Trade Potential and Financial Market Contagion among Shanghai Cooperation Organization Member Countries

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Abstract: This study aims to explore the trade potential and financial market contagion among the member countries of the Shanghai Cooperation Organization (SCO). Revealed comparative advantage index utilized to examine the trade patterns, which leads toward identifying sectors having trade potential. The CCC-MGARCH was model used to determine co-movements and financial contagion between concerned stock markets. The findings show that member countries have a comparative advantage in terms of raw material, as well as in finish goods and a significant portion of imports of all the member countries is from China. The results also affirm that member countries have a strong intra-trade through free trade and trade preferential agreements. The results of CCC-MGARCH indicate that concerned stock markets show an increase in correlation (contagion), which indicates a positive and significant association between stocks' co-movements. Overall findings indicate that SCO member countries are working as per the directions and objectives of SCO. The intra-trade among the member countries is increasing over the period, and member countries need further strengthening the intra-trade. These results support the SCO mission of mutual economic growth, which affirms that trade-free agreements can facilitate the mutual trade, needs, and demands of member countries for common economic growth along with other mutual benefits.

Keywords: Trade Potential, Financial Market Contagion, Shanghai Cooperation Organization, CCC-MGARCH, Revealed Comparative Advantage.

INTRODUCTION

Global regional trade associations formed in various regions of the world are to protect economic and financial stability and ensure the growth of member countries. Multilateral trade among member countries of regional trade associations is mainly based on their comparative advantage, benefiting each other in terms of cost-effectiveness, development, and growth. In addition to this, to compete with superior economic powers, it is becoming imperative for other countries to associate with each other (Hill and

Hernández- Requejo, 2008). This study is to explore the trade potential (e.g., trade liberalization and Free Trade Area) among the five Shanghai Cooperation Organization (SCO) member countries. Because of trade liberalization, the financial and stock markets of the member countries are likely to experience a contagion phenomenon. This study also attempts to determine the existence of financial contagion between the SCO member countries. Contagion among SCO member countries is likely to be positive due to the formation of this organization regarding China, India, Kazakhstan, Pakistan, and Russia.

Intra-regional trade of SCO member countries is low when we compare it with other regional organizations (e.g., ASEAN, North American Free Trade Agreement (NAFTA), and European Union). Whereas, SCO is also one of the important and most significant regional organizations in the world. Most importantly and comparatively, SCO in its present shape is a new organization (especially after the admission of India and Pakistan), which attracted a few empirical studies (Sargana, 2021; O'Donnell and Papa, 2021; Qureshi and Hashmi, 2020; Khetran, 2019; Zeb, 2018; Chakraborty, 2017). As SCO hoses almost fifty percent of the world's population, it is the third-largest landmark in the world, one of the most tremendous energy potential. China, Russia, Central Asia, and India also have a high technological industrial base. For example, China can produce the world's cheapest hardware and India produces the world's cheapest software; Pakistan has the fastest growing service industry (60 % of GDP); regarding GDP, China is second, India is ninth, and Russia is the tenth-largest economy in the world; these countries along with Central Asian states produce the most significant number of doctors, engineers, scientists, and technicians; in other words, this is the region and trade partners that Pakistan will be able to trade. Furthermore, SCO has great water potential in the world, with Pakistan having the most extensive canal network, and India and China having the largest water dams as well as freshwater potential including glaciers; these countries are located just above the equator and have one of the most helpful food resources and weather patterns.

As the benefit to member countries of SCO comes from connectivity, therefore, regional integration among SCO member countries looks like a big basket, and countries around it seem like different kinds of precious pieces of gold. Therefore, there is a need to put these precious pieces of gold in the big basket, but in an empirically suggested way. The philosophical question arises to what extent can especially Pakistan and India, as well as other SCO member countries, gain from economic and trade relations among each other, which further needs empirical evidence. Trade liberalization will also lead to stock market contagion among the member countries, and the spillover effect will also be of high significance.

The literature on the analysis of trade patterns and potential for trade liberalization and FTA among the SCO member countries is scarce (categorically speaking, after the admission of India and Pakistan in SCO). The current study attempts to add to the body of existing literature relative to the trade patterns among SCO countries, the potential for trade liberalization, and FTA both in economic and financial terms. The literature on stock market contagion is mostly available concerning the negative spillover in the period of the financial crisis. However, studies have been done in BRICS and some other countries, which mainly focus only on recent global financial crises and prior crises. Whereas, scholarly research that focuses on markets of SCO is rare, mainly, regarding the Russian financial crisis and the Chinese financial crisis. As financial market contagion effect and transmission of shocks between SCO member countries during crisis

periods (e.g., Russian financial crisis, Chinese financial crisis, and global financial crisis) is a crucial research area in the practice of portfolio management for risk management and assets allocation. Therefore, another philosophical question arises of how countries should behave to avoid stock market contagion; to address this question, it is important to understand how a stock market contagion effect during crises can be transmitted from one country to another. Following are the main objectives of this research;

1. Analyzing current possible trade patterns of SCO member countries.
2. Identifying sectors, which have vast potential for trade (Bilateral or Multilateral) in SCO member countries.
3. To determine stock market contagion effect among the SCO member countries.

NOVELTY, SIGNIFICANCE AND CONTRIBUTION OF STUDY

As SCO in its present form operates only for the last few years, so very little work has been done on it by researchers. Hence, this could be among the first study, which will fill the existing gap. The primary contribution of this study is to present an up-to-date analysis regarding the trade patterns, the potential for economic cooperation among SCO member countries. Furthermore, specific and possible contributions of this study may be summarized as: This study adds to the body of existing literature relative to bilateral and multilateral trade of SCO. It provides an analysis of comparative advantage and an analysis of the potential for trade liberalization and potential for an FTA among the SCO member countries.

The present study offers some policy suggestions for the future. This research work leads the policymakers and trade analysts of concerned member countries towards the development of strategies and policies to enhance trade and establishing a free trade area among SCO member countries. This research work enables the policymakers to find out more appropriate and suitable solutions and strategies to boost up the level of bilateral and multilateral trade among SCO countries and improve the balance of payment, as well as. This study also enables the policymakers to choose among the options, which are suitable for the current scenario. Furthermore, this research work also useful for the business community and products-based firms of concerned countries. This study ultimately beneficial for the economic welfare of member countries and regions at large. Especially, Pakistan is more important because of China–Pakistan Economic Corridor-CPEC, which will link China and Central Asia with the whole world via shortcut; therefore, this is a study relevant to regional trade.

This study also determines the stock market co-movement of SCO member countries, considering the development of free trade areas and trade liberalization by each country, and the effects are likely to be positive. This study contributes to the literature by investigating the stock market contagion effect by employing the Constant Conditional Correlation (CCC) multivariate GARCH model.

