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# Impact of Trade Liberalization Asean-China Free Trade Area (ACFTA) on the Performance of Indonesia Maize Economy

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### **ABSTRACT**

This study aims to analyze the impact the ASEAN-China Free Trade Area (ACFTA) agreement on performance of Indonesia maize economy and to find out alternative policies within the maize self-sufficiency framework. This research uses an econometric model with a simultaneous equations system. Parameter estimation used is Two Stages Least Squares (2SLS). Forecasting the performance of Indonesia maize economy and the search for policy alternatives in 2010-2015 ACFTA eras is performed using ex ante simulation. The implementation trade liberalization agreements of ASEAN-China Free Trade Area (ACFTA) have negative impact on Indonesia maize economy. Indonesia does not have a policy package that can be used as a policy instrument for Indonesia maize self-sufficiency. Effective policy is to ban the import, but IT is difficult to do because contradict with ACFTA agreement. If Indonesia 'should' make maize self-sufficiency, then the policy that needs to be done is policies combination to increase acreage of 6.29% per year, to increase productivity 3.5%, and to increase raise maize prices by 4:47% through price subsides.

**Keywords**: ASEAN-China Free Trade Area (ACFTA), maize, simulation

### INTRODUCTION

In Indonesia, maize has a very strategic role, especially for the farm development and other industries. In past, maize was mainly used as staple. However, maize mainly was used as an industrial material. In line with the rapid growth of livestock industry, it is estimated more than 55% of domestic maize needs is used for feed, while for food consumption is only about 30%, and the remainder for other industrial needs and seeds.

Currently, the development of maize production can not meet high demand. Therefore, the government meets the shortage of these needs through imports. For 2010 forecast figures, with area of 3 million ha of crops, it is estimated to produce 12.1 million tons. Meanwhile, maize demand in the country reached 13.8 million tons, resulting in a shortage about 1 million ton to be imported. If the import increment increase was not controlled, it will cause a reduction in foreign exchange, and can lower the domestic maize price, where the price was relatively low. Based on these facts, the government is trying to meet the domestic maize need through maize self-sufficiency program.

Maize self-sufficiency effort must be directed to environmental factors, both international and internal environments that exist in Indonesia. In line with the development of world economy, maize commodity will face a different environment. The international and domestic changes will affect performance of Indonesia maize. The international environment change is liberalization of trade, with agreement on the treaty AFTA (Asean Free Trade Area) and WTO (World Trade Organization). Trade liberalization is carried on agricultural commodities, including maize. Distortions and trade restrictions will definitely be reduced and eventually disappear. Then, trade liberalization in ASEAN expanded to include an agreement with China through the ASEAN-China Free Trade Area (ACFTA) in 2010 for all ASEAN member countries.

Based on this fact, it is necessary to study the maize self-sufficiency policy scenarios in era ASEAN-China Free Trade Area (ACFTA). With ACFTA agreement, maize self-sufficiency efforts in Indonesia face serious problems. ACFTA (ASEAN-China Free Trade Area) Agreement has agreed on tariff reduction and elimination of barriers between ASEAN countries and China, including maize trade. Maize self-sufficiency policy needs to consider the impact of regional agreements with the ACFTA member countries. It is important because someday the maize trade liberalization will raises the question whether these conditions will encourage the production and promotion of Indonesia maize exports, or even enhance Indonesia's imports.

Therefore, the problem of this research are: (1) how the impact of ACFTA agreement on the performance of maize Indonesia economy, (2) what are alternative policies that must be done to achieve maize self-sufficiency in ACFTA era.

#### MATERIALS AND METHODS

### The impact of ACFTA to China and ASEAN

Many studies have analyzed the impact of regional free trade between ASEAN and China, or also so-called ACFTA. Most studies have estimated that ACFTA will stimulate the economies of member countries through reduction of trade barriers and transaction costs, thus promoting the development of bilateral trade. Danupon Ariyasajjakorn, et al [1] examines the impact of free trade agreements on distribution of income ASEAN members. The results showed the impact of trade liberalization will stimulate each country to enhance comparative advantage. Zhaoyong Zhang and Ow Chin Hock [2] examined the correlation between international trade and foreign direct investment (FDI) among ASEAN countries, China and America obtained changes pattern of the ASEAN countries which led to increase comparative advantage. Although ASEAN and Chinese economies will differ significantly in economy size, it appears that China's trade dependence on ASEAN countries are relatively larger. As a result, China's imports to ASEAN countries is much larger compared to ASEAN countries exports to China.

