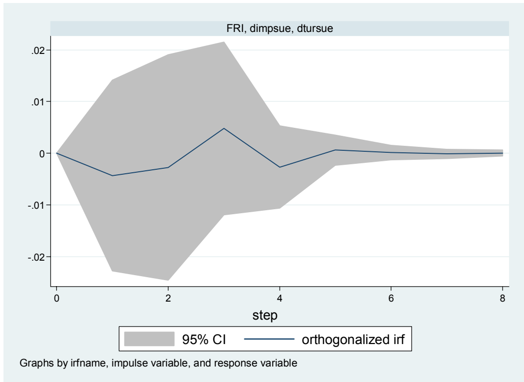
(ii) Impulse (Exports), Response (Tourism)



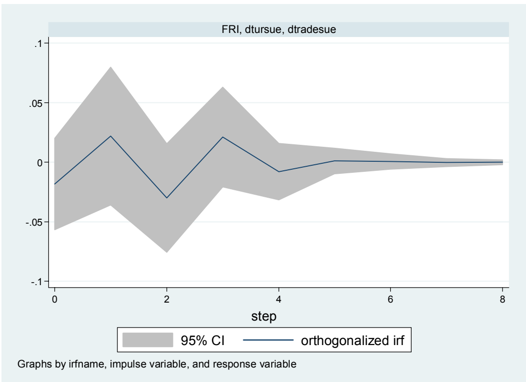
(iii) Impulse (Tourism), Response (Imports)



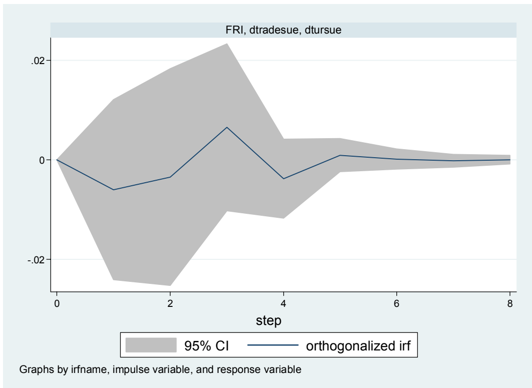
(iv) Impulse (Imports), Response (Tourism)



(v) Impulse (Tourism), Response (Total Trade)



(vi) Impulse (Total Trade), Response (Tourism)



Chapter 3
On the impact of exchange rate regimes on trade and tourism

3.1 Introduction

Recent research on exchange rate regimes has been focused on the effect of currency unions on international trade flows. Although the effect of a common currency on trade has been studied extensively, the empirical link between a currency union and international tourism has been less explored. What is more important, the relevance of the exchange rate regime, further than the common currency regime, in the volume of trade and tourism has received a little attention and the main antecedents are founded on the empirical trade literature. The present chapter makes a contribution to shed light on the effect of exchange rate regimes on international trade and tourism flows.

The beliefs about the performance in terms of inflation and growth are decisive in the choice of the exchange rate regime. Furthermore, the effect of the exchange rate regime on the international trade is another argument commonly considered to support the exchange rate policy. In this way, less flexible exchange rates are expected to promote international trade and tourism *via* reduced uncertainty in the international transactions, eliminated transaction costs and enhanced transparency of the markets. However, the empirical literature is not conclusive to that respect. As surveyed by McKenzie (1999) and more recently by Ozturk (2006), the evidence about the effect of less exchange rate volatility on trade is mixed and the results are sensitive to the choice of sample period, model specification, proxies for exchange rate volatility and countries considered.

In contrast to this inconclusive link, an influential article by Rose (2000) estimates a very large effect of a currency union on trade and suggests that fixed exchange rate regimes could affect trade performance. According to their results, members of currency unions seemed to trade over three time as much as otherwise pair of countries. This result is surprisingly large and has received little acceptance among the researchers. Related to the effect of common currency on tourism, to the best of our knowledge, Gil-Pareja et al. (2007a) is the unique published paper for the analysis of the effect of a common currency on international tourism. These authors find a moderate effect of the currency union on tourism for the members of the Economic and Monetary Union (EMU).

Adam and Cobham (2007) estimate for the first time the influence of exchange rate regimes on international trade. The authors found that exchange rate regimes which reduce exchange rate risk and transactions costs have positive effects on trade. Moreover Qureshi and Tsangarides (2010) analyse the impact of exchange rate regimes on trade and find that both *the facto* and *the iure* fixed exchange rate regimes promote bilateral trade. Related to international tourism as far as we are concerned, there is not paper about the impact of exchange rate regimes on this flow. So, our research is the first attempt to analyse the effect of the exchange rate regimes, further than currency unions, on international tourism. A large panel data set based on a gravity equation model is estimated to explain trade and tourism flows and the impact of a set of different exchange rate arrangements between countries is analysed. Furthermore, our sample reflects the creation of a currency union, that is, the case of the euro. So, it seems interesting to study the effect of the euro on intra-EMU trade flows.

The main contribution of the present chapter is threefold: First the influence of exchange rate regimes, not only a common currency, on tourism and trade flows are studied, second the analysis highlights the distinction between official and *de facto* and *de iure* exchange rate regimes and third a larger data set than previous works is used. An empirical econometric panel data methodology is proposed. This method takes into account the endogeneity of some regressors in the gravity equation and also a treatment of the individual heterogeneity in the panel data model.

This chapter is organised as follows. In Section 3.2 the relevant literature about the link between exchange rate regimes and tourism and trade is reviewed. In Section 3.3 data and methodology followed are described. In Section 3.4 the results for the estimation effect of exchange rate regimes on trade are discussed while the impact on tourism is presented in Section 3.5. Finally, Section 3.6 summarises the main results and conclusions.

3.2 Background

In this section, the main antecedents of the research are presented. As mentioned above, the effect of currency unions on trade has been extensively studied in the literature, although the impact of other exchange rate regimes has received little attention. Furthermore, regardless the importance of currency unions on tourism, there is just one paper written by Gil-Pareja et al (2007a) that analyses the effect of common currency on tourism and it is focused on the case of the EMU. Even more notable is the fact that there is not any research that investigates the effect of exchange rate regimes on tourism.

The antecedents, founded in the trade theory, can be organised in three groups. The first group is focused on the effect of exchange rate volatility on trade and tourism, the second group analyses the influence of a common currency on both flows and the third group refers to the few articles that study the effects of the exchange rate regimes beyond the currency union on trade.

3.2.1 Exchange rate volatility, trade and tourism

Regarding the effect of exchange rate volatility on trade, McKenzie (1999), Clark et al. (2004) and Ozturk (2006) are exhaustive reviews of the theoretical and empirical effects of exchange rate volatility on international trade. The underlying trade theory holds that international trade responds adversely to exchange rate uncertainty. However, this theoretical relationship is sensitive depending on the risk attitude of agents and the presence of developed forward exchange markets, among other things[1]. At the same time, as surveyed by the previously mentioned guides, the empirical work reproduces this ambiguity, which may reflect the lack of clear theoretical foundations as well as the difficulty to measure the exchange rate risk. The results of the reviewed papers suggest that although less exchange rate volatility seems to imply less risk, the empirical effect on trade remains ambiguous.

With respect to the effect of exchange rate volatility on tourism, several articles have attempted to evaluate the impact of exchange rates on the international tourism demand. Although these studies have generally shown that exchange rates exert a significant influence, the estimated magnitude of this influence varies from study to study. Crouch (1994) investigates this variability by examining exchange rate elasticities of tourism demand from among 80 empirical studies. His study provides some greater insight into the impact of changes in currency exchange rates on the demand for international tourism, particularly in terms of the range of likely exchange rate elasticities given the methodological and substantive characteristics in question[2].

Moreover, Webber (2001) investigates the impact of exchange rate volatility on tourism demand. The author applies cointegration and Granger causality

[1] See for instance De Grauwe (1988).

[2] See Martin and Witt (1988), and Crouch (1994), for surveys of the international tourism literature.

techniques to study the long run relationship between tourism demand and exchange rate volatility. The variance of the exchange rate was found to be a significant determinant of long-run tourism demand in the half of estimates.

3.2.2 Currency unions, trade and tourism

The study of the effect of common currency arrangement on trade and tourism is a distinct issue from the impact of exchange rate volatility. Common currency implies more than just an elimination of exchange rate volatility among members because it also reduces transaction costs relevant to trade and tourism dealings and provides a commitment device for macroeconomic policies. Using Rose (2000) own words: *"entering a currency union delivers an effect that is over an order of magnitude larger than the impact of reducing exchange rate volatility from one standard deviation to zero".* This is easier to understand in the case of tourism where hedging strategies are less common than in international trade.

To that respect, the seminal paper written by Rose (2000) constitutes an unsolved puzzle in International Economics that we address in Chapter 5. The author deals with the question of the relevance of a common currency in the volume of trade and estimates an empirical model of bilateral trade based on a gravity equation. Andrew Rose uses data on trade for around 200 countries in five consecutive five-year periods from 1970. The results suggest a positive and significant coefficient of the currency union dummy with an estimation of 1.2 which implies an effect of currency union on trade of a 200%. As a matter of facts, although economists widely believe that monetary union lower inflation and promote trade, still many are surprised that the magnitude of the observed trade effect is so large. Rose himself has offered further empirical work in the area (notably Rose, 2001; Rose and van Wincoop, 2001; Glick and Rose, 2002),

Rose's finding that membership of a currency union appears to have a very large positive effect on trade between countries has provided a major stimulus to empirical and theoretical work on gravity models of trade. The effect of common currency on trade estimated by Rose (2000) has received little acceptance and, as a consequence some researches have been devoted to justify why it is not correct. For instance, Thom and Walsh (2002) emphasize the need for a longer dataset. According to them, a short term analysis addresses the question of whether countries with the same currency trade more but not analyses the interesting issue of what happens to trade when a currency union is created or dissolved. For this reason, Glick and Rose (2002) estimate the effect of currency unions on trade covering 217 countries for 50 post-war years. This data set allowed them to exploit time and cross-sectional variation. Using conventional OLS, the authors obtain that countries which share a common currency trade over three time as much as otherwise pairs of countries. In the fixed effects estimation, a currency union almost doubles bilateral trade.

Another important critique to Rose's work lies on the econometric technique used. Persson (2001) indicates the presence of non-random selection and non-linearities. However, Rose (2001) calculates a low correlation between the common currency and the gravity regressors, suggesting the absence of bias selection problems. He also uses the matching techniques proposed by Persson and addresses the problem of non-linearity. Rose (2001) provides an alternative estimates and the results although suggest a more modest expansion of trade, around 40%, it still remains considerable. Rose and Stanley (2005) implement a meta-analysis to explain and to summarize thirty-four recent studies that investigate the effect of currency union on trade. Combining these estimates, the authors found that a currency union increases bilateral trade by between 30 and 90%, i.e., there is evidence of a positive trade effect.

The mixed results about the effect of exchange rate volatility on trade jointly with the important impact of a single currency on international trade draw attention to the apparent contradictory empirical findings. Exchange rate volatility does not make a clear influence in international trade but a volatility of zero, i.e. a common currency, seems to be a major factor in the determination of the volume of international trade. This result suggests that the measures of exchange rate volatility may not be a good proxy for exchange rate risk and other variables such as the exchange rate regime may be better to analyse the effect of the exchange rates on trade.

As can be easily verified, the effect of the currency unions on international trade has been studied intensively. Nevertheless, international tourism has failed to attract the attention of economists to analyse the effect of a common currency on this flow. According to Gil-Pareja et al. (2007a) there is no paper on the impact of a single currency on tourist flows. These authors estimate the effect of the euro on intra-EMU tourism flows by using a panel dataset of 20 OECD countries over the period 1995-2002. The results reveal that the euro has increased tourism with an effect of around 6.3%. Despite being much more moderate than Rose's (2000) findings for the effect of common currency on trade, this is a noticeable impact given the early stage of the EMU at the period considered. Moreover, the robustness checks show that the evidence of a positive impact is quite widespread across the EMU destination countries. However, it is important to clarify that this research focuses on the case of the EMU and does not consider other currency union cases and as a consequence general statements on the relevance of a common currency on tourism can be hardly set.

3.2.3 Exchange rate regimes, trade and tourism

Finally, related to the third group of papers, the antecedents are less abundant in contributions. Aristotelous (2001) analyses the effect of exchange rate systems using a long span of data for the British exports to the US, finding that there is not evidence that any official exchange rate regime had any impact on the exports. However, López-Cordova and Meissner (2003) found strong evidence that monetary regime choice had large impact on trade in the Gold Standard Era before 1913. More recently Gil-Pareja et al (2007b) by using a dataset of 24 OECD countries over the period 1960-2004, investigates the effect of a particular arrangement such as the exchange-rate mechanism of the European Union on international trade. The findings confirm the importance of this regime for the peripheral countries.

Among the few empirical studies on this group, there is an interesting paper by Adam and Cobham (2007) which provides the first estimates of the effects of a full 'menu' of exchange rate regimes on trade. These authors estimate the relevance of exchange rate regimes on trade using the Reinhart and Rogoff's (2004) classification of *de facto* exchange rate systems. The main result is that any other regimes than flexible exchange rates are significantly more pro-trade. Furthermore they find that the more an exchange rate regime reduces uncertainty and transactions costs, the more it boosts trade.

Related to tourism, the analysis of the relevance of a currency union and other exchange rate arrangements on tourism has received little attention with the exception of Gil-Pareja et al. (2007a) which estimate an effect of 6.3% of euro on intra-EMU tourism flows. Moreover, there is not paper in the analysis of the effect of different exchange rate regimes on tourism.

Nevertheless, the exchange rate is commonly considered as a determinant in the estimation of tourism demand and it is introduced either as an independent variable or into a relative price variable. According to the discussions of Martin and Witt (1987), Crouch (1994), and Witt and Witt (1995), the cost of living in the tourist destination depends on the destination country prices and the exchange rate. In this sense, tourism is likely to be affected by the exchange rate volatility since a substantial component of the expense of a foreign holiday is spent at the holiday location.

Webber (2001) suggests that exchange rate volatility affects tourist decision of the destination country for their holidays and changes in the exchange rate are likely to have the same impact on the tourist's destination choice as relative price changes. In a similar way, Sinclair and Stabler (1997) argue that the exchange rate mimics the effects of the relative prices, of which tourists have a limited knowledge, due to the fact that they buy the holidays before leaving using their own national currency[3]. According to these results, exchange rate is a major

[3] For instance, Patsouratis et al (2005) find that the exchange rate is a main determinant of Greece's tourism demand. This is also the result obtained by Eilat and Einav (2004) using a panel data approach, and by Roselló-Villalonga et al. (2005) for the case study of Balearic Islands.

determinant of tourist demand and exchange rate regimes with low uncertainty could promote tourism.

Summarizing, the evidence of the effect of exchange rate policy on trade is mixed and more research is needed. Moreover, although exchange rate and its volatility are recognize as relevant factors explaining international tourism, the influence of the exchange rate regime on tourism has received very little attention. Initiate

3.3 Data and methodology

The empirical analysis carried out in this chapter is based on the gravity equation. Moreover, it would be also the basis of the analysis presented in Chapter 4. To estimate the effect of different exchange rate regimes on trade and tourism, gravity equations for both flows are estimated. In this section, some particular features of the gravity equation are presented, the dataset used is described paying special attention to the exchange rate regime data and finally the estimation method is discussed.

3.3.1 Gravity equations for trade and tourism

Gravity model is a workhorse in a number of empirical issues addressed by the International Economics. This model is used to estimate the effects of economic and non-economic events on international flows of goods, migrants, investment and tourism. Indeed the evaluations of free trade agreements, international borders and currency unions are the main fields of application of gravity equations.

The origin of this model is the Newton's Law of Universal Gravitation, and it was firstly proposed by Tinbergen (1962) to describe international bilateral trade. The main reason for its extended use in empirical research is its goodness of fit, due to the international flows are assumed to be increasing in economic size of countries and decreasing in the distance between them.

On the contrary, a major critique of gravity equations in the past was the lack of theoretical foundations to its specification. However, as presented by Deardorff (1998), the basic features of gravity specification may be obtained from international trade models based on both comparative advantage and increasing returns and product differentiation.

Anderson (1979) provided theoretical foundation for gravity models based on product differentiation by country of origin, i.e., adopting the Armington assumption. By specifying demand in these terms, Anderson helped to explain the presence of income variables in the gravity model. Several papers, mainly Bergstrand (1989) and Anderson and Van Wincoop (2003) introduce monopolistic competition to derive gravity equations, where product differentiation by country of origin is replaced by product differentiation by producing firms.

Anderson (1979) employed the product differentiation by country of origin assumption.. This approach was also adopted by Bergstrand (1985). The author considers that prices in the form of GDP deflators might be an important additional variable to include in the gravity equations. Anderson and Van Wincoop (2003) contribute to both the theoretical foundation and the empirical estimation of gravity equations. In particular, their approach sheds light on the distinction between multilateral and bilateral trade resistance. Helpman et al. (2008) generalizes the Anderson and van Wincoop (2003) accounting for firm heterogeneity and fixed trade costs and thus predicting an extensive margin for trade flows.

There are other approaches to gravity-based explanations of bilateral trade that do not depend on complete specialization. According to Haveman and Hummels (2004), it should be taken into consideration trade frictions in the form of distance-based shipping costs or other trade costs, as well as policy-based trade barriers. Distance costs can also be augmented to account for infrastructure, oil price, and trade composition as in Brun et al. (2005).

The standard empirical specification of the gravity equation takes the following form:

$$F_{ij} = \alpha \ \frac{(Y_i)^{\alpha_1} (Y_j)^{\alpha_2}}{(D_{ij})^{\alpha_3}} \qquad [3.1]$$

where i and j represents the destination and origin country respectively, F_{ij} is the flow between countries, Y_i and Y_j are their economic sizes commonly measured by *GDP* or *GDP per capita* and D_{ij} is the distance between the two countries. Gravity models used in international trade literature additionally include other relevant variables such population, and common language, number of islands and landlocked countries, colony or a common border, trying to deal with trade resistances.

According to Anderson and Van Wincoop (2003) the gravity model has been widely used to address several empirical issues. Armstrong (2007) and Fratianni (2007) provide two recent surveys of the literature on the wide use of gravity models on trade. This type of equations has been commonly used to investigate a number of empirical regularities, such as border effects (McCallum, 1995 and Fitzsimons et al., 1999), regional trading blocs (Matyas 1997, Cheng and Wall, 2005) and currency unions (Rose, 2000).

Moreover, under the assumption of tourism as a particular class of trade, a gravity equation can be used to study the main determinants of its volume. As a matter of fact, Durbarry (2000), Eilat and Einav(2004) and Gil-Pareja et al (2007a) have applied gravity equations to explain international tourism flows.

Therefore, it seems suitable to use a gravity equation to estimate the effect of a currency union on international trade and tourism. In our context, a gravity equation accordingly adapted is used for tourism.

Specifically, this study considers international trade between countries *i* and *j* and tourist arrivals at destination *i* from country *j* as the dependent variables for both a trade gravity equation and a tourism gravity equation, respectively. Reformulating equation [3.1] and applying logarithm, the gravity model recognizes that international trade defined by equation [3.2] and tourist arrivals defined in equation [3] are increasing in *GDP per capita* and decreasing in the distance between countries. The model is also augmented with a number of additional controls:

$$\begin{aligned}\ln Trade_{ijt} &= \beta_0^* + \gamma_t^* + \beta_1^* \ln GDPpc_{ijt} + \beta_2^* \ln Pop_{ijt} + \beta_3^* \ln D_{ijt} + \beta_4^* \ln Tou_{ijt} \\ &+ \beta_5^* Lang_{ij} + \beta_6^* Border_{ij} + \beta_7^* Colony_{ij} + \beta_8^* Landl_{ij} + \beta_9^* Island + \eta^{*`} Z_{ijt} \\ &+ \alpha_i^* + \lambda_j^* + \gamma_t^* + u_{ij}^* \end{aligned} \qquad [3.2]$$

$$\begin{aligned}\ln Tou_{ijt} &= \beta_0 + \gamma_t + \beta_1 \ln GDPpc_{it} + \beta_2 \ln GDPpc_{jt} + \beta_3 \ln Pop_{it} + \beta_4 Pop_{jt} \\ &+ \beta_5 \ln D_{ijt} + \beta_6 \ln Trade_{ijt} + \beta_7 \ln Lang_{ij} + \beta_8 Border_{ij} + \beta_9 Colony_{ij} \\ &+ \beta_{10} Landl_{ij} + \beta_{11} Island_{ij} + \beta_{12} \ln Comp_{ijt} + \eta` Z_{ijt} + \alpha_i + \lambda_j + \gamma_t + u_{ij} \end{aligned} \qquad [3.3]$$

where ln denotes natural logs, *i* and *j* indicates destination and origin countries respectively, *t* is time, and the variables introduced are defined as:

- $Trade_{ijt}$ is the international trade, sum of exports and imports, between countries *i* and *j* in year *t*,
- Tou_{ijt} is the number of tourist arrivals to country *i* from country *j* in year *t*,
- $GDPpc_{ijt}$ is the product of real GDP per capita of countries *i* and *j* in year *t*,
- $GDPpc_{it}$ is the real GDP per capita of the destination country in year *t*,
- $GDPpc_{jt}$ is the real GDP per capita of the origin country in year *t*,
- Pop_{ijt} denotes the product of populations of countries *i* and *j* in year *t*,
- Pop_{it} denotes the population of the destination country in year *t*,
- Pop_{jt} denotes the population of origin country in year *t*,
- D_{ij} is the great circle distance between capital cities of countries *i* and *j*,
- $Lang_{ij}$ is a binary variable which is unity if *i* and *j* have a common language and zero otherwise,

> $Border_{ij}$ is a binary which is unity if *i* and *j* share a common land border and zero otherwise,
> $Colony_{ij}$ is a binary variable which is unity if one country ever colonized the other or vice versa and zero otherwise,
> $Landl_{ij}$ is the number of landlocked countries in the country-pair (0, 1, or 2),
> $Island_{ij}$ is the number of island nations in the pair (0, 1, or 2),
> $Comp_{ijt}$ denotes a competiveness variable calculated as a real exchange rate between countries *i* and *j,*
> Z_{ijt} is a vector of binary variables related to exchange rate regimes.

β_0^* and β_0 are constants, α_i^* and α_i are country *i* fixed effects, λ_j^* and λ_j are country *j* fixed effects and γ_t^* and γ_t are year fixed effects in equations [3.2] and [3.3] respectively. $\beta_1^*,...,\beta_9^*$ and $\beta_1,...,\beta_{12}$ are two sets of coefficients, $\eta^{*'}$ and η' are two row vectors of the parameters of interest, and u_{ijt}^* and u_{ijt} are well-behaved disturbance term for equations [3.2] and [3.3].

Since dependent variable in tourism equation [3.3] is unidirectional, i.e. tourist arrivals to country *i* from country *j,* GDP per capita and population are presented independently for origin and destination country. This recognises a different impact of origin variables from destination variables on tourist arrivals. For instance, a greater effect of origin GDP per capita and population are expected than for the destination ones. Moreover, to avoid biased estimates a variable of competitiveness -$Comp_{ijt}$, is also included.

Additionally, in the tourism specification [3.3] *Trade* variable is included based on the assumption that bilateral trade is a proxy for the intensity of the economic relations between the countries (Eilat and Einav, 2004). Likewise, in the trade specification [3.2] tourism arrivals variable is also included as a regressor. Indeed, trade and tourism may be both complementary and substitutive as studied in Chapter 2. In that sense, *Tou* and *Trade* are not strictly exogenous in equations [3.2] and [3.3] respectively.

This same problem of endogeneity appears in the product of GDP per capita in equation [3.2] and *GDPpc* of the destination country in equation [3.3]. In this case, endogeneity is understood since both tourism and trade might increase the market size of the tourist destination promoting growth. As would be described in Subsection 3.3.3, instrumental variable methods are required to deal with this problem and lagged values of the endogenous variables are considered as instruments.

3.3.2 Data

Dataset includes the OECD countries as origins and 113 countries, including the OECD countries, as tourist destinations[4]. OECD countries are selected since this group supposes the main source of tourist in the world. Then, database includes 3360 pairs of countries over the period 1995-2006[5].

The source of tourism data is the *United Nations World Tourism Organisation (UNWTO)* and includes annual international arrivals by country of origin. UNWTO provides data on total arrivals associated to inbounds tourism for 204 countries and territories. These data are presented in excel files according to tourist destination and per country of origin. However, one of the main drawbacks of this source is that the availability of data for each tourist destination is not homogeneous. This is the reason why we decided to consider just the 30 OECD countries as origins. As tourist destinations, the 113 countries with greater data availability are used in the analysis. So, the choice of countries included in the analysis as well as the time period is mainly conditioned by tourism data availability.

Trade variable is defined as the sum of imports and exports in million of US$ and is obtained from *Direction of Trade* dataset of the *International Monetary Fund*. This variable requires to be converted into real terms by using US GDP deflator. US GDP deflator, GDP *per capita* and population were obtained from the *World*

[4] The list of countries considered in the analysis is presented in Table A.3.1 in the Appendix.

Development Indicators (2006) and the *UNCTAD Handbook of Statistics* (2008)[6]. The distance variable and dummy variables *Lang*, *Border*, *Colony* and *Landl* were collected from the *Centre d'Etudes Prospectives et d'Informations Internationales (CEPII)* dataset while *Island* was obtained from Andrew K. Rose's website and the *CIA Factbook*. Finally, $Comp_{ijt}$ is calculated using CPIs from the *International Labour Organisation* and nominal exchange rates obtained from the *International Monetary Fund Financial Statistics*.

To build the exchange rate regime variables, the dataset of *de facto* exchange rate regimes estimated by Reinhart and Rogoff (2004) is used. This is one of a number of classifications produced in recent years in attempts to discriminate between regimes on the basis of what countries actually do rather than what they say they do. It makes particular use of parallel market data as well as official exchange rate data. This dataset presents a classification of *the facto* exchange rate regimes of 153 countries for the period 1946-2007[7].

Countries frequently implement an exchange rate regime (*de facto*) that differs from the officially declared regime (*de iure*). The official exchange rate regime is one of the most important signals of a government's economic policy preferences. When a government makes a *de iure* public commitment to a fixed exchange rate, it sends a signal to domestic and international markets of its strict monetary-policy priorities. In contrast, a government that proclaims a floating exchange rate signals a desire to retain discretion over monetary policy, even if it has implemented a *de facto* fixed rate.

Qureshi and Tsangarides (2010) found that the impact of exchange rate regimes on trade is more pronounced for *the facto* exchange rate regimes than for *the iure* since they increase transparency in regime choice anchors expectations and credibility which amplify the impact of fixed exchange rate regime on trade.

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[5] Descriptive statistics of the dataset are presented in Table A.3.2 in the appendix.