DATA AND METHODS

By focusing on the objectives of this study, it's analytical and descriptive research. Secondary data has been utilized in this study. The target population was SCO member countries (i.e. Uzbekistan, Tajikistan, Russia, Pakistan, Kyrgyzstan, Kazakhstan, India, and China). SCO member countries have been considered for data analysis, whereas, countries (i.e., Uzbekistan, Tajikistan, and Kyrgyzstan) have been excluded due to the unavailability of data. To explore trade potential, trade data used at the one-digit and two-digit level products categories of Standard International Trade Classification (SITC) revision 3. Table 4.1 shows the one-digit level of SITC products categories.

Whereas, for stock market contagion effect among SCO countries, the data used in this study are indices of daily stock price and sample period from July 1, 2002, through June 30, 2016, and excludes holidays. It may be noted that, for stable period estimation, each country's sample period adjusted consequently in case of unavailability of data in any country (but it will conditional). The data set contains indices of the stock market of SCO member countries. Indices of all stock-price indices used in currency terms (i.e. dollar) and based on each market's daily closing prices. The returns of the stock market of each sample financial market calculated by considering the natural log of first difference of each stock-price index multiplied by one hundred. Alternately, the return of continuously compounded estimated for each index, where p indicates price on day t:

$$r_t = Ln(p_t) - Ln(p_{t-1}) \tag{1}$$

Various sources were used to collect the concerned data sets: SCO official website; SCO Secretariat; central banks of SCO countries and monetary authorities of SCO member countries (i.e. People's Bank of China, Bank of Russia, Reserve Bank of India, State Bank of Pakistan, Kazakhstan's National Bank); United Nations Conference on Trade and Development (UNCTAD) database, United Nations Commodity Trade Statistics Database (UN COMTRADE), Trade Map, World Trade Organization, International Monetary Fund (IMF), and World Bank Indicators among other sources. Data related to stock market indices taken from respective stock markets of SCO member countries.

Methods

Different kinds of statistical tools have been used to analyze the trade flows and economic potential (e.g., trade liberalization and free trade area) among SCO member countries; but for concerning data analysis, following statistical and econometrics techniques used to test the required hypotheses and to achieve the objectives of this study:

Revealed Comparative Advantage (RCA) Analysis: Revealed Comparative Advantage (RCA) analysis and CCC-MGARCH Model.RCA index of Balassa utilized to examine the trade patterns (exports and imports) of SCO member countries; further, this analysis leads toward the identification of products or sectors of SCO member countries, which contain trade potential among each other. Half a century ago, RCA first used was proposed by Balassa. Since then Balassa RCA index has been employed in several reports, working papers and academic scholarly publications to measure and captured the international

trade specialization, to gauge technological specialization by using patent data, and to check production specialization (Laursen, 2015). Though in literature various studies examined in details properties of RCA (Yeats 1985; Hinloopen & Marrewijk, 2008; and Vollrath 1991), and various RCA indexes have been recommended by different scholars (Jain & Singh, 2020) but empirical literature review is witness that Balassa RCA index is still considered as a mostly adopted index of RCA within the theoretical framework of Ricardian and Heckscher–Ohlin (HO). The statistical form of the RCA Balassa Index is:

$$RCA_{i,j} = \frac{EXP_{i,j} \,/ \sum EXP_j}{EXP_{i,w}/ \sum EXP_w} \tag{2}$$

Here; RACij = revealed comparative advantage for goods/sector 'i' of country 'j', EXPi,j = exports of good/sector 'i' by country 'j', ΣEXPj = total exports by country 'j', EXPi,w = world exports of goods/sector 'i', and ΣEXPw = total world exports. This index contains very simple interpretation of its results. If result of RCAij index for a country will be more than one, it means that country 'j' contains comparative advantage in goods 'i'. Whereas, ffRCAij index is less than one, it means that country 'j' contains comparative disadvantage in goods 'i'.

CCC-MGARCH Model: This study used Constant Conditional Correlation Multivariate Generalized Autoregressive Conditional Heteroskedasticity Model (CCC-MGARCH Model) to determining the contagion effect. This model was proposed by Bollerslev (1990), which contains a time-invariant correlation matrix (never changing). Therefore this model is called the Constant Conditional Correlation (CCC) multivariate GARCH model. Restricting Rt to a constant matrix decreases parameters' number and simplifies the assessment conditional covariance are modeled as nonlinear functions of conditional variance. Formally, the CCC-MGARCH model written as:

$$\mathbf{y}_t = \mathbf{C}\mathbf{x}_t + \boldsymbol{\epsilon}_t$$
$$\boldsymbol{\epsilon}_t = \mathbf{H}_t^{1/2}\boldsymbol{\nu}_t$$
$$\mathbf{H}_t = \mathbf{D}_t^{1/2}\mathbf{R}\mathbf{D}_t^{1/2} \tag{3}$$

Here; y_t is a 'm x 1' vector of endogenous variables, C is a 'm x k' matrix of parameters, X_t is a 'k x 1' vector of exogenous variables, which may comprise lags of y_t. $H_t^{1/2}$ is Cholesky factor of time fluctuating conditional covariance matrix H_t, v_t is a 'm x 1' vector of regular, exogenous, and identically distribution innovations, and D_t is diagonal matrix of conditional variances.

FINDINGS AND DISCUSSIONS

CCC-MGARCH Model

Table 1: Descriptive Statistics

	China	*India*	*Kazakhstan*	*Pakistan*	*Russia*
Mean	*0.0005*	*0.0005*	*0.0012*	*0.0010*	*0.0011*
Median	*0.0010*	*0.0004*	*0.0012*	*0.0010*	*0.0011*

	China	*India*	*Kazakhstan*	*Pakistan*	*Russia*
Maximum	0.0654	0.0874	0.1142	0.0459	0.1341
Minimum	-0.0884	-0.0612	-0.1288	-0.0455	-0.1312
Std. Dev.	0.0150	0.0120	0.0161	0.0097	0.0197
Skewness	-0.8475	0.4753	0.0302	-0.2024	-0.1464
Kurtosis	8.1357	7.5088	11.2916	5.7490	7.3296
Jarque-Bera	2455.6860	1782.6360	5772.4350	648.2509	1581.0570
Probability	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	2015.0000	2015.0000	2015.0000	2015.0000	2015.0000
Q (36)	94.3800	72.1530	70.4780	58.4930	44.7800
P-value	0.0000	0.0000	0.0000	0.0100	0.1500
Q2 (36)	1692.9000	884.0500	199.8900	608.4100	806.9400
P-value	0.0000	0.0000	0.0000	0.0000	0.0000
Cross-correlation					
	China	*India*	*Kazakhstan*	*Pakistan*	*Russia*
China	1.0000	0.1987	0.1761	0.0883	0.1806
India	0.1987	1.0000	0.2427	0.0867	0.3844
Kazakhstan	0.1761	0.2427	1.0000	0.1326	0.3258
Pakistan	0.0883	0.0867	0.1326	1.0000	0.0791
Russia	0.1806	0.3844	0.3258	0.0791	1.0000

Table 1 presents details descriptive statistics of the Chinese stock market, Russian stock market, Pakistani stock market, Indian stock market, and Kazakhstan stock market. The Jarque-Bera test is goodness–of–fit measure of departure from normality, based on the sample kurtosis and skewness. Under the null hypothesis of normality, the statistic JB has an asymptotic chi-square distribution with two degrees of freedom. $Q(k)$, $|Q|(k)$, and $Q2(k)$ are the Ljung–Box portmanteau test statistics for serial correlation of k lags of the original, absolute, and squared return series, respectively. Under the null hypothesis of no serial correlation, the Q–statistics follow the chi-squared distribution with k degrees of freedom.