Chirathivat [3] examined the economic feasibility of ACFTA in ASEAN perspective, using a CGE model. It was found that the establishment of ACFTA will increase GDP growth of China 0.36 percent (U.S. \$ 298.6 billion) and ASEAN 0.38 percent (U.S. \$ 178.7 billion). In short term, ACFTA will lead to structural adjustments in some manufacturing industries in which ASEAN economies have a smaller comparative advantage relative to China. But in the long run, these competitive pressures will force the ASEAN countries to make more capital investment of labor, physical capital and technological improvements

Ahearne *et al.* [4] states the trade relations between China and other countries in Asia are growing, both in aggregate and sectorial levels. At aggregate level, ASEAN's relations with China are complementary. Export growth is driven by common factors such as global growth. In addition, the rapid growth of China itself is an important opportunity for ASEAN countries, especially with the ACFTA tariff reductions among the member countries can make products import of non-members countries become less competitive. Some researchers have found that as a result of bilateral agreements, ASEAN countries will decrease their welfare, because labor costs is lower in China. Cheaper Chinese products will have a negative effect on total welfare of ASEAN countries, at least in some important sectors in ASEAN countries [5].

The study results of Lu [6], in which compare agricultural products from China and ASEAN, concluded that most agricultural products from the two sides complement each other, so that ACFTA will promote the exports of most agricultural products of China, except for vegetables and fish. However, Rong and Yang [7] found that agricultural products from both sides more competitive. Jun Yang *et.al.* [8] conducted a study the impact of ACFTA on economic development and agricultural areas in China. The simulation results show that ACFTA agreement will enhance the economic well-being and stimulate economic growth in China and ASEAN. ASEAN will receive an absolute socio-economic welfare advantage (US\$ 1.507 billion), while the welfare of China will increase US\$ 517 million. Net welfare increment for ASEAN member US\$ 117 million. ACFTA will increase GDP growth for all participants

Amalia [9] examined the regional free trade and export competitiveness of Indonesia. It was found, after the ratification of the ACFTA, the weighted-average tariff has declined, both in ASEAN-6 market and China. Trade deficit China with Asean-6 tend to increase, indicating the imports from ASEAN-6 rises faster than volume exports to Chinese market. From some analysis of the competitiveness of Indonesian export products in ASEAN and China, after the implementation of AFTA and ACFTA, it is found that export intensity and the RCA index is dynamic. These results indicate that Indonesia is in good condition and has opened its own market share for some products. But some, policy strategies are needed for these products, especially for vegetable products which have lost his chance in the ASEAN markets. Some policies needed include product diversification, improvement of quality control and health-related problems

Ibrahim *et al.* [10] examined the impact of ACFTA implementation to Indonesia's international trade. Simulation results show that with the enactment of ACFTA trade agreement, import export development among ASEAN countries with China is changing. Based on the GTAP model, the estimated exports of ASEAN countries to the ASEAN region declined 4.9%, including the deterioration Indonesian exports by 4.4%. In addition, China's exports to ASEAN increased 50.5%. Tambunan [11] examined the ACFTA trade liberalization, particularly of agricultural products in Indonesia. The simulation results show that Indonesia, in this case the agricultural sector, will not fully obtain benefits from the deal. Problems encountered in the agricultural sector area land problem, technology, human resources, capital, and fertilizer with good quality and reasonable prices; the lack of rural infrastructure; domestic market / distribution distortions

Erwidodo *et al.* [12] conducted a study on the application of import tariffs for maize commodity, resulted a recommendation to increase profits (and welfare) for farmers. Government policy should be directed to spur productivity, reduce imperfection / distortion of the maize market and market inputs, and expand employment opportunities in rural areas through, among others: (1) increased investment in maize research and development (R & D), particularly the seed, (2) to create conditions that can encourage private sector

involvement and investment in development of national maize production, namely for seed industry and feed industry, (3) increased investment in infrastructure and new irrigation networks, as well as maintenance of existing irrigation networks, and (4) an increase the investment for facilities and road infrastructure, transport, electricity and communications

