

INDONESIA EXPORT, IMPORT AND DEMAND FOR DOMESTIC COMMODITIES UNDER ECONOMIC LIBERALISATION

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Abstract

The aim of this research is to identify the behaviour of export, import and domestic commodities demand in liberalization era both in the long run and the short run. This research applies the Vector Error Correction Model, Johansen Cointegration Test, Impulse Response Analysis and Granger Causality Test. The data range from 1993:01 to 2002:12. The result shows that in the long run the cross-price elasticity of imported non agricultural goods with respect to demand for domestically produced goods have lower magnitudes than own price elasticity of domestically produced goods. The demand elasticity of import commodities is elastic but that of domestic commodities is inelastic.

Keywords: Import, Export, Economic Liberalization, Vector Error Correction Model

JEL Classification: F13, F19

INTRODUCTION

From 1980s until the end of the IMF program after the economic crisis in Indonesia (December 2002), Indonesia was experiencing an era of increasingly open economy with the international economy (economic liberalization). In general there are two major factors that influence these phenomena. First, during the year 1982-1995 due to declining oil prices in the mid-1980s, Indonesia was forced to change its foreign trade policy from import substitution strategy to the promotion of non-oil exports, particularly for industrial goods in order to diversify sources of foreign exchange. Details of important policies that are outward looking in this era can be seen in Table 1.

Secondly it was international agreement on trade liberalization. Indonesia through AFTA has agreed on CEPT (Common Effective Preferential Tariff). This preferential tariff requires reduction on im-

port tariff of all commodities traded in South-East Asia area (Brunei Darussalam, Indonesia, Malaysia, Philippine, Singapore and Thailand) up to level 0-5% except for sensitive commodity like rice until 2002. This commitment results in 99,07% CEPT Indonesia tariff had at the range of 0-5%.

Other important agreement is acceleration of integration 11 ASEAN priority sectors on 12 July 2003, in which products listed in CEPT list will be zero tariff. Moreover, tariff barriers were eliminated, and harmonization of its exchange rates based on agreement of ASEAN Economic Minister in Cambodia at September 2003.

Second, through WTO the industrial sector deregulation is as follows: a) eliminating tariff surcharge in the year 2004. For Indonesia, it had been implemented in 1996, a far before deadline which is specified by WTO, b) eliminating all non-tariff barriers in 2004. Before end of Uruguay Round, Indonesia had been abolished most of non-

Indonesia had been abolished most of non-tariff barriers. c) Maintaining the tariffs applied are under maximum limit set by WTO commitment. Practically, most tariffs of industrial products of Indonesia have been staid far below the allowed maximum rate.

Table 1: Indonesia Trade Deregulation 1982-1995

Deregulation Package of January 16, 1982	<ol style="list-style-type: none"> 1. Regulate export/import and international payment for strengthening Indonesia competitiveness 2. Counter purchase policy
Deregulation Package of May 6, 1986	<ol style="list-style-type: none"> 1. Improving Indonesia export competitiveness and reducing export barrier 2. Relaxing non oil export regulation, custom and excise return, free custom and excise policy, and implementation of bonded zone
Deregulation Package of October 25, 1986	Cutting cost of production through reduction of custom tariff for selected commodities, domestic trade protection by tariff system, new swap policy, and investment policy
Deregulation Package of January 15, 1987	Improving the distribution and stock management for production input of domestic industry, and non tariff policy for protecting domestic industry of selected commodities
Deregulation Package of Desember 24, 1987	Fund mobilization in the money markets to accelerate production, services and investments, as well as the flow of exports and imports
Deregulation Package of May 28, 1990	Determination of replacement protection through import trade order to be protected by tariff duties are intended to enhance and strengthen the competitiveness of national industrial products
Deregulation Package of July 6, 1992	Loosened trade regulation policy so that each manufacturer can import directly without recommendations from the Ministry of Industry
Deregulation Package of June 10, 1993 and Deregulation Package of de-bureaucratization of October 23, 1993	Deregulation in the automotive industry, export/import, investment and business permit, and pharmaceutical industry
Deregulation Package of May 23, 1995	Deregulation in import and export and import tariffs which includes reduction of 64.16% tariff posts

Source; Astiyah, et al. (2005)

As according to schedule of tariff reduction, most of tariff line (83,4%) have been at the range of 0-10% in 2003, more-over 67,9% from the total tariff lines have been reduced to become 0% or 5%.

Thirdly, LOI (Letter of Intent) IMF implies higher Indonesia economy openness when government of Indonesia had to sign Letter of Intent with International Monetary Fund. Acceleration of economic was a consequence of the agreement with IMF which required deregulation and liberalisation of all economic sector. Not only in monetary and macroeconomic sector but also other sectors likes banking, agriculture, corporate restructuring, and industry. All those commitment must have been executed at the end of program IMF in December 2002 (Irawan, 2006).

Based on the background above, interesting question raised is how are the behaviour of exports, import and demand of domestic commodities in the liberalisation era and the policy implication both short and long term. The answer would be useful not only to describe clear picture on exports behaviour, domestic import and domestic demand in era liberalisation but also determine right and suitable trade policy in economic liberalisation era.

METHODS

Data

Data used is monthly time series from 1993:01 to 2002:12 obtained from statistical publications such as Central Bank of Indonesia (BI), Central Bureau of Statistic (BPS), CEIC Data Company Limited and International Financial Statistics IMF. Sample data observation is selected from the year 1993-2002 because Indonesia economy is considered to be integrated significantly to international economies. It is indicated by several policies which is outward looking-oriented policies like economic deregulation and agricultural sector liberalization. While

monthly data is selected to overcome the problem of degree of freedom since using quarterly or annual series will experience this problem.

