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A. Nedelea – Ph. D. Stefan cel Mare University, Suceava, Romania;**L. Elmazi** – Ph. D. Marketing and Tourism Department, Faculty of Economics, University of Tirana, Albania;**O. Totska** – Senior teacher, Chair of finance of the enterprises and credit, Volyn National University named after Lesya Ukrainka, Ukraine

Understanding the Economic Impact of Tourism – a Comparative Analyses

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In the article the authors examine economic benefits and costs, related to tourism; direct, indirect and induced effects of tourism; specify on expedience of isolation of tourism as a distinct sector in systems of national accounts .

Key words: benefits, costs, tourism.

Неделя А., Елмази Л., Тоцька О. Розуміння економічного впливу туризму – порівняльний аналіз.

Розглянуто економічні вигоди та затрати, пов'язані з туризмом, прямі, опосередковані та вимушені ефекти туризму; вказано на доцільність виокремлення туризму як сектору в системах національних рахунків.

Ключові слова: вигоди, затрати, туризм.

Неделя А., Элмази Л., Тощкая О. Л. Понимание экономического влияния туризма – сравнительный анализ. В статье рассмотрены экономические выгоды и затраты, связанные с туризмом; прямые, посредственные и вынужденные эффекты туризма; указано на целесообразность выделения туризма как сектора в системах национальных счетов.

Ключевые слова: выгоды, затраты, туризм.

Abstract. The combined effects of major expenditures on investments in infrastructure and the associated influx of visitors mean that tourism can have significant impacts, both positive and negative, on an economy, on its culture, and on the environment. In practice, the dominant motive for the development of tourism is economic (improvements in employment, incomes and exports), but the very process of developing tourism will impose costs elsewhere.

While recognizing the variety of different impacts that tourism may have, this discussion will focus particular attention on the economic impact of tourism. Economic benefits are probably the main reason why so many countries are interested in the development of tourism and the contribution of tourism to the world economy is considerable.

The purpose of this paper is to examine the main economic costs and benefits associated with tourism and to highlight the difficulties associated with their measurement.

Having highlighted the potential economic contribution of tourism, we will then examine the role played by tourism satellite accounts in providing a consistent and reliable source of information on the economic dimensions of tourism.

Finally, the use of economic impact modelling techniques will be introduced to present an integrated framework for the evaluation of the economic impact of tourism.

The Economic Benefits of Tourism. Before discussing the various economic benefits of tourism in detail, it is perhaps appropriate to clarify the current position of tourism in the world economy. Arguably, tourism is the second largest industry in the world; estimates from the World Travel and Tourism Council (WTTC) suggest that it generates around 200 million jobs world-wide and accounts for 10 % of global GDP [7]. Although there may be debates about the precise scale of tourism's impact on the world economy, few would argue with the view that it does make a major contribution. The scale of that contribution will vary considerably across countries partly because the extent of domestic tourism will vary and partly because the numbers and spending of international visitors will also vary. Relatively speaking, the impact of international visitors is probably greater than the impact of domestic tourists, although the importance of the latter should not be underestimated and for many large countries (e.g. US, Brazil, India), domestic tourism is

often of far greater economic significance than international tourism. Some indication of the scale and variation in international tourist arrivals and spending is given in tables 1 and 2. In particular, Europe attracts almost half of the revenue generated by international tourism and France in particular attracts the largest number of visitors of any single country worldwide.

Table 1

International Tourism Receipts (US \$ billion)

	2000	2001
World	477,0	463,6
Africa	10,8	11,7
Americas	132,8	122,5
East Asia / Pacific	82,0	82,2
Europe	234,5	230,4
Middle East	12,2	11,8
South Asia	4,7	5,0

Source: World Tourist Organization (WTO)

Table 2

International Tourist Arrivals (million)

№	Rank	2001	Market share 2001
1	France	76,5	11,0
2	Spain	49,5	7,1
3	United States	45,5	6,6
4	Italy	39,1	5,6
5	China	33,2	4,8
6	United Kingdom	22,8	3,3
7	Russian Federation	–	–
8	Mexico	19,8	2,9
9	Canada	19,7	2,8
10	Austria	18,2	2,6
11	Germany	17,9	2,6
12	Hungary	15,3	2,2
13	Poland	15,0	2,2
14	Hong Kong (China)	13,7	2,0
15	Greece	–	–

Source: World Tourist Organization (WTO)

The Americas are the second most important region in terms of receipts from international tourism and as table 3 shows, this region is dominated by the US, Canada and Mexico, who between them account for 71 % of total international arrivals and 76 % of total international receipts.

