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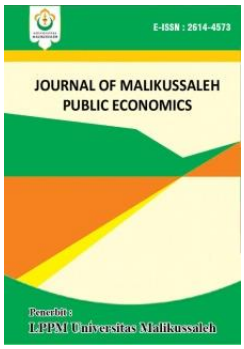
# Effects of Imports of Main and Processed Raw Materials for the Foods and Beverages Industry on Economic Growth In Indonesia

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**ARTICLE INFORMATION** **ABSTRACT**

***Keywords:***
***Imports of Main Raw Materials, Imports of Processed Raw Materials, Economic Growth and Vector Autoregression (VAR).***

The purpose of this study is to analyze the relationship between Imports of Main Raw Materials and Processed Materials for Industry to Indonesian Economic Growth. This study uses secondary data in the year 1997-2015 obtained from BPS (Central Bureau of Statistics) Indonesia. Data are analyzed using Vector Autoregression (VAR) with Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD). The results of the study indicated that there were Co-interrelations of each variable to the variable itself and other variables. Variable Imports of Primary Raw Materials had the most effective effect in the short run on Economic Growth, while the variable Imports of Processed Raw Materials had the most effective effect in the long run on Economic Growth

## 1. INTRODUCTION

The study of food and beverage raw materials industry becomes likely common discussion in some research. This study focus on the main processed types of foods and beverages. Besides foods and beverages are kinds of basic needs in Indonesia. Therefore, the title is considered important because there are very few research regarding this. Then to see the number of imports of main and processed raw materials for the foods and beverages industry in Indonesia and the rate of economic growth, we can see in table 1 below:

**Table 1**
**Imports of main raw materials and processed materials for industry and Indonesia's economic growth in 2012-2016**

| No | Year | Impor Utama (US Dollar) | Impor Olahan (US Dollar) | PE (%) |
|---|---|---|---|---|
| 1 | 2012 | 4101.00 | 3349.30 | 6.03 |
| 2 | 2013 | 4354.40 | 3685.20 | 5.58 |
| 3 | 2014 | 4935.40 | 3247.10 | 5.02 |
| 4 | 2015 | 4100.20 | 2730.40 | 4.79 |
| 5 | 2016 | 4426.40 | 3460.20 | 5.02 |

Source: Indonesian Central Statistics Agency 2017

From table 1 above we can see that Indonesia's economic growth has fluctuated, as well as the baseline of costs spent on imports of main raw materials and processed materials for the foods and beverages industry in Indonesia. In 2013 to 2014 the accumulation of imports of primary and processed raw materials for the foods and beverages industry has decreased but a decline

in the percentage of economic growth has also occurred. If imports decline then economic growth will increase. In the year 2015 to 2016 where the accumulation of imports of main raw material industries increase in line with economic growth, if imports increase then economic growth decreases.

This study intends to see how far the influence of the import of main and processed raw materials for the foods and beverages industry on economic growth in Indonesia. Previous studies used multiple linear regression while in this study uses Vector Autoregression (VAR) as a data analysis method.

The remainder of this paper will be filled in by the following sections: the second part is discussing theoretical reviews, the third part is a research method, the fourth part discusses the findings and research implications. The fifth section contains conclusions and policy recommendations.

## 2. THEORITICAL REVIEW

### International Trade

International trade has a direct link with international economic activities. International economics that discusses about economic interdependence between countries in the world, in terms of international trade and international credit markets.

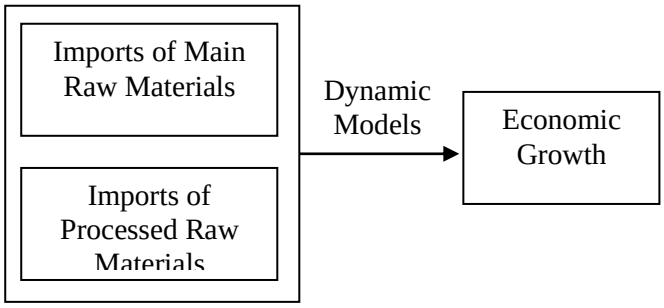
### Import

Import is a process of buying goods and services from abroad into the country. This study highlights the import of main and processed raw materials for foods and beverages industry in Indonesia. The relationship between imports and economic growth has a negative correlation meaning that when imports increase, economic growth decreases or vice versa (Syaparuddin, N. 2017).

