# GLOBAL (NUTMEG IN SHELL) TRADING: TRADE AND INTEGRATION OF INTERNATIONAL MARKET

Maswadi[1)*], Novira Kusrini[1)] , Darsono[2)]

[1]Agribusiness Study Program, Faculty of Agriculture, Universitas Tanjungpura, Pontianak.
[2] Agribusiness Study Program, Faculty of Agricultre, Universitas Sebelas Maret, Surakarta
Jalan Prof. Dr. H. HadariNawawi, 78124 Kalimantan Barat.

Correspondence author's: Maswadi
Email: maswadi@faperta.untan.ac.id

## ABSTRACT

The role of nutmeg in traditional and international trade is very significant because it is able to supply around 60-75 percent of the world's market share needs. The government as one of the market players has a role in creating strategic agricultural product price stabilization, and while there are still weaknesses of the agribusiness structure prevailing in Indonesia, integration analysis is very important given the benefits of knowledge about market integration. Market integration is useful to facilitate monitoring of price changes and support government policies on price stabilization and predict prices in the domestic market. Analysis of the market integration of this research uses the Vector Autoregression (VAR) model in difference determined through data stationarity test. Meanwhile, to determine the impact of the response of each variable due to shock (impulse response analysis) and Variance Decomposition. This research has three equations in the VAR analysis model and the results are all significant. The benefit of this research is to help determine the forecast of nutmeg prices in the domestic market and the impact of the response of each variable due to shocks.

## INTRODUCTION

Indonesia is known as one of the countries that have a strong agricultural base. This is proved from the agricultural sector can survive and at the same time become the backbone of the Indonesian economy monetary and global economic crisis a few years ago. Nutmeg is the result of the agricultural subsector which has great potential to be developed into Indonesia's leading export commodity. Nutmeg is dubbed the "king of spices" because it is the most important product in international trade. The role of nutmeg in both traditional and international trade is

very significant because it is able to supply 60-75 percent of the world's market share needs (Raharti, 2013).

The government as one of the market players has a role in creating strategic agricultural product price stabilization, while there are still some weaknesses of the agribusiness structure prevailing in Indonesia, integration analysis is very important considering the large benefits of knowledge about market integration.

Market integration is the level of price movements in different regions with the same product having the same price. Although it is sold in different places, price signals, and market information are transmitted equally (Fatin, et.al., 2020). In addition, market integration is serviceable to facilitate monitoring of price changes and support government policies on price stabilization and predict prices in the domestic market. The implementation of the price stabilization policy is more effective in integrated markets than in non-integrated markets.

The novelty of this study is research about nutmeg in the context of market integration and international trade, using three countries (Sri Lanka, Nepal, and Bhutan) as the foreign price of nutmeg which represents the global market price. In addition, the research updates of the analyzed period years are different, the years used are 2000 to 2015.

## RESEARCH METHODS

### Place and Time of research

The location of this research was conducted purposively which included Indonesia, Nepal, Bhutan, and Sri Lanka. The time of data collectionwas in December 2018.

### Types and Source of Data

This research is limited by analyzing annual quantitative secondary data for 15 years in the period 2002 and 2017 to analyze market cohesiveness. Secondary data is used because the research conducted includes objects that are macro and easy to obtain.

The data used in this study are secondary data obtained from various sources and literature which include: Indonesian nutmeg price data, overseas nutmeg prices that represent global market prices (Sri Lanka, Nepal, and Bhutan). Secondary data were collected from the Food and Agricultural Organization (FAO). These data have also been tested using the classic assumption test and have passed the autocorrelation, normality, heteroscedasticity, and multicollinearity tests.

### Data Analysis and Processing Method

Analysis of the market integration of this study uses the Vector Autoregression (VAR) model in difference determined through data stationerity test. Meanwhile, to determine the impact of the response of each variable due to shock (impulse response analysis) and Impulse Response Analysis (variance decompositions). The variables used are Indonesian nutmeg prices, overseas nutmeg prices that represent global market prices (Sri Lanka, Nepal and Bhutan).

Before determining the use of VAR / VECM in the model, the data is first tested in a classic assumption. If the analyzed model does not have a cointegration relationship, then the analysis model used in market integration analysis is VAR, and vice versa if there is a cointegrationrelationship the analysis model uses VECM. The use of VAR in market integration analysis has been done before (Fazaria, et.al., 2016).