Table 3

Tourist Arrivals and Receipts for the Americas

	International Tourist Arrivals				International Tourism Receipts			
	(1000)		Growth Rate (%)		(US \$ Million)		Growth Rate (%)	
	2000	2001	00/99	01*/00	2000	2001	00/99	01*/00
Americas	128,497	120,840	5,0	-6,0	132,77	122,487	8,8	-7,7
United States	50,945	45,490	5,0	-10,7	82,042	72,295	9,8	-11,9
Mexico	20,641	19,811	8,4	-4,0	8,295	8,401	14,8	1,3
Canada	19,663	19,697	1,5	0,2	10,704	10,774	5,2	0,7
Brazil	5,313	4,773	4,0	-10,2	4,228	3,701	5,9	-12,5
Puerto Rico	3,341	3,551	10,5	6,3	2,388	2,728	11,6	14,2
Dominican Rep.	2,973	2,778	12,1	-6,6	2,860	2,689	15,2	-6,0

Argentina	2,909	2,629	0,4	-9,6	2,817	2,534	0,1	-10,0
Uruguay	1,968	1,892	-5,1	-3,9	652	561	-0,2	-14,0

Source: World Tourism Organization (WTO)

As well as being a major source of revenue for countries worldwide, tourism is also an industry where long-term growth prospects are good; indeed, over the past decade, the growth in tourism receipts has exceeded the growth rates observed in most other service sectors.

Looking to the future, the World Tourism Organization (WTO) forecasts an annual growth rate of 4,1 % in international tourist arrivals up to 2020 [6]. Of course, tourism is subject to short-term shocks and fluctuations in demand as recent experience in the aftermath of terrorist attacks, SARS and war in Iraq has shown. For example, as a consequence of the terrorist's attacks of September 11-th, international tourist arrivals in the United States were down by almost 11 % for 2001 compared with 2000. Similarly, the presence of foot and mouth disease in the UK resulted in a fall of almost 10 % for the same period. However, over the longer term, as incomes continue to rise, there will be a growing demand for leisure.

As travel becomes easier and quicker, our natural curiosity and desire for new experiences will increasingly be realized through the expansion of both domestic and international tourism. The challenge for the tourism sector is not so much about achieving growth as about managing that growth in such a way as to reap maximum benefits without significantly negative impacts on the natural, cultural and social environments. Having established the general economic significance of tourism, let us move on to consider in more detail, its economic benefits and in particular the ways in which individual countries may gain from tourism. Economic costs and benefits may arise from both initial investments to develop tourism and from regular expenditure by tourists visiting a particular location. Assessing the impact of major investment projects would normally rely on conventional cost-benefit analysis, whereas assessing the impact of a regular and diverse stream of tourist expenditure requires a rather different approach [2]. The focus of the current discussion will be on the impact of continuing tourist expenditure on key economic aggregates such as income, and employment. In considering the aggregate impact of tourism expenditure, we assume that spare capacity exists in an economy – i.e. that the economy has the capacity to expand employment and output in response to demand from tourists. However, if this spare capacity is absent, tourist expenditure will result in increased prices rather than increases in income and employment.

The impacts of tourism expenditure are generally considered under three headings:

- direct effects,
- indirect effects,
- induced effects.