[6] GDPpc and Population of Guadaloupe and Martinique were collected from the *Institute National de la Estatistique et des Études Économiques.*

[7] Initially the classification runs until 2001, but in 2008, Ilzetzki et al. updated the classification until 2007. SeeReinhart website: http://terpconnect.umd.edu/~creinhar/Papers.html.

Table 3.1. Classification of exchange rate regimes.

Fine classification codes	Reinhart and Rogoff's description	New clasiffication	Dummy
1	No separate legal tender	Common currency	Common Currency
2	Pre-announced peg or currency board arrangement	Currency Board	Currency Board of a currency to the other one in the pair
3	Pre-announced horizontal band (+/-2%)	Currency Peg	Peg between currencies in the pair
4	De facto peg		
5	Pre-announced crawling peg	Crawling peg	Crawling peg between currencies in the pair
6	Pre-announced crawling band (+/-2%)		
7	De facto crawling peg		
8	De facto crawling band (+/-2%)		
9	Pre announced crawling band (+/-2%)		
10	De facto crawling band (+/-5%)	Managed Floating	Managed Floating
11	Moving band that is narrower (+/-2%)		
12	Managed floating		
13	Freely floating	Flexible Exchange Rate	
14	Freely falling		
15	Dual market in which parallel market data is missing		

Reinhart and Rogoff (2004) improve upon existing methods considering exchange rates on parallel markets for countries with a dual currency market. Their classification is carried out by successive sorting. Their so-called "natural classification" coded *de facto* exchange rate regimes, classify exchange rate regime choices made into a fine 15-point scale.

Following this classification, and as presented in Table 3.1, five binary exchange rate regimes dummy variables are defined in our analysis. That is, *CommonCurrency* which is unity if the countries share the same physical currency[8], *CurrencyBoard* which is unity if one currency in the pair presents this regime with the other currency in the pair, *Peg* which is unity if a country in the pair pegged its currency to the other one in the pair, *CrawlingPeg* which is unity if a currency in the pair is pegged to the other currency with a clear trend to depreciation and *ManagedFloating* which is unity if both countries present managed floating regimes.

The first regime is associated with a completely fix exchange rate, meaning that the common currency not only implies the reduction of uncertainty by eliminating exchange rate volatility but also avoids some transaction costs. The second and third regimes can be considered nearly fixed, although there is some exchange rate uncertainty. Related to the crawling peg regime, it could promote tourism in two ways: the exchange rate presents low uncertainty and there is a continuous trend to depreciation that importers/visitors interpret as a signal of cheap country. Finally the managed floating regime is the most flexible regime of the previously mentioned[9].

In the sample used in the analysis, there is a case of creation of a common currency, that is, the euro. Moreover, this common currency is a special case since it involves a large group of rich countries sharing a single currency. This fact

[8] It is important to note that *CommonCurrency* dummy variable reflects the case of euro since it started to circulate but not since irrevocable exchange rates were fixed. The main reason to do this is because the other cases of common currencies included in the dummy variable refer to countries which share the same physical currency.
[9] The exchange rate regimes cases considered in this analysis are summarised in Table A.3.3 in the appendix. This table presents the different dummies variables for exchange rate regimes, the countries involved in each regime, the reference currency and the period of time.

differs from other common currency cases where relatively small or poor countries adopt a strong currency, i.e. Panama or Ecuador adopted the US dollar. To study this specific case, the *CommonCurrency* dummy is split into two different cases: *CCeuro* which is a binary variable that takes the value 1 if countries in the pair share the euro (since 2002) and *CCothers* which is unity if countries in the pair share a common currency different from the euro.

Also as a sensitivity analysis and in order to better study the impact of the euro within a homogeneous group of countries, the effect of this currency on trade and tourism flows for a restricted sample of the OECD countries is estimated[10]. Following Gil-Pareja et al (2007a), since the EMU involved a two-stage process, it is also interesting to differentiate empirically the effects of the EMU between the years when the euro operated as a unit of account (1999–2001) and the years in which it operated as a physical currency (2002). To this end, three different dummy variables are defined: the more general one *Euro99-06* (which takes the value 1 for the EMU pairs during the period 1999-2006) and then, it is split into two dummy variables: *EMU99-01* (which takes the value of 1 for the EMU pairs during the period 1999–2001) and *EMU02* (which is unity for EMU pairs between 2002-2006).

3.3.3 Methodology

Empirical research on gravity equation commonly estimates by pooled OLS. However, if we assume that an unobserved heterogeneity exists, this technique can provide inconsistent and inefficient estimates. In this sense, panel data offers a more suitable estimation technique to control by individual heterogeneity. Estimation of classical panel data models can be addressed by fixed-effect (FE) or random-effect estimators (RE), depending on individual invariant effects, which are unobserved, may be correlated with exogenous regressors (RE) or not (FE). The Hausman test, based on the difference between RE and FE, allows us to determine which estimator is statistically better.

[10] Descriptive statistics of this database are presented in Table A.3.4 in the appendix.

However, our models present two different features with respect to most of the gravity equation estimations. Firstly, if we consider that some regressors are not strictly exogenous the estimation of the parameters is inconsistent. This is the case of *GDPpc* and *Tou* which may be endogenous in equation [3.2] while *GDPpc* of the destination country and *Trade* which may be endogenous in equation [3.3].

On the one hand, *Trade* and *Tou* are considered as endogenous variables since recent evidence of a bilateral relationship between trade and tourism is found as illustrated in Chapter 2. That chapter presents the different paths that the reciprocal influence between travels and trade can take. On the other hand, the consideration of *GDPpc* of destination country as an endogenous variable is clear since both tourism and trade increase the market size of tourist destination promoting growth. The influence of international trade in economic growth has been extensively studied over decades as Marin (1992) surveyed. For its part, recent research finds that tourism has enforced the economic growth in many countries[11].

Henceforth, instrumental variable methods, such as two-stage least squares fixed effects (FE-2SLS) or two-stage least squares random effects (RE-2SLS), are appropriate to deal with endogeneity. In this context, we can also test if the set of instruments are strictly exogenous. Although this is not a test of endogeneity per se, it is a test of whether endogeneity has a significant effect on the consistency of the estimates. Specifically, we use a simple way to test the exogeneity of regressors by regressing the FE-2SLS and RE-2SLS residuals against the instrumental variables and all the exogenous ones. The acceptance of the null hypothesis of absent of relation between instruments and residuals would suggest that the instruments are strictly exogenous and hence they would be suitable for the estimation.

Secondly, it is important to note that the classical estimation by using country-pair fixed effects cannot be addressed since observations of interest disappear. Indeed, variables of exchange rate regimes are dropped from the estimation by fixed-

[11] See, for instance, Balaguer and Cantavella-Jordà (2002) for Spain, Dritsakis (2004) for Greece, Oh (2005) for Korea and Kim *et al.* (2006) for Taiwan.

effect due to the collinearity, given that they are time-invariant in many country pairs. For instance, Panama and USA share a common currency during the whole same period and hence the dummy variable *CommonCurrency* is time invariant for this pair of countries. In a recent econometric literature, a way to overcome this problem is the introduction of individual country fixed-effects for the importers and the exporters in the gravity model. Several papers have estimated trade models including individual country effects as Matyas (1997) and Matyas et al. (2004), or more recently Cheng and Wall (2005) and Kandogan (2008). In any case, the inclusion of country fixed effects is proposed by Rose and Van Wincoop (2001), as a way to approximate the multilateral resistances defined in the well-founded approach of Anderson and Van Wincoop (2003). In other words, the estimation of country specific effects is suitable not only from an econometric point of view, but also attending to the theoretical foundations of the gravity specification.

In this modified fixed-effect model, the intercept has four parts: one common to all country pairs β_0^* in equation [3.2] and β_0 in equation [3.3], one specific to country *i,* that is α_i^* and α_i , one specific to country *j,* λ_j^* and λ_j and finally, one specific to years γ_t^* and γ_t for equations [3.2] and [3.3] respectively. This model is a special case of the FE model given that it has a unique value for each trading pair's intercept, with the restriction that a country's fixed effect as a destination or origin is the same for all of its trading partners.

A way to prevent perfect collinearity in estimating equation [3.2] and [3.3] with the separate fixed-effect dummy variables is to impose the restrictions that one of the fixed effects for destination, origin and year are zero (Cheng and Wall, 2005).

3.4 The exchange rate regime effect on trade

In this section, the effects of different exchange rate regimes on trade flows are explored. The empirical analysis is based on the standard gravity framework, presented in subsection 3.3.3. Equation [3.2] is estimated including a set of dummy variables related to different exchange rate regimes. Table 3.2 reports the results after estimating by FE-2SLS, the number of observations, the R^2, the F-statistic and the exogeneity test for the set of instruments. Standard errors robust to heteroscedasticity are computed by using Huber-White estimator, also known as sandwich estimator. This estimator is robust to some types of misspecification so long as the observations are independent.

Table 3.2. Currency union effect on trade.

Variables	Coef.	t	Coef.	t
Constant	15.9889	1.94	3.3962	0.54
Ln Tou	0.1902	22.42	0.1886	22.27
Ln GDPpc	0.9782	8.39	0.9819	8.42
Ln Pop	-0.3822	-1.58	-0.4145	-1.74
Log Dist	-0.8672	-56.72	-0.8655	-56.69
Lang	0.1249	4.51	0.1260	4.55
Border	0.0512	1.23	0.0602	1.45
Colonial	0.4967	13.84	0.4968	13.88
Landl	-3.5764	-6.47	9.8629	6.68
Islands	0.5479	12.23	0.5486	12.26
CommonCurrency	0.1376	3.75		
CCother			0.8008	2.90
CCeuro			0.0800	2.59
CurrencyBoard	0.4145	7.70	0.4253	7.88
Peg	0.1296	2.42	0.1313	2.44
CrawlingPeg	0.3486	8.53	0.3576	8.75
ManagedFloating	-0.0931	-3.37	-0.0934	-3.38
R^2	0.91		0.92	
F	1381.68		1374.44	
Obs	21975		21975	
Exogeneity test	0.00	1.00	0.00	1.00

First two columns report the results of the estimate considering the *CommonCurrency* dummy variable and the rest of exchange rate regimes. From the R^2, it can be observed how gravity equation works well explaining over 90% of the variation in international trade and the instruments seem to be strictly exogenous. The coefficient of *LnTou* is significant and has a positive sign, indicating a complementary relationship between trade and tourism as suggested in Chapter 2.

The product of logarithm GDP *per capita* is significant, so economic mass has a positive influence in trade flows implying that as richer countries are, higher the international trade between them. *Population* appears to be not relevant maybe because this effect is being gathered by the *GDPpc* variable. The distance has the expected negative sign, showing that *ceteris paribus*, international trade is greater between closer countries. *Lang* has a positive effect, indicating that a different language behaves as a barrier for trade, *Border* variable is significant and with a positive sign which implies that trade is greater between contiguous countries and the coefficient of *Colony* is positive suggesting that international trade increases whether one country ever colonized the other or vice versa.

Focusing our attention on the *CommonCurrency* variable, its coefficient 0.1376 is statistically significant and this result suggests that a common currency promotes international trade. Specifically, the effect of a currency union on trade amounts to $14\%[\exp(0.1376)-1\approx 0.14]$. This result is much lower than the one estimated by Rose (2000) and subsequent papers. As pointed out by Micco et al (2003) this could be caused because Rose's estimates relies on currency unions formed by very small or very poor countries (such as those in the Eastern Caribbean Currency Area) or very small or poor countries adopting the currency of larger ones (such as Tonga using the Australian dollar, or Reunion with the French franc).

Then, equation [3.2] is again estimated by including different dummies for sharing the euro (*CCeuro*) or sharing other currency (*CCother*). Results are reported in the last two columns of Table 3.2. The coefficient of the *CCother* dummy variable is 0.8008 which implies an increase in trade flows of around 122%. This results is more similar to the one traditionally estimated for non-Eurozone experiences. Moreover, the impact of this exchange rate regime is greater than the effect of other regimes which imply less fixity.

The coefficient of the variable *CCeuro* is 0.08 which supposes a much moderate effect on trade of around 8%. This result is quite similar to the one obtained by Micco et al (2003) which was the first attempt to estimate the effect of euro on intra-EMU flows. The authors estimate the early effect of the EMU on trade considering 22 countries for the period 1992 to 2002. The result shows that the effect of the euro on bilateral trade between member countries ranges between 5 and 20%. Nevertheless, it is important to note that our sample reflect a longer time period and a greater number of countries.

Frankel (2008) tries to explain the discrepancy between estimates of the euro's effect on trade among members and other cases of currency unions. He examines three likely reasons: First, lags because euro is still very recent. Second, size because European countries are much bigger and richer than most of those who had formed currency unions in the past. Third, endogeneity of the decision to adopt an institutional currency link. However, the author finds no evidence that any of these factors explains the gaps between the two estimates.

Regarding other cases of exchange rate agreements, the coefficient for *CurrencyBoard* and the *Peg* are 0.425 and 0.013 which suppose an increase of trade of around 53% and 14% respectively. If we observe the coefficient of *CrawlingPeg*, it is 0.357 and associated with an increase of 43% on trade flows. Finally, the coefficient of *ManagedFloating* is -0.093 which is significant but with a negative impact on trade. This could be because this regime implies higher volatility than the previous regimes. Summarising, the results suggest that the fixer the exchange rate arrangements are, the more intense trade flows.

As mentioned in sub-section 3.3.2, the impact of the euro on trade for a restricted sample of the OECD countries is also estimated as a sensitivity analysis. This sample is more homogeneous than the previous one and includes only the euro as the unique case of common currency. Also the results from this analysis are more comparable with previous literature. The results of the estimation of equation (2) are presented in Table 3.3.

From R^2 it can be observed how the gravity equation works well explaining around 93% of variability of trade flows. Estimates are very similar to the previous analysis in terms of sign and signification. Regarding the variable of interest, the coefficient of the *Euro99-06* variable, which equals one for countries sharing the euro over the period 1999-2006, is 0.0468 which implies an overall increase on intra-EMU trade flows of 5%.

Table 3.3. Currency union effect on trade-OECD sample

Variables	**Coef.**	**t**	**Coef.**	**t**
Constant	3.2492	0.30	3.4102	0.32
Ln Tou	0.2347	21.82	0.2346	21.83
Ln GDPpc	1.3249	9.84	1.3282	9.86
Ln Pop	-0.2071	-0.63	-0.2148	-0.66
Log Dist	-0.7875	-46.44	-0.7874	-46.48
Lang	0.0886	3.00	0.0886	3.00
Border	0.1171	3.57	0.1170	3.57
Colonial	0.0282	0.61	0.0285	0.62
Landl	3.2101	2.71	-6.3523	-2.99
Islands	0.3435	7.51	0.3432	7.51
Euro99-06	0.0468	1.85		
Euro99-01			0.0048	0.15
Euro02-06			0.0732	2.56
R^2	0.9368		0.9368	
F	1036.02		1023.32	
Obs	6342		6342	
Exogeneity test	0.00	1.00	0.00	1.00

Then, the differentiated effect between *Euro99-01*, when the irrevocable exchange rate where fixed, and *Euro01-06*, when the euro started to circulate among members, is considered. The coefficient of the former variable is 0.0048 (0.5%) while the coefficient of the later is 0.0732 (7.6%). It seems to indicate that the effect of the euro since it started to circulate is greater than since the irrevocable exchange rate were set.

3.5 The exchange rate regime effect on tourism

Similarly to the previous section, in the present one the effects of different exchange rate regimes on tourist arrivals are analysed. To that end, equation [3.3] is estimated including a set of dummies variables related to different exchange rate regimes. Table 3.4 reports the results after estimating by FE-2SLS, the number of observations, the R^2, the F-statistic and the exogeneity test for the set of instruments.

Table 3.4. Currency union effect on tourism

Variables	**Coef.**	**t**	**Coef.**	**t**
Constant	-53.7335	-5.07	-40.1084	-5.52
Ln Trade	0.2690	21.51	0.2682	21.48
Ln GDPpcdest	0.9769	6.70	0.9789	6.74
Ln GDPpcorig	0.9131	4.69	0.9160	4.71
Ln Popdest	1.9702	3.97	1.9602	3.95
Ln Popdest	0.8326	2.95	0.7734	2.74
Ln Comp	-0.0002	-0.04	0.0001	0.01
Log Dist	-0.7957	-32.23	-0.7915	-32.06
Lang	0.5201	17.68	0.5232	17.82
Border	0.2408	3.63	0.2535	3.82
Colonial	0.7663	14.00	0.7624	13.95
Landl	-4.6517	-3.59	-4.3727	-3.37
Islands	-0.2194	-4.33	-0.2189	-4.32
CommonCurrency	0.0248	0.56		
CCother			1.3776	10.70
CCeuro			-0.0625	-1.42
CurrencyBoard	0.5190	7.60	0.5316	7.78
Peg	0.0372	0.56	0.0398	0.59
CrawlingPeg	0.1318	3.10	0.1442	3.38
ManagedFloating	0.1085	3.22	0.1078	3.20
R^2	0.8469		0.8473	
F	1004.4		999.31	
Obs	22205		22205	
Exogeneity test	0.00	1.00	0.00	1.00

Again, the first two columns present the results after including the *CommonCurrency* dummy variable as well as other exchange rate regimes in equation [3.3]. The regression fits well the data since the R^2 is around 84%. The coefficients of the explanatory variables are significant at 10% in almost all the cases and the signs are as expected. The variable *Trade* is significant and with positive sign, suggesting, as in the previous section, a complementary relationship between trade and tourism. GDP *per capita* and population of destination and origin countries are significant, so economic mass has a positive influence in tourism. In particular, the population and the real GDP *per capita* variables of the origin countries have a larger impact on tourism flows than the destination ones. The distance has the expected negative sign, showing that *ceteris paribus*, international tourists prefer near destinations. The competitiveness variable is not significant, suggesting the relevance of non-price competition in tourism markets[12]. *Lang, Border* and *Colony* have a positive effect on international tourism while the impacts of *Landl* and *Island* are negative, suggesting that these conditions make the access to this destination country more difficult.

Regarding the exchange rate regimes dummy variables, *CommonCurrency* is not significant. As in Section 3.4, equation [3.3] is also estimated by including *CCother* and *CCEuro* and results are presented in the last two columns of Table 3.4. The coefficient of *CCother* is 1.376 which implies an effect of around 300% on tourism flows. The result is larger than the one estimated for this variable in the case on trade. However, this result must be interpreted with caution as common currency cases rely on poor and small countries. The impact of the *CCeuro* appears to be no significant.

The coefficient for the *CurrencyBoard* is 0.5316 which is associated with an increase of 70% of tourist arrivals. The coefficient of the *Peg* dummy variable is and 0.0398 although it is not significant. The coefficient of the C*rawlingPeg* is 0.1442 which supposes an increase of 15% of tourism. This last result is greater than the one estimated for the *Peg* which implies lower volatility. However, it is not surprising since this regime not only implies low volatility and consequently low uncertainty but also is associated with a continuous depreciation of the exchange rate which makes the tourist destination "cheaper". Finally, the coefficient of the *ManagedFloating* is 0.1078 which is significant but with an effect on tourism flows lower than the other regimes. As for the analysis on the impact of exchange rate regimes on trade, the results suggest that other exchange rate regimes with low flexibility, not only currency unions, promote tourism trips.

The non-significance of *CCEuro* estimates diverges with the results obtained by Gil-Pareja et al (2007a) of an effect of a 6.3% for a subset of OECD countries. This difference can be because the sample and time period are different. For that reason, the impact of this currency for the case of OECD countries is also explored.

[12] Note that competiveness could be better measured by using the PPP conversion factor variable from the WDI but it would dramatically reduce the number of common currency cases to be studied due to the lack of data.

Table 3.5. Currency union effect on tourism-OECD sample

Variables	Coef.	t	Coef.	t
Constant	-64.9559	-3.73	-80.6974	-4.59
Ln Trade	0.6808	31.68	0.6812	31.70
Ln GDPpcdest	-0.7084	-3.01	-0.7236	-3.07
Ln GDPpcorig	0.5270	2.30	0.5057	2.20
Ln Popdest	3.5026	5.54	3.5254	5.59
Ln Popdest	0.7121	1.24	0.7162	1.25
Ln Comp	0.0022	0.37	0.0022	0.38
Log Dist	-0.3555	-11.88	-0.3552	-11.87
Lang	0.2300	5.74	0.2300	5.74
Border	0.1995	3.52	0.1995	3.52
Colonial	0.5328	9.06	0.5327	9.05
Landl	4.5403	1.39	20.2842	4.94
Islands	-0.1126	-1.75	-0.1123	-1.74
Euro99-06	0.1309	4.12		
Euro02-06			0.1030	2.75
Euro99-01			0.1798	4.54
R^2	0.8967		0.8968	
F	895.7		884.53	
Obs	6800		6800	
Exogeneity test	0.00	1.00	0.00	1.00

Equation [3.3] is estimated by considering *Euro99-06* dummy variable and results are presented in the first two columns on Table 3.5. Then this variable is split into *Euro99-01* and *Euro02-06* and results are presented in the last two columns. Observing the *Euro99-06* variable, its coefficient 0.1309 is statistically significant and this result suggests that the effect of the euro on tourist arrivals since the irrevocable exchange rates were set amounts to 14%. Being moderate, this effect is greater than the one estimated by Gil-Pareja et al (2007a) although our research included a greater number of countries and a longer time period. When the variable is split into two, the impacts of *Euro99-01* and *Euro02-06* are 11 and 20% respectively. As found by Gil-Pareja et al (2007a), the impact of the euro on tourism has been greater when it was effectively circulated than when it was set as a unit of account.

3.6 Summary and conclusions

In this chapter, the effect of the exchange rate regimes on international trade and tourism flows is estimated. The literature is not conclusive about the effect of exchange rate volatility on trade. On the contrary, the empirical research suggests a big positive impact of a common currency on trade while its effect on tourism need to be more investigated. Now a more general question is addressed: Do exchange rate regimes affect trade and tourism flows? There are few works that analyses the effect of exchange rate regimes on bilateral trade while there is not paper in analysing this effect on tourism.

On the basis of a gravity equation the impact of several *de facto* exchange rate arrangements on trade and tourism are estimated. The results suggest that other intermediate exchange rate regimes, between completely fixed and completely flexible, promote flows of goods and tourists. In particular, less flexibility in the exchange rate arrangements generates a positive effect on trade and tourism. These results may contribute to the controversial debate on the choice of the exchange rate regime. Since fixity seems to expand tourism and trade, it could encourage growth *via* an increase of the market size. This issue is addressed in Chapter 4.

As a sensitivity analysis and to study separately the case of the euro, the main analysis of this Chapter is complemented by studying the effect of the euro using a restrictive sample of the OECD countries. Results suggest that Euro had an effect on trade flows of around 5% while the effect on tourist arrivals was around 14%. By considering the differentiated effect between the euro when the irrevocable exchange rate where fixed and when it started to circulate, it is found that for both flows, the effect is greater since it was effectively circulated, than since it was simply a unit of account.

Appendix 3.

Table A.3.1.List of countries.

