EXPORT PROMOTION POLICY AND ITS IMPACT ON ASEAN ECONOMIC DEVELOPMENT: A COMPARATION ANALYSIS ON INDONESIA AS ASEAN COUNTRIES

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ABSTRACT

The main objective of this research is to analyze whether international trade policies that lead to exports promotion would benefit ASEAN economic development. The study used secondary data in the 1993 to 2013 in five countries of ASEAN, namely Indonesia, Malaysia, Philippines, Thailand and Singapore. 3SLS methods is used to estimate the impact of export promotion policies on economic development, which is indicated by: (i) the growth of agricultural sector, (ii) the growth of industrial sector, (iii) the growth of exports, and (iv) the growth of GDP. The estimation results indicate that the reduction in the import tariff that reflects the higher degree of export promotion policy turned out to encourage the acceleration of industrialization based on agriculture, so as to encourage the export of agro-industry commodities and accelerate the economic growth. In addition, the estimation results also suggest that increased degree of export promotion could have a negative impact on economic growth, if industrialization had weak linkages with the agricultural sector.

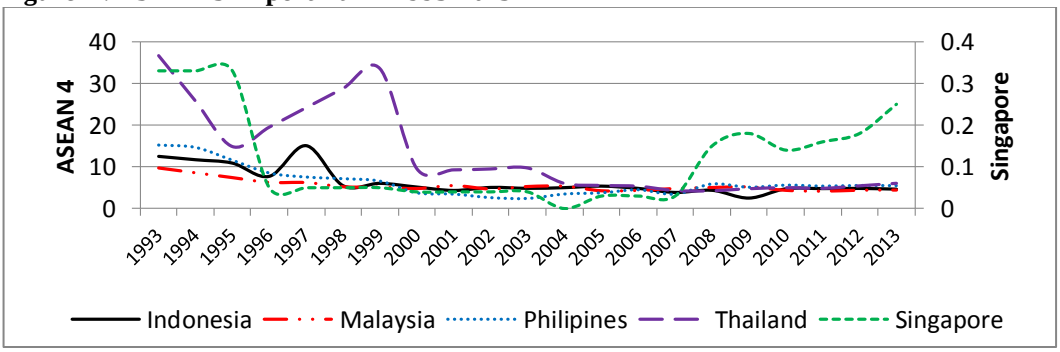
Keywords : *International trade, export promotion, import tariff, industrialization*

A. INTRODUCTION

Basically, each country expected a continuous increase in export, so that there would be an increase in foreign exchange reserves and market expansion (Mac Ewan, 2009). The increase in these two things are needed in order to accelerate the domestic economic activity, as reflected by an increase in Gross Domestic Product (GDP). Therefore, countries are implemented different policies to increase export. However, those policies could be grouped into two categories, namely: (i) export promotion policies, and (ii) import substitution policies.

The differences in those strategies are the intensity of government intervention in international trade. Where, international trade in countries with export promotion policies tend to done by market mechanism. Conversely, countries with import substitution policies tend to protect the domestic market by increasing government role. Thus, the international trade policies in a country could be reviewed from their import tariff rate as a part of international trade policies. Where, countries with export promotion policies could be seen from the low import tariff and vice versa. Figure 1.1 shows that since the ASEAN5 countries, namely Indonesia, Malaysia, Philippines, Singapore, and Thailand, international trade policy are likely lead to export promotion. This could be seen from the decreasing import tariff, prior to 2004. Out of those countries, Singapore is the most consistent to implemented export promotion since 1993.

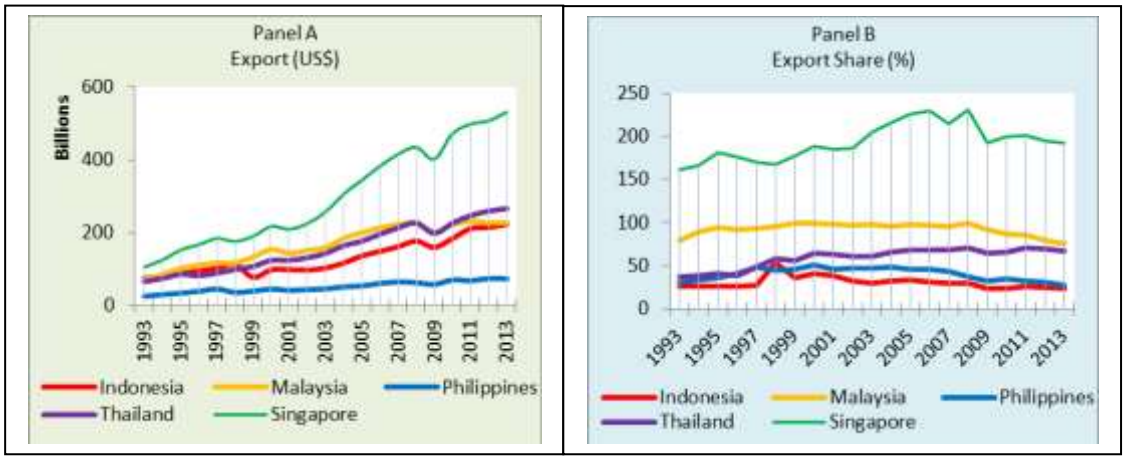
Figure 1 : **ASEAN 5 Import Tariff 1993-2013**



Source : Worldbank Databank. Accessed in 2016.

