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Assessment the Impact Of Asean Free Trade Area (AFTA) on Exports of Indonesian Agricultural Commodity

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ABSTRACT

This paper focuses on investigation whether Indonesian membership on ASEAN Free Trade Area (AFTA) increased export of agriculture commodity. The panel augmented gravity model data from 33 major partner countries over the period of 2000-2014 has been applied to analyze the factors affected Indonesian agricultural exports. The overall finding showed that Indonesian agricultural exports were positively correlated with the size of economy and partner countries population, while they are negatively correlated with the appreciation of currency exchange rate and the enrollment on free trade agreement. Moreover, the Indonesian membership on AFTA does not gave significant impact and profitable on Indonesian agricultural exports.

Keywords: AFTA, Gravity Model, Agricultural Exports, JEL Classifications: F15, C23, Q17

INTRODUCTION

In present time, there is a growing concern on the formation of free trade agreement (FTA) among countries over the globe. Based on report from World Trade Organization (WTO) on 1st July 2016, some 635 of Regional Trade Agreements (RTAs) had been notified to the organization (World Trade Organization, 2016). Economic integration in general could lead to increase trade and other benefits in the form of a more competitive trade region by removal trade and non-trade barriers and free flow of goods and services.

The basic principle of any economic integration form is the elimination of barriers to trade among two or more member countries. Regional economic integration implies the countries to come together in some type of partnership to foster trade and development. Economic integration processes can be realized through various stages, namely: preferential trading area; free trade area, monetary union; customs union, common market; economic union, customs and monetary union; economic and monetary union, fiscal union; and full or complete economic integration (Ndulu et al., 2005)

Indonesia as the largest economy in South-east Asia also involved on several regional economic cooperation's. According to RTA database that notified to WTO, until 2015 Indonesia had become member of at least seven free trade agreements (FTA) which is one of them is the trade liberalization among ASEAN countries called ASEAN Free Trade Area or AFTA (World Trade Organization, 2016). AFTA is the oldest and the most developed trade agreement among Indonesia's free trade agreements. AFTA trade agreement was signed by six original members of ASEAN in 1993 and became full operated by all ten ASEAN member countries in 2003 which covered trade liberalization agreement on good and services (ASEAN Secretariat, 1992).

The Indonesian membership on AFTA is expected to boost trade among parties due to decreasing trading cost and removing trade barrier. This policy ultimately could enhance market size and increase the competitiveness of countries product, which is in the end could increase economic growth and welfare.

A previous study conducted by Zahniser et al. (2002) examined the impact of regional economic integration on exports of agricultural commodities of The United States (U.S.) revealed that the membership on free trade agreement showed positive value and statistically significant effect on export. Another study about the effect of free trade agreement on Turkish agricultural exports was conducted by Erdem and Nazlioglu (2008), the results showed that Turkish agricultural exports to the Turkish-European Union FTA countries shows positive and significant which means that Turkish exports to the FTA countries were higher than non-FTA members. And the latest research conducted by Oktaviani et al. (2008) on the impacts of ASEAN agricultural trade liberalization also showed positive effect on export of several commodities such as rice, sugar, plant based fiber and animal products.

Despite many potential benefit, trade liberalization gets much criticism regarding its effect on economy, particularly the liberalization in agriculture sector since agriculture still becomes major sector by many countries especially developing countries. For Indonesia, agriculture sector is still considered as the economic backbone due to the contribution of this sector to country's Gross Domestic Product (GDP) and supply around two fifth of country's labor force. Based on Statistics Indonesia or *Badan Pusat Statistik* (BPS), the share of agriculture sector to Indonesian GDP are around 14.43%-15.29% in the last 15 year since 2000 to 2014 (Statistics Indonesia, 2016a). In term of employment, according to Statistic of Indonesia, agriculture sector provides 38,291,111 employments or about 31.74% of Indonesian workforce (Statistics Indonesia, 2016b).

A recent study about the Impact of Free Trade Agreement on Indonesia's Agriculture Trade was conducted by Dianniar (2013). Using the gravity model, this research showed that Indonesia's participation in AFTA and ASEAN China Free Trade Agreement (ACFTA) did not have a significant impact on Indonesia's agricultural trade flows. However, this does not necessarily mean that become a member of FTA would not favorable for Indonesia.

