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International Tourism, Demand, and GDP Implications: A Background and Empirical Analysis

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"Americans have always been eager for travel,
that being how they got to the New World in the first place"

-Otto Friedrich

I. Introduction

By any measure, the tourism industry has become one of the most considerable in the world. Most countries would rate tourism as among its most important exports, be they rich or poor. Yet, despite its undisputed significance, many governments, development agencies, and economists still know relatively little about what drives tourism and its impacts on national economies.

The reasons for the relative ignorance of tourism's role in economic growth are many and complex. Among the most important is the extreme difficulty of arriving at concrete definitions for what tourism and its components really are. Whatever one's perspective, it would be fallacious to deny that the impacts of tourism stop at its core industries: transportation, accommodations, and other service based commodities. In addition, tourism has many corollary effects on the expansion of local infrastructure, agriculture, and manufacturing to serve foreigners, their pockets brimming with valuable currencies. Some even argue that local human capital increases with tourism as citizens must learn to meet the demands of visitors. The problematic task of identifying and separating the many effects of tourism from other causal factors prohibits a clear understanding of tourism's true magnitude and impact.

As a result, the data for tourism are often insufficient for rigorous economic analysis. Without a precise definition of what tourism consists of, it is foolish to suppose clear numbers can be assigned to it. Standard price indexes do not exist for the tourism industry, nor is an aggregation of profits accrued easily derived. Any further examination of the impacts of tourism on the employment level, income inequality, or general welfare of an economy is even more difficult, and can only be accomplished with any level of precision using complex, site-specific measures of input-output analysis and Keynesian multipliers. These studies are time-consuming, expensive, and above all, limited in scope. Otherwise, econometricians are forced to rely on the compilation of basic data on tourism such as international arrivals, receipts, and its percentage share of GDP or exports. Unfortunately, these data only go back to 1980 at the earliest, and are often unavailable for many developing countries.

It soon becomes apparent that while much research remains to be done within the realm of tourism economics, most of it will be crippled by sundry limitations. As a result, the direct socio-economic impacts of tourism, such as changes in income or employment levels, are very difficult to analyze with any degree of certainty.

At the same time, more understanding about what drives the growth of the tourism industry is necessary, especially since the focus of much of the previous work has been limited in breadth and duration.

Presently two facets of tourism demand research are deficient: the choice of variables and the number and location of countries studied. To gain a better understanding of tourism demand, new and different explanatory variables must gradually be included in the literature. Additionally, past research often fails to include the most sensitive regions of the world where some low to middle income countries can succeed or fail due to dependence on especially important industries such as tourism. While the developing nations are also by far the most vulnerable to absent or suspicious data, some effort must be made to see what motivates tourism in different countries, and how national incomes are therefore affected.

Consequently, my paper will consist of two primary sections. First, I will augment existing research on tourism demand by constructing a model with new variables and a more expansive data set. The demand model includes proxies for prices, incomes, and exogenous variables that might influence the tastes and preferences of tourists across countries and time. It is hypothesized that these explanatory variables will be significant with regard to both spatial and temporal differences.

Secondly, it follows from the first hypothesis that a heightened sensitivity of demand to exogenous variables (that may not have comparable impacts in alternative industries) might have some implications for the steadiness of the tourism industry and consequently national income. Thus, due to the relatively greater instability of tourism demand to non-price determinants as compared to other industries, there will be a significantly positive relationship between the share of tourism in exports and GDP volatility.

In addition, I hope to highlight the history, different perspectives, and posited results of tourism development. Tourism stems from many sources, and its importance spans disciplines. By highlighting some background information, I hope to abet the reader's understanding of tourism beyond mere data analysis, and thereby instill added meaning into my eventual results.

II. Travel & Tourism: A Brief History

Since the beginning of human history, many people have harbored a nomadic inspiration to roam. Millions of years ago the ancestors of modern man, *Australopithecines*, wandered the African savannahs not for leisure, but

in an attempt to ensure the preservation of one's self or group. For millennia, travel was a means to survival as early man constantly sought better sources of food, water, and shelter. Eventually though, humans evolved and were able to adapt the environment to their needs, rather than their needs to the harsh environment. Sustenance could be obtained largely in one place through primitive agriculture and industry. Whereas before people struggled to secure their welfare, steady improvements in subsistence farming made the battle against death less dire. Eventually, what desired goods could not be procured at home could be purchased from commercial activities that slowly expanded from the scale of small villages to across the entire globe. Through trade commodities migrated, and the economic imperative to move was, for most people, eradicated.

Up until the nineteenth century, most travel was done by a very small minority of explorers and traders. Some sought to discover new resources or cultures in harsh, distant lands. Indirectly, they augmented the human capital of their nations by expanding the knowledge of foreign places and ideas, and sometimes exploiting them. Others sought to satisfy the economic demands of their home countries through bartering, bringing precious metals, fabrics, and spices back to ever more affluent, if not inequitable, societies.

For the classes that benefited most from the growth of capitalism, family units were afforded the luxury of surplus hours and incomes. Subsequently, along with the increased welfare of the elite came an invigorated capacity for new ways to spend their leisure. By the nineteenth century especially, travel had become yet another way to ensure the happiness of fortunate members of society who sought relaxation and renewal. Perhaps travel fulfilled their innate human impetus to move, inherited from ancient ancestors, or perhaps it was just a way to relieve boredom. Either way, as they escaped to ostentatious country estates and seaside resorts, they became the first beneficiaries of the fruits of tourism.

While historically only the very wealthy have been afforded the opportunity to travel for pleasure, there has in recent centuries been a steady progression in the ability and propensity of middle classes to share in the activity. Through industrialization in the West, more people were blessed with the riches of expansion. According to Harrison (1994), "During the nineteenth century, improved standards of living, increased leisure, and more efficient forms of transport enabled the working class of Western Europe to benefit from capitalist growth" (232). As a result, more members of both the middle classes and bourgeoisie participated in the domestic tourism industry. Still, given limitations on the ease of travel and means to do so, it would remain for decades an infant industry.

Soon, the tastes and preferences of some travelers changed. As domestic destinations became more congested and incomes continued to expand, the horizons of tourism began to seem almost limitless. The improvements in transportation infrastructure through rail, automobiles, and ocean liners provided the thrust for accelerated tourism expansion. Wealthy travelers became more eager to visit international destinations, and travel between affluent societies became a more common practice. It was the arrival of airplanes, however, which enabled tourism to transform into an economic necessity.

After the industrial boom surrounding World War II, surplus airplane manufacturing was converted into civil uses. At the same time, aircraft technology improved and a post-war economic growth period occurred. Suddenly, charter flights became a possibility. With them, tourism instantly became big business. According to Harrison (1994), much of the subsequent gains to the industry occurred across international borders. He says, "In 1950 a little over 25 million tourists (excluding day trippers) crossed national boundaries. By 1990, this figure had increased to 425 million" (233). The ability to travel overseas was greatly improved by the speed and efficiency of airline services. As national incomes and populations in the United States and Western Europe increased and the costs of airplane seats fell, the phenomenal role of international tourism in the world economy would soon become a reality.

III. The Current State of Tourism

Today, tourism claims a lion's share of the world economy. According to some sources, international tourism alone is the third largest item in world trade, responsible for seven percent of global exports and monetary values higher than any national GNP save the United States (Harrison, 1994). To cite a different source, William Theobald (1994) contends that by 1992 tourism had actually become the single largest industry and employer in the world, with a gross output of $3.5 trillion, or approximately twelve percent of consumer spending. As of 1998, *The Economist* pronounced confidently that over one in ten jobs worldwide were supported by the tourism industry, with its share rising rapidly (Roberts, 1998). Whatever hazy definition of tourism and supporting data one espouses, there is no denying that the collection of activities known as tourism has become extremely important.

Like most industries, tourism is still dominated by the developed countries. Since they are blessed with the highest incomes, developed countries correspondingly contribute the most international tourists to the world

economy. However, as Harrison (1994) remarks, it is a slightly less explainable phenomenon that "In 1989, developed countries attracted 65 per cent of all international arrivals and 72 per cent of all tourism receipts…In other words, most international tourists live in developed countries and visit other developed countries" (232). This distinction can be important to note, as it implicates the extreme importance of tastes and preferences in consumer decision making over price considerations, since developed countries might often be more expensive to visit. In most cases, because of traditions, cultural and natural attractions, or other factors, developed countries remain the most preferred destination.

Yet, while less-developed countries (LDCs) attract a relatively small minority of global travelers, one should not therefore infer that tourism plays a similarly unimportant role in their respective economies. In fact, tourism can have even more profound effects on small LDC economies than on developed countries with far more incoming travelers. Quite simply, one more tourist arrival or foreign dollar will mean more to the economy of Dominica than France, for example. The importance of tourism is further exacerbated in countries with relatively few primary exporting industries or those relying heavily on foreign visitors. Of course, the footprint of tourism varies widely among developing countries. Whereas many Caribbean economies rely almost exclusively on European and American tourists, some West African states of similar income levels may have extremely small tourism industries. Nevertheless, it is essential to realize the significance of the tourism industry in almost every country, regardless of geographical location or income level.