The implementation of export promotion policy in ASEAN 5 led to increased exports. Where, Singapore as country with higher degree of export promotion policy also shows a higher export performance. Figure 1.2 shows the level of exports and its role on the economy of each ASEAN countries. Panel A shows that Singapore and Malaysia had a rapid growth in export since 1993. These two counties trade openness are increasing as shown in Figure 1.1. These countries are likely to undertake the policy because their economic structures are dependent on exports (Panel B). If they are not implemented an open trade policies, then both countries would face obstacle in developing export, such as high import tariff from export destination.

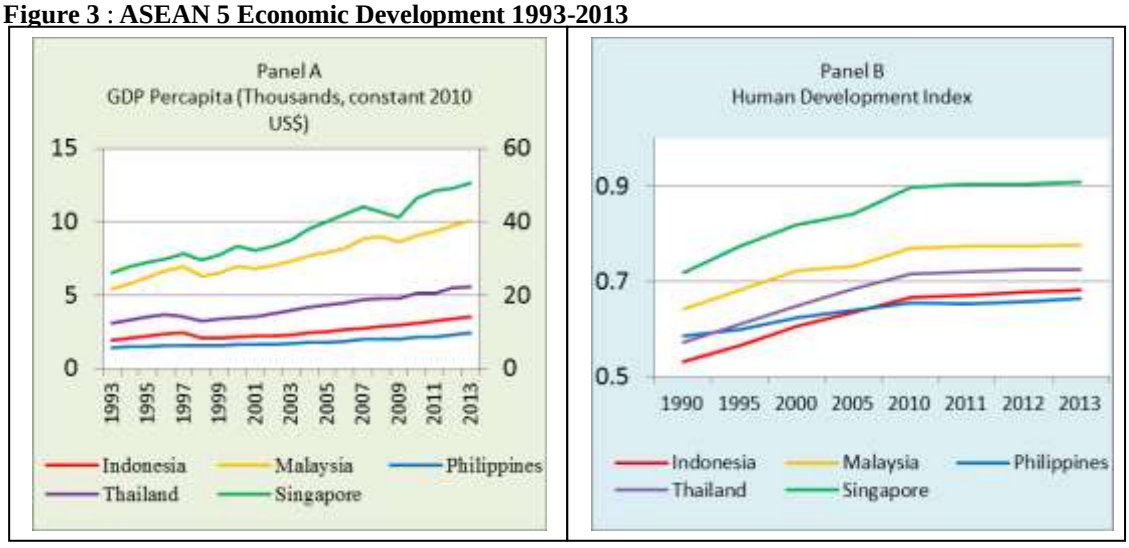
Figure 2 : **ASEAN 5 Export Performance 1993-2013**



Source : Worldbank Databank. Accessed in 2016.

Furthermore, it appears that country with highest degree of export promotion policies also posess highest income per capita and HDI. Figure 1.3 Panel A shows that Singapore and Malaysia has the highest income per capita compared to other ASEAN 5 nations. In Panel B, those countries also has the highest HDI. This is in accordance with Sen (1998) studies which suggested that income could be used by an individual to develop their abilities, thus countries's income are followed by human capabilities.

Figure 3 : **ASEAN 5 Economic Development 1993-2013**



Source : Worldbank Databank. Accessed in 2016.

Based on the empirical data, the implementation of export promotion policies in ASEAN over the years supported Balassa (1985) and North (1977) studies that are renewed by Palley (2012). However, some research indicates the opposite, as suggested by Dos Santos (1970) which renewed by Ahmed (2012) that trade openness would worsened the disparity between trading countries. Therefore, the main focus of this study are to analyze the impact of international trade policies towards the component of economic development, namely the agriculture revitalization, industrialization, export development, and economic growth.