Trade liberalization undertaken by Indonesian government through the membership in ASEAN Free Trade Area (AFTA) on the one side may encourages economic growth and increases trade because Indonesia's commodity would have larger market and get more efficient trade procedure within AFTA. However, in the same time the participation in AFTA also gave more access to another ASEAN countries into Indonesian market which may threaten domestic agriculture commodity. Within ASEAN agreement, agriculture

commodity would compete with another ASEAN countries imported product which may cheaper and better in quality.

According to above exploration, it is interesting to investigate whether Indonesian agricultural exports are influenced by Indonesia's membership in AFTA. It is also appeal to find out whether these facts effect on Indonesia's decision to participate in free trade agreement. Hence the objective of this study is to assess the economic impact of ASEAN Free Trade Area (AFTA) on Indonesia's agriculture exports.

METHODOLOGY

The assessment of the impact of free trade agreement on Indonesian agricultural exports could be analyzed using gravity model. The gravity model is widely used tool to analyze factors affecting agricultural trade flows such as free trade agreement, exchange rate, common border, language commonality and arable land (Erdem and Nazlioglu, 2008).

The traditional basic gravity model established by Tinbergen (1962) underlying the value of exports from country i to country j . Exports as dependent variable is a positive function of countries gross domestic product (GDP), but negatively related to the distance between countries. While many literatures agree to the empirical model that GDP and distance is the main explanatory variable, many studies uses other variable to be included as another explanatory variable. Ghosh and Yamarik (2004) showed a list of 48 independent variables that has been used in literatures to estimate the gravity model in various combinations such as economic development (GDP), trade policy, common language, common border, currency exchange rate, landlock and area.

Sohn (2005) concluded that in gravity model, the most common dependent variables are exports and bilateral trade flows. While the explanatory variables are factors indicating demand and supply of trading countries, and impedance factors of trade flow between countries. The proxies for demand and supply are measures of countries economic and market size such as income level, population, area size and GDP per capita.

Greene (2013) on his paper about Export Potential for U.S. Advanced Technology Goods to India Using a Gravity Model Approach said that the most often used as dependent variable in gravity model are total trade (exports + imports), exports and imports. While on the right-hand side as independent variable, most researcher include country income level, geographical distance, land area, population, real exchange rate, market openness, FTA membership and other geographic characteristic (Island, landlocked, etc.).

To this end, this research follows Erdem and Nazlioglu (2008) and Greene (2013) gravity model specification, the model is as follows:

$$\text{Ln}E_{ijt} = \beta_0 + \beta_1 \text{GDP}_{it} + \beta_2 \text{GDP}_{jt} + \beta_3 \text{lnDist}_{ij} + \beta_4 \text{lnPop}_{jt} + \beta_5 \text{lnLand}_{jt} + \beta_6 \text{lnEx}_{it} + \beta_7 \text{Ex}_{jt} + \beta_8 \text{AFTA}_{ij} + \varepsilon_{ijt}$$

Where: E_{ijt} is total Agricultural export from Indonesia (i) to partner countries (j) measured in current US\$ dollar. Agriculture exports commodity in this paper are refer to the AFTA Agreement on the Common Effective Preferential Tariff Scheme (CEPT). According to the agreement, agricultural products were defined as non-processed product rounded up on Chapter 01 to Chapter 24 Harmonized System and other product which were similar to unprocessed agricultural material (ASEAN Secretariat, 1992).

Furthermore, on the right-hand side, GDP_{it} and GDP_{jt} were the sum of real gross domestic product (GDP) of Indonesia (i) and partner (j) countries which was measured in 2010 U.S. dollars. GDP was a proxy of country's income and stage of development. Income effect on export was expected to be positive (Amin et.al, 2009).

