

**ECONOMETRIC ANALYSIS OF THE FACTORS
AFFECTING THE AIR EXPRESS INDUSTRY IN
SRI LANKA**

Hettiarachchige Dona Nimesha Damithri

179204P

Master of Logistics & Supply Chain Management

Department of Transport & Logistics Management

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Thesis submitted in partial fulfillment of the requirements for the Master of Logistics
& Supply Chain Management

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

This dissertation is a study of the air express market in Sri Lanka and ultimately identifying factors affecting air express market in Sri Lanka. A literature review related to logistics and courier, express and parcel was examined. Particularly, the factors affecting the logistics performance and CEP industry have been scrutinized and based on this foundation, descriptive analysis was carried out.

The characteristics and overview of the air express market are described and determinants which affect the air express market are identified and analysed. Quantitative analysis was prepared by applying log linear multiple regressions to identify the factors and the degree of impact of those factors to the air express market in Sri Lanka. The concluding chapter identifies the recommendations of the thesis with regard to data, methods and approaches.

Keyword: *air express market, CEP industry, log linear regression, econometric analysis, express market, courier*

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H. D. Nimesha Damithri

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CHAPTER 01

GLOBAL COURIER, EXPRESS & PARCEL (CEP) INDUSTRY- ITS ROLE AND THE CONTRIBUTION

1.1 Introduction to CEP Industry

Increasing capacity, volatile consumer demand and the disruptive technological innovations are leading the shippers and all the logistics service providers to create a simpler supply chain. Dynamic changes in the consumer preferences and the availability of numerous alternatives are making all the stakeholders of the supply chain to be faster and closer to the consumer. Since the need for faster delivery of the goods and services that are in demand, service providers leave no choices but to send the goods and services which ever the mode which is faster and optimum. Thus it makes a mode neutral transportation for the customers.

Literature provides evidence of the definition in different perceptive and CEP refers to as Courier, Express delivery & Parcel. Since there are similarities in the service attributes of these three services, people often get confused as these services are same and which are not. Shipments delivered by CEP are small in size mostly one single piece of consignment is weighing not more than 31.5 Kilos (71lbs) when compared to air freight as for all the heavy shipments which are time sensitive are mostly carried as air freight to get the price advantages. Shipments of the parcel services are rarely shipped via air, whereas main transport of the express shipments is done through air.

Express delivery is a time definite and shipments are delivered within two or three days. Most of the time express shipments are delivered by a specified day or may be a specified time of a day. A company or a person who carries and delivers packages, messages and mails seems to be the source of the term “courier”-originally courier service providers deliver shipments within a short distance (Kumar 2015). All these three types of services deliver consignments from door –to-door. Since there are

slight differences all these services can be interconnected as these services try to provide faster and reliable delivery to the customer.

With the globalization and the technological booming in the world, CEP industry has evolved in steady phase as most of the traditional postal companies failed to keep up with the changing consumer preference. Most of them were unsuccessful in the operation due to lack of focus on the changes in the demand and faster responsiveness. Most of the CEP companies have expanded their services to different geographies and provide international services such as USA based companies like FedEx & UPS; Europe based companies like DHL & TNT. Further companies like Toll Express (Australia), SF Express (China), Blue Dart, Gati, DTDC (India), Aramex (Middle East) & etc. can be categorized as regional specific players. There are postal companies who have express & parcel arms such as Geo Post (La Poste) and Purolator (Canada Post).

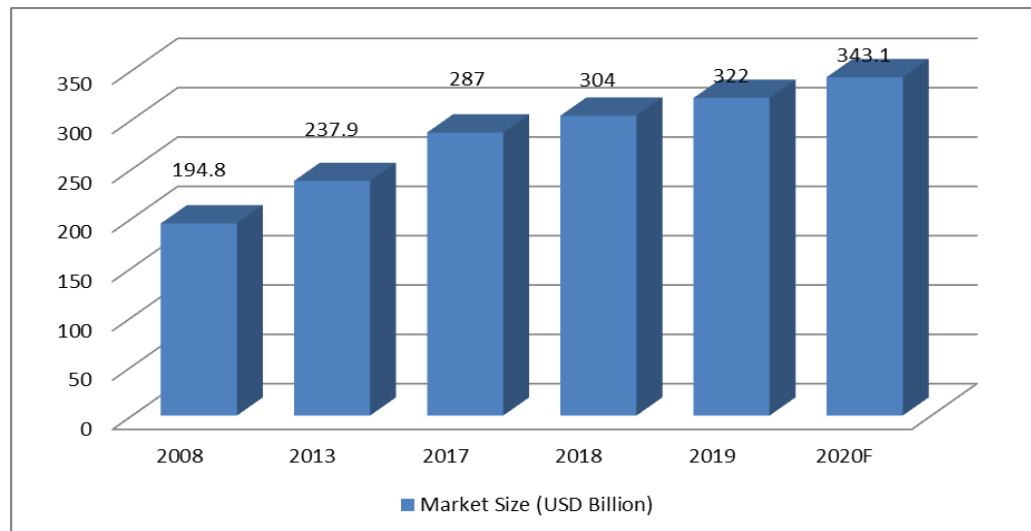
1.1.1 Market size and growth of the CEP industry

Courier Express & Parcel market has three main business segments and those are Business to Business (B2B), Business to Customers (B2C) and Customers to Customers (C2C). B2B segment of the market has the major share compared with other two segments and have higher margins to the service providers. But slow growth has shown in the recent past which is similar to the growth rate of the world GDP. When consider the B2C segment, it is evident that there is a significant growth with the e-commerce market trends that are booming in the world.

As per UN statistics, 55% of the world population lives in urban areas today and number of smart phone users forecast to grow from 2.5 billion to 2.87 billion in 2020 (Statista 2019). Further internet penetration in population is reported as 47% (UN international telecommunication union). And the growing middle class in the Asia Pacific countries can be identified as the reason for the growth of the B2C business segment which leads to have dynamic market preferences and the affordability which in turn grow the demand for trade. C2C can be categorized as an

emerging segment with the effect of the circular economy that is being started trending and considerable growth rate can also be witnessed.

CEP market also has two main routes; International and domestic, wherein in the international route, faster growth was as a result of the growing cross border e-commerce trade (Accenture research 2015). As per Accenture Research 2015, CEP market is forecasted to be growing up to USD 343 billion in 2020 (Figure 1.1).



Source: Accenture Research, Transport Intelligence 2015

Figure 1.1: Market size of the CEP industry

CEP market share is expected to grow especially in Asia Pacific region in a steady phase and North America and Europe share are expected to be showing a slight decline in 2020 (Table 1.1)

Table 1.1: CEP Regional wise market share growth

Market	APAC	N. America	W. Europe	Europe Rest	Middle East	S. America	Africa
2013 share	32%	33%	23%	5.7%	3.5%	2.5%	1.5%
2020 share	38%	30%	19%	5.3%	4.1%	2.5%	1.9%
2013-20 CAGR	15%	9%	5%	8%	7%	5%	10%

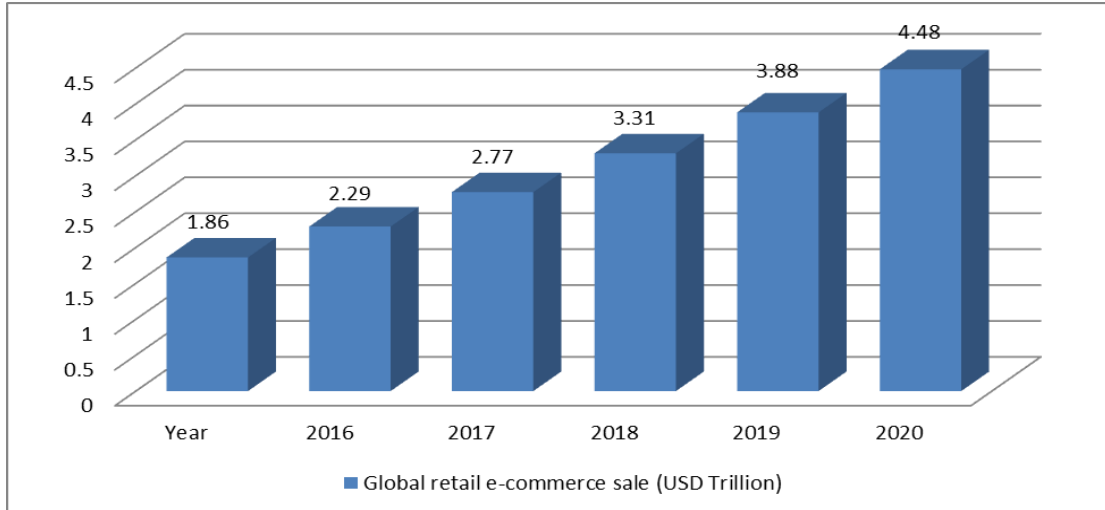
Source: Accenture Research, Transport Intelligence (2015)

1.1.2 Development of the CEP industry with e-commerce

With the popularity of the social networks and the increasing usage of internet enabled devices such as computers, smartphones tabs & etc. and the free and increasing availability of data, customers have more choices than the past and which leads CEP service providers to experience more volatility of the demand.

If they are not agile enough to cater the demand, there may be service disruptions which in turn lead to have lost sales. Further faster review can be gained and customers will have lower switching costs. Moreover, from the retailers and deliverers end there will be more competition among them, and they will also experience better visibility in the supply chain.

Global e-commerce market had grown in to a USD 3.3 trillion in 2018 and it is expected to be evolved USD 4.5 trillion in 2020 (Figure 1.2).



Source: Accenture Research (2019)

Figure 1.2: Global Retail E-commerce Sale

Faster delivery at a low cost is the key to the success of the ecommerce market as customers expect seamless consumer experience. Therefore, CEP service providers

have to use different innovative technologies to streamline the process in order to improve the faster turnaround time. Most of the online purchases 1st preference would be for free shipping and now the retailers are challenged to face the barrier of providing free shipping by minimizing the cost.

On the other hand, online retail giants like Alibaba and Amazon have started investing on to own delivery network and infrastructure and Amazon itself has invested in 40 aircrafts which are in use now (Amazon Air)

1.1.3 Overview- Air expresses industry in Sri Lanka.

Air express industry in Sri Lanka is commonly known by public as international courier industry which is a USD xx billion market. All most all the industry players are either agent of the principals located in other countries or joint ventures with international players. DHL, UPS, FedEx, TNT, Aramex, Antron Express, ACX, SCS, DPEX, DEX, OCS, DPD, SKY net are the leading air express companies operating in Sri Lanka.

Main business of the CEP industry especially the express industry is to offer time definite, value added, and door to door service which includes delivery of envelops, documents and parcels. In Sri Lankan air express market, mostly high value, low volume cargo is transported as air express cargo. In addition, time sensitive cargo like perishables, biological samples, samples of apparel and other manufacturing, machinery and spare part items & etc. Air express industry in Sri Lanka is considered as an international service as there is no available air express domestic market in the country.

After end of 27 years of civil conflicts, currently industrial sector in Sri Lanka and thereby the logistics sector are experiencing an exponential growth . With the aid of the foreign investments, lot of construction projects are in progress therefore logistics sector involvement for the development of the country is very crucial.

1.2 Problem Statement

Even for a same industry, the performance dynamics of a particular market may change country to country. For instance, market dynamics of air express industry in another country may differ from the air express market dynamics in Sri Lanka. Therefore, it is vital to identify the factors that affect the air express market in Sri Lanka may affect due to various factors.

Therefore, the central question of the dissertation is;

What are the factors affecting air express market in Sri Lanka?

1.3 Aim of the study

The main purpose of this thesis is to analyze the behavior of air express market in Sri Lanka using qualitative and quantitative methods including econometric tools. Thereby the paper attempts to identify the influential factors of air express market particularly for Sri Lankan context. Further this study also will develop a forecasting model for air express market in Sri Lanka by conducting an econometric analysis of average air express market performance.

1.4 Significance of the study

The ability of understand the market dynamics of air express market not only in Sri Lanka but also in the global CEP industry is crucial in many aspects for various reasons. As there are number of stakeholders involving in logistics and air transportation this would benefit every stakeholder in different degrees. As this paper attempts to understand the market parameters which is crucial for the performance of the market all the stakeholders, especially the service providers would benefit due to increasing competition among industry players. The main objective of the express companies is the revenue generation which largely depends on their excellence of the service performances which in turn affect the market performance.

With the globalization, increasing competition and disruptive innovation different types of business initiatives have come up such as e-commerce. Technology has raised the bar for all the businesses; thereby the customers' expectations are also changing and demanding. Faster, reliable service with different types of customization

is required. Hence it is vital to understand the air express market dynamics in general and particularly of Sri Lankan market. Further it is also important to make aware of how those market dynamics behave and in what degree it will affect the air express market.

Analyzing of factors that affect air express market qualitatively and quantitatively would make more awareness not only for service providers but also for the decision makers so that it can help formalizing and facilitating the processes.

1.5 Objectives of the study

- The overriding objective of the research is to recognize the factors affecting the air express market in Sri Lanka. In addition, another objective which is to be fulfilled is to find the degree of relationships among express industry performance and factors influencing industry performance.
- A number of secondary objectives are envisaged to be achieved. They are a) to construct an econometric model to best represent the market dynamics b) to provide guidance of freight determinants to express companies particularly. c) to identify how these findings is used for modelling future market performance, when econometric and economic concepts are linked together.

1.6 Structure of the thesis

The structure of the dissertation includes five chapters.

Chapter 1 sets to introduce the thesis's subject and the objectives. Also, it includes the aim of the study, significance of the study, problem statement and the limitations of the study. Chapter 2 starts with a literature review on logistics and CEP market determinants. From there, it introduces various analyses, models and different approaches especially the econometric models which identify the factors affecting air express market. Chapter 3 describes the research methodology would be used in the

study to achieve the thesis objectives. Chapter 4 contains descriptive analysis of air express market which provides a detailed analysis of the sector. In addition, analysis of influential factors of the air express market in Sri Lanka can be found.

It also includes analysis using linear Multiple Regression. Finally, Chapter 5 contains the conclusion of works presented in the thesis together with the direction for further research relating to this topic.

1.7 Limitation of the study

Naturally the thesis is limited by a number of factors. First, due to the difficulties of data collection, the periods of data series were compiled from 2012 on a quarterly basis. If the analysis has done based on monthly figures, would have been more accurate. Further freight rates, both inbound and outbound do not documented Sri Lanka unless the payment term is “collect at the destination”. In the literature it was found very negligible number of studies done on the air express market in Sri Lanka.

Even though there are some factors identified in the study, only nine of them are chosen as independent variables in the empirical analysis. Because some parameters in qualitative and difficult to convert into a quantitative manner and difficulties in data collection. In addition, although it seems that the multiple regression method is suitable, there are still many other methods that should be taken into consideration such as Autoregressive Integrated Moving Average Model (ARIMA Model).

Finally, it is assumed that the reader is familiar with econometrics at master level. Therefore, basic statistical & econometric concepts are only explained to a very limited extent. On the other hand, the qualitative & the quantitative models are introduced thoroughly, both in terms of intuition, interpretation and estimation.

CHAPTER 02

LITERATURE REVIEW

2.1 Background to the Literature Survey

An extensive literature review on the past work on CEP sector was carried out under three different aspects. First the review focused on scholarly works in the field of CEP or logistics industry in broader aspects such as CEP market, pricing, competition and market structure. Second the review was carried with regard to the factors affecting the CEP industry. Finally, the literature review focused on the different analytical methods that have been used in researches particularly to study CEP/Logistics industry

2.2 Literature survey on Courier Express & Parcel Industry

With the development of the e-commerce and e-retailing and especially the growing consumer needs, it is paramount important to deliver the items ordered by a customer to the intended recipients as fast as possible with an affordable price. With the globalization it is essential to maintain the speed to the end customer and CEP industry supports all the stakeholders to maintain the speed. There are many definitions of the CEP services can be found in the literature given by different experts in different perspectives. As per the research by Brewe et al, (2001), there are three conceptual models that include express delivery which is referred to as “CEP service” namely courier, express delivery and parcel delivery. The main task of all three concepts is to physically distribute the goods/items to ensure that the goods ordered are available at the right places at the right time in the right quantity to satisfy the customer demand (Gurau, Ranchhod and Hackney, p 34, 2001).

Further in the background note by the secretariat WTC (1998), it has given a comprehensive definition and scope identification of the postal and courier service. Postal service contains four sub items; (1) postal services related to letters consisting of pick-up, transport and delivery services of letters, newspapers, journals,

periodicals, brochures, leaflets and similar printed matters, whether for domestic or foreign destinations; (2) postal services related to parcels consisting of pick-up, transport and delivery services of parcels and packages, whether for domestic or foreign destinations; (3) post office counter services rendered at post office counters, e.g. sales of postage stamps, handling of certified or registered letters and packets, and other post office counter services; and (4) other postal services which includes mailbox rental services.

In addition courier service has two sub items which include (1) multi-modal courier services consisting of pick-up, transport and delivery services, whether for domestic or foreign destinations of letters, parcels and packages rendered by courier and using one or more modes of transport and (2) other courier services for goods, not elsewhere classified, e.g. trucking or transfer services without storage, for freight.

In addition to that it has also emphasized that how existing monopolies have impacted to the postal services of many countries through regulations which definitely led to underperform as an industry. One of the interesting points is that the mentioned study has highlighted was most low-income countries have postal monopolies with fairly broad reservation of services to them, the lower market shares attributable to their national postal suppliers would seem to indicate that on a de facto basis, their suppliers already face significant competition. Customs regulations, regulatory role of the postal monopolies or the scope of their privileges, licensing requirements, postal taxes, and concession fees of countries can have a huge impact to the courier industry as it has access to foreign markets than postal services.

Existing literature also provides a uniformly used definition for air express service. Air express refers to courier companies shipping items from door to door, from a pickup point to a designated address. Delivery is mostly same day, next day or one to three days transit as per the sensitivity of the time and the nature or the content of the shipment such as biological shipments, spare parts or medical instruments & etc. (Panagiotis& Piia, 2013).

As per the report of US International Trade Commission on Express Delivery Services: Competitive Conditions Facing U.S.-based Firms in Foreign Markets (2004), as a result of the e-commerce growth around the world which was caused by the enhancing internet literacy and the supporting infrastructure, internationalization of the business and rising demand by manufacturers for outsourced logistics services demand for express delivery services are increasing. The study indicates that poor customer environment disturbs mostly the time definite shipments and if the customs procedures are supportive enough mostly shipments will tend to ship by air.

Study carried out by Nag (2008) on Trade in Services under the Possible India-EU Trade and Investment Agreement has detail qualitative analysis which was based on a survey and interviews of the industry experts of the India and EU countries. It has also looked in to the possibility of liberalizing the India express industry as it is generating low revenue specially the postal services. Further it has also identified the barriers in the EU market from the Indian companies' perspective and those are high license fee, custom clearance charges, stringent operating cost and the new act of Authorized Economic Operators (AEOs).

There are many literatures can be found which have examines the global express delivery market and, in the research, done by Oxford Economic Forecasting (2005) on the impact of the express delivery industry on the global economy. As per the study high-tech, IT, pharmaceuticals, electronics and financial & business services sectors are the most important client sectors of the global express delivery industry.