B. LITERATURE REVIEW

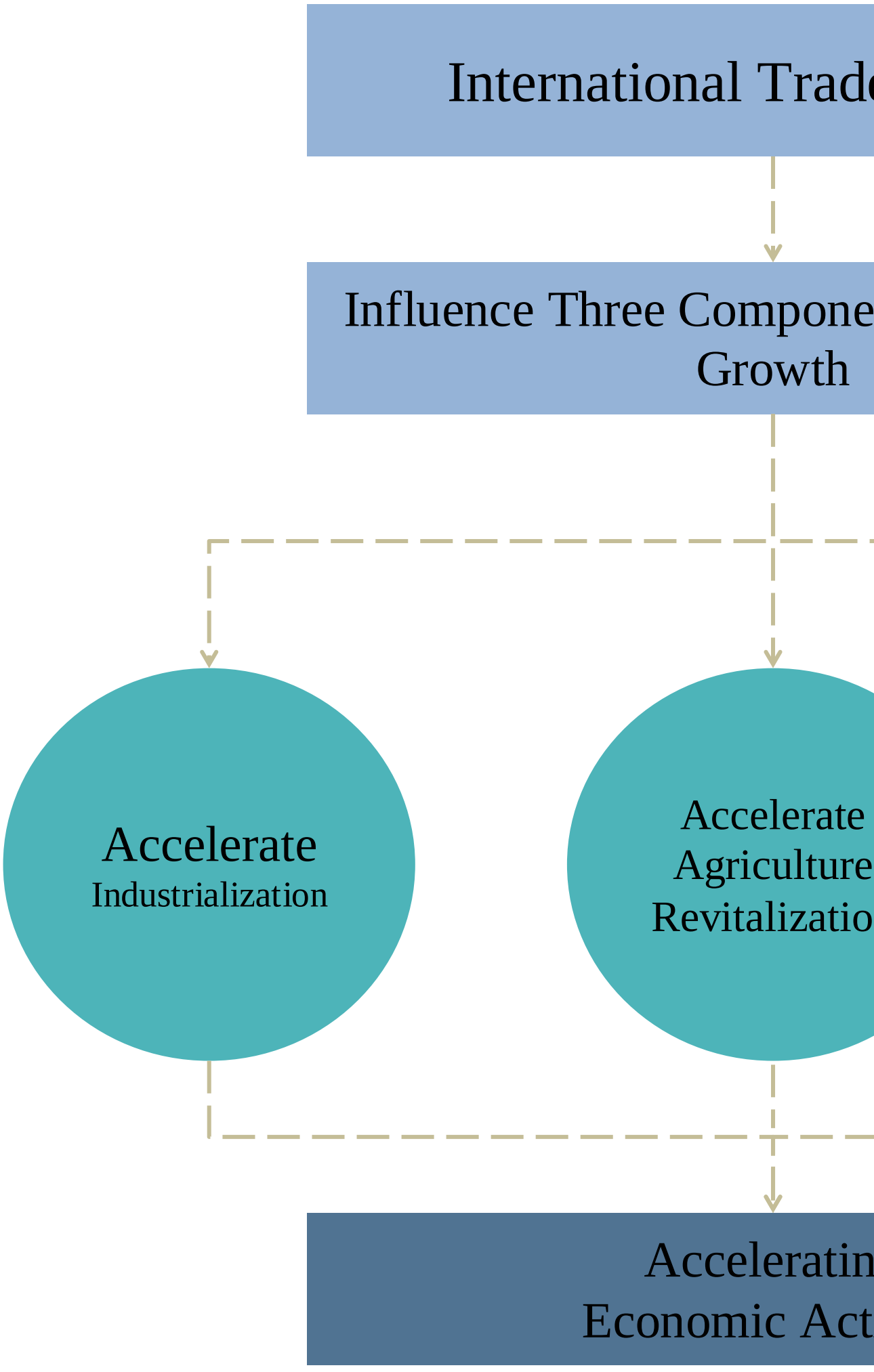
In classical economic view, economic development is thought to be the main component of economic growth. Rostow (1960) in Todaro (2011) stated that country reached maturity when it has high income and consumption. Therefore in the early era, high economic growth became the main target of economic development (Kumar, 2014). Chenery (1982) study further explained that there are three main components of economic growth, which are (i) input, in the form of capital and labor, (ii) productivity, and (iii) output, in the form of income. Findings from Chenery's research shows that industrial sector have the highest contribution toward the increase in all three components, through comparison on all sectors in economy. Hence, improvement in industrial sector has the highest impact on economy, compared to other sectors. Consequently, industrialization is regarded as a driving force in rapid economic growth.

Industrialization, as an effort to raise economic growth, decreases the participation of another sector such as agricultural sector. While agricultural sector holds important role in a nation' state of economy, mostly in labor market and rural development. However, Agricultural sector is in fact regarded as one of the vital factors in promoting industrialization. Most raw materials used by industry in the beginning of industrialization depend on the availability of natural resources, including agricultural products. Therefore, agricultural products became one of the deciding factors for productivities in industry (Fisher, 1949). On the further progress of industrialization, agriculture is needed as one of the sources of resource transfer (Krueger, 1988). Thus, a high quality of process in agricultural sector is one of indirect investment that has benefits for industrialization (Hayami, 1985).

On the other hand, Keynes *demand led growth* theory, states that an increase in aggregate demand will cause an increase in production or supply, which in turn increases economic activities (Nell, 2012). It is vital to increase demands; one of it is by doing export in international trade. Thus, it can be said that aside of industrialization and agriculture revitalization, export could drive demand led growth (Palley, 2012). Where, in order to encourage export, export promotion policy are implemented. Export promotion policy basically are a strategy to expand market through free-trade. So that countries could trade efficiently and ganing benefit by dismissing trade restrictions (Melitz, 2012).

However, global market is not a perfect market, and thus, free trade can't be separated from fears of failure in market mechanism. One of the chief reasons of market failure is the different capabilities between trading countries (Ahmed, 2012). Therefore, import substituition strategy emerged to protect the domestic market and production from global competition. In the recent studies, trade block agreement is deemed as a new type of protectionism. A number of economists presume that trade block hamper freedom of international trade. Trade block generates new market that is limited to regions, and hence weakens global competition (Sterbova, 2008).

THEORETICAL FRAMEWORK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C. RESEARCH METHOD

This study uses quantitative approach to achieve the purpose of study and conducted toward ASEAN from 1993 until 2013.This study uses data panel regression method in which time series and cross section data is incorporated. There are three methods that can be used for data panel in data panel regression method. According to Gujarati (2003), those three methods are *pooled least square* (PLS) or *common effect model, fixed effect* (FE), and *random effect* (RE).

