ESTIMATION OF SOURCE DIFFERENTIATED IMPORT DEMAND FUNCTION OF BLACK TEA IN PAKISTAN

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CERTIFICATE

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Abstract

Pakistani tea market is one of the largest tea import markets as it ranked third among the world import markets for tea. Nevertheless, there is no economic research has been done on Pakistan tea market. Accordingly, this paper is the first study analysing the Pakistan import demand for tea differentiated by source of production. Thus, the source differentiated Almost Ideal Demand System (SDAIDS), in which sources of tea are differentiated and the expenditure is treated as endogenous, has been adopted. Pakistan imports average 85% of black tea imports from these five countries. To estimate SDAIDS parameters data required on three variables, Prices for every import origin, expenditure share of a particular country in the overall black tea import and overall expenditure on black tea import. The data of import quantity (measure in metric tons) and Cost, Insurance, and Freight (CIF) import values (measure in thousand Pakistani rupees) is obtained from (PBS) publications.

The results showed that Pakistani tea consumers are more sensitive to prices and all of the countries have expenditure elasticities positive and greater than one except Kenya. The share of Kenya for the last 10 to 15 years is continuously increasing while the share of the other tea exporters to Pakistan is fluctuating. Despite the advantage of PSFTA, Sri-Lanka continued to face fierce competition for the Pakistan export market from the Kenya and Other countries. Furthermore Sri Lanka has opportunity to increase their exports to Pakistan by removing trade barriers rather than price reduction. Indonesia and Tanzania has the largest expenditure elasticity and high own-price elasticity indicating that both encountered sever competition in the Pakistani market. Both of them have to adopt Price decrease policy to increase their share.

Keywords: Tea – Source Differentiated Almost Ideal Demand system – Pakistan, PBS

Chapter 1

Introduction

1.1 Introduction

Estimation of import demand function is an effective approach for building economic models and predicting possible development scenarios for international trade (Oktay and Gozgor, 2013). Conventionally linear and log linear import demand functions are widely employed. This specification of import demand functions are usually based on the homogenous products, that is it treats particular product imported from all the countries as perfect substitutes (Sarmad, 1987)**.** The functional form incorporated by (Armington, 1969) treated all the imports of a particular product from range countries as imperfect substitutes.

Winter, (1984) raised objections about Armington's (1969) import demand elasticities parameters biasedness. While Yang and Koo, (1994) empirically found, these parameters are biased due to its functional form, that is based on constant elasticity of substitution (CES) and it also do not satisfies the basic assumption of homogeneity[1] which may lead to biased parameter estimates (Yang and Koo, 1994). Homogeneity and any other theoretical property can be rejected due to incorrect specification of the model.

The import demand specifications; Rotterdam and the almost ideal demand system (AIDS) could be adopted by the trade economist to estimate the import demand (Winter, 1984). Both of these models represent flexible demand system, it also fulfill

the condition of additivity of the utility function[1]. It also justifies the $axiom\ of\ choice$ [2] exactly. One common characteristic of these import demand functions is the use of the non-source differentiation, which becomes a limitation if one wishes to obtain detailed results with respect to particular country. Because parameters of these import demand function do not provide statistics about different sources of import. Considering this (Winters, 1984) modified AIDS model into the Source Differentiated Almost Ideal Demand System (SDAIDS). Furthermore, Yang and Koo (1994) provided a more general and systematic specification for the SDAIDS model by including multiple products and multiple sources.

Import demand specifications used by the Classical and Neoclassical trade economist to justify comparative advantage, they give importance to import supply and takes import demand for granted (Chiarlone, 2000). In contrast to this source differentiated import demand function consider products that are differentiated, by source of supply, it emphasize on the export competition among exporters instead of trade between countries focused on comparative advantage. In order to understand clearly, generally source differentiated import demand function is estimated with reference to a single commodity. Source differentiation analysis is suitable for those commodities of which domestic production is negligible and country fulfill demand of products through imports. To analyze source differentiation researchers find out the commodities that have prominent share in world trade.

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[1] Additivity also called linearity or modularity; it means that "the whole is equal to the sum of its parts.

[2] $Axioms\ of$ choice, there exists a function that chooses one subset from the given set, even it is infinite.

Pakistan's tea import share in the world trade was 4% Small and Medium Enterprise Development Authority report, 2007 (SMEDA) and 7.5 per cent Food and Agriculture Organization of United Nations (FAO) 2017.This is massive amount of import of tea by any country. According to the Pakistan Economic Survey (PES) the trade balance of agricultural products during the period 2007- 08 to 2018-19 is in deficit. Despite agriculture based economy it has also become a net importer of food products. In the food group of imports the share of tea is 12 per cent PES 2017-18.In Pakistan the value of tea imports represents almost 2.2 times the food trade deficit in 2017-18 PES.

Pakistan have recently signed bilateral free trade agreements (FTA), it is expected that it will further lead to expansion in the import demand of the black tea. Such as Afghanistan Pakistan Transit Trade Agreement (APTTA) to curb smuggling of tea, Pakistan Sri Lanka free Trade Agreement –PSFTA duty free excess to tea and Pakistan has reduced tariff rate from 33% to 10% for Kenyan tea. Major steps taken towards the tea trade liberalization led to imported black tea import market complex and fragmented. Understanding the import demand of black tea, that is source differentiated and the factors (import prices and expenditure on imports) shaping it would provide helpful insight about this complex market.

China is the largest exporter of tea but its exports to Pakistan is minimal according to Pakistan Bureau of Statistics (PBS). Same is the case with Sri Lanka. During 1980's Sri Lanka was the largest exporter of tea to Pakistan. However, its share of tea exports to Pakistan is decreasing gradually even after FTA has been signed between the two countries. On the other hand, the share of Kenya for the last 10 to 15 years is continuously increasing while the share of the other tea exporters to Pakistan is fluctuating. Despite the advantage of PSFTA, Sri-Lanka continued to face fierce

competition for the Pakistan export market from the Kenya and Other countries. Thus it can be inferred that this competitive analysis pushing us towards a source based differentiated study.

Pakistan completely depends on the international tea market to cater domestic demand of the black tea, dependency on global tea market increasing further as import share is increasing. To understand the behavior of import with respect to change in domestic income or imported tea prices, as well as the tea import pattern with different importing countries are important for the tea market player in the Pakistan. Muhammad and Jones, (2011) found that import preferences toward different sources of specific product are not same. They further illustrate if we consider homogenous preferences towards different exporting countries, it will lead to significant information loss, which will not provide cross countries behavior.

Despite the importance of the topic, most of the previous studies (Shah et al., 2018) estimated the domestic demand for black tea. While Manan et al., (2017) analyzed the behavior of tea consumer in domestic market. Similarly Memon, (2013) analyzed domestic tea market and its dominant players. On the other hand Consulate General of Sri Lanka, Karachi, (2016) and SMEDA, (2007) explored the investment opportunities for tea companies in Pakistan.

In contrast to these studies those studies focusing domestic market it is important to mention that domestic production of tea is negligible and these investment opportunities will lead to significant increase in import of black tea. It shows that import demand analysis of black tea is imperative, however in the existing literature Irum et al, (2015) and Ejaz & Hussain, (2011) estimated the import demand function of black tea. While the objective of these two studies is to predict the future trend and find the determinant of import demand of black tea. These studies import

demand function lead to significant information loss, as mentioned (Muhammad and Jones, 2011) due to non-source-differentiated import demand function, which can further lead to aggregation biasedness as mentioned previously.

1.2 Problem Statement

Import demand of black tea is to be estimated by utilizing the specification of source differentiated AIDS for Pakistan. Aggregation over source of supply is to be tested while focusing on finding out whether black tea from various exporting countries should be preserved as disparate commodities. For estimating the import demand function the use of source differentiation is inevitable. This study is also addressing the problem of Stationarity.

1.3 Research Objectives

In this context the objectives of the research paper are;

(1) Provide source differentiated estimates of Pakistan's black tea import demand function.

(2) Country wise commodity analysis is to be done which will tell us their import substitutability or complementary relation amongst countries trading with Pakistan.

(3) The competitiveness of the different exporting sources of the black tea is to be found in terms of economic variables.

(4) Check the validity of aggregation biasedness in Pakistan's tea imports

(5) Investigate the maximum gain to Pakistan from import of tea from countries dominating the Pakistan's tea market.

Chapter 2

Literature Review

2.1 Introduction

Considerable attention is given to the estimation of import demand function by trade economist. In the existing literature, researcher utilized alternative import model to estimate the import demand function. The earlier studies on the import, mostly focused on supply side of import, and considered import demand as for granted. Difference between domestic production and demand was incorporated into the import model to evaluate the import demand function. Price index (Import prices relative to domestic prices) and real income were used to determine the import demand. Before 1970 the import demand specifications are totally dependent on econometric specifications, and criteria for the selection of import demand specification was the goodness of fit score. As Sarmad, (1987) pointed out that there is rarely some import demand specification that is derived from the economic theory. This chapter main emphasis is to discuss the work done on import demand specification.

There are some import demand specifications those are derived from consumer demand and production theory and are estimated by multistage approach analysis. Import is considered as final good (that's ready to consume without any further production process) in the consumer demand based import demand specification. The utility function of import specification based on the consumption of final goods; consequently import demand function is derived from this utility function (Schmitz & Seale, 2002). It implies that import demand specification starts with utility function where importer maximizes their utility with respect to budget constraints.

According to Washington & Kilmer, (2002) production theory considered

imported good as input of production (it implies that there is further need of production process). In case of production theory the objective of the economic agents is to either profit maximization in terms of sale, or cost minimization instead of utility maximization. Producer of imported products used two stage budgeting process, in the first stage they maximized profit while in the second stage they considered cost minimization. Davis & Jensen, (1994) derived this specification of the import demand.

The advantage of the consumer demand based import demand function is, it required specific information on each stage of utility maximization. In the first stage economic agent allocated expenditure for that category with the given prices of that category products. In the second stage they further divided allocated expenditure into sub category expenditure as a function of their sub category prices (Deaton & Meulbauer, 1989). Lee et al., (1990); Seale et al., (1992) raised the objection that, imported good cannot be considered as final good due to intermediate good nature of the imported good and it required further production process (Washington & Kilmer, 2002; Muhammad et al., 2007). Production based import demand specification best fits the import demand data in such conditions.

Numerous algebraic specifications of import demand systems now exist, including the linear and quadratic expenditure systems revealed through reviewing the existing literature. The existing import demand functions incorporated in the studies undergo certain limitations e.g. the Armington model suffers the limitations of homotheticity and symmetry while other conventional import demand function do not incorporate the block seperability and source differentiation. Comparatively, AIDS satisfies the criterion of import demand function while its SDAIDS extension incorporates the block seperability and source differentiation.

SDAIDS empirical estimation of imports' demand considers product

aggregation i.e commodities from different sources is considered as a single product (Honeyberry and Hwang, 2007): as in the case of this study, black tea is imported from multiple countries. The basic principle for product aggregation is that the prices of all the commodities move together by same proportion (Yang and Koo, 1994). This may not hold in the presence of quality differences (li, 2018) as would be the case in black tea import market. Black tea importers may consider tea imported from Kenya totally differently than the tea imported from other countries due to quality differences.

The transaction cost of imports from different sources is different among origins (Johnson et al, 2012). This is the reason that non-source aggregation is not practiced due to which source differentiation incorporation in import demand analysis is necessary. In the next sections we will go through the existing literature on import demand function and present the way that how conventional import demand function transformed into econometric based non-source differentiated import demand function into theoretical based source differentiated import demand function.