Movement of Stock Index Series:Figures 1 present details dramatic movement of stock index series of Chinese stock market, Russian stock market, Pakistani stock market, Indian stock market, and Kazakhstan stock market.
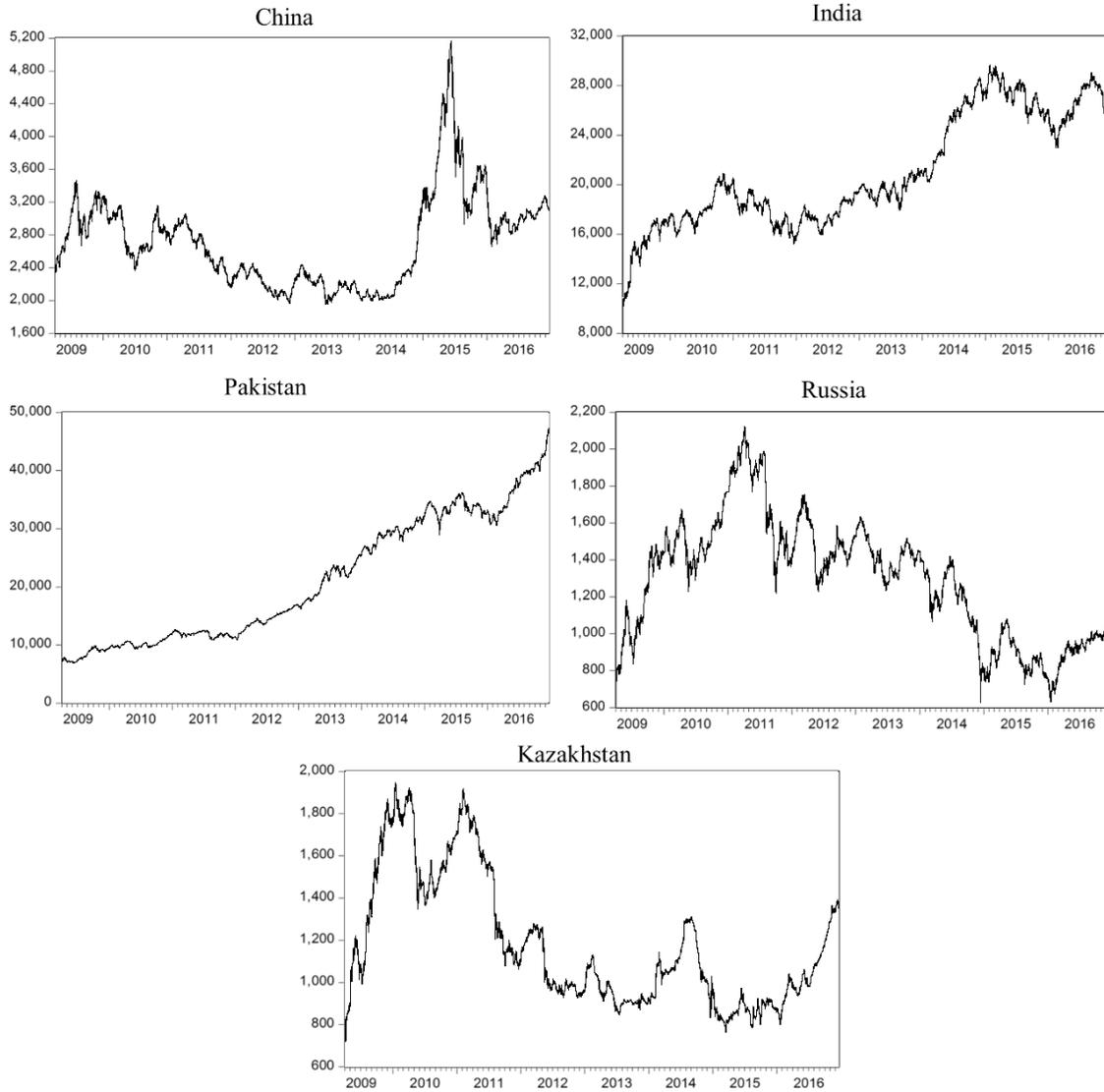
Figure 1: Daily Index Series.

Movement of Daily Return Series: Figures 2 present detailed movement of daily return series of the Chinese stock market, Russian stock market, Pakistani stock market, Indian stock market, and Kazakhstan stock market. China stock market are consistent with some high(s) and low(s) during the first quarter of 2009 the stock market return of China indicates some fluctuations in terms of returns and again during the second quarter of 2015 stock market shows some quiet fluctuations in terms of returns and similar results can be seen in the first quarter of 2016. Pakistan stock market returns remains the same till the last quarter of 2009. A similar pattern has been observed during the second quarter of 2010, 2011, 2013, 2014, and 2015 respectively. Graphical representation indicates some high and low nodes in terms of returns from 2009 to 2016. Indian daily stock returns indicate fluctuations in terms of high and low since the start of 2009 till mid-2009 and again some fluctuations have been shown in the last quarter of 2011. In the last quarter of 2013, a little fluctuation has been observed and similar results can be seen in the last quarter of 2015. The daily return series of Russia indicates less fluctuation in terms of returns however,

