

**Tourism demand in North Cyprus Economy:
Evidence from a demand model over the time period
1999Q1-2009Q4**

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ABSTRACT

This thesis empirically investigates the effect of world income and the relative price of tourism in North Cyprus economy based on demand for export of tourism. I conduct Engel- Granger Co-integration and unit root Augmented Dickey-Fuller (ADF) test using a sample of quarterly data covering the period 1999-2009.

The Augmented Dickey-Fuller (ADF) test indicates that the variables in question are all non-stationary in levels but stationary in first differences whereas a residual-based cointegration (Engel-Granger) technique shows that there is an existence of a long-run relationship among the variables. Error correction modeling framework also indicates the relationship between quantity of export and its determinants in the short-run. It is found that ratio of price indexes has negative impact on the quantity of exports of tourism demand which stimulates export quantity of demand as ratio of domestic price to world price goes down for both long and short-run periods. The exchange rate used in both periods has a negative influence on export quantity of demand. This advises that a decrease in the exchange rate causes an increase in export quantity of demand. It is also estimated that positive significant nexus exists between world income and export quantity of demand. This evidence suggests that an increase in world income or nation's wealth contributes to export quantity of demand for the North Cyprus economy.

Keywords: Tourism demand model, North Cyprus economy, co integration, unit root, OLS technique, income and price elasticity.

ÖZ

Yapılan bu tez çalışması ampirik olarak Kuzey Kıbrıs ekonomisinde dünya gelirleri, nispi fiyat endeksi ve döviz kuru endeksi arasındaki ilişkiyi ölçmektedir. Bu ilişkiyi ölçerken turizm ihracatı talep fonksiyonu ele alınmaktadır. Eş bütünleme ve birim kök analizleri uygulanarak yukarıda belirtilen ilişkinin rolü ölçülmeye çalışılmıştır. Yapılan durağanlık ve eşbütünleme analizleri ışığında serilerin durağan olmadığına, ancak eşbütünleşik seriler olduğuna karar verilmiştir.

Çalışma, aynı zamanda kullanılan ilgili modelin doğruluğunu da ortaya koymaya çalışmıştır. Elde edilen ampirik sonuçlarda, hem uzun hem de kısa dönemde, nispi fiyat endeksinin turizm ihracatı talebi üzerinde negatif etkisi olduğu görülüyor. Ampirik sonuçlarda döviz kuru endeksinin Kuzey Kıbrıs ekonomisi üzerinde büyük ve negatif etkisi olduğu ölçülerek belirtilmiştir. Aynı zamanda, dünya gelir oranlarının turizm ihracatı talebi üzerinde pozitif etkisi bulunmuştur. Ampirik bulgular bir ülkenin turizminin artmasının dünya gelir düzeyinin artmasına ve yerel tüketici fiyat endekslerinin azalmasına birebir bağlı olduğunu ortaya koymaktadır.

Anahtar Kelimeler: Turizm talep modeli, Kuzey Kıbrıs ekonomisi, eş bütünleme, birim kök, en küçük kareler yöntemi, fiyat ve gelir esnekliği.

Dedicated to my husband and my late mother with love...

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LIST OF ABBREVIATIONS

GDP:	Gross Domestic Production
GNP:	Gross National Product
OLS:	Ordinary Least Square
TRNC:	Turkish Republic of Northern Cyprus
SPO	State Planning Organization
WTTC	The World Travel and Tourism Council
WTO	World Tourism Organization
REER	Real Exchange Rate
WGDP	World Income
TEXP	Tourism Expenditures of North Cyprus
CPI	Consumer Price Index
NCPI	Consumer Price Index of North Cyprus
NCER	North Cyprus Exchange Rate

Chapter 1

INTRODUCTION

1.1 Introduction

Tourism is an important and the fastest growing sector for many countries after the telecommunication and information sectors in the 21th century (Crouch and Ritchie, 1999:137). Chumni (2001:1) stated that, “Tourism has been one of the most significant essences of human nature for a long time. A large portion of people in this world must have travelled from their usual environment at least once in their lifetime”. According to Görmüş and Göçer (2010), growing tourism sector has enormous ability to make investment, income, foreign exchange and employment. In this thesis, I investigated the relationship between the impact of world income, relative price and North Cyprus’ exports of tourism for the period of 1999-2009 using quarterly data.

1.2 Scope and Objectives of This Research

Following the works of Artus (1972), Moreno (1989) and Vogt and Wittayakorn (1998), I assume that the demand for North Cyprus’s exports of tourism relates on current and lagged values and relative prices. I investigated the relationship between the impact of world income, relative price and North Cyprus’ exports of tourism for the period of 1999-2009 using quarterly data.

1.3 Methodology of the Research

In this study, Ordinary Least Square (OLS) estimation technique is applied. This technique is based on several assumptions and if these assumptions are not satisfied,

some biases may occur in estimation results. Within this framework, the following issues for the model are observed: multicollinearity among the regressors, the autocorrelation (serial correlation) among the residuals, F-test, t-test, the Coefficient of Determination (R^2) and Durbin-Watson statistics.

1.4 Findings of the Study

I investigated the relationship between the impact of world income, relative price and North Cyprus' exports of tourism for the period of 1999-2009 using quarterly data.

The empirical findings show that ratio of price indexes has negative impact on the quantity of exports of tourism demand which stimulates export quantity of demand as ratio of domestic price to world price goes down for both long and short-run periods. The exchange rate used in both periods has a negative influence on export quantity of demand. This advises that a decrease in the exchange rate causes an increase in export quantity of demand.

It is also found that positive significant nexus exists between world income and export quantity of demand. This evidence suggests that an increase in world income or nation's wealth contributes to export quantity of demand for the North Cyprus economy.

The last variable called DUM2001 which was used to take into account the negative effects of the financial crises formed in Turkey in the year 2001. This suggests that a decrease in this variable favourably affects export quantity of demand for the Turkish Cypriot economy.

1.5 Outline of the study

Chapter 1 is introductory part. Chapter 2 reviews the relevant literature on tourism demand and relative factors. Chapter 3 contains an overview of North Cyprus economy. In Chapter 4, Data, methodology and the theoretical modelling are described. Chapter 5 shows the interpretation and empirical results. In Chapter 6, concluding remarks are presented. It also gives some recommendations and suggestions for further studies.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

Tourist demand is explained by the total number of people who travel or who are willing to travel away from their places of work or residence, to utilize tourist facilities and services at different places. Objectives of this study have to explain the concept “tourist demand” and to identify the determinants of demand for tourism. In a basic way, demand for tourism is focused into developed countries and prevails between those with more discretionary incomes. As Dritsakis and Athanasiadis (1998:1) described, “Tourism as an economic activity of primary value and importance for many countries is an accepted fact by all. Developing countries especially saw in tourism a sector that could potentially cover their needs in foreign currency”. Because of its effect on sectors rather than the foreign exchange sector, the contribution of the tourist sector is valuable for the economy of a country. The variables such as economic, technological, demographic, socio-political, psychological, etc. attract the growth of potential international tourists. In international tourism, fixing the interrelationships between all these variables is impossible to accomplish an entire analysis of trends. A growth in Gross National Product (GNP) is the most important variable that positively affects tourist movements. Also disposable income increases due to GNP growth. Therefore consuming many goods and services, as well as a rise in tourist demand, whether such a demand is concerned to number of arrivals and number of nights spent or to sums of tourist foreign exchange.

According to Nadiri (1998:1), “Tourism is one of the most challenging and fastest growing sectors in the world. The tourism industry provides various benefits and satisfaction for people related with economic, social and environmental concerns”. As a consequence, tourism has become highly important for the growth of economies, particularly for developing countries. Some of the sectors turn into leading areas due to the challenge in forming and maintaining industrial activities with finite capacity of internal markets and the lack of resources especially in the case of island economies. A correspondence problem exists for North Cyprus. In that case, tourism is one of the sectors that get precedence within the North Cyprus economy.

The growth of tourism sector has only relied on mass tourism and tourism plans has been adapted to promote sea-sand-sun (3S) type of coastal activities, when the historical background of tourism in North Cyprus is observed. In terms of employment and growth, tourism is an important sector for the country.

The tourism demand literature shows that there are many variables for international tourism demand such as: the number of nights spent by tourist or the receipts from tourism and the number of the tourist arrivals (Görmüş and Göçer, 2010). Song and Li (2008) argued that main common variable used in researches on tourism demand is the number of tourist arrivals.

According to Chumni (2001), tourism as one of the international trades in services now becomes an important portion in global market. For Lee, Var and Blaine (1996), recently tourism provides not only political and socio-cultural importance but also it provides an economic welfare. Tourism had become as one of the biggest and the

most quickly growing industry in the global economy in the past century (Eadington and Redman, 1991 cited in Lee et al., 1996:527). The World Travel and Tourism Council (WTTC) reported that (1995:1), travel and tourism is the “world’s largest industry and generator of quality jobs” (cited in Frechtling 1996:1). ¹As an increasing source of foreign exchange earnings, tourism exports have been a locomotive sector in many countries. Through rapid growth of international tourism which led to a rise in the tourism exports is mostly assigned to high growth rates of income in developed countries and real transportation costs between countries also considerably declined. Furthermore, it provides foreign exchange earnings and relieves the balance of payments problems came across in many countries. International tourism also generates employment. According to Lim (1997), international tourism has other advantages which include uprising income, savings, investment and economic growth.

Chumni evaluated that (2001:1) “The world today is more economically interdependent than any other time in history, which has led to the globalization of product, service and capital market”. The economic situation is changed and the whole world is becoming intimately interconnected result from technological advances in communication which makes international trade becomes increasingly important. Tourism provides the distribution of income with the shift of wealth from the industrialized to the growing countries. Nevertheless, most countries use tourism as an opportunity to promote their culture, arts and raise their life quality of the people. It also increases employment in less developing regions. Because of those

¹ “Travel and tourism directly and indirectly contributes more than 10 percent of the gross world product, the most comprehensive measure of the total value of the goods and services the world’s economy product” (Chumni 2001:2; see also Frechtling, 1996:1).

role of tourism, many countries try to promote collaboration among the communities in local, public, private sector (Chumni, 2001). For the tourism development international cooperation with neighboring countries is also crucial. Development of communications, facilitation systems and transportation networks on several tourism services play important role to use of tourism resources effectively and to maximize their value in order to attract more interest from international visitors (Chumni, 2001).

2.2 Tourism Demand Theory

It is argued that “Research on tourism demand has grown rapidly since the 1960s” (Allen and Yap 2009:3-4). Li (2005) mentioned that in terms of the diversity of research interests, there are impressive growth in tourism demand analysis and the extent of the theoretical foundations and advances in research methodologies. From another standpoint, literature on modelling tourism demand with applying time-series models is intensified. ²Furthermore, Allen and Yap (2009:1239) stated that literature has reached to assign “more advanced time-series models, such as seasonal ARIMA and conditional volatility models, to model tourism demand (see also Kulendran and Wong, 2005; and Shareef and McAleer, 2007)”. Moreover, in tourism demand research panel data analysis has emerged (Eilat and Einav, 2004; Garín Muñoz, 2007; and Naude and Saayman, 2005). ³Applying the panel data approach has many benefits. According to Song and Witt (2000), it has a mixture of cross-sectional and time- series data. Furthermore, according to Baltagi (2001) panel data supplies more variability, more efficiency, more degrees of freedom, more instructive data and less

² The application of simple time-series models, such as naïve, simple autoregressive, refining exponential and trend curve analysis are initiated by Martin and Witt (1989). Simple time-series models like naïve and autoregressive (AR) econometric models are also used (Allen and Yap, 2009).

³ “Panel data models were used in the literature are pooled with logit regression, the generalized method of moments (GMM) procedure of Arellano and Bond (1991), generalized least squares (GLS) panel data regressions, and ordinary least square (OLS) panel data regressions (which comprise of fixed and random effects models) into the literature” (Allen and Yap, 2009:1239).

collinearity between the variables. But, Song and Li (2008) examined that panel data approach has hardly been applied in tourism demand research with distinguishing the volume of econometric and time-series analyses in tourism literature. Also, up to this point, on domestic tourism demand virtually there isn't any empirical research that used a panel data approach that investigated.

The volume of tourism revenue at destinations of the kind is affected by some widely-examined elements such as; “(1) the quality of natural/physical environment, which is determined by such factors as natural beauty and resources, historical heritage, quality of facilities etc. (2) the quality of social environment, which relies on factors such as awareness/recognition and understanding of different people and cultures by the residents, varieties of cultural facilities and activities in the community, the variety of entertainment in the area, positive attitudes of local residents toward tourists, community spirit among local residents, the dynamism and liveliness of the community, etc. (3) the level of economic development at the destination, which is determined by a number of factors containing, the standard of living, the number of jobs (or the level of employment) in the community, the variety of economic facilities in the area (4) the prices of goods, services and accommodation (or the prices of vacation packages) at the destination” (Kara, Tarım and Tatoğlu, 2003:61-72).

The prices of holiday packages at different (alternative) destinations affect tourism income. In the tourist-attracting countries, the average income of tourists could be expressed by the average households' income countries.

Along with the remarkable increase in demand for tourism in the world over the last two decades is an increasing interest in tourism research. Both academics and practitioners have influenced by demand modelling and forecasting and this is the one of the most important field in the tourism research. Song found in his study (2008:1) and stated that, “According to a comprehensive review by Li et al (2005), 420 studies on this topic were published during the period 1960-2002. The majority of these studies focus on the application of different techniques, both qualitative and quantitative, to model and forecast the demand for tourism in various destinations. These studies also attempted to establish forecasting principles that could be used to guide the practitioners in selecting forecasting techniques. However, this effort has not been successful”.

The performance of the forecasting models changes pursuant to the data frequencies applied in the model estimation (Witt and Song, 2000 and Li, 2005). There is no best interpretation for tourism demand forecasting. So many articles on tourism demand forecasting have been published over the last decade (Crouch 1994, Li et al 2005, Lim 1997a, 1997b, 1999 and Witt and Witt 1995). These approaches under these studies published almost entirely during in 1960-2000 period. Some studies published in 2000 and 2004 years. They are involved in the current work of Li et al (2005) the study is only focused on the econometric approach.

For Song (2008), all methods are used in tourism demand modelling and forecasting, involving time series models, the econometric approach also with developing new statistical and non-statistical methods in recent studies.⁴ “The main objective is,

⁴ “A time series model explains a variable with regard to its own past and a random disturbance term. Particular attention is paid to exploring the historic trends and patterns (such as seasonality) of the

therefore, to investigate whether there are any new trends/issues emerging recently in tourism demand modelling and forecasting literature, and to suggest new directions for future research based on the new trends and issues identified” (Song and Li, 2008:2).

Seasonality is a most prominent characteristic of the tourism industry. Decision makers are so much concerned about the seasonal variation in tourism demand.

In terms of model construction and estimation, tourism demand modelling and forecasting research extremely depends upon secondary data. But the independent variables included in the tourism demand models change profoundly with research objectives and researchers' backgrounds. As the measurement of tourism demand variables in modelling and forecasting tourism demand, the employment of particular indicators have been less disputable as evoked by Witt and Song (2000).

Tourism import and export (Smeral, 2004), tourism employment (Witt, 2004), tourism revenues (Akai, 2004) are also applied in the literature as tourism demand variables. The tourist arrivals variable is the most general measure of tourism demand in recent years.⁵

time series involved, and to predict the future of this series based on the trends and patterns identified in the model. Since time series models only require historical observations of a variable, it is less costly in data collection and model estimation” (Song and Li, 2008:10).

⁵ “This variable was measured by total tourist arrivals from an origin to a destination, which could be decomposed further into holiday tourist arrivals, business tourist arrivals, tourist arrivals for visiting friends and relatives purposes (e.g., Turner and Witt, 2001a, 2001b, Kulendran and Wong, 2005, respectively), and tourist arrivals by air (Coshall, 2005; Rosselló-Nadal, 2001). Tourist expenditure in the destination as the demand variable (such as Li et al, 2004, 2006a and 2006b) and others employed tourist expenditure on particular tourism product categories, such as meal expenditure (Au and Law, 2002), sightseeing expenditure and shopping (Au and Law, 2000)” (Song and Li, 2008:9).

For Song and Li (2008:9), “Tourism demand modelling and forecasting methods can be broadly divided into two categories: quantitative and qualitative methods”. Many published studies used in forecasting tourism demand have been applied quantitative methods; this can be stated in the works of Song and Turner (2006). Song and Li (2008:9) posit that the “Quantitative forecasting literature is dominated by two subcategories of methods: non-causal time series models and the causal econometric approaches. The difference between them is whether the forecasting model identifies any causal relationship between the tourism demand variable and its influencing factor”.

“The economic literature on tourism demand can be divided in two main groups: papers following a non causal approach, and contributions characterized by a causal approach. The main difference between these groups lies in their different aim” (Giacomelli, 2006:11). Forecasting tourism figures (arrivals, nights of stay, expenditure) stand for the only aim of non causal analysis. Defining tourism determinants and forecasting tourism figures represent the aims of causal analysis. Other differences follow through on this initial distinction (linkages between economic theory and empirical applications, econometric strategies adopted etc.). Examples of non causal analysis may be contributed in Witt and Witt (1992), and Chu (1998).

The traditional approach to the neoclassical consumer theory (hereafter traditional neoclassical theory) has so far indicated the theoretical cornerstone of tourism research. As indicated by this theory, destinations offer a homogeneous tourism good. The tourism good is related with a certain price. As Giacomelli (2006) stated, price is settled by two components: stay and transport. Individuals coming from a

given country of origin (henceforth origin) allocate their tourism disposable income (disposable income dedicated to tourism expenditure) as determined by destinations' price competitiveness.

“Tourism demand model is usually estimated as a function of income of tourists' origin country, transportation costs between destination and origin, exchange rates, relative prices, dummy variables and the deterministic trends” (Kareem, 2008:14). Even though in the literature, annual data is generally applied, there has been widening use of quarterly data in recent literature with the growing interest in the seasonality of global tourism flows (Li et al. 2005). As the estimated coefficients can be defined as elasticities, in terms of the estimation techniques, the log-linear regressions are generally used functional forms. On the other hand, the use of cointegration, vector autoregressive model, time-varying parameter models and almost ideal demand systems have since become recognized approaches while traditional econometric techniques possessed studies until the middle of 1990s. So, according to Mervar and Payne (2007:9), “This trend parallels the overall trend in applied econometric studies since it has been shown that most time series data are not stationary and, therefore, the use of traditional econometric techniques may seriously affect the credibility of the results”. But, with many forecasting methods some studies have tried to estimate the demand for tourism for a specific period of time. The precision of many quantitative methods in forecasting tourism demand in an international level is observed by Martin and Witt (1989). The factors affecting of tourism demand is investigated by Johnson and Ashworth (1990). Almost sixty five empirical studies on the tourism demand criticized as Witt and Witt (1995) mentioned. “Sinclair and Stabler (1997) made a combination of some tourism analyzes, discussing and especially the application of several types of models, with

full deliberation of the single-equation, system of equations approaches, their several advantages and disadvantage” (Kareem, 2008:14).

2.3 Evidence on the Tourism Demand Theory

Standing for almost 10 percent of total international trade and almost half of total trade in services, with inducing 700 billion dollars in annual revenues, international tourism industry is growing rapidly (Eilat and Einav, 2004). However, it has so far failed to have the support it deserves from mainstream economics. ⁶“International tourism is the world's largest export earner” (Eilat and Einav,2003:1).⁷ With inducing government revenues through various taxes and fees, tourism has a significant role in provoking investments in new infrastructure. Importance of tourism for development is absolute in many developing and small countries. These facts and the evidence show that, tourism contains great share of GNP. International tourism demand remarkably influenced by crises and natural disasters. Determining the effects of these external shocks on tourism demand with employing different forecasting techniques is a growing field (Huang and Min, 2002; Eugenio-Martin et al, 2005).

Görmüş and Göçer (2010) argued that a wide range of econometric techniques (OLS, VAR, ARDL, AIDS, etc.), data set (time series or panel data) and variables (GDP, relative prices, the cost of transportation, the exchange rate, accommodation capacity, competitive prices, trade value and country specific dummies, etc.) are employed in these studies to interpret tourism demand.

⁶ World Tourism Organization (WTO) indicates that, receipts from international tourism in 1980 countries' were 287 billion dollars; receipts were 564 billion dollars in 1995. They had 702 billion dollars in 2000 and in 2010 willing to surpass the one trillion dollar mark.

⁷ “Foreign currency receipts from international tourism reached 423 billion dollars in 1996, more than petroleum products, motor vehicles, telecommunication equipment, and textiles. Moreover, it is a labor-intensive industry, employing an estimated 100 million people around the world”(Eilat and Einav, 2003:1).

2.4 Advantages and Disadvantages of the Theory

In many less developed countries, tourism has long been considered as practical choice for growth. It has been widely known that “Tourism is a low investment, high return industry making its profitability extremely high” (Rodríguez, 2004:1). Clearly, to have a strong sector, so many people think that tourism industry also reveals many problems and disadvantages. Foreign tourists bring some negative, social and environmental problems into destination country . The reasonable question occurs: What factors affect the growth of tourism industry? It is mentioned that estimations are essentially explaining the demand side of the equation, in the literature. Although it is possible to forecast, difficulties are explained by the development of a production function for this service oriented industry. When defining the change in tourism demand from an economist’s perspective, econometric analysis has its empirical helpfulness for determining policy advices in addition to examining the success of the current tourism policies. On the other hand, main interests of businesses and governments are focused on the time series model which does not support under conditions in which interdependent relationships between tourism demand and other relevant factors (Song and Li, 2008). After so many years of forecasting research in tourism demand, it is so hard to demonstrate which methodology is the most useful for estimating future modes of tourists' arrivals. Actually, after thirty years no one could determine the “best” method form the many estimating competitions and adopt the one of his/her estimating problems as Fildes and Lusk (1984) discussed. So each forecasting methods in tourism demand have different advantages and disadvantages. Then, it is necessary for the forecaster to choose and compare as many forecasting tools as the time and money would allow so as having more chances to produce accurate results.

2.5 Determinants and The Factors Affecting of Tourism Demand

Observing the effects of variables that change over time on tourism demand is more interesting line of research when concerning with tourism.

According to Eilat and Einav (2004), tourism flows are more sensitive to some elements like external and ethnical conflicts. In international tourism, like in other kinds of trade in services, the exporting country supplies itself and not solely its products. They generally take into account in standard trade models. Tourism industry approach can be helpful in forecasting the effects of variables and also the impacts of fluctuations in exchange rates on tourism. There are two main types in the literature. Eilat and Einav (2004) describe that the first composed of studies that apply time series and co-integration models in an effort to forecast future tourism flows between one or several pairs of countries. The second kind has such studies that forecast the determinants of tourism demand implementing multivariate regressions. Cross- sectional Ordinary Least Square techniques mostly used in these studies for a limited number of countries. This type will be discussed in more detail since it is closely relevant to this study.

2.5.1 Relative Prices and Competitive Prices:

The great number of the tourists compare the cost of living at the tourist destination country corresponding to the origin of the country, before having a decision (Görmüş and Göçer, 2010). When the price level of the destination country increses relative to sending country deters tourists to travel to this place or they redistribute their demand to other relatively inexpensive alternative tourism destinations. ⁸The selection of

⁸ “Two types of relative prices have to be considered in the demand function of international tourism: the first one is relative price between the destination and the sending country; the second one is relative prices between the destination and different competing countries (the substitution price effect)” (Görmüş and Göçer, 2010:91).

alternative destinations was limited to Turkey, Greece, Spain and Egypt. Because of the geographic and cultural similarities to North Cyprus, they are referred as alternative destinations.

Görmüş and Göçer (2010:91) also explained that “The relative price variable, which is normally used in the demand for tourism function, is the ratio of the consumer price indexes between the destination and the sending countries adjusted by the exchange rates. The competitive price variable is used in the demand for tourism function is the ratio of the consumer price indexes between the destination and the alternative destination countries adjusted by the exchange rates”. Both prices must be contrarily referred to tourism demand, as higher prices in the destination country relative to sending countries, as well as in alternative destinations, are possible to affect the visitor's decision whether or not to travel and/or where to travel. In this thesis, the relative prices are used in the tourism demand model.

2.5.2 Real Exchange Rate (REER):

In empirical tourism research, the necessity to consider variables that correspond to tourism prices orders a big problem. The problem mostly comes from the accessibility of the indices of tourism prices. ⁹The real exchange rate changes may have a substantial effect on decision of international tourists. Görmüş and Göçer (2010) noticed that if the price of foreign currency decreases (travel become cheaper) then, people are more willing to travel and tourism demand increases. Because of easy comparison tourists mostly use the real exchange rates as a proxy for destination

⁹ “Researchers have used exchange rate variables to proxy for tourism prices. One popular version is the use of relative nominal exchange rates, measured as an index relative to a base year. The motivation behind using this variable is that people are aware of changes in exchange rates but do not have information on nominal price changes in destination countries. However, this argument is weak if some of the costs of tourism are paid in advance, as is often the case with hotels, car rental etc.” (Eilat and Einav, 2004:25).

prices. Depreciation in the real exchange rate implies that it is now cheaper to visit the destination; therefore, it is probably to be positively related with tourism demand. Relative real exchange rates are similar to nominal exchange rates which are another version to use. But in both the origin and the destination countries, they adapted for inflation. "This adjustment better accounts for changes in actual cost of living in both countries. The common thread in both of these versions is that they are indices that are measured relative to a base year. They can therefore trace changes in costs over time, but cannot capture the actual differences between countries in costs of living". (Eilat and Einav, 2004:4).

2.5.3 Real Income (GDP):

In the origin country, Real Income (GDP) is another extensively used variable. Nevertheless, the effect of income distribution on tourist trends is still undetermined field. Income and prices are the main widely used variable, in terms of the main factors that affecting the demand for tourism (Lim, 1997). Tourism is a normal good. As people's income increase, they are more willing to travel abroad. As a result, it is expected that a grow in income may cause a grow in demand for tourism. Görmüş and Göçer (2010) pointed that because of easy availability of data, most studies have used real (per capital) personal income or real gross domestic product (GDP) as measure for income in sending countries. In this study, the real GDP of sending countries are implemented as a proxy for national income.

2.5.4 Trade Value and Distance:

In recent years, increasing number of studies have used gravity model theory to define tourism demand. Trade value and distance variables between sending and destination countries in tourism demand function are used in these studies with this model (Görmüş and Göçer, 2010). Studies try to initiate that there is an important

nexus between trade and tourism demand. According to Görmüş and Göçer, (2010:91) studies argued that trade can influence tourism demand in two ways: “First, bilateral trade can make home-country product more preferable. Second, it can reduce transportation cost between sending and destination countries.”

In this study, the model does not contain trade value and distance; so it did not take into consideration.

2.5.5 Dummies:

Being politically, economically unrecognized state and February 2001 Turkish economic crisis recently, had some effect on North Cyprus tourism demand. Thus, economic crises can be a main obstacle for tourists (Görmüş and Göçer, 2010). It is expected that the dummy variable have negative effect on North Cyprus tourism demand. There has been great depreciation on Turkish currency after the February 2001 economic crisis. As a result, North Cyprus depends on Turkey becomes relatively cheaper and tourism demand expects to increase.

Eventually, in the literature the results change substantially from study to study and cannot seem to be assured. Actually, this fact could be better expressed in the article of Crouch (1994b:21): “It is apparent from the wide variety of results that a narrative review of the research cannot adequately reveal the underlying nature of the relationships between the demand for international tourism and its determinants”.

Chapter 3

BRIEF OVERVIEW ON NORTH CYPRUS' TOURISM SECTOR

3.1 Introduction

Tourism is without a doubt an essential industry for North Cyprus as being the main foreign exchange earner and a main source of job creation. Income and prices are the main generally used variables that concerning with the demand for tourism (Lim, 1997).

3.2 Economic Background of North Cyprus (GDP)

International tourism industry moved into a continuous increase all over the world during the 20th century and has obviously become one of the most important economic trends in many countries in the past few decades. In many destinations, tourism is one of the most dynamic and growing sectors of the economy (Goh and Law, 2002). Thus, tourism planning is crucial for development of tourism which will contribute the destinations' economic development. Political relationships between countries have substantial effect on tourism planning. They are one of the significant determinants of tourism patterns. This is specifically consistent with small island states' case where tourism is the inducing economic activity in many small island states (Ayres, 2000).

Tourism as a rapid growth industry in the world will continue to be an essential source of foreign exchange earnings for the countries. North Cyprus is an internationally unrecognized state since 1974. As an unrecognized state, it has a substantially small economy with finite natural resources, a small internal market,

and it is extensively weak to external shocks. In terms of its foreign trade with other countries, the political and economic isolation of the North Cyprus led to a great oppression its tourism sector. “North Cyprus is a typical small island state in the Mediterranean Sea with limited natural resources and limited workforce efficiency” (Katircioğlu, Araslı and Ekiz, 2007:40). ¹⁰It has the typical features of a small island economy. Since 1975, statistical data of the country has been recorded. Consequently, North Cyprus cannot develop any political and economic relations with other countries, except for Turkey. Tourism is a vital precedent sector for the economic development of North Cyprus. Mainly, the tourism industry is an important source of income for North Cyprus. ¹¹Furthermore, Katircioğlu, Araslı and Ekiz (2007) stated that net tourism revenue has the biggest share in invisible account and is particularly used for compensating trade deficit but the non-recognition of TRNC has weakened the tourism sector over the years. Despite the fact there are two airports in TRNC. Because of the political reasons, Ercan and Geçitkale Airports are not internationally recognized. All the flights are done via Turkey to other foreign countries.

Katircioğlu, Araslı and Ekiz (2007:41) also mentioned that “Having a potential tourism with the geographical location, favourable climate, history and natural beauties in the island, the policies for improving capacity further determining marketing targets have taken place in the First Five Year Development Plan Period (FFYDP, 1978-1982)”. Among the other important targets regarding tourism

¹⁰ “The population is of North Cyprus is approximately 264,000 (2006 census) and 55 percent of the population live in urban areas. It has 3,355 km² land area, 4,610 US \$ per capita income, 982.9 million US\$ GDP” (Katircioğlu, Araslı and Ekiz, 2007:40).

¹¹ “In 2005, the tourism industry provided \$145.6 million (3.3 percent) to the GDP of North Cyprus and created 8,004 jobs. The North Cyprus tourism industry hosted 589,549 tourists, with its bed capacity of 12,222, with an annual occupancy was 40.7 percent in 2005” (Katircioğlu, Araslı and Ekiz, 2007:41).

development in this plan are; attracting more tourists from abroad, extending average stay periods in tourist foundations, impeding seasonal fluctuations in tourism sector, accruing tourism revenues, advancing internal tourism, applying mass tourism, utilizing effective marketing and recognition activities, organizing education programs on tourism and increasing bed capacity.

Because of the political risk of the country, foreign direct investments could not appeal to foreign tourists and it caused a main problem in the tourism sector for TRNC. Investments are generally done by citizens but these are inadequate in marketing and promoting tourism activities in foreign markets together with attracting foreign tourists. There are some embargoes and propaganda activities annoyingly hold and dictated by Greek Cypriots against Turkish Cypriots. Transportation is another problem. ¹²Political non-recognition caused a major damage for the sector. Katircioğlu, Araslı and Ekiz (2007) pointed out that the main sectors are agriculture, tourism, industry and higher education in North Cyprus but the problems have seen in the first three mainly due to the non-recognition and embargoes caused the higher education sector to be a prior and number one sector of the country. By way of international conferences, TRNC is being recognized indirectly by other countries with the help of universities in the country. Beginning from the late 1980s, North Cyprus based its economic development on services sector which consist of tourism, higher education and banking. According to Katircioğlu, Araslı and Ekiz (2007), this obviously shows how a transition from production based economy to services economy takes place with the pressure of political isolation.

¹² There isn't any direct flight from/to foreign countries other than Turkey to/from North Cyprus. The great majority of tourists, 80 percent, come from Turkey (SPO, 2002b).

Casino tourism has remarkable growth in North Cyprus after the mid 1990s. Since casinos were closed in Turkey, great investments on casinos were done in North Cyprus by internal investors and the investors from Turkey. The visits from Turkey to the casinos in North Cyprus increase the occupancy rate at the weekends and official holidays. Besides, cross border visits have started between North and South Cyprus since April 23, 2003. It was the first time that two communities got together after 1974. This reflected to both economies since then. Greek Cypriots have an important demand on casinos in North Cyprus since April 2003. According to Altınay L., Altınay M. and Bıçak (2002), the political problems between Turkish and Greek Cypriots have created a political imbalance that reflected to North Cyprus tourism industry for many years. ¹³North Cyprus economy which has had a high rate of growth since 2002 attained to 10.9 percent annual average growth rate during these years (2002-2006). According to State Planning Organization report, an economic crisis occurred with the problems in the banking sector and failure of the foreign currency policy of Turkey. Investments and public revenues are declined by this crisis. Inflation rate is increased and employment problems arose, which caused a recession in the economy during the years 2000 and 2001.

Table 3.1 General Evaluation of the 1999-2009 Periods.

Sectors	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Annual Avg. Change (%)
Trade-Tourism	13.4	13.1	12.7	13.9	12.5	20.8	25.5	29.3	33.3	30.6	30.4	14.7
GDP	8.3	7.2	5.9	6.2	10.6	14.2	13.8	7.8	8.6	8.7	9.2	10.5
Net Factor Income From Abroad	125.8	564.3	595.7	594.1	123.6	88.4	4.2	5.1	6.4	7.2	8.4	100.0
GNP	8.7	7.6	5.2	6.9	11.4	15.4	13.5	7.8	8.3	8.9	9.4	10.9

¹³ “Economic integration with Turkey and federation with the Greek Cypriots are considered to be two alternative political solutions” (Altınay L., Altınay M. and Bıçak, 2002:176).

Source: State Planning Organization

Moreover, the tourism sector has a significant share in export of services, had an annual average growth of 6.2 percent in 2002-2006 periods (SPO). As explained in detail in SPO report, the hotels and restaurants sector had negative effects that led to a decrease in average growth rate in 2006. But the positive developments in higher education are another important services export sector for the economy. Business and personal services sector also had a high rate of growth due to these developments in higher education.

Table 3.2 Sectoral Distribution of GNP of the 1999-2009 periods.

Sectoral Distribution of GNP	(GDP Based, %)										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sectors											
Trade-Tourism	14.7	13.4	12.1	15.7	15.9	17.5	18.6	17.6	17.3	18.6	18.5
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Net Factor Income From Abroad	2.2	1.4	0.2	0.8	1.6	2.6	2.4	2.3	2.4	2.6	2.5
GNP	101.3	100.4	100.2	100.8	101.6	102.6	102.4	102.3	102.4	100.0	100.0

Source: State Planning Organization

Retail price indices indicate the price movements in North Cyprus. These developments go parallel with average dollar exchange value. Moreover, a fall in exchange rates reduces the increase rate of consumer price index, but not in the same level every year (SPO). Exchange rates and CPI movements have been volatile in 1999-2009 periods.

Table 3.3 Balance of Payments of the 1999-2009 periods.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Marginal Change	Annual Avg. Change (%)
Tourism (Net): MillionUS\$	192.8	198.3	93.7	114.1	178.8	288.3	328.8	303.2	376.2	427.1	427.8	144.2	26.9
Average US\$ Exchange Rate : YTL	1.42	1.56	1.87	1.50	1.48	1.42	1.35	1.44	1.42	1.18	1.41		

Source: State Planning Organization

Because of a fall in bed night numbers in 2006 and recorded as 258.3 million \$. Also, other invisibles item that recorded as 582.3 million \$ in 2005 is forecasted to grow by 17.7 percent and accomplished to 685.6 million \$ in 2006. ¹⁴In 2007, the positive developments led to rise of 4.4 percent in the invisible accounts balance, which came to 985.1 million \$.

Table 3.4 Statistical Pattern of the Tourism Sector of the 1999-2009 periods.

Statistical Pattern of the Tourism Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
% Share of GDP	17.3	16.4	14.6	15.7	15.9	18.5	18.2	17.9	17.4	17.3	16.9
% Share of EAP ¹⁵	10.9	10.8	10.7	11.3	11.2	12.3	11.8	11.5	11.1	10.9	10.6
Earnings from tourism (US\$ million)	192.8	198.3	93.7	114.1	178.8	288.3	328.8	303.2	376.2	427.1	427.8
Tourist arrivals	414,015	432,953	366,097	425,556	463,090	460,342	458,761	448,169	446,762	476,201	476,393
Share of tourists from Turkey	80.8	80.3	76.1	74.3	71.3	72.4	74.6	75.8	78.9	80.1	80.6
Number of beds	9,932	10,520	10,798	10,916	11,858	11,587	12,243	12,662	12,781	12,853	12,968
Rate of Occupancy	36.7	37.2	30.9	37.8	37.0	38.9	40.3	39.2	38.6	38.8	38.5

Source: State Planning Organization

¹⁴ Net tourism revenues had a share of 27.4 percent in invisible accounts balance are projected to grow by 6.3 percent and other invisibles item to rise 3.6 percent (SPO).

¹⁵ EAP refers to economically active population.

In 2003, in the trade-tourism sector 11.2 percent of the Economically Active Population (EAP), almost 11,088 people were employed during this year. 16 percent of GDP received from this sector. The tourism earnings had an essential portion (US\$178.8 million) of the total foreign earnings in this year.

Table 3.5 Tourist Arrivals and Net Tourism Revenues in North Cyprus of the 1988-2009 periods.

Year	Tourist Arrivals			Net Tourism Revenues (million US\$)
	from Turkey	from other countries	Total	
1988	173,351	56,050	229,401	118.0
1989	214,566	59,507	274,073	154.9
1990	243,269	57,541	300,810	224.8
1991	179,379	41,858	220,237	153.6
1992	210,178	57,440	267,618	175.1
1993	281,370	77,943	359,313	224.6
1994	256,549	95,079	351,628	172.9
1995	298,026	87,733	385,759	218.9
1996	289,131	75,985	365,116	175.6
1997	326,364	73,000	399,364	183.2
1998	315,797	77,230	393,027	186.0
1999	334,400	79,615	414,015	192.8
2000	347,712	85,241	432,953	198.3
2001	277,739	87,358	365,097	93.7
2002	316,193	109,363	425,556	114.1
2003	330,105	129,985	463,090	178.8
2004	331,245	129,097	460,342	288.3
2005	332,564	126,197	458,761	328.8
2006	342,578	105,597	448,169	303.2
2007	341,782	104,980	446,762	376.2
2008	350,294	125,907	476,201	427.1
2009	348,831	127,562	476,393	427.8

Source: State Planning Organization

Table 5 shows the number of the tourists visiting North Cyprus and the net tourism revenues during the period of 1988-2009. Tourist arrivals to North Cyprus have increased by average of 6 percent annually between 1988 and 2003 years. At the same time, the annual average growth in arrivals from Turkey was 5.3 percent. For visitors from other countries, this was particularly higher at 7.4 percent. In this period also prominent fluctuations are seen in net tourism revenues which on average increased by 7.3 percent per annum.

Table 3.6 Macroeconomic Indicators of the 1999-2009 periods.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
GDP, current prices, billion TL	403,627	649,964	1,069,152	1,407,701	1,877,403	2,458,984	3,365,132	3,988,099	4,514,785	4,740,524	4,572,698
Real GNP Growth, % per annum	7.4	-0.6	-5.4	6.9	11.4	15.4	13.5	7.8	8.3	8.9	9.4
Consumer Prices, %	55.3	53.2	76.8	24.5	12.4	11.6	2.7	19.2	9.4	14.5	5.7
Population	206,562	208,886	211,191	213,491	215,790	234,687	254,619	265,100	266,304	267,201	267,761
Exports, fob US\$ million	52.4	50.4	34.6	45.4	50.8	62.0	68.1	65.1	64.9	64.4	66.2
Imports, fob US\$ million	412.7	424.9	272.0	309.6	477.8	853.1	1,255.5	1,291.0	1,289.4	1,286.3	1,290.5
Current Account US\$ million	-90.3	-32.8	-17.1	13.7	19.4	-14.1	-276.3	-282.0	-178.0	-174.4	-172.3
Reserves, excluding gold, US\$ million	654.4	631.9	722.6	941.6	1,222.6	1,221.7	1,224.8	1,230.7	1,231.5	1,234.6	1,232.5
Ave. Exchange rate, TL/US\$	422,312	626,397	1,177,869	1,507,051	1,485,591	1,136,001	1,135,402	1,142,502	1,180,087	1,545,045	1,505,031

Sources: State Planning Organisation Annual Statistics, Nicosia.

For the SPO report, economy of North Cyprus is extremely dependent on imports. Many of the production inputs and consumption goods are supplied by imports. So, costs and prices are affected by the changes in value of YTL against foreign exchange. The Turkish Government performed the current finance, money and

foreign exchange policies that resulted in value rise of YTL against foreign currency. But, the positive growth did not continue in 2007. Rise in demand caused the foreign exchange rates to increase in some period.

3.3 The determinants of export Tourism of demand in Turkish Cypriot economy

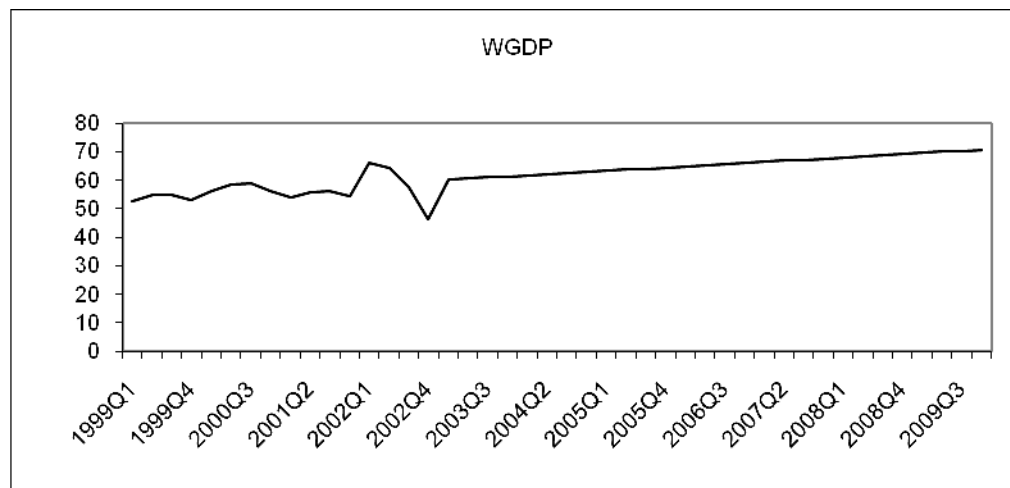


Figure 3.1 World GDP (the Republic of Turkey, the United Kingdom of Great Britain, and other countries data reported between the years 1999 and 2009).

As can be seen in Figure 1, the world income and demand of tourism in the North Cyprus are fluctuating during 1999 to 2001. After the year 2002, there is a sharp decrease in the demand of tourism in the North Cyprus at the year 2002. This decrease can be explained by the fluctuations in the economy. From fourth quarter of 2002, despite of the Turkish economy faced with an economic crisis during these years, a growth in the tourism demand has seen. It is growing continuously during 2003 to 2009.

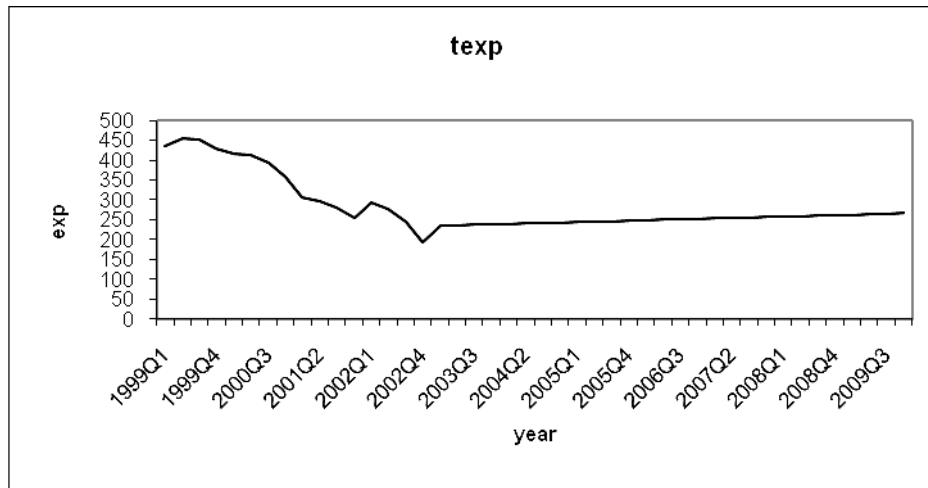


Figure 3.2 Tourism Expenditures of North Cyprus (1999-2009).

Figure 2 shows that the tourism expenditures of North Cyprus within the years of 1999 and 2009. In 1999, a sharp decrease in tourism expenditures can be observed until late of 2002 because of the economical crisis in Turkey. The crisis affected tourism expenditures of North Cyprus. After the year 2002 tourism expenditures are relatively increase until 2009.

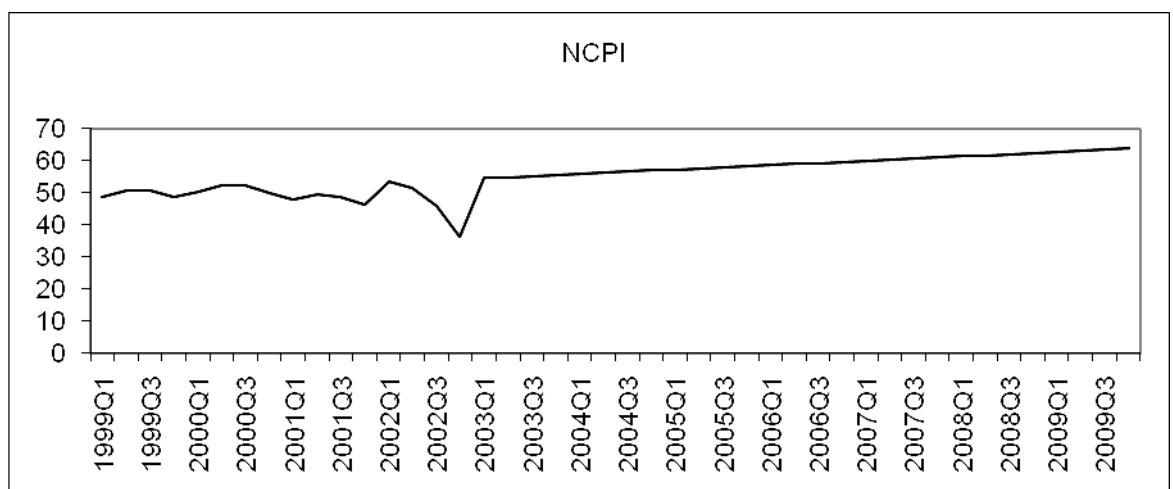


Figure 3.3 Consumer Price Index of North Cyprus (1999-2009).

Figure 3 shows that TRNC's consumer price index from 1999 to 2009. From 1999 to at the beginning of 2002, CPI is fluctuated around 50 percent. After that, there is a decline to 35 per cent. From the third quarter of 2002, CPI is started to rise slowly to 65 percent until 2009.

Chapter 4

THEORETICAL MODELLING AND DATA DESCRIPTION

4.1 Theoretical Modelling

Following the works of Artus (1972), Moreno (1989), Vogt and Wittayakorn (1998), I assume that the demand for TRNC's export of tourism based on current and lagged values of income and relatives prices. Indeed, this link happens when the demand for tourism depends on permanent levels of income and relative prices. This relationship can be formulated as follows:

It is important to note that Equation 4.1 represents the original model for exports of tourism demand. Equation 4.2 shows long-run relationship and Equation 4.3 indicates short-run dynamics¹⁶ for exports of tourism demand.

$$Q_x = f\left(\frac{P_x}{P_y}, \left(\frac{P_x}{P_y}\right)_{t-1}, E, E_{t-1}, YW, YW_{t-1}\right) \quad (4.1)$$

$$\ln Q_{x_t} = \alpha_1 + \alpha_2 \ln\left(\frac{P_x}{P_y}\right)_t + \alpha_3 \ln\left(\frac{P_x}{P_y}\right)_{t-1} + \alpha_4 \ln E_t + \alpha_5 \ln E_{t-1} + \alpha_6 \ln YW_t + \alpha_7 \ln YW_{t-1} + \alpha_8 \ln X_{t-1} + \varepsilon_t \quad (4.2)$$

$$\Delta \ln Q_{x_t} = b_1 + b_2 \Delta \ln\left(\frac{P_x}{P_y}\right)_t + b_3 \Delta \ln\left(\frac{P_x}{P_y}\right)_{t-1} + b_4 \Delta \ln E_t + b_5 \Delta \ln E_{t-1} + b_6 \Delta \ln YW_t + b_7 \Delta \ln YW_{t-1} + b_8 \Delta \ln X_{t-1} + \varepsilon_t \quad (4.3)$$

Where;

QX is the quantity of exports of tourism demanded, PX is the price of tourism in TRNC, using CPI, PW is the world price of tourism, using in WPI, a weighted

¹⁶ A disequilibrium framework in which the log of the quantity of tourism services adjusts to the difference between the desired and actual amount.

average of prices TRNC's trading partners, YW is world income using real GDP, E is the exchange rate, the price of TRNC's currency (TL) in terms of foreign currency, ε_t is serially uncorrelated random disturbance term and a_2, a_3, a_4 and a_5 are relative price elasticities of demand for tourism with expected signs less than zero. The parameters a_6, a_7 are income elasticities of demand for tourism with expected signs more than zero. Ln and Δ are logarithms and differences respectively.

4.2 Data Description

I used price of tourism in TRNC measured by consumer price index (1977=100), quantity of TRNC's exports of tourism, world price of tourism, the exchange rate index and world income employing quarterly data¹⁷ from the time period 1999-2009.

Where¹⁸;

QXQ_t is the quantity of TRNC exports of tourism during the year t , QXQ (term used in text) = tourism expenditures by government (millions of TL) _{t} / (CPI) 100, PX_t (NCPI) is the price of tourism in TRNC in year t , used in CPI measures by TRNC's consumer price index (1977=100), PW_t (WPI) is the world price of tourism, a weighted average of prices TRNC's trading partners. $PW_t = \sum_{i=t}^3 w_i CPI_{i,t}$ where w_i is the weight of the country i in TRNC's exports of tourism-($PX/PW=NCPI/WPI$). The weights are based on the composition of foreign tourism expenditures in TRNC. The two countries and one group (the Republic of Turkey, the United Kingdom, and the other countries) accounted for 64 percent of total foreign tourism expenditures in TRNC in 2005; e_t (NCER) is the exchange rate in the year t , the price of TRNC's

¹⁷ I examine the stationary properties of the data using the Augmented Dickey-Fuller (ADF) unit root tests proposed by Dickey and Fuller (1979; 1981) respectively.

¹⁸ The 'ADF' command in Microfit includes the intercept term in the ADF equation. Therefore the corresponding critical values should take the intercept term into account. In addition to this, we included trend in levels, but we excluded it in first difference (Pesaran and Pesaran, 1997).

currency (TL) in terms of foreign currency as world exchange rate. The components and weights are from the two countries and the group included in the measurement of PW-The base year is 1977. YW_t (WGDP) is world income year t expressed as an index-1977=100. $YW_t = \sum_{i=1}^3 w_i [(Real\ GDP_{i,t}) 100 / Real\ GDP_{1977}]$.

It is worthy to mention that the rationales for estimating separate coefficients for the exchange rate and relative price are explained in Vogt and Wittayakorn (1998). Vogt and Wittayakorn (1998:712) also emphasized that “Travellers will be informed more quickly of exchange rate changes than changes in the foreign prices of tourism. Second, the available data enable the researcher to measure the exchange rate with much more precision than the local currency prices of travel. Third, the resulting measurement errors in PX/PW are likely to lead to estimates of the corresponding parameters that differ both individually compared to the estimated parameters for the exchange rate” (see also Artus, 1972).

It is also important to emphasize that the results of the Augmented Dickey-Fuller (ADF) test indicate that the variables in question – LQXQ, LNCPIWPI, LNCER, and LWGDP – are all non-stationary in levels but stationary in first differences (see appendix 4 for the results).

CHAPTER 5

ANALYSIS AND INTERPRETATION

5.1 Diagnostic Test Results

As the Ordinary Least Square (OLS) technique is applied, some assumptions should be taken into account, otherwise some biases may occur in estimation results. Within this framework, the following issues should be tested:

- The multicollinearity
- The serial correlation
- The normality
- The heteroscedasticity
- The Functional form

The issues were investigated over the period of 1999 to 2009 using quarterly data¹⁹.

5.1.1 Multicollinearity

The problem of multicollinearity is the existence of strong relation among explanatory variables of regression. The problem does not affect the best unbiased estimator of OLS but since some coefficient have large standard errors; they tend to be insignificant, thus making precise estimation to becoming difficult. It is expected

¹⁹ It is worth stressing that the data set used in this thesis was obtained from State Planning Organization and Turkish Republic of Northern Cyprus Ministry of Tourism and Economy Tourism Planning Office.

to have high correlation between the quantity of exports of tourism and the exchange rates, the prices of tourism, the world price of tourism and the world income whereas there is a low correlation between the explanatory variables (i.e. the exchange rates, the prices of tourism, the world price of tourism and the world income). The correlation matrix also gives further evidence whether the relationships between the relevant variables would be established. The signs for the variables were found as expected (see Table 5.1).

Table 5.1: Estimated correlation matrix of variables.

	LQXQ	LNCPIWPI	LNCER	LWGDP
LQXQ	1.0000			
LNCPIWPI	-.84276	1.0000		
LNCER	-.95525	.48985	1.0000	
LWGDP	.98147	-.42084	-.46395	1.0000

The estimated output shows us that there is low correlation between the explanatory variables (LNCPIWPI, LNCER, and LWGDP) and high correlation between the dependent variable (LQXQ) and the explanatory variables. The correlation matrix also indicates that the independent variables have high explanatory power on the dependent variable and advocate that these variables adequately explain the behaviour of the output. It is also observed that the data used for this thesis seemed to fit the model and are consistent with predicted behaviour.

5.1.2 Autocorrelation (Serial Correlation)

When the results are not independent of each other, autocorrelation occurs. If the autocorrelation exists in the residuals, the regression coefficients are unbiased but the standard errors will be underestimated and the test of regression coefficients will be unreliable. The most popular test for detecting auto-correlation is the one that developed by Darwin and Watson, known as Durbin-Watson (DW) statistics. Therefore Darwin-Watson technique used in this thesis:

With 44 observations and 4 independent variables the tabular value is $D_L= 1.33$ and $D_U= 1.72$. Since calculated value is higher than D_U ($2.08; 2.85 > 1.72$), there is no evidence of autocorrelation at the 5 percent level of significance.

5.1.3 Normality

Normality shows us whether the residuals are normally distributed or not as normal distribution is one of the assumptions of the OLS. To check this assumption, the chi-square statistics are used for employing the following hypothesis:

$H_0: u_t = 0$ (residuals are normally distributed)

$H_1: u_t \neq 0$ (residuals are not normally distributed)

Since the equation indicates its calculated value of normality is smaller than the tabular value, there is no problem in terms of normality (see Tables 5.2 and 5.3).

5.1.4 Heteroscedasticity

Homoscedastic issue is another assumption of the OLS regression models. If the residuals have a constant variance, they were said to be homoscedastic, but if they are not constant, they are said to be heteroscedastic. The effect of heteroscedastic are that even though the regression coefficients are still linear and unbiased, they are no longer the best or minimum variance estimates, thus they are no longer the most efficient coefficient. As a result, in the presence of heteroscedasticity, the usual hypothesis testing routine is not reliable, raising the possibility of drawing misleading conclusions. The model was tested whether error variance is constant or not. The hypothesis is conducted as follows;

$H_0: \sigma_2 = \sigma_2$ (Homoscedasticity)

$H_1: \sigma_2 \neq \sigma_2$ (Heteroscedasticity)

The problems of heteroscedasticity were not observed in the estimated equation under this study (see tables 5.2 and 5.3).

5.1.5 Functional Form

Functional form is a kind of problem whether there is the presence of misspecification within the estimation equation. Following hypothesis are tested for the presence of misspecification:

$H_0: \gamma = 0$ (no misspecification)

$H_1: \gamma \neq 0$ (existence of misspecification)

Since the calculated figures are smaller than tabular ones, there is no variable omitted (see Tables 5.2 and 5.3).

5.2 Empirical Results²⁰

After analyzing the diagnostic test results for the serial correlation, functional form, normality and heteroscedasticity are observed. The results estimated from the regression equation using t-test, F-test, Darwin-Watson (DW) statistics and R^2 values are evaluated.

The test results in the long-run²¹ as well as in the short-run²² periods are presented in the following Tables 2 and 3 for demand of North Cyprus's exports of tourism and its determinants as follows:

Actually, the OLS results shown in the following Tables are our final outcome, which indicates almost the best model can be estimated after the insignificant variables were dropped from the estimated model sequentially. This is called Parsimonious Model. Simply, every single variable shown in the model is observed, however the results show that some estimated variables are insignificant, so the most insignificant variables are eliminated from the model.

²⁰ The empirical test results obtained have been carried out by Microfit 4.0 (Pesaran and Pesaran, 1997).

²¹ I employ a residual-based cointegration technique to test the existence of a long-run relationship among the variables. A sufficient condition for joint co-integration among the variables in a long-run regression is that the error term should be stationary. The residual based ADF test statistics for the error term ensure that we reject the null hypothesis of non-stationary (or no co-integration) at 5% significant level for the model in table 2 (also see appendix 5).

²² Note that if two or more time series variables are co-integrated, then there exists an error-correction mechanism (ECM). Empirically, in small samples, statistically significant error-correction terms provide further evidence in favour of the presence of a 'genuine' long-run relationship. Since the existence of joint co-integration among the variables in long-run regressions Equations 4.2 is confirmed, the next step is to model the short-run dynamics with the use of ECM. I therefore employ an ECM to test for short-run adjustment towards long-run equilibrium, and to explore the relationship between quantity of export and its determinants (if any) for the model in the short-run. The results of the parsimonious dynamic models, using the error terms from OLS regressions are in Table 3 (also appendix 6).

Table 5.2: Ordinary Least Square Estimation (OLS)-Long-Run.

Dependent Variable	LQXQ
Variable/ Sample Period	1999Q1-2009Q4
Constant	1.77 (1.56)
LNCPIWPI	- .13 (-1.68)
LNCER	-.22 (-2.08)
LNCER(-1)	-.26 (-2.02)
LWGDP	.60 (8.35)
DUM2001	-.68 (-2.41)
R ²	.968
F-test	303.24
SER	1.0822
CRDW	2.008
ADF*	-6.4363
CV	-4.7553
X _{SC}	0.58 [.96]
X _{FF}	0.056 [.812]
X _{NORM}	5.67 [.059]
X _{HET}	.33 [.56]

Notes: LQXQ = the quantity of exports of tourism demanded; NCPIWPI = North Cyprus price index related with world price index, LNCER = North Cyprus exchange rate, LWGDP = World income, World of Gross Domestic Product, SER = standard error of regression, CRDW = Cointegration Durbin Watson statistic, t-values in the parentheses near by the estimated coefficients and all diagnostic pass at 5% level of significance for the model. Reported diagnostics also suggest that there does not exist evident for misspecification at 5% level of significance for the model used. ADF is the Augmented Dickey Fuller test and CV is the critical value. It is worth emphasising that the star (*) indicates no augmentation is necessary to remove autocorrelation from the error terms.

Table 5.3: Ordinary Least Square Estimation (OLS)-Short-Run.

Dependent Variable	DLQXQ
Variable/ Sample Period	1999Q1-2009Q4
Constant	1.68 (1.81)
ECT (-1)	-0.84 (-4.54)
DLNCPIWPI	- .29 (-2.78)
DLNCER	-.15 (-1.67)
DLWGDP	.54 (4.13)
DUM2001	-.51 (-1.75)
R ²	.58
F-test	28.32
DW	2.85
SER	1.04
X _{SC}	0.26[.99]
X _{FF}	2.74 [.097]
X _{NORM}	4.83 [.089]
X _{HET}	.42 [.57]

Notes: DL indicates differences of logarithms of the data series used in this thesis. t-statistics are in parentheses and all diagnostic pass at the 5% level of significance for the model. It is worth stressing that reported diagnostic suggests that there is no evident misspecification at the 5% level of significance for the model. ECT is error correction term and it should be minus between 0 and 1. The rests are already explained as in the previous table.

5.3 The Interpretation of Estimated Coefficients

For each unit increase in North Cyprus price index related with world price index, the estimated average amount of export tourism of demand is decreased by 13 percent holding the others constant. An increase in North Cyprus exchange rate, the estimated average amount of export tourism of demand is decreased by 22 percent and 26 percent in the previous period respectively holding the others constant. An increase in world income by 1 percentage point causes an increase the quantity of TRNC exports of tourism by almost 60 percentage point. It is worth mentioned that the estimated short-run elasticities have the more or less same magnitude and correct signs with the corresponding long-run elasticities.

5.3.1 t-Statistics

In order to explain the significance of each variable, t-values are used and it's relevant hypothesis as follows;

The hypotheses are $H_0: B_s = 0$ (not significant)

$H_1: B_s \neq 0$ (significant)

By using t-distribution, it can be decided whether individual t-values (calculated or estimated) of the existing variables are significant or not according to the tabulated t-values as appears in the Table 5.2 and 5.3 above. T-statistics of each variable for both long-run and short-run period are displayed within Tables 5.2 and 5.3.

In the long-run period, LNCPIWPI (-1.68<- 2) -the ratio of price index to world price index is less significant compared to the other determinants. LNCER (-2.08<-2) – the North Cyprus exchange rate is significant at 10 percent level whereas LWGDP-

World income- (8.35>2) shows that this variable is statistically significant at 1 percent level. In the short-run period, LNCPIWPI (-2.78<- 2) -the ratio of price index to world price index is more effective whereas LNCER (-1.67<-2) and LWGDP are significant but less powerful.

5.3.2 F-Statistics

F-test shows overall significance of the estimated equation. Since calculated F-values bigger than tabulated F-values, we reject the null hypothesis and accept the alternative hypothesis which means that the equation holds overall significance for the case of TRNC based on the relationship between world income, the price elasticity of tourism demand and tourism expenditures. Since 303.24>2.84 F-tabular=2.84 and F calculated= 303.24; (in the short-run, F-tabular=3.23 and F calculated= 28.32), we accept the 5 percent level of significance the null hypothesis that there is statistically significant relationship between the independent variables and the dependent variable.

5.3.3 R²

R² indicates the proportion of the total variation in the dependent variable explained with the variation in explanatory variables within the regression model. The estimated R² is 0.968 (0.58 in the short-run) which is highly reasonable score. This means that the estimated regression for North Cyprus tourism can only explain 96% of the total variation in the dependent variable in the long-run period.

5.4 An Overview of the Empirical Results

This study empirically investigates the relationship between North Cyprus price index related with world price index (NCPIWPI), North Cyprus exchange rate (LNCER), world income (LWGDP) and their relationship with the quantity of exports of tourism demanded (LQXQ) of North Cyprus.

The reported correlation matrix gives low correlation between the explanatory variables and high correlation between the dependent variable and explanatory variables. In the long-run period, the regression model indicates that the independent variables have high explanatory power on the dependent variable and advocate that these variables adequately explain the behaviour of the quantity of exports of tourism demanded (LQXQ) of North Cyprus. It is also realized that the data used for this thesis seemed to fit the model and are consistent with predicted behaviour. The estimated coefficients for both periods have right measurement and the correct signs. It is ultimately found that ratio of price indexes has negative impact on the quantity of exports of tourism demand which stimulates export quantity of demand as ratio of domestic price to world price goes down for both long and short-run periods. The Exchange rate used in both periods has a negative influence on export quantity of demand. This advises that an increase in the exchange rate causes a decrease in export quantity of demand (tourism expenditures by government). It is also found that positive significant nexus exists between world income and export quantity of demand. This evidence suggests that an increase in world income or nation's wealth contributes to export quantity of demand for the North Cyprus economy. The last variable called DUM2001²³ which was used to take into account the negative effects of the financial crises formed in Turkey in the year 2001. This suggests that a decrease in this variable favourably affects export quantity of demand for the Turkish Cypriot economy.

²³ It is noteworthy that without the use of dummy, a co integration relation among the variables has not been established. This situation provides a justification for the inclusion of dummy variables for the model. I use dummy variable for the year 2001, taking the value of 1 and 0 otherwise. The dummy used for DUM2001 reflects the adverse effects on the Turkish economy owing to the deterioration of the economic activities or financial activities (see also Fethi, 2002).

When we compare my estimates of relative prices and income elasticities of demand for the Turkish Cypriot economy with the ones estimated in the relevant literature. My results of elasticities are within the range of estimates reported in the relevant studies. My estimates are slightly smaller than the elasticities reported by Diamond (1977) (who studied for Turkey's export of tourism), Little (1980) (who studied for US export of tourism), Artus (1972) (who studied for eleven West European countries' export of tourism), Moreno (1989) (who studied for Korea and Taiwan export of tourism), and Vogt and Wittayakorn (1998) who studied for Thailand's export of tourism). However, I found the similar estimates of elasticities compared to Bahmani-Oskooee's (1986) estimates who studied for Thailand's exports of tourism. In other words, my estimates of the short and long run income as well as relative prices elasticities are slightly smaller than the findings reported in the other studies. This indicates that the flow of tourists from other countries (where the people have higher income and there exists higher prices in their market places) to North Cyprus.

Chapter 6

CONCLUSION, RECOMMENDATIONS AND POLICY

IMPLICATIONS

6.1 Conclusion

In this thesis, following the works of Artus (1972), Moreno (1989) and Vogt and Wittayakorn (1998), I assume that the demand for North Cyprus's exports of tourism depends on current and lagged values and relative prices. I investigated the relationship between the impact of World income, relative price and North Cyprus' exports of tourism for the period of 1999-2009 using quarterly data.

The empirical findings show that ratio of price indexes has negative impact on the quantity of exports of tourism demand which stimulates export quantity of demand as ratio of domestic price to world price goes down for both long and short-run periods. The exchange rate used in both periods has a negative influence on export quantity of demand. This advises that an increase in the exchange rate causes a decrease in export quantity of demand (tourism expenditures by government). It is also found that positive significant nexus exists between world income and export quantity of demand. This evidence suggests that an increase in world income or nation's wealth contributes to export quantity of demand for the North Cyprus economy. The last variable called DUM2001 which was used to take into account the negative effects of the financial crises formed in Turkey in the year 2001. This

suggests that a decrease in this variable favourably affects export quantity of demand for the Turkish Cypriot economy.

Overall, my estimates of the short and long run income as well as relative prices elasticities are slightly smaller than the findings reported in the other studies. This indicates that the flow of tourists from other countries (where the people have higher income and there exists higher prices in their market places) to North Cyprus.

6.2 Policy Implications

The empirical results show that the data used for this thesis seemed to fit the model and are consistent with predicted behaviour. The estimated coefficients for both periods have right measurement and the correct signs. My estimates of the short and long run income elasticities as well as relative prices elasticities are slightly smaller than the findings reported in the other studies. This may point out that the model and data used for this study are consistent with the theory.

The Turkish Cypriot economy is currently experiencing an appreciation of its real exchange rate due to stability in Turkish economy or large capital flows from Turkey. However, the output results of the exchange elasticities of demand imply that a decrease of the local currency will lead a raise in tourism demand. The estimates of the prices elasticities of demand imply that a decrease of the local prices will lead an increase in tourism demand in North Cyprus.

The followings can be taken into consideration. In order to reduce possible adverse effects of the appreciation of the local currency, the government should adopt some policies to control the exchange rate. In addition, there should be another policy for keeping the local prices down compared to the world prices to increase the quantity

of tourism exports. Due to political and economic isolation of the Turkish Cypriot economy, this situation makes the quantity of tourism exports to decrease relative to the other countries. This point is also taken into account for policy makers because the most tourism arrangements should be organized via Turkey.

6.3 Recommendation

More constructive time series techniques such as seasonal cointegration and causality techniques can be applied on the same subject for further studies in order to get more accurate results. The model employed in this study can be developed using the concept of gravity-based model rather than export demand model. However, due to availability of the relevant data set and the time limitation, I have been confined to do more solid research on the relevant subject. I recommend that those master students who really want to analyse this subject; they can take those points above mentioned into account.