2.2 Conventional Non-Source Differentiated Import Demand Function

The importance of import demand function can be observed by various trade economist and they estimated import demand function through several import demand specifications. The focus of the early studies was related with two main determinant of import demand those are; relative price and income of importing countries. Harberger (1953), Hinshaw (1945), Liu (1954), Lovasy & Zassenhaus (1953), Vegh (1941), Adler (1945), Harrod & Hague (1963) and Junz et al., (1973) these are earlier studies on import demand function those incorporated the traditional determinant of import demand to find out import behavior and policy implication for trade balance. The traditional determinants of Aggregate import demand function are relative prices (ration of imports prices to consumer price index) and income (real GDP). Its signs are

also of paramount importance while exploring the aggregate non-source differentiated import demand function.

These determinants were incorporated as a function of import demand while utilizing annual data from 1967-68 to 1984-85 by (Gaffar, 1998) for Trinidad and Tobago and used linear import demand function. His findings indicated that coefficient of income elasticity is positive and more than one, which indicates import as a luxurious good for the economy i.e. when income increases then imports will also increase. Strangely, the relative price sign is positive and value of estimate is less than one which means that if the relative prices increase, still the imports will increase. The reason for this given by the researcher was that there was no close substitute available for the imports.

Moreover, the findings of the above study are not parallel with economic theory. Functional form of the import demand affects the sign and coefficient of parameter and that's why it is imperative to choose the appropriate functional form. Sarmad, (1989) found that estimated elasticities of import demand function are mostly affected by the methodological problems. Empirical model for the dynamic estimation of import demand function can be chosen through the utilization of Box-Cox method in the absence of any economic theory.

Moreover his finding showed that log linear form of import demand best fit the import behavior as compared to any other econometric model for both developed and non-developed countries. In the case of insignificant lagged dependent variable, he suggested functional form test for the equilibrium model. The estimated price and income elasticities of this paper are consistent with economic theory i.e. relative price has negative sign and income has positive.

Similarly, the importance of functional form of the import demand function is

highlighted by another trade economist (Afzal, 2007) and concluded that functional form of import is important to depict the actual behavior of import. He suggested that the selection of the functional form depends on the objective and inclination of the research study. He pointed at the use of log linear form to test the significance of functional form rather than testing the significance of the explanatory behavior. He opted for simultaneous equation model to estimate the import demand function. The resultant estimated price and income elasticity parameters were significant and similar to economic theory.

He also did comparison between OLS and Two Stage Least Squares estimated values for relative price and income elasticities. His findings showed that estimates of OLS and TSLS are insignificant and biased in comparison to simultaneous model. Another study using Double log econometrics technique to estimate the conventional import demand function of edible oil for Pakistan is by (Zaidi, 2014). In his study findings the sign of the relative price is negative and less than one as well as statistically significant while income impacts the import demand positively and its coefficient is less than one.

The problems of functional form have been solved with the passage of time. Trade economist developed functional form that best fit the non-source differentiated import demand function and also formulated the test that can be used to choose the appropriate functional form. However research studies highlighted the issue of spurious regression which can interfere in the significance of the sign and value of the parameter. In this scenario (Rehman, 2007) estimated the traditional non-source differentiated import demand function. The main objective of study was to analyze and provide elasticity estimate of traditional determinant of non-source differentiated import demand that are free from spurious regression influence. This is because in the previous

studies there was problem of stationary while this research tackled this problem.

Non-source differentiated import demand function for Pakistan was estimated through applying the techniques of Johansson and Juselius cointegration techniques. His findings indicated that only long run relationship exists among imports, relative price and income variables. Their signs are consistent with the economic theory and both are inelastic (< 1). This means that the relative prices and income have a miniscule impact on imports.

To find out the appropriate parameters those are not biased another study by (Hye, 2008) used different set of econometrics techniques on the data set available from 1971 to 2007 in order to find the behavior of general determinant (relative price and real income) of non-source differentiated import demand for Pakistan. He used co-integration Engle Granger (1987), Johanson and Juselius (1990), and the autoregressive distributed lag (ARDL) framework by Pesaran and Shin (1996) to find out the robust estimates of import demand function while analyzing the long run relationship between the concerned variables. ECM used for short run dynamics also identifies long run relationship among variables.

Similarly to examine the two stage (short and long run) relationship among import, relative price and real income (Baluch & Bukhari, 2012), they used all the major available time series econometrics techniques, but it was also non-source differentiated import demand study. The main techniques they used were ARDL and bound test. Their findings are in accordance with the previous studies and they again found that income elasticities are greater than one and import is insensitive to relative prices. They suggested that insensitive price can be used to formulate the policy that can curb overall import level and improve the balance of the payment of the country.

Moreover, another study that used time series econometrics techniques to explore the relationship in the short and long run among the concerned variables is by (Tirmaze et al., 2014). They evaluated the conventional non-source differentiated import demand function for Pakistan by using the time series data of 1970 to 2010 to find out variation and continuous growth in import level. They chose vector error correction model and impulse response function for empirical estimation. Their findings indicated that the significance of the variables relative prices and income diminishes in the long run. That is the reason they included additional variables in the model to best fit the import demand function. They incorporated term of trade in the Import demand function which is not used by any other study as a determinant of import demand

The pioneering study among the studies that incorporated the components of traditional non-source differentiated import demand function and used additional variables to forecast the trend of import demand for Pakistan is of (Ghafoor et al., 2005). They analyzed and forecasted the impact of domestic production. This was done through the incorporation of lagged value of government procurement and shocks in wheat imports in their study by using the annual data of 1973 to 2003. A simple linear model was used to estimate the import demand function.

Researcher have pointed out that parameters of import demand function cannot forecast import trend appropriately if there is structural break in the coefficient of import demand. To explore this further (Shabbir & Mahmood, 1991) estimated the non-source differentiated import demand function to check the structural break in the time period from 1959 to 1988 for Pakistan. Chow test was used for structural test.

They divided data into two parts from1959 to 1971 and 1971 to 1988. Their results showed that structural break exists in the 1971period and dummy variable is not

enough to capture the structural change in the simple equation of non-source differentiated import demand function. Conventional variables elasticities are also affected by structural break. Researcher also showed that the parameters found through dummy variables for structural breakthrough might be misleading and would give biased results. Therefore, in order to find out appropriate values of the estimators, structural adjustments must be done.

The above studies indicated that most of the researchers estimated import demand functions using relative price and real income at aggregated level but exchange rate was left out of the function while trade economists believe that exchange rate is substantial variable to understand the phenomena of total import demand of the country. Here it is also important to point out that all these studies are based on econometrics techniques and criterion of selection of different functional form of import demand function are also based on econometrics techniques.

2.3 General Non-Source Differentiated Import Demand Function with Exchange Rate

Economic theory asserts that, the role of exchange rate is very crucial to determine the international flows. Previously, the role of exchange rate was missing in the traditional non-source differentiated import demand function. To find out the behavior of exchange rate (Dutta & Ahmed, 2004) analyzed the annual data 1962-95 to investigate the variables which affect the import demand of India. They concluded that import demand of the country significantly affected by economic activities. The relationship exists among almost all variables in the long run, however exchange rate is ineffective to explain the import demand. Real income impact is positive and the relationship between import and relative price is negative and inelastic, which means removing tariff and non-tariff barriers will not impede the import flow into the economy.

Contrary to previous study (Yazici, 2012) found that exchange rate do impact import demand in the long run instead of short run. He applied double log techniques to find the agricultural products import demand function of turkey by utilizing the data from 1970 to 2003. He used diagnostic and co-integration test instead of applying model selection criteria. He found that, non-source differentiated import demand of turkey is affected by price index in the short run. All the remaining variables are insignificant but the sign of co-efficient of variables are parallel to economic theory. He further stated that in the short run import demand is highly elastic than in the long run. This means that the variables have more impact in the short run than in the long run. However, others variables like income and exchange rate play their role in the long run and are significant as well where income positively impacts imports while exchange rate have a negative effect on import level.

In case of developing economies (Imran & Shilpi, 2008) highlighted the problem of data availability. However he pointed out that available data is not accurate due to nature of the imperfect market and other hurdles. Consequently functional form of non-source differentiated import demand function may lead to parametric biasness if not opted appropriately. They chose structural econometric model to estimate the import demand function. This model's parameter provides enough knowledge about the exchange rate and policy maker can use it to find out equilibrium value of exchange rate by parameterizing the Lagrange of a binding foreign exchange constraint.

Similar econometric technique used in the above study is utilized by (Khan & Majeed, 2018). Their findings are contrary to the above study. They investigated and forecasted the non-source differentiated import demand function during 1978- 2016. The techniques used in this research paper are standard model, revised traditional, dynamic structural and dynamic financial import demand models. They found that short run

elasticities of relative price and economic activities variables are lesser than long run elasticities when co-integrated with these variables. Moreover the result showed that exchange rate is ineffective in the short run while in the long run it does impact the import demand of the country. They concluded that standard demand model best fit the import demands function in case of Pakistan.

On the other hand (Iqbal et al., 2001) used econometric time series techniques of Johansson co-integration with impulse response function. Their aim was to find short and long run behavior of non-source differentiated import demand by using relative price, real income (GDP) and exchange rate volatility. Their findings ofco- integration vectors show that income elasticity is more than unity and positive as well while the magnitude of exchange rate is negative and less than one. Relative price is negative and its magnitude is greater than one. On the other hand the shocks in output and volatility of exchange rate have little impact on import as compared to shocks in relative prices.

Likewise the previous section this section studies lack of economic theory based import demand function. The sole objective of the researcher is to find out import demand behavior by using extensive econometrics techniques. Exchange rate has paramount importance in the determination of import behavior. All of the above studies incorporated exchange rate in their studies through different strategies and find out the impact of exchange rate. However it does not mean that import is solely determined by exchange rate and other general variables. In the developing economies they used import as an intermediate good and their growth of real GDP depends on intermediate expenditure, so there is need to incorporate all those variables at disaggregated level which adds up to make real GDP/income of a country.

2.4 Non-Source Differentiated and GDP Dis-aggregated Import Demand Function.

To highlight the importance of different expenditure components researchers disaggregated the real income variable into different expenditure heads and incorporated into conventional non-source differentiated import behavior. Chani et al., (2011) pointed out that aggregation over component of real income variable cause aggregation biasedness, due to disparate behavior of different component. They further highlighted that the conventional non-source differentiated import demand function which assumes that imported good is a perfect substitute for a domestic good is a highly unrealistic assumption and imperfect substitutability should be taken under consideration in the conventional import demand models.

In this scenario another study (Sajjad et al., 2013) also highlighted that the non-source differentiated import demand function is based on two basic determinants which are price and income. This model faced aggregation biasedness and real income did not incorporate the expenditure impact on overall imports demand. They concluded that expenditure effect should be incorporated into import demand through different expenditure components. These expenditure components of overall income are expenditure on consumption, investment expenditure and expenditure on exports. These all determinant of import demand will help the policy maker to manipulate the overall import in their favor.

Another study that used disaggregated expenditure is (Serge & Yue, 2010). They analyzed the non-source differentiated import demand and its determinant for the Cote D'Ivoire. They heavily relied on the econometric technique of ARDL to find the short and long run behavior of variables and used bound test to check the association between relative prices and import demand function. They found positive relation among export expenditure; consumption expenditure and investment expenditure and

they are all statistically significant while price is negatively associated with import level and significant as well. Furthermore their findings indicated that in the long run import is totally dependent on the export level of the country.

Chani & Chaudhary, (2012) further decomposed real income into four sub heads instead of three sub categories and analyzed non-source differentiated import demand by using the ARDL and bound test approach to find the long run relationship among variables for Pakistan. They used expenditure components like household consumption, government expenditure, export expenditure and expenditure on investment. Their finding shows import is positively related with component of expenditure and statistically significant as well.

Similarly (Marwat, 2015) assessed the association between non-source differentiated import behavior with decomposition of GDP (machinery, transport group, manufactured and petroleum groups) for Pakistan by using the annual data. He applied the econometrics techniques of restricted ECM ARDL model to explore the behavior of the variables. Unrestricted ECM ARDL technique was utilized to explore the long run relationship. Import behavior was analyzed at aggregated (major heads of imports) and disaggregated (selected commodities groups) level as well. He found income as inelastic and significant in all import demand function.