2.3 Literature survey on factors affecting CEP/Logistics industry

There is lots of literature which have analyzed the factors affecting logistics and CEP industry.

As per the research of Basarab (2001), has identified that economy and logistics has a strong relevance after analyzing cross sectional data of 42 countries and has recognized the seven explanatory factors of logistics performance of a country including exports of goods and services, imports of goods and services, merchandise trade, industry, value added, services, value added, GNI per capita and GDP growth (annual %). Surprisingly this study has identified that there is a negative

dependency of the GDP growth and the logistics performance of the examined countries. Many poor countries have shown a drastic growth rates due to globalization and the direct foreign investments but that have not impacted to bring better infrastructure and institutions.

In the analysis carried out by Yang (2016) on the demand in china courier industry, it has been identified that total output of primary industry (agriculture), secondary industry (construction and manufacturing), tertiary industry (the service sector), the total investment in fixed assets, the total retail sales of consumer goods, the total export-import volume, and the residents' consumption are impacting the demand for courier industry in china. The study also suggests that the Chinese government could improve the courier industry of the country by investing more in fixed assets and also concluding that domestic market should be given more focus as a result of the correlation between export-import and the courier industry of the country.

There are conceptual frameworks of the logistics performance and the factors affecting to logistics performance which were developed by some experts can be found in the literature.

According to Arvis et al. (2014) and Tongzon and Lee (2016) Logistics Performance (LP) is affected by resources of infrastructure, technology, labor, education, and the institutional quality such as corruption and political stability. The quality of institutions has a strong bearing on competitiveness and growth (Easterly and Levine 1997; Acemoglu, Johnson, and Robinson 2001; Rodrik, Subramanian, and Trebbi 2002; Sala-i-Martin and Subramanian 2003). This study presupposes institutional quality would affect LP. It examined the two most common indicators of institutional quality i.e. corruption perception (CP) and Political Stability. Institutional quality is the main policy implication of the findings. To alleviate the negative effect of corruption and to maintain economic sustainability, governments throughout should strive to enhance the quality of their institutions to further improve LP.

In addition, in the research on the courier service market in Bulgaria, Otsetova & Dudin (2016), has identified the most important criteria for choosing courier provider by individual customers as price, service quality, ability to change the service according to individual requirements and customer needs, ensuring the

security of shipment, quality of information, timeliness & personal contact quality. Further the most important criteria for choosing courier provider by business customers are as timeliness, service quality, ensuring the security of shipments, quality of information, personal contact quality, ability to change the service according to individual requirements & customer needs and finally the price.

In an analysis on air cargo, a strategic tool for development by Kouskouridis (2013) identified that freight rates, world merchandize trade, real exchange rates, macroeconomic and industrial policies, cost and free trade determines the cargo volume. The known correlation between GDP and the world air cargo volume was found to be not applicable in the case of Greece (subjected land area of the research) as a result of the geographical location, export partners and the economic instability.

Moreover research carried out on the Express Delivery Services with regard to competitive conditions facing U.S.-based firms in foreign markets by U.S. International Trade Commission (2004), identified that the international trade of express delivery services is affected by a broad range of issues, including laws and regulations in the areas of freight transportation, cargo handling services, storage and warehousing services, freight agency services, telecommunication services, postal and courier services, and customs clearance.

The Organization for Economic Co-operation and Development (OECD) has developed a Services Trade Restrictiveness Indices (STRIs) for the 36 OECD countries for the postal and courier services and has found that restrictions on foreign entry, barriers to competition, regulatory transparency include custom procedures and licensing procedures can have a huge impact on the courier and postal services of those countries.

2.4 Analytical methods to evaluate the factors affecting CEP/Logistics Industry

There are several analytical methods and tools which can be found frequently in the evidence of the literature and this section of the literature review focuses on the analytical methods that have deployed by different researchers.

In an analysis of the forecast of demand in china courier industry by Yang (2016) Grey Correlation Model has been used to understand the correlation among explanatory variables identified, which are total output of primary industry (agriculture), secondary industry (construction and manufacturing), tertiary industry (the service sector), the total investment in fixed assets, the total retail sales of consumer goods, the total export-import volume, and the residents' consumption. This model also helps to identify the synchronization among those variables. In that analysis linear regression model had also developed to total output of the three main industries of China. In the findings of the research it shows that the courier industry in China will maintain a remarkable growth in the next 5 years from 2016, under three different scenarios; optimistic scenario, negative scenario and normal scenario. Moreover, courier industry will render more service to residents will rely more on the Residents' consumption and the total retail of goods.

Further, partial least squares approach for structural equation modeling (PLS-SEM) analysis was used in the analysis done by Wang, Jie, Abareshi (2015) on measuring business logistics performance in Third-Party Logistics of Australian Courier Firms. When compared with other approaches structural equation modeling is ideal if the sample size is smaller. They have conducted a factor analysis for the logistics performance and found out that the performance of the Australian courier firms can be evaluated by customer satisfaction, on-time and accurate delivery, customer complaints, damaged / lost freight, customer response time, accurate billing/delivery information, frequency of disruptions / delays, reputation in the industry, operating costs.

Analytic Hierarchy Process (AHP) based methodology was employed by Chan and Chan (2006) in their research on benchmarking logistics performance of the postal industry. AHP is a problem-solving framework and flexible, systematic method employed to represent the elements of a complex problem. It is based on the three principles: decomposition, comparative judgment and synthesis of priorities (Korpela and Tuominen, 1996). In the AHP benchmarking, which was developed, has two categories 1) performance measurement & 2) continuous Improvement. Using 1st category, managers can identify the companies AS-IS scenario of the logistics performance and the gap between a best in class company and their company. In the

2nd category, developed AHP model suggests the best practices that can be implemented by the company in order to improve the logistics performance.

Econometric modelling has been used in the analysis done by Basarab (2001) and that is based on linear regression model. Using the regression developed, study has concluded that the international trade and the development of the service sector positively affect the logistics performance of a country. Implementing trade and transport facilitation measures can improve the service sector of a country.

Zhou and Wang (2009) in their research of prediction of regional logistics demand based on multi factor analysis based on radial basis function network have built a multivariate nonlinear prediction model using radial basis function network (RBF network) which proves its accuracy despite sample limits, to predict future demand of logistics in Sichuan province.

In order to predict the logistics demand of Guangdong Province from 2012 to 2015 Liu (2013) used generalized regression neural network (GRNN). GRNN is more suitable for limited and instable sample data.

Degree of competition and concentration of the competitors of the Bulgarian courier market was assessed by Hirschman-Herfindahl Index (HHI) and Concentration ratio (CR) in the research completed by Otsetova & Dudin (2014). By this study they have concluded that the Bulgarian market is relatively competitive market which has a medium to moderate level of concentration.

Multiple regression analysis has deployed using SPSS Air cargo: a strategic tool for development by Kouskouridis (2013), in which it projected the traffic of air cargo of EU countries and predicting that the existing infrastructure could cater the increased volume of traffic without adding new infrastructure.

In the analysis of Air transportation and urban-economic restructuring: competitive advantage in the US Carolinas by Debbage (1999), it has clearly identified that there is a strong relationship between regional economies with the air transportation.

Econometric exercise has been conducted to assess the impact of customs procedures on U.S. exports in the study done by US International Trade Commission on Express Delivery Services: Competitive Conditions Facing U.S.-based Firms in Foreign Markets (2004) and it is based on the gravity model formulation. The model

specifically accounts for non-linear impacts of customs and time-sensitivity variables as a means of assessing differential cross-commodity and cross-country impact.

CHAPTER 03

METHODOLOGY

3.1 Conceptual Framework

Both qualitative and quantitative methods were carried out in order to achieve the objectives of the research. The research methodology used here has divided into three phases; First phase involves the qualitative analysis which has an aim of acquiring knowledge of the operation and structure of air express market and identifying the factors that are impacting the air express industries in the world. This task was achieved as a meta-analysis of the literature review carried out for the research.

In the analysis of explanatory factors of logistics performance of a country, by Gogoneata (2008) has identified that Gross Domestic Product (GDP) is an influential factor that explain the behavior of the logistics performance. Thus, in explaining the air express market behavior, GDP of a country and the rest of the world is considered to an explanatory variable. Explanatory variable is one type of an independent variable and those two terms can be used interchangeably. However, it is not affected by any other variable. But if a variable is not an independent variable, it is called as an explanatory variable. Further in the study different aspects of GDP have identified as explanatory variables such as share of exports of goods and services in Gross Domestic Product (GDP), the share of imports of goods and services in GDP, the share of merchandise trade in GDP, the share of value added by industry in GDP, the share of value added by services in GDP.

Further, in the analysis of the forecast of demand in courier industry in China by Yang (2016) has found that there is a strong correlation between the courier industry performance and the GDP of China. Three broader sectors or industries of China namely; primary industry (agriculture), secondary industry (construction and manufacturing) and tertiary industry (the service sector) have a huge contribution to the national GDP of China.

Hence this study has identified sectorial GDP which includes agriculture, forestry and fishing sector GDP, industries sector GDP and the service sector GDP of Sri Lanka as explanatory/independent variables.

Moreover, the size of the world trade also could have a major impact of the CEP industry as when considering Sri Lanka entire economy is largely based on the imports and export market. Changes in the world GDP can have a huge impact of the economy of Sri Lanka. Therefore, researcher has considered World GDP (excluding Sri Lanka's GDP) as an explanatory/independent variable for the study.

Chan, Lau, and Ip (2006) have found in their analysis of benchmarking logistics performance of the postal industry that the cost of the service plays a vital role when benchmarking logistics performance in the postal industry. In the benchmarking framework they have proposed for postal industry, the study identified that reliability, lead time, convenience, flexibility as parts of the performance evaluation criteria and those can be varied based on the capital inputs a service provider may place to enhance the performance. At the end those cost also counted in when offering the price to the customers.

Therefore, the researcher has taken freight rates (final price of the service offered to the customer) as an explanatory/independent variable. However, when offering the final price/commonly known as the freight rates to the customers, it is well known fact that CEP companies usually include fuel surcharge to the final freight rates to the customers. Fuel surcharge is an additional cost charged by the CEP companies as there are fluctuations in the cost of fuel in the world market. Most of the companies calculate fuel surcharge as a percentage of the base rate charged from the shipper and that is finally added to the freight bill. Therefore the researcher has taken freight rate without the fuel surcharge as an explanatory/independent variable for the analysis.

In addition, it is quite apparent that fuel surcharge has a huge impact on the final rate to the shipper based on which the shipper may decide the mode of transport; the researcher has taken fuel price as an explanatory/independent variable for the study.

In addition to the above, in the report of Economic Impact of Trade Agreements Implemented under Trade Authorities Procedures, (2016), United States

International Trade Commission has clearly mentioned in the case study 9-Express delivery that services supplied by the express delivery companies to partner countries of the U.S trade agreements have increase as it has caused to increase the merchandize trade among partner countries.

Trade agreements of USA and partner countries have taken necessary steps to simplify the customs paper work and raising de minimis levels for low-value shipments. de minimis refers to a maximum value beneath which a shipment may clear customs without the need to pay tariffs, customs fees, and taxes; submit manifest information (i.e., a description of the good that is being brought into a country); or undergo formal customs procedure. Especially small and medium-sized enterprises (SMEs) are hugely benefited by these trade agreements as those are facilitating exports. It was proven with the available data that U.S. trade agreements have led to growth in U.S.-based express delivery services to certain partner countries and to a higher value of U.S. SME exports to partner versus non-partner countries.

Further in the research of The Impact of Services Trade Restrictiveness on Trade Flows First Estimates done by Nordås & Rouzet (2015), it was very clear that that Service Trade Restriction Index (STRI) has a strong negative relationship of the cross-border imports and exports of a country which can be resolved in Preferential Trade Agreements (PTA). Hence import and export volume growth after trade agreements can be considered here as another explanatory/independent variable but as a result of the lack of data it is noe been taken into the quantitative analysis.

Moreover, in the analysis done by Gogoneata on explanatory factors of logistics performance of a country (2008), he has investigated on one of the most important macroeconomic factors and that is the relationship of the merchandize trade to the logistics performance of the country. Further there are many analysis found that volume of the merchandize trade gives a reasonable indication of the logistics performance of the country. Therefore, this research has also considered merchandised trade of Sri Lanka as an explanatory/ independent variable. In the current context none of the global air express companies including FedEx, DHL, TNT, UPS & etc. are not operating their freighters to and from Sri Lanka. Hence all the service providers are using commercial flights to transport the cargo to a nearest/convenient hub of their companies and then from the hub freighters of their

companies transport the goods to the destination airport. Thus, the CEP industry performance would have a greater impact if the number of commercial flights operating from Sri Lanka or to Sri Lanka changes. This study has considered number of commercial flights operated during the study period considered as an explanatory/independent variable.

Similarly, Phase two involved in an analysis of the depended variables such as total volume in Kgs (inbound & outbound), total volume in AWB wise (inbound & outbound) and the total revenue (\$) of Air express market related data. Third phase comprises of mathematical studies to identify the parameters influencing the air express market in Sri Lanka.

3.2 Data Collection

For this empirical analysis, all the collected data is time series data. In order to complete the quantitative analysis, data of the all dependent variables from 2015 to 2018 such as the air express market performance including total volume in Kilos (inbound and outbound) total volume in Air Way Bill (AWB) wise and the total value or the revenue in dollar value were collected from the published data of the Association of Air Express Companies in Sri Lanka. And for the independent variables which are considered in the in the model developed in the study, data collected using following mentioned sources.

Sectorial GDP data were collected from the central bank annual reports and the information published by the census and statistics department of Sri Lanka for the mentioned period. Total merchandise trade volume data were collected from the central bank annual reports. Since the researcher is directly dealing with the pricing aspect of air express industry, average freight rates were collected considering competitor freight rates like DHL and UPS. Further average freight rates were taken without fuel surcharge charged by the service providers.

Data of the fuel surcharge was taken from the World Bank reports and nominal exchange rate, US dollar value to Sri Lanka rupee value was taken from the central bank statistics. Trade volume fluctuations after trade agreement signed during 2015 to 2018 were also taken from the central bank report. Finally, for the airline

network limitations, number of commercial flights departed and arrived from and to Sri Lanka data was taken from the airport & aviation authority.

3.3 Descriptive Statistics and Econometric Modelling

As mentioned in the third phase, econometric modelling was carried out in order to achieve the research objectives. The OLS based linear regression model has the following specifications.

$$\begin{aligned} \Sigma Weightout_{ij} &= \alpha_0 + \beta_1 ACSGDP_i + \beta_2 ISGDP_i + \beta_3 SVSGDP_i + \beta_4 EXR_i + \beta_5 BP_i \\ &+ \beta_6 WGDP_i + \beta_7 MTV_i + \beta_8 FR_i + \beta_9 ACM_i + \varepsilon \end{aligned}$$

$$\begin{aligned} \Sigma AWBout_{ij} &= \alpha_0 + \beta_1 ACSGDP_i + \beta_2 ISGDP_i + \beta_3 SVSGDP_i + \beta_4 EXR_i + \beta_5 BP_i \\ &+ \beta_6 WGDP_i + \beta_7 MTV_i + \beta_8 FR_i + \beta_9 ACM_i + \varepsilon \end{aligned}$$

$$\begin{aligned} \Sigma TRout_{ij} &= \alpha_0 + \beta_1 ACSGDP_i + \beta_2 ISGDP_i + \beta_3 SVSGDP_i + \beta_4 EXR_i + \beta_5 BP_i \\ &+ \beta_6 WGDP_i + \beta_7 MTV_i + \beta_8 FR_i + \beta_9 ACM_i + \varepsilon \end{aligned}$$

$$\begin{aligned} \Sigma TVINweight_{ij} &= \alpha_0 + \beta_1 ACSGDP_i + \beta_2 ISGDP_i + \beta_3 SVSGDP_i + \beta_4 EXR_i + \beta_5 BP_i \\ &+ \beta_6 WGDP_i + \beta_7 MTV_i + \beta_8 FR_i + \beta_9 ACM_i + \varepsilon \end{aligned}$$

$$\begin{aligned} \Sigma AWBin_{ij} &= \alpha_0 + \beta_1 ACSGDP_i + \beta_2 ISGDP_i + \beta_3 SVSGDP_i + \beta_4 EXR_i + \beta_5 BP_i \\ &+ \beta_6 WGDP_i + \beta_7 MTV_i + \beta_8 FR_i + \beta_9 ACM_i + \varepsilon \end{aligned}$$

$$\begin{aligned} \Sigma TR in_{ij} &= \alpha_0 + \beta_1 ACSGDP_i + \beta_2 ISGDP_i + \beta_3 SVSGDP_i + \beta_4 EXR_i + \beta_5 BP_i \\ &+ \beta_6 WGDP_i + \beta_7 MTV_i + \beta_8 FR_i + \beta_9 ACM_i + \varepsilon \end{aligned}$$

Where:

Dependent variables:

$\Sigma TVIN_{ij}$ = Sum of Total inbound volume in Kgs to and from ij OD pairs

$\Sigma TVOUT_{ij}$ = Sum of Total outbound volume in Kgs to and from ij OD pairs

$\sum AWBoutij$ = Total volume in outbound AWB to and from ij OD pairs

$\sum AWBinij$ = Total volume in inbound AWB to and from ij OD pairs

$\sum TRinij$ = Total inbound revenue (\$) of the entire air express market to and from ij OD pairs

$\sum TRoutij$ = Total outbound revenue (\$) of the entire air express market to and from ij OD pairs

Explanatory variables:

$(AGSGDP)_i$ = Agriculture Sector Gross Domestic Product of Sri Lanka

$(INSGDP)_i$ = Industrial Sector Gross Domestic Product of Sri Lanka

$(SVSGDP)_i$ = Service Sector Gross Domestic Product of Sri Lanka

$(EXR)_i$ = Exchange Rate (Sri Lankan Rupee to US Dollar)

$(BP)_i$ = Bunker Price

$(WGDP)_i$ = World GDP without SL GDP

$(MTV)_i$ = Merchandize trade volume in Sri Lanka

$(FR)_i$ = Freight Rate

$(ACM)_i$ = Number of Air craft movements in Bandaranayke International Airport

Where all three sectoral GDP values are in LKR Billion, Exchange rate is in Rupee value, BP will be in USD per barrel terms, World GDP is in USD Billion, and total merchandize trade is in LKR Billion, freight rates are in USD terms. Further $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ are called parameters and ε is known as the error term.

Econometrics can be defined as an application of mathematical statistics to economic data which supports to model an actual situation in a mathematical environment where the data is observational and not experimental. Regression analysis is one of the most commonly use and important statistical techniques for business applications which helps estimate the strength and direction of the relationship between two or more variables. Validity of a relationship between two variables or among more variables can also be checked using the regression results.

The two primary uses for regression in business are forecasting and optimization. In addition to helping managers predict such things as future demand for their products, regression analysis helps fine-tune manufacturing and delivery processes.

Besides, for the quantitative analysis, econometric modeling would be used to identify the parameters and multiple regression analysis would be used to achieve the econometric modelling. Regression analysis is concerned with describing and evaluating the relationship between a given variable (usually known as dependent variable) and one or more other variables (usually called independent variable(s)). The objective of this method is to find out the regression line that best fits the data points.

