IDENTIFICATION OF RELATIONSHIP BETWEEN MACROECONOMIC VARIABLES AND TOURIST ARRIVALS TO SRI LANKA

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Declaration of Candidate and Supervisor

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Abstract

The study investigates the macroeconomic factors which affect on tourist arrivals in Sri Lanka for the period 1990-2014, using annually series of the corresponding variables. To achieve the objectives both time series technique and econometrics techniques were used to analysis of data. The statistical techniques used include the unit root Augmented Dickey Fuller test in order to fulfill the objective of stationary for all the time series. The results from granger causality revealed that past behavior of gross domestic production, gross domestic per capita income, government expenditure on capital and net lending, imports of goods, exports of goods and foreign direct investment are significant factors which determine the present behavior of tourist arrivals. The regression analysis it showed that all macroeconomic variables are strongly linear associated with tourist arrivals. The VECM model has revealed that there exists long run relationship between tourist arrivals and those variables. While tourist arrivals have elastic behavior with respect to gross domestic production, per capita income, imports and tourist cost and inelastic demand with respect to exports, direct employment and inflation rate in the economy. The results derived in this study can be effectively used for implementation of new strategies to attract more tourists to Sri Lanka.

Keywords: Granger Causality, Gross Domestic Production, Regression Analysis, Tourist Arrivals, VECM

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller Test
CV	Coefficient of Variation
DE	Direct Employment
EX	Exports
FDI	Foreign Direct Investment
GDP	Gross Domestic Production
GDPPC	Per Capita Gross Domestic Production
GE	Government Expenditure
IM	Imports
INF	Inflation Rate
TA	Tourist Arrivals
TC	Tourist cost Per Day
VAR	Vector Auto Regression
VEC	Vector Error Correction
VECM	Vector Error Correction Model
XER	Average Exchange Rate

CHAPTER ONE
INTRODUCTION

1.1Background of the Study

Tourism industry has been identified as one of the key industries by economists since it contributes to the development of the economy. There are direct benefits and indirect benefits associated with the tourism industry. Accommodation earnings, visitors expenditure, transport earnings are some of direct contributions while investment spending on travel tourism, government collective travel and tourism spending and impact of purchasing from supplier are considered as indirect travel and tourism contribution (WTTC, 2014).The contribution of tourism to the economic development depends on the power of the tourist attraction factors by the economy. Attraction of tourism to the economy mainly depends on economic and non-economic factors like natural heritage. Most of Asian countries are endowed in natural resources including Sri Lanka and those factors can't control by the government or any institution in the economy. Therefore each nation can complete each other with better management and control of the economic factors influence the tourism to the economy.

1.2 Concepts and Definitions

The better understand of the concepts and definition related the field of tourism is important to carry out better study about the field.

1.2.1 Tourism

Tourism comprises the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited (WTO, 2011).

1.2.2 Type of Tourism

According to World Tourism Organization (WTO) there are three forms of Tourism. The residents of a country travelling as visitors only within that country are called as

Domestic Tourism. Then on-residents of a country travelling as visitors to that country named as Inbound Tourism and the residents of a country travelling as visitors to other countries Outbound Tourism. This study is based on the inbound tourism. Further they categorized tourism as internal tourism which comprises domestic and inbound tourism, National tourism which comprises domestic tourism and outbound tourism. International tourism which comprises inbound tourism and outbound tourism.

1.3 Tourism Industry in World

International tourist arrivals reported by destinations around the world reached 1,138 million in 2014, an increase of 4.7 per cent, over the previous year. Overall demand was robust with 51 million more tourists traveling the world (SLTDA, 2014).

Table 1.1: World Tourist Arrivals by Regions in Million from 2012-2014

Region	2012	2013	2014	% change		
				2012	2013	2014
Africa	52.2	54.7	56	5.2	4.8	2.3
America	162.5	168.1	180.6	4.4	3.5	7.4
Asia & Pacific	233.8	249.8	263	6.9	6.8	5.3
Europe	539.6	566.3	588.4	3.7	5	3.9
Middle East	49.8	48.2	50.3	-5.6	-3.4	4.4
World	1038	1087	1138	4.1	4.7	4.7

Source: World Travel and Tourism Authority (2014).

Furthermore United Nations World Tourism Organization (UNWTO)'s Tourism 2020 Vision estimates that international arrivals are expected to reach nearly 1.6 billion by the year 2020, and 1.2 billion will be intraregional and 378 million will be long-haul travelers. The total tourist arrivals by region appearances that by 2020, Europe (717 million tourists), East Asia and the Pacific (397 million) and the Americas (282 million), followed by Africa, the Middle East and South Asia will be the top three tourists receiving regions. Compared to the world average growth rate of 4.1%, East Asia and the Pacific, Asia, the Middle East and Africa are forecasted to record growth at rates of

over 5% year. The more mature regions Europe and Americas are expected to show lower than average growth rates while Europe will maintain the highest share of world arrivals, although there will be a decline from 60 per cent in 1995 to 46 per cent in 2020.

1.4 Tourism Industry of Sri Lanka

Sri Lanka Tourism has boomed to a new milestone of 1,527,153 arrivals in 2014, transcending all time high successes in the history which is an increase of 19.8% over last year's 1,274,593 arrivals (SLTDA, 2014). Significant increase in investment in the tourism industry, infrastructure developments, introduction of new tourist attractions and promotional campaigns conducted by the private sector and the government supported to attract more tourist in to the country (CBSL, 2014).

1.4.1 Tourist Arrivals

According to Figure 1.1 it can be seen tourist arrivals to Sri Lanka has increased over the period of time. After end of civil war in 2009 it can be seen upward trend of the data series of tourist arrivals. According to central bank report 2014 it stated that the tourism industry performed well in 2014 exceeding the tourist arrivals target of 1.5 million set for the year and tourists arrivals in 2014 increased by 19.8percent to 1527153 compared to 1274593 arrivals in 2013.
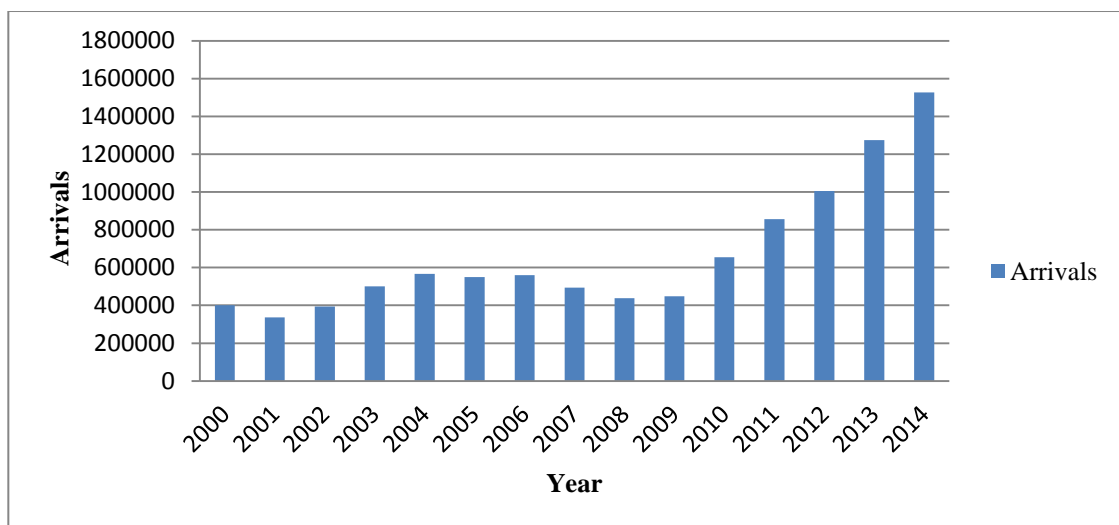
Figure 1.1: Tourist Arrivals by Year 2000-2014

Source: SLTDA Annual Report 2014.

Tourist arrivals from all major regions increased in 2014.Western Europe continued to be the largest tourist origin for Sri Lanka. Meanwhile, the share of the South Asia region is the second major market (CBSL, 2014). Furthermore individual country basis, India remained the leading country of tourist origin followed by UK, China, Germany and Maldives. These five countries together accounted for 46.1 per cent of tourist arrivals to Sri Lanka in 2014 (Figure1.2)
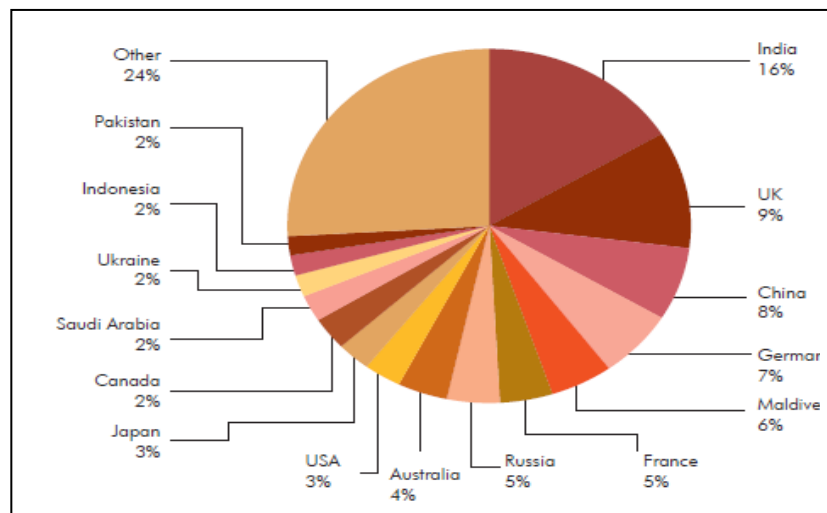
Figure1.2: Tourist Arrivals of Sri Lanka in 2014 by Different Region.
Source: Central Bank Report, 2014.

Furthermore the tourists used to come with different purpose to the county. Then having good knowledge of purpose of tourist arrivals is important to carry out the research and important to getting better understanding about the data. Figure 1.3 shows the purpose of travel by the tourist to Sri Lanka in 2014. It can be seen that 68% of tourists have arrived to Sri Lanka for pleasure while 2% arrived for business purpose.
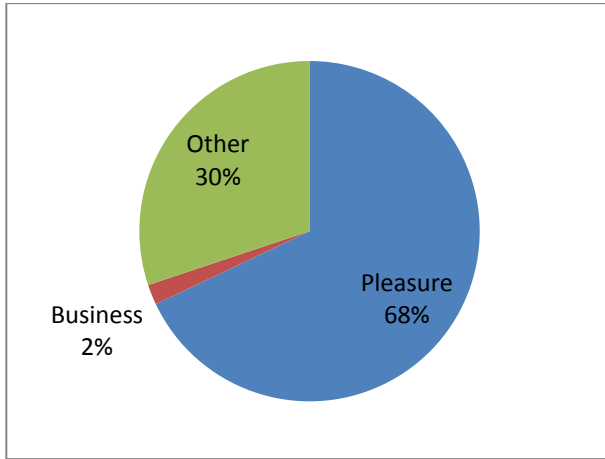
Figure 1.3: Tourist Arrivals to Sri Lanka in 2012 by Purpose

Source: CBSL Report, 2014

1.4.2 Sri Lanka Tourism Development Authority (SLTDA)

The Sri Lanka Tourism Development Authority (SLTDA) was formed as the apex body for Sri Lanka Tourism under Section 2 of the tourism Act (No. 38 of 2005). The organization (Formally known as "Ceylon Tourist Board / Sri Lanka Tourist Board / Sri Lanka Tourism Board ") is committed towards transforming Sri Lanka to be Asia's foremost tourism destination. The SLTDA will strive to develop diverse, unique and quality tourism services and products that would make Sri Lanka as a unique destination, globally.

The SLTDA creatively uses its products, while ensuring optimization of resources to efficiently and effectively serve the industry. Some of its activities include identifying and developing tourist specific, unique products and services, formulating and implementing Tourism Development Guidelines, and facilitating and implementing the legal and administrative process for new product and service development.

1.5 Tourist Contribution to Economy

The foreign exchange earnings increased by 43.6% from US$ 1,715.5 million in 2013 to US$ 2,431.1 million in 2014. Foreign Exchange (FE) Receipts per tourist per day recorded has increased of US$ 4.3, from US$ 156.5 to US$ 160.8 in 2014 (SLTDA,2014).Tourism has increased its rank up to third level as the largest source of Foreign Exchange Earner of the national economy in 2014 from fourth level in last year.

Those that ranked above tourism were Workers Remittances – 916.3 billion and Textiles and Garments – Rs. 643.6 billion. The portion of tourism contribution to total foreign exchange earnings in 2014 amounted to 10.2%. Travel and tourism had been contributed around 9.4% to the GDP of Sri Lanka in 2013 and has ranked @ 87th place while country which recorded 1st place has contributed more than 90% for their GDP (WTTC,2014).

It is widely acknowledged that tourism growth contributes to economic growth through its various impacts, such as employment generation, foreign exchange earnings, and government revenues with multiplier effects, development of infrastructure, and development of entrepreneurial and other skills. Because tourism is a multidisciplinary activity that involves several industries and draws upon a variety of skills, its benefits are spread over a wider section of society comparatively to other sectors of the economy (Telce and Schroenn, 2006).It can be further segmented as follows reported by the World Travel and Tourism Authority.

1.5.1 Direct Travel and Tourism Contribution

The direct contribution of Travel & Tourism to GDP reflects the 'internal' spending on Travel & Tourism which are total spending within a particular country on Travel & Tourism by residents and non-residents for business and leisure purposes as well as government 'individual' spending those are spending by government on Travel & Tourism services directly linked to visitors, such as cultural or recreational (WTTC.2014).

- Tourism contributed to commodities in accommodation, transportation, entertainment and Attractions.
- It further contributes industries in accommodation services, food and beverage services, retail trade and culture, sports and traditional services.
- Residents' domestic travel and tourism spending, business' domestic travel and tourism spending visitor's exports individual government travel and tourist spending directly contributed to the economy.

6

1.5.2 Indirect Travel and Tourism Contribution

- Travel and tourism investment spending
- Government collective travel and tourism spending.
- Impact of purchases from suppliers.

1.5.3 Induce Contribution

- Food and beverages
- Recreation
- Clothing
- Housing
- Household goods

Finally tourism is contributed to overall gross domestic production and employment in the economy. Since there are more contributions to the economy it is time to change the international competiveness among the others considering uplift of economic factors affecting to the attraction of tourist. The Sri Lanka has undertaken varies projects to attract more tourists in future. The Authority on World Travel & Tourism has forecasted Sri Lanka will the high place among the other Asian countries with respect to contribution to GDP (Figure1.4).

Travel & Tourism's Direct Contribution to GDP	2014 - 2024 % growth pa	Travel & Tourism's Total Contribution to GDP	2014 - 2024 % growth pa
9 Thailand	6.7	8 India	7.0
11 India	6.4	11 Tanzania	6.7
17 Tanzania	6.2	13 Thailand	6.4
26 Sri Lanka	6.1	16 Sri Lanka	6.2
Asia Pacific	5.4	Asia Pacific	5.6
56 Kenya	5.2	54 Kenya	5.2
62 Madagascar	5.1	65 Madagascar	4.9
87 Mauritius	4.4	83 Malaysia	4.5
91 Malaysia	4.4	91 Mauritius	4.4
99 Seychelles	4.3	96 Maldives	4.2
101 Maldives	4.2	World	4.2
World	4.2	104 Seychelles	4.0

Figure1.4: Estimated Travel and Tourism Contribution to GDP During 2014-2024.

Source: The Authority on World Travel & Tourism.

To reach above mentioned position government and other private sectors have to look factors affecting to the travel and tourism arrivals.

1.6 Statement of Problem

The tourism industry is influential in the advancement of macroeconomic development and change the direction of macroeconomic variables in the economy. It is evident that well developed tourist industries in the world encourage investors and corporations to allocate their limited resources to increase in investments in tourist industry in efficiently, which lead to increase rate of economic growth. Therefore policy makers more concern about relationship between tourist arrivals and behavior of macroeconomic variables. Therefore policy makers, corporations and individuals need to find out whether there is a relationship among macroeconomic variables and tourists arrivals.

The dynamic relationship between macroeconomic variables and tourist arrivals is well-documented in the literature. However, the past literature related to examine the causality relationship and elasticity between macroeconomic variables and tourist arrivals in related to the Sri Lanka are few. Therefore, the paper examines the causality

relationship between selected macroeconomic variables and elasticity among the variables after identifying macroeconomic variables which are influenced to the demand for tourists to the economy.

1.7 Significant of the Study

There are large numbers of factors affecting on the tourist attraction of the country. Factor may be geographical, social political and economic. Sri Lankan wealthier with the natural resources but other factors has to be considering in meaning fully. This study only considers the economic factors affecting to the tourist arrivals. Those factors were selected from the literature reviews discussed in Chapter 2.

Earning from tourism has continued to record a healthy growth in 2014 with higher spending and increased duration of stay by tourists. Meanwhile investment in the tourism sector has expanded further in 2014 with introducing international hotel chains. It can be seen that importance of tourism promotion has been highlighted by the activities taken by the government of Sri Lanka because the tourist industry enhance the economy thought many channels. After finding out significant factors which affect to the tourist arrivals economy can allocate their limited resources to identified factors to further development of the tourist industry. It facilitates to improve the tourism industry of Sri Lanka with Collaboration between private and government institutions of Sri Lanka and Tourist Board of Sri Lanka.

1.8 Objective of the Study

In the view of above the objectives of this study are,

- ✓ To identify trend of tourist arrivals to Sri Lanka.
- ✓ To identify the granger causality between Tourist arrivals and macroeconomic factors affecting the tourist arrivals
- ✓ To develop a model to forecast future arrivals
- ✓ To measure the Elasticity of tourist arrivals with respect to macroeconomic variables

1.9 Limitation of the Study

This study only considers the tourist arrivals in Sri Lanka and macroeconomic data from 1990-2014 annually. This is due to the lack of quarterly data on some macroeconomic variables. However this does not affect the results obtained because of the model and estimation procedure used which is ideal for the 24 years period.

There is also need for statistics on tourist from source countries and need to be considering social and political factors. Furthermore, the results obtained shows possible determinants of tourist arrivals in Sri Lanka and will probably vary according to the variables used and the model used in estimation.

1.10 Outline of the Report

This study has five chapters and a brief description of each chapter is given bellow,

Chapter 1:   Provides a detailed introduction to background of the study covering tourist industry performance of world and Sri Lanka. Furthermore it covers objective of studying while study the significant of the study.

Chapter 2:   Provides the literature review focusing on key areas related to the tourist arrivals in the world also in Sri Lankan context.

Chapter 3:   Provides the materials and methods used for the study including sampling methods, variables, statistical packages and methodology used in the study.

Chapter 4:   Provides the analytical process and highlights of the outcomes.

Chapter 5:   Provides the conclusions drawn based on the outcome and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature relevant to tourist arrivals and macroeconomic variables. Section 2.2 represents the studies on gross domestic production and tourist arrivals, section 2.3 describes relationship between tourist arrivals and income, section 2.4 provides studies related to exchange rate and price levels. While section 2.5 describes the relationship between international trade and tourism, section 2.6 provides studies related to government expenditure and foreign direct investment. Finally section 2.7 presents the relationship employment in the industry, tourist receipts and tourists arrivals.

2.2 Studies on Gross Domestic Production (GDP) and Tourism

Carla Massidia et al (2012) have analyzed a relationship between International Tourism Arrivals, GDP in Italy using VECM. It was found the long run and short run and simultaneous relationships across per capita international tourism arrivals and real GDP. The study has used quarterly data from 1987 to 2009. Akinboade and Braimoh (2010) studied linkage between tourism and trade for South Africa. Tourism was co-integrated with GDP .It was found that long run relationship exists between real GDP and international tourist arrivals.

IIhan Ozturk (2009) has investigated on causality between tourism growth and economic growth in Turkey. It examined the long-run relation-ship between the real GDP and international tourism in Turkey during the time period 1987-2007.It was considered main macroeconomic indicators of GDP Per capita, GNP growth rare as a measure of growth rate for Turkey and no of tourist arrivals. A vector error correction model (VEC) and an autoregressive distributed lag model (ARDL) were used to investigate tourism-led hypothesis. The results of the Johansen co-integration test showed that there is no unique long-term or equilibrium relationship between the real GDP and international tourism. Therefore granger causality test and error correction model cannot be used to

run any further in the long-term period. The study further showed the importance of the economic growth and international tourism.

Bandula et al (2013) have investigated and observed causality and long run relationship between tourism and economic growth in Sri Lanka. A multivariate model has been used to identify the long run and short run dynamics of the relationship between tourism and economic growth. Real gross domestic product (RGDP) and international tourist arrivals (ITA) were variables that have been used. It was found that long run relationship between the variables and tourism has a positive impact on economic growth in the developing country and unidirectional causality running from tourist arrivals to economic growth but did not exists from economic growth to tourist arrivals.

Wanhill, Stephen (1983) has identified co-integration and causality between tourism and economic growth in Mauritius and it was revealed that tourism has contributed to economic growth. Furthermore, it is claimed that tourism has a significant positive impact on Mauritian economic development. Armstrong (1996) has investigated the impact of tourism in the long run on economic growth of Greece. Study indicated that there exist a strong Ganger causality relationship between international tourism receipts and economic growth and also a moderate causal relationship between international tourism receipts and economic growth.

2.3 Studies on Income and Tourism

Munóz and Amaral (2000) have revealed that economic demand theory suggested as country's income rises, more of its residents can afford to visit other countries, and therefore tourist arrivals are a positive function of income. While Muchapondwa and Pimhidzai (2011) have estimated the coefficients of the determinants of international tourism demand for Zimbabwe for the period 1998 to 2005. The results revealed that change in global income has significant impact on international tourism demand. Hanafiah and Harun (2010) have found out tourism demand in Malaysia based on the key economic factors like income, price, exchange rate, consumer price Index, distance,

population and economic crisis using a modified Gravity model. The results have found that income is the most important factor that affects tourism flow.

Teresa and Teodosio (2000) have found out the impact of the economic determinants of the international demand on tourist services in Spain. Study revealed that real per capita income influence the demand for Spanish tourist services. The estimated income elasticity was positive 1.40 concluding that it was a luxury service for the people. While yair and Liran (2004) have found the tourism was the main factor for developed countries which has a price elasticity of about one, while tourism to less developed countries does not respond to price fluctuations.

2.4 Relationship Exchange Rate, Price and Tourism.

Artus (1970) has suggested that travelers are more conscious of exchange rates that they use and they are using them as proxy for the cost of living abroad. Raymond (2001) has examined the impact of economic factors on tourism in Hong Kong. Real tourism expenditure (RTE) had been considered as dependent variable and Exchange rate had been considered as a one of independent variable. It was revealed that expected expenditure of tourists was depending on the Exchange rate. Further Iittm (2010) has stated Exchange rate is seen as determining factor, even though not very significant in India. Negative regression coefficients for countries the U.K, Germany and Singapore could explain the adverse bearing of exchange rates on demand. Furthermore Hanafiah and Harun (2010) have found out tourism Exchange rate is negatively related with tourism demand in Malaysia based on the key economic factors using a modified Gravity model.

Armstrong (1996) has examined the impact of tourism on the long run economic growth of Greece. It was found that moderate causal relationships between exchange rate and international tourism receipts. In the studies in elasticity, Teresa and Teodosio (2000) have found out there was positive inelastic relationship between exchange rate and tourism and it was positive 0.50.

Raymond (2001) has studied the impact of economic factors on tourism in Hong Kong. Real tourism expenditure (RTE) had been considered as dependent variable and price levels had been considered as one of independent variables. It was revealed that expected expenditure of tourists depends on the price levels. Tourism prices were described as cost of living in Egypt by the tourists from the origin countries by Ibrahim (2011) further it was identified that demand for international tourism was an inverse function of relative prices. According to Witt& Martine (1987) the cost of goods and services purchased by tourists in the destination country was considered as prices of tourist. Teresa and Teodosio (2000) have found out the international demand for tourist services in Spain was negatively related to the real prices with coefficient value of negative 0.30.This suggests that this demand is price inelastic. The comparison of this result with those previous studies was not straight forward. The reason is that different studies have used different measures of price and this explains why the estimates of price elasticities vary considerably. Nadue & Saayman (2005) have shown that the coefficient for CPI is 0.20 for Europe and 0.92 for Africa which shoes that 1% increase in prices would lead to a 0.20% and 0.92% increase in tourists from Europe and Africa respectively. This was in contrast to the principles of consumer theory. In this study CPI used as a proxy for prices.

2.5 Studies on International Trade and Tourism

Carla Massidia et al (2012) have found there was long run and short run relationship between International Tourism Arrivals and total international commercial transactions (imports and exports) for the Italian economy. The study has used quarterly data from 1987 to 2009.

Turner and Witt (2001) have revealed that a long-term bidirectional relationship between tourism and trade exists and the relationship was positive. Further results were shown that international trade plays a major role in influencing business tourism demand. Muhammad and Andrews (2008) have identified that a country's exports have a positive effect on tourist arrivals. Phakdisoth and Kim (2007) have revealed that bilateral trade, which captures the economic relationships, also has a positive correlation with the

tourist arrivals in Laos. Habibi et al (2009) have investigated that the trade openness has an insignificant and positive impact on the tourism demand in Malaysia. Gil- Alana and Fischer (2007) have found that the causality relation resulting from tourism as tourist visits have impact on trade. Thus, tourism is thought to be able to promote cross-border exports by originating entrepreneurial activities as a result of learning about new business opportunities, while travelling and demand for new products to be consumed back home may be created as a consequence of learning about them during foreign travel. WTTC (2014) has stated that Money spent by foreign visitors to a country or visitor exports is a key component of the direct contribution of Travel & Tourism.

2.6 Studies on Government Expenditure, Foreign Direct Investment and Tourist Arrivals

Brida, Carerra, and Risso(2008) have identified possible causal relationships between tourism expenditure, real exchange rate and economic growth by using quarterly data. The results showed the positive elasticity and the tourism-led growth hypothesis is confirmed through cointegration and causality testing. Short-run Granger causality shows that causality goes from tourism expenditure to GDP.

CBSL (2014) has stated that significant increase in investment in the tourism industry, infrastructure developments, introduction of new tourist attractions and promotional campaigns conducted by the private sector and the government supported to attract more tourists in to the country. Selvanathan et al (2012) have found a two-way causality link is found between FDI and tourist arrivals in India. This explains the rapid growth in the tourism sector as well as FDI in India during the last decade. Our two-way causality results in relation to India are similar to the findings of a number of small island developing states.

Samimi et al (2013) have revealed that the existence of Granger causality and co-integrated relationships between tourism associated Foreign Direct Investment (FDI) and tourism development in developing countries using panel VECM techniques from 1995 to 2008. The results were confirmed the existence of a co-integrated relationship

between variables in the long run. In addition, there is a bilateral long-run causality between tourism related FDI and tourism development, while there is no short-run causality between variables.

WTTC (2014) Travel& Tourism is expected to have attracted capital investment ofUSD814.4bn in 2014. This is expected to rise by 4.8% in 2015, and rise by 4.6% pa over the next ten years to USD1, 336.4bn in 2025.Travel & Tourism's share of total national investment will rise from 4.4% in 2015 to 4.9% in 2025

2.7 Studies on Employment in the Industry and Tourists Receipts

Ranasinghe and Deshapriya (2010) have stated that the rapid expansion of international tourism has led to significant employment creation. Tourism can generate jobs directly through hotels, restaurants, nightclubs, taxis, and souvenir sales, and indirectly through the supply of goods and services needed by tourism-related businesses. WTTC(2015) Travel & Tourism generated 105,408,000 jobs directly in 2014 (3.6% of total employment) and it is forecasted to grow by 2.0% in 2015 to 107,519,000 (3.6% of total employment).This includes employment by hotels, travel agents, airlines and other passenger transportation services. It also includes, for example, the activities of the restaurant and leisure industries directly supported by tourists.

Armstrong, Daniel & Franci (1974) have examined the impact of tourism in the economic growth of Greece in the long run. He analyzed the causality of GDP, exchange rate and international tourism receipts and concluded that there is a strong Ganger causality relationship between international tourism receipts and economic growth, a strong causal relationship between exchange rate and economic growth, and moderate causal relationships between economic growth and international tourism receipts and between exchange rate and international tourism receipts.

Welgamage (2015) has suggested that at one percent increase in foreign receipt per tourist per day the share of foreign exchange will increase in the power of 1.08884 percent. An increase in one percentage of the employment in the tourism sector will increase foreign exchange earnings by exponent 0.19397 percent.

2.8 Summary of Chapter 2

This chapter provided a background and described the rational for model development for macroeconomic variables and tourist arrivals. On the impact of tourist arrivals it was found that various types of studies have been conducted by different authorities. Though the various factors have been used as macroeconomic variables the common factors used are per capita gross domestic production, real effective exchange rate, exchange rate, real gross domestic production, price levels, tourism expenditure done by government, foreign direct investment, employment, total exports and imports. It also found that various techniques have been applied by different authors. The information gathered from the review would immensely beneficial to carry out this study.

CHAPTER THREE
MATERIALS AND METHODS

3.1 Introduction

In this chapter, the type of data used and basic theory of statistical methods used for this study are briefly discussed. Section 3.2 describes the secondary data used, section 3.3 provides description of selected variables and section 3.4 describes the conceptual framework. Section3.7 describes the time series approach for the test granger causality, section 3.8 provided methodologies related to regression analysis and finally section 3.9 describes the software used in the analysis.

3.2 Secondary Data Used

The data set consists of time series observations on tourist arrivals to Sri Lanka and selected macroeconomic variables of Sri Lanka. The time series data on tourist arrivals and selected macroeconomic variables were collected for the period 1980 to 2014. Data on tourist arrivals was obtained from various issues of annual reports of the Authority of World Travel and Tourism, Tourist Board of Sri Lanka. The data on macroeconomic variables were obtained from annual report of Central Bank in Sri Lanka.

3.3 Description of the Selected Macroeconomic Variables

The following macroeconomics variables are selected. The description of those variables is given below.

3.3.1 Gross Domestic Production (GDP)

Gross Domestic Production measures total output produced by a country during the period of time within the territorial boundary of the country. Nominal GDP, real GDP, and potential GDP are three different measures of aggregate output. Since nominal GDP value inflated by prices that change over time, aggregate output is also measured holding the prices of all goods and services constant over time. This valuation of GDP at constant price is called as real GDP. In this study GDP at constant price (2005 US$) was

considered as measure of economic development of the country. Continuous increase in real GDP of the country is indicated the economic growth.

3.3.2 Per Capita Gross Domestic Production (GDPPC)

Per capita gross domestic production is obtained by dividing gross domestic production at current market prices or constant price by the population. As a measurement of income level of the country per capita gross domestic production at constant price is used by economists. Increase in real term of per capita income indicates that purchasing power of people increased over the period of time. In this study data are collected on gross domestic per capita income at constant (2005 US$).

3.3.3 Exports of Goods (EX)

The outflow of domestic production to foreign countries is called as exports which are recorded in trade account of the balance of payment debit transactions. Exports valued in US$ million is considered for the model development purpose.

3.3.4 Imports of Goods (IM)

The inflow of foreign production to domestic market is calculated in imports which are recorded in trade account of balance of payment as credit transaction. Imports in US$ millions is considered in this study

3.3.5 Official Average Exchange Rate (EXR)

Exchange rate is the value of one currency for the purpose of conversion to another. An exchange rate thus has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly. In a direct quotation, the price of a unit of foreign currency is expressed in terms of the domestic currency. Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally certified exchange market. It is calculated as an annual average based on monthly averages of local currency units per one unit of the U.S. dollar.

3.3.6 Inflation (INF)

Colombo Consumer price index (as measure of inflation) is an indicator to measure the changes in the general level of consumer prices and used as one of the key indicators of inflation. Consumers' Price Index is also used for socio-economic analysis and policy purposes, mainly in the determination of monetary and income policies.

3.3.7 Tourist Cost per Day (TC)

The receipts per tourist per day in US$ are considered as a proxy variable to measure the cost of tourist per day.

3.3.8 Foreign Direct Investment (FDI)

The investment in a business by an investor from another country for which the foreign investor has control over the company purchased is called as foreign direct investment. The direct investment in financial account in balance of payment in values US$ millions are considered in this study.

3.3.9 Government Expenditure (GE)

The productive transactions done by the government is called as government expenditure in national accounting. There are two types of government expenditure recurrent expenditure and capital expenditure. In this study capital expenditure is considered because expenditure on long term projects and infrastructure developments are included in capital expenditure. The annual capital expenditure is collected for the purpose of model development. Value are presented in US$ million.

3.3.10 Direct Employment (DE)

There are two types of employment opportunities in the industry of tourism named direct and indirect. The tourism board of Sri Lanka collected data on employment in these two areas. Direct employment means people who are directly deal with tourists for example hotel managers, tourist transport providers.

3.4 Conceptual Framework
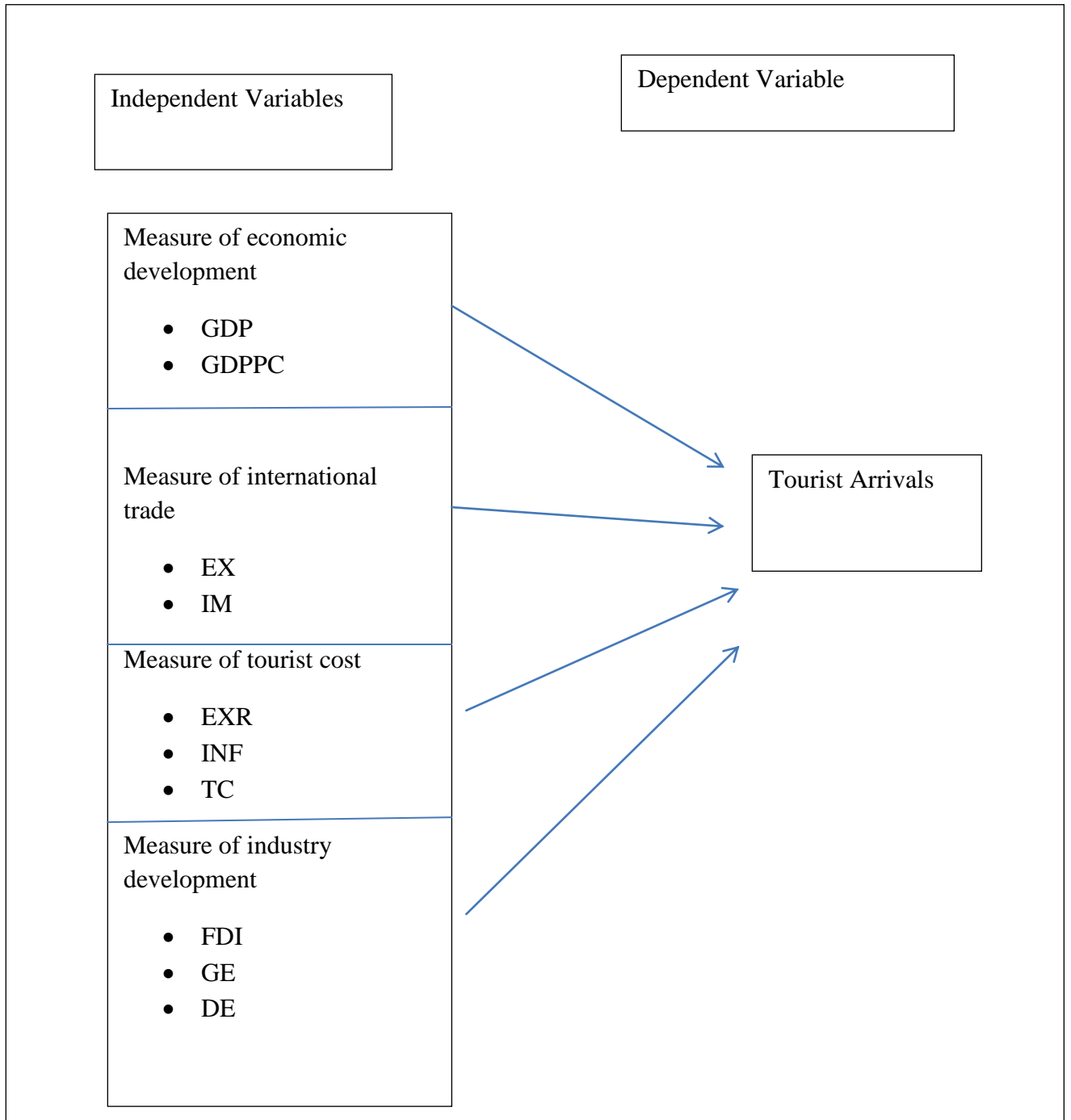
Figure 3.1 Conceptual Framework

3.5 Research Design

Haiyan and Gang (2008) have reviewed 121 studies on tourism demand modeling and forecasting. In their study the latest developments of quantitative forecasting techniques were summarized in three categories: time series models, the econometric approach, and other emerging methods such as artificial intelligence techniques. Although recent studies (IIhanOzturk2009, Nadue and saayman2005, Ranasighe and Deshapriya 2010) have shown that the newer and more advanced forecasting techniques tend to result in improved forecast accuracy under certain circumstances, no clear-cut evidence shows that any one model can consistently outperform other models in the forecasting competition. However in this study combination of statistical approaches are used.

In view of above this study adopted two types of techniques the first approach is a causal relationship which investigate the causal relationship between the tourist arrivals and macroeconomic variables using time series approach. This helps to understand how one variable under study affected, or was responsible for changes in another variable. Causal research design was chosen because in business research, the cause-effect relationship is less explicit. Use of such causal research design eases the understanding, explanation, prediction and control of any relationship between variables under study.

The second approach is the use of regression analysis which investigates the degree of influence of macroeconomic variables which are granger caused with tourist arrivals. After that VECM model was build up using significant variables which was found with regression analysis. To understand elasticity of tourist arrivals with respect to change in each macroeconomic variables isolate simple linear regression analysis was applied.

3.5.1 Analysis Framework
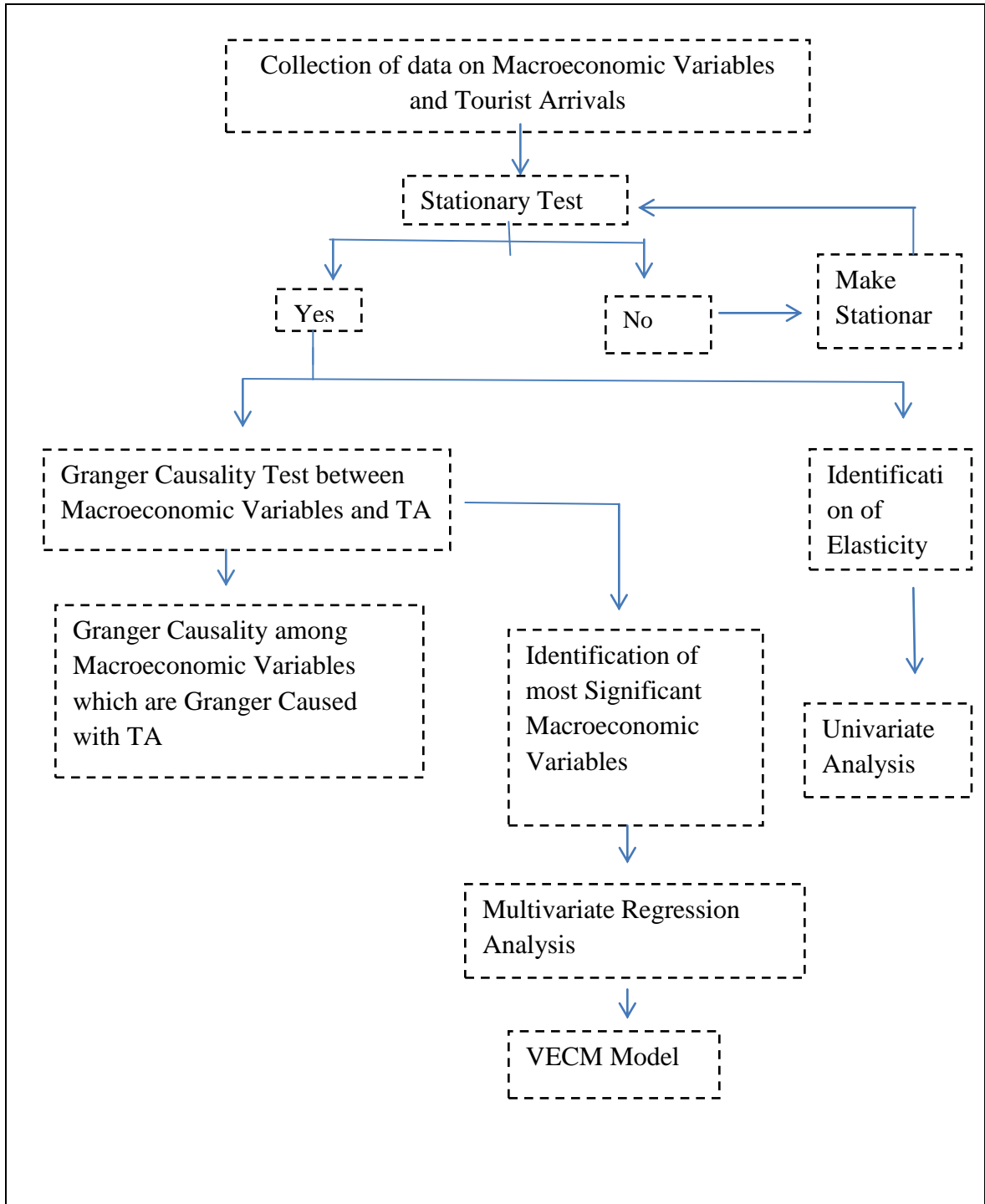
Figure 3.2: Analysis Framework

3.6 Time Series Analysis

The analysis of the long term and short term dynamic relationship between macroeconomic variables and tourist arrivals may be undertaken through either Engle or Granger (1987) or Johansen and Juselius (1990) protocols. The procedures given below are used to investigate such dynamic relationships among variables.

3.6.1 Test for Stationary

Time series data can be either stationary or non-stationary. Autoregressive integrated moving average (ARIMA) model can be fitted for stationary series only. The common type of non-stationary series are given bellow,

- Pure random walk: $Y_t = Y_{t-1} + \varepsilon_t$ ………………….(1)

Where ε_t is independent and circulated with zero mean and variance.

- Random walk with drift : $Y_t = \alpha + Y_{t-1} + \varepsilon_t$ ………………….(2)

Where ε_t is white noise and α is a drift. It does not contain long run mean and variance.

- Deterministic trend : $Y_t = \alpha + \beta t + \varepsilon_t$

This has a mean which increases with fixed trend.

- Random walk with drift and deterministic trend : $Y_t = \alpha + Y_{t-1} + \beta t + \varepsilon_t$ ………(3)

As described above non stationary series cannot be modeled using ARIMA approach. Thus time series have to be converted in to stationary series by taking first difference or second deference of the time series.

3.6.2 Unit Root for Stationary

Stationarity of the data is important for forecasting. Also checking for stationarity, unit root testing has been carried out prior to modeling. Autocorrelation function of stationary series tells about what kind of ARIMA model is suitable for the time series along with partial autocorrelation function. (Diebold and kilian 1999)

Unit root tests were developed by David Dickey and Wayne Fuller (1979) and Pierre Perron and Peter Phillips (1988) and they are commonly known as Augmented Dickey Fuller test and Phillips Perron test.

3.6.3 Augmented Dickey Fuller Test

$$Y_t = \emptyset Y_{t-1} + u_t$$

The test studied the null hypothesis of an ARIMA model against the stationary ARIMA alternative. The null hypothesis is,

H_0 : series include unit root ($\emptyset \geq 0$)

Vs

H_1 : series is stationary ($\emptyset < 0$)

- Test for random walk against a stationary

H_0 : $Y_t = Y_{t-1} + U_t$

H_1 : $Y_t = \varphi Y_{t-1} + U_0$ $\varphi < 1$

- Test for random walk with drift against a stationary

  H_0: $Y_t = Y_{t-1} + U_t$

  H_1: $Y_t = \varphi Y_t + \mu + U_0$

- Test for a random walk with drift and constant against a stationary

  H_0: $Y_t = Y_{t-1} + U_t$

  H_1: $Y_t = \varphi Y_t + \mu + \lambda t + U_0$

$\Delta Y_t = \alpha + \beta T + \gamma Y_{t-1} + \sum_{i=0}^{p} \varphi_i \Delta Y_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots(4)$

Y_t is level and ΔY_t is first difference time series. T is time in year. α is the intercept constant. β is the coefficient on the time period. γ is the coefficient presenting root.p is the lag order of first difference autoregressive process. α, β, γ are parameters which are estimated.

3.6.4 Johansen's Co-integration

Cointegration is a statistical property generally applies for set of stationary series. When the observed series are stationary at the first difference, it is said to be that the series are integrated of order one. That is series are in I(1). Once a unit root has been confirmed for all data series as stationary, it is required to test whether there is any possibility for the existence of a long-run equilibrium relationship among a given set of variables. In this aspect it is required to find the lag period Johansen's co-integration test is very sensitive to the choice of optimal lag length. Thereafter, the sequential modified likelihood ratio test statistics is used to select the number of lags required in the co-integration test.

3.6.5 Testing for the Causality

The researcher's selected the granger procedure because it consists the more powerful and simpler way of testing causal relationship. The Granger-causality test is planning to use to investigate direction of causation between stock market performance and macroeconomic variables. The outcome from the Granger-causality test was used to determine whether the variables under study can be used to predict each other or not. At the same time, the variables used in the granger-causality test were all assumed to be stationary i.e. I (0) process. Finally, the causality test helps to ascertain whether a uni-directional or bi-directional (feedback) relationship exists between macroeconomic variables and tourist arrivals.

3.7 Regression Analysis

Regression analysis is statistical technique to find the relationship between response variable and explanatory variables.

3.7.1 Correlation Coefficient

Pearson correlation is used to find the strength of the linearity between two variables. The significance of the correlation coefficient is tested from the t- statistics given below

Ho: $\rho = 0$ Vs H$_{1:}$ $\rho \neq 0$

The test statistics is $t = \dfrac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ with n-2 degree of freedom. Where r is the correlation coefficient.

3.7.2 Simple Linear Regression (SLR)

SLR explains the linear relationship between two variables one is dependent (Y) and other is independent (X). The model is written as

$$Yi = \beta_0 - \beta_1 Xi + \varepsilon i \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (5)$$

The parameters are estimated by minimizing error sums of square $\sum(yi - \hat{y}i)^2$, where Yi is the fitted value at x= xi. Two parameters are given by

$$\hat{\beta} = \frac{Sxy}{Sxx} \ldots\ldots\ldots\ldots(6)$$

$\hat{\beta} = \bar{Y} - \hat{\beta}_1 \bar{X}$ $\ldots\ldots\ldots\ldots(7)$

Where, $Sxy = \sum(x - \bar{X})(y - \bar{Y})$

$\quad\quad\quad Sxx = \sum(x - \bar{X})^2$

3.7.3 Multiple Linear Regression (MLR)

MLR explains the relationship between dependent variable and two or more independent or explanatory variables.

Multiple linear regression model can be written as follows.

$$\boldsymbol{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k }_{ + }\boldsymbol{\varepsilon i}\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

Where,

Y= Dependant Variable

X$_1$, X$_2$,………X$_k$ = Independent variables

β_0, β_1, β_2, β_k = Parameters

εi = error term.

The parameters $\hat{\beta}$ are given by

$\hat{\beta} = (X^TX)^{-1}X^TY$ $\ldots\ldots\ldots\ldots\ldots\ldots(9)$

27

In Econometrics log-log function is defined as

$$\ln Y = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\ln X + \boldsymbol{\beta_2}\ln X + \ldots \boldsymbol{\beta_k}\ln X + \varepsilon i \ldots\ldots\ldots\ldots(10)$$

In equation (10), the regression coefficients become elasticity coefficients
Furthermore following model also applied,

$$Y = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\ln X + \boldsymbol{\beta_2}\ln X + \ldots \boldsymbol{\beta_k}\ln X + \varepsilon i \ldots\ldots\ldots\ldots(11)$$

In equation (11) the regression coefficients represent absolute change in Y as results of percentage change in independent variable.

3.8 Software Used

Data analysis was carried out using time series software E views 5.0 and statistical software SPSS 16.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The descriptive statistics for eleven variables have been obtained for empirical investigation and presented in Table 4.1. The variables are Number of Tourist Arrivals (TA), Gross Domestic Production (GDP), Per Capita Gross Domestic Production(GDPPC), Average Exchange Rate(EXR) , Capital Expenditure of Government(GE), Inflations Rate(INF), Exports of Goods and Services (EX), Imports of Goods and services(IM), Foreign Direct Investment(FDI), Direct Employment(DE) and Tourist Cost Per Day (TC)

Table 4.1 Descriptive Statistics of Macroeconomic Variables

	Mean	Medium	Maximum	Minimum	Std.Dev	Skewness	Kurtosis
TA	548094.60	436440	1527153	297888	306759.70	2.01	6.22
GDP	2.36E+10	2.06E+10	4.41E+10	1.21E+10	9.30E+09	0.71	2.43
GDPPC	1211.66	1086.863	2135.65	710.1417	410.1571	0.77	2.58
XER	85.30205	95.66207	130.56	40.06292	30.35665	-0.12	1.59
GE	163333.10	82979	472967	28043	152364	0.97	2.39
INF	10.01	9.36	22.56	3.27	4.95	1.04	3.64
EX	5879.232	5133.3	11130.10	1983.90	2709.307	0.46	2.20
IM	9024.04	6671.90	20268.80	2686.40	5418.10	0.92	2.60
FDI	350.38	201	895.90	41.60	283.22	0.92	2.45
DE	48932.56	38821	129790	24964	24854.39	2.03	6.88
TC	74.44	63.40	160.80	41.10	29.82	1.77	5.79

It can be seen that the mean number of tourist per year varies with mean value of 548094.60, minimum 297888 to maximum 1527153 with standard deviation of 306759.70 while the values of skewness and kurtosis indicate the lack of symmetry in the distribution. Further, if skewness and kurtosis have values zero and 3 respectively, it is observed that the given data series is normally distributed which is not represented in some variables. It can be further explained in Section 4.3.

4.2 Temporal Variations of Macroeconomic Variables

The graphical representation of Tourist Arrivals time series can be easily identified that the series is stationary or not which observes the evidence of mean, variance, autocorrelation and seasonality. Figure 4.1 highlights the graphical representation of TA from 1990-2014 due to changes in economic and market.
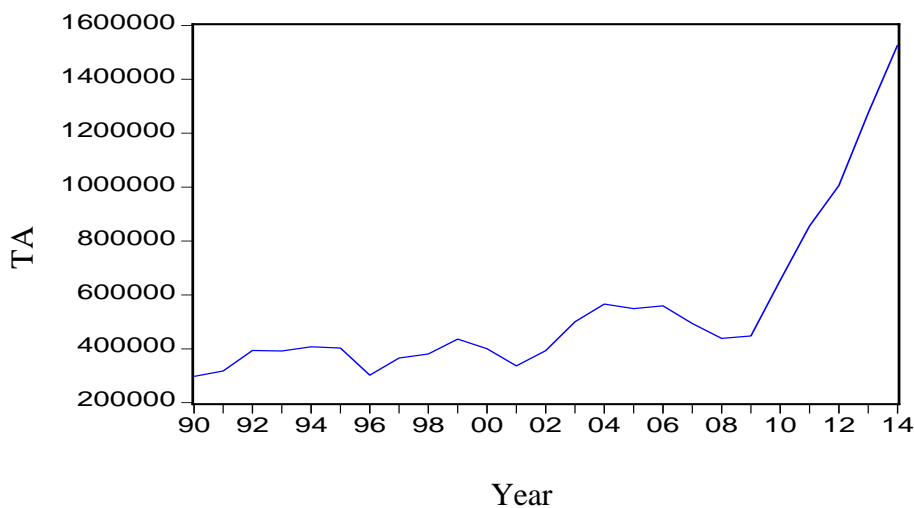
Year

Figure 4.1: Pattern of Tourist Arrivals (TA)

The TA has no significant gradual movements till year 2009. Thereafter, upward trend can be identified and a steep upward slope is notable after year 2009 due to the end of Sri Lankan civil war. The following figure indicate the variability of Gross Domestic Production (GDP)
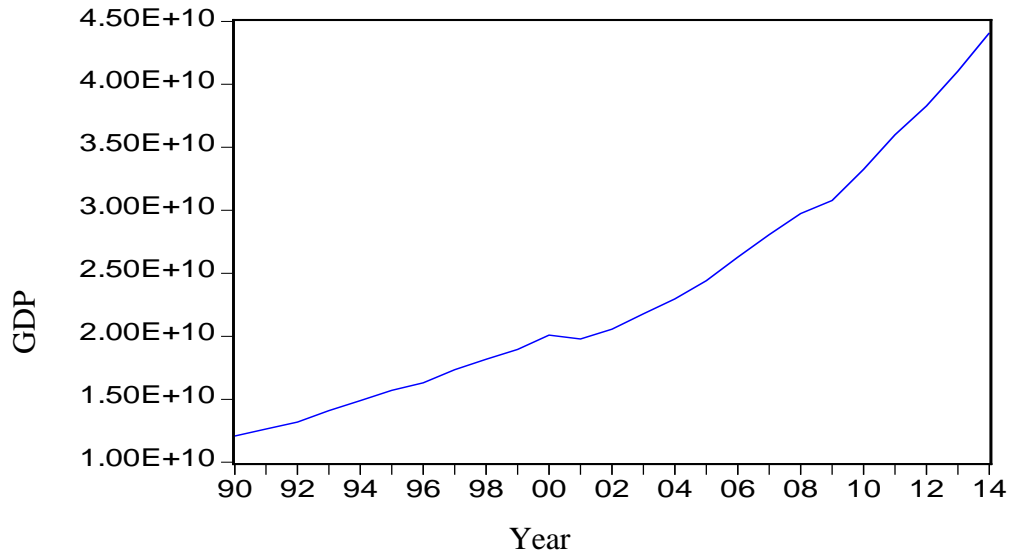
Figure 4.2: Pattern of Real Gross Domestic Production (GDP)

A smoothing curve of increase in gross domestic product (GDP) represents no high volatility in the data series. Since data were collected on constant prices it does not indicate how price changes influences on the GDP. The real gross domestic production gradually increasing and as a result this GDP variable influence on per capita GDP. The change in per capita GDP represent in Figure 4.3
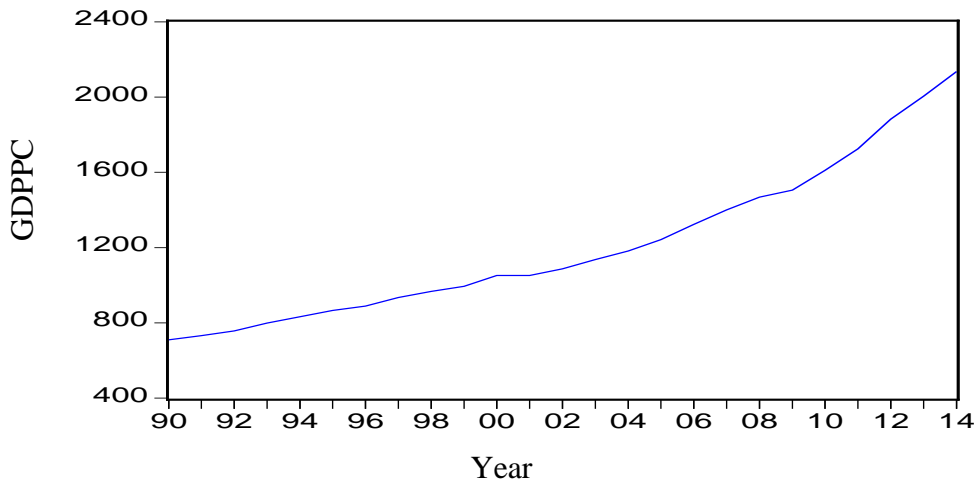
Figure 4.3: Pattern of Per Capita Gross Domestic Production (GDPPC)

It can be seen gradually increasing per capita GDP over the period of time corresponding to the incensement of real gross domestic production of the country. A smoothing curve of increase in per capita gross domestic production (GDPPC) where no presence of high volatility. The change in GDP and GDPPC influenced on change in exchange rate over the period of time. The pattern of change in exchange rate is represented in Figure 4.4.
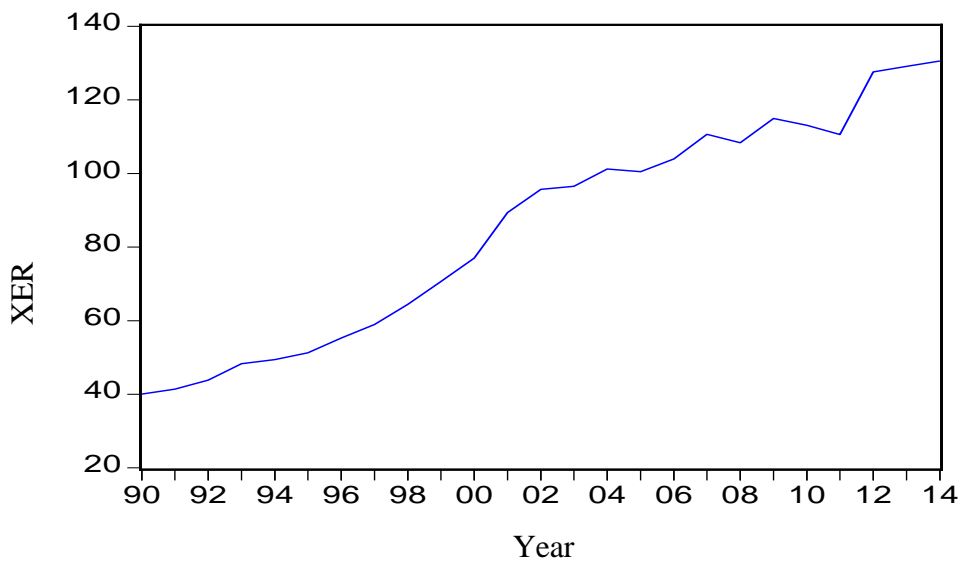
Figure 4.4: Pattern of Official Exchange Rate (EXR)

Official exchange rate of Sri Lanka has shown upward trend where volatility is low. Variation of international transactions inflows and outflows lead to the variation of official exchange rate, it can be seen significant fluctuation of date series after year 2002 with the floating exchange rate regime. The change in government expenditure on social and infrastructure developments is presented in following Figure 4.5.
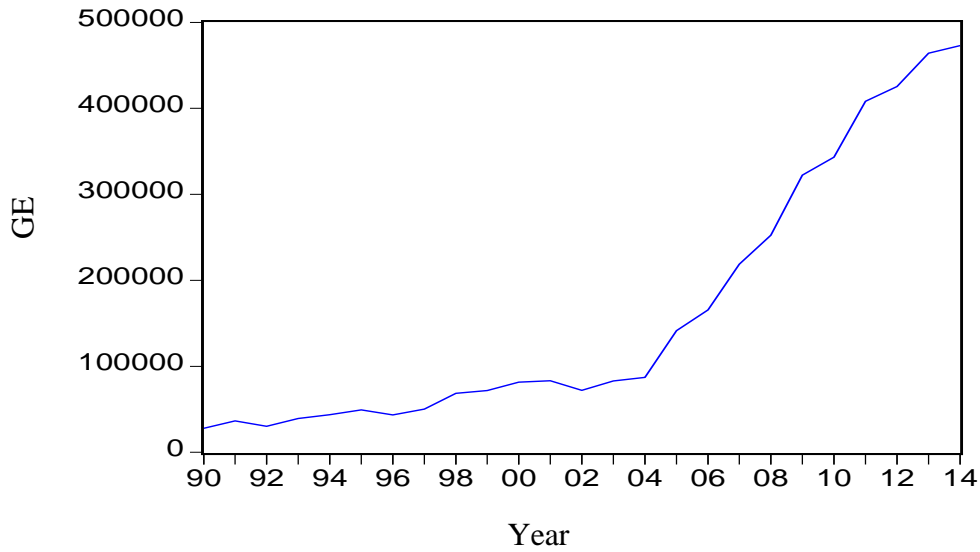
Figure 4.5: Pattern of Change in Expenditure on Capital and Net Lending (GE)

The government expenditure on capital and net lending has increased in trend over the period of time. It can be seen gradually upward movement of government expenditure after 2004 with the acquisition of military good for the civil war under the new government. Also it can be influenced on change in inflation of the country. The pattern of change in price level is shown in following Figure 4.6.
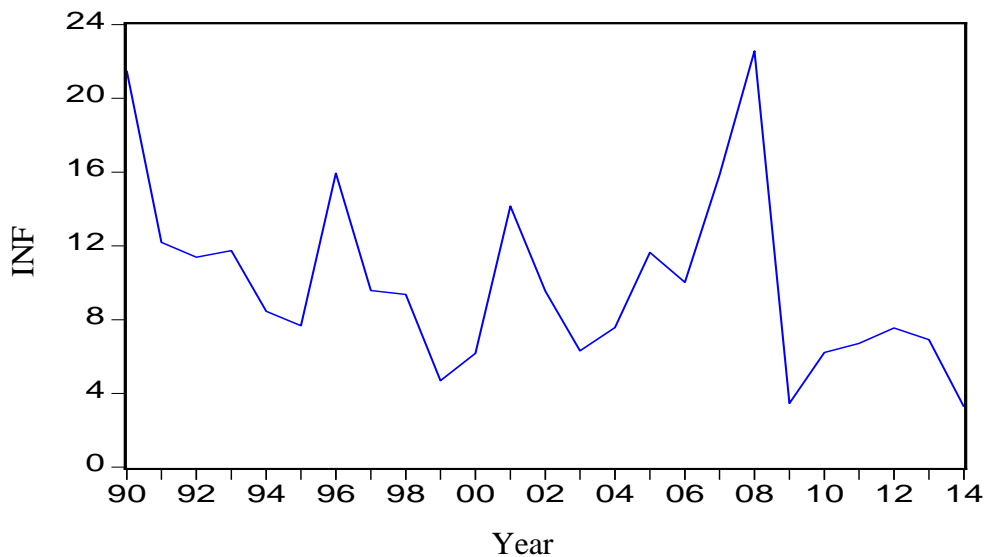
Figure 4.6: Pattern of Change in Inflation Rate (INF)

Inflation rate shows a cyclical pattern where highest inflation rate of 22.56 percent as shown in Table 4.1 reported in year 2008 and disinflation has been reported after 2008. The behavior of price level changes is more volatile and drop in inflation rate is reported in currently.

The change in inflation, exchange rate and government expenditure are influenced on change in imports and exports over the period of time. The change in pattern of export and imports are present in Figure 4.7 and Figure 4.8.
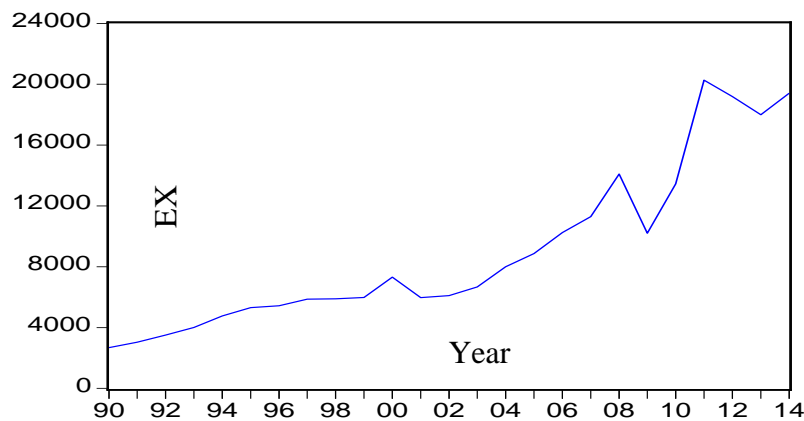
Figure 4.7: Pattern of Exports Goods (EX)
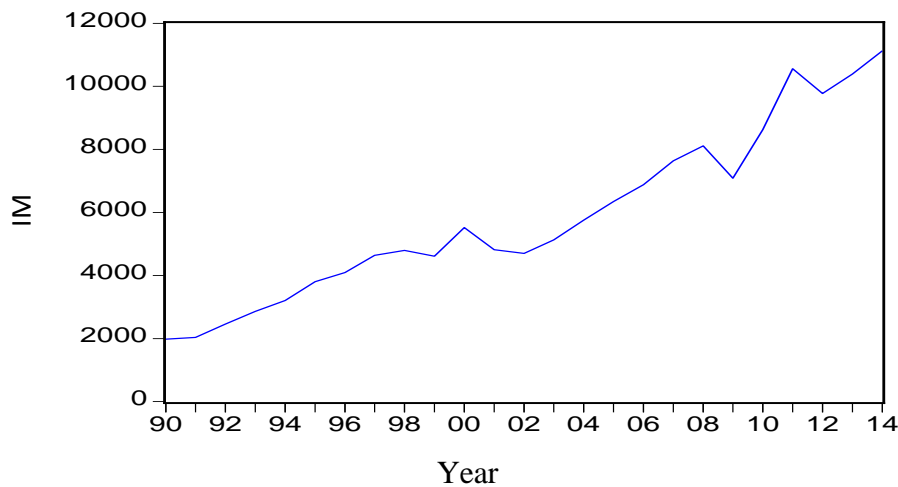
Figure 4.8: Pattern of Imports of Goods (IM)

According to Figure 4.7 and 4.8 it can be seen the imports and exports have shown increase in trend over the period of time with volatility. Both exports and imports were recorded drop in 2010 with the end of civil war. Change in Foreign Direct Investment (FDI) is shown in Figure 4.9.
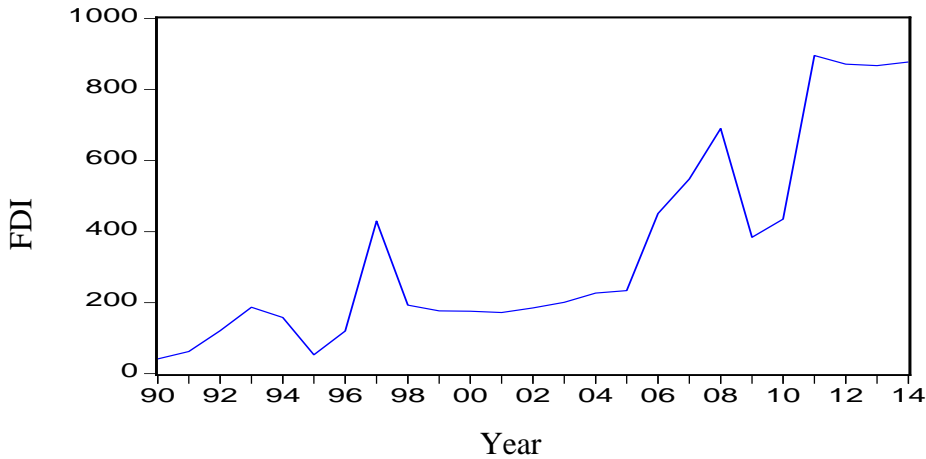
Figure 4.9: Pattern of Foreign Direct Investment (FDI)

Foreign direct investment has fluctuated over the period of time with increase in trend where volatility is very much high. The change in tourist arrivals is influenced on change in direct employment in the sector. The change in pattern of direct employment (DE) is shown in Figure 4.10.
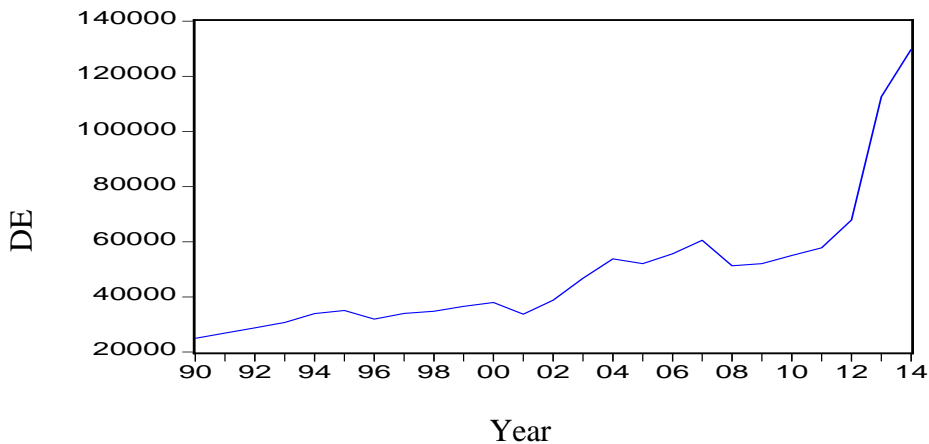
Figure 4.10: Pattern of Direct Employment (DE)

Direct employment (DE) in the tourism industry has increased over the period of time with some volatility. It can be seen slight incensement after 2010. The tourist arrivals are influenced on change in cost per day of tourist. The change in cost is represent in Figure 4.11

Year
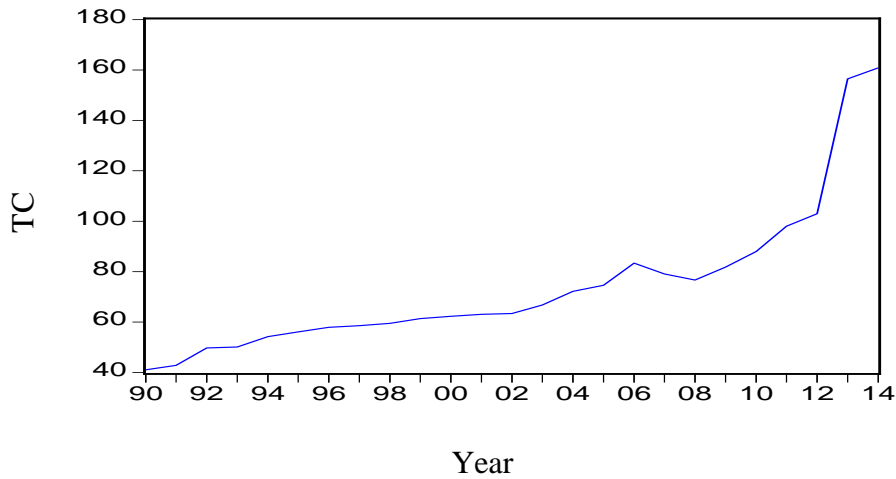
Figure 4.11: Pattern of Cost of Tourist Per Day (TC)

Same as direct employment in the industry the cost of tourist over day (TC) has increased over the period of time with low volatility. It also slightly increased after 2012.

4.3 Normality of Time Series

Table 4.2 is represented the Jarque – Bera Statistics and Coefficient of Variance (CV) which can be used to identify the variability of the time series.

Table 4.2: Normality of Data Series

	CV (%)	Jarque-Bera	Probability
TA	55.97	27.52	0.000
GDP	39.41	2.45	0.294
GDPPC	33.85	2.67	0.264
XER	35.59	2.14	0.343
GE	93.28	4.31	0.116
INF	49.42	4.94	0.085
EX	46.08	1.53	0.466
IM	60.04	3.72	0.156
FDI	80.83	3.84	0.147
DE	50.79	32.82	0.000
TC	40.06	21.14	0.000

The Jarque-Bera statistic is significant only for TA, DE and TC. Thus it can be concluded the distributions of all series except TA, DE and TC are not significantly deviate from normality. It can be seen that the variables GE and FDI have exceptionally high variability and CV of the two series are 93.28% and 80.3%. the other series also have a considerable variability and CV varies from 33.85% (GDPPC) to 60.04% (IM). Thus in order to reduce the hetroscedasicity all the variables were transformed to log.

4.4 Test for Stationary

Results of the Augmented Dicky- Fuller (ADF) test and Phillips Perron (PP) test of macroeconomic variables and tourist arrivals is shown in Table 4.3.

Table 4.3: Unit Root Test for Original Series of Data

	ADF - Fisher Chi-square -Significant Value			PP - Fisher Chi-square - Significant Value		
variables	level	1st different	2nd Difference	level	1st different	2nd Difference
TA	1.0000	0.4952	**0.0002**	1.0000	0.4952	**0.0001**
GDP	1.0000	0.6751	**0.0003**	1.0000	0.7883	**0.0000**
GDPPC	1.0000	0.6261	**0.0000**	1.0000	0.7526	**0.0000**
EXR	0.5620	0.5104	**0.0037**	0.9137	**0.0002**	**0.0000**
GE	0.6412	0.6495	**0.0000**	0.9997	**0.0188**	**0.0000**
IN	**0.0027**	**0.0003**	0.0062	**0.0026**	**0.0000**	**0.0000**
EX	0.9941	**0.0002**	**0.0000**	0.9984	**0.0000**	**0.0000**
IM	0.9978	**0.0001**	0.0020	0.9908	**0.0000**	**0.0000**
FDI	0.7766	**0.0002**	**0.0004**	0.8613	**0.0000**	**0.0000**
DE	0.9999	0.0772	**0.0000**	0.9999	0.0756	**0.0000**
TC	0.9999	0.9886	**0.0000**	0.9999	**0.0021**	**0.0000**

Since the P value for variables in original series at level are greater than the significant level (0.05) null hypothesis could not be rejected for all the variables except inflation rate (IN) under both ADF test and Phillips Perron test. As non-stationary at level, the 1st difference transformation is applied for the original date series. At 1st difference Inflation (IN), Exports (EX), Imports (IM) and foreign direct investment (FDI) are significant since corresponding P values less than the significant level (0.05). However government expenditure (GE), exchange rate (EXR) and cost of tourist (TC) are stationary at 1st different according to the Phillips Perron test. As ADF statistics of most of variables showed non stationary in 1st difference, second difference transformation is

applied for the series as variance stabilization measure as shown in Table 4.3.At 2nd difference all the variables are stationary since the P value for the variables are less than the significant level (0.05) under both ADF test and Phillips Perron test statistics conforming stability of the variance.

In order to make the series more homogenous in the variance of the series were converted to natural Logarithm and ADF and PP were carried out and results are shown in Table 4.4.

Table 4.4: Unit Root Test for Log Series of Data

	ADF - Fisher Chi-square			PP - Fisher Chi-square		
		1st	2nd		1st	2nd
	level	different	Difference	level	different	Difference
LTA	0.9931	**0.0219**	**0.0000**	0.9931	**0.0210**	**0.0000**
LGDP	0.9996	**0.0102**	**0.0002**	0.9996	**0.0102**	**0.0000**
LGDPPC	1.0000	**0.0302**	**0.0000**	1.0000	**0.0295**	**0.0000**
LEXR	0.1734	0.7616	0.4240	0.4142	**0.0028**	**0.0000**
LGE	0.9422	**0.0001**	**0.0000**	0.9502	**0.0001**	**0.0000**
LIN	**0.0115**	**0.0004**	**0.0035**	**0.0147**	**0.0000**	**0.0000**
LEX	0.5571	**0.0004**	**0.0000**	0.2961	**0.0004**	**0.0000**
LM	0.7608	**0.0006**	**0.0007**	0.7563	**0.0000**	**0.0000**
LFDI	0.8132	**0.0000**	**0.0000**	0.3550	**0.0000**	**0.0000**
LDE	0.9964	**0.0170**	**0.0003**	0.9964	**0.0180**	**0.0000**
LP	0.9977	**0.0009**	**0.0000**	0.9944	**0.0009**	**0.0000**

As can be seen in table 4.4 null hypotheses can be rejected at 5% significant level for all the variables at 1st difference except exchange rate (EXR) according to the ADF test. However as Phillips Perron test statistics for the exchange rate confirmed the data series stationary at 1st difference. Thus it can be conclude that al the log series are stationary at its 1st difference based on ADF test and Phillips Perron test. Since the all variables of log series are integrated of the order 1.

4.5 Granger Causality between Macroeconomic Variables and Tourist arrivals

The Granger Causality test is statistical hypothesis test for determining whether one time series is useful in forecasting another (Granger 1969). It proposed that if causal relationship exists between variables, these variables can be used to predict each other. The author pointed out that in causality approach, a variable say Y, is caused by X if Y can be predicted better from past values of Y and X than from past values of Y alone. The causality test helps to ascertain whether a uni-directional or bi-directional (feedback) relationship exists between variables. The researcher's choice for the granger procedure is because it consists the more powerful and simpler way of testing causal relationship. At 2nd difference original series and log series both are stationary granger causality can be carried out either for original series or log series.

Macroeconomic environment is critically affect tourists arrivals. This study provides a great role to recognize the association of those macroeconomic variables with the tourist arrivals. Table 4.5 represents the granger causality between macroeconomic variables and tourist arrivals for original data series and Table 4.6 represents the granger causality between macroeconomic variables and tourist arrivals for log transformed data series

Table 4.5 Granger Causality between TA with Macroeconomic Variables (Original Data Series)

Null Hypothesis:	F-Statistic	Causal inference
GDP does not Granger Cause TA	**5.88615(0.01079)**	Causality
TA does not Granger Cause GDP	1.4263(0.26608)	No causality
GDPPC does not Granger Cause TA	2.58966(0.10269)	No causality
TA does not Granger Cause GDPPC	2.49669(0.11041)	No causality
EXR does not Granger Cause TA	1.79338(0.19488)	No causality
TA does not Granger Cause EXR	0.14195(0.86862)	No causality
GE does not Granger Cause TA	**5.30281(0.01547)**	Causality
TA does not Granger Cause GE	0.78978(0.46906)	No causality
INF does not Granger Cause TA	1.26475(0.30623)	No causality
TA does not Granger Cause INF	2.49966(0.11016)	No causality
EX does not Granger Cause TA	**6.83695(0.00618)**	Causality
TA does not Granger Cause EX	1.93239(0.17368)	No causality
IM does not Granger Cause TA	**9.1292(0.00183)**	Causality
TA does not Granger Cause IM	1.92837(0.17425)	No causality
FDI does not Granger Cause TA	**4.24974(0.03078)**	Causality
TA does not Granger Cause FDI	1.39063(0.27441)	No causality
DE does not Granger Cause TA	0.2045(0.81693)	No causality
TA does not Granger Cause DE	**11.7219(0.00055)**	Causality
TC does not Granger Cause TA	0.92074(0.41619)	No causality
TA does not Granger Cause TC	**10.0264(0.00119)**	Causality

*parenthesis is indicated the probability value.

The value of F statistics in Table 4.5 is revealed that tourist arrivals granger causes direct employment and tourist cost per day at 5% significant level. Thus it can be argued that past values of tourist arrivals contribute to the prediction of present value of direct employment, tourist cost per day. The study suggested that gross domestic production, Government expenditure, imports, exports and foreign direct investment granger causes tourist arrivals therefore past value of those variables contribute to the prediction of

present value of tourist arrivals. Furthermore it can be seen only uni directional causality between variables.

However, the value of F statistics revealed that the value of per capita GDP, exchange rate, inflation, direct employment and per day cost of tourist do not contributed to prediction of present value of tourist arrivals.

Table 4.6 Granger Causality between TA with Macroeconomic Variables (Log Data Series)

Null Hypothesis:	F-Statistic	Causal inference
LGDP does not Granger Cause LTA	4.13765 (**0.03323**)	Causality
LTA does not Granger Cause LGDP	1.34974 (0.28433)	No causality
LGDPPC does not Granger Cause LTA	3.4764(**0.05289**)*	Causality
LTA does not Granger Cause LGDPPC	2.72991(**0.09216**)*	Causality
LEXR does not Granger Cause LTA	1.15185(0.33828)	No causality
LTA does not Granger Cause LEXR	0.0347(0.96596)	No causality
LGE does not Granger Cause LTA	2.43731(0.11568)	No causality
LTA does not Granger Cause LGE	0.14991(0.86185)	No causality
LINF does not Granger Cause LTA	0.41764(0.86185)	No causality
LTA does not Granger Cause LINF	1.50577(0.2485)	No causality
LEX does not Granger Cause LTA	4.83974(**0.0208**)	Causality
LTA does not Granger Cause LEX	2.85578(**0.08372**)*	Causality
LM does not Granger Cause LTA	4.3908(**0.02798**)	Causality
LTA does not Granger Cause LM	2.45287(0.11428)	No causality
LFDI does not Granger Cause LTA	0.69902(0.51007)	No causality
LTA does not Granger Cause LFDI	2.44155(0.1153)	No causality
LDE does not Granger Cause LTA	0.29003(0.75167)	No causality
LTA does not Granger Cause LDE	4.0325(**0.03572**)	Causality
TC does not Granger Cause LTA	1.5495(0.23938)	No causality
LTA does not Granger Cause TC	5.51398(**0.01356**)	Causality

*at 10% significant level.

The value of F statistics in table 4.5 is revealed that tourist arrivals granger causes direct employment and tourist cost per day at 5% significant level while tourist arrivals granger causes gross domestic per capita income and average exchange rate at 10% significant level. Thus it can be argued that past values of tourist arrivals contribute to the prediction of present value of direct employment, tourist cost per day, gross domestic per capita income and average exchange rate. The study suggested that gross domestic production; gross domestic per capita income, imports, and exports granger causes tourist arrivals therefore those past value of those variables contribute to the prediction of present value of tourist arrivals. Furthermore it can be seen bi directional causality runs toward per capita gross domestic income to tourist arrivals and exchange rate to tourist arrivals. However, the value of F statistics revealed that the value of government expenditure, inflation, exports, foreign direct investment direct employment and per day cost of tourist do not contributed to prediction of present value of tourist arrivals.

4.6 Granger Causality among Macroeconomic Variables which Granger Caused with TA

Since above two studies suggested that gross domestic production, government expenditure, gross domestic per capita income, imports, exports and foreign direct investment granger causes tourist arrivals, Granger causality test of the study is conducted under following sections also. Original series are considered.

- Granger Causality between gross domestic production and macroeconomic variables
- Granger causality between gross domestic per capita income and Macroeconomic variables
- Granger causality between exports and macroeconomic variables.
- Granger causality between imports and macroeconomic variables.
- Granger causality between government expenditure and macroeconomic variables.
- Granger causality between foreign direct investment and macroeconomic variables.

4.6.1 Granger Causality between Gross Domestic Production and Macroeconomic Variables

Gross domestic production is a main determinant of tourist demand. The following Table 4.7 is shown the causality relationship between cost of tourist and macroeconomic variables

Table 4.7 Granger Causality between GDP with Macroeconomic Variables

Null Hypothesis	F-Statistic	Causal inference
GDPPC does not Granger Cause GDP	0.21708(0.80694)	No causality
GDP does not Granger Cause GDPPC	0.96437(0.40007)	No causality
XER does not Granger Cause GDP	0.06834(0.93419)	No causality
GDP does not Granger Cause XER	0.27833(0.76025)	No causality
GE does not Granger Cause GDP	0.61604(0.55108)	No causality
GDP does not Granger Cause GE	**3.45823(0.05359)***	Causality
INF does not Granger Cause GDP	0.94891(0.4057)	No causality
GDP does not Granger Cause INF	1.16784(0.33352)	No causality
EX does not Granger Cause GDP	**4.4986(0.02604)**	Causality
GDP does not Granger Cause EX	**6.54235(0.00732)**	Causality
IM does not Granger Cause GDP	1.97389(0.16786)	No causality
GDP does not Granger Cause IM	**12.0363(0.00048)**	Causality
FDI does not Granger Cause GDP	0.65708(0.53036)	No causality
GDP does not Granger Cause FDI	**10.234(0.00108)**	Causality
DE does not Granger Cause GDP	0.42195(0.66209)	No causality
GDP does not Granger Cause DE	**4.65055(0.02354)**	Causality

The value of F statistics in Table 4.7 is revealed that gross domestic production running bi directional granger towards exports while uni directional causal effect to imports, direct employment in tourist industry and foreign direct investment at 5% significant level. Gross domestic production granger causes government expenditure at 10% significant level. Thus it can be argued that past values of gross domestic production

contribute to the prediction of present value of exports, imports, direct employment in tourist industry, foreign direct investment and government expenditure. Furthermore study shows past values of exports contribute to the prediction of present value of gross domestic production.

4.6.2 Granger Causality between GDPPC and Macroeconomic Variables

Since gross domestic per capita income has granger causality towards tourist arrivals following Table 4.8 investigate the causality effect between gross domestic per capita income and other macroeconomic variables.

Table 4.8 Granger Causality between GDPPC with Macroeconomic Variables

Null Hypothesis	F-Statistic	Causal inference
GDPPC does not Granger Cause GDP	0.21708(0.80694)	No causality
GDP does not Granger Cause GDPPC	0.96437(0.40007)	No causality
XER does not Granger Cause GDPPC	0.97634(0.39577)	No causality
GDPPC does not Granger Cause XER	0.22867(0.79786)	No causality
GE does not Granger Cause GDPPC	2.25764(0.1334)	No causality
GDPPC does not Granger Cause GE	2.03145(0.16014)	No causality
INF does not Granger Cause GDPPC	1.4367(0.2637)	No causality
GDPPC does not Granger Cause INF	1.18989(0.32708)	No causality
EX does not Granger Cause GDPPC	0.75644(0.48368)	No causality
GDPPC does not Granger Cause EX	**4.68799(0.02297)**	Causality
IM does not Granger Cause GDPPC	0.26338(0.77136)	No causality
GDPPC does not Granger Cause IM	**9.43808(0.00157)**	Causality
FDI does not Granger Cause GDPPC	0.79608(0.46635)	No causality
GDPPC does not Granger Cause FDI	**11.0269(0.00075)**	Causality
DE does not Granger Cause GDPPC	0.77477(0.47558)	No causality
GDPPC does not Granger Cause DE	**7.53741(0.00419)**	Causality
TC does not Granger Cause GDPPC	1.36478(0.28064)	No causality
GDPPC does not Granger Cause TC	**4.6007(0.02433)**	Causality

The value of F statistics in Table 4.8 is revealed that GDPPC running uni directional causal effect to imports, export, direct employment in tourist industry, foreign direct investment and tourist cost at 5% significant level. Thus it can be argued that past values of GDPPC contribute to the prediction of present value of exports, imports, direct employment in tourist industry, foreign direct investment and tourist cost.

4.6.3 Granger Causality between Exports and Macroeconomic Variables

As past value of exports can be can be used to estimate present value of tourist arrivals, the understanding causal relation between tourist arrivals and other macroeconomic variables is suitable in this study.

Table 4.9 Granger Causality between Exports and Macroeconomic Variables

Null Hypothesis	F-Statistic	Causal inference
EX does not Granger Cause GDP	**4.4986(0.02604)**	Causality
GDP does not Granger Cause EX	**6.54235(0.00732)**	Causality
EX does not Granger Cause GDPPC	0.75644(0.48368)	No causality
GDPPC does not Granger Cause EX	**4.68799(0.02297)**	Causality
EX does not Granger Cause XER	2.61106(0.101)	No causality
XER does not Granger Cause EX	0.97733(0.39541)	No causality
EX does not Granger Cause GE	1.91621(0.17601)	No causality
GE does not Granger Cause EX	1.51161(0.24726)	No causality
EX does not Granger Cause INF	1.05885(0.36749)	No causality
INF does not Granger Cause EX	2.55613(0.10541)	No causality
IM does not Granger Cause EX	2.60462(0.10151)	No causality
EX does not Granger Cause IM	**4.07927(0.03459)**	Causality
FDI does not Granger Cause EX	1.42006(0.26752)	No causality
EX does not Granger Cause FDI	**5.50174(0.01366)**	Causality
DE does not Granger Cause EX	0.98538(0.39256)	No causality
EX does not Granger Cause DE	8.25195(0.00286)	Causality
TC does not Granger Cause EX	1.51(0.2476)	No causality
EX does not Granger Cause TC	1.93093(0.17389)	No causality

The value of F statistics in Table 4.9 is discovered that exports running uni directional causal effect to imports, direct employment in tourist industry and foreign direct investment at 5% significant level while bi direction causality to dross domestic production. Thus it can be argued that past values of exports contribute to the prediction of present value of imports, direct employment in tourist industry and foreign direct investment while past value of per capita gross domestic income can predict present value of exports since GDPPC running a uni direction causality towards exports.

4.6.4 Granger Causality between Imports and Macroeconomic Variables

Table 4.10 Granger Causality between Imports and Macroeconomic Variables

Null Hypothesis	F-Statistic	Causal inference
IM does not Granger Cause GDP	1.97389(0.16786)	No causality
GDP does not Granger Cause IM	**12.0363(0.00048)**	Causality
IM does not Granger Cause GDPPC	0.26338(0.77136)	No causality
GDPPC does not Granger Cause IM	**9.43808(0.00157)**	Causality
IMP does not Granger Cause XER	**4.65142(0.02353)**	Causality
XER does not Granger Cause IMP	2.07959(0.15398)	No causality
IMP does not Granger Cause GE	1.16665(0.33387)	No causality
GE does not Granger Cause IM	**8.49005(0.00253)**	Causality
IM does not Granger Cause INF	0.86819(0.43656)	No causality
INF does not Granger Cause IM	1.81701(0.19108)	No causality
IM does not Granger Cause EX	2.60462(0.10151)	No causality
EX does not Granger Cause IM	**4.07927(0.03459)**	Causality
FDI does not Granger Cause IM	1.04719(0.37135)	No causality
IM does not Granger Cause FDI	**6.6906(0.00672)**	Causality
DE does not Granger Cause IM	0.88528(0.42982)	No causality
IM does not Granger Cause DE	**13.8551(0.00023)**	Causality
TC does not Granger Cause IM	2.27286(0.13179)	No causality
IM does not Granger Cause TC	**7.97788(0.00331)**	Causality

According to study in section 4.5 imports are granger cause with tourist arrivals; the import value of past years can be used to predict the present value of tourist arrivals. The above Table 4.10 describes the causality relationship between imports and macroeconomic variables.

The value of F statistics in table 4.10 is suggested that imports granger causes exchange rate, foreign direct investment, direct employment in the tourist industry and tourist cost at 5% significant level. Thus it can be argued that past values of imports contribute to prediction of present value of exchange rate, foreign direct investment, direct employment in the tourist industry and tourist cost. GDP, GDPPC, GE and EX granger causes imports where causal influence is running from stated variables to imports.

4.6.5 Granger Causality between government expenditure and Macroeconomic Variables

The capital expenditure done by the government on social and economic infrastructure development in past years could be used to predict the present value of tourist arrivals stated in section 4.5 the granger causality among government expenditure and macroeconomic variables are tested.

According to Table 4.11 suggested that past value of government expenditure can be estimated imports, foreign direct investment and tourist cost since government expenditure granger causes with those variables. The past value of exchange rate, direct employment in tourism industry can be estimated value of government expenditure at 5% significant level while past value of gross domestic production and tourist cost and be estimate the value of government expenditure at 10% significant level.

Table 4.11: Granger Causality between government expenditure and Macroeconomic Variables

Null Hypothesis	F-Statistic	Causal inference
GE does not Granger Cause GDP	0.61604(0.55108)	No causality
GDP does not Granger Cause GE	**3.45823(0.05359)***	Causality
GE does not Granger Cause GDPPC	2.25764(0.1334)	No causality
GDPPC does not Granger Cause GE	2.03145(0.16014)	No causality
GE does not Granger Cause XER	0.12183(0.88603)	No causality
XER does not Granger Cause GE	**3.59083(0.04872)**	Causality
INF does not Granger Cause GE	1.09458(0.35595)	No causality
GE does not Granger Cause INF	2.35341(0.12361)	No causality
EX does not Granger Cause GE	1.91621(0.17601)	No causality
GE does not Granger Cause EX	1.51161(0.24726)	No causality
IM does not Granger Cause GE	1.16665(0.33387)	No causality
GE does not Granger Cause IM	**8.49005(0.00253)**	Causality
FDI does not Granger Cause GE	0.58309(0.56837)	No causality
GE does not Granger Cause FDI	**12.1627(0.00046)**	Causality
DE does not Granger Cause GE	**10.4174(0.00099)**	Causality
GE does not Granger Cause DE	**7.17015(0.00513)**	Causality
TC does not Granger Cause GE	**3.13174(0.06806)***	Causality
GE does not Granger Cause TC	**5.5501(0.01326)**	Causality

*at 10% significant level

4.6.6 Granger Causality between FDI and Macroeconomic Variables

The direct investment have been done by the foreign nation in the Sri Lanka is influenced the tourist arrivals to Sri Lanka because of granger causes foreign direct investment to tourist arrivals. To identification variables which are granger cusses foreign direct investment is tested as follow,

Table 4.12: Granger Causality between FDI and Macroeconomic Variables

Null Hypothesis	F-Statistic	Causal inference
FDI does not Granger Cause GDP	0.65708(0.53036)	No causality
GDP does not Granger Cause FDI	**10.234(0.00108)**	Causality
FDI does not Granger Cause GDPPC	0.79608(0.46635)	No causality
GDPPC does not Granger Cause FDI	**11.0269(0.00075)**	Causality
FDI does not Granger Cause XER	2.80744(0.08685)	No causality
XER does not Granger Cause FDI	1.87223(0.18252)	No causality
FDI does not Granger Cause GE	0.58309(0.56837)	No causality
GE does not Granger Cause FDI	**12.1627(0.00046)**	Causality
FDI does not Granger Cause EX	1.42006(0.26752)	No causality
EX does not Granger Cause FDI	**5.50174(0.01366)**	Causality
FDI does not Granger Cause IM	1.04719(0.37135)	No causality
IM does not Granger Cause FDI	**6.6906(0.00672)**	Causality
DE does not Granger Cause FDI	2.52018(0.10841)	No causality
FDI does not Granger Cause DE	**4.64713(0.02359)**	Causality
TC does not Granger Cause FDI	**5.73465(0.01183)**	Causality
FDI does not Granger Cause TC	2.4046(0.1187)	No causality

The value of F statistics in Table 4.12 is suggested that foreign direct investment granger causes tourist arrivals and direct employment in the tourist industry. Thus past value of foreign direct investment can be predicting value of tourist arrivals and direct employment in the tourist industry. While gross domestic production, per capital gross domestic income, government expenditure, exports, imports and tourist cost can be use to predict present value of foreign direct investment since those variables running granger causality towards foreign direct investment at 5% significant level.

4.7 Identification of Significant Macroeconomic Variables with Respect to TA

The one of the main objective of this study to build up an econometric model for forecast tourist arrivals in future. The best way of construct model for selected variables is time series analysis because of all data series are time series. However problem of insufficient observation in time series model development first regression analysis was carried out to identify most significant variables to tourist arrivals. Original time series are considered for the model development and correlation between each variables have be tested in order to test linear association between variables.

4.7.1 Correlation between Variables

Table 4.13 shown the pearson correlation obtained from SPSS software for the variables, Total Tourist arrivals and p-value. The hypothesis analysis has been carried outat 0.01 level of significance.

Table 4.13: Hypothesis testing for Correlation between Total Tourist Arrivals and other Explanatory Variables

	Variable	Pearson correlation	p- value Sig. (2-tailed)
1.	TA	1.000	
2.	GDP	0.862	0.000
3.	GDPPC	0.877	0.000
4.	EXR	0.732	0.000
5.	GE	0.829	0.005
6.	INF	-0.548	0.000
7.	EX	0.795	0.002
8.	IM	0.846	0.000
9.	FDI	0.795	0.000
10.	DE	0.935	0.000
11.	TC	0.934	0.000

Below hypothesis have been tested with the use of the above correlation test.

H_0 : There is no linear association between Total Tourist Arrivals $\&i^{th}$variable.
H_1 : There is a linear association between Total Tourist Arrivals $\&i^{th}$variable.

According to the correlation analysis between explanatory variables and tourist arrivals, almost all hypotheses are highly significant even under one percent level of significance. Since it can be concluded that, all explanatory variables are highly lineally associated with tourist arrivals Pearson Correlation Coefficient between tourist arrivals and inflation rate are negatively correlated whilst the other variables show a positive correlation.

4.7.2 Selection of Variables

Stepwise method has been used in selection of variables since all variables are highly correlated and following hypotheses are tested for the purpose of model development.
H_0: Tourist Arrivals independent from i^{th} variable.
H_1: Tourist Arrivals dependent on i^{th} variable.

Table 4.14: Parameter Coefficients of the Model

Model	Sig.	Collinearity Statistics		Durbin Waston
		Tolerance	VIF	
(Constant)	.000			
GDPPC	.000	.001	847.455	
GDP	.001	.001	847.455	1.211

According to the finding in Table 4.14 all the hypothesis stated above can be rejected 5% significant level (P<0.05). Thus it can be concluded that tourist arrivals to Sri Lanka is depend on only gross domestic production and gross domestic per capita income.

4.8 Model Development for Forecast TA

The time series analysis was carried out for the model development purpose because linear regression analysis is not provided correct interpretation for the time series data sine Variance Inflation Factor (VIF) and Durbin Waston statistics were not supported for the model development. Therefore Johansen cointegration method was applied for the model development.

4.8.1 Selection of Appropriate Lag Length

The important step in the johansen cointegration method is the selection of appropriate lag length of the model by applying maximum likehood estimation procedure. The results of the the analysis of optimal lag length for VAR, VECM model based on the sequential modified likelihood ratio test statistics is given in Table 4.15

Table 4.15: Results of lag Order Selection for VECM Model

Lag	AIC	HQ
0	83.11873	83.15111
1	75.77739	75.90693
2	75.65026*	75.87695*
3	75.67418	75.99802
4	75.74107	76.16207

Results in Table 4.15indicate that the optimal log length of the model is two according to the Akaike Information Criterion (AIC) and Hunnan Information Criterion (HQ). Thus cointergration test was carried out for tourist arrivals for lag 2.

