



COMPARATIVE ADVANTAGE

Explaining Tourism Flows

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Abstract: The objective of this paper is to explain international tourism flows in terms of supply-side factors associated with its production in destination countries. Unlike demand-oriented analysis, the study suggests that there are parallels between tourism and international trade flows that are typically explained from the supply-side variables, the comparative advantage of the exporting countries. A simple model is proposed and tested. The results render strong support for the relevance of supply-side factors such as natural endowments, technology, and infrastructure in explaining international tourism flows. **Keywords:** comparative advantage, international tourism flows, trade, trade in services, foreign direct investment. © 2006 Elsevier Ltd. All rights reserved.

Résumé: Avantage comparatif: une explication des flux du tourisme. L'objectif de cet article est d'expliquer les flux du tourisme international en termes des facteurs de l'offre associés à sa production dans les pays de destination. À la différence de l'analyse axée sur la demande, cette recherche suggère qu'il y a des parallèles entre le tourisme et les flux du commerce international qui sont expliqués typiquement à partir des variables de l'offre, l'avantage comparatif des pays exportateurs. On propose un modèle simple et le met à l'essai. Les résultats fournissent un fort appui à l'importance des facteurs de l'offre tels que qualités naturelles, technologie et infrastructure pour expliquer les flux du tourisme international. **Mots-clés:** avantage comparatif, flux du tourisme international, commerce, commerce des services, investissement direct étranger. © 2006 Elsevier Ltd. All rights reserved.

INTRODUCTION

Every year, more than 750 million people travel from their resident countries to various destinations for leisure, business, and other purposes. For quite some time now, agencies such as the UN World Tourism Organization (WTO) and the World Trade Organization have treated tourism processes as an equivalent to actual goods exporting activities for tourist receiving countries (World Trade Organization 1998). However, within both economic and tourism research, there is a need to adapt existing trade theories to services. Further, the

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existing empirical analysis of such flows is still greatly inadequate. There is a need to better understand such trade in services in order to answer several fundamental questions. Why are some countries more successful destinations than others? What are the challenges of increasingly global production systems to those involved in tourism exports? What are the benefits for developing countries of liberalizing their tourism trade by allowing more inbound tourism and foreign direct investment (FDI) in this industry?

This paper focuses on the first question concerning what decides comparative advantages in tourism and discusses whether the singular focus on the demand side to explain its flows with an econometric method in earlier literature is justified. It is argued that the emphasis in the past is partly due to traditional definition as a demand phenomenon measured by the flow of people from origin to destination countries. However, this flow is indirectly a parallel source to that of money (receipts) from tourism origin to destination country in exchange for an indirect flow of goods and services (trade) from people in the receiving to those in the originating countries. Viewed in this perspective it is clear that tourism and trade flows (although they appear to be in an opposite direction, since tourists have to travel to and consume the goods and services directly in the destination country) are two closely related types of international economic activities. In this paper it is argued that the out flow to the destination country is a reasonable and superior indicator to other variables of such type of trade in terms of data availability. However, the data section also considers alternative dependent variables (indicators of trade) such as tourism receipts and trade in related services.

EXPLAINING TOURISM FLOWS

The tourism-demand model has prevailed in the literature as the appropriate modeling framework to estimate the international tourist trade between two or several pairs of countries (Askari 1971; Barry and O'Hagan 1972; Crouch 1994a; Lim 1997; Morley 1998; Sinclair 1998; Witt, Witt and Wilson 1994). The dependent variables within these models include, in most cases, tourism flows measured either by number of arrivals and departures, or by demand in terms of expenditures and receipts. Flows of receipts may be slightly superior to other variables as they indirectly include the dimension of numbers of days spent by tourists at the individual destination. The most important explanatory variables of flows to date, as identified in the literature overview (Crouch 1994b; Lim 1997), are income (in the originating country or market), population (in the market), cost of living (relative prices or consumer price index ratios between the originating and destination countries), transportation cost (between the two), currency exchange rate (between the pairs of destination and originating countries) and other price factors (inflation, exchange rates).

The tourism-demand model focuses primarily on explaining how income changes in originating countries or changes in relative price,

transportation cost, and exchange rates between them and destinations affect the tourist flows to the latter. Often the analysis includes just one or a few destinations. These demand models measure income and price elasticity from tourism and other coefficients of the variables. One of the advantages of the model is that it can function as a short-run forecasting tool to estimate the demand for a destination country from its main markets.

The traditional demand theory in tourism suffers from a number of drawbacks, as it ignores the particularities of the product (Papatheodorou 2001). It is not realistic to assume a representative tourist treats all the destinations as undifferentiated. Their products are heterogeneous and unique in offering unique experiences at different destinations. The demand model also ignores the comparative advantage of tourism exporting countries and the active role that countries often play in attracting tourism flows. These issues are explored by research that investigates the relationships between tourist's motivation/place experience and the destination's image. These are also associated with destination loyalty and competitiveness (Trauer and Ryan 2005; Yoon and Uysal 2005). Moreover, the demand model is static; it treats all destinations as equals and ignores their stages of development. However, histories of tourism in individual countries give a more dynamic picture of arrivals; over time some popular destinations may decline while new ones emerge. The historical development of competitiveness among them should be considered when analyzing these flows (Crouch and Ritchie 1999; Enright and Newton 2004, 2005; Ritchie and Crouch 2003).