Anatomy of the econometric modelling has four sections after the data collection is done which includes 1) estimation of the econometric modelling in which it is possible to identify the numerical estimates of the parameters which give the empirical content of the function laid out. 2) Hypothesis testing; after developing the model assuming that the developed model is reasonably represent the realistic situation, it was to found that whether the estimates obtained were in accordance with the expectation of the theory that was tested. 3) Forecasting or prediction; when the hypothesis or theories that are tested are not rejected by the Hypothesis testing it can be used to predict the future performance of the tested scenario and conclusively, 4) the use the model for policy purposes.

This study is primarily concerned with a linear regression model. First, it was verified that the relationships of the independent and dependent variables are linear. Scatter diagrams were created in order to determine if the linear relationships exist between variables. Then the best fitting lines of the variables were found using excel trend line tool and this best-fitting regression line is called least-squares regression. Further least square coefficients were found and Analysis of the Variance (ANOVA) was conducted. F-Test was done to determine whether the variance is significantly greater. Then the hypotheses were tested for regression coefficients. The hypotheses are tested under the confidence interval approach and the test of significance approach

with the 95% [(1- α) %] of confidence. Consequently, all these calculations would be done using SPSS/MS Excel which is well recognized regression software package.

It is the method of OLS that would be used extensively in the regression analysis here because it is intuitively appealing and mathematically much simpler than the method of maximum likelihood even though two methods generally give similar results in the linear regression context.

Statistical hypothesis testing has two branches namely Point estimation & Interval estimation. As a result of the sampling fluctuations, the reliability of point estimation is less. Therefore, the study used interval estimation which comprises of two mutually complementary approaches for devising rules namely Confidence interval approach & Test of significance approach for deciding whether to reject or not reject the hypothesis. Since the decision whether to reject or not reject is depend critically on α , the level of significance, the study chose α as 5% because it is commonly fixed at 1, 5, or 10 percent.

CHAPTER 04

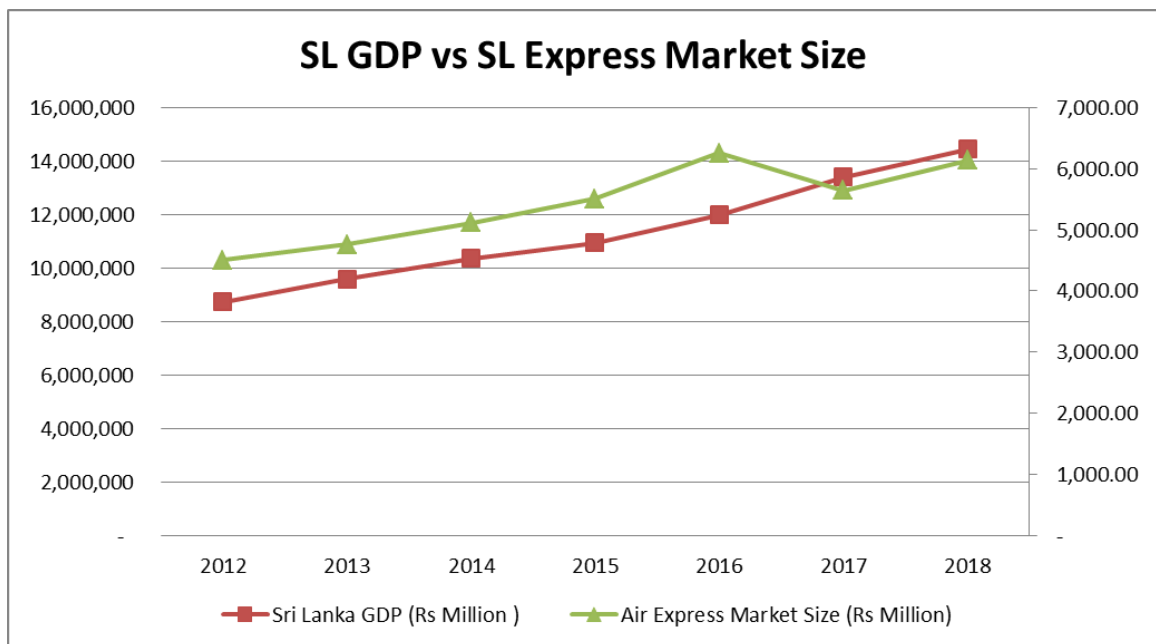
ANALYSIS RESULTS

4.1 Descriptive Analysis

In this section of the research, independent variables are discussed and examine the relationship descriptively.

4. 1.1 Gross Domestic Product

Gross Domestic Product is also known as GDP. It can be defined as the accumulated value of all finished goods and services in a country. It is vital to understand how the air express market performance varies with the GDP of the country.



The data is based on the base year 2010 GDP estimates.

Sources: Department of Census & Statistics & SLAAEC

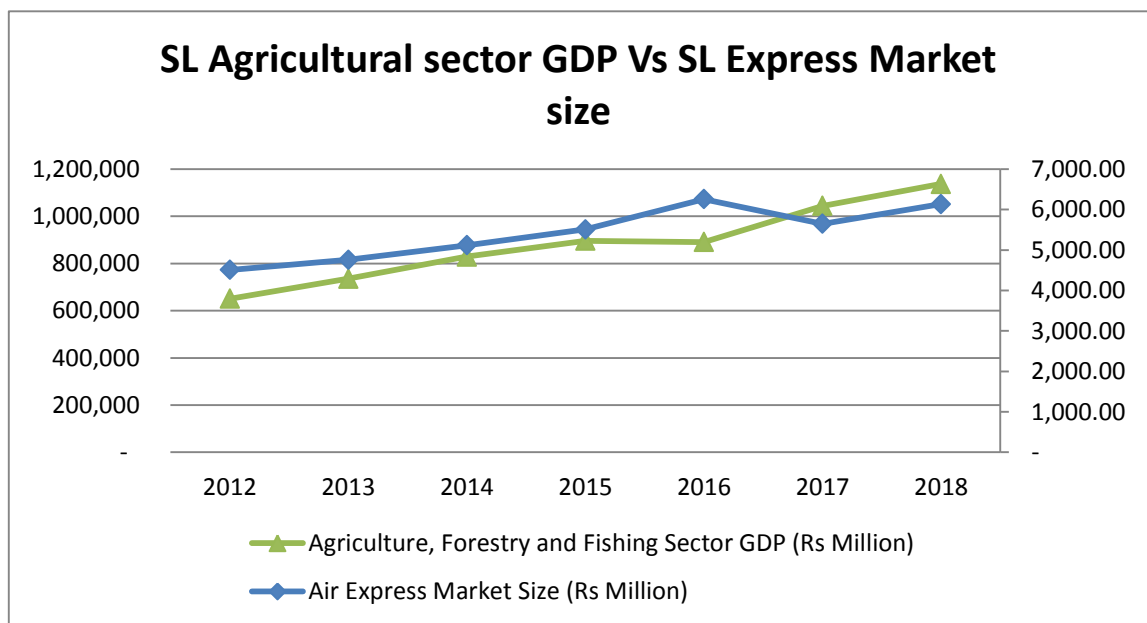
Figure 4.1: The relationship between Gross Domestic Product of Sri Lanka and CEP market size

GDP of Sri Lanka is in an upward trend and there is increasing growth rate of GDP can be seen in the Figure 4.1. In addition, Air express market size is also in an increasing trend despite the fact that there is a slight decrease in the 2017 market performance. Even though the air express industry in Sri Lanka is a small part of the county's GDP, it has been growing rapidly. When considering without the effect of the inflation, express market has been achieving average of 6% market growth year on year.

4. 1.2 Sectorial GDP- Agriculture, forestry and fishing sector GDP, Industries sector GDP and the service sector GDP

Sectoral GDPs of Sri Lanka are also considered in the study as independent variables as one of the objectives of the research is to identify the market structure of the air express market in Sri Lanka.

4. 1.3 Agriculture, forestry and fishing sector GDP



The data is based on the base year 2010 GDP estimates

Sources: Department of Census & Statistics & SLAAEC

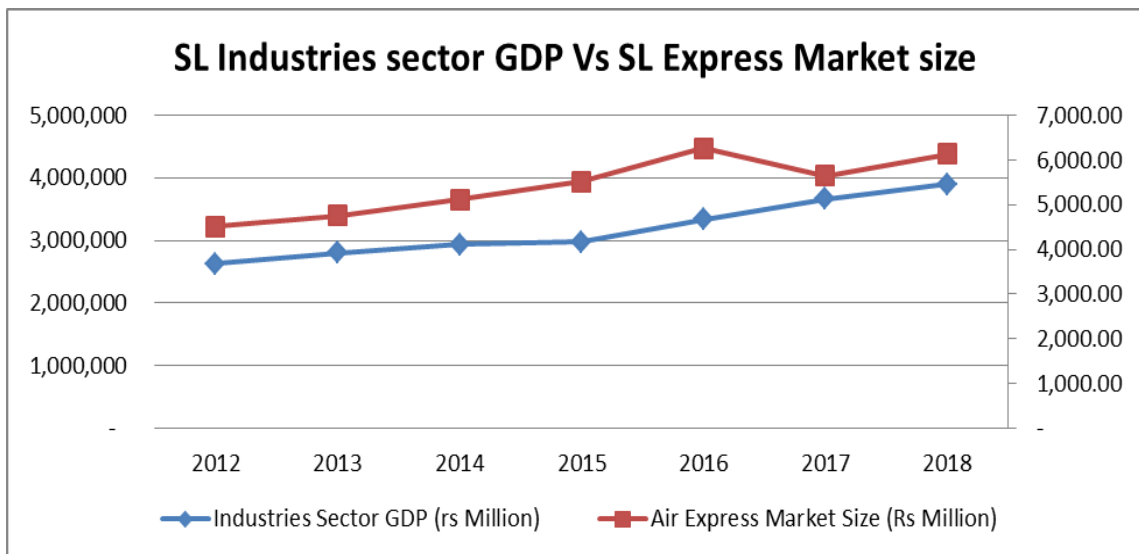
Figure 4.2: The relationship between Agriculture, forestry and fishing sector GDP of Sri Lanka and CEP market size

Agriculture can be considered as one of the main contributor of the Sri Lanka's economy as it is being the main livelihood of the majority of the people but least contributing sector to the economy as it is only contributing 7 percent to the economy.

Agriculture, forestry and fishing sector experiencing an increasing trend from 2012 as a result of substantial recovery in growing of rice, vegetables and cereals and with the positive contributions from growing of fruits, animal production, fishing, growing of spices, and forestry and logging(Central Bank Reports). Even though there is a small reduction in the market performance in 2017, both parameters are in an upturn trend.

4. 1.4 Industries Sector GDP

Industries sector GDP includes all the value added activities including food and beverages, textiles, wearing apparels and construction.



The data is based on the base year 2010 GDP estimates

Sources: Department of Census & Statistics & SLAAEC

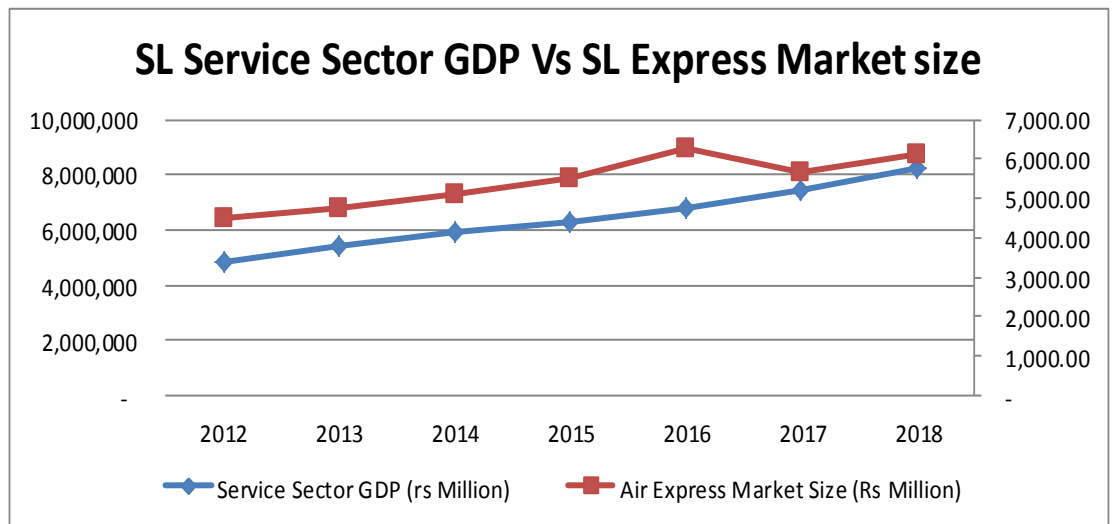
Figure 4.3: The relationship between Industries sector GDP of Sri Lanka and CEP market size

Industries sectoral GDP contributes around 30 percent to the National GDP and as per the Central bank of Sri Lanka; largest portion is coming from manufacturing businesses which accounts nearly 17 percent.

Manufacturing companies in Sri Lanka use air express services extensively to send mostly the samples of the manufacturing items and stocks of the urgent orders. Sri Lanka is one of the attractive apparel manufacturing countries in the world due to cheap labor and the quality of the work. Express delivery services are used to send almost all the samples to the multinational clients in different countries and urgent orders are also send via express delivery because of the limited lead times of the supply chains. But urgent bulk order quantities are send using express delivery and not as air freight since air freight cargo is only provide port to port delivery whereas express delivery provides door to door services to the customers. Further most of machinery spare parts are receiving as express cargo due to the urgency.

4. 1.5 Service Sector GDP

Service sector is the largest sector in the Sri Lankan Economy which represents nearly 61% of the Sri Lanka economy.



The data is based on the base year 2010 GDP estimates

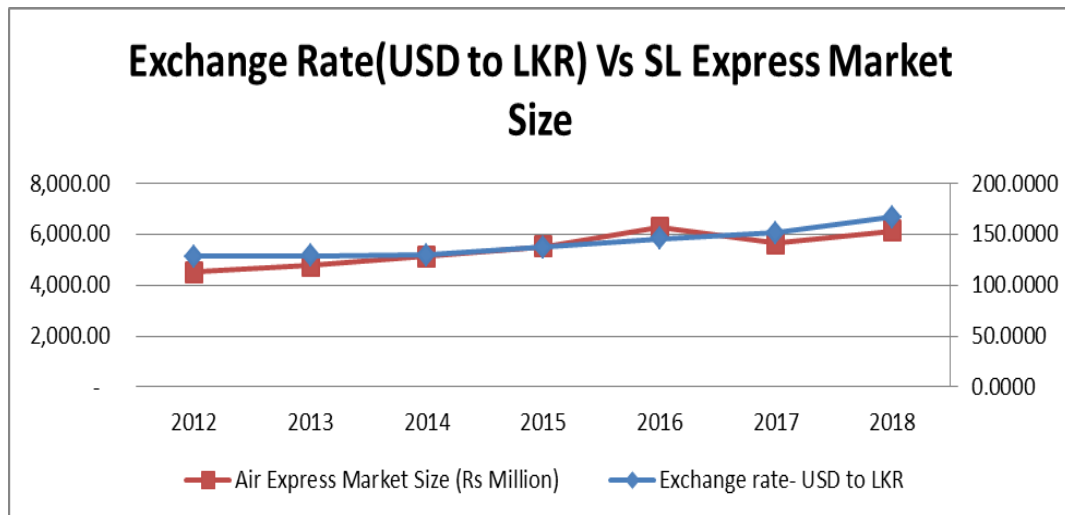
Sources: Department of Census & Statistics & SLAAEC

Figure 4.4: The relationship between service sector GDP of Sri Lanka and CEP market size

This growth of the service sector over the years was primarily supported by the continuous expansion in financial services, wholesale and retail trade activities and other personal services activities. Further, real estate, transportation, accommodation, insurance, telecommunication, professional services, human health activities, and education services also contributed positively to the expansion in Services activities (Central Bank of Sri Lanka Reports).

4.1.6 Exchange Rate

Since air express market is operated as an international service, every transaction is done using US dollar. Hence foreign currency fluctuations can be highly impacted to the number of transaction done and thereby the entire market performance



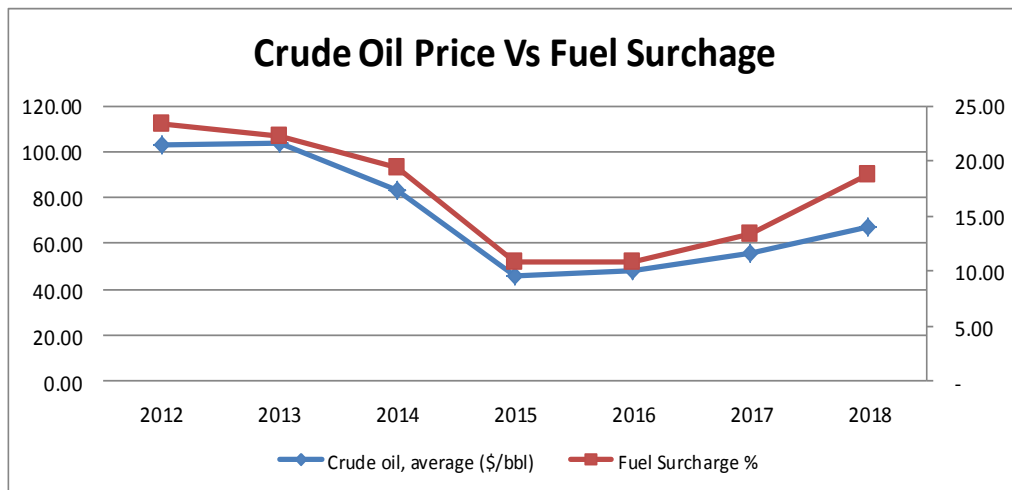
Sources: Central Bank & SLAAEC

Figure 4.5: The relationship between exchange rate and CEP market size

But in the above graph, depreciation of the LKR over the years seems not having an impact on the air express market performance.

