Characteristics of food purchasing depending on socio-demographic factors[1)]
-Focusing on metropolitan area in South Korea-

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Abstract Demographic transition drives changes in consumer demand for food products. This study examines how rising incomes and population trends affect spending on food purchased for home. The objective of this study is to characterize the relationships between selected socio-demographic factors and food selection among South Korean households. Panel data from Rural Development Administration (RDA) in South Korea in 2010 was used (n=971). Household food purchases were classified into one of the five food groups from Composition of Foods of RDA. Multiple regression analysis was used to analyze the effects of household size and income based on the expenditure share on each food group. All statistical analyses were performed using SAS/ PC version 9.3. Results show that household socio-demographic characteristics have a strong influence on food purchasing, with the purchase of vegetables and fruit, and processed food and pre-packaged being particularly sensitive.

Keywords Food purchases, Korean food consumption pattern, the size of households, Socio-economic factors, Demographics

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1 Introduction

Public concerns about food and health are increased due to the imported and processed food. The problem has thickens since processed and restaurant foods dominated the Korean diet. There are many processed foods because of being for convenience. Especially the younger people prefer processed and pre-packaged food, the more likely they affect the food consumption patterns and markets. The agriculture and food sector realize this kind of trends and promote healthy diets for individuals and population groups in South Korea. Including generation, there are many factors which affect the food consumption patterns.

Diets develop over time, being influenced by many factors. Income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, social and economic factors all interact in a complex manner to shape food consumption patterns. A study on the food consumption patterns of first generation Korean-Americans in Hawaii shows the distinct age difference which the older the subjects and the shorter the stay in Hawaii, subjects were more likely to consume Korean foods (Han, 1998). Another study comparing college students in South Korea and China shows that cultural factors such as social responsibility and a faith in God, and the value of a good life also influence the food consumption patterns (Kim et al. 2010) There are many studies regarding the relationships between food consumption and socio-demographic factors conducted in different countries. Studies have shown that income and education have similar effects on food consumption, where higher income and higher education are closely related with greater consumption of vegetables and fruit (illson et al. 1999, Nayga et al. 1999, Groth et al. 2001, Perez. 2002)

A few studies, however, have found some factors to have different effects on the consumption of certain food groups. A study on socio-demographic influence of Canadian households shows that income and education had opposite on meat and alternatives purchasing even though both factors were strong determinants of food selection (Ricciuto. 2006). According to an analysis of factors influencing the food consumption pattern in South Korea, important factors influencing food consumption patterns are household inmoce, household type, the age of head of household, car ownership and so on(Kim et al. 2011)

This study explores the socio-demographic characteristics of food consumption of certain food groups in Korean households. The purpose of this study is to find the characteristics of food consumption and the trends of food purchases according to the different groups. Results found that an increase in household size was associated with purchasing more from all food groups regardless of declines in expenditure shares - economies of scale – and can contribute to understanding Korean food consumption patterns.

2 Literature review

There are many studies regarding the Korean food consumption pattern. Most of them use survey data or existing statistical data. Using the national statistical data of the past consumption, Maeng (1986) estimated the year 2000 food consumption according to the each food category such as grains, animal products, and vegetables and fruit. This study showed that a rapid increase of animal product consumption would give rise to increase importation of feed grains which are heavily dependent upon from foreign supply. But the results concluded that maximum utilization of domestic food resources and development of our own food consumption patterns are important(Maeng, 1986)

Kim et al. (1995) explored the elements affecting the propensity and the type of food consumption expenditure among the households in the city of Daegu. The variable affecting the consumption of the different types of food are as follows(Kim et al., 1995).

Using the Family Income and Expenditure Survey done by Statistics Korea, Kim (2008) studied the decomposition analysis of changes in consumers' food consumption expenditure over time according to the economic effects and demographic effect. Economic effects are decomposed into a total substitution effect, and income effects and a habit effect. The analysis is based on the Linearized AIDS model. The study found that demographic effect rather than economic effects was the main driving force in explaining changes in expenditure shares for all food items except dairy products and fruits. Moreover economic effects explained changes in expenditure shares varying across food items(Kim, 2008).

3 Methods

3.1 Family Food Expenditure Panel Data

The panel data was collected in 2010 by Rural Development Administration (RDA) in South Korea in order to know the agricultural food consumption patterns. This sample was represented of the non-institutionalized Capital area which accounted for 23,616 people (49.0% of South Koreans' population) in 2010[1]. The data is drawn for the whole year and socio-demographic data for each panelist are collected. Each panelist maintains a diary of household food expenditures, recording the type and quantity of food purchased from stores, price paid and the type of store where food was purchased (e.g., supermarkets, convenience stores, big box retailers, and traditional markets). A total of 996 households were sampled in 2010. Households were excluded if they did not report income. In total, 24 households were excluded resulting in a final analytical sample size of 971 households.

Table 1 Variables affecting the consumption of the food

Food	Variable	Food	Variable
rice	The number of family members	flour & noodles	The number of family members
vegetables	The average of monthly expenditure	Kimchi	Oriented-convenience trend
pork	The number of family members	eggs	The average of monthly expenditure
Fish & shells	The average of monthly expenditure	Milk & milk products	The number of family members
fruits	Oriented-hobby and leisure trend	Cake & cookies	Age of housewives

1) http://kostat.go.kr/portal/korea/index.action

3.2 Analytical Methods

3.2.1 Measures

Food purchased for home consumption was categorized by Composition of Foods of RDA. We classified 73 different food codes into five food groups (i.e., grain products, vegetables & fruit, milk products, meat & seafood, and other foods).