International Trade Theory

Trade theory and the explanations of international trade flows of goods have been almost entirely dominated by supply-side perspectives. Among other things, this is due to standard assumptions of the neoclassical trade theory, such as that of similar preferences in the Heckscher-Ohlin model (Krugman and Obstfeld 1997). This is the case despite the fact that mainstream theory throughout the 20th century has also been well aware that differences in preferences could be an independent explanation for the existence of trade. Linder (1961) provides the only stand-alone theory that really takes into account preferences and the relevance of similarity in preferences in explaining the direction of international trade flows. Some important parallels to this theory may be seen in the empirical observations regarding the importance of proximity that underlay the gravity model (Bergstrand 1989; Thursby and Thursby 1987; Zhang and Kristensen 1995). All other models must be viewed as setting out supply-side types of explanation.

The very early trade theories such as those of Ricardo and Heckscher-Ohlin explain flows with relative productive efficiency (technology in Ricardo) or relative available resource endowments of countries (where the Heckscher-Ohlin theory assumed that all

countries have access to the same technologies). It is the difference in technology and/or endowments according to these theories that are the prime motivators or underlying causes of international trade. In practice, the differences in productive capacities cause relative product prices to deviate widely in a state of autarky. When barriers to trade are dismantled, such large price differences are no longer justifiable and countries will start to trade until gross prices even out across countries. The reason why goods are more affordable in some countries compared to others is explained by comparative advantage, which refers back to their unique endowments or technologies. While the Heckscher-Ohlin theory has lost in significance with the industrial and especially the information technology revolution and the following decline in role of natural resources relative to knowledge (created assets), the Ricardian theory, perhaps due to its unwillingness to delve further into specific explanations for differences in efficiency, remains as universally valid as ever before.

The new trade theories give a central role to increasing returns in explaining these efficiency differences (Romer 1986). These depend a lot on the source of scale economy: whether it is firm-specific (internalized) or arises through broader social processes of learning and externalities. One strand of the new trade literature centers on the multinational enterprise as an important source of superior technology or so-called ownership advantages that render technological leadership to those countries that foster them (Markusen 1995) and also, depending on the technology transferred, to those that host them. Another strand emphasizes the role attached to agglomeration economies or industry clusters that are the generators of long-term competitiveness through provision of virtuous circles of superior learning, thick factor markets, infrastructural improvements, and hence better technologies (Ottaviano and Puga 1998). Finally, a third direction, which is somewhat related to both (neotechnology theories), focuses on the location of innovation-driven industries and how spin-offs from these diffuse to other locations over time (Krugman 1979a; Vernon 1966). Table 1 lists the different theories and shows parallel examples in tourism for why countries may have comparative advantage in this activity.

These trade theories can be applied in the service (or tourism) trade. Tourists may choose to visit a country because of cultural affinity (as in pilgrim tourism); they may be attracted by the natural endowment, such as sun, sand, and sea (as in island tourism); or by some cultural heritage. The relative price competitiveness of the tourism product at the destination country compared to other competing destination countries can also be the cause of flows (this dimension holds a clear overlap between demand models and Ricardian trade theory). Multinational tour operators and hotel chains (FDI in hotels in the destination countries) have advantages in terms of reputation, branding, and product recognition to attract tourists to the countries where they invest. Nowadays more and more countries, especially in the developing parts of the world, have realized that better hotel facilities and tourism infrastructure are important factors in attracting more arrivals. They must invest in better and more hotels, restaurants, airports, roads, and

Table 1. Trade Theories and Their Application to Tourism

Trade Theory	Main Explanation for Trade	Tourism Example
Linder	Preferences (similarity)	Cultural affinity, such as pilgrim tourism
Ricardian theory	Technology/productive efficiency	Price competition among tourism destination countries
Heckscher-Ohlin theory	Natural endowments (capital, labor, and land)	Sun, sand, sea and cultural heritage
Multinational firms	Ownership advantages (firm-specific technology)	International hotel chains
Neo-technology	Innovation/diffusion patterns	Adventure parks, internet marketing for tourism
Agglomeration	Externalities, infrastructure, chance	Tourism clusters, investment in tourism infrastructure

means of transportation, in order to improve the quality of the tourism products and attract more into the country. The new technology-oriented adventure parks, computer reservation system, and internet marketing for tourism that make it convenient to travel in the destination countries also play an attracting role.

Trade in Services

The General Agreement on Trade in Services classifies four main modes of supply: cross-border supply (a service is supplied from a supplier's country of residence to a consumer's country of residence); consumption abroad (through the movement of a consumer to a supplier's country of residence); commercial presence (through the movement of a commercial organization to a consumer's country of residence); and presence of a natural person (through the movement of a natural person to a consumer's country of residence).

