An Exploratory Study of International Tourism Demand from the Selected Countries to Taiwan

by

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(ABSTRACT)

This study, covering the period between 1968 and 1991, employed the ordinary least square (OLS) multiple regression technique to estimate the elasticities of international tourism demand from four generating countries (Japan, USA, Hong Kong and South Korea) to Taiwan for a set of potential important determinants: per capita income and population in the tourist-generating countries, relative prices, exchange rate, and trade volume within the tourist-generating countries and Taiwan. The log-linear model was used in this study to explain both tourist arrivals and tourist expenditures. The C(p), R^2, Model significance level (α), Durbin-Watson d statistic, regression coefficients of variables and variable significance levels are reported for each regression analysis. The criteria used to determine the "best" tourism demand models for each country are: conformity to regression and theoretical concepts and best empirical explanatory ability. For Japan, the tourist arrival model is best explained by trade volume, and the tourist expenditure model is best

explained by relative prices and exchange rates. For the USA and South Korea, both the tourist arrival models and tourist expenditure models are best explained by relative prices and trade volume. For Hong Kong, the tourist arrival model is best explained by population and exchange rate; tourist expenditure model is best explained by income.

Surprisingly, income and tourism demand are negatively related in three of the four countries, implying that Taiwan as a tourism destination may not be a "normal product". Prices tended to provide the highest explanation for tourism demand for Taiwan.

Conclusively, the Western traditional assumptions regarding international tourism demand may not be completely applied to Asian countries. The findings of this study indicate that international tourism demand for newly industrialized and emerging developed countries in Asia does not necessarily follow the Western model of international tourism demand. There are some things unique and vibrant about these newly emerging Asian countries which require further studies and understanding of this phenomenon.

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CHAPTER I

INTRODUCTION

The importance and significant contributions of tourism to a country's economic growth cannot be over-emphasized, tourism earns foreign exchange, creates employment opportunities and serves as a catalyst to other industries (McIntosh, 1990). In addition, tourism is regarded as people's diplomacy through which friendship can be enhanced among countries and international image can be improved. Today, international travel and tourism has become a substantial and rapidly growing sector of international trade. It is now highly competitive and often constitutes an important component of a country's balance of payment (Crouch and Shaw, 1990).

In the economy, it is useless to recommend an industry for which there is no demand, even if all factors at the supply side are favorable. Since tourism is regarded as a unique export commodity in the economy, the demand for it could be expected to respond to most of the same factors that affect the demand for other goods and services in the economy. Tourism demand is described as tourism markets (Gunn, 1985). Laverty (1974) divided tourism demand into two types--effective demand and deferred demand. Effective demand refers to a measure of the actual participation in a tourism activity. Deferred tourism demand refers to the potential

market for tourism. This study addresses only the effective demand and the term "tourism demand" is measured in terms of number of tourist arrivals and tourist receipts.

In the past, tourism in Taiwan was somehow not respectable and received little attention from the government, because the official policy was concentrated on other sectors of the manufacturing economy considered more important. However, Taiwan government has changed its attitude towards tourism. Furthermore, the government is vigorously trying rescue tourism from deterioration. For example, visa exemption is considered an important step to boost tourist arrival figures; the increasing international aviation agreement will make Taiwan more competitive with other Asian countries; and the Six-Year National Development Plan is geared to rebuild Taiwan's infrastructure to ease the access of tourism. As a consequence, it is worthwhile and timely to examine the nature of international tourism demand to Taiwan. The purpose of this study is to study factors which are likely to impact international tourist flows from Japan, USA, Hong Kong, and South Korea to Taiwan. The factors to be investigated in this study include the following variables: per capita income, population, relative prices, exchange rate, and trade volume (exclude tourist receipts) within the tourist-generating countries and Taiwan.

Statement of the problem

In the previous studies, tourism demand between West European and North American countries has dominated the research. Obviously, Africa, Asia-Pacific, Middle East and Eastern Europe are not represented in the findings of the body of research. Since, today, the center of world economy is shifting from Western countries to the Asia-Pacific region, it may be that international tourism is about to undergo a substantial restructuring which will change and affect the usefulness of previous empirical results in determining international tourism demand. It is questionable that if the traditional Western models of tourism demand, which indicated that income is the primary explanatory variable, followed by price and exchange rates, can be applied to Asian countries. Taiwan, one of the four little dragons, which are renowned for their rapid and impressive economic growth, has become increasingly important in the international stage in terms of economy. Therefore, it is necessary to begin to study and understand if there is something unique and vibrant about the Asian countries and subsequently attempt to examine the potential factors that affect tourism demand in Asian countries.

Background of Taiwan

Taiwan is a small and heavily populated island (20.7 million population) situated in the Pacific Ocean about 160 km off the south east coast of China. It is 385 km long and 137 km wide at its extreme points, and has a land area of 36,000 km^2 (two thirds of the land is mountains, and there are more than 60 peaks over 3,000 m); about the size of West Virginia (Background Notes: Taiwan, 1991).

The history of Chinese migration to Taiwan may have begun as early as AD 500. Dutch traders first claimed the island in 1624 as a base for Dutch commerce with Japan and coastal China. Dutch colonists administered the island and its predominantly aboriginal population until 1661. Sequentially, Taiwan was ruled as a frontier district by China from 1661 to 1886. In 1886, it was declared a separate Chinese province. In 1895, a weakened imperial China ceded Taiwan to Japan following the first Sino-Japan war. At the end of World War II, Taiwan reverted to mainland Chinese rule. During the immediate postwar period, the Nationalist Chinese fought a civil war with communists on the mainland. Following the victory of the communists in 1949, about two million persons, predominantly from the military, government, and business, retreated to Taiwan and established the provisional capital in Taiwan (Background Notes: Taiwan, 1991).

Over the past four decades, Taiwan has changed from an

agricultural to an industrialized economy, and has made it one of the four little dragons, known for their rapid and impressive economic growth. Taiwan also holds one of the largest foreign exchange reserves in the world (US $82 billion in 1992) (Asia $ Pacific Review, 1993).

Profile of Tourism Industry in Taiwan

1. Development of Tourism

Taiwan's tourism development can be traced back 35 years; in 1956, just under 15,000 tourist arrivals were recorded compared with the 1990 level which was 130 times greater, slightly below 2.0 million tourist arrivals (Statistical Yearbook of Taiwan, 1992).

In the period of 1960-1973, Taiwan experienced a period of rapid and strong growth in tourist arrivals. Annual growth rates averaged 32 percent a year. This was a very high growth rate compared to the world tourism growth rate of about 8 percent per year for the same period. During this time, Taiwan was able to attract many foreign tourists because Taiwan was a showplace for Chinese culture and was known for low commodity prices and hotel rates, and minimal crime and pollution.

During the mid and late 1970s, Taiwan did not escape the effects of the oil crises , and as a consequence, its average annual tourist arrivals growth between 1974 and 1985 was

significantly reduced to 5.7 percent, much closer to the global average of 4.2 percent. It should be noticed that the tourist arrivals growth was even negative (-4.2) in 1985 (Statistical Yearbook of Taiwan, 1992).

From 1986 to 1991 the number of tourist arrivals to Taiwan increased just 15.16 percent. By comparison, tourist arrivals to the other major Asian countries over these years increased by about an average of 76.5 percent: Japan (70.75 percent), Korea (92.17 percent), Hong Kong (61.58 percent), Singapore (69 percent) and Thailand (88.93 percent). In 1989, the tourist arrivals growth rate dropped from 9.89 percent to 3.57 percent, and the two following years even recorded negative growth rates of -3.49 percent and -4.11 percent, respectively. The possible reasons for the decreasing tourist arrivals to Taiwan during this period are the following:

* Its strong currency which has made Taiwan more expensive for visitors
* The lack of new tourist attractions and tourism "image". Taiwan used to be considered by foreign tourists as a center for Chinese culture, but this changed after the opening up of China to foreign travellers from 1978. Now foreign travellers prefer visiting mainland China because prices are much cheaper and there are more things to see.
* The visa restrictions---all visitors require a visa. Due to the fact that Taiwan has diplomatic links with only a small

number of countries, most visitors have to obtain their visas from a variety of trade and cultural centers, and all visa are single entry permits.

* The inadequate or lack of direct air links with some important market sources (for example Europe and Australia). As mentioned earlier, it is more a political matter.

2. Tourist-generating Markets to Taiwan

Although Taiwan received tourists from more than 100 countries, the sources of tourists are highly concentrated. Japan, Hong Kong, USA and South Korea supplied more than 75 percent of tourist arrivals to Taiwan.

Japan: For a long time, Japan has been the largest market to Taiwan's tourism, and the reasons involve geography, history and cultural connections. The distance between Taiwan and Japan is only three hours by air. In history, Taiwan was a Japanese colony from 1895 to 1945, therefore, the older generation of Taiwanese can speak fluent Japanese, and they have been directly affected by Japanese culture. However, tourist arrival from Japan decreased 4.97 percent in 1990 and 9.77 percent in 1991 (Table 1).

Table 1.
Tourist Arrivals From Japan, 1987-1991

Year	Arrivals	% change	% share of total visitors
1987	794,537	14.82	45.2
1988	909,044	14.42	47.0
1989	962,545	5.89	48.0
1990	914,750	-4.97	47.3
1991	825,420	-9.77	44.5

Source: Data were compiled from various statistical reports published by Taiwan Tourism Bureau.

Hong Kong: Hong Kong has been the second largest tourist source in the Asian market for Taiwan, because of the close relationship and the vast majority of overseas Chinese in Hong Kong, who accounted for 8.4 percent of total visitors. Due to the appreciation of NT dollar and the expected 1997 take-over of Hong Kong by China, the number of visitors from Hong Kong has levelled off over the past five years (Table 2).

Table 2.
Tourist Arrivals From Hong Kong, 1987-1991

Year	Arrivals	% change	% share of total visitors
1987	240,393	-5.3	13.65
1988	223.389	-7.1	11.54
1989	211,804	-5.2	10.57
1990	193,544	-8.2	10.01
1991	181,765	-6.1	9.80

Source: Data were compiled from various statistical reports published by Taiwan Tourism Bureau.