Expenditure components are mainly derived focusing on sub categories of the industrial products that are imported by the economy. So the above studies identified that aggregation over expenditure components leads to the biasedness of import demand parameters. To avoid these types of estimation biasedness researcher have adopted and formulated the techniques those are based on economic theory and tackled the issue of biasedness through data classification at further disaggregated level at the industry wise.

Disaggregated non-source differentiated import demand function highlighted the aggregation biasedness; due to this parameters of import demand function are positively and negatively influenced. Another important thing is when we consider disaggregation that's mean that we divide main heads into sub categories as contrary to this non source differentiation consider particular products imported from different countries.

2.5 Source Differentiated with Disaggregation of total Imports into subcategories

Developing economies used imported goods as intermediate goods. So it is important to find out the relationship among sub categories of import, conventional determinant and expenditure component. To examine the phenomena researchers have classified total imports into different sub categories according to their research objectives. Cheong, (2002) disaggregated total imports into three main categories as final goods, intermediate goods and investment and examined the non-source differentiated import demand function for Malaysia by using the econometric technique of co- integration. Results indicated, behavior of all variables is not same in the both periods. They have opposite sign in the two periods; however long run behavior existed among all the variables.

Contrarily to above study (Tennakoon, 2010) disaggregated total imports into the consumer goods, intermediate goods, and investment and investigated the impact of relative import prices and income on the import demand function. The results of this study are in contrast with previous study. He found same sign of variables in the short and as well as in the long run. Moreover results of this study showed that all these variables are less responsive to change in relative prices and are also statistically significant. Intermediate and investments goods are relatively less inelastic than consumption goods due to easily availability of domestic substitutes. Similarly income

is positively associated with all three subcategories of imports. However income is statistically insignificant for investments.

Similarly, (Grullon, 2012) further disaggregated the total imports into the four sub categories of intermediate goods and estimated non-source differentiate import demand function for these categories by using the annual data of Dominican Republic. General determinants were incorporated to find the nature of relationship among them. Findings of the research paper showed that services, merchandise, petroleum and other products' elasticities are less sensitive to relative prices while the domestic income coefficients are positive and highly elastic with response to these four sub categories.

Moreover (Sarmad & Mahmoud, 1987) disaggregated trade into 17 different categories of import at 3 digit level. They estimated trade elasticities and influence of the economic activity on the non-source differentiated import demand of the Pakistan for the period 1969-70 to 1983-84. Elasticities were estimated by the techniques of Cochrane-orcutt iterative techniques for first order Autoregressive. They used relative import price and income as the explanatory variables. Their findings again showed that income elasticities are greater than 1 for subcategories as well and price elasticity was elastic for some categories and inelastic for the rest.

Furthermore, (Riaz, 2018) highlighted that aggregation of the import values leads to aggregation biasness which effect the estimated values of estimators. He observed that different commodities behave differently with the determinants of import behavior. He estimated import behavior of 26 commodities at 3 digit level. In all the selected commodities used in his study, Pakistan is the net importer of all those commodities. In order to tackle the problem of endogeneity that existed between import and domestic demand, Generalized Method of Moments (GMM) was used to estimate the parameters of equations. GMM is preferred over 2SLS due to time series nature of

the data. His findings deviate from the results obtained in the previous study due to the problem of endogeneity.

Accessibility of disaggregated data on commodities shifted researcher's interest from sub category heads of imports to higher level of disaggregation. Ejaz & Hussain, (2011) examined the non-source differentiated import demand elasticity of tea in Pakistan by using two stage least square (TSLS) model. Time series analysis of this non-source differentiated tea data suggested that Imports were chiefly determined by domestic consumption and Gross Domestic Product (GDP). They found Income elasticity >1 which shows that tea is a luxurious commodity for country while behavior of tea import is insensitive to price and import duty.

Another study which used the import data of tea was conducted by (Irum et al., 2015). They investigated the trend of Pakistan's tea import by using Quadratic Trend Model. Their findings were based on data from 1984 to 2013. They observed that import of tea had shown an upward trend. Furthermore, they forecasted the quantity and values of tea import for the next 10 years on the basis of 2013-14 estimated values and predicted that the import of tea would be following same trend in the upcoming years. Forecasted values of their study are based on elasticity estimates.

The disaggregated data on total trade components partially mitigate the problem of biasedness in the import demand parameters at dependent side variables but it still impacts the parameter estimates because researchers used the value of total import rather than value for the particular country level. Trade economists observed the importance of inclusion of import value at country level. It will also be helpful to recognize the trade partner who has relatively larger share in total import of that product.

2.6 Source Differentiated Import Demand Function into Countries Head

Significant increase in the import of a country definitely boosts the economic growth of the other countries. To analyze the country specific non-source differentiated import demand function. Senhadji, (1998) estimated the import demand function for number of developed and developing countries and derived the structural demand equation to address the nonstationarity. Findings of the paper showed that developed countries have relatively higher income elasticity and lower price elasticity in comparison to developing world. Furthermore it showed income and price elasticities of all countries under consideration are lesser in the short run against the value of long run.

Moreover price and income elasticities are inelastic in short run while elastic in the long run He stated that if the problem of endogeneity is not tackled properly it would make variables insignificant. He further showed that estimated values of OLS and FM (Fully Modified) in this case are insignificant. Similarly (Zhou & Dube, 2011) estimated the non-source differentiated import demand function for the selected developing economies CIBS (China, India, Brazil and South Africa).

They used all existing non-source differentiated import demand specification and choose single equation model because it addressed the problem of endogeneity. They adopted the ARDL and bound test approach for finding the co- integration vector. In contrast to the previous study results of this study highlighted that co- integration existed among some countries but not at all. Additionally their estimated short and long run elasticity values are high for the CIBS countries with respect to previous studies. In contrary to previous study they found statistically significant and positive sign of the relative price for CIBS countries.

Contrarily (Hibert et al., 2012) investigated non-source differentiated import demand function of Jamaica with respect to USA and UK by utilizing the annual data

from 1996 to 2010. Co-integration and ECM techniques were adopted for the estimation. In contrast to above studies they used different explanatory variables such as; real foreign reserves, Real GDP, relative price and exchange rate volatility as determinants of the import demand. Moreover their findings are not similar with the previous studies. They found relative prices highly elastic in the short run as compared to the long run behavior. In contrast result showed that co-efficient of income elasticity is negative in the short run against the value of the long run behavior. The behavior of the exchange rate volatility with import is moving opposite direction in short and long run behavior. They found different result for UK and USA and recommended different set of policies for both countries.

Similarly, (Haider et al., 2011) investigated the dynamics of import trade with Asian countries and traditional trade partners. Variables that were included as independent variables are not similar to the previous study. They used domestic price competitiveness, domestic production, real exchange rate, disposable income at family level and relative inflation. Results estimated with the help of OLS showed that income and exchange rate highly impacts imports of a country while (Senhadji, 1998) mentioned that OLS techniques provide biased result. The findings confirm that behavior is the same among Asian countries except for India and China with respect to imports. Result of long run behavior of this study is similar with (Zhou & Dube, 2011) findings.

Likewise, (Auodotun et al., 2016) studied the import demand for Sub Sahara economies. To examine the robustness of parameters they applied redundancy test. Hausman test was also applied to find fixed and random effects. Their finding showed that pooled regression is completely defined by its independent variables and all variables are significant. Result indicated that the lag of the last year import value is

positively affected by the current year import demand i.e. its coefficient is significant. Hausman test suggested fixed effect as appropriate technique to use. Almost every study contradicts results of the other studies even if the set of the countries are similar.

The advent of Trade liberalization connected the disparate countries into different blocs and other form of trade agreements which insure the extension of trade volume. So to reap the benefits of free trade, every country enhance their knowledge of trade at the level of commodity. It facilitates whether a country exports or imports certain product to/from particular country or set of countries. That is how it does not affect the national interest of the country and it translates into trade gains.

Microeconomic foundation based import demand function

2.7 Source Differentiated Import Demand Function

Product differentiation provides basis for the estimation of Source differentiated import demand specification in the existing literature. The importance of source specification and nature of competition among countries is highlighted in the recent literature by Yang and Koo (1994). Constant relative prices seem practically unlikely. Due to heterogeneous movements of import prices from different sources. They examined the source differentiated import demand function of Japanese meat while using source differentiated almost ideal demand system (SDAIDS) and test the assumption of non-source differentiation among countries. The results of their test reject the assumption of non-source differentiation against the assumption of source differentiation. They concluded that estimated values could be overvalued or undervalued depending on the nature of biasness if estimated through conventional or Armington import demand function.

Fabiosa et al, (2000) examined the specific product import demand function of pork for Japan by considering source differentiation among countries. On the contrary

to above study he considered segregation between domestic and imported product. The econometric problem of source specific parameter was avoided by adopting a two stage model. Seemingly Unrelated Regression (SUR) technique was utilized by researcher for the estimation of the source differentiated import demand function. Monthly import values and price data from 1993 to 1998 was utilized in this paper. Findings of this paper show that income elasticity of domestic pork is higher than imported pork, due to higher quality of domestic pork.it also highlighted japan has used different set of tariff policies for imported pork that eliminate the competitiveness of countries and provide level playing field to every country.

Similarly, (Klonaris, 2017) investigated the source differentiated import demand function to identify the intensity of competition in the imported meat market of Greece. Seperability tests reject the possibility that imported meat are separable from domestic ones. His findings show that Germany and France are highly competitive in the Greece import market and will get more benefit in the case of demand driven expansion. Greece consumer's preferred German and France meat as compared to rest of the world (ROW) because it has low own price elasticities and higher expenditure elasticities as compare to others. In the poultry market France is also highly competitive with respect to rest of the world (ROW) as long as the export of poultry meat to Greece is concerned.

Similarly, (Alboghdady et al., 2013) analyzed the elasticity of tea import for Egypt considering source differentiation. SDAIDS model is considered according to theoretical specification. Their results supports the (Yang and Koo, 1994) findings that import demand function of a particular product provide unbiased estimates if differentiation over sources is considered. Furthermore, they found that Egyptian consumers prefer Chinese and Kenyan tea as compared to other countries tea and the

elasticity estimate of both countries are highly inelastic.

Likewise, (Rasteregi et al, 2017) examined the source differentiated import demand function of South Korea for beef and applied first difference version of Restricted SDAIDS model for empirical estimation. In contrast to above studies he estimated short and long run behavior of the source differentiated import demand function. In order to find the long run elasticities, first difference of Restricted SDAIDS is adopted.

The main reason was adapted to this specification was to liberalized the institutional and behavior effect from source differentiated import demand function. Findings showed that meat categories are not separable from one another non source differentiation test rejected as well. While it also identified that prices and expenditure are endogenous, therefore the demand system was estimated using an iterative 3SLS method of estimation.

Similarly (Nzaku et al, 2012) estimated a dynamic version of source differentiated import demand function of USA for agricultural products by using the technique of SDAIDS. They estimated import demand elasticities for fresh fruits and divide it into further sub categories of fruit imports. Unit root test was conducted to check the possibility of co-integration. Results of estimated elasticities showed mixed behavior where some fruits have highly elastic import demand while others are less affected by import prices. Moreover income elasticities for all goods show that fruits considered in the study are luxury goods. Most of the parameters of SDAIDS model are statistically significant at different p values.

Contrarily, (Mutondo et al, 2006) investigated the source differentiated import demand function of meat for USA and preferred the Rotterdam model due to absolute prices version. Production theory based import demand specification was utilized to

investigate the disparate origin of supply with the profit maximization and cost minimization objective instead of consumption based utility maximization.