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APPENDICES

Appendix 1: Estimated Correlation Matrix of Variables

```
*****
          LQXQ   LNCPIWPI   LNCER   LWGDP
LQXQ      1.0000   -.84276   -.95525   .98147
LNCPIWPI  -.84276   1.0000   .48985   -.42084
LNCER     -.95525   .48985   1.0000   -.46395
LWGDP     .98147   -.42084   -.46395   1.0000
*****
```

Appendice 2: Long-Run Period

Ordinary Least Squares Estimation

Dependent variable is LQXQ

44 observations used for estimation from 1999Q1 to 2009Q4

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
C	1.7754	1.1319	1.5678[.068]
LNCPIWPI	-.13828	.07721	-1.6834[.100]
LNCER	-.22200	.10543	-2.0870[.044]
LNCER(-1)	-.26300	.12873	-2.0270[.050]
LWGDP	.60549	.071893	8.3543[.000]
DUM2001	-.68642	.28216	-2.4179[.022]

R-Squared	.96885	R-Bar-Squared	.96565
S.E. of Regression	1.0822	F-stat. F(4, 39)	303.2499[.000]
Mean of Dependent Variable	14.1037	S.D. of Dependent Variable	5.8394
Residual Sum of Squares	45.6732	Equation Log-likelihood	-63.2544
Akaike Info. Criterion	-68.2544	Schwarz Bayesian Criterion	-72.7149
DW-statistic	2.0089		

Diagnostic Tests

* Test Statistics *	LM Version	* F Version
* A:Serial Correlation*CHSQ(4)=	.5874[.969]*F(4, 35)=	.21754[.927]
* B:Functional Form *CHSQ(1)=	.0560[.812]*F(1, 38)=	.05693[.867]
* C:Normality *CHSQ(2)=	5.6748[.059]*	Not applicable
* D:Heteroscedasticity*CHSQ(1)=	.33746[.561]*F(1, 42)=	.34558[.573]

A:Lagrange multiplier test of residual serial correlation

B:Ramsey's RESET test using the square of the fitted values

C:Based on a test of skewness and kurtosis of residuals

D:Based on the regression of squared residuals on squared fitted values

Appendix 3: Short-Run Period

```

                          Ordinary Least Squares Estimation
*****
Dependent variable is DLQXQ

43 observations used for estimation from 1999Q2 to 2009Q4
*****

Regressor           Coefficient      Standard Error      T-Ratio[Prob]
C                   1.6854           .9219                1.8178[.068]
DLNCPIWPI          -.29426          .10558              -2.7872[.008]
DLNCER             -.15853          .0898               -1.6759[.105]
DLWGDP             .54859           .13145              4.1733[.000]
DUM2001            -.51859          .29145              -1.7533[.085]
*****

R-Squared           .58611           R-Bar-Squared       .56541
S.E. of Regression  1.042           F-stat.             F( 2, 40)          28.3218[.000]
Mean of Dependent Variable  -.27917           S.D. of Dependent Variable  2.2318
Residual Sum of Squares  86.5825           Equation Log-likelihood  -76.0622
Akaike Info. Criterion  -79.0622           Schwarz Bayesian Criterion  -81.7040
DW-statistic        2.8520
*****

```

Diagnostic Tests

```

*****
*   Test Statistics   *           LM Version           *           F Version
*****
*
*
* A:Serial Correlation*CHSQ( 4)= .2603[.991]*F( 4, 36)= 0.3615[.110]
*
*
* B:Functional Form *CHSQ( 1)= 2.7429[.097]*F( 1, 39)= 2.7935[.094]
*
*
* C:Normality *CHSQ( 2)= 4.8358[.089]*           Not applicable
*
*
* D:Heteroscedasticity*CHSQ( 1)= .42936[.572]*F( 1, 41)= .39408[.534]
*****

```

A:Lagrange multiplier test of residual serial correlation

B:Ramsey's RESET test using the square of the fitted values

C:Based on a test of skewness and kurtosis of residuals

D:Based on the regression of squared residuals on squared fitted values

Appendix 4: Unit root test (ADF) Test results

Unit root tests for variable LQXQ

The Dickey-Fuller regressions include an intercept but not a trend

39 observations used in the estimation of all ADF regressions.

Sample period from 2000Q2 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-1.7319	-85.5482	-87.5482	-89.2117	-88.1450
ADF(1)	-1.5790	-85.0515	-88.0515	-90.5468	-88.9468
ADF(2)	-1.5339	-85.0495	-89.0495	-92.3766	-90.2432
ADF(3)	-1.7357	-83.5381	-88.5381	-92.6970	-90.0303
ADF(4)	-1.5156	-82.9753	-88.9753	-93.9660	-90.7659

95% critical value for the augmented Dickey-Fuller statistic = -2.9378

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Unit root tests for variable DLQXQ

The Dickey-Fuller regressions include an intercept but not a trend

38 observations used in the estimation of all ADF regressions.

Sample period from 2000Q3 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-7.2702	-84.6236	-86.6236	-88.2612	-87.2062
ADF(1)	-4.7988	-84.5752	-87.5752	-90.0315	-88.4491
ADF(2)	-2.9181	-83.4295	-87.4295	-90.7047	-88.5948
ADF(3)	-3.1907	-82.5448	-87.5448	-91.6388	-89.0014
ADF(4)	-3.5825	-81.2211	-87.2211	-92.1339	-88.9690

95% critical value for the augmented Dickey-Fuller statistic = -2.9400

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Unit root tests for variable LNCPIWPI

The Dickey-Fuller regressions include an intercept but not a trend

39 observations used in the estimation of all ADF regressions.

Sample period from 2000Q2 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-6.1117	-76.0797	-78.0797	-79.7432	-78.6765
ADF(1)	-3.3054	-74.5988	-77.5988	-80.0942	-78.4941
ADF(2)	-2.3590	-73.5829	-77.5829	-80.9100	-78.7766
ADF(3)	-2.5164	-73.1217	-78.1217	-82.2806	-79.6138
ADF(4)	-1.2812	-62.3928	-68.3928	-73.3834	-70.1834

95% critical value for the augmented Dickey-Fuller statistic = -2.9378

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Unit root tests for variable DLNCPIWPI

The Dickey-Fuller regressions include an intercept but not a trend

38 observations used in the estimation of all ADF regressions.

Sample period from 2000Q3 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-12.6252	-78.2140	-80.2140	-81.8516	-80.7966
ADF(1)	-8.1144	-74.9899	-77.9899	-80.4463	-78.8639
ADF(2)	-4.5539	-74.9819	-78.9819	-82.2571	-80.1472
ADF(3)	-8.4170	-62.1900	-67.1900	-71.2839	-68.6466
ADF(4)	-3.8689	-61.5265	-67.5265	-72.4393	-69.2745

95% critical value for the augmented Dickey-Fuller statistic = -2.9400

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Unit root tests for variable LNCER

The Dickey-Fuller regressions include an intercept but not a trend

39 observations used in the estimation of all ADF regressions.

Sample period from 2000Q2 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-1.5273	-81.2493	-83.2493	-84.9129	-83.8462
ADF(1)	-1.2932	-80.7164	-83.7164	-86.2117	-84.6117
ADF(2)	-1.3840	-80.4128	-84.4128	-87.7399	-85.6065
ADF(3)	-1.2335	-80.2090	-85.2090	-89.3679	-86.7012
ADF(4)	-.99061	-75.9927	-81.9927	-86.9833	-83.7833

95% critical value for the augmented Dickey-Fuller statistic = -2.9378

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Unit root tests for variable DLNCER

The Dickey-Fuller regressions include an intercept but not a trend

38 observations used in the estimation of all ADF regressions.

Sample period from 2000Q3 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-7.2220	-79.2976	-81.2976	-82.9352	-81.8803
ADF(1)	-4.1181	-79.1367	-82.1367	-84.5931	-83.0107
ADF(2)	-3.8769	-78.6910	-82.6910	-85.9661	-83.8563
ADF(3)	-5.0638	-74.7219	-79.7219	-83.8158	-81.1785
ADF(4)	-2.9952	-73.8071	-79.8071	-84.7199	-81.5550

95% critical value for the augmented Dickey-Fuller statistic = -2.9400

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Unit root tests for variable LWGDP

The Dickey-Fuller regressions include an intercept but not a trend

39 observations used in the estimation of all ADF regressions.

Sample period from 2000Q2 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-1.6030	-86.9200	-88.9200	-90.5835	-89.5168
ADF(1)	-1.5312	-86.8590	-89.8590	-92.3543	-90.7543
ADF(2)	-1.5039	-86.8585	-90.8585	-94.1856	-92.0523
ADF(3)	-1.4754	-86.8582	-91.8582	-96.0171	-93.3504
ADF(4)	-1.4350	-86.8554	-92.8554	-97.8460	-94.6460

95% critical value for the augmented Dickey-Fuller statistic = -2.9378

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Unit root tests for variable DLWGDP

The Dickey-Fuller regressions include an intercept but not a trend

39 observations used in the estimation of all ADF regressions.

Sample period from 2000Q2 to 2009Q4

	Test Statistic	LL	AIC	SBC	HQC
DF	-6.6213	-88.0894	-90.0894	-91.7529	-90.6862
ADF(1)	-4.5187	-88.0796	-91.0796	-93.5749	-91.9749
ADF(2)	-3.6460	-88.0682	-92.0682	-95.3954	-93.2620
ADF(3)	-3.1869	-88.0358	-93.0358	-97.1947	-94.5279

95% critical value for the augmented Dickey-Fuller statistic = -2.9378

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

Appendix 5: Cointegration test (ADF) Test results

Unit root tests for residuals

```

*****
Based on OLS regression of LQXQ on:
C          LNCPIWPI          LNCER          LNCER(-1)          LWGDP          DUM2001
43 observations used for estimation from 1999Q2 to 2009Q4
*****
          Test Statistic          LL          AIC          SBC          HQC
DF          -6.4363          -61.3182          -62.3182          -63.1871          -62.6367
*****
95% critical value for the Dickey-Fuller statistic = -4.7553
LL = Maximized log-likelihood          AIC = Akaike Information Criterion
SBC = Schwarz Bayesian Criterion          HQC = Hannan-Quinn Criterion

```

Appendix 6: Error Correction model and term results

Error correction modeling tests for residuals

```

*****
Based on OLS regression of DLQXQ on:
C          ECT(-1)          DLNCPWPI          DLNCR          DLWGD          DUM2001
43 observations used for estimation from 1999Q2 to 2009Q4
*****
          Coefficient          Test Statistic
ECT          -0.84          -4.54
*****

```