The direct effects of tourism arise from expenditure by tourists, which immediately generates income for businesses and households, employment and revenue from taxation. Indirect effects arise as initial income received by households, government and local businesses is re-spent on activities necessary to provide the products and services purchased by tourists. This is sometimes referred to as 'upstream' expenditure'. In addition, some of the income received by governments, households and businesses will be re-spent 'downstream' i.e. on consumption goods and services unrelated to the supply of tourism products. At each stage, some tourism expenditure is lost because it is used to purchase imported goods and services and some induced expenditure may be lost through savings. These losses from the system are generally referred to as leakages. A simplified version of what happens to initial tourism expenditure is shown in fig. 1.

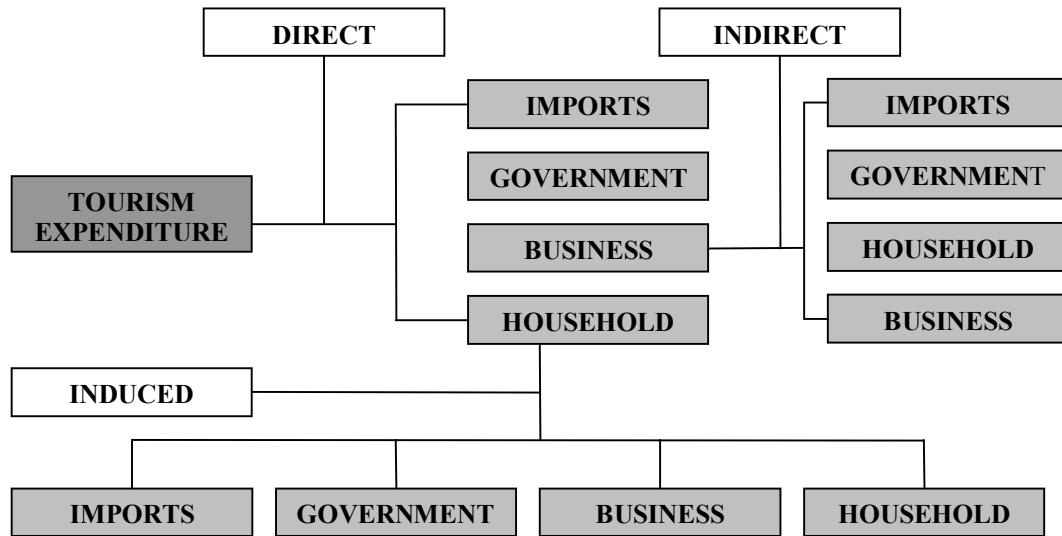


Fig. 1. The Effects of Tourism Expenditure

If we consider fig. 1, then initial tourism expenditure has a direct effect in the form of income to businesses for goods and services bought by tourists, wages to households in connection with tourism related employment and income to the government through tourism related taxation and fees. Where tourists spend their income on imported goods (often food and drink but possibly also furnishings in hotels, salaries for overseas workers etc), that expenditure is lost to the system (leakages via imports). Governments, households and most notably business, must then make purchases in order to provide tourism related goods and services. This is most apparent in the case of businesses that must purchase a range of different inputs to create the goods and services purchased by tourists. This indirect expenditure provides further income to other businesses, to households and to government (as well as further losses via imports); they in turn will re-spend the income received in order to buy necessary inputs and will provide income to other businesses, households and governments.

Thus the effect of the initial expenditure is multiplied throughout the economy. In addition, of course, it is important to remember that not all the initial expenditure is spent on the purchase of tourism-related inputs. Households, governments and businesses will also spend some income on their own consumption, and this additional consumption expenditure is effectively being induced by the additional income received from tourism. This consumption expenditure in turn provides a source of income for other households, for government and for business. As with other types of expenditure, there is a risk of leakages via spending on imports.