Compared to other types of services (such as banking, that is mainly related to the mode of commercial presence), tourism is relatively more complicated to categorize. Only in rare cases does it involve only one mode, although the prevailing mode is arguably consumption abroad. The subsectors in the tourism satellite account document (OECD 2001b) are described much more broadly to include hotels and similar, second home ownership, restaurants and similar, railway passenger transport services, road passenger transport services, water passenger transport services, air passenger transport services, transport supporting services, transport equipment rental, travel agencies and similar, cultural services, and sporting and other recreational services.

It is clear that all the above activities are likely to be involved in one or two supply modes of tourism services. For example, international air transport service involves cross-border supply. Many tour operator services could involve both cross-border supply and consumption abroad. The most internationalized commercial activities regarding

tourism involve hotels and restaurants, which are categorized as the mode of commercial presence. Even tourist guide services often imply the involvement of the mode of presence of a natural person. The industry also involves the consumption of many tangible goods categories in the destination country such as food, textiles, and handicrafts. Hence, it is really a highly composite type of activity including major components of both commodities and services and these components may be provided equally by cross-border supply, consumption abroad in combination with commercial presence, and the presence of natural persons.

As early as 1970, Gray engaged the research on international trade in service with a special emphasis on international travel and passenger transportation. He pointed out three aspects of international trade in this industry that merit detailed analysis: the degree to which trade in tourism services is determined by demand oriented characteristics; the direction of any bias in the input mix of general factors of production (whether trade is labor or capital intensive); and the construction of a general, simple analytic model to analyze the market for an exporting country and its implication for the rate of return on native factors of production. The distinguishing characteristic of two of the three aspects for international trade flows in service derives from supply considerations, while the third aspect owes its existence primarily to the demand aspect (1970:17). It is also emphasized in Gray's book that the Heckscher-Ohlin model may be only a partial explanation of trade in travel services. There are several possible explanations for observed two-way trade including international trade in services, such as foreign investment and multinational corporations. He also discusses the contribution to a country's economic development made by the export of tourism services:

A single theory of international trade cannot hope to account for all of the kinds of international trade which is undertaken in this world. What is needed, then, is a more flexible body of analysis which will allow studies of specialist subcategories to be undertaken; instead of a general model of international trade into which international trade in service must be compressed, there is a need for a series of models for separately-identifiable categories of international trade (1989:99).

Ritchie and Crouch (2003) agree and believe that tourism provides an excellent basis for starting work on trade in service.

Concerning two-way trade, Fish and Gibbons (1989) examined the distribution of the US international tourism payment and found that 63% of it went to the rich countries. As mentioned above, tourism products are differentiated and its markets are typically imperfectly competitive. Linder (1961), Krugman (1979b), Lancaster (1980), and Helpman (1981) have each developed different theories to address the underlying causation of observed two-way trade, including similarity in preferences, economies of scale, and externalities for differentiated products as explanatory variables.

Bond and Ladman (1972) set up models to explain international flows from both demand and supply sides. The supply side variables

applied in the equation are the price of tourism, the cost of production factors, the status of technology, the producer's goals, and the prices of related goods. However, referring to the empirical tests, the authors claimed, "Since the factors that affect the supply are difficult to quantify, our empirical analysis is restricted to a test of the demand side of the market" (1972:46).

Plenty of research concentrates on the role of destination development. Smith (1988, 1994) argues for a return to supply-side perspectives to be able to understand and analyze tourism as an industry and economic activity. Many studies have focused on destination marketing, image related to motivation and satisfaction, market positioning analysis, and competitiveness (Chen and Uysal 2002; Crouch and Ritchie 1999; Enright and Newton 2004, 2005; Trauer and Ryan 2005; Ritchie and Crouch 2003; Uysal, Chen and Williams 2000; Yoon and Uysal 2005).

Crouch and Ritchie (1999) give a comprehensive description of the nature of both comparative and competitive advantage in tourism by applying Porter's (1990) core diamond theory of competitive advantage of countries. They acknowledged that "the resources that make up a destination's factor of endowments change over time, altering the comparative advantage of a destination" (1999:142) and they set up a conceptual model for destination competitiveness. Enright and Newton (2004 and 2005), working from Crouch and Ritchie's conceptualization of destination competitiveness, and using survey data and a factor analysis, give very strong empirical support for inclusion of both industry-level, such as business related factors, and destination attributes in explaining competitiveness.

Melián-González and García-Falcón (2003) and Murphy, Pritchard and Smith (2000) relate products and services to destination competitiveness. They conclude that several supply-side related factors (such as quality, resources, destination environment, infrastructure, and value) can influence the tourist's intention to return. The same ideas are tested and validated from a sociological perspective by Beerli and Martín (2004). Similar ideas have also been developed with the area lifecycle (Moore and Whitehall 2005) and the effects of tourist motivation and satisfaction on destination loyalty (Yoon and Uysal 2005).

