

Tourism and Natural Resources

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Abstract

Tourism is a rapid growing phenomenon and has become one of the largest industries in the world. The impact of tourism is extremely varied. The introduction of tourism will imply an increased stress on resources available and the tourism industry is very resource- and land intensive. An influx of tourists into the area leads to a competition for resources. This competition is compounded by employees working at the tourist sites. Almost as a rule tourists are supplied at the expense of the local population. Following Leamer (1984), standard Heckscher-Ohlin-Vanek (HOV) equations incorporating measures of factor endowments are used to explain observed trade patterns. The advantage of focusing on trade patterns is that they can be analyzed through conventional theories of comparative advantage. To test whether natural sources distort patterns of tourism's trade, variables representing the natural sources are added to the HOV equations and the coefficients tested for significance. We examine the relationship between factor endowments, natural sources and tourism's net exports by Heckscher-Ohlin-Vanek (HOV) model in the 15 European countries. The results indicate the travel & tourism sector employment and energy use have negative effects, but arable land, forest area and fixed investment expenditure have positive effect on tourism's trade. The renewable internal freshwater resources flows' region is non significant in attracting tourists.

Key Words: Tourism; Natural Resources; Factor endowments; Heckscher-Ohlin-Vanek (HOV); OECD countries.

1- Introduction

The linkage between tourism development and natural sources is well documented. Tourist activities imply an intensified utilisation of vulnerable

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habitats. Investors and tourists do not necessarily possess awareness on how to use natural resources sustainably, and subsequently this utilisation often leads to a degradation of resources. Tourism is also a major generator of wastes. In most tourist regions in developing countries, sewage, waste water and solid waste disposal are not properly managed or planned. Lastly, tourism is also responsible for a considerable proportion of increased volumes and mileage in global transport and hence the associated environmentally damaging pollutant emissions. The tourism industry has not shown sufficient willingness to (internalise or) compensate the cost of conservation of biodiversity by for instance protected areas, even though they profit from it.

In general, the tourism industry should engage in promoting sustainability as a hall-mark for investors. More specifically, the investors in tourism should strive to adopt environmentally sound technologies or other measures to minimise the consumption of the local ground water. In the case of water utilization such measures might be water-saving equipment, desalination systems and collecting and utilising rain water. Using other types of resources in a sustainable manner is of course also crucial. There is a need to use ecological materials and installation of renewable sources of energy systems (solar energy) in all new buildings and new construction. Furthermore there should be an acceleration of installation of solar/wind power in all public work projects of communities where tourism will be introduced. To prevent or minimise the impact of chemical inputs in soil, water and health, one should start utilizing sound ecological methods, including IPM (Integrated Pest Management). Ecological methods need to be applied in all areas utilised for tourism, including in the maintenance of golf courses, gardens and recreational facilities.

To avoid degradation of the natural environment, tourism projects can help finance protected areas and safeguard ecologically sensitive regions against further environmental deterioration. By empowering local populations and have them participating in the entire process, sustainability will be ensured as it becomes accepted by and adjusted to the local communities. A protected area might certainly also be a suitable tourist-attraction, where tourists can experience amazing nature and learn about conservation and traditional uses of natural resources in the area.

Investors in tourism should always respect the traditional land tenure system in the area and the traditional user-right systems of resources. In regard to this the communication and consultation with the local communities about resource-use is important. Tourism investors should not exclude local people from using local resources, and thus take away what they depend on for maintaining their well-being.

Trade economists regularly build models in which the number of goods exceeds, equals, or is less than the number of factors. These seemingly innocuous variations in model structure have profound implications regarding the ability of general equilibrium models to explain production patterns. In models where the number of goods exceeds the number of factors, output and hence trade flows can no longer be determined solely on the basis of a country's factor endowments. Indeed, it is precisely because of this potential indeterminacy of trade and production that many tests of the factor abundance theory have focused on the Heckscher–Ohlin– Vanek (HOV) model (e.g. Bowen et al., 1987; Trefler, 1993, 1995). This formulation posits a relationship between factor endowments and the factor services that are embodied in industries trade. According to the HOV model, countries will export the services of relatively abundant factors and import the services of relatively scarce factors.