Clearly then the initial expenditure by tourism can have significant additional effects throughout the rest of the economy, resulting in increased income and expenditure by a range of different groups, many of whom are not directly connected with tourism. This process of spending and re-spending is commonly described as the multiplier effect. The term ‘multiplier’ is used to describe the final change in output in an economy relative to the initial change in tourist expenditure and is central to any measure of the economic impact of tourism. The true impact of tourism is not the actual expenditure by tourists, it is the final impact that this expenditure has on the economy. Different multiplier values can be calculated depending on the outcome, which is of interest. For example, output multipliers measure the impact of tourism expenditure on the output of an economy; income multipliers measure the impact on income and employment multipliers measure the impact on employment. Although the estimation of multipliers can be problematic (see for example Sinclair and Stabler, 1998), values have been calculated for a range of countries and regions and an indication of the range of possible multiplier values is shown in table 4.

Table 4

Selected Multiplier Values

Country/region	Income Multiplier	Output Multiplier
Turkey	–	2,34-3,20

Edinburgh, Scotland	0,35	1,51
Barbados	0,60	1,41
UK	1,73	–
Dominican Republic	1,20	–
Philippines	0,82	–

Source: [2]

As well as these specific impacts on income and expenditure, there are other more general economic benefits commonly associated with tourism. Many commentators point to the important role tourism can play in stimulating economic growth (see for example Eadington and Redman, 1991; Sinclair and Stabler, 1998) and tourism may be of particular significance to countries that do not have major supplies of natural resources. For example, in countries such as Jordan, Ireland, the Caribbean, and perhaps to a lesser extent Egypt, income from tourism has contributed significantly to economic development. Many would make a similar argument for the case of Spain, (although the shortage of natural resources is perhaps less apparent) and for countries such as Cambodia, tourism may be a major source of revenue for future economic growth. Of particular significance is the fact that tourism is a major source of foreign exchange, and thus provides the basis for export lead economic growth. It is also worth noting that the development of tourism may reduce a country's dependence on primary commodities as a source of export earnings. Over-dependence on a single source of income is always likely to create risks, but these are probably particularly apparent in relation to primary commodities where prices can display high levels of volatility year-on-year and where agricultural support policies operated in many developed economies have artificially depressed world market prices (Brown, 1998).

As well as having a positive impact on economic growth and development overall, tourism can also have a positive impact on regional development, and may help to even out some of the inequalities between different parts of a given country. Regions, which do not have access to other major resources or do not have major urban centers, may be able to use tourism to improve regional incomes and reduce out-migration. Skiing, various forms of rural tourism, some forms of eco-tourism and of course, sun, sand and sea tourism have all been used to promote the development of peripheral regions in both developed and developing countries (e.g. Pearce, 1995; [4]). In developed economies, tourism also has the potential to stimulate economic regeneration, as the experience of cities such as Manchester in the UK and Bilbao in Spain shows.

Finally it has been suggested that tourism may also encourage entrepreneurship and the development of new small businesses, particularly among groups who might not have easy access to formal labour markets. Special interest tourism, because of its relatively early stage of development is thought to be particularly conducive to entrepreneurial activity (Douglas, Douglas and Derret, 2001). Such entrepreneurial activity can range from specialized tour and guiding services to new types of attraction to the provision of local handicrafts.

The Economic Costs of Tourism. Alongside these economic benefits, we must also recognize that there are potentially some significant costs associated with tourism development. At the most basic level, if resources are being used for the development of tourism they cannot be used in other sectors of the economy; if labour is employed in tourism, it is not available for use by other sectors of the economy and if capital is invested in tourism, it cannot be invested in other projects. Consequently, there is a danger that tourism may 'crowd-out' development in other sectors. In practice, of course, this is only likely to be a major issue if an economy is at full employment and there are no unused resources available. Perhaps of more immediate concern would be that fact that resources particularly labour used in tourism are not used most efficiently because levels of productivity growth tend to be rather low. Indeed the general tendency of tourism to create primarily low skill, part-time, seasonal jobs is often cited as a negative dimension in relation to the sector's capacity to generate employment (Townsend, 1997).