Model Specification of VECM

Model contains 35 variables; thereby z vector is vector 35 x 1 as follows:

$$Z_t = (LPA, LPN, LPBINA, LPBINN1, LX, LPM, LPB, LPBIN_B, LW, LWA/LPA, LPMA/LPA, r, LWN/LPN, LPMN/LPN, LP_A, LP_N, LXBIN, LREER, LCA, LCN, LC_BINA, LCBIN_N1, LM2, LB, LBBIN, LYA, LLA, LKA, LYN, LLN, LKN, LC_A, LC_N)$$

Since VAR has p order hence Z_t becomes:

$$Z_t = \sum \Pi_i Z_{t-i} + \varepsilon_t \quad (1)$$

From equation (1) can be written in first difference as follows:

$$\Delta Z_t = \sum \Pi_i Z_{t-i} + \sum_{i=1} \Gamma_i \Delta Z_{t-i} + \varepsilon_t \quad (2)$$

where:

- Π = $\alpha\beta$ is parameter of 34 x 34 matrix
- ΔZ_t = first difference vector
- Γ_i = the 34 x 34 matrix coefficient
- ε_t = the 34 x1 white noise vector
- β = the 34 x 15 *cointegrating vector*
- α = the 34 x 15 matrix coefficient

Matrix β is estimated by its cointegration regression so that is obtained *error correction term* $E_{t-1} = \beta Z_{t-1}$. Thus $\sum \Pi_i Z_{t-i}$ can be estimated as αE_{t-1} . Component of E_{t-1} is 15x1 vector of long run disequilibrium error. As for analysis of Vector Error Correction Model is as follows:

Block of Commodity Demand

Vector Error Correction Model which analyse source of instability in block demand of commodity with formula:

$$\Delta Z_{1,t} = \alpha_1 E_{t-1} + \sum_{i=1}^{p-1} \Gamma_1 \Delta Z_{1,t-i} + \varepsilon_{1t} \quad (3)$$

where:

ΔZ_1 is the 10 x 1 variable vector in demand block, α_1 is the 10 x 15 coefficient matrix, E_{t-1} is the 15 x 1 error correction vector (long run disequilibrium error)

Block of Export Demand

Vector Error Correction Model which is to analyse source of instability in block demand of export is as follows:

$$\Delta Z_{5,t} = \alpha E_{t-1} + \sum_{i=1}^{p-1} \Gamma_1 \Delta Z_{5,t-i} + \varepsilon_{5t} \quad (4)$$

where:

Z_5 is the 7 x 1 vector of variables (LC_A, LC_N, LREER, LP_A, LP_N, and LX_BIN)

E_{t-1} is *error correction term* of equation of each block in previous period, α_3 is the 6 x 15 coefficient matrix

RESULT DISCUSSION

Long Run Analysis

There were 35 variables used in the research. In accordance with the technical analysis of time series data, it requires test of stationery. Time series data could lead spurious regression because of a unit root (Verbeek, 2002). Therefore before analysing VAR it need perform Augmented Dickey Fuller test (ADF). This test is based on the largest value of Schwarz Information Criterion (Pesaran and Pesaran in Siregar, 2002).

The greater is the Schwarz Information Criterion, the more significant is the model. The models with the largest Schwarz Information Criterion means that the model has an optimum lag. The next step is to compare the t-statistic values with critical values of 95 and 99 percent. If the value of t-statistic is greater than its critical value then the data is stationer (I(0)). It means that the analysis can be done only with the VAR approach, but if less than the critical value the data is non-stationer.

A consequence of the non stationer data is that the data contain unit root. When the data directly estimated would produce a spurious regression. To avoid this problem, this procedures are performed as follows: (1) create a first difference ($\Delta Y_t = Y_t - Y_{t-1}$) by differentiating endogenous variable so that the data is stationer I(1), and (2) make corrections on its errors term so that is called Error Correction Model (ECM). Unit root test results show that all the variables used in the model studies have been stationer at I(1).

Block of Commodity Demand

Based on Schwarz Information Criterion the optimal lag for block of commodity demand is VAR equation with order 1. While Johansen cointegration test shows that there are 4 vectors cointegrated at 1% level. Restriction result on over identifying cointegrated vector is obtained with p-value of 0.000089. It means that the null hypothesis is rejected at 1% level. Based on over identified restriction result it is produced four long run equations as follows:

Long-Run Equation of Demand for Agriculture Commodity:

$$\begin{aligned}
 LCA = & 2,557578^* - 0,138337 LPA & - 0,470336 LPBINN1 \\
 & (1,63308) & (1,06827) \\
 & + 0,25831 LPN^* - 0,008^a LPBINA & - 0,716634^e LREER \\
 & (-2,26366) & + 1,021731 LX^* \\
 & - 0,111152LPBINN1 & (-3,68377) \\
 & (1,16416) \\
 & - 0,199875 LREER^* \\
 & (4,85703) \\
 & + 0,83508 LX^* \\
 & (-12,5690)
 \end{aligned}$$