### Economic Growth

Economic growth is a process of increasing output in the long run. Economic growth can also be interpreted as an increase in GDP / GNP. The increase is regardless of whether the increase is greater or smaller than the rate of population growth, and also changes to the economic structure as stated of Boediono in (Almuthmainnah, 2016).

### Conceptual Framework




**Picture 1**
**Conceptual Framework**

Figure 1 shows that the reserch wants to know the effect of import of main and processed raw materials for industry as an independent variable on economic growth as a dependent variable.

### Research Hypothesis

(Sugiyono, 2009) states that the hypothesis is a temporary allegation of the question of the problem formulation. The temporary nature of the hypothesis can be changed, according to the current conditions of the study. The alternative hypotheses in this study are as follows:

$H_0$ : The main and processed raw materials do not affect the economic growth in Indonesia in the short and long run.

$H_1$ : The main and processed raw materials have effect on economic growth in Indonesia in the short and long run.

## 3. RESEARCH METHODS

### Data and Data Sources

This research uses time series data. Time series data is data that is chronologically arranged according to time used to see the effect in a certain time span (Kuncoro 2007).

The number of observations is 16, namely from 2001-2016. Researchers use data sourced

from the Central Bureau Statistics (BPS) and other sources

**Data analysis method**

To analyze the effect of imports of main and processed raw materials for the foods and beverages industry on economic growth in Indonesia. The study uses a multivariate vector autoregression (VAR) model with a dynamic regression test sequence.

a. Stationarity Test
b. Determination of lag length
c. Granger causality test
d. VAR estimation
e. VAR Stability Testing
f. Impulse Respons
g. Variance Decomposition

**Stationary Test**

Stationarity test for data in research using dynamic models is very important as the reason for avoiding spurious regression in estimating a model (Puspita, 2017). This stationarity test is also often called the unit root test. In this study the unit root test will be conducted with the Augmented Dikey Fuller method.

To see the stationary data or not we can test it on several levels, if the data is not stationary at the level (0) then the stationary test can be reduced to first Different (1). If the first different data is still not stationary. The stationary test is carried out in Seccond Different (2) (Masta, 2014). The requirement for using VAR is if the stationary data is in the same order.

**Determination of Optimum Lag**

The second step in the VAR analysis is determining the optimum lag. Determination of the number of lags in the VAR model is determined by the information criteria recommended by the smallest value of Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn (HQ). The Eviews program has provided asterisks for lags that are specified as optimum lags.

**Granger Causality Test**

The method used to analyze the causality relationship between the observed variables is the Granger causality test. In general, a granger equation can be interpreted as follows:

1. Uninderectional causality from the dependent variable to the independent variable. This happens when the lag coefficient of the dependent variable is statistically and significantly different from zero, while the lag coefficient of all independent variables is equal to zero.
2. Bilateral causality if the lag coefficient of all variables, both the dependent variable and the independent variable are statistically and significantly different from zero.
3. Independence if the lag coefficient for all variables, both the dependent and independent variables are not statistically different from zero.

Decision making in the causality test can be done by comparing the estimated t-statistic value with the t-table value or by looking at the F-statistical probability value. If the estimated t-statistic value is greater than the t-table value or the F-statistic probability value <ά = 5%.