South Korea: South Korea has quickly become an important tourist source for Taiwan, since the Korea government

lifted all restrictions on outbound travel in 1989. However, the growth of South Korea market is likely to slow down. Although the number of visitors from this market has quadrupled in the last five years, the growth in tourist arrivals from South Korea in 1990 was 5.91 percent, which was disappointing, compared with the growth of 117.57 percent in 1988 and 60.51 percent in 1989 (Table 3).

Table 3.
Tourist Arrivals from South Korea, 1987-1991

Year	Arrivals	% change	% share of total visitors
1987	38,839	30.85	2.21
1988	84,503	117.57	4.37
1989	135,635	60.51	6.77
1990	143,656	5.91	7.43
1991	150,076	4.47	8.10

Source: Data were compiled from various statistical reports published by Taiwan Tourism Bureau.

US market: Among the north American countries, the United States, who has been a principal trade partner to Taiwan, accounted for 12.1 percent of visitors in 1991. Generally, there has been little change over the past few years, partly because leisure travel drifted away (often to China) as business travel picked up(Table 4).

Table 4.
Tourist Arrivals from U.S., 1987-1991

Year	Arrivals	% change	% share of total visitors
1987	215,884	11.89	12.26
1988	214,581	-0.60	11.10
1989	219,046	2.08	10.93
1990	221,201	0.98	11.44
1991	224,182	1.35	12.1

Source: Data were compiled from various statistical reports published by Taiwan Tourism Bureau.

The importance of the study

Demand is the fundamental measure of any area's success in attracting and serving visitors. All planning activities are ultimately intended to increase or control demand, and all marketing programs are aimed at increasing demand, also. Therefore, the need to enhance the understanding of the determinants of international tourist flows is considerable for both government and private enterprises engaged in the travel and tourism industry. Furthermore, an econometric model of tourism demand, despite its limitations, can provide some policy implications and may be of value to those who are promoting destinations and formulating strategies in tourism. Moreover, some of the findings of the research may be used to affect decisions on pricing, investment, marketing and product development.

Objectives of the Study

The objectives of the study are as follows:

1. to investigate factors which affect tourism generation in USA, Japan, South Korea and Hong Kong to Taiwan;
2. to develop an individual demand model for each country which will explain the international tourist flows to Taiwan;
3. to determine the patterns of international tourist flows to Taiwan;
4. to assess the implications of findings regarding factors affecting international tourist flows to Taiwan.

Hypotheses

The general research hypothesis: the international tourism demand from the USA, Japan, South Korea and Hong Kong to Taiwan can be explained as a function of per capita income and population of tourist generating countries, relative prices, exchange rates , and trade volume between the receiving and generating countries.

The specific hypotheses tested are as follows:

H1.A: The number of international tourist arrivals to Taiwan is not responsive to the changes in per capita income of its major tourist-generating countries.

H1.B: The number of international tourist arrivals to Taiwan is not responsive to the change in relative prices within the major tourist-generating countries.

H1.C: The number of international tourist arrivals to Taiwan is not responsive to the changes in relative exchange rates within the major tourist-generating countries.

H1.D: The number of international tourist arrivals to Taiwan is not responsive to the changes in the population of the major tourist-generating countries.

H1.E: The number of international tourist arrivals to Taiwan is not responsive to the changes in trade volume within the major generating countries.

H2.A: The level of international tourist receipts is not responsive to the changes in per capita income of the major tourist-generating countries.

H2.B: The level of international tourist receipts is not responsive to the changes in relative prices within the major tourist-generating countries.

H2.C: The level of international tourist receipts is not responsive to the changes in relative exchange rates within the major tourist-generating

countries.

H2.D: The level of international tourist receipts is not responsive to the changes in the population of the major tourist-generating countries.

H2.E: The level of international tourist receipts is not responsive to the changes in trade volume within the major tourist-generating countries.

Limitations

The limitations of the study include the following:

1. The study relies on data which is secured from secondary data sources. Hence, it is assumed that the data were collected properly and recorded accurately.
2. The study does not include all the tourist-generating countries to Taiwan. Only four countries are included in this study: USA, Japan, South Korea and Hong Kong, which supply more than 75 percent of the total international tourist arrivals to Taiwan.
3. The study is limited to a macroeconomic approach. It does not, for example include individual motivation and behavior; because the consideration of motivation and behavior is more applicable to a tourism psycho-social behavioral study.
4. The study does not consider seasonal differences. Taiwan has a sub-tropical climate with no major

changes in temperature during the whole year, therefore the seasonal differences in the tourist market in Taiwan are not significant. The other factor is the fact that the business share of visitors is high.

Definition of terms

1. Number of tourist arrivals: is the total number of visitors to Taiwan from the generating countries. It also includes overseas Chinese. In Taiwan, there is a market segment designated as "overseas Chinese". These are Taiwanese nationals living abroad and holding foreign passports.

2. Tourist receipt: is calculated by multiplying per capita expenditure by the number of visitors to Taiwan, expressed in US dollars.

3. Per capita income: is the gross national product divided by the consumer price index and the population of the tourist-generating countries, expressed in US dollars.

4. Relative price: is a ratio of price (CPI) in Taiwan compared to those of the tourist-generating countries.

5. Relative exchange rate: is calculated in units of Taiwan's currency divided by units of currency used in the tourist-generating countries.

6. Trade volume: is calculated by adding the total amount of exports with imports subtracting total tourist receipts

between Taiwan and the tourist-generating countries, expressed in US dollars.

7. Population: is the total number of people living in the tourist-generating countries.

Organization

This study is divided into five chapters. Chapter II presents the review of related literature and research. Chapter III discusses the selection of variables and the methodology. The trends of international tourist flows to Taiwan, the development of individual country tourism demand models and hypotheses testing present in chapter IV. Finally, chapter V discusses conclusions and presents some possible implications emerging from the research and recommendations for future research.

CHAPTER II

LITERATURE REVIEW

Introduction

Since the early 1960s, numerous empirical studies have been undertaken to develop an understanding of the determinant factors of the flow of international tourism. Although the studies covered approximately 100 countries, the researches are dominated by Western European and North American countries. However, some researchers have investigated international tourism demand in Turkey, Japan, Australia, and New Zealand. Obviously, other countries have largely been ignored, such as eastern European countries, African countries and Asia-Pacific countries. The majority of studies have analyzed data in the form of a time series, several studies, however, have used cross-sectional analysis and a small number have pooled data in order to increase the variability of the variables. The researches span the early 1960s to the late 1980s, although the 1970s and 1980s are the most heavily represented periods (Crouch and Shaw, 1990).

The Review of Related Literature

The formal econometric modelling of tourism demand between countries has received considerable research attention

in recent years (eg., Little 1980, Kliman 1981, Loeb, 1982, Witt and Martin 1985, 1987). It is generally accepted in the literature that international tourism demand depends on income, relative prices, relative exchange rates, and in some instances, also depends on transportation costs between the generating and destination countries, and other appropriate variables such as marketing expenditure or "dummy variables", representing special events, for example, the Olympic Games and the Tiananmen Massacre in China in 1989.

One of the earliest studies on tourism demand was investigated by Guthrie (1962). He employed pooled cross-sectional data and time-series data on tourism expenditure in fifty-eight countries over a four-year time frame in a log linear regression model to analyze the determinant factors that affected tourism expenditures.

Guthrie also tried to examine the determinants of business travel on the demand for tourism. The result showed that there was a positive and statistically significant relationship between business travel and demand for tourism. However, it was difficult in collecting the adequate data with generating demand for business travel. Thus, a selected group of export earnings as a proxy measure was used in his study.

Gerakis (1965)'s study, which was often cited in the early literature, calculated the exchange elasticities of expenditures. The analysis covered a number of devaluations

and revaluations between 1957 and 1962. Countries' gains or losses of tourism receipts due to exchange rates were calculated as the difference between the actual level of receipts after the devaluation or revaluation. In addition, the level of receipts would have reached, if there had been no changes in the value of the currency.

The first significant empirical study of the aggregate demand patterns of international tourism was conducted by Gray (1966). He attempted to estimate the income and exchange rate elasticities using double logarithmic demand functions for international tourism by the residents of U.S.A. and Canada. As the dependent variable, travel expenditure was regressed against GNP per capita, exchange rates and the cost of transportation. Even though all tourism imports were found to be income elastic, the coefficients for overseas travelling were much higher than those for the trips between Canada and the U.S.A.. Exchange rate elasticities were all significant and their signs were consistent with a priori expectations. However, the cost of transportation for the intercontinental trips was found to be insignificant.

The next important demand study was done by Kwack, published in 1972. His study analyzed the determinant of demand for tourism in U.S.A. and demand for tourism abroad for U.S. citizens. Kwack used quarterly U.S. data covering the period between summer 1960 and fall 1967. The model used

ordinary least squares (OLS) to determine the impact of real income per capita and prices on tourist expenditures. Income per capita was at least as powerful as prices in explaining the variation in travel spending.

A study by Bechdoltt (1973) attempted to present estimates of cross-sectional demand function for travel from each of the mainland states of the U.S. and D.C. to Hawaii for each of the ten years from 1961 through 1970. In this study, only two independent variables were used, income and transportation costs. Number of tourists was employed as a dependent variable in the model. He concluded that both income and transportation costs were significant determinants; however, the elasticity of transportation costs was greater than one and decreased with time.

Sunday (1978) used regression analysis and panel data in his study to estimate the parameter effect of prices (including relative prices and transportation costs) on American demand for international tourism to the following countries: Austria, Belgium-Luxembourg, Greece, Ireland, Israel, Italy, Portugal, Spain, Switzerland and West Germany over the period 1962-1972. The results indicated that transportation costs were but a relatively small part of the total complex of tourism demand; however, higher transportation costs reduced the number of tourists but increased the length of stay, that is, greater expenditure per

tourist.

Little (1980), in his study, attempted to determine the U.S. travel imports from various countries including Germany, Japan, United Kingdom, Canada, Italy, France, Switzerland, Spain, Mexico and Netherlands whose travel accounts showed significant tourism trade with the U.S.A.. The analysis covered 18 years between 1961 and 1978. The independent variables were real per capita personal disposable income, lagged relative exchange rates, lagged relative general prices, transportation costs, and a dummy variable to capture the impact of special events, such as world fairs, Olympic Games, and Expo 67 in Canada. Unlike the suggestion of the earlier studies that the income variable displayed better explanatory power, variations in relative prices and exchange rates were unequivocally better explanatory variables than the variations in income. In additional, transportation costs were generally not significant.

A study by Cleverdon and Edwards (1982) analyzed the total demand for international tourism by five industrialized countries: the U.S.A., U.K., France, Germany and Japan. This study covered the period between 1963 and 1977 and using the OLS procedure, was the first to use discretionary income in demand analysis of tourism. Discretionary income should be more powerful as an explanatory variable, because discretionary income is calculated after allowance is made for

basic needs such as housing, food, medical expenses, and insurance. The price variable used was the weighted average of the exchange rates which were adjusted to the CPI between the domestic currency and destination countries. As a result, price elasticity was generally lower than income elasticity and varied more between countries.

O'Hagan and Harrison (1984) estimated the disturbance factors and price elasticity coefficients of the U.S. demand for tourism products of European nations. Their study covered the 17-year period between 1964 and 1981 and used a model which is theoretically more sound than the methods used earlier. "Almost ideal demand system" (AIDS) was their estimating demand equations. AIDS is used to derive a full set of own-price and cross-price elasticities. In this study, the authors found that the own-price elasticity of demand is generally significant and the effect of the non-economic factors (dummy variable) are highly significant.

Uysal (1983) described the development and findings of a set of models used to identify the most important of the selected variables including per capita income, relative prices, relative exchange rates, special events (dummy variable) and promotional expenditure. This study covered the period 1960 to 1980, and separate models were developed for tourist flows to Turkey from each of the following countries: Austria, Canada, Greece, Italy, Spain, United Kingdom, USA,

Switzerland, France, Germany and Yugoslavia. In this study, log-linear models were used to explain both tourist arrivals and tourist expenditure. Since the Turkey government had invested largely in promoting tourism, it was important that the author incorporated this variable in the model. However, as a result, the impact of promotional expenditure was found to be insignificant, and per capita income, price and exchange rate were found to be important in explaining international tourist flows to Turkey.

Rosensweig (1986) studied, for the U.S. market, the impact of changes in exchange rates weighted by the consumer price index on the competitiveness of Caribbean tourism in relation to those of Mexico and of Europe. This study, covering the period between 1964 and 1983, estimated the elasticities of substitution between the Caribbean basin nations. Relative prices factor was found to be the determinant that affect the shifting market shares in Caribbean basin tourism, and all estimated elasticities of substitution in this study are highly significant.

Summary (1987) evaluated the usefulness of multivariable regression analysis in identifying factors which affect the international tourist flows to Kenya. The five generating countries investigated in this study are United Kingdom, USA, Italy, Germany, and Switzerland covering the time period from 1968 to 1982. Her demand models included typical independent

variables found in many of other studies mentioned previously: per capita real disposable income, relative price, exchange rate, transportation costs, and dummy variable. The results of this study indicated that multicollinearity and other estimation problems limit the usefulness of multivariable regression in analyzing determinants.

Chadee and Mieczkowski (1988) examined the impact of the depreciation of the Canadian dollar relative to the U.S. dollar on Canadian tourism. Unlike most of studies mentioned earlier, they used the travel price index (TPI) as a proxy for the prices of substitutes. Although, it is generally agreed that a depreciation of the currency of a destination country will increase the purchasing power of the currency of a generating country and result in a positive boost to the tourism industry of the destination country, the impact of exchange rate on Canadian receipts from U.S. tourists was found to be small in this study.

Tremblay (1989) attempted to make some improvement in measurements of international tourism demand elasticities by pooling cross sectional and time series data. Eighteen western European countries were pooled and estimates of elasticities with respect to income, exchange rates, relative prices, aggregated transportation costs and terrorism were computed. Here, the author provided new ways of measuring two of the independent variables--transportation costs and terrorism. A

combination of inter-country distances and receipts per passenger-mile of airline companies was used to derive the transport index. It is widely accepted that terrorism could affect tourism in a dramatic way, and should be take into account in the international tourism demand model. In this study, terrorism refers to many categories of special and irregular events, such as bombings, assassination, hostage-taking, and skyjacking. The results showed that the responses to changes in these variables are significantly different across countries.

A more recent research was conducted by Crouch at el (1992). This study employed multivariable regression analysis to estimate the elasticities of demand from five generating countries to Australia for a set of potential important determinants. Per capita disposal income, relative price, air fares, marketing expenditure, time trends and "dummy" variable were selected as independent variables in this research. Generally, the estimated elasticities of this study are consistent with the results of other similar studies.

Conclusion

1. From the studies reviewed above, the income variable was found to have a strong influence on the dependent variables. In general, the income elasticity is above unity,

that is, a small percentage increase in income of the origin countries would make demand for tourism increase at a higher percentage value. Hence, it is evident that international tourism is a luxury product rather than a necessity product.

2. For the relative price variable, it was proven to provide a high explanatory power to both tourist expenditures and tourist numbers. Knowing the values of price and exchange rate elasticity in the case of international tourism would enable the policy maker to plan ahead to control inflation and to calculate gains and losses from proposed currency devaluations.

3. Using relative rather than absolute prices has become a conventional practice. Even though general price indices may not truly reflect the price variations in the tourism sector, lack of data has led to the use of the consumer price index (CPI) as a proxy for tourism prices.

4. Exchange rates have been used both as a separate independent variable and as a price deflator. The exchange rate is actually a measure of relative prices, therefore, the inclusion of both exchange rate and relative prices as explanatory variables may lead to serious statistical problems, such as multicollinearity. However, if the trips to the countries are free-lance trips rather than package tours, using the exchange rates as an independent variable instead of a deflator may be more realistic.

5. Economic theory proposes that the major determinants of the demand for tourism are the income of tourists, the prices of tourism products, the prices of substitutes, the taste of tourists, and other exogenous factors. These non-economic factors can be considered as a dummy variable. Eventually, non-economic factors are at least as important as economic factors and should ideally be taken into account.

6. Over the past three decades, a considerable number of studies in international tourism demand has accumulated. Although a large number of countries has been investigated, it is apparent that tourism between West Europe and North American countries has dominated the research. This could raise the issue of representativeness of the countries in the world tourism market. Due to the heterogeneity among countries, in conjunction with the ongoing dramatic changes taking place in Eastern Europe and the emergence of the Asia-Pacific region in economic terms, more attention should be given to these areas.

7. Tourism has been regarded as a part of invisible international trade. In 1990, the worldwide international tourism receipts represents approximately 20% of the international trade in services. As far as concerned, trade volume has not been used in any of the commonly cited tourism demand models. As a matter of fact, only Guthrie (1962) tried to examine the determinants of business travel on the tourism

demand using a selected group of export earnings as a proxy measure. And the result shows a positive and statistically significant relationship between business travel and demand for tourism. Undoubtedly, an increase in trade will cause an increase in international tourists as businessmen. However, the relationship between international trade and international tourism generation has received little attention by the researchers.

CHAPTER III

RESEARCH METHODS

Econometric models of international tourism demand may be used to address the consequences of possible changes in the determining factors (Witt and Martin 1987). "An econometric model is a system of one or more equations that describe the relationship among several economic and time series variables (Mendenhall and Reinmuth 1982 P.635)."

The system of equation models, used to estimate tourism demand, have an explicit theoretical basis on consumer demand theory. For economists, demand can be defined as the quantity of a commodity or service which a consumer is willing and able to buy at a given price during a given period of time, assuming that all other variables are constant. Quantity demanded is significantly determined by the price of the commodity or service, the price of all related goods either as complementary commodities or substitutional ones, the level of personal disposable income, and the taste and preferences. The relationship between tourism demand and its determinants may be estimated using multiple regression analysis, and elasticity values. In addition, the short-term and long-term sensitivity of tourism demand to changes in the variable can be shown by the calculated statistics.

Selection of the Estimation Technique

The most common statistical method used in tourism demand studies is Ordinary Least Square (OLS) Multiple Regression (Armstrong 1972, Artus 1970 1972, Gray 1966, Blackwell 1970, Little 1980, Truett 1982 1987, Witt 1980a 1980b, Uysal and Crompton 1984, Uysal and O'leary 1986, Martin and Witt 1987 1988, Jud and Joseph 1974, Summary 1987, Stronge 1982, Diamond 1977). Under certain assumptions, the method of OLS has some very attractive statistical properties which have made it one of the most powerful and popular methods of regression analysis. Kerlinger (1973) indicated that multiple regression analysis is an efficient and powerful hypothesis-testing and inference making technique, since it helps the investigator study, with relative precision, complex interactions between independent variables and a dependent variable, and this helps to explain the presumed phenomenon represented by the dependent variable. Therefore, this study will follow most of the other studies using the ordinary least square multiple regression based on the availability of the time-series data to analyze the factors affecting international tourism to Taiwan.

Ordinary least square (OLS) may be described as a statistical technique which estimates an equation that fits a line to the data by minimizing the sum of squared deviations about the line. In this study, estimates of tourism demand to

Taiwan are obtained from each of the following countries: Japan, Hong Kong, USA and South Korea, Using annual time series data for the period 1968-1991. Two different types of dependent variables are used in estimating the demand for international tourism to Taiwan: number of tourist arrivals and total tourist expenditure.

With the use of OLS estimation technique, there are also two concerns: (1) multicollinearity and (2) autocorrelation, that need to be addressed. Multicollinearity means the existence of a perfect or exact liner relationship among some or all explanatory variables of a regression model. The consequences of multicollinearity are as follows: if there is a perfect collinearity among the explanatory variables, their coefficients are indeterminant and their standard errors are infinite; if collinearity is high but not perfect, estimation of regression coefficients is possible but their standard errors tend to be large. As a result, the population values of the coefficients cannot be estimated precisely. There are several indicators, for example, the clearest sign of multicollinearity is when R^2 is very high but none of the regression coefficients is statistically significant on the basis of the conventional t test; if multicollinearity existed in the analysis, the standard error of the coefficients would be larger than it otherwise would be, which would lead to imprecision in their estimates. According to

Gujarati (1978), there are several ways to detect multicollinearity, one of them is combining cross-sectional data and time-series data, known as pooling the data, and another possible method of trying to remove multicollinearity is to omit one or more of the collinear variables, whenever they could be identified.

The other major source of concern is autocorrelation. Autocorrelation is a kind of correlation between members of series of observations ordered in time such as time-series data and space such as cross-sectional data. Autocorrelation can arise for several reasons, for example, sluggishness of most econometric time-series, using an incorrect functional form and data manipulation. If it existed, the standard error of the estimate would be underestimated and lead to the conclusion that a variable is statistically significant when in reality it is insignificant (Johnstone, 1971, pp:179). Some of the models which were estimated using OLS appeared to suffer from serial correlation. In order to detect a serial correlation (autocorrelation), the Durbin-Watson "d" test is usually used. The null hypothesis of the Durbin-Watson test is that there is no autocorrelation among the error terms in the first-order condition. Durbin and Watson provided tables showing the upper and lower limits of "d" for various sample sizes and numbers of variables. If the calculated statistic lies below the lower tabulated "d" figure, the residual can

then be regarded as autocorrelated. If the calculated "d" statistic is higher than the tabulated upper limit, the residual (error term) is then independent. If the value of "d" lies between the upper and lower limits, the test is inconclusive.

Selection of the Independent Variables

Income Per Capita

Income is the variable most commonly used to explain international tourism demand (Artus 1970, Barry and O'Hagan 1972, Bechdolt, Jr 1973, Blackwell 1970, Bond and Ladman 1972, Gray 1966, Jud and Joseph 1974, Kwack 1972, Uysal and Crompton 1985, Archer 1980, Armstrong 1972, Edwards 1985, Witt and Matrin 1987, Truett and Truett 1987, Tremblay 1989, Summary 1987, Smeral 1988, Papadopoulos, 1987, Martin and Witt 1987, 1988, Chadee and Mieczkowski 1987, IAC 1989, Crouch at el, 1992). Income can be measured in a variety of ways. One might consider total gross national product (GNP) or GNP per capita; furthermore, using the disposable income is sometimes preferred since this reflects how much people have to spend after taxes are deducted. However, there are problems in the availability and accuracy of disposable income data. According to economic theory, the larger the per capita income of a country, the more likely are its citizens to be able to afford foreign tourism, all other things remain the same. The tourism

literature is replete with studies that support this hypothesis (for example, see Kwack 1972, Gray 1966, Little 1980, Loeb 1982, Artus 1970, Barry and O'Hagen 1972, Bechdolt Jr. 1973, Blackwell 1970, Bond and Lodmen 1972, Jud and Joseph 1974, Edward 1979, and Uysal and O'Leary 1986, Witt and Martin 1987, Summary 1987, Tremblay 1989, Smeral 1988, Crouch at el, 1992). In this study, per capita income of the tourist-generating countries will be used.

Relative Prices

The price variable plays a particular role in tourism demand, because it shows another dimension of purchasing power. The effect of relative prices has also played an important role in determining international tourism (Artus 1970, Barry and O'Hagan 1972, Bechdolt, Jr 1973, Blackwell 1970, Bond and Ladman 1972, Gray 1966, Jud and Joseph 1974, Kwack 1972, Uysal and Crompton 1984, Archer 1980, Armstrong 1972, Edwards 1979, Loeb 1982, Chadee and Mieczkowski 1987, IAC 1989, Martin and Witt 1987, 1988, Summary 1987, Tremblay 1989, Smeral 1988, Crouch at el, 1992). As a matter of fact, the role of price is a more complex construct than income in the case of international tourism. First, price consists of numerous components, such as the accommodation, food and beverage, local transportation, souvenir, travel insurance and transportation cost to the destination country which would

normally account for the major portion of the total price. Another aspect of the price is the price of other substitute or complementary products. According to the wide diversity of price definitions in the past studies, price may be represented in either absolute or relative terms. A further concern is the availability of price information. The general consumer price index might be used. However, to be more specific, the sizable portion of the total cost of a holiday generally includes air fares, hotel/motel rates, food and beverages away from home and public transportation; therefore, the consumer price indices of these categories can be considered as the price of tourism. Some studies have attempted to develop a tourist price index (Martin and Witt 1987; World Tourism Organization 1985), while most researches employed the published Consumer Price Indices (CPI). Traditionally, economic theory assumes that quantity of demand for a product declines as the price of the product increases. The relative prices (a ratio of consumer price index in Taiwan compared to those of the tourist-generating countries) will be employed in this study.

Exchange Rates

It has been argued that current exchange rate may have a significant effect on the extent of international travel (Loeb, 1982, Quayson and Var 1982, Brady and Widdows 1988,

Little 1980, Martin and Witt 1987 1988, Chadee and Mieczkowski 1987, Summary 1987, Uysal and Crompton 1984, Uysal and O'Leary 1986, Tremblay 1989). Both Vanhove (1980) and Archer (1980) included exchange rate in a list of the most commonly used explanatory factors of tourism demand. Tourists are expected to be affected by the price of foreign currency. If a currency devalues in a foreign country, international tourism becomes "cheaper" and results in increased travel to that country, while other things remain the same. Conversely , an increase in value of a country's currency will make international tourism "more expensive" and cause decreased travel in that country (Uysal and Crompton 1984). For example, if the price of a vacation in Taiwan stayed constant in the last two years in terms of New Taiwan dollars, but the price of the New Taiwan dollars declined significantly in terms of the Japan Yen in the second year, it would be expected that the Japanese would purchase more travel tourism services from Taiwan in the second year.

Population

The population variable was included in Vanhove's (1980) list and was included in both Armstrong's (1972) distribution and generation models. The population can be thought of as a potential pool from which tourists are generated. If we assumed that there is a ceiling on tourism demand per person

(Edwards 1985) then the size of the population determines the absolute limits on outbound tourism generation from a given country. As a result, population has often been included in tourism demand models as an explanatory variable (Bond and Ladman 1972, Chadee and Mieczkowski 1987, Rugg 1971, Crampon and Tan 1973, Diamond 1977, Kliman 1981, Noval 1975, Schulmeister 1979).

Trade volume

Gray (1970) delineates international tourism demand as a part of invisible international trade. Tourism expenditure and receipts are included in the balance of payments published by the International Monetary Fund. The Yearbook of Tourism Statistics (1988) published by the World Tourism Organization (WTO) presented tables which compare tourism receipts to merchandise exports. It is therefore logical that trade volume should be included and analyzed in a macroeconomic study of tourism demand generation, and is used as an independent variable in this study. The other specific reason to incorporate trade volume in this study is that Taiwan has been a heavy foreign trade oriented country, and the major trade partners are USA, Japan, Hong Kong and south Korea, which are consistent with the major tourist-generating countries to Taiwan.

Transportation Costs

International tourism is also dependent on transportation costs. One would anticipate that an increase in relative transportation costs would result in a decline in international tourism, while other things remain the same. A number of researchers have used the costs of travel in their models, including Askari (1971), Bechdolt (1973), Gray (1966), Guthrie (1961), Jud and Joseph (1974), Sunday (1978), Fujii and Mak (1980), Crouch at el (1992). However, in contrast, others such as Bond and Ladman (1972), used air distances rather than monetary costs of travel; while Barry and O'Hahen (1972), and Loeb (1982) did not include any form of travel costs in their studies.

In this study, transportation costs were not included. There are several reasons for this decision:

a. it is difficult to obtain accurate data on transportation costs.
b. tourists will visit more than one country, for example, Taiwan , Hong Kong and Singapore, therefore, the role of transportation costs in the relation is not clear.
c. it creates a problem of multicollinearity e.g., income and air fares are highly correlated (Archer 1976, Artus 1972)

d. in those studies where a relative transportation cost was incorporated, relatively insignificant statistical results were obtained (Gray 1966, Little 1980, Stronge and Redman 1982, Quayson and Var 1982).

Marketing Expenditure

Several authors state the importance of marketing expenditure as a determinant of tourism demand , but only a few of the econometric studies of the demand of international tourism incorporated marketing variables as demand determinants (Papadopoulos and Witt 1985, Papadopoulos 1987, Uysal and Crompton 1984, Uysal and O'Leary 1986, Barry and O'Hagan 1972, Clarke 1978, Crouch at el, 1992). The major failure to include it as an explanatory variable in the demand functions is the difficulties in obtaining the relevant data. This study encounters the same problem. In addition, only a relatively small proportion of Taiwan Tourism Bureau total budget is allocated to marketing activities. Therefore, the marketing expenditure is not considered in this study.

The Sources of Data

The secondary data for the number of tourist arrivals, tourist Expenditure, trade volume, exchange rates of Taiwan and Taiwan consumer price indices were drawn from various issues of statistical Yearbook of Taiwan, published by

Executive Yuan, the Republic of China, 1969-1992. Price indices and exchange rates for the tourist generating countries (Japan, Hong Kong, South Korea and USA) were obtained from various issues of International Financial Statistical Yearbook, published by International Monetary Fund, 1969-1992. Price indices, per capita income and exchange rates for Hong Kong came from Statistical Yearbook, published by United Nations, 1968-1992. Per capita income figures for Japan, USA and South Korea were drawn from World Table, published by World Bank, 1969-1992. Population figures were taken from the demographic Yearbook, published by the United Nations.

Specification of The Model

After selecting what were expected to be the most useful variables for explaining international tourism to Taiwan, the following demand function was derived:

$$D_{TGR}=F(PCI, POP, RPI, EXR, TV,) \quad (1)$$

In the previous empirical studies, linear model or logarithmic model were commonly used. However, the logarithmic model performed well in the past studies and was proven to provide the better fit to the data. Furthermore, the logarithmic model can produce coefficients of regression which measure the elasticities of demand directly. Nevertheless, the limitation of this model is that the elasticities of demand

are assumed to be constant.

The logarithmic form of Function (1) can be re-written as:

$$logD_{TGR} = \alpha + \beta_0 logPCI_G + \beta_1 logPOP_G + \beta_2 \log\frac{PRI_R}{PRI_G} + \beta_3 \log\frac{EXR_R}{EXR_G} + \beta_4 logTV_{GR} + \epsilon \quad (2)$$

Where:

D_{TGR} = a measure of the demand for travel services by country G to country R (that is, number of tourists, and total expenditure);

PCI = a measure of per capita income in country G;

POP = the size of population in country G;

RPI = relative prices, that is, the ratio of prices (CPI) in R to prices in tourist generating countries, Gs;

EXR = relative exchange rate, calculated as units of R's currency/unit of G's currency;

TV = trade volume, that is, the trade volume between country R and country G, including export and

import but exclude tourist receipts;

R= subscript denoting the country exporting tourism services, namely Taiwan;

G= subscript denoting the country importing tourism services, namely tourist generating countries: Japan, USA, Hong Kong and South Korea;

α, β_0, β_1, β_2, β_3, β_4, are coefficients to be estimated; and ϵ is error term.

Given the model specified for international tourism to Taiwan, the following signs of the coefficients of elasticity should be expected:

1. The coefficient of income would be expected to be positive. That is, the larger the per capita income (GNP) of a generating country, the more likely its citizens are able to purchase foreign travel. Therefore, a positive relationship would be anticipated between the income variable and international tourism demand.

2. The coefficient of price elasticity should be negative for all generating countries. Thus, as relative prices decline, an increase in the quantity of international tourism services imported by a tourist generating country should be expected.

3. The coefficient of elasticity of exchange rate between the currencies of Taiwan and a generating country is also expected to be positive. For example, if the New Taiwan dollar

devalues with respect to a generating country's currency unit, the goods and services in Taiwan would become less expensive for tourists from that generating country whose budget was defined in that generating country's currency unit. In other words, if the price of a vacation in Taiwan remained unchanged over a given time period in terms of Taiwan dollar, but the exchange rate of Taiwan dollar depreciated significantly in terms of the US dollar at some point in this time period, then an increase in the quantity of tourism services demanded by American travelers would be anticipated.

4. The coefficient of elasticity of population should be positive for all generating countries. That is, the larger the size of population of the generating country, the more tourists will be generated. Thus, a positive relationship between the population variable and international tourism demand would be expected.

5. The coefficient of elasticity of trade volume between Taiwan and a generating country is also expected to be positive. An increase in trade volume, more business activities, is expected to convey more international tourists as businessmen to utilize tourism service--accommodation, food and beverage, local transportation, and shopping. Therefore, as the trade volume between Taiwan and a generating country increase, a growing in the quantity of international tourism services exported by Taiwan to a generating country is

anticipated.

Thus, the signs of the coefficients of elasticity can be written as follows:

$$\frac{D_{TGR}}{PCI} > 0, \quad \frac{D_{TGR}}{POP} > 0, \quad \frac{D_{TGR}}{RPI} < 0, \quad \frac{D_{TGR}}{EXR} > 0, \quad \frac{D_{TGR}}{TV} > 0, \quad ,$$

CHAPTER VI

RESULTS AND DISCUSSION

Multiple regression analysis was executed for each model form and for each country, including all five explanatory variables. The C(p), R^2, adjusted R^2, model significance level (α), Durbin-Watson d statistic, regression coefficients of variables and variable significance levels are reported for each regression analysis. In order to facilitate the exposition, this result section is divided into procedural categories:

1. results of full models for each country;
2. results of individual variables for all models and all countries;
3. final best individual tourism demand model for each country;
4. testing the hypotheses.

Full Tourism Demand Models for Each Country

The number of significant variables within each model varied from one for Japan(tourist expenditure model) and Hong Kong(tourist arrival model) to four for South Korea(tourist arrival model). The multiple coefficient of determination (R^2) is above 0.90 in all cases, the lowest being that of the Japan tourist arrival model (0.92) and the highest, USA tourist expenditure model(0.99) (Tables 5. and 6).

Table 5.
R^2 for Each Model and Each Country

Country	Tourist arrival model	Tourist expenditure model
Japan	0.92	0.96
USA	0.93	0.99
HK	0.96	0.98
SK	0.97	0.98

Table 6.
Number of significant variables in each model for each country

Country	Tourist arrival model	Tourist expenditure model
Japan	2	1
USA	3	2
HK	1	2
SK	4	2

Models for Japan:

1. Tourist arrival model

The full model for Japan is significant and explains 92 percent of the variation in the tourist arrival demand measure (Table 7). Per capita income variable is significant but with an unexpected sign. Trade volume variable is also significant. However, there was a multicollinearity problem with the full model. This may have caused the wrong signs for per capita income and exchange rates.

2. Tourist expenditure model

The full model for Japan is significant and explains 96 percent of the variance in the tourist expenditure demand measure. Only trade volume variable is significant with elasticity exceeding unity (Table 8). The multi-collinearity is evident. The multi-collinearity also may account for the reversed signs in per capita income and exchange rates.

Table 7
Full Tourist Arrival Model: Japan

Country: Japan Model: Tourist Durbin-Watson D statistic=0.725	R^2=0.923 Adjusted R^2=0.90	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-79.24	0.12
Per Capita Income	-1.13	0.02
Population	6.51	0.16
Relative Price	-0.35	0.47
Exchange Rate	-0.82	0.19
Trade Volume	1.11	0.00

Table 8
Full Tourist Expenditure Model: Japan

Country: Japan Model: Expenditure Durbin-Watson D statistic=0.82	R^2=0.96 Adjusted R^2=0.95	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-101.66	0.15
Per Capita Income	-0.89	0.18
Population	8.24	0.20
Relative Price	0.15	0.81
Exchange Rate	-0.81	0.34
Trade Volume	1.40	0.01

Models for the USA:

1. Tourist arrival model

The full model for USA is significant and explains 93 percent of the variance in the tourist arrival variable. Per capita income is significant but with a "uncorrected" sign. Relative price index variable and trade volume variable both are significant (Table 9). Multi-collinearity is evidently presented and may explain the wrong sign for per capita income variable.

2. Tourist expenditure model

The full model for USA is significant and explains 99 percent of the variance in the tourist expenditure variable (Table 10). Exchange rate variable is significant but with an

unexpected sign. Trade volume variable is also significant. Multi-collinearity is evidently present and may explain the wrong signs for per capita income variable, population variable and exchange rate variable.

Table 9
Full Tourist Arrival Model: USA

Country: USA Model: Tourist Durbin-Watson D statistic=1.55	R^2=0.93 Adjusted R^2=0.91	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-26.36	0.58
Per Capita Income	-1.46	0.00
Population	3.11	0.46
Relative Price	-0.93	0.00
Exchange Rate	0.16	0.46
Trade Volume	0.56	0.00

Table 10
Full Tourist Expenditure Model: USA

Country: USA Model: Expenditure Durbin-Watson D statistic=2.24	R^2=0.99 Adjusted R^2=0.98	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	56.43	0.33
Per Capita Income	-0.15	0.80
Population	-4.41	0.40
Relative Price	-0.31	0.35
Exchange Rate	-0.76	0.01
Trade Volume	0.89	0.00

Models for Hong Kong:

1. Tourist arrival model

The full model for Hong Kong is significant and explains 96 percent of the tourist arrival variable (Table 11). Only population variable is significant with elasticity well exceeding unity. There is evidence of multi-collinearity and it may account for the incorrect sign in trade volume variable.

2. Tourist expenditure model

The full model for Hong Kong is significant and explains 98 percent of the tourist expenditure variable (Table 12). Population variable is significant with elasticity well exceeding unity. Relative price index variable is significant but with a reversed sign. There is evidence of multi-collinearity and it may explain the wrong sign for relative price index variable.

Table 11
Full Tourist Arrival Model: Hong Kong

Country: HK Model: Tourist Durbin-Watson D statistic=1.32	R^2=0.96 Adjusted R^2=0.95	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-46.37	0.00
Per Capita Income	0.20	0.75
Population	6.76	0.00
Relative Price	0.46	0.41
Exchange Rate	0.89	0.12
Trade Volume	-0.11	0.76

Table 12
Full Tourist Expenditure Model: Hong Kong

Country: HK Model: Expenditure Durbin-Watson D statistic=1.54	R^2=0.98 Adjusted R^2=0.97	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-34.51	0.10
Per Capita Income	0.96	0.26
Population	5.27	0.04
Relative Price	1.67	0.03
Exchange Rate	0.00	0.99
Trade Volume	0.01	0.97

Models for South Korea:

1. Tourist arrival model

The full model for South Korea is significant and explains 97 percent of the tourist arrival variable. Per capita income is significant but with an unexpected sign. Relative price index variable is significant with elasticity well exceeding unity. Exchange rate variable is also significant with elasticity exceeding unity. Trade volume variable is significant. Multi-collinearity may account for the "uncorrected" sign in the per capita income variable (Table 13).

2. Tourist expenditure model

The full model for South Korea is significant and explains 98 percent of the tourist expenditure variable (Table 14). Relative price index is significant with elasticity well exceeding unity. Trade volume variable is significant. Multi-collinearity is evidently presented.

Table 13
Full Tourist Arrival Model: South Korea

Country: SK Model: Tourist Durbin-Watson D statistic=1.23	R^2=0.978 Adjusted R^2=0.97	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-101.38	0.11
Per Capita Income	-1.06	0.05
Population	10.77	0.10
Relative Price	-2.87	0.00
Exchange Rate	2.37	0.02
Trade Volume	0.67	0.00

Table 14
Full Tourist Expenditure Model: South Korea

Country: SK Model: Expenditure Durbin-Watson D statistic=1.46	R^2=0.989 Adjusted R^2=0.985	Significance Level=0.000
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-74.62	0.24
Per Capita Income	-0.37	0.45
Population	7.9	0.22
Relative Price	-2.24	0.00
Exchange Rate	1.54	0.13
Trade Volume	0.76	0.00

Results of Individual Variables for all Models and Countries

1. Income

Inconsistent with other studies, income (PCI) was found to be either insignificant or with the reverse (negative) signs in all cases. In economics, when income and demand of products are inversely related, the products refer to be inferior goods. That is, individual consumer demand can decrease as income increases, because consumers replace them with more desirable alternatives. Thus, the findings of this study suggest that Taiwan as a tourism destination may not be "normal product".

2. Population

Population variable was found to be insignificant in all cases except in both tourist arrival and tourist expenditure models of Hong Kong, which have high elasticities of 6.76 and 5.27 respectively. The population of the USA as an independent variable has a negative sign in the tourist expenditure model, but the coefficient is not significant.

3. Relative price index

The relative price index variable (RPI) was found to be insignificant for Japan in both tourist arrival and tourist expenditure models, the USA tourist expenditure model, and Hong Kong tourist arrival model. However, it was significant for the USA in the tourist arrival model with elasticity of -0.93, which is close to unity, and for South Korea in both

tourist arrival and tourist expenditure models with elasticities of -2.87 and -2.24 respectively.

4. Exchange Rate

Exchange rate was proved insignificant in all cases except in the South Korea tourist arrival model, which has a high elasticity of 2.37. The tourist arrival and tourist expenditure models of Japan and the tourist expenditure model of the USA had negative signs, but the coefficients were not significant.

5. Trade volume

The trade volume variable has the appropriate sign for all four generating countries in both tourist arrival and tourist expenditure models except in the tourist arrival model of Hong Kong, which had a negative sign but the coefficient was not significant. In general, in both the tourist arrival and tourist expenditure models, the variable of trade volume was found to play a positive role in stimulating international tourist flows to Taiwan except for Hong Kong. Table 15 gives a summary of the tourist arrival models with their associated coefficients for the selected four tourist generating countries.

Table 15
Summary of Tourist Arrival Models For four Countries

	Coefficients						
Countries	Intercept	PCI	POP	RPI	EXR	TV	R^2
Japan	-79.24	-1.13*	6.51	-0.35	-0.82	1.11*	0.92
USA	-26.36	-1.46*	3.11	-0.93*	0.16	0.56*	0.93
HK	-46.37*	0.20	6.76*	0.46	0.89	-0.11	0.96
SK	-101.38	-1.06*	10.77	-2.87*	2.37*	0.67*	0.98

* indicates significance at the 5 percent probability level.

Table 16, on the other hand, gives a summary of the tourist expenditure models with their associated coefficients for the four tourist generating countries.

Table 16
Summary of Tourist Expenditure Models For four Countries

	Coefficients						
Countries	Intercept	PCI	POP	RPI	EXR	TV	R^2
Japan	-101.66	-0.89	8.24	0.15	-0.81	1.4*	0.96
USA	56.43	-0.15	-4.41	-0.31	-0.76*	0.89*	0.99
HK	-34.51	0.96	5.27*	1.67*	0.00	0.01	0.98
SK	-74.62	-0.37	7.9	-2.24*	1.54	0.76*	0.99

* indicates significance at the 5 percent probability level.

Final Best Individual Tourism Demand Models for Each Country

This section presents the recommended models with "best" explains tourism demand for each of the four generating countries to Taiwan. The criteria used to determine the "best" model for each country are: conformity to regression and theoretical concepts, and best empirical explanatory ability.

For Japan, the tourist arrival model is best explained by trade volume, and the tourist expenditure model is best explained by relative price and exchange rate. For the USA and South Korea, both tourist arrival model and tourist expenditure model are best explained by relative price index and trade volume. For Hong Kong, the tourist arrival model is best explained by population and exchange rate; tourist expenditure model is best explained by per capita income. Each of the chosen best model is discussed as follows:

Best Models for Japan:

1. Tourist arrival model

The selected best tourist arrival model for Japan to Taiwan is a function of trade volume. However, the coefficient of determination (R^2) is close to 0.90 (R^2=0.895), the regression coefficient indicates that trade volume is inelastic (β_4=0.48). The Durbin-Watson statistic indicates the rejection of the hypothesis of no autocorrelation. It is likely that certain explanatory variables have been omitted in the estimation of Japan's demand, though they may not be quantifiable, such as cultural connection.

2. Tourist expenditure model

The chosen best tourist expenditure model for Japan to Taiwan is a function of relative price and exchange rate (Table 18). The coefficients of determination (R^2) is 0.81.

The regression coefficient indicates that tourism expenditure is price elastic (β_2=-7.08) and exchange rate also well elastic (β_3=3.87). The Durbin-Watson test for autocorrelation proved the exception of no autocorrelation.

Table 17
Best Tourist Arrival Demand Model: Japan

Country: Japan Tourist arrival Durbin-Watson D statistic=0.297	C(p)=4.56 Adjusted R^2=0.981 Significance level =0.000	R^2=0.895
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	2.35	0.000
Trade Volume	0.48	0.000

Table 18
Best Tourist Expenditure Demand Model: Japan

Country: Japan Tourist Expenditure Durbin-Watson D statistic=2.687	C(p)=1.59 Adjusted R^2=0.80 Significance level =0.000	R^2=0.81
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	22.12	0.00
Relative Price	-7.08	0.01
Exchange Rate	3.87	0.00

Best Models for the USA:

1. Tourist arrival model

The chosen best tourist arrival model for the USA to Taiwan is a function of relative price index and trade volume (Table 19). The coefficient of determination (R^2) is 0.89. The regression coefficients indicate that the tourist generation is relative price inelastic with β_2 value of -0.58, and trade volume inelastic (β_4=0.15). However, the Durbin-Watson test for autocorrelation proved the rejection of no autocorrelation, implying that this model has an omission of certain explanatory variables which may not be quantifiable or the misspecification of functional form.

2. Tourist expenditure model

The chosen best tourist expenditure model for the USA to Taiwan is a function of relative price index and trade volume (Table 20). The coefficients of determination (R^2) is 0.98. The regression coefficients indicate that tourist expenditure is relative price inelastic (β_2=-0.33) and trade volume inelastic (β_4=0.65). The Durbin-Watson test for autocorrelation shows inconclusive.

Table 19
Best Tourist Arrival Demand Model: USA

Country: USA Tourist Arrival Durbin-Watson D statistic=0.991	C(p)=13.18 Adjusted R^2=0.879 Significance level =0.000	R^2=0.89
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	8.46	0.00
Relative price index	-0.58	0.00
Trade volume	0.15	0.00

Table 20
Best Tourist Expenditure Demand Model: USA

Country: USA Tourist Expenditure Durbin-Watson D statistic=1.328	C(p)=2.65 Adjusted R^2=0.988 Significance level =0.000	R^2=0.982
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	3.32	0.00
Relative price index	-0.33	0.05
Trade volume	0.65	0.00

Best Models for Hong Kong:

1. Tourist Arrival Model

The selected best tourist arrival model for Hong Kong to Taiwan is a function of population and exchange rates (Table 21). The coefficient of determination (R^2) is 0.958. The

regression coefficients indicate that tourist generation depends on population with an elasticity of β_1=7.14, and also exchange rate is also elastic with a beta value of β_3=1.42. The Durbin-Watson statistic for autocorrelation in inconclusive.

2. Tourist expenditure model

The chosen best tourist expenditure model for Hong Kong to Taiwan is a function of per capita income (Table 22). The coefficient of determination (R^2) is 0.916. The regression coefficient indicates that tourist expenditure generation is income elastic (β_0=1.43). However, the Durbin-Watson test for autocorrelation showed the presence of autocorrelation, implying that this model has an omission of certain explanatory variables which may not be quantifiable, such as close historical links.

Table 21
Best Tourist Arrival Demand Model: Hong Kong

Country: HK Tourist Arrival Durbin-Watson D statistic=1.383	C(p)=1.38 Adjusted R^2=0.954 Significance level =0.000	R^2=0.958
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	-51.3	0.00
Population	7.14	0.00
Exchange Rate	1.42	0.00

Table 22
Best Tourist Expenditure Demand Model: Hong Kong

Country: HK Tourist Expenditure Durbin-Watson D statistic=0.384	C(p)=57.8 Adjusted R^2=0.912 Significance level =0.000	R^2=0.916
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	6.29	0.00
Per capita income	1.43	0.00

Best Models for South Korea:

1. Tourist Arrival Model

The selected best tourist arrival model for South Korea to Taiwan is a function of relative price index and trade volume with a coefficient of determination of (R^2) = 0.965 (Table 23). The regression coefficients indicate that the tourist generation is price elastic (β_2=-1.619) and trade volume inelastic (β_4=0.364). The Durbin-Watson statistic indicates the presence of autocorrelation. It is likely that certain explanatory variables have been omitted in the estimation of South Korea's demand or the misspecification of the functional form.

2. Tourist expenditure model

The chosen best tourist expenditure model for South Korea is also a function of relative price index and trade volume (Table 24). The coefficient of determination (R^2) is 0.987.

The regression coefficients indicate that tourist expenditure generation is price elastic (β_2=-1.889) and trade volume inelastic (β_4=0.694). The Durbin-Watson test showed no autocorrelation.

Table 23
Best Tourist Arrival Demand Model: South Korea

Country: SK Tourist Arrival Durbin-Watson D statistic=1.04	C(p)=8.79 Adjusted R^2=0.961 Significance level =0.000	R^2=0.965
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	3.15	0.14
Relative price index	-1.619	0.00
Trade volume	0.364	0.00

Table 24
Best Tourist Expenditure Model: South Korea

Country: SK Tourist Expenditure Durbin-Watson D statistic=1.598	C(p)=2.77 Adjusted R^2=0.985 Significance level =0.000	R^2=0.987
Explanatory Variable	Regression Coefficient	Significance Level
Intercept	3.08	0.00
Relative price index	-1.889	0.00
Trade volume	0.694	0.00

Testing the Hypotheses

Study hypotheses were all tested according to the "best fit" selected models for each of the four selected tourist generating countries, using F-test at the 0.05 significance level.

H1.A: The number of international tourist arrivals to Taiwan is not responsive to the changes in per capita income of its major tourist-generating countries.

This hypothesis measured the responsiveness of tourist generation to changes in the levels of per capita income of the selected tourist generating countries. None of the four countries includes per capita income variable in the "best fit" tourist arrival models. Therefore, H1.A can not be rejected for any of the four generating countries.

H1.B: The number of international tourist arrivals to Taiwan is not responsive to the change in relative prices within the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist generation to changes in the relative prices between the generating countries and Taiwan. Only the USA and South Korea include relative price variable in their "best fit" tourist arrival models. Therefore, H1.B can not be rejected by Japan

and Hong Kong. However, it can be rejected for the USA and South Korea cases.

H1.C: The number of international tourist arrivals to Taiwan is not responsive to the changes in relative exchange rates within the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist generation to differences in the exchange rates between the generating countries and Taiwan. Only Hong Kong includes exchange rate variable in the "best fit" tourist arrival model. Therefore, H1.C can not be rejected for Japan, the USA and South Korea. However, it can be rejected for Hong Kong model.

H1.D: The number of international tourist arrivals to Taiwan is not responsive to the changes in the population of the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist generation to the population of the generating countries. Only Hong Kong includes population variable in the "best fit" tourist arrival model". Therefore, H1.D can not be rejected for Japan, the USA and South Korea. However, it can be rejected for Hong Kong.

H1.E: The number of international tourist arrivals to

Taiwan is not responsive to the changes in trade volume within the major generating countries.

This hypothesis measured the responsiveness of tourist generation to the trade volume between the generating countries and Taiwan. Except for Hong Kong, the H1.E can be rejected for the countries of Japan, the USA and South Korea.

H2.A: The level of international tourist receipts is not responsive to the changes in per capita income of the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist expenditure to changes in the levels of per capita income of the selected tourist generating countries. Only Hong Kong includes per capita income in the "best fit" tourist expenditure model. Therefore, H2.A can not be rejected for the tourist generating countries of Japan, the USA and South Korea. However, It can be rejected at the 0.05 probability level for Hong Kong.

H2.B: The level of international tourist receipts is not responsive to the changes in relative prices within the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist expenditure to changes in the relative prices between the tourist generating countries and Taiwan. This hypothesis was rejected for the three tourist generating countries,

including Japan, the USA and South Korea.

H2.C: The level of international tourist receipts is not responsive to the changes in relative exchange rates within the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist expenditure to differences in the exchange rates between the generating countries and Taiwan. This hypothesis was rejected for Japan only.

H2.D: The level of international tourist receipts is not responsive to the changes in the population of the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist expenditure to changes in the population of the selected tourist generating countries. None of the four countries includes population variable in the "best fit" tourist arrival models. Therefore, H2.D can not be rejected for any of the four generating countries.

H2.E: The level of international tourist receipts is not responsive to the changes in trade volume within the major tourist-generating countries.

This hypothesis measured the responsiveness of tourist expenditure to the trade volume between the generating countries and Taiwan. the USA and South Korea both include trade volume in their tourist expenditure models. Therefore,

H2.E can not be rejected for Japan and Hong Kong. However, it can be rejected for the USA and South Korea.

Tables 25 and 26 give a summary of the hypothesis testing results for the four selected tourist generating countries with their associated significant individual variables.

Table 25

Summary of Hypothesis Testing for Tourist Arrival Models

Tourist	Japan	USA	HK	SK
H1.A	fail to reject	fail to reject	fail to reject	fail to reject
H1.B	fail to reject	reject	fail to reject	reject
H1.C	fail to reject	fail to reject	reject	fail to reject
H1.D	fail to reject	fail to reject	reject	fail to reject
H1.E	reject	reject	fail to reject	reject

Table 26

Summary of Hypothesis Testing for Tourist Expenditure Models

Receipt	Japan	USA	HK	SK
H2.A	fail to reject	fail to reject	reject	fail to reject
H2.B	reject	reject	fail to reject	reject
H2.C	reject	fail to reject	fail to reject	fail to reject
H2.D	fail to reject	fail to reject	fail to reject	fail to reject
H2.E	fail to reject	reject	fail to reject	reject

CHAPTER V

Conclusion and Implications

This exploratory study attempted to examine the international tourism demand for Taiwan from the four major tourist-generating countries by using econometric models. It is clear that no full model applies to all of the four countries. As in other studies of this nature, multi-collinearity is pervasive in the four full models of all four countries. Even though the problem of multi-collinearity is known, there is no best way to deal with it (Summary, 1987).

The variables included in the best fit models were selected on the basis of empirical results. Surprisingly, per capita income was not one of the significant explanatory variables, and relative price tended to provide the highest explanation for tourism demand for Taiwan. The analysis suggests that in both the tourist arrival and tourist expenditure models, the relative price variable has a high negative effect on international tourism generation on all countries with the exception of Hong Kong. Therefore, relative price seems to be especially important as an indicator of international tourism demand for Taiwan.

The best model of Japan for tourist arrival only included one variable--trade volume. However, the estimated elasticity of trade volume was 0.48. It seems that trade volume only has

a modest impact on tourist arrival from Japan. As to the tourist expenditure model for Japan, it is highly sensitive to relative price and exchange rates. The regression coefficient indicates that tourism expenditure of Japan is highly price (β_2=-7.08) and exchange rate elastic (β_3=3.87). It implies that one percent increase in relative price is expected to be accompanied by a more than proportionate fall in tourist expenditure from Japan. Due to increasingly high living standard in Japan, "shopping" has become one of the main purpose of travelling overseas. Thus, Japanese are highly sensitive to price fluctuations. The high elasticity of exchange rate differential could be attributed to the frequency of trips to Taiwan because of the geographic proximity.

The best tourist arrival model and tourist expenditure model for the USA included trade volume and relative price. However, all of the regression coefficients were inelastic. It is likely that some qualitative variables may have been omitted. Historically, the links between Taiwan and USA have been very special. Between 1952 and 1968, the USA contributed about $1.5 billion US dollars of economic aid, which allowed Taiwan to survive and build a modern economy with rapid industrialization. Even though Taiwan severed diplomatic relationships with the USA in 1979, its government policies have continued to maintain a close and friendly relation with

the USA.

For Hong Kong, the best tourist arrival model included population and exchange rates. The population elasticity of demand for Taiwan's tourism was estimated to be relatively high. This number implies that for every one percent increase in the population of Hong Kong, there is a corresponding 7.14 percent increase in the number of Hong Kong tourists coming to Taiwan. This high elasticity of population could attributed to the majority of overseas Chinese living in Hong Kong. The exchange rate elasticity could be attributable to the geographic proximity and the high frequency of trips into Taiwan. As to the best tourist expenditure model, only per capita income is included. It suggests that, on average, one percent increase in income will generally be associated with a more proportionate (1.43) increase in tourist expenditure in Taiwan.

The best tourist arrival and tourist expenditure models for South Korea both included relative price and trade volume. The elasticities of relative price are above unity for both tourist and expenditure models. In contrast, the trade volume is inelastic in both tourist and expenditure models.

The results of this exploratory study indicate that the traditional tourism demand models estimated by ordinary least square regression may not represent a reasonably reliable model of international tourism demand for Taiwan. In addition,

the literature review of tourism demand indicated that income is the primary explanatory variable for tourism demand, followed by price and exchange rates. However, the findings of this study suggest that international tourism demand for Taiwan may be different from those of Western countries in their reaction to economic conditions. It appears that there are unique indicators of tourism demand for Taiwan, qualitative variables such as geographic proximity and historical and cultural linkage, rather than income.

Implications

Admittedly, this study was limited to the data available and restrictions of statistical techniques, therefore, the results only could be regarded as tentative. Nevertheless, some implications can be suggested. Undoubtedly, three of the four tourist-generating countries--Japan, the USA and South Korea all are highly sensitive to prices. These high price elasticities are a reflection of the extent to which other destinations, such as Hong Kong, Singapore and Thailand, may be substitutes for Taiwan. Therefore, the prices of tourism in Taiwan need to maintain competitive if Taiwan is to exploit fully its tourism potential. Taiwan has long been a business center and the business traffic has been strong. Obviously, increases in trade with Taiwan will increase the number of business travellers, who are likely to mix business with

pleasure. The Taiwan government should continue to develop Taiwan as a world trade center in order to increase the trade volume and also the business trips.

Recommendations

Since the income and tourism demand for Taiwan are negatively related, Taiwan may not be "normal product" in terms of a tourism destination. That is, when the income of the tourist-generating countries increased, people from those countries may have chosen to another more desirable alternative destination(s) instead of Taiwan. Therefore, some recommendations are suggested here in order to promote tourism to Taiwan and enhance the image of Taiwan as a tourism destination.

1. Over the years, the Japanese who came to Taiwan for leisure travel had cultural links with Taiwan, and they had no communication problems with the older generation. Today, the cultural links are fading and the older generation slowly being replaced. Tourist arrivals from Japan, which accounts for nearly half of the total visitors, have declined from a high figure in 1989 and continue to fall. However, The Taiwan government should attempt to diversify its markets and reduce the dependence on Japan.

2. Rugged mountains and seashore scenery, fascinating folk arts and customs, rich historical heritage, and the

world's best Chinese cuisine are all Taiwan's potential tourism resources. Particularly, the National Palace Museum which unquestionably contains the world's best collection of Chinese art--more than 600,000--is the best known attraction among foreign tourists. The Taiwan government should endeavor to develop these resources of tourism and maintain the cultural and historical sites in order to attract the tourists who are interested in Chinese culture.

3. Due to the deficient promotional activities overseas, Taiwan Tourism Bureau should increase promotion budget and adopt a pragmatic approach to the allocation of advertising and promotional budgets. Especially, international markets in growth areas should be targeted in order to effectively and efficiently allocate resources for maintaining the share of tourists from international markets and the development of several new high potential growth markets. Practically, Taiwan needs a marketing program based on a number of themes to present this place to the world of tourism, for example, promoting events centering on calligraphy one year, and cuisine the next, and porcelain the third, and painting the fourth year. In this way, people will keep coming back, looking for different themes, and different cultural presentations. Follow this concept, Taiwan could be promoted for the long term. Moreover, Taiwan can use national holidays such as Double Ten Day, and festivals such as

Chinese Food Festival and Lantern Festival to attract additional visitors.

4. Taiwan could develop some activity-related tours to attract the incentive/special interest market. For example, tea garden tours, temple tours, culture and history tours, mountain and forest tours, golf tours, ethnic cuisine tours, coast tours, fruit picking tours to scenic farms, and tours to visit industrial establishment, which is of special interest to overseas Chinese visitors.

Further Recommended Research

From the findings of this study, two further studies are recommended as follows:

1. the relationship between trade and tourism demand;
2. the search for other explanatory variables on a more qualitative approach to providing the best possible international tourism demand model.

In conclusion,, this exploratory study points out the need for more research into international tourism demand for Asian countries. The Western traditional assumptions regarding international tourism demand may not be completely applicable to Asian countries. The findings of this exploratory study indicate that international tourism demand for newly industrialized and emerging developed countries in Asia does not necessarily follow the Western model of international

tourism demand. There are some things unique and vibrant about these newly emerging Asian countries which require further studies and understanding.

Appendix

Appendix A

Data Tables

Table A-1. Tourist Arrivals, Relative Price Index, Exchange Rate, Per Capita Income and Population Data for Japan

DATA FOR UNITED STATES

Year	Tourist	RPI	EXR	PCI	POP
1968	103299	1.151	0.1118	1440	101.961
1969	143624	1.090	0.1064	1680	103.172
1970	177446	1.040	0.1118	1940	104.345
1971	225699	0.979	0.1270	2140	105.679
1972	277704	0.974	0.1320	2540	107.188
1973	437821	1.073	0.1397	3230	108.707
1974	438911	1.224	0.1302	3820	110.162
1975	419259	1.035	0.1279	4490	111.573
1976	516449	0.977	0.1280	4970	112.775
1977	561166	0.928	0.1413	5690	113.872
1978	624868	0.922	0.1708	7020	114.913
1979	693671	1.012	0.1642	8620	115.890
1980	654413	1.142	0.1586	9870	116.807
1981	592683	1.171	0.1714	10390	117.648
1982	575686	1.137	0.1600	10280	118.455
1983	595878	1.103	0.1693	10320	119.270
1984	634236	1.084	0.1660	10580	120.035
1985	617830	1.035	0.1668	11250	120.754
1986	691984	0.994	0.2104	12840	121.492
1987	794537	0.961	0.1970	15840	122.091
1988	909044	0.939	0.2194	21050	122.653
1989	962545	0.915	0.1897	24240	123.161
1990	914750	0.882	0.1872	25890	123.642
1991	825420	0.856	0.1912	27160	124.097

RPI = Relative Price Index(Consumer Price Index of Taiwan/Consumer Price Index of Japan)

EXR = Exchange Rate (NT$/Yen$)

PCI = Per Capita Income (US$)

POP = Population (Million)

Table A-2. Tourist Arrivals, Relative Price Index, Exchange Rate, Per Capita Income and Population Data for USA

DATA FOR UNITED STATES

Year	Tourist	RPI	EXR	PCI	POP
1968	78166	1.160	40.00	4440	200.706
1969	97932	1.098	40.00	4760	202.677
1970	121745	1.065	40.00	4950	205.052
1971	111444	1.022	40.00	5310	207.661
1972	121805	1.033	40.00	5780	209.896
1973	135213	1.195	37.90	6410	211.909
1974	117191	1.513	37.95	6890	213.854
1975	123550	1.316	37.95	7400	215.793
1976	137488	1.300	37.95	8180	218.035
1977	141837	1.234	37.95	9040	220.239
1978	150432	1.187	35.95	10100	222.585
1979	113596	1.214	35.98	11150	225.055
1980	122673	1.300	35.96	12000	227.757
1981	131997	1.269	37.79	13270	230.138
1982	137531	1.193	39.86	13620	232.520
1983	151018	1.142	40.22	14510	236.799
1984	171476	1.100	39.42	15910	237.001
1985	179981	1.035	39.80	16770	239.279
1986	192942	0.981	35.45	17530	241.625
1987	215884	0.908	28.50	18590	243.934
1988	214581	0.867	28.12	19870	246.329
1989	219046	0.824	26.17	20850	246.777
1990	221201	0.777	27.11	21790	250.410
1991	224182	0.746	25.75	22720	252.502

RPI = Relative Price Index(Consumer Price Index of Taiwan/Consumer Price Index of USA)

EXR = Exchange Rate (NT$/US$)

PCI = Per Capita Income (US$)

POP = Population (Million)

Table A-3. Tourist Arrivals, Relative Price Index, Exchange Rate, Per Capita Income and Population Data for Hong Kong

DATA FOR UNITED STATES

Year	Tourist	RPI	EXR	PCI	POP
1968	33111	0.915	6.600	680	3.803
1969	25981	0.891	6.980	786	3.864
1970	35395	0.873	6.600	912	3.959
1971	46933	0.836	7.168	1028	4.045
1972	58690	0.819	7.080	1312	4.116
1973	102352	0.851	7.461	1804	4.213
1974	95331	1.051	7.700	1779	4.320
1975	105850	0.983	7.530	2138	4.396
1976	132062	0.980	8.110	2728	4.518
1977	147873	0.953	8.214	3226	4.584
1978	165115	0.923	7.474	3615	4.668
1979	176385	0.942	7.254	4378	4.930
1980	208012	0.996	7.001	5278	5.063
1981	246433	0.940	6.660	5614	5.183
1982	281717	0.850	6.137	5453	5.265
1983	283466	0.761	5.170	4991	5.345
1984	279377	0.710	5.039	5923	5.398
1985	249350	0.667	5.095	6202	5.456
1986	253730	0.630	4.550	6763	5.524
1987	240393	0.576	3.673	8485	5.583
1988	223389	0.529	3.600	9846	5.641
1989	211804	0.477	3.351	11149	5.701
1990	193544	0.433	3.474	12309	5.760
1991	181765	0.389	3.310	14163	5.818

RPI = Relative Price Index(Consumer Price Index of Taiwan/Consumer Price Index of HK)

EXR = Exchange Rate (NT$/HK$)

PCI = Per Capita Income (US$)

POP = Population (Million)

Table A-4. Tourist Arrivals, Relative Price Index, Exchange Rate, Per Capita Income and Population Data for South Korea

DATA FOR UNITED STATES

Year	Tourist	RPI	EXR	PCI	POP
1968	3216	3.126	0.1423	180	30.838
1969	3387	2.750	0.1315	220	31.544
1970	4129	2.448	0.1278	270	32.241
1971	5495	2.160	0.1072	310	32.883
1972	5068	2.018	0.1015	330	33.505
1973	5466	2.395	0.0952	390	34.074
1974	6780	2.709	0.0962	480	34.692
1975	6910	2.057	0.0784	580	35.281
1976	7227	1.833	0.0784	750	35.860
1977	9686	1.708	0.0784	910	36.436
1978	11610	1.545	0.0743	1190	37.019
1979	13790	1.487	0.0743	1510	37.534
1980	15333	1.405	0.0592	1630	38.124
1981	22721	1.245	0.0555	1830	38.723
1982	35052	1.160	0.0545	1930	39.326
1983	33147	1.108	0.0518	2100	39.929
1984	29579	1.088	0.0489	2230	40.513
1985	30323	1.035	0.0457	2310	41.056
1986	29682	0.973	0.0402	2550	41.548
1987	38839	0.914	0.0346	2920	41.983
1988	84503	0.839	0.0384	3550	42.356
1989	135635	0.664	0.0356	4400	42.700
1990	143656	0.724	0.0383	5400	43.045
1991	150076	0.662	0.0351	6500	43.390

RPI = Relative Price Index(Consumer Price Index of Taiwan/Consumer Price Index of South Korea)

EXR = Exchange Rate (NT$/WON$)

PCI = Per Capita Income (US$)

POP = Population (Million)

Table A-5. Trade Volume and Tourist Expenditure Data for Japan

DATA FOR JAPAN

Year	Trade Volume	Tourist Expenditure
1968	0.575726	18235373
1969	0.668087	21672862
1970	0.817701	30692835
1971	1.085636	46006484
1972	1.436982	61622518
1973	2.255269	130584492
1974	3.062558	149076954
1975	2.507921	176600276
1976	3.547966	238764702
1977	3.866808	266632413
1978	5.238785	298918105
1979	6.811104	475566964
1980	7.527451	464011538
1981	8.381957	454267046
1982	7.149265	386596176
1983	8.063764	404916977
1984	9.628311	445753746
1985	9.009659	409967275
1986	12.799557	572609840
1987	18.818722	730600608
1988	23.586242	1075335419
1989	25.095877	1295970588
1990	24.336143	823183525
1991	28.047153	897743300

Trade Volume = Exports (f.o.b.) + Imports (f.o.b.)
(Billion US$)

Tourist Expenditure (US$)

Table A-6 Trade Volume and Tourist Expenditure Data for USA

DATA FOR UNITED STATES

Year	Trade Volume	Tourist Expenditure
1968	0.585543	13449468
1969	0.731976	14777939
1970	1.042281	21058233
1971	1.265217	22716745
1972	1.794754	27028530
1973	2.620878	40328630
1974	3.715597	39796892
1975	3.475192	52041731
1976	4.860970	63563452
1977	5.597900	67392432
1978	7.375223	71962156
1979	9.025870	77879146
1980	11.425244	86981291
1981	12.881118	102621262
1982	13.321050	92357568
1983	15.980155	102621262
1984	19.909352	120516762
1985	19.519264	119428192
1986	24.410482	159657576
1987	31.289713	198511815
1988	36.432994	253834302
1989	36.039002	294923534
1990	34.357680	199058780
1991	36.434632	243824872

Trade Volume = Exports (f.o.b.) + Imports (f.o.b.)
(Billion US$)

Tourist Expenditure (US$)

Table A-7 Trade Volume and Tourist Expenditure Data for Hong Kong

DATA FOR UNITED HONG KONG

Year	Trade Volume	Tourist Expenditure
1968	0.085279	5845085
1969	0.106067	3920533
1970	0.164478	6122273
1971	0.198863	9566823
1972	0.288726	13023311
1973	0.394143	30527508
1974	0.454784	32373454
1975	0.412337	44586137
1976	0.711103	61054904
1977	0.838166	70260377
1978	1.007266	78986063
1979	1.343620	120926028
1980	1.797580	147490909
1981	2.195851	188881037
1982	1.872362	189184234
1983	1.942521	192623651
1984	2.457486	196351743
1985	2.859252	165458686
1986	3.294034	209959038
1987	4.871405	221048575
1988	7.501358	264253550
1989	9.247484	285172906
1990	10.012110	174170246
1991	14.376273	197691250

Trade Volume = Exports (f.o.b.) + Imports (f.o.b.)
(Billion US$)

Tourist Expenditure (US$)

Table A-8. Trade Volume and Tourist Expenditure Data for South Korea

DATA FOR South Korea

Year	Trade Volume	Tourist Expenditure
1968		567720
1969		511598
1970		714191
1971	0.046888	1120101
1972	0.054469	1124589
1973	0.095238	1630290
1974	0.226737	2302420
1975	0.183658	2910630
1976	0.160871	3341187
1977	0.193495	4602206
1978	0.285952	5553876
1979	0.348377	9454148
1980	0.474700	10871864
1981	0.579224	17414738
1982	0.431381	23538820
1983	0.387728	22524381
1984	0.474376	20788713
1985	0.440433	20121130
1986	0.678504	24561558
1987	1.169911	35713626
1988	1.817154	99961134
1989	2.371822	182618964
1990	2.556462	129276034
1991	3.034351	163225665

Trade Volume = Exports (f.o.b.) + Imports (f.o.b.)
(Billion US$)

Tourist Expenditure (US$)

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