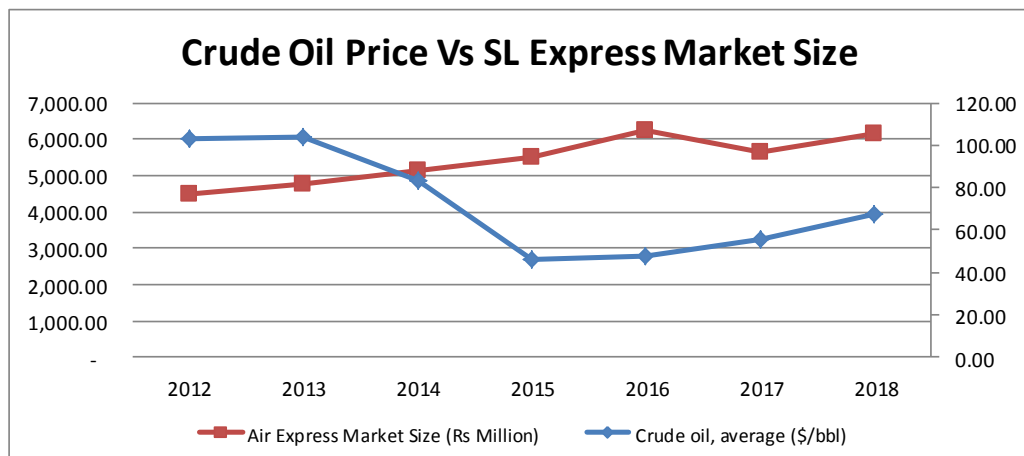
4. 1.7 Fuel Surcharge

Since all the air express cargo is transported as air cargo, some percentage of the base freight rate are charged by the service providers from the customers as fuel surcharge. Fuel surcharge, percentage of the freight rate is decided by the Association of the Air Express companies in Sri Lanka (SLAAEC)



Source: World Bank Commodity Price Data (The Pink Sheet) & SLAAEC
Figure 4.6: The relationship between crude oil prices and fuel surcharge

Average crude oil prices have calculated considering the Brent, Dubai and WTI crude oil prices. As per the data, it can be concluded that according to the oil prices in the global market, fuel surcharge percentages have decided by the SLAAEC



Source: World Bank Commodity Price Data (The Pink Sheet) & SLAAEC

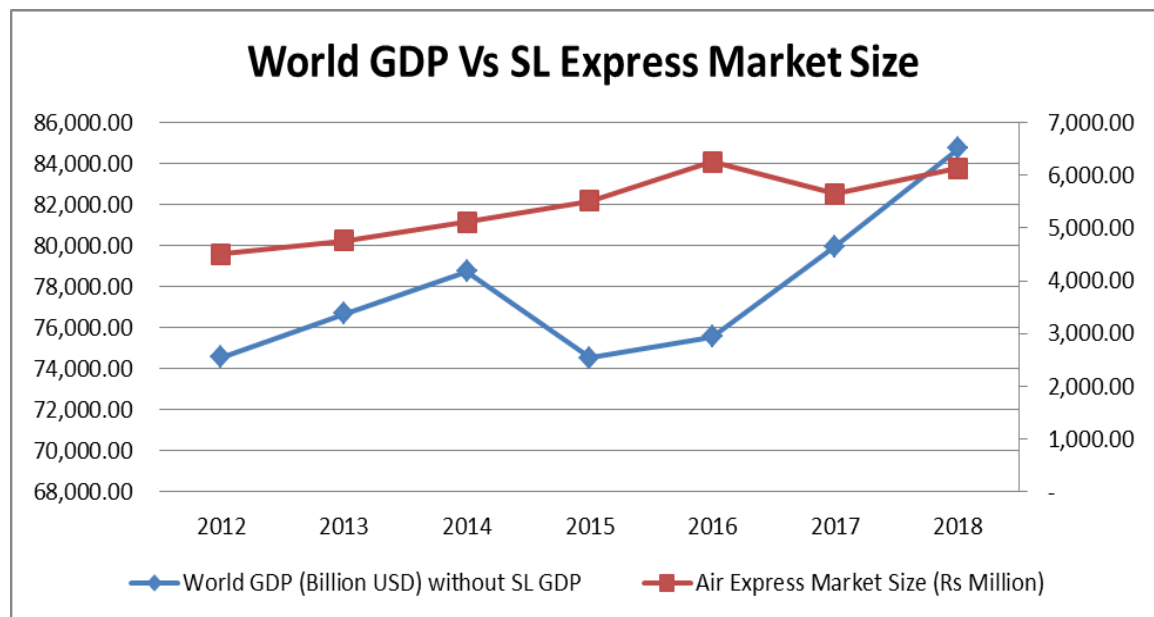
Figure 4.7: The relationship between crude oil prices and CEP market size

As per the above graph, it is clear that there is an inverse relationship between world crude oil prices and the air express market performance of Sri Lanka

4.1.8 World GDP without Sri Lanka GDP

Since the air express market serves the international market, it is important to understand how the global production affects the express market in Sri Lanka. Hence GDP of Sri Lanka should be excluded from the world GDP, as it has a correlation between the express market and the GDP of Sri Lanka.

There is a drop in the world GDP in 2015 and 2016, but it has come up to the same phase in 2017. Further world GDP is in an upward trend same as air express market performance in Sri Lanka



Source World Bank reports

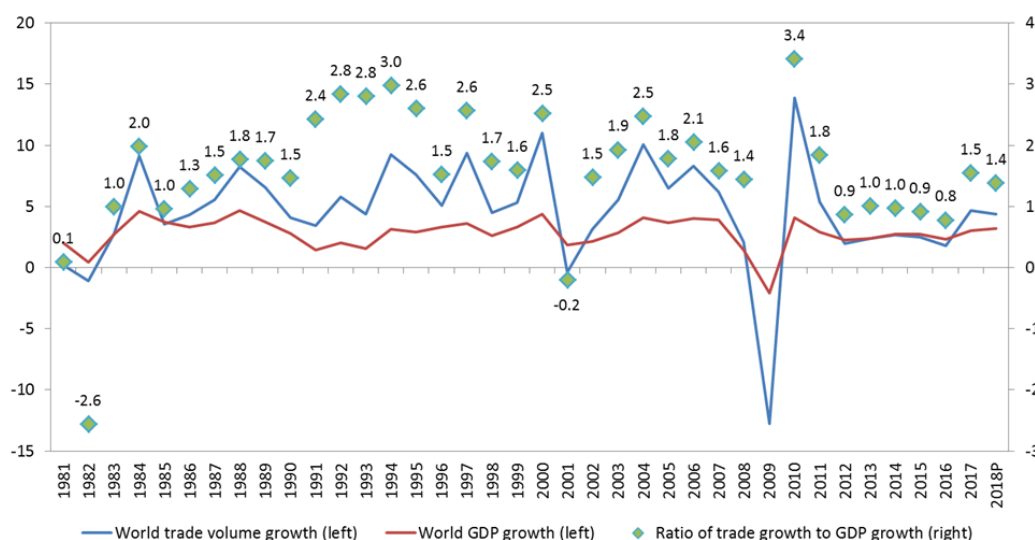
Figure 4.8: The relationship between world GDP and CEP market size

4.1.9 International Trade Volume

International trade performance is one of the key factors of the economic growth of a country. Over the years it was evident that countries that have experienced a healthy and fast economic growth have had excellent international trade performances.

Gradual removal of the barriers to international trade by different trade agreements with trade concessions, Globalization which has enable any country to market their products and services internationally and have expanded the market reach, Increased specialization which encourage countries to focus on their competitive advantages, Global communications which enables countries and companies to market their products using different communication platforms like, internet & etc. are the factors that boost the international trade (OEF 2005).

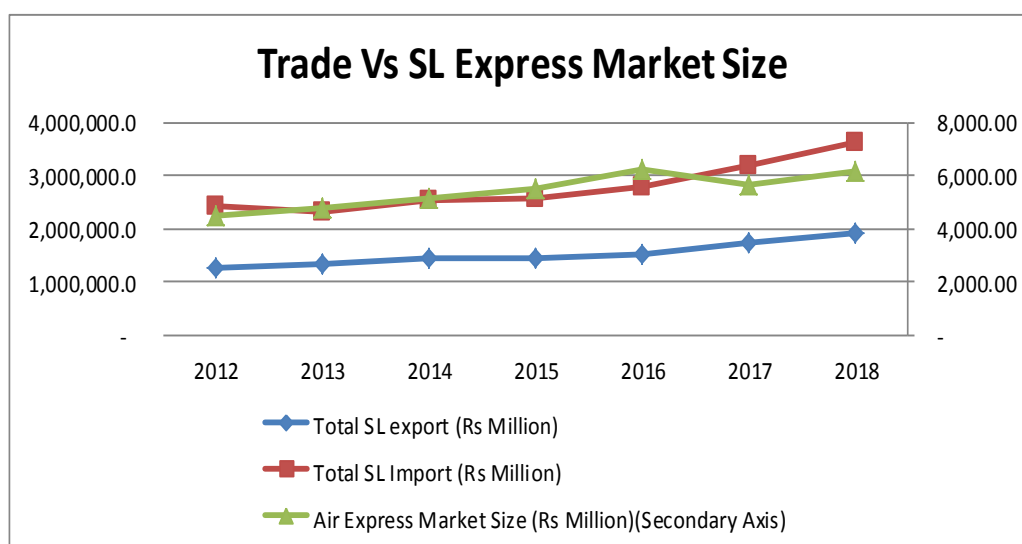
In the below graph, it is clear that whenever there is a decrease in world trade volume growth, there is a decrease in the world GDP growth. When looking at the country level data it can be found that the countries with higher rates of GDP growth also tend to have higher rates of growth in trade as a share of output.



Source: WTO and UNCTAD for trade, consensus estimates for GDP

Figure 4.9: The relationship between world trade volume growth and the world GDP growth

Hence global economy is highly reliable on the trade, therefore countries have to highly be dependent on a efficient and reliable transport modes and mediums which bring them speed, reliability and required destinations served. The express delivery companies are able to connect 90% of world GDP within 24-48 hours (OEF 2005).



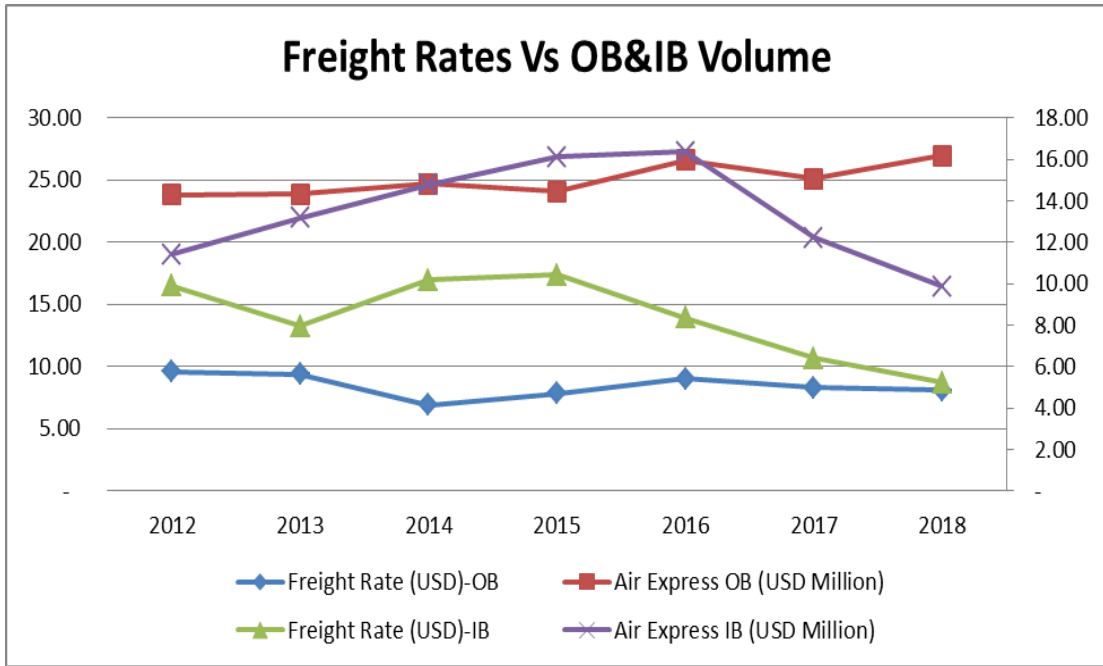
Source: Department of Census & Statistics

Figure 4.10: The relationship between trade volume and CEP market size

According to the above Figure xx, import and export volumes have grown up over the years and air express market performance has also increased. Therefore it is safe to assume that when trade volumes are increasing air express market volumes are also growing.

4.1.10 Freight Rate

Price is considered to be one of the main decisive factor when it comes to every transaction. Right price for the product or service decides the wayforward of the company as volume of the shipments.



Source: Competitor Freight rates and SLAAEC

Figure 4.11: The relationship between freight rates and Ob & IB Volume

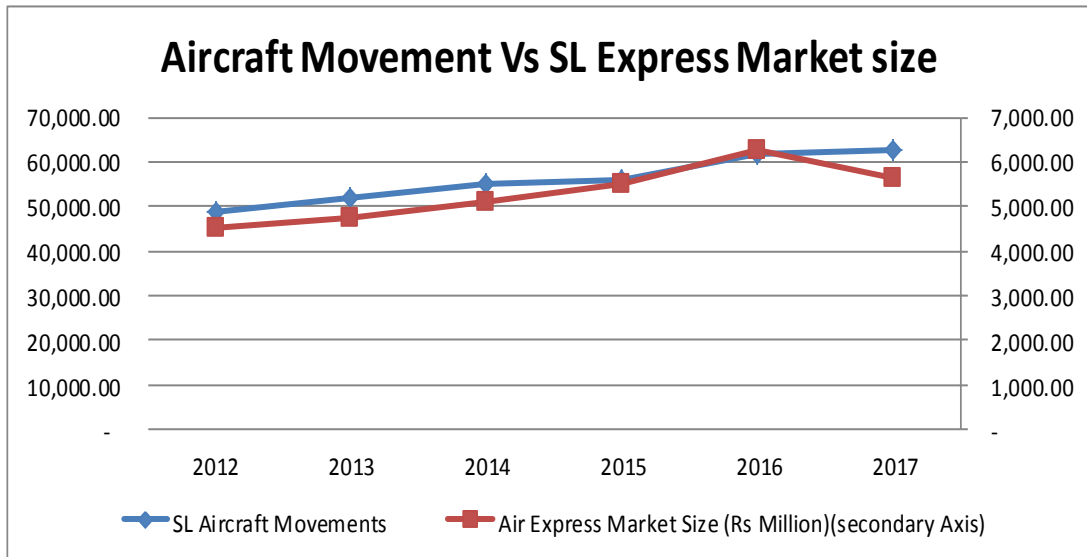
Outbound and inbound volume changes in the same trends of the freight rates of outbound and inbound. Therefore it is safe to assume that the freight rate is one of the decisive factors of the air express market performance in Sri Lanka.

4.1.11 Aircraft Movements

All the international express companies operating in Sri Lanka are either agents or in the form of joint ventures. Further compared to other markets like India, Singapore, Hong Kong, Sri Lanka is considered to be one of the smallest air express market in the world. Therefore operating principles freighters to Sri Lanka is considering as a non-profitable business. Commercial aircrafts are used to transport express cargo to the principles' hubs by the service providers (eg Hong Kong, China, Singapore) where their freighters come for loading the cargo and from the hub principles' freighters take the cargo to the destination airport.

Hence if the commercial aircraft movements are limited then that can have an impact to the transportation of the goods which will definitely cause to affect the express market performance.

Following graph shows the air craft movements and the market performance



Source: Annual Reports, Civil Aviation Authority & SLAAEC

Figure 4.12: The relationship between air craft movements and express market size

4.2 Multiple regression analysis

Quantitative analysis of factors affecting CEP industry was carried out for both Inbound and outbound air express volume in Sri Lanka. In the analysis of inbound and outbound volumes, inbound and outbound freight rates are considered respectively. Following formulas are considered for regression analysis. OB1, OB2, and OB3 are for the outbound volume and IB1, IB2 and IB3 formulas are for the inbound volume.

All the independent variables data collected were converted in to LOG values so that in the results it can be observed that how much of percentage change impact can have on the air express volume can be happened by the percentage change in the

independent variables. In essence, the regression model estimates the elasticity of CEP market volume of each independent variable. The Table 4.1 and 4.2 below presents all the regression output results for outbound and inbound volume.

Table 4.1; regression result output matrix for outbound

Model	R Square	Intercept	AGSGDP	INSGDP	SVSGDP	EXR	BP	WGDP	MTV (Export)	FR(OB)	ACM
OB1	0.5151	**17.7457	(0.2011)	*0.5517	(0.0748)	0.6628	0.1203	(1.0851)	0.3626	**0.4165	(0.6675)
OB2	0.7120	**38.2558	(0.5386)	0.0386	0.3202	0.4842	(0.0971)	(2.0831)	(0.0114)	**0.4023	(0.6642)
OB3	0.4500	9.7172	**0.4586	(0.0249)	0.4431	(0.3374)	0.0072	0.1725	0.2302	(0.0433)	0.3396

***- Significance at 1%, **-Significance at 5%, *- Significance at 10%

Table 4.2; regression result output matrix for inbound

Model	R Square	Intercept	AGSGDP	INSGDP	SVSGDP	EXR	BP	WGDP	MTV (Import)	FR(IB)	ACM
IB1	0.7216	4.2362	*-1.2120	0.0104	**3.6684	(0.6418)	(0.2958)	0.0049	**1.5820	0.3127	(0.5545)
IB2	0.6934	9.0155	**1.3858	(0.0111)	**3.3747	(0.7414)	(0.3062)	(0.5762)	*-1.27565	*0.3695	(0.3340)
IB3	0.7160	20.2052	**1.6417	0.0137	**3.6369	(0.2717)	(0.1299)	(1.0137)	**1.8818	*0.3237	(0.0969)

***- Significance at 1%, **-Significance at 5%, *- Significance at 10%

4.2.1 Regression analysis for outbound volume

For the outbound volume, initially three regression summary output were taken; 1st model is Outbound volume in Kg as dependent variable, 2nd model is AWBs as dependent variable, and 3rd model is Outbound revenue in dollars as dependent variable.

4.2.1.1 Regression analysis output: Summary Output model OB1: Outbound volume in Kg as dependent variable (Appendix A)

Multiple R-Strength of a linear relationship between two variables is measured by the Correlation Coefficient and it can be any value between -1. Relationship strength is indicated by the absolute value and the larger the absolute value, the stronger the relationship.

If the Multiple R value is 1, it means a strong positive relationship and if it is -1 it means a strong negative relationship. 0 means no relationship at all. In the summary output (Appendix A), multiple R is 0.717 and it indicates that there is positive good relationship between variables.

R Square is the Coefficient of Determination, which can be used as an indicator of the goodness of fit. It shows how many points fall on the regression line. The R^2 value is calculated from the total sum of squares, more accurately; it is the sum of the squared deviations of the original data from the mean. As per the output model OB1 (Appendix A), 51.5% of the data points fall on the regression line. Simply 51.5 % of the dependent variables (y-values) are explained by the independent variables (x-values).

Adjusted R square is a statistic that modifies the value of R^2 by incorporating the sample size and the number of explanatory variables in the model and used for multiple regressions; the value is 0.27 which is very low. It does not give the actual present of variation explained by the model as R^2 does.

Thus, for 9df, the probability of obtaining a t value of- 0.7160 or greater is 0.44831 and the probability of obtaining a t value of 2.064 or greater is 0.0537. Also, the probability of obtaining a t value of -0.1514 or greater is 0.8812 and the probability of obtaining a t value of 1.7078 or greater is 0.1048. It can explain as that for all the independent variables.

