CHANGES OF HOUSEHOLD FOOD CONSUMPTION IN INDONESIA: A FOCUS ON GRAINS CONSUMPTION[1)]

HANDEWI P. SALIEM[2)], HARIANTO[3)], AND SITI JAHROH[3)]

1) Indonesian Center for Agriculture Socio Economic and Policy Studies (ICASEPS), E-mail: hps0406@yahoo.com
2) Department of Agribusiness, Faculty of Economics and Management, IPB Bogor
Email: harianto_ipb@yahoo.com and sitijahroh@gmail.com

ABSTRAK

Tujuan penelitian ini adalah menganalisis perubahan konsumsi rumah tangga (RT) khususnya konsumsi biji-bijian (beras, kedelai, jagung, mie dan tepung gandum). Data Susenas 1999, 2002 dan 2005 dianalisis dengan menggunakan analisis regresi berganda. Hasil penelitian adalah sebagai berikut. Pertama, pengeluaran untuk makanan masih menduduki proporsi tertinggi (60%) dari seluruh pengeluaran RT. Di antara makanan, konsumsi beras merupakan pengeluaran tertinggi walaupun ada kecenderungan menurun, dari 28% pada tahun 1999 menjadi 19% pada tahun 2005. Konsumsi kedelai dan jagung menunjukkan kecenderungan yang menurun pula, sebaliknya mie dan tepung gandum menunjukkan tingkat konsumsi yang meningkat. Kedua, elastisitas harga dari masing-masing komoditas adalah negatif, yang berarti bahwa jika harga meningkat, maka permintaan akan menurun. Sebaliknya, elastisitas pendapatan terhadap permintaan beras dan kedelai adalah negatif dan elastisitas pendapatan terhadap permintaan jagung adalah positif. Ada kecenderungan perubahan pola konsumsi dari beras ke mie dan tepung gandum. Terakhir, dengan memperhatikan kedudukan yang strategis dari beras dalam pengeluaran RT, kebijakan perberasan hendaknya dapat menekan peningkatan harga beras. Sebaliknya, penekanan harga beras akan menyebabkan dampak negatif kepada petani, oleh karena itu peningkatan produktivitas seperti melalui peningkatan teknik budidaya padi dan penekanan harga input, dapat menjadi solusi bagi petani.

Kata kunci: konsumsi pangan, elastisitas harga, elastisitas pendapatan, kebijakan beras

ABSTRACT

This paper aims to analyze the changes of household food consumption, especially grains consumption (rice, soy bean, corn, noodle, and wheat flour) that occupied high proportion in household food consumption. The *Susenas* data (National Socio-economic Survey) 1999, 2002, and 2005 were analyzed by statistical method of multiple regression analysis. The finding results can be summarized as follows. First, food expenditure still occupied the highest proportion of 60% of the total household expenditure on the average. Amongst the foods, rice contributed the highest contribution although there was a tendency of decreasing trend, from 28% in 1999 to 19% in 2005. Soy bean and corn also showed the decreasing trends, on the contrary, noodle and wheat flour showed the increasing trends. Second, the price elasticity of each commodity was negative, implying that if the price increases, the demand will decrease. On the other hand, the income elasticity of rice and soy bean demands were negative and income elasticity of corn, noodle, and wheat flour demands were positive. There was a tendency in staple food change of rice to noodle and wheat flour. Lastly, considering the strategic position of rice at household expenditure, the rice policy should be able to suppress the increase of rice price. On the other hand, suppressing rice price will give negative impact to farmers, thus, improvement of rice productivity, i.e. improvement in cultivation techniques and suppressing the farm input prices, can be the solutions for the farmers.

Keywords: food consumption, price elasticity, income elasticity, rice policy

INTRODUCTION

Background

Food is one of the important strategic commodities that commonly used as one of the economic indicators. Food consumption is important in determining the living standard of people that will affect the quality of human resources as one of the important factor in development. Thus, every country, Indonesia as well, has to ensure the availability and distribution of food for the people in terms of quantity and quality.

Food consumption is determined by income and price. As the income increases, the food consumption will increase. In other words, the increase in income indicates the increase in people's welfare and it will be used to fulfill their basic needs such as food. On the

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other hand, the increase in food price will decrease the purchasing power of the people and will change their food consumption pattern, i.e. decreasing food consumption in terms of quality and quantity. The decrease in food consumption will decrease the nutrient and health status of the people and in the long term will decrease the quality of human resources. Thus, the availability of food should include the quantity, quality and also affordable price of food.