some key fluctuations have been observed during the first quarter of 2014 and 2015. The terms of returns fluctuations some little fluctuations can be during mid-2010, 2011, and 2016. Kazakhstan stock market is less volatile in terms of returns however, some high and low returns have been shown during the period.
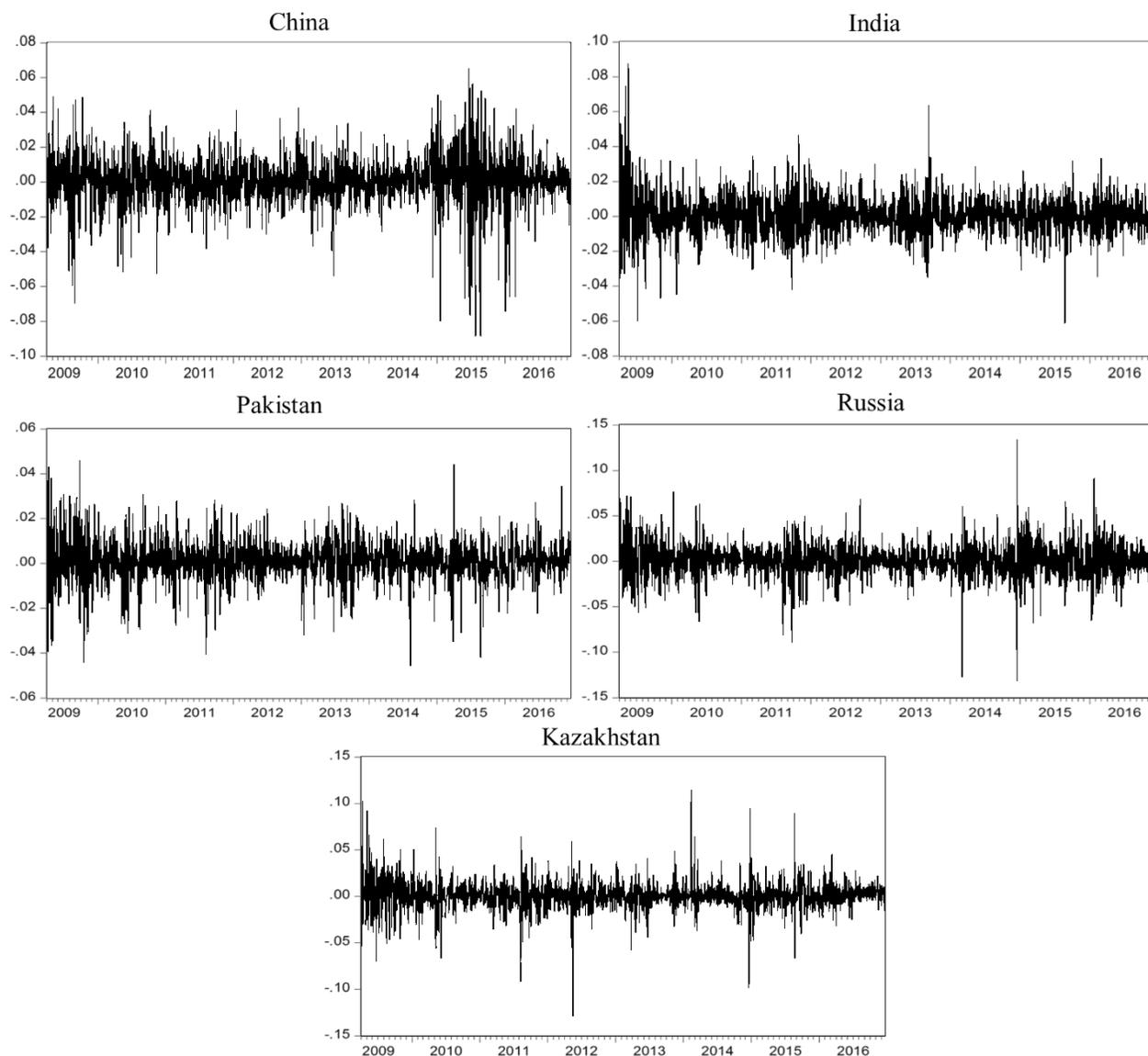
Figure 2: Daily Return Series.

Parameter estimates of CCC Model: We applied simple models having order (1,1) in the following empirical investigation, which is characteristically the case in financial applications and this study can simply generalize these models to the higher–order. All the subscripts concerning the estimated coefficients under are allocated as follows: if the coefficient is α_ijfori,j= ch, pk, in, ru, ka then China = ch, Pakistan = pk, India = in, Russia = ru, and Kakhazstan = ka.CCC model under multivariate Gaussian distribution is estimated, attempting to moderately explain the noticeable non–normality due to negative values of skewness and high values of kurtosis in concerned marker return series.

Table 2: Parameter Estimation of CCC-MGARCH Model

Parameter	Coefficient	Standard Error	Test Statistic	P–value		
Y_{china}	0.0452	0.0061	7.450	0.000	0.3331	0.5711
α_{china}	0.9471	0.0070	134.370	0.000	0.9333	0.9609
β_{china}	0.0000	0.0000	2.870	0.004	0.0000	0.0000
$Y_{pakistan}$	0.1081	0.0161	6.710	0.000	0.0766	0.1397
$\alpha_{pakistan}$	0.8402	0.0228	36.910	0.000	0.7957	0.8849
$\beta_{pakistan}$	0.0000	0.0000	4.550	0.000	0.0000	0.0000
Y_{india}	0.0857	0.0137	6.280	0.000	0.0589	0.1125
α_{india}	0.8773	0.0198	44.250	0.000	0.8384	0.9161
β_{india}	0.0000	0.0000	3.790	0.000	0.0000	0.0000
Y_{russia}	0.0629	0.0091	6.920	0.000	0.0451	0.0807
α_{russia}	0.9143	0.0124	73.440	0.000	0.8899	0.9387
β_{russia}	0.0000	0.0000	3.960	0.000	0.0000	0.0000
$Y_{kazakhstan}$	0.1614	0.0198	8.150	0.000	0.1226	0.2002
$\alpha_{kazakhstan}$	0.7600	0.0250	30.450	0.000	0.7111	0.8090
$\beta_{kazakhstan}$	0.0000	0.0000	6.830	0.000	0.0000	0.0000
Correlation						
$Cor_{china-pakistan}$	0.0635	0.0221	2.880	0.004	0.0202	0.1067
$Cor_{China-india}$	0.2052	0.0213	9.650	0.000	0.1636	0.2469
$Cor_{China-russia}$	0.1859	0.0215	8.660	0.000	0.1438	0.2279
$Cor_{China-kazakhstan}$	0.1747	0.0216	8.090	0.000	0.1324	0.2170
$Cor_{Pakistan-india}$	0.0982	0.0219	4.490	0.000	0.0554	0.1411
$Cor_{Pakistan-russia}$	0.0810	0.0220	3.680	0.000	0.0378	0.1241
$Cor_{Pakistan-kazakhstan}$	0.0953	0.0220	4.330	0.000	0.0521	0.1384
$Cor_{India-russia}$	0.3655	0.0193	18.960	0.000	0.3278	0.4033
$Cor_{India-kazakhstan}$	0.2130	0.0212	10.030	0.000	0.1714	0.2546
$Cor_{Russia-kazakhstan}$	0.2930	0.0204	14.360	0.000	0.2530	0.3330