Dwyer and Forsyth (1994) argue that foreign investment plays a positive role in attracting foreign tourism flows and expenditure to the destination country. Dwyer, Forsyth and Rao (2000) examine the price competitiveness of travel and tourism in 19 destination countries. Well-defined competitiveness indices (both the travel cost and ground cost) for travel to the destination countries are compared among these countries. The important feature in this research is that they use efficiency and productivity (that is, comparative advantage) to show the competitiveness among the destination countries, demonstrating that the destination has an important role in attracting tourism flows to the country.

Prideaux (2000) shows the transport system also plays a role in destination development. Transport is a significant factor in both tourism development and the type of markets in which destinations

compete. Geyikdagi (1995) uses Turkey as a case to investigate tourism demand applying a traditional model that uses real disposable per capita income in the markets, travel costs, and bilateral exchange rates, among others. However, he adds one variable, the gross fixed investment in the Turkish tourism industry, into the model to represent the supply variable. The results show that the variable has a greater impact on tourism flows than any of the other traditional demand-related variables. Through the upgrading of quality and quantity of accommodation establishments and the provision of new transport facilities (new airports and motorways) tourists have been attracted to Turkey in greater numbers, according to these results.

The literature shows that there is a basis, both conceptually and empirically, for applying a more supply-side oriented perspective along with the more traditional tourism-demand studies. However, especially in terms of more quantitative style studies, there is a void in the supply-side-oriented tradition compared with the demand-side investigations. This is because of difficulties in obtaining relevant data and good proxies for supply-side factors.

The objective of this study is to test whether a supply-side perspective as espoused by international trade theory is applicable to explaining comparative advantage in international tourism. This may be done in different ways: a single country could be examined for a longer period of time (in longitudinal case or time series studies), several countries could be compared at a particular point in time (again using a case study or in a statistical cross section study), or a dynamic cross-country perspective can be adopted exploring the time and cross-country dimension at the same time (panel study). Each approach has its advantages and disadvantages. A study including more countries and years has greater applicability in terms of generalized results. But there is the danger of missing variables for destination specific information. This is the necessary trade off when choosing between specific qualitative studies and broader quantitative ones. The panel approach chosen here is complementary to a more qualitative research design.

Within statistics the panel approach is viewed as a methodological accomplishment in the sense that it achieves a combined analysis of country-specific and time variant factors in a way that reduces data requirements for country specific factors that do not vary over time (Hsiao 1986). By using this approach here it becomes possible to say whether or not a country has comparative advantage in tourism activities due to its specific factors. But the method is not able to answer exactly why this is the case (as for scenic attraction, climate, or cultural heritage) as is possible, for example, in a case study. For time varying factors such as investments into infrastructure, the panel approach is far superior to any other. It gives the researcher the ability to follow over time many countries and renders the power to compare these experiences in a way that would be impossible in any other type of study. For example it would not be feasible in a qualitative study relying mainly on the cognitive abilities of the researchers themselves to compare more than 100 countries over a time span of several years.

The Theoretical Model

Destination production is modeled at the level of countries in the present paper. Since tourism is a heterogeneous product, a simple model of monopolistic competition is chosen for a framework (Krugman and Obstfeld 1997). Demand or market size S is taken as exogenously given. It is assumed that each destination offers a partially naturally determined and a partially augmented or created tourism product—that is, the destination can be consumed either in a “raw” or increasingly more sophisticated forms through investments in created assets such as technology and infrastructure. The market share of the individual country is hence decided by a number of factors as described with the equation below.

In the equation, Q represents tourism inflows to each country while S is the total volume of tourism flows in the world. The parameter a represents natural endowments of scenic attraction, climate, geography, and cultural heritage. If only natural endowments were relevant, it would be the nature-given circumstances in each country divided by the number of competing destinations n that would decide each country’s market share. It is assumed in the theoretical model that all countries are of identical size. The parameter b represents the extent to which market share is sensitive to price differences. If b is large, it means that noncompetitive destinations in terms of prices are severely punished and that competitive destinations in terms of price have an advantage. Conversely if b is small, price differences are not an independent source of comparative advantage.

However, through differentiation, countries may countervail the impact of the normal price mechanism. Through investments the experience (as aggregate product tourists obtain at destination) may be differentiated, and hence it is possible to charge a price p that lies above the average price \bar{p} in a way that adds to the market share. In this case b would be negative, but this would require investments in technology and infrastructure.

$$Q = S \left[\frac{a}{n} - b(p - \bar{p}) \right]$$

No assumption is made about the long run equilibrium, although the industry should be moving towards a state of zero profits, according to the assumptions of the monopolistic competition market form. Without modeling the cost-side of production, but assuming some economies of scale in production, it is known that under regimes of less competition among countries the model will deviate more from average-cost pricing, giving room for supra-normal profits. Oppositely, under regimes of more competition, pricing will tend towards average cost pricing and only normal profits. In terms of the model, this means that price differences across countries can be large in the short-run but only based on differentiation practices that are mirrored by different quality and hence cost levels in individual countries in the long run.