In the last decade, there have been several cases of malnutrition in the country. The oil price hike has automatically increased the food prices and changed the food consumption pattern. Theoretically, the food demand and consumption of the household are influenced by the prices of food commodities themselves, the prices of substitute commodities, income, preferences, number of family members and education level. Thus, it is important to examine various aspects that will influence the direction and change of household food consumption.

Aims of the Study

This paper aims to analyze the changes of household food consumption with a focus on grains consumption based on the *Susenas* (National Survey of Socioeconomic) data 1999, 2002 and 2005. The study actually conducted on eleven important commodities; however, this paper only focuses on grains, i.e. rice, soy bean, corn, noodle, and wheat flour.

METHODOLOGY

Framework of the Study

The household decision in allocating food consumption in its expenditure is determined by its household income. Magrabi et al (1991) categorized household food consumption into two groups, i.e. food consumption (FC) and non food consumption (NFC). With the assumption that all household income is spent to fulfill household consumption (there is no saving, or saving = 0), the total household expenditure (TE) = household income (IC). Therefore, theoretically the household expenditure allocation can be written as follows:

$TE = IC = FC + NFC$ ..... (1)

$FC = \Sigma P_i Q_i$ for i = 1,2, ...n ..... (2)

$NFC = \Sigma P_j Q_j$ for j = 1,2, ...k ..... (3)

The equations above can be written in the form of its share as follows:

$SFC = FC/TE$ ..... (4)

$SNFC = NFC/TE$ ..... (5)

$SNF + SNFC = 1.0$ ..... (6)

Where P_i and P_j is the price of commodity $_i$ and $_j$ ($i \neq j$), Q_i and Q_j is the quantity of consumed commodity $_i$ and $_j$, SFC is the share of food expenditure, SNFC is the share of non food expenditure, and TE is the total household expenditure.

Considering food as the human basic needs in order to live healthily, theoretically and naturally a human being will allocate food expenditure first and next is non food expenditure. Based on that framework, the share of food expenditure is often used as one of the indicators in order to measure the household welfare.

Scope of the Study

Analysis of consumption pattern and demand in this paper is focused on grains consumption. The grains consist of rice, corn, soy bean, noodle, and wheat flour.

Analysis was conducted at the national level based on area (rural-urban) and income level (low-medium-high). In order to describe the change of household expenditure in general, the performance of household expenditure allocation for food and non food is also presented.

Analytical Method

Consumption and household expenditure patterns were analyzed by descriptive analysis considering the changes at three different times. In order to estimate the demand, multiple regression analysis was used with the ad hoc model. In general, the model used in the analysis is written as follows:

$$Ln\ Cit = \alpha \ln Pit + \beta \ln Pyt + \delta \ln It + \lambda JART + e$$

Where Cit = consumption of commodity i at year t; Pi = price of commodity i at year t; Py = price of commodity y at year t that is predicted as the substitute or complementary of commodity i; It = household income (the proxy from the total household expenditure at year t); JART = number of household/family members; and e = error.

Data

Data used in this analysis are the Susenas data (Survey Sosial Ekonomi Nasional/National Socio-economic Survey) year 1999, 2002, 2005 from Central Bureau Statistics (Badan Pusat Statistik/BPS).

HOUSEHOLD FOOD CONSUMPTION

Many researches regarding household food consumption have been conducted. This section gives a brief overview of the household food consumption in Indonesia and the household food consumption in Indonesia from 1999 to 2005.

Overview of Household Food Consumption

In terms of consumption, food consumption and other goods, households generally depend on their income. Simatupang and Ariani (1999) mentioned that income was the main factor of household purchasing power where income determined the combination of goods and services that the households would consume. Moreover, Kuntjoro (1984) and Daud (1986) showed that there are differences of food consumption based on income and regional groups.

Kasryno (2004) found that increase in income and urbanization has changed the food consumption

pattern into more consuming meats, eggs, and milks. In the last two decades, the demand of meats have been increasing where the demand of chickens and eggs increased more than 5 % per year and demand of beef more than 2.5 % per year. On the other hand, Arifin and Saliem (1992) figured out that the consumption of rice, corn, and tubers of the households in the rural areas were relatively higher than the households in the urban areas that have relatively higher income level. This is in line with Bennet Law that mentioned "the share of carbohydrate consumption will decrease and the price per unit Calorie will increase if the household income increases". Bennet Law also implicitly mentioned that the food preferences were influenced by the household income (Simatupang and Ariani, 1997).

