Household Budget and Calorie Consume of Livestock Products: Evidence from Indonesia

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ABSTRACT

This study intends to capture the household budget of livestock products consumption and its calorie consume in six provinces of Java Island in Indonesia. An empirical analysis is made by employing simple Engel model and the descriptive analysis. The result suggested that both household in urban and rural area spent their income for meat higher than that of egg and milk. In other words, as income increase consumption of meat responds much faster than consumption on egg and milk. The calories consume from meat, egg and milk consumption are still low, under government's recommendation.

Keywords: Household budget, calorie consume, livestock products

INTRODUCTION

Livestock product is important animal protein source for Indonesian consumers. Even the average consumption of protein in Indonesia above of the amount of recommendation but consumption on animal protein still low. Overall, animal protein still 21.56 percent from the total recommendation of protein consumption. High proportion of consumption of food is rice (49.61 percent). The low consumption of animal protein in Indonesia due to high price of animal protein compare with that of vegetable protein. In other words, purchasing power is the main factors of animal protein consumption (see Martianto, 1995; Hermanto et al., 1996; dan Erwidodo et al., 1998).

However, the average of meat, egg and milk consumption of Indonesian people is relatively low as compared with that of other countries like Malaysia, Philippine, and Thailand. Annual per capita consumption of meat is relatively low as compare with that of Malaysia (36.7 kg/cap/year), Thailand (13.5 kg/cap/year) and Philippine (7.5 kg/cap/year). Consumption of milk reached 8 liter/cap/year still lower than that of Malaysia (25 liter) and India (45 liter). The highest rate of consumption in livestock products is egg   compare with Malaysia (14.4 kg/cap/year) and Thailand (9.9 kg/cap/year).

Livestock products such as meat and dairy products have higher responsiveness than do cereals (Chernichovsky and Meesook, 1985; Hutasuhut et al, 2002; Ariningsih, 2004, Warr, 2005; Bond et al, 2007). Hence, the share of expenditure allocated to livestock product food groups increases faster than the share for other food groups when consumer's income rises (see Seale et al, 2003). As follow Bennet`s law that as incomes rise the share of `starchy staple` in diet decline (Bennet, 1941).

There is positive relationship between level of income and the consumption of livestock products, with the consumption of meat, milk and eggs increasing at the expense of staple foods (WHO). Animal protein food is more elastic to the change of income that that of vegetable protein such as soybean curd and soybean cake.

Other important problem in demand analysis besides modeling to explain the relationship among the quantity consumed of a single commodity, its price and the prices of its related commodities, and total income, is concerning on allocating expenditure of different commodities (Yoshihara, 1969).

The objectives of this study are to analyzed expenditure pattern of household on livestock products and to analyze the correlation between expenditure of livestock products and the income from estimation of Engel Function for livestock products

MATERIAL AND METHODS

Household Expenditure Survey (SUSENAS) data were used in this study. The 2008 SUSENAS survey was conducted by Central Bureau of Statistics (CBS) which is involved by sample households in Indonesia. In this study, we used raw household data record from six provinces in Java. Households were dividing into three categories; low, middle and high income in rural and urban area.

Measuring expenditure is important to know how much money household allocate for livestock products. In this study expenditure behavior of household will analyze with Engel analysis. In this cross-section data there is no time for price to change, so price to be constant. Linier Engel model in this study is formulated as follow

$$\log w_i = \alpha_i + \beta_i \log(Y) + \varepsilon_i$$

Where w_i is expenditure on ith commodity, Y is household income, α_i and β_i are coefficients regression, and ε is an error term. This model specification allows luxuries ($\beta>0$), necessities ($\beta<0$), and inferior goods. The expenditure elasticity can be derived from

$$\varepsilon_i = \left(1 + \frac{\beta_i}{w_i}\right)$$

Expenditure elasticity measures the expected change in quantity demanded of a specific product, as the expenditure on livestock product is increased. If the calculated expenditure elasticity is positive and greater than one, the product is classified as a luxury product. A positive expenditure elasticity ranging between zero and one indicates a normal product, whereas negative expenditure elasticity is indicative of an inferior product.

The model has the advantage of being valid for all income groups; and the implied elasticity behavior is a slow decline with differences between elasticities remaining constant, which is quite plausible (Leser, 1963)

RESULT AND DISCUSSION

Analysis of livestock products consumption of household can be estimate by using household expenditure data. Magrabi et al (1991) mentioned that expenditure data summarized information in single statistic and convenient to use.

Average proportion of expenditure for meat, egg and milk (dairy products) compare to other food expenditure in rural and urban is presented in Figure 1. Food expenditures covered all food items included in the survey such as rice, pulses, eggs and milk products, vegetables, fruits and nuts, fish and meat, and beverages.