Based on the research purposes of this study, there are four equations in this study:

a. Equation of export promotion strategy impact on revitalization of agricultural sector

$Gag = \alpha + \beta_1 TR + \beta_2 dxTR + \beta_3 \text{cpi} + \mu$..(1)

b. Equation of export promotion strategy impact on industrialization

$Gin = \alpha + \beta_4 TR + \beta_5 dxTR + \beta_6 Gag + \beta_7 dGag + \mu$...(2)

c. Equation of export promotion strategy impact on export

$Ge = \alpha + \beta_8 TR + \beta_9 dxTR + \beta_{10} Gin + \beta_{11} dxGin + \beta_{12} GGDPUS + \beta_{13} GGDPJP + \mu$....(3)

d. Equation of indirect impact of export promotion strategy on economic growth

$Ge = \alpha + \beta_{14} Ge + \beta_{15} Si + \mu$..(4)

Whereas:

α = constant

β = Coefficient

T_R = Import Tariff

G_{ag} = Agricultural Sector Growth

Cpi = Agriculture Productivity Index

GCGDPUS= GDP Growth of United States

GCGDJP = GDP Growth of Japan

Gi_n = Industry sector growth

G_e = Export Growth

G = Economic growth

Si = Import share

D = Dummy variable

Chow test and Hausman test is conducted to select which model is the best one to analyze the data. Chow test is conducted to test between common effect and fixed effect model, whilst Hausman test is conducted to test between fixed effect and random effect model.

In Chow testing, data is regressed using common effect model and fixed effect and then hypothesis for testing was formulated. Hypothesis is stated as below:

1) **Ho** :therefore, uses common effect model (model pool)
2) **Ha** :therefore, uses fixed effect model and continue testing with Hausman test

Guideline that is used in drawing conclusion in Chow testing:

1. If the probability score is F ≥ 0.05, means that Ho is accepted; thus common effect model is used.
2. If the probability score is F < 0.05, means that Ho is rejected; thus fixed effect model is used.

If Ho is rejected then Hausman test is conducted to select which method is going to be used between fixed effect and random effect method. Data is regressed using random effect model, and then compared between fixed effect and random effect bymaking hypothesis:

1) **Ho** :therefore uses *random effect model*
2) **Ha** :therefore, uses *fixed effect* model

Guideline that is used in drawing conclusion in Hausman testing:

1. If the chi-square probability score is ≥ 0.05, means that Ho is accepted; thus random effect model is used.
2. If the chi-square probability score is < 0.05, means that Ho is rejected; thus fixed effect model is used.

The test showed that common effect model is chosen as the best one, thus simultaneous equation model will be done as estimation measurement. Simultant equation is a system that has more than one equation which had many similarities in dependent and independent variables. This simultaneous equation model is suitable to use in this study because the equations is related to one another. The simultaneus model chosen is 3SLS model.

D. RESULT AND DISCUSSION

STATISTICAL RESULT

Based on the stationarity test result, all equations can be tested using least square method. Simultaneous equation model is used because many equations that were formed have similar variables. The output of the stimultaneous equation with 3 stage least square method can be summarized as below:

1) Equation in dependent variable Gag

Gag	=	4.68	-	0.25 TR	+	0.14dTR	-	0.02CPI	
Probability		0.00		0.00		0.30		0.03	
R square		0.10					P	0.00	

In accordance to the first simultaneous equation with 3 stage least square method result, it can be concluded that:

a. The constants of that variable is 4.68, which implies that without the influence of other variables, agricultural sector will grow as much as 4.68%
b. Variables that have significant effect on agricultural growth are tariff and crop production index variables.
c. Tariff variable coefficient is -0.25, which implies that an increase of 1% in tariff will decrease agricultural sector as much as 0.25%.
d. CP variable coefficient is -.0.02, which implies that an increase of 1% in CP will decrease agricultural sector growth as much as 0.02%.

2) Equation in dependent variable Gin

Gin	=	-10.09	+	1.38TR	-	0.88dTR	+	5.79 Gag	-	1.67dGag	
Probability		0.00		0.00		0.03		0.00		0.01	
R square		-16.93						P		0.00	

From the second simultaneous equation with 3-stage least square method, it can be concluded that:

a. Constants from that equation is -10.09, which implies that without the influence of other variables, industrial sector will decrease -10.09%.
b. Variables that have significant effect on industrial sector growth are tariff, dummy tariff for Indonesia, agricultural sector, and dummy agricultural for Indonesia variables.
c. Coefficient for tariff variable is 1.38, which implies that an increase of 1% in tariff will decrease industrial sector growth as much as 1.38%.
d. Coefficient for dummy tariff for Indonesia is -0.88, which implies that by considering tariff variable coefficient, an increase of 1% in tariff for Indonesia will decrease industrial sector growth as much as 0.58% .
e. Coefficient for agricultural growth variable is 5.79, which implies that an increase of 1% in agricultural sector growth will decrease industrial sector growth as much as 5.79%.
f. Coefficient for dummy agricultural sector for Indonesia is -1.67, which implies that by considering agricultural sector growth variable coefficient, an increase of 1% in agricultural sector growth for Indonesia will decrease industrial sector growth as much as 4.13%.

3) Equation in dependent variable Ge

Ge	=	-0.0008	+	0.02 TR	+	0.03 dTR	+	1.21 Gin	-	0.23 dxGin	+	0.23 GGDPJP	+	0.87 GGDPUS	
Probability		0.99		0.82		0.91		0.02		0.57		0.56		0.33	
R Square		0.26											P	0.00	

From the third simultaneous equation with 3-stage least square method, it can be concluded that:

a. Constants from that equation is 0.0008%, which implies that without the influence of other variables, export will decrease 0.0008%.
b. Variable that has significant effect on export growth is industrial sector growth variable.
c. Coefficient for industrial sector growth variable is 1.21, which implies that an increase of 1% in industrial sector growth will increase export growth as much as 1.21%.