Besides the income, food consumption is also influenced by the external factors such as macro economy. The macro economy condition such as economic crisis has caused the decrease of energy and protein consumption at the household level in Indonesia in general. Specifically, the rural households with low income and engaged in agriculture had lower consumption level compared to other household categories (Ariani *et al.* (2001) and Ariningsih (2002)). The economic crisis has changed the food consumption patterns as follows: (1) corn and cassava became the substitute of rice and instant noodle, and (2) vegetable protein became the substitute of animal protein.

Saliem *et al.* (2008) and Ariani *et al.* (2008) explained the direction of food household consumption changes. From 1996 to 1999 the food consumption per capita per household in Indonesia has decreased either in the rural or urban areas, in Java or outside Java as the impact of economic crisis. From 1999 to 2002 the pattern changed to the increase of consumption of corn, soy bean, sugar, meat and milk, while the consumption of rice and tubers (cassava and potato) still decreased. According to the regions, consumption of rice, corn, tubers and sugar in Java was relatively lower than that of in outside Java, in contrast, the consumption of soy bean, meat and eggs in Java was relatively higher than that of in outside Java.

Household Food Consumption in Indonesia in 1999, 2002, and 2005

Total household expenditure has increased from 1999 to 2005 (Table 1). The growth of household expenditure was higher than inflation rate. In other words, household real expenditure (as a proxy of income) has increased. Increase in income would change food household consumption. Household expenditure for food has absolutely increased. However, if we look at the share, food share of household expenditure has consistently declined over time. In contrast, non-food share of household expenditure continued to increase. This is in line with Engel Law.

In food expenditure, rice still occupied the highest and important position. However, rice share in food expenditure has decreased from around 28 % in 1999 to around 19 % in 2005 (Table 1). Increase in household income was followed by decrease in the share of rice expenditure, reflecting the change to other various nutrients that assumed to have better quality. The rice substitute commodities such as noodle and wheat flour have increased consistently over time. Yet, the increase of noodle share was much higher compared to other commodities.

Table 1. Household Expenditure Pattern in 1999, 2002, and 2005

Items	1999	2002	2005
Total expenditure (Rp/capita/month)	172,777	257,408	313,449
1. Food (%)	63.54	60.52	60.04
2. Non food (%)	36.46	39.48	39.96
Food expenditure (Rp/capita/month)	96,770	135,247	163,001
1. Rice (%)	28.14	23.02	18.77
2. Corn (%)	0.71	0.66	0.57
3. Soy bean (%)	1.83	1.61	1.62
4. Egg (%)	2.78	3.09	2.95
5. Chicken (%)	1.49	2.38	2.39
6. Beef (%)	0.67	0.81	0.55
7. Cooking oil (%)	3.73	3.30	3.49
8. Sugar (%)	3.14	2.94	3.23
9. Noodle (%)	0.43	0.55	1.97
10. Wheat flour (%)	0.20	0.24	0.29
11. Milk (%)	1.27	1.79	2.16

Source: Susenas 1999, 2002, and 2005

The penetration of instant noodle seemed to happen at all regions. The ease of serving that combined with relatively affordable price and various flavors that suit the Indonesian consumers have made this commodity was preferred by the majority. Although the instant and non-instant noodles were not separated, due to the massive marketing of instant noodle, it is predicted that the increase was mostly caused by the increase consumption of instant noodle. Noodle share in food expenditure that was relatively small (around 2 %) would continue to increase sharply. It showed that noodle had the potency to occupy high share in household expenditure.

Besides noodle, the commodity that consistently increased over time was milk. In 1999, milk share in food expenditure was 1.27 % and in 2005 it increased to 2.16 %. Increase in milk consumption is a good trend and expected. However, milk consumption in Indonesia was still relatively low compared to developed countries and even ASEAN countries. Increase in milk consumption hopefully will improve the nutrients intake of Indonesian population, especially children, and accordingly will affect the improvement of human resources in the future.

GRAINS CONSUMPTION

Household expenditure is determined by the price and quantity of the food consumed. The expenditure of certain commodity can increase in terms of value but decrease in terms of quantity. This may be due to the decrease in physical quantity that accompanied with the higher percentage increase of price.