Even if tourism development does not crowd-out the development of other sectors, it does still impose some significant and direct financial costs on governments. These costs include the costs of advertising and marketing the country as a destination and the establishment and operation of national tourism organizations as well as the costs associated with developing and maintaining relevant infrastructure. Additional costs may be incurred in instances where governments need to provide subsidies and other incentives to attract private

sector investment [5]. Over time, of course, the costs of developing and subsidizing tourism may be offset by additional government income in the form of taxation on tourism related activities, not to mention other economic benefits to the economy, but the initial, upfront costs often remain highly visible.

There are other short-term economic costs that may result from tourism. If tourism development is heavily reliant on imported goods and services, there is a risk that existing local production may be displaced or its development inhibited. This effect can be particularly significant if 'demonstration effects' result in the local population, copying tourists and increasing their consumption of imported goods and services rather than domestically produced ones.

Revenues from tourism are also potentially quite variable. Part of this variability is simply a reflection of seasonal patterns in demand, which, although predictable, can create inefficiencies in terms of the utilization of resources. More problematic, perhaps are the unpredictable reductions in tourist arrivals and expenditure, which arise as a consequence of unanticipated events – terrorist actions are perhaps the most obvious example, but extreme weather conditions can also have similar effects, as can natural disasters. Where economies are heavily dependent on tourism, sudden drops in demand can have significant negative impacts on income and employment as the recent experience of destinations such as Egypt, Kenya, Jordan and Bali has shown. (see [3] for a more detailed discussion of the impacts of terrorism on tourism decisions).

Although sudden falls in tourism arrivals may be problematic, the same is true of sudden increases. High levels of tourist arrivals may also cause problems. Large numbers of tourists may overload local infrastructure placing pressure on water, electricity, sewage provision, and on transport links. Such infrastructure problems may be particularly acute in developing countries and may add to tourism development costs because of the need for additional investment. There is little doubt that many communities have suffered because of the influx of large numbers of tourists, but equally there are many examples of communities where local residents have benefited from access to improved infrastructure, which was initially put in place to support tourism.

Finally it is often argued that many of the economic benefits of tourism are lost because of high levels of leakages in the form of increased imports. To the extent that tourism expenditure is lost overseas, the host economy fails to realize one of the major benefits of tourism as was explained earlier in this chapter. The issue of leakages has long been recognized as problematic and the extent of leakages can be difficult to estimate. In some small island economies it has been suggested that as much as 50 % of tourist expenditure may be lost overseas, with food and beverages often found to have a particularly high import content (see for example, Wilkinson, 1987; Telfer and Wall, 1996). In many larger destinations, leakages are probably much lower and often less than 20 %. A high level of leakages suggests that, other things being equal, the multiplier for tourism expenditure will be lower and hence the economic benefits of tourism expenditure will be reduced. However, this comparison may be a little too simplistic. High levels of leakages may lead to low multipliers, but if the level of expenditure is relatively high in total, then the benefits may still be significantly greater than those which would arise with lower levels of leakages, higher multipliers but lower initial levels of tourism expenditure. Hence any assessment of the impact of leakages must be made in relation to the levels of tourism expenditure that generate those leakages.

Assessing the Impact of Tourism. The previous discussion has highlighted a variety of different ways in which tourism can benefit an economy and has also pointed to a number of the costs that it may impose. Clearly any assessment of the overall impact of tourism in economic terms will require detailed information relating to tourist expenditures, prices, tax revenues, expenditures by other sectors of the economy, prices for tourism and non tourism products, patterns of arrivals and so on. Because of the complexity associated with assessing the economic effects of tourism, there continues to be considerable debate and conflicting evidence. Strong advocates of tourism argue persuasively for significant benefits to economies particularly in developing countries. At the other extreme, tourism's critics adopt a more negative perspective and highlight the dependency that can be created by tourism and its neo-colonialist features. An intermediate position would point to the presence of significant economic benefits but also highlight potential costs, which if not monitored, could significantly erode the gains made to employment, income and other economic aggregates.

There have been many attempts to evaluate the economic impact of tourism; one of the most comprehensive comes from the work of the World Travel and Tourism Council who have simulated

Tourism Satellite Accounts for a range of countries in order to be able to evaluate the economic contribution of tourism. Although the conventions used by WTTC do not correspond to conventions used by WTO, which creates problems in relation to comparability, the WTTC figures do provide a useful starting point in assessing tourism's role.