## RESULT AND DISCUSSION

### Indonesian Nutmeg Position Analysis

Indonesia Nutmeg is includedas competitive products compared to Malaysia, the Philippines, Singapore and Thailand (Asmara &Artdiyasa, 2008). FOB price of nutmeg seeds will increase the export volume of nutmeg seeds (Sayidah, et.al., 2014). It is shown from the highest number of nutmegs exported by Indonesia (19,957 tons) in 2016

(Pakpahan, et.al., 2020). However, the increase in the rupiah exchange rate and trade barriers such as tariffs, quotas, and other restrictions tend to reduce nutmeg exports (Yamarik& S., 2005).

Figure 1 shows a positive trend in export opportunities for Indonesian products. The increase in Indonesia's export volume is relatively stable (Asrol&Heriyanto, 2017). However,

stakeholders need to maintain production continuity, prevent low quality (Amelia, 2009), and transportation costs (Kien, 2009). The main problem of nutmeg is the low quality of seedlings because they have not used superior varieties and still use seeds from wild plants (Ermiati, 2011; Rodianawati, et.al., 2015) and poor aquaculture management due to low education levels (Rosli, et.al ., 2013).
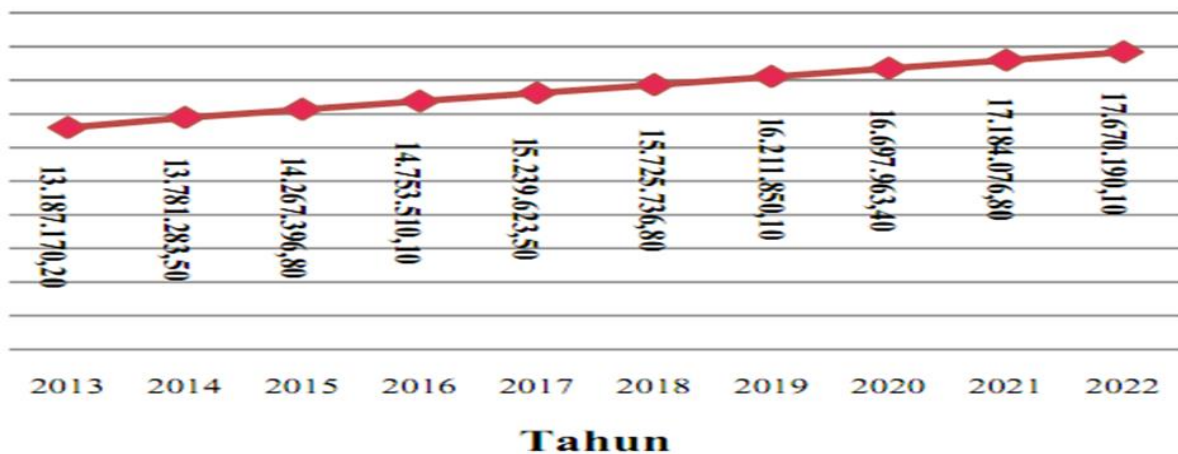


**Picture 1.**Indonesian Nutmeg Export Volume Trends.

Therefore, the utilization of tissue culture seeds to seed breeders so that the scale of the nursery business is wider, the price of seeds is lower, and the reduction of fertilizer doses to reduce production costs (Personal & Sujianto, 2013).

**Model Analysis VAR**

**D (*Bhutan Price*) =-2.23-6.17dbhutan_PRICE (-1) + 12.62dInd_Price(2)…………Equation 1**

**D (*Ind Price*) =-2.25db hutan_Price(-2)- 3.44d Ind_Price(-2)-3.44 dInd_Price(-2) + 3.01 dnepal_Price(-1) + 2.89d Srilanka_Price(1) ………Equation 2**

**D(Nepal Price) = 3.46d Nepal_Price(-2) + 2.47d Srilanka_Price(1)………….….……Equation 3**

Keterangan:
*Bhutan Price* = The price of nutmeg in Bhutan
*Ind Price* = The price of nutmeg in Indonesia
Srilanka Price = The price of nutmeg in srilanka
*Nepal Price* = The price of nutmeg in Nepal

The prices of Bhutanese nut (equation 2) are significant relative to the prices of nutmeg in Bhutan itself, prices in Indonesia, Nepal, and Sri Lanka. Changes in the price of nutmeg in Bhutan two years ago rose by one rupiah per US dollar, causing Indonesia's price to decline by 2.25 percent. It also came as a change in the price of nutmeg in Indonesia two years ago by one rupee per US dollar. If a change in the price of nutmeg in Nepal one year ago increased by one rupiah per US dollar, it would cause Indonesia's price change rise to 3.01 percent. If the change in the price of nutmeg in Srilanka one year ago increased by one rupee per US dollar, it would cause Indonesia's price change to rise by 2.89 percent.