Rice as the most important grain has consistently decreased in terms of quantity consumed by the households in 1999, 2002, and 2005, however, in terms of low income groups and rural households it increased in 2002 in comparison to 1999 (Table 2, 3, 4 and 5). In terms of wheat flour and noodle, from 1999 to 2005, they have been increasing for all categories, i.e. regions, areas, income level and income sources. The tendency of decreasing consumption of rice that accompanied with the increasing consumption of wheat flour and noodle is predicted to continue in the future.

Table 2. Food Consumption Pattern of Grains in Java and Outside Java in 1999, 2002 and 2005 (Kg/capita/year)

Grains	Java			Outside Java		
	1999	2002	2005	1999	2002	2005
Rice	97.09	89.97	89.67	113.62	113.31	107.92
Corn	3.25	3.36	2.73	3.15	3.93	3.92
Soy bean	5.04	5.94	5.72	1.95	2.36	2.51
Wheat flour	0.63	1.15	1.28	0.89	1.24	1.54
Noodle	0.96	1.50	4.35	0.53	0.76	4.04

Source: Susenas 1999, 2002 and 2005

Rice self-sufficiency can be achieved as long as the rice productivity can increase higher than the population growth and the rice consumption decreases, implying diversification of rice consumption. On the other side, the dependency of Indonesia on imported wheat will increase due to the increasing demand of wheat and noodle.

Table 3. Food Consumption Pattern of Grains in Rural and Urban Areas in 1999, 2002 and 2005 (Kg/capita/year)

Grains	Rural Areas			Urban Areas		
	1999	2002	2005	1999	2002	2005
Rice	114.10	112.10	109.20	93.72	88.54	84.51
Corn	4.97	6.03	5.11	0.69	0.73	0.82
Soy bean	3.06	3.69	3.68	3.97	4.78	4.65
Wheat flour	0.63	1.02	1.46	0.97	1.41	1.34
Noodle	0.62	0.96	3.57	0.91	1.35	5.08

Source: Susenas 1999, 2002 and 2005

Table 4. Food Consumption Pattern of Grains Based on Income Groups in 1999, 2002 and 2005 (Kg/capita/year)

Grains	Low Income			Medium Income			High Income		
	1999	2002	2005	1999	2002	2005	1999	2002	2005
Rice	101.20	102.60	99.36	113.29	107.04	104.53	99.40	88.10	87.40
Corn	5.95	6.54	6.04	1.67	2.20	1.89	0.76	0.71	0.85
Soy bean	2.68	3.45	3.23	3.73	4.50	4.48	4.35	4.98	4.94
Wheat flour	0.30	0.62	0.84	0.81	1.33	1.68	1.62	2.09	2.02
Noodle	0.42	0.67	2.42	0.81	1.33	1.68	1.42	1.92	6.83

Source: Susenas 1999, 2002 and 2005

As can be seen in Table 6, the average growth of rice consumption was relatively slow from 1999 to 2005, around 1 % a year. On the contrary, the growth of wheat flour and noodle has sharply increased during the same period. The growth of wheat flour and noodle consumption increased around 10.6 % and 33.5 % per year, respectively. Assuming the growth continues at the same rate, it is predicted that the wheat flour and noodle consumption will double in around 10 years and 3 years, respectively.

Table 5. Food Consumption Pattern of Grains Based on Income Sources in 1999, 2002 and 2005 (Kg/capita/year)

Grains	Agriculture			Non Agriculture		
	1999	2002	2005	1999	2002	2005
Rice	115.70	113.50	111.10	99.32	93.36	91.11
Corn	6.38	6.76	6.48	1.19	1.54	1.28
Soy bean	2.76	3.67	3.51	3.86	4.52	4.44
Wheat flour	0.51	0.94	1.32	0.93	1.37	1.47
Noodle	0.54	0.88	3.22	0.87	1.30	4.83

Source: Susenas 1999, 2002 and 2005

Table 6. The Growth of Quantity and Value Consumption of Grains 1999-2005 (in %)

Commodity	Quantity	Value*
Rice	-1.07	-5.65
Corn	0.72	-1.22
Soy bean	2.88	-0.66
Noodle	33.50	28.96
Wheat flour	10.61	6.03

Source: Susenas 1999, 2002 and 2005
Note: * Real value of expenditure was deflated to 1999 price based on food price index before the growth was calculated.