Though the HOV model generates precise predictions of trade in factor services, more often economists are interested in using factor endowments to estimate trade flows or outputs. This task often involves an appeal to the existence of what we call the 'factor-endowments-driven' (FED) model of production, which provides the foundation for a common, one-to-one mapping of factor endowments into outputs.

The purpose of this study is to examine the role of natural resources on tourism's net export by HOV model in the 15 European countries. In the next section of the article, additional background on the literature dealing with the relation of tourism and natural resources is discussed. The theoretical basis for the approach used in this study is presented in the third part of the article which also includes a description of the data and estimated HOV equations. The final section of the article is a conclusion in which the policy implications of the results are discussed.

2- Tourism Impacts

Different groups are often concerned about different tourism impacts. To generalize, where one group embraces the economic impacts of tourism, another group experiences social and cultural impact, while another is affected by tourism's environmental impacts. In theory, the interests of each group could be completely separate. For example, Group of economic impacts could include the business community and people who are in need of the jobs offered by tourism. Group of social and cultural impact might include residents who feel displaced by an influx of visitors. Group of environmental impacts could be local outdoor enthusiasts concerned about changes in natural resources. In such a case, each group would have completely different outlooks on tourism. Ideally, all groups could be positively affected and would support the community's tourism efforts. However, when group interests are divergent, differing perspectives can make consensus on tourism development difficult.

In most cases, groups with interests in one area of tourism will also have interests or concerns about other tourism impacts. In these situations, there are common areas of interest and a greater likelihood that each group will show more appreciation for the concerns of the other groups. Finding commonality provides a starting point for resolving tourism issues.

2-1- Economic Impacts

Tourism increases employment opportunities. Additional jobs, ranging from low-wage entry-level to high-paying professional positions in management and technical fields, generate income and raise standards of living. Particularly in rural areas, the diversification created by tourism helps communities that are possibly dependent on only one industry. As tourism grows, additional opportunities are created for investment, development, and infrastructure spending. When considering the economic impacts of tourism, it is essential to understand that tourism businesses often include a significant number of low-paying jobs, often at minimum wage or less. These jobs are often seasonal, causing under-employment or unemployment during off-seasons. Labor may be imported, rather than hired locally, especially if particular skills or expertise is required, or if local labor is unavailable. Some tourism-related businesses are volatile and high-risk

ventures that are unsustainable. Greater demand for goods, services, land, and housing may increase prices that in turn will increase the cost of living.

2-2- Impacts on Water Consumption Intensity

Water is critical, a precious resource, and its enormous importance must be considered when planning any activity or installation. The tourism industry also impacts the environment in the areas of solid waste generation, physical damage to corals from divers and from boat anchors, as well as sand compaction from the heavy usage of beaches by tourists and vehicles. Building tourism facilities in ecologically sensitive areas (land use planning) is also a concern as is the usage of potable water. In fact tourists use significantly more water than residents.

Tourism increases water supply concerns by concentrating water demand in short periods, particularly in dry, sunny holiday destinations where water resources are often relatively scarce. This situation has increased the pressure on conventional resources and results in over-exploitative practices. Furthermore, water infrastructure necessary to supply this very high seasonal demand (reservoirs, water transfer schemes) remains "oversized" during the rest of the year.

2-3- Impacts on Energy Use Intensity

The tourism industry consumes considerable amounts of energy and potable water. It should be recalled that the production and distribution of electricity use up resources (fuels, water...), generate waste and polluting substances (combustion gases, radioactive waste...) and produce other important impacts (loss of fertile soil, deterioration of habitats, nuisance to animals, erosion, deterioration of landscape, etc).