**Vector Autoregression (VAR) Estimation**

In the estimation of VAR, to see whether the variable Y affects X and vice versa, it can be seen by comparing the t-statistic of the estimation results with t-table. If the t-statistic is greater than the t-table value, it can be said that the Y variable affects X. The VAR equation in this study is as follows:

$PE_t = \alpha + \sum_{i=1} \beta_1 PE_{t-1} + \sum_{i=1} \beta_2 \text{Ln ImpBBU}_{t-I} + \sum_{i=1} \beta_3 \text{Ln ImpBBO}_{t-i} + et$

$\text{Ln ImpBBU}_t = \alpha + \sum_{i=1} \beta_1 \text{Ln ImpBBU}_{t-I} + \sum_{i=1} \beta_2 PE_{t-1} + + \sum_{i=1} \beta_3 \text{Ln ImpBBO}_{t-i} + et$

$\text{ImpBBO}_t = \alpha + \sum_{i=1} \beta_1 \text{Ln ImpBBO}_{t-I} + \sum_{i=1} \beta_2 PE_{t-1} + \sum_{i=1} \beta_3 \text{Ln ImpBBU}_{t-I} + et$

Information :

PE = Indonesian Economic Growth
ImpBBU = Import of Main Raw Materials
ImpBB0 = Import of Processed Raw Materials
β1, β2, = Regression Coefficient (Parameter)
et = Error term

**VAR Stability Testing**

VAR Stability Test is performed to see whether or not the VAR estimation that has been done by VAR condition stability check is in the form of polynominal root of characteristic. A VAR estimate is said to be stable if all its roots have a modulus less than 1, but if all of its roots have a modulus that is greater than or equal to 1 then the VAR estimate that has been done is not stable. (Gujarati, n.d.).

**Impulse Response Analysis**

The ordering of variables based on the Cholesky factorization is done by backing up variables that have predictive values for other variables that are placed in front of each other side by side. While the variable that has no predictive value to other variables is placed at the back.

**Forecast Error Variance Decomposition (FEVD) Analysis**

Variance decomposition which details the variance of forecast error to become components can be linked to each endogenous variable in the model. Calculating the percentage of squared prediction error in the future stages of a variable due to innovation in other variables. This can be seen how much the error in forecasting the variable which is caused by the variable itself and other variables.

In the next step, the writer will estimate the data using Vector Autoregration.

## 4. RESEARCH AND RESULTS DISCUSSION

**Stationary Test**

Unit Root Test Results with the method (ADF) can be seen in the following table 2: Information

**Table 2**
**Unit Root Test Table**

| Variabel | Unit Root | ADF Test Statistic | Critical Value 5% | Prob ADF | Information |
|---|---|---|---|---|---|
| Economic Grwth | Level | -2.957488 | -3.081002 | 0.0622 | No |
| | First Diff | -4.598621 | -3.098896 | 0.0035 | Stasionary |
| | Second Diff | -3.751682 | -3.212696 | 0.0223 | Stasionary |
| Import Main Ingredient | Level | -0.921156 | -3.081002 | 0.7518 | No |
| | First Diff | -4.355485 | -3.119910 | 0.0060 | Stasionary |
| | Second Diff | -6.897172 | -3.144920 | 0.0002 | Stasionary |
| Import Processed Materials | Level | -0.540178 | -3.081002 | 0.8570 | No |
| | First Diff | -3.406625 | -3.098896 | 0.0292 | Stasionary |
| | Second Diff | -4.921440 | -3.119910 | 0.0024 | Stasionary |

**Source: Processed Data, 2018**

From table 2 above we can see that Economic Growth reaches stationary in First Difference 1 (I) and Second Difference II (2) using constant regression (Intercep) at the levels of 1%, 5% and 10%. Imports of Main Raw Materials for Foods and Beverages Industry are stationary in First Different 1 (1) and Seccond Different II (2) using constant regression (intercept) at the significant levels of 1%, 5% and 10%. Then for the Imports of Processed Raw Materials for the stationary Foods and Beverages Industry are stationary at First Different I (1) and Second Different II (2).