Previously, Rosegrant, et al. [13] examined the five food commodities. It was found that although maize farming in Indonesia has a comparative advantage for the purposes of import substitution and inter-island trade, but for purposes of export, domestic farming unprofitable. This is indicated by the value of domestic resource cost (DRC) coefficient, which is still greater than one. New export is feasible if the rupiah devalued. Meanwhile, Suprapto [14] research on comparative advantage and policy impacts of maize production in East Java province. By using the analysis of Effective Protection Rate (EPR), it can be concluded that maize, both varieties of hybrid and pistil that free for export promotion orientation, has a positive TPE values for orientation and import substitution. Meanwhile, the inter-regional trade has a negative value for TPE. This means that maize farming for export promotion receives protection from the government. It is an incentive to increase production and productivity of the commodity. In contrast, farming maize for import substitution and interregional trade does not get protection. Therefore, today government policies still inhibit the production of the commodities.

Indonesia maize imports are disaggregated by country of origin, which is imported from America, China and Thailand. It is influenced by maize price in country origin, supply, and domestic demand and Indonesia maize trade restriction.

World maize price is based on exports and imports of world maize. World Export is separated into the U.S. maize exports, Thailand maize exports and China maize exports. Meanwhile, the behavior of world maize imports are determined from the production and demand power, as well as the influence of importers trade restriction in each country. In this paper, world importer focused Japan and South Korea as the world's largest importer country.

This study uses econometric model with a dynamic simultaneous equations system. Models specification used are described as follows:

```
1. OJ = AJ * PRJ
2. AJ = a_1 PJ + a_2 Pkdl_{t-1} + a_3 AJ_{t-1} + U_1
3. PRJ = b_1 Pp + b_2 i + b_3 AJ + b_4 W + b_5 PRJ_{t-1} + U_2
4. DIT = DIP + DIL + DK
5. DIP = c_1Ppk + c_2Pj + c_3Pkdl + c_4DIP_{t-1} + U_3
6. DIM = d_0 + d_1Pop + d_2PJ + d_3Pni + U_4
7. DK = e_0 + e_1PJ + e_2Y + e_3DK_{t-1} + U_5
8. MIT= MIAS + MICH+ MITH + MIO
9. MIAS = f_1(PIAS-PIAS_{t-1}) + f_2QJ + f_3DIT + f_4ERI + f_5(RISTI-RISTI_{t-1}) + U_6
10. MICH = g_1PICH + g_2QJ+ g_3DIT + g_4RISTI + U_7
11. MITH = h_1PITH + h_2QJ + h_3DIT + h_4RISTI + U_8
12. MIO = MIT-(MIAS + MICH+ MITH)
13. RISTI = (PJ - PWJ)/PWJ
14. PIAS = PWJ + RISTAS
15. PICH = PWJ + RISTCH
16. PITH = PWJ + RISTTH
17. PJ = i_1MIT + i_2DIT + U_9
18. XAS = j_0 + j_1QAS + j_2DAS + j_3XTH + j_4XCH + j_5MJJ + j_6MJK + U_{10}
19. XCH = k_1QCH + k_2DCH + j_3XAS + j_4XTH + j_5MJJ + j_6MJK + U_{11}
20. XTH = l_0 + l_1PWJ + l_2QTH + l_3DTH + U_{12}
21. MJJ = m_0 + m_1PWJ + m_2NPRJ_1 + m_3ER_1 + U_{13}
22. MJK = n_0 + n_1PWJ + n_2DJ_k + n_3MJK_{t-1} + U_{14}
23. XW = XAS + XTH + XCH + XRO
24. MW = MJJ + MJK + MRO
25. PW = o_1XW + o_2MW + U_{15}
```

### Note:

```
    AJ = acreage of maize harvested (ha)
    PRJ = maize productivity of Indonesia (tones / ha)
    QJ = maize production of Indonesia (tones)
    PJ = maize prices of Indonesia (US $ / tone)
    i = Indonesia interest rate (%)
```