Furthermore, (Li, 2016) also analyzed the import demand of mushroom for USA by using the techniques of SDAIDS and Source Differentiated Rotterdam model while utilizing the data of the period 2002 to 2015. This paper further conducted the test to show which model best fits the import demand of mushrooms. He dis aggregated mushroom import demand into two sub heads; canned and fresh mushroom demand. Results of the test showed that first difference of SDAIDS is preferred over Source differentiated Rotterdam. Furthermore, it showed that import demand from China is less affected by variation in prices while on the other hand USA mushroom's import from Mexico is highly price elastic.

Moreover, (Thanagopal, 2014) suspected that the unit value used in the source differentiated import demand function does not truly represents the quality differences. He believed this problem led to price and quality biasness in the parameters. To provide appropriate estimators of source differentiated import demand, he introduced proxy for quality (direct expenditures on research and development and also indirect expenditures due to positive externalities originating from innovation efforts by other countries) variable in the model. Estimated source differentiated import demand function of manufacturing and services for France. Contrary to above studies he adopted the Restricted SDAIDS and Rotterdam model by using bilateral trade data disaggregated at manufacturer and services level. Results of this study showed that price elasticities are lower for homogenous products while the differentiated products are more responsive to price for both manufacturing and services goods.

Moreover, (Song, 2017) used agricultural products to investigate the source differentiated import demand function of Korea at both aggregated and disaggregated

levels. 2SLS Autoregressive correction and Least Squares Autoregressive correction techniques are applied to estimate the parameters. This paper estimated import demand elasticities for 32 products out of which 27 products have inelastic import demand while 5 products have highly elastic import demand. On the basis of product elasticities they tried to determine the country's power to manipulate world prices. Durbin Wu-Hausman test is used to check the endogeneity of import prices. It showed that most of the prices in the country are not exogenous.

These commodity and source specific studies tested different models specification and disparate estimation techniques used to estimate these models. Most of them used unit values as proxy for import prices, for countries where data of import prices is not available. However, they arrived at the same conclusions, even if some researchers used unit values for some countries and other used import prices. Findings of different models are also not very different but most of the researcher's emphases on utilizing SDAIDS model for import demand estimation.

2.8 Literature Gap

The existing literature has pointed out that there exist the problem of data availability. Thus most of the studies are based on non-source differentiated import demand function. Consequently, most of the above studies are also based on the econometric specification rather than backed up by consumer and producer demand theories. Hence, both of these problems influenced the appropriateness of parameter of import demand function. Therefore, there is need to conduct a study that evaluates source differentiated import demand function and is also based on the micro economic theory that satisfies basic axioms of demand theory.

Literature review also highlights that trade economist transformed conventional non-source differentiated import demand function into disaggregated import demand

and then further modified it into source differentiated import demand function. However agricultural trade researchers of Pakistan have not paid attention towards agricultural products that were being imported from different countries. Thus, there are few studies that incorporated agricultural products and found import demand for these products. However, as mentioned above their studies did not incorporate source differentiation.

With the availability of country and product specific import data, only few studies have been conducted while considering particular products. In order to examine their elasticities, Irum et al., (2011); Tanver & Hussain, (2012) investigated elasticities of tea and trend but both of them ignored the differentiation over sources. Other than that they also didn't used the import demand function (which was used by renowned trade economists) in their studies. Therefore, it is imperative to find out import demand function that is based on microeconomic foundations and also incorporate the source differentiation.

Chapter 3

Overview of Black Tea Market and Descriptive Analysis

3.1 Overview of Pakistan Black Tea Market

Import is the prominent part of external sector of the economy. Every commodity consumed by country either is a part of domestic production or being imported. In the existing literature trade economist found positive association between consumption and import if domestic production of that product is either negligible or less than domestic demand. So to analyse the behaviour of import demand of specific product it is import to analyse the domestic consumption and production of that product. In this paper our focus is black tea import so it is imperative to analyse the domestic consumption of imported black tea as well as domestic production of black tea to comprehensively analyse the black tea import demand.

3.2 Domestic Consumption of Black Tea

The consumption of tea in Pakistan has increased during the last three decades lavishly Memon, (2013). The list issued by FAO states that Pakistan is among the seven countries where per capita tea consumption has increased (FAO). The growth rate recorded is 35.8 per cent from 2007 to 2016. It also highlights that Pakistan is among one of those tea importing economies where per capita tea consumption is more than 1kg. Pakistan is perhaps one of the few countries where tea has attained the status of basic food among the poor masses (Memon, 2013).

The tea consumption during 2017-18 was 1, 75,000 metric tons. If the consumption pattern remains the same then according to FAO projections by 2027 the quantity consumed will be 2, 51,000 metric tons. There is space for further increase in the tea import because of high rate of urbanization and high population growth which

are 37.5 per cent and 2.4 per cent respectively.

3.3 Domestic Production of Black Tea

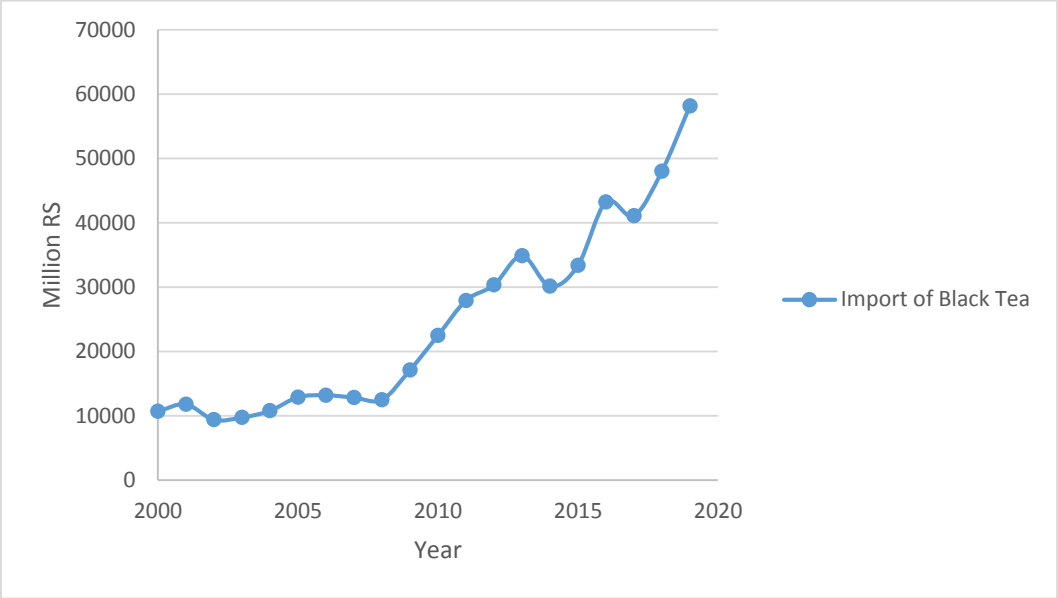
Pakistan was a bulk producer and exporter of tea Carruthers & Gwyer, (1968), but after the loss of its eastern wing (Bangladesh) it turned into an importing country. At present domestic production of tea is negligible. Pakistan agriculture research council (PARC) have found some areas which are suitable for production of black tea, but domestic farmers are not interested to grow black tea due to high production costs and availability of imported tea at cheap prices.

Consumption of black tea is increasing by manifolds with the passage of time while domestic production is negligible it indicates that domestic demand is fulfilled via imported black tea. It indicates the importance of import demand of black tea.

3.4 Pakistan Black Tea Import

The need of tea consumption is mostly fulfilled through import of tea as the domestic production is not enough to cater to the domestic demand (Ejaz & Hussain, 2011). Thus tea is imported to Pakistan which comprises of both raw and processed tea (Latif et al., 2008). Pakistan's tea import share in the world trade is 7.5 per cent Food and Agriculture Organization of United Nations (FAO, 2017 Report) while it was 4% during 2007, SMEDA. This is large amount of import of tea by any country. Pakistan is only below United Kingdom and Russia on global import of tea (Adnan et al, 2013). In 2005 Pakistan was the fifth largest tea importer; now it stands at number three. The trend of Pakistan black tea import is presented in figure 3.1.

Figure 1; Import of black tea



Source: Pakistan Economic Survey (PES 2005-06)

The vertical axis measure the value of black tea import that is reported in million Pakistani rupee while year is represent on horizontal axis. In the food group of imports the share of tea is 10 per cent, Pakistan Economic Survey (PES 2005-06), during 2017-18, that share became 12 per cent. In Pakistan the value of tea import represents almost 2.2 times the food trade deficit in 2017-18 PES. It is clearly visible that import of black tea increasing tremendously. The amount of black tea in 2000-01 was 10 billion rupee and value of imported black tea was 60 billion rupee in 2018-19. The value of tea import increased 16% during 2000-01 to 2008-09 while it witnessed 3.6 time growth 2008-09 to 2018-19.

It is prominent in figure 3.1 that import bill of black tea increased manifold after 2008-09. One of the reason behind this international price hike of 2008 and others reasons are; few steps taken by government of Pakistan to control smuggled tea by reducing customs duty and other duties on black tea import (Irum et al, 2015). Pakistan has trade agreement with Sri Lanka, the Pakistan Sri Lanka free Trade Agreement – PSFTA. Due to these agreements 10,000 MT of tea per year is allowed duty free to

Pakistan (Pakistan Business Council, 2005) whereas 10% custom duty is applicable for tea from other countries. Pakistan has reduced tariff from 33% to 10% for Kenya.

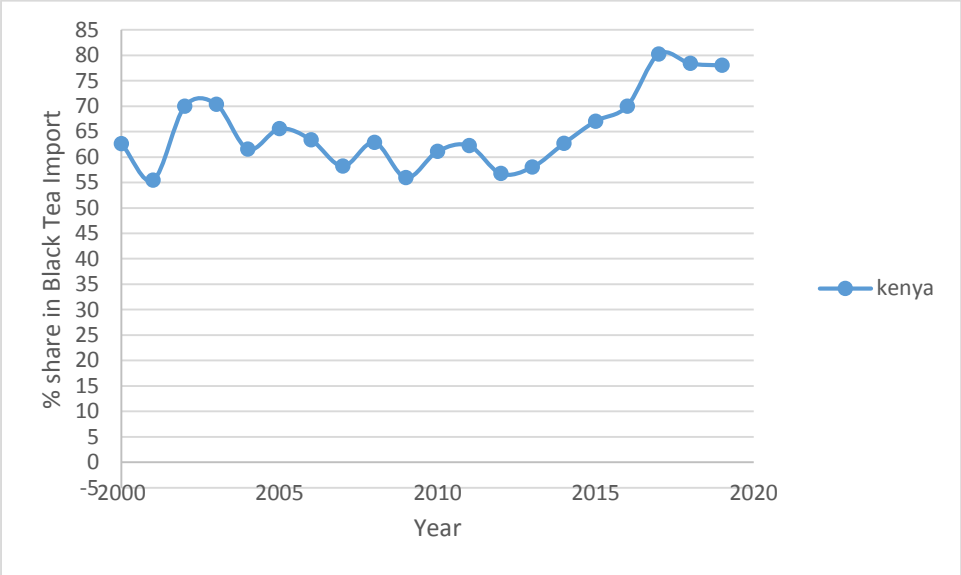
According to PES, quantity growth and value of black tea import for 2017-18 are respectively 22.5% and 5.3 % with respect to the previous year. While population growth in the same respective years is 2.4% and tea import has grown by 5.3%. This shows that the growth in tea consumption is growing exponentially more than population growth.

When the researcher interest is to find out determinants of import, flow of imports, trend analysis, aggregated value of particular product pleased researcher. However when the core interest of the researcher is policy implication and find out competitiveness in term of price and other economic variables researcher is more interested in country wise relationship among different sources of that particular products.

