An Estimation Of Normalized Revealed Comparative Advantage And Its Determinants In Pakistan

Mahboob Ul Hassan
Hafiz Khalil Ahmad

Abstract

This study has investigated the Comparative Advantage (CA) of Pakistan's exports over the period of 1995 to 2013. For measuring comparative advantage, Normalized Reveal Comparative Advantage (NRCA) index has been constructed in case of Pakistan's exports. There are 17 sectors and more than two hundred commodities are used for measuring NRCA of Pakistan. In this study Agricultural Products (ArP), Food Items (Food), Fuels and Mining Products (FMP), Fuels Products (Fuel), Manufactured Products (MuP), Iron and Steel Products (ISP), Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE), Pharmaceuticals Products (PaP), Integrated circuits and electronic components (ICEC), Transport equipment (TrE), Automotive products (AutoP), Textiles (Text) and Clothing (Cloth) are the selected sectors for measuring NCRA in case of Pakistan. This study has also investigated the determinants of Normalized Revealed Comparative Advantage in case of Pakistan. The estimated overall exports NRCA is taken as dependent variable whereas EXC, FDI, TOT, OPEN and HC are selected as independent variables. For the solution of unit root problem in this study ADF unit root test is used. For examining the co-integration among the variables of the model ARDL bound testing approach to co-integration. The results of commodities groups show that Pakistan has enjoying normalized reveal comparative advantage in most of agricultural products sector whereas Pakistan has normalized reveal comparative disadvantage in industrial and technological products sector. But that normalized reveal comparative disadvantage is offset by the overall normalized reveal comparative advantage in Pakistan. The results show that there is negative and significant relationship between NRCA and EXC. FDI has insignificant and negative effects on NRCA whereas NRCA and HC has positive and significant relationship in case of Pakistan. In our estimated model the coefficient of OPEN has insignificant and positive relationship with NRCA in Pakistan. Overall results of the model show

that rising EXC causes to decrease in NRCA while rising HC causes to increase in NRCA in case of Pakistan. So government of Pakistan should use normalized reveal comparative advantage for measuring comparative advantage, instead of traditional and outdated methods. For gaining and maintaining normalized reveal comparative advantage in agricultural products government should focus on serious policy issues which this study highlighted.

Introduction

Normally trade is considered a part and parcel of economic growth and had critical role for poverty reduction. This notion further strengthens the idea of specialization and comparative advantage. The export pattern of developing and developed countries had been changed due to liberalization and improved technological methods of production. Hence the benefits of specialization and comparative advantage are shifting to those parts of the world which once have comparative disadvantage in some products. The hypothesis of comparative advantage became the main principle of explaining the international trade pattern among the open economies more two centuries ago. Ricardo (1817) presented the concept of comparative advantage after finding some weakness in the absolute advantages hypothesis. Following the comparative advantage of a country, it is producing a good more efficiently as compared to any other country. Sometimes, the import of that good are profitable and following the productive behavior export of other goods are done. For enhancing the welfare mostly, a country prefers the relatively most efficient production activities and imports those products in which it had less efficiency as compared to other countries (Deardorff, 2011).

Comparative advantage is equally important concept to both practitioners and policymakers. In a market based economy the amount of exports decides the level of revealed comparative advantage and this process further strengthens the idea of factor endowment and trade policy of a nation. Much of the existing empirical work in international trade focused on testing or the extension of comparative advantage. The revealed comparative advantage proposed by Balassa (1977) in the late 1970s are considered as the best method for measuring the gains from trade. Moreover, revealed comparative advantage gives information about the regional comparative advantage and it further explains the variation across sectors and times (Richardson and Zhang, 1999).

After the World War II the era of trade liberalization started under the umbrella of GATT which was promoted to be WTO in 1995. Moreover, regional Economic integration initiatives also started new reforms in unilateral trade which mainly

aimed to remove barriers in trade and structural changes for trade related issues. Hence more benefits can be attained by those countries which have comparative advantage. But there is an important question in literature, that are does comparative advantage still explain the extent and trade flows among different countries? Comparative advantage is mainly based on the domestic resources which are now inappropriate in the presence of advanced technology. Indeed, comparative advantage plays an important role in increasing mobility of ideas, goods and services, factors of production and changing the pattern of international trade (Kowalski et al., 2011). Thus as compared to static and traditional approaches of comparative advantage there are an intense need for some dynamic models or approaches which can significantly explain the changing behavior of international trade.

The world trade pattern is changing due to reduction in trade barriers and technological changes, which will lead to increase in productivity and bring changes in patterns of comparative advantage among economies of the world. Moreover, following the shortcomings of revealed comparative advantage (RCA), index of Balassa, a number of alternatives to revealed comparative advantage indices have been presented (Vollrath 1991; Laursen 1998; Proudman and Redding 1998 and Hoen and Oosterhaven 2006). Although these indices have improved certain aspects of Balassa's RCA index, but none of these successfully became a general index that may be comparable over space and time. This study is proposing a normalized revealed comparative advantage (NRCA) index as an alternative measure for comparative advantage for Pakistan. Moreover, this study had constructed NRCA index in case of Pakistan and investigated the determinants of comparative advantage and Determinants of NRCA in case of Pakistan for Different Standard International Trade Classification (SITC). So this study is a healthy contribution to respective literature.

Literature Review

The Neo-Classical model of Ricardo (1817) explains the comparative advantage of a country. This model is based on economic conditions, production ability of specific products at the lowest costs, product exports pattern and comparative disadvantage for imports. The Ricardo (1817) trade model explains that trade among countries are based on labor productivity difference whereas H-O model explains the difference of intensities and factor endowments for international trade among countries. Having the assumption of increasing returns to scale and imperfect competition, the New Trade Theory explains intra-industry trade among countries. New trade Theory does not rely on traditional properties of comparative advantage. Krugman (1979) presented a non-comparative advantage model of trade which are

based on simple general equilibrium process. In this interpretation comparative advantage are based on traditional view-point, on which inter-industry triggers trade among countries, rather than relying on increasing returns to scale.

Vernon (1966) mentioned that there are four stages of product development and each stage has its vital significance. First, a new product is introduced in market by an innovative country. In this stage, the interaction among market forces are smooth, which implies an easy gathering of inputs for production. However, this phase is characterized by higher cost of investment at production platforms, human capital and R&D. In the second stage, the product becomes homogeneous and the production development becomes normalized. Product life cycle are strongly attached to incoming and outgoing FDI. Therefore, considering the nature of Multinational Enterprises' (MNE) and their economic incentives; foreign production commencement are part of Vernon's second stage of product development. In this stage, production is commonly established in another developed country to satisfy the increased market demand. The product becomes saturated by entering the third stage where the rise in competition yields lower market shares. Throughout this stage, the production can be transferred to underdeveloped countries, where the lowest possible cost of production is preferred. The final stage (product standardization) asserts the decline of the product, where the manufacturing of the good shifts to the least developed countries.

Yeats (1985) mentioned that traditional Balassa index has poor economic sense of country or product ranking. There are chances for some countries to have the value of comparative advantage below or above one and sector specific top rank country may have less comparative advantage because of other sectors specialization. There are also chances that exports outflow of a sector are highly concentrated towards some counties and lowest index value of comparative advantage has value very high of Balassa index. As a result, numeric value of Balassa index does not provide the exact comparative advantage ranking of a country when index values are based on cross sectors or countries (UNIDO 1982).