Albania	France	Norway
Algeria	Germany	Oman
Angola	Ghana	Pakistan
Antigua and barbuda	Greece	Panama
Australia	Grenada	Papua n.guinea
Austria	Guadeloupe	Paraguay
Bahamas	Guatemala	Peru
Bahrain	Guinea	Philippines
Bangladesh	Haiti	Poland
Barbados	Honduras	Portugal
Belgium	Hong kong	Romania
Belize	Hungary	Saudi arabia
Benin	Iceland	Senegal
Bermuda	India	Seychelles
Bolivia	Indonesia	Singapore
Brazil	Iran	South africa
Brit. Virgin islands	Ireland	Spain
Brunei	Israel	Sri lanka
Bulgaria	Italy	St. Vincent & the Grenadines
Burkina_faso	Jamaica	St. Kitts nevis
Cambodia	Japan	St.lucia
Canada	Jordan	Sweden
Cayman islands	Kenya	Switzerland
Chad	Korea rep	Thailand
Chile	Kuwait	Togo
China	Luxembourg	Trinidad&tobago
Colombia	Malaysia	Tunisia
Cook islands	Maldives	Turkey
Costa_rica	Malta	Turks and caicos islands
Cyprus	Martinique	U.k.
Czech republic	Mauritius	U.s.a.
Denmark	Mexico	Rusia
Dominica	Morocco	Uruguay
Dominican_rep.	Nepal	Venezuela
Ecuador	Netherlands	Vietnam
Egypt	New caledonia	
El salvador	New zealand	
Fiji	Nicaragua	
Finland	Nigeria	

Table A.3.2.Descriptive statistics. Panel 1995-2006

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Ln Tou	26096	9.1466	2.6756	0	17.6
Ln Trade	36966	18.066	3.4536	0.9785	26.85883
Ln GDPpc	39840	18.9004	1.2956	8.886685	22.2295
Ln Pop	39960	32.1464	2.7928	22.1366	40.5125
Ln GDPpcdest	39780	8.9234	1.1585	6.4892	11.1468
Ln GDPpcorig	39960	9.9896	0.4571	8.5895	11.0819
Ln Popdest	39960	16.5280	1.5246	12.4987	19.5172
Ln Popdest	39960	15.6183	2.3394	9.6373	20.9946
Ln Comp	37830	-0.8307	3.4452	-11.0540	8.6935
Log Dist	39960	8.5915	0.9395	2.9444	9.8848
Lang	39960	0.1096	0.3124	0	1
Border	39960	0.0213	0.1444	0	1
Colonial	39960	0.0348	0.1833	0	1
Landl	39960	0.2900	0.4919	0	2
Islands	39960	0.3573	0.5759	0	2
CommonCurrency	38628	0.0233	0.1510	0	1
CCotros	38628	0.0016	0.0403	0	1
CCeuro	38628	0.0217	0.1458	0	1
CurrencyBoard	39960	0.0195	0.1383	0	1
Peg	39960	0.0098	0.0989	0	1
CrawlingPeg	39952	0.031688	0.1751704	0	1
ManagedFloating	39960	0.0576827	0.2331453	0	1

Table A.3.3. Exchange rate regimes

country	Exchange rate regime	Reference Currency
Austria	Common Currency	Euro 02-04
Belgium	Common Currency	Euro 02-04
British Virgin Islands	Common Currency	US Dollar 95-04
Cook Islands	Common Currency	New Zealand Dollar 95-04
Ecuador	Common Currency	US dollar 00-06
El Salvador	Common Currency	US dollar 01-06
Finland	Common Currency	Euro 02-04
France	Common Currency	Euro 02-04
Germany	Common Currency	Euro 02-04
Greece	Common Currency	Euro 02-04
Guadeloupe	Common Currency	French Franc 95-01 Euro 02-04
Ireland	Common Currency	Euro 02-04
Italy	Common Currency	Euro 02-04
Luxembourg	Common Currency	Euro 02-04
Martinique	Common Currency	French Franc 95-01 Euro 02-04
Netherlands	Common Currency	Euro 02-04
Panama	Common Currency	US Dollar 95-04
Portugal	Common Currency	Euro 02-04
Spain	Common Currency	Euro 02-04
Turks and Caicos Islands	Common Currency	US Dollar 95-04
Antigua and Barbuda	Currency Board	US Dollar 95-04
Bahamas, The	Currency Board	US Dollar 95-04
Bahrain	Currency Board	US Dollar 95-04
Belize	Currency Board	US Dollar 95-04
Benin	Currency Board	French Franc 95-98 Euro 99-04
Bermuda	Currency Board	US Dollar 95-04
Bulgaria	Currency Board	German Marc 95-98 Euro 99-04
Burkina Faso	Currency Board	French Franc 95-98 Euro 99-04
Cayman Islands	Currency Board	US Dollar 95-04
Chad	Currency Board	French Franc 95-98 Euro 99-04
Dominica	Currency Board	US Dollar 95-04
Grenada	Currency Board	US Dollar 95-04
Hong Kong, China	Currency Board	US Dollar 95-04
Kuwait	Currency Board	US Dollar 03-04
Malaysia	Currency Board	US Dollar 99-04
Maldives	Currency Board	US Dollar 95-04
Nepal	Currency Board	US Dollar 95
Oman	Currency Board	US Dollar 95-04
Saint Kitts and Nevis	Currency Board	US Dollar 95-04
Saint Lucia	Currency Board	US Dollar 95-04
Saint Vincent and the Grenadines	Currency Board	US Dollar 95-04
Senegal	Currency Board	French Franc 95-98 Euro 99-04
Togo	Currency Board	French Franc 95-98 Euro 99-04
Austria	Currency Peg	German Marc 95-98
Belgium	Currency Peg	German Marc 95-98

China	Currency Peg	US Dollar 95-04
Cyprus	Currency Peg	German Marc 95-98 Euro 99-04
Denmark	Currency Peg	Euro 99-04
Egypt, Arab Rep.	Currency Peg	US Dollar 95-04
El Salvador	Currency Peg	US Dollar 95-00
Finland	Currency Peg	German Marc 95-98
France	Currency Peg	German Marc 95-98
Greece	Currency Peg	German Marc 95-98
India	Currency Peg	US Dollar 95
Ireland	Currency Peg	German Marc 97-98
Italy	Currency Peg	German Marc 97-98
Jordan	Currency Peg	US Dollar 95-04
Luxembourg	Currency Peg	German Marc 95-98
Malta	Currency Peg	Euro 01-04
Netherlands	Currency Peg	German Marc 95-98
Philippines	Currency Peg	US Dollar 96-97
Portugal	Currency Peg	German Marc 95-98
Saudi Arabia	Currency Peg	US Dollar 95-04
Spain	Currency Peg	German Marc 95-98
Thailand	Currency Peg	US Dollar 95-04
Albania	Crawling Peg	Euro 04
Algeria	Crawling Peg	French Franc 95-98 Euro 99-00
Bangladesh	Crawling Peg	US Dollar 95-04
Bolivia	Crawling Peg	US Dollar 95-98
Brazil	Crawling Peg	US Dollar 95-04
Brunei Darussalam	Crawling Peg	US Dollar 95-04
Cambodia	Crawling Peg	US Dollar 95-04
Canada	Crawling Peg	US Dollar 95-04
Chile	Crawling Peg	US Dollar 99
Costa Rica	Crawling Peg	US Dollar 95-04
Czech Republic	Crawling Peg	German Marc 95 Euro 02-04
Denmark	Crawling Peg	German Marc 95-98
Dominican Republic	Crawling Peg	US Dollar 95-03
Ecuador	Crawling Peg	US Dollar 97
Ghana	Crawling Peg	US Dollar 01-04
Guatemala	Crawling Peg	US Dollar 95-04
Guinea	Crawling Peg	US Dollar 95-04
Honduras	Crawling Peg	US Dollar 99-04
Hungary	Crawling Peg	German Marc 95-98 Euro 99-04
Iceland	Crawling Peg	German Marc 95-98 Euro 99-00
Iceland	Crawling Peg	German Marc 95-98 Euro 99-00
India	Crawling Peg	US Dollar 96-04
Indonesia	Crawling Peg	US Dollar 95-97
Ireland	Crawling Peg	German Marc 95-96
Italy	Crawling Peg	German Marc 95-96
Jamaica	Crawling Peg	US Dollar 95-04
Jordan	Crawling Peg	US Dollar 95

Kenya	Crawling Peg	US Dollar 96-04
Korea, Rep.	Crawling Peg	US Dollar 95-97
Kuwait	Crawling Peg	US Dollar 95-02
Malaysia	Crawling Peg	US Dollar 95-97
Mauritius	Crawling Peg	US Dollar 95-04
Morocco	Crawling Peg	French Franc 95-98 Euro 99-00
Nepal	Crawling Peg	US Dollar 96-04
Nicaragua	Crawling Peg	US Dollar 95-04
Pakistan	Crawling Peg	US Dollar 95-04
Papua New Guinea	Crawling Peg	US Dollar 95-04
Paraguay	Crawling Peg	US Dollar 95-99
Peru	Crawling Peg	US Dollar 95-04
Philippines	Crawling Peg	US Dollar 00-04
Russian Federation	Crawling Peg	US Dollar 00-04
Seychelles	Crawling Peg	US Dollar 95-04
Sri Lanka	Crawling Peg	US Dollar 95-04
Switzerland	Crawling Peg	German Marc 95-98
Trinidad and Tobago	Crawling Peg	US Dollar 95-04
Tunisia	Crawling Peg	French Franc 95-98 Euro 99-00
Venezuela, RB	Crawling Peg	US Dollar 97-02
Vietnam	Crawling Peg	US Dollar 02-04
Albania	Managed Floating	02-03
Brazil	Managed Floating	00-04
Canada	Managed Floating	02-04
Chile	Managed Floating	02-04
Colombia	Managed Floating	95-04
Czech Republic	Managed Floating	96-01
Ecuador	Managed Floating	95-96
Fiji	Managed Floating	02-04
Ghana	Managed Floating	97-99
Guinea	Managed Floating	00-04
Haiti	Managed Floating	02 04
Honduras	Managed Floating	95-98
Iceland	Managed Floating	01-04
Indonesia	Managed Floating	99-04
Iran, Islamic Rep.	Managed Floating	96-01
Israel	Managed Floating	95-04
Kenya	Managed Floating	95
Korea, Rep.	Managed Floating	99-04
Malta	Managed Floating	95-00
Mexico	Managed Floating	96-04
New Zealand	Managed Floating	95-04
Nigeria	Managed Floating	96-04
Norway	Managed Floating	95-04
Paraguay	Managed Floating	00-04
Philippines	Managed Floating	95 98-99
Poland	Managed Floating	95-04

Romania	Managed Floating	01-04
Singapore	Managed Floating	95-04
Sweden	Managed Floating	95-04
Switzerland	Managed Floating	99-04
Thailand	Managed Floating	98-04
Turkey	Managed Floating	98-00
United Kingdom	Managed Floating	95-04
Uruguay	Managed Floating	02-04

Table A.3.4. Descriptive statistics. Panel OECD 1995-2006

Variable	Obs	Mean	Std. Dev.	Min	Max
Ln Tou	7655	11.1928	2.0932	3.4000	17.8000
Ln Trade	9761	21.0414	2.1106	13.2656	26.8588
Ln GDPpc	10440	20.0005	0.6526	17.1794	22.1631
Ln Pop	10440	33.0917	2.1663	24.9972	39.0341
Ln GDPpcdest	10440	10.0108	0.4496	8.5895	11.0820
Ln GDPpcorig	10440	9.9897	0.4571	8.5895	11.0820
Ln Popdest	10440	16.5281	1.5247	12.4987	19.5173
Ln Popdest	10440	16.5636	1.5386	12.4987	19.5173
Ln Comp	10440	0.0659	2.9853	-8.3202	8.3202
Log Dist	10440	7.8727	1.2776	2.9444	9.8826
Lang	10440	0.0828	0.2755	0.0000	1.0000
Border	10440	0.0736	0.2611	0.0000	1.0000
Colonial	10440	0.0379	0.1910	0.0000	1.0000
Landl	10440	0.3724	0.5502	0.0000	2.0000
Islands	10440	0.2011	0.4671	0.0000	2.0000
Euro99-06	10092	0.1141	0.3180	0.0000	1.0000
Euro02-06	10092	0.0713	0.2574	0.0000	1.0000
Euro99-01	10092	0.0428	0.2024	0.0000	1.0000

Chapter 4
On the effect of common currency on growth via trade and tourism

4.1. Introduction

The theoretical analysis of currency unions began with a seminal paper by Robert Mundell (1961). Mundell briefly argued that there are advantages to regions that share a common currency but there are also problems caused by presence of asymmetric shocks and nominal rigidities (in prices and wages). The case for joining a currency union rests on two important benefits: one is the reduction of transaction costs by eliminating currency conversion costs and the disturbances in relative prices coming from nominal exchange rate fluctuations. The second is its potential to discipline monetary policies, in particular to combat inflation. The lower transaction costs and better monetary discipline encourage deeper integration in financial and non-financial markets. In contrast, one of the main arguments against currency unions is the loss of independence to tailor monetary policy to country's needs. A currency union would be relatively less costly for countries that present high levels of labour mobility and high co-movement of economic shocks with other countries in the union.

Frankel and Rose (2002) hold that currency unions are good for the performance of the economy in the long run, although the channel runs via a substantial stimulus to trade among the members, rather than via macroeconomic influences. As mentioned above, currency unions imply the elimination of risk of future changes in the exchange rate, as well as the transactions costs incurred from converting one currency into another. Thus, they would facilitate trade. For similar reasons, it is also expected that tourism benefit from this reduction of transaction cost and elimination of exchange rate volatility. Hence, as suggested in Chapter 3, common currency would promote tourism as well as trade.

The economic benefits of currency unions on trade have been widely investigated in the literature while the potential empirical link between a currency union and international tourism has hardly been explored. Section 3.2.2 of previous chapter presents a review of the more relevant papers that analyse the effect of common currencies on trade and tourism. The empirical analysis suggests that by sharing a common currency countries would expect to intensify their flows of goods and tourists. Moreover, Chapter 3 presents the estimates of a large panel dataset where several experiences of common currencies are considered to explore their impact on trade and tourist arrivals. The estimates of the analysis suggest that the euro and other cases of common currencies promote tourism and trade flows.

The influence of a common currency on income via trade and tourism has received much less attention. Growth theory holds that market size facilitates economic growth. The relevance of this relationship is direct since both trade and tourism increase market size. According to the neoclassical Solow model, the level of the GDP per capita in the steady state will depend on any factor that affects the level of productivity, such as allocation of resources and saving rates. In that sense, openness implies a more efficient allocation of resources and hence raises steady state level of income. Berg and Krueger (2003) present an exhaustive survey of recent research on the effect of trade openness to growth, suggesting that openness to trade is a major determinant of economic growth. In contrast to the extensive literature on the export-led growth hypothesis, there are fewer studies investigating empirical relationship between tourism and economic development, i.e. the tourism-led growth hypothesis[1]. Such analysis is especially relevant for developing countries with a high dependence on the tourism sector. Cortés-Jiménez and Pulina (2009) provide a comprehensive review of studies on the potential role of tourism to long-run growth.

Summarising, some research finds a positive effect of a single currency on international trade and tourism. Moreover, growth theory and empirical research suggest that openness to trade and tourism promote growth. Given this scenario, the present chapter addresses the following question "Could a common currency increase the income of a country via international trade and tourism?"

By using a panel dataset which includes trade flows from over 180 countries for the period 1970-1995, Frankel and Rose (2002) deal with the hypothesis that a monetary union increases the income of a country via trade. The authors analyse the consequences of currency unions on international trade and growth arguing that sharing a common currency reduces the costs of international transactions and promotes trade and openness. Therefore, such trade induced by currency union may in turn have a beneficial effect on income. Particularly, these authors find that the unique effect of currency unions on growth is derived via international trade. However, despite being proven that common currency promotes tourism and the role of tourism as a way of enlarging the market size, the tourism-induced effect of currency unions on income has been neglected. In that sense, Frankel and Rose's (2002) results could be underestimating the true effects of a common currency on income.

Following Frankel and Rose's (2002) paper, the tourism-induced effect of currency unions on growth, over and above its effect on trade, is investigated in the present chapter. However, as pointed out by Frankel and Rose (2002) is important to clarify that in the present analysis the costs of currency unions are not taken into consideration. Rather, potential benefits of currency unions that have been under-examined in the literature are being quantified. This analysis attempts to provide new insights into the literature on the benefits and costs of

[1] See for instance, Balaguer and Cantavella-Jordá (2002).

currency unions, also investigationg the importance of the potential effects on trade, tourism and growth of adopting a common currency for policy purposes. .

Another important point to pay attention to is the heterogeneity within the countries considered in this study. Frankel and Rose's (2002) estimates rely on small, poor countries since the case of the euro is not being included in their sample. In that sense, the authors doubt in their paper whether the results can be extended to large and rich countries. Based on this argument, up-to-date data including the case of the euro are considered in the present analysis. Moreover, the sample is divided into three groups by levels of income. Hence, another contribution of our analysis is the choice of samples according to low, middle and high income economies which provides more accurate results and allows the identification of similarities and differences across countries worldwide.

Therefore, our research contribute to the question posed by Frankel and Rose (2002) in at least three ways: (i) tourism is included as an additional channel for a common currency to promote growth, (ii) the heterogeneity of countries is addressed by dividing the sample into three groups classify by their level of income. This classification provides more accurate results, and (iii) up-to-date data, including the case of the euro, are considered.

The investigation follows three steps. First, the effects of a common currency on inbound tourism and trade flows are calculated by means of a gravity equation. Second, the effects of openness to trade and of tourism on the economic growth of the destination countries are estimated, using a standard convergence growth model. Third, considering the results from the two previous stages, the potential impact of a common currency on a country's tourism, trade and income are calculated.

The chapter is organised as follows. In section 4.2 the effects of currency unions on international trade and tourism flows are obtained by estimating a gravity equation. In section 4.3 the effects of tourism and openness to trade on growth are obtained. Section 4.4 combines the results of the two previous analyses to calculate the potential effect on income of adopting a common currency. Finally, in section 4.5 some conclusions are drawn.

4.2. The effect of common currency on trade and tourism

The first stage of our analysis involves two objectives. First, the effect of a common currency on tourism flows is estimated. Second, and in a similar way, the effect of a common currency on trade is determined.[2]

4.2.1. Data and Methodology

The empirical analysis of this section is based on the estimation of a gravity equation for trade and tourism. This model is presented in Chapter 3. For the purposes of this empirical analysis two similar equations are evaluated. The effect that sharing a single currency has on trade and tourism flows is studied by estimating equations [4.1] and [4.2], respectively.

$$\begin{aligned}\ln Tou_{ijt} = {} & \phi_0 + \phi_1 \ln GDPpc_{it} + \phi_2 \ln GDPpc_{jt} + \phi_3 \ln Pop_{it} + \phi_4 \ln Pop_{jt} + \phi_5 \ln Comp_{ijt} \\ & + \phi_6 \ln D_{ij} + \phi_7 \ln Trade_{ijt} + \phi_8 Lang_{ij} + \phi_9 Border_{ij} + \phi_{10} Colony_{ij} + \phi_{11} Landl_{ij} \\ & + \phi_{12} Island_{ij} + \eta CC_{ijt} + \alpha_i + \lambda_j + \mu_t + u_{ijt}\end{aligned} \qquad [4.1]$$

$$\begin{aligned}\ln Trade_{ijt} = {} & \phi_0^* + \phi_1^* \ln GDPpc_{ijt} + \phi_2^* \ln Pop_{ijt} + \phi_3^* \ln D_{ij} + \phi_4^* \ln Tou_{ijt} + \phi_5^* Lang_{ij} \\ & + \phi_6^* Border_{ij} + \phi_7^* Colony_{ij} + \phi_8^* Landl_{ij} + \phi_9^* Island_{ij} + \eta^* CC_{ijt} \\ & + \alpha_i^* + \lambda_j^* + \mu_t^* + v_{ijt}\end{aligned} \qquad [4.2]$$

where ln denotes natural logarithms, *i* indicates destination country, j origin country, *t* is time and the explanatory variables introduced are defined as:

[2] Note the previous work use IMF statistics that only include tangible goods and, as a consequence, tourism has been neglected.

$Trade_{ijt}$ is the international trade, sum of exports and imports, between countries i and j in year t,

Tou_{ijt} is the number of tourist arrivals to country i from country j in year t,

$GDPpc_{ijt}$ is the product of real GDP per capita of countries i and j in year t,

$GDPpc_{it}$ is the real GDP per capita of the destination country in year t,

$GDPpc_{jt}$ is the real GDP per capita of the origin country in year t,

Pop_{ijt} denotes the product of populations of countries i and j in year t,

Pop_{it} denotes the population per capita of the destination country in year t,

Pop_{jt} denotes the population per capita of origin country in year t,

D_{ij} is the great circle distance between capital cities of countries i and j,

$Lang_{ij}$ is a binary variable which is unity if i and j have a common language and zero otherwise,

$Border_{ij}$ is a binary which is unity if i and j share a common land border and zero otherwise,

$Colony_{ij}$ is a binary variable which is unity if one country ever colonized the other or vice versa and zero otherwise,

$Landl_{ij}$ is the number of landlocked countries in the country-pair (0, 1, or 2),

$Island_{ij}$ is the number of island nations in the pair (0, 1, or 2),

$Comp_{ijt}$ denotes a competiveness variable calculated as a real exchange rate between countries i and j,

CC_{ijt} is a binary variable related to currency union which takes value 1 if both countries in the pair share a common currency, 0 otherwise

Finally, ϕ_0 is the constant α_i refers to destination fixed effects, λ_j are origin fixed effects, μ_t are year fixed effects, $\phi_1, \ldots, \phi_{12}$ are the set of coefficients and η is the parameter of interest. Asterisk in parameters refers to the same definition of parameters and variables but in equation [4.2], and u_{ijt} and v_{ijt} are well-behaved disturbance terms. Since origin and destination fixed effects are included, the equations are estimated following the same methodology as in Chapter 3.

The dataset includes the 30 OECD countries as origins and 179 countries, including the OECD countries as tourist destinations[3]. Therefore, the dataset covers 5,370 pairs of countries over the period 1995-2006[4]. In terms of revenues, OECD countries generate about 70% of world tourism activity and about 75% of world international trade, so it makes sense to consider these countries as countries of origin. The destination countries are divided into three samples according to their level of income. The official World Bank classification divides countries into four groups: low income, lower-middle income, upper-middle income and high income, three groups of countries are created, namely *low income countries* which includes both low and lower-middle income countries from the World Bank classification; *middle income countries* which corresponds to upper-middle income and *high income countries* which refers to the high income countries in the World Bank classification.

As in Chapter 3, in tourism equation [4.1] the dependent variable is unidirectional, i.e. tourist arrivals to country *i* from country *j,* so GDP per capita and population are presented independently for origin and destination country. Moreover, $Comp_{ijt}$, is included to account for price competiveness.

Again, following results found in Chapter 2 and 3, *Trade* is considered as an explanatory variable in the tourism specification [4.1] while *Tou* variable is included as a regressor in the trade specification [4.2]. In that sense, *Trade* and *Tou* are not strictly exogenous in equations [4.1] and [4.2], respectively. Moreover, *GDPpc* of the destination country in equation [4.1] and the product of GDP per capita in equation [4.2] are also considered as potentially endogenous variables. Henceforth, instrumental variable methods are required to deal with this problem and lagged values of the endogenous variables are considered as instruments.

The source of annual international tourist arrivals by country of origin is the *United Nations World Tourism Organisation (UNWTO).* Trade variable is measured in millions of US$ and is obtained from *Direction of Trade* dataset of

[3] Table A.4.1 in the Appendix presents the list of countries considered in this analysis.
[4] Descriptive statistics are presented in Tables A.4.2, A.4.3 and A.4.4 in the Appendix

the *International Monetary Fund* and the *OECD Statistics*. *GDPpc* and *Trade* need to be converted to real terms by using US GDP deflator. GDP per capita, population and US GDP deflator were collected from the *World Development Indicators* (2006) and the *UNCTAD Handbook of Statistics* (2008)[5]. As in previous chapter, $Comp_{ijt}$ variable is calculated using Consumer Price Indexes from the *International Labour Organisation* and nominal exchange rates from the *IMF Financial Statistics*. Distance and variables *Lang*, *Colony, Border* and *Landl* come from the *Centre d'Etudes Prospectives et d'Informations Internationales (CEPII)* dataset while *Island* and *CC* were obtained from Andrew K. Rose's website and the *CIA Factbook*[6].

In this stage, the variable of interest is the commom currency dummy variable. This dummy contains time-invariant cases across pairs. Thus, equations [4.1] and [4.2] are estimated by fixed-effect with two-stage least squares (2SLS-FE).

4.2.2. Results

In this section, equations [4.1] and [4.2] are evaluated to estimate the impact of a common currency on tourism and trade, respectively. On the basis of the results of equation [4.1] for tourist arrivals, Table 4.1 presents the estimates by FE-2SLS for each sample: low-income, middle-income and high-income economies. Standard errors robust to heteroskedasticity are computed by using Huber-White estimator.

A check of the goodness of fit (R^2) shows that the gravity equation works well accounting for over 80% of the variation in international tourism for the three groups of countries. Moreover, the exogeneity of instruments is tested in the same way as in Chapter 3, i.e., by regressing the FE-2SLS residuals against the

[5] The source of GDP per capita and Population of Guadeloupe and Martinique are the *Institute National de la Estatistique et des Études Économiques.*
[6] The common currency cases considered in the analysis are presented in Table A.4.5 in the Appendix.

Table 4.1. Common currency effect on tourism

	Low-Income		Middle-Income		High-Income	
Variables	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**
Constant	10.927	1.69	-97.266	-5.59	10.481	1.87
Ln $Trade_{ij}$	0.204	15.33	0.264	17.36	0.386	24.76
Ln $GDPpc_j$	0.800	5.99	0.317	1.39	0.150	0.75
Ln $GDPpc_i$	0.674	2.51	1.120	3.68	0.692	2.99
Ln Pop_j	-1.130	-3.09	0.402	0.82	-0.825	-2.31
Ln Pop_i	0.313	9.92	4.601	5.49	0.160	5.23
Ln $Comp_{ij}$	-0.003	-0.35	-0.021	-1.96	0.003	0.48
Ln D_{ij}	-1.021	-34.75	-0.870	-26.85	-0.701	-26.87
$Lang_{ij}$	0.596	17.36	0.893	16.56	0.273	7.36
$Border_{ij}$	2.618	14.31	1.802	15.76	0.098	1.88
$Colony_{ij}$	0.984	21.86	0.996	12.62	0.768	14.71
$Landl_{ij}$	1.968	4.19	13.684	4.93	-3.205	-12.32
$Islands_{ij}$	-0.263	-3.68	-0.650	-8.14	-0.020	-0.36
Common $Currency_{ij}$	0.660	6.16	1.223	10.44	0.087	2.23
R^2	0.8346		0.873		0.9006	
F	690.41	0.00	634.01	0.00	1057.12	0.00
F-FE	265.42	0.00	119.56	0.00	201.2	0.00
Obs	13010		6702		10707	
Exogeneity test	0.00	1.00	0.00	1.00	0.00	1.00

instrumental variables. The acceptance of the null hypothesis suggests that the instruments are strictly exogenous and hence they are suitable for the estimation.

As expected from Chapter 2, the coefficient of the trade variable is significant and has a positive sign in the three samples suggesting a complementary relationship between trade and tourism. GDP *per capita* of destination and origin countries are significant, meaning that national economic mass has a positive influence on tourism. In other words, the richer the countries, the higher the international tourism between them are. The population of the origin country is significant in all the cases while the population of the destination appears not to be relevant for the case of middle income economies and negative for the case of low and high income countries. In general, the population and the real GDP *per capita* variables of the origin countries have a higher impact on tourism flows than the variables of destination countries. These results seem reasonable since origin variables represent the size of the tourism demand.

The competitiveness variable turns out to be not significant suggesting the relevance of non-price competition in worldwide tourism markets. As expected for the three samples, distance has a negative sign while common language, contiguity and colony variables have a positive effect on international tourism flows. The impact of landlocked countries is positive in the case of low and middle income while it is negative for the case of high income. Finally, the number of islands in the pair is not significant for the case of rich countries while it is negative for the case of low and middle income economies, suggesting that these conditions make the access to these destination countries more difficult.

Focusing our attention on the common currency variable, its coefficient is positive and significant for the three groups of countries. For the case of low income economies, the coefficient is 0.66, which implies that the effect of currency unions on tourism amounts to 93% $[\exp(0.66)-1=0.93]$. For the middle income countries, the coefficient is 1.22, which implies an effect of 240% on tourism and for high income economies the coefficient is 0.087 with an effect of 9% on tourism flows.

Sharing a currency seems to have a much higher effect on low and middle income economies than on the high income ones. However, it is important to note that this last group of countries reflects the case of the euro and as pointed out in Chapter 3 the estimated impact of this currency is lower than other cases of currency union.

Table 4.2 presents the estimate of equation [4.2] by FE-2SLS where the effect of common currency on trade flows is studied. Again, the standard errors robust to heteroskedasticity are computed. The specification seems to explain trade flows properly as confirmed by the R^2. The model explains over 85% of the variability on trade flows. As expected, the estimates for the GDP *per capita* and population are significant and positive except for the case of the population in middle income countries where it does not seem to be relevant. As found in Chapter 2, tourism variable is significant and positive for the three cases suggesting complementarity between trade and tourism flows. Distance has the expected negative sign while common language,

Table 4.2. Common currency effect on trade

	Low-Income		Middle-Income		High-Income	
Variables	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**
Constant	-25.957	-11.39	0.652	0.05	-15.702	-4.66
Ln Tou_{ij}	0.221	15.40	0.282	18.03	0.363	27.29
Ln $GDPpc_{ij}$	1.213	9.50	0.879	4.46	0.853	4.77
Ln Pop_{ij}	0.874	28.77	0.075	0.18	0.512	17.37
Ln D_{ij}	-1.225	-40.99	-1.174	-39.78	-0.672	-31.71
$Lang_{ij}$	0.061	1.63	0.179	2.62	0.039	1.06
$Border_{ij}$	0.883	4.92	-0.187	-2.62	0.101	2.57
$Colony_{ij}$	0.718	13.86	0.373	4.89	0.238	4.70
$Landl_{ij}$	2.405	9.19	8.483	2.68	0.495	1.89
$Islands_{ij}$	0.833	10.49	0.894	10.68	0.318	5.35
Common Currency	0.534	2.65	0.821	1.91	0.125	3.41
R^2	0.8565		0.8808		0.9286	
F	651.22	0.00	692.17	0.00	1316.88	0.00
F-FE	82.99	0.00	95.53	0.00	134.27	0.00
Obs	13370		7191		11302	
Exogeneity test	0.00	1.00	0.00	1.00	0.00	1.00

contiguity, number of landlocked and number of island are significant and positive in almost all the cases with the exception of language for the high income countries, where it is not significant and the influence of the border variable remains inconclusive.