Nepalese nutmeg prices (equation 3) are significantly affected by nutmeg prices in Nepal itself and prices in Sri Lanka. Changes in nutmeg prices in Nepal two years ago increased by one rupiah per US

dollar, it will cause changes in prices in Nepal itself increased by 3.46 percent.

**Estimating of International Nutmeg Prices**

Next, estimating is done using Vector Auto Regression (VAR), on the price of nutmeg for the next 10 years (figure 2).

The trend of Indonesian Nutmeg prices is relatively good (figure 2) showing a good upward trend. Therefore, farmers need to take advantage of these opportunities by improving nutmeg productivity. An upward trend is also shown by Bhutan, which has increased from 2008 to forecasting 2027.
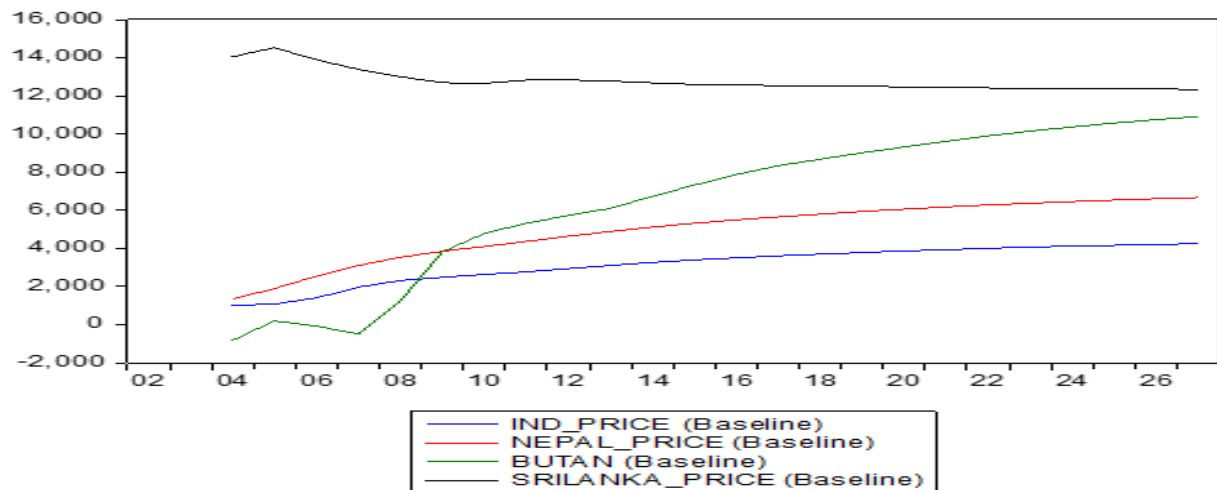


**Figure 2.** Nutmeg Price Estimating Chart for the next 10 years.

The downward trend occurred in Sri Lankan nutmeg prices from 2011 to 2017, although the decline was not large. The decline in prices compared to other countries is relatively equal, prices in Sri Lanka are much higher than Indonesia, Nepal, and Bhutan. This will make the price of Nutmeg in Sri Lanka more profitable than other countries in this study. The high nutmeg prices estimation can be caused by high base prices.

Efforts to improve the position and competitiveness of Indonesian nutmegs in the country, especially in improving prices, namely increasing the benchmark interest rate. An increase in interest rates on savings or deposits will stimulate the community to save so that the share of the income received by the community will be reduced for consumption including nutmeg consumption (Frankel, 2006; Arango, et.al., 2012). This will reduce consumption and reduced nutmeg demand, so the price of nutmeg will fall.

Stakeholders can emulate Thai policies to increase the competitiveness of exports of agricultural products through diversification and agricultural specialization so that they can still contribute to reducing poverty in rural areas and achieving food security (Leturque & S., 2010). The government can also learn from the Philippines to improve competitiveness through a more conducive business environment (Deloitte, 2014). Therefore, stakeholders need to reform trade facilitation and encourage increased export performance, because it can increase productivity, both import substitution products and export promotion (Perez & J.S., 2012; Fleming & D. G, 2013). This was explained (Mohan, et.al., 2013) that exporters usually had made agreements with small-scale spices farmers at a certain selling price with the quality of spices determined by the destination country.