Reidel (1988) studied the determinants of exports on both the supply and demand side by using simultaneous equations approach from 1972 to 1984. In the demand equation, prices of exports, competing goods and world demand were taken as exogenous variables. While in the supply side equation, time trend, raw materials prices, exports' domestic prices and inputs for industries were taken as exogenous variables. The estimated results revealed that income elasticities and infinite price levels encouraged the existence of small country hypothesis. Supply side equation's parameters had correct signs and were statistically significant.

Porter (1990) developed a framework of competitive advantage "A Diamond of National Advantage". This study was based on 100 industries from 10 developed countries which had the strongest industrial background. These 10 countries were holding 50 percent exports of the world in the 1985. A country had comparative advantage in a specific industry "if it possessed competitive advantage relative to the best worldwide competitors" in terms of indicators such as "the presence of substantial exports to a wide array of other nations and/or significant outbound foreign investment based on skills assets created in the home country" (Porter, 1990a). The main concept behind are "National prosperity are created, not inherited". It does not grow out of a country's natural endowments, its labour pool, its interest rates, or its currency's value as classical economics insists. A nation's competitiveness depends on the capacity of its industry to innovate and upgrade. Companies gain advantage against the world's best competitors because of pressure and challenge. "Having strong domestic rivals, aggressive home-based suppliers and demanding local customers" (Porter, 1990). Innovational activities of firms play a critical role in determining the comparative advantage. But the question raised are that why some firms have high capability as compared to others? There are four factors which are responsible for the fluctuating capabilities of the firms, such as, firm structure and strategy for production, demand conditions, factor conditions and supporting and related industries.

Vollrath (1991) examined RCA index for different industries; the results of the study suggested that by following the rules of demand and supply balance the traditional RCA index are a more suitable measure than any other index. The study mentioned that the relative export advantage played an important role in trade distortion among countries. So it is necessary that comparative advantage indices should not be compared at all.

Funke and Holly (1992) examined the supply and demand side determinants of West Germany by using quarterly data from 1961 to 1987. For empirical estimation Maximum Likelihood method was used. In supply and demand side equations exports prices, foreign exports price for producers, world demand, exports price at domestic level, non-exportable products prices, industrial inputs prices and industrial total costs were taken as exogenous variables. In supply and demand sides equations all variables had the correct sign with significant magnitudes except export demand price elasticity which was insignificant.

Reidel et al. (1994) analyzed the exports determinants of Hong Kong with the help of quarterly time series data over the period: 1977 to 1984. In this study demand for export was taken as the dependent variable whereas exports volume, competing goods price and income at world level were taken as explanatory variables. The

estimated results of the study revealed that income and prices played a significant role in determining the Hong Kong exports demand in the world.

Muscatelli et al. (1995) investigated the determinants of exports of the newly industrializing Asian countries, including Hong Kong, Korea, Malaysia, Taiwan, Singapore and Thailand using time series data for the period 1967-1987. For empirical analysis maximum likelihood method was used. The results showed a significant income and price elasticity of demand for exports of all countries, and rejected the small country hypothesis that global demand are not relevant for explaining the behavior of the newly industrialized countries' exports.

Malik (2000) analyzed the clothing and textile exports determinants in case of Pakistan from 1960 to 2000. Both supply and demand side equations of exports were examined with the help of simultaneous equations. For examining the co-integration among the variables of the model Johnsen cointegration was applied. The estimated results of the study showed that there was insignificant relationship between world income and textile exports prices in Pakistan. But the results of supply-side equation had correct signs and significant relationship among the selected variables of the model.

Yilmaz and Ergun (2003) analyzed the specialization structure and competitiveness of trade pattern of Turkish economy with the comparison of five European economies such as, Bulgaria, Czech Republic, Hungry and Poland. Trade overlap, export similarity index, comparative exports' performance and Balassa RCA index were used for measuring trade competitiveness among the selected countries. The estimated results of this study showed that Turkish exports were showing higher comparative advantage for labor intensive products and some primary products. While, in some products Turkey had higher comparative disadvantage which had technological basis.

Karakaya and Özgen (2002) investigated the trade diversion and the potential trade creation impact on economic integration in case of Turkey for European Union market by using standard RCA approach. For examining the jeopardize impacts for Southern countries the RCA index was used. The estimated results of the study showed that Turkey had remarkably different export structures as compared to Southern European countries in EU market. The results suggested that having the less export share in European Union market Turkish exports were unable to change the exports structure of EU market. The estimated results of the study showed that having zero trade barriers among European countries Turkey had lower comparative advantage as compared to Southern countries of EU.

Ferman and Yüksel (2004) used RCA index and similarity export index for reviewing the Turkish exports' competitiveness for EU market. The estimated results disclosed that China and India were the closest competitors of Turkish products in EU market. FDI was considered an important determinant of comparative advantage although FDI worked through technology. Technology are the key outcome which works through knowledge capital assets and it provides the biggest benefit in firm specific environments. Moreover, technology or the technological development provides a relationship between FDI and economic growth/specialization (Johnson, 2005). The latter was empirically studied and analyzed by Claro (2008) in case of China. It was concluded that major foreign direct investments inflows in labor-intensive sectors was a stronghold in Chin's exceptional position. On the whole, China's immense labor-intensive export segment in terms of world exports are a direct contribution of a large labor force. Its high relative productivity in labor-intensive sectors, much thanks to the high amount of FDI.

Gallardo (2005) examined the relationship among comparative advantage, economic growth and free trade. First, the study explored whether developing countries were having benefits of specialization in product of their comparative advantage? Second, the study analyzed whether free market policy, adopted by an economy led to greater efficiency? The results revealed that if developing countries specialized according to their comparative advantage, it would be beneficial and favorable for them. Secondly, those economies which were following free market policy they did not achieve greater efficiency. He found that market forces were not much reliant for explaining comparative advantage. He suggested that state intervention was essential especially for developing countries. Thus, specialization would accelerate demand for labor and reduce unemployment.

Wörz (2005) believed that in a given time period, the rate of change in a country's comparative advantage are closely related to its economic development. The more developed a country's economy brings more stability in its imports and exports structure, i.e. the more stable its comparative advantage model will be. In contrast, the comparative advantage model of developing countries will undergo relatively greater and more rapid changes during the process of export growth. The relationship between export comparative advantage change and economic development are essentially interactive, with the former both passively reflecting and significantly influencing the latter.

Sadia (2006) analyzed the determinants of exports and imports of Pakistan from 1973 to 2005. Imports, nominal exchange rate, world GDP and Pakistan GDP were taken as exogenous variables in export function. The main assumption in this study

was a small country are a price taker and can't impact world prices. For empirical estimation simple OLS method was used. The results of the study showed that all independent variables had theoretically correct relationship with the dependent variable.

Sinha (2007) examined the supply and demand models for Indian manufactured exports. Time series data was used from 1960 to 2004. For empirical investigation FIML was used and supply and demand side equations used six types of manufactured exports. The results of the study showed that demand factors played an important role in explaining Indian exports' performance. While the supply model presented mix results where some variables were significant and some were insignificant.