The problem with making a fair and proper assessment of tourism's contribution is that many countries (indeed, most) lack the appropriate data and information. And yet if governments are to make sensible decisions regarding the future development of the tourism sector, a rigorous and reliable measure of the costs and benefits is essential. Arguably, one of the areas that presents the greatest challenge is the comprehensive measurement of the benefits that arise as a result of tourism spending.

The problem with measuring the impact of tourism spending is, quite simply that tourism does not exist as a distinct sector in any system of national accounts. Systems of national accounts are the main mechanism for tracking what is produced and sold within an economy and tracing what happens to expenditure. These accounts are organized around specific industry sectors – that is to say systems of national accounts (SNAs) are structured around what is produced (clothing, electrical goods, hotels, air transport etc). However, tourism is essentially an activity that is defined by consumers at the point of consumption. In effect anything that tourists buy and any form of expenditure that tourists make is a contribution to the economy that is generated by tourism. Of course, a very large proportion of tourist expenditure goes into identifiable tourism characteristic sectors such as transport, hotels, recreation etc. However, tourists will also spend money in other sectors – clothing, gifts, cosmetics, food, petrol etc – which are not normally associated with tourism. For example in the case of Canada, research has suggested that 25 % of tourism expenditure is direct towards non-tourism sectors (Meis, 1999). This suggests that any attempt to examine the economic contribution of tourism which looks at systems of national accounts only, and considers only what might be classed as tourism related sectors (hotels, accommodation, transport) is likely to seriously under-estimate the overall expenditure by tourists and thus its economic impact.

Given that the economic contribution of tourism is spread across a series of different sectors, it is consequently, very difficult to identify how tourism can contribute to an economy using standard national accounts and existing statistical resources. These information sources can provide at best, only a very partial picture. As a consequence of this weakness in existing accounting systems, a number of countries (including Canada, USA, Australia, New Zealand and Norway) have moved towards the development of Tourism Satellite Accounts (TSAs). These are new sets of accounts, which are linked to the existing system of National Accounts. They build on information from existing accounts and also allow for new information to be incorporated. In so doing, they allow a much more detailed analysis and tracking of tourism expenditure across a range of sectors, both tourism characteristic sectors (such as transport, hotels etc) etc, and non-tourism characteristic sectors (such as retail, cosmetics, clothing etc). The World Tourism Organization notes that tourism satellite accounts are the only way of measuring tourism's economic contribution in a way that is consistent with the measurement of other sectors in the economy.

A Tourism Satellite Account (TSA) is deceptively simple. It takes information from the systems of National Accounts about what industries produce and what inputs they use (input-output tables). This provides the basis for the calculation of industry value-added (i.e. the difference between the value of the outputs provided by an industry and the value of the inputs that it uses), which, when summed, provide an estimate of gross domestic product (GDP). The impact of a change in final demand can be estimated using information from the input-output table. For example, the effect of an increase in demand for hotel accommodation can be traced through to increases in demand for the inputs used by the hotel industry (including capital, labour and intermediate goods).

Alongside the input-output table, the TSA also uses estimates of tourist expenditure (usually based on visitor expenditure surveys) and then allocates tourism expenditure to different industries. By allocating tourist expenditures by sector and then apportioning value added by sector, the TSA can provide an estimate of overall value added through tourism and thus identify tourism's contribution to GDP. In addition, inspection of the TSA provides insights into where tourists spend, the extent to which different sectors benefit from tourist spending and the extent to which individual sectors are dependent upon tourism.