Long-Run Equation of Demand for Non-Agriculture Commodity:

$$\begin{aligned}
 LCN = & -0,704317 - 0,13699 LPA \\
 & (1,03117) \\
 & - 0,5882^b LPN + 0,610 LPBINA^* \\
 & (-4,039) \\
 & + 0,30097 LPBINN1 \\
 & (-1,66789) \\
 & + 0,339223LREER^* + 0,824533 LX^* \\
 & (-6,41952) \quad (-6,60251)
 \end{aligned}$$

Long-Run Equation of Demand for Import Agriculture Commodity:

$$\begin{aligned}
 LC_BINA = & 4,999254 + 0,245803 LPA \\
 & (-0,54944) \\
 & - 0,0674483 LPN \\
 & (0,97882) \\
 & - 0,0575^c LPBINA \\
 & + 0,164318 LPBINN1 \\
 & (-0,38392) \\
 & - 0,1507^d LREER \\
 & + 1,203768 LX^* \\
 & (-4,27528)
 \end{aligned}$$

Long-Run Equilibrium of Demand for Import Non-Agriculture Commodity:

$$\begin{aligned}
 LCBIN_N1 = & 1,43068 + 0,941381 LPA^* \\
 & (-2,58022) \\
 & + 1,739395 LPN^* \\
 & (-3,81048) \\
 & - 2,51635 LPBINA^* \\
 & (6,37541)
 \end{aligned}$$

Where entries in parentheses are *t-statistics*,^a,^b,^c,^d and ^e refer to restriction, LCA is Demand for Domestic Agriculture Commodity, LCN is Demand for Domestic Non-Agriculture Commodity, LC_BINA is Demand for Import of Agriculture Commodity, LCBIN_N1 is Demand for Import of Non-Agriculture Commodity, LPA is Price of Agriculture Commodity, LPN is Price of Non-Agriculture Commodity, LPBINA is Price of Import Agriculture Commodity, LPBINN1 is Price of Import Non-Agriculture Commodity, LREER is *Real Effective Exchange Rate*, and LX is Consumption Expenditure of Domestic Household

There are several important findings that can be drawn from those four long-run equations. First, for the same type of commodities it appears that own price elasticity of demand for domestic commodities tends to be larger than that of import commodity. This indicates that domestic demand for commodities is more responsive to the movement its prices than import commodity. Thus it implies that pricing policies is more effective in affecting the demand for domestic commodity than import commodity.

Second, as theory says that own price elasticity of agricultural commodities both domestic and import are low (inelastic). This is because the nature of agricultural commodities are generally a necessity.

Third, a cross price elasticity between demand for domestic non-agricultural commodities to price of import non-agricultural commodity have a lower elasticity compared to own price elasticity of demand for domestic non-agricultural commodities. This implies that price policy on

import of non-agricultural commodity will have smaller effect on demand for domestic non-agricultural commodities compared to that of for domestic non-agricultural commodities. For example, if the government applies a higher import tariff of non-agricultural commodities which causes prices of imported non-agricultural commodity increase 1 percent, this increase raise demand for domestic commodities by 0.301 percent. While the 1 percent decrease of domestic commodity prices it would increase its demand for 0.58 percent. This indicates that higher trade barriers such as high import tariffs will negatively impact on demand for domestic non-agricultural commodities which in turn hurt domestic producers. Impulse response analysis in section Trade Policy Analysis will clarify these findings.

Fourth, the elasticity of household consumption expenditure on demand for imported commodities is greater than the demand for domestic commodities. The elasticity for import commodity is greater than 1 (elastic), while for domestic commodity is less than 1 (inelastic). This has implications that the expansion period of Indonesia will experience an increase in trade deficit if imports are not accompanied by an increase in exports.

Block of Export Demand

Based on the Schwarz information criterion and Hannan_Quinn Information criterion the optimal lag is VAR equations with order 1. Johansen cointegration test result shows two cointegrating vectors. The next step is determining the long run VAR structural model before analyzing the Impulse Response Function (IRF) by using likelihood ratio (LRT) test by imposing general restriction based on two cointegrating vectors resulted in the previous step to gain restriction that produce cointegration vector which has economic value. Restriction results that are over

identifying is resulted with p-value of 0.000013 which means that the null hypothesis is rejected in 1 percent significance level.

Restriction result having a economic meaning explains that there are 2 long-run equation as follows:

Long Run Equation of Demand for Export Agriculture Commodity

$$\begin{aligned} LC_N &= 9,94963 \text{ LREER}^* \\ &(-8,13362) \\ &+ 1,7533596 \text{ LP}_N^* \\ &(-7,06775) \\ &- 6,01285 \text{ LX_BIN}^* \\ &(-7,28) \end{aligned}$$

Long Run Equation of Demand for Export Non-Agriculture Commodity

$$\begin{aligned} LC_N &= 12,95412 \text{ LREER}^* \\ &(-9,0826) \\ &+ 2,26825 \text{ LP}_A^* \\ &(-6,70338) \\ &- 8,526646 \text{ LX_BIN}^* \\ &(8,39487) \end{aligned}$$

Where:

Entires in parentheses are *t-statistics*, LC_N is Demand for Export Non-Agriculture Commodity, LC_A is Demand for Export Agriculture Commodity, LREER is Real Effective Exchange Rate, LP_A is Export Price of Agriculture Commodity, LP_N is Export Price of Non-Agriculture Commodity, LX_BIN is Expenditer of World Consumption.