Mohanan (2007) used three stage least squares for examining the supply and demand side exports' performance of India from 1980 to 2005. The estimated results of the study showed that exchange rate and demand at world level played significant role in determining the exports' performance of India over the selected time period. The results showed that export prices and human capital played significant role in determining the exports supply for India.

Widodo (2008) conducted a comparative analysis of the changes in comparative advantage between China and India from 1988 to 2003. The study concluded that comparative advantages of the two countries were generally expanding (except for China during 1998-2003), and that China's enhancement of comparative advantage was more prominent than that of India. International research has begun to identify the characteristics of China's changing exports' comparative advantage, yet a lack of clarity persists regarding its particular phases and potential influence.

Naseem et al. (2008) investigated the footwear industry's performance in case of Pakistan by using RCA index. Furthermore, this study made a comparison of footwear industry of Pakistan with footwear industries of China and India. HC 2-digit level as well as HC 4-digit level was used for the calculation of RCA index over the period, 1996 to 2006. The results of the study showed that footwear industry of Pakistan faced a serious shift in comparative advantage as compared to China and India. The estimated results of the study showed that after 1990 comparative advantage of China and India was showing a decreasing trend in comparative analysis.

Yu et al. (2010) investigated the dynamics of comparative advantage based on agricultural exports of Hawaii by using NRCA index "normalized revealed comparative advantage index" over the 1995-2005 period. The study concluded that

normalized revealed comparative advantage index had three perspectives for explaining comparative advantage: (1) identification of static patterns of CA for Hawaii agricultural products; (2) identification of changing pattern of loss and gain of CA for Hawaii agricultural products; and (3) the significant trends of CA for Hawaii agricultural products.

Bhattacharyya (2011) examined the horticultural products' competitiveness and comparative advantage of India. EU, Asian and North American markets were used for the comparison of these products with major exporters. The results of the study showed that India had comparative advantage in vegetables and fruit products. The results showed that agricultural products were labor-intensive in India and had CA in these markets.

Bano and Scrimgeour (2012) analyzed the relationship between exports growth and fruit outputs growth in case of Kiwi over the period, 1981 to 2011. Comparative advantage was measured with the help of standard RCA index. The estimated results revealed that comparative advantage increased the output growth for Kiwi fruit products. Arvis et al. (2012) examined trade cost of manufactured goods with the help of a large number of countries data set. Decomposition of composite trade costs was done for this purpose. The results showed that trade facilities enhanced exports of manufactured goods and became the cause of reduction in trade cost of manufactured goods. Augmented gravity model was used for observing the trade facilitation of manufacturing exports in case of Thailand.

Moise and Sorescu (2013) examined trade facilitation impact on developing countries overall exports. Database of OECD was used for the construction of sixteen trade facilitations. Moreover, ESCAP and World Bank database were also used for the construction of trade facilitation. The results of the study showed that trade facilitation had a significant and positive impact on inflows of trade among countries. Impartiality and good governance, procedures of border streamlining, risk management and automated processes and availability, simplification and harmonization of documents were used for measuring trade facilitation.

Shahab and Mahmood (2013) examined the aggregate leather industry and selected products based leather industry's revealed comparative advantage of Iran, India, China and Pakistan over the period, 2002-2009. The estimated results revealed that comparative advantage of Pakistan showed increasing trend in leather industry. The study concluded that there were enough opportunities for enhancing the leather sector growth in Pakistan. The results showed that China and India enjoyed comparative advantage in leather industry whereas Iran faced comparative disadvantage in leather industry.

Haller (2014) examined the milk quota abolishment in different scenarios. The study mentioned that less attention has been paid towards examining the relationship between comparative advantage and abolishment of quota, so there is an intense need to full the literature gap and for observing the determinants of comparative advantage. This type of research will highlight how comparative advantage are important for economic improvement and the impact of comparative advantage on domestic policy matter.

A detailed review of literature enables us to observe the strength and weakness of the existing measures of comparative advantage. This study proposes the normalized revealed comparative advantage (NRCA) index as an alternative measure of comparative advantage for Pakistan. Moreover, this study has constructed NRCA index in case of Pakistan and has investigated determinants of NRCA in case of Pakistan for Different Standard International Trade Classification (SITC). Thus this study would be a healthy contribution to respective literature.

Theoretical Background and Econometric Methodology

Balassa (1989) mentioned that there are some chronic difficulties in measuring comparative advantage as under autarky relative prices cannot be observe easily. For solving these difficulties Balassa (1965) mentioned that it is not compulsory to account all the elements impacting comparative advantage of a country.He proposed that revealed level of comparative advantage is a better measure for observing the pattern of trade instead of relying on pre-traded level of relative prices. On these bases he presented an index of comparative advantage which is known as Balassa RCA index. This index states that a country has comparative advantage in revealed terms rather than traditional simple comparative advantage. For measuring trade performance at country level or regional level Balassa and his followers used consumption, production, exports and imports data. Balassa revealed comparative advantage (RCA) index for Pakistan has the following procedure:

$$BRCA_{ip} = (E_{ip} / E_p) / (E_p / E) \qquad (1)$$

Here $BRCA_{ip}$ is Balassa Revealed Comparative Advantage index of product *i* in Pakistan. E_{ip}represents exports of commodity *i* in Pakistan; Ep represents the total exports of Pakistan andE represents the total world exports. According to Balassa if$BRCA_{ip} > 1$, Pakistan has higher competitiveness in commodity *i's* exports than the average competitiveness of its exports baskets. On the other hand, if $BRCA_{ip} < 1$, then Pakistan has weak or lack of comparative advantage in commodity *i*.

Yu et al., (2009) presentednormalized revealed comparative advantage (NRCA) index. The NRCA index calculates the degree of deviation of a country's actual exports from its comparative-advantage-neutral level in terms of its relative scale with respect to the world exports market and thus provides a proper indication of the underlying comparative advantage. The salient features of NRCA index include its symmetrical distribution and independence from the number of countries and sectors. Therefore, the present study has applied the NRCA index to examine comparative advantage of Pakistan. The NRCA index can be expressed as follows:

$$NRCA_{p,j} = \frac{E_{p,j}}{E} - \frac{E_p E_j}{EE} \qquad (2)$$

where, NRCAp,j refers to the normalized revealed comparative advantage index of commodity j in Pakistan; Ep,j is the export of commodity j in Pakistan, Ej indicates total world exports of commodity j; Ep stands for total exports of Pakistan and E represents total world exports.The conditions of NRCAp,j > 0 or NRCAp,j < 0 indicates Pakistan's actual exports of commodity j is higher or lower than its neutral level of comparative advantage, that would further points out j commodity's comparative disadvantage or advantage for Pakistan. A higher NRCAp,j score indicates stronger comparative advantage and a lower NRCAp,j score represents comparative disadvantage. The equation for determinants of NRCA is written in the general functional form as follows:

NRCAi,t =F(EXCt, TOTt, HCt, FDIt, Xt) (3)

Where
NRCA=Normalized reveal comparative advantage of *i*thsector, EXC= Exchange rate, TOT=terms of trade, HC=human capital, FDI=foreign direct investment, X=a set of control variables, e=error term, t=time period.