Thus, a Tourism Satellite Account can provide a comprehensive database which identifies tourism's role in an economy and provides a rigorous and reliable basis for drawing comparisons between tourism and

other sectors in terms of their contribution to the economy. By providing a comprehensive picture of tourism's position in the economy and its interactions with different sectors, a TSA provides a foundation on which future decisions about the planning and development of tourism can be based. In addition, because of the ability to make comparisons across sectors, the TSA gives tourism organizations the information they need to lobby governments to ensure that tourism can compete on a level playing field. TSAs can even point out new marketing opportunities as the experience of Canada suggests. In particular, the identification of non-tourism characteristic sectors that benefited significantly from tourism (such as retailing) was thought to provide Canadian tourism organizations with an opportunity for new collaborative marketing activities (Meis, 1999).

Tourism Impact Analysis. TSAs typically concentrate on measuring the direct impact of tourism expenditure, and often do not directly address the issues of the indirect and induced effects discussed earlier. To gain more comprehensive insight into the indirect and induced effects of tourism requires a further level of analysis – this is usually described as tourism impact analysis. Traditionally tourism impact analysis relied heavily on simple Keynesian multipliers as discussed earlier. These are calculated based on estimates of leakages from a given economy and seek to provide a single figure that relates tourism expenditure to output, income employment, sales or any other aggregate outcome that is of interest. Such multipliers are relatively straightforward to calculate and provide a quick and simple way of assessing the overall magnitude of a change in tourism expenditure.

However, simple Keynesian multipliers only give a rather limited and partial perspective on the impact of tourism, not least because they focus on simple aggregates and are unable to address the nature of linkages between sectors (Cooper et al, 1998). Consequently, interest has moved towards the use of general equilibrium techniques – i.e. methods of tourism impact analysis, which explicitly recognize the interdependence between different sectors of the economy. The most widely used of these general equilibrium techniques is probably input-output analysis which builds on the data contained in input-output tables (also a key element of a TSA) and analyses the effects of tourism by charting the movement of initial tourism expenditure through different sectors of the economy. A particular strength of this form of analysis is the ability to measure direct, indirect and induced effects (see Fletcher, 1989 for a review).

With input-output data readily available this technique has become increasingly widely used in studies of tourism's economic impact (see for example Archer and Fletcher, 1996 who use input-output analysis to evaluate the impact on the Seychelles of tourists from a range of different destinations). However, it is worth noting that input-output analysis does not just use input-output tables, it also requires detailed data on tourist expenditures as well as data on intersectoral transactions. As with the development of TSAs, input-output analysis can be a costly exercise but one, which can offer significant benefits in terms of understanding tourism impacts. Computable General Equilibrium models discussed below are equally costly (if not more so) to develop, highlighting the significant investment required to generate accurate insights into tourism impacts. However, once the initial investment has been made, these techniques can and do offer significant benefits in terms of the accuracy and diversity of information they can provide.

Although input-output analysis can provide a much greater understanding of the linkages across and the relationships between different sectors as well as the overall contribution of tourism, the technique does have its limitations. It is generally classified as an inflexible approach to general equilibrium modelling in that it does not allow for factor substitution between sectors and prices are taken as given [8]. In particular, assumes the wages and prices do not change when tourism expenditure changes. In reality, a change in tourism expenditure is likely to change both output and prices – if there is a significant increase in expenditure for example, then businesses will experience an increase in demand, which means that prices might be expected to rise and also wages. This in turn will attract resources into the sector to enable production to increase. The precise nature of these changes will vary across markets but what is important to note is that a change in tourism expenditure will actually result in both changes in quantities supplied and changes in prices. Ideally any attempt to measure tourism's impact must address both of these effects.

The development of Computable General Equilibrium (CGE) modelling has provided economists with an alternative approach to analysing the impact of tourism and one which has the same ability as input-output analysis to highlight the inter-sectoral linkages without being restricted to fixed prices and wages. Moreover CGE modelling has the additional advantage of being able to simulate the impacts on tourism of

