



PARAMETER ESTIMATION OF QUADRATICS ALMOST IDEAL DEMAND SYSTEM OF ANIMAL PROTEIN IN INDONESIA USING GENERALIZED METHOD OF MOMENTS

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Background

According to CBS (2014) Indonesia consumption patterns was 85% obtained from vegetable protein, and only 15% obtained from animal protein. Quadratic Almost Ideal Demand System (QUAIDS) model is one of demand function system model that developed by Banks (1997) by adding the quadratic income variable in an AIDS model. The application of QUAIDS model widely applied by researchers in various areas. However QUAIDS model application in Indonesia has not been widely applied to study in Indonesia. One study that using QUAIDS model as demand analysis in Indonesia is Virgantari (2010) on estimating demand function of fish products in Indonesia. Although AIDS and QUAIDS model are fit but QUAIDS model give better results than AIDS model with great determination coefficient and give more significant number of independent variables than AIDS model. The main problems in the demand consumption system of animal protein in Indonesia are nonlinear system and restriction that causes parameter on QUAIDS model have a strong relationship between expenditure, income, and price with big residual result and possibility to have errors that do not normally distributed. Number of moment condition more than number of parameters in the system model causes the estimating parameters model cannot be done. Therefore, Generalized Method of Moments (GMM) is used to avoid these problems.

Research Aim

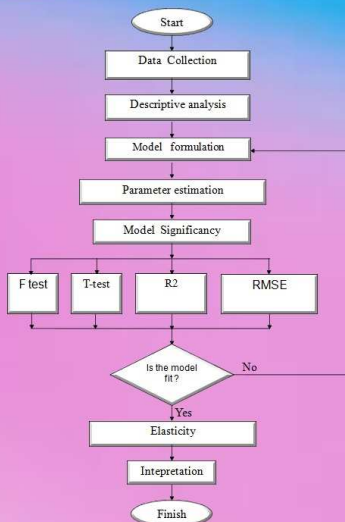
This study aims to determine best estimator to estimate parameter of demand function of animal protein in Indonesia. Demand function to be used is the Quadratic Almost Ideal Demand System (QUAIDS) model

Research Methodology

Data

Data used in this study are household consumption/expenditure data collected by Central Bureau of Statistics (CBS) in 2014 in 36 provinces in Indonesia. Animal protein is grouped into 3 categories, namely fish, meat, egg and milk. Type of region (rural/urban) are added to the model.

Analysis



Results and Discussions

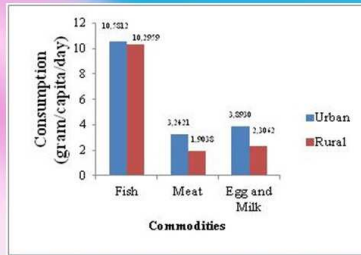


Figure 1. Daily Consumption of Fish, Meat, Egg and Milk in Indonesia in Rural and Urban Area

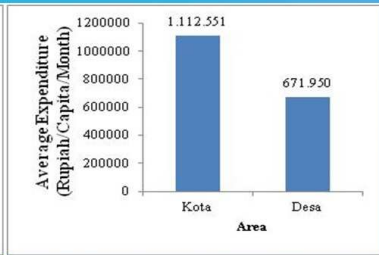


Figure 2. Monthly Household Expenditure per Capita in Indonesia by Rural and Urban Area

Table 1. Parameter Estimate on Fish, Meat, Egg and Milk Demand Function with GMM Estimation

Variabel	Fish	Meat	Egg and Milk
$F_{fishing}$	34.6271*	16.7742*	19.1615*
Intersep	0.7250*	0.0207	0.2543*
Ln of fish price	-0.0600*	0.0131	0.0469*
Ln of meat price	0.0131	0.0803*	-0.0934*
Ln of egg and milk price	0.0469*	-0.0934*	0.0465
Ln of expenditure	-0.2635*	0.3285*	-0.0650*
Quadratic of Ln Expdtr	-0.1155	-0.0697	0.1852*
Area	-0.0178	0.0312*	-0.0197
R^2	0.6926	0.5198	0.5563

* Level of significance : 10%

Table 2. Price and Expenditure Elasticity

Commodity	Expenditure Elasticity	Price Elasticity		
		Fish	Meat	Egg and Milk
Fish	0.2056	-0.5402	0.0537	0.2809
Meat	2.2982	-0.9656	-0.4843	-0.8483
Egg and Milk	1.6049	-0.2175	-0.4145	-0.9730

Conclusions

Fish commodities is the most consumed commodities by peoples in urban and rural areas. While meat commodities are significantly more consumed by people in urban areas.

Based on fitted model test and restriction assumption on QUAIDS model show that QUAIDS model with GMM estimator is fit to be used as animal protein food consumption model in Indonesia. All independent variables which on QUAIDS model affect to share expenditure of consuming animal protein food simultaneously. Share expenditure to consume animal protein food is affected by animal protein food price change and income household change.

Based on own price elasticity show that fish, meat, egg and milk are classified as inelastic. Result of cross price elasticity show that fish commodities are substitute goods for meat, egg and milk commodities. Meat commodities are complement goods for fish, egg and milk commodities. For egg and milk commodities are complement goods for fish and meat commodities.

Concluding Remarks

Result of low determination coefficient indicate that possible to have correlation between error from used equations in the model. Simulation in GMM estimator can be used in next research to solve this problem.

In order to all peoples in Indonesia can consume animal protein food to satisfy protein nutrition needs, then government should maintain the stability of animal protein food prices, especially which have been become basic needs. Furthermore, the government must increase incomes in rural areas so that people can consume animal protein food in Indonesia at affordable price.

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