Allocation of Expenditure for Livestock Products Foods in Indonesia: Working-Leser Approach

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ABSTRACT

The paper deals with the dependence of the share of households' livestock products food expenditure on the total expenditure and the household's size. This problem is important in applied welfare economics. In the study, the Working-Leser model was applied to household's expenditure data for year 2011, 2012, and 2013. The results of the analysis reveal that basic characteristics of households, such as the household's size, have direct effects on the consumption patterns of households. Estimated expenditure elasticities for food groups are positive and less than one except for beef, as they moved up to the necessity commodities in 2011-2013. The estimated expenditure elasticities for food groups have decreased significantly over the time, caused by an increase of total expenditure. Consistent with Engel's law, households with lower total expenditure make bigger changes in food expenditure than those with higher total consumption expenditure. These indicate that income has a positive effect on the diversity of these foods group. Share of expenditure for food generally increased with the household's size. In most samples demand for beef, poultry meat, egg, and milk is expenditure and own-price elastic. On average all food groups investigated are found to be normal goods.

Keywords: Consumption expenditure, Expenditure elasticity, Livestock products.

INTRODUCTION

The percentages of population's expenditure for consumption compare to the condition in 2010 tend to decrease, although with the small number of percentage. This indicates the better condition of people's welfare

Most studies of consumption in Indonesia focus on staple food. Consumption on livestock products considering household characteristics is also important to analyze. Food consumption analysis with some socioeconomic variable commonly use classical demand models which are quantity demanded as function of price, income and other factors. Consumption analysis can be explored by using food expenditure condition of household, not only quantity consumed data. Huang and Gale (2009) believe that expenditure on food can be faster than its quantity.

Household size was found to have significantly positive impact on household food expenditure (Hatloy et al, 2000). Armagan and Akbay (2008) investigated some socio-demographic factors on the demand of animal product. They found that household size,

education, age and the employment status of household head were impact to the consumption of milk, cheese, meat and fish.

The aim of this work is, firstly, to provide an overview of consumption expenditure of households and, secondly, to present econometric estimations of food expenditure share in the total household's expenditure and its elasticities, taking into account the differences in size of households.

MATERIALS AND METHODS

The data used come from the detailed consumption module of the 2011, 2012, and 2013 SUSENAS raw data for DI Yogyakarta (here after DIY Province). We use consumption/expenditure module to study livestock products consumption. The expenditure data is household level. The food expenditure is one week recall information with detailed categories. Aggregate household expenditures on food consumption are last one year expenditure, last month, and average monthly expenditure.

In this econometric approach the Working-Leser model was used. The model was estimated using household survey microeconomic data collected by the DIY Province Central Bureau of Statistics.

Explanation of the food expenditure share may be done parametrically by estimating a functional equation relating the food expenditure to the total expenditure and other household characteristics. For this purpose we employ the so called Working-Leser specification where budget shares are linear in the logarithm of total expenditure (Deaton and Muellbauer 1999). The Working-Leser model Working (1943) and Leser (1963) was extended by Deaton and Muellbauer to include the effect of prices

$$w = \alpha + \beta \ln x + \varepsilon \ \ldots\ldots \quad (1)$$

where w is the share of expenditure for selected food i.e. meat, poultry meat, egg, and milk in the total food expenditure; x is the total household expenditure; α and β are unknown parameters to be estimated, ε is an independently identically distributed error with a normal distribution of zero mean and standard deviation of sigma. Working-Leser specification can be extended to include the effect of household' size:

$$w = \alpha + \beta \ln x + \gamma \ln n + \varepsilon \quad \ldots.. \quad (2)$$

where n is the household size and γ an unknown parameter to be estimated.

In this study, one of the most important concepts in economics, i.e. elasticity, is applied. Elasticity is a measure of the sensitivity of one variable to changes in another variable. If we denote food expenditures as f, i.e. $w=f/x$, then applying to the Working-Leser model (2) we obtain a formula:

$$E_x f = 1 + \frac{\beta}{\alpha + \beta \ln x + \gamma \ln n} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Elasticity $E_x f$ informs about a proportionate change of food expenditure in response to a change in the total expenditure. It varies with the total household expenditure.