We should also bear in mind that energy production is one of the main contributors to climate change, which in turn is one of the main environmental problems faced by humanity and can have a very serious impact on tourism (floods in beach zones, storm damage to tourism infrastructures, etc). Saving on energy will therefore not only be beneficial to our pockets but will also reduce the extent of the impacts on all the previous links in the energy production and distribution chain.

2-4- Impacts on Land and Landscape Usage Intensity

There is no doubt that the most obvious impacts of tourism are related to the transformation and occupation of the land. We have already referred above to the unbridled urban development caused by tourism in coastal areas, as well as the deforestation and habitat fragmentation resulting from mountain tourism.

The destructive occupation and massive changes in land use that come with tourism represent a direct attack on the natural environment, given the transformation and destruction of the habitats of wildlife in the area and the deterioration of the landscape.

Urban development of areas close to the sea has led to the virtual destruction of coastal ecosystems along much of the coast, while certain actions in mountain areas are endangering the viability of fragile alpine ecosystems.

Local and regional authorities and technical experts should draw up land use strategies that help protect the integrity of the landscape, as well as ecosystems and the natural and cultural processes that manifest themselves through the landscape. Destinations should estimate their carrying capacity and act accordingly to adopt the necessary measures to ensure the tourism offer does not exceed this capacity.

It is not hard to understand that the landscape is a key resource for marketing a tourism destination and attracting visitors. It is what the tourist perceives most directly and is a fundamental factor in the choice of destination. Deterioration of the landscape results in a serious loss of quality in tourism. We all prefer typical homes to concrete blocks, the shade afforded by trees to that of uralite roofs, wooded hillsides to litter-strewn roadsides... Destinations are therefore marketed as 'pristine beaches' or 'unrivalled surroundings'. Paradoxically, although tourism depends on the existence of a quality environment and surroundings, tourism itself is the cause of the deterioration.

The best way to use land and landscape in a manner that respects the environment is to take into account, from the design stage of installations onwards, the environmental aspects of the location, spatial distribution and architecture. Many tourism activities take place in installations that have already been built and design improvements are therefore difficult. However,

reforms or additional installations are always a possibility, in which case environmental guidelines can be followed.

3- Introduce of Heckscher-Ohlin-Vanek (HOV) Model and Our Model

Modern trade theory explains comparative advantage in terms of differing national characteristics. In particular, a country is thought to have a comparative advantage in goods produced with a technology that makes intensive use of that country's abundant resources. A country's abundant resources will be relatively less costly so industries that depend on the use of these cheap resources should have a cost advantage relative to the same industries in countries where the critical resource is scarce and expensive.

Thus, according to this account, industries making intensive use of a country's abundant factors will expand as trade is opened while those based on the scarcer and more expensive factors will decline. The products of the expanding industry will be exchanged for goods formerly produced by the relatively less efficient domestic industries allowing consumers to attain a higher level of utility than was possible in autarky. This is the essence of the Heckscher-Ohlin theory of international trade.

The Heckscher-Ohlin model is based on a number of assumptions that are violated in the real world. For example, it is assumed that there is one common technology used by all countries to produce particular goods. Thus, if textile production is a labor-intensive industry, it is labor-intensive in all countries and at all levels of production. Other assumptions upon which the model is based include perfect competition, constant returns to scale, and the absence of externalities and public goods, among others.

Despite the conceptual problems with the assumptions on which the Heckscher-Ohlin model is based, differences in resource endowments seem to explain trade patterns surprisingly well. For this study, we extend the HOV equations to include variables that are thought to influence trade flows along with variables designed to measure factor endowments. This procedure allows a direct test of assertions that regulatory and policy variables can offset the influence of resource endowments to distort the trade patterns that would prevail in a world without government interference.