Dist_{ij} was geographical distance between capital cities of Indonesia and partner countries in kilometers. Distance was hypothesized to be negative effect on agricultural export (Karemera, 1999). Therefore, the further distance between exporter and importer countries, the higher in cost will take which reduce importer profit. Pop_{jt} was Indonesian partner country population. Population is represented country's market size and potential domestic consumption. Partner countries population as an importer is expected to have positive impact on Indonesian agriculture export for the reason that larger market tends to consume more importer goods (Lambert and McCoy, 2009). Land_{jt} represents total irrigated land of Indonesian partner country in hectare. The partner countries irrigated land variable was expected to have negative effect on Indonesian agricultural exports since the extent of irrigated land may interfered importing country's ability to produce more agricultural product (Erdem and Nazioğlu, 2008).

The next variables were Exc_{it} and Exc_{jt} which were Indonesian currency real exchange rate and partner countries currency real exchange rate per US\$ dollar. The literature suggested that the appreciation of exporter currency can decrease exports due to increasing export price (Greene, 2013). On the contrary the depreciation of exporter currency could enhance export (Karemera et.al, 1999). AFTA_{ijt} is dummy variable if Indonesia and partner country are member of ASEAN free trade agreement (AFTA). The formation of free trade agreement by Indonesia and partner countries was ex-

pected to boost the volume and value of Indonesian agriculture export in the reason of FTA would reduce or even remove tariff and nontariff barriers (Kristjánsdóttir, 2005).

Panel data was used in this study. The reason for using this type of data was because panel data could give empirical analysis in a way that is not feasible if just use a cross-section or time series data. According to Wooldridge (2013), there are four types of panel data estimation model: Pooled OLS, Fixed Effect Model (FEM), Random Effect Model (REM) and First Difference (FD).

In order to choose which is the best effective model for this research among estimation models, Hausman Test is applied. The null hypothesis that underlying the Hausman test is that REM is more preferable. The test statistic developed by Hausman has an asymptotic χ^2 distribution. By testing the model, we are able to choose the best estimation model based on the available data set and eventually we will make the proper analysis. (Wooldridge, 2013).

Egger (2000) pointed out that the random effects model (REM) would be more appropriate when estimating trade flows between randomly drawn samples of trading partners from a larger population. While, the fixed effects model (FEM) would be a better choice than REM when one is interested in estimating trade flows between a predetermined selection of nations. Since the sample of this study includes trade exchanges between Indonesia and its trading partners, the FEM might be the most appropriate estimation. However, Hausman test is also conducted to check whether the REM is more efficient than the FEM estimation.

The yearly data of agricultural export commodities were obtained from United Nation Commodity Trade Database (UN-Comtrade, 2016). The data on GDP (real value in the 2010 base year), population and exchange rate are obtained from the database of the World Bank (World Bank, 2016). Data of Free Trade Agreement (FTA) were from World Trade Organization (WTO) regional trade agreement database, ASEAN secretariat and the official website of AFTA. While the data on distance were collected from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII, 2016) and the data of irrigated land were collected from Food and Agriculture Organization (FAO, 2016). This study used panel data that covered for periods 2000-2014. This period was selected as it covers the time when the liberalization on agriculture product under AFTA were enforced.

RESULT AND DISCUSSION

Table 1 and Table 2 demonstrated the estimation results of gravity model of Indonesian agricultural exports with their trading partners for year 2000 to 2014. The Hausman test and Wald test showed that the Fixed Effect Model (FEM) was found to be the most suitable model for this study.

TABLE I. GRAVITY MODEL USING FIXED EFFECT MODEL

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR	P-VALUE
Constant	-97.379***	5.803	0.000
LnGDP _i	1.943***	0.222	0.000
LnGDP _j	1.331***	0.239	0.000
LnDist _{ij}	Omitted	Omitted	Omitted
LnPop _j	1.677***	0.357	0.000
LnLand _j	0.285	0.194	0.142
LnExci	-0.647**	0.327	0.048
LnExcj	0.057	0.065	0.384
AFTA	-0.040	0.146	0.785
R-squared	0.928		
F-statistic	149.485		
Prob.(F-statistic)	0.000		
No. Observations	495		
Estimation Method	FEM		

Note: ***/**/* significant at 1%, 5%, and 10% level.
N is number of observations.
Dependent variable: Ln (Indonesian agricultural exports)
Source: Author's calculation using E-Views.8

Table 1 indicates the result of panel data estimation of 495 observations of Indonesian agricultural exports with their trading partners for year 2000 to 2014. The R² value presented in the Table I shows 0.928 value means that 92.8 percent of the variation on Indonesian agricultural exports across the data set could be explained by the model.