**Lag Length Creterion**

We can see the Optimum Lag Test Results in the following table:

**Table 3**
**Optimum Lag Test**

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -234.2373 | NA | 1.05e+11 | 33.89104 | 34.02798 | 33.87837 |
| 1 | -212.9315 | 30.43682* | 1.90e+10* | 32.13308 | 32.68084* | 32.08237 |
| 2 | -202.5913 | 10.34019 | 2.01e+10 | 31.94162* | 32.90021 | 31.85289* |

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

**Source: Processed Data, 2018**

Based on table 3 above, the optimum lag value in the study is in lag one. Where in this lag the lowest values of the LR, FPE (Final prediction

error) and SC (Schwarz information criterion) while the AIC (Akaike information criterion) value and the Hannan-Quinn (HQ) value lies in lag 2. The highest number of stars is in Lag 1 which we can then conclude that the optimum lag is in lag 1.

**Granger Causality**

Granger Causality Test is intended to determine whether a variable relationship occurs reciprocal or not (Masta, 2014).

**Table 4**
**Granger Causality Results**

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|---|---|---|
| IMP_UTAMA does not Granger Cause PE | 15 | 0.35769 | 0.5609 |
| PE does not Granger Cause IMP_UTAMA | | 2.04895 | 0.1778 |
| IMP_OLAHAN does not Granger Cause PE | 15 | 0.09669 | 0.7612 |
| PE does not Granger Cause IMP_OLAHAN | | 1.26992 | 0.2818 |
| IMP_OLAHAN does not Granger Cause IMP_UTAMA | 15 | 6.62120 | 0.0244 |
| IMP_UTAMA does not Granger Cause IMP_OLAHAN | | 0.27511 | 0.6095 |

**Source: Processed Data, 2018**

From table 4 above we can see that the Import of Main Material does not have a relationship to economic growth, and vice versa. Then the main raw material of import does not have a relationship to economic growth, and vice versa. The Import of Processed Raw Materials has a relationship to the Main Import of Raw Materials but not the Main Import to the Processed Import.

Thus we can conclude that in this research there is no causality or Granger Causality. Decision making is done by looking at each variable has a significant two-way relationship at the level of 5% (Probability> 0.05).

**Vector Autoregression (VAR) Estimation Results**

Vector Autoregressin (VAR) estimation is done to determine a good model and in order to determine projections, where the results taken are based on a significant level of error tolerance α = 0.05, that is by comparing t-counts with t-tables (1.74588).

**Table 5**
**Vector Autoregression Estimation Results**

| | DDPE | DDIMP_UTAMA | DDIMP_OLAHAN |
|---|---|---|---|
| DDPE(-1) | 0.560049 | 312.6014 | 331.6388 |
| | (0.25599) | (188.839) | (187.683) |
| | [ 2.18781] | [ 1.65538] | [ 1.76701] |
| DDIMP_UTAMA(-1) | -0.000280 | 0.111666 | 0.012369 |
| | (0.00036) | (0.26907) | (0.26742) |
| | [-0.76681] | [ 0.41501] | [ 0.04625] |
| DDIMP_OLAHAN(-1) | 0.000252 | 0.811185 | 0.744430 |
| | (0.00043) | (0.31764) | (0.31569) |
| | [ 0.58555] | [ 2.55380] | [ 2.35808] |
| C | 2.662614 | -495.9721 | -1148.130 |
| | (1.14911) | (847.691) | (842.501) |
| | [ 2.31711] | [-0.58509] | [-1.36276] |

**Source: Processed Data, 2018**

From table 5 above we can see that the Economic Growth has a positive and significant effect on economic growth, then Economic Growth has no significant and positive effect on the Import of Main Raw Materials and Economic Growth has a positive and significant effect on the Import of Processed Materials.

Then the Main Import has a negative effect on Economic Growth, the Main Import has a positive and insignificant effect on the Main Import, and the main Import has a positive and insignificant effect on the processed import.

Processed import has a positive and not significant effect on economic growth, Processed Imports have a positive and significant effect on Main Imports and Processed Imports have a positive and significant effect on Processed Imports.