Differ to rice, wheat flour, and noodle, the consumption of corn and soybean was relatively stable in the period of 1999 to 2005. Corn consumption decreased as the income increased. For example in 2005 the corn consumption of low income group was 6 kg/capita/year and it decreased to 0.85 kg/capita/year at the high income group. It is predicted that in the future the corn consumption will not change significantly. If we see the tendency of developed countries, the corn consumption for feed will increase sharply but not corn consumption for household consumption.

Soy bean consumption did not show a consistent change over the years. Soy bean consumption increased in 2002 compared to 1999, but it decreased again in 2005. The quantity of soy bean consumption did not change significantly over time. It must be noted that the higher income groups consumed higher soy bean compared to lower income groups. In 2005, soy bean consumption per capita per year of low, medium and high income groups was 3.2, 4.4, and 4.94 kg, respectively. If household income increases and the soy bean productivity increases lower than the increase in demand, so it can be predicted that the growth of imported soy bean will get higher.

In terms of household expenditure, the value of rice expenditure has decreased by 5.65 % in 2005 compared to 1999. The same trends were also seen in corn and soy bean but with lower percentage. The growth of corn and soy bean consumption in terms of quantity was 0.7 % and 2.8 %, respectively, during the period of 1999 -2005, while the decrease in expenditure value of corn and soy bean was 1.22% and 0.66 %, respectively, in the same period. It implies that there was a decrease

of real prices of the two commodities. However, since the decrease of value was relatively small, the prices of two commodities were relatively stable. As for wheat flour and noodle, the growth of consumption in terms of value was not significantly different to their quantity. It implies that the prices of the two commodities at the consumer level were relatively stable. The stable prices of wheat flour and noodle are predicted as the important factor in increasing their consumption.

DEMAND OF THE GRAINS

Demand function describes the relation between the quantity of a commodity and the factors that influenced its demand. The factors that affect its demand are the price of the commodity, the prices of other related commodities, household income, and other relevant variables. The eleven commodities that were analyzed are rice, corn, soy bean, egg, chicken, beef, cooking oil, sugar, noodle, wheat flour and milk. However, in this paper we focus on the grains, i.e. rice, corn, soy bean, noodle, and wheat flour. The changes in demand of the grains if there are changes in commodity price (its commodity price and other commodities prices), household income, and number of family member. As for the household income variable, it was estimated from the total amount of household expenditure as its proxy.

Demand of Rice

As mentioned above, rice occupied the highest proportion of food expenditure of the household. Thus, it is important to analyze its demand if there are changes in rice price or other commodities prices. As seen in Table 7, own-price elasticity of rice demand was inelastic. Own-price elasticity in 2002 and 2005 was higher than in 1999. Own-price elasticity was -0.47 in 2002 and -0.41 in 2005, implying that if rice price increases by 10 %, the rice demand will decrease by 4.7 and 4.1 %, respectively. Own-price elasticity in 1999 was -0.29. The change of elasticity that became more elastic was probably due to the diversity of rice varieties and quality that are available in the market. The available choices of rice might cause the change of rice price became more sensitive and influenced its demand.

The influence of other commodities (non-rice) price change to rice demand was relatively small. The prices of soy bean, egg, chicken, sugar, and noodle gave a positive influence, implying that the increase of these prices will increase rice demand. These commodities have competed in order to occupy household budget.

In Indonesia, rice is not only the main source of carbohydrate, but also the important source of protein. If other protein commodities prices increase, as the substitute of these commodities, the household increases rice consumption. The sugar and egg price elasticities of rice demand were 0.3 and 0.13 on the average, respectively. Sugar is the high source of carbohydrate and egg is the important source of protein. For the low income households, there two nutrients are often fulfilled from rice consumption.

Table 7. Price, Income, and Family Member Elasticities of Rice Demand in 1999, 2002 and 2005

Variables	Rice			
	1999	2002	2005	Average
P rice	-0.29*	-0.47*	-0.41*	-0.39
P corn	0.00***	-0.01*	-0.02*	-0.01
P soy bean	0.04*	0.05*	0.04*	0.04
P egg	0.09*	0.21*	0.11*	0.14
P chicken	*0.00*	0.02*	0.08*	0.04
P beef	-0.02*	*0.00*	-0.01*	-0.01
P cooking oil	-0.15*	-0.07*	-0.16*	-0.12
P sugar	0.33*	0.28*	0.31*	0.31
P noodle	0.03*	-0.06*	0.10*	0.02
P wheat flour	-0.02*	-0.02*	-0.01*	-0.01
P milk	-0.05*	-0.05*	0.01**	-0.03
Income	-0.03*	-0.13*	-0.11*	-0.09
Number of family member	0.28*	0.26*	0.26*	0.27

Source: Susenas 1999, 2002, and 2005
Notes:
* denotes significant at 1 % level.
** denotes significant at 5 % level.
*** denoted significant at 10 % level.