•	W	= Indonesia wage labor (US \$ / day)
•	Pp	= the price of fertilizer (US \$/ tone)
•	CH	= climate change (oceanic nino index)
•	DIT	= total maize demand of Indonesia (tones)
•	DIP	= Indonesia maize demand for feed industry (tones)
•	DIM	= Indonesia maize demand for food industry (tones)
•	DK	= Indonesia maize demand for direct consumption (tones)
•	KDP	= feed prices of Indonesia (US \$ / tone)
•	Pkdl	= soybean price of Indonesia (US \$ / tone)
•	Pop	= population of Indonesia (people)
•	MIT	= Total Imports corn of Indonesia (tones)
•	MIAS	= Indonesia maize imports from US. (tones)
•	MICH	= Indonesia maize Import from China (tones)
•	MITH	= Indonesia maize imports from Thailand (tones)
•	MIO	= Indonesia maize imports from other countries (the rest)
•	PIAS	= the price of maize imports from US (US \$ / ton)
•	PITCH	= the price of maize imports from China (US \$ / ton)
•	PITH	= the price of maize imports from Thailand, (US \$ / ton)
•	RISTI	= maize trade restrictions of Indonesia
•	ERI	= exchange rate of Indonesia (rupiah / US \$)
•	XAS	= US maize exports (thousand tones)
•	XTH	= Thailand maize exports (thousand tones)
•	XCH	= Chinese maize exports (thousand tones)
•	QAS	= U.S. maize production (thousand tones)
•	QTH	= Thailand maize production (thousand tones)
•	QCH	= Chinese maize production (thousand tones)
•	MJJ	= Japan maize imports (thousand tones)
•	PET	= Ethanol price (US\$/bushel)
•	MJK	= Korea maize imports (thousand tones)
•	DJ	= maize demand of Korea (thousand tones)
•	NPRJ	= maize trade restrictions of Japanese (thousand tones)
•	ER	= exchange rate of Japan (Yuan / US \$)
•	XW	= world exports (thousand tones)
•	XRO	= maize exports of other country (thousand tones)
•	MW	= world maize imports (thousand tones)
•	MRO	=maize exports of other country (thousand tones)

## RESULTS AND DISCUSSION

# **General Variance Result of Econometrics Model Estimation**

The value of statistic F test generally is high. There are 12 of 15 equation had value greater than 11.22. Meanwhile, only two equations have F-value 8.50 and a 1.38. That is, simultaneously, explanatory variable variance in each equation behavior are able to explain the variance of endogenous variable, at  $\alpha$ = 0.0001;  $\alpha$  = 0.0003 and  $\alpha$ =0.2744. Detailed econometric model estimation for maize is presented in Table 1.

Table 1. Model Estimation Results of Indonesia maize economy

	Variable	coefficient	t-statistic	Statistic
Maize harvest area of	PJ	5.3656	0.41	0.6882
Indonesia	PKDLL	-0.37924	-0.75	0.4618
	AJL	0.962391	7.61	<.0001
	F-test= $1016.30 \mathrm{R}^2 = 0.99$	9284 DW = 1.73635		
Maize productivity of	PUPUK	-5.87E-10	-2.57	0.0186
Indonesia	I	-0.04547	-3.01	0.0072
	AJ	5.259E-08	0.31	0.7584
	W	-0.00018	-0.41	0.6869