RESULTS AND DISCUSSION

Figure 1 presents some selected food expenditure and the food expenditure of DIY Province households. Decreasing share of these foods expenditure in the total food expenditure decreased except for meat products in the decade 2011-2013. For instance,

expenditure share for egg decreased 9.25% in 2013 from 18.7% in 2011 but the share of meat expenditure increased 11.07% in the same period.
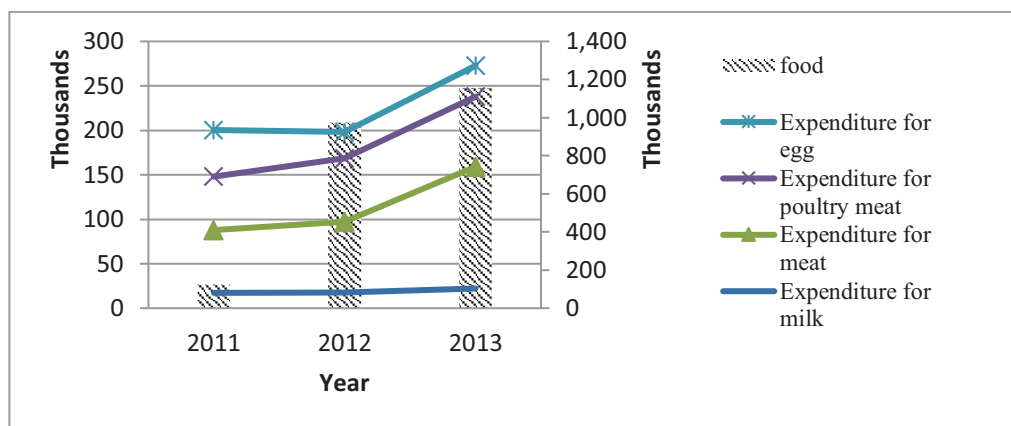

Figure 1. Expenditure of selected foods of households' sample

The results of the analysis reveal that basic demographic characteristics of households, such as the household's size, have direct effects on the consumption patterns of households.

Differences between shares of food expenditure depending on the household size for the range of total expenditure on food are presented in Figure 2. It showed that a decreasing trend of per capita consumption with respect to household size. Some of the food items reached a peak where there were one or two persons in a household. This is understandable since most of these household members are adults. As to a household with more than four persons, usually the additional member is either a child or an elder family member; dramatically reduced per capita consumption is expected since these additional family members usually do not need as much these foods as the two adult members.
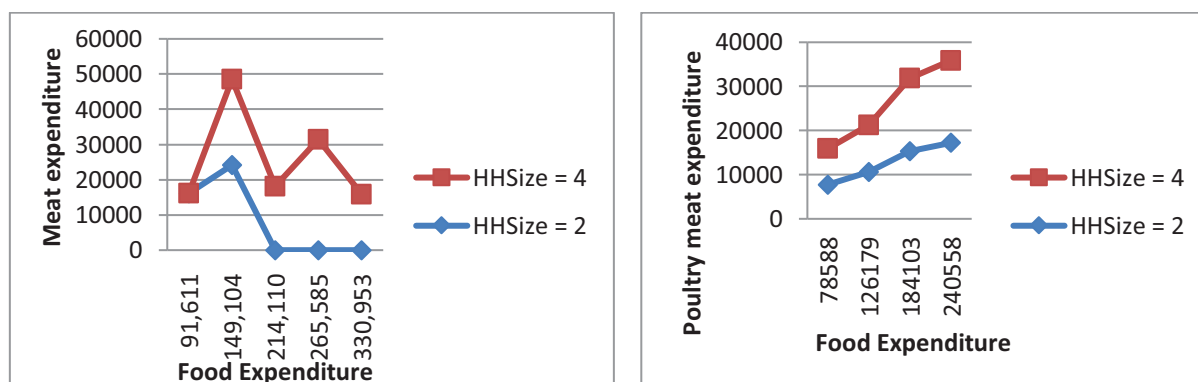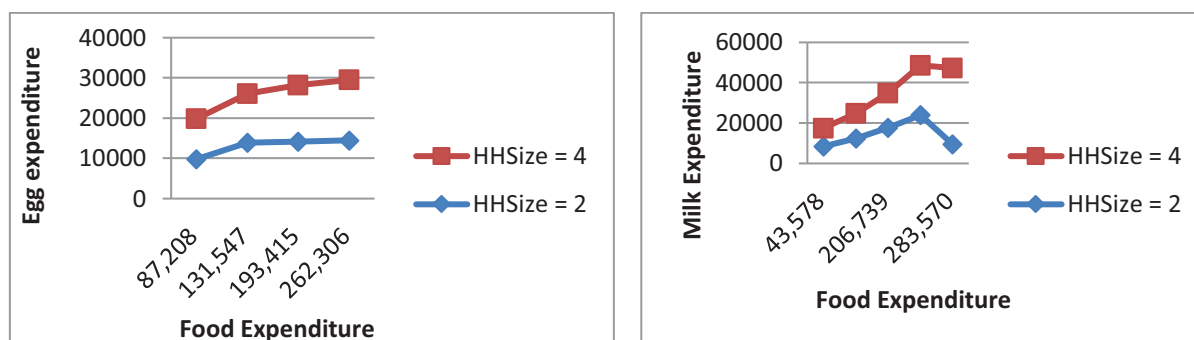
Figure 2. Expenditure for selected food in the total monthly expenditure on food in 2013

Estimated expenditure elasticities for food groups are positive and less than one except for beef, as they moved up to the necessity commodities in 2011-2013. The estimated expenditure elasticities for selected food groups have decreased significantly over the time, caused by an increase of total expenditure.