It is clear that the elasticity of long-run demand for export agricultural commodities and non-agricultural commodity has no economic meaning when is viewed from the sign of relationship and the coefficients. It is because Indonesia's export behaviour is not affected by the its demand side but the supply side. Indirectly, these

findings confirm the findings of Arthukorala and Reidel (1998) in Sugema and Simorangkir (2004) which states that the specifications of supply function for the export equation in developing countries is better to explain the export performance.

Short Run Analysis

Trade policy

This section has 2 goals: First, to analyse the impact of changes in the total expenditure to the demand for domestic commodities and imported commodities. Second, in this section it will also discuss the impact of changes in import prices of agricultural commodities and non-agricultural commodities on commodity demand. It also discuss the impact of a shock of real effective exchange rate on demand for commodities. Those two objective are important to understand how is the impact, when and how long the import tariffs application if the government wants to reduce import tariffs to meet domestic needs or to increase import tariffs to help domestic producers. In the post-New Order era this issues is considerable debate among economists in Indonesia, especially among the pro-liberalization with the structuralist who tends to protection. Analysis techniques meet the main question in this section is the Impulse Response Analysis and Causality Granger Test.

Impulse response analysis shows if there is shock in the form of decreased in total expenditures will lower all the demand for commodities in the next period. Besides it seems that the demand for imported commodities is more responsive to change (shock) the total expenditure compared to

the domestic commodity demand response to total expenditures shock.

The duration of the total expenditure shock impact on commodity demand is not much different. This shock is generally effective to influence the commodity demand for 15 periods (months) forward (for domestic agricultural and non-agriculture commodities as well as import agricultural commodity). After 15 periods, the demand of these three commodities will be returned to a new equilibrium.

Figure 1 through Figure 5 shows the shock impact of import non-agricultural commodity prices on demand for commodity. Impulse Response Analysis shows that in the event of a shock that lowers the price of imported non-agricultural commodities (such as a decline in the tariff or lower production costs in Indonesia trading partner countries) will increase the demand for imported commodities (agricultural and non agricultural) in the next period. But at the same period with declining import non-agriculture commodity prices it decrease demand for domestic agricultural commodities and increase demand for domestic non-agricultural commodities.

However Granger Causality test analysis showed that non-agricultural commodity prices only affect the demand for imported commodities both agricultural and non agricultural. Thus the implications of price shock in import non-agricultural commodity will provide positive externalities for the demand for import commodities (agricultural and non-agriculture), and relatively no impact on domestic commodity demand.

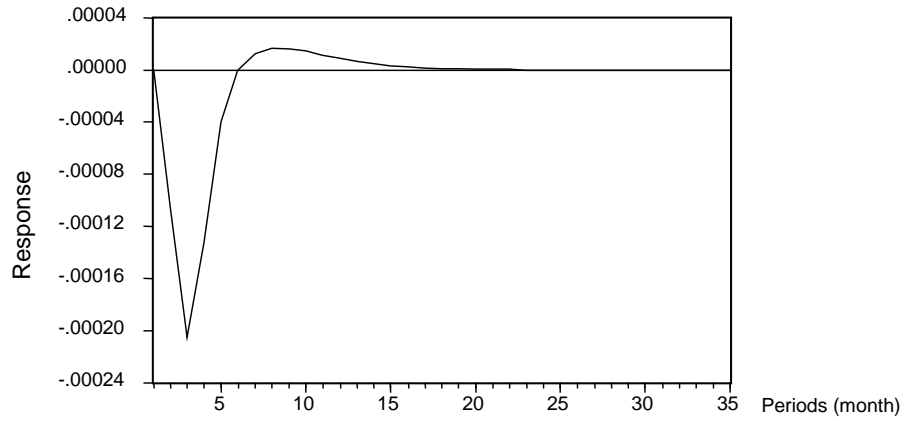


Figure 1: Response of Demand for Domestic Agriculture to Import Non-Agriculture Price Shock

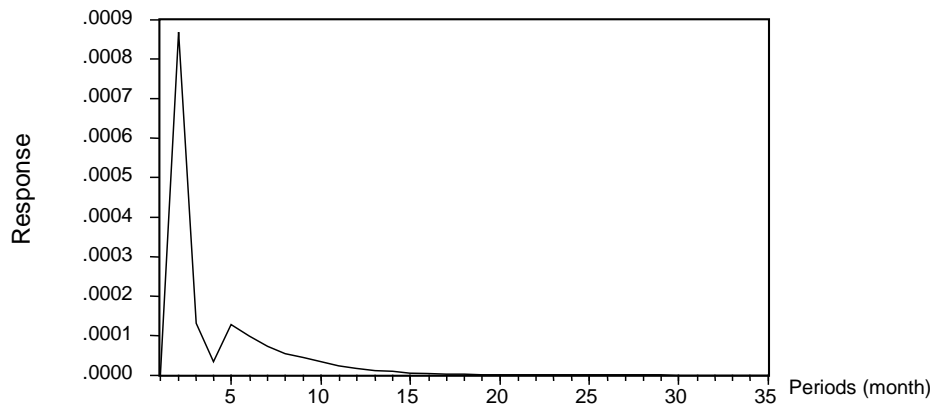


Figure 2: Response of Demand for Domestic Non-Agriculture to Import Non-Agriculture Price Shock