	nn v	1015005	4405	0004
	PRJL	1.246336	14.97	<.0001
	CH	-0.02339	-1.21	0.2416
	F-test = $2640.65 \text{ R}^2 = 0.9$		2.10	0.0207
Indonesia maize demand for feed industry	PPK	41.06936	2.19	0.0397
for feed industry	PJ	-34.4608	-1.15	0.2642 0.0002
	DIPL	0.881228	4.48	
	PKDL -0.33793 -0.17 0.8647 F-test= 92.47 R <sup>2</sup> = 0.94628 DW = 1.241174			
Indonesia maize demand		-15280000	-3.86	0.0009
for food industry	Intercept PJ		-3.80	0.2709
101 1000 muustry	PNI	-128.926 56.18753	5.59	<.0001
	POP	0.023537	3.18	0.0045
	F-test= $12.62 \text{ R}^2 = 0.643$		3.10	0.0043
Indonesia maize demand	Intercept	769281.5	1.18	0.2496
for direct consumption	РЈ	-22.447	-0.94	0.3578
101 unicer communication	Y	-62.2421	-0.45	0.654
	DKL	0.652367	7.14	<.0001
	F-test= $58.46 \text{ R}^2 = 0.893$		7.17	<.0001
total maize demand of	DIT = DIP + DIM + DK	00 BW = 0.703701		
Indonesia				
Indonesia maize imports	PIASH	-50301.5	-0.32	0.7514
from US.	QJ	-0.39767	-5.13	<.0001
	DIT	0.403125	5.33	<.0001
	ERI	-16.0265	-0.84	0.4118
	RISTIH	-75.6419	-0.21	0.8352
	F-test= $13.82 \text{ R}^2 = 0.775$	557 DW = 2.307239		
Indonesia maize Import	PICH	-540.767	-0.35	0.728
from China	QJ	-0.15933	-1.27	0.2183
	DIT	0.195036	1.9	0.0716
	RISTI	-624179	-1.83	0.0815
	F-test= $8.28 \text{ R}^2 = 0.61206$			
Indonesia maize imports	PITH	-819.626	-1.62	0.1206
from Thailand	QJ	-0.02801	-0.73	0.4737
	DIT	0.046871	1.41	0.1737
	RISTI	-45811	-0.37	0.7169
T-4-1 I	F-test= $8.76  ext{ R}^2 = 0.62513$			
Total Imports corn of Indonesia	MIAS + MICH+ MITH+N	MIO		
Maize prices of Indonesia	MIT	-0.00093	-0.3	0.7638
Maize prices of indonesia	DIT	0.001993	6.89	<.0001
		37  DW = 0.136375	0.07	<.0001
US maize exports	Intercept	9262248	0.11	0.9148
ob mane enports	QAS	0.061165	0.53	0.5999
	DAS	-0.02246	-0.14	0.8919
	XTH	-0.03033	-0.01	0.991
	XCH	-0.53669	-1.57	0.1352
	MJJ	3.226394	0.61	0.5487
	MJK	0.971053	0.91	0.3738
	PETH	-23310000	-1.38	0.1848
	F-test= 1.52 $R^2$ = 0.38465 DW = 1.937323			
Chinese maize exports	QCH	0.174571	1.2	0.2436
Chinese maize exports	QCH DCH	0.174571 -0.23146	-1.26	0.2232
Chinese maize exports	QCH DCH XAS	0.174571 -0.23146 -0.23542	-1.26 -1.76	0.2232 0.0948
Chinese maize exports	QCH DCH XAS XTH	0.174571 -0.23146 -0.23542 -0.74319	-1.26 -1.76 -0.66	0.2232 0.0948 0.517
Chinese maize exports	QCH DCH XAS XTH MJJ	0.174571 -0.23146 -0.23542 -0.74319 1.194996	-1.26 -1.76 -0.66 2.27	0.2232 0.0948 0.517 0.0348
Chinese maize exports	QCH DCH XAS XTH MJJ MJK	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035	-1.26 -1.76 -0.66	0.2232 0.0948 0.517
·	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621	-1.26 -1.76 -0.66 2.27 1.02	0.2232 0.0948 0.517 0.0348 0.3217
Chinese maize exports  Thailand maize exports	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222	-1.26 -1.76 -0.66 2.27 1.02	0.2232 0.0948 0.517 0.0348 0.3217
·	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept PWJ	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124
·	QCH DCH XAS XTH MJJ MJK F-test=11.23 R²=0.78010 Intercept PWJ QTH	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176 1.011109	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73 20.58	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124 <.0001
·	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept PWJ QTH DTH	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176 1.011109 -0.93046	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124
Thailand maize exports	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept PWJ QTH DTH F-test= 612.58 R <sup>2</sup> =0.5	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176 1.011109	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73 20.58	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124 <.0001
Thailand maize exports	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept PWJ QTH DTH F-test= 612.58 R <sup>2</sup> =0.5	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176 1.011109 -0.93046 98870 DW = 2.079181	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73 20.58 -40.62	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124 <.0001 <.0001
Thailand maize exports	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept PWJ QTH DTH F-test= 612.58 R <sup>2</sup> =0.9 XAS +XTH +XCH + XO Intercept	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176 1.011109 -0.93046 98870 DW = 2.079181	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73 20.58 -40.62	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124 <.0001 <.0001
Thailand maize exports	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept PWJ QTH DTH F-test= 612.58 R <sup>2</sup> =0.9 XAS +XTH +XCH + XO Intercept PWJ	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176 1.011109 -0.93046 98870 DW = 2.079181 21603517 -8992.84	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73 20.58 -40.62	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124 <.0001 <.0001
Thailand maize exports	QCH DCH XAS XTH MJJ MJK F-test=11.23 R <sup>2</sup> =0.78010 Intercept PWJ QTH DTH F-test= 612.58 R <sup>2</sup> =0.9 XAS +XTH +XCH + XO Intercept	0.174571 -0.23146 -0.23542 -0.74319 1.194996 0.638035 DW = 2.12621 -427222 2148.176 1.011109 -0.93046 98870 DW = 2.079181	-1.26 -1.76 -0.66 2.27 1.02 -1.98 2.73 20.58 -40.62	0.2232 0.0948 0.517 0.0348 0.3217 0.0614 0.0124 <.0001 <.0001