**Vector Autoregression Stability Test**

The following are the results of VAR estimations that have been made which are then presented in table 6 below:

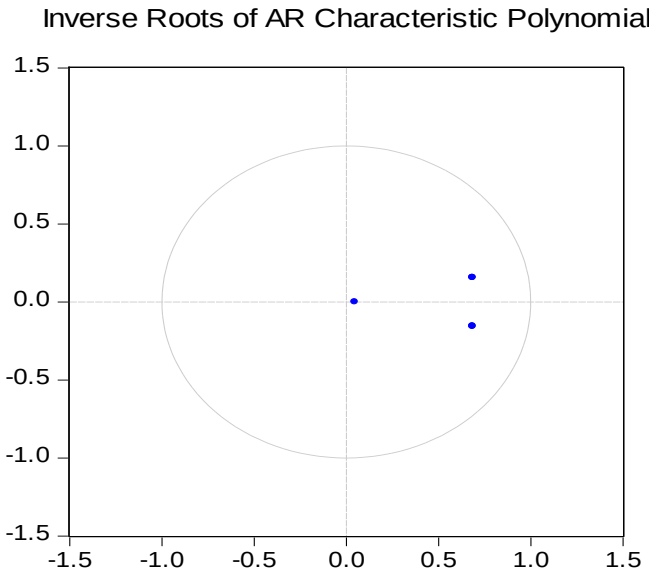
**Table 6**
**VAR Stability Test**

| Root | Modulus |
|---|---|
| 0.685390 - 0.156273i | 0.702980 |
| 0.685390 + 0.156273i | 0.702980 |
| 0.045365 | 0.045365 |

**Source: Processed Data, 2018**

From table 6 above it can be seen that there are no root characteristic and modulus values in excess of 1. This indicates that the Vector Autoregresion Test can be said to be stable.

Apart from the table above, we can also see the VAR stability test from the following figure:



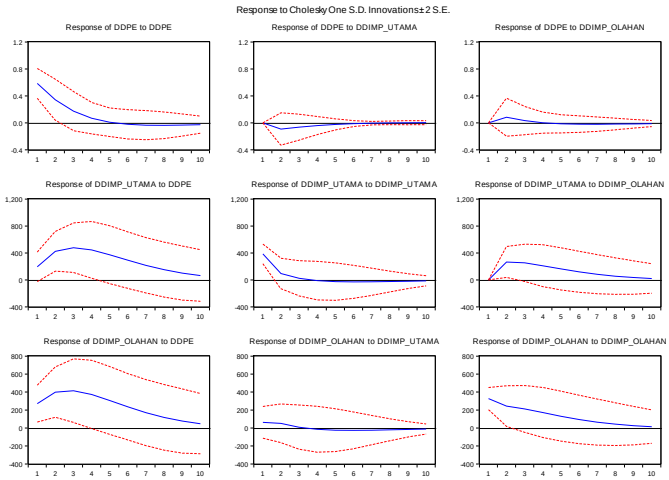

**Source: Processed Data, 2018**

**Figure 2**
**Vector Autoregression stability**

From Figure 2 above we can see that no point passes through the circle, this indicates that the Vector Autoregression Test is stable

## Inpulse Response

In research during the research period, which we can then see in Figure 3 as follows:




**Source: Processed Data, 2018**

**Figure 3**
**Impulse Response**

Based on Figure 3 above the results of the Impuulse Response, we can see that the response to economic growth has fluctuated up to the fifth year since the shock of the economic growth itself. Then it takes 4 years to stabilize due to the shock of the import of primary raw materials. As well as taking 4 years to stabilize the shock of the Import of Processed Materials.

The Import of Processed Materials takes more than 10 years to stabilize due to shocks from the economic growth. Then the processed material import takes 3 years to stabilize due to interference with the Main Import. It takes 9 years for the Processed Import to stabilize due to shocks from the processed import variable itself.

## Analysis of Variant Decomposition

Variance Decomposition is also useful for predicting the contribution of the percentage of variance for each variable due to changes in certain variables in the VAR system (Masta, 2014).