Related to the impact of common currency variable on trade, its parameter is positive and significant in the three estimates suggesting that currency unions promote trade flows. In particular, the coefficients of the *CC* variables are 0.53, 0.82 and 0.12 for the low, middle and high income economies, respectively. These results imply an effect of a common currency on trade of 70% for the low income countries, 127% for the middle income economies and 12% for the high income ones.

Up to this point, it has been found that a common currency has a positive effect on the creation of trade and tourism flows.[7] Moreover, this effect is higher for the middle and low income countries than for the high income ones. These results

[7] Following Frankel and Rose (2002), to test the possibility that the stimulus to trade and tourism among members of a currency union may come at the expense of trade and tourist arrivals with non-members, a dummy variable equal to 1 when one of the members of the pair belongs to a currency union is added to equations [1] and [2]. These dummies are positive and significant, which suggests that trade/tourism creation rather than trade/tourism deviation takes place.

might shed light on the currency union debate and the potential incorporation of developing economies into currency unions. Moreover, sharing a common currency seems to have a greater impact on tourism flows than on international trade for low and middle income countries but a lower one for the case of high income economies.

4.3. The effect of openness to trade and tourism on growth

Since common currencies seem to promote trade and tourism, the analysis of their impact on growth requires to estimate the effect of openness on income. In the second stage of the empirical analysis, the influence of openness to trade and tourism on income is estimated.

4.3.1. Data and Methodology

The neoclassical Solow framework has been the workhorse for the empirical analysis of the determinants of growth holding that steady-state growth depends on technological progress and population growth. An important feature of the neoclassical model is the convergence property which means that countries with a similar level of technology converge to a similar level of output in the steady state.

Throughout economic growth literature, researchers have been interested in the rate at which regions and countries close the gap between their current positions and their respective steady states. They have also tried to analyse which factors are relevant to this process. In our context, convergence economic growth literature becomes relevant (Barro, 1991; Barro and Sala-i-Martin, 1992; 2004). Convergence applies if a poor economy tends to grow faster than a rich one, so that the poor country tends to catch up with the rich one in terms of the level of per capita income or product, i.e., the β-convergence concept.

Mankiw et al (1992) provides a simple theoretical framework for growth regressions. Their specification includes some of the generally accepted sources of growth, such as investment in physical capital and human capital. Moreover, other factors are recognised to have an influence on growth, including population growth or openness to trade (Barro, 1991; Barro and Lee, 1994; Temple, 1999).

In that sense, the concept of unconditional β-convergence is used, which means that an inverse relationship between growth rate and the level of income exists. The standard model to study β-convergence is the following

$$\ln GDPpc_{it} - \ln GDPpc_{it-1} = \beta \ln GDPpc_{it-1} + \gamma x_{it} + \delta z_{it} + w_i + \varepsilon_{it} \qquad [4.3]$$

where *ln* represents natural logarithm, $GDPpc_{it}$ is per-capita real income in country *i* at time *t*, x_{it} is a column vector of exogenous variables, z_{it} is a column vector of endogenous variables, and γ and δ are row vectors of parameters. Parameter β is the speed of convergence (beta-convergence) and $0 < \beta < 1$ implies that convergence between countries exists. The term w_i represents country-specific effects, which are independent and identically distributed over the countries, and ε_{it} are errors independent and identically distributed.

The particular equation estimated for the analysis of the influence of openness to trade and tourism on income is as follows

$$\begin{aligned} \ln GDPpc_{it} &= (1-\beta)\ln GDPpc_{it-1} + \gamma_1 PopG_{it} + \gamma_2 SCHprim_{it} + \gamma_3 SCH\sec_{it} \\ &+ \delta_1 Ln(Inv/GDP)_{it} + \delta_2 Ln(Trade/GDP)_{it} + \delta_3 Ln(Tou/Pop)_{it} + v_i + \varepsilon_{it} \end{aligned} \qquad [4.4]$$

where the term v_i represents country-specific effects, and ε_{it} is an independent and identically distributed error. The variables considered as exogenous are *PopG* which measures the annual growth rate of population, with a negative expected sign. *SCHprim* and *SCHsec* refer to percentage of primary and secondary school gross enrolment levels, respectively, used as measures of human capital. These two variables are expected to have a positive coefficient meaning that more education will result in faster growth.

Several variables on the right hand side of equation [4.4] may be both a cause and an effect of economic growth and hence could be considered endogenous. This is the case of the investment rate, openness to trade and tourist arrivals. *Inv/GDP* is the ratio of gross fixed capital formation to GDP used as a proxy of the ratio of investment of the economy. The expected effect of this variable is positive suggesting that a higher rate of investment generates a higher growth rate. *Trade/GDP* represents the openness to trade while *Tou/Pop* denotes the ratio of total tourist arrivals to population. With respect to this latter variable, the ideal indicator to analyse the effect of tourism on economic growth would be tourist receipts to GDP. However, tourist arrivals have to be used as the dependant variable in Section 4.3 since bilateral tourist receipts data are not available. As a consequence, in this section we must use the same variable.[8] The parameters of interest are the coefficients of *Trade/GDP* and *Tou/Pop,* which estimate the effect of tourism and trade on income. As mentioned above, these two flows are expected to promote economic growth.

The source for population annual growth rate data is the *World Health Organisation,* while the percentages of primary and secondary gross school enrolments are obtained from the *World Bank EdStat*. Gross fixed capital formation (as a percentage of GDP), tourist arrivals, GDP and population are obtained from the *World Development Indicators,* while total trade in goods is collected from the *World Trade Organisation*. The time period considered is 1995-2006 and the number of countries included is 179[9]. These are the same countries as in the previous section and the sample is divided again into three groups: low-income, middle-income and high income economies.

[8] Gunduz and Hatemi-J (2005), Kim et al. (2006) and Cortés-Jiménez (2008) also use tourist arrivals per capita as an indicator of tourism flows for the empirical analysis of the contribution of tourism to growth.
[9] Descriptive statistics are presented in Tables A.4.6, A.4.7 and A.4.8 in the Appendix.

Traditionally, the convergence growth equation has been estimated following Mankiw et al (1992) specification as a single cross-section regression. However, Islam (1995) introduces the panel data approach for analysing growth convergence. According to this author, the main advantage of the panel data approach is that it allows for differences in the aggregate production function across economies. Moreover, this technique corrects for omitted variables bias involved in the single cross-section regression. As pointed out by Arellano (2004), this approach has been already used in the convergence growth context by several authors (Islam, 1995; Caselli *et al.*, 1996; Benhabib and Spiegel, 2000; Forbes, 2000; Levine *et al.*, 2000 as examples).

4.3.2. Results

Equation [4.4] is estimated by using two-step Arellano-Bond Generalized Method of Moments (GMM). This technique first applies difference to the growth model removing the individual fixed effect and then estimates the equation by instrumental variables where lagged variables are used as instruments. This procedure provides consistent estimates of the endogenous regressors in a dynamic panel context. Tests for autocorrelation and the Sargan test for the validity of instruments are presented with the coefficient estimates in Table 4.3.

The Sargan test for over-identifying restrictions supports the assumption that the model is correctly specified, and autocorrelation test suggests that there is no second-order autocorrelation. Broadly, the results reveal the expected relationship between the income growth and their explanatory variables. The β parameter associated with growth of GDP *per capita* is positive and less than one. As expected in this type of model, this result implies that in all three groups of countries there is evidence of convergence.

Population growth has a negative sign for middle and high income economies, while for the case of low-income countries it is not significant. Related to the investment ratio, its coefficient is positive for the case of middle income countries

Table 4.3. Growth effect of openness to trade and tourist arrivals per capita

Variable	Low-Income		Medium-Income		High-Income	
	Coef.	**t**	**Coef.**	**T**	**Coef.**	**t**
LnGDPpc	0.9863	176.39	0.8223	34.17	0.9110	61.36
PopG	-0.0010	-0.60	-0.0057	-3.90	-0.0171	-6.35
SCHprim	0.0004	4.69	-0.0003	-2.06	-0.0010	-5.27
SCHsec	0.0006	9.73	0.0011	5.35	0.0000	-0.36
LnINV/GDP	0.0012	0.34	0.0572	4.02	-0.0065	-0.75
LnTrade/GDP	0.0210	8.12	0.1036	10.23	0.0319	3.94
LnToupc	0.0071	4.26	0.0485	6.50	0.0657	6.41
Obs	402		200		250	
Wald chi2	4E+05	0.000	18158.63	0.000	31143.76	0.000
Sargan Test	61.93588	1.000	25.16766	1.000	34.16634	1.000
ρ1	-2.8045	0.005	-2.5919	0.0095	-2.7114	0.0067
ρ2	-0.26019	0.7947	-0.96685	0.3336	-1.5723	0.1159

while it is not significant for low and high income economies. The human capital coefficients reveal an interesting finding: for low income economies, both primary and secondary education coefficients are significant and positive with the effect of secondary school enrolment being more sizeable for the economic growth. For the middle economies, the relevant factor for the economic growth is secondary education while for the case of high income economies none of them are significant[10].

Observation of the trade and tourism variables suggests there is a positive effect of both flows on income in the three samples. For low income countries, coefficients of openness to trade and tourism per capita are 0.021 and 0.0071 respectively. In that sense, an increase of 1% in openness to trade implies an increase of 0.021% on GDP per capita and the same increase of tourist per capita generates an increase of 0.0071% in GDP per capita. For middle income countries, the coefficients correspond to increases of 0.1% and 0.0485% of average per capita income for trade and tourism respectively. Similarly, for the high income economies the elasticities are 0.032 for the openness to trade and 0.066 for per capita tourist arrivals.

[10] The estimates from including primary, secondary and tertiary education are available upon request. In that case, tertiary education is the one relevant for the economic growth of high income economies.

These results suggest that openness to trade and tourist arrivals have a larger effect on middle and high income economies than in low income ones. Nevertheless, the most important implication for this research is that an increase in the level of openness of the economies, via trade and/or tourism, has a positive effect on countries' level of income.

4.4. The effect of common currency on income

Following Frankel and Rose (2002), the estimates of the two previous sections are now integrated to evaluate the common currency effect on income. This analysis concerns which countries are in the currency union and how open they are, in terms of trade and tourism. Therefore, a greater effect on trade and tourism is expected to be obtained if the currency union partner is one with whom the country has intense economic relationships. For instance, Canada is expected to increase its total trade, tourist arrivals and output more by adopting the US dollar than by adopting the euro.

In this final stage of the paper, the potential effects of adopting the euro or the dollar for particular countries are obtained. This is not a forecasting analysis but a comparative statics analysis in which the potential effects of a common currency on trade, tourism and income are calculated. To that end, the euro zone is defined as the set of member countries of the EMU at that date[11] while the dollar zone is the USA. For each country not belonging to either the euro zone or the dollar zone, this analysis calculates the potential effect of a common currency on its trade, tourism and income.

[11] That is, Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain.

Table 4.4. Potential effects on trade, tourism and income. Low income economies

	Tourism							Trade						
	Ratios			effect euro		effect dollar		Ratios			effect euro		effect dollar	
Country	% Tourism euroZone	% Tourism dollarZone	tourist (% Pop)	On tourism	On GDP	On tourism	On GDP	% Trade euroZone	% Trade DolarZone	Trade (%GDP)	On trade	On GDP	On trade	On GDP
Albania	20.68	3.85	29.54	5.68	0.04	1.06	0.01	64.58	1.48	49.31	22.29	0.47	0.51	0.01
Algeria	13.52	0.25	4.91	0.62	0.00	0.01	0.00	48.77	20.09	77.15	26.34	0.55	10.85	0.23
Armenia	15.22	11.95	12.66	1.79	0.01	1.41	0.01	34.00	4.90	58.26	13.87	0.29	2.00	0.04
Bosnia and Herzegovina	23.95	3.40	6.52	1.45	0.01	0.21	0.00	37.98	0.93	101.11	26.88	0.56	0.66	0.01
Burkina Faso	39.88	2.98	1.84	0.68	0.00	0.05	0.00	27.58	1.21	39.32	7.59	0.16	0.33	0.01
Cambodia	10.86	7.29	11.97	1.21	0.01	0.81	0.01	8.83	29.44	137.01	8.47	0.18	28.24	0.59
Cape Verde	82.82	2.46	46.67	35.94	0.25	1.07	0.01	71.20	2.32	57.25	28.53	0.60	0.93	0.02
Comoros	30.38	0.00	3.54	1.00	0.01	0.00	0.00	43.17	0.83	36.07	10.90	0.23	0.21	0.00
Dominican Republic	27.30	27.55	41.24	10.47	0.07	10.56	0.07	8.70	55.66	64.34	3.92	0.08	25.07	0.53
Egypt, Arab Rep.	33.38	2.64	11.66	3.62	0.03	0.29	0.00	28.20	11.36	37.13	7.33	0.15	2.95	0.06
Gambia, The	20.80	1.46	7.52	1.45	0.01	0.10	0.00	15.32	2.81	61.67	6.61	0.14	1.21	0.03
Georgia	5.26	1.69	22.17	1.08	0.01	0.35	0.00	19.11	3.15	70.13	9.38	0.20	1.55	0.03
Guatemala	6.62	22.53	11.53	0.71	0.00	2.42	0.02	6.09	22.94	58.97	2.52	0.05	9.47	0.20
Honduras	5.93	30.85	10.60	0.58	0.00	3.04	0.02	6.15	54.54	92.54	3.99	0.08	35.33	0.74
Jordan	3.76	4.11	56.29	1.97	0.01	2.15	0.02	13.66	18.39	137.37	13.13	0.28	17.68	0.37
Lao PDR	9.24	5.56	14.62	1.26	0.01	0.76	0.01	5.09	4.30	65.81	2.34	0.05	1.98	0.04
Madagascar	64.96	0.00	1.63	0.98	0.01	0.00	0.00	32.31	2.48	58.45	13.22	0.28	1.01	0.02
Maldives	45.99	1.19	200.47	85.75	0.60	2.21	0.02	9.02	16.06	144.48	9.12	0.19	16.25	0.34
Mali	43.57	9.30	1.28	0.52	0.00	0.11	0.00	25.30	1.96	67.23	11.91	0.25	0.92	0.02
Morocco	39.31	1.43	20.94	7.66	0.05	0.28	0.00	53.36	1.55	65.27	24.38	0.51	0.71	0.01
Nepal	16.73	5.17	2.34	0.36	0.00	0.11	0.00	4.58	1.35	43.36	1.39	0.03	0.41	0.01
Nicaragua	4.53	21.85	13.97	0.59	0.00	2.84	0.02	3.77	42.02	87.98	2.32	0.05	25.88	0.54
Paraguay	6.12	3.42	6.45	0.37	0.00	0.21	0.00	4.73	5.81	97.68	3.23	0.07	3.97	0.08
Peru	14.15	18.18	5.93	0.78	0.01	1.00	0.01	12.69	25.73	49.26	4.37	0.09	8.87	0.19
Samoa	0.94	7.48	62.58	0.55	0.00	4.36	0.03	0.63	5.44	63.02	0.28	0.01	2.40	0.05
Senegal	31.10	2.99	7.17	2.07	0.01	0.20	0.00	36.71	2.41	63.16	16.23	0.34	1.07	0.02
Sri Lanka	20.80	3.72	2.92	0.56	0.00	0.10	0.00	12.09	12.26	73.90	6.25	0.13	6.34	0.13
Syrian Arab Republic	2.41	0.80	22.78	0.51	0.00	0.17	0.00	22.73	1.49	78.08	12.42	0.26	0.82	0.02
TFYR of Macedonia	27.44	4.00	9.92	2.53	0.02	0.37	0.00	39.40	1.15	115.43	31.84	0.67	0.93	0.02
Togo	28.39	2.87	1.47	0.39	0.00	0.04	0.00	25.88	3.88	102.21	18.52	0.39	2.78	0.06
Tonga	1.77	15.23	40.08	0.66	0.00	5.67	0.04	6.72	12.51	65.60	3.08	0.06	5.74	0.12
Tunisia	40.21	0.00	64.11	23.97	0.17	0.00	0.00	69.48	3.10	101.45	49.34	1.04	2.20	0.05
Ukraine	28.56	0.31	40.60	10.78	0.08	0.12	0.00	21.09	2.58	91.16	13.46	0.28	1.65	0.03
Vietnam	8.41	10.76	4.16	0.33	0.00	0.42	0.00	10.02	11.41	161.67	11.34	0.24	12.91	0.27

Table 4.5. Potential effects on trade, tourism and income. Middle income economies

	Tourism							Trade						
	Ratios			effect of euro		effect of dollar		Ratios			effect of euro		effect of dollar	
Country	% Tourism euroZone	% Tourism dollarZone	Tourist (% Pop)	On tourism	On GDP	On tourism	On GDP	% Trade euroZone	% Trade dollarZone	Trade (% GDP)	On trade	On GDP	On trade	On GDP
Belarus	21.01	4.5	0.91	0.46	0.02	0.1	0	18.84	1.79	132.34	31.663	3.166	3.007	0.301
Belize	6.6	61.34	87.7	13.83	0.67	128.57	6.24	7.53	36.33	89.88	8.592	0.859	41.471	4.147
Brazil	30.89	14.38	2.65	1.96	0.09	0.91	0.04	18.56	17.73	25.45	5.998	0.6	5.731	0.573
Bulgaria	38.72	1.35	67.05	62.05	3.01	2.16	0.1	45.47	2.63	141.45	81.69	8.169	4.733	0.473
Chile	11.62	8.86	13.68	3.8	0.18	2.9	0.14	19.13	17.01	77.22	18.765	1.876	16.68	1.668
Costa Rica	9.75	42.39	39.22	9.14	0.44	39.73	1.93	15.68	36.43	103.39	20.589	2.059	47.831	4.783
Croatia	23.5	1.42	190.06	106.72	5.18	6.43	0.31	44.89	2.4	86.35	49.235	4.923	2.627	0.263
Dominica	4.21	23.93	136.05	13.68	0.66	77.8	3.77	4.87	20.02	76.05	4.702	0.47	19.335	1.934
Jamaica	4.01	71.01	62.22	5.96	0.29	105.6	5.12	7.07	5.27	88.56	7.956	0.796	5.927	0.593
Kazakhstan	2.65	0.55	30.73	1.95	0.09	0.41	0.02	31	11.1	94	37.012	3.701	13.249	1.325
Latvia	42.95	0.92	67.06	68.84	3.34	1.48	0.07	30.99	0.57	102.29	40.254	4.025	0.742	0.074
Lebanon	14.32	6.03	26.21	8.97	0.44	3.78	0.18	27.63	1.27	63.9	22.424	2.242	1.028	0.103
Lithuania	35.63	2.98	19.65	16.73	0.81	1.4	0.07	29.75	5.8	130.92	49.46	4.946	9.636	0.964
Malaysia	1.6	0.99	67.19	2.57	0.12	1.6	0.08	9.56	10.29	224.48	27.25	2.725	29.346	2.935
Mexico	4.04	82	20.27	1.96	0.09	39.73	1.93	6.56	4.44	71.93	5.991	0.599	4.055	0.405
Poland	59.6	2.26	41.09	58.52	2.84	2.22	0.11	54.56	1.67	81.71	56.611	5.661	1.733	0.173
Romania	18.44	2.16	28.04	12.36	0.6	1.45	0.07	49.94	2.56	79.64	50.507	5.051	2.587	0.259
Russian Fed.	10.32	1.56	15.7	3.87	0.19	0.59	0.03	37.77	3.8	55.26	26.51	2.651	2.667	0.267
St. Kitts & Nevis	0	59.7	265.2	0	0	378.37	18.35	10.88	51.83	70.55	9.75	0.975	46.435	4.643
Saint Lucia	2.09	38.76	185.81	9.28	0.45	172.14	8.35	40.37	18.85	85.64	43.903	4.39	20.497	2.05
Saint Vincent	5.02	29.48	80.99	9.72	0.47	57.07	2.77	40.96	8.56	85.24	44.34	4.434	9.264	0.926
Serbia	27.58	2.86	6.31	4.16	0.2	0.43	0.02	0	9.94	71.27	0	0	8.999	0.9
Seychelles	57.63	1.78	163.72	225.5	10.94	6.97	0.34	32.01	1.66	170.78	69.433	6.943	3.605	0.36
South Africa	8.76	3.09	17.39	3.64	0.18	1.29	0.06	25.9	9.37	61.85	20.346	2.035	7.358	0.736
Turkey	38.1	1.73	25.59	23.3	1.13	1.06	0.05	33.85	5.13	65.06	27.966	2.797	4.241	0.424
Uruguay	5.16	3.59	52.5	6.47	0.31	4.51	0.22	15.48	10.38	52.47	10.319	1.032	6.92	0.692
Venezuela	30.87	11.88	2.75	2.03	0.1	0.78	0.04	8.18	43.89	63.35	6.578	0.658	35.308	3.531

Table 4.6. Potential effects on trade, tourism and income. High income economies

	Tourism							Trade						
	Ratios			effect of euro		effect of dollar		Ratios			effect of euro		effect of dollar	
Country	% Tourism euroZone	% Tourism dollarZone	tourist(% Pop)	On tourism	On GDP	On tourism	On GDP	% Trade euroZone	% Trade dollarZone	Trade (% GDP)	On trade	On GDP	On trade	On GDP
Australia	8.87	9.01	24.67	0.20	0.01	0.20	0.01	11.17	10.55	39.15	0.57	0.02	0.54	0.02
Barbados	4.01	23.23	192.20	0.69	0.05	4.02	0.26	5.63	36.40	70.17	0.51	0.02	3.32	0.11
Bermuda	1.13	76.16	464.44	0.47	0.03	31.84	2.09	19.32	44.37	25.09	0.63	0.02	1.45	0.05
Canada	6.07	75.86	56.07	0.31	0.02	3.83	0.25	5.93	68.39	68.42	0.53	0.02	6.08	0.19
Cyprus	20.64	0.83	313.28	5.82	0.38	0.24	0.02	51.18	1.40	52.29	3.48	0.11	0.09	0.00
Czech Republic	43.60	4.76	63.16	2.48	0.16	0.27	0.02	58.78	1.86	152.94	11.69	0.37	0.37	0.01
Denmark	22.96	6.23	40.82	0.84	0.06	0.23	0.02	44.56	4.70	75.13	4.35	0.14	0.46	0.01
Grenada	4.88	22.86	112.36	0.49	0.03	2.31	0.15	7.55	2.56	69.84	0.69	0.02	0.23	0.01
Hong Kong, China	3.48	5.55	221.82	0.70	0.05	1.11	0.07	7.54	64.42	403.94	3.96	0.13	33.83	1.08
Hungary	27.66	0.95	92.05	2.29	0.15	0.08	0.01	53.48	9.92	158.10	10.99	0.35	2.04	0.07
Iceland	42.17	9.41	239.35	9.08	0.60	2.03	0.13	38.60	2.05	68.64	3.44	0.11	0.18	0.01
Israel	29.99	27.07	26.80	0.72	0.05	0.65	0.04	25.33	15.84	80.27	2.64	0.08	1.65	0.05
Japan	5.56	11.14	5.73	0.03	0.00	0.06	0.00	9.51	37.65	32.71	0.40	0.01	1.60	0.05
Korea, Rep.	3.29	9.03	12.81	0.04	0.00	0.10	0.01	9.22	7.45	83.20	1.00	0.03	0.81	0.03
Malta	35.78	1.51	277.70	8.94	0.59	0.38	0.02	47.71	2.00	121.18	7.52	0.24	0.31	0.01
New Caledonia	43.25	0.82	42.03	1.64	0.11	0.03	0.00	45.90	6.11	84.97	5.07	0.16	0.67	0.02
New Zealand	6.51	9.37	58.19	0.34	0.02	0.49	0.03	10.85	12.53	54.41	0.77	0.02	0.89	0.03
Norway	33.13	4.13	84.50	2.52	0.17	0.31	0.02	40.39	5.62	64.72	3.40	0.11	0.47	0.02
Saudi Arabia	1.25	0.45	35.66	0.04	0.00	0.01	0.00	16.72	14.92	93.70	2.04	0.07	1.82	0.06
Singapore	7.24	5.55	173.17	1.13	0.07	0.86	0.06	8.08	11.88	447.82	4.70	0.15	6.92	0.22
Slovak Republic	26.56	1.83	29.92	0.72	0.05	0.05	0.00	46.65	1.87	183.24	11.11	0.36	0.44	0.01
Slovenia	59.19	2.92	80.82	4.30	0.28	0.21	0.01	58.81	1.62	147.57	11.28	0.36	0.31	0.01
Switzerland	54.35	9.23	105.48	5.16	0.34	0.88	0.06	60.90	8.82	88.38	7.00	0.22	1.01	0.03
United Kingdom	56.23	12.71	50.66	2.56	0.17	0.58	0.04	47.40	11.10	51.46	3.17	0.10	0.74	0.02

4.4.1. Potential effects of adopting euro or dollar on income

Tables 4.4 to 4.6 show the potential effect of adopting the euro or the dollar on tourism, trade and income for a subsample of 84 countries[12]. The results for low, middle and high-income groups are presented in Tables 4.4, 4.5 and 4.6, respectively.

The first seven columns of these tables show the effect of adopting a common currency on tourism and income, while the last seven reveal the corresponding effect on trade and income. The first two columns of each table present the share of tourism arrivals from the euro zone and the dollar zone respectively, while the third columns represent the ratio of total tourist arrivals to population. With respect to the trade effects, columns 8 and 9 show the share of trade conducted within the euro zone and the dollar zone, respectively. Column 10 shows the total trade of the country as a percentage of GDP.

In order to illustrate the effect of common currency on tourism, trade and income, Albania is taken as an example from Table 4.4. As can be observed, the percentage of arrivals to Albania from the eurozone is 20.68%, while those from the dollar zone are 3.85%. Moreover, the ratio of total tourist arrivals to total population of Albania is 24.67%. The potential effect of adopting the euro and the dollar on tourism and GDP per capita for Albania are reported in columns 4-7. Bearing in mind that Albania is a low-income economy, in Section 2 we calculate that the existence of a common currency would increase tourist arrivals by 93%. Therefore, the potential effect on Albanian tourism of adopting the euro is 0.568% $(0.2068 \times 0.2954 \times 0.93 = 0.00568)$. Then, considering from Section 3 that the effect of tourist arrivals per capita on growth, for low-income economies, is 0.70%, the potential effect on income via tourism of adopting the euro is 0.04% $(0.0568 \times 0.007 = 0.000398)$. Similarly, the potential effect on tourism of

[12] To obtain a visual presentation of these results, see Figures A.4.1 and A.4.2 in the Appendix

adopting the dollar would be 0.106% $(0.0385 \times 0.2954 \times 0.93 = 0.001057)$ while on GDP per capita it would be 0.007% $(0.001057 \times 0.007 = 0.000074)$. In a similar way, the potential effect on trade and GDP per capita of adopting euro and dollar can be obtained. These results are presented in columns 11-14.