3.5 Share of Particular country in overall Black Tea Import

According to Wolak and Kolstad, (1991), the allocation of an import across exporting sources could be a diversification strategy used by firms to reduce unexpected fluctuations in supply of particular imported products. In this context importers mostly do not rely on a particular source of supply, they import specific product from different sources to mitigate the interruption in the supply. It also shows the preferences of the importer of that products towards different countries. As a rational economic agents Pakistani importers of black tea also don't put all eggs in a single basket. They have diversified import of black tea towards different countries according to Pakistan Bureau of Statistics (PBS) Pakistan import black tea from 45 different countries. However Kenya is the biggest importer of black tea to Pakistan, it almost fulfill the 60% import demand of Pakistan black tea.

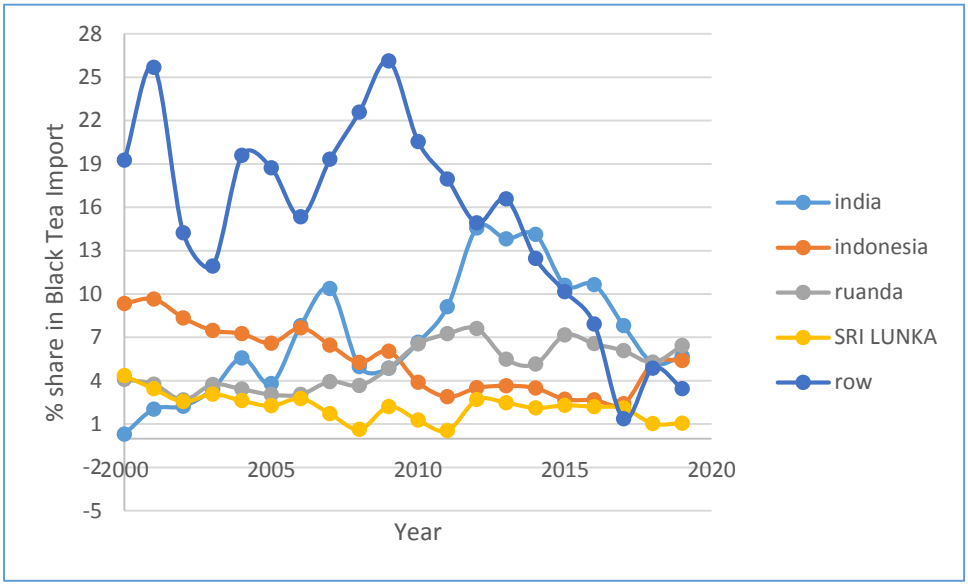
Figure 2; % share of Kenya in import of black tea



Source: Pakistan Economic Survey (PES 2005-06)

Vertical axis measures the percentage share of black tea import in overall black tea imported value, while horizontal axis represents the years. The share of Kenyan tea in Pakistan import of black tea ranges 60% to 75%. While share of Kenyan tea decline from 2003 to 2012 onwards, it is imperative to highlight that in this period Pakistan black tea import on sharp increasing trend, while main importer share facing decreasing trend. One of the reason behind this can be the reshuffle of Pakistani importer preferences towards other countries. Other reason can be the international price hike of black tea that switch Pakistani importer towards cheap sources of black tea. However increase in 2013 onwards is quite clear that is concession given to Kenyan tea by reducing import duty to 10% previously from 33% that provide level playing field with others competitors. While the other important sources of black tea are India, Indonesia, Rwanda, Sri-Lanka and Rest of the World (ROW).

Figure ***3; % share of other countries in Pakistan black tea import***



Source: Pakistan Economic Survey (PES 2005-06)

The vertical and horizontal axis follows the above graph pattern. It is visible in this graph, periods when Kenyan imported tea share decreasing at that time the share of Indian tea, Rwanda tea share and rest of the world share on black tea import was at increasing trend. Share of Indian tea reached its peak at 2013-14 with the share of 16.5% similarly in the same time period Rwanda tea secured 8 % share in the black tea import and ROW attained the highest share of 26% at 2008-09. While with the same time period Sri-Lankan tea picked increasing momentum but it is not for more than two to three years.

After 2012-13 most of them facing decreasing trend as against the increasing trend in the Kenyan tea import.as mentioned above there can be a government policy that divert the importer preferences toward different or any particular country. Indonesia had the significant share in Pakistan black tea market in 1990s, but the share of Indonesian tea at decreasing trend from 2000-01 onwards. The share of Indonesian tea was stable during 2011-12 to 2015-16, but after that it again on decreasing trend. It is also worth noting that at the start 0f 2000-01 ROW had also prominent share in the

black tea import but at present ROW has almost lost the all market share, and 5 importers fulfill the black tea import demand of Pakistan. Most of the government policy best reflected by prices as, tariff and other import duties.

There is another factor that push importer to diversify their import from different countries is quality of that product. Quality of product can be judged in different scenario, one of the best is, price of the product that reflects the quality of product. Different countries imported prices of black tea represented in table 3.1, these prices are average prices of 20 years. It ranges between 140Rs to 230Rs per KG, while India black tea is the cheapest source to Pakistan and Sri-Lanka is the most expensive source of the imported black tea.

The diversification of the black tea import among different sources can be well explained through price differentiation. Sri-Lanka and Kenya is relatively expensive supplier of imported black tea before 2008-09 these two exporters hold the maximum share of the Pakistani black tea import. Price of Kenyan and Sri-Lankan black tea per KG are 214 and 230 respectively, price difference between two importers is minor but difference between shares is huge which can be seen in figure 3.3. The sole reason behind this is the marketing strategy of the Kenyan tea that shift Pakistani importer preference towards Kenyan tea from Sri-Lankan tea, before 2000 Sri-Lanka was the prominent player of the Pakistan black tea market.

After 2008-09 Pakistani importer preferred cheap tea sources as table 3.1 highlighted that cheap source of black tea to Pakistan are Indonesia, India, ROW and Rwanda (little bit expensive). These all have experienced upward trend and reached their highest share level expect Indonesia, increasing momentum existed up to 2012-13. The international price of black tea picked decreasing momentum in 2012 and the special treatment provided by government of Pakistan to in term of tariff concessions,

revert the conditions in favor of Kenya.

3.6 Prices of Imported Countries

Table 1 Import prices of black tea from Different Countries

	IND_P	INDO_P	KEN_P	RAWA_P	ROW_P	SIRI_P
Mean	141.4	160.5	213.7	202.4	195.8	229.6
Median	130.1	163.7	228.6	214.7	204.7	234.4
Maximm	253.3	294.7	368.0	376.0	349.9	392.8
Minimum	61.57	64.67	102.6	102.0	95.04	89.93
Std. Dev.	65.30	80.53	98.67	93.07	92.38	108.0
Skewness	0.284	0.123	0.188	0.390	0.240	0.160
Kurtosis	1.642	1.414	1.456	1.852	1.528	1.427
Obs	20	20	20	20	20	20

Source: Pakistan Economic Survey (PES 2005-06)

Graphical analysis provides hints about complex situation but it does not provide scientific knowledge about this type of complex conditions. As the above analysis focuses our intention toward importer preferences, that is how preferences changed over the time. As the analysis finds that sometime preferences transformed either, due to extensive marketing techniques adopted by particular country or changes in the prices of the given basket of a particular country. There is another variable that hits the behavior of importer, income of the country. To explore information about all these variables scientifically we have to use econometric models that incorporate the source differentiation and also backed by consumer demand theory. One of the important features of the import demand function is that it should provide knowledge about behavior of the economic agent.

CHAPTER 4

MODEL CONSIDERATION

4.1 Model Specification

Different econometrics techniques and frameworks are used for modeling of conventional import demand function. These import demand functions are formulated by using relative prices, real income and expenditure as regressors. The objective of these traditional import demand specification was; to predict the overall flows of import, predicting the future import demand and explore the determinant of import of specific product/country. Similarly these import demand specification incorporated the disparate sources of specific product homogenous with single price and did not estimate the relationship existed among different import sources of particular product.

The focus of the study is to investigate the source differentiated import demand function as, Davis, (1997) pointed out that ignoring import source of origin which might be viewed as quality attribute, may lead to biased estimates and thus not reflect the true import demand response. Similarly Yang & Koo, (1994) tested and rejected the assumption of non-source differentiation in case of agricultural products, and also highlighted that non-source differentiated import demand function could lead to parameters biasedness. Hennerby & Mutondo, (2007) and li, (2013) also endorsed the findings of above two studies.

To address the source differentiation, trade economist formulated the import demand functions that incorporate the source differentiation. These import demand specification are; Armington, (1969) model, SDAIDS model (Yang & Koo, 1994) and Rotterdam model (Theil, 1980). As mentioned earlier the parameters of the Armington's import demand function are biased due to model specification. While (li,

2013) import demand model specification test suggests that Rotterdam import demand model did not fit the import data best, due to this parameters value of the Rotterdam import model are also biased upwards. Similar to findings of (Winter, 1984), Li, (2013) also suggested to use of SDAIDS to estimate the import demand function.

SDAIDS import demand model consider import as final product. Imported black tea is also justifiable as final product, due to minor value added processing that involved after the import of tea. SDAIDS model possess all the required properties and satisfies all the basic assumption of consumer demand function. It is easy to estimate and interpret as well (Klonaris, 2014).

Unlike traditional import demand function source differentiated import demand function provide the cross countries relationship behaviour among different sources of black tea. This analysis envisions importers to diversify import of a particular product towards different sources of supply to mitigate the risk of supply interruptions. By overviewing country specific knowledge of a particular product, government can maximize the benefits of free trade agreements between bilateral trading countries or among multilateral trading countries. It can also divert importer behaviour from expensive sources to cheapest one. Considering source differentiation Yang & Koo, 1994 modified AIDS in to SDAIDS;

4.2 Source-Differentiated AIDS Model

The models used in this study are adopted from previous studies, with appropriate adjustments based on recommended modifications. Deaton and Muellbaur (1980) derived AIDS model from expenditure function. The expenditure function constitutes budget share for a particular product for a representative consumer which depends on Price Independent Generalized Logarithmic (PIGLOG) preference. The contribution of (Yang and Koo, 1994) in the import demand estimation model is that they modified

AIDS and presented SDAIDS import demand model. The basic difference between AIDS and SDAIDS equation is that AIDS depend on the commodity share while SDAIDS depend on the share of the country, thus the basic equation remains same but their subscripts differs. Other modification in the AIDS is block substitutability incorporated by (Young and Koo, 1994) that is not the interest of this research. SDAIDS also originates from expenditure function. SDAIDS expenditure function integrates the approximation of the importer behaviour where products are differentiated by origins. The equation that represents budget share is denoted by ω_i which is given as:

$$\omega_i = \alpha_i + \sum_j \gamma_{ij} \ln P_j + \beta_i \ln(\frac{X}{P^\circ}) + \mu_{ij} \quad (1)$$

Where (ω) represents import share of tea and (i) represents the specific country share in the total import of tea (i=1, 2….n). (p_j) shows the normalized price for country (j=1, 2…...). (X) refers to the total expenditure on black tea by Pakistan. α_i is the intercept term in the equation that shows the bench mark import level for a particular country. (γ_j) is the price coefficient which shows change in the (i^{th}) country's share in import due to percentage change in (j^{th}) country's price. (μ_i) represents random error term. (p°) represents translog price index which is defined as:

$$\ln P^\circ = \alpha + \sum \alpha_j \ln P_j + \frac{1}{2}\sum_i^n \sum_j^n \gamma_{ij} \ln P_i \ln P_J \quad (2)$$

The disadvantage associated with translog price index is, it is complex and complicated the model because of its non-linearity. Due to this estimation of parameter of a model becomes tedious. To overcome this problems trade economist utilized the linear approximation of the SDAIDS import model, they simply modified non-linear price index into the linear price index as suggested by (Deaton & Muellbaur, 1980). There is number of studies those used LA/AIDS function to estimate the demand; [Green &

Alston, (1991); Pashardes, (1993); Alston et al, (1994); Buse, (1994); Hahn, (1994); Moschini et al., (1994); Moschini, (1995) and Asche & Wessels, (1997)]. Association between linear and non-linear specification of the SDAIDS are also discussed by these researchers. Finding of these studies acknowledge that, parameters values of LA/AIDS reasonably same to the SDAIDS import demand specification. The linear Stone price index suggested by Deaton and Meulbauer, (1980), to replace the non-linear translog price index. Defined as follows:

$$\ln P^{\circ} = \sum_{i=1}^{n} \omega_i \ln P^{\circ} \tag{3}$$

Where (w_i) represents the average budget share of country (i).