The reference is made in this paper to comparative rather than competitive advantage of destinations. However, from a methodological

viewpoint, some clarification may be necessary in view of heated debates about these different concepts in international economics. From the perspective of countries, the best notion is comparative advantage, since all countries engaging in trade should from a theory viewpoint have such position. From the perspective of firms and hence sometimes of countries (as under conditions of imperfect competition) it might be appropriate also to make reference to competitive advantages, which are taken here as entirely synonymous with the concept of absolute advantage in international trade theory. For example, countries may have a comparative position in tourism because of the competitive (absolute) advantages of some of its firms or cities in this industry typically based on innovations (Disneyland or Las Vegas could be practical examples hereof). However, some may also have a comparative advantage simply because this is the activity that they are “the least worst at” according to the original definition of the concept. For example, some island economies may have few options but to be specialized in tourism, and this is only on the basis of their comparative (low wages, natural resources) and not their competitive advantages.

Study Data

The data used in this paper are compiled from two main sources: the World Tourism Organization, through their database on tourism and two recent WTO statistical publications, and the World Bank’s *World Development Indicators* database (2002). The database of the former delimits the number of years and number of countries included in the final dataset. Individual variables and their relevance to the model are only described to the extent that measurement issues are involved in the present section (the relevance of the data variables in relation to the theoretical model is discussed later).

Other sources are used to complement this data, such as FDI information from the United Nations Conference on Trade and Development (UNCTAD)’s online database, since this source also calculates estimates for the FDI stock invested in each country. Industry level data on FDI and internationalization of hotels and restaurants were compiled from the Organization for Economic Cooperation and Development (OECD) (2001a) and from other statistics (UNCTAD 2004).

The dependent variable in this study is flows measured by number of arrivals. Using this variable as a proxy for the actual comparative advantage of countries in tourism activities may contribute to validity problems. In terms of measurement issues, these flows do not control for either the length or the spending intensity (actual value consumed) of the tourist stay. In addition, there is a question as to whether absolute or relative flows (controlling for country size) is the correct dependent variable in this context.

Alternative data such as those provided both by the WTO (1996) (tourism spending) and the World Trade Organization (trade in travel services) are obvious complementary sets to consider. However, both these types are insufficiently available at present to undertake

estimations for a large panel of countries. The routine of collecting data on trade in tourism services is of recent date and only includes members of the World Trade Organization. Data on tourism spending also involve availability problems and on top of this they are often considered highly inaccurate. To check the validity of flows as a dependent variable up against these alternative variables, the volume of service is compared with their population and GDP for the 15 largest exporters in the world tourism services (according to the World Trade Organization in 2003). With the data on trade in tourism services, it is possible to calculate an index for comparative advantage because these can be related in a meaningful way to other general export data.

The index of revealed comparative advantage relates the export of each country in the particular category of tourism services to that of their general export activities, with both weighted by the size of world trade in this industry and total world trade, respectively. Hence the revealed comparative advantage shows to which extent countries are specialized in this business relative to other export revenue generating activities. It is found that revealed comparative advantage is highly related to both arrival/population ratios and tourism spending/GDP ratios. It is also clear that there are strong parallels between the revealed comparative advantage index and the traditional indicators of tourism once they are weighted (taking into account country size in terms of population or GDP). For the purposes of the present study it is necessary to accept that data on flows (arrivals) as a dependent variable is in some aspects less valid (it only weakly quantifies what should be measured), but in other aspects a more valid indicator (it quite accurately measures tourism flows) than receipts.

Besides standard variables for technology and infrastructure, data on FDI is also introduced into the model under the “created assets” variables. The intention is to capture international knowledge spillovers of locally available technology. This stock is used as a substitute for specific information about FDI in hotels and restaurants since the latter is only available for a very limited number of countries in the larger sample. This is much inferior to using precise data on FDI by industry, but the correlation coefficients (not shown here) indicate that the general level invested in a given country is a reasonable substitute for the hotel and restaurant stock. It should also be noted that FDI is far from perfect in terms of capturing international knowledge spillovers in an industry such as tourism, as other modes of international involvement also lead to knowledge spillovers such as the widespread usage of management contracts (Horwath International, 2002).

Combining these different sources, a unique dataset is built, including the variables as listed in Table 2. However, the size of the sample for regression analysis has to be reduced due to lack of some variables for several countries. From the original dataset, some of them are further excluded due to the insignificance of tourism activities. Those which during the period 1982–2001 do not attain an arrival/population ratio greater than 2% are excluded from the dataset, as are ones which contribute to a very unbalanced panel by offering less than six years of data availability. This narrows the number of countries