Econometric Methodology

In this modern era of applied econometrics, applying the econometric tools on theoretical economic models are considered an important aspect of economic analysis. Normally, macroeconomic data has the involvement of time trend which makes it non-stationary and OLS results become spurious. Nelson and Plosser (1982) analyzed that time series data of macroeconomic variables have unit root problem. They concluded that existence or non-existence of unit root helps to check the authenticity of data generating process. Stationary and non-stationary data has some different features. The stationary time series data have temporary shocks which disappear over time and series move back to their long-run mean values.

While, in non-stationary time series data shocks are permanent. As a result, the variance and mean of a non-stationary time series depends upon time trend and the series follows; (a) no long run mean to which the series returns (b) variance will depend on time and will approach infinity as time goes to infinity. In case the time series data has only negative or positive shocks, the time series data are non-stationary (Dickey and Fuller, 1979). Different unit root tests are available for making data stationary. For our analysis we used Augmented Dickey-Fuller (ADF) unit root test (1981). The general forms of the ADF can be written as:

$$\Delta X_t = \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{1t} \quad (4)$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{2t} \quad (5)$$

$$\Delta X_t = \alpha + \beta t + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{3t} \quad (6)$$

X_t are a time series for testing unit roots, t are the time trend and e_t is error term having white noise properties. If $j = 0$, it representing the simple DF test. The lagged dependent variables in the ADF regression equation are included until the error term becomes white noise. For checking the serial correlation of error terms LM test are used. The null and alternative hypotheses of ADF unit roots are;

H_0 : $\delta = 0$ non-stationary time series ; so it has unit root problem.

H_a : $\delta < 0$ stationary time series

We apply OLS and compute τ statistic of the estimated co-efficient of X_{t-1} and compare it with the Dickey Fuller (1979) critical τ values. If calculated value of τ statistic are greater than the critical value we reject H_0. In this case the time series data are stationary. On the other hand, if we cannot reject the H_0, then the time series are non-stationary. In this way by applying this procedure on all variables, one can easily find their respective orders of integration.

ARDL bound testing approach has numerous advantages over traditional methods of co-integration. At first, ARDL can be applied regardless by following the order of integration. It can be applied I(0), purely I(1) or mix order of integration (Pesaran and Shin, 1999). On second, ARDL bound testing approach to co-integration can be used for small sample size (Mah, 2000) rather than traditional methods. At third,

this approach allows to take sufficient number of lags in framework of model specification and in generating process of data (Laurenceson et al., 2003). In the last, ARDL gives efficient and valid detailed information about the structural breaks in data. However, Pesaran and Shin (1999) contended that "appropriate modification of the orders of the ARDL model is sufficient to simultaneously correct for residual serial correlation and the problem of endogenous variables". Alam and Quazi (2003) reveal that ARDL can be applied when independent variables are endogenous and this method is still valid if the order of integration of explanatory variables is varied. Anyhow, ARDL fails if there is I(2) integration. For using the bounds testing procedure, it is necessary to represent equation in a conditional autoregressive distributed lag model as following:

$$\Delta \ln Y_t = \beta_1 + \beta_2 t + \beta_3 \ln Y_{t-1} + \beta_4 \ln X_{t-1} + \beta_5 \ln Z_{t-1} + ... + \sum_{h=1}^{p} \beta_h \Delta \ln Y_{t-h} + \sum_{j=0}^{p} \gamma_j \Delta \ln X_{t-j} + \sum_{k=0}^{p} \phi_k \Delta \ln Z_{t-k} + ... + u_{it} \quad (7)$$

Here $\ln Y_t$ is used for different dependent t is for time of $\ln Y_{t-1}$ representing the lag of dependent variable and $\ln X_t$ is first independent variable and $\ln Z_t$ is second independent variable so on. Δ represents the rate of change in variables. The study will discover the relationship direction among the variables of the model. The Wald test for the bounds testing depends on some of the following factors: The order of integration I(d) of variables in the ARDL model, either the intercept or trend or both are included in the ARDL model and the number of regressors in ARDL model. This study is proposing the normalized revealed comparative advantage (NRCA) index as an alternative measure of comparative advantage for Pakistan. Moreover, this study will construct NRCA index in case of Pakistan and will investigate determinants of comparative advantage and Determinants of NRCA in case of Pakistan for Different Standard International Trade Classification (SITC). So in this study will be a healthy contribution to respective literature. On the base of the above equation our null and alternative hypothesis for co-integration test are as given below:

$H_0 : \beta_3 = \beta_4 = \beta_5 = 0$ (no co-integration among the variables)

$H_A : \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$ (co-integration among variables)

Once the long run co-integration relationship among the variables can be disclosed, short run relationship can be examined and we use the Vector Error Correction Model (VECM). The VECM is explained as under:

$$\Delta \ln Y_{it} = \beta_1 + \beta_2 t + \sum_{h=1}^{p} \beta_h \Delta \ln Y_{it-h} + \sum_{j=0}^{p} \gamma_j \Delta \ln X_{t-j}$$

$$+ \sum_{k=0}^{p} \phi_k \Delta \ln Z_{it-k} + \omega ECT_{t-1} + u_t \qquad (8)$$

all the variables are explained above except ECT_{t-1} which represents lagged error correction term. The results of ECT explain the adjustment speed towards long run because of shock in short run. For examining the goodness of fit of ARCL approach, the sensitivity or diagnostic tests are under taken. The sensitivity or diagnostic tests analysis normality, serial correlation, autoregressive conditional heteroscedisticity, and heteroscedisticity linked to the variables of the model.

Empirical Results and Discussion

This part of the study consists of empirical results and their discussion.This study has investigated the comparative advantage of Pakistan's exports. For measuring comparative advantage, Normalized Reveal Comparative Advantage (NRCA) index was constructed in case of Pakistan's exports. Seventeen sectors were used for measuring NRCA over the period of 1995 to 2013. These sectors included: Agricultural Products (ArP), Food Items (Food), Fuels and Mining Products (FMP), Fuels Products (Fuel), Manufactured Products (MuP), Iron and Steel Products (ISP), Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE), Pharmaceuticals Products (PaP), Integrated circuits and electronic components (ICEC), Transport equipment (TrE), Automotive products (AutoP), Textiles (Text) and Clothing (Cloth). Because of large number of sectors, the results of these sectors are presented in Tables 1-3.

The time series NRCA of Agricultural Products (ArP), Food Items (Food), Fuels and Mining Products (FMP), Fuels Products (Fuel), Manufactured Products (MuP) and Iron and Steel Products (ISP) are presented in Table-1. The results show that Pakistan has normalized revealed comparative advantage in agricultural products exports. The estimated value shows that in the year 1995 this NRCA was (0.050642) which decreased to (0.03635) in the year 1997. In the next three years

the NRCA remained stable and after the year 2000 NRCA showed a continuous decreasing trend till the year 2004. In the year 2005 the NRCA got the highest value (0.07905) over the last decade which revealed the agricultural development in Pakistan at gross root level. After the drop of NRCA value (0.0582) in the year 2007, the NRCA of agricultural products remained between (0.104) and (0.149) during PPP (Pakistan People's Party) government. The estimated results show that Pakistan has normalized revealed comparative advantage in food items exports. This NRCA got its highest point (0.079) of the decade in the year 2005. After the year 2007 NRCA of food items remained between (0.099) to (0.138) till the year 2013. The estimated results show that Pakistan had normalized reveal comparative disadvantage in Fuels and Mining Products. This disadvantage remained between (-0.08925) to (-0.22335) during the selected time period. The lack of research and development (R&D) expenditures on fuels and mining products and unfavorable natural conditions for these products were the main reasons for normalized revealed comparative disadvantage of this sector (Zaidi, 2004). The results show that Pakistan had normalized revealed comparative disadvantage in fuels products and this disadvantage lied between (-0.0699) to (–0.16608) during the selected time period.