4.8.2 Estimation of Johansen Cointegration Model for Tourist Arrivals

The Co-integration relationship between TA and other macro-economic variables is tested using Johansen approach at the predetermined lag 2. In these tests, maximum eigen value statistic is known as trace statistic which is compared to the corresponding critical value as shown in Table 4.16

Table4.16 : Results of Johansen Cointegration Test for TA

Sample (adjusted): 1993 2014

Series: TA GDP GDPPC

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Significant at 5% level
None *	0.610082	41.71030	29.79707	0.0014	Yes
At most 1*	0.395100	20.99028	15.49471	0.0067	Yes
At most 2*	0.363271	9.931062	3.841466	0.0016	Yes

The Trace Test in Table 4.16 indicates the existence of three cointegrating equation at the 5% significance level. This cointegrating equation means that three linear combination exists between the variables that force these indices to have a relationship over the entire 21 years time period, despite potential deviation from equilibrium levels in the short-term. In order to confirm the results the Maximum Eigen value test was carried out and results are shown in Table 4.17

Table 4.17: Unrestricted Cointegration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**	Significant at 5% level
None *	0.610082	20.72002	21.13162	0.0570	Yes
At most 1	0.395100	11.05922	14.26460	0.1513	No
At most 2*	0.363271	9.931062	3.841466	0.0016	Yes

The results in Table 4.17indicate that maximum eigen value statistic values are greater than the critical value at 5% significant level (P<0.05) Therefore, two cointegration equations can be found. It implied that there exists a long run relationship between TA and macroeconomic variables.

Similarly, the maximum Eigen value rejects the null hypothesis of r = 0 co-integrating vector at 5 percent significant level and accepts the alternate hypothesis of two co-integrating vector. Therefore, both test statistics suggest the presence of two co-integrating vector. It can be concluded that the variables are co integrated and follow long-run equilibrium relationship. Engle and Granger (1987) stated that the evidence of cointegration rules out spurious correlation and suggests the presence of at least one direction(s) of Granger causality

Table 4.18: Normalized Cointegrating Coefficients

Variable	TA	GDP	GDPPC
Coefficient value	1.000000	-0.000843	19192.85
Standard error		(0.00022)	(5176.05)
T statistics		-3.81818	3.708011

Results in Table 4.18 indicate that there is one integrating equation, with normalized cointegrating coefficient. Hence, an error correction model should be applied. The study can interpret the coefficients as follows:

- One unit increase in gross domestic production lead to decrease in TA by 0.000843 in log run
- One unit increase in gross domestic per capita income will lead to increase in TA by 19192.85 in long run.

The ECM for tourist arrivals was fitted to determine the short run relationship between macroeconomic variable and TA results are shown in Table 4.19

Table 4.19: Adjustment Coefficients and the Corresponding Standard Error

Variables	D(TA)	D(GDP)	D(GDPPC)
Coefficient value	-0.199982	782.8868	-2.49E-05
Standard error	(0.14840)	(1047.94)	(4.5E-05)

According to the above Table 4.19,0.20 of disequilibrium "corrected" each year by changes in tourist arrivals, 782.88 of disequilibrium "corrected" each year by change in GDP and 0.00002 disequilibrium "corrected" each year by change in GDPPC.

Table 4.20: Results of The ECM Estimates for TA

CointegratingEq:	CointEq1
TA(-1)	1.000000
GDP(-1)	-0.000843 (0.00022) [-3.77772]
GDPPC(-1)	19192.85 (5176.05) [3.70801]
C	-3832092

The figures in the parentheses indicate the test statistics of the coefficients. It can be seen that significant relationship between macroeconomic variables considered in the study and TA. One cointegration equation is developed for the study as shown in the following Table 4.21

Table 4.21: Cointegration Results for Error Correction Model for TA

Error Correction:	D(TA)
CointEq1	-0.199982[-1.34755]
D(TA(-1))	0.788886[2.69472]
D(TA(-2))	-0.153801[-0.46085]
D(GDP(-1))	-0.000245[-2.05785]
D(GDP(-2))	-0.000164[-1.04419]
D(GDPPC(-1))	5359.465[1.86459]
D(GDPPC(-2))	4791.347[1.48655]
C	-31103.44[-0.75973]

The figures in the parentheses indicate the test statistics of the coefficients. The model has been displayed below equation to explain the relationship between macroeconomic variables and TA.

d(ta) = -0.1999821519*(ta(-1) - 0.0008432557717*gdp(-1) + 19192.85201*gdppc(-1) - 3832092.227) + 0.7888864463*d(ta(-1)) - 0.1538011156*d(ta(-2)) - 0.0002452310463*d(gdp(-1)) - 0.0001641034305*d(gdp(-2)) + 5359.464534*d(gdppc(-1)) + 4791.346939*d(gdppc(-2)) - 31103.43757

4.8.3 Diagnostic test for Error Correction Model for TA

The result of the ECM is given in Table 4.21.In order to provide the final equation acceptable, the study carried out various diagnostic tests. The LM model seems to be fit in the sense that it satisfies the diagnostic test explain below in Table 4.22.

Table 4.22 VEC Residual serial Correlation LM Test

Lags	LM-Stat	Prob
1	10.33715	0.3239
2	5.507206	0.7880
3	12.40328	0.1915
4	8.173407	0.5168
5	16.14391	0.0639
6	3.862195	0.9202
7	12.17354	0.2037
8	6.552285	0.6836
9	6.382633	0.7011
10	17.72881	0.0385
11	10.91844	0.2813
12	17.99113	0.0353

The result of the diagnostic tests shows that there is no serious problem of either serial correlation. VEC Residual Serial Correlation LM Tests confirm that there is no serial correlation in the residuals of the ECM regression at lag 1 and lag 2 (P >0.05).This shows that there are no lagged forecast variances in the conditional variance equation. Moreover, the errors are conditionally normally distributed, and can be used for inference.
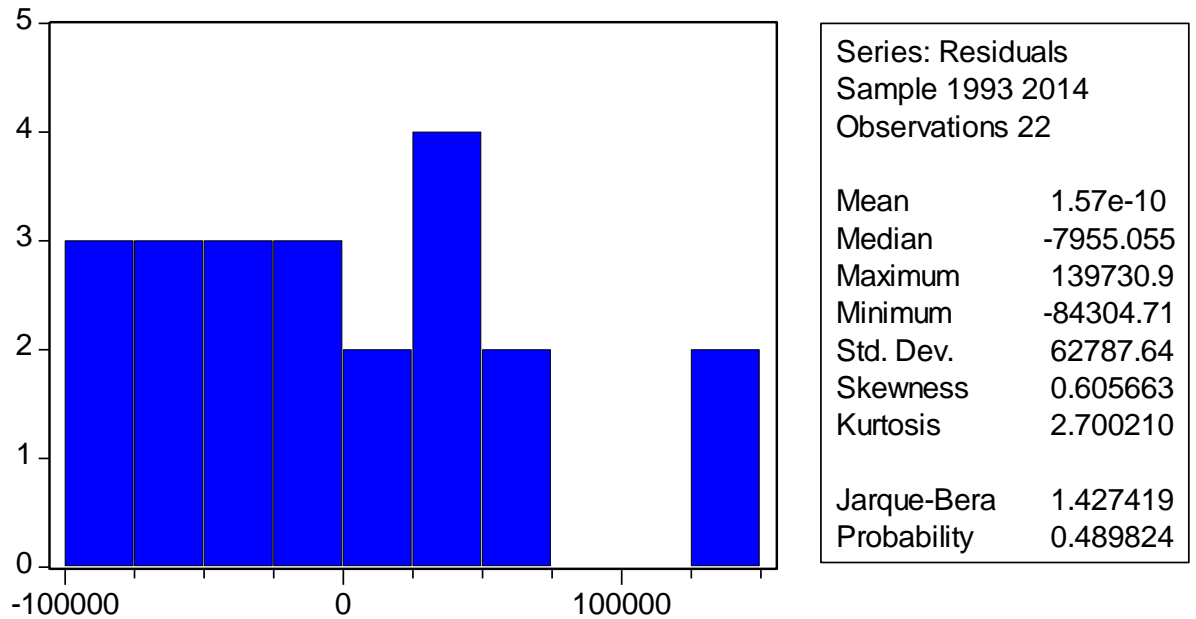
Figure 4.12: Normality Distribution of Residuals of VECM.

The Error-Correction Model yielded residuals that are normally distributed. This conclusion is arrived at given that the Jarque-Bera statistic is not significant (P=0.489824).The coefficient of the error correction term with two period lag is significant suggesting that the above long run relationship is stable and unique and any disequilibrium created in the short run will be temporary and will get corrected over a period of time.

4.9 Elasticity of Tourist Arrivals with Respect to Macroeconomic Variables

The one of the objective of this study is measure the degree of response of tourist arrivals with respect to each macroeconomic variable. The elasticity values of tourist arrivals with respect to all variables are shown in following Table 4.23. Simple linear regression was carried out for the log series of the variables to find out elasticity values.

Table 4.23: Elasticity of Tourist Arrivals

Tourist arrivals with respect to	Elasticity
GDP	2.22
INF	-0.48
GDPPC	1.16
IM	1.4
EX	0.73
TC	1.18
DE	0.98

According to finding in Table 4.23, it can be concluded that tourist arrivals is seen elastic with respect to GDP, GDPPC, IM and TC since percentage change in tourist arrivals is greater than the percentage change in those variables. While tourist arrivals been inelastic with respect to the INF, EX and DE since the percentage change in tourist arrivals with respect to those variables is less than the considered variables. Inflation is negatively related while all other variables are positively related with change in tourist arrivals.

4.10 Summary of Chapter 4

All series except TA, DE and TC are not significantly deviate from normality. All series were not stationary at the original form. Log series of the first different of all series are stationary while second difference of the original series also stationary. Tourist Arrivals (TA) granger causes GDP, GDPPC, GE, IM , and FDI. The summary of the granger causality among the variables are shown in Table 4.24

Table 4.24: Summary of Findings and Results of Granger Causality Test.

Variables granger cause tourist arrivals	Granger cause with									
	GDP	GDPPC	EXR	GE	INF	EX	IM	FDI	DE	TC
GDP						√				
GDPPC										
GE	√		√						√	√
IM	√	√		√		√				
EX	√	√								
FDI	√	√		√		√	√			√

Among the macroeconomic variables which is granger caused with the tourist arrivals GDP and GDPPC were identified as most significant variables for the model development using regression analysis. The result of Johansen Cointegration has indicated that existence of long term relationship among TA with respect to GDP and DGPPC.

CHAPTER FIVE
CONCLUSIONS AND RECOMMANDATIONS

5.1 Conclusions

This study investigated the macroeconomic variables which influence the tourist arrivals to Sri Lanka. Results of the granger causality between tourist arrivals and macroeconomic variables namely GDP, GDPPC, EXR, GE,INF, EX, IM, FDI, DE, and TC identified direction of causality while regression analysis identified degree of responsiveness of tourist arrivals with respective to the change in macroeconomic variables.

The results of granger causality indicate that overall selected macroeconomic variables directly and indirectly influence on tourist arrivals. Furthermore it revealed that past behavior of GDP, GDPPC, GE, IM, EX and FDI determine the present behavior of tourist arrivals. Among macroeconomic variables which were granger caused with tourist arrivals only GDP and GDPPC have significantly influenced on tourist arrivals to Sri Lanka. Therefore only those two variables were considered for the VECM. It shows that one unit decrease in GDP lead to decrease in TA by 0.000843 in log run while one unit increase in GDPPC will lead to increase in TA by 19192.85 in long run.

Furthermore correlation analysis showed that all macroeconomic variables considered are significantly linear associated with tourist arrivals. Except inflation all other indicate positive correlation. Tourist arrivals being elastic with respect to GDP, GDPPC, IM and TC since percentage change in tourist arrivals is greater than the percentage change in those variables. While tourist arrivals been inelastic with respect to the INF, EX and DE since the percentage change in tourist arrivals with respect to those variables is less than the considered variables. Inflation is negatively related while all other variables are positively related with change in tourist arrivals.

5.2 Recommendations

This study has some practical implications for policy makers and academics in the field of the study. It is supposed that the economic development of the country is the main determinant of the tourist attraction because among all other variables, the variables considered under the economic development were only significantly influenced by the tourist arrivals. The study has suggested that the increment in gross domestic per capita income will increase the tourist arrivals in future. However the sign of the coefficient of the GDP is questionable since according to the economic theory it should positively influence to the tourist arrivals. Nevertheless elasticity coefficient of the tourist arrivals with respect to change in GDP is positive which was supported to the previous studies. However the study has suggested that increment in GDP will decrease the tourist arrivals by smaller units and it not by considerable amount. Tourist arrivals being elastic with respect to change in GDP and DGPPC smaller change in GDP and GDPPC can increase more tourists to the economy.

It is supposed to take arrangements to stimulate the economic development with increase in the living standard of the country through fiscal and monitory policy. Furthermore it is advisable to take measures to increase income level of the country because increase in per capita income and gross domestic production in one percent will increase tourists arrivals by more than one percent. Furthermore giving subsidies to the producers who produce for tourist market can attract more tourist while increase in the per capita income of the country. However giving subsidies to import substitute industries will decrease the number of tourist arrivals to the Sri Lanka. Furthermore elasticity value of inflation is negatively related to the tourist arrivals and it is inelastic. It is suggested that living cost of Sri Lanka is not seriously influenced by tourist arrivals.

Finally it is recommended that further studies may be desired to consider socio economic factors to formulate better relationship. It is possible to consider quarterly data for most recent years than more past years. Nevertheless researchers can use more countries to identify factors which influence tourist arrivals. Furthermore it is recommended to do further study to find out which category of GDP more influenced by tourist arrival to Sri Lanka.

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65

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