The value of the $\beta_2 = -0.2011$ is the partial regression coefficient of AGSGDP and implies that with the influence of other independent variables held constant, as AGSGDP increases in 1 percent on average, air express volume decreases by 20.11 percent. The coefficient 0.5517 indicates that holding the influence of other independent variables constant; on average the express volume increases by 55 percent when the INSGDP increases by 1 percent on average. Further the coefficient -0.0747 tells that with the influence of other variables held constant, as express volume decreases by 7.47 percent, on average SVSGDP goes up by 1 percent. Further when the influence of other independent variables held constant, as EXR increases in 1 percent on average, air express volume increases by 66.27 percent. If the influence of

other independent variables held constant, as BP increases in 1 percent on average, air express volume increases by 12.02 percent. When other variables set constant, as WGDP increases in 1 percent on average, air express volume decreases by 108 percent. The coefficient 0.3626 indicates that holding the influence of other independent variables constant; on average the express volume increases by 36.26 percent when the MTV increases by 1 percent. The coefficient -0.4165 indicates that holding the influence of other independent variables constant, on average the express volume decreases by 41.65 percent when the FR increases by 1 percent. Finally, the coefficient -0.6675 indicates that holding the influence of other independent variables constant; on average the express volume decreases by 66.75 percent when the ACM increases by 1 percent.

The intercept value is 17.7457 means that, if the values of independent variables were fixed at zero, the mean express volume would be about 17.74 percent. The R^2 value of about 0.5150 means that, about 51.5 percent of the variance in express volume is explained by the variance in independent variables mentioned.

4.2.1.2 Hypothesis testing of multiple regression coefficients for model OB1 (Appendix A)

It can be used the t test to test a hypothesis about $\beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$ which are the partial regression coefficients of independent variables mentioned respectively. For multiple linear regressions ANOVA tests of significance of the entire model. That is, it computes an F -statistic for testing the hypotheses.

If postulate that, $H_0 : \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$ and $H_1 : \text{at least one } \beta_j \neq 0$ then, the null hypothesis states that, no linear relationship exists between the dependent and any of the independent variables whereas the alternative hypothesis states that the dependent variable has a linear relationship with at least one independent variable. If the null hypothesis is rejected, it cannot be concluded that a relationship exists with every independent variable individually.

From the ANOVA section it can be tested for significance of regression. At a 5% significance level null hypothesis cannot be rejected as *Significance F* is 0.0830

which is greater than 0.05. Therefore, it can be concluded that there is no linear relationship exists between the dependent and any of the independent variables in the regression model.

Among the independent variables, FR (OB) is only statistically significant at the 5% significance level.

4.1.2.3 Regression analysis output: Summary Output model OB2- Outbound volume in AWBs as dependent variable (Appendix B)

In the OB2 (Appendix B) regression model, number of Air Way Bill is considered as the dependent variable.

In the above output (Appendix B), Multiple R is 0.843 and it indicates that there is positive strong relationship between variables. R Square value is 0.712 and 71.2% of the data points fall on the regression line. Simply 71.2% of the dependent variables (y-values) are explained by the independent variables (x-values).

Adjusted R square value is 0.568 which is moderate. It does not give the actual present of variation explained by the model as R^2 does.

Thus, for 9df, the probability of obtaining a t value of -1.2617 or greater is 0.2231 and the probability of obtaining a t value of 0.0947 or greater is 0.9255. Also, the probability of obtaining a t value of 0.4253 or greater is 0.6756 and the probability of obtaining a t value of 0.8339 or greater is 0.4152. It can explain as that for all the independent variables.

The value of the $\beta_2 = -0.5386$ is the partial regression coefficient of AGSGDP and implies that with the influence of other independent variables held constant, as AGSGDP increases in 1 percent on average, air express volume decreases by 53.86 percent. The coefficient 0.0385 indicates that holding the influence of other independent variables constant; on average the express volume increases by 3.8 percent when the INSGDP increases by 1 percent on average. Further the coefficient 0.3201 tells that with the influence of other variables held constant, as express volume decreases by 32.01 percent, on average SVSGDP goes up by 1 percent. Further when

the influence of other independent variables held constant, as EXR increases in 1 percent on average, air express AWB volume increases by 48.41 percent. If the influence of other independent variables held constant, as BP increases in 1 percent on average, air express volume decreases by 9.7 percent. When other variables set constant, as WGDP increases in 1 percent on average, air express volume decreases by 208 percent. The coefficient -0.0114 indicates that holding the influence of other independent variables constant; on average the express volume decreases by 1.14 percent when the MTV increases by 1 percent. The coefficient -0.4023 indicates that holding the influence of other independent variables constant, on average the express volume decreases by 40.23 percent when the FR increases by 1 percent. Finally the coefficient -0.6642 indicates that holding the influence of other independent variables constant; on average the express volume decreases by 66.42 percent when the ACM increases by 1 percent.

The R^2 value of about 0.712 means that, about 71.2 percent of the variance in express volume is explained by the variance in independent variables mentioned.

4.1.2.4 Hypothesis testing of multiple regression coefficients for the model OB2 (Appendix B)

If postulate that, $H_0 : \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$ and $H_1 : \text{at least one } \beta_j \neq 0$ then, the null hypothesis states that, no linear relationship exists between the dependent and any of the independent variables whereas the alternative hypothesis states that the dependent variable has a linear relationship with at least one independent variable. If the null hypothesis is rejected, it cannot be concluded that a relationship exists with every independent variable individually.

From the ANOVA section it can be tested for significance of regression. At a 5% significance level null hypothesis can be rejected as *Significance F* 0.001942 is less than 0.05. Therefore it can be concluded that there is linear relationship exists between the dependent and any of the independent variables in the regression model.

4.1.2.5 Regression analysis output: Summary Output model OB3 (Appendix C) - Outbound revenue as dependent variable

In the model OB3, dependent variable is total revenue generated by the air express market and (Appendix C) shows the regression output for the same.

In the summary output of OB3, Multiple R is 0.6708 and it indicates that there is positive strong relationship between variables. R Square value is 0.458 and 45.8 percent of the data points fall on the regression line. In other words 45.8 percent of the dependent variables (y-values) are explained by the independent variables (x-values).

Adjusted R square value is 0.1750 which is low. It does not give the actual present of variation explained by the model as R^2 does.

Thus for 9df, the probability of obtaining a t value of -1.784 or greater is 0.0912 and the probability of obtaining a t value of -0.1014 or greater is 0.9203. Also the probability of obtaining a t value of 0.9775 or greater is 0.3412 and the probability of obtaining a t value of -0.9650 or greater is 0.3472. It can explain as that for all the independent variables. Summary output for model OB3 can also be explained as previously explained.

4.1.2.6 Hypothesis testing of multiple regression coefficients for the model OB3 (Appendix C)

If postulate that, $H_0 : \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$ and $H_1 : \text{at least one } \beta_j \neq 0$ then, the null hypothesis states that, no linear relationship exists between the dependent and any of the independent variables whereas the alternative hypothesis states that the dependent variable has a linear relationship with at least one independent variable. If the null hypothesis is rejected, it cannot be concluded that a relationship exists with every independent variable individually.

From the ANOVA section it can be tested for significance of regression. At a 5% significance level null hypothesis cannot be rejected as *Significance F* 0.1785 is greater than 0.05. Therefore it can be concluded that there is no linear relationship

exists between the dependent and any of the independent variables in the regression model

4.2.2 Regression analysis for inbound volume

Regression analyses were done for the IB1; IB2 and IB3 regression equations for inbound volume of air express market in Sri Lanka

4.2.2.1 Regression analysis output: Summary Output model IB1 (Appendix D) -Inbound volume in Kg as dependent variable

Now in this summary output in the (Appendix D), Multiple R is 0.8494 and it indicates that there is positive strong relationship between variables. R Square value is 0.7216 and 72.16 percent of the data points fall on the regression line.

Adjusted R square value is 0.5824 which is moderate. It does not give the actual present of variation explained by the model as R^2 does.

Thus for 9df, the probability of obtaining a t value of -2.0129 or greater is 0.0593 and the probability of obtaining a t value of 0.0218 or greater is 0.9828 Also the probability of obtaining a t value of 3.2536 or greater is 0.0044 and the probability of obtaining a t value of -0.8132 or greater is 0.4266. It can explain as that for all the independent variables.

The value of the $\beta_2 = -1.2120$ is the partial regression coefficient of AGSGDP and implies that with the influence of other independent variables held constant, as AGSGDP increases in 1 percent on average, air express volume decreases by 121 percent. The coefficient 0.0104 indicates that holding the influence of other independent variables constant; on average the express volume increases by 1 percent when the INSGDP increases by 1 percent on average. Further the coefficient 3.6684 tells that with the influence of other variables held constant, as express volume decreases by 366 percent, on average SVSGDP goes up by 1 percent. Further when the influence of other independent variables held constant, as EXR increases in 1 percent on average, air express AWB volume decreases by 64.18 percent. If the influence of other independent variables held constant, as BP increases in 1 percent on

average, air express volume decreases by 29.58 percent. When other variables set constant, as WGDP increases in 1 percent on average, air express volume increases by 0.48 percent. The coefficient -1.5820 indicates that holding the influence of other independent variables constant; on average the express volume decreases by 158 percent when the MTV increases by 1 percent. The coefficient 0.3126 indicates that holding the influence of other independent variables constant, on average the express volume increases by 31.26 percent when the FR increases by 1 percent. Finally, the coefficient -0.5544 indicates that holding the influence of other independent variables constant; on average the express volume decreases by 55.44 percent when the ACM increases by 1 percent.

4.2.2.2 Hypothesis testing of multiple regression coefficients for the model IB1(Appendix D)

If postulate that, $H_0 : \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$ and $H_1 : \text{at least one } \beta_j \neq 0$ then, the null hypothesis states that, no linear relationship exists between the dependent and any of the independent variables whereas the alternative hypothesis states that the dependent variable has a linear relationship with at least one independent variable. If the null hypothesis is rejected, it cannot be concluded that a relationship exists with every independent variable individually.

From the ANOVA section it can be tested for significance of regression. At a 5% significance level null hypothesis can be rejected as *Significance F* 0.00149 is less than 0.05. Therefore it can be concluded that there is a linear relationship exists between the dependent and any of the independent variables in the regression model.

4.2.2.3 Regression analysis output: Summary Output model IB2 (Appendix E)- Inbound volume in AWBs as dependent variable

In this model, since the coefficients of the AGSGDP, INSGDP, EXR, BP, EGDP, MTV(imports) and ACM are minus figures, which means those variables are negatively impacted to the model

Summary output of model IB2 also can be explained as done for the above mentioned regression models.

4.2.2.4 Hypothesis testing of multiple regression coefficients for the model IB2 (Appendix E)

If postulate that, $H_0 : \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$ and $H_1 : \text{at least one } \beta_j \neq 0$ then, the null hypothesis states that, no linear relationship exists between the dependent and any of the independent variables whereas the alternative hypothesis states that the dependent variable has a linear relationship with at least one independent variable. If the null hypothesis is rejected, it cannot be concluded that a relationship exists with every independent variable individually

From the ANOVA section it can be tested for significance of regression. At a 5% significance level null hypothesis can be rejected as *Significance F* 0.0031 is less than 0.05. Therefore it can be concluded that there is a linear relationship exists between the dependent and any of the independent variables in the regression model.

4.2.2.5 Regression analysis output: Summary Output model IB3 (Appendix F)- Inbound revenue as dependent variable

In the model IB 3(Appendix F), AGSGDP, EXR, BP, WGDP, MTV (Import) and ACM are negatively impacted. SVSGDP, MTV (Import) and FR (IB) are not statistically significant to the model

4.2.2.6 Hypothesis testing of multiple regression coefficients for the model IB3 (Appendix F)

If postulate that, $H_0 : \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = 0$ and $H_1 : \text{at least one } \beta_j \neq 0$ then, the null hypothesis states that, no linear relationship exists between the dependent and any of the independent variables whereas the alternative hypothesis states that the dependent variable has a linear relationship with at least one independent variable. If the null hypothesis is rejected, it cannot be concluded that a relationship exists with every independent variable individually

From the ANOVA section it can be tested for significance of regression. At a 5% significance level null hypothesis can be rejected as *Significance F* 0.0017 is less than 0.05. Therefore it can be concluded that there is a linear relationship exists between the dependent and any of the independent variables in the regression model.

4.2.3 Regression for total market performance

Finally, total market performance including inbound and outbound were accumulated and run the regression. Three summary outputs; Summary Output – weight as dependent variable (Model In & Out 1), (Appendix G), AWB as dependent variable (Model In & Out 2)(Appendix H)and revenue as dependent variable (Model In & Out 3))(Appendix I)were prepared using regression tool.

R-square value of the Model In & Out 1 is 0.4307 and there is no significant variable contributing to this model's performance (Appendix G). Further in the Model In & Out 2, R Square value is 0.6835 and intercept, service GDP and the merchandize trade volume are contributing significantly to the model. Finally, in the Model In & Out 3, 0.5161 is the R-Square value and Intercept, Agricultural GDP, Service sector GDP and bunker price are significantly contributing the model.

4.2.4 Identification of the best regression model

4.2.4.1 Best regression model for outbound

As per the table xx, the highest R-Square value reported was 0.7120 which means that 71.2 percent of the data is represented by this model OB2 (Appendix B), Therefore it is taken as the best regression model for further improvements. In order to improve the selected model OB2, preceding approach can be applied. Variable with the largest *p*-value exceeding 0.05, in this case is MTV (exports) was removed and re run the regression. Then the R-Square has slightly decreased as result of removing a variable but Adjusted R-Square has increased up to 0.5907 (Appendix J). Still, the intercept and the FR(OB) are only statistically significant to the model OB 2.1(Appendix J). Again, the variable with the highest *p*-value exceeding 0.05 is

INSGDP and it was removed and re run the regression. In this model OB 2.2 (Appendix K) also intercept and the FR(OB) are only statistically significant. As per the iteration process, SVSGDP was removed as it was the variable with the highest p value, again the results were same, only the intercept and the FR(OB) are only statistically significant to the model OB 2.3. (Appendix L). In the iteration process, ACM (model OB 2.4, Appendix M) and BP (model OB2.5, Appendix N) were removed respectively and finally in the model OB 2.5 (Appendix N) all the variables, AGSGDP, EXR, WGDP, FR(OB) are statistically significant to the model.

In the model OB2, AGSGDP is negatively impacted to the model, even though it is statistically significant. However if we do the same iteration process to the model OB1 (Appendix A) as it has industrial GDP is statistically significant and positively impacted the to the model, it is interesting to see the results of the regression. In the iteration process, SVSGDP was removed from model OB1(Appendix A), then WGDP was removed from the model OB 1.1(Appendix O). Again BP was removed from model OB1.2 (Appendix P) and re run and EXR was removed from model OB 1.3 (Appendix Q).Finally only ACM is the only variable which is not significant, as a result is was removed from the model OB 1.4(Appendix R) and re run the model. In the model OB 1.5 (Appendix S) all the variables, AGSGDP, INSGDP, MTV(Export), and FR(OB) are statistically significant to the model. Therefore, the model OB1 is to be considered as the best regression models for the air express outbound volume.

4.2.4.2 Best regression model for inbound

As per the Table 5.2,regression result output matrix for inbound, the highest R-Square value reported was 0.7216 which means that 72.16 percent of the data is represented by this model IB1 (Appendix B), Therefore it is taken as the best regression model for further improvements. In the model IB 1, only SVSGDP is statistically significant to the model. In the iteration process, WGDP was removed from the model IB 1, INSGDP was removed from model IB 1.1 (Appendix T), ACM was removed from model IB 1.2 (Appendix U), EXR was removed from model IB 1.3 (Appendix V), arrived to the model IB 1.4 (Appendix W) in which all the variables,

AGSGDP, SVSGDP, BP, MTV(imports), FR(IB) are statistically significant. However, in the summary output of model IB 1.4, AGSGDP, MTV are negatively impacted, FR are positively impacted.

4.2.4.3 Best regression model for total market performance

It is paramount important to understand the air express total market performance without dividing it to outbound and inbound. Regression was run for the models in which weight (Model In&Out 1) (Appendix G), AWB (Model In&Out 2) (Appendix H) and revenue (Model In&Out 3) (Appendix G) are dependent variables respectively and arrived the summary outputs for those models.

R-Square value of model In&Out 1 (Appendix G) is 0.4307 and none of the variables are statistically significant in this model. Further in the model In&Out 2(Appendix H), intercept, SVSGDP and MTV are statistically significant and the R-Square value is 0.6835. 0.5161 is the R-Square value of model In&Out 3 (Appendix D)and Intercept, AGSGDP, SVSGDP and BP are statistically significant to the model.

When finding the best regression model for total market performance, In&Out 2(Appendix H) is considered as it has the highest value of R-Square which is 0.6835. Therefore, it was taken for further model improvements.

Thus, from the model In&Out 2(Appendix H), FR was removed as it has the highest p value of 0.9836. EXR was removed from model In&Out 2.1 (Appendix X) and re run the regression. From model In&Out 2.2 (Appendix Y) WGDP was removed in order to improve the model and re run the regression. Then ACM was removed as it has the highest p value from the model In&Out 2.3 (Appendix Z). Finally, in the model In&Out 2.4 (Appendix AA) all the variables AGSGDP, INSGDP, SVSGDP, MTV, BP and intercept are statistically significant to the model. But AGSGDP, INSGDP and MTV have negative impacts to the model.

4.2.5 Discussion of the mathematical outcome of the regression analysis

Regression analysis was done for all the six models and found out the best models for inbound, outbound and total market performance separately. Further improvements have done applying the preceding approach. Following table 5.3 shows the summary of the best regression models after the improvements of the models done.

Table 4.3: Summary of best regression models

Model	R Square	Intercept	AGSGDP	INSGDP	SVSGDP	EXR	BP	WGDP	MTV	FR	ACM
OB2.5	0.6917	***43.1488	**0.3792			0.4919		***-2.8300		***-0.4634	
OB1.5	0.4101	***11.4049	**0.4493	**0.2808					*0.3405	***-0.3428	
IB1.4	0.6909	4.6087	*-0.8791		***2.87014		*-0.2480		***-1.6350	**0.3744	
In&Out 2.4	0.6688	***24.7207	*-0.7069	*-0.4488	*1.4043		**0.2052		**1.2174		

***- Significance at 1%, **-Significance at 5%, *- Significance at 10%

All the empty variables of the tables are the ones that were removed during each iteration process. As per the preceding approach, model with the highest R-Square is taken for further model improvements. For outbound OB 2(Appendix B) was the best model and further improved, which is the OB 2.5 (Appendix N). However, it shows unexpected results such as the impacted of GDP and WGDP are negative. Therefore, next best model; OB1 (Appendix A) was further improved up to) OB1.5 (Appendix X)

Hence, in the improved model OB 1.5, If agricultural GDP has a negative impact to the model, which means, if AGSGDP increase by 1 percent, air express volume decreases by 44.93 percent. Agricultural GDP includes farming, fishing, and forestry,

CHAPTER 05

CONCLUSION AND RECOMMENDATIONS

The central aim of the study is to identify the parameters influencing air express market in Sri Lanka qualitatively and quantitatively. Primary, secondary and unpublished data and information were used in order to achieve these objectives. Parameters were identified qualitatively by examining the past performance of this sector and with the use of prevailing literature. Quantitative analysis was carried out using econometric modeling.