Table 2. Definition of Data Variables

Variable	Explanatory Notes
ARRIVAL	The annual inflow (arrivals) of international tourists according to the WTO database
RECEIPTS	The annual income earned per international tourist (income/arrivals) according to the WTO database
POP	Population, measuring the sizes of the tourism destination countries
GDPCAP	GDP per capita in US dollar in 1995 prices
HOTELCAP	Hotel capacity, measuring the total number of hotel rooms available in the tourism destination countries
FDIHR	Foreign direct investment (FDI) in hotel and restaurant sectors (stock) in the tourism destination countries
FDIST	The stock of foreign direct investment according to UNCTAD
OPEN	Openness, measured as total exports plus total imports divided by the country's GDP
PPP	The relative price competitiveness of the destination measured by the ratio of GDP in PPP to GDP by market exchange rate at the destination countries. The ratio represents the local relative price level from the perspective of international currency holders
TIME	A time trend, 1982 is 1, 1983 is 2 etc.

included from 214 in the original dataset to 133 in the final sample used for the ordinary least square (OLS) regressions and 101 countries in the final sample used in the panel regressions.

Regions represented with the data include developing Africa DAF (23 countries), developing America DAM (33), developing Asia DAS (25), developing Middle East DME (9) and European Transition Countries ETC (13), and finally the most highly developed countries belonging to the OECD (30). The number of years included in the regression analysis ranges from 6–15 (1985–1999).

The Statistical Model

The theoretical model is tested by using an OLS, assuming that the intercept and slopes are the same for all countries in the model. However, in this simple OLS it is allowed for independent regional intercepts. The regional intercepts should capture regional differences in natural endowments. The size of individual countries is controlled for by using population data POP. To capture the potential effect that differentiation via technology and infrastructure has on the market share of the individual country, a number of explanatory variables are introduced into the model. The level of economic development is captured with income per capita GDPCAP which is known to be strongly correlated with local productivity levels and hence locally available technology. Investment in infrastructure is measured with hotel capacity HOTELCAP. The stock of foreign direct investment FDIST is also used as a proxy for the level of technology. This may have slightly

different interpretations for countries at different levels of development. In the most highly developed countries the presence of FDI is more an indicator of competitive rivalry, whereas in less developed countries it is an indicator of technology transfer (Narula and Dunning 2000). The price competitiveness of the individual destination is captured with the variable PPP. Finally, institutional differences are controlled in terms of openness by using trade data as introduced through the variable OPEN. A time trend is introduced to capture changes in total market size over time and likely changes in the competitive regime.

$$\begin{aligned} Arrival_{it} = & \alpha_i + \beta_1 POP_{it} + \beta_2 GDPCAP_{it} + \beta_3 HOTELCAP_{it} + \beta_4 FDIST_{it} \\ & + \beta_5 OPEN_{it} + \beta_6 PPP_{it} + \delta T_t + \varepsilon_{it} \end{aligned}$$

This model is compared with a panel data model that instead assumes both country i and time t have varying intercepts (the two-way fixed effects model). In terms of observing the importance of natural endowments towards explaining tourism flows, this is a more relevant model. Overall, the advantage of using panel data in either type of the model is that individual differences for the explanatory variables across countries can be used to reduce problems of collinearity. Furthermore, the advantage of the panel data model over the simple OLS model is that the problems of omitted variables are reduced by introducing country specific effects (Hsiao 1986). These capture many of the factors that are relatively stable over time, but they strongly affect the ability of countries to attract tourists according to the hypothesis. The country specific effects include cultural and natural attractions like attractive climate and scenic advantages of some destinations. In other words, the fixed effect represents the individual a_i of each country following the theoretical model introduced above. However, other time invariant factors such as institutions (like those related to visa control) and geographic location are also likely to affect these fixed effects which may render them slightly more difficult to interpret in practice. With the present study, the purpose is mainly to distinguish between natural endowments and created assets as separate sources of comparative advantage and investigate how countries through their actions and choices may use created assets to attract more tourists.

The panel data model is also tested both for the whole set according to the selection criteria described above and for a smaller part of it only including a balanced sample. The latter is necessary to test the robustness of results obtained from an unbalanced sample; especially, selected data availability over time may be a particular problem that could lead to biased results.

Finally, the estimation of the panel model for individual regions is made to test whether regional heterogeneity may be affecting the results. For example, it could be the case that what appears to be a relevant explanatory factor behind tourism flows in general is only relevant for some regions (within-region effect) or in competition between regions (between-region effect). Such differences can only be tested

for by running the model for each region separately. From a methodological viewpoint this is also desirable as some regions are much better represented in terms of data (such as the OECD countries) compared to other regions (such as Africa and the Middle East).

