Demand Analysis of Clothing and Footwear: The Effects of Price, Total Consumption Expenditures and Economic Crisis

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Abstract

This study investigates the effects of changes in price, total consumption expenditures and economic situations on Korean household demands for clothing and footwear using time-series data. The clothing and footwear category was reclassified as clothing, footwear and clothing services items for the demand analysis. This study utilized the Linearized Almost Ideal Demand System (LAIDS) model to analyze household demand. The results indicate that price and total consumption expenditures are significantly related to Korean household consumption expenditure allocations for clothing and footwear items. The effects of the IMF bailout crisis in 1997 and the global financial crisis in 2008 on household expenditure shares for clothing and footwear items were very weak and statistically insignificant. All the demand elasticities were estimated with respect to total consumption expenditures and prices. Clothing was expenditure elastic (greater than one) and other items were classified as inelastic. All the own price elasticities of demands were negative (other than clothing). Through the estimations of cross price elasticity the relationships between the demands for items and other item prices were evaluated (i.e., substitutes and complements).

Key words: Demand, Consumption expenditures, Elasticity, Price, Clothing

I. Introduction

Based on the data in the National Accounts of Statistics Korea (Korean Statistical Information Service [KOSIS], 2012a), household consumption expenditures for clothing and footwear have had two slumps in 1990s and 2000s for about 20 years (Fig. 1). They happened in two periods of the IMF bailout crisis in 1997 and the global financial crisis caused by the US subprime mortgage crisis in 2008, which are well known to Korea, but the former impacted stronger on Korean economy. The economic growth was very low in these periods (KOSIS, 2012a). Korean economy suffered a number of hardships, and household consumption expenditures experienced depression as well as entire economy during these periods. Household expenditures for consumption items vary directly

as macroeconomic indicators and some items change much, but some of them do not change much (Doo, 1999). Particularly comparing the periods before, after and during the IMF bailout crisis, based on the data in the Household Income and Expenditure Survey of Statistics Korea (KOSIS, 2012b), before and after the IMF bailout crisis, the average annual real household expenditures for clothing and footwear were 130,923 won and 142,274 won respectively, but it decreased by 109,168 during the IMF bailout crisis (Table 1). As shown in <Table 1> and <Fig. 2>, the average annual composition ratio of real household consumption expenditures for clothing and footwear to total consumption expenditures before 1998 was 7.4%, but after that time it decreased by 6.41%. This shows the fact that the ratio does not recover the consumption level up to before 1998. Compared the price of clothing and footwear to the price of total consumption goods, the price (relative price) has constantly de-

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Fig. 1. Change of real clothing & footwear consumption expenditures (billions of won), 1980-2011.

Table 1. Average annual composition ratio and household expenditures for clothing & footwear - selected periods

	1990-1997	1998-1999	2000-2011
Ratio* (%)	7.46	6.19	6.41
Expenditure (won)	130,923	109,168	142,274

*Ratio to total household consumption expenditures. Ratio and expenditure are calculated in constant won value for 2010.

creased since 1990 (Fig. 3).

Despite many variations in the economic indicators such as household consumption, price and economic recession, there have been a few studies on the relationships between the Korean economic situations and household consumption expenditures for clothing and footwear. Of the previous studies some pointed out that the IMF bailout crisis most heavily influenced on the consumption expenditures after 1990s (Ji & Rhee, 1999; Lee, 2005, 2006). Lee (2006) reported that the composition ratio has a trend to decrease through the IMF bailout crisis during the period from 1990s to the middle of 2000s, and this trend continued, which might suggest that the structural change in the consumption of clothing and footwear happened. It is, however, hard to judge whether the structural change really happened or whether households really decreased their demands for clothing and footwear. The previous researchers (Ji & Rhee, 1999; Lee, 2006) reported that clothing and footwear expenditures has a substitute relationship to communication

Fig. 2. Annual composition ratio of clothing and footwear expenditures to total consumption expenditures (%).

Fig. 3. Relative price of clothing and footwear to consumer price index.

expenditures, education expenditures and so on only because the clothing and footwear composition ratio decreased compared other consumption items. A decrease in the composition ratio, however, also occurs by a decrease in price when the quantity demanded does not change. The substitute relationship is revealed by analyzing the price relationships between items (i.e., cross price elasticity).

Although the researchers mentioned above conducted empirical works on the changes of household

clothing and footwear expenditures along with the IMF bailout crisis or economic situations in Korea, they have not worked on the demand analysis of clothing and footwear, and did not show whether the structural changes in the household consumption for clothing and footwear were brought about by the economic crisis. Most research on the consumption for the household clothing and footwear has done in the frames of the analysis on the pattern changes of clothing and footwear expenditures with different household patterns (Ji & Rhee, 1999; Jung & Rhee, 1997; Lee, 2005, 2006) and on the correlation between clothing behavior and clothing and footwear expenditures (Kim & Lee, 2008; Nam & Kim, 2008; Park & Bae, 1997). Generally, demand analyses conduct works on the analysis and estimation about income effects and price effects on the demand for certain goods, but there has not been an empirical study on the household demands for clothing and footwear items in Korea. Thus the present study analyzed the demands for clothing and footwear items with the quarterly time-series data, 1990-2012, provided by Statistics Korea. In order to examine the structural changes in the consumption of these items caused by economic situations, the IMF bailout crisis and the global financial crisis variables were included in the analysis.

The present study has three research objectives, and they can be represented as follows: (1) what is the effect of changes in total household consumption expenditures on the household demands and consumption expenditures for clothing and footwear in Korea; (2) what is the effect of changes in clothing and footwear prices on the household demands and consumption expenditures for clothing and footwear in Korea; (3) how much the economic crises, the IMF bailout crisis and the global financial crisis, in Korea influenced the household consumption expenditures for clothing and footwear. The effects of changes in total consumption expenditures and price were estimated by the demand model estimation and demand elasticities of those items. To address the objectives of the study, a demand analysis was conducted in the framework of Almost Ideal Demand System (AIDS) model developed by Deaton and Muellbauer (1980).

II. Literature Review

1. Studies on Demand Analysis for Clothing and Footwear (Shoes): Price and Income Elasticity, and Structural Change

There have been a few studