MODELLING INTERNATIONAL DEMAND: CASE OF THE PHILIPPINES

Preliminary
Not for quotation

by

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Modelling International Tourism Demand: Case of Philippines

Maria Cherry Lyn S. Rodolfo,* Veronica Domingo and Mary Grace Agner

Abstract

Stakeholders in the tourism industry must be able to reduce the risks of their strategic and operational decisions in order to become effective competitors in the global markets. Their high risks are associated with factors such as the perishability of their products and services (e.g. airline seats) and vulnerability of demand to natural disasters, political uncertainties, image and perceptions. The large investment requirements and long – lead times can likewise lead to excess capacity if future demand is not anticipated correctly.

In this paper, the authors attempt to provide an understanding of the various theoretical and empirical issues related to modeling and forecasting international tourism demand from the Philippine’s source markets. First, it identifies the determinants of and measures of tourism demand. Second, using panel data for the period 1990-2009, they estimate the quantitative relationship between the volume of visitor arrivals to the Philippines and some hypothesised determinants. The determinants used include socioeconomic factors (income, relative prices, population, level of trade activity), geographical variables (distance, climate), and random factors related to unexpected events (political uncertainties and natural calamities). The authors then make recommendations related to the development and use of statistics and information in order to facilitate the conduct of similar research works in aid of the forecasting needs by the stakeholders – public and private.

Keywords: tourism demand, income, tourism price, exchange rate, panel data regression
INTRODUCTION

For a country like the Philippines, it is important to establish the determinants of the flows of visitors given tourism’s economic impact and its role in socio-economic growth and development as recognized by the Tourism Act of 2009. From 2000 to 2009, the average annual spending of $2.2 B by international visitors contributed 43.5 percent and 4.8 percent to the service export and total export revenues of the Philippines, respectively.\(^1\) Tourism also employed 3.3 million persons in 2008 and its average share to national employment was 9.5 percent, indicating that the sector generated one out of 10 jobs.\(^2\) The average share of tourism industries’ contributions to the Gross Domestic Product (GDP) was 6.2 percent from 2000 – 2007.\(^3\)

As the country gears up its efforts to make tourism a premier destination in Asia, it becomes more important to understand the factors behind the performance of our international tourism markets. One way to address this is to use economic tools to estimate tourism demand to the Philippines. The use of demand models is relevant to estimate the sensitivity of markets to factors such as income and prices and to analyse the effects of alternative policies and scenarios. Such approach also allows stakeholders to produce forecasts that stakeholders need in order to reduce the risks of their strategic and operational decisions. Risks are associated with factors such as the perishability of their products and services (e.g. airline seats), excess capacity from investments that require long lead times and vulnerability of demand to natural disasters, political uncertainties, health scares, image and perceptions.

Empirical studies that use the wide range of available economic tools in the field of tourism are still relatively scarce in the Philippines. This paper is one of the initial attempts to provide an understanding of the various theoretical and empirical issues related to estimating international tourism demand. First, we identify the determinants of and measures of tourism demand and explore the issues related to the use of these indicators. Second, we estimate the quantitative relationship between the volume of visitor arrivals to the Philippines and some hypothesised determinants using panel data of the Top 12 markets from 1990 to 2009. A dynamic panel data estimation based on the Generalized Method of Moment estimation (GMM) is used. Lastly, we propose initiatives related to the development and use of statistics and information in order to facilitate the conduct of similar research works in aid of the forecasting needs by the stakeholders – public and private.

The paper is organized as follows. In Section 2, we briefly review the performance of international tourism demand to the Philippines. In Section 3, we then explore the theoretical and empirical issues related to tourism demand modeling. Section 4 presents the model and

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\(^1\) In computing the shares to total service exports and total Philippine exports, the adjusted values of tourism receipts (from the DOT visitor expenditure data) for the years 2006 to 2008 were used. Source: CRC Report on Tourism Developments in the Philippines, June 2010.


\(^3\) Ibid
data used. Section 5 presents the empirical findings and their interpretation. Finally, Section 6 presents summary and conclusion and recommendations for future research.

2 Brief Review of International Tourism Performance

International tourist arrivals to the Philippines increased from nearly 1 million in 1990 to 3 million in 2009, or an annual average growth rate of 5.3% (Figure 2.1). These arrivals contributed tourism receipts amounting to US$1.3 Billion (B) in 1990 to US$2.3 B in 2009, or an average of 4.9 percent growth in receipts during the same period. On the average, the main purpose of visit is holiday (49%). The Visiting Friends and Relatives (VFR) market follows with a share of 26%.

![Figure 2.1 Evolution of Tourist Arrivals to the Philippines: 1990-2009](image)

In terms of market dependence, the Philippines relied on the US, Japan and Korea for fifty percent of the volume of arrivals in the past two decades. The Northeast Asian block (South Korea, Japan, Mainland China, Hong Kong SAR and Taiwan) accounted for an average of 42.7 percent of total arrivals. The US alone had an average share of 21 percent. In 2009, the US emerged as the number one market again, after being overtaken by Korea in 2005.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 3</td>
<td>40%</td>
<td>45%</td>
<td>56%</td>
<td>51%</td>
</tr>
<tr>
<td>USA</td>
<td>20%</td>
<td>21%</td>
<td>22%</td>
<td>19%</td>
</tr>
<tr>
<td>South Korea</td>
<td>5%</td>
<td>7%</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>Japan</td>
<td>15%</td>
<td>18%</td>
<td>16%</td>
<td>12%</td>
</tr>
<tr>
<td>Top 12</td>
<td>80%</td>
<td>80%</td>
<td>84%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Source: DOT

Stakeholders have noted that the VFR market is in fact larger in the case of countries with extensive network of Balikbayan, as in the case of the US, Canada, Australia and the United Kingdom.
Arrivals from Korea dramatically increased from just 5 percent in 1990-1995 to 19 percent in 2006-2009. The Philippines has become a relatively reasonable destination for education for Koreans thus leading to the growth of Korean communities and tourists for English as second language. The expansion of air seats from Korea following amendments of the bilateral air services agreement and promotional activities by the DOT also contributed to the rise of Korea as an important source of volume for the Philippines.

The DOT regularly reports the performance of the Top 12 markets that accounted for 82.7 percent of total arrivals in 2009. This group is a mix of long haul (US, UK, Canada, Australia and Germany) and short haul (Northeast Asia and the ASEAN such as Singapore and Malaysia travellers (Table 2.2). From 1990 to 2009, the only notable changes in market shares were those of China and Korea. Mainland China, for example, was ranked 12 prior to 2001 and with a share of only 1.1 percent to total arrivals. As a result of the visa upon landing policy implemented and the increase in flights (commercial and charters) to this market, the number of Chinese visitors surged from only 18,931 in 2001 to 163,689 in 2009. In 2006, China surpassed Taiwan and gained 4th place.

Table 2.2 – Percent Share and Growth Rates of Top 12 Source Markets

<table>
<thead>
<tr>
<th>Source Markets</th>
<th>Volume of arrivals</th>
<th>% share to total</th>
<th>Growth (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
<td>2009</td>
<td>2008</td>
</tr>
<tr>
<td>USA</td>
<td>578,246</td>
<td>582,537</td>
<td>19.6</td>
</tr>
<tr>
<td>Korea</td>
<td>611,629</td>
<td>497,936</td>
<td>20.8</td>
</tr>
<tr>
<td>Japan</td>
<td>359,306</td>
<td>324,980</td>
<td>12.2</td>
</tr>
<tr>
<td>China</td>
<td>163,689</td>
<td>155,019</td>
<td>5.6</td>
</tr>
<tr>
<td>Australia</td>
<td>121,514</td>
<td>132,330</td>
<td>4.1</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>116,653</td>
<td>122,786</td>
<td>4.0</td>
</tr>
<tr>
<td>Taiwan</td>
<td>118,782</td>
<td>102,786</td>
<td>4.0</td>
</tr>
<tr>
<td>Canada</td>
<td>102,381</td>
<td>99,102</td>
<td>3.5</td>
</tr>
<tr>
<td>Singapore</td>
<td>100,177</td>
<td>98,305</td>
<td>3.4</td>
</tr>
<tr>
<td>UK</td>
<td>87,422</td>
<td>91,009</td>
<td>3.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>69,676</td>
<td>68,679</td>
<td>2.4</td>
</tr>
<tr>
<td>Germany</td>
<td>55,303</td>
<td>55,912</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,484,778</td>
<td>2,331,381</td>
<td>84.5</td>
</tr>
</tbody>
</table>

Source: DOT

Figure 2.2 shows that the Philippines is already lagging behind Vietnam (and the rest of Southeast Asia) in terms of the volume of arrivals.\(^5\) Apart from income and prices, stakeholders also attribute this performance to supply rigidities i.e. poor infrastructure (in

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\(^5\) The destinations of Malaysia, Singapore and Thailand account for 72 percent of total arrivals to ASEAN. The Philippines ranks 6th in terms of volume of visitors. The ASEAN market accounts for only 6 percent of total international arrivals to the Philippines.
terms of air seats, accommodation and convention facilities) and constraints in terms of low marketing budget.

Figure 2.1 International Tourist Arrivals from Selected ASEAN Countries

![Figure 2.1](image)

Source of basic data: UNWTO and different tourism ministries

To elaborate on some of these supply fixities, the Philippines lags behind its Asian neighbors in terms of international air connectivity. There are only about 770 incoming flights to the country compared to the rest of ASEAN (Figure 2.2). The number of flights by foreign air carriers has dwindled in the past ten years. There are only about 355 flights per week by foreign carriers to the Philippines. This is a sharp contrast to the capacity of our neighbors. A major reason behind this poor connectivity is the tax regime (i.e. common carriers tax and gross Philippine billings and their pertinent regulations) that does not conform with international standards and practices. Another is the lack of air access due to restrictions imposed by existing bilateral air agreements particularly during the period 1997 to 2007. Nonetheless a number of these agreements were renegotiated and new ones were signed starting in 2007. The increase in flights in recent years catered primarily to the OFW markets.

Figure 2.2 Comparison of International Air Connectivity in ASEAN
3 Related Literature

This review examines the motivation behind the choice of variables and estimation technique used in this paper. It is divided into two parts. The first part explores the theoretical issues related to tourism demand. The second examines the empirical issues as regards measures of tourism demand and its determinants and the model specification.

3.1 Theoretical Issues

The neo-classical demand theory has served as the underlying theory of a number of empirical tourism demand studies. Income and price are considered to be the two most important factors influencing a consumer’s or household’s decision to travel overseas. Rugg (1973), Papatheodorou (2001) and Giacomelli (2006) cite limitations of this theory in explaining touristic choice. It only accounts for price as the destination’s characteristic (Giacomelli 2006) and ignores the differences in vertical (quality differentiation) and horizontal (attitudes of tourists towards different destinations) dimensions (Papatheodorou 2001). The theory assumes perfect competition where producers are assumed to be price takers and are not able to create strategic plans or take control of the market thus ignoring the realities of market consolidation that shape the travel behavior of consumers (Papatheodorou 2001).

Papatheodorou (2006) examines the other theories to explain touristic choice that have emerged in the economic literature on international tourism demand. There is Lancaster’s (1966) goods-characteristics theory which argues that an individual tourist does not obtain satisfaction from “possessing or consuming travel destinations” but from staying in a certain destination for a period of time that enables the tourist to “consume” characteristics of destinations (such as beautiful scenery). Other studies have incorporated factors such as financial (cost of transport) and time (cost of time in traveling to alternate destinations) constraints (Rugg 1973), duration of travel and allocation of budget (Morley
1992), role of information (Morley 1998), role of regulation (Keane 1997), and the role of tour operators in improving market access when there is asymmetric information (Clerides, Nearchou and Pashardes 2004). In spite of the limitations of the standard economic theory, it continues to remain a popular framework because of its simplicity and ability to explain international tourism demand through the two most basic determinants, income and price.

3.2 Empirical Issues

There is a set of review articles that provide comprehensive reviews of research in the field of international tourism demand since the 1960s. They include the works of Crouch (1994a, 1994b, 1995), Lim (1997a, 1997b, 1999), Witt and Witt (1995), Fretchling (1996), and Li, Song and Witt (2005). They compare new and old econometric approaches to modeling and forecasting tourism demand. They agree that income and prices are the main factors affecting tourism demand but they recognize the differences in the formulation of those factors and the inclusion of additional variables like transportation costs, dummies or time trends.

Measures of Tourism Demand

From the receiving country point of view, tourism demand represents the set of goods and services that the visitors - residents and non residents- acquire during a specific period of time of their permanence (Proenca and Soukiazis 2005) and under certain conditions which are controlled by the explanatory factors used in the demand equation (Song and Witt 2000). There is no single and standard measure of international tourism demand. Bearing in mind that the demand for tourism is a variable not directly observable it is necessary to find a suitable proxy to represent it (González and Moral 1995). The measures used include number of visitors (entrances), number of visitors crossing the borders, number of nights spent, receipts originated from the visitors’ spending, stay-length of tourists visiting a country and nights spend in lodging facilities.

Tourism receipts or expenditures, expressed in total or per capita visitor and in nominal or real terms of measures such as share of total expenditure on airfares, expenditure shares (Lim 2006), is the most appropriate measure of demand from the point of view of the receiving country for two reasons. One, it captures the consumption behaviour of the tourists and explains the spending component of this economic activity (Mello and Sinclair 2002). Second, changes in tourists’ consumption patterns and not the volume of visitors have a direct impact on the tourism industry’s generation of income and foreign exchange earnings (Lim 2006). Tse (1999), Lathiras and Siriopoulos (1998) and Cunha (2001) find expenditures as a more complete definition than using the number of visitors or entrances and Cunha argues that the latter ignores one of the most important aspects in this sector, that is, the demand of goods and services that tourists require during their permanence. Sheldon (1993), however, notes inaccuracies in forecasting tourist expenditures given the high degree of error even in the developed countries.

The tourist arrivals (entrances) indicator is the more popular and frequently used relative to the tourist expenditure or receipt. The main reason for this choice has been the unavailability of data on tourism spending and difficulty of monitoring since the industry is
composed of several sub sectors (Sheldon 1993). Various measures of tourist arrivals include number of holiday visitors per capita; share of groups of tourist arrivals to total; proportion of tourists to a particular destination; visit rate; total departures of citizens less non-returning citizens, and the number or proportion of recreational and business tourists, separately from total tourists. Rodriguez and Ibanez (2001) use the number of visitors lodged in the destination country that exclude tourists who stay in homes of friends and relatives as another measure of tourism demand.

Determinants

Economic factors tend to generally account for the total demand of an origin country for all destinations but noneconomic factors drive the choice of specific types of tourism or destinations (Sauran 1978 as cited in Croes and Venegas 2004). The assumption of no money illusion assumption is imposed to explain that a proportional increase in all prices and money incomes would leave demand for tourism unchanged Song and Turner (2006). In the literature, the most commonly tested explanatory variables are income, relative prices, exchange rates, and transportation costs (Sinclair & Stabler, 1997; Song & Witt, 2000) because they are considered to have the greatest effect on demand for international tourism.

Income Among the determinants, income is the most frequently used variable in explaining tourism demand. International tourism, especially long haul travel, is regarded as a luxury good and therefore significantly depends on the income of the travelling individual. An increase in the real income per capita leads to an increase in the number of tourism goods that are purchased (Crouch 1994b, Sinclair and Stabler 1997). Since this discretionary income is subjective and not accurately measurable (Song and Turner 2006), there is extensive use in the literature of proxy variables that include Gross National Product, Gross Domestic Product (Kulendran and Wilson 2000) expressed in real (or nominal) per capita terms. According to Witt and Witt (1992) tourism is a luxury good and expected income elasticity of demand is higher than one. Crouch (1995) and Song and Turner (2006) note that while empirical studies have confirmed such elasticity, researchers should still bear in mind that income elasticities of the demand for tourism are specific to each country and no generalization can be made about its value.

Price Based on the demand theory, prices and tourism demand are negatively related. Tourism demand increases when the cost of living in the destination country is lower relative to the origin country, and vice versa. There is no single dataset or variable that captures and represents tourism price.

The most commonly used variable is the relative price index, or ratio of the consumer price indexes between the receiving and the sending countries adjusted by the bilateral exchange rate (Kulendran and Wilson 2000, Lathiras and Siriopoulos 1998). A rise in the relative price index means that purchases in a destination are relatively more expensive for tourism from the point of view the tourist. This could be due either to a higher inflation rate in the destination compared with the origin. It is also possible that the currency in the destination has become more expensive in terms of the current in the origin market. Apart from its own price, authors (Turner, Reisinger and Witt, 1998) have also introduced a
substitute price in estimating tourism demand. The same ratio is applied between different competing destinations to account for the so-called price substitution effect. An increase in the price level of the destination country discourages tourists to move to this place. It also pushes them to consider cheaper competing places.

The nominal exchange rates between the origin and the destination countries have been used as another price variable (apart from the relative price index) in order to test the sensitivity of the origin markets (Sinclair and Stabler 1997) given that tourists tend to respond more to exchange rate movements but not to changes in relative inflation rates due to lack of access to information about prices of the basket of services or goods that they will consume in the destination country (Lim 2006). The use of nominal exchange rate has not been widely popular because it does not account for the cost of living between the origin and destination (Eilat and Einav 2004) and the inclusion of both exchange rates and relative prices as determinants of demand may lead to estimation issues such as multicollinearity because exchange rate is also a measure of relative prices. The use of exchange rates alone on the other hand can be misleading because exchange rate in a destination may become more favorable if this could be counterbalanced by a relatively high inflation rate (Song and Turner 2006). Empirical studies do not provide conclusive findings about the role of this variable.

Transportation costs are also added as an explanatory variable to account for the travel cost between the origin and destination countries. It also reflects the opportunity cost of travel time (Ordonez et al 2010). The measure of effective transportation cost becomes more difficult to measure due to the range of prices, particularly air fares, brought about by the practice of discriminating passengers. However, Sinclair and Stabler (1997) argue that it is no longer necessary to include price of transport since demand is already defined as the “total bundle of tourism components which are purchased” and is already represented by the own price variable. Due to the unavailability of data, transport costs are commonly measured in terms of distance between the origin and destination (Eilat and Einav 2004, Naude and Saayman 2005), price of fuel (Gain-Munoz 2007, Garin-Munoz and Perez-Amaral 2000, Ledesma-Rodríguez et al 2001) and time spent in traveling (Witt 1980a, 1980b, 1983). Travel and time costs are expected to increase with distance to the tourist destination but distance does not vary over time and therefore fails to capture the dynamic changes in the aviation industry, including the impact of more efficient aircraft types and the phenomenon of low cost carriers (Ordonez et al 2010).

Dynamics The role of dynamics has gained more prominence in recent literature with the increasing use of lagged variables that account for the rigidities faced by tourists when they make and change travel plans in the short run. These constraints mean that tourism demand cannot respond fully to a change in income and prices. To incorporate the travel behavior patterns of consumers and the persistence of “word of mouth” advertising, a lagged tourist arrivals is included in some studies (Proenca and Soukiazis 2005, Song, Wong and Chon 2003, Song and Wong 2003, Li, Song and Witt 2006 and Zhou, Bonham and Ganges 2007). The lagged dependent variable also introduces dynamics into the demand function and captures supply constraints in room availability, passenger transportation capacity and trained staff, factors that require time to build up or to adjust (Witt and Witt 1995, Song and Witt
Some studies also use accommodation capacity, exchange rate reforms or foreign exchange restrictions as variables separate from the lagged dependent variable.

**Other Factors** Population is another factor used to explain tourism demand since large countries constitute a potential market for supplying tourists and, therefore, more economies to scale can be explored. Marketing expenditure is added if the objective is to see the effect of promotions to the demand although very few studies incorporated this in the estimations due to lack of historical series for specific target markets. For business tourism, openness to trade is used and measured by trade share of output is a determinant of business travel (Kulendran and Wilson 2000). Dummy variables may be used to capture seasonal variations in travel demand and the qualitative factors such as tourists’ attributes (Eilat and Einav 2004), destination attractiveness, political and social events.

### 2.3. Specification and Estimation Issues

Crouch (1994a in Croenca and Psoukazis 2005) explains that the specification of the demand function varies according to the countries or regions used, the time period of the study, the type of the data (time series or panel data) and the nature of tourism (holidays, business trips, visits to family or friends). Croenca and Psoukazis (2005) note that the choice of the explanatory variables to be included in the models is also sensitive to problems, such as, the degree of freedom loss, data reliability, collinearity problems, omitted variable bias or endogeneity inconsistency. In addition, not all of the variables can be included in models of international tourism demand (Croes and Vanegas Sr 2004).

The range of estimation techniques and battery of diagnostic tests has increased in recent years as provided in the reviews by Song and Turner (2006) and Lim (2006). They range from time series to simple to complex models such as cointegration analysis, error components method (ECM) estimation techniques (Kulendran and Wilson 2000, autoregressive distributed lag model (ADLM), time varying parameter (TVP), vector autoregression (VAR), almost ideal demand system (AIDS) (De Mello, Pack, & Sinclair, 2002), ARIMA and Holt-Winters univariate Modelling (Kim 1999, Fretchling 1996), 2SLS and 3SLS (Tse 1999), and panel data regression (Eilat and Einav 2004). Econometric models are considered to be more superior (Song, Wong and Chon 2003) given their strong basis on economic theory and the fact that they allow researchers to analyze the tourists’ process of choosing a destination given a certain change in the determinants. The TVP approach for instance takes into account the effect of behavioral changes (for example, changes in preferences) of tourists over time and the ability to simulate different external shocks such as political instability and economic reforms to the tourism demand. Song, Witt and Jensen (2003 in Li et al. 2006) and Song and Witt (2000 in Li et al. 2006) note that the TVP model performs better than other techniques, including ADLM and VAR.

Recent studies have started to apply panel data regression in tourism demand estimation (Eilat and Einav 2004, Proenca and Soukiazis 2005, Garin-Munoz and Perez-Amaral 20001, Ledersma-Rodriguez, Navarro-Ibanez and Perez-Rodriguez 2001, Naude and Saayman 2005, Giacomelli 2006) to incorporate both space and time dimensions (Gujarati 2003), uncertainties (Naude and Saayman 2004), the ability to examine the behavior of
different cross-sections and treat countries as heterogeneous destinations (Eilat and Einav 2004), provide better estimates of long-run relationships and solve the problem of unobserved country effects, outliers, endogeneity and dynamics. On the other hand, it cannot recognize the difference between a single trip and multiple trips (Eilat and Einav 2004) and can also suffer from heteroscedasticity that can provide misleading results.

4 Data and Methodology

A panel data approach is used to analyze the relationship between international tourism demand to the Philippines and its main explanatory variables, namely income and price. This method presents some advantages over time series. It allows for the control of individual heterogeneity, reduces the problem of collinearity, and provides more degrees of freedom that make it easier to infer the outcome in the case of small samples (Munoz 2006). However, certain limitations of the panel data technique should be considered. These include errors related in the design of the database, distortions produced by the errors of measure, selection problems, and the length of the time series (Garin-Munoz and Montero-Martin 2007). See Arellano & Bond (1991), Holtz-Eakin (1988) and Hsiao (2003) as references.

In this paper, we use panel data with observations for 12 origin countries over the period from 1990 to 2009. These markets represent about 80 percent of the total visitor arrivals over the 20-year period covered in this paper. The use annual data allows us to avoid seasonality problems that heavily characterize tourism demand.

Dependent variable

We have chosen international tourist arrivals\(^6\), measured in terms of the number of entrances to the Philippines, as our measure of demand. We are particularly interested in producing forecasts of the volume of arrivals although the forecasting exercise will not be covered in this paper. The dataset is compiled and published by the DOT. Before we continue, we need to cite certain limitations of the data used. In our estimation of the demand by the holiday and VFR markets that account for 70 percent of the total air arrivals\(^7\), we use fewer observations, that is, from 1996 to 2009. The VFR category was used only in 1996. Note also that the shares of the holiday and VFR markets to the total in 2009 were estimated using their percentage shares in 2008. The breakdown by purpose was not yet available at the time of this research. We also note that the elasticities derived in this paper will tend to be underestimated because the length of stay of the visitor is ignored.

Explanatory variables and Data

The main purpose of this paper is to examine how adequately income and price can explain the behavior of international tourism demand to the Philippines. The main variables used to explain the quantity of visitors to the Philippines are:

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\(^6\) Tourism, for this purpose, is defined as “the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year”. In particular, international tourists are “tourists who stay at least one night in a country where they are not residents”, where a resident is “a person who has lived for most of the past year in a country”.

\(^7\) Ninety eight percent of all visitors arrive by air.
(1) Income of the source markets – This impacts positively on the purchasing power of the
sending (importing) country. In fact, the higher the purchasing power of the sending
country the higher the demand for tourism of its citizens. We use GDP per capita of each
origin country in real terms (using 1990 constant prices) as proxy measure of discretionary
income of the origin markets.

(2) Price of the tourism goods and services in the Philippines – Price impacts negatively on
visitor arrivals. The higher the price level of the Philippines (relatively to the origin
markets), the lower the volume of arrivals. The price variable used in this paper is
computed as the relative price index, or ratio of the consumer price indexes between the
Philippines and the Top 12 markets adjusted by the bilateral exchange rate using Equation
3.1.

\[ P_{od} = \frac{CPI_{d}}{CPI_{o} \cdot EX_{od}} \]  

(3.1)

(3) Lagged Tourist Arrivals – This variable captures other factors such as word of mouth
advertising, lack of knowledge, habit, supply and institutional rigidities or constraints that
may preclude full adjustment to optimal level (Song & Witt, 2000; Sinclair & Stabler,

(4) Special factors – Commonly represented as dummy variables, they refer to events and
destination specific characteristics such as political and social risks that can positive or
negatively impact on tourist arrivals. Their inclusion in the model tends to relax the
assumption that every observation in a time series is impacted by the independent
variables in the same way during the time span under review (Croes and Vanegas 2005).
The dummies assume values of 1 for the years 2003 and 2001 and zero otherwise.

We recognize that transportation costs, one of the major components of the total travel
cost, should be considered as an explanatory variable given that 98 percent of visitors arrive
by air. An increase in transportation costs would lead to lower tourism demand, assuming all
else the same. However, we could not construct a time series of airfares for all the markets.
Since we estimated the dynamic model using first differencing we tested the price of crude oil
(Garin-Munoz 2004) instead of distance as proxy for transportation costs. The World Bank
Economic Outlook and International Monetary Fund Statistics serve as sources for data on
GDP, CPI, and exchange rate.

Model Specification
Based on these specifications, the international tourism demand functions for the Philippines
have the following general form:

\[ Q_{it} = f(Income, Price, Dummies, Lagged Tourist Arrivals) \]

The log linear model is the following:

\[ Ln \left( Q_{it} \right) = c + \beta_{1}ln(PGDP_{it}) + \beta_{2}ln(P_{it}) + \beta_{3}ln(Q_{it}) \cdot (-1) + \beta_{5}D911+ \beta_{6}D03+ u_{it} \]  

(4.1)
where \( i \) is the country of origin and \( t \) is the year (1990-2009)

\( \text{TA} \) is the number of visitor arrivals from country \( i \) during year \( t \)

\( c \) is the constant term for each country which takes into account the individual specific characteristics of the country as well as possible omitted variables;

\( Y_{it} \) is real GDP per capita,

\( P_{it} \) is the relative price index

\( D_{911} \) is the dummy variable for the 9/11 terrorist attack

\( D_{03} \) is the dummy variable for the SARS health scare in 2003

**Estimation Technique**

The Generalized Method Moments (GMM) proposed by Arellano and Bond (1991) is the procedure used to estimate the dynamic model in (4.1) that includes the value of the visitor arrivals in the previous period (lagged dependent variable) as an explanatory variable. According to Arellano & Bond (1991) and Hsiao (2003), when the number of observations in a time dimension \( T \) is not that large in a model with lagged dependent variable, the simple estimation procedures are not valid because the within estimator (least squares after transformation to deviations from means) would be inconsistent. Under the Arellano-Bond GMM approach, the problem is addressed by removing the individual effects. This is done by first differencing the equation and then estimating by instrumental variables (IV), using as instruments the values of the dependent variable lagged two or more periods similar to the work of Garin-Munoz and Montero-Martin (2007). The dynamic model to be estimated will therefore be:

\[
\Delta \ln Q_{it} = \beta_1 \Delta \ln Q_{it-1} + \beta_2 \Delta \ln P \times GDP_{it} + \beta_3 \Delta \ln P_{it} + \beta_4 \Delta d_{03} + \beta_5 \Delta d_{911} + \Delta \varepsilon_{it},
\]

where \( i = 1 \ldots N; \ t = 1 \ldots T \), and all the variables are in first differences. That means \( \Delta \ln Q_{it} = \ln Q_{it} - \ln Q_{it-1} \) and analogously, for the other variables.

The double-logarithmic form of the model from Eq 4.1 will allow us to examine the short-run elasticities from the estimated parameters or coefficients. We can estimate the long-run elasticities by dividing each of the coefficients by \((1-\beta_1)\).

5 **Estimation Results**

We first estimate Eq (4.2) by using income and price as the main explanatory variables in order to ascertain their impact on tourism demand to the Philippines. The results of the ordinary least squares, fixed effects and random effects estimation reveal that while income has a positive sign, it is not significant.\(^8\) In the case of price, the sign is positive and insignificant. Even the addition of distance or the price of crude oil as another explanatory variable does not increase the power of the model to explain international tourism demand to the Philippines.

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\(^8\) Differentiating helps avoid the problem of non-stationarity. As a result, one can have confidence in the estimation results, particularly in the reported coefficients and standard errors.

\(^9\) See Annex
We then estimate Eq 4.2 by adding the lagged dependent variable to introduce the role of dynamic elements i.e. effects of previous consumption on the current purchases of tourists. To estimate Eq 4.2, the GMM-DIFF estimator of Arellano and Bond is used (Munoz 2006, Garin-Munoz and Montero-Martin 2007). The results are presented in Table 5.1.

**Signs and Significance of the Variables**

1. The sign of the income coefficient for the Top 12 markets – total, holiday and VFR- is positive, confirming the theoretical prediction that demand increases with improvements in income levels. Income is also significant in explaining tourism demand.
2. In the case of relative prices, the sign is negative, indicating that demand for tourism to the Philippines goes up when prices in the Philippines decline relative to those in the origin markets. Price, however, is not a significant determinant of holiday visits but is significant in the case of the VFR market.
3. The negative signs of the two dummy variables representing the 9/11 and SARS in 2001 and 2003 respectively indicate the negative impacts of external shocks on visitor arrivals. Note however that for the VFR market, the estimated coefficient for the 9/11 dummy is -0.029 with a t-statistic of -0.56 indicating an insignificant effect. The dum03 variable that captures the impact of the SARS health scare is significant for the VFR market thus implying that this market tends to be more sensitive to health-related rather than security risks. Both risks have negative and significant impact on holiday visits.

**Table 5.1 - Dynamic Panel Results for the Top 12 Source Markets**

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Total</th>
<th>Holiday</th>
<th>VFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(PRGDP)</td>
<td>1.015</td>
<td>1.086</td>
<td>0.833</td>
</tr>
<tr>
<td></td>
<td>(2.275)</td>
<td>(1.987)</td>
<td>(3.075)</td>
</tr>
<tr>
<td>Ln(Price)</td>
<td>-0.0675</td>
<td>-0.138</td>
<td>-0.283</td>
</tr>
<tr>
<td></td>
<td>(-0.475)</td>
<td>(-0.534)</td>
<td>(-4.960)</td>
</tr>
<tr>
<td>Ln(Visitors(-1))</td>
<td>0.545</td>
<td>0.589</td>
<td>0.644</td>
</tr>
<tr>
<td></td>
<td>(4.183)</td>
<td>(4.160)</td>
<td>(7.320)</td>
</tr>
<tr>
<td>DUM03?</td>
<td>-0.139</td>
<td>-0.194</td>
<td>-0.108</td>
</tr>
<tr>
<td></td>
<td>(-6.270)</td>
<td>(-6.741)</td>
<td>(-5.566)</td>
</tr>
<tr>
<td>DUM911?</td>
<td>-0.139</td>
<td>-0.199</td>
<td>-0.029</td>
</tr>
<tr>
<td></td>
<td>(-5.653)</td>
<td>(-3.63)</td>
<td>(-0.561)</td>
</tr>
<tr>
<td>No. of observations</td>
<td>216</td>
<td>144</td>
<td>144</td>
</tr>
</tbody>
</table>

T-ratios in parentheses; unless indicated, all variables are significant at 1%, 5% and 10% significance levels. NS - not significant

**Sensitivity to Income and Price Changes in the Short Run**
4. The coefficients of income and price can be interpreted as short-run elasticities. Thus, for the Top 12 markets, a 1% increase in their incomes translates to a 1.01% increase in their volume of arrivals. Although the value is slightly higher than one their demand to the Philippines is not very sensitive to changes in their income and therefore not really considered a luxury good.

5. In general, price is not a significant variable in explaining visitor flows to the Philippines. This suggests that the markets are related more to the so-called ethnic travel, that is, the VFR and to official business travel to some extent. Even if we consider the significant results for the VFR market, given by the coefficient of -0.283 and t-statistic of 4.9, we can conclude that price has little impact on this group of visitors. The absolute value of 0.283 implies that a 1% increase in prices in the Philippines relative to their origin leads to a decrease of only 0.283% in their volume of arrivals. The insignificant impact of the relative price variable may enhance the country’s benefits from highly income elastic demand since tourism receipts may not fluctuate significantly (Croes and Vanegas 2005).

Role of information, word of mouth, and familiarity

6. The lagged variable is positive and significant for the three groups. This means that higher consumption for Philippine tourism in the previous period will translate to higher visits in the current year. The positive relationship between these two periods indicates that the more information the market has about the Philippines the greater is their demand for our tourism products and services. It is therefore likely that the demand is driven by the markets’ familiarity about the Philippines due to the availability of more information through the effects of “word of mouth advertising” and/or habit persistence (consumers develop the habit of making repeat visits to destinations) due to favorable results of previous visits, and marketing. It may be said that the visitors to the Philippines are the so-called psychocentric tourists in the tourism literature. They are those who prefer familiarity as opposed to new destinations and experiences. This apparent loyalty is evidenced by the relatively large shares of repeat visitors, about 53 percent, to the total arrivals of the Top 12. In fact, the share is higher at 62 percent if we exclude China, Taiwan. These two markets have higher shares of first time visitors. Repeat visitors are recognized to be instrumental in communicating the true quality of products and services to their friends and relatives. They also help improve the quality at the destination they have basis of comparison with previous visits.

Sensitivity to Income and Price Changes in the Long Run

7. In the short run the elasticities are generally smaller in absolute value because it takes people more time to make the necessary adjustments to income and price changes. For them the process of change may involve some abrupt or immediate decline in overall satisfaction (disutility). In some cases, there supply constraints that limit their ability to make the immediate changes. In the case of tourism to the Philippines, these constraints can be related to difficulty in confirming airline seats and hotel/resort rooms. To estimate the long run elasticities, in general, the Top 12 markets are more sensitive to income changes in the long run as shown in Table 5.2. The elasticity increases significantly to

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10 This can be derived by dividing the coefficients of income and price by the value of the coefficient of adjustment (obtained by subtracting the statistically significant coefficient of the lagged dependent variable from 1).
2.2. The leisure visitors tend to be more responsive than the VFR group, as revealed by the long-run elasticity values of 2.6 and 2.3, respectively. These figures suggest that the Philippines is very dependent on the economic conditions of these origin markets. The Top 3 markets, for instance, already account for half of the arrivals. It may be argued that marketing efforts should not be directed at just a single or few markets. On the other hand, one can also contest that the Philippines should intensify promotions in these markets given their relatively large base of outbound travellers and the fact that the share of the Philippines to this outbound is still very small.

Inertia or Rigidity in Tourism Inflows

8. In performing the dynamic estimation, we assume that the adjustment to optimum tourism demand to the Philippines is spread over time due to factors such as lack of knowledge, supply fixities, institutional constraints faced in the short run. Even if the markets would want to increase their travel to the Philippines they may be faced with constraints such as lack of flights or available seats, lack of rooms, visa issues etc. in the short-run. We then ask the question: how long does it take for these markets to adjust to the changes in economic conditions? Let us first use the coefficient of adjustments in Table 5.2 to explain the adjustment process. Similar to the analysis and findings of Croes and Vanegas (2005), the coefficients suggest that under the assumption that our markets do not react instantaneously to the fullest extent to the changes in economic conditions, only 45% of the planned (desired) visitors from the Top 12, 41% from the holiday and 35% for the VFR markets occur within the first year, respectively. Thus, value of the adjustment coefficient ($\delta = 45\%$) indicates the relatively low adjustment process of the markets between the actual variation of in tourism demand to the Philippines and the desired long-run level (Proença and Soukiazis 2005). This suggests the presence of inertia or rigidities in tourism flows to the country due to the factors mentioned above.