The role of noodle became more important in household expenditure, thus it is important to examine the influence of noodle price to rice demand. Noodle had the potency to be the substitute of rice. In 1999, noodle price elasticity of rice demand was relatively elastic as much as 0.03. It became negative in 2002 and increased to be positive of 0.1. If the noodle price was reduced by 10 %, rice demand would decrease by 1 % in 2005, while in 1999 it was 0.3 %. In the future, this figure is predicted to increase due to the availability and accessibility of instant noodle.

From 1999 to 2005, household income has consistently showed that it had a negative correlation to rice demand. As household income increases, the amount of rice demanded will decrease. However, this inferior influence of income was relatively small. The average income elasticity of rice demand from 1999 to 2005 was 0.09, implying that as income increases 10 %, the rice demand will decrease 0.9 %.

The negative correlation of income was relatively small compared to the influence of number of family member to rice demand. From 1999 to 2005, the result showed that as the number of family member increases the rice income per capita will increase. The average family member elasticity of rice demand from 1999 to 2005 was 0.26. This elasticity is much higher than the negative income elasticity. However, if we see that the percentage of income increase tended to be much higher than the increase of number of family member, it is predicted that the influence of these two factors will make the rice demand decrease, although it is relatively small.

Demand of Corn

Based on the experiences of various countries in the world, especially the developed countries, the

corn demand has shifted significantly. Corn demand by household for direct consumption (direct demand) tended to decrease, while corn demand as raw materials for industry (derived demand) has increased. Corn, besides directly consumed by the household, is also the input for industry, such as feed and input for food processing industry. However, this section analyzed only corn that directly consumed by the household.

The influence of own-price elasticity of corn demand was relatively small (Table 8). In 1999 own-price elasticity of corn demand was positive that might be due to the economic crisis that made corn became the staple food and even its price increased, the corn consumption still increased. In 2002 and 2005 own-price elasticity of corn demand was around 0.01 %, implying that 10 % increase in corn price will increase 0.1 % of corn demand.

The influence of other commodities (non-corn) price change was relatively small. There were no other commodities prices that had elasticity more than 1 (elastic). The influence of price changes of other commodities was not consistent over time. For example the change of sugar price, in 1999 and 2002 the elasticity was positive and in 2005 it became negative.

Table 8. Price, Income and Family Member Elasticities of Corn Demand in 1999, 2002, and 2005

Variables	Corn			
	1999	2002	2005	Average
P rice	0.00	0.03	0.10*	0.05
P corn	0.03*	-0.01*	-0.01*	0.00
P soy bean	*0.01*	0.04*	-0.04*	0.00
P egg	0.21*	0.42*	0.19*	0.27
P chicken	0.02*	0.06*	0.05*	0.04
P beef	*0.00*	-0.05*	-0.01*	-0.02
P cooking oil	0.45*	0.10*	0.08*	0.21
P sugar	0.15*	0.71*	-0.06*	0.27
P noodle	-0.06*	-0.11*	-0.09*	-0.09
P wheat flour	-0.03*	-0.06*	-0.06*	-0.05
P milk	*0.00***	0.12*	0.04*	0.05
Income	-0.26*	-0.26*	-0.23*	-0.25
Number of family member	-0.04*	-0.04*	-0.02*	-0.03

Source: Susenas 1999, 2002 and 2005
Notes:
* denotes significant at 1 % level.
** denotes significant at 5 % level.
*** denoted significant at 10 % level.

The influence of egg price to corn demand was interesting. There was a positive relation if egg price increase to corn demand. As the egg price increases, the corn demand will increase. From 1999 to 2005 cross elasticity of egg price to corn demand was 0.27, implying that 10 % increase of egg price will increase corn demand of 2.7 %. There is a possibility that although the question asked for corn consumption was as food consumption, the respondents did not separate the corn they bought for chicken feed. Thus, as the egg price increased the corn demand as feed also increased.