Of course, as with any issue, how one views the desirability of tourism growth is inextricably linked with one's socio-economic perspectives. Those who advocate tourism borrow from modernization theory, thereby viewing the industry as a source of comprehensive development arising not only from the direct consumption of goods and services but also corollary investments in capital, education, employment, and basic human services. On the other hand, critics of unbridled tourism expansion often employ some form of Marxist underdevelopment theory in defense of their position. As such, they argue the social and environmental costs resulting from an industry dominated by Western capital far outweigh the benefits. To these skeptics, according to Harrison (1994), "investment [in tourism] is followed by 'leakage' of foreign exchange, the jobs created in tourism are menial and demeaning, and the profits made from the labour of the poor in LDCs are repatriated to the West" (233). While the underdevelopment perspective offers important insights into issues developers should treat with caution, its simplistic denunciation of tourism ignores the benefits that accrue from the tourist industry. To most governments,

the remunerations associated with mature tourist industries are self-evident, compelling them to sell the fruits of their country to foreigners who will spend money to enjoy them.

Many countries, especially developing ones, have recently turned to tourism in the hope of capitalizing on perceived benefits. These include the exposure of a given economy to hard foreign currency that can alleviate gaps in foreign exchange and current account balances, and the possibilities of decreasing unemployment and increasing national and per-capita incomes. Sinclair (1998), a prominent scholar on tourism, mentions that tourism as an alternative source of growth can become even more lucrative when countries are "faced with the problem of declining terms of trade for agricultural products and high levels of protection against manufactures" (1). It is understandable why, in the foreboding markets of many commodities, countries see the influx of foreigners as a boon to the economy, and one that can be relatively easy to achieve. However, as many have pointed out, the costs of tourism can also be considerable.

In the process of attracting large numbers of tourists, most nations also have to make significant investments. A basic prerequisite level of infrastructure must be developed and maintained to attract meaningful numbers of tourists. Most developed nations have already achieved such levels of advancement, so tourism is much easier to cultivate and can be encouraged more naturally. Developing nations, however, must make expensive improvements to airports, roads, accommodations, and civil services to facilitate the needs of incoming tourists. It may seem as though such achievements would be valued *prima facie* but many of these investments are specific to tourism and are not widely applicable to general citizen use. Hence, if the tourists fail to come, significant civil expenditures could be judged an inefficient use of resources. Also, the opportunity costs of not encouraging other avenues of development must be considered. Additionally, it has been posited that the expenditure effects of tourism can be inflationary, deplete national resources, and adversely affect wealth distribution (Sinclair 1998). Furthermore, "leakages" can be considerable, especially in small, poor, and isolated economies. Leakages are defined as the phenomenon in which profits trickle out of the host country due to foreign ownership, the need to import large volumes of goods to satisfy the needs of travelers, and other unique circumstances. Ultimately, in many small tourist economies, income leakage can explain why countries with advanced tourist industries do not often see per-capita incomes rise considerably.

IV. Models of Tourism Demand

With the possibility of both important economic benefits and costs, it is therefore necessary to understand what makes some tourism industries more successful than others. The scale and underlying determinants of tourism on a national level is most often understood through models of demand. Single equation models of demand are the most common methodology employed. Admittedly, they lack the ability to yield certain parameters, such as cross-price elasticities, that are calculable with a systems-of-equations approach. However, systems-of-equations approaches are also subject to statistical limitations, such as the inability to correct for autocorrelation, a significant barrier to accuracy for most time-series studies (Divisekera, 2003). Here, despite its limitations, the single equation approach will be utilized because it allows for easy inclusion of various independent variables and is more statistically accurate.

While inherently imperfect, models for tourism demand have important implications for further research and policy-making by virtue of the realized impacts of variables and determined elasticity values. Sinclair's 1998 paper, "Tourism and Economic Development: A Survey," provides the most comprehensive and accurate overview of demand models for tourism. According to the summary information provided therein, single equation demand models appear in the functional form shown in Eq. 1,

$$\textbf{Eq. 1} \quad D_{ij} = f(Y_i, P_{i/jk}, E_{ij/k}, T_{ij/k}, DV)$$

where i refers to the tourist origin country, j to the destination, and k to competing destinations. The dependent variable, D_{ij}, most frequently refers to demand by US tourists and is often measured in tourism receipts or arrivals accrued. The following explanatory variables are sometimes, but not always, included in various forms: Y_i, which refers to income per capita; $P_{i/jk}$, relative prices; $E_{ij/k}$, exchange rates; $T_{ij/k}$, transport costs; and DV, dummy variables. Unfortunately, previous studies have failed to determine which variable definitions are most appropriate, or have been limited in either the duration of their time-series data or their selection of a broad range of countries.

The uses and importance of the different variables have also varied considerably. Income elasticities have often been the most significant variable in many demand models. The first major paper on tourism demand, Gray (1966), found US and Canadian per capita income elasticities for demand tourism demand overseas to be 5.13 and 6.6, respectively. To cite other studies with slightly different methodologies, Broomfield (1991) found income elasticities for tourism demand to Fiji to range from .18 to 8.1, depending on country of origin. For Malaysia, on the

other hand, values from a similar analysis only ranged between .94 and 3.44 (Shamsudding, 1995). Thus, while income elasticities have previously been found to be significant, they can vary immensely depending on the given country of origin or destination.

According to Sinclair (1998), relative price and exchange rate elasticities have historically been more stable. According to Shamsudding (1995), for example, exchange rate elasticities only varied between -.78 and 1.27 in Malaysia. In Turkey, they varied from .18 to 4.22 based on dependent variables of expenditure estimates for arriving tourists (Uysal and Crompton, 1984). Price elasticities of demand for tourism have been found by multiple scholars to be less than unity in absolute value, and relatively inelastic (Divisekera, 2003; White, 1985).

Though theoretically important, the transport cost variable has usually played a minor role in demand models. It has often been omitted from models because previous research has found it to be insignificant. Also, there exists no clear and accurate proxy for representing the costs of transport. The final primary category of variables, dummies, has also been historically insignificant in most analyses based on Sinclair's (1998) literature review.

As a service industry and a luxury good, tourism can be subject to the influence of many factors that might not seriously impact other commodities. Whereas price fluctuations are of the greatest concern for other exports, the tourism industry is most concerned with creating and sustaining large numbers of tourist arrivals and expenditures. These key parameters could be expected to fluctuate considerably based on periods of growth or recession in the country of origin or the changing attractiveness of alternative destinations.

As an example, terrorism is one particularly salient way for a dramatic change of tourist taste and preferences to occur. A substantial amount of work has already been done to test the rigor of this relationship, probably because it is relatively easy to identify and intuitively seems like an obvious source of reticence for tourist decision-making. One would expect terrorist attacks to greatly impact choices made by consumers, as the perceived risk of traveling in a relatively dangerous country would weigh heavily on considerations of utility. Hence, consumers would choose alternative destinations less vulnerable to terrorism.

Consequently, some researchers have tried to estimate the extent of terrorism's impact on tourism. Enders, Sandler, and Parise (1992) analyzed a 1974-1988 sample of European nations using an autoregressive integrated moving average (ARIMA). They found terrorism to have a significant impact on tourism receipts, implying decreased revenues for affected countries and shifting patterns to other destinations. Drakos and Kutan (2001)

employed a slightly different methodology and extended the cross-country analysis to Mediterranean nations. Using an autoregressive and seemingly unrelated regressions (SUR) model, they showed that some countries exhibit less vulnerability to changes in tourism given a terrorist event. Specifically, they find that tourism in Turkey and Israel is more sensitive to terrorism than tourism to Greece. Sloboda (2003), on the other hand, used an ARMAX (autoregressive moving average with explanatory variables) model for a short-term assessment of terrorism on US tourism. He too found a discernible impact of terrorism on incoming tourism in the current period. Also, the results imply that terrorism's impact extends beyond one year but its magnitude diminishes as the initial threat recedes. The significance of these results illustrates tourism's vulnerability to exogenous shocks that might not affect traditional commodities, with possible implications for the volatility of the industry.

V. A New Model for Tourism Demand: Theory and Variable Specification

The choice of where to allocate scarce resources among competing choices depends upon an individual's underlying utility function. Tourism is merely one of the many ways consumers can spend surplus money and leisure hours and individuals will engage in it with different propensities. Nonetheless, despite many alternative options for spending or saving disposable income, many consumers choose to direct expenditures at travel services. Once consumers have chosen to travel, they face another decision: whether to travel overseas, and if so, to where. The numbers of substitute destinations are nearly infinite, and will appeal to different individuals for different reasons. Some prefer domestic travel while the more adventurous strive for distant and exotic locales. Certain travelers respond to the call of urban sophistication, to others nature beckons their attention.

According to consumer maximization theory, individuals will choose destinations based on an optimization of utility. Faced with income and budgetary limitations, consumers choose between competing destinations. For a given individual, some destinations will be less attractive due to the length of time involved in getting there and the expenses incurred upon arrival. Like all goods, the price of tourism factors into their decision-making process. However, unlike most other goods, tourism must be consumed at the point of supply, further complicating the consumer choice problem. Destinations cannot be packaged attractively and sold at local markets; tourism choices, by definition, account for the willingness of consumers to travel to, and live temporarily in, a given destination. Thus scenery, climate, prejudices, cultural attractions, and many other attributes will affect consumer choices in

conjunction with prices. Therefore, the factors influencing consumer maximization theory for tourism will be different than for other goods. To approximate the attributes that influence consumer choices, one can construct a model for tourism demand.

Dependent Variable

The amount of tourism demand can easily be represented by the number of tourists arriving at a destination from a specific country of origin per year. The chosen country of origin in this analysis is the United States, and the number of American tourists arriving in a given country per year is obtained from the World Tourism Organization (WTO), the leading international organization in the field of travel and tourism.

Numbers of international tourist arrivals are based on the organization's description of an international tourist. International tourism is strictly defined as the activities of visitors who temporarily visit countries outside of their usual places of work and residence for greater than 24 hours. In other words, the dependent variable of tourism demand represents the arrivals of American citizens into a foreign country for the purposes of visiting for at least one full day. Yet, the numbers tell a story of wildly disparate tourist activities across the globe. Reported U.S. tourist activity ranges from 20 visits to Zambia in 1993, to 20,314,149 to Mexico in 1996. Ultimately, an insightful explanation for worldwide tourist patterns will include a diverse set of factors, including sheer proximity. Yet, a few key factors can be included in a model of demand to explain how at least some of the differences in American travel departures have arisen.

According to consumer demand theory, three broad categories of determinants explain demand for a given commodity: socio-economic and demographic factors, qualitative factors, and price factors. In turn, these broad determinants can be broken down into specific factors directly applicable to tourism demand, as follows.

Price Variable

Among price factors, there are two relevant components international tourists consider when weighing travel options. The first of these two is *transport costs*, or the costs of traveling to a destination country by land, sea, and air. While important theoretically, as the price of airfares can vary wildly (the most common means of international travel), it is nonetheless usually omitted from models of demand. Usually, the exclusion of transport costs from a model is justified on the basis of data limitations. For one, meaningful transport cost variables are

nearly impossible to construct owing to the complexities of fare structures (Syriopolus and Sinclair, 1993). These might include different prices for seat classes, air carriers, means of transport, or discounted bargain fares, which are relatively important for tourist flows to certain markets. Even rudimentary averages of fare prices that approximate at least some of these unique characteristics are simply unavailable in time-series data. Furthermore, merely measuring the *prices* of airfare, even if done precisely, would be inadequate representations of the *cost* of transport. In other words, transportation also includes economic costs, such as the opportunity costs associated with long, uncomfortable, and impractical flights. It is reasonable to assume that travelers confronted with a hypothetical situation of equal fare prices across the globe would choose more convenient destinations, all else held constant. Therefore, both the prices and economic costs of international transport serve as hindrances for long-distance international travel, as flights to distant continents are both more time-consuming and expensive. Moreover, means of transportation to a given destination can be diverse, with some destinations welcoming large numbers of tourists by automobiles, trains, or ships. Thus, to only account for airline data would ignore important alternative means of travel which would vary in importance depending on the location and its prices. Hence, because of the inaccessibility of adequate data, it is frequently necessary to merely ignore the influence of transport costs in a model of tourism demand. This tendency is reinforced here, especially since past models that have been able to approximate changes in transport costs indicate that they do not appear as significant determinants of demand (Sinclair, 1998).

Secondly, the price-determinants of demand for international travel include *in-country costs*. In general, in-country costs represent the expenses of residing in a destination country for the short-term. These might include accommodations, food, drink, tour services, souvenirs, and entertainment, among many others. As is indicated by the aforementioned list of common tourist expenditures, the economic activities of travelers are subject to the prices of many different markets. Furthermore, the expenses of travelers may vary significantly among chosen destinations. For example, the budget shares allocated to expensive cultural attractions for tourists in London will far surpass those of an eco-traveler to Fiji. Similarly, budgetary expenses may also vary considerably within destinations, as the price of one night in a luxurious five-star hotel eclipses the cost of a week's stay in a hostel only miles away. Thus, a consistent and representative "Tourism Price Index" based on a well-defined basket of goods consumed by tourists is not available, nor does it seem likely that one could ever be formulated that would be satisfactory for a wide variety of nations and individuals. Any such price index would likely either underestimate the number of

commodity markets that tourists interact with, or would be subject to skewed comparisons among destinations with different attributes.

Instead, a more inclusive approach to measuring international in-country prices is to construct a Price Competitive Index (PCI). To manufacture a PCI, the first task is to obtain the general overall price level of an economy. According to Divisekera (2003), the implicit assumption underlying the use of general price levels is that "prices of tourism goods and services tend to move in the same direction as overall consumer prices" (32). However, merely using national Consumer Price Indices (CPIs) or other measures of general price levels are meaningless for international analyses, as different base years, inflationary pressures, and exchange rates preclude direct comparisons of relative prices across destinations. Hence, one must calculate Purchasing Power Parities (PPPs), which indicate the levels of expenditure required in different countries to consume the same general basket of goods and services. To complete the Price Competitive Index (PCI), one must adjust for the effects of exchange rate variations in PPPs, so as to obtain an objective index standard for comparing relative prices among countries, and then multiply by 100, as follows:

$$\textbf{Eq. 2} \quad PCI = (PPP / ExchangeRate) * 100$$

In so doing, a general basis for comparing the relative prices of staying in competing destinations is obtained. As calculated, the United States has the base value of approximately 100 for any given year, and thus relative prices for U.S. tourists vary from the domestic standard. In any given country, a PCI of less than 100 (i.e. Brazil) indicates countries that are more price competitive than the U.S. (goods and services are relatively cheaper). On the other hand, a PCI of greater than 100 (i.e. Switzerland) denotes destinations that are less price competitive than the U.S. (goods and services are relatively more expensive). The data necessary to calculate this index can be obtained from the World Bank's World Development Indicators.

Income Variable

Socio-economic and demographic explanatory variables of demand are, in theory, wide-ranging. As opposed to some of the other salient factors, these variables vary only within the country of tourist origin, not among possible tourism destinations. Thus, they reflect changes in tourist patterns and levels over time along with the evolution of consumer characteristics, but do not reflect differentiating factors that compel consumers to choose one

destination over another (as do the aforementioned price factors or the qualitative factors discussed below). Potentially, these could include leisure time, education, or occupation, among others, but these are either insignificant or meaningless at an aggregate national level. Instead, the most relevant socio-economic and demographic characteristic is income.

Income, in this analysis, refers to per-capita incomes in the country of origin, the U.S.A. According to economic theory, as per-capita incomes rise, average disposable incomes will increase, along with the ability to afford the time and money expenses of international tourism. Over the past two decades, average American incomes have generally risen uninterruptedly, a phenomenon that likely explains much of the increase in American tourist departures. Research has also shown this effect to increase disproportionately with income. That is, for most destinations tourism has a hypothesized income elasticity greater than one, thus classifying it as a luxury good. As incomes rise, a smaller share of consumer budgets must be devoted to necessities such as food, clothing, and housing, with more available income and leisure for expenditures such as tourism. U.S. per-capita incomes are obtained from the Penn World Tables.

Political Variable

Finally, there are many qualitative factors influencing international tourism demand which, while likely are very important, are also nearly impossible to quantify. The simple availability and quality of tourism services in a given country might qualify as one possible factor influencing the willingness for tourists to travel to a particular country. However, if demand for tourism to a country existed unfulfilled, willing investors would meet any possible opportunity for profit by expanding local infrastructure and accessibility, assuming open markets. Thus some other underlying determinants of demand must explain most tourism development, or lack thereof. Of extreme importance is the general category of tourist appeal. Cultural landmarks, protected endowments of cherished national resources, and ancestral ties are just a few of the assets countries claim in differing degrees that may draw an individual tourist to one country rather than another. However, these qualitative resources elude any attempts at quantification for present analyses. These are merely intangibles that, while they might influence demand for given countries, will remain forever relegated to the error term of any econometric study.

However this study, unlike those previous, seeks to illuminate the impact of one particular qualitative factor, the political situation of host countries, on the demand for international tourism. Countries with more authoritarian

political regimes and heavily controlled economies can be expected to exhibit greater social instability and therefore be less attractive as tourist destinations. The impacts of the political variable can be felt holding either space or time constant. For example, changing preferences over time periods can be exhibited by the ebb and flow of tourists to a particular nation as its political regime changes. To cite one example, the influx of tourists to South Africa was astounding following the demise of apartheid in the early 1990s. According to Commey (2002), "Tourism has grown from 3% to 12% of the economy and is being touted as one of the solutions to the country's unemployment problems. It has provided more than 800,000 jobs since 1994" (49). Once the violence, uncertainty, and stigma associated with an illegitimate government became no more than a memory, tourists began to arrive in greater numbers.

Moreover, political effects should be significant in any given year from a cross-country perspective because tourists will be more likely to visit nations with greater freedoms, *ceteris paribus*. Over the past two decades, for instance, tourists have been far more likely to visit the Dominican Republic than Haiti, even though the two share the same island of Hispaniola. Much of this disparity can most likely be attributed to Haiti's ongoing problems with lasting peace and the continued presence of despotic rulers. In general, countries with less freedom, more repressive states, and a higher degree of political instability will not be attractive destinations for tourists. The perception of potential risks, either real or imagined, will influence tastes and preferences and therefore the willingness to spend exorbitant amounts of money to visit a country. Richter (1992) agrees, saying, "Tourism as a discretionary activity is incredibly vulnerable to political instability" (36). Also, countries with political problems and economic mismanagement will be less likely to have well-developed tourist infrastructure, further hampering demand. Furthermore, countries characterized by repressive and unstable political conditions are more likely to be susceptible to terrorist attacks. Terrorist attacks, in turn, further hamper demand, as has been shown in numerous previous studies (Sloboda, 2003; Drakos and Kutan, 2001; Enders, Sandler, and Parise, 1992). Assuming political incompetence does not as severely infect the productivity of agricultural and manufacturing sectors, the deleterious effect of political strife on tourism will be far more noticeable than on other industries in which exported commodities are consumed abroad.