9. Thus, during the first year, as a result of higher incomes, their adjustment may involve staying longer or spending more or both in the destination. Over time, however, when they are able to respond fully to those positive changes, they will tend to increase their number of visits to the Philippines. How long will the adjustment take place? It requires nearly 5 years\(^{11}\) for the Top 12 markets for complete adjustment to take place assuming all other factors remain the same. Note however that it takes the VFR market slightly longer adjustment period, 7 years, compared to the holiday visitors (6 years). These figures suggest that the VFR market is more psychocentric than the holiday visitors, that is, they prefer familiarity rather than new destinations or experiences. Psychocentric tourists tend to have longer adjustment time or no adjustment at all (Sinclair and Stabler 1997).

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\(^{11}\) If $N$ is the number of periods required for adjustment to within 5% of the long-run equilibrium level, $N$ may be determined by the formula: $(1 - \delta)^N \geq 0.05$, where $\delta$ is the coefficient of adjustment (Croes and Vanegas 2004).


<table>
<thead>
<tr>
<th>Elasticity</th>
<th>Coefficient of Adjustment $\delta$</th>
<th>Income</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short run</td>
<td></td>
<td>1.015</td>
<td>-0.069</td>
</tr>
<tr>
<td>Long run</td>
<td></td>
<td>2.231</td>
<td>-0.148</td>
</tr>
<tr>
<td>Holiday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short run</td>
<td></td>
<td>0.41</td>
<td>-0.138</td>
</tr>
<tr>
<td>Long run</td>
<td></td>
<td>2.642</td>
<td>-0.336</td>
</tr>
<tr>
<td>VFR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short run</td>
<td></td>
<td>0.35</td>
<td>-0.283</td>
</tr>
<tr>
<td>Long run</td>
<td></td>
<td>2.340</td>
<td>-0.795</td>
</tr>
</tbody>
</table>

### 6 Summary and Conclusion

The basic aim of this paper was to estimate the demand function of tourism in the Philippines with respect to the Top 12 source markets that accounted for an average of 80 percent during the period 1990 to 2009. A dynamic panel data approach was used to examine the impact of income and price as main determinants and the role of elements such as habit persistence, word of mouth and supply fixities.

Income is more important than price in explaining visitor flows to the Philippines similar to the findings in other studies. Based on the dynamic model, we showed that the markets tend to be more income and price sensitive in the long run. The higher values for income elasticities suggest that the tourism is very dependent on the economic conditions of the Top 12 markets and in fact on the Top 3 – USA, Japan and Korea that account for at least half of the arrivals. They imply the importance of diversifying the market portfolio in order to reduce the vulnerability of the Philippines to changes in economic conditions in one or two of the markets. On the other hand, this implication does not mean that the country should reduce its marketing efforts in those markets, given that the flows to the Philippines account for a very minimal share of the total outbound travel of these markets. The results also reveal the sensitivity of the markets to political and social risks.

The positive relationship between the lagged variable and the current demand only reveals the role of information in the behavior of international visitors to the Philippines. It is therefore likely that the demand is driven by the markets’ familiarity about the Philippines due to the availability of more information through the effects of “word of mouth advertising” and/or habit persistence (consumers develop the habit of making repeat visits to destinations) due to favorable results of previous visits, and marketing. It may be said that the visitors to the Philippines are the so-called psychocentric tourists in the tourism literature. They are those who prefer familiarity as opposed to new destinations and experiences. The findings imply the strong possibilities of generating more tourists with improvements in product and service
quality and therefore destination image by the tourism suppliers. This is an effort for both the government and the private sector.

The low value of the adjustment coefficient on the other hand indicates the relatively low adjustment process of the markets given improvements in economic conditions. This suggests the presence of inertia or rigidities in tourism flows to the country due to factors such as lack of knowledge, supply fixities and institutional constraints faced in the short run. Even if the markets would want to increase their travel to the Philippines they may be faced with constraints such as lack of flights or available seats, lack of rooms, visa issues etc. in the short-run.

This research is limited to the Top 12 markets and the holiday and VFR markets. The behavior of the business travellers is ignored but definitely merits further investigation given their significant share and the fact that they also drive repeat visits. The role of transportation costs specifically airfares has not been given due attention due to the lack of an appropriate proxy variable to be used in the dynamic model. We used price of crude oil as proxy variable in one of the estimations but it was not significant at all. Furthermore, the prices of substitute destinations relative to the Philippines were not considered. Corpuz (2010) notes that this is significant in explaining tourism demand to the Philippines, with demand measured in terms of tourism expenditures or receipts for the Top 5 markets. Other factors that merit further investigation in terms of their impact are supply factors such as accommodation capacity, impact of more liberalized aviation markets, impact of taxes, and marketing expenditures. For marketing purposes, it is also worthwhile to examine the behavior of individual markets rather than a group. The impact of the lagged dependent variable or information availability and dynamics may vary across individual markets.

We suggest the examination of the impact of the variables using other methodologies mentioned in the literature review. This will help validate the generalization of the findings in this paper. Furthermore, we can explore discussions of the possibility of producing a tourism price index for the Philippines although we admit that this initiative will require financial resources and that tourism stakeholders will have to compete with other sectors for the limited funds.

For the industry to benefit from the interface between applied economics (and other disciplines) and the tourism literature, it is important for collaboration to take place. This collaboration can be in the form of joint or consortium research among educational institutions and the government. Another is the regular conduct of conferences or seminars in tourism to be participated in by students, government and private researchers similar to the initiative by the National Statistical Coordination Board. This is one way by which local tourism destinations can benefit from the presence of knowledge institutions in their areas.
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