**Table 7**
**Variance Decomposition**
**Economic growth**

| Variance Decomposition of DDPE: Period | S.E. | DDPE | DDIMP_UTAMA | DDIMP_OLAHAN |
|---|---|---|---|---|
| 1 | 0.585329 | 100.0000 | 0.000000 | 0.000000 |
| 2 | 0.689088 | 96.78200 | 1.788791 | 1.429213 |
| 3 | 0.714263 | 95.96109 | 2.490901 | 1.548012 |
| 4 | 0.718660 | 95.69000 | 2.780505 | 1.529491 |
| 5 | 0.719239 | 95.54789 | 2.882971 | 1.569137 |
| 6 | 0.720012 | 95.44461 | 2.905238 | 1.650150 |
| 7 | 0.721213 | 95.36707 | 2.900421 | 1.732510 |
| 8 | 0.722417 | 95.31341 | 2.890918 | 1.795676 |
| 9 | 0.723354 | 95.27970 | 2.883740 | 1.836562 |
| 10 | 0.723973 | 95.26037 | 2.879712 | 1.859923 |

**Source: Processed Data, 2018**

From table 7 above we can see at first the economic growth variable is strongly influenced by economic growth itself, this can be seen from the amount of its contribution which is 100 percent. Where other variables have not yet given a shock to economic growth. However, in the following year the contribution of other variables in the study begin to influence even though the proportion was still very small, namely 2 percent to 3 percent for the import of main raw materials. Whereas the contribution of processed materials is smaller, that is, only 1 to 2 percent.

This indicates that the variable of economic growth is very dominant, meaning that other variables in the study do not have a significant influence on economic growth during the study period.

**Table 8**
**Primary Import Variance Decomposition**

| Variance Decomposition of DDIMP_UTAMA: Period | S.E. | DDPE | DDIMP_UTAMA | DDIMP_OLAHAN |
|---|---|---|---|---|
| 1 | 431.7937 | 20.13103 | 79.86897 | 0.000000 |
| 2 | 667.6236 | 48.85479 | 35.38416 | 15.76105 |
| 3 | 859.0937 | 60.38917 | 21.44293 | 18.16791 |
| 4 | 989.8311 | 65.63487 | 16.16397 | 18.20116 |
| 5 | 1070.622 | 68.24285 | 13.87455 | 17.88260 |
| 6 | 1116.531 | 69.57634 | 12.82993 | 17.59373 |
| 7 | 1140.589 | 70.24674 | 12.35714 | 17.39612 |
| 8 | 1152.179 | 70.56728 | 12.15414 | 17.27858 |
| 9 | 1157.270 | 70.70907 | 12.07483 | 17.21610 |
| 10 | 1159.276 | 70.76540 | 12.04818 | 17.18641 |

**Source: Processed Data, 2018**

From table 8 above we can see that the main Import Raw Material at the beginning was still strongly influenced by the variable of imports themselves at 79.8 percent and economic growth at 20.13 percent. However, in the following year, the contribution is significantly reduced to only 35 percent. The distribution of imports of main raw materials in the following year tends to be small and the imports of processed materials for the distribution of variants fluctuate, while the distribution of variants in variables of economic growth is getting stronger and even greater even by 70 percent.

This indicates that in the import affect economic growth is still very dominant, meaning that the main import variables do not have a significant contribution to economic growth.