4) Equation in dependent variable Gag

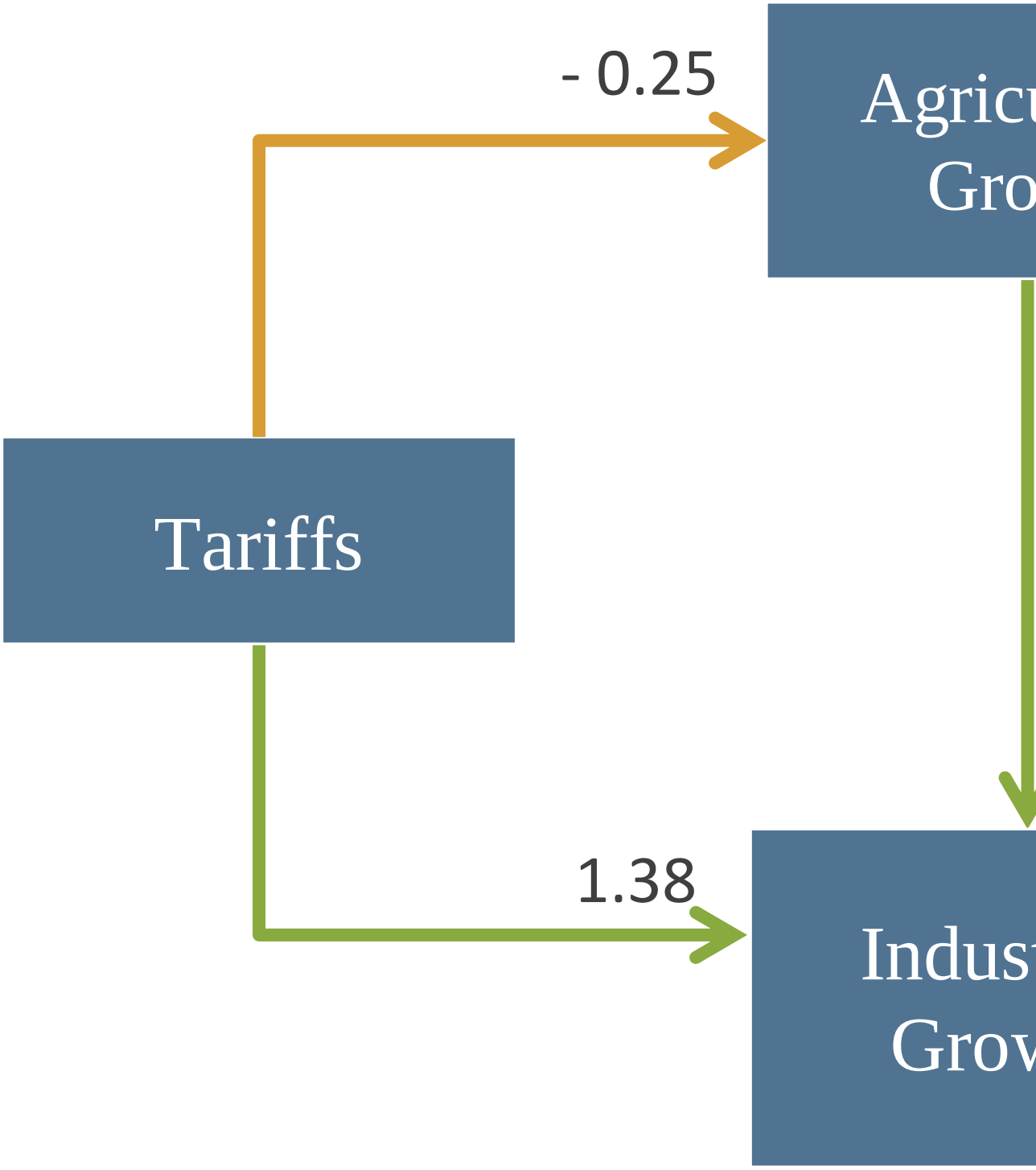
Ggdp	=	3.1	+	0.32 Ge	- 0.007 Si
Probability		0.00		0.00	0.15
R square		0.14		P	0.00

From the last simultaneous equation with 3-stage least square method, it can be concluded that:

a. Constants from that equation is 3.1 %, which implies that without the influence of other variables, gross domestic product will grow as much as 0.0008%.
b. Variable that has significant effect on nations' income growth is export growth.
c. Coefficient for export growth variable is 0.32, which implies that an increase of 1% in export growth will increase gross domestic product growth as much as 1.21%.