Following Leamer (1984), who also uses the HOV model, this paper does not incorporate such economies into the model because the model explains

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net trade, i.e. exports minus imports, instead of exports and imports separately.¹

The equation estimated is specified as:

$$N_{it} = A_{0i} + b_{1it}V_{1it} + b_{2it}V_{2it} + \dots + b_{nit}V_{nit} + c_{1it}E_{1it} + c_{2it}E_{2it} + \dots + c_{mit}E_{mit} + \varepsilon_{it} \quad (1)$$

where N_{it} is travel & tourism foreign net exports of country i , A_{0i} is a constant, V_{jit} are national endowments of various resources, E_{jit} is a measure vector of the natural resources, ε_{it} is the error term and the b_{ji} ($j = 1 \dots n$) and c_{ri} ($r = 1 \dots m$) are coefficients to be estimated. The hypothesis that natural sources affect tourism's trade patterns is tested with a t-test for the significance of the coefficient for the natural sources variable.

Thus, International tourism receipts represent **travel & tourism services exports** and international tourism expenditures represent **travel & tourism services imports**.

World Bank data defines international tourism receipts are expenditures by international inbound visitors, including payments to national carriers for international transport. These receipts include any other prepayment made for goods or services received in the destination country. They also may include receipts from same-day visitors, except when these are important enough to justify separate classification. For some countries they do not include receipts for passenger transport items.

International tourism expenditures are expenditures of international outbound visitors in other countries, including payments to foreign carriers for international transport. These expenditures may include those by residents traveling abroad as same-day visitors, except in cases where these are important enough to justify separate classification. For some countries they do not include expenditures for passenger transport items.

To estimate equation (1), we need measures of the factor endowments in different countries. I use **travel & tourism sector employment** that covers

1- According to Leamer (1984), "The apology is that the level of aggregation and the use of net exports rather than exports and imports separately reduce the possibility that scale effects are important".

the jobs generated by Travel & Tourism sector to represent national labor endowments.

Travel & tourism economy capital investment includes fixed investment expenditure by Travel & Tourism service providers and government agencies to provide facilities, capital equipment and infrastructure for visitors.

I include four variables to represent natural resource endowments (energy, land, forest and water). Because tourism in countries need to highly energy intensive, it was decided for this study that some measure of a country's energy endowment would be appropriate. **Energy use** (oil equivalent) in kilograms, as reported by the World Bank, was used to represent this resource. According to the World Bank, this measure refers to petroleum-based energy sources, solid fuels such as coal, and energy from other sources such as nuclear or hydroelectric generation.

Arable land (hectares per person) includes land defined by the FAO as land under temporary crops (double-cropped areas are counted once), temporary meadows for mowing or for pasture, land under market or kitchen gardens, and land temporarily fallow. Land abandoned as a result of shifting cultivation is excluded.

Forest area, defined by the World Bank, is land under natural or planted stands of trees of at least 5 meters in situ, whether productive or not, and excludes tree stands in agricultural production systems (for example, in fruit plantations and agroforestry systems) and trees in urban parks and gardens.

Finally, a measure of the natural resources is needed to complete the model as **renewable internal freshwater resources flows** that refer to internal renewable resources (internal river flows and groundwater from rainfall) in the country.

3-1- Data Sources

The time period covered in the estimations is 1990-2010 across the 15 countries of European Union (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom). Data are obtained from the World Bank's 2011 World Development Indicators' (WDI's) on-line WDI 2011 (<http://publications.worldbank.org/wdi>).

3-2- The Estimation and Results

Panel data analyses offer different ways to deal with the possibility of country-specific variables. I estimate the equation (1) using fixed and/or random effects of 1990-2010 panel data and stata 10 for tourism's net exports for the 15 countries of European Union.