**Table 9**
**Import Variance Decomposition**
**Processed Raw Materials**

| Variance Decomposition of DDIMP_OLAHAN: Period | S.E. | DDPE | DDIMP_UTAMA | DDIMP_OLAHAN |
|---|---|---|---|---|
| 1 | 429.1504 | 39.90824 | 2.123595 | 57.96816 |
| 2 | 636.1125 | 57.37694 | 1.617649 | 41.00541 |
| 3 | 788.6130 | 65.05093 | 1.064975 | 33.88409 |
| 4 | 889.0081 | 68.73897 | 0.865306 | 30.39572 |
| 5 | 949.3775 | 70.61990 | 0.825595 | 28.55451 |
| 6 | 982.8329 | 71.58784 | 0.842447 | 27.56971 |
| 7 | 999.9274 | 72.07118 | 0.871721 | 27.05710 |
| 8 | 1007.942 | 72.29842 | 0.896974 | 26.80460 |
| 9 | 1011.356 | 72.39632 | 0.914189 | 26.68949 |
| 10 | 1012.651 | 72.43372 | 0.924300 | 26.64198 |

**Source: Processed Data, 2018**

From Table 9 above we can see that the contribution of processed material import variants is 57.96 percent and main material imports by 2.12 percent and economic growth by 39.90 percent. In the following year, the contribution tends to fluctuate, even in the 10th year, the contribution is 26.64 percent. While other variables, namely the import of main raw materials, the contribution of variants also fluctuated, up to the 10th year, the contribution is very small at 0.92 percent. Then the variable of economic growth has a very large and stable contribution even up to the 10th year with a contribution of 72.43 percent.

From the description above we can see that the contribution of economic growth is the most dominant and stable in the testing program. This indicates that the imported processed material does not provide significant shocks to economic growth.

From the three tests above we can see that the variable of economic growth is very stable, the contribution of the variant. So it can be concluded that other variables in the study do not provide significant shocks in the study period.

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**Discussion**

**Relationship of import of main raw materials to economic growth**

Based on the testing that has been done, it can be concluded that the Import of Main Raw Materials has a negative correlation on economic growth. This is consistent with the theory which states that if imports increase, economic growth decreases. The processed import is purchased by using foreign currencies when foreign currencies are used in transactions, it will reduce a country's foreign exchange reserves. When foreign exchange reserves decline, economic growth also decreases.

The results of this study are also in line with research conducted by (Ayunia Primadayanti, 2012) in a study entitled The Effects of Exports, Imports and Exchange Rates on Economic Growth in Indonesia in the Period of 2002-2012 with the results of research on Exports have a positive effect on economic growth, Imports have a negative effect on economic growth in Indonesia.

**The Relationship of Processed Raw Material Imports to Economic Growth**

In the Vector Autoregression estimation that has been done, the results show that the Import of Processed Raw Materials and their effects on Economic Growth have an in-significant and positive correlation on Economic Growth. This is consistent with research conducted by (Ismadiyanti Purwaning Astuti, 2018) with the title Effect of Exports and Imports on Economic Growth in Indonesia. It shows that exports have a positive and significant effect on economic growth while Imports have a positive and insignificant effect on Economic Growth.

**Results of Inpulse Response Analysis**

The Import Variable of Processed Materials takes more than 3 to 10 years to stabilize due to the shock given by the Economic Growth and the Import of the Main Raw Material during the research period.

## 5. CONCLUSIONS AND SUGGESTIONS

**Conclusions**

Based on the results of research conducted, researchers can draw conclusions as follows :

1. Import of main raw materials for the foods and beverages industry in Indonesia has a negative correlation to economic growth thus, it can be concluded that Ha is accepted and H0 is rejected. Then the impulse response takes 3 to 10 years to regain stability due to shocks caused by other variables in the study.
2. Imports of processed raw materials for the foods and beverages industry in Indonesia have an insignificant and positive correlation on economic growth in Indonesia during the study period.
3. Then based on inpulse response, it takes 3 to 10 years to regain stability due to shocks caused by other variables in the study.

**Suggestion**

Based on the results of processing data and with all the limitations that exist in this study there are some suggestions and contributions given as follows:

1. Researchers interested in this field are advised to take longer time to be vulnerable and add other variables so that they can provide better results on Economic Growth in Indonesia.
2. It is recommended to the government to make economic growth a policy priority in Indonesia. As well as making a regulation to reduce imports so that the goverment can promote utilization existing resources in Indonesia as the main raw materials in the foods and beverages industry in Indonesia.

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