The lack of research and development (R&D) expenditures on fuels products and adverse natural conditions for these products were the main reasons for normalized reveal comparative disadvantage of this sector (Zaidi, 2003). The results show that Pakistan had normalized revealed comparative advantage in manufactured products. This NRCA of manufactured products got its highest point (0.257933) of the decade in year 2005. During the whole selected time period NRCA of manufactured products showed much fluctuation but it remained between (0.257933) to (0.126812). Zaidi (2003) mentioned that following the less profits of primary agricultural exports, Pakistan is changing its exports structure and preferring manufactured products exports. This preference is increasing the normalized revealed comparative advantage of manufactured products sector for Pakistan. The results show that Pakistan had normalized revealed comparative disadvantage in Iron and Steel Products (ISP) and this disadvantage lied between -0.01753) to (-0.03757) but it showed a decreasing trend during the selected time period.

Table-1:
Sector Specific Normalized Revealed Comparative Advantage (NRCA)

Years	ArP	Food	FMP	Fuels	Mup	ISP
1995	0.050642	0.038487	-0.11849	-0.08065	0.128369	-0.03757
1996	0.065615	0.011548	-0.13261	-0.09813	0.253594	-0.03326
1997	0.036350	0.027966	-0.12468	-0.08468	0.247045	-0.02992
1998	0.067043	0.067269	-0.09456	-0.07023	0.148797	-0.03032
1999	0.065129	0.069052	-0.08925	-0.06990	0.183983	-0.02276

2000	0.068573	0.053497	-0.10728	-0.08712	0.224149	-0.02136
2001	0.051871	0.050978	-0.11165	-0.08200	0.214437	-0.02239
2002	0.051043	0.052356	-0.09519	-0.07861	0.248665	-0.0226
2003	0.048603	0.049433	-0.11019	-0.09150	0.212191	-0.02631
2004	0.045059	0.041576	-0.09097	-0.08860	0.217793	-0.02841
2005	0.079018	0.078982	-0.11336	-0.09717	0.257933	-0.02724
2006	0.065644	0.068146	-0.12245	-0.10012	0.203417	-0.02935
2007	0.058178	0.060469	-0.09306	-0.07924	0.187188	-0.02811
2008	0.124733	0.122880	-0.14526	-0.09224	0.190103	-0.02643
2009	0.104484	0.099112	-0.09004	-0.10371	0.156976	-0.02144
2010	0.116761	0.111176	-0.11166	-0.09247	0.176287	-0.02286
2011	0.148673	0.137598	-0.20238	-0.13068	0.126812	-0.02427
2012	0.129955	0.110208	-0.17529	-0.16608	0.197204	-0.01753
2013	0.140144	0.131667	-0.22335	-0.15956	0.126923	-0.01968
Agricultural Products (ArP), Food Items (Food), Fuels and Mining Products (FMP), Fuels Products (Fuel), Manufactured Products (MuP), Iron and Steel Products (ISP) Source: Authors' own calculations using data from						

The time series NRCA of Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE) and Pharmaceuticals Products (PaP) are presented in Table-2. The results show that Pakistan had normalized revealed comparative disadvantage in Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE) and Pharmaceuticals Products (PaP). The results show that Pakistan had higher normalized revealed comparative disadvantage in chemical products sector and lower normalized revealed comparative disadvantage in iron and steel sector over the selected time period. Empirics reveal that there occurred much revolution in world transport infrastructure, telecommunication infrastructure and Pharmaceutical Products; Pakistan lagged behind in these sectors and is still trying to fulfil the basic requirement of the masses. So instead of gaining exports advantage the main focus of the government is to import Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE) and Pharmaceuticals Products (PaP).

Table-2
Sector Specific Normalized Reveal Comparative Advantage (NRCA)

Years	ChP	PaP	MTE	OTE	IAS	TLE
1995	-0.10954	-0.01754	-0.46506	-0.1469	-0.05157	-0.0259
1996	-0.10478	-0.01809	-0.47052	-0.14876	-0.05769	-0.03225
1997	-0.09816	-0.01699	-0.42551	-0.14174	-0.05798	-0.03627
1998	-0.10227	-0.0167	-0.46594	-0.15076	-0.07088	-0.04911
1999	-0.09134	-0.01556	-0.4272	-0.14744	-0.07208	-0.05545
2000	-0.07376	-0.01178	-0.40136	-0.15069	-0.05816	-0.04435
2001	-0.08584	-0.01831	-0.42842	-0.14891	-0.05894	-0.04736
2002	-0.08711	-0.02323	-0.41704	-0.14121	-0.05472	-0.04479
2003	-0.09661	-0.02698	-0.41036	-0.14992	-0.05806	-0.04787
2004	-0.0899	-0.02423	-0.37078	-0.13249	-0.05052	-0.04302
2005	-0.07561	-0.02218	-0.37194	-0.1243	-0.04757	-0.04145
2006	-0.07959	-0.02153	-0.36018	-0.12047	-0.04495	-0.04141
2007	-0.07204	-0.0186	-0.28614	-0.09634	-0.03604	-0.03274
2008	-0.05604	-0.01662	-0.25889	-0.07963	-0.02907	-0.02806
2009	-0.07895	-0.02601	-0.31875	-0.10608	-0.03742	-0.03959
2010	-0.07129	-0.02353	-0.30753	-0.10452	-0.03578	-0.0367
2011	-0.07041	-0.023	-0.31836	-0.0965	-0.0324	-0.03509
2012	-0.06423	-0.01996	-0.2918	-0.08748	-0.02955	-0.03189
2013	-0.0643	-0.02192	-0.31504	-0.09527	-0.03018	-0.03506

Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE), Pharmaceuticals Products (PaP)

The time series NRCA of Integrated circuits and electronic components (ICEC), Transport equipment (TrE), Automotive products (AutoP), Textiles (Text), Clothing (Cloth) and Total of all Products (Total) are presented in Table-3. The results show that Pakistan had normalized revealed comparative disadvantage in Integrated circuits, electronic components (ICEC), Transport equipment (TrE) and Automotive products (AutoP). The results of normalized revealed comparative disadvantage in integrated circuits and electronic components had decreasing trend over the selected time period. Pakistan used to make or assemble a number of Integrated circuits and electronic components were the main reasons behind this decreasing trend (Economic Survey of Pakistan, 2013). But transport equipment and automotive products hadthe mostly fluctuating normalized revealed comparative disadvantage in Pakistan over the selected time period. The tariff policy on automotive products changed the import structure of Pakistan and the normalized revealed comparative disadvantage of Pakistan in automotive products and transport equipment showed fluctuations in the selected time period. The estimated results show that Pakistan had normalized revealed comparative advantage in textile and clothing sectors. The normalized revealed comparative advantage in textile and clothing sectors showed a lot of fluctuations during the selected time period.