The estimated coefficient of the LnGDP_i denotes Indonesian national income (GDP) was positive and statistically insignificant effect on export. The magnitudes for this variable was 1.943 bear a meaning that 1 percent increase on Indonesian GDP would increase Indonesian agricultural export by 1.9 percent. This result revealed that the positive growth on Indonesian economy has positive impact on Indonesian agricultural exports. LnGDP_j as a proxy for the income effect of the partner country size of economy also show positive sign as expected and statistically significant on exports. The coefficient of partner countries GDP was 1.331 means that 1 percent increase on importer income would boost Indonesian agricultural exports by 1.3 percent. This result indicates that the growth of partner countries income

leads to increase exports. This result in line with other study which was concluded that big country trade more than small countries in agricultural commodities (Grant and Lambert, 2005).

TABLE 2. INDIVIDUAL EFFECT REGRESSED WITH TIME-INVARIANT VARIABLE

Independent Variable	Coefficient	Standard Error	p-Value
LNDist _{ij}	2.169***	0.012	0.000
R-squared		0.552	
No. Observations		495	
Estimation Method		FEM	

Note: ***/**/* significant at 1%, 5%, and 10% level.
Source: Author's calculation using E-Views.8

The estimation result of distance as mentioned on Table 2 surprisingly showed unexpected positive value and statistically significant impact on Indonesian agricultural export. The positive effect of distance on exports was happened may due to some reasons. According to Dreyer (2014), the variable of distance could have a positive effect on agricultural trade because of distance are not only represent transportation cost but also the differences on climate, land and agriculture products among partner countries. The misaligned of distance also revealed that distance was not an obstacle factor for Indonesia to develop trade with partner countries around the world. Regarding with the result on distance effect, from 33 partner countries in this study, around 80.50 percent of Indonesian exports (value \$ 190.22 Billions) over the year 2000-2014 are not to neighboring ASEAN countries but spreads over the globe from Asian countries like India (4,998 km) and China (5,221 km), to European countries Netherland (11,362 km) and the farthest partner countries United States of America (16,371 km). One of the reason is the development in transportation and technology which is leads to the more efficient and cheaper transportation cost. Nowadays transportation cost is not a big portion of trade cost since the marginal cost of land and shipping transportation is low (Wu, 2015).

Furthermore, the population of partner country as represent in coefficient LnPop_j shows as expected in positive sign and statistically significant effect on Indonesian agricultural exports. Partner countries population as an importer is expected to have positive impact on agriculture export for the reason that larger market tends to consume more importer goods (Lambert and Mc.Coy, 2009). The magnitudes for this variable was 1.677 bear a meaning that 1 percent increase on Indonesian partner countries population would rise Indonesian agricultural export by 1.7 percent.

The next variable is partner countries irrigated land. This variable has an unexpected positive sign but statistically insignificant effect on agricultural exports. This means that the extent of irrigated land owned by partner country does not effect on Indonesian agricultural export. The insignificant effect of land on export may due to the difference on climate, which is caused by different types of agriculture commodities (Wu, 2015). So, even the importing countries have larger irrigated land but they still need agriculture product from Indonesia.

Moreover, the variable real exchange rate of Indonesia (Exci) shows negative sign and statistically significant. Real exchange rate of Indonesia represented the fluctuation of Indonesian currency Rupiah. The negative result of Indonesian Rupiah exchange rate indicated that price competitiveness was important factor on Indonesian agriculture exports (Greene, 2013). The coefficient of real exchange rate of Indonesia was -0.647 means that 1 percent appreciation of Rupiah would lower Indonesian agricultural exports by 0.65 percent. Whilst real exchange rate of importer countries (Excj) showed positive value but statistically insignificant, meaning that fluctuation of partner country's currency exchange rates did not effect on exports. The insignificant effect of change in partner countries real exchange rate indicated that low exchange rate risk was not the determinant factor for importer countries to buy Indonesian agricultural products (Folaweo and Olokojo, 2010).