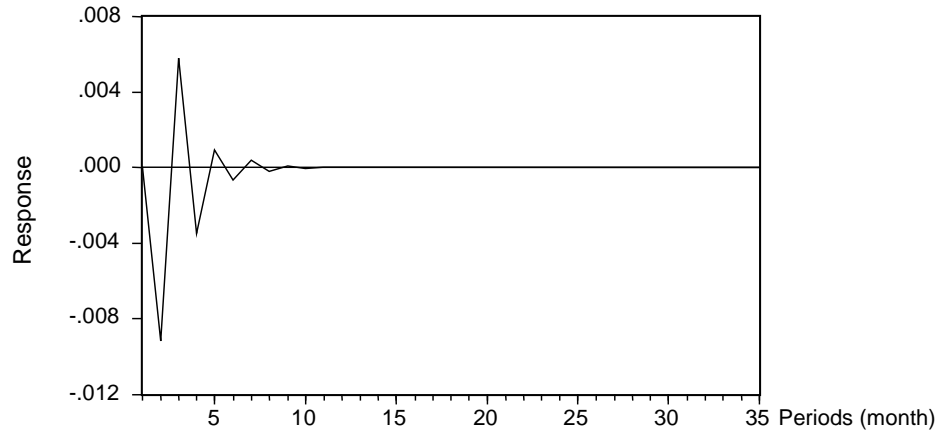


Figure 3: Response of Demand for Import Agriculture to Import Non-Agriculture Price Shock

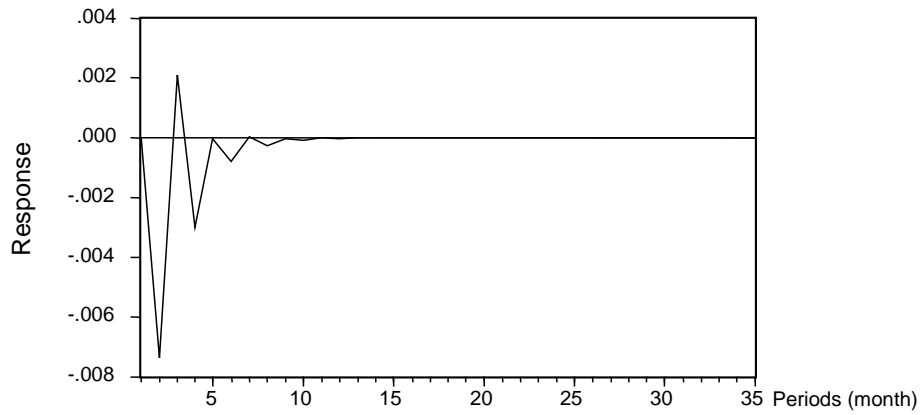


Figure 4: Response of Demand for Import Non-Agriculture to Import Non-Agriculture Price Shock

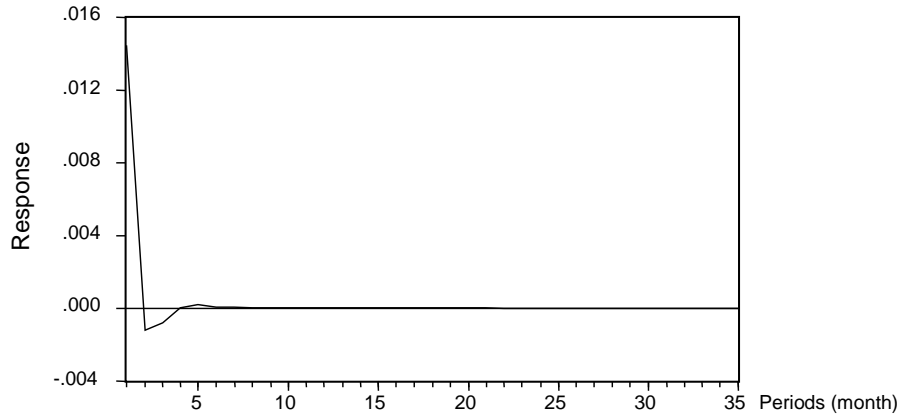


Figure 5: Response of Import Non-Agriculture Price to Import Non-Agriculture Price Shock

Short run impulse response analysis will show a different phenomenon to the situation in the long-run equilibrium. If there is a shock of real effective exchange rate (rupiah appreciation), at one period ahead will lead to an increase in demand for imported commodities. On the other hand, domestic exchange rate appreciation will result in reduced demand for domestic commodities in the same period. Nevertheless Causality Granger Test in block of commodity demand shows that real effective exchange rate only affects the demand for import agricultural commodities. Granger causality test results show that there is no feedback effects of imports agricultural commodities and non-agriculture to the real effective exchange rate.

Export

In contrast to the analysis of long-run equilibrium, short-run relationship between real effective exchange rate and export prices to the export volume has an economically relationship. Granger Causality test of real effective exchange rate and export prices to the export volume explains the empirical

facts as follows: First, a one-way causality between the export price (agricultural and non agricultural) to the real effective exchange rate. On the other hand there is no causality from the real effective exchange rate to the price of exports (agricultural and non agricultural). Graphic analysis of short-run impulse response shows when there is a shock to the export price of agricultural which lowers export prices of agricultural commodities are then seemed to lead to appreciation of the rupiah (Figure 6). It due to the decline in export prices of agricultural commodities will increase export demand, which in turn increase export revenue thus appreciation of rupiah. The same thing is appeared on the export price shock of non-agricultural commodity to the real effective exchange rate. The shock which causes a decrease in export prices of non-agricultural commodities will have an impact on the depreciation of the rupiah against foreign currencies (see Figure 7). Another important fact is that the impact of export price shock is only in a very short time i.e. only up to a 7 periods (months) ahead from the initial shock.