RESULT DISCUSSION

Figure 4 : **ASEAN 5 Statistical Result**



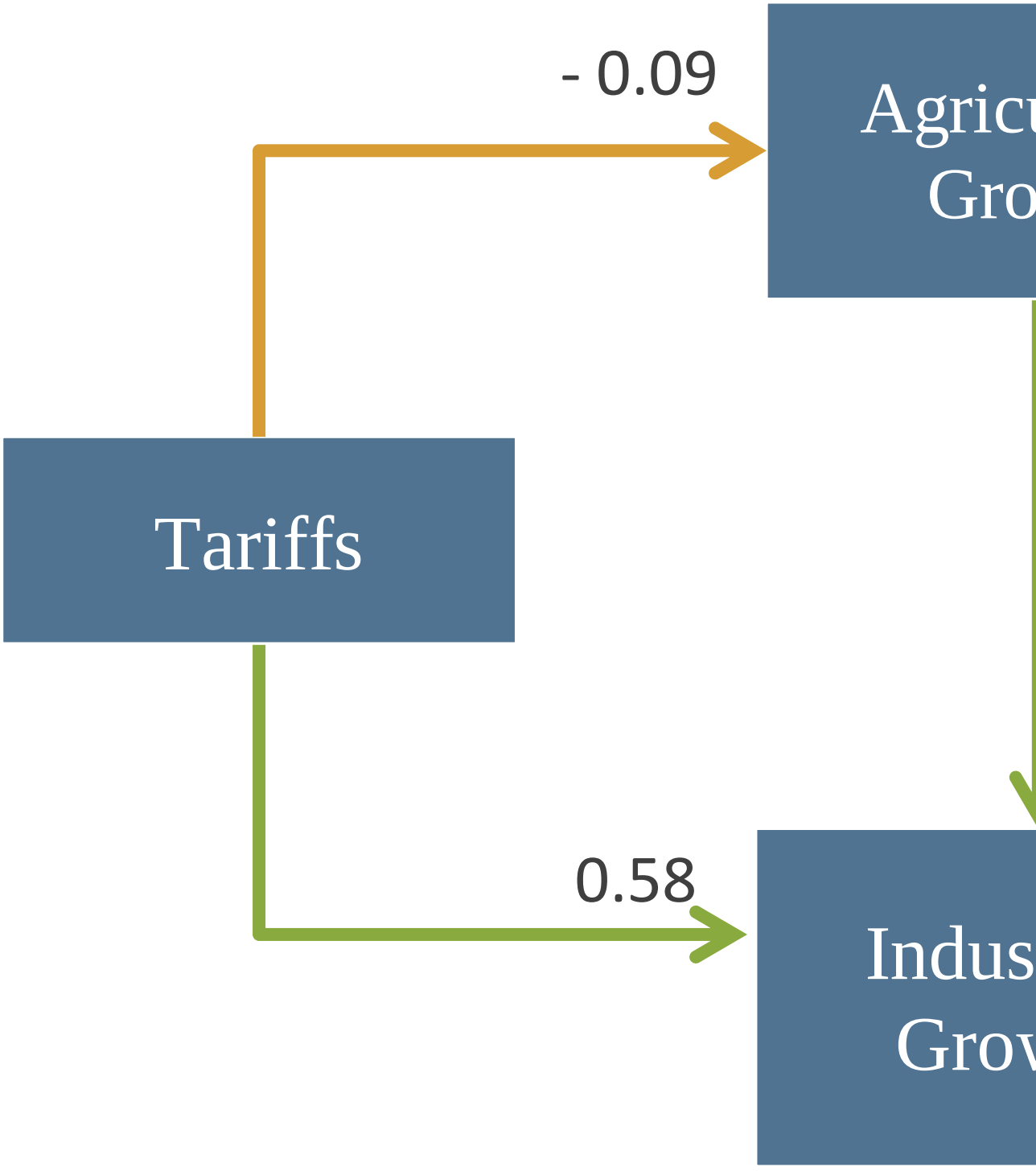
Source : STATA analysis, 2016

Figure 4 showed the simplified statistical result of ASEAN5 in this research. From the statistical result, it is known that export promotion policy which lowers the tariff could provide both positive and negative impact on ASEAN5 economic growth. The positive impact of export promotion strategy occurred from agriculture sector. This is due to the geographical condition of ASEAN, except Singapore, which has a favorable soil and climate for agricultural development. The majority of ASEAN5 countries also has abundant labor, thus it matched the labor-intensive characteristic of agricultural sector. With their natural resource and adequate manpower, ASEAN5 became one of the most productive and competitive agriculture producers. Therefore, trade openness provides opportunity to expand the market (Hassina and Decaluwe, 2010).

On the other hand, industrial sector receive negative impact from export promotion policy. This is because the industrial sector in ASEAN, except Singapore, does not have a good competitiveness. Wong, Shankar, and Toh (2010) accumulating the Global Competitiveness Index (GCI) of ASEAN countries in five years. The results of the study showed that the level of competitiveness of ASEAN as an average constantly placed on position 57 of 132 countries over the study period. This means that the efforts to improve competitiveness in ASEAN are not effective yet. The low competitiveness is partly due to the low labor productivity, slow innovation, and small-scale production. Therefore, in order to survive the global market, the growth of ASEAN5 industry needs protection from the government.

Under this condition, the economic growth of ASEAN5 countries, except Singapore, depends on the characteristic of industrialization. If the industrialization are developed on industry that based on agriculture, export promotion policy will provide a better opportunity to improve competitive advantage. Therefore, it will encourage export growth and economic growth. On the other hand, commodity from non-agricultural based industry does not have a considerable advantage to compete in the global market. Thus, export promotion policy which provide openness would decrease competitive advantage. Henceforth, it will hamper export growth and economic growth.

Figure 5 : **Indonesia Statistical Result**



Source : STATA analysis, 2016.

Figure 5 showed the statistical result for Indonesia that derived from the interactive dummy variables in the equation. It turns out that the impact of export promotion strategy in Indonesia has similar pattern with ASEAN. Where, export promotion policy would benefit economic growth if the industrialization are based on agriculture sector. Although it should be noted that tarrif rate in Indonesia has lower elasticity towards agriculture and industrial sector. Thus, Indonesia economic has low sensitivity towards change in international trade policy.