The mean annual household income was 40,928,836 won (A dollar was equivalent to approximately 1,150 won in Korean money in 2010 and it is equivalent to approximately $ 35,590) with income ranging from 12,000,000 won to 96,000,000 won (from $10,435 to $ 84,478). Korean families devoted 13.12 of their outlay to food in the first outlay, and 13.3% in the second quarter, the highest rate in nearly nine years in 2010 according to Bank of Korea, Statistics Korea. The Engel's

Table 2 Description of five food groups in analyses

Food group		Types of foods included
Grain		Sweet potato, Rice, corn, bean, sesame, barley
Vegetables & Fruit	Vegetables	Eggplant, chili, root vegetable, herbs, garlic, carrot, radish, jellied food, cabbage, mushroom, chives, broccoli, ginger, cucumber, onion, ginseng, bean sprouts, welsh onion, paprika, squash
	fruit	Persimmon, nuts, tropical fruit, strawberry, melon, peach, blueberry, apple, pear, watermelon, orange, plum. Oriental melon, kiwi, tomato, grape, pineapple, banana
Milk Products		Sour milk, milk, cheese
Meat & Seafood	Meat	Egg, chicken, pork, beef
	Seafood	Fish and shellfish, seaweed, fishery products
Other foods		Oils, desserts and savory snacks, alcoholic and non-alcoholic beverages, Home Meal Replacement, tea, coffee, bean products, wheat products, rice products, Kimchi

Other foods include processed and prepackaged foods, and others.

In order to examine proportional allocations to different food groups, food expenditure shares were calculated as the ratio of total annual household income.

3.2.2 Statistical Analysis

All statistical analyses were performed using SAS/PC Version 9.3. Multiple regression analysis was used to estimate the relationships between household socio-demographic characteristics and food purchasing. Expenditure shares were the dependent variable modeled for the five food groups. The explanatory variables were household size, and per capita income (i.e., household income/household size). Both the household size and per capita income variables were log-transformed to improve model fit.

A variable 'meals out' was constructed but this 'meals out' variable was found to have no impact on the relationships between socio-demographic characteristics and food purchasing in the final regression model.

4　Results

4.1 Socio-demographic characteristics and purchasing patterns of the data

coefficient- the percentage of food consumption to total spending- of panel data shows 13.13% and it indicates our data was unbiased with regards to income. Fig 1 shows histogram of annual income.
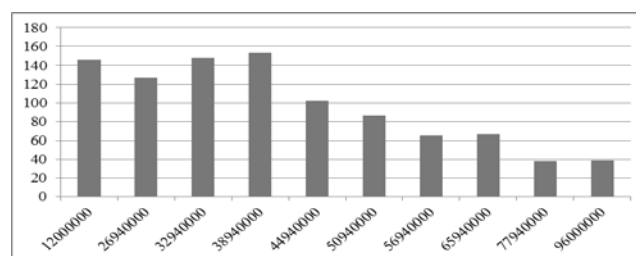
Fig. 1 Histogram of annual income

Fig 2 shows the histogram of household size. Household size is defined as the number of persons living together in one house and the majority of household sizes are four.
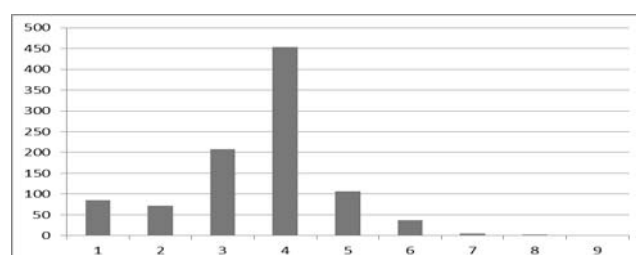
Fig. 2 Histogram of household size

4.2 Associations between food purchasing and household socio-demographic characteristics

Household size and income explained a substantial portion of the variation in food purchasing. An increase in household size was associated with purchasing more from all food groups regardless of declines in expenditure shares. Table 3 shows the results of this 'economies of scale' which means the larger households spend less per person than smaller ones, holding per capita income constant.

scale‐and this can contribute to understanding Korean food consumption patterns.

Food industry has been changing rapidly in Korea and understanding the pattern is important for policy makers to plan future national food and health policy. This study can be utilized for the advisory tools on diet and agri-food industry.

Table 3 Associations between household socio-demographic characteristics and expenditure shares allocated to each of the five major food groups, n=971

	Expenditure Shares Beta2(standard error), P-value				
	Grain products	Vegetables & fruit	Milk Products	Meat & Fishery	'Other' Foods
Log(household size)	-0.036**** (0.000)	-0.162**** (0.002)	-0.015**** (0.000)	-0.137**** (0.002)	-0.172**** (0.002)
Log(per-capita income)	-0.035**** (0.000)	-0.157**** (0.002)	-0.014**** (0.000)	-0.133**** (0.001)	-0.166**** (0.002)

Note: Number of observation with missing values is n=242 Obtain from multiple regression models including all socio-demographic variable
****$P<0.0001$, **$P<0.01$, *$P<0.05$

The economies of scale gained by larger household size likely result from the benefits of buying larger quantities that often cost less per unit (Deaton et al. 1998). However, lower food spending among larger households may also be explained by their tendency to substitute less expensive foods, regardless income level (Horton et al. 1990). The share of income devoted to each food group declined with income, with the largest declines for meat and other foods, regardless of household size. The purchase of grain and milk products was comparatively less responsive to income and household size.

5   Conclusion and Discussions

This study has a different signification from previous studies. Above all, it explored the socio-demographic characteristics of food consumption of certain food groups in Korean households using the panel data which were the real consumption data of each panelist in 2010. Results found that an increase in household size was associated with purchasing more from all food groups regardless of declines in expenditure shares - economies of

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