Results from above Table 2 shows that all parameters in the models are significant at the 1% significance level. As expected, the coefficient of a degree of freedom is much bigger than 2 and is significant. Furthermore, the log-likelihood increases a lot. All these pieces of evidence are a justification of improperness of assumption of normality for the return series. The numbers are average level and a very rough indication of the relative integration level between the stock markets. We can draw some conclusions from the CCC model. Results showed dynamic paths of correlation between the five markets. Dynamic paths of conditional covariance relationships between the five markets (China, Pakistan, India, Russia, and Kazakhstan) are presented in Figure 3 and Figure 4.
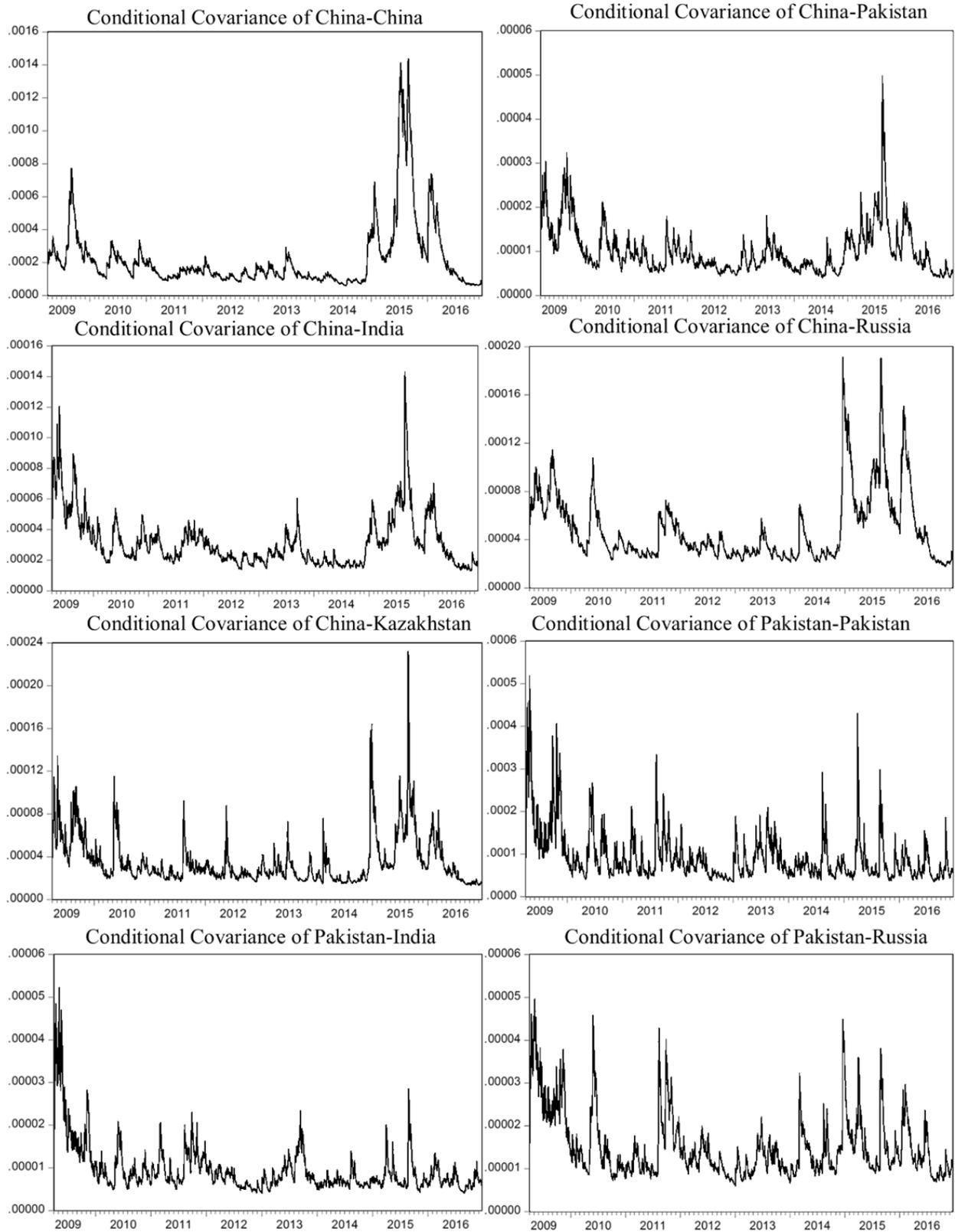
Figure 3: Pairwise Conditional Covariance.
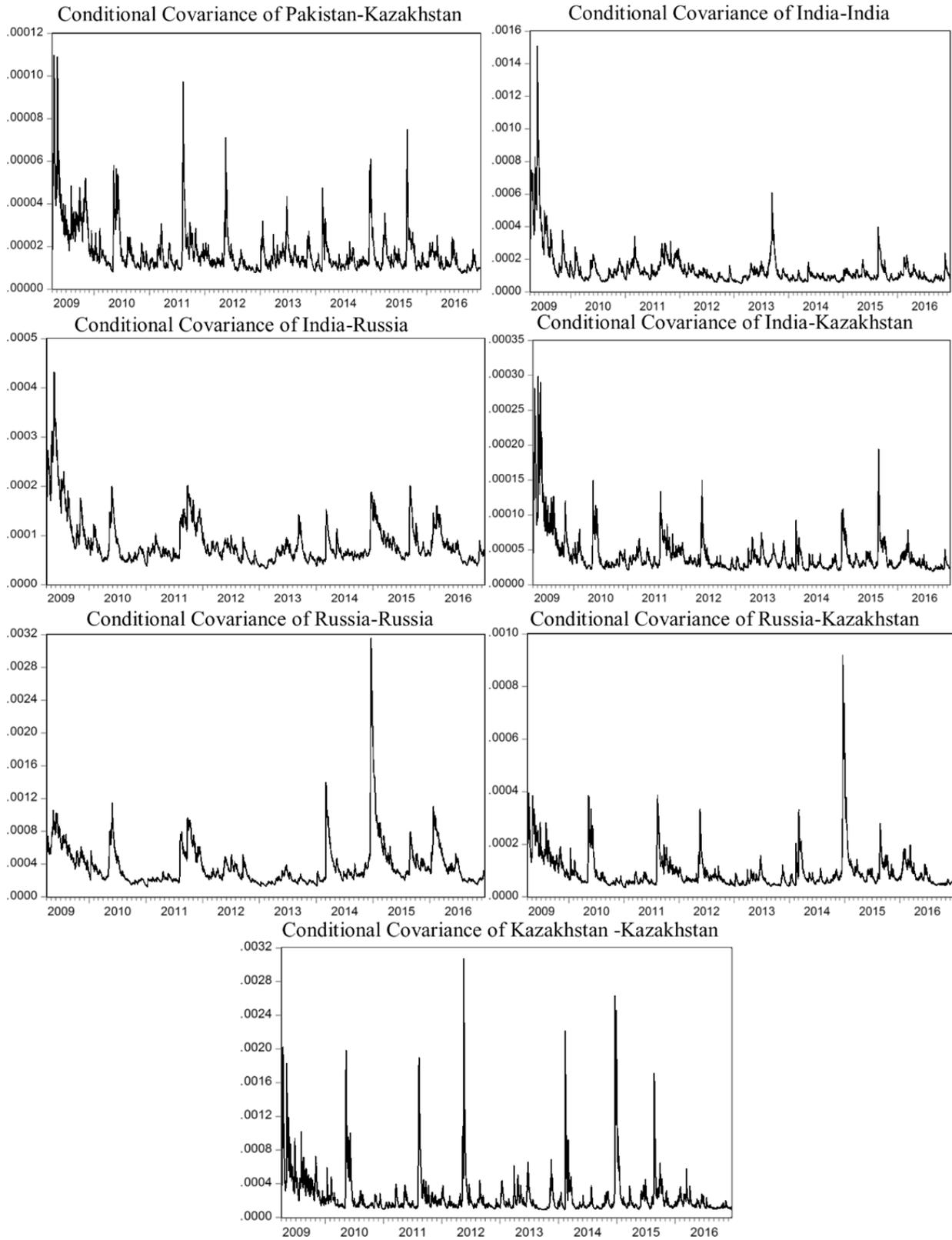
Figure 4: Pairwise Conditional Covariance (Cont.).