In total, the potential effect on GDP per capita, via trade and tourism, of adopting the euro would be 0.51% while the effect of adopting the dollar would be 0.02%. Despite this moderate effect in the case of Albania, Tables 4-6 identify cases with greater impact, such as Costa Rica, where the effect on income of adopting the dollar would be 1.93% via tourism and 4.78% via trade. Another example is the case of Tunisia, which could achieve an increase in GDP per capita of 0.17% via tourism and an increase of 1.04% via trade by adopting the euro.

4.4.2. Three different cases for the effect of currency unions on income

First, we consider the case of a low-income economy, such as Maldives, to illustrate the effect on income of adopting the euro or the dollar. Maldives is a highly open economy both in terms of openness to tourism, around 200%, and in terms of openness to trade, around 144%. Tourist visitors to Maldives come mainly from the euro zone while trade is more intense with the dollar zone. The potential effect of adopting the euro on tourism would be an increase of 85.75% and its effect on GDP per capita through this channel would be 0.6%. The effect on trade of adopting the euro would be an increase of 9.12% while on GDP per capita it would be 0.19%. Similarly, the potential effect on tourism of adopting the dollar would be an increase in tourist arrivals of 2.21%, with an effect on GDP per capita of 0.02%, while the effect on trade of adopting the dollar would imply an increase of 16.25% and of 0.34% on GDP per capita. Maldives represents a singular case because with respect to tourism it is more beneficial to adopt the euro, while with respect to trade it would be more beneficial for its economy to adopt the dollar. Nevertheless, considering the total effect on income via trade and tourism of adopting the euro, this effect amounts to 0.79%, while the total effect of adopting the dollar amounts to 0.36%.

Let us now analyse the impact on a middle-income economy such as Poland of adopting a common currency. The effect on trade, tourism and income of joining a currency union has important implications for the case of Poland since it is close to entering the eurozone. On the one hand, if Poland joined the eurozone the effect on tourism would be an increase of 58.52% and an increase in income via tourism of 2.84%. The effect on trade would be 56.61% and on income via trade of 5.66%. Consequently, the total effect on GDP per capita of adopting the euro could be a sizeable 8.50%. On the other hand, the effect for the Polish economy of adopting the dollar would be an increase in tourism of 2.2%, an increase in trade of 1.73% and a total effect on GDP per capita through these two channels of 0.28%. Clearly, Poland would obtain greater benefits by joining the euro zone than by adopting the dollar.

Finally, we describe the effect on tourism, trade and GDP for a high income economy, the United Kingdom, of adopting a single currency. By joining the euro zone, the UK would increase its tourist arrivals by 2.56% with an effect on income of 0.17%. Similarly, the effect on trade would be an increase of 3.17% and an increase in GDP per capita of 0.10%. Consequently, the total effect of adopting the euro on GDP per capita would be 0.27%. The effect on the British economy of adopting the dollar would be an increase in tourism of 0.58%, an increase in trade of 0.74% and a total increase in GDP per capita of 0.06%.

4.5. Synthesis and conclusions

In a seminal paper, Frankel and Rose (2002) estimated the effect of the existence of a common currency on GDP via trade. That analysis was carried out under the assumption that the only effect that common currencies have on growth is that of promoting international trade flows. However, the effect of sharing a common currency on market size via tourism has been neglected. In the first stage of our study, after dividing the sample of 179 countries into three groups by income levels, there was seen to be a considerable effect of common currency on both trade and tourism. For this reason, we conclude that the adoption of a common currency promotes not only trade but also tourism. In fact, for the high income economies in our sample, the estimated effect of a common currency on tourism is greater than on trade.

In the second stage of the paper, a convergence growth equation is estimated, where openness to trade and tourism are included as determinants of income growth. The results obtained show that both trade and tourism may have a significant effect on the level of income of the countries.

As an illustrative exercise, the potential effects on trade, tourism and income of adopting a common currency are calculated, for the three different groups of countries according to their level of income. In this sense, we address the concerns expressed by Frankel and Rose (2002) about extending their results to large and/or rich countries. Our results highlight the importance of the fellow-members of the currency union and of the openness of the economy, in terms not only of trade but also of tourism. In this respect, the effect on trade, tourism and GDP per capita is greatest if a country shares a common currency with a trading partner or if it is a traditional origin of tourists.

Appendix 4.

Table A.4.1. Countries considered in the analysis

Albania	Cyprus	Kuwait	Reunion
Algeria	Czech Republic	Kyrgyz Rep.	Romania
Andorra	Denmark	Lao PDR	Russian Federation
Angola	Dominica	Latvia	Saint Kitts and Nevis
Anguilla	Dominican Rep.	Lebanon	Saint Lucia
Antigua and Barbuda	Ecuador	Lesotho	Saint Vincent the Grenadines
Armenia	Egypt, Arab Rep.	Libya	Samoa
Aruba	El Salvador	Liechtenstein	San Marino
Australia	Eritrea	Lithuania	Sao Tome and Principe
Austria	Estonia	Luxembourg	Saudi Arabia
Azerbaijan	Ethiopia	Madagascar	Senegal
Bahamas, The	Fiji	Malaysia	Serbia
Bahrain	Finland	Maldives	Seychelles
Bangladesh	France	Mali	Singapore
Barbados	French Polynesia	Malta	Slovak Republic
Belarus	Gambia, The	Marshall Islands	Slovenia
Belgium	Georgia	Martinique	South Africa
Belize	Germany	Mauritius	Spain
Benin	Ghana	Mexico	Sri Lanka
Bermuda	Greece	Micronesia, Fed. Sts.	Suriname
Bhutan	Grenada	Moldova	Swaziland
Bolivia	Guadeloupe	Monaco	Sweden
Bosnia and Herzegovina	Guatemala	Montserrat	Switzerland
Botswana	Guinea	Morocco	Syrian Arab Republic
Brazil	Guinea-Bissau	Mozambique	Tanzania
British Virgin Islands	Guyana	Namibia	TFYR of Macedonia
Brunei Darussalam	Haiti	Nepal	Thailand
Bulgaria	Honduras	Netherlands	Togo
Burkina Faso	Hong Kong, China	New Caledonia	Tonga
Cambodia	Hungary	New Zealand	Trinidad and Tobago
Cameroon	Iceland	Nicaragua	Tunisia
Canada	India	Níger	Turkey
Cape Verde	Indonesia	Nigeria	Turkmenistán
Cayman Islands	Iran, Islamic Rep.	Norway	Turks & Caicos Islands
Central African Rep.	Iraq	Oman	Uganda
Chad	Ireland	Pakistan	Ukraine
Chile	Israel	Palau	United Arab Emirates
China	Italy	Panama	United Kingdom
Colombia	Jamaica	Papua New Guinea	United Status
Comoros	Japan	Paraguay	Uruguay
Congo, Dem. Rep.	Jordan	Peru	Venezuela, RB
Congo, Republic.	Kazakhstan	Philippines	Vietnam
Cook Islands	Kenya	Poland	Zambia
Costa Rica	Kiribati	Portugal	Zimbabwe
Croatia	Korea, Rep.	Puerto Rico	

Table A.4.2. Descriptive Statistics.
1st stage. Low-Income countries

Variables	Obs	Mean	Std.Dev	Min	Max
Ln $Trade_{ij}$	15113	17.4088	2.7696	3.0166	26.4598
Ln Tou_{ij}	15635	7.7939	2.4440	0.0000	15.1963
$LnGDPpc_{ij}$	15635	17.7030	0.8150	13.7547	19.7969
Ln $GDPpc_{j}$	15635	7.6401	0.7349	4.7449	8.9185
Ln $GDPpc_{i}$	15635	10.0629	0.3869	8.5895	11.0820
Ln Pop_{ij}	15635	33.2062	2.2862	24.9486	40.5126
Ln Pop_{j}	15635	16.3549	1.9039	10.8378	20.9947
Ln Pop_{i}	15635	16.8514	1.4096	12.4987	19.5173
Ln $Comp_{ij}$	15635	8.6570	0.7078	6.0088	9.8497
Ln D_{ij}	14626	-2.3936	3.4212	-11.0540	10.1065
$Lang_{ij}$	15635	0.0076	0.0869	0	1
$Border_{ij}$	15635	0.1369	0.3437	0	1
$Colony_{ij}$	15635	0.0525	0.2231	0	1
$Landl_{ij}$	15635	0.3749	0.5430	0	2
$Islands_{ij}$	15635	0.1492	0.4240	0	2
Common $Currency_{ij}$	15635	0.0029	0.0542	0	1

Table A.4.3. Descriptive Statistics. 1st stage.
Middle-Income countries

Variables	Obs	Mean	Std.Dev	Min	Max
Ln $Trade_{ij}$	8231	18.2031	2.7950	4.4635	26.3862
Ln Tou_{ij}	8646	8.5263	2.4857	0.0000	17.8006
$LnGDPpc_{ij}$	8379	18.9730	0.5471	10.1255	20.5943
Ln $GDPpc_{j}$	8373	8.9264	0.2709	8.0929	9.5571
Ln $GDPpc_{i}$	8646	10.0507	0.4030	8.5895	11.0820
Ln Pop_{ij}	8646	32.1703	2.4557	23.5447	38.5766
Ln Pop_{j}	8646	15.4407	2.1471	8.4416	19.0590
Ln Pop_{i}	8646	16.7296	1.4572	12.4987	19.5173
Ln $Comp_{ij}$	8646	8.4539	0.9630	5.6021	9.8302
Ln D_{ij}	7632	-0.8928	3.0679	-7.8779	8.3202
$Lang_{ij}$	8646	0.0217	0.1459	0	1
$Border_{ij}$	8646	0.1211	0.3263	0	1
$Colony_{ij}$	8646	0.0464	0.2103	0	1
$Landl_{ij}$	8646	0.2127	0.4299	0	2
$Islands_{ij}$	8646	0.2628	0.5123	0	2
Common $Currency_{ij}$	8646	0.0066	0.0809	0	1

Table A.4.4. Descriptive Statistics.
1st stage. High-Income countries

Variables	Obs	Mean	Std.Dev	Min	Max
Ln $Trade_{ij}$	12683	19.4966	3.3879	0.9786	26.8588
Ln Tou_{ij}	13692	9.6022	2.7907	0.0000	16.5996
$LnGDPpc_{ij}$	13565	20.0476	0.6386	17.2687	22.4353
Ln $GDPpc_j$	13565	9.9931	0.4756	8.6797	11.4204
Ln $GDPpc_i$	13692	10.0555	0.4116	8.5895	11.0820
Ln Pop_{ij}	13692	31.6432	2.7001	22.5606	38.1842
Ln Pop_j	13692	14.9854	2.3600	9.6373	19.5173
Ln Pop_i	13692	16.6578	1.4800	12.4987	19.5173
Ln $Comp_{ij}$	13692	8.1692	1.1493	4.0943	9.8826
Ln D_{ij}	12222	0.1527	2.9162	-8.3202	8.6935
$Lang_{ij}$	13692	0.0558	0.2295	0	1
$Border_{ij}$	13692	0.1325	0.3390	0	1
$Colony_{ij}$	13692	0.0460	0.2095	0	1
$Landl_{ij}$	13692	0.3248	0.5224	0	2
$Islands_{ij}$	13692	0.4368	0.6040	0	2
Common $Currency_{ij}$	13692	0.0567	0.2314	0	1

Table A.4.5. Common currency cases

US dollar	**Australian dollar**
Ecuador since 2000 (Low)	Kiribati (Low)
El Salvador since 2001 (Low)	Autralia (High)
Marshal Island (Low)	**euro since 2002**
Fed. Sts. Micronesia (Low)	Martinique (Medium)
Palau (Medium)	Reunion (Medium)
Panama (Medium)	Andorra (High)
British Virgin Islands (High)	Austria (High)
Turks and Caicos Islands (High)	Belgium (High)
United States (High)	Finland (High)
Puerto Rico (High)	France (High)
French Franc until 2002	Germany (High)
Martinique (Medium)	Greece (High)
Reunion (Medium)	Guadeloupe (High)
Andorra (High)	Ireland (High)
Guadeloupe (High)	Italy (High)
Monaco (High)	Luxembourg (High)
France (High)	Monaco (High)
Spanish Peseta until 2002	Netherlands (High)
Andorra (High)	Portugal (High)
Spain (High)	San Marino (High)
Italian Lira until 2002	Portugal (High)
Italy (High)	Spain (High)
San Marino (High)	
Swiss Franc	
Liechstentein (High)	
Switzerland (High)	

Table A.4.6. Descriptive statistics.
2nd stage. Low-Income

Variables	Obs	Mean	Std.Dev	Min	Max
LnGDPpc	607	7.5642	0.7785	5.38	8.78
LnTrade/GDP	607	4.0424	0.4865	2.83	5.25
LnToupc	607	1.4649	1.6439	-2.95	5.36
PopG	607	1.7191	1.1098	-2.00	4.30
SCHprim	607	99.2728	20.3525	29.00	148.00
SCHsec	607	53.2227	26.2886	5.00	108.41
LnInv/GDP	607	3.0655	0.3972	0.95	4.11

Table A.4.7. Descriptive statistics.
2nd stage. Middle-Income

Variables	Obs	Mean	Std.Dev	Min	Max
LnGDPpc	289	8.9604	0.2375	8.22	9.56
LnTrade/GDP	289	4.1856	0.4610	2.46	5.35
LnToupc	289	3.2822	1.4223	-0.51	6.16
PopG	289	0.8301	0.9916	-1.50	2.90
SCHprim	289	105.0458	9.9298	85.70	154.44
SCHsec	289	84.6515	14.6981	35.00	114.02
LnInv/GDP	289	3.0873	0.3184	2.24	4.43

Table A.4.8. Descriptive statistics.
2nd stage. High-Income

Variables	Obs	Mean	Std.Dev	Min	Max
LnGDPpc	386	10.0704	0.3812	8.86	11.15
LnTrade/GDP	386	4.1972	0.5921	2.61	6.00
LnToupc	386	4.2013	1.1808	0.98	6.68
PopG	382	0.9005	1.1235	-2.40	6.70
SCHprim	386	101.6154	6.6050	73.00	128.00
SCHsec	386	102.5530	18.1168	58.00	161.66
LnInv/GDP	386	3.0554	0.2122	2.35	3.65

Figure A.4.1. Potential effect of a common currency on output. Euro effect on GDP

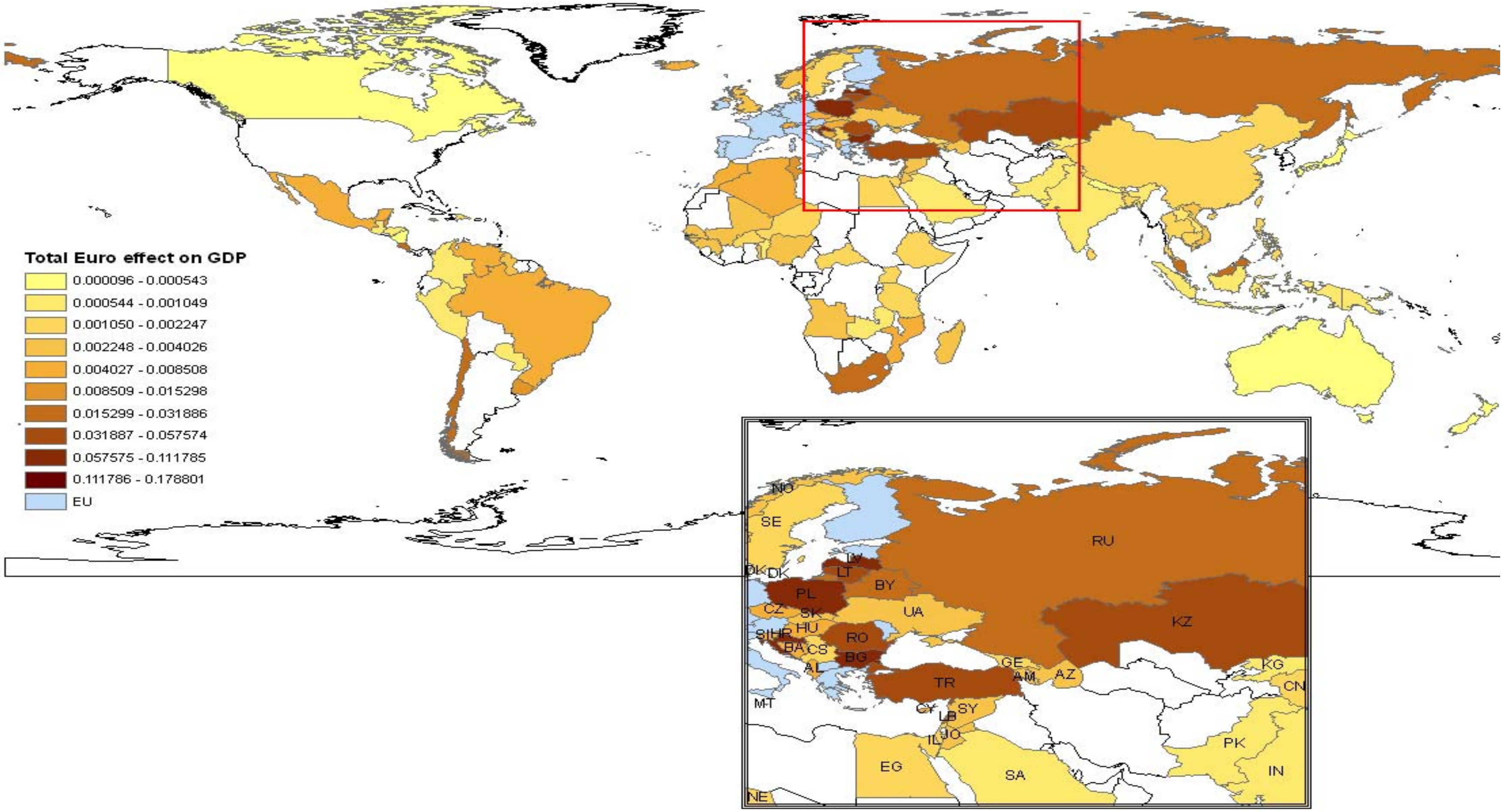
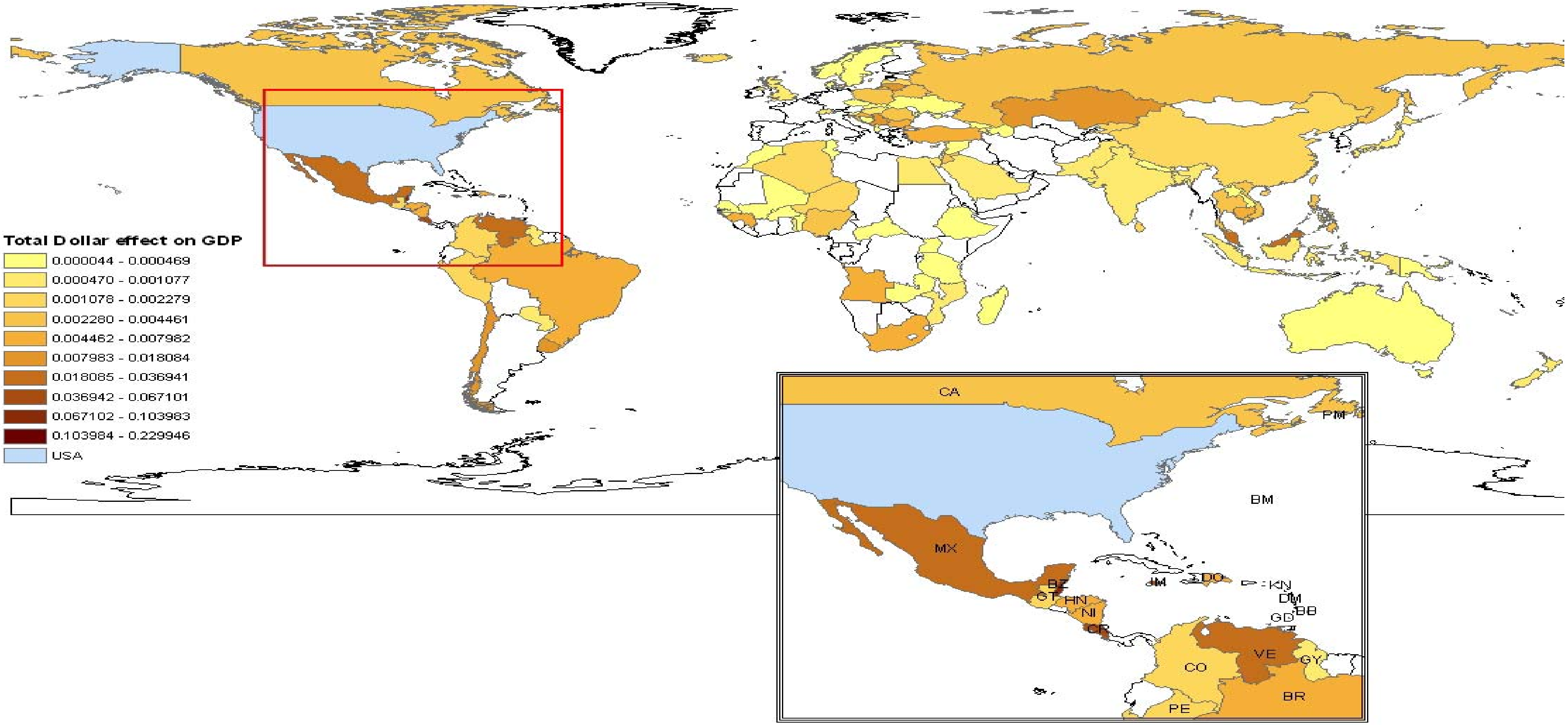


Figure A.4.2. Potential effect of a common currency on output. Dollar effect on GDP



Chapter 5
Revisiting Rose's common currency debate

5.1 Introduction

As studied in Chapter 3, in the last decade a growing literature in international trade focuses on the effect of common currencies on the volume of international trade. The issue is simple since sharing a single currency eliminates exchange rate uncertainty and reduces transaction costs between members, and as a consequence it fosters trade. What is more controversial is the magnitude of this influence and it still remains as a *puzzle* in the International Economics.

In a seminal paper, Rose (2000) estimates a surprising large effect of a currency union on trade. His results suggest that members of currency unions seemed to trade over three time as much as otherwise pair of countries. However, although economists widely believe that monetary unions could reduce transaction costs and promote trade, still many are surprised that the magnitude of the estimated effects of common currencies is so large. This result has received little acceptance and it has directed the research to find reasons of why this is not precise. In section 3.2.2 of Chapter 3, the main contributions on this issue are presented.

Another important cause of the non-acceptance of Rose's results is the traditional critique about the lack of theoretical underpinnings of the estimated gravity equations. However nowadays international economists recognize that the gravity specification can be supported by Heckscher-Ohlin models, models based in differences in technology across countries, and the new models that introduce increasing returns and product differentiation (Deardoff, 1998). Moreover, Anderson and Van Wincoop (2003) developed a method that consistently and efficiently estimates a theoretical gravity equation by considering multilateral and bilateral trade resistance.

As an attempt to summarize the results reached in the literature, Rose and Stanley (2005) implement a meta-analysis to thirty-four studies that investigate the effect of currency union on trade. Combining these estimates, the authors found that a currency union increases bilateral trade by between 30 and 90%. This magnitude is lower than the early estimations but still it means a sizeable trade effect.

In the present chapter, Rose's debate about the effect of currency unions on trade is revisited in two ways. First, the effect of common currencies on trade is estimated following the new methodology proposed by Helpman, Melitz and Rubistein (2008),. This approach presents a theoretical framework to study bilateral trade flows across countries. According to these authors, not all firms in the country have a productivity level high enough to generate profits sufficient to cover fixed costs of exporting. In that sense, if fixed costs are high enough, no firms in a country may find it profitable to export and hence "zeros" naturally arise in trade data. This is known as country selection bias. The HMR approach holds that by disregarding countries that do not trade with each other, important information is not being considered and hence estimates could be biased.

Second the potential omission of a relevant variable in trade gravity equations is addressed. In particular, we deal with the challenge from Rose and Van Wincoop (2001), i.e. *to find some omitted factor that drives countries to both participate in currency unions and trade more*. In this research the omission of international tourism is proposed as a suitable candidate to explain the possible overvalued estimate of the impact of a common currency on trade. Moreover, tourism is introduced in the well-founded HMR model by recognizing that tourism could reduce fixed and variable costs of exporting. If so tourism arrivals arise as an explanatory variable in the probit equation for firm selection and in the gravity equation.

The chapter is organized as follows. In Section 5.2 the HMR approach is presented in detail. Section 5.3 introduces and discusses tourism in the estimated equations. In section 5.4 the model is estimated avoiding estimation bias when tourism is omitted. Finally, Section 5.5 draws some conclusions.

5.2 The HMR approach

Gravity model is a workhorse in a number of empirical issues addressed by the International Economics. This model is used to estimate the effects of economic and non-economic events and factors on international flows of goods, migrants, investment and tourists. Indeed the evaluations of free trade agreements, international borders and currency unions are the main fields of application of gravity equations. A brief review on the use of this specification is presented in section 3.3.1 of Chapter 3.

HMR presents a theoretical framework to study bilateral trade flows across countries. The model presents three features that make it suitable to describe empirical patterns of bilateral trade flows. First, the model can yield asymmetric trade flows between country pairs depending on the direction of export flows (from i to j versus from j to i). Second, it can generate zero trade flows in both directions between some countries, as well as zero exports from one country, say j, to a second country i, together with positive exports from country i to country j. Third, a well-founded empirical framework for estimating the gravity equation for positive trade flows is developed. Therefore, the HMR model has the potential to explain prevalent regularities in trade data reflected in the sample: the asymmetry in bilateral trade flows between country pairs and the high presence of zeroes.

The HMR approach generalizes the Anderson and VanWincoop (2003) model in two ways. First, it accounts for firm heterogeneity and fixed trade costs and second, deals with asymmetries in the volume of exports between two countries. HMR use their theoretical model to develop a two-stage estimation procedure. In the first stage, a probit equation is estimated for the probability that country *j* exports to country *i* while in the second stage predicted components of probit are used to estimate the gravity equation for positive exports flows.