Residential locations also appear to be an important determinant of food consumption. This variable was found to have a positively or negatively significant impact depending on the specification of the location (Mazengo et al, 1997). Of the total number of respondents, 46%

of the household observations used were located in urban areas and the other 54% were located in rural areas. Rural households showed a higher expenditure share on food compared to urban households in all provinces except Jakarta province. Food expenditure of households in rural areas represented more than 50% of total expenditure and 44% for households in urban areas. Urban households were reported that livestock product consumption spent 1.7 times compared to rural households livestock product consumption. The livestock products expenditure accounted for 23.15% of urban household total food expenditure, which is much higher compared to the 19.6% for rural households. The total expenditure of urban households was 3.05 times higher than the total expenditure of rural households.
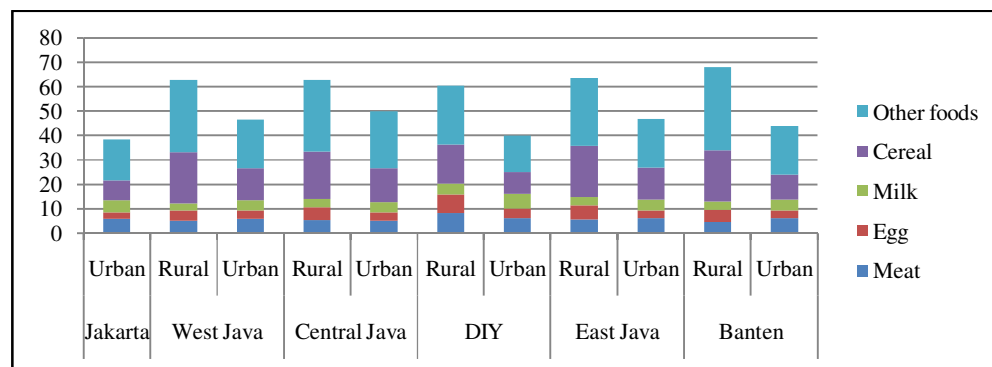

Figure 1. Proportion of selected food expenditure to total Food expenditure in Java (%)

Households in urban consumes far more meat and milk. We can see that households allocated a large percentage of budgets on meat and milk. In rural, households allocate smaller budget shares on meat while spent relatively much more on egg.

Table 1. Engel Model Estimation and Correlation Analysis

Income	Commodity	Region		Engel Model	Urban		Rural	
		Rural	*Urban*		*Coef*	*SE*	*Coef*	*SE*
	Meat	0.006	0.088**	*Meat*				
Low	Egg	0.033	0.129**	Intercept	2.32	0.14	5.8	0.15
	Milk	0.014	0.082**	Total income	1.35	0.02	0.71	0.03
	Meat	0.189**	0.298**	*Egg*				
Middle	Egg	0.156**	0.192**	Intercept	2.26	0.05	2.63	0.05
	Milk	0.124**	0.185**	Total income	0.33	0.01	0.27	0.01
	Meat	0.042	0.357**	*Milk*				
High	Egg	0.022	0.134**	Intercept	1.29	0.09	2.03	0.08
	Milk	0.046*	0.178**	Total income	0.53	0.02	0.36	0.01

** Correlation is significant at the 0.01 level.   * Correlation is significant at the 0.05 level.

The Pearson Product Moment Correlation Coefficient is the most widely used measure of correlation or association. Pearson's correlation coefficient (r) is a measure of the strength of

the association between the two variables. Each of the livestock products is significantly correlated with various income groups in urban area. As observed in Table 1, meat, egg and milk in urban area is correlated positively and significantly with income for low, middle and high income group. But at same time, expenditure on livestock products is not correlated with income in rural area for low income group. Among three income group in the rural area, consumption on meat and egg for household in the high income group is highest, so as income increase did not responsive to the change of expenditure on these food.

As shown by positive income parameter in the Engel function, the proportion of expenditure on meat, egg and milk will in increase with an increase in household income. Expenditure on egg and milk had income elasticities smaller than unity (necessity). The expenditure on meat products in urban area was the only commodity having income elasticity greater than one (luxury good).

The elasticity of livestock products expenditure was higher than that of expenditure for household in rural area. This suggests that as total income increase, expenditures for livestock products in urban area may increase more rapidly than expenditures for livestock products on rural household. Both household in urban and rural area, household will spent their income for meat higher than that of egg and milk. In other words, as income increase consumption of meat responds much faster than consumption on egg and milk.

Generally, the expenditure elasticities for selected food groups such as livestock products in Indonesia are relatively high. This can be explained by the economic situation in Indonesia. Many households, especially the poor, face tight budgetary constraints. As Fabiosaet al (2002) mentioned that households substituted away from more expensive food groups to cheaper alternatives.