**Impulse Response Analysis**

Impulse Response Function (IRF) is a shock from endogenous variables that

directly influence the shock of other variables in the VECM model (Nasir, 2019). Shock variables through new information affect the variables themselves and other variables in the system (Subekti& Carolina, 2011).
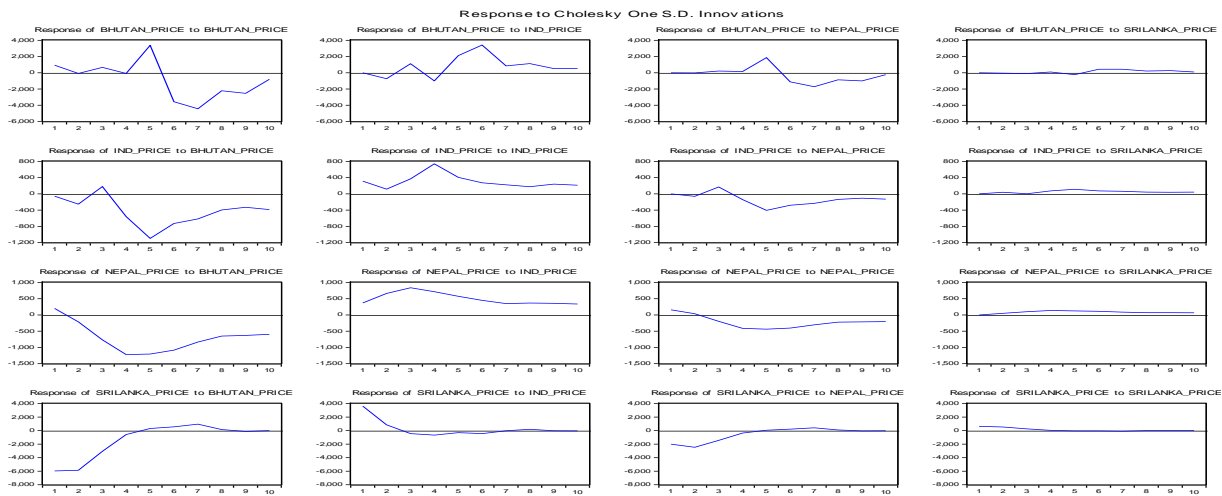


**Figure 3.** Impulse Response Analysis Results.

Figure 3 shows the impact of the response of a variable due to the shock of other variables for ten periods after the shock. The response of a variable due to shock is gradually disappearing and returning to the previous balance and does not leave a permanent impact on the variable. This indicates the VAR specification which involves the price of Bhutan, Indonesia, Sri Lanka, and Nepalese nutmeg prices is correct.