The choice of a proxy for political and economic freedoms and instability could be somewhat ad hoc. One could imagine the inclusion of dummy variables to indicate qualitative societal factors. A "dictator dummy" could capture the simple existence or non-existence of totalitarian rulers. Unequivocally, Chile under General Augusto

Pinochet or Zaire under Mobutu Sese Seko would receive the binary value of one, to cite just two of the world's many historical autocracies. However, such a distinction would be highly arbitrary and would ignore gradual reforms or transition periods, not to mention being vulnerable to the inherent subjectivity of the researcher. More appropriate is the inclusion of a variable that takes some sort of number value, however rudimentary, to measure changes in political and economic status. Such a measure comes from the Freedom House Country Ratings, an objective source of information about political conditions in world nations. The assignation of values from Freedom House comes in two parts: political rights and civil liberties.

According to Freedom House definitions, political rights and civil liberties, while always inextricably linked, are not necessarily the same. Political rights can be defined as citizens' ability to participate in the political process without undue government intervention, corruption, and coercion. Civil liberties, on the other hand, represent the ability of people to develop views, institutions, and businesses autonomous from state intervention. While neither definition may represent exact proxies for political instability and discontent, they are both indicative of general levels of unrest, however latent. Freedom House measures both political and civil liberties on a seven point scale from one (most free) to seven (least free), in one-unit increments tabulated from an objective set of criteria. The measures are available for 192 nations and 60 territories from 1972 to 2002, with some missing data. Since both political rights and civil liberties measure important facets of in-country stability, an average of the two values will be used for the purposes herein.

VI. Data and Model Specifications

Given the aforementioned independent and dependent variables, a preliminary functional form for the tourism demand model is as follows,

$$\textbf{Eq. 3} \quad TD_{ij} = f(Y_i, P_j, POLI_j)$$

where *TD* is the demand for tourism to a particular destination, *j*, from an origin country, *i*. Y_i refers to incomes per-capita in the country of origin, *i*. P_j refers to the Price Competitiveness Index for a destination country *j*, which reflects both relative prices and exchange rates. $POLI_j$ is a proxy measure of political and economic freedoms and stability in the destination country *j*. The origin country *i* refers to the United States in all relevant variables. The

destination countries, *j*, represents a cross-section of 85 countries with available data, from a broad range of incomes, locales, and characteristics.[1] Annual data for fifteen years from 1984 to 1999 was used as the time-series, with occasional missing data points.

The correct functional form for the econometric analysis should be chosen based upon economic theory rather than the best statistical fit. In a simple linear regression model, the slopes of the relationships between independent variables X and a dependent variable Y are assumed to be constant. On the other hand, the elasticity of Y with respect to X, or the change in the dependent variable given a one percent increase in the independent variable, is not constant. Yet, according to prevailing economic theory, product demand models are presumed to have constant elasticities and non-constant slopes. The most accepted way to model constant elasticities is to use a double-log transformation, where the natural log of Y is the dependent variable and the natural logs of the X's are the explanatory variables. In a double-log model, each coefficient on an independent variable is interpreted as the percentage change in Y attributable to a one-percent change in X, *ceteris paribus*. Thus, the demand curve is bowed towards the origin, such that slopes may vary but elasticities are the same at any point along the curve. In general, using this economic framework, the model for tourism demand from one country of origin to one destination would look as follows after a double-log transformation:

$$\textbf{Eq. 4} \quad \ln(TD_{ij}) = \alpha_1 + \beta_1 \ln(Y_i) + \beta_2 \ln(P_j) + \beta_3 \ln(POLI_j)$$

However, it is obvious that some of the aforementioned variables will be significant in a cross-section analysis, others in a longitudinal analysis, and some will be meaningful in both. By running separate regressions of demand for one country at many points in time, or one point in time for many countries, some important explanatory power will be lost. For example, a cross-sectional analysis of demand will best highlight differences in tourism demand across geographical locations while being unable to capture simultaneous changes in income. Longitudinal analysis, on the other hand, will capture the effects of changing parameters over time. Variability in prices and political stability will be captured by comparing differences in either space or time. However, the true impacts will be incomplete if measured separately. Since the most basic multiple regression models can only measure changes in

[1] Destination countries included in the demand model: Algeria, Angola, Antigua & Barbuda, Australia, Bahamas, Bahrain, Bangladesh, Belgium, Belize, Bhutan, Bolivia, Botswana, Brazil, Canada, Chad, Chile, Colombia, Costa Rica, Cote d'Ivoire, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Fiji, Finland, France, Germany, Ghana, Greece, Grenada, Guatemala, Haiti, Honduras, Hungary, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Laos, Lesotho, Luxembourg, Malaysia, Mali, Mexico, Morocco, Nepal, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Romania, Samoa, Senegal, Singapore, South Africa, South Korea, Spain, Sri Lanka, Sudan, Switzerland, Syria, Thailand, Togo, Trinidad & Tobago, Turkey, United Kingdom, Uruguay, Venezuela.

time *or* place, they will be insufficient. Instead, we must use a slightly more complex model that is equipped to use pooled data.

Pooled data includes cross-sectional units observed over time. Due to its unique nature, pooled time-series, cross-section data must be manipulated in more than one dimension to accurately capture the effects of the data. As an example, there are 15 different years worth of data for the PCI index. Within each year, there are 85 cross-sectioned indicators, each of which represents a country and associated value for that place and time. In other words, any piece of information in a pooled data series is defined in three dimensions: the variable, the time period, and the cross-section.

Due to the requirements of pooled data, slight transformations must be performed on the model. A standard OLS regression of the double-log model cannot capture the true nature of pooled data, only allowing for interpretation across space *or* time. Instead the general class of econometric models that can be estimated using pooled objects follows a specific functional form as follows:

$$\textbf{Eq. 5} \quad Y_{it} = \alpha_{it} + \beta_i X_{it}' + \varepsilon_{it}$$

In Eq. 5, Y_{it} is a dependent variable, X_{it}' is an independent regressor, and β_i is a parameter for i = 1, 2,…, N cross-sectional units and t = 1, 2,…,T time periods. The error term is denoted as ε_{it}. Eq. 6 shows an alternative form, where the pooled model is equipped with an agglomeration of N cross-section specific regressions of the following form, each with T observations:

$$\textbf{Eq. 6} \quad Y_i = \alpha_i + \beta_i X_i' + \varepsilon_i$$

Next, the functional form of a pooled model can be applied to the complete tourism demand model constructed above, as shown in Eq. 7,

$$\textbf{Eq. 7} \quad \ln(TD_{ijt}) = \alpha_j + \beta_1 \ln(Y_{it}') + \beta_2 \ln(P_{jt}') + \beta_3 \ln(POLI_{jt}') + \varepsilon_{jt}$$

with j = 1, 2,…, 85 cross-section units and t = 1, 2,…, 15 time periods.

Regression Techniques

Pooled models have the inherent capability of measuring independent variables as either common or cross-section specific coefficients. Defining a variable as cross-section specific would require different outputs for each cross-sectional unit. For example, if the political variable was defined as cross-section specific, each country would be equipped with its own coefficient representing the impacts of political effects on tourism for that specific destination. Similarly, changes in income from the United States could be made cross-section specific to determine differences in income-elasticities across destination countries. While many studies achieve important results by employing such a methodology, the purpose of this paper is to aggregate the effects of a number of variables on tourism demand across a broad range of countries. Doing this requires the use of common coefficients, which means that estimation concludes with a single coefficient for each independent variable that represents the overall impact of that variable for all included countries and time periods.

There are also many different ways to estimate models using pooled data: fixed-effects, random-effects, and seemingly unrelated regression (SUR) are a few accepted options. In this analysis, SUR, which accounts for both heteroskedasticity and contemporaneous correlation, is unavailable due to the relatively large number of cross-sections as compared to time periods. Most appropriate for this analysis is a fixed effects model, which estimates different intercepts for each member (country) of the pool. In so doing, *all* behavioral differences between individual countries and over time are captured by the intercept. Thus, $\alpha_{it} = \alpha_i$, so that α_i varies amongst the cross-section. Therefore, only the intercept parameter varies, thereby "fixing" the existing differences between countries. Hence, response parameters are not allowed to vary, and we are able to obtain a common and accurate coefficient on each explanatory variable. Therefore, $\beta_{1it} = \beta_{1,} \beta_{2it} = \beta_{2,}$ and $\beta_{3it} = \beta_{3.}$ Fixed-effects specification in this model is chosen in preference of random effects modeling, which treats each intercept as a random variable. Since we are only interested in making inferences about the countries for which we have data, we treat the intercept as a fixed parameter and use a fixed effects model.

Fixed effects are computed by subtracting the mean from within each variable and then using OLS to estimate the remaining transformed model. This is demonstrated in Eq. 8, where $\bar{y} = \Sigma y_{it} / N$, $\bar{x} = \Sigma x_{it} / N$, and $\bar{\varepsilon} = \Sigma \varepsilon_{it} / N$.

$$\textbf{Eq. 8} \quad y_i - \bar{y}_i = (x - \bar{x})'\beta + (\varepsilon_i - \bar{\varepsilon}_i)$$

Finally, after performing OLS on Eq. 8, the fixed effects are estimated from Eq. 9, which gives us the intercept coefficients ($\hat{\alpha}_i$) for each cross sectional unit.

$$\textbf{Eq. 9} \quad \hat{\alpha}_i = \sum_t (\bar{y}_i - x_i' b_{FE}) / N$$

VII. Results

Using the above techniques and acting under the assumption of heteroskedasticity, the tourism demand model was estimated in EViews using White heteroskedasticity-consistent standard errors and covariance. This allows for variance estimators that are robust to heteroskedasticity within cross-sections and are allowed to vary across time. Weighted generalized least squares (GLS) is not used because it does not allow for the possibility of contemporaneous correlation.

Additionally, an initial regression of the model showed strong evidence of autocorrelation.[2] To correct for this defect, a first-order autoregressive term, AR(1), is added into the model. First-order autoregression merely implies that the error term from the previous time period influences the error term from the present time period. Algebraically, in estimating with an AR(1) term, the correlation of errors is compensated by substituting Eq. 11 into Eq. 10 below,

[2] Upon running an initial regression without correcting for serial correlation, the estimated Durbin-Watson statistic, which tests for first-order serial correlation, is approximately .675. First-order serial correlation is merely the presence of a linear association between adjacent residuals from a regression model. Due to the unique nature of the Durbin-Watson statistic distribution, simple critical values cannot easily be calculated to determine the presence or absence of serial correlation. Nevertheless, a formal test, known as a bounds test, can still be performed to try to detect for serial correlation.

In a first-order autoregressive model, the errors are represented by the following model:

$$\varepsilon_t = \rho\varepsilon_{t-1} + v_t$$

such that v_t are independent random errors with the distribution $N(0,\sigma_v^2)$.

Under the assumption of normally distributed random errors, $\rho = 0$, $\varepsilon_t = v_t$, and the errors are not serially correlated. If there is positive autocorrelation, which is the most likely form of autocorrelation for most economic models, then $\rho > 0$. Thus, we test the null hypothesis of $\rho = 0$ against the alternative hypothesis of $\rho > 0$. However, due to the difficulties of calculating the probability distribution of $\hat{\rho}$ as alluded to above, testing of the statistic requires different methods. Durbin-Watson chose a different but closely related statistic (d) that can be derived, where ultimately $d \approx 2(1-\hat{\rho})$. Therefore, if the estimated value of d is two, it can be inferred that ρ is close to zero and errors are not serially correlated. Since the probability distribution of d varies, a bounds test can be performed to overcome the problem of indefinite critical values.

The bounds of the test are a lower bound (d_L) and an upper bound (d_U). If d_{Lc} and d_{Uc} are the 5% critical values from a probability distribution, then $P(d_L < d_{Lc}) = .05$ and $P(d_U < d_{Uc}) = .05$. Hence, it logically follows that if we are testing an alternative hypothesis of $\rho > 0$ against the null hypothesis of no serial correlation, then if the test statistic $d < d_{Lc}$, we can reject the null hypothesis and accept the alternative that serial correlation is present. As gathered from a statistical table, when the number of parameters K = 4 and T > 200, $d_{Lc} = 1.738$ and $d_{Uc} = 1.799$. From the statistical output we obtain a Durbin-Watson statistic of .675. Since this is far less than the lower critical bound, we can soundly reject the null hypothesis and assume serial correlation.

$$\textbf{Eq. 10} \quad y_t = x_t' \beta + \varepsilon_t$$

$$\textbf{Eq. 11} \quad \varepsilon_t = \rho \varepsilon_{t-1} + v_t$$

where Eq. 11 accounts for the carryover from the past residual. After accounting for serial correlation with a first-order autoregressive term, the Durbin-Watson statistic becomes 1.97, very near two and well past the upper bound of 1.799 where positive autocorrelation is presumed to no longer exist.

Final Model

After correcting for heteroskedasticity and autocorrelation, we obtain the following results on the American demand for tourism to 85 countries from 1985-1999:

$$\textbf{Eq. 12} \quad \ln(TD_{ijt}) = \alpha_j + 1.464 \ln(Y_{it}') - .057 \ln(P_{jt}') - .058 \ln(POLI_{jt}') \qquad R^2 = .988$$

(12.737) (-.464) (-1.788) (t)

In Eq. 12, α_j is a different intercept for each particular destination (see Appendix 1). Approximately 98.8% of the variations in tourism demand are explained by variations in the independent variables, according to R^2. All of the coefficients on the independent variable have the expected signs.

Model Justification

The overall significance of the model can be tested with a "Global Test" using the F-statistic. The model is tested for viable explanatory power by using a joint test of significance for all included independent variables. Thus, the following null and alternative hypotheses are assumed:

H0: $\beta_1 = 0$, $\beta_2 = 0$, $\beta_3 = 0$

H1: at least one of the β's is nonzero

The null hypothesis is a joint hypothesis with three parts, and states that each parameter other than the intercept has no explanatory value. While an accepted alternative hypothesis gives no indication of what variables have relevancy in the model, it does validate the overall significance of the model. Since we are using an F-test, we must test the unrestricted model from above (Eq. 7), against an unrestricted model (Eq. 13).

$$\textbf{Eq. 7} \quad \ln(TD_{ijt}) = \alpha_j + \beta_1 \ln(Y_{it}') + \beta_2 \ln(P_{jt}') + \beta_3 \ln(POLI_{jt}') + \varepsilon_{jt}$$

$$\textbf{Eq. 13} \quad y_t = \alpha_j + \varepsilon_{jt}$$

The restricted model shown in Eq. 13 is obtained assuming a true null hypothesis, where α_j are the cross-section specific intercept coefficients.

The F-statistic we are calculating is computed according to Eq. 14,

$$\textbf{Eq. 14} \quad F = \frac{(SST - SSE)/(K-1)}{SSE/(T-K)}$$

where the critical value of the F-test is 2.61, given a significance level of .05, three degrees of freedom in the numerator, and 1132 degrees of freedom in the denominator. EViews output automatically supplies the F-statistic for the above test when a regression is performed. For the given model, the F-statistic of the global test of overall significance is reported as 29,883. Since this value greatly exceeds the critical value, we can easily reject the null hypothesis and presume that at least one of the explanatory coefficients is not zero. Thus, we conclude the model's coefficients are jointly significant. The large F-statistic has important implications for assessing the overall viability of the model, but says nothing about the effectiveness of using a fixed-effects specification as the method of regression.

To determine the importance of using a fixed-effects model versus other models, one can first look at the variability of the intercepts. Ostensibly, the intercepts vary considerably in value. This observation lends anecdotal evidence to the importance of having individual intercepts for different countries, thereby fixing the effects of country-specific variations rather than using a common intercept coefficient or none at all (Appendix 1). However, one can also affirm this statistically, again by using an F-test. First, the following hypotheses are established:

H_0: $\alpha_1 = \alpha_1 = \ldots \alpha_{85}$

H_1: the α's are not all equal

The null and alternative hypotheses are tested using the F-statistic in Eq. 15,

$$\textbf{Eq. 15} \quad F = \frac{(SSE_R - SSE_U)/J}{SSE_U/(NT-K)},$$

where the unrestricted model is the originally regressed fixed-effects model (Eq. 7). The restricted model has the same explanatory variables, but the intercept is common and is not allowed to vary between countries. Upon regressing the restricted model, we obtain the following values:

$$F = \frac{(82.4 - 64.9)/84}{64.9/1047} = 3.36$$

The critical value, given a .05 level of significance, 84 degrees of freedom in the numerator, and 1047 degrees of freedom in the denominator, is 1.28. Since the F-statistic 3.36 is greater than the critical value, the null hypothesis can be rejected. Thus, it is reasonable to conclude that the intercepts are not all equal, and that by using a fixed-effects specification explanatory power is added to the model.

Individual Variable Significance

The above statistical elaborations merely affirm the econometric map which was followed. However, they say nothing about the actual validity of the individual explanatory variables. Instead, tests of significance using the t-distribution are used to determine the importance of per-capita incomes, price levels, and political legitimacy with regards to demand for international tourism.

Y_t, per-capita American income, is significant at the .01 significance level, implying its extreme statistical importance in the model. According to the elasticity as interpreted from the log-log model, a one percent increase in American GDP per capita increases tourism demand to an average destination by approximately 1.46 percent. This robust relationship adheres to the underlying theories of income's impact on the demand for tourism services. Thus, this study is consistent with those previous that classify tourism as a luxury good, where demand rises faster than income.

As expected from the law of demand, there is a negative sign on the price variable. However, the variable is not statistically significant. The coefficient implies a .057 percent decrease in the number of tourists to a given destination with a one percent increase in that country's competitive price index. Most likely the statistical insignificance, which does not correspond with the variable's presumed economic significance, implies one or more of a few things. First, the price proxy, which is represented by an index of a country's price level relative to the United States, may not entirely capture the true prices of tourism within a given destination. That is, tourism goods and service may represent a limited and differently priced subset within the competitive price index. However, as mentioned earlier, the presumptions underlying the price index as an accurate measure of tourism make economic sense. Secondly, the full costs of tourism also include the price of international transport, which was omitted from the model due to data limitations and insignificance in previous models. Despite this, by combining transport costs

with in-country costs, perhaps a more meaningful price measure could be approximated. Finally, and perhaps most importantly, the very nature of the above model may imply that statistically significant variables for in-country prices should not reasonably be expected. Of course, *ceteris paribus*, consumers will respond negatively to higher prices according to the law of demand. However, the above model accounts not for fixed price changes for one good, but rather the more complex interactions of prices for tourism goods across many different destinations. Hence, the negative coefficient might reflect choices by consumers as one destination becomes relatively more or less expensive.

Nevertheless, price may not be a definitive factor influencing tourism behavior, thus resulting in an insignificant t-statistic. Rather, utility-maximizing rational consumers might choose destinations based upon tastes and preferences primarily, and prices secondarily. That is, tourists are willing to go to a given destination despite its relatively high prices because of the attractive characteristics of that particular country. As relative prices rise further, tourists may substitute away to other destinations, but not enough to imply high price elasticities.

Finally, the *POLI* variable has a negative sign. This is expected as it is presumed tourists would choose relatively more stable destinations to less stable ones, and would substitute towards or away a destination as it becomes more or less politically free, respectively. The t-statistic of -1.788 implies statistical significance at the .10 level of significance. A coefficient of -.058 implies that tourist arrivals to a given country decrease by 5.8 percent given a one-hundred percent deterioration (e.g. from a rating of two to four) of the country's political status. The variable used is specifically a proxy for political conditions, to determine how they might affect the level of tourist demand to global nations. However, in a more indirect way it can also be seen as a proxy for other shocks that exogenously impact the tourist industry. Since tourism must by definition be consumed in the country of supply, shocks that impact the prevailing circumstances of the host country – such as politics, and alternatively health concerns like SARS or the occurrences of terrorism – might presumably impact tourism more than other commodities that can be exported for consumption to the safe confines of your home country. However, does this imply more economic volatility for countries that emphasize tourism than those that do not?

VIII. Tourism Sector Volatility and Impacts on GDP

There has been very little work done to quantify how much, if at all, tourism contributes to the volatility of national incomes. It is hypothesized that due to the unique nature of tourism as an export – luxury good, consumed in host country, uniquely subjected to the impact of exogenous variables – it will perform differently in the economy when compared to other commodities. As such, the volatility of tourism demand is less vulnerable to price fluctuations than many goods but potentially more vulnerable to conditional fluctuations in the country of supply. Thus, does the potential for volatility in the tourism industry correspond to volatility in the national economy? If so, it is important to understand the nature of this impact, as fluctuations in tourist arrivals can have significant impacts on policies and decision-making in both public and private sectors.

One can imagine many scenarios whereby the aforementioned characteristics of tourism might drastically influence its performance as an industry, and therefore the economic stability of countries highly dependent on tourism. Since most studies have found an income elasticity for tourism of greater than one, it is classified as a luxury good, x. This means that as incomes rise, the proportion of income spent on x will rise faster than income. Conversely, as incomes stagnate or fall, the proportion of income spent on x will fall faster than income. People concerned about the economy will be more likely to forego international travel to luxury destinations. Consumption will shift away from luxury goods to more essential commodities. Consumers inclined to travel will either postpone or cancel trips entirely, or instead visit cheaper and more accessible domestic or international destinations rather than distant and more expensive locales. The effects of these changes in demand will have strong implications for the tourism industries of international destinations, which may be the first to suffer due to the expenses of long-distance travel.

Since tourism is considered "tradable", it is registered with many other commodities in a country's balance of payments. However, there is one important difference between tourism and most other traded goods. Namely, as mentioned above, tourism must by definition be consumed in the country of supply, rather than being shipped overseas for use in other markets. The concept is obvious but the implications profound. Since tourism must be consumed in the foreign country, any event or circumstance that makes travel to a given destination less attractive will adversely affect tourism. Under these circumstances, tourism is usually the first to leave but the most eager to return, often in large numbers. Thus, the impact of exogenous factors on tourism can have important and highly erratic impacts on tourist arrivals. These impacts may not be completely borne out be the data, which is subject to

the effects of an aggregation bias (Sloboda, 2003). In other words, important fluctuations may occur on a seasonal or temporary level, but be obscured in annual data. Alternatively, changes in the desirability of certain locales within a country will have important implications for tourism in that particular region, but may not be widely visible in national data upon aggregation.

Upsetting the tourism industry through exogenous shocks, often related to political strife or endemic health crises, can occur on many levels. For one, tourism shocks can occur on a global scale, as it did after September 11, 2001, when travelers were wary to fly anywhere given the risks of further terrorist attacks. The estimated two-year impact of the disaster was a fall in overall demand for tourism by approximately 7.4 percent and the loss of over 3.2 million tourism jobs (Toyne 2002). Most of this impact was due to consumer fears of travel, and was compounded significantly by economic downturns in many industrialized nations.

Alternatively, shocks to the industry can occur at the level of individual regions, countries, or even areas of a country. The breakout of the SARS epidemic in Southeast Asia, for example, strongly influenced the willingness of people travel to the region during the duration the disease. It is estimated that the disease contributed to an eighty to ninety percent decrease in bookings to Hong Kong at the height of the epidemic. According to some forecasts, a ten percent decline in service earnings from tourism to Hong Kong results in a .5 percent decline in annual GDP growth (Kolesnikov 2003). SARS also temporarily devastated many tourism industries besides Hong Kong's, including those in Thailand, China, and Singapore.

On a slightly smaller and less damaging level, many political threats stemming from national governments have damaged the growth of potentially lucrative markets for tourism. In the demand model, the variable for political coercion, illegitimacy, and instability was seen to have a moderately significant impact. As a contemporary example, Robert Mugabe's increasingly authoritarian reign in Zimbabwe has hampered political, civil, and economic rights, frightening both his own citizens and prospective travelers. Therefore, he has helped transform a formerly leading African destination into a traveler's pariah.

Tourism arrivals can be even more fickle on a local or regional scale, where particular regions of a country might be affected by endemic unrest, disruption, or even isolated yet dangerous circumstances. Often, these impacts do not reverberate even as far as the national economy. For instance, due to India's violent border dispute with Pakistan in the Jammu and Kashmir province, a once beautiful Himalayan retreat has been almost completely abandoned by foreigners. At the same time, such a limited yet protracted conflict has little, if any, effect on tourism

to Calcutta, Mumbai, or other areas of the country. Thus, the data may not tell an entirely accurate story, as losses to one part of a nation might be hidden by tourism to another part, even though the damages to the specific region might be profound.

IX. Modeling the Effects of Tourism on GDP Volatility

It has been established that the tourism industry is subject to vagaries in demand that are not experienced by other industries for the same reasons or to the same degree. A minimal number of studies have demonstrated the impacts of volatility within the industry using a model of international tourism demand (Chan et al, 2003). However, the extent to which, if at all, the volatility in demand owing to exogenous shocks translates into volatility in national GDPs has not been investigated. Since many countries in the Caribbean, South Pacific, and Southeast Asia rely on tourism receipts for over ten percent of annual exports, changes in tourist flows are presumed to have drastic impacts on economic solvency.

Due to a limited body of consistent international data and a dearth of prior work on the subject, the approximation of the tourism-GDP volatility link will be very rudimentary for the purposes herein. A simple regression will be performed relating average export concentrations of tourism and fluctuations in annual GDP. Though simple in character, the regression might highlight some general trends relevant to countries who fail to diversify their economies.

Data comes from the World Bank's World Development Indicators. Trends are averaged over time for the independent variable, *IT*, which denotes the percentage of exports attributable to international tourism receipts for a particular country (tourism concentration). According to this definition, international tourism receipts include all payments and prepayments made by an international visitor for goods and services. The share of international tourism in exports is calculated as a ratio of receipts to exports of all goods and services. Single values for each country are calculated using an arithmetic mean.

The dependent variable, *GDPV*, denotes the volatility of GDP. It is calculated using the annual percentage growth rates of GDP based on 1995 dollars. *GDPV* is not examined longitudinally in this study. Rather, a single representative value for average annual GDP volatility is obtained by taking the standard deviation of the percentage growth rates of GDP, where standard deviation is defined as follows:

$$\textbf{Eq. 16} \quad s.d. = \sqrt{\frac{n\sum x^2 - (\sum x)^2}{n(n-1)}}$$

For both series, data is available for 94 countries, and averages and standard deviation for each country are computed for the years 1980-2000.

With the above observations, an OLS regression was performed according to the simple linear econometric model shown in Eq. 17:

$$\textbf{Eq. 17} \quad GDPV = \alpha + \beta_1 IT + \varepsilon$$

Due to the simple and uncertain relationship between the two variables, one does not expect the model to have a high coefficient of determination. It is assumed, however, that a significant and positive relationship between *IT* and *GDPV* will be shown. That is, as the share of exports devoted to international tourism rises, it is hypothesized that the volatility of GDP will increase due to reasons explained in the above section.