The increase of household income gives a negative correlation to corn demand. As the household income increases, the corn demand will decrease. Thus, corn has categorized as the inferior commodity. Demand of corn had a negative relation to the increase of family member. As the number of family member increases, the corn consumption per capita will decrease. Hence, the increase in income and number of family member had effect in strengthening the decrease in corn demand.

Demand of Soy Bean

As can be seen in Table 9, household income had a positive correlation to soy bean demand. As the household income increased the soy bean demand also increased. The average income elasticity of soy bean demand was 0.15 from 1999 to 2005, implying that 10 % increase of income will increase 1.5 of soy bean demand. Thus, it can be predicted that as household income increases, the imported soy bean will also increase in the future. Soy bean import can be reduced if Indonesia is able to increase corn productivity consistently from year to year.

Table 9. Price, Income, and Family Member Elasticities of Soy Bean Demand in 1999, 2002 and 2005

Variables	Soy Bean			
	1999	2002	2005	Average
P rice	-0.62*	0.27*	-0.55*	-0.30
P corn	0.02*	0.02*	0.00	0.01
P soy bean	-0.06*	-0.11*	-0.05*	-0.07
P egg	-0.48*	-1.00*	-0.23*	-0.57
P chicken	0.05*	-0.07*	0.00	-0.01
P beef	0.01*	0.05*	0.04*	0.04
P cooking oil	-0.36*	-0.11*	0.05*	-0.14
P sugar	-0.68*	-0.63*	-0.05*	-0.45
P noodle	0.01*	0.03*	0.15*	0.06
P wheat flour	0.02*	0.05*	0.05*	0.04
P milk	0.09*	0.05*	0.03*	0.06
Income	0.22*	0.07*	0.17*	0.15
No of family member	-0.09*	-0.15*	-0.13*	-0.12

Source: Susenas 1999, 2002, and 2005
Notes:
* denotes significant at 1 % level.
** denotes significant at 5 % level.
*** denoted significant at 10 % level.

The influence of soy bean price to soy bean demand was relatively small. Still, the statistical test was not significant for the own-price coefficient. The average own-price elasticity was -0.07 from 1999 to 2005, implying that 10 % increase of soy bean price will decrease 0.7 % of soy bean demand. Thus, when there is an increase of soy bean price in the international market that affected increase of soy bean price in domestic market, the domestic demand of soy bean will not decrease significantly. In other words, the increase of soy bean price in the international market will give relatively small influence to soy bean import in Indonesia.

Demand of Wheat Flour

Wheat flour is made from wheat and Indonesia does not produce wheat, thus it is made from imported wheat as the main raw material. Wheat flour demand is influenced by household income. If the household

income increases, wheat flour demand will also increase. The average income elasticity of wheat flour demand from 1999 to 2005 was 0.22 (Table 10). Wheat flour demand is influenced positively by number of family member, although it is relatively small. When the number of family member increases, it will not decrease the wheat flour consumption per capita, but in contrast increases the wheat flour consumption. If the household increase accompanied by increase in population, it cannot be avoided that wheat flour import will also increase.

Table 10. Price, Income, and Family Member Elasticities of Wheat Flour Demand in 1999, 2002 and 2005

Variables	Wheat Flour			
	1999	2002	2005	Average
P rice	-0.06*	-0.21*	-0.25*	-0.17
P corn	0.01*	0.01*	*0.00*	0.01
P soy bean	*0.00*	0.01**	0.01*	0.01
P egg	0.07*	-0.05*	*0.01*	0.01
P chicken	-0.02*	-0.03*	*0.00*	-0.02
P beef	0.00*	-0.01*	-0.01*	-0.01
P cooking oil	0.03*	-0.06*	*-0.02*	-0.01
P sugar	-0.06*	*0.04*	0.08*	0.02
P noodle	*0.00*	-0.02*	0.03*	0.00
P wheat flour	0.07*	-0.01*	0.05*	0.03
P milk	-0.03*	-0.05*	-0.04*	-0.04
Income	0.21*	0.24*	0.19*	0.22
No of Family Member	0.13*	0.17*	0.16*	0.15

Source: Susenas 1999, 2002, and 2005
Notes:
* denotes significant at 1 % level.
** denotes significant at 5 % level.
*** denoted significant at 10 % level.

Wheat flour demand is not sensitive to its own-price changes. Own-price elasticity in 2002 was -0.01, implying if the wheat flour price increased by 10 %, wheat flour demand will decrease by 0.1% only. Wheat flour demand for direct consumption of household is relatively small. Wheat flour is used as the raw material for cakes, breads and noodles. Thus, wheat flour demand is the derived demand of direct demand of other commodities (cakes, breads, and noodles).