E. CONCLUSION AND SUGGESTION

CONCLUSION

Based on the result, it can be concluded that the export promotion policy would benefit ASEAN5 economics, exclude Singapore, as long as export is dominated by agricultural based industry. Because port promotion strategy has positive impact on revitalization of agricultural sector, due to the high competitiveness level of agricultural sector in ASEAN 5. On the contrary, export promotion policy has negative impact on non-agriculture based industry. This is due to the low competitiveness level of industrial sector in ASEAN, except for Singapore. Therefore, export promotion policy only encourages agricultural based industrialization. The result also suggested that export promotion strategy does not have direct impact on export. Its impact depends on the industrialization pattern. If the industrialization is based on agricultural-industry, then the trade openness will increase export. Conversely, if the industrialization is based on non-agricultural industry, then the trade openness will reduce export. Thus, Except Singapore, export promotion policy would accelerate economic growth through agricultural development. For Indonesia case, the result show that export promotion policy could benefit Indonesian economic as long as industrialization is based on agriculture sector. However, Indonesia has a slightly lower elasticity compared to other ASEAN 5 nations.

SUGGESTION

Based on the conclusions that have been presented in the previous section, then there are some suggestions that can be given from this research. First, in globalization era, increasing comparative advantage in ASEAN 5, except for Singapore, would occur when the development of industrialization has higher linkage with agriculture sector. As for Indonesia case, Global competition is not a threat for economic activities in Indonesia, because the international trade strategy in Indonesia has lower elasticity in export promotion policy impact toward economic development compared to other ASEAN 5 nations. This implies that the government of Indonesia should not be conservative in implementing import tariff policy.

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APPENDIX 1

Panel Data Test For First Equation

1) Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.164215	(4,97)	0.0037
Cross-section Chi-square	16.639658	4	0.0023

Cross-section fixed effects test equation:
Dependent Variable: GAG
Method: Panel Least Squares
Date: 01/08/17 Time: 09:08
Sample: 1993 2013
Periods included: 21
Cross-sections included: 5
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TR	-0.180250	0.058473	-3.082641	0.0026
DXTR	0.258131	0.128590	2.007395	0.0474
CPI	28.95589	7.017042	4.126510	0.0001
C	1.154734	0.632428	1.825875	0.0708

R-squared	0.255159	Mean dependent var	1.451429
Adjusted R-squared	0.233035	S.D. dependent var	4.365773
S.E. of regression	3.823394	Akaike info criterion	5.557505
Sum squared resid	1476.452	Schwarz criterion	5.658608
Log likelihood	-287.7690	Hannan-Quinn criter.	5.598474
F-statistic	11.53312	Durbin-Watson stat	1.367763
Prob(F-statistic)	0.000001		

2) Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	16.656454	3	0.0008

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
TR	-0.108083	-0.180250	0.002113	0.1164
DXTR	0.046430	0.258131	0.051317	0.3500
CPI	32.912156	28.955893	2.977499	0.0219

3) Random Effect

Dependent Variable: GAG
Method: Panel EGLS (Cross-section random effects)
Date: 01/08/17 Time: 09:08
Sample: 1993 2013
Periods included: 21
Cross-sections included: 5
Total panel (balanced) observations: 105
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TR	-0.180250	0.055121	-3.270093	0.0015
DXTR	0.258131	0.121219	2.129463	0.0356
CPI	28.95589	6.614803	4.377438	0.0000
C	1.154734	0.596175	1.936904	0.0556

Effects Specification		
	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	3.604225	1.0000

Weighted Statistics			
R-squared	0.255159	Mean dependent var	1.451429
Adjusted R-squared	0.233035	S.D. dependent var	4.365773
S.E. of regression	3.823394	Sum squared resid	1476.452
F-statistic	11.53312	Durbin-Watson stat	1.367763
Prob(F-statistic)	0.000001		

Unweighted Statistics			
R-squared	0.255159	Mean dependent var	1.451429
Sum squared resid	1476.452	Durbin-Watson stat	1.367763

4) Stationery Test Variable Gag

Null Hypothesis: Unit root (individual unit root process)
Series: GAG
Date: 01/08/17 Time: 09:11
Sample: 1993 2013
Exogenous variables: Individual effects
User-specified lags: 1
Total (balanced) observations: 95
Cross-sections included: 5

Method	Statistic	Prob.**
ADF - Fisher Chi-square	35.3489	0.0001
ADF - Choi Z-stat	-4.02731	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

5) Stationery Test Variable CPI

Null Hypothesis: Unit root (individual unit root process)
Series: CPI
Date: 01/08/17 Time: 09:12
Sample: 1993 2013
Exogenous variables: Individual effects
User-specified lags: 1
Total (balanced) observations: 95
Cross-sections included: 5

Method	Statistic	Prob.**
ADF - Fisher Chi-square	53.6534	0.0000
ADF - Choi Z-stat	-5.76911	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Intermediate ADF test results CPI

Cross section	Prob.	Lag	Max Lag	Obs
IDN	0.0110	1	1	19
MYS	0.0065	1	1	19
PHL	0.0059	1	1	19
SGP	0.0091	1	1	19
THAI	0.0006	1	1	19

6) Stationery Test Variable TR

Null Hypothesis: Unit root (individual unit root process)
Series: TR
Date: 01/08/17 Time: 09:12
Sample: 1993 2013
Exogenous variables: Individual effects
User-specified lags: 1
Total (balanced) observations: 95
Cross-sections included: 5

Method	Statistic	Prob.**
ADF - Fisher Chi-square	31.4723	0.0005
ADF - Choi Z-stat	-3.38687	0.0004

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Intermediate ADF test results TR

Cross section	Prob.	Lag	Max Lag	Obs
IDN	0.2293	1	1	19
MYS	0.0039	1	1	19
PHL	0.0031	1	1	19
SGP	0.1607	1	1	19
THAI	0.3290	1	1	19

APPENDIX 2

Panel Data Test For Second Equation

1) Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.114860	(4,96)	0.0848
Cross-section Chi-square	8.867319	4	0.0645