A regression analysis confirmed the Engel's law. We obtained a positive sign for the total food expenditure as a determinant of these food expenses share in the total expenditure. In contrast, the number of persons in a household turns out to be a positive factor for this share. Detailed estimation results are presented in Table 1.

Table 1. Estimates of parameters of model

Estimates of parameters		α	β	γ
2011	Meat	1.593 (-1.127)	0.664 ** (-5.468)	0.045 (-0.392)
	Poultry	-0.582 (-1.212)	0.822 ** (-19.566)	0.089* (-2.119)
	Egg	3.67** (3.463)	0.476 ** (-5.169)	-0.022 (-0.175)
	Milk	2.972 ** (-5.897)	0.546 ** (-11.839)	-0.01 (-0.168)
2012	Meat	2.016* (-2.135)	0.519** (7.790)	0.016 (0.016)
	Poultry	2.331 ** (-7.332)	0.476** (-20.906)	0.207 ** (-5.167)
	Egg	3.568 ** (-15.903)	0.335 ** (-20.566)	0.257 ** (9.741)
	Milk	0.826 (1.642)	0.584 ** (-16.632)	0.077 (-1.518)
2013	Meat	6.507 ** (-5.616)	0.237** (-2.942)	0.154 (-1.186)
	Poultry	2.773 ** (-8.473)	0.459 ** (-19.556)	0.133 ** (-3.437)
	Egg	3.078 ** (-14.376)	0.384 ** (-24.723	0.201 ** (-8.26)
	Milk	-2.143 ** (-4.27)	0.798 ** (-22.755)	0.02 (-0.409)

Note: *t*-statistic values are reported in parentheses

The results showed that the estimates of elasticities of food expenditure in 2012 and in 2013 were very similar, while for 2011 they were bigger than in the later years. For example in one-person households whose total expenditure was on an average level one percent increase of the total expenditure caused a growth in the expenditure for food. Consistent with Engel's law, households with lower total expenditure make bigger changes in food expenditure than those with higher total consumption expenditure. As mentioned by Pangaribowo (2010) that the poorest households' dominant expenditure is staple food and the households are less likely to consume dairy product

According to the Engel's law, at lower total expenditure levels the percentage of food expenditure is greater. The results of the analysis reveal that basic demographic characteristics of households, such as the household's size, have direct effects on the consumption patterns of households.

CONCLUSION

The application of data analysis for food expenses share in the total consumption expenditure resulted in estimation of regression coefficients coherent with the economic theory. According to the Engel's law, shares of the selected food expenditure in DIY Province were related to the total food expenditure. Consequently, at lower total expenditure levels the percentage of food expenditure is greater. Moreover, the results of the analysis reveal that basic demographic characteristics of households, such as the household's size, have direct effects on the consumption patterns of households. On the one hand, the average level of share of food expenditure by households decreased in the decade 2011-2013. These phenomena create an optimistic view of DIY Province an increasing variation of the relative level of food expenditure. This means a growth of diversification with regard to living wage in DIY Province.

REFERENCES

Armagan, G and Akbay, C., 2008. , An econometric analysis of urban households`s animal products consumption in Turkey, *Applied Economics*, 40, p. 2025-2032.

Deaton A., and Muellbauer J. 1999. Economics and Consumer Behavior. Cambridge University Press, Cambridge

Hatloy, A., Hallund, J., Madibbo, M. D., and Oshhaug, A. 2000. Food Variety, Socioeconomic status and Nutritional status in urban and rural area in Koutiala (Mali), *Public Health Nutriition:* 3(1),pp. 57-65.

Huang, K.S, and F. Gale. 2009. Food Demand in China: Income, Quality, and Nutrient Effects. *China Agricultural Economic Review*, 1: 395-409.

Leser, C. E., 1963. Forms of Engel Function. *Econometrica,* 31: 694-703.

Pangaribowo, EH, 2010, Food Demand Analysis of Indonesian Households: Do They Eat Better or Smoke When They Get Richer? International Conference on Eurasian Economies 2010

Working, H.1943. Statistical Laws of Family Expenditure. Journal of the American Statistical Association, 38: 43-56.