The dummy variable ASEAN Free Trade Area (AFTA) as a proxy of country's economic integration within ASEAN shows unexpected negative value but statistically insignificant impact on Indonesian agriculture commodity exports. The insignificant effect of the formation of AFTA on agricultural export might because the liberalization on agriculture commodities was growing slowly since agriculture commodities often excluded from the reduction on tariff within FTA and even included in the agreement, tariff reduction on agriculture commodities often takes longer time than other commodities. For instance, the agriculture liberalization on AFTA, even AFTA agreement been in effect since 1993, but agricultural commodities were excluded on reduction tariff in AFTA agreement (agricultural product were included in the sensitive and highly sensitive list). Trade liberalization on agricultural commodity within AFTA start in 1 January 2003 for ASEAN-6 (Indonesia, Malaysia, Singapore, Thailand, the Philippines and Brunei) and completed in 1 January 2010 for all member countries.

Another reason may because ASEAN has small market size in the global economy and most international trade by Indonesia are with non-ASEAN countries. Indonesian agricultural export to 10 ASEAN partner countries on the data set in this study only 21.4 percent (value \$ 51.75 billions) compare with non-ASEAN countries counted more than 78.6 percent (value \$ 190.22 Billions) of total Indonesian agriculture export over the year 2000-2014. Hence, the expected gain from tariff reductions under the AFTA scheme was very small since the tariff reduction was applied only to ASEAN members. This result is in line with other study by Dianiar (2013) which was pointed out that the participation on AFTA did not bring significant effect on Indonesian agricultural exports commodities.

CONCLUSION

The objective of this study is to employ an "augmented" gravity model of international trade to empirically analyze the impact of ASEAN Free Trade Area (AFTA) on Indonesia's agricultural exports during the years 2000-2014. The gravity equation included standard gravity variables plus dummy variable AFTA. The results are based on the study of 33 Indonesian trading partners over 15 years' period. Regression analysis was performed on panel data in three ways: pooled OLS, the random-effect model, and the fixed-effect model. The fixed-effect model was selected because it fits the data and more efficient than either pooled or the random-effect models.

The result shows that conventional variable of the gravity model (i.e. GDP as size of economy and population) has significant impact on Indonesian agricultural exports. Unexpected sign is shown also by independent variable distance which has positive and significant effect on exports. The other variables partner countries irrigated land (LAND) has positive sign but statistically insignificant. The variable of Indonesian real exchange rates shows as expected in negative sign and bring significant impact on Indonesian agricultural exports. While partner countries real exchange rates were positive but insignificant impact on export. An unexpected result was found on the participation on AFTA. Trade liberalization within AFTA was not significant and profitable on Indonesian agriculture exports.

The policy implication that can be suggested from this research is that Indonesia should explore more benefit from their membership in AFTA, particularly related to agricultural products trading agreements. Lattermost, this research

employed few on its explanatory variable. Hence, for further development of this study it is obligatory to consider include more explanatory variable that already proved by other previous research, such as dummy variable common language, colonial link and investment.