Cross-section fixed effects test equation:
Dependent Variable: GIN
Method: Panel Least Squares
Date: 01/08/17 Time: 08:53
Sample: 1993 2013
Periods included: 21
Cross-sections included: 5
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TR	0.164980	0.087369	1.888319	0.0619
DXTR	-0.237858	0.247529	-0.960928	0.3389
GAG	0.199319	0.132665	1.502418	0.1361
DXGAG	0.407276	0.545250	0.746952	0.4568
C	3.584156	0.838119	4.276428	0.0000

R-squared	0.048393	Mean dependent var	4.839810
Adjusted R-squared	0.010329	S.D. dependent var	5.476478
S.E. of regression	5.448121	Akaike info criterion	6.274867
Sum squared resid	2968.202	Schwarz criterion	6.401246
Log likelihood	-324.4305	Hannan-Quinn criter.	6.326078
F-statistic	1.271362	Durbin-Watson stat	1.917147
Prob(F-statistic)	0.286322		

APPENDIX 3

Panel Data Test For Third Equation

1) Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.935075	(4,94)	0.4472
Cross-section Chi-square	4.097016	4	0.3930

Cross-section fixed effects test equation:
Dependent Variable: GE
Method: Panel Least Squares
Date: 01/08/17 Time: 08:59
Sample: 1993 2013
Periods included: 21
Cross-sections included: 5
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TR	-0.018036	0.115201	-0.156559	0.8759
DXTR	0.089115	0.312132	0.285503	0.7759
GIN	0.556614	0.169807	3.277923	0.0014
DXGIN	-0.424679	0.343835	-1.235127	0.2197
GGDPJPN	1.209099	0.520347	2.323638	0.0222
GGDPUS	1.161979	0.529175	2.195831	0.0305
C	0.905815	1.455438	0.622366	0.5351

R-squared	0.424488	Mean dependent var	7.211714
Adjusted R-squared	0.389253	S.D. dependent var	9.019548
S.E. of regression	7.048804	Akaike info criterion	6.807934
Sum squared resid	4869.193	Schwarz criterion	6.984864
Log likelihood	-350.4165	Hannan-Quinn criter.	6.879629
F-statistic	12.04721	Durbin-Watson stat	2.522133
Prob(F-statistic)	0.000000		

APPENDIX 4

Panel Data Test For Fourth Equation

1) Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.882237	(4,98)	0.4776
Cross-section Chi-square	3.714529	4	0.4460

Cross-section fixed effects test equation:
Dependent Variable: GGDP
Method: Panel Least Squares
Date: 01/08/17 Time: 09:03
Sample: 1993 2013
Periods included: 21
Cross-sections included: 5
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GE	0.205792	0.037298	5.517558	0.0000
SI	-0.013771	0.006417	-2.146161	0.0342
C	4.588279	0.631397	7.266866	0.0000

R-squared	0.243082	Mean dependent var	5.006952
Adjusted R-squared	0.228240	S.D. dependent var	3.879224
S.E. of regression	3.407893	Akaike info criterion	5.318221
Sum squared resid	1184.601	Schwarz criterion	5.394048
Log likelihood	-276.2066	Hannan-Quinn criter.	5.348948
F-statistic	16.37847	Durbin-Watson stat	1.974497
Prob(F-statistic)	0.000001		

APPENDIX 5
3SLS Estimation Result

Three-stage least-squares regression

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Gag	105	3	4.108274	0.1060	21.71	0.0001
Gin	105	4	23.0829	-16.9363	65.64	0.0000
Ge	105	6	7.703716	0.2635	95.20	0.0000
Ggdp	105	2	3.563855	0.1479	27.35	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Gag						
TR	-.259818	.0608326	-4.27	0.000	-.3790478	-.1405882
cp	-.0227406	.0109599	-2.07	0.038	-.0442216	-.0012597
dxTR	.145262	.1408739	1.03	0.302	-.1308458	.4213698
_cons	4.686222	1.138562	4.12	0.000	2.454681	6.917763
Gin						
TR	1.381473	.2414907	5.72	0.000	.9081598	1.854786
Gag	5.793916	.7714094	7.51	0.000	4.281981	7.305851
dxgag	-1.674398	.6751394	-2.48	0.013	-2.997647	-.351149
dxTR	-.8884639	.4259997	-2.09	0.037	-1.723408	-.0535197
_cons	-10.09832	2.462733	-4.10	0.000	-14.92519	-5.271451
Ge						
TR	.0260678	.1188767	0.22	0.826	-.2069263	.2590619
dxTR	.0320355	.3142516	0.10	0.919	-.5838864	.6479574
Gin	1.213073	.5204951	2.33	0.020	.1929213	2.233224
dxgin	-.2324892	.4095146	-0.57	0.570	-1.035123	.5701447
GGDPUS	.235062	.4128698	0.57	0.569	-.574148	1.044272
GGDPJPN	.8733024	.9076768	0.96	0.336	-.9057115	2.652316
_cons	-.0087742	2.134117	-0.00	0.997	-4.191566	4.174017
Ggdp						
Ge	.3283365	.0627911	5.23	0.000	.2052682	.4514047
Si	-.0071044	.0049865	-1.42	0.154	-.0168777	.0026689
_cons	3.188736	.6274413	5.08	0.000	1.958973	4.418498

Endogenous variables: Gag Gin Ge Ggdp
Exogenous variables: TR cp dxTR dxgag dxgin GGDPUS GGDPJPN Si