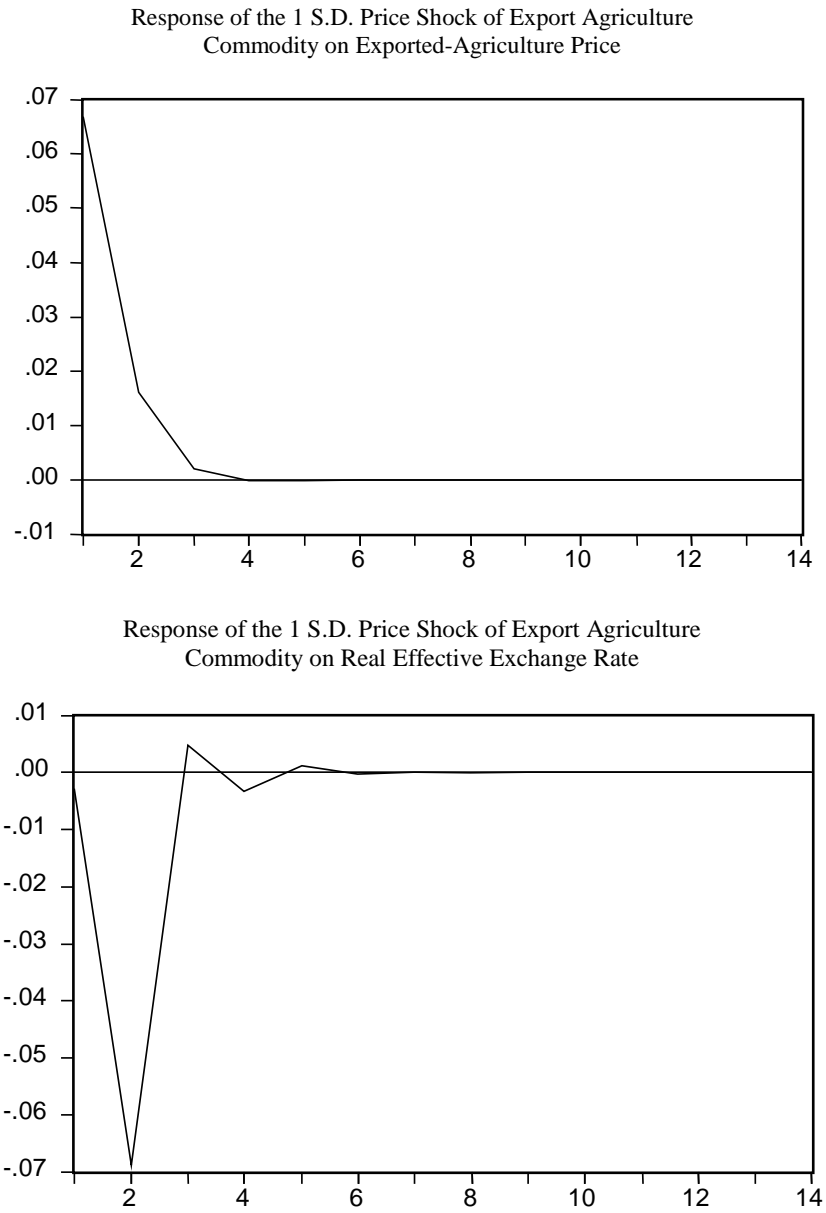


Figure 6: Impulse Response of the Price Shock of Export Agriculture Commodity on Real Effective Exchange Rate