Fluctuations in the textile sector were directly related to cotton output at national level. In the year 2010 flood reduced the cotton output in the 2010 and 2011 years. On the other hand, Pakistan had normalized revealed comparative advantage in total exports. The estimated results show that normalized revealed comparative advantage had increasing trend from the year 1995 to the year 2002. After 2003 the normalized revealed comparative advantage showed fluctuations. The overall results of Table-1, Table-2 and Table-3 show that Pakistan enjoyed normalized revealed comparative advantage in most of agricultural products sector whereas it had normalized revealed comparative disadvantage in industrial and technological products sectors. But that normalized revealed comparative disadvantage was offset by the overall normalized revealed comparative advantage in Pakistan. Zaidi (2003) mentioned that instead of removing comparative disadvantage Pakistan should try to increase the exports and specialization in those sectors in which it had comparative advantage.

Table-3
Sector Specific Normalized Reveal Comparative Advantage (NRCA)

Years	ICEC	TrE	AutoP	Text	Cloth	Total
1995	-0.04511	-0.08868	-0.11135	0.622293	0.211067	0.0186
1996	-0.04916	-0.10565	-0.11268	0.692315	0.238208	0.123805
1997	-0.04841	-0.11252	-0.10174	0.625511	0.221976	0.105477
1998	-0.05734	-0.14613	-0.11258	0.589778	0.226092	0.058201
1999	-0.05681	-0.15769	-0.10332	0.565938	0.222649	0.106937
2000	-0.04818	-0.12777	-0.08973	0.545426	0.238507	0.153928
2001	-0.04261	-0.14602	-0.10017	0.560635	0.242428	0.104325
2002	-0.0417	-0.14778	-0.10419	0.565649	0.240951	0.140904
2003	-0.04399	-0.12303	-0.11349	0.591431	0.251732	0.086724
2004	-0.03895	-0.1123	-0.0996	0.514434	0.23478	0.089254
2005	-0.03528	-0.12895	-0.09256	0.526401	0.249719	0.168194
2006	-0.03411	-0.12172	-0.0844	0.481878	0.235029	0.078289
2007	-0.02757	-0.08374	-0.07772	0.408984	0.196193	0.091208
2008	-0.02249	-0.093	-0.06263	0.349808	0.177858	0.157144
2009	-0.02907	-0.10663	-0.06699	0.391006	0.184681	0.076374
2010	-0.03205	-0.10359	-0.06977	0.395846	0.183222	0.117053
2011	-0.02901	-0.11037	-0.07362	0.385924	0.177429	0.048377
2012	-0.02762	-0.10189	-0.06824	0.366752	0.162279	0.095887
2013	-0.03003	-0.111	-0.07393	0.381387	0.168326	0.018198

Integrated circuits and electronic components (ICEC), Transport equipment (TrE), Automotive products (AutoP), Textiles (Text), Clothing (Cloth), Total all Products (Total)

This part of the paper is devoted to investigate the determinants of Normalized Revealed Comparative Advantage in case of Pakistan. NRCA is taken as the

dependent variable whereas exchange rate, foreign direct investment, terms of trade, trade openness and human capital are taken as the independent variables. Table-4shows the estimated ADF test results. The results of ADF unit root test show that there is mixed order of integration, which is appropriate to apply ARDL bound testing approach to co-integration.

Table-4

Unit Root Estimation

Variables	ADF at Level		ADF at 1st Difference	
	Intercept and Trend	[prob.] Lag	Intercept and Trend	[prob.] Lag
NRCA	-4.772	0.003[0]*	-4.9258	0.008[1]*
EXC	1.962	0.992[0]	-5.5855	0.0004[2]*
FDI	-2.6439	0.0972[0]	-3.0102	0.0413[1]**
TOT	-0.30806	0.9093[0]	-4.0701	0.0051[1]*
OPEN	-2.8555	0.0657[0]	-6.6625	0.0000[1]*
HC	-0.1348	0.9341[0]	-5.5732	0.0002[1]*

Note: * (**) represent significance at 1 percent (5 percent).

Table-5 shows the results of selecting the lag length criteria. The sequential modified LR test statistic (LR), Akaike information criterion (AIC), Final prediction error (FPE), Schwarz information criterion (SC), and Hannan information criterion (HQ) were used for selection of lag length. The optimum lag length was selected as 1 on the basis of the Schwarz information criterion (SC), Final prediction error (FPE), Hannan information criterion (HQ) and Akaike information criterion.

Table-5

Lag Order Selection Criteria Based on VAR

Lag	FPE	AIC	SC	HQ
0	4.01000	6.90259	7.19875	6.75482
1	5.13008*	0.12323*	2.1959*	2.36831*

* Indicates optimum lag length
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

ARDL co-integration methodwas used to check the co-integration among the variables of the model. With the help of W-statistic and F-statistic the null hypothesis of no-integration was tested. The value of F-statistic is 10.054 which is higher than the upper bound value of 4.081 at 5 percent level of significance are

reported in Table-6. The calculated value of W-statistic 60.3269 is greater than the upper bound value of 4.0364 at10 percent. So we rejected the null hypothesis of no co-integration against the alternative hypothesis, i.e. co-integration existed among variables of the model.

Table-6
F-Statistic of Co-integration Relationship
ARDL(1, 1, 0, 0, 0, 1) selected based on Scwarz Baysian Criterion

Test-statistic	Calculated value	Lag-order	Significance level	Bound Critical Values	
				I(0)	I(1)
F-statistic	10.0545	1	95%	3.4088	4.9081
Wald-Test	60.3269		90%	2.7484	4.0364

To check the problem of functional form, heteroscedasticity and serial correlation among the variables of the model, the diagnostic tests were conducted. The results of diagnostic tests are reported in Table-7. The results show that there is no problem of heteroscedasticity or serial correlation. The time series data are normally distributed and variables of the model have correct functional form.

Table-4.7
Diagnostic tests

Test Statistic	LM Version	F Version
A. Serial Correlation	1.4934[.222]	.9027[.359]
B. Functional Form	.2538[.987]	.1434[.991]
C. Normality	.9440[.624]	No applicable
D. Heteroscedasticy	.9086[.340]	.8637[.363]
A: Lagrange Multiplier test of residual serial correlation B: Ramsey's RESET test using the square of the fitted values C: Based on a test of skewness and kurtosis of residuals D: Based on the regression of squared residuals on squared fitted values		

After checking the status of the co-integration among the variables, the next stage is to examine the long-run relationof the dependent variable with the independent variables. In this study the dependent variable was NRCA and EXP, FDI, TOT, OPEN and HC were independent variables.