5.1 Outline of the central analytical outcome

The econometric analysis on the CEP industry in Sri Lanka revealed that several factors are influential in the performance of the industry and they are influential in different significant levels (refer table 4.3). Most importantly the price sensitivity of the inbound CEP market is reflected by the positive relationship between freight rate on CEPs and the CEP volume outbound, confirming the price theory, the negative relationship between price and the quantity demanded. Price sensitivity of CEP industry can be justified that a higher freight rate may push shippers to use alternative cheaper means of sending their couriers unless they are not time sensitive. Further Among the factors considered, Gross Domestic Product of the country is a key factor and the sectoral contribution to GDP is directly impacting the performance of CEP. For outbound CEP performances, industrial sector contribution to GDP is positively impacting the industry, implying that growth in industrial production promotes CEP industry. Growth in industrial production leads to growth in exports, as well as, delivery of samples to foreign importers. Thus, CEP industry is able to capture these times sensitive CEP volume.

For inbound CEP market section, in the main, service sector GDP positively correlated with the performances of inbound CEP market, while growth of imports negatively affects the inbound CEP market. Notably agricultural output is negatively impacting on the performance on the inbound CEP volume.

In conclusion, this study found that CEP industry performance (outbound CEP sector) in Sri Lanka is largely determined by industrial sector performance and the freight rate charged on the outbound CEPs. And for inbound, Services sector contribution to GDP plays a major role.

5.2 Recommendation for policy purposes

In order to facilitate the air express market, decision makers should consider about several factors. First is the industrial sector and the service sector GDP. Industrial policies and service sector growth policies that raise productivity can be used to promote CEP industry. In addition, factors influential to freight rate needs to be managed to keep the freight rate low as possible. Such one factor bunker price has identified as the influential factor of express market performance which in turn influence the fuel surcharge charge from the customer by the service providers. Therefore, it is very vital to control the oil prices as it not only affects the air express market but also it can lead to influence every aspect of the economy. Government should act as facilitators of the air express market by removing the impediments of the express market such as bureaucratic customs procedures that more flexible and reliable service can be given to the customers. With the e-commerce initiatives taken by many industries and the development of the information and communication technology, supply chains will be simpler, fast, reliable and data driven.

5.3 Recommendation for future studies

It is important to note that in the study, the quantitative analysis was carried using 28 observations which are quarterly data and that is from 2012 quarter 1 to 2018 quarter 4. Therefore, the study should be carried out using at more observations so that the accuracy of the models would be increased. Further elaboration of work should be done by adding the easiness of the customs procedures and GDP of main trading partners of Sri Lanka as other independent variables. Because of the time definite delivery express market should have the capability to facilitate the seamless transportation. In addition, this research carried out a study only for the air express

market. But Sri Lanka involves in air freight of which the volumes are considerably very high compared to air express. Therefore, one could develop work such as the work presented in this study including air freight sector as well.

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Appendix A

Regression analysis output: Summary Output model OB1: Outbound volume in Kg as dependent variable

SUMMARY OUTPUT- Model OB1

<i>Regression Statistics</i>	
Multiple R	0.717689773
R Square	0.515078611
Adjusted R Square	0.272617916
Standard Error	0.072503839
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	0.100507087	0.011167454	2.124379836	0.083006749
Residual	18	0.09462252	0.005256807		
Total	27	0.195129608			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	17.74574471	6.752483221	2.628032403	0.017062031	3.559303883	31.93218553	3.559303883	31.93218553
AGSGDP	-0.201120164	0.280870932	-0.71605902	0.483142002	-0.791208095	0.388967767	-0.791208095	0.388967767
INSGDP	0.551729979	0.267290681	2.064157183	0.053721914	-0.009826904	1.113286863	-0.009826904	1.113286863
SVSGDP	-0.07476494	0.493541942	-0.151486496	0.881276859	-1.111658084	0.962128205	-1.111658084	0.962128205
EXR	0.662763342	0.38806307	1.707875328	0.104848086	-0.152526914	1.478053598	-0.152526914	1.478053598
BP	0.120253553	0.099882853	1.203945919	0.244204622	-0.089592534	0.33009964	-0.089592534	0.33009964
WGDP	-1.085057868	1.093493525	-0.992285591	0.334210925	-3.382402515	1.212286779	-3.382402515	1.212286779
MTV (Export)	0.362639684	0.321017332	1.129657645	0.273450335	-0.311792705	1.037072073	-0.311792705	1.037072073
FR(OB)	-0.416547186	0.121985657	-3.414722649	0.003089104	-0.672829542	-0.16026483	-0.672829542	-0.16026483
ACM	-0.667544652	0.512429147	-1.302706251	0.209096068	-1.74411834	0.409029036	-1.74411834	0.409029036

Appendix B

Regression analysis output: Summary Output model OB2- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB2

<i>Regression Statistics</i>	
Multiple R	0.843811702
R Square	0.712018188
Adjusted R Square	0.568027282
Standard Error	0.110220008
Observations	28

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	0.540653982	0.060072665	4.944883028	0.00194269
Residual	18	0.218672102	0.01214845		
Total	27	0.759326084			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	38.25581999	10.52286672	3.635494111	0.001891738	16.14809737	60.3635426	16.14809737	60.3635426
AGSGDP	-0.538646173	0.426891721	-1.261786411	0.223131935	-1.435512398	0.358220053	-1.435512398	0.358220053
INSGDP	0.038565173	0.406920505	0.094773236	0.925542016	-0.816343085	0.893473432	-0.816343085	0.893473432
SVSGDP	0.320175235	0.752798798	0.425313159	0.675649787	-1.261396351	1.901746821	-1.261396351	1.901746821
EXR	0.48416344	0.580589366	0.833917169	0.41525768	-0.735609555	1.703936435	-0.735609555	1.703936435
BP	-0.097129789	0.141255751	-0.687616527	0.500459519	-0.393897109	0.199637531	-0.393897109	0.199637531
WGDP	-2.083068419	1.690266208	-1.232390738	0.233658722	-5.634185948	1.46804911	-5.634185948	1.46804911
MTV (Export)	-0.011402365	0.48973481	-0.023282732	0.981680913	-1.04029702	1.017492291	-1.04029702	1.017492291
FR(OB)	-0.402348248	0.189479209	-2.123442724	0.04783742	-0.800429296	-0.004267201	-0.800429296	-0.004267201
ACM	-0.664217809	0.782500605	-0.848839994	0.407117979	-2.308190577	0.979754959	-2.308190577	0.979754959

Appendix C

Regression analysis output: Summary Output model OB3 - Outbound revenue as dependent variable

SUMMARY OUTPUT- Model OB3

<i>Regression Statistics</i>	
Multiple R	0.670833111
R Square	0.450017063
Adjusted R Square	0.175025595
Standard Error	0.066364481
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	0.064866979	0.007207442	1.636476	0.178579677
Residual	18	0.079276398	0.004404244		
Total	27	0.144143377			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	9.71719717	6.335914882	1.533669147	0.1425	-3.59406605	23.02846039	-3.59406605	23.02846039
AGSGDP	-0.458690154	0.257035434	-1.784540551	0.091201	-0.998701562	0.081321253	-0.998701562	0.081321253
INSGDP	-0.02485893	0.245010581	-0.101460638	0.920306	-0.539607059	0.489889199	-0.539607059	0.489889199
SVSGDP	0.443078437	0.453267083	0.97752176	0.341267	-0.509200369	1.395357242	-0.509200369	1.395357242
EXR	-0.337375554	0.3495782	-0.96509323	0.347286	-1.071812098	0.397060991	-1.071812098	0.397060991
BP	0.007241038	0.085051387	0.085137208	0.933092	-0.171445297	0.185927372	-0.171445297	0.185927372
WGDP	0.172534604	1.017724837	0.169529717	0.867271	-1.965625938	2.310695145	-1.965625938	2.310695145
MTV (Export)	0.23021397	0.294873835	0.780720234	0.445114	-0.38929297	0.84972091	-0.38929297	0.84972091
FR(OB)	-0.043334626	0.114087176	-0.379837838	0.70851	-0.283022888	0.196353635	-0.283022888	0.196353635
ACM	0.339606208	0.471150815	0.720801487	0.480289	-0.650244923	1.32945734	-0.650244923	1.32945734

Appendix D

Regression analysis output: Summary Output model IB1 -Inbound volume in Kg as dependent variable

SUMMARY OUTPUT- Model IB1

<i>Regression Statistics</i>	
Multiple R	0.849479008
R Square	0.721614585
Adjusted R Square	0.582421878
Standard Error	0.152996475
Observations	28

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	1.092179902	0.121353322	5.184284432	0.001490541
Residual	18	0.421342585	0.023407921		
Total	27	1.513522487			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.236244584	12.39009037	0.341905866	0.736381183	-21.79436936	30.26685853	-21.79436936	30.26685853
AGSGDP	-1.212001395	0.602094872	-2.012974118	0.059321095	-2.476955783	0.052952993	-2.476955783	0.052952993
INSGDP	0.010428419	0.47771758	0.021829674	0.982823996	-0.993218975	1.014075813	-0.993218975	1.014075813
SVSGDP	3.668468201	1.127493129	3.253650162	0.004409803	1.299693036	6.037243365	1.299693036	6.037243365
EXR	-0.641848192	0.789220734	-0.813268285	0.426691436	-2.299939427	1.016243042	-2.299939427	1.016243042
BP	-0.295825457	0.224053381	-1.320334717	0.203267183	-0.766544143	0.174893229	-0.766544143	0.174893229
WGDP	0.004883342	1.931874742	0.002527774	0.998010935	-4.053834882	4.063601567	-4.053834882	4.063601567
MTV (Import)	-1.582094222	0.577823784	-2.738021981	0.013513124	-2.796056946	-0.368131499	-2.796056946	-0.368131499
FR(IB)	0.312654613	0.191254553	1.634756443	0.119467122	-0.089156293	0.71446552	-0.089156293	0.71446552
ACM	-0.554498576	1.08369528	-0.511673887	0.615099241	-2.831257874	1.722260723	-2.831257874	1.722260723

Appendix E

Regression analysis output: Summary Output model IB2 - Inbound volume in AWBs
as dependent variable

SUMMARY OUTPUT- Model IB2

<i>Regression Statistics</i>	
Multiple R	0.832690395
R Square	0.693373295
Adjusted R Square	0.540059942
Standard Error	0.163796654
Observations	28

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	1.092042882	0.121338098	4.522589078	0.003156716
Residual	18	0.482928192	0.026829344		
Total	27	1.574971074			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	9.015482565	13.26471966	0.679658734	0.505367992	-18.85265932	36.88362445	-18.85265932	36.88362445
AGSGDP	-1.385872759	0.644597372	-2.14998202	0.045398543	-2.740121584	-0.031623934	-2.740121584	-0.031623934
INSGDP	-0.011100472	0.511440158	-0.021704342	0.982922593	-1.085596372	1.063395428	-1.085596372	1.063395428
SVSGDP	3.374700826	1.207084034	2.795746386	0.011945087	0.838711374	5.910690277	0.838711374	5.910690277
EXR	-0.741420881	0.844932641	-0.87749111	0.391781863	-2.516558489	1.033716727	-2.516558489	1.033716727
BP	-0.306197654	0.23986954	-1.276517451	0.217996916	-0.810144858	0.19774955	-0.810144858	0.19774955
WGDG	-0.576174129	2.068247776	-0.278580804	0.783741679	-4.921401467	3.769053209	-4.921401467	3.769053209
MTV (Import)	-1.275656383	0.618612962	-2.062123591	0.053934931	-2.57531399	0.024001224	-2.57531399	0.024001224
FR(IB)	0.369531794	0.20475541	1.804747404	0.087871951	-0.060643359	0.799706948	-0.060643359	0.799706948
ACM	-0.334026699	1.160194449	-0.28790579	0.776707556	-2.771504789	2.10345139	-2.771504789	2.10345139

Appendix F

Regression analysis output: Summary Output model IB3 - Inbound revenue in USD as dependent variable

SUMMARY OUTPUT- Model IB3

<i>Regression Statistics</i>	
Multiple R	0.846192829
R Square	0.716042304
Adjusted R Square	0.574063456
Standard Error	0.149215144
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	1.010609428	0.112289936	5.043302683	0.001740698
Residual	18	0.400772863	0.022265159		
Total	27	1.411382291			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	20.20522021	12.08386738	1.672082255	0.111800545	-5.182043093	45.59248351	-5.182043093	45.59248351
AGSGDP	-1.641782976	0.587214005	-2.795885253	0.011941534	-2.875473821	-0.408092131	-2.875473821	-0.408092131
INSGDP	0.013717156	0.465910717	0.029441598	0.976836379	-0.965124937	0.992559249	-0.965124937	0.992559249
SVSGDP	3.636950542	1.099626962	3.307440311	0.003916445	1.326720021	5.947181062	1.326720021	5.947181062
EXR	-0.271707093	0.769715022	-0.352997	0.728190754	-1.888818347	1.34540416	-1.888818347	1.34540416
BP	-0.129876451	0.218515867	-0.594357072	0.559670468	-0.588961251	0.32920835	-0.588961251	0.32920835
WGDP	-1.013699058	1.884128159	-0.538020226	0.597153499	-4.972105435	2.944707318	-4.972105435	2.944707318
MTV (Import)	-1.881826805	0.56354278	-3.339279415	0.00365043	-3.065786252	-0.697867358	-3.065786252	-0.697867358
FR(IB)	0.323720734	0.186527668	1.735510547	0.099737878	-0.068159354	0.715600822	-0.068159354	0.715600822
ACM	-0.096878414	1.056911583	-0.091661796	0.92797916	-2.317367255	2.123610426	-2.317367255	2.123610426

Appendix G

Regression analysis output: Summary Output model In & Out 1(Appendix G) Total volume in Kgs as dependent variable

SUMMARY OUTPUT- Model In&Out 1

<i>Regression Statistics</i>	
Multiple R	0.6563503
R Square	0.430795716
Adjusted R Square	0.146193574
Standard Error	0.107630233
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	0.157813549	0.017534839	1.513677	0.216791726
Residual	18	0.208516809	0.011584267		
Total	27	0.366330358			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	10.55737676	9.841855032	1.072701917	0.297576522	-10.11959339	31.23434691	-10.11959339	31.23434691
AGSGDP	-0.52703708	0.42979641	-1.226248214	0.235905934	-1.43000583	0.37593167	-1.43000583	0.37593167
INSGDP	-0.019997312	0.337058433	-0.059328919	0.953343854	-0.728130802	0.688136178	-0.728130802	0.688136178
SVSGDP	1.281076305	0.835137908	1.533969771	0.142426232	-0.473483332	3.035635941	-0.473483332	3.035635941
EXR	-0.042779185	0.545461356	-0.078427526	0.938353261	-1.18875097	1.1031926	-1.18875097	1.1031926
BP	-0.223543827	0.143243887	-1.560581969	0.136031642	-0.524488067	0.077400412	-0.524488067	0.077400412
WGDP	0.793375554	1.350003229	0.58768419	0.564044949	-2.042875984	3.629627093	-2.042875984	3.629627093
MTV	-0.642471498	0.542991821	-1.183206585	0.252119588	-1.783254982	0.498311986	-1.783254982	0.498311986
FR	-0.106452016	0.28756544	-0.370183621	0.715565602	-0.710604586	0.497700555	-0.710604586	0.497700555
ACM	-0.692653534	0.765721945	-0.90457579	0.3776385	-2.301375645	0.916068578	-2.301375645	0.916068578

Appendix H

Regression analysis output: Summary Output model In & Out 2(Appendix H) Total volume in AWBs as dependent variable

SUMMARY OUTPUT- Model In&Out 2

<i>Regression Statistics</i>	
Multiple R	0.826798177
R Square	0.683595226
Adjusted R Square	0.525392838
Standard Error	0.114827015
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	0.512762965	0.056973663	4.321017134	0.004014286
Residual	18	0.237334382	0.013185243		
Total	27	0.750097347			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	25.75302608	10.49993856	2.452683503	0.024606648	3.693473742	47.81257842	3.693473742	47.81257842
AGSGDP	-0.771997118	0.458535091	-1.683616221	0.109518251	-1.735343597	0.191349362	-1.735343597	0.191349362
INSGDP	-0.2648947	0.359596115	-0.736645056	0.470831085	-1.020378104	0.490588703	-1.020378104	0.490588703
SVSGDP	1.713324545	0.890980073	1.922966177	0.070451608	-0.158555128	3.585204218	-0.158555128	3.585204218
EXR	-0.057497581	0.581934067	-0.098804288	0.922385684	-1.280095688	1.165100526	-1.280095688	1.165100526
BP	-0.198265491	0.152822004	-1.297362196	0.210888813	-0.519332609	0.122801626	-0.519332609	0.122801626
WGDP	-0.332567415	1.440272277	-0.230905934	0.819992104	-3.358467186	2.693332356	-3.358467186	2.693332356
MTV	-1.114306319	0.579299404	-1.923541282	0.070374944	-2.331369205	0.102756567	-2.331369205	0.102756567
FR	0.006374687	0.306793733	0.020778412	0.98365102	-0.63817503	0.650924403	-0.63817503	0.650924403
ACM	-0.597555992	0.816922557	-0.731472019	0.473906904	-2.313846597	1.118734614	-2.313846597	1.118734614

Appendix I

Regression analysis output: Summary Output model In & Out 2(Appendix I) Total Revenue in USDs as dependent variable

SUMMARY OUTPUT- Model In&Out 3

<i>Regression Statistics</i>	
Multiple R	0.718445471
R Square	0.516163894
Adjusted R Square	0.274245842
Standard Error	0.062989539
Observations	28

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9	0.076190129	0.00846557	2.133631154	0.081826016
Residual	18	0.071418276	0.003967682		
Total	27	0.147608405			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	12.47626941	5.759849144	2.166075724	0.04397546	0.375275392	24.57726342	0.375275392	24.57726342
AGSGDP	-0.755730222	0.251534134	-3.004483764	0.00761083	-1.284183828	-0.227276616	-1.284183828	-0.227276616
INSGDP	-0.168396521	0.197260142	-0.853677375	0.404501712	-0.582824701	0.24603166	-0.582824701	0.24603166
SVSGDP	1.070024343	0.488756271	2.18928003	0.041995424	0.043185522	2.096863165	0.043185522	2.096863165
EXR	-0.390520084	0.31922591	-1.223334548	0.236977668	-1.061188833	0.280148666	-1.061188833	0.280148666
BP	-0.147529856	0.08383208	-1.759825774	0.095421177	-0.323654521	0.02859481	-0.323654521	0.02859481
WGDP	0.523901609	0.790076151	0.663102675	0.515667604	-1.13598679	2.183790009	-1.13598679	2.183790009
MTV	-0.292379967	0.317780638	-0.920068537	0.36970364	-0.960012314	0.37525238	-0.960012314	0.37525238
FR	0.023498816	0.168294854	0.139628847	0.890503716	-0.330075551	0.377073184	-0.330075551	0.377073184
ACM	0.150752123	0.44813126	0.336401711	0.740457991	-0.790736718	1.092240963	-0.790736718	1.092240963

Appendix J

Regression analysis output: Summary Output model OB2.1- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 2.1