The impact of the response received on the price of the country of Bhutan due to shocks in the price of the country of Bhutan itself for 10 years is also a convergence that is marked with a graph toward the zero point. The graph shows that at the beginning of the period / month, the price of Bhutan gave a very fluctuating response (starting from negative response to positive and returning negative) until the 7th period since the shock of the variable price of Bhutan. After that, the graph goes to a new balance point. The same pattern applies to the other 15 response graphs. Price stabilization policy will be effective if the shocks that drive price changes are temporary and the variance is not large (Borensztein, et.al., 1994).
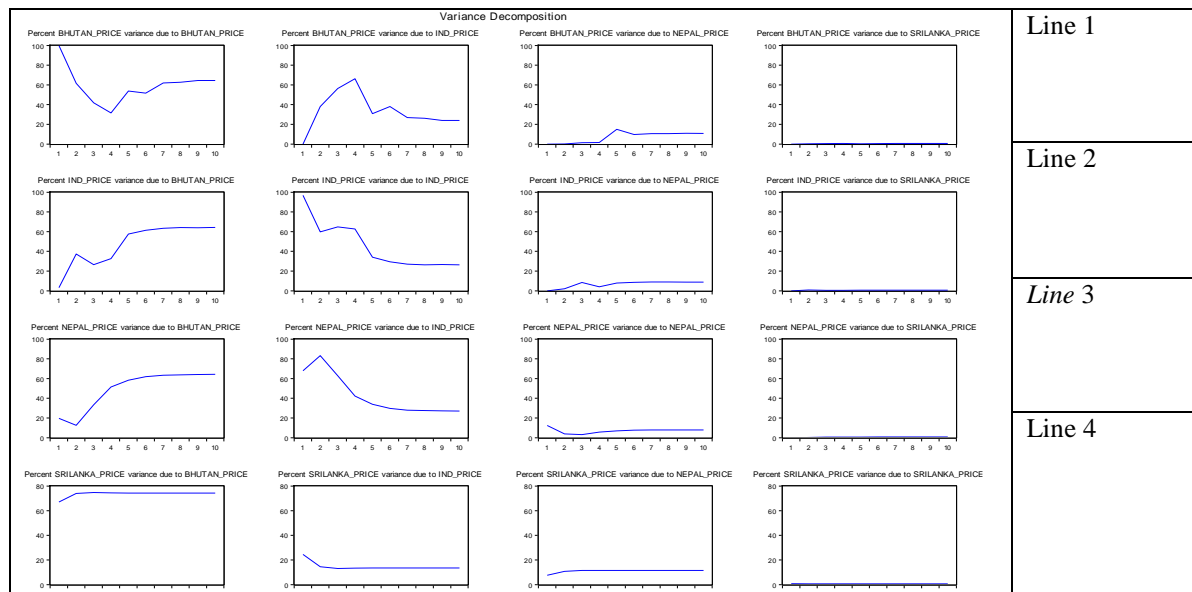
**Forecast Error Decomposition Variance (FEDV) Analysis**

Line 1 explains the decomposition variance of the Bhutanese price variation is the Bhutan price shock itself, while the shocks from other variables namely the prices of Indonesia, Nepal, and Sri Lanka have relatively little effect.

In the first period of the shock, variations in the price of the Bhutanese nutmeg are 100% contributed by the price of the Bhutanese nutmeg itself. Furthermore, the second period showed that 61 percent of shocks were contributed by Bhutan, 38 percent by Indonesia, and the remainder by Sri Lanka and Nepal, which had relatively little effect. A different pattern occurred in the third period, namely when Bhutan's price shocks were contributed by Indonesia by 56 percent, while Bhutan only 42 percent, the rest by Sri Lanka and Nepal. This continued until the fourth period, in that period the price of Bhutan was donated by Indonesia by 66 percent, while Bhutan was only 31 percent. The fifth to tenth period, the situation returns to the initial period. Shocks are affected by Bhutan, where the average percentage of shocks is 61 percent

per period, Indonesia accounts for an average of 26 percent, the rest is contributed by Nepal and Sri Lanka.

The smallest shaking contribution was in Sri Lanka, which was an average of 0.3 percent.



**Figure 4.** Forecast Error Decomposition Variance (FEDV) Analysis Results.

Line 2 explains the decomposition variance of variations in Indonesian prices is shocks from Indonesian prices, while due to shocks from other variables namely prices in Indonesia, Nepal, and Sri Lanka relatively small effect. In the first period of the shock, variations in the price of Indonesian nutmeg 96% was contributed by the price of Indonesian nutmeg itself, the rest was contributed by Bhutan by 4 percent. In the second period, 61 percent of the shocks were contributed by Indonesia, 37 percent by Bhutan, and the remainder by Sri Lanka and Nepal, which had relatively little effect. It goes on until the fourth period. A different pattern occurred in the fifth to tenth periods of which Indonesian price shocks were contributed by Bhutan at an average of 61 percent, while Indonesia alone was only an average of 26 percent, the rest by Sri Lanka and Nepal at an average of 8 percent.

Line 3 explains that the decomposition variance of the Nepalese price variations is a shock from the prices of Indonesia and Bhutan, while the effect of the shock from the Nepalese variable is relatively small. In the first period of the shock, variations in Nepal's nutmeg prices were contributed by Indonesian nutmeg prices by 67 percent, the remainder was contributed by Bhutan by 20 percent, Nepal's own prices accounted for only 12 percent and the remainder by Sri Lanka. In the second period, 83 percent of shocks were contributed by Indonesia, 12 percent by Bhutan, and the remainder by Sri Lanka and Nepal, which had relatively little effect. And so on until the fourth period. A different pattern occurred in the fourth to the tenth period, namely that Nepal's price shocks were contributed by Bhutan at an average of 58 percent, Indonesia at an average of 26 percent, while Nepal only contributed an average of 6 percent, the rest by Sri Lanka.