Study Findings

Results for the first version of the model (OLS) explaining tourism flows are shown in Table 3. Two variations of the dependent variable are used: one where the country size is controlled for on the right hand side of the equation as an explanatory factor, and the other where the population-weighted tourism inflows are used instead. The latter

Table 3. Results from the Pooled Dataset – OLS

Variable	Estimated Parameters	
	OLS	OLS (POP weighted)
Intercept	3.611 (5.83)	-0.326 (-2.38)
Log POP	0.182 (5.25)	-
Log GDPCAP	0.161 (3.70)	0.000 (0.66)
Log HOTELCAP	0.478 (17.39)	66.65 (18.93)
Log FDIST	0.118 (5.13)	31.059 (3.79)
OPEN	0.006 (9.30)	0.001 (2.15)
PPP	0.001 (3.49)	-0.000 (-1.29)
DAF	-0.670 (-6.75)	0.254 (2.50)
DAM	-0.887 (-11.22)	0.156 (1.76)
DAS	-0.662 (-6.91)	0.851 (7.73)
DME	-0.466 (-3.19)	0.214 (1.28)
ETC	-0.301 (-2.88)	0.124 (1.01)
Time trend	0.012 (2.34)	0.003 (0.62)
N	1129	1129
R ²	0.857	0.409
CI > 10	Time and region	Time

Note: t-values are in parentheses, figures in bold denote statistical significance at least at 5% level. Dependent variable is log (Arrival) or (Arrival/POP).

model is statistically stricter and potentially reduces spurious effects associated with country size including possible problems of multi-collinearity (explaining variables are not independent) associated with using country size and other size-related explanatory factors in the same equation. However, the initial results show little difference with regard to the signs and significance of most of the explanatory variables by using either of the dependent variables.

Across both equations it is found that the hotel capacity, openness, and FDI stock variables are positive and significant explanatory variables. However, with respect to other explanatory variables such as income per capita and regional dummies, there is quite a large difference in the results, most likely caused by multi-collinearity associated with regional income differences in both models. In subsequent models the simple dependent variable for tourism flows is used, as jumping to a panel data model solves some of these potential issues of multi-collinearity, which seems to be the main reason for differences in the results using the simple and weighted dependent variables.

Results for the panel model are shown in Table 4 (first column). Once the fixed effects are included, it confirms and increases the robustness of the results obtained from the OLS model. All the explanatory variables with respect to technology and infrastructure are significant and have the expected signs. The variable capturing the relative

Table 4. Regression Results from the Panel Model

Variable	Estimated Parameters						
	Pooled sample	DAF	DAM	DAS	DME	ETC	OECD
Log POP	1.276 (6.38)	2.110 (1.79)	0.500 (1.60)	-0.441 (-0.31)	4.929 (2.83)	-0.733 (-0.40)	3.946 (9.12)
Log GDPCAP	0.694 (7.98)	0.216 (0.75)	0.522 (3.64)	0.897 (2.23)	2.562 (3.28)	-0.963 (-1.67)	0.834 (4.66)
Log HOTELCAP	0.100 (3.86)	0.408 (3.17)	0.116 (3.07)	0.252 (2.07)	-0.111 (-0.27)	0.114 (0.95)	0.036 (1.44)
Log FDIST	0.068 (4.51)	-0.072 (-1.02)	0.128 (3.38)	0.102 (0.96)	0.269 (2.02)	-0.081 (-1.37)	0.108 (4.84)
OPEN	0.003 (4.62)	0.012 (3.17)	0.006 (6.03)	-0.004 (2.13)	0.010 (1.79)	-0.004 (-0.65)	-0.000 (-0.23)
PPP	0.000 (1.50)	0.000 (0.82)	-0.000 (-0.70)	0.000 (1.16)	0.001 (0.70)	0.000 (0.08)	-0.001 (-3.03)
Country dummies	Yes (-)	Yes (-)	Yes (-)	Yes (+)	Yes (-)	Yes (+)	Yes (-)
Time dummies	Yes (?)	Yes (+)	Yes (+)	Yes (-)	Yes (+)	Yes (-)	Yes (+)
N	1129	221	369	128	32	71	308
-2RESLOGLI	312.6	204.1	-9.2	91.7	2.2	72.6	-130.5

Note: t-values are in parentheses, figures in bold denote statistical significance at least at 5% level. Dependent variable is log (Arrival).

price competitiveness of the individual destination is barely significant but has the sign one would expect in a normal competitive regime (better local purchasing power attracts tourists). Differences in competitive regimes across regions could in part explain the insignificance of the price variable as shown below with the regional results. The fixed or country specific effects that capture natural endowments are highly significant as hypothesized. Apart from being significant, the sign and size of the country specific effects are difficult to interpret. One should here mainly attach importance to the relative ranking of countries (not shown).

Results for the panel model are also checked by estimating the model by region to account for heterogeneity in the data caused by regional differences. The results are shown in [Table 4](#) under each region column header. Most of the explanatory factors are confirmed not to be stable across regions with the individual regional estimation results. The obtained log likelihood statistics confirm that regions are much more homogenous in terms of the present data.

With respect to the country specific effects, the regional results show that this is more a between- rather than within-region phenomena (except for the OECD countries and the Middle East). This result must be understood to mean that countries do compete for tourist arrivals on the basis of natural endowments, but that this competition is more inter-regional than intra-regional. Within-region advantageous natural endowments only matter among the OECD and the Middle East countries, meaning that some OECD countries rely extensively on the country specific factors, such as scenic attraction and cultural heritage, as a basis of comparative advantage to distinguish their tourism product, whereas other countries do not.