The changes of other commodities prices had a relatively small influence to wheat flour demand. Among other commodities, it is only rice price that had a relatively big influence. Cross elasticity of rice price to wheat flour was negative, implying that the decrease of rice price will cause the increase in wheat flour demand of the household. The decrease of rice price has a significant impact to increasing household purchasing power because the high share of rice in household food expenditure. The increased purchasing power will give an opportunity to the household to increase non staple food consumption such as cakes or cookies made from wheat flour.

Demand of Noodle

The same as wheat flour demand, noodle demand is influenced by household income. Household income had a positive correlation to noodle demand. As the household income increases, noodle demand will also increase. Income elasticity of noodle demand was 0.20 in 1999, 0.23 in 2002, 0.45 in 2005 and the average was 0.29 (Table 11).

Table 11. Price, Income, and Family Member Elasticities of Noodle Demand in 1999, 2002 and 2005

Variables	Noodle			
	1999	2002	2005	Average
P rice	-0.11*	0.09*	-0.16*	-0.06
P corn	0.00*	*0.00*	-0.01*	0.00
P soy bean	0.01*	0.01*	0.04*	0.02
P egg	-0.01	-0.22*	0.23*	0.00
P chicken	0.00	0.00	0.03*	0.01
P beef	0.01*	0.02*	*0.00*	0.01
P cooking oil	-0.06*	-0.05*	0.10*	0.00
P sugar	-0.12*	-0.13*	-0.08*	-0.11
P noodle	-0.03*	-0.11*	-0.38*	-0.17
P wheat flour	0.01*	0.01*	0.04*	0.02
P milk	-0.04*	*0.00*	-0.02*	-0.02
Income	0.20*	0.23*	0.45*	0.29
No of Family Member	0.03*	0.03*	0.08*	0.05

Source: Susenas 1999, 2002, and 2005
Notes:
* denotes significant at 1 % level.
** denotes significant at 5 % level.
*** denoted significant at 10 % level.

Compared to wheat flour or milk demands, noodle demand had relatively high own-price elasticity. Its own-price elasticity was -0.03 in 1999, -0.11 in 2002, -0.38 in 2005 or the average was -0.17. However, other commodities prices had a relatively small influence to noodle demand, either positive or negative correlations. Only egg price had relatively high figure. Egg price cross elasticity of noodle demand was still not conclusive although the figure was relatively high. The egg price cross elasticity in 2002 was negative and it became positive in 2005. It seemed that noodle consumption in Indonesia cannot be separated from egg consumption.

CONCLUSION

1. In Indonesia, food expenditure still occupied the highest proportion of 60% of the total household expenditure on the average. Amongst the foods, rice contributed the highest contribution although there was a tendency of decreasing trend, from 28% in 1999 to 19% in 2005. Soy bean and corn also showed the decreasing trends, on the contrary, noodle and wheat flour showed the increasing trends.
2. The price elasticity of each commodity was negative, implying that if the price increases, the demand will decrease. In terms of rice, own-price elasticity of rice demand was in-elastic. The values of own-price elasticity derived from *Susenas* 2002 and 2005 data sets were higher compared to that of 1999's data. The changes of the elasticity tended to be more elastic and it was probably caused by more diverse varieties and qualities of rice available at the markets. The more diverse alternative the more sensitive rice price changes affected the demand of rice. In terms of noodle, over time, it has played more important role

in the household expenditure and it had the potency as the rice substitute. In 1999, impact of noodle price on rice demand shown by elasticity of -0.03. The elasticity was negative in 2002; however, in 2005 the elasticity has become positive and increased by 0.1. It is estimated in the future that the figure will get higher by more spreading and easier accessibility to buy instant noodle

3. The income elasticities of rice and soy bean were negative, but for corn, noodle, and wheat flour demands were positive. These may imply that as household income increases the demand for rice and soy beans will decrease and on the contrary the demand for corn, noodle and wheat flour will increase. There was a tendency in staple food change of rice to noodle and wheat flour.
4. Considering the strategic position of rice at household expenditure, the rice policy should be able to suppress the increase of rice price. On the other hand, suppressing rice price will give negative impact to farmers, thus, improvement of rice productivity, i.e. improvement in cultivation techniques and suppressing the farm input prices, can be the solutions for the farmers.

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