X. Results

When initially regressed, the model shows a very weak R^2. More importantly, the estimated coefficient β is of the wrong sign and very statistically insignificant. However, heteroskedasticity is a problem for this model, both theoretically and practically. Heteroskedasticity exists when the propensity for variation amongst all observations is not the same. This can be suspected in this model, especially due to the high number of data points at relatively low levels of *IT*. Given small values of *IT*, there will far more uncertainty surrounding the corresponding variations in volatility. Greater uncertainty results at low levels of *IT* because the economies in question are very diverse in their constituent parts. The only common characteristic they necessarily share is a fairly small tourist industry in relation to the rest of their economy. Thus, the factors that contribute to GDP volatility in these countries will be very different, and will contribute to stark differences in average rates of volatility. On the other hand, at high levels of *IT*, the economies have relatively more in common; all share at least nominally large tourism industries. Therefore, the industry that drives much of their economies is motivated by many of the same factors of demand. Consequently, comparative levels of GDP volatility can be assumed to correspond more closely. A quick glance at residuals from the regression plotted against the explanatory variable highlight this tendency (see appendix 2).

While the presence of heteroskedasticity makes intuitive sense and seems to correspond with a graphical representation, it can also be confirmed statistically. One way to examine the presence of heteroskedasticity is through a Goldfeld-Quant test (G-Q). The G-Q test can help indicate whether variations in the magnitude of the residuals are attributable to chance, or whether they provide evidence contrary to a null hypothesis of homoskedasticity. According to calculations of the G-Q test, heteroskedasticity does exist as expected, with greater residual variances in the first half of the sample.[3]

Generalized Least Squares Model

Upon establishing the nature of the heteroskedasticity, the problem must be rectified to avoid violating one of the fundamental rules of simple linear regression. To do this, generalized least squares must be implemented through model transformation. In so doing, the variance of the transformed error term is constant over the whole sample and it is possible to obtain a best linear unbiased estimator (BLUE) by applying least squares to the transformed model. Consistent error terms are accomplished by dividing each variable by its corresponding error variance estimates, which will be either 5.98 or 1.76 depending on which half of the sample any given observation lies. Thus, the first 47 observations of both the dependent and independent variables are divided by the estimate of σ_1 (5.98), and the latter 46 observations are divided by the estimate of σ_2 (1.76).

[3] To perform a G-Q test, the sample must be split into two approximately equal sub-samples. If heteroskedasticity exists, some observations will have relatively high variances by virtue of their location in the original sample. The sample is divided so that one sub-sample contains the observations with potentially high variances, and one sub-sample contains observations with potentially low variances. For our purposes, the sub-sample suspected of relatively high variances is the first half of the observations.

Next, estimated error variances are computed for each of the sub-samples. The estimated error variance from the first half of the sample is denoted as $\hat{\sigma}_1^2$; $\hat{\sigma}_2^2$ denotes estimated error variances from the second half of the sample. Error variances are computed as follows:

$$\hat{\sigma}_1^2 = \frac{\sum \hat{e}_1^2}{T - K}$$

Thus, it follows that if the null hypothesis of equal variances is not true and heteroskedasticity exists, we expect the ratio between the first and second estimated error variances to be large. Error variances of the sub-samples are easily computed by running separate OLS regressions on each sample, then using the sum of the squared residuals to compute each error variance.

The null and alternative hypotheses look as follows:

H_0: $\sigma_t^2 = \sigma$

H_1: $\sigma_t^2 = \sigma^2 x_t$

In other words, the null hypothesis assumes equal uncertainty of variances across the sample, while the alternative hypothesis says that variances depend on the level of x, the explanatory variable.

The Goldfeld-Quant test statistic is defined as the ratio between the first and second estimated error variances. Thus, for our estimation GQ = 5.98/1.76, or 3.40. The critical value is 1.64, obtained from an F-distribution of 44 numerator degrees of freedom and 45 denominator degrees of freedom. Thus, to reject the null hypothesis of equal variances, we need a Goldfeld-Quant of greater than 1.64. Since our calculated GQ statistic is 3.40, which is greater than 1.64, we can reject the null hypothesis and assume that variations in the magnitude of the residuals are statistically larger from the first sub-sample.

To complete the process of generalized least squares, OLS is applied to the above transformed variables. The results are shown in Eq. 18:

$$\textbf{Eq. 18} \quad GDPV = 1.20 + .05IT \qquad R^2 = .07$$
$$(8.64)\ (2.65) \qquad (t)$$

Generalized least squares provides a much better approximation of the relationship than the original model by correcting for heteroskedastic error variances. The small coefficient of determination is to be expected in the simple single regression model that has been constructed.

Of more importance is the demonstrated relationship between international tourism concentration and the volatility of GDP. The hypothesized sign on the β_1 estimate is achieved. Also, the t-statistic of 2.65 is statistically significant at the .01 level of significance. The coefficient on the *IT* variable implies that as the ratio of international tourism receipts to all exports increases by one percentage point, the standard deviation of the GDP growth rate increases by approximately .05 units. In other words, the average deviation from the mean GDP growth rate increases by .05 percentage points, implying slightly greater volatility. While the magnitude of the impact is not drastic, it is presumed that the relationship between tourism concentration and GDP volatility might have appreciable ramifications for some destinations, which could ultimately affect their allocations of resources. This supposition merits much more detailed investigation in future research.

XI. Conclusions

The purpose of this paper was to gain insight into the international tourism industry. Through the construction of a fixed-effects demand model, insight was gleaned into three major determinants that explain at least some of the changes witnessed in American tourist departures to foreign destinations over the past two decades. Due to the unique nature of tourism as an export good that must be consumed in the country of supply, it was hypothesized that tourism as a commodity would therefore be disproportionately vulnerable to exogenous shocks that impact the willingness of consumers to travel long distances. Hence, it was inferred that tourism would be subject to more sources of volatility than other industries. As a result of the external shocks that disrupt the tourism industry, a simple model was constructed to determine if, therefore, countries that concentrate exports on tourism experience a greater volatility of GDP.

The demand model supplemented past research in multiple ways. First, 85 countries were used to develop parameters that reflect relationships on a global scale. Most other studies of tourism demand have focused on specific countries or limited regions. Furthermore, many developing countries were included in the demand model, while in previous analyses they have been sorely misrepresented. To analyze the pool of data, a fixed-effects model, corrected for heteroskedasticity and serial correlation, was used to most appropriately control behavioral differences across countries while obtaining consistent response parameters. A further addition to past models is the inclusion of a third variable, *POLI*, besides the standard variables of price and income. *POLI* is a proxy for increasing political illegitimacy, instability, and coercion. As such, it is also a proxy for the many qualitative factors that influence the willingness of individuals to travel abroad according to consumer maximization theory. Upon analysis, it was found to be significantly negative at the .10 level of significance. A statistically negative relationship between political strife and tourism arrivals has implied ramifications for the behaviors of governments and citizens who seek to encourage the growth of tourism within their borders. The price and income variables corresponded with past studies. In other words, tourism behavior shows relatively high income elasticity and price inelasticity.

This study also incorporated a new element into the paper: examining the link between tourism concentration and GDP volatility. It was hypothesized that many exogenous shocks impact tourism demand – political situations as represented in the demand model, in addition to terrorism, health concerns and others – that do not as significantly impact other industries. Thus, countries that focus a large share of their exports on tourism will hypothetically be subject to large fluctuations in tourism arrivals, which consequently translate into higher fluctuations in Gross Domestic Product when compared to other nations. A very simple model was constructed to examine this relationship. Upon correcting for heteroskedasticity, a significantly positive relationship between international tourism receipts as a percentage of total exports and volatility in the annual GDP growth rate was detected. It is thought that the nature of the relationship is mitigated somewhat by tourism's relative price inelasticity in relation to other goods. Hence, contradicting factors of instability within the industry might be present. Nonetheless, it seems countries that fail to diversify their portfolio of exports will be vulnerable to changes in global and national forces that may have serious implications for both tourism and GDP.

A primary suggestion for future research is the continual expansion of tourism demand models as a means to greater understanding of the industry. Demand models should explicitly attempt to include developing nations to complement past knowledge about what drives tourism growth to the most vulnerable destinations. Furthermore,

research into the impact of exogenous shocks on tourism needs further explication and refinement. As a corollary, an examination of the impact of these exogenous shocks on tourism as compared to other industries should be explored. Similarly, the links between exogenous shocks to tourism volatility, and tourism volatility to GDP volatility, need far greater understanding. More advanced statistical measures than those used here should be employed, to more accurately capture the nature of any effect, and what sources contribute to that effect. Finally, the above relationships should be examined in more detail on the scale of individual countries, to see which areas are most prone to vagaries in demand and volatility in the industry. Such research will have profound implications for the understanding and administration of international tourism, an industry that will continue to become increasingly important to every country within the near future.