The contribution of the various livestock products to protein, carbohydrates and calorie intake presented in Figure 2. The calculation was based on some main livestock products which are consumed. Calorie consume in DKI Jakarta province is higher in all category of livestock products while East Java province has the lowest ones. Results for 2008 indicate that calorie consumption is highest in DKI Jakarta province for meat products while West Java is the lowest one. Although it was based on households' recall of their livestock products food consumption the previous week, the collection method organized from good sample frame method in 2008 survey. Of the six provinces in Java in Figure 2, the one that came closest to Jakarta Province in terms of calories in the diet derived from livestock products is Banten. The calorie intake from livestock products of the average Banten was 115.70kcal compare with 95.19 kcal in DIY Province and 94.37 kcal in Central Java Province.
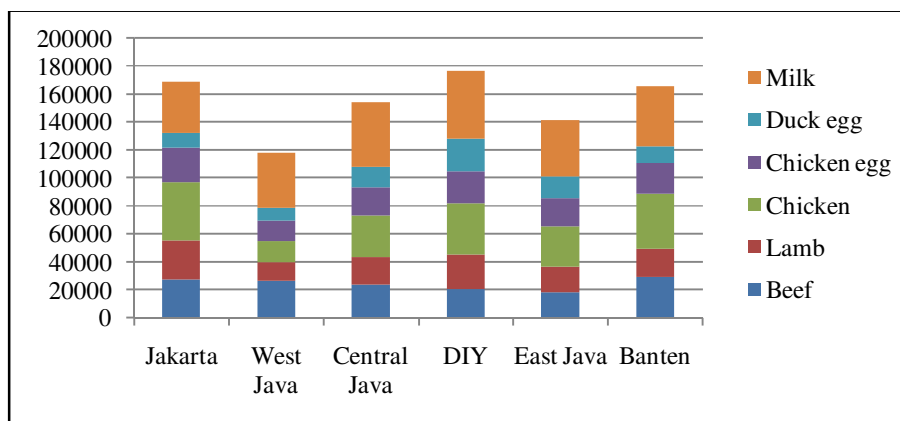

Figure 2. Calorie consume per person per day derived from some livestock products

The situation with regard to livestock products as a source of fats and protein was similar to that with regard to livestock as a source of calories. Fat and protein per person per day derived from livestock products were presented in Figure 3. DIY Province became highest fat consumers from livestock products, followed by Jakarta and Banten. DIY consumers obtained 52.6 g of fat per day on average, while Jakarta and Banten, more economically advanced provinces, consumed 50.7 g and 49.6 g of fat, respectively, from livestock products.Protein consumption based upon livestock products was also high in the three provinces (DIY, Jakarta, and Banten).

The rise in income and the expansion of western style fast food restaurant associated with situation is leading to lifestyle changes that are influencing consumer purchases and food choices (see INSTATE, 2004). Economic situation, both national and each household,
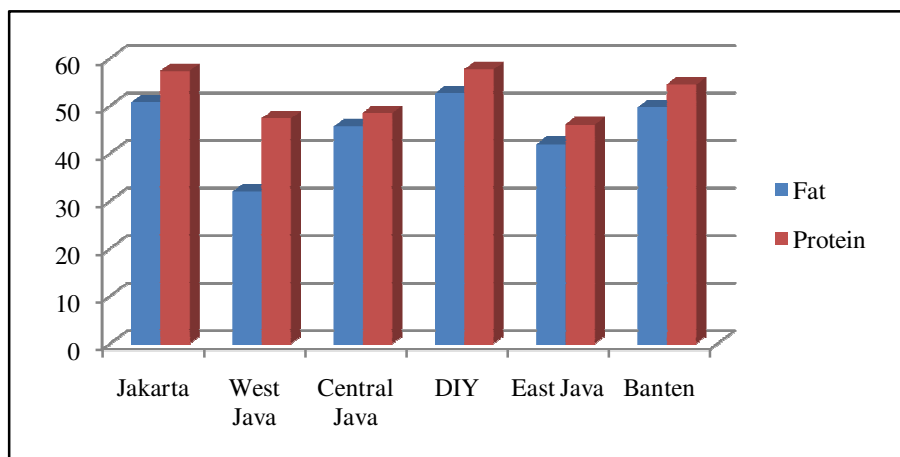
Figure 3. Fat and protein per person per day derived from livestock products (g)

CONCLUSION

This study revealed household in urban and rural area, household will spent their income for meat higher than that of egg and milk. In other words, as income increase consumption of meat responds much faster than consumption on egg and milk. The calorie consumes from livestock products consumption was still low, under national nutrition standard. Those advocating these animal protein source consumption programmes believe will increase protein consumption from livestock products in the future, and forecasts of per person consumption of almost any livestock products food is complicated task economic and non-economic factors drives consumption.

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