Out of Sample Prediction:This study also forecasted the variance out of the sample for a better understanding of financial contingent and volatility movement. Figure 5 indicates the out-of-sample prediction of the CCC-MGARCH model. Results of out of sample are also in favor of constant conditional correlation between the stock returns of China, Russia, Pakistan, India, and Kazakhstan.
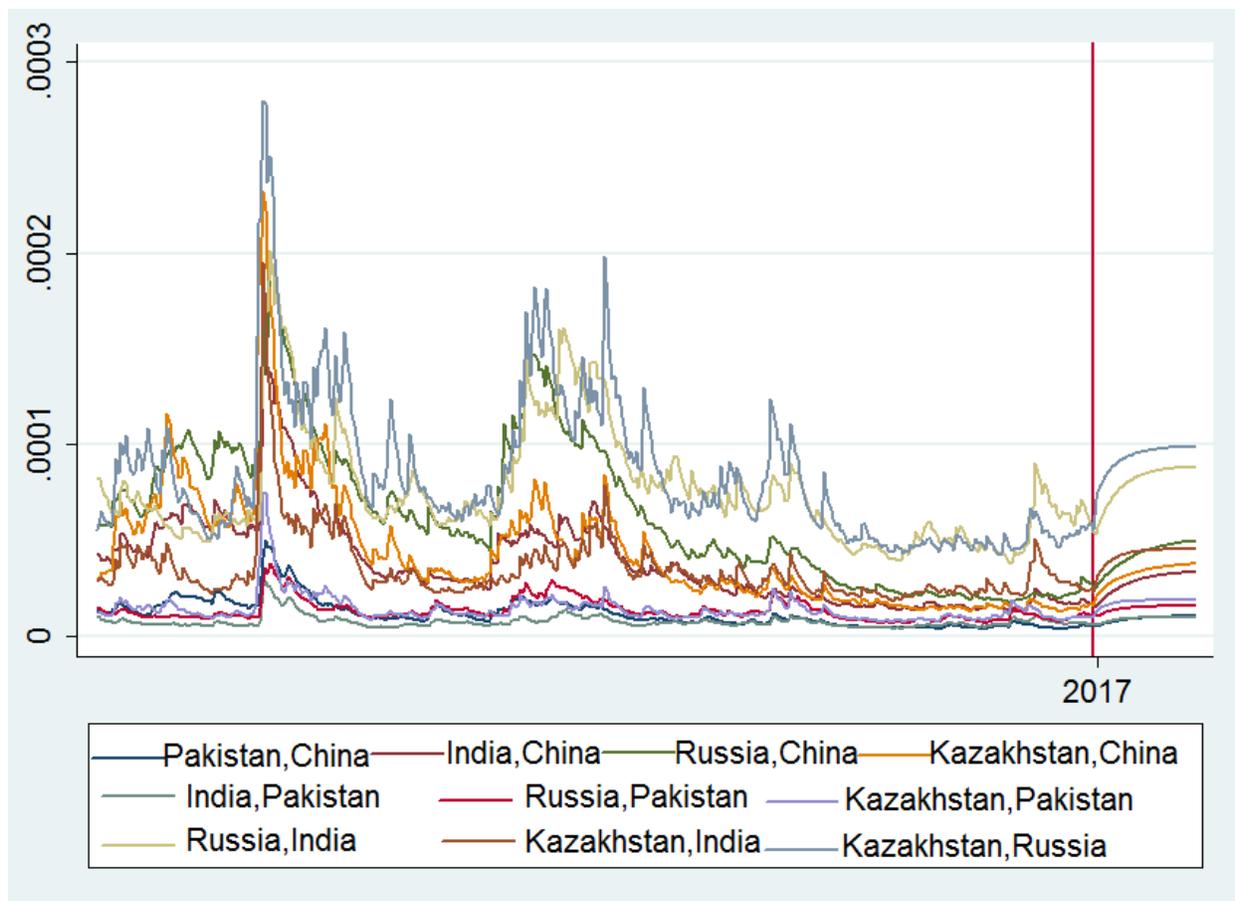
Figure 5: Out of Sample Variance Prediction

Comparative Advantage Index (Balassa, 1965)

With the total production of $12.71 billion total GDP excluding Pakistan and India while including Pakistan and India it was worth 15.252 billion SCO was ranked third after European Union and the USA. Moreover, member countries are middle level in terms of per capita, Table 3 reports the general macroeconomic statistics which indicates that China, Russia, and India were much stronger as compared to other group members.

Table 3: Macroeconomic Indicators of SCO Members

Country	*Per Capita Income*	*Inflation (%)*	*Unemployment (%)*	*Public Debt to GDP %*	*Export to GDP*	*Current Account Balance to GDP %*
China	8.12	2.0	4.0	46.2	19.6	1.7

Country	Per Capita Income	Inflation (%)	Unemployment (%)	Public Debt to GDP %	Export to GDP	Current Account Balance to GDP %
Russia Fed.	8.74	7.0	5.5	17.0	25.7	1.7
Kazakhstan	7.51	14.5	5.0	21.0	32.6	-6.0
India	1.70	4.8	8.5	69.5	19.2	-0.9
Pakistan	1.46	2.8	5.9	66.8	8.7	-1.1

Source: IMF (2017), World Economic Outlook, April 2017

To determine the strong or weak sector in any economy based on the total export flows the idea was coined initially by Liesner (1958). Later on, Bela Baslassa (1965) refined the concept and measurement method which was known as Balassa Index. The strong sector of any economy with higher export flows is known as Revealed Comparative Advantage (RCA). The current study determines the comparative advantage index in commodity exports of Shangani corporation member countries of raw material (code 0 to 4) and finished goods (code 5 to 8) according to the United Nations international trade statistics standard international trade classification (SITC) revision 3 for a period of 1997 to 2016. The RCA index frequency distribution is given in Table 4. The results reveal that in the case of China and the Russian Federation weak level comparative advantage indicates a decline while medium comparative advantage indicates increase, and strong level comparative advantage indicates a significant decrease. In the case of Kazakhstan, weak level comparative advantage indicates an increase at a weak level of comparative advantage, medium level, and strong level comparative advantage indicate declining trends as the mean value also indicates the decline. In the case of Pakistan and India the total increase significantly, weak level comparative advantage indicates a decrease in case of India and increasing trends have been observed in the case of Pakistan. At medium level comparative advantage there is a significant improvement in case of India while in case of Pakistan it is consistent, at the strong level comparative advantage there is a slight decrease in case of India while in case of Pakistan there is significant improvement the same results affirm from the mean value of comparative advantage of both countries.