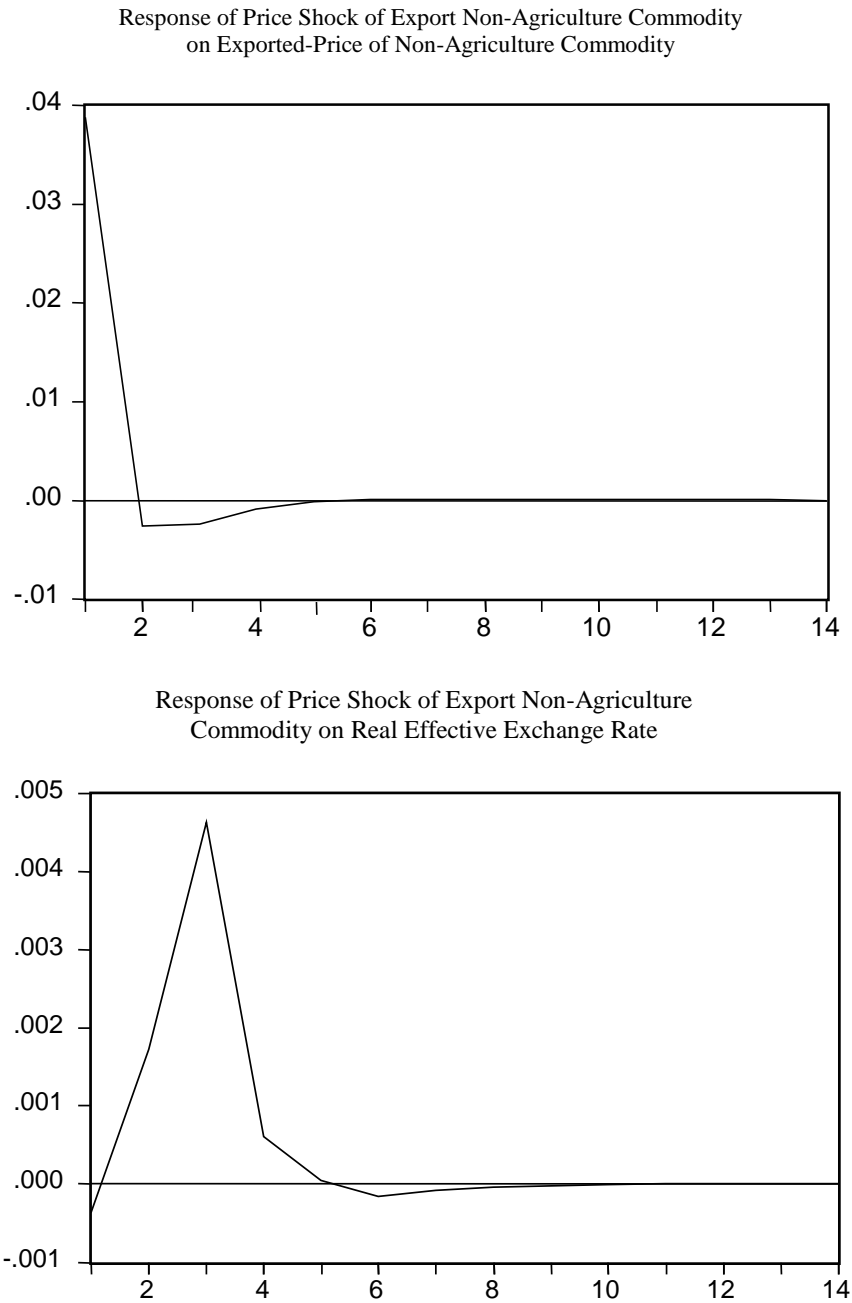


Figure 7: Impulse Response of the Price Shock of Export Non-Agriculture Commodity on Real Effective Exchange Rate

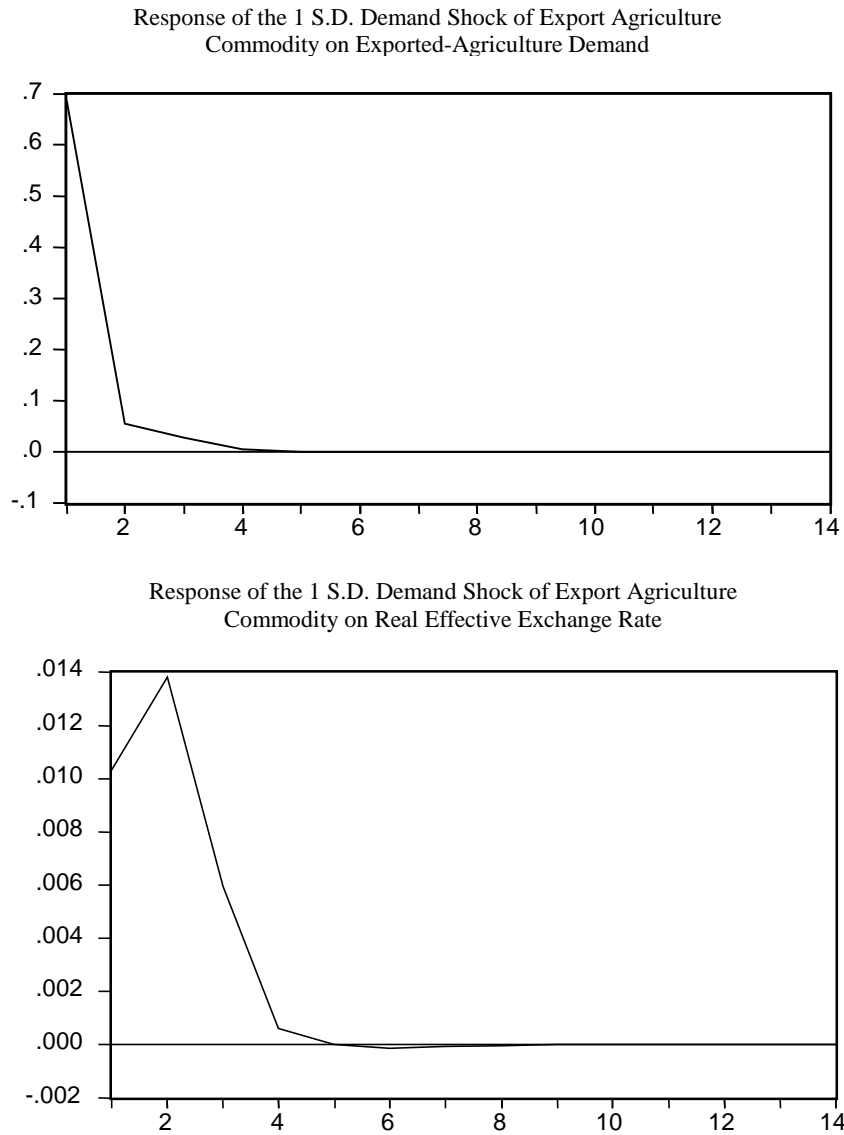


Figure 8: Impulse Response of Demand Shock of Export Agriculture Commodity on Real Effective Exchange Rate

Second, the real effective exchange rate does not affect exports (agricultural and non agricultural) but in contrast export demand (agriculture and non agriculture) affect the real effective exchange rate. From

the analysis of impulse response, the shock that causes a decrease in demand for agricultural exports will depreciate the value of the rupiah foreign currencies (Figure 8). The same thing when look at the graphic of im-

pulse response analysis of the demand shock the real effective exchange rate (Figure 9).
impact of non-agricultural commodities to