<i>Regression Statistics</i>	
Multiple R	0.843806563
R Square	0.712009515
Adjusted R Square	0.590750363
Standard Error	0.107281893
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	8	0.540647397	0.067580925	5.871800237	0.000746355
Residual	19	0.218678687	0.011509405		
Total	27	0.759326084			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	38.36759651	9.114293309	4.209607394	0.000474796	19.29116137	57.44403164	19.29116137	57.44403164
AGSGDP	-0.538425181	0.415409426	-1.296131351	0.210453989	-1.407887102	0.331036741	-1.407887102	0.331036741
INSGDP	0.043747527	0.331567117	0.131941693	0.89641761	-0.650230424	0.737725477	-0.650230424	0.737725477
SVSGDP	0.310994343	0.624167468	0.49825465	0.624023016	-0.995403181	1.617391868	-0.995403181	1.617391868
EXR	0.483306871	0.563977009	0.856962009	0.402145802	-0.697110576	1.663724318	-0.697110576	1.663724318
BP	-0.096945775	0.137274942	-0.706216101	0.488623988	-0.384265531	0.190373982	-0.384265531	0.190373982
WGDP	-2.102250662	1.43653615	-1.46341647	0.159701275	-5.10895538	0.904454056	-5.10895538	0.904454056
FR(OB)	-0.403472067	0.178343832	-2.262326997	0.035589247	-0.776749998	-0.030194136	-0.776749998	-0.030194136
ACM	-0.664876787	0.761143242	-0.873523866	0.393284462	-2.257967901	0.928214326	-2.257967901	0.928214326

Appendix K

Regression analysis output: Summary Output model OB2.2- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 2.2

<i>Regression Statistics</i>	
Multiple R	0.843650192
R Square	0.711745646
Adjusted R Square	0.610856622
Standard Error	0.104613348
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	7	0.540447034	0.077206719	7.054738145	0.00026332
Residual	20	0.21887905	0.010943952		
Total	27	0.759326084			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	37.88629886	8.144715353	4.651641858	0.000153744	20.89672034	54.87587737	20.89672034	54.87587737
AGSGDP	-0.552635395	0.391225484	-1.412575146	0.173153415	-1.368717454	0.263446664	-1.368717454	0.263446664
SVSGDP	0.310646913	0.608636419	0.510398168	0.615359773	-0.958946409	1.580240236	-0.958946409	1.580240236
EXR	0.456790437	0.513846716	0.888962454	0.384590872	-0.615075029	1.528655903	-0.615075029	1.528655903
BP	-0.104329864	0.122230974	-0.853546854	0.403463546	-0.359299208	0.150639481	-0.359299208	0.150639481
WGDP	-2.002280609	1.190113728	-1.682427959	0.108033838	-4.484814343	0.480253124	-4.484814343	0.480253124
FR(OB)	-0.398627338	0.170181837	-2.342361237	0.029619552	-0.753620429	-0.043634247	-0.753620429	-0.043634247
ACM	-0.610836395	0.625590951	-0.976415011	0.340522232	-1.91579625	0.694123461	-1.91579625	0.694123461

Appendix L

Regression analysis output: Summary Output model OB2.3- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 2.3

<i>Regression Statistics</i>	
Multiple R	0.841422036
R Square	0.707991042
Adjusted R Square	0.624559911
Standard Error	0.102754914
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	0.537596065	0.089599344	8.485933672	9.4262E-05
Residual	21	0.221730018	0.010558572		
Total	27	0.759326084			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	38.5642328	7.892927838	4.885922384	7.85016E-05	22.14999079	54.97847481	22.14999079	54.97847481
AGSGDP	-0.402767595	0.253940154	-1.586072896	0.127666834	-0.930865055	0.125329864	-0.930865055	0.125329864
EXR	0.528843642	0.485297077	1.089731768	0.288178635	-0.480386878	1.538074162	-0.480386878	1.538074162
BP	-0.104646252	0.120058023	-0.871630647	0.393266201	-0.35432058	0.145028075	-0.35432058	0.145028075
WGDP	-1.977209425	1.167975486	-1.692851818	0.105268273	-4.406147417	0.451728567	-4.406147417	0.451728567
FR(OB)	-0.403090618	0.166937767	-2.414616083	0.024958912	-0.750256709	-0.055924526	-0.750256709	-0.055924526
ACM	-0.440456678	0.519685118	-0.847545297	0.406247667	-1.521201045	0.640287689	-1.521201045	0.640287689

Appendix M

Regression analysis output: Summary Output model OB2.4- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 2.4

<i>Regression Statistics</i>	
Multiple R	0.835465431
R Square	0.698002486
Adjusted R Square	0.629366687
Standard Error	0.102095007
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	0.530011494	0.106002299	10.16965636	3.77924E-05
Residual	22	0.22931459	0.01042339		
Total	27	0.759326084			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	39.58120945	7.751087372	5.106536354	4.07197E-05	23.5064381	55.65598079	23.5064381	55.65598079
AGSGDP	-0.489294121	0.231021451	-2.117959696	0.045712779	-0.968403286	-0.010184957	-0.968403286	-0.010184957
EXR	0.325319797	0.419013415	0.776394707	0.445783471	-0.543660839	1.194300434	-0.543660839	1.194300434
BP	-0.077938602	0.115104772	-0.677110086	0.505394443	-0.31665129	0.160774085	-0.31665129	0.160774085
WGDP	-2.219558023	1.125160152	-1.972659641	0.061231568	-4.55299736	0.113881315	-4.55299736	0.113881315
FR(OB)	-0.443470157	0.158967394	-2.789692562	0.010682549	-0.773148355	-0.11379196	-0.773148355	-0.11379196

Appendix N

Regression analysis output: Summary Output model OB2.5- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 2.5

<i>Regression Statistics</i>	
Multiple R	0.831690378
R Square	0.691708884
Adjusted R Square	0.638093038
Standard Error	0.100885964
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0.525232598	0.13130815	12.90120241	1.18878E-05
Residual	23	0.234093486	0.010177978		
Total	27	0.759326084			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	43.14889036	5.617498864	7.681156936	8.55642E-08	31.52820859	54.76957214	31.52820859	54.76957214
AGSGDP	-0.379286698	0.162297737	-2.336980812	0.028511642	-0.715025148	-0.043548248	-0.715025148	-0.043548248
EXR	0.491913204	0.335156751	1.467710863	0.155725805	-0.201411359	1.185237768	-0.201411359	1.185237768
WGDP	-2.830031296	0.665175639	-4.254562447	0.00029855	-4.206051945	-1.454010648	-4.206051945	-1.454010648
FR(OB)	-0.463477669	0.154347334	-3.002822648	0.00634812	-0.782769455	-0.144185883	-0.782769455	-0.144185883

Appendix O

Regression analysis output: Summary Output model OB1.1- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 1.1

<i>Regression Statistics</i>	
Multiple R	0.717258939
R Square	0.514460386
Adjusted R Square	0.310022653
Standard Error	0.070615025
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	8	0.100386453	0.012548307	2.516464938	0.047152602
Residual	19	0.094743154	0.004986482		
Total	27	0.195129608			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	17.39540429	6.178822055	2.815326957	0.011048294	4.462981103	30.32782748	4.462981103	30.32782748
AGSGDP	-0.227954715	0.212288116	-1.073798759	0.296361693	-0.672278848	0.216369418	-0.672278848	0.216369418
INSGDP	0.540478461	0.25007483	2.161266933	0.043649567	0.017065826	1.063891095	0.017065826	1.063891095
EXR	0.651857499	0.371392698	1.755170477	0.095341563	-0.125476352	1.429191349	-0.125476352	1.429191349
BP	0.119586456	0.09718619	1.230488163	0.233531485	-0.083826577	0.322999489	-0.083826577	0.322999489
WGDP	-1.049122535	1.03964444	-1.00911667	0.32559805	-3.225123357	1.126878286	-3.225123357	1.126878286
MTV (Export)	0.337352187	0.267058852	1.263212902	0.221794541	-0.221608414	0.896312788	-0.221608414	0.896312788
FR(OB)	-0.413696128	0.117385225	-3.524260628	0.002266992	-0.659386229	-0.16800603	-0.659386229	-0.168006028
ACM	-0.695131943	0.466499479	-1.490102293	0.152611492	-1.671526572	0.281262687	-1.671526572	0.281262687

Appendix P

Regression analysis output: Summary Output model OB1.2- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 1.2

<i>Regression Statistics</i>	
Multiple R	0.698883107
R Square	0.488437597
Adjusted R Square	0.309390756
Standard Error	0.070647353
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	7	0.095308637	0.01361552	2.727987797	0.036876247
Residual	20	0.099820971	0.004991049		
Total	27	0.195129608			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	11.39153546	1.668026966	6.829347301	1.22551E-06	7.912092177	14.87097874	7.912092177	14.87097874
AGSGDP	-0.287928113	0.203892544	-1.412156168	0.17327508	-0.713240507	0.13738428	-0.713240507	0.13738428
INSGDP	0.381799129	0.19454001	1.962573812	0.063758423	-0.024004221	0.787602479	-0.024004221	0.787602479
EXR	0.496654057	0.33820461	1.468501734	0.15752119	-0.208828398	1.202136512	-0.208828398	1.202136512
BP	0.041644095	0.059013571	0.705669802	0.488532252	-0.081456058	0.164744248	-0.081456058	0.164744248
MTV (Export)	0.218220963	0.239658112	0.910551123	0.373376044	-0.281697099	0.718139026	-0.281697099	0.718139026
FR(OB)	-0.368057623	0.108372639	-3.396222774	0.002866213	-0.594118986	-0.14199626	-0.594118986	-0.14199626
ACM	-0.559045219	0.44678622	-1.251258866	0.225278989	-1.491024942	0.372934505	-1.491024942	0.372934505

Appendix Q

Regression analysis output: Summary Output model OB1.3- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 1.3

<i>Regression Statistics</i>	
Multiple R	0.68971042
R Square	0.475700464
Adjusted R Square	0.325900597
Standard Error	0.06979779
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	0.092823245	0.015470541	3.175573332	0.022341147
Residual	21	0.102306363	0.004871732		
Total	27	0.195129608			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	11.58979246	1.624424273	7.134707759	4.9041E-07	8.211617254	14.96796767	8.211617254	14.96796767
AGSGDP	-0.339810288	0.187888513	-1.808574045	0.084859712	-0.730545841	0.050925265	-0.730545841	0.050925265
INSGDP	0.410050683	0.188086615	2.180116237	0.040771489	0.018903155	0.80119821	0.018903155	0.80119821
EXR	0.43574917	0.323074193	1.348758828	0.191780632	-0.236120395	1.107618736	-0.236120395	1.107618736
MTV (Export)	0.302438115	0.20533032	1.472934515	0.155599851	-0.124569661	0.729445892	-0.124569661	0.729445892
FR(OB)	-0.346440411	0.10270285	-3.373230737	0.002872924	-0.56002268	-0.13285814	-0.56002268	-0.13285814
ACM	-0.636418269	0.427914981	-1.487254004	0.1518096	-1.526316187	0.25347965	-1.526316187	0.25347965

Appendix R

Regression analysis output: Summary Output model OB1.4- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 1.4

<i>Regression Statistics</i>	
Multiple R	0.655959132
R Square	0.430282383
Adjusted R Square	0.300801107
Standard Error	0.071085344
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	0.083960833	0.016792167	3.323124352	0.021914995
Residual	22	0.111168775	0.005053126		
Total	27	0.195129608			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	10.82422307	1.550105899	6.982892641	5.2209E-07	7.609500196	14.03894595	7.609500196	14.03894595
AGSGDP	-0.4048801	0.184938823	-2.189265041	0.039475738	-0.788419745	-0.02134046	-0.788419745	-0.021340456
INSGDP	0.404664832	0.191513056	2.112988229	0.046179112	0.007491064	0.801838601	0.007491064	0.801838601
MTV (Export)	0.406058561	0.193928515	2.093856904	0.048013851	0.003875436	0.808241686	0.003875436	0.808241686
FR(OB)	-0.336085891	0.104304766	-3.222152773	0.003921794	-0.552400736	-0.11977105	-0.552400736	-0.119771046
ACM	-0.322703064	0.365806189	-0.882169502	0.387222602	-1.081338667	0.43593254	-1.081338667	0.43593254

Appendix S

Regression analysis output: Summary Output model OB1.5- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model OB 1.5

<i>Regression Statistics</i>	
Multiple R	0.640413398
R Square	0.410129321
Adjusted R Square	0.307543116
Standard Error	0.070741794
Observations	28

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0.080028373	0.020007093	3.997899335	0.013207862
Residual	23	0.115101234	0.005004401		
Total	27	0.195129608			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	11.40495551	1.39659531	8.166256489	3.00834E-08	8.515877996	14.29403303	8.515877996	14.29403303
AGSGDP	-0.449343285	0.177078225	-2.537541163	0.018400847	-0.815657503	-0.08302907	-0.815657503	-0.083029067
INSGDP	0.280877106	0.129704317	2.16551856	0.04096367	0.012563283	0.549190929	0.012563283	0.549190929
MTV (Export)	0.340540844	0.178277751	1.910170187	0.068658672	-0.028254781	0.70933647	-0.028254781	0.70933647
FR(OB)	-0.342880704	0.103517266	-3.312304494	0.003038817	-0.557022484	-0.12873892	-0.557022484	-0.128738925

Appendix T

Regression analysis output: Summary Output model IB1.1- Outbound volume in Kgs
as dependent variable

SUMMARY OUTPUT- Model IB 1.1

<i>Regression Statistics</i>	
Multiple R	0.84947895
R Square	0.721614487
Adjusted R Square	0.604399534
Standard Error	0.14891586
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	8	1.092179752	0.136522469	6.156334734	0.00055987
Residual	19	0.421342735	0.022175933		
Total	27	1.513522487			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.262385956	6.641813973	0.641750277	0.528702407	-9.639090454	18.16386237	-9.639090454	18.16386237
AGSGDP	-1.211380471	0.535046593	-2.264065387	0.035463421	-2.33124586	-0.091515082	-2.33124586	-0.091515082
INSGDP	0.011052858	0.397982843	0.027772196	0.978133476	-0.821934806	0.844040521	-0.821934806	0.844040521
SVSGDP	3.668845175	1.087779275	3.372784589	0.003195124	1.392096987	5.945593363	1.392096987	5.945593363
EXR	-0.64089651	0.675131281	-0.949291684	0.354391748	-2.05396252	0.7721695	-2.05396252	0.7721695
BP	-0.295387725	0.138378524	-2.134635604	0.046034925	-0.585017305	-0.005758145	-0.585017305	-0.005758145
MTV (Import)	-1.582240119	0.559599704	-2.827449887	0.010759794	-2.753495759	-0.410984478	-2.753495759	-0.410984478
FR(IB)	0.312722779	0.184293829	1.696870591	0.106042815	-0.073008639	0.698454197	-0.073008639	0.698454197
ACM	-0.555035367	1.034342016	-0.536607194	0.597766766	-2.719938087	1.609867353	-2.719938087	1.609867353

Appendix U

Regression analysis output: Summary Output model IB1.2- Outbound volume in Kgs as dependent variable

SUMMARY OUTPUT- Model IB 1.2

<i>Regression Statistics</i>	
Multiple R	0.849472298
R Square	0.721603186
Adjusted R Square	0.624164301
Standard Error	0.145148172
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	7	1.092162648	0.156023235	7.405700359	0.0001916
Residual	20	0.421359839	0.021067992		
Total	27	1.513522487			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.332612321	5.986239283	0.723761967	0.477592812	-8.15446401	16.81968865	-8.15446401	16.81968865
AGSGDP	-1.212270721	0.520572705	-2.328725091	0.030473549	-2.298166356	-0.126375085	-2.298166356	-0.126375085
SVSGDP	3.667460025	1.059142541	3.462668983	0.002458558	1.458127399	5.876792652	1.458127399	5.876792652
EXR	-0.643268939	0.652761011	-0.98545858	0.336171389	-2.004904547	0.718366669	-2.004904547	0.718366669
BP	-0.295644871	0.134575167	-2.196875383	0.039982275	-0.57636375	-0.014925992	-0.57636375	-0.014925992
MTV (Import)	-1.58151881	0.544853608	-2.902649056	0.008801814	-2.71806352	-0.444974101	-2.71806352	-0.444974101
FR(IB)	0.311720892	0.176155946	1.769573488	0.092044515	-0.055733973	0.679175757	-0.055733973	0.679175757
ACM	-0.540057804	0.860289119	-0.627763146	0.537261661	-2.33458946	1.254473853	-2.33458946	1.254473853

Appendix V

Regression analysis output: Summary Output model IB1.3- Outbound volume in Kgs as dependent variable

SUMMARY OUTPUT- Model IB 1.3

<i>Regression Statistics</i>	
Multiple R	0.846237297
R Square	0.716117563
Adjusted R Square	0.635008296
Standard Error	0.143038864
Observations	28

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	1.083860035	0.180643339	8.829047342	7.1506E-05
Residual	21	0.429662451	0.020460117		
Total	27	1.513522487			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.822091196	5.844556132	0.653957479	0.520236918	-8.332328653	15.97651104	-8.332328653	15.97651104
AGSGDP	-1.173925811	0.509463986	-2.304237088	0.031521225	-2.233414169	-0.114437453	-2.233414169	-0.114437453
SVSGDP	3.495281951	1.008147435	3.467034511	0.002304614	1.398724587	5.591839315	1.398724587	5.591839315
EXR	-0.80629615	0.590175348	-1.366197611	0.186329665	-2.033632974	0.421040674	-2.033632974	0.421040674
BP	-0.27329115	0.127892733	-2.136877869	0.044534135	-0.539258648	-0.007323653	-0.539258648	-0.007323653
MTV (Import)	-1.658418273	0.523189537	-3.169823086	0.004615314	-2.746450477	-0.570386068	-2.746450477	-0.570386068
FR(IB)	0.33172558	0.170731954	1.942961304	0.065547844	-0.023330955	0.686782115	-0.023330955	0.686782115

Appendix W

Regression analysis output: Summary Output model IB1.4- Outbound volume in Kgs as dependent variable

SUMMARY OUTPUT- Model IB 1.4

<i>Regression Statistics</i>	
Multiple R	0.831195451
R Square	0.690885877
Adjusted R Square	0.620632668
Standard Error	0.145828538
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	1.045671311	0.209134262	9.83422509	4.81706E-05
Residual	22	0.467851176	0.021265963		
Total	27	1.513522487			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.608657053	5.929561359	0.777234061	0.4452984	-7.688500554	16.90581466	-7.688500554	16.90581466
AGSGDP	-0.879170457	0.470526882	-1.868480824	0.075070061	-1.854983486	0.096642572	-1.854983486	0.096642572
SVSGDP	2.87014797	0.915845614	3.133877508	0.004826747	0.970800417	4.769495523	0.970800417	4.769495523
BP	-0.248021134	0.129016176	-1.922403383	0.067598331	-0.515584308	0.01954204	-0.515584308	0.01954204
MTV (Import)	-1.63500403	0.533107002	-3.066934077	0.005644431	-2.740600283	-0.529407777	-2.740600283	-0.529407777
FR(IB)	0.374481495	0.171112526	2.188510123	0.039537519	0.019615836	0.729347153	0.019615836	0.729347153

Appendix X

Regression analysis output: Summary Output Model In & Out 2.1- Outbound volume
in AWBs as dependent variable