Substituting equation 3 in equation 1, the equation 1 becomes:

$$\omega_i = \alpha_i + \sum_j \gamma_{ij} \ln P_j + \beta_i(\ln X - \sum_{i=1}^{n} \omega_i \ln P_i) + u_i \tag{4}$$

In equation 4, (ω_i) is present on both sides (independent and dependent) of the equation which leads to simultaneity problem (unexpected results that happen when the independent variable is correlated with the regression error term, (u_i) sometimes called the residual disturbance term). To overcome this problem lagged share of linear stone price index is incorporated by (Eales & Unnevehr, 1994) in (equation 3). Incorporating lagged in equation 3 and substitute in equation 2 given as.

$$\omega_i = \alpha_i + \sum_j \gamma_{ij} \ln P_j + \beta_i\left(\ln X - \sum_{i=1}^{n} \omega_{i,t-1} \ln P_i\right) + \mu_i \tag{5}$$

Equation 5 applied to estimate the import demand function of black tea. After estimating the parameters of import demand function, values of these parameters will be utilized to further calculate the elasticities parameters. The formulas used for the elasticities calculations are given below.

The coefficients of SDAIDS are restricted because of microeconomic theory foundation of utility maximization.

Adding up

$$\sum_{i=1}^{n} \omega_i = 1$$

It makes sure that sum of expenditures should always equal to 1..it implies that expenditure devoted for black tea import should be exhausted completely and sum of the expenditure elasticity should not be exceed to unity.

The adding up condition is satisfied only if:

$$\sum_{i=1}^{n} \alpha_i = 1 \qquad \sum_{i=1}^{n} \beta_i = 0 \qquad \sum_{i=1}^{n} \gamma_{ij} = 0$$

Homogeneity:

In term of economic interpretation it implies that if the expenditure devoted for tea import increases and there is proportionate increase in the prices of imported black tea, its impact on the well-being of the imported nation remain same. In other words increase in country income will not allow attaining higher indifference/satisfaction curve, due to proportionate increase in the prices.

$$\sum_{i=1}^{n} \gamma_{ij} = 0$$

Symmetry:

The requisite for this condition application is Shepard's Lemma introduction in to expenditure function:

$$\gamma_{ij} = \gamma_{ji}$$

To reduce the number of parameters, Yang & Koo, (1994) introduced this condition to reduce the number of estimated parameters. For example, this assumption says that

Pakistan demand for Kenyan black tea exhibits the same cross-price response to green tea demand from Indonesia and green tea from China. It will allow researcher to incorporate the multiple number of countries or commodities with the limited set of data.

Price and expenditure elasticities

Uncompensated Marshallian own price and cross-price elasticities with the linear approximation using lagged share are:

Sample mean of expenditure shares are used to calculate the elasticities. The uncompensated (Marshallian) own-price elasticities (ε_{ii}) and cross-price elasticities (ε_{ij}) can be derived respectively as: See Alston et al, (1994) and Alboghdady et al., (2013).

$$\varepsilon_{ii} = -1 + \frac{\gamma_{ii}}{\omega_i} - \beta_i \tag{6}$$

$$\varepsilon_{ij} = \frac{\gamma_{ij}}{\omega_i} - \beta_i \frac{\omega_j}{\omega_i}, i \neq j \tag{7}$$

Calculation of expenditure elasticity for a particular commodity is given as:

$$\eta_i = 1 + \frac{\beta_i}{\omega_i} \tag{8}$$

In the light of consumer theory, positive income elasticity indicates that if income of an individual rises then his consumption of a particular product also increases.

Hicksian own and cross-price elasticities can be obtained by applying Slutsky decomposition to expenditure share equation (8), and using the linear price index in equation (3) (Alboghdady et al., 2013), which are given as:

$$\ell_{ii} = -1 + \frac{\gamma_{ii}}{\omega_i} + \omega_i \tag{9}$$

$$\ell_{ij} = \frac{\gamma_{ij}}{\omega_i} + \omega_j, i \neq j \quad (10)$$

The nature of the good is decided by value of compensated price elasticity, if it is negative and <0 good is considered as normal good. Moreover, if the cross-price elasticities (7) and (10) are 0> the good is cross substitute and if it is negative then the good is referred as cross complement.

The LA/SDAIDS model specification presented above is static, it implies that it always assume import is always in equilibrium, it is not true especially when the nature of data is time series. Importers are not instantaneously adjusting expenditure due to change in prices or income, because of these factors such as; habit persistence, adjustment costs, imperfect information and incorrect expectations. In this condition dynamic specification of the LA/SDAIDS is more suitable than LA/SDAIDS (Ealse & Unnevehr, 1994);

$$\Delta w_{it} \approx \sum \gamma_{ij} \Delta \ln P_j + \beta_i [\Delta \ln X_t - \Delta \ln P_j] \quad (11)$$

4.3 Variable Construction

Pakistan Tea imports are categorized into black tea, Dust and Bulk Black Tea. Disaggregated data of black tea at 8- digit Harmonized System (HS) Code 09024090 level from 2000-01 to 2018-19 is taken annually for this comprehensive research study to estimate the parameter of SDAIDS import demand function. Pakistan imports black tea from 45 different sources.

4.3.1 Share of Each Country in Total Import:

The estimation of SDAIDS is based on the share of each country in the total import of the specific products rather than the imported value of that product from particular origin. So there is need to find out the share of focused country. The formula for computing share of specific country is:

$$\textbf{country share} = \frac{\text{value of black tea import from country (i)}}{\text{total value of black tea import}}$$

If the import share of the country is constituted more than 5%, in this case a specific country is specified as import source of supply. Otherwise source lies in the rest of world (ROW) category. I have taken average of 20 years of import share data (that is produced by above given formula) of black tea to decide their share, these countries average share are: India (7.5), Indonesia (13.5%), Kenya (57%), Rwanda (5%) and Sri-Lanka (5%). The criteria of choosing a country as a sources of supply is totally based on the researcher choice as (Yang & Koo, 1994) considered a country is source of supply if its share is 10% in that product import. However (li, 2013) select a country is a source of supply if the share of country is greater than 2 per cent. Similarly (Mnatsakanyan, 2017) set 5% as benchmark

Pakistan imports average 85% of black tea imports from these five countries. To estimate SDAIDS parameters data required on three variables, Prices for every import origin, expenditure share of a particular country in the overall black tea import and overall expenditure on black tea import. The data of import quantity (measure in metric tons) and Cost, Insurance, and Freight (CIF) import values (measure in thousand Pakistani rupees) is obtained from (PBS) publications.

4.3.2 Unit Price:

Retail/wholesale level prices for black tea by import sources are not published, thus as a proxy of market prices for imported black tea unit value is used. The yearly per-unit values is calculated by dividing the yearly import value of black tea by quantity imported from particular country, and used as proxy for import prices (Yang and Koo 1994, Alboghdady et al., 2013 and li 2016). The formula for unit price is:

$$\textbf{Unit value} = \frac{\text{import value of black tea from country (i)}}{\text{quantity of import from country (i)}}$$

However the unit value is different from what the importer is actually paying for import of black tea from disparate sources.

4.3.3 Total Expenditure:

The total expenditure is also a choice variable and depend on the researcher objective. Yang and Koo, (1994) used per capita investment as a expenditure variable while (Alboghdady et al., 2013) used total import on a particular product as an expenditure. Similarly in this paper total import on tea is used as expenditure variable.

4.3.4 Prices of Other Goods:

The prices of others goods are simulated by the package that are used to estimate the dynamic specification of LA/SDAIDS (Henneberry et al, 2007).

4.4 Estimation Procedure

Parameters of conditional demand system estimated by conventional ordinary least squares techniques are not consistent, due to endogeneity problems of prices and expenditures (Blundell and Robin, 1999) instead of certain exceptional cases. Moreover instrumental variables method suggested by (Yang & Koo, 1994) and used by several studies like (Nazuku et al., 2012; Thanagopal, 2014; Ramirez & Wolf, 2008 and Wang & Reed, 2013), provide consistent and efficient parameters of import demand if the given expenditure is linear (Lafrance, 1990). These findings play important role in the empirical estimation of import demand, because mostly expenditure is non-linearly associated with import quantity.

Although SDAIDS possesses many desirable properties and satisfies the basic assumption of consumer demand theory, but it may be difficult to estimate if it is estimated with non-linear price index (Alston et al., 1994). To overcome this tedious exercise linear approximation of SDAIDS is utilized. The empirical estimation of the

LA-SDAIDS is simple, which can be conveniently done in many econometrics packages (Yang and Koo, 1994).

Due to above mentioned reasons, iterated linear least-squares (ILLS) estimator has been adopted to estimate parameter of equation.

$$\Delta w_{it} \approx \sum \gamma_{ij} \Delta \ln P_j + \beta_i [\Delta \ln X_t - \Delta \ln P_j] \quad (11)$$

The advantage of use the latter technique is that it controls the endogeneity problem of prices and expenditure. Estimations are done using linear techniques (Lecocq et al., 2015). Moreover this estimation technique of import demand is preferred as compared to non-linear seemingly unrelated regression (SUR) and non-linear three-stage least square method. Models having multiple numbers of equations (in term of sources, each equation for specific source) are best suited to be estimated easily using this technique. Moreover it also satisfied the microeconomics foundations of demand system. These include constrained of homogeneity or and symmetry, it also permits us to directly estimate elasticities parameters by using single command rather than using multiple commands.

SDAIDS import demand model must be singular, it implies that share of each country included in the import demand estimation should be equal to unity, and elimination of one equation is inevitable to estimate the import demand of black tea for Pakistan. In the estimation procedure of ILLS, it eliminates the last equation automatically that is the (ROW), it does not matter because singular systems is invariant to this choice. The additivity of the estimation function is used by ILLS to recover the parameters and corresponding elements in the variance-covariance of dropped equation (Lecocq & Robin, 2015).

4.5 Stationarity Analysis

Augmented Dickey Fuller (ADF) test will be used to check for Stationarity in prices, expenditures shares and expenditure variables.

CHAPTER 5

Results and Discussion

The nature of data used in this research study is the time series. The problem with the time series data is that $spurious\ regression$[3] exists, if the problem of $non-stationarity$[4] is not tackled properly. In this study it will lead to the biasedness of the parameters of the import demand functions. To check the Stationarity of the variables ADF unit root test is conducted and the result of ADF is reported by table 5.1.

Table 5.1; Result of Unit Root Test

Variable	Level I(0)		First Difference I(1)		Criteria	Decision
	T-Stat	P-value	T-Stat	P-value		
India_share	-1.33	0.846	-4.027	0.027	AIC	I(1)
Indonesia_s	-0.94	0.928	-5.136	0.003	AIC	I(1)
Kenya_s	-1.30	0.849	-5.042	0.004	AIC	I(1)
Rwanda_s	-2.64	0.266	-3.848	0.039	AIC	I(1)
Sri-Lanka_s	-1.93	0.592	-5.856	0.001	AIC	I(1)
ROW_s	-2.11	0.507	-5.236	0.003	AIC	I(1)
P_ India	-3.17	0.120	-3.337	0.091	AIC	I(1)
P_Indonesia	-2.72	0.237	-3.143	0.041	AIC	I(1)
P_Kenya	-0.09	0.936	-3.993	0.008	AIC	I(1)
P_Rwanda	0.65	0.987	-3.415	0.025	AIC	I(1)
P_SriLanka	-0.60	0.846	-3.254	0.034	AIC	I(1)
P_ROW	0.03	0.950	-3.399	0.025	AIC	I(1)
Expenditure	-0.34	0.899	-3.250	0.033	AIC	I(1)

3 Spurious regression is a regression that provides misleading statistical evidence of a linear relationship between independent non-stationary variables.