REFERENCES

- Amin, R. M., Hamid, Z., & Saad, N. M. 2009. Economic Integration Among ASEAN Countries: Evidence from Gravity Model. *Working Paper*. East Asian Development Network; p-79.
- ASEAN Secretariat. 1992. Agreement on the Common Effective Preferential Tariff Scheme for the ASEAN Free Trade Area (Online). Accessed: 7 December 2016. <http://www.asean.org>
- Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). 2016. CEPII's Distance and Geographical Database (Online). Accessed: 3 December 2016. <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>.
- Dianniar, U. 2013. The Impact of Free Trade Agreements on Indonesia's Agricultural Trade Flows: An Application of the Gravity Model Approach. *Thesis*. International Institute of Social Studies. The Hague, The Netherlands.
- Dreyer, H. 2014. Misaligned distance: why distance can have a positive effect on trade in agricultural products. Institute of Agricultural Policy and Market Research, University of Giessen, Germany. *Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2014 AAEA Annual Meeting, Minneapolis, MN, July 27-29, 2014*.
- Egger, P. 2000. A note on the proper econometric specification of the gravity equation. *Economics Letters, Journal Austrian Institute of Economics Research* 66: 25-31.
- Erdem, E. & Nazlioglu, S. 2008. Gravity Model of Turkish Agricultural Exports to the European Union. *Working Paper*. International Trade and Finance Association 2008. The Berkeley Electronic Press (bepress).
- Food and Agriculture Organization (FAO). 2016. Area Equipped by Irrigation Data. Accessed 17 December 2016 <http://www.fao.org/nr/water/aquastat/irrigationmap/index.stm>.
- Folawewo, A. O., & Olokojo, S. A. 2010. Determinants of agricultural exports in oil exporting economy: empirical evidence from Nigeria. *Journal of Economics Theory*: 84-92.
- Ghosh, S. & Yamarik, S., 2004. "Are preferential trade agreements trade creating? An application of extreme bounds analysis". *Journal of International Economics*: 369-395.
- Grant, J. H. & Lambert, D. M. 2005. Regionalism in world agricultural trade: lesson from gravity model estimation. *Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Providence, Rhode Island, July 24-27, 2005*.
- Greene, W. 2013. Export Potential for U.S. Advanced Technology Goods to India Using a Gravity Model Approach. Office of Economic Working Paper. Office of Economics U.S. International Trade Commission. No. 2013-03B. Washington DC.
- Karemera, D., Smith, W. I., Ojah, K., & Cole, J. A. 1999. A gravity model analysis of the benefits of economic integration in the Pacific Rim. *Journal of Economic Integration* 14(3): 347- 367.
- Kristjánsdóttir, H. 2005. A Gravity Model for Exports from Iceland. *Working Paper*. Centre for Applied Microeconometrics University of Copenhagen. Copenhagen, Denmark.
- Lambert, D. & McKoy, S. 2009. Trade creation and diversion effects of preferential trade associations on agricultural and food trade. *Journal of Agricultural Economics* 60 (1): 17-39.
- Ndulu, B., Kritzingervan, L., & Reinikka, R. 2005. Infrastructure, Regional Integration and Growth in Sub-Saharan Africa. *Working Paper*. Africa in the World Economy - The National, Regional and International Challenges, Fondad, The Hague, December 2005. pp.101-119.
- Oktaviani, R., Puspitawati, E., & Haryadi. 2008. Impacts of ASEAN Agricultural Trade Liberalization on ASEAN-6 Economies and Income Distribution in Indonesia. *Working Paper*. Asia-Pacific Research and Training Network on Trade (ARTNeT), an initiative of UNESCAP and IDRC, Canada.
- Sohn, C. H. 2005. Does the gravity model explain South Korea's trade flows. *The Japanese Economic Review* 56(4): 417-30.
- Statistics Indonesia. 2016a. GDP at 2000 Constant Market Prices by Industrial Origin, 2000-2014 (Online). Accessed 2 December 2016. <https://www.bps.go.id/linkTabelStatis/view/id/1206>
- Statistics Indonesia. 2016b. Population 15 Years to Top Who Worked by Main Industry 1986-2016 (Online). Accessed 2 December 2016. <https://www.bps.go.id/linkTabelStatis/view/id/970>
- Tinbergen, J. 1962. *Shaping the World Economy, Suggestions for an International Economic Policy*. Twentieth Century Fund, New York.
- UN-Comtrade. 2016. International Trade Statistic Database. United Nations Commodity Trade Database (Online). Accessed 7 August 2016 <http://comtrade.un.org/data/>
- Wooldridge, J. M. 2013. *Introductory Econometric, A Modern Approach*. South Western CENGAGE Learning, Canada.
- World Bank. 2016. World Development Indicators (Online). Accessed 2 August 2016 <http://data.worldbank.org/data-catalog/world-development-indicators>
- World Trade Organization (2016). Regional Trade Agreement Database (Online). Accessed: 2 December 2016. https://www.wto.org/english/tratop_e/region_e/region_e.htm.
- Wu, Haonan. 2015. Revisiting the Distance Coefficient in Gravity Model. Cornell University Library. USA. Accessed: 2 December 2016. <https://arxiv.org/abs/1503.05283>
- Zahniser, S.S., Pick, D., Pompelli, G., & Gehlhar, M.J. 2002. Regionalism in the western hemisphere and its impact on U.S. agricultural exports: a gravity-model analysis. *American Journal of Agricultural Economics* 84(3): 791-797.