different policy changes. CGE modelling is based around a mathematical specification of key relationships within the economy (what determines levels of supply, demand etc), and is calibrated to real data to ensure that the model provides a good representation of the economy. With a comprehensive model of the economy, which incorporates businesses, governments and consumers, it is possible to analyse the economy-wide impacts of changes in tourism spending, changes in subsidies or taxation, and other policy and market changes. In a comparison of the two approaches, Zhou et al noted that the negative consequences of a decline in tourism expenditure in Hawaii were predicted to be much greater using input-output analysis than using CGE analysis [8]. This difference is due to the fact that the CGE model is able to reallocate factors of production and adjust prices to accommodate the reduction in tourist demand. This would tend to suggest that input-output analysis may over-estimate the impact of changes in tourism demand on a given economy (whether that change is positive or negative). In addition to greater accuracy in estimation, CGE models may also provide a greater understanding of the nature of the impact of external shocks and policy changes.

Two examples of the valuable insight that can be obtained from CGE modelling come from recent studies of two major tourism crises – the impact of foot and mouth disease on tourism in the UK and the impact of September 11-th on the tourism sector in the US. Blake et al (2001) use a CGE model to analyze the impact of Foot and Mouth Disease in the UK on tourism and on the rest of the economy. This model comprised 115 different markets for goods and services with equations specified for production and consumption in each and with appropriate linkages specified between different sectors. Using estimates of initial drops in tourism numbers the model highlighted different sectoral impacts, with hotels, roads, meat, and leather being most significantly affected (as shown in figure 5 below). It also noted that the net effect on GDP in 2001, would be a reduction of 2,3 billion, with an overall GDP loss of almost 5 billion in the period to 2004. The model also estimated that 82,000 jobs would be lost economy wide. Overall, one of the important contributions of this form of analysis was to demonstrate that the impact of Foot and Mouth Disease on tourism was far greater and more economically significant than the impact on agriculture.

A second example concerns the impact of the events of September 11-th on the tourism sector in the USA (Blake and Sinclair, 2002). The terrorist attacks in New York and Washington resulted substantial reductions in both domestic and international travel and concomitant reductions in tourism revenue. The Air Transport Safety and System Stabilization Act (ATSSSA) was implemented in late September to provide support for the ailing airline industry. Further policy measures to support other tourism sectors were also proposed by the Travel Industry Recovery Coalition. A CGE model of the US economy based on 98 sectors and commodities was used to analyze the relative efficiency of these different actual and proposed policy responses. The model showed that the policy responses introduced in relation to the airline industry (both ATSSSA and subsequent measures) were very effective in reducing the adverse consequences of the fall in tourism expenditure, protecting both GDP and employment. The model suggested that in the absence of any policy response, GDP would have fallen by \$30 billion and over 500,000 jobs would have been lost with airlines and hotels being particularly badly hit. The provision of financial assistance to airlines was found to be a highly effective policy response, reducing the fall in GDP to around \$10 billion and reducing the rise in unemployment to around 335,000. More generally, the model suggested that subsidies to production could prove to be a very effective way of reducing the adverse consequence of a major tourism crisis.

Conclusion. The economic significance of tourism has been subject to considerable debate. Resolving this debate requires reliable and rigorous information on the precise nature of tourism spending and its impact on different sectors of the economy. One problem, which has always faced those seeking to analyze the economic contribution of tourism, is that tourism simply does not exist as a distinct sector in systems of national accounts. There are sectors, which are characteristic of tourism, such as transport, hotels and accommodation, but tourists spend their money across a range of different sectors and national accounts do not track this spending. These difficulties can be resolved through the construction of Tourism Satellite Accounts, which provide an internationally recognized and standardized method of assessing the scale and impact of tourism spending and its links across different sectors. Although costly, investment in the construction of satellite accounts provides policy makers with information on the economic contribution of tourism and the ability to analyse its effects economy wide. Such information is the prerequisite to efficient

and effective policy decisions to guide the future development of tourism. Moreover, satellite accounts provide a foundation for more sophisticated analyses of the impact of tourism and the assessment of different policy regimes using techniques such as computable general equilibrium modeling. These general equilibrium techniques do require significant investment, but are increasingly being utilized because of the benefits they generate in terms of understanding the extent and diversity of tourism's impact on an economy.

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