Korea maize Import	Intercept	-122641	-7.82	<.0001	
	PWJ	-234.022	-1.85	0.0789	
	DJK	1.005725	536.15	<.0001	
	MJKL	0.003463	2.03	0.0549	
	F-test= $130684  ext{ R}^2 = 0.99995  ext{ DW} = 1.885428$				
World import	MJK + MJJ + MIT + MJO				
World price	XW	-1.41E-07	-0.18	0.8566	
	MW	1.72E-06	2.2	0.0382	
F-test= 227.42 R <sup>2</sup> = 0.95187 DW =1.126065					

### External Shocks Simulation on the Performance of Indonesia maize economy

All the three factors will affect the performance of world's maize. Therefore, this study tried to make the simulation. Simulations based on the following assumptions: (1) climate anomalies cause production decrement. As a result, maize prices rose 20%, the global monetary crisis led to depreciation of the rupiah 7.16%, and the development of bio-ethanol causes U.S. halted maize exports. The results of ex-ante simulation 2010-2015, about the impact of external shocks on performance of Indonesia maize economy, are presented in Figure 3.

The increase world maize prices by 20 percent have relatively small impact on prices, demand, production and import of maize. Depreciation of the exchange rate of 7.16% will reduce the import of 12.42%, not followed by rising prices and production. External shocks that impact on the Indonesia maize performance is American maize export halt. This causes the decline imports of maize Indonesia by 33.28%. The fall in imports will increase production by 0.060%, domestic maize prices rose 1.003%, which resulted in lower domestic demand of 2.8%.

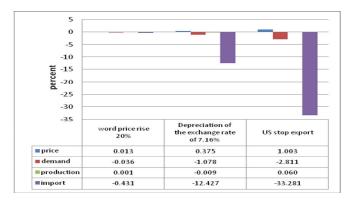


Figure 3 Impact of External Shocks on the Performance of Indonesia maize economy

### Simulation of Bilateral Trade Liberalization, ACFTA and the World

Indonesia maize performance is strongly influenced by the regional Asia and America. Since 2010, Asia will become an important point because the agreement of the ASEAN-China Free Trade Area (ACFTA) will be implemented gradually. China and countries ASEAN member try to reduce or eliminate tariffs in the AFTA. Additionally, in 2015 ASEAN will establish the ASEAN Community (AC). The aim is to increase the competitive strength of a unified market within ASEAN, **ASEAN Economic Community** (AEC). While in the 1994, regional American, Canada, the United States and Mexico ratified the **North American Free Trade Agreement** (NAFTA) which forms the largest free trade area in the world. Of course, this deal will affect performance of Indonesia maize economy.

Based on these facts, maize trade liberalization anticipation of Indonesia will be evaluated. Evaluation is based on whether the implementation begins with bilateral inter-state or is it implemented at once. The result of simulation ex-ante 2010-2015 is presented in Figure 4.