In this section the HMR proposal is presented in detail as a suitable framework to revisit Rose's empirical findings. In their model, a utility function *à la* Dixit-Stiglitz is assumed to allow for product differentiation. Producers face both variable and fixed costs of exporting to each destination country by recognizing that profitability of exports to a particular destination depends on both a genuine transport cost and a fixed cost of serving that particular country. The monopolistic competition equilibrium yields a gravity equation as well as a firm selection equation.

5.2.1 Consumption

Let a world with J countries, indexed by j=1, 2,..., J, where a set of goods B_j is available for consumption in country j. Consumers of country j maximize a CES utility function given by

$$u_j = \left[\int_{l \in B_j} x_j(l)^{\varepsilon-1/\varepsilon} dl\right]^{\varepsilon/\varepsilon-1}, \ \varepsilon > 1$$

where $x_j(l)$ is the country j's consumption of product l and ε is the elasticity of substitution across products.

Solving the first-order conditions of the consumer problem yields the country j's demand for product l

$$x_j(l) = \frac{\breve{p}_j(l)^{-\varepsilon} Y_j}{P_j^{1-\varepsilon}} \qquad [5.1]$$

where Y_j is the income of country j, $\breve{p}_j(l)$ is the price of product l in country j and P_j is the country j's dual price index given by

$$P_j = \left[\int_{l \in B_j} \breve{p}_j(l)^{1-\varepsilon} dl\right]^{1/(1-\varepsilon)} \qquad [5.2]$$

Taking into account that

$$\frac{\partial P_j}{\partial \breve{p}_j(l)} = P_j^{\varepsilon} \breve{p}_j^{-\varepsilon} \qquad [5.3]$$

Price demand elasticity for the good l produced in country j is

$$\frac{\partial x_j(l)}{\partial \breve{p}_j(l)} \frac{\breve{p}_j(l)}{x_j(l)} = -\varepsilon - (1-\varepsilon)\frac{\breve{p}_j(l)^{1-\varepsilon}}{P_j^{1-\varepsilon}} \qquad [5.4]$$

The "large group" assumption assures that the second term in the right hand side is about zero, and as a result elasticity is approximated to $-\varepsilon$.

5.2.2 Production

Each firm of each country produces a distinct good and this may be supported by the presence of scale economies. The number of bundles used by a firm to produce one unit of output is a being c_j the (country-specific) cost of a bundle supported by a firm country j. As a result, $c_j a$ is the minimum cost of a firm of country j producing one unit of output. Moreover, a cumulative distribution function $G(a)$ with support $\lfloor a_{L,} a_H \rfloor$ describes the distribution of a across firms, where $a_H > a_L > 0$ and this distribution function is assumed to be the same in all countries.

A producer only supports a production cost when selling in the home market. However a producer of country *j* faces two types of additional costs of selling in country *i*: a transport variable cost τ_{ij} and a fixed cost $c_j f_{ij}$ of serving other market. τ_{ij} represents an iceberg transport cost so that only arrive to destination $1/\tau_{ij}$ units when one unit of product is shipped from *j* to *i*. Therefore, for domestic trade f_{jj} equals zero and τ_{jj} equals one while for international trade $f_{ij} > 0$ while $\tau_{jj} > 1$.

Profit maximization is carried out to find the price of a good *l* produced in country *j* that is sold in country *i*. The profit equation is

$$\Pi_{ij} = \breve{p}_j(l)x_j(l) - c_j a \tau_{ij} x_j(l) - c_j f_{ij} \qquad [5.5]$$

where the second term in the right hand side recognizes that $\tau_{ij} x_j(l)$ units of a good are shipped in order to sell $x_j(l)$ units in country *i*.

The first-order condition for a firm producing a good *l* in country *j* to be sold in country *i* is given by

$$\frac{\partial \Pi_{ij}}{\partial \breve{p}_j(l)} = \left(\breve{p}_j(l) - c_j a \tau_{ij}\right)\frac{\partial x_j(l)}{\partial \breve{p}_j(l)} + x_j(l) = 0 \qquad [5.6]$$

Taking into account equations [5.3] and [5.4], the first-order condition [5.6] provides the price of a good *l* produced in country *j* that is sold in country *i*

$$\breve{p}_j(l) = \frac{\varepsilon}{\varepsilon - 1} c_j a \tau_{ij} \qquad [5.6']$$

By substituting [5.6'] in [5.5], the maximized operating profits for a firm producing a good *l* in country *j* to be sold in country *i* are

$$\Pi_{ij}^{*}(a) = \frac{1}{\varepsilon}\left[\frac{\varepsilon\tau_{ij}c_j a}{(\varepsilon-1)P_i}\right]^{1-\varepsilon} Y_i - c_j f_{ij} \qquad [5.7]$$

Sales in country $i \neq j$ are profitable if profits in equation [5.7] are non-negative. This is the case when $a \leq a_{ij}$, since a is an inverse measure of productivity, being a_{ij} the threshold for a making operating profits equal to zero, so that

$$\frac{1}{\varepsilon}\left[\frac{\varepsilon\tau_{ij}c_j a_{ij}}{(\varepsilon-1)P_i}\right]^{1-\varepsilon} Y_i = c_j f_{ij} \qquad [5.8]$$

Only a fraction $G(a_{ij})$ of the N_j firms of country j have non-negative profits, so they will export to country i. Note that if $a_{ij} \leq a_L$, no firm in country j finds profitable to export to country i. Precisely, this may explain zero trade data for a number of country pairs. On the contrary, when $a_{ij} \geq a_H$ all firms from country j would export to country i.

5.2.3 International trade

Turning to bilateral trade, by combining [5.1] and [5.6'], and by aggregating across firms, the value of country i's imports from j is

$$M_{ij} = \left(\frac{\varepsilon c_j \tau_{ij}}{(\varepsilon-1)P_i}\right)^{1-\varepsilon} Y_i \int_{a_L}^{a_{ij}} a^{1-\varepsilon} dG(a) N_j \qquad [5.9]$$

Let

$$V_{ij} = \begin{cases} \int_{a_L}^{a_{ij}} a^{1-\varepsilon} dG(a) & \text{for } a_{ij} \geq a_L \\ \text{and zero otherwise} & \end{cases} \qquad [5.10]$$

Therefore, equation [5.9] may be rewritten as

$$M_{ij} = \left(\frac{\varepsilon c_j \tau_{ij}}{(\varepsilon - 1) P_i} \right)^{1-\varepsilon} Y_i V_{ij} N_j \qquad [9']$$

which reflects the positive influence of multilateral resistance P_j to trade and the negative effect of bilateral resistance τ_{ij}. Again bilateral trade is zero if $a_{ij} \leq a_L$.

Finally, using equations [5.2], [5.6'] and [5.10], the price index of country i can be written as

$$P_i^{1-\varepsilon} = \sum_{j=1}^{J} \left(\frac{\varepsilon c_j \tau_{ij}}{(\varepsilon - 1)} \right)^{1-\varepsilon} N_j V_{ij} \qquad [5.11]$$

In order to obtain the empirical equations to be estimated, HMR approach assumes a truncated Pareto distribution for productivity *1/a* across firms, so that

$$G(a) = \frac{(a^k - a_L^k)}{(a_H^k - a_L^k)} \qquad [5.12]$$

and, as a consequence,

$$dG(a) = \frac{k a^{k-1}}{(a_H^k - a_L^k)} da \qquad [5.13]$$

where $k > \varepsilon - 1$ determines the shape of the distribution. Now by substituting [5.13] in [5.10], V_{ij} can be expressed as

$$V_{ij} = \int_{a_L}^{a_{ij}} a^{1-\varepsilon} \frac{k a^{k-1}}{(a_H^k - a_L^k)} da \qquad [5.14']$$

and after some algebra

$$V_{ij} = \frac{k a_L^{k-\varepsilon+1}}{(k-\varepsilon+1)\left(a_H^k - a_L^k\right)_{ij}} \left[\left(\frac{a_{ij}}{a_L} \right)^{k-\varepsilon+1} - 1 \right] \qquad [5.14']$$

where the term in brackets is denoted by W_{ij} by Helpman et al. (2008) and it is restricted to be non-negative. As a consequence, the expression for W_{ij} can be expressed as

$$W_{ij} = \max\left[\left(\frac{a_{ij}}{a_L} \right)^{k-\varepsilon+1} - 1, 0 \right] \qquad [5.15]$$

Note that V_{ij} increases monotonically with a_{ij} and therefore with the share $G(a_{ij})$ of firms exporting from country j to country i. As a consequence, from equation [5.9'] a growth in the number of firms exporting from country j to country i increases the value of country i's imports from j.

Taking logarithms in [5.9']

$$m_{ij} = (\varepsilon-1)\ln\left((\varepsilon-1)/\varepsilon\right) - (\varepsilon-1)\ln c_j + n_j + (\varepsilon-1)p_i + y_i + (1-\varepsilon)\ln\tau_{ij} + v_{ij} \qquad [5.16]$$

where lowercase variables denote logarithms of uppercase variables. HMR approach assume that the transport cost is given by

$$\tau_{ij} = \left[D_{ij}^{\gamma} e^{-u_{ij}} \right]^{1/\varepsilon-1}$$

where u_{ij} are i.i.d. unmeasured trade frictions and D_{ij} is the distance between countries i and j. Taking logarithms in the expression of the transport cost and in [5.14], and substituting in [5.16], the gravity equation to be estimated can be expressed as

$$m_{ij} = \beta_0 + \lambda_j + \chi_i - \gamma d_{ij} + w_{ij} + u_{ij} \qquad [5.16']$$

where

$\beta_0 = (\varepsilon - 1)\ln\alpha + \ln\left[\frac{k a_L^{k-\varepsilon+1}}{\left(a_H^k - a_L^k\right)\left(k - \varepsilon + 1\right)}\right]$ is the constant term

$\chi_i = (\varepsilon - 1)p_i + y_i$ is a fixed effect of the importing country

$\lambda_j = (1-\varepsilon)\ln c_j + n_j$ is a fixed effect of the exporting country

Following HMR, their approach incorporates two main differences with respect to previous work. First, w_{ij} is included in equation [5.16']. This additional variable depends on a_{ij} which is determined by variables in equation [5.8], namely income and multilateral resistance of the destination country, as well as fixed and variable costs of serving market *i* from country *j*. Second, HMR approach considers zero trade data.

5.2.4 Firm selection into the export market

The selection of firms into export markets, represented by the variable W_{ij} is determined by the cut-off value of a_{ij}, which is implicitly defined by the zero profit condition. In that sense, HMR approach proposes a latent variable from the operating profits in equation [5.8] so that

$$Z_{ij} = \frac{\frac{1}{\varepsilon}\left[\frac{\varepsilon\tau_{ij}c_j a_L}{(\varepsilon-1)P_i}\right]^{1-\varepsilon} Y_i}{c_j f_{ij}} \qquad [5.17]$$

which is the ratio of operating variable profits for the firm with the highest level of productivity, as measured by $1/a_L$ to the fixed costs of serving country *i* from country *j*. Z_{ij} lower than one suggests that the most productive firm of *j* cannot find profitable the export to *i*. In that case zero trade between the pair of countries is observed. On the contrary, Z_{ij} higher than one implies positive exports from *j* to *i*.

Precisely, when Z_{ij} is higher than one, W_{ij} is increasing in Z_{ij}. In other words, the variable that controls for the fraction of firms that export from j to i is increasing in the new latent variable Z_{ij}. This relationship can be examined from [5.8] by calculating the ratio

$$\frac{a_{ij}}{a_L} = \left(\frac{\varepsilon c_j f_{ij}}{Y_i}\right)^{1/1-\varepsilon} \frac{P_i(\varepsilon-1)}{\varepsilon\tau_{ij} c_j a_L} \qquad [5.18]$$

As can be easily proved from equation [5.17], this ratio equals $Z_{ij}^{1/(\varepsilon-1)}$, and equation [5.15] can be rewritten as

$$W_{ij} = Z_{ij}^{(k-\varepsilon+1)/(\varepsilon-1)} - 1 \qquad [5.19]$$

Taking logarithms in [5.17] and by substituting the expression of the logs of transport costs

$$\begin{aligned} z_{ij} = {} & \ln\left(\frac{1}{\varepsilon}\right) + (\varepsilon-1)\ln\left(\frac{\varepsilon-1}{\varepsilon}\right) + (1-\varepsilon)\ln a_L - \varepsilon \ln c_j + (\varepsilon-1)p_i + y_i \\ & + (1-\varepsilon)\ln\tau_{ij} - \ln f_{ij} + u_{ij} \end{aligned} \qquad [5.20]$$

where lowercase variables denote logarithms of uppercase variables. A positive value of the new latent variable z_{ij} indicates that country j exports to country i.

Let define the term of fixed costs as

$$f_{ij} = \exp(\phi_{ex,j} + \phi_{im,i} + \kappa\phi_{ij} - v_{ij}) \qquad [5.21]$$

where $\phi_{ex,j}$, $\phi_{im,i}$ and ϕ_{ij} measure trade fixed costs for the export country, the import country and the pair of countries, respectively. v_{ij} are unmeasured trade frictions making trade fixed costs stochastic. By applying logarithms to [5.21] and substituting in [5.20], the latent variable can be expressed as

$$z_{ij} = \gamma_0 + \xi_j + \zeta_i + \gamma d_{ij} - \kappa\phi_{ij} + \eta_{ij} \qquad [5.20']$$

where

$\gamma_0 = \ln(1/\varepsilon) + (\varepsilon - 1)\ln((\varepsilon - 1/\varepsilon) + (1-\varepsilon)\ln a_L$ is a constant term

$\xi_j = -\varepsilon \ln c_j - \phi_{ex,j}$ which is an exporter fixed effect

$\zeta_i = y_i + (\varepsilon - 1)p_i - \phi_{im,i}$ which is an importer fixed effect

$\eta_{ij} = u_{ij} + v_{ij} \sim N(0, \delta_u^2 + \delta_v^2)$ is the error term correlated with the error term u_{ij} in the gravity equation [5.16'].

Using equation [5.20'], an indicator variable T_{ij} can be defined so that it equals 1 if country *j* exports to country *i*. Therefore the probability that country *j* exports to country *i* can be expressed using the following probit equation[1]

$$\rho_{ij} = \Pr(T_{ij} = 1 | \text{observed variables}) = \Phi(\gamma_0 + \xi_j + \zeta_i - \gamma d_{ij} - \kappa\phi_{ij}) \qquad [5.22]$$

where $\Phi(.)$ is the accumulative standard normal distribution function. HMR approach consists in the estimation of the probit equation [5.22] in a first stage and the gravity equation [5.16'] in a second stage.

5.3 Adding tourism to the HMR approach

As presented in the introduction of this chapter, one of the contributions of the present analysis is the consideration of tourism as a relevant factor to explain trade flows and the surprisingly high estimated effect of common currencies on trade. In Chapter 2 a link in the sense tourism causes trade is found. Moreover, in Chapters 3 and 4 it has been empirically proven how tourist arrivals appear to be

[1] Since $\delta_\eta^2 = \delta_u^2 + \delta_v^2 = 1$ is not imposed, (20') is devided by the standard deviation δ_η^2 to specify the probit equation [5.22].

significant in gravity equations for international trade. In this section tourism is included in the HMR model.

A simple way to introduce tourism in HMR framework is by recognizing that bilateral tourism can reduce both trade variable costs and trade fixed costs associated with exports. For instance, tourism may improve the knowledge about foreign culture and, as a consequence, about business habits and practices in other countries. Furthermore, tourism facilitates and stimulates to learn other languages, making bilateral trade easier. In addition, tourism requires infrastructure reducing trade costs.. The effect of tourism on trade via reduction of trade barriers is presented in Chapter 2.

This may result in the promotion of trade in terms of both, the existence of bilateral trade and its volume. Therefore, this promotional effect of trade through tourism may be interpreted as the consequence of a reduction of both trade fixed costs, as measured by f_{ij}, and trade variable costs, as measured by τ_{ij}. In this research the equations for variable trade costs and fixed costs of serving a market are rewritten respectively as

$$\tau_{ij} = \left[D_{ij}^{\gamma} Tou_{ij}^{-\psi} e^{-u_{ij}}\right]^{1/\varepsilon - 1}$$

and

$$f_{ij} = Tou_{ij}^{-\beta} \exp(\phi_{ex,j} + \phi_{im,i} + \kappa\phi_{ij} - \nu_{ij})$$

where Tou_{ij} represents tourist arrivals to country j from country i and parameters β and ψ are positive.

By substituting these two expressions in [5.16'] and [5.22], the gravity equation and the probit equation can be expressed as

$$m_{ij} = \beta_0 + \lambda_j + \chi_i - \gamma d_{ij} + \psi Tou_{ij} + w_{ij} + u_{ij} \qquad [5.23]$$

and

$$\rho_{ij} = \Pr(T_{ij} = 1 | \text{observed variables}) = \Phi(\gamma_0 + \xi_j + \zeta_i \\ +(\beta + \psi)\ln Tou_{ij} - \gamma dij - \kappa\phi_{ij}) \qquad [5.24]$$

A look at equations [5.23] and [5.24] shows that tourism promotes both, the probability that *j* exports to *i* and the magnitude of this export, *via* a reduction of variable and fixed trade costs.

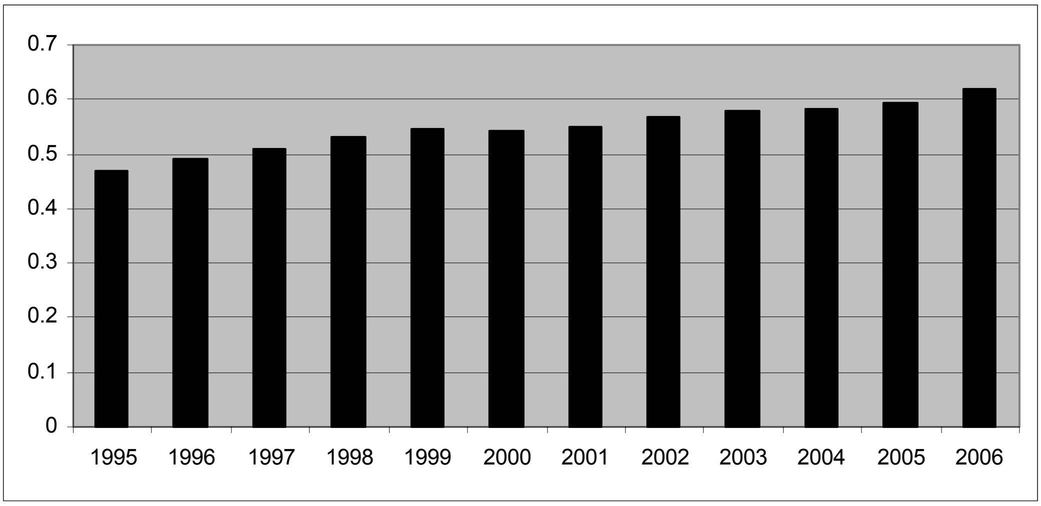
5.4 Empirical results

The empirical analysis of this chapter is supported by the HMR theoretical framework. This methodology accounts for zero trade flows between pair of countries. The first stage of the model involves the estimate of a probit model for the probability that country *j* exports to country *i*. To that end a dataset containing enough zero trade flows between country pairs is necessary. The objectives addressed in Chapter 3 and 4 recommended the use of a dataset where OECD countries are considered as one of the countries in the pair. However, in this chapter a new dataset with a relatively large number of zeros need to be built.

Therefore, a panel dataset which considers 200 countries as exporters and 164 countries as importers for the period 1995 to 2006 is used[2]. For a total of 303,541 observations, 167,077 present positive exports which suppose a 55% of the sample. Figure 5.1 presents the percentage of country pairs with positive exports flows in our dataset.

[2] The list of countries used in the analysis is presented in Table A.5.1 and A.5.2 in the appendix.

Figure 5.1. Percentage of country pairs with positive exports



The dependent variable, export flows from country *i* to country *j*, comes from the *Direction of Trade* dataset published by the *International Monetary Fund*. The data comprise bilateral merchandise trade and requires to be converted into real terms by using US GDP deflator, obtained from the *World Development Indicators* (2006) and the *UNCTAD Handbook of Statistics* (2008).

Tourism data is obtained from the *United Nations World Tourism Organisation (UNWTO)* and includes annual international arrivals by country of origin. The distance variable and dummy variables for common language (*Lang)*, common border (*Border)*, colonial ties (*Colony)* and number of landlocked countries in the pair (*Landl)* are collected from the *Centre d'Etudes Prospectives et d'Informations Internationales (CEPII)* dataset while number of islands in the pair (*Island),* Free Trade Agreements *(FTA)* and common currency (*CC)* were obtained from Andrew K. Rose's website and the *CIA Factbook*[3].

HMR follows a two-stage estimation procedure. In the first stage a Probit, equation [5.24], is estimated by maximum likelihood and two controls are generated. In the second stage, the gravity equation [5.23] is consistently estimated by adding the two control variables saved from the first stage. Let $\hat{z}_{ij} = \Phi^{-1}(\hat{p}_{ij})$ be the predicted value of the latent variable. The first control is for

[3] The common currency cases considered in the analysis are presented in Table A.5.3 in the Appendix.

country selection into trading, captured by the inverse Mills ratio defined by $\hat{\bar{\eta}}_{ij} = \phi(\hat{z}_{ij}) / \Phi(\hat{z}_{ij})$, where $\phi(.)$ is the standard normal density function. The second control is the endogenous number of exporters defined by $\hat{\bar{w}}_{ij} \equiv \ln(\exp[\delta(\hat{z}_{ij} + \hat{\bar{\eta}}_{ij})] - 1)$ with $\hat{\bar{z}}_{ij} = \hat{z}_{ij} + \hat{\bar{\eta}}_{ij}$. Therefore, equation [5.23] can be estimated using the transformation:

$$m_{ij} = \beta_0 + \lambda_j + \chi_i - \gamma d_{ij} + \psi Tou_{ij} + \vartheta \hat{\bar{\eta}}_{ij} + \ln(\exp[\delta(\hat{z}_{ij} + \hat{\bar{\eta}}_{ij})] - 1) + u_{ij}$$

[5.23']

As previously mentioned, the main objective of our research is to analyse whether tourism, which has been a traditionally omitted factor in gravity equations for trade, reduces the impact of common currency on trade. Hence, all the equations are estimated twice, without tourism and with tourism. The results of the HMR approach appear in Table 5.1.

The estimates for the Probit regression without including and including tourism are presented in column 1a and 1b of Table 5.1, respectively. These results suggest that variables commonly considered in gravity equation also affect the probability that two countries trade which each others. Particularly, countries that are closer are more likely to trade. Moreover, sharing a common border, a common language, a common currency (CC) and belonging to the same regional free trade agreement (FTA) increase the probability to trade while the existence of islands or landlocked countries in the pair as well as the existence of colonial ties between the countries reduce this probability[4]. As presented in section 5.3, tourist arrivals may increase the probability of trading between countries since tourism flows reduce trade fixed-costs.

[4] For identification reasons, one variable from the first stage requires to be excluded in the second stage. According to Gil-Pareja (2009) this could be a variable that affects the probability of exporting to a country but not the volume. Alternatively, a variable which affects both decisions in opposite directions would also work. Colony is excluded in the second stage since it affects negatively in the probit but is expected to affect positively the volume of exports as obtained in Chapters 3 and 4.

Table 5.1. HMR two-stage estimation of the effect of common currency on trade

	1st Stage		2nd Stage					
	Probit		Benchmark		Non Linear Model		Polynomial Model	
Variables	**(1a) Without tourism**	**(1b) With tourism**	**(2a) Without tourism**	**(2b) With tourism**	**(3a) Without tourism**	**(3b) With tourism**	**(4a) Without tourism**	**(4b) With tourism**
Tourism		0.1048		0.0902		0.0536		0.0487
		(43.89)		(36.42)		(7.39)		(2.04)
Distance	-0.2322	-0.1594	-1.1198	-0.9599	-1.0524	-0.9070	-1.0745	-0.8903
	(-33.91)	(-22.49)	(-124.07	(-95.94)	(-35.51)	(-28.53)	(-30.64)	(-18.72)
Border	0.4699	0.1531	0.8077	0.5968	0.7005	0.5774	0.8616	0.6053
	(11.57)	(3.56)	(20.60	(15.12)	(5.36)	(4.57)	(11.75)	(4.83)
Language	0.4884	0.3750	0.7067	0.6014	0.6242	0.5208	0.6669	0.4839
	(47.61)	(36.29)	(37.37)	(31.56)	(11.75)	(10.15)	(9.73)	(5.36)
Colony	-0.1722	-0.4067						
	(-3.11)	(-7.20)						
CU	0.5056	0.5552	0.7747	0.7309	0.6777	0.6177	1.0560	0.8242
	(11.25)	(12.97)	(15.51)	(14.69)	(5.03)	(4.60)	(12.33)	(4.97)
FTA	0.2061	0.1633	0.7789	0.6975	0.6610	0.6184	0.8596	0.7403
	(7.03)	(5.54)	(29.85)	(26.74)	(10.07)	(9.52)	(21.22)	(9.90)
Island	-0.3078	-0.3055	-0.9085	-0.8986	-0.8285	-0.8055	-0.8007	-0.7370
	(-19.27)	(-19.02)	(-27.56)	(-27.36)	(-9.00)	(-8.79)	(-14.86)	(-6.80)
Landlocked	-0.1523	-0.1697	-0.6950	-0.6883	-0.6448	-0.6259	-0.6432	-0.6062
	(-8.15)	(-9.13)	(-17.41)	(-17.31)	(-6.30)	(-6.17)	(-13.56)	(-5.57)
σ					0.0618	0.0898		
					(1.87)	(2.83)		
$\hat{\bar{\eta}}_{ij}$					0.5426	0.4052	1.4716	1.2907
					(8.31)	(6.87)	(13.54)	(6.81)
$\hat{\bar{Z}}_{ij}$							2.7917	3.2332
							(14.49)	(8.76)
$\hat{\bar{Z}}_{ij}^2$							-0.4541	-0.5639
							(-12.92)	(-7.20)
$\hat{\bar{Z}}_{ij}^3$							0.0171	0.0306
							(5.87)	(4.80)
Constant	0.9446	1.0154	13.3584	12.4239	16.4085	14.7624	12.9866	10.9746
	(4.41)	(3.94)	(34.68)	(32.31)	(22.68)	(25.54)	(21.94)	(12.08)
Obs	303,541	303,541	167,077	167,077	167,077	167,077	167,077	167,077
F	65904	76258	839	847	23240	21873	201	201
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Reduction			6%		9%		22%	

Note: Results from columns 1a and 1b correspond to the first stage of the approach where a probit is estimated. The rest of the columns correspond to the second stage of the model where a gravity equation is estimated. Columns 2a and 2b refers to the benchmark equation estimated by OLS. Results from columns 3a and 3b are obtained by ML while results from column 4a and 4b are obtained by OLS. Imported, exporter and year fixed effect are included in both stages. t-statistics appear between parenthesis and p-values appear between brackets.