The income per capita (technology variable) is still significant for most regions (except Africa and Eastern Europe), meaning that created assets are a universal factor of competition among countries both on a within- and between-region basis. The hotel capacity (infrastructure variable) and the country's openness are significant in the regions of developing Africa, America, and Asia, but not for the other regions. FDI, which should capture the importance of international knowledge spillovers, is significant now only in the developing America and the OECD regions. Not surprisingly, the model performs, in general, best for the highly developed and mature market economies within the OECD, whereas it breaks down for the emerging market economies in Eastern Europe.

The region-specific results also reveal large differences with respect to price competition, which is now significant for the OECD countries but with the opposite sign. This result must be interpreted so that it is the more expensive and hence differentiated countries that attract tourists within this region. For the other regions, the sign for the PPP variable remains positive but is also still insignificant.

To sum up, it is found that most traditional aspects of comparative advantage (natural endowments, technology, and infrastructure) are relevant in a between-region context, except for price differences which are found to be less important in this study. Some aspects of

the supply-side model are mainly relevant in a between-region context (such as natural endowments), while some of the variables are also found to be highly relevant in a within-region context of competition (technology) and selectively in some cases for particular regions (infrastructure and institutions). The general level of development which is used as a proxy for technology in the present study is found to be the main universal factor behind explaining comparative advantage within tourism.

CONCLUSION

The research objective has been to demonstrate that international tourism flows can be related to the traditional theories that explain trade flows. In the existing literature, flows and demand forecasts are typically explained by the demand-side variables, while traditional trade theories explain international trade flows with reference to supply-side variables, the comparative advantage of the exporting countries. This paper stresses that tourism flows are also trade flows, but in the form of people traveling to get the goods and services from the destination countries. It investigated whether comparative advantage plays a role in determining the tourism flows.

A model is proposed in the paper to explain the factors that from a supply-side perspective can decide the comparative advantage of countries in a certain type of service activity in a modern and global economy. Given the availability of data for a panel of 133 countries and up to 15 years, it is possible to test the model using secondary empirical data combined from the World Bank and the WTO.

The results render strong support for the relevance of certain supply-side factors in explaining international tourism flows such as natural endowments, created assets associated with technology, infrastructure, and international knowledge spillovers. The price competitiveness of the tourism product (variable PPP) is the only variable for which robust results across countries in the fixed effect models is not obtained. The two-way fixed effect model is preferred to the pooled panel model, as it gives stable estimation results. At the same time it also proves that country fixed effects is highly relevant. Comparing the results for the whole sample and each region individually shows the large differences between regions; the differences within the regions for the same explanatory factors including the fixed effects appear to be only generally valid for the OECD and the Middle East countries.

For the world as a whole, it is found that differences in technology are the main explanatory factor behind comparative advantage in the industry. Only on a between-region basis and within the OECD area, it is found that country-specific factors matter in each country's battle for international tourism. Potentially this result should be seen in the context of the majority of tourists still emanating from the OECD countries; these can better appreciate the underlying cultural and heritage endowments of their own countries as compared to countries in more distant regions.

Among the countries in the less developed parts of the world, the study points to the importance of technology and investment in infrastructure. On a within-region basis and for those regions where a sufficiently large number of observations is available, this is found to be the case. It is also noteworthy that this result contrasts with that for the OECD countries, where investment in infrastructure was found to be less important to attracting tourists. This result may be interpreted that there is already excess capacity in the OECD countries, hence investing in additional infrastructure will not in itself help to attract more tourists.

With respect to the international knowledge spillover variable (FDI), the results suggest that this was only important in some regions, namely the developing parts of America and the OECD countries. Possibly the lack of results for the FDI variable owes to validity problems due to the fact that it is not available at the industry level and that other modes of production involving international spillovers are highly relevant in this industry.

Finally, study findings suggest that price differences across countries matter less than expected and in the same way as with the natural endowments—in the traditional sense of more competitive prices attracting more tourists—on a between-region basis. Within the OECD area prices play the reverse role. Higher prices attract more tourists, a result that can only be understood in relation to the extent to which these countries have been able to differentiate and augment the tourism product that they offer.

In a broader social science context, the study shows that being available as a destination for tourism is a necessary but not sufficient condition for building a prosperous industry. Hence there is little prospect for less developed countries relying on this business as a quickfix for economic prosperity. It is an industry like any other requiring sophisticated technological inputs and adequate social planning to be successful. The varying success with which many tropical islands have introduced tourism into their economic system is a vivid example thereof.

Finally, the study also raises broader questions of interest to researchers, such as the relative balance and management of factors internal and external to each country's ability to attract tourists. This study mainly concentrated on the internal aspects. Is this balance shifting in an increasingly globalized world? Is it true that the global value-added chains in tourism could pose a potential threat with respect to the sovereignty of countries in managing their tourism industries? Still, what role do other outside threats such as the rise in terrorism play in this picture? Could such external forces potentially render futile national efforts to build comparative advantage in tourism? **A**

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