Appendix 1

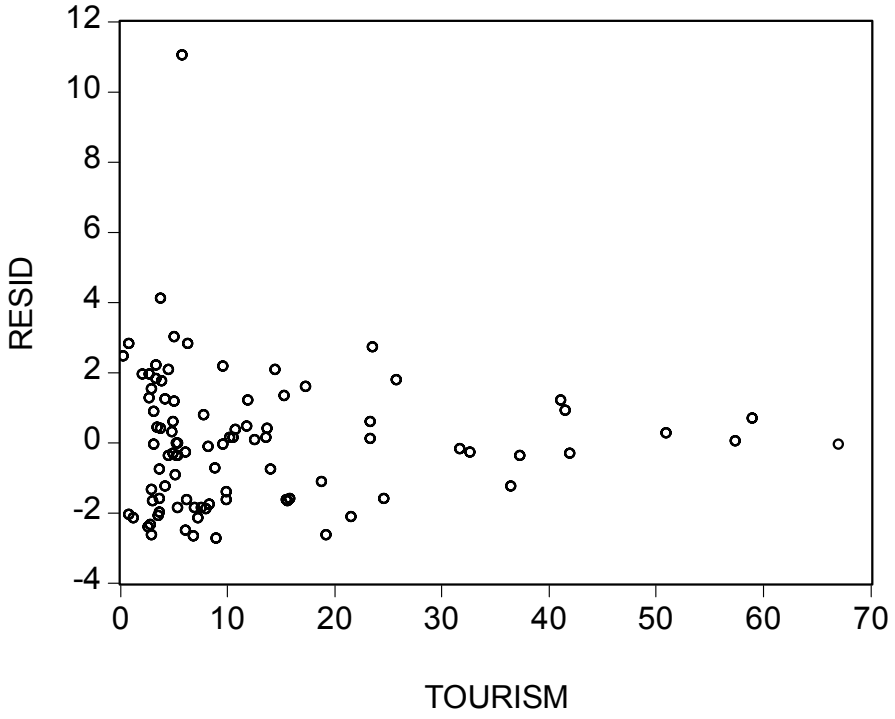
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(USGDP)	1.463974	0.114932	12.73772	0.0000
LOG(P?)	-0.056626	0.122163	-0.463529	0.6431
LOG(POLI?)	-0.058424	0.032684	-1.787576	0.0741
AR(1)	0.651369	0.042144	15.45581	0.0000
Fixed Effects				
_ALG--C	-7.390146			
_ANG--C	-8.147796			
_ANTBAR--C	-3.384444			
_AUSSIE--C	-1.992831			
_AUSTRIA--C	-1.438998			
_BAHAMAS--C	-0.609241			
_BAHRAIN--C	-3.495215			
_BANG--C	-5.643463			
_BELG--C	-2.148205			
_BELIZE--C	-3.211741			
_BHUTAN--C	-7.879963			
_BOL--C	-4.263904			
_BOT--C	-5.591413			
_BRA--C	-2.250840			
_CAN--C	1.703146			
_CHAD--C	-7.908619			
_CHILE--C	-3.316698			
_COL--C	-2.330046			
_CR--C	-2.342088			
_CDI--C	-5.228567			
_DENMARK--C	-3.299337			
_DR--C	-2.025338			
_EC--C	-3.261496			
_EGYPT--C	-2.827186			
_ES--C	-3.423817			
_ETH--C	-5.893845			
_FIJI--C	-3.957717			
_FIN--C	-3.320961			
_FRAN--C	-0.066481			
_GER--C	-0.290713			
_GHANA--C	-5.120967			
_GREECE--C	-2.369220			
_GREN--C	-4.568207			
_GUAT--C	-2.776426			
_HAITI--C	-3.396986			
_HOND--C	-3.224620			
_HUNG--C	-2.617593			
_INDIA--C	-2.571776			
_INDO--C	-2.877041			
_IRAN--C	-8.122312			
_IRELAND--C	-1.545070			
_ISRAEL--C	-1.902622			
_ITALY--C	-0.014207			
_JAMAICA--C	-1.171763			
_JAPAN--C	-1.378641			
_JORDAN--C	-3.769057			
_KENYA--C	-3.610909			

_SKOR--C	-1.852413
_LAOS--C	-5.495733
_LESO--C	-8.786588
_LUX--C	-4.407606
_MALAY--C	-3.239388
_MALI--C	-6.639977
_MEX--C	1.977519
_MOROC--C	-3.383898
_NEPAL--C	-4.527731
_NETH--C	-1.477132
_NZ--C	-2.727919
_NIC--C	-3.919142
_NIG--C	-6.303785
_NOR--C	-2.440362
_PAK--C	-4.049688
_PAN--C	-3.411909
_PNG--C	-6.145956
_PAR--C	-5.106129
_PERU--C	-3.233467
_PHIL--C	-2.061353
_PORT--C	-2.590339
_ROM--C	-4.079771
_SAMOA--C	-5.964907
_SENEG--C	-5.604064
_SING--C	-1.948169
_SA--C	-3.376511
_SPAIN--C	-1.107680
_SRILANKA--C	-5.736783
_SUDAN--C	-6.976464
_SWISS--C	-1.075647
_SYRIA--C	-5.426351
_THAI--C	-2.012136
_TOGO--C	-6.826517
_TRINTOB--C	-3.286752
_TURKEY--C	-2.776243
_UK--C	0.247851
_URUG--C	-4.751450
_VENEZ--C	-2.941612

R-squared	0.988467	Mean dependent var	11.14114
Adjusted R-squared	0.987497	S.D. dependent var	2.227402
S.E. of regression	0.249063	Sum squared resid	64.88570
F-statistic	29883.68	Durbin-Watson stat	1.973181
Prob(F-statistic)	0.000000		

All coefficients with the suffix -- C are country-specific intercepts as calculated by fixed effects modeling.

Appendix 2



References

Balaguer, J. and M. Cantavella-Jorda. (2002) Tourism as a Long-Run Economic Growth Factor: The Spanish Case. *Applied Economics* 34(7), 877-85.

Board, J., M.T. Sinclair, and C.M.S. Sutcliffe, (1987) A Portfolio Approach to Regional Tourism. *Built Environment* 13(2), 124-37.

Broomfield, J.G. (1991) Demand for Tourism in Fiji. MA Dissertation in Development Economics, University of Kent at Canterbury.

Chan, F., C. Lim, and M. McAleer. Modelling Multivariate International Tourism Demand and Volatility. CRENOS working paper.

Commey, P. (2002) South Africa Tourism: It's All in the Price. *New African* Sept. 48-49.

Deaton, A. and J. Muellbauer (1980) An Almost Ideal Demand System. *The American Economic Review* 70(3), 312-326.

Divisekera, S. (2003) A Model of Demand for International Tourism. *Annals of Tourism Research* 30(1), 31-49.

Drakos, K. and A.M. Kutan (2001) Regional Effects of Terrorism on Tourism: Evidence from Three Mediterranean Countries. Working Paper B26, Center for European Integration Studies.

Enders, W., T. Sandler, and G.F. Parise (1992) An Econometric Analysis of the Impact of Terrorism on Tourism. *Kyklos* 45, 531-554.

Freedom House (2003) Freedom in the World Country Ratings 1972-73 to 2001-02. Washington D.C: Freedom House.

Gray, P. H. (1966) The Demand for International Travel by the United States and Canada. *International Economic Review* 7(1), 83-92.

Hall, D.R. (Ed.), (1991) *Tourism and Economic Development in Eastern Europe and the Soviet Union.* London: Belhaven Press.

Harrison, D. (1994) Tourism, Capitalism, and Development in Less Developed Countries. In Leslie Sklair (Ed.) *Capitalism and Development*. New York: Routledge.

Heston, A., R. Summers, and B. Aten. (2002) *Penn World Table Version 6.1* Center for International Comparisons at the University of Pennsylvania (CICUP).

Kolesnikov, S. (2003) Analysis: SARS Hitting Tourism. *United Press International* 28 March 2003.

Kravis, I.B., A. Heston, and R. Summers. (1983) The Share of Services in Economic Growth. in Adams, G.F., and Hickman, B.G., eds, *Global Econometrics* Cambridge, MA: MIT Press.

Roberts, M. (1998) Home and Away. *The Economist* 10 Jan 1998, S3.

Richter, L.K., (1992) Political instability and tourism in the Third World. In David Harrison (Ed.) *Tourism & The Less Developed Countries*. London: Belhaven Press.

Shamsuddin, S. (1995) Tourism Demand in Peninsular Malaysia. MA dissertation in Development Economics. University of Kent at Canterbury.

Sinclair, M.T. (1998) Tourism and Economic Development: A Survey. *Journal of Development Studies*, 34 (5), 1-51.

Sinclair, M.T. and A. Tsegaye. (1990) International Tourism and Export Instability. *Journal of Development Studies*, 26(3), 487-504.

Sloboda, B.W. (2003) Assessing the Effects of Terrorism on Tourism by use of Time-Series Methods. *Tourism Economics*, 9(2), 179-190.

Smeral, E. (2003) A Structural View of Tourism Growth. *Tourism Economics*, 9 (1), 77-93.

Toyne, S. (2002) Counting Cost of Lost Tourism. *BBC News* 2 September 2002.

White, K. An International Travel Demand Model: US Travel to Western Europe. *Annals of Tourism Research*, 12(1985), 529-545.

World Bank (2002) *World Development Indicators*, Washington, D.C.: World Bank.

WTO (1998) *Current Travel and Tourism Indicators*, Madrid: WTO.

Zhou, D., J.F. Yanagida, U. Chakravorty, and P. Leung. (1997) Estimating Economic Impacts from Tourism. *Annals of Tourism Research* 24(1), 76-89.