Estimates from the first stage are used to construct $\hat{\bar{\eta}}_{ij}$ and $\hat{\bar{w}}_{ij}$.[5] In the second stage, both the non-linear coefficient δ and the linear coefficient for $\hat{\bar{\eta}}_{ij}$ are estimated. Columns 2a and 2b of Table 5.1 present the results for the benchmark gravity equation estimated by ordinary least squares (OLS) without these controls while columns 3a and 3b present the estimate of the maximum likelihood (ML) by not including and including tourism, respectively. As found in Helpman et al (2008), the heterogeneity bias in the estimated effects of trade barriers is important. Consequently, the estimates of the effects of trade frictions in the benchmark gravity equation are biased upward.

Focusing on the estimates of the ML presented in columns 3a and 3b, the significance and sign of the variables are as expected. Results suggest that exports decrease in distance and increase in tourist arrivals to country *j* from country *i.* According to the extended theoretical model that incorporates tourism, both distance and tourist arrivals affect transport costs, the former increasing them while the later decreasing costs. Sharing a common border, common language and belonging to the same FTA affects positively the volume of exports while landlocked countries and islands in the pair reduce trade.

Regarding the variable of interest, the coefficient of common currency is positive and significant. Without including tourism in the regression, the coefficient of CC is 0.6777 which suppose an increase of exports of around 97% while the coefficient after including tourism drops to 0.6177, implying an effect on trade of 85%. Thus, tourist arrivals appears to be a relevant factor in the explanation of trade flows and the impact of CC on trade is reduced around a 10% after including tourism in the model.

Finally, following HMR (2008), the parameterization assumptions that determine the functional forms are progressively relaxed. In this sense, the Pareto distribution assumption for the inverse of productivity *a* is relaxed, allowing for a

[5] Following HMR (2008), there are country pairs whose characteristics are such that their probability of trade is indistinguishable from 1. Therefore, the same $\hat{z}_{ij}$ is assigned to country pairs with an estimated $\rho_{ij} > 0.9999999$.

general specification of V_{ij}. Hence, the control function $\hat{\bar{w}}_{ij}$ is approximated by a polynomial in $\hat{\bar{z}}_{ij}, \nu(\hat{\bar{z}}_{ij})$. As the nonlinearity is eliminated, this second stage can be easily estimated by OLS.

As in the seminal paper, the $\nu(\hat{\bar{z}}_{ij})$ is expanded until a cubic polynomial[6] and the results are very similar to the ML estimates. In that case, the inclusion of tourism in the model reduces the magnitude of the common currency coefficient in around 22%. This reduction of the coefficient of interest differs from the one obtained from NLS estimation and must be taken with caution. Although polynomial approximation allows for more statistical flexibility, ML estimation deals with the well-founded HMR model presented in sections 5.2 and 5.3.

5.5 Synthesis and conclusions

There is a debate in the literature about the impact of currency unions on trade. Rose (2000) estimates an effect of currency union on trade of a 300% but this result has received little acceptance and, as a consequence, has directed the research to find reasons of such high impact. One of the reasons could be that there is some omitted factor that drives countries to both participate in currency unions and trade more. In this chapter, two contributions to this debate are made. First, the recent method proposed by Helpman, Melitz and Rubinstein (2008) is used, and second, tourism is introduced as an explanatory variable in the trade equation.

Helpman, Melitz and Rubinstein (2008) develop a theoretical model that deals with positive and zero trade flows. The model proposes a two-stage estimation procedure that uses an equation for selection into trade partners in the first stage and a trade flow equation in the second stage. In this research the model is simply

[6] In practice, the polynomial is expanded until a tenth power although not noticeable changes for expanding $\nu(\hat{\bar{z}}_{ij})$ beyond a cubic polynomial are found.

modified to incorporate tourism. It is expected that tourism reduces both, variable costs and fixed costs of trade. Thus, the consideration of tourism as an explanatory variable in trade equation is theoretically justified.

Two main results are reached. First, tourism affects positively both, the probability of exporting and the volume of exports between two countries. Thus, the results suggest that tourist arrivals are a relevant factor explaining trade flows. Second, the effect of a common currency is positive and after controlling by tourism, a noticeable reduction in its impact founded. As a consequence, the omission of this relevant variable may contribute to explain the presence of an upward bias in the estimation of the effect of a common currency on international trade.

Appendix 5

Table A.5.1 Countries considered as importers/origins

Afghanistan, I.S. of	Dominica	Kuwait	Réunion
Albania	Dominican Rep.	Kyrgyz Rep.	Saint Helena
Algeria	Ecuador	Lao, P. D. Rep.	Saint Kitts and Nevis
Angola	Egypt	Latvia	Saint Lucia
Antigua & Barbuda	El Salvador	Lebanon	Saint Pierre & Miquelon
Argentina	Equatorial Guinea	Lesotho	Saint Vincent
Armenia	Eritrea	Liberia	Samoa
Aruba	Estonia	Libya	Saudi Arabia
Australia	Ethiopia	Lithuania	Senegal
Austria	Falkland Islands	Luembourg	Serbia and Montenegro
Azerbaijan	Feroe Islands	Macao	Seychelles
Bahamas, The	Fiji	Madagascar	Sierra Leone
Bahrain	Finland	Malawi	Singapore
Bangladesh	France,	Malaysia	Slovak Rep.
Barbados	French Guiana	Maldives	Slovenia
Belarus	French Polynesia	Mali	Solomon Islands
Belgium	Gabon	Malta	Somalia
Belize	Gambia, The	Martinique	South Africa
Benin	Georgia	Mauritania	Spain
Bermuda	Germany	Mauritius	Sri Lanka
Bhutan	Ghana	Mexico	Sudan
Bolivia	Gibraltar	Mongolia	Suriname
Bosnia and Herzegovina	Greece	Morocco	Swaziland
Botswana	Greenland	Mozambique	Sweden
Brazil	Grenada	Namibia	Switzerland
Brunei Darussalam	Guadeloupe	Nauru	Syrian Arab Rep.
Bulgaria	Guatemala	Nepal	São Tomé & Príncipe
Burkina Faso	Guinea	Netherlands	TFYR of Macedonia
Burundi	Guinea-Bissau	Netherlands Antilles	Tajikistan
Cambodia	Guyana	New Caledonia	Thailand
Cameroon	Haiti	New Zealand	Togo
Canada	Honduras	Nicaragua	Tonga
Cape Verde	Hong Kong	Niger	Trinidad and Tobago
Central African Rep.	Hungary	Nigeria	Tunisia
Chad	Iceland	Norway	Turkey
Chile	India	Oman	Turkmenistan
China	Indonesia	Pakistan	Uganda
Colombia	Iran, Islamic Rep. of	Palau	Ukraine
Comoros	Iraq	Panama	United Arab Emirates
Congo	Ireland	Papua New Guinea	United Kingdom
Costa Rica	Israel	Paraguay	Tanzania
Cote d'Ivoire	Italy	Peru	United States
Croatia	Jamaica	Philippines	Uruguay
Cuba	Japan	Poland	Uzbekistan
Cyprus	Jordan	Portugal	Vanuatu
Czech Rep.	Kazakhstan	Qatar	Venezuela
Czechoslovakia	Kenya	Rep. of Moldova	Vietnam
Dem. Rep. of Congo	Kiribati	Romania	Yemen, Rep. of
Denmark	Korea, dem	Russia	Zambia
Djibouti	Korea, rep of	Rwanda	Zimbabwe

Table A.5.2 Countries considered as exporters/destinations

Albania	Czech Rep.	Lao People's Dem. Rep.	Rwanda
Algeria	Côte d'Ivoire	Latvia	Saint Kitts and Nevis
Argentina	Denmark	Libya	Saint Lucia
Armenia, Rep. of	Dominica	Liechtenstein	Saint Vincent
Aruba	Dominican Rep.	Lithuania	Sao Tome and Principe
Australia	El Salvador	Luxembourg	Senegal
Austria	Estonia	Macedonia, FYR	Serbia and Montenegro
Azerbaijan, Rep. of	Ethiopia	Madagascar	Seychelles
Bahamas, The	Fiji	Malawi	Singapore
Bahrain, Kingdom of	Finland	Malaysia	Slovak Rep.
Bangladesh	France	Maldives	Slovenia
Barbados	Gabon	Mali	Solomon Islands
Belarus	Gambia, The	Malta	South Africa
Belgium	Georgia	Martinique	Spain
Belize	Germany	Mauritius	Sri Lanka
Benin	Ghana	Mexico	Sudan
Bermuda	Greece	Moldova	Suriname
Bolivia	Grenada	Monaco	Sweden
Bosnia and Herzegovina	Guadeloupe	Mongolia	Switzerland
Brazil	Guatemala	Monserrat	Syrian Arab Rep.
British Virgin Island	Guinea	Morocco	Tajikistan
Brunei Darussalam	Guinea-Bissau	Mozambique	Tanzania
Bulgaria	Haiti	Nepal	Thailand
Burkina Faso	Honduras	Netherlands	Togo
Cambodia	Hong Kong	New Caledonia	Tonga
Cameroon	Hungary	New Zealand	Trinidad and Tobago
Canada	Iceland	Nicaragua	Tunisia
Cape Verde	India	Niger	Turkey
Central African Rep.	Indonesia	Nigeria	Turkmenistan
Chad	Iran, Islamic Rep. of	Norway	Turks and Caicos
Chile	Iraq	Oman	Uganda
China	Ireland	Panama	United Arab Emirates
Colombia	Israel	Papua New Guinea	United Kingdom
Comoros	Italy	Paraguay	United States
Congo	Jamaica	Peru	Uruguay
Congo (Dem. Rep. of the)	Japan	Poland	Vanuatu
Cook Islands	Kazakhstan	Portugal	Venezuela
Costa Rica	Kenya	Puerto Rico	Vietnam
Croatia	Korea, Rep. of	Reunion	Yemen, Rep. of
Cuba	Kuwait	Romania	Zambia
Cyprus	Kyrgyz Rep.	Russian Federation	Zimbabwe

Table A.5.3 Currency Unions in the sample

(Australian Dollar)	**(New Zealand Dollar)**
Australia	Cook Islands
Kiribati	New Zealand
Nauru	
	(Danish Kroner)
(Euro-since 2002)	Denmark
Austria	Feroe Islands
Belgium	Greenland
Finland	
France,	**(East Caribbean Dollar)**
Germany	Antigua & Barbuda
Greece	Dominica
Ireland	Grenada
Italy	Monserrat
Luxembourg	Saint Kitts and Nevis
Netherlands	Saint Lucia
Portugal	Saint Vincent and the Grenadines
Spain	
	(French Franc)
(US Dollar)	France
United States	French Guiana
Bahamas	Guadeloupe
Bermuda	Martinique
El Salvador	Monaco
Panama	Réunion
Puerto Rico	Saint Pierre & Miquelon
Turks and Caicos	
	(Swiss Franc)
(West African Franc)	Liechtenstein
Benin	Switzerland
Burkina Faso	
Central African Republic	**(Indian Rupee)**
Chad	Nepal
Congo	India
Cote d'Ivoire	
Equatorial Guinea	**(Comptoirs Francais du Pacifique francs)**
Gabon	New Caledonia
Guinea-Bissau	French Polynesia
Mali	
Niger	**(British Pound)**
Senegal	United Kingdom
Togo	Falkland Islands
	Gibraltar
(Brunei-Singapore Dollar)	Saint Helena
Brunei Darussalam	
Singapore	

Chapter 6
Conclusions

In this last chapter, I try to summarise the main results of the analyses and answer the four questions posed in the introduction.

- Is there a relationship between trade and tourism?

A positive nexus between flows of goods and tourists is found. In Chapter 2, this relationship is explored following a time series and a panel data perspective for three different cases study, namely United Kingdom, Canary Islands and the OECD countries. In general, in both approaches the short and long-run analyses suggest a complementary link between trade and tourism exists.

- Do exchange rate regimes affect trade and tourism flows?

The analysis suggest that the less flexible the exchange regime is, the greater the impact on these flows. On the basis of a gravity equation the impact of several *de facto* exchange rate arrangements on trade and tourism are estimated in Chapter 3. The results show that other intermediate exchange rate regimes, between completely fixed and completely flexible, promote flows of goods and tourists. This result could support the idea that exchange rate regimes matter and that they are a better proxy than volatility to study the impact of exchange rate risk on trade and tourism.

- Does a common currency affect countries' growth via trade and tourism?

Currency unions promote members' income via an increase in their international trade and tourism flows. Chapter 4 quantifies both the tourism-induced and the trade-induced effects of currency unions on growth. Results suggest that belonging to a currency union promotes trade and tourism flows. Moreover, openness to trade and tourism raises income.

As an illustrative exercise, the potential effects on trade, tourism and income of adopting a common currency are calculated. The magnitude of this impact for a particular country critically depends on how open to trade and tourism the country is, as well as the share of trade and tourist arrivals from the other members of the currency union.

- Does tourism reduce the estimated impact of currency unions on trade?

The analysis finds evidence that tourism is a relevant factor to explain trade flows and the magnitude of the estimated effect of currency union on trade is reduced after considering tourism. In Chapter 5 two main contributions to the debate on the large impact that a common currency has on trade flows are made. The new HMR approach is applied and tourism is incorporated to the model as a determinant of international trade.

Results suggest that tourism affects positively both, the probability of exporting and the volume of exports between two countries. Thus, tourist arrivals seem to be a relevant factor explaining trade flows. Although a common currency still encourages trade, after introducing tourism in the gravity equation and in the selection equation, its impact is conservatively reduced around 10%.

References

Adam, C and Cobham, D. (2007), "Exchange rate regimes and trade", Manchester School, University of Manchester, 75(s1), 44-63.

Ahmed, J. and Kwan, A. C. C. (1991), "Causality between exports and economic growth". Economics Letters, 37 243-248

Anderson, J. E. (1979), "A theoretical foundation for the gravity equation", American Economic Review, 69(1), 106-116.

Anderson, J. E. and Van Wincoop, E. (2003), "Gravity with gravitas: A solution to the border puzzle". American Economic Review 93, No. 1, . 170-192.

Aradhyula, S., and Tronstad, R. (2003), "Does tourism promote cross-border trade?". American Journal of Agricultural Economics, 85(3), 569-579.

Arellano M, Bond S. (1991), "Some tests of specification for panel data. Monte Carlo evidence and an allocation to employment equations". Review of Economic Studies, 58, 277–297.

Arellano, M. (2003), "Panel data econometrics". Oxford University Press: Advanced Texts in Econometrics, 2003

Aristotelous, K. (2001), "Exchange-rate volatility, exchange-rate regime, and trade volume: evidence from the UK-US export function (1889-1999)", Economics Letters, 72, 87-94.

Armstrong, S. (2007), "Measuring Trade and Trade Potential. A Survey", Asia Pacific Economic Papers No. 368. Australia-Japan Research Centre

Bai, J. and Ng, S. (2002), "Determining the number of factors in proximate factor models". Econometrica, 70, 1, 191–221.

Bailliu J., Lafrance, R. and Perrault, J.F. (2003), "Does exchange rate policy matter for growth?" International Finance, 6: 381-414.

Balaguer J., and Cantavella-Jordá, M. (2002), "Tourism as a long-run economic growth factor: the Spanish case", Applied Economics, 34, 877-884.

Barro, R. J., (1991), "Economic growth in a cross-section of countries". Quarterly Journal of Economics, 45, 407-443.

Barro, R. J., Sala-i-marti, X. (2004), "Economic growth", McGraw-Hill.

Barro, R. J., Sale-i-Marti, X. (1992), "Convergence", Journal of Political Economy, 100, 223-251.

Berg, A. and Krueger, A.O. (2003), “Trade, growth and poverty. A selective Survey”, IMF Working Papers 03/30. International Monetary Fund.

Bergstrand J.H. (1985), “The gravity equation in international trade: Some microeconomic foundations and empirical evidence,” The Review of Economics and Statistics, 67, 474-481.

Bergstrand, J. H. (1989), “The generalized gravity equation, monopolistic competition, and the factor-proportions theory in international trade”. Review of Economics and Statistics 71(1), 143-153.

Breitung, J. (2000), “The local power of some unit root tests for panel data”. B. Baltagi (ed.), Nonstationary Panels, Panel Cointegration, and Dynamic Panels, Advances in Econometrics, 15, JAI. Amsterdam, 161-17

Breitung, J. and Pesaran, M.H. (2008), “Unit roots and cointegration in panels”. Matyas, L. and P. Sevestre (eds.), The Econometrics of Panel Data (Third Edition), Kluwer Academic Publishers, 279-322.

Brun, J.F, Carrère, C., Guillaumont, P. and de Melo, J. (2005), “Has distance died? Evidence from a panel gravity model”, World Bank Economic Review, Vo l19(1), 99-120.

Capó-Parrilla, J., Riera-Font, A. and Rosselló-Nadal, J. (2005), Dutch disease in Tourism Economies. Evidence from Spain. CRE Working Papers 2005/01, Centre de Recerca Econòmica (UIB ·Sa Nostra),

Caselli F, Esquivel, G, Lefort, F. (1996), “Reopening the convergence debate. A new look at cross country growth empirics”. Journal of Economic Growth, 1, 363–389.

Cheng, I-H and Wall, H.J. (2005), “Controlling for heterogeneity in gravity models of trade and integration”, Review, Federal Reserve Bank of St. Louis, issue Jan, 49-63.

Choi, I. (2001), “Unit root tests for panel data”. Journal of International Money and Finance, 20, 249–272.

Chul H., Muzaffer, U. and Weaver, P.A. (1995), “Product bundles and market segments based on travel motivations, a canonical correlation roach”. Int. J. Hospitality Management, 14(2), 123-137,

Clark, P.B., Tamiris N. and Wei, S-J (2004), “A New Look at Exchange Rate Volatility and Trade Flows”, IMF Ocassional Paper 235.

Corden, W. (1984), "Booming sector and Dutch disease economics, survey and consolidation". Oxford Economic Papers, 36, 359-80.

Corden, W. and Neary, P. (1982), "Booming sector and des-industrialization in a small open economy". The Economic Journal, 92, 825-48.

Corradi, V., Galleotti, M. and Rovelli, R. (1990), "A cointegration analysis of the relationship between bank reserves, deposits and loans. The case of Italy, 1965-1987". Journal of Banking and Finance, 14, 199-214.

Cortés-Jiménez, I. (2008), "Which type of tourism matters to the regional economic growth? The cases of Spain and Italy", International Journal of Tourism Research, 10(2), 127-139.

Cortes-Jimenez, I. and.Pulina, M. (2010), "Inbound tourism and long-run economic growth", Current Issues in Tourism, 13 (1), 61-74.

Crouch, G.I. (1994), "The study of international tourism demand: A review of findings", Journal of Travel Research, 33(1), 12-23.

Cuñado, J. and Gil-Alaña, L.A. (2007), "Tourism in the canary islands. Forecasting using several seasonal time series models". Faculty Working Papers 02/07, School of Economics and Business Administration, University of Navarra.

De Grauwe, P. (1988), "Exchange rate variability and the slowdown in the growth of international trade", IMF Staff Papers, 35, 63-84.

Deardoff, A. V. (1995), "Determinants of bilateral trade: Does gravity work in a Neoclassical World? ", NBER Working Papers, 5377, National Bureau of Economic Research, Inc.

Deardoff, A. V. (1998), "Determinants of bilateral trade: Does gravity work in a Neoclassical World?", in J. Frankel (ed.), The regionalization of the world economy, . 7-22. University of Chicago Press.

Demas, G. (1965), "The economics of development in small countries with special reference to the caribbean", Montreal, McGill University Press.

Díaz-Pérez, F.M., Bethencourt-Cejas, M. and Alvarez-Gonzalez, J.A. (2005), "The segmentation of Canary Island tourism markets by expenditure implications for tourism policy". Tourism Management 26, 961-964.

Dixit A. and V. Norman (1980), "Theory of international trade". Cambridge Economic Handbooks, Cambridge. Cambridge University Press.

Dritsakis, N. (2004), "Cointegration analysis of German and British tourism demand for Greece", Tourism Management, 25(1), 111-119.

Durbarry, R., (2000), "Tourism expenditures in the UK. Analysis of competitiveness using a gravity-base model". Christel DeHaan Tourism and Research Institute, Working Papers, University of Nottingham.

Easton, S. T. (1998), "Is tourism just another commodity? Links between commodity trade and tourism". Journal of Economic Integration, 13, 522-543.

Eilat, Y. and Einav, L. (2004), "Determinants of international tourism: a three-dimensional panel data analysis", Applied Economics, 36, 1315-1327.

Engle, R.F. and Granger, C.W.J. (1987), "Cointegration and error Correction, representation, estimation and testing". Econometrica 55, 251-76

Fischer, C. and Gil-Alana, L.A. (2005), "The nature of the relationship between international tourism and international trade". The case of German imports of Spanish wine. Faculty Working Papers 15/05

Fitzsimons, E., Hogan, V. and Neary, P. J., (1999), "Explaining the volume of North-South trade in Ireland. A gravity model approach", Economic and Social Review 304, 381–401.

Forbes K.J. (2000), "A reassessment of the relationship between inequality and growth". American Economic Review, 90, 869–887.

Frankel, J. and Rose, A.K. (2002), "An estimate of the effect of common currencies on trade and income". Quarterly Journal of Economics, 1172, 437-466.

Frankel, J.A. (2008), "The Estimated effects of the euro on trade: Why are they below historical effects of monetary unions among smaller countries?" NBER Working Papers 14542, National Bureau of Economic Research, Inc.

Fratianni, M., (2007), "The gravity equation in international trade". Working Papers 2007, 17 Indiana University, Kelley School of Business, Department of Business Economics and Public Policy.

Funk, M. and Strauss, F. (2000), "The long-run relationship between productivity and capital". Economics Letters, 69(2), 213-217

Garín, T., (2006), "Inbound international tourism to Canary Islands. A dynamic panel data model". Tourism Management, 27, 281-291.

Ghosh, A., Gulde, A., and Wolf, H. (2003), "exchange rate regimes: choices and consequences", Cambridge, MA: MIT Press.

Gil-Pareja, S., Llorca-Vivero R., and Martínez-Serrano, J.A. (2007a), "The effect of EMU on tourism", Review of International Economics, 15(2), 302-312

Gil-Pareja, S., Llorca-Vivero R., and Martínez-Serrano, J.A. (2007b), "Did the european exchange-rate mechanism contribute to the integration of peripheral countries? ", Economics Letters, 95, 303-308.

Glick, R. and Rose, A.K. (2002), "Does a currency union affect trade? The time-series evidence", European Economic Review, l46, 1125-1151.

Goh, C., and Law, R. (2003), "Incorporating the rough sets theory into travel demand analysis". Tourism Management, 24 (5), 511-517.

Granger, C.W.J. (1981), "Some properties of time series data and their use in econometric model specification". Journal of Econometrics, 16. 121-130

Hadri, K. (2000), "Testing for stationarity in heterogeneous panel data". Econometric Journal, 3, 148–161.

Haveman, J. and Hummels, D. (2004), "Alternative hypotheses and the volume of trade: The gravity equation and the extent of specialization", Canadian Journal of Economics, 37(1), 199-218.

Helpman, E. (1987), "Imperfect competition and international trade: Evidence from fourteen industrial countries", Journal of the Japanese and International Economies, 1(1), 62-81.

Helpman, E. and Krugman, P.R. (1985), "Market structure and foreign trade: increasing Returns, Imperfect Competition and the International Economy". London. MIT Press.

Helpman, E., Melitz, M. and Y. Rubinstein (2008), "Estimating trade flows: trading partners and trading volumes". Quarterly Journal of Economics 123 (2), 441-487.

Hernandez-Lopez, M., (2004), "Future tourists characteristics and decisions. The use of genetic algorithms as a forecasting". Tourism Economics, 10, 245-62.

Hernández-Martín, R., (2004), "Impact of tourism consumption on GDP. The role of imports". Nota Di Lavoro 27, Fondazione Eni Enrico Mattei.

Hoti, S., León, C. and M. McAleer, (2006), "International tourism demand and volatility models for the Canary Islands". Mimeo.

Husain, A.., Mody, A., and Rogoff, K. (2005), "Exchange rate regime durability in developing versus advanced economies". Journal of Monetary Economics, 52, 35-64

Ilzetzki, E., Reinhart, C. and Rogoff (2009),K., "Exchange rate arrangements entering the 21st century: which anchor will hold?" mimeo (University of Maryland and Harvard University),

Im K, H. Pesaran, and Shin, Y. (2003), "Testing for unit roots in heterogeneous panels". Journal of Econometrics, 115, 53–74.

Islam N. (1995), "Growth empirics. A panel approach". Quarterly Journal of Economics, 110, 1127–1170.

Jin, C. J. (1995), "Export-led growth and the four little dragons". The Journal of International Trade and Economic Development, 4, 203-215.

Johansen (1995), "Likelihood-based inference in cointegrated vector autoregressive models". Oxford University Press, Oxford

Kandogan, Y. (2008), "Consistent estimates of regional blocs", Trade Effects Review of International Economics, 16(2), 301-314,

Kao, C. and Chiang, M. (2000), "On the estimation and inference of a cointegrated regression in panel data". Baltagi, B., ed. Nonstationary panels, panel cointegration, and dynamic panels. Advances in Econometrics, 15. Amsterdam; New York and Tokyo, Elsevier Science, 179-222.

Khan, H. and Lin, C. (2002), "International trade and tourism. Evidence from Cointegration and Causality Tests by using Singapore Data". The 33rd Annual Conference of Travel and Tourism Association (TTRA), 23-26 June 2002, Arlington, Virginia, USA

Khan, H., Toh R.S. and L. Chua (2005), "Tourism and trade. Cointegration and Granger causality tests", Journal of Travel Research, 44, 171-176.

Kim, H.J., Chen, M.H. and Jang, S. (2006), "Tourism expansion and economic development: the case of Taiwan", Tourism Management, 27(5) 925-933

Krueger, A. (1980), "Trade policy as an input to development". American Economic Review, 70, 288–92.

Krugman, P. (1995), "Increasing returns, imperfect competition and the positive theory of international trade", Handbook of International Economics, Volume II, Grossman, G and K. Rogoff (eds), Chapter 1, 1245-1260.

Kulendran, N. and Wilson, K., (2000), "Is there a relationship between international trade and international travel?" Applied Economics, 32, 1001-1009.

Kwan, A. C. C. and Cotsomotis, J. (1991), "Economic growth and the expanding export sector, China 1952-1985". International Economic Review, 5, 105-117.

Ledesma, F.J., Navarro, V., and Pérez, J.V. (2001), Panel data and tourism demand. a case study of Tenerife. Tourism Economics, 7 (1), 75-88.

Ledesma, F.J., Navarro, M. and Pérez, J.V. (2005), "Return to tourist destinations. Is it reputation, after all?" Applied Economics 37, 2055-2065.