4 Non-Stationarity, random process at which distribution alters with alterations in time or space.

The result of the table 5.1 shows that all of the variables of interest are non-stationary. For example to check the Stationarity of Indian black tea imported prices unit root test is conducted and the p-value presented in column 3 rejects the null hypothesis that is given series is stationary as p-value is less than 0.05 and accepts the alternative hypothesis that series under observation is non- stationary. All the variables of interest incorporated in this study are stationary at first difference level as confirmed by the p value presented 5^{th} column of table 5.1. Therefore, the results endorse the use of first difference version of SDAIDS instead of static SDAIDS estimation.

The basic assumption of the SDAIDS import demand model is that, importer place disparate preferences/values to the particular product imported from disparate origin of supply. There is need to test this assumption, the rejection of the test provide insight about various imported sources of black tea (e.g., India, Kenya and Sri-Lanka) used as aggregated group (non-source differentiation) in the estimation of import demand function of black tea for Pakistan.

The type of model fits this study is given by the header of the output which is estimated by ILLS using equation 11. The above part of table 5.1 provides information about the model to be estimated and statistics of each equation. While the second part of table 1 sheds light on the parameter estimates of every estimated equation along with the standard errors and other useful statistics.

Table 5.2; Source Differentiation Test Result

Iteration = 1 Criterion = 0.19266477

Iteration = 2 Criterion = 0.00394601

Iteration = 3 Criterion = 0.00029144

Iteration = 4 Criterion = 0.00001715 Iteration = 5 Criterion = 1.354e-06

	OBS	Params	RMSE	RSquare	F(7,11)	Prob>F
India	19	7	0.013	0.87	11.17	0.0003
Indones	19	7	0.005	0.95	31.62	0.0001
Kenya	19	7	0.04	0.742	4.53	0.0132
Rwanda	19	7	0.012	0.78	5.6	0.006
SriLank	19	7	0.01	0.671	3.21	0.0413
ROW	19	7	0.027	0.741	4.51	0.0134

	Coef	std. err	Z	P>|z|	[95% Conf. Interval]	
India						
Gamma	-0.022	0.031	-0.73	0.467	-0.847	-0.038
Gamma	0.287	0.04	7.14	0.002	0.208	0.366
Gamma	0.307	0.101	3.03	0.002	0.108	0.506
Gamma	-0.124	0.068	-1.81	0.070	-0.258	0.01
Gamma	-0.104	0.044	-2.36	0.018	-0.191	-0.017
Gamma	-0.337	0.122	-2.75	0.006	-0.577	-0.096
Beta	-0.016	0.024	-0.68	0.507	-0.065	0.032
Alpha	-0.385	0.444	0.87	0.386	-0.485	1.25
Indonesia						
Gamma	0.003	0.014	0.27	0.786	-0.023	0.031
Gamma	0.037	0.017	2.128	0.03	0.003	0.071
Gamma	0.207	0.045	4.53	0.0001	0.117	0.297
Gamma	0.008	0.028	0.28	0.779	-0.048	0.064
Gamma	-0.025	0.018	-1.37	0.169	-0.062	0.01
Gamma	-0.269	0.052	-5.17	0.0001	-0.371	-0.167
Beta	-0.013	0.01	-1.28	0.002	-0.033	0.007
Alpha	0.479	0.185	2.59	0.01	0.116	0.84
Kenya						
Gamma	-0.047	0.115	-0.41	0.679	0.273	0.178
Gamma	-0.336	0.121	-2.78	0.005	0.574	-0.099
Gamma	-1.486	0.384	-3.87	0.0001	2.239	-0.733
Gamma	0.172	0.2	0.86	0.389	0.219	0.564
Gamma	0.035	0.134	0.26	0.795	0.229	0.299
Gamma	1.699	0.402	4.22	0.001	0.909	2.489
Beta	0.14	0.072	1.94	0.052	0.001	0.281
Alpha	-2.111	1.288	-1.64	0.101	4.636	0.413

Rwanda						
Gamma	0.003	0.024	0.16	0.876	-0.044	0.052
Gamma	0.055	0.036	0.51	0.13	-0.016	0.127
Gamma	-0.007	0.087	-0.08	0.935	-0.178	0.164
Gamma	-0.048	0.063	-0.76	0.445	-0.171	0.075
Gamma	-0.025	0.041	-0.63	0.531	-0.106	0.054
Gamma	0.05	0.111	0.46	0.648	-0.167	0.269
Beta	0.005	0.023	0.24	0.81	0.039	0.05
Alpha	-0.191	0.412	-0.46	0.643	-0.999	0.616
Sri-Lanka						
Gamma	0.005	0.018	0.29	0.775	0.03	0.04
Gamma	-0.045	0.028	-1.59	0.111	-0.101	0.01
Gamma	0.134	0.068	1.96	0.05	0.001	0.268
Gamma	-0.087	0.048	-1.8	0.072	-0.182	0.007
Gamma	-0.004	0.032	-0.13	0.896	-0.068	0.06
Gamma	-0.019	0.088	-0.22	0.823	-0.192	0.153
Beta	0.114	0.018	0.63	0.523	-0.023	0.046
Alpha	-0.122	0.322	-0.38	0.705	-0.753	0.509
ROW						
Gamma	0.057	0.082	0.7	0.482	-0.103	0.218
Gamma	0.001	0.083	0.02	0.984	-0.161	0.164
Gamma	0.843	0.288	2.93	0.003	0.278	1.409
Gamma	0.079	0.14	0.57	0.572	-0.196	0.355
Gamma	0.125	0.098	1.27	0.205	-0.068	0.319
Gamma	-1.124	0.296	-3.79	0.001	-1.7	-0.543
Beta	-0.127	0.049	-2.58	0.01	-0.224	-0.03
Alpha	2.555	0.881	2.9	0.004	0.831	4.287

The column 1 of table 5.2 shows the number of sources from where the black tea is imported by Pakistan. There are 6 equations and every equation have 7 parameters. Five of these parameters show the amount of tea imported from different sources/countries. One of the remaining two show expenditure and the other shows the intercept term, that is subsistence level of import for a particular country. Column 4 is showing results of R^2 (Goodness of fit[53]) for every country, which has a range from 0.67 to 0.95. Its value is highest for Indonesia (0.95) and lowest for Sri-Lanka (0.67) which means that the equations depicting Indonesia are better explained by its regressor than Sri-Lanka. Since it is a time series data so the range 0.67-0.95 is

considered best.

The last column is showing the probability values of $F-test$ [54] for every country's equation. Each value shows the overall significance of the parameters in the given equation. For example the probability value of F-statistics for the testing of null hypothesis that all parameter of India's equation is equal to zero against the alternative hypothesis of not equal to zero is 0.0003. Thus it rejects the null hypothesis and accepts the alternative hypothesis at 0.001% level. The F-test column is showing that all country's' equations are statistically significant at 1% level that is p-value for all equation is less than 0.01.

Since the equation of each country is statistically significant so this rejects the possibility of aggregation over sources. Non-source differentiation is rejected i.e. black tea import from disparate sources should be considered as different product, estimation of import demand function should be estimated by source differentiated import demand function. Ejaz & Hussain, (2011) analyzed tea import where they did aggregation over sources but this study is stating that if aggregation is done then the results might cause aggregation biasness. Here it can be concluded that the findings of (Ejaz and Hussain, 2011) could be biased due to non-source differentiation.

Whereas the second part of table 5.2 further elucidates seven parameters of each country particularly, that is reported in the above. In the case of Kenya the first six parameters show relationship of expenditure share with other countries. The remaining two are showing income and intercept respectively. Most of these parameters are statistically significant.

5.1 Expenditure and Price Elasticity Estimate

When import demand function is estimated one is keen to finding the share, expenditure (income) and price elasticities than in estimating the parameters of

demand function. The reason is that elasticities are more informative and are used extensively by the policy makers.

Table 5.3 has four sections. The second column is showing the average share of each country from which Pakistan is importing black tea. Column 3 is presenting expenditure elasticity of a particular country for black tea. Similarly Column 4 is showing the estimated own price (Marshallian/Uncompensated) elasticities for the countries. The last column depicts compensated (Hicksian) elasticities for each country.

Column 2 reports average share estimated for a given country by ILLS. The share of the countries are; India (5%), Indonesia (4%), Kenya (70%), Rwanda (5%) and Sri Lanka (2%). Here the null hypothesis is that the share of Kenyan tea in black tea import is zero, p-value is 0.0007. Null hypothesis is rejected as against the alternative hypothesis, that is the share of Kenyan tea is 70%. The p-value shows that the share of each country is statistically significant so we reject the null hypothesis i.e. share of each country is equal to zero at 1% level.

Table 5.3; Country share, Expenditure, Marshalian and Hicksian Price Elasticities

	Share	Expenditur	Marshalian	Hicksian
India	0.051**	0.675	-1.328**	-1.249**
	(0.002)	(0.489)	(0.428)	(0.437)
Indones	0.039***	0.657*	0.075	-0.1
	(0.001)	(0.267)	(0.42)	(0.42)
Kenya	0.705***	1.199***	-2.678***	-1.833***
	(0.0007)	(0.103)	(0.381)	(0.404)
Rwanda	0.046***	1.122*	-2.045*	-1.994*
	(0.002)	(0.507)	(1.357)	(1.201)
SriLank	0.021***	1.536	-1.127	-1,094
	(0.002)	(0.646)	(1.482)	(1.48)
ROW	0.139***	0.081**	-6.605***	-6.594***
	(0.005)	(0.057)	(1.746)	(1.733)

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Source differentiated import demand explains expenditure elasticity of import demand function as, percentage change in quantity share in tea import for a particular country due to % change in overall expenditure of tea import by importing country. Engel's law illustrates a commodity will lose its share in the import market, if its expenditure elasticity lies in the range of (0-1) due to increase in the expenditure on that commodity import. On the other hand the specific commodity whose expenditure elasticity is greater than 1 will capture further share in the import market due to increase in the expenditure. Commodities nature describe by the value of elasticity, the commodity is identified as necessities if its elasticity is below unity, and classified as luxury good if its elasticity is greater than unity. It implies that increase in the demand of commodity is proportional to its elasticity parameters (Nygard, 2012).

Column 3 in table 5.3 reported the expenditure elasticities. Sri-Lanka expenditure elasticity is 1.536 and highest among all importers, but statistically not significant. Kenya and Rwanda expenditure elasticities are 1.199 and 1.122 and both are statistically significant. Considerably larger than one, suggesting that when import expenditures rise, a largest portion of import is spent on Kenyan and Rwanda black tea. It is parallel with the findings of (Nygard, 2012) and can easily be seen in figure 3.3 i.e. both countries shares are increasing with the passage of time. Such upward-sloping expenditure shares lead us to conclude that the good is luxurious.

The budget share of India, Indonesia and ROW experienced gradually decreasing since 2000-01. This deteriorating expenditure shares would normally suggest that the commodity must be necessities. The expenditure elasticities of these countries are; 0.67,0.65 and 0.81 respectively. It can be seen from figure 3.3 that during 2000-01 the share of Indonesia was 13% and now it is 3% same is the case with India during 2012-13 it share was 13% and now it is 3%. In these countries case positive

sign of expenditure elasticity reflects expenditure on import of black tea by Pakistan to India is increasing but at decreasing rate.

The signs of all countries expenditure elasticities are positive and consistent with economic theory. However (Ejaz & Hussain, 2011) found expenditure elasticity of Pakistan black tea import is more than unity. On the contrary to this we find 3 out 6 expenditure elasticities, inelastic (less than one).