In line 4, it is explained that the decomposition variance of Sri Lankan price variations is a shock from the Bhutan price, while due to the shocks from other variables namely the prices in Indonesia,

Nepal, and Sri Lanka are relatively small. In the first period of the shock, 67 percent of Sri Lankan nutmeg prices were contributed by the Bhutanese nutmeg, 24 percent for Indonesia, 8 percent for Nepal, and the remainder by Sri Lanka. In the second to tenth period consistently, 74 percent of the shocks were contributed by Bhutan, 13 percent by Indonesia, Nepal 11 percent and the rest of Sri Lanka which had relatively very little effect.

**Granger Causality Analysis.**

Granger causality test was conducted to determine the causality relationship between Indonesian nutmeg markets, international nutmeg markets represented by the Sri Lankan, Nepalese and Bhutanese markets (Murtala, et al., 2019). Basis of testing with a null hypothesis on the whole data that the Indonesian market price, Nepal market, Sri Lanka market price, and Bhutan do not influence each other. The criterion used is prob<alpha with a level of 5% (0.05), so that some hypotheses are rejected and a two-way causality relationship occurs and some are only one-way (appendix 1).

Indonesian prices do not affect Nepal prices, but Nepal prices affect Indonesian prices. This shows a one-way causality relationship. This happened because of differences in the quality of nutmeg from the two countries. Bhutan prices also don't affect Nepal prices, but Nepal prices affect prices in Bhutan. Prices in Sri Lanka and Nepal indicate no causal relationship between the two countries (appendix 1).

Causality analysis in looking at prices between Bhutan, Indonesia and Sri Lanka is that Bhutan's prices do not affect prices in Indonesia, but there is a causality relationship because Indonesian prices affect Bhutan prices. Prices in Indonesia are also not influenced by Sri Lanka, and vice versa. This also happened to the Sri Lankan and Bhutan causality relationships which showed no mutual influence (appendix 1.

## CONCLUSION AND SUGGESTION

Based on the results of research and discussion described before, the conclusions can be drawn as follows:

1. VAR testing has three equations and all of the equations are significant.
2. The results of Impulse Response show the impact of the response of another variable with ten periods after the shock, it appears that the response of a variable due to a shock will gradually disappear and return to the next balance, and does not leave a permanent impact on that variable.
3. The result of Granger's Causality is that the price between Bhutan, Indonesia and Sri Lanka is that the price of Bhutan does not affect prices in Indonesia, but there is a causality relationship. Prices in Indonesia are also not influenced by Sri Lanka, and vice versa.

Stakeholders need to take advantage of Indonesian nutmeg opportunities through increasing the competitiveness of Indonesian nutmeg, especially the use of superior varieties, making international trade policies that support Indonesian farmers, establishing good nutmeg cultivation. In addition, further research is needed related to nutmeg policy strategies in Indonesia.

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## Appendix

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|---|---|---|
| IND_PRICE does not Granger Cause NEPAL_PRICE | 14 | 0.79140 | 0.4824 |
| NEPAL_PRICE does not Granger Cause IND_PRICE | | 19.3291 | 0.0006 |
| BHUTAN_PRICE does not Granger Cause NEPAL_PRICE | 14 | 0.30970 | 0.7412 |
| NEPAL_PRICE does not Granger Cause BHUTAN_PRICE | | 7.55340 | 0.0119 |
| SRILANKA_PRICE does not Granger Cause NEPAL_PRICE | 14 | 10.0373 | 0.0051 |
| NEPAL_PRICE does not Granger Cause SRILANKA_PRICE | | 0.42965 | 0.6634 |
| BHUTAN_PRICE does not Granger Cause IND_PRICE | 14 | 0.03159 | 0.9690 |
| IND_PRICE does not Granger Cause BHUTAN_PRICE | | 30.2609 | 0.0001 |
| SRILANKA_PRICE does not Granger Cause IND_PRICE | 14 | 1.44604 | 0.2854 |
| IND_PRICE does not Granger Cause SRILANKA_PRICE | | 0.02884 | 0.9717 |
| SRILANKA_PRICE does not Granger Cause BHUTAN_PRICE | 14 | 0.06969 | 0.9332 |
| BHUTAN_PRICE does not Granger Cause SRILANKA_PRICE | | 0.04093 | 0.9601 |

**Appendix 1.** Granger Causality Results