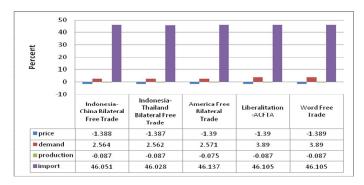


Figure 4 Impact of Trade Liberalization on Performance of Indonesia maize economy

The simulation results show that the trade liberalization will adversely affect performance of Indonesia maize economy. If liberalization should be done, then Indonesia should immediately do so without preceded by bilateral agreements, because the impact is relatively the same. Trade liberalization will increase the import maize with an average of 46% per year. The decline in domestic maize prices cause demand to rise by 3.9% per year. Meanwhile, maize production is relatively unaffected.

Estimated performance of domestic maize in the era of trade liberalization ACFTA can be predicted as in Figure 5.

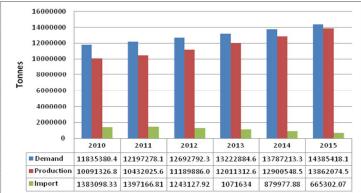


Figure 5 estimated Performance of Indonesia maize economies at the Era of Trade Liberalization in ACFTA

### Policy Simulations at Trade liberalization era in ACFTA

The negative impact of trade liberalization should be anticipated. Simulations performed using three policy instruments, namely: (1) increased productivity and acreage, (2) imports restriction from United States, and (3) import prohibition policy. The simulation results are presented in Figure 6. Indonesia's import restriction policy that is no longer import from the United States is more effective than a policy to increase production. Meanwhile, the overall policy of the import ban will make the soaring price of 4.47%, increase domestic production of 9.7%, but lowering maize demand of 1.6%.

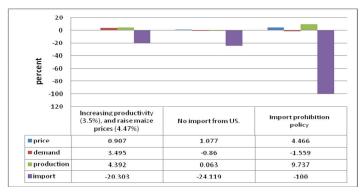


Figure 6 Policy Simulations at Trade liberalization era in ACFTA

Import prohibition policy seems difficult to do because contradict with ACFTA agreement, which must be able to access the market from quota into tariff barriers. Therefore, if Indonesia 'should' do maize self-sufficiency, then Indonesia may perform a combination policy, namely: policy to increase acreage 6.29% annually, increasing productivity 3.5%, and raise maize prices by 4.47% through price subsidies. Therefore, Indonesia may just be ready to face the full trade liberalization after 2015. If the scenario is done, then the projected performance of maize Indonesia is presented in Table 2 below.

Table 2 Projected Harvest Area, Productivity, Demand and Production of Indonesia Maize Self-Sufficiency, Year 2010-2015

_		_	_	_
Year	Harvest area	Productivity	Demand	Production
2010	2213003.8	5.01502	11660949	11660949
2011	2214619.1	5.18067	12021073	12021073
2012	2256409.3	5.45242	12536014	12536014
2013	2301669	5.73569	13087734	13087734
2014	2350398.2	6.03047	13676234	13676234
2015	2402597.1	6.33677	14301513	14301513
Rata-rata	2289783	5.625173	12880586	12880586

#### CONCLUSION

External shocks, as food crisis due to climate anomalies, causing the world price of maize increase by 20 percent, but relatively less impact on the Indonesia maize economy. In general, world monetary crisis shock which led to the depreciation of the exchange rate of 7.16% will reduce imports of 12.42%. If the energy crisis cause the maize used as ethanol material, so the United States not to export maize, maize imports have an impact on decline maize in Indonesia at 33.28%. Domestic maize prices rose 1003% and resulted in lower domestic demand of 2.8%. The implementation of trade liberalization agreements of ASEAN-China Free Trade Area (ACFTA) will increase the imports of maize per year on average 46%, increase domestic maize prices by 1.3%, and causes an increase in demand of 3.9% per year. Meanwhile, maize production is relatively unaffected. In trade liberalization ACFTA era, there is no single policy package that can be used as a policy instrument for maize self-sufficiency. Policy to increase production through increased productivity and acreage, as well as the transfer of Indonesian imports so they no longer import from the United States have not been able to be used for achieving self-sufficiency. Effective policy is import ban, but difficult to do because contradict with the ACFTA agreement.

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