Table-4.8
Long-run Estimates

Dependent Variable: NRCA			
Variable	Coefficient	Std. Error	t-ratio[prob.]
Constant	-.53684	.17484	-3.0716[.008]
EXC	-.4372	.12280	-3.5604[.003]
FDI	-.1092	.8896	-1.2279[.240]
HC	.7192	.1958	3.6734[.003]
OPEN	.3659	.3393	1.0784[.229]
TOT	.6063	.5412	1.1152[.284]

The long-run results of the model are shown in Table-8.The results show that there is negative relationship between NRCA and EXC in case of Pakistan and this relationship is significant at 1 percent. The results show that 1-unitincrease in EXC leads to .4372-unitdecrease in NRCA in Pakistan. FDI has insignificant and negative effects on NRCA in case of Pakistan. There is positive relationship between NRCA and HC and it is significant at 1 percent. The results reveal that 1 unit change in HC brings about .7192 unit change in NRCA in case of Pakistan. In our estimated model the coefficient of OPENhas insignificant and positive relationship with NRCA in Pakistan. The estimated results show the insignificant and positive relationship between NRCA and TOT in Pakistan. Overall long-run results of the model show that rising EXP causes to decrease NRCA while rising HC causes to increase NRCA in case of Pakistan.

Table-9
Short-run Dynamics

Dependent Variable: ΔNRCA			
Variable	Coefficient	Std. error	t-ratio[prob.]
ΔEXC	.2261	.2922	.8760[.394]
ΔFDI	-.1503	.1226	-1.2262[.238]
ΔHC	.9899	.2907	3.4045[.004]
ΔOPEN	.5035	.4494	1.1205[.279]
ΔTOT	-.2416	.1675	-8.3540[.000]
ECMt-1	-.1376	.0254	-5.4173[.000]
R-Squared .86588 DW-statistic 2.2266 F-Stat. 15.0637[.000]			

Short-run results of our estimated model are shown in Table-9. The results show that NRCA and EXC have positive and insignificant relationship. The short-run estimated results of the model show negative and insignificant relationship between NRCA and FDI in case of Pakistan. HC and NRCA have positive relationship in short run in case of Pakistan and it is significant at 1percent level. The estimated

results reveal that 1-unitincrease in HC brings about .9899 unit increase in NCRA in case of Pakistan. OPEN and NRCA have positive but insignificant relationship in the short run. The short-run estimates show that TOT negatively affects the NRCA in case of Pakistan and is significant at 1 percent level. The statistically significant and negative value -.1376 of ECM strongly supports the long-run relationship of the variables in case of Pakistan. The coefficient value of ECM is significant at 1 percent leveland shows the speed of adjustment from short-run deviation towards long-run equilibrium path. The short-run deviations from the long-run equilibrium are corrected by 0.1376units towards the long-run equilibrium path in each year.

Conclusion

This study has investigated comparative advantage (CA) based on NRCA index for seventeen sectors of Pakistan's exports sectors over the period of 1995 to 2013.These sectors includedAgricultural Products (ArP), Food Items (Food), Fuels and Mining Products (FMP), Fuels Products (Fuel), Manufactured Products (MuP), Iron and Steel Products (ISP), Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE), Pharmaceuticals Products (PaP), Integrated circuits and electronic components (ICEC), Transport equipment (TrE), Automotive products (AutoP), Textiles (Text) and Clothing (Cloth). Moreover, determinants of NRCA were measured using ARDL bound testing approach to co-integration.

The results showed that Pakistan had normalized revealed comparative advantage in exports agricultural products. This NRCA was the highest (7.9E-05) in 2005. After year 2007 NRCA of food items remained between (0.00011) to (0.000138) till 2013. The results show that Pakistan had normalized revealed comparative disadvantage in fuels products and this disadvantage lied between (-9.8E-05) to (–0.00017) during the selected time period.The results show that Pakistan has normalized revealed comparative advantage in manufactured products. This NRCA of manufactured products got its highest point (0.000258) in 2005. During the whole selected time period NRCA of manufactured products showed much fluctuations but it remained between (0.000128) and (0.000258).The results show that Pakistan had normalized revealed comparative disadvantage in Iron and Steel Products (ISP) although this disadvantage lied between (-1.8E-05) to (-3.8E-05) and it showed a decreasing trend during the selected time period. The results show that Pakistan had normalized revealed comparative disadvantage in Chemical Products (ChP), Machinery and transport equipment (MTE), Iron and Steel (IAS), Office and telecom equipment (OTE), Telecommunications equipment (TLE) and

Pharmaceuticals Products (PaP). The results show that Pakistan had higher normalized revealed comparative disadvantage in chemical products sector and less normalized revealed comparative disadvantage in iron and steel sector over the selected time period. Empirics reveal that there occurred much revolution in the world transport infrastructure, telecommunication infrastructure and Pharmaceuticals Products.

This study has also investigated the determinants of Normalized Revealed Comparative Advantage in case of Pakistan. The estimated overall exports NRCA was taken as the dependent variable whereas EXC, FDI, TOT, OPEN and HC were used as the independent variables. For the solution of unit root problem in this study ADF unit root test is used. For examining the co-integration among the variables of the model ARDL bound testing approach to co-integration. The results showed that there was negative relationship between NRCA and EXC in case of Pakistan and this relationship was significant at 5 percent level. The results show that 1-unitincrease in EXC led to 0.4372 unitsdecrease in NRCA in Pakistan. FDI had insignificant and negative effect on NRCA in case of Pakistan. There was a positive relationship between NRCA and HC and it was significant at 1 percent level. The results revealed that 1 unit change in HC brought about .7192unit increase in NRCA in case of Pakistan. In our estimated model the coefficient of OPEN was insignificant and positive with NRCA in Pakistan. The estimated results showed the insignificant and positive relationship between NRCA and TOT in Pakistan. Overall long-run results of the model showed that rising EXC caused to decrease the NRCA while rising HC caused to increase it in case of Pakistan. The statistically significant and negative value (-0.1376) of the ECM term strongly supported the long-run relationship of the variables in case of Pakistan. The short-run deviations from the long-run equilibrium were corrected by 13.76unitstowards the long-run equilibrium path each year. The overall, results showed that the selected independent variables explained0.86 percent of thevariation in the dependent variable. So these are the main determinants of NRCA in case of Pakistan.

In this part of the study we give policy implications based on the empirical results and discussion. This study has investigated the Comparative Advantage (CA) of Pakistan's exports over the period of 1995 to 2013. There is hardly any study found in the existing literature which measured normalized reveal comparative advantage in case of Pakistan. On the basis of estimated results of NRCA this study recommends that Pakistan should focus on the exports of agriculture products. Pakistan should encourage its farmers to produce cash crops which are becoming the main source of increasing NRCA of Pakistan. Incentives should also be given to farmers so that they help government for achieving its desired agriculture goals. The results show that in those period when flood destroyed agriculture products Pakistan

hadto face normalized reveal comparative disadvantage, so government should take necessary steps for reducing the chances of flood in Pakistan. In most of technological based sectors and commodities, there is increasing normalized revealed comparative disadvantage for Pakistan. So government of Pakistan can reduce this normalized revealed comparative disadvantage by importing the production units of these sectors and commodities based on the latest efficient technology. The worst normalized reveal comparative disadvantage is witnessed in case of electronic commodities in Pakistan. The estimated results reveal that there is negative relationship between normalized revealed comparative advantage and exchange rate in case of Pakistan. Pakistan is exporting most of primary goods so Pakistan should prefer floating exchange rate for gaining normalized revealed comparative advantage in its exports. Human capital played positive and significant role in determining the normalized revealed comparative advantage in Pakistan. As skilled labor improves quality and quantity of exported commodities, so government of Pakistan should improve human capital for getting the required normalized revealed comparative advantage.