Lagrange-multiplier test for random effects developed by Breusch and Pagan (1980) and as modified by Baltagi and Li (1990). The Breusch-Pagan Lagrange Multiplier test for heteroskedasticity is supposedly able to detect heteroskedasticity which is an arbitrary function of some set of regressors. The null hypothesis of the one-way random group effect model is that variances of groups are zero. If the null hypothesis is not rejected, the pooled regression model is appropriate. The evidence ($P < 0.05$) rejects the null hypothesis.

Fixed effects regression is the model to use when we want to control for omitted variables that differ between cases but are constant over time. But, random effects be used when some omitted variables may be constant over time but vary between cases, and others may be fixed between cases but vary over time. Estimating multiple regressions on panel data is often complicated by heteroskedasticity and serial correlation, and an OLS estimator produces biased, inaccurate estimates of parameters.

First, I test the stationarity of variables in the model. Therefore, I make the unit root test of Levin, Lin & Chu and Im, Pesaran & Shin W-stat to test for it. The results show that all variables are stationarity at level in region (Table 1).

Next, I employ different panel data procedures to avoid estimation problems, namely, autocorrelation and heteroskedasticity. Heteroskedasticity and autocorrelation arises from different countries characteristics.

When heteroskedasticity is present the standard errors of the estimates will be biased and we should compute robust standard errors correcting for the possible presence of heteroskedasticity.

As the error process is homoskedastic within crosssectional units, but its variance differs across units we have so called groupwise heteroskedasticity.

I use a modified Wald statistic for groupwise heteroskedasticity in the residuals of a fixed effect regression model. The results ($P < 0.05$) indicate that we must reject the null hypothesis of homoskedasticity.

Because serial correlation in linear panel-data models biases the standard errors and causes the results to be less efficient, researchers need to identify serial correlation in the idiosyncratic error term in a panel-data model. While a number of tests for serial correlation in panel-data models have been proposed, a new test discussed by Wooldridge (2002) is very attractive because it requires relatively few assumptions and is easy to implement (Drukker, 2003). Wooldridge's method uses the residuals from a regression in first-differences. The results ($P < 0.05$) reject the null of no first order serial correlation in the model. The different tests show that we have autocorrelation and heteroskedasticity in the region (Tables 2).

Because both heteroscedasticity and autocorrelation are present in the data, a three-step feasible generalized least squares (FGLS) approach is required. In order account for heteroscedasticity across panels and autocorrelation, I rely on an iterated FGLS estimator

According to Hsiao (1991) the choice of treating effects as fixed and random is a difficult one. In fact, there is a trade-off between efficiency and consistency in the random and fixed effects models, and this trade-off provides an empirical basis on which to make the decision between them. The Hausman (1978) provides a method to test whether the bias from the random effects model exceeds the gain in efficiency.

So, I run a Hausman test to decide whether we have a random-effects model or a fixed-effects one. The probability is 0.000, less than 0.05, so we reject the null hypothesis that individual effect are random and so, fixed effects provides consistent estimates.

Table 1: Variables Stationary Tests in the 15 EU Countries

Variables	Levin, Lin & Chu- Test		Im, Pesaran and Shin W-stat -Test	
	Statistic	Prob	Statistic	Prob
Employment _{it}	-4.72885	0.0000	-5.46511	0.0000
Capital investment _{it}	-5.22293	0.0000	-3.69638	0.0001
Energy use _{it}	2.1906	0.0000	5.4583	0.0000
Arable land _{it}	2.0782	0.0000	4.5599	0.0000
Forest area _{it}	-5.22095	0.0000	-4.16839	0.0000
Freshwater resources flows _{it}	-3.77125	0.0001	-3.45786	0.0003

Source: Author's finding

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The all coefficients of the variables except renewable internal freshwater resources flows are significantly. The negative coefficient of travel & tourism sector employment indicates the jobs generated by Travel & Tourism sector wasn't efficient in attracting tourists' region. But fixed investment expenditure by travel & tourism service providers and government agencies is important factor to entry financial resources by tourism to this region.