Lee, C. and Chang, C. (2008), "Tourism development and economic growth, A closer look at panels". Tourism Management, 29(1) 180-192

Levin, A., Lin, C.F., and Chu, C. (2002), "Unit root tests in panel data. Asymptotic and finite-sample properties". Journal of Econometrics, 108, 1–24.

Levine R, Loayza, N. and Beck T. (2000), "Financial intermediation and growth. Causality and causes". Journal of Monetary Economics, 46, 31–77

Lim, C (1997), "An econometric classification and review of international tourism demand models". Tourism Economics , 3, 69–81.

López-Cordova, J.E. and Meissner, C.M. (2003), "Exchange-rate regimes and international trade: Evidence from the Classical Gold Standard Era", American Economic Review, 93 (1), 344-353.

Maddala, G. S., and Wu, S. (1999), "A comparative study of unit root tests with panel data and a new simple test". Oxford Bulletin of Economics and Statistics, 61, 631–52.

Maeso-Fernandez, F., Osbat, C. and Schnatz, B. (2004), "Towards the estimation of equilibrium exchange rates for CEE acceding countries. Methodological issues and a panel cointegration perspective". ECB Working Paper 353, Frankfurt am Main.

Mankiw, N. G., Romer, D., Weil, D. (1992), "A contribution to the empirics of economic growth". Quarterly Journal of Economics, 107, 407-437.

Marin, D. (1992), "Is the export-led growth hypothesis valid for industrialized countries? ", Review of Economics and Statistics, 74, 678-688.

Martin, C.A. and Witt, S.F. (1987), "Tourism Demand Forecasting Models: Choice of Appropriate Variable to Represent Tourists" Cost of Living", Tourism Management, 8 (3) 233-246

Matyas, L. (1997), "Proper econometric specification of the gravity model", The World Economy, 20, 363-368.

Matyas, L., Konya, L. and Harris, M.N. (2004), "Modelling export activity of eleven APEC countries, 1978-1997", Applied Econometrics and International Development, Euro-American Association of Economic Development, 4 (4),

McCallum, J., (1995), "National borders matter. Canada-U.S. regional trade patterns". American Economic Review 853, 615–623.

McKenzie, M.D. (1999), "The impact of exchange rate volatility on international trade flows", Journal of Economic Surveys, 13 (1), 71-106.

Micco, A., Stein, E. and Ordoñez, G. (2003), "The currency union effect on trade: early evidence from EMU". Economic Policy, CEPR, CES, MSH, 18(37), 315-356,

Moon, H. R and Perron, B. (2004), "Testing for A Unit Root in Panels with Dynamic Factors". Journal of Econometrics, 122.1, 81-126.

Moreno, S. (2003), Tourism development in the Canary. Annals of Tourism Research, 30, 744-747.

Nowak, J.J and Sahli, M. (2007), "Tourism and Dutch disease in a Small Island Economy". Tourism Economics, 13 (1), 49-65.

Nowak, J-J., Sahli, M., and Cortes-Jimenez, I. (2007), "Tourism, capital good imports and economic growth, theory and evidence for Spain". Tourism Economics, 13 (4), 515-536.

Oh, C. (2005), "The contribution of tourism development to economic growth in the Korean economy", Tourism Management, 26, 39-44.

Ozturk I. (2006), "Exchange rate volatility and trade: A literature survey", International Journal of Applied Econometrics and Quantitative Studies, Euro-American Association of Economic Development, 3(1), 85-102.

Patsouratis V, Frangouli, Z. and Anastasopoulos, G. (2005), "Competition in tourism among the Mediterranean countries", Applied Economics, 37 (16), 1865-1870.

Pedroni, P. (1996), “Fully modified OLS for heterogeneous cointegrated panels and the case of purchasing power parity”. Indiana University working papers in economics no. 96-020 (June),

Pedroni, P. (1999), “Critical values for cointegration tests in heterogeneous panels with multiple regressors”. Oxford Bulletin of Economics and Statistics, 61, 653–70.

Pedroni, P. (2000), “Fully-modified OLS for heterogeneous cointegrated panels. In Baltagi, B., ed. Nonstationary panels, panel cointegration, and dynamic panels”. Advances in Econometrics, 15. Amsterdam; New York and Tokyo, Elsevier Science, 93-130.

Pedroni, P. (2004), “Panel cointegration; asymptotic and finite sample properties of pooled time series tests with an application to the P-hypothesis”. Econometric Theory, 20, 597–625.

Persson, T. (2001), “Currency unions and trade: how large is the treatment effect? “, Economic Policy, 33, 435-448.

Pesaran, M. H., Smith, R. and Shin, Y. (1999), “Pooled mean group estimation of dynamic heterogeneous panels”. Journal of the American Statistical Association, 94, 621-634.

Qureshi, M.S. and Tsangarides, C. (2010), “The empirics of exchange rate regimes and trade: Words Vs. Deeds”. IMF working papers 10/48. International Monetary Fund

Reinhart, C.M. and Rogoff, K.S. (2004), “The modern history of exchange rate arrangements: A reinterpretation”, Quarterly Journal of Economics, 119, 1-48.

Rose A.K. and Van Wincoop, E. (2001), "National money as a barrier to trade". American Economic Review 91, No. 2, . 386-390.

Rose, A.K. (2000), “One money, one market: Estimating the effect of common currencies on trade”, Economic Policy, 20, 9-45.

Rose, A.K. (2001), “Currency unions and trade: the effect is large”, Economic Policy, 33, 449-461.

Rose, A.K. and Stanley, T.D. (2005), “A meta-analysis of the effect of common currencies on international trade”, Journal of Economic Surveys, Vol19 (3), 347-365.

Roselló-Villalonga, J., Aguiló-Pérez, E, and Riera, A. (2005), "Modelling tourism demand dynamics", Journal of Travel Research, 44 (1), 111-116.

Shan, J., and Wilson, K., (2001), "Causality between trade and tourism. Empirical evidence from China". Applied Economics Letter, 8, 279–283.

Sims, C., Stock, H., and Watson, M. (1990), "Inference in linear time series models with some unit root". Econometrica, 58, 113-145.

Sinclair M.T. (1998), "Tourism and economic development: a survey", Journal of Development Studies, 34, 1-51

Sinclair, M.T. and Stabler, M. (1997), "The economics of tourism". Routledge, London.

Temple, J. (1999), "The new growth evidence". Journal of Economic Literature, 37, 112-156.

Thom, R. and Walsh, B. (2002), "The effect of a common currency on trade: Ireland before and after the sterling link", European Economic Review, 46, 1111-1123.

Thornton, J. (1997), "Exports and economic growth. evidence from 19th century Europe". Economics Letters, 55, 235-240

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

Tinbergen, J. (1962), Shaping the World Economy: Suggestions for an International Economic Policy. New York: The Twentieth Century Fund.

Turner, L.W. and Witt, S.F. (2001), "Factors influencing demand for international tourism. tourism demand analysis using structural equation modelling, revisited". Tourism Economics, 7 (1), 21-38.

Webber , A.G. (2001), "Exchange rate volatility and cointegration in tourism demand", Journal of Travel Research, 39(4), 398-405.

Witt, S.F. and Witt , C.A. (1995), "Forecasting tourism demand: a review of empirical research", International Journal of Forecasting , 11(3), 447-475.

RESUMEN EN ESPAÑOL

1. Motivación y estructura

La economía internacional, entre otras cuestiones, se ocupa de las interacciones económicas entre los países, tales como los flujos internacionales de bienes, servicios, capitales y personas. En particular, muchas de las investigaciones en el área se han centrado en el análisis de los efectos de las uniones monetarias sobre el comercio internacional.

Jeffrey Frankel (2008) sostiene que *el articulo de Andrew Rose (2000) titulado "One Money, One Market…" ha sido tal vez el artículo de economía internacional más influyente de la última década*. Aunque esta afirmación puede ser discutible, este artículo ha sido revelador y ha motivado un conjunto de cuestiones de investigación abordadas en la tesis. En ese sentido, esta tesis pretende contribuir a la literatura existente en el tema en diversos aspectos:

i. Considerando una nueva dimensión en los efectos económicos que tienen las uniones monetarias, como es su efecto sobre el turismo internacional. Aunque el impacto de una moneda común en el comercio de bienes ha sido ampliamente investigado, aún sabemos muy poco sobre el efecto de la moneda única sobre los flujos turísticos.

ii. Reconociendo que no sólo las uniones monetarias, sino también otros regímenes cambiarios intermedios pueden promover el comercio y el turismo. Los análisis empíricos sobre el efecto de la volatilidad del tipo de cambio ofrecen resultados mixtos, por lo que los regímenes cambiarios "de facto" puede ser un indicador más adecuado para explorar el impacto de los tipos de cambio sobre el comercio y el turismo.

iii. Teniendo en cuenta el efecto que compartir una moneda común provoca en la renta de los ciudadanos. Se pretende aportar una motivación adicional al debate sobre los beneficios y los costes de las uniones monetarias. Mediante su incorporación a una unión monetaria cabe esperar que los países miembros intensifiquen sus flujos comerciales y de turismo lo que podría implicar un aumento en sus ingresos.

En esta tesis se pretenden responder a cuatro principales cuestiones de investigación. Primera, ¿existe una relación entre turismo y comercio? Segunda, ¿afectan los regímenes cambiarios a los flujos internacionales de bienes y turistas? Tercera ¿cuál es efecto que tiene la moneda única sobre la renta de un país vía intensificación de los flujos de bienes y turistas? Cuarta, ¿puede el turismo reducir el impacto estimado de la moneda única sobre el comercio internacional? En cada capítulo de esta tesis se trata de responder a estas preguntas formuladas.

La primera cuestión se aborda en el Capítulo 2, donde se explora la relación entre el comercio y los flujos de turismo. Este análisis servirá para arrojar luz sobre la relación entre el movimiento de mercancías y turistas y además se puede considerar como un análisis introductorio que apoyaba la idea de que el comercio es un factor relevante en la explicación de los flujos turísticos y *viceversa.*

El Capítulo 3 trata de una cuestión general: ¿Afectan los regímenes cambiarios al comercio y los flujos de turistas? Se espera que la moneda única promueva el comercio y el turismo, pero se trata de analizar si otros regímenes cambiarios también afectan a estos flujos.

El Capítulo 4 se centra en el impacto que compartir una moneda común tiene sobre los ingresos de los países a través de su impacto en el comercio y el turismo. Existen unos efectos inducidos de la moneda única sobre el comercio y el turismo que supondrán un incremento final en el nivel de renta de un país. Por tanto, en primer lugar se estima el efecto que tiene la moneda única sobre los flujos de bienes y turistas. En segundo lugar se estudia el efecto de la apertura comercial y turística sobre el crecimiento económico y por último estos dos resultados se combinan para determinar el potencial efecto que la adhesión a una unión monetaria podría tener sobre el nivel de renta de los países.

Finalmente, el Capítulo 5 trata de responder a un rompecabezas de la economía internacional, esto es, el gran impacto que tienen las uniones monetarias en el comercio internacional. Para ello, la nueva metodología propuesta por Helpman, Melitz y Rubistein's (2008) es utilizada para analizar si después de incluir el turismo como variable explicativa de los flujos de comercio internacional, se reduce la magnitud del efecto estimado de las uniones monetarias en el comercio.

2. Objetivos y contribuciones

Tal y como se ha mencionado anteriormente, en esta tesis se tratan de abordar cuatro cuestiones de investigación sobre el comercio internacional, el turismo y los tipos de cambio. Cada capítulo está dedicado a tratar con cada una las preguntas propuestas. En las siguientes subsecciones estas preguntas se plantean con más detalle y se presentan las principales contribuciones a la literatura existente.

2.1 ¿Existe una relación entre el comercio y el turismo?

En las últimas décadas, tanto en el comercio internacional como el turismo han presentado un incremento espectacular. Sin embargo, a pesar de esta evidencia, la potencial relación existente entre el comercio y los flujos de turistas ha sido poco explorada en la literatura. En el Capítulo 2 se analiza empíricamente la relación entre los flujos de mercancías y de turistas. En primer lugar, se presentan las diferentes razones aportadas en la literatura para explicar este posible nexo. Además, se aporta un canal adicional para explicar la relación en el sentido “turismo genera comercio" mediante el enfoque de la Economía Integrada. En segundo lugar, la relación se analiza empíricamente siguiendo un enfoque tanto de series temporales como de datos de panel.

El análisis de series temporales se utiliza cuando datos de comercio y de turismo están disponibles para un país o región determinado y para un período largo de tiempo. Este es el enfoque seguido tradicionalmente en la literatura para explorar el vínculo entre el comercio y el turismo mediante la aplicación de tests de cointegración y de causalidad de Granger. El valor añadido de este análisis es el estudio de la relación a largo y corto plazo entre el comercio y el turismo para dos escenarios diferentes que no se han considerado anteriormente. El primer escenario es Reino Unido. Este país es tanto una fuente como un destino principal de turistas, así como una economía muy abierta en términos de comercio internacional. El segundo escenario son las Islas Canarias. Esta región es una pequeña economía turística altamente dependiente del comercio exterior, de modo que se pueden esperar interacciones entre el comercio y el turismo Una motivación adicional para el uso de las islas como un caso de estudio es que es lugar donde se ha llevado a cabo esta tesis y por tanto implicaciones políticas para la región podrían derivarse de este análisis.

La segunda metodología considera en este capítulo es el enfoque de datos de panel. En lo que a nosotros respecta, no hay ningún estudio que aborda el análisis de la relación entre el comercio y el turismo desde la perspectiva de datos de panel. Los pocos estudios existentes en la literatura como Kulendran y Wilson (2000), Shan y Wilson (2001) o Khan y Lin (2002) aplican una metodología de series temporales y centran su análisis en un país específico. El presente análisis contribuye a la literatura existente mediante el estudio de la relación entre el comercio y el turismo a través de la aplicación de una metodología de datos de panel. Para tal fin, los países de la OCDE se consideran como el tercer escenario de este estudio ya que este grupo de países concentra alrededor del 75% de los flujos mundiales de mercancías y turistas.

En los siguientes capítulos de la tesis, se estiman las ecuaciones de gravedad para el comercio y el turismo. Por lo tanto, dadas las conclusiones del capítulo 2, el turismo se presenta como una variable explicativa en la ecuación del comercio internacional y viceversa. Las estimaciones del capítulo 3, 4 y 5 desprenden que el turismo y el comercio son variables relevantes y complementarias en el comercio y el turismo, respectivamente. Además, estos resultados refuerzan las conclusiones obtenidas en el Capítulo 2.

En esta tesis el comercio de mercancías y el turismo son considerados de manera independiente. No ha habido un debate académico sobre la interesante cuestión de las diferencias y similitudes entre el turismo y el comercio. Desafortunadamente, este tema está fuera del alcance de nuestro estudio. La diferencia básica entre estos flujos es que el turismo implica el movimiento internacional de consumidores, mientras que en el comercio internacional son los bienes los que se mueven. Este hecho sugiere que las dos actividades implican diferentes actividades económicas. Problemas de información y factores no económicos, tales como aspectos psicológicos, sociológicos e históricos parecen ser más relevantes en los flujos de turismo. Por ejemplo, esta diferencia nos lleva a esperar magnitudes diferentes en cuanto a los efectos de un shock negativo (tales como los ataques del 11 de septiembre) y sobre el efecto de la moneda única en el comercio y el turismo.

2.2 ¿Afectan los regímenes cambiarios a los flujos comerciales y turísticos?

En la literatura, los trabajos sobre los efectos económicos de los regímenes cambiarios se han centrado principalmente en cuestiones de crecimiento, inflación y estabilización (Bailliu et al, 2003; Ghosh et al, 2003; y Husain et al, 2005). Sin embargo, se ha prestado mucha menos atención a la cuestión de si el régimen cambiario elegido por un país afecta al volumen de comercio y de turismo entre los países. Existe una extensa literatura, iniciada por el controvertido artículo de Rose (2000), sobre el efecto de las uniones monetarias en el comercio. Además, existe un creciente interés en el análisis del impacto de las uniones monetarias en el turismo, por ejemplo Gil-Pareja et al (2007). Sin embargo, las uniones monetarias representan sólo uno de los regímenes cambiarios posibles. Otros regímenes que implican baja volatilidad también se espera que promuevan las relaciones comerciales y turísticas entre los países. En este sentido, en el Capítulo 3 se analiza sin los regímenes cambiarios afectan al turismo y al comercio internacional.

Es generalmente aceptado que los tipos de cambio fijo promueven el comercio y el turismo mediante la reducción de la incertidumbre sobre la evolución del tipo de cambio así como los costes de transacción. Sin embargo, la evidencia empírica, así como los resultados teóricos sobre el efecto de una menor volatilidad del tipo de cambio sobre el comercio y el turismo, son desiguales dependiendo de las especificaciones del modelo, la muestra considerada y la medida de la volatilidad del tipo de cambio utilizada.

En contraste con este resultado no concluyente, una magnitud considerable del efecto que tiene la moneda única sobre el comercio y el turismo ha sido estimada. Por tanto, aunque parecen existir resultados contradictorios sobre el efecto de la volatilidad del tipo de cambio sobre el comercio y el turismo, una volatilidad de cero, por ejemplo una moneda común, es un determinante importante del volumen de estos flujos. Este último resultado podría estar sugiriendo que las medidas de la volatilidad del tipo de cambio no son un buen indicador del riesgo cambiario y otras variables como el régimen cambiario pueden ser más adecuadas para analizar el efecto de los tipos de cambio sobre el comercio y el turismo.

El principal objetivo del capítulo 3 es explorar el impacto de los distintos regímenes cambiarios en el comercio y el turismo entre países. Para tal fin, se utiliza un amplio conjunto de datos que incluye 113 países durante el período 1995-2006. Se estima el efecto de cinco regímenes cambiarios que implican diferentes grados de volatilidad cambiaria sobre el turismo y el comercio; tales como la unión monetaria, la caja de conversión, el tipo de cambio fijo, la flotación reptante y la flotación dirigida. . Por otra parte, como un análisis de sensibilidad y teniendo en cuenta los 30 países de la OCDE, el efecto particular del euro en los flujos turísticos y comerciales se estima para el mismo período. Este último análisis nos permite comparar mejor nuestros resultados con los estimados en trabajos anteriores.

Dos ecuaciones de gravedad para el comercio y el turismo son evaluadas para estimar el impacto de cinco regímenes cambiarios diferentes. Por otra parte, en base de los resultados obtenidos en el Capítulo 2, el turismo y el comercio son además incorporados en cada ecuación como variables explicativas.

En un análisis de sensibilidad, y con el fin de comparar nuestros resultados con estudios anteriores, el análisis principal del Capítulo 3 se complementa con el estudio del efecto del euro sobre el comercio y los flujos de turismo para los países de la OCDE.

2.3 ¿Pueden las uniones monetarias afectar al crecimiento económico de los países a través del comercio y el turismo?

En el Capítulo 3 se demuestra cómo las uniones monetarias pueden promover el comercio y los flujos de turismo. Al compartir una moneda común, los países reducen las barreras al comercio y al turismo. Por ejemplo, la moneda única supone la eliminación de los costes de conversión de divisas y la incertidumbre sobre la evolución de los tipos de cambio y además implica que los países tienen la misma unidad de cuenta lo que favorece la transparencia de precios. En el capítulo 4, se estima el impacto específico de las uniones monetarias en el crecimiento de los países a través del comercio y el turismo.

Frankel y Rose (2002) analizan la hipótesis de que una unión monetaria aumenta el ingreso de un país a través del comercio internacional. Es decir, las uniones monetarias intensifican el comercio internacional y este comercio inducido por la moneda común a su vez puede tener un efecto beneficioso sobre la renta del país. Al respecto, los autores sostienen que el único canal por el que las uniones monetarias afectan al crecimiento económico viene a través del comercio internacional. Sin embargo, a pesar de estar probado que la moneda común promueve el turismo y el papel del turismo en la ampliación del tamaño del mercado, el efecto inducido de las uniones monetarias a través del turismo sobre el nivel de renta no ha sido considerado.

Otro punto importante a prestar atención es la heterogeneidad entre los países considerados en el estudio. Las estimaciones del efecto de la moneda única obtenidas por Frankel y Rose (2002) se basan en países pequeños y pobres, puesto que el caso del euro no está incluido. En este sentido, los propios autores dudan de si los resultados obtenidos podrían extenderse a los países grandes y ricos. Esta preocupación parece razonable ya que en el capítulo 3 se encuentra un impacto diferenciado del euro frente a otros casos de uniones monetarias. Basándonos en este argumento, en el Capítulo 4 se utilizan datos actualizados para reflejar la creación del euro. Además, la muestra se divide en tres grupos según el nivel de renta de los países. Por lo tanto, otra contribución de este trabajo es la estimación del modelo para tres grupos de países, países de renta baja, media y alta, lo que proporciona resultados más precisos y permite la mejor identificación de similitudes y diferencias entre los países del mundo.

En resumen, este capítulo contribuye a la cuestión planteada por Frankel y Rose (2002) en al menos tres formas: (i) el turismo se incluye como un canal adicional a través del cual la moneda común promueve el crecimiento económico, (ii) se reconoce la heterogeneidad de los países mediante la división la muestra en tres grupos de acuerdo al nivel de renta, y (iii) se considera una base de datos actualizada para incluir el caso del euro.

El análisis empírico se basa en tres etapas. En primer lugar, se estiman los efectos de una moneda común sobre el turismo y el comercio. En segundo lugar, se estima el efecto de la apertura comercial y turística sobre el nivel de crecimiento económico de los países de destino. En tercer lugar, se combinan los resultados obtenidos en las dos etapas anteriores para calcular el potencial efecto de la adopción de una moneda única sobre el turismo, el comercio y la renta.

2.4 ¿Puede el turismo reducir el impacto estimado de la moneda común sobre el comercio?

Como se mencionó anteriormente, en un influyente trabajo publicado Rose (2000) el autor estima un efecto sorprendente grande de las uniones monetarias sobre el comercio. Sus resultados sugieren que los países miembros de las uniones monetarias parecían triplicar su comercio con el resto de países miembros. Sin embargo, este controvertido resultado ha recibido poca aceptación entre los economistas y sigue siendo un *enigma* en la economía internacional.

En este capítulo, se pretende contribuir al debate de Rose en dos aspectos. La primera contribución sería la aplicación de una reciente metodología propuesta por Helpman, Melitz y Rubistein (2008). Este enfoque presenta un marco teórico para estudiar el comercio bilateral entre países teniendo en cuenta la inexistencia de comercio internacional entre pares de países. El enfoque de HMR sostiene que la no consideración de estos casos en los que un país no comercia con otro supone la pérdida de información relevante y, por ende las estimaciones podrían estar sesgadas.

La segunda contribución es tratar con el desafío propuesto por Rose y Van Wincoop (2001), de *encontrar algún facto omitido que impulse a los países tanto a participar en una unión monetaria y así como comerciar más.* En ese sentido, el turismo ha sido una variable tradicionalmente omitida en la explicación de los flujos comerciales. Además, en el Capítulo 2 se justifica teórica e empíricamente la existencia de un vínculo en el sentido "turismo causa de comercio internacional". Por otra parte, en los capítulos 3 y 4 se ha demostrado empíricamente cómo la llegada de turistas parece ser una variable relevante en las ecuaciones de gravedad para el comercio internacional. Por todas estas razones, el turismo se propone como un candidato adecuado para explicar la posible sobrevaloración del impacto estimado de una moneda común sobre el comercio. Adicionalmente, se justifica teóricamente la inclusión del turismo en el enfoque de HMR a través de la idea de que estos flujos reducen los costes tanto fijos como variables de exportar.

3. Principales conclusiones

Los principales resultados alcanzados en esta tesis podrían resumirse a través de la contestación de cada una de las preguntas formuladas anteriormente.

- **¿Existe una relación entre el comercio y el turismo?**

Se demuestra empíricamente la existencia de un nexo positivo entre los movimientos internacionales de bienes y turistas. En el Capítulo 2, esta relación es empíricamente analizada siguiendo dos enfoques, la perspectiva de series temporales y la perspectiva de datos de panel. Se consideran tres casos de estudio, a saber, Reino Unido, Islas Canarias y los países de la OCDE. En líneas generales para los tres escenarios propuestos, ambos enfoques sugieren la existencia de una relación a corto y largo plazo así como que esta relación es de complementariedad.

- **¿Afectan los regímenes cambiarios a los flujos comerciales y turísticos?**

El análisis sugiere que a menor flexibilidad del regímen cambiario, mayor es el impacto sobre los flujos de turismo y comercio. En el Capítulo 3 se estima una ecuación de gravedad para estudiar el impacto de varios regímenes cambiarios *de facto* sobre el comercio y el turismo. Los resultados muestran que otros regímenes cambiarios intermedios, entre completamente fijo y totalmente flexible, promueven los flujos de mercancías y turistas. Este resultado podría reforzar la idea de que los regímenes cambiarios son mejor indicador que la volatilidad del tipo de cambio a la hora de estudiar el impacto del riesgo cambiario sobre el comercio y el turismo.

- **¿Pueden las uniones monetarias afectar al crecimiento económico de los países a través del comercio y el turismo?**

Las uniones monetarias afectan al crecimiento económico de los países miembros a través de un incremento de sus flujos comerciales y turísticos. En el capítulo 4 se cuantifican los efectos inducidos vía turismo y comercio de la moneda única sobre el crecimiento económico. Los resultados sugieren que la pertenencia a una unión monetaria, promueve el comercio y los flujos de turismo. Además, la apertura al comercio y el turismo incrementa la renta de un país.

Como un ejercicio ilustrativo se calculan los potenciales efectos de la adopción de una moneda común en el comercio, el turismo y la renta. La magnitud de este efecto para un determinado país depende fundamentalmente de su grado de apertura comercial y turística así como de la intensidad de los flujos con el resto de países miembros.

- **¿Puede el turismo reducir el impacto estimado de la moneda común sobre el comercio?**

Se encuentran evidencias de que el turismo es un factor relevante para explicar los flujos comerciales y que la magnitud del efecto estimado de la unión monetaria sobre el comercio se reduce después de considerar el turismo. En el Capítulo 5 se realizan dos contribuciones al debate sobre el gran impacto que las uniones monetarias tienen sobre los flujos comerciales. Para tal fin se aplica la reciente metodología de HMR y el turismo se incorpora al modelo como un factor determinante del comercio internacional.

Los resultados sugieren que el turismo afecta positivamente tanto, a la probabilidad de exportar y como al volumen de las exportaciones entre dos países. A su vez, las llegadas de turistas parecen ser un factor relevante para explicar los flujos de comercio. A pesar de que el impacto estimado de la moneda única sobre los flujos de comercio es aún considerable, después de introducir el turismo en el modelo, su impacto se reduce moderadamente en torno al 10%.