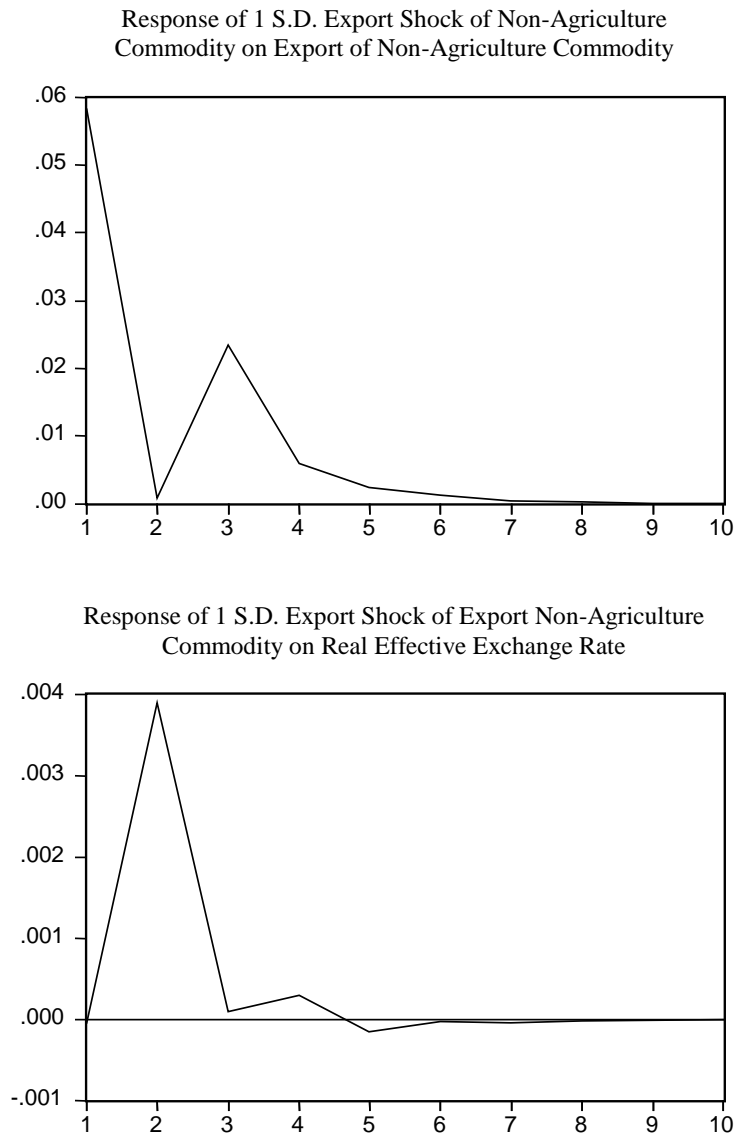


Figure 9: Impulse Response of Demand Shock of Export Commodity on Real Effective Exchange Rate

Figure 9 shows that real effective exchange rate depreciates until second period when demand of export commodity non agriculture downwards. Then when demand of commodity export non agriculture increases until the third period and at the same time real effective exchange rate experiences appreciation. From two chart in Figure 9 it is known that effective shock demand of export commodity on real effective exchange rate is very short time, only during 7 periods (months) forwards since the shock happened. A Granger Causality test also shows that real effective exchange rate of export price (agriculture and non agriculture) and world consumption do not have causality relation to demand of its export (agriculture and non agriculture). This finding strengthens indication that export Indonesia commodity is not defined by demand behaviour.

CONCLUSION

Conclusion and policy implication related to the demand behaviour (export, import and domestic commodities) in liberalisation era on a long term is as follows: Firstly, cross price elasticity between demands of non domestic agriculture commodity to price of imported non agriculture has lower magnitude (absolute value) compared its own price elasticity of demand of commodity non domestic agriculture. This implies that pricing policy to imported non agriculture commodity will have smaller effect to demand of domestic non agriculture commodity compared to this of domestic non agriculture commodity. It indicates that higher trade protection such as higher import tariff would have negative effect on demand of domestic non agriculture commodity which in turn harm domestic producer.

Secondly, the elasticity of household consumption to demand of imported commodities is larger compared to demand of domestic commodities. The elasticity for import commodities is more than 1 (elastic) while for domestic commodities is less than 1 (inelastic). This implies Indonesia period of expansion that will experience trade deficit if increase of import not be accompanied with increase of export.

Third, real effective exchange rate has positive co-movement with demand of import commodity (agriculture and non agriculture) and domestic agriculture commodity. Domestic currency depreciation hence will increase demand of domestic import commodity and agriculture commodity. On contrast, real effective exchange rate has negative co-movement to demand of non domestic agriculture commodity. It explain that rupiah depreciation reduces demand for non domestic agriculture commodity.

While conclusion and policy implication referring to the demand behaviour (export, import and domestic commodity) in liberalisation era in short-run is as follows: real effective exchange rate of export price (agriculture and non agriculture) and world consumption do not have a causality relation to demand of its export (agriculture and non agriculture). This finding strengthens indication that Indonesia export commodity is not determined by demand behaviour. Because export is not defined by its demand aspect (fluctuation in exchange rate, the export price and world consumption) then improvement in competitiveness of domestic products can be reached by increasing productivity, efficiency, infrastructure investment, and human resource development.

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