Table 2: The Determinants of the Tourism's Net Exports in the 15 EU Countries

Variables	Fixed Effects ⁽¹⁾	Random Effect
C	4.89e+09*** (1.80)	6.17e+09 (0.96)
Employment _{it}	-6445.593* (-8.93)	-9765.967* (-3.23)
Capital investment _{it}	31.47738** (2.46)	45.04196 (0.77)
Energy use _{it}	-205411.3* (-10.22)	-153451.4** (-3.04)
Arable land _{it}	949.2665** (2.93)	4117.777* (4.49)
Forest area _{it}	26394.8* (4.68)	-12314.7 (-1.29)
Freshwater resources flows _{it}	5.01e+07 (0.45)	4.80e+07 (0.61)
R ²		0.3983
Groups	15	15
Number of observation	156	156
Wald Test	562.65	41.52
Prob > chi2	0.0000	0.0000
Breusch and Pagan LM test		258.79
Prob > chi2		0.0000
Modified Wald Test for heteroskedasticity ⁽³⁾	5.0e+05	
Prob > chi2	0.0000	
Hausman Test ⁽²⁾		$\chi^2(3) = 26.47$
Prob > chi2		0.0000
Wooldridge test for autocorrelation in panel data		28.981
Prob > F		0.0001

Note: T-statistics are shown in parentheses. Significance at the 99%, 95% and 90% confidence levels are indicated by *, ** and ***, respectively.

The robust standard errors are White's heteroskedasticity-corrected standard errors

(1) The acceptance of model by the Hausman test.

(2) The hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the

consistent fixed effects estimator. If they are (insignificant P-value, Prob> chi2 larger than .05) then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

(3) For FE regression model, the modified Wald test for groupwise heteroskedasticity is used while the Woolridge test for autocorrelation in panel data (Ho: no autocorrelation) is applied.

The coefficient of energy use variable is negative and significant. This means the growth of energy use leads to environmental pollution increase and so, tourism attractive decrease in region.

The coefficients of arable land and forest area are positive and significant. Despite, the deforestation and urban development, technical improve in land use strategies has helped to protect the integrity of the landscape and increase in the attraction of tourists and expenditures of international inbound visitors.

The arable land, forest area and parks can facilitate tourism (e.g., festivals and events, nature-based tourism, historical and cultural interpretation, and sports), which can have a significant impact on the state's economy.

These natural resources can promote tourism's region by:

- 1- Hosting special events and festivals at park sites to attract tourists.
- 2- Using park sites for sports tournaments, this may lead to major sources of tourism and economic benefits.
- 3- Attracting tourists to large forest area and urban parks that have memorials, museums, zoos, cultural and heritage artifacts, and historical sites.
- 4- Attracting tourists to arable land with landscape planting and design that are recognized as living works of art.

Conclusions

In this paper the Heckscher-Ohlin-Vanek (HOV) model is tested in an empirical analysis of tourism's trade performance. The explanatory power of both country-specific and sector-specific determinants of tourism's trade performance is considered in the HOV model. Leamer and Bowen (1981) have proved that the net trade of sectors is dependent on country-specific factor endowments rather than on sector-specific factor inputs.

Tourism sector remains a critical economic sector worldwide and one that provides significant potential for economic growth and development internationally. A growing national travel & tourism sector contributes to employment, raises national income, and can improve a country's balance of payments. In this paper, I investigated the role of natural resources in tourism's net exports in the 15 European Union countries. The indexes of the expenditures of international inbound visitors and outbound visitors have been used as travel & tourism services exports and imports. The natural resources variables as energy use, arable land, forest area and renewable internal freshwater resources flows are important in attracting tourists.

I examined the role of these natural resources as energy, arable land, forest area and renewable internal freshwater resources flows in tourism's net exports. The results indicate that arable land and forest area have positive and significant effects, but energy use variable has negative effect. I didn't find any relation between renewable internal freshwater resources flows and tourism's net exports in this region.

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