SUMMARY OUTPUT- Model In&Out 2.1

<i>Regression Statistics</i>	
Multiple R	0.826793588
R Square	0.683587636
Adjusted R Square	0.550361378
Standard Error	0.11176575
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	8	0.512757273	0.064094659	5.131027809	0.001642828
Residual	19	0.237340075	0.012491583		
Total	27	0.750097347			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	25.86622323	8.736774134	2.960614849	0.00803152	7.579944809	44.15250165	7.579944809	44.15250165
AGSGDP	-0.77367375	0.439345732	-1.760967945	0.094330245	-1.693234935	0.145887434	-1.693234935	0.145887434
INSGDP	-0.266284119	0.343904643	-0.774296375	0.448284165	-0.986084809	0.453516572	-0.986084809	0.453516572
SVSGDP	1.710747895	0.858786156	1.992053415	0.060934578	-0.086712188	3.508207977	-0.086712188	3.508207977
EXR	-0.057659592	0.566368976	-0.101805704	0.919977628	-1.243083483	1.127764298	-1.243083483	1.127764298
BP	-0.199191406	0.142283728	-1.399959144	0.17764282	-0.49699467	0.098611859	-0.49699467	0.098611859
WGDP	-0.333432744	1.401288742	-0.237947208	0.814469245	-3.266363789	2.599498302	-3.266363789	2.599498302
MTV	-1.114543156	0.563746242	-1.977029862	0.062733095	-2.294477601	0.06539129	-2.294477601	0.06539129
ACM	-0.598103573	0.794729719	-0.7525874	0.460921139	-2.261491991	1.065284846	-2.261491991	1.065284846

Appendix Y

Regression analysis output: Summary Output Model In & Out 2.2- Outbound volume in AWBs as dependent variable

SUMMARY OUTPUT- Model In&Out 2.2

<i>Regression Statistics</i>	
Multiple R	0.826689201
R Square	0.683415035
Adjusted R Square	0.572610297
Standard Error	0.108965486
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	7	0.512627805	0.073232544	6.167742006	0.000615619
Residual	20	0.237469542	0.011873477		
Total	27	0.750097347			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	26.35218935	7.134124056	3.693822695	0.001437752	11.47066734	41.23371136	11.47066734	41.23371136
AGSGDP	-0.752885873	0.379265517	-1.985115546	0.061017408	-1.544019878	0.038248132	-1.544019878	0.038248132
INSGDP	-0.255203064	0.318052097	-0.802393906	0.43175706	-0.918648112	0.408241984	-0.918648112	0.408241984
SVSGDP	1.693675023	0.821150596	2.062563226	0.052383565	-0.019215105	3.406565151	-0.019215105	3.406565151
BP	-0.19376514	0.128617953	-1.506517053	0.147566948	-0.462057489	0.074527209	-0.462057489	0.074527209
WGDP	-0.400423018	1.20618447	-0.331974941	0.743362039	-2.916479734	2.115633697	-2.916479734	2.115633697
MTV	-1.114041243	0.549600697	-2.027001146	0.056201864	-2.260488208	0.032405722	-2.260488208	0.032405722
ACM	-0.633739543	0.695613693	-0.911050989	0.373118979	-2.08476428	0.817285194	-2.08476428	0.817285194

Appendix Z

Regression analysis output: Summary Output Model In & Out 2.3- Outbound volume
in AWBs as dependent variable

SUMMARY OUTPUT- Model In&Out 2.3

<i>Regression Statistics</i>	
Multiple R	0.825633415
R Square	0.681670535
Adjusted R Square	0.59071926
Standard Error	0.106632008
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6	0.51131926	0.085219877	7.494898022	0.000218304
Residual	21	0.238778087	0.011370385		
Total	27	0.750097347			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	24.1455668	2.535595756	9.522640485	4.53054E-09	18.87250676	29.41862684	18.87250676	29.41862684
AGSGDP	-0.789905111	0.354738638	-2.226724201	0.037041047	-1.527624494	-0.05218573	-1.527624494	-0.052185728
INSGDP	-0.300570958	0.28104485	-1.069476839	0.29699428	-0.885035719	0.283893803	-0.885035719	0.283893803
SVSGDP	1.675459977	0.801769894	2.089701783	0.048995325	0.008088206	3.342831748	0.008088206	3.342831748
BP	-0.22389161	0.089191772	-2.510227158	0.020323873	-0.409376054	-0.03840716	-0.409376054	-0.038407165
MTV	-1.138426469	0.533005871	-2.135861031	0.044626287	-2.246872858	-0.02998008	-2.246872858	-0.029980081
ACM	-0.62794685	0.680503039	-0.92276862	0.366609136	-2.043130393	0.787236692	-2.043130393	0.787236692

Appendix AA

Regression analysis output: Summary Output Model In & Out 2.4- Outbound volume
in AWBs as dependent variable

SUMMARY OUTPUT- Model In&Out 2.4

<i>Regression Statistics</i>	
Multiple R	0.817779313
R Square	0.668763004
Adjusted R Square	0.593481869
Standard Error	0.10627152
Observations	28

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	0.501637356	0.100327471	8.883540361	9.87052E-05
Residual	22	0.248459992	0.011293636		
Total	27	0.750097347			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	24.72077113	2.449471622	10.09228721	1.02108E-09	19.6408779	29.80066436	19.6408779	29.80066436
AGSGDP	-0.706950726	0.341998721	-2.067115115	0.050688134	-1.416212663	0.002311211	-1.416212663	0.002311211
INSGDP	-0.448856653	0.2297912	-1.953323941	0.063615549	-0.925414434	0.027701129	-0.925414434	0.027701129
SVSGDP	1.404323346	0.743466794	1.888885095	0.072161833	-0.137532415	2.946179106	-0.137532415	2.946179106
BP	-0.20525244	0.086580729	-2.370648085	0.02694	-0.384809883	-0.025695	-0.384809883	-0.025694997
MTV	-1.217448724	0.524302974	-2.322032838	0.029880981	-2.304786542	-0.13011091	-2.304786542	-0.130110906

Appendix AB

Quarterly OB log values of the dependent and independent variables

Weight Volume(OB)	AWB Volume(OB)	Revenue Volume(OB)	AGSGDP	INSGDP	SVSGDP	EXR	BP	WGDP	MTV (Export)	FR(OB)	ACM
13.2338	12.0423	15.5993	11.8938	13.4697	13.9513	4.8532	4.6330	9.8329	12.6125	2.5003	7.6121
13.2085	12.0206	15.6260	11.9320	13.3334	13.9633	4.8726	4.6325	9.8329	12.6781	2.5524	7.6121
13.2166	12.0315	15.7233	11.9601	13.3869	14.0469	4.8505	4.6242	9.8329	12.6733	2.6415	7.6121
13.1593	12.0157	15.4271	12.1844	13.3913	14.0726	4.8304	4.6548	9.8329	12.6083	2.4026	7.6121
13.1572	11.9638	15.5472	12.0591	13.5698	14.0895	4.8304	4.5984	9.8610	12.5820	2.6003	7.6548
13.2769	12.0996	15.6502	12.0801	13.4098	14.1105	4.8694	4.6765	9.8610	12.7736	2.5779	7.6548
13.2450	12.0706	15.5903	12.1005	13.4397	14.1395	4.8629	4.6493	9.8610	12.9017	2.5518	7.6548
13.4057	12.0976	15.6139	12.2376	13.4029	14.1271	4.8621	4.6411	9.8610	12.8162	2.1656	7.6548
13.3288	12.0736	15.6098	12.1341	13.5734	14.1378	4.8599	4.6664	9.8878	12.7470	2.3456	7.6738
13.3372	12.1102	15.6483	12.1953	13.3973	14.1923	4.8581	4.6089	9.8878	12.8251	2.0726	7.6738
13.4177	12.1333	15.7118	12.2106	13.5271	14.2277	4.8652	4.3120	9.8878	12.8215	2.0089	7.6738
13.3333	12.0940	15.5637	12.4077	13.5136	14.2522	4.8797	3.9430	9.8878	12.8570	2.1342	7.6738
13.2539	12.1105	15.6110	12.2567	13.5566	14.2066	4.8877	4.1019	9.8326	12.7372	2.1471	7.7352
13.2274	12.0776	15.5967	12.2906	13.4325	14.2552	4.8952	3.8871	9.8326	12.7690	2.0611	7.7352
13.2796	12.1423	15.6250	12.2751	13.5388	14.2752	4.9408	3.7428	9.8326	12.7845	2.2050	7.7352
13.2539	12.1105	15.6110	12.4447	13.5454	14.3277	4.9591	3.4879	9.8326	12.8848	2.2659	7.7352
13.3822	12.1064	15.7102	12.2538	13.7457	14.2576	4.9678	3.8020	9.8465	12.7562	2.3495	7.8410
13.2875	12.1095	15.6367	12.3228	13.5146	14.3083	4.9690	3.7996	9.8465	12.8653	2.2565	7.8410
13.3020	12.1173	15.6465	12.2938	13.6441	14.3634	4.9858	3.8930	9.8465	12.8297	2.3115	7.8410
13.3075	12.1109	15.6518	12.3802	13.6198	14.4301	5.0040	3.9693	9.8465	12.9443	2.3263	7.8410
13.3372	11.9824	15.5407	12.3142	13.8285	14.3475	5.0148	3.9001	9.9030	12.8983	2.2468	7.8583
13.0511	11.5876	15.5901	12.4598	13.6099	14.4217	5.0187	3.9157	9.9030	13.0474	2.3037	7.8583
13.3080	11.7784	15.7382	12.4555	13.7447	14.4952	5.0200	4.0721	9.9030	13.0181	2.2333	7.8583
13.2139	11.6581	15.7221	12.6345	13.7136	14.4908	4.8505	4.1685	9.9030	13.0450	2.2553	7.8583
13.3262	11.6743	15.7403	12.4917	13.9079	14.4532	5.0489	4.2683	9.9612	12.9784	2.2653	7.9338
13.2599	11.7922	15.7334	12.5611	13.6834	14.5223	5.0724	4.2910	9.9612	13.1438	2.3167	7.9338
13.4422	11.7902	15.6945	12.5429	13.8078	14.5752	5.1583	4.1641	9.9612	13.1749	2.3022	7.9338
13.3456	11.7538	15.7229	12.6304	13.7483	14.5829	5.1795	4.1027	9.9612	13.1595	2.3046	7.9338

Appendix AC

Quarterly IB log values of the dependent and independent variables

Weight Volume(I B)	AWB Volume(I B)	Revenue Volume(I B)	AGSGDP	INSGDP	SVSGDP	EXR	BP	WGDP	MTV (Export)	FR(IB)	ACM
12.22229	10.27395	14.83644	11.89377965	13.46966977	13.95133649	4.853167	4.633044	9.832942	13.26466	2.874313	7.612171
12.31235	10.28609	14.88669	11.93199494	13.33339415	13.96334724	4.872583	4.632502	9.832942	13.27147	2.862732	7.612171
12.39699	10.33527	14.84536	11.96005839	13.3868944	14.04692971	4.850458	4.62424	9.832942	13.38311	2.710731	7.612171
12.41165	10.37807	14.88785	12.18443712	13.39125357	14.07255214	4.830427	4.654786	9.832942	13.25667	2.755989	7.612171
12.48655	10.32022	14.9775	12.05911917	13.56982777	14.08953439	4.830403	4.598351	9.86104	13.27216	2.663193	7.655785
12.5714	10.46948	15.0051	12.08012021	13.40977085	14.11051403	4.869398	4.676477	9.86104	13.26918	2.605912	7.655785
12.68419	10.51178	15.04401	12.100539	13.43969432	14.13948263	4.862874	4.6493	9.86104	13.29023	2.300783	7.655785
12.66694	10.43023	14.9981	12.23764303	13.4029389	14.12707397	4.862096	4.641063	9.86104	13.33854	2.711575	7.655785
12.64883	10.51975	15.16625	12.13413694	13.5733798	14.13777396	4.859933	4.666433	9.887773	13.22265	2.726459	7.672991
12.86346	10.89879	15.18773	12.19531105	13.39725169	14.19230853	4.858116	4.608919	9.887773	13.43286	2.979492	7.672991
12.87197	10.67521	15.11405	12.2106222	13.52713914	14.22771477	4.865213	4.312036	9.887773	13.42942	2.918406	7.672991
12.76543	10.53678	15.01226	12.4077374	13.51355441	14.25222723	4.879712	3.943026	9.887773	13.36034	2.659432	7.672991
13.03608	10.9304	15.20783	12.25673167	13.55658589	14.20662528	4.887661	4.101853	9.832553	13.3606	2.80868	7.734741
12.96247	10.86303	15.16742	12.29063348	13.43248891	14.25518536	4.895203	3.887115	9.832553	13.35159	2.846515	7.734741
13.10464	10.99351	15.24667	12.27511634	13.53876511	14.27518603	4.940767	3.742762	9.832553	13.42218	2.925173	7.734741
13.03608	10.9304	15.20783	12.44466134	13.54541287	14.32772819	4.959131	3.487885	9.832553	13.40203	2.835731	7.734741
12.87113	10.73674	15.22376	12.2538357	13.74568684	14.25755549	4.967817	3.80201	9.846524	13.43754	2.623945	7.841558
12.87113	10.73674	15.22376	12.32276633	13.51464878	14.30833047	4.969015	3.799576	9.846524	13.41254	2.605419	7.841558
12.87113	10.73674	15.22376	12.29384754	13.64408255	14.36335841	4.98576	3.892999	9.846524	13.56637	2.627626	7.841558
12.87113	10.73674	15.22376	12.38018199	13.61977339	14.43010061	5.003956	3.969327	9.846524	13.58744	2.673025	7.841558
13.01142	10.89704	15.36372	12.31418305	13.82845966	14.3475044	5.014787	3.900108	9.903017	13.51663	2.526299	7.858093
12.5687	10.41606	14.76918	12.45982213	13.60988362	14.42166445	5.018714	3.915683	9.903017	13.5719	2.571839	7.858093
12.72063	10.63823	14.84923	12.45548956	13.74469777	14.49524309	5.020031	4.072099	9.903017	13.68434	1.868042	7.858093
12.45234	10.25746	14.55398	12.63446804	13.71363142	14.4908418	4.850458	4.16849	9.903017	13.73674	2.350305	7.858093
12.44348	10.28325	14.41314	12.49169994	13.90788355	14.45323292	5.0489	4.268298	9.961152	13.66781	2.270639	7.934185
12.65207	10.40326	14.84191	12.56108516	13.6834132	14.52234103	5.072427	4.290977	9.961152	13.67959	2.087086	7.934185
12.6597	10.31866	14.84125	12.54292503	13.80781085	14.57524818	5.158319	4.164095	9.961152	13.76083	2.082398	7.934185
12.58998	10.33634	14.7181	12.63037446	13.74831228	14.58292056	5.179525	4.102662	9.961152	13.72104	2.202131	7.934185

Appendix AD

Quarterly Total volume log values of the dependent and independent variables

Weight Volume	AWB Volume	Revenue Volume	AGSGDP	INSGDP	SVSGDP	EXR	BP	WGDP	MTV	FR(OB)	ACM
13.54398	12.19986	15.98204	11.8937797	13.46967	13.9513365	4.853167	4.633044	9.832942	13.68397	2.704686	8.305299
13.55074	12.18312	16.01631	11.9319949	13.333394	13.9633472	4.872583	4.632502	9.832942	13.71132	2.719539	8.305299
13.58166	12.19988	16.07087	11.9600584	13.386894	14.0469297	4.850458	4.62424	9.832942	13.78305	2.676718	8.305299
13.54693	12.19334	15.88655	12.1844371	13.391254	14.0725521	4.830427	4.654786	9.832942	13.67727	2.594838	8.305299
13.57021	12.1405	15.99553	12.0591192	13.569828	14.0895344	4.830403	4.598351	9.86104	13.67863	2.632244	8.348459
13.67825	12.2785	16.07195	12.0801202	13.409771	14.110514	4.869398	4.676477	9.86104	13.74492	2.592024	8.348459
13.69656	12.26156	16.04714	12.100539	13.439694	14.1394826	4.862874	4.6493	9.86104	13.80786	2.43414	8.348459
13.7962	12.27045	16.04581	12.237643	13.402939	14.127074	4.862096	4.641063	9.86104	13.80426	2.475402	8.348459
13.73867	12.26542	16.10559	12.1341369	13.57338	14.137774	4.859933	4.666433	9.887773	13.70598	2.554071	8.366545
13.82128	12.37083	16.13747	12.1953111	13.397252	14.1923085	4.858116	4.608919	9.887773	13.8676	2.625514	8.366545
13.87473	12.34246	16.15009	12.2106222	13.527139	14.2277148	4.865213	4.312036	9.887773	13.86411	2.563671	8.366545
13.78228	12.28522	16.01868	12.4077374	13.513554	14.2522272	4.879712	3.943026	9.887773	13.83315	2.430898	8.366545
13.84404	12.3784	16.12272	12.2567317	13.556586	14.2066253	4.887661	4.101853	9.832553	13.78987	2.531631	8.428125
13.79685	12.33754	16.09806	12.2906335	13.432489	14.2551854	4.895203	3.887115	9.832553	13.79528	2.529016	8.428125
13.8891	12.41766	16.14679	12.2751163	13.538765	14.275186	4.940767	3.742762	9.832553	13.84647	2.628554	8.428125
13.84404	12.3784	16.12272	12.4446613	13.545413	14.3277282	4.959131	3.487885	9.832553	13.86965	2.590874	8.428125
13.8521	12.33291	16.1894	12.2538357	13.745687	14.2575555	4.967817	3.80201	9.846524	13.84695	2.496095	8.534427
13.79399	12.33533	16.14455	12.3227663	13.514649	14.3083305	4.969015	3.799576	9.846524	13.86905	2.446118	8.534427
13.80274	12.34157	16.15043	12.2938475	13.644083	14.3633584	4.98576	3.892999	9.846524	13.95752	2.482022	8.534427
13.80609	12.33649	16.15363	12.380182	13.619773	14.4301006	5.003956	3.969327	9.846524	14.00984	2.514616	8.534427
13.88065	12.27339	16.14927	12.3141831	13.82846	14.3475044	5.014787	3.900108	9.903017	13.94766	2.396285	8.551353
13.53186	11.85755	15.95474	12.4598221	13.609884	14.4216645	5.018714	3.915683	9.903017	14.03679	2.446729	8.551353
13.75	12.05588	16.08252	12.4554896	13.744698	14.4952431	5.020031	4.072099	9.903017	14.09886	2.067275	8.551353
13.59708	11.87843	15.99288	12.634468	13.713631	14.4908418	4.850458	4.16849	9.903017	14.14267	2.30395	8.551353
13.67239	11.89653	15.97558	12.4916999	13.907884	14.4532329	5.0489	4.268298	9.961152	14.07451	2.267952	8.627153
13.69461	12.01483	16.07699	12.5610852	13.683413	14.522341	5.072427	4.290977	9.961152	14.1403	2.208486	8.627153
13.81879	11.99688	16.04938	12.542925	13.807811	14.5752482	5.158319	4.164095	9.961152	14.20334	2.198302	8.627153
13.7307	11.97075	16.0349	12.6303745	13.748312	14.5829206	5.179525	4.102662	9.961152	14.17232	2.254669	8.627153