Enhancing value addition in our exports and to earn more per unit of exports should be the main purpose to focus on. Pakistan's own brands should be developed by its major export houses and should be made popular around the world. A retail outlet has to be opened in Dubai, London and New York by the government which would bea piece of good news for the export industry for promotion of the image of Pakistani products. Image building campaign is required by hiring services of reputable international public relations companies. Modern infrastructure should be established in two special export zones, one in Karachi and the second in Punjab. The needs of textile sector can be catered primarily by these zones. In the end, the exports pattern should be diversified for making balance of trade positive, both in terms of products and destination and to produce products at the lowest possible cost. For this, diplomatic and marketing efforts are needed by Pakistan to search out new destinations for its exports. But the main focus should be not only on the new markets but also to establish and maintain a good reputation for the Pak-Marked exports. As attached with the export consignments, the specification of quality certificate should be counter-checked both for quality and quantity. Moreover, an aggressive promotional campaign by the government of Pakistan with the collaboration of the efforts of private sector will surely further increase exports of Pakistan in international market. In nutshell, government of Pakistan should use normalized revealed comparative advantage for measuring comparative advantage, instead of traditional and outdated methods. For gaining and maintaining normalized revealed comparative advantage in agricultural products government should focus on serious policy issues which this study has highlighted.

Notes and References

Altay, N. O. and Gacaner, A. (2003). Turkey's Dynamics of Competition: A Comparative Analysis of Competitiveness of the Textile and Clothing Industry (in Turkish). Paper presented at the *VII. ERC/METU 2003 International Economy Congress*, 2003, Ankara.

Balance, R. Forstner, H. and Murray, T. (1986). More on measuring comparative advantage: a reply. *WeltwirtschaftlichesArch,* 122, 375–378.

Balance, R. H., Forstner, H. and Murray, T. (1987). Consistency Tests of Alternative Measures of Comparative Advantage. *Review of Economics and Statistics*, 69, 157-61.

Balassa, B. (1965). Trade liberalization and Revealed comparative advantage. *Manchester School of Economic and Social Studies*, 33, 99-125.

Balassa, B. (1977). Revealed Comparative Advantage Revisited. *The Manchester School*, 45, 327-44.

Balassa, B. (1989). *Comparative Advantage, Trade Policy and Economic Development*, Harvester Wheatsheaf, New York.

Bano, S., and Scrimgeour, F. (2012). The export growth and revealed comparative advantage of the New Zealand kiwifruit industry. *International Business Research*, *5*(2), 73.

Bhattacharyya, R. (2011). Revealed comparative advantage and competitiveness: a case study for India in horticultural products. *In International Conference On Applied Economics–ICOAE* (p. 21).

Deardorff, A. (2011). Comparative Advantage: Theory behind Measurement in *Globalisation, Comparative Advantage and the Changing Dynamics of Trade,* OECD Publishing.

Engle, R. and C. Granger (1987), Cointegration and error correction representation: Estimation and testing. *Econometrica*, Volume 55, pp. 251-276.

Ferman, M. S. and Yüksel, A. H. (2004). The Competitiveness of Turkey and Its Sustainability: A comparison in the EU Market from the Perspectives of the Rival Countries and Turkey (in Turkish). *Economy Congress of Turkey*, İzmir, organised by the State Planning Organisation, 4-29.

Haller, T. (2014). Abolition of the Milk Quota System. *European milk board.*

Harrigan, J. (1995). Factor endowments and the international location of production: Econometric evidence for the OECD, 1970–1985. *Journal of International Economics*, *39*(1), 123-141.

Harrigan, J., and Zakrajsek, E. (2000). *Factor supplies and specialization in the world economy* (No. w7848). National Bureau of Economic Research.

Johansen, S. (1988), Statistical analysis of co-integrating vectors. *Journal of Economic Dynamics and Control*, Volume 12, pp. 231-254.

Johansen, S. (1991), Estimation and hypothesis testing of cointegration vectors in Gaussian Vector Autoregressive Models. *Econometrica*, Volume 59, pp. 1551-1580.

Johansen, S. and K. Juselius (1990), Maximum likelihood estimation an inference on cointegration with application to the demand for money. *Oxford Bulletin of Economics and Statistics*, Volume 52, pp. 169-210.

Johnson, A. (2005). The Effects of FDI Inflows on Host Country Economic Growth. *CESIS Working Paper nr. 58,* Royal Institute of Technology.

Kowalski, P., and Bottini, N. (2011). Comparative advantage and export specialisation mobility. *Globalisation, comparative advantage and the changing dynamics of trade*, *2011*, 81.

Krugman, P. (1979). Increasing returns, monopolistic competition, and international trade. *Journal of International Economics,* 9, 469-479.

Laursen, K., 1998. Revealed Comparative Advantage and the Alternatives as Measures of International Specialisation. *Danish Research Unit for Industrial Dynamics,* 3 December. 30.

Laurenceson, J., and Chai, C. H. (2003). *Financial reform and economic development in China*. Edward Elgar Publishing.

Mah, J. S. (2000). An empirical examination of the disaggregated import demand of Korea—the case of information technology products. *Journal of Asian Economics*, *11*(2), 237-244.

Mohanan. (2007). determinants of the Indian Machine tools exports. Jawaharlal Nehru University India.

Moise, E. and Sorescu, S. (2013). Trade facilitation indicators: The potential impact of trade facilitation on developing countries' trade, *OECD Trade Policy Papers*, 144. OECD Publishing.

Muscatelli et.al (1992). demand and supply factors in the determination of NIE‟s exports. the economic journal, 102, 1457-1477.

Narayan, P. K. (2005). The saving and investment nexus for China: evidence from cointegration tests. *Applied economics*, *37*(17), 1979-1990.

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Pesaran, M. H., Shin, Y., and Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, *94*(446), 621-634.

Reidel. (1988). the demand for LDC exports of manufacturers. *The economic journal*: 98, 138-198.

Reidel, J., Hall, C., and Grawe, R. (1984). Determinants of Indian export performance in the 1970s. *Weltwirtschaftliches Archiv*, *120*(1), 40-63.

Ricardo, D. (1817). *The Principles of Trade and Taxation*. London: John Murray, Albemarle-Street.

Richardson, J. D., and Zhang, C. (2001). Revealing comparative advantage: chaotic or coherent patterns across time and sector and US trading partner? In *Topics in Empirical International Economics: A Festschrift in Honor of Robert E. Lipsey* (195-232). University of Chicago Press.

Sharma, K. (2000). *Export growth in India: has FDI played a role* (No. 816). Center Discussion Paper.

Vollrath, T. L. (1991). A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage. *Weltwirtschaftliches Archiv*,*127*(2), 265-280.

Yu, R., Cai, J. and Leung, P. S. (2009). The normalized revealed comparative advantage index. *Annals of Regional Science*, 43(1), 267-282.

Yu, R., Cai, J., Loke, M. K., and Leung, P. (2010). Assessing the comparative advantage of Hawaii's agricultural exports to the US mainland market. *The Annals of Regional Science*, *45*(2), 473-485.

Zaidi, S. Akbar (2004), *Issues in Pakistan Economy,* Oxford UniversityPress, Karachi, Pakistan.