The Marshalian demand function specifies what the consumer would buy at each price and given wealth situation (Alboghdady et al, 2013). In other words, uncompensated price elasticities indicate how a change in specific country import's price affects the demand of that product and other sources (Nzaku et al., 2012).

Column 4 in table 5.3 shows the uncompensated own price elasticities estimated by ILLS. Such results indicate that Pakistani consumer of black tea respond more to price reductions. As expected the sign of almost all price elasticities for tea from disparate origin of supply are according to the law of demand that is negative price elasticity. Elasticity of price for Kenya is (-2.678) and statistically significant at 1%. It implies that 1% increase in the Kenyan tea price will decrease almost 3% import demand of Kenyan tea. On the other hand other countries elasticities are highly elastic and statistically significant, Rwanda (-2.045) at 10 %, for India (-1.328) at 5 % and for ROW (-6.605) at 1% level. Similarly import price elasticity of Sri-Lanka is (-1.127) but not statistically significant. However Indonesian imported tea, elasticity of price is positive and inelastic also (0.075) but statistically not significant.

Five out of six price elasticity estimates are elastic and significant. It explains that a decrease in import prices will lead to higher increase in import bill of the economy and vice versa. Pakistan import low quality black tea (Latif et al., 2008) it can be a good reason to explain the phenomena of high elastic demand because low

quality black tea consumers are very sensitive to prices.

These findings are utterly contrary with the previous finding of the (Ejaz and Hussain, 2011). They concluded that Pakistan tea import is highly inelastic and there should be preferences transformation rather than price and custom duty policy to decrease the overall import level of black tea. The results of this study indicate price control instrument will work for Pakistan. Policy maker can curb the import bill of black tea by increasing tariff rate or other price control instrument rather than non-tariff barriers. Tariff/Non-tariff barrier will also work in case of preferences transformation towards cheap source.

Hicksian demand function is the demand of a consumer over a bundle of goods that minimizes their expenditure while delivering a certain level of utility (Mas-Colell et al,. 1995). Compensated elasticities measure these effects, assuming that real expenditures are held constant (Alboghdady & Alashry, 2010). As per theory compensated elasticities are slightly lower than Marshallian own price elasticities (Rastegari et al., 2019), because it only reflect the price effect and eliminate income effect to the demand. Last column of Table 2 reports the compensated price elasticities for all countries are negative instead 0f Indonesia. These estimates are slightly lower than uncompensated one as per theory. For example uncompensated price elasticity value is (-2.678) and compensated own price elasticity value for Kenya is (-1.833), significant at 1%. It can be seen, there is difference between the two values. All values follow the same pattern and all are statistically significant, different from zero instead of Indonesia and Sri-Lanka.

5.2 Uncompensated and Compensated Cross Price Elasticity

Divisekera, (2003) argued that cross-price elasticities allow the classification of sources as substitutes or complements with respect to an alternative source.

Table 2.4; Hicksian Cross-Price Elasticities

	P_India	P_Indonesia	P_Kenya	P_Rwanda	P_Srilanka	P_ROW
India	-1.32** (0.428)	5.754*** (0.815)	5.341** (1.833)	-2.476* (1.314)	-2.104* (0.868)	-5.743* (2.397)
Indonesia	0.227 (0.234)	0.075 (0.42)	4.593** (0.998)	0.172 (0.714)	-0.707* (0.407)	-5.987** (1.31)
Kenya	-0.143 (0.090)	-0.542** (0.161)	-2.678** (0.381)	0.266 (0.274)	0.078 (0.18)	1.870*** (0.499)
Rwanda	0.04 (0.443)	1.186* (0.712)	0.108 (1.879)	-2.045* (1.307)	-0.548 (0.891)	0.788 (2.464)
SriLanka	0.039 (0.738)	-2.305* (1.337)	7.443* (3.189)	-4.039* (2.283)	-1.127 (1.482)	2.379 (4.104)
ROW	0.763* (0.313)	0.304 (0.559)	4.094** (1.33)	0.464 (0.953)	0.775 (0.627)	-6.605** (1.746)

The sign of cross price elasticity tells the relationship between the sources, negative sign shows they are complement and positive sign shows they are competitors between each other's. Table 5.4 presents the Hicksian cross price elasticities for all countries; all the diagonal elasticities are negative

The second column of table 5.4 shows the relation between Indonesia and all other respective countries. It shows Pakistani imported tea market player take Indonesian and Kenyan tea as an complementary good to each other which shows that if Indonesian tea price increase by 1 % there is 1.063% decrease in the demand of Kenyan and Sri-Lankan tea while all other factors remains constant, estimates is significant at 5%.

While the Indonesian and Rwanda tea are treated as substitute, it implies that if there is 1% increase in the prices of Indonesian tea it will lead to almost 2.5 % increase in the demand for Rwanda imported tea. It can also interpret as if 1% increase in the prices of Indonesian tea, the 3% import share of Indonesian tea will be captured by

the Rwanda tea. It is also obvious in figure 3.3, where the share graph on Indonesia and Rwanda moving in opposite direction.

Moreover tea imported from Kenya also shows high substitutability relation with the tea imported from India. This can be observed in the figure 3.3 where Kenyan tea share replaced by Indian imported black tea during the period when Kenyan tea price was increasing trend. Similarly Kenyan and ROW tea are substitute to each other. Same is true for relation exists between Kenya and Sri-Lanka. These findings are parallel with Council General Report of Sri-Lanka, Karachi that showed share of Sri-Lankan tea captured by Kenyan tea. Kenyan tea is relatively cheaper than Sri-Lankan tea.

Furthermore column 4 of table 5.4 shows the Rwanda tea relationship with others sources. Rwanda, Indian and Sri-Lanka are complements to each other. It is also prominent in figure 3.3 where Rwanda and India share move in the same direction. Moreover last column shows the relationship between ROW and others imported countries of black tea.

In the presence of income and substitution effect, the classification of complements and substitutes cannot easily find on the basis of the sign of Hicksian elasticity of price. Table 5.5 shows the parameters of Hicksian elasticity of cross price that is estimated by ILLS using equation (11). Compensated cross price follow the same trend, there is minor difference among the values of uncompensated and compensated cross price elasticities which is theoretically consistent. For example the value of Hicksian own and cross price elasticity for India to Kenya are (-0.542) and (-0.495) respectively.

Table 5.5; Hicksian Cross-Price Elasticities

	P_India	P_Indo	P_Kenya	P_Rwnda	P_Srilank	P_ROW
India	-1.29** (0.437)	5.781** (0.815)	5.817** (1.945)	-2.445* (1.308)	-2.089* (0.856)	-5.649* (2.379)
Indonesia	0.261 (0.238)	0.100 (0.42)	5.056** (1.059)	0.202 (0.711)	0.692 (0.469)	-5.89** (1.301)
Kenya	-0.082 (0.091)	-0.495** (0.161)	-1.83** (0.404)	0.321 (0.273)	0.103 (0.180)	2.036** (0.496)
Rwanda	0.097 (0.452)	1.239* (0.797)	0.899 (1.996)	-1.994* (1.351)	-0.524 (0.89)	0.944 (2.445)
SriLank	0.118 (0.757)	-2.245* (1.336)	8.526* (3.389)	-3.969* (2.273)	-1.094 (1.48)	-2.166 (4.072)
ROW	0.767* (0.319)	0.308 (0.559)	4.151** (1.41)	0.478 (0.949)	0.777 (0.626)	-6.59** (1.733)

* p<0.05, ** p<0.01, *** p<0.001

Alboghdady & Alashry, (2010) reported that, result those reflects the expenditure effect on the quantities demanded from different sources is very significant. The value of the expenditure and price elasticities shows the opportunity to enhance the export share in the imported market, if the country import demand is inelastic with price and elastic with expenditure, it shows exporter country has greater advantage to increase the share of export (Alboghdady, 2013). In other words it also shows the competitiveness of the exporter country in the import market. In case of Pakistan there is not a single exporting country whose expenditure elasticity is more than unity and also price elasticity is below than unity.

This conclusion also consolidate the findings of Consulate General of Sri Lanka, Karachi, (2016) that FTA signed between Pakistan and Sri-Lanka did not benefited Sri Lanka even the duty free access given to Sri Lankan tea. However, Pakistan tea import demand is highly elastic that's mean that, duty free excess to Sri-

Lankan tea will lead to increase in imported tea demand, but the duty free excess did not work for Sri-Lanka. The reason behind this is the price and income elasticity of Sri-Lanka are elastic but not statistically significant. It can be concluded that there is non-tariff barriers which are undermining the duty free advantage of Sri-Lankan tea, Such as one is pointed by Sri-Lankan consulate General report, (2016), that Kenya used extensive marketing techniques to divert preferences of Pakistani tea importer towards Kenyan tea.

CHAPTER 6

Conclusion and Policy Recommendation

6.1 Conclusion

The issues related with import demand specification and estimation are briefly discussed in this research study highlighting the problem of conventional import demand function, Importance of source differentiated import demand function, sensitivity of parameter of import demand if source differentiated is not incorporated. It also highlighted that import demand function those are derived from the consumer demand theory, and estimation techniques that satisfied the basic axioms of consumer theory.

Existing literature on the econometric specification of import demand function is comprehensively utilized and classified into 5 non-source differentiated themes. Issues related with these estimation techniques are articulated and also how these non-source differentiated import demand function diverted into theoretical based source differentiated import demand function.

Comprehensive studies of import demand function identified that trade economist have not paid due attention to the agriculture import demand of Pakistan, while during the last decade Pakistan was the net importer of agricultural product, and data trend shows that it will further erode the condition until and unless it is not rectified. We choose black tea to analyze its import demand, due its sizable share in the imported food group as well as in the world market. Pakistan is the one of the largest importer of the black tea and import trends of black tea depicting upward trend. It is the first research paper that utilized the SDAIDS to analyze the import demand function of black tea for Pakistan.

To overcome short coming of existing study on black tea import demand and provide comprehensive information about import demand of black tea, SDAIDS is estimated by ILLS estimating techniques, and conducted test for source aggregation. Non-source differentiation is rejected at conventional significance level. It implies that black tea import from different origins of supply should be considered as different commodities. Augmented dickey fuller (ADF) unit root test is conducted to find out Stationarity of data. All variables utilized in this research study are stationary at I(1).

The inception of FTA with Sri Lanka does not appear to influence black tea imports, perhaps due to the fact that, tea imports are large from other countries. Relaxation provide to Kenya in terms of decrease in tariff rate from 33 to 10 % is the main reason behind grabbing the Pakistani tea market because Kenyan tea is highly price elastic. The sign of expenditure share of the given countries are positive and statistically significant as well, strengthening the (PTA) perceptions about the tea industry that import expenditure play important role in determining tea import demand. Kenya, Rwanda and Sri Lankan tea are luxury goods as the values of the expenditure elasticities are greater than one. Alternatively, India, Indonesia and ROW are necessity goods as the expenditure elasticity is less than one.

All of the estimated own-price elasticities are highly elastic except for Indonesia and Sri- Lanka, indicating that the Pakistan black tea market is highly sensitive to the price changes of the tea. The estimated cross-price elasticity indicated the Pakistani consumer responds to India and Kenya, Indonesia and Kenya, Sri-Lanka and Kenya and Rwanda and Kenya tea as substitutes to each other, while Indian, Rwanda and ROW teas are complements to each other's. Moreover cheapest import source to Pakistan is India, while Sri-Lanka and Kenya are expensive ones. Results of this research paper indicates that none of the origin of the supply of tea enjoys the

competitive advantage in the Pakistan tea imported market, as it is defined on the basis of high expenditure and low price elasticity.

6.2 Policy Recommendations

- Country specific Price and tariff rate can be used to curtail overall growth in tea imports.
- Non-tariff barrier can also be utilized to curtail import demand.
- The amount of black tea bill import can also be reduced by diverting importer behavior from expensive to cheapest source.

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