Table 4: RCA Index Frequency Distribution of SCO Members

	China		Russia Fed		Kazakhstan		India		Pakistan	
	1997	*2016*	*1997*	*2016*	*1997*	*2016*	*1997*	*2016*	*1997*	*2016*
$0 < RCA \leq 1$	165	156	212	201	201	218	188	169	186	202
$1 < RCA \leq 2$	45	66	14	21	12	6	24	46	8	8
$2 < RCA \leq 4$	36	31	9	18	11	9	19	26	10	16
$4 < RCA$	17	3	19	15	24	19	20	17	17	23
Total	263	256	254	255	248	252	251	258	221	249
Mean	1.01	0.96	0.88	0.84	1.60	1.48	1.28	1.30	1.24	1.86
Maximum	22.27	5.59	21.39	12.67	39.80	83.81	21.46	17.87	38.80	73.99

Source: Calculated from UN Comtrade data

The results of comparative advantage reveal that member countries of the SCO had the comparative advantage in terms of exports over the other countries at the aggregate and disaggregate level from raw material to finished goods. The results of table 4 indicate that member countries have a comparative advantage according to trade classification codes as per revision SITC-3. The results affirm that member countries have a comparative advantage from product code Food and live animals [0] at an aggregate level to product code Commodities [9]. Few members gain a comparative advantage in raw material while others indicate a comparative advantage in finished goods. This affirms that the mission of the Shanghai corporation organization can facilitate the needs and demands of member countries for the common economic growth and mutual benefit of member countries.

Furthermore, to understand the detail of comparative advantage at the industry and product level SITC-3 further segregates at the first, second and third digits. The results affirm that member countries have a comparative advantage with a similar pattern as mentioned in Table 5 of appendices. The results of comparative advantage at the second digit level were reported in Table 6 of appendices, which indicates the members' comparative advantage at the industry level. The results affirm that in every industry appropriately two to three member countries have a comparative advantage. The results affirm the significance of members of the SCO and how these members contributing to the total world needs and demands which eventually boost their economic growth and trade-free agreements among the members' countries facilitate their common mission.

Table 7 of appendices reports the comparative advantage of member countries at the product level at digit three. The results of SITC-3 at the third digit reveals that member countries have a comparative advantage at the product level as well in terms of exports. These results at the product level comparative advantage support the shanghai corporation organization's mission of mutual economic growth. The trade-free agreements among the member countries can facilitate mutual trade and facilitate in achieving economic growth along with other mutual benefits. Member countries have a comparative advantage at the disaggregated level in terms of exports to the world ranging from product code meat of bovine animals, fresh, chilled, or frozen [011] to Gold, non-monetary (excluding gold ores and concentrates) [971].

SUMMARY OF DISCUSSIONS

The underpinning objective of the Shanghai corporation organization was to facilitate the member countries in terms of trade, growth, education, and environmental protection. The current study tests the one dimension of underpinning objective of SCO, which is stock intra trade among the member facilitate the country in better energy, education, and environmental protection. The findings of the current study indicate that all the member countries have a comparative advantage at the aggregate (industry to the sector) level and dis-aggregate (sector to product) level results of the current study.

The results of the revealed comparative advantage index (Balassa Index) indicate that some member countries of SCO have a comparative advantage at the industry-sector level, particularly a case of less developed or developing economies, moreover, have a comparative advantage at the sector-product level a case of developed member countries. The findings indicate that the member countries that have a

comparative advantage at the industry-sector level need to sign more trade preferential and trade-free agreements with member countries that have a comparative advantage at the sector-product level. These trade-free agreements and trade preferential agreements will facilitate the member countries in terms of trade growth. The results reveal comparative advantage have been reported at industry level digit one and then at the sector level digit two and then at product level at the digit three. The findings show that all the member countries of SCO have a comparative advantage in terms of raw material, as well as in finish goods. The member countries need further to strengthen the intra trade among the member economies.

Furthermore, the results of the CCC-MGARCH Model are well aligned with the results of the revealed comparative advantage index, complementary trade index, and trade intensity index. The findings of CCC-MGARCH indicate that all the stock markets of member economies have a constant conditional correlation among the member countries. The recent literature indicates that the stock market of SCO member countries has a positive and significant association (Hasnat & Zamurrad, 2016).

CONCLUSIONS

The findings of the current study indicate that SCO is beneficial for the member countries as its underpinning objective is to boost intra-trade, energy, growth, education, and environmental protection. The findings of the current study also affirm that SCO member countries are improving the intra organizational trades from raw material to finished goods. The member countries of SCO need to further strengthen their internal trade through trade free and trade preferential agreements. Moreover, member countries have several free-trade and trade preferential agreements among the member countries. However, still further improvements to fully utilize the resources member countries possess in terms of raw material, semi-finish goods. Based on the findings, the current study concludes that SCO has considerable potential to achieve the underpinning objectives of SCO along with the broader interests of member countries. The SCO role is more important for the member countries from central Asia because these members are striving for economic development and political maturity. The responsibility of SCO success and survival is more on Russia and China. Furthermore, the development and integration of SCO depend on security cooperation, economic, and potential tensions among the regional members. SCO needs to come up with some more effective regional reforms that ensure cross-cultural linkages and economic integration in a peaceful environment and security cooperation among the regional members.

IMPLICATIONS

It is clear that under the umbrella of SCO, trade creation is in favor of member countries to enhance their economic growth. Therefore, findings recommend the adoption of a combined approach in favor of SCO member countries for reduction and removing tariffs. The adoption of the combined approach will lead to achieving the full objective of SCO and benefits from the free trade agreements. The Governments of SOC member countries should invest in those sectors in which concerned countries have export potential to the

remaining members of SCO. The governments should arrange seminars and workshops on the importance of regional integration. Practically, the current study will benefit the SCO member countries by assisting them to enhance their growth and economic performance through sustainable trade development among member countries. The policymakers of countries will be able to make appropriate policies in this regard so that, the positive contribution of a regional organization to the economic growth can be realized.

LIMITATIONS AND FUTURE DIRECTIONS

Besides these contributions, the current study has certain limitations and future directions, for instance, the current study examined the trade potential and financial market contagion in the context of SCO member countries only. Future researchers are directed to assess trade potential and financial market contagion for a regional organization. Furthermore, the current study considered only revealed comparative advantage index and CCC-MGARCH. While, much other econometrics and statistical techniques (e.g., trade complementarily Index, Trade Intensity analysis, Panel gravity trade model) can be employed to investigate trade potential among SCO member countries or other regional organizations members countries.

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APPENDICES

Table 5: Member's countries comparative advantage at first digit

Code	Description	China	India	Kazakhstan	Pakistan	Russia
0	Food and live animals	No	Yes	No	Yes	No
2	Crude materials, inedible, except fuels	No	Yes	Yes	No	Yes
3	Mineral fuels, lubricants and related materials	No	Yes	Yes	No	Yes
4	Animal and vegetable oils, fats and waxes	No	No	No	Yes	No
5	Chemicals and related products, n.e.s.	No	Yes	No	Yes	No
6	Manufactured goods	Yes	Yes	Yes	Yes	Yes
7	Machinery and transport equipment	Yes	No	No	No	No
8	Miscellaneous manufactured articles	Yes	Yes	No	No	No
9	Commodities and transactions, n.e.s.	No	No	No	No	yes

Table 6: Member's countries comparative advantage at second digit

Code	Description	China	India	Kazakhstan	Pakistan	Russia
03	Fish, crustaceans, molluscs and preparations thereof	Yes	Yes	No	Yes	No
04	Cereals and cereal preparations	No	Yes	Yes	Yes	No
05	Vegetables and fruits	Yes	Yes	No	Yes	No
06	Sugar, sugar preparations and honey	No	Yes	No	Yes	No
07	Coffee, tea, cocoa, spices, and manufactures thereof	No	Yes	No	No	No
08	Feedstuff for animals (excluding unmilled cereals)	No	Yes	No	No	No
12	Tobacco and tobacco manufactures	No	Yes	No	No	No
22	Oil seeds and oleaginous fruits	No	Yes	No	No	No
23	Crude rubber (including synthetic and reclaimed)	No	No	No	No	Yes
24	Cork and wood	No	No	No	No	Yes
25	Pulp and waste paper	No	No	No	No	Yes
26	Textiles fibres and their wastes	No	No	Yes	Yes	No
27	Crude fertilizers other than division 56, and crude minerals	No	Yes	Yes	Yes	Yes
28	Metalliferous ores and metal scrap	No	Yes	Yes	No	Yes
29	Crude animal and vegetable materials, n.e.s.	No	Yes	No	Yes	No
32	Coal, coke and briquettes	Yes	No	Yes	No	Yes
33	Petroleum, petroleum products and related materials	No	Yes	Yes	No	Yes
34	Gas, natural and manufactured	No	No	No	No	Yes
35	Electric current	No	No	No	No	Yes
43	Processed Animal and vegetable oils and fats	No	Yes	No	Yes	No
51	Organic chemicals	No	Yes	No	No	No
52	Inorganic chemicals	Yes	No	Yes	No	Yes
53	Dyeing, tanning and colouring materials	No	Yes	No	No	No
54	Medicinal and pharmaceutical products	No	Yes	No	No	No
56	Fertilizers other than group 272	No	No	No	No	Yes
61	Leather, leather manufactures and dressed furskins	No	Yes	No	Yes	No
62	Rubber manufactures, n.e.s.	Yes	Yes	No	No	No

63	Cork and wood manufactures (excluding furniture)	Yes	No	No	No	No
65	Textile yarn and related products	Yes	Yes	No	Yes	No
66	Non-metallic mineral manufactures, n.e.s.	Yes	Yes	No	No	No
67	Iron and steel	No	Yes	Yes	No	Yes
68	Non-ferrous metals	No	No	Yes	No	Yes
69	Manufactures of metal, n.e.s.	Yes	No	No	No	No
74	Other industrial machinery and parts	Yes	No	No	No	No
75	Office machines and automatic data processing machines	Yes	No	No	No	No
76	Telecommunication and sound recording apparatus	Yes	No	No	No	No
77	Electrical machinery, apparatus and appliances, n.e.s.	Yes	No	No	No	No
81	Prefabricated buildings, sanitary, heating and lighting fixtures, n.e.s	Yes	No	No	No	No
82	Furniture and parts thereof	Yes	No	No	No	No
83	Travel goods, handbags, etc.	Yes	Yes	No	No	No
84	Articles of apparel & clothing accessories	Yes	Yes	No	Yes	No
85	Footwear	Yes	Yes	No	No	No
87	Professional and scientific instruments, n.e.s.	Yes	No	No	No	No
89	Miscellaneous manufactured articles, n.e.s.	Yes	Yes	No	Yes	No
97	Gold, non-monetary (excluding gold ores and concentrates)	No	No	Yes	No	Yes

Table 7: Member's countries comparative advantage at third digit

Code	Description	China	India	Kazakhstan	Pakistan	Russia
03	Fish, crustaceans, molluscs and preparations thereof	Yes	Yes	No	Yes	No
04	Cereals and cereal preparations	No	Yes	Yes	Yes	No
05	Vegetables and fruits	Yes	Yes	No	Yes	No
06	Sugar, sugar preparations and honey	No	Yes	No	Yes	No
07	Coffee, tea, cocoa, spices, and manufactures thereof	No	Yes	No	No	No
08	Feedstuff for animals (excluding unmilled cereals)	No	Yes	No	No	No
12	Tobacco and tobacco manufactures	No	Yes	No	No	No
22	Oil seeds and oleaginous fruits	No	Yes	No	No	No
23	Crude rubber (including synthetic and reclaimed)	No	No	No	No	Yes
24	Cork and wood	No	No	No	No	Yes
25	Pulp and waste paper	No	No	No	No	Yes
26	Textiles fibres and their wastes	No	No	Yes	Yes	No
27	Crude fertilizers other than division 56, and crude minerals	No	Yes	Yes	Yes	Yes
28	Metalliferous ores and metal scrap	No	Yes	Yes	No	Yes
29	Crude animal and vegetable materials, n.e.s.	No	Yes	No	Yes	No
32	Coal, coke and briquettes	Yes	No	Yes	No	Yes
33	Petroleum, petroleum products and related materials	No	Yes	Yes	No	Yes
34	Gas, natural and manufactured	No	No	No	No	Yes
35	Electric current	No	No	No	No	Yes
43	Processed Animal and vegetable oils and fats	No	Yes	No	Yes	No

51	Organic chemicals	No	Yes	No	No	No
52	Inorganic chemicals	Yes	No	Yes	No	Yes
53	Dyeing, tanning and colouring materials	No	Yes	No	No	No
54	Medicinal and pharmaceutical products	No	Yes	No	No	No
56	Fertilizers other than group 272	No	No	No	No	Yes
61	Leather, leather manufactures and dressed furskins	No	Yes	No	Yes	No
62	Rubber manufactures, n.e.s.	Yes	Yes	No	No	No
63	Cork and wood manufactures (excluding furniture)	Yes	No	No	No	No
65	Textile yarn and related products	Yes	Yes	No	Yes	No
66	Non-metallic mineral manufactures, n.e.s.	Yes	Yes	No	No	No
67	Iron and steel	No	Yes	Yes	No	Yes
68	Non-ferrous metals	No	No	Yes	No	Yes
69	Manufactures of metal, n.e.s.	Yes	No	No	No	No
74	Other industrial machinery and parts	Yes	No	No	No	No
75	Office machines and automatic data processing machines	Yes	No	No	No	No
76	Telecommunication and sound recording apparatus	Yes	No	No	No	No
77	Electrical machinery, apparatus and appliances, n.e.s.	Yes	No	No	No	No
81	Prefabricated buildings, sanitary, heating and lighting fixtures, n.e.s	Yes	No	No	No	No
82	Furniture and parts thereof	Yes	No	No	No	No
83	Travel goods, handbags, etc.	Yes	Yes	No	No	No
84	Articles of apparel & clothing accessories	Yes	Yes	No	Yes	No
85	Footwear	Yes	Yes	No	No	No
87	Professional and scientific instruments, n.e.s.	Yes	No	No	No	No
89	Miscellaneous manufactured articles, n.e.s.	Yes	Yes	No	Yes	No
97	Gold, non-monetary (excluding gold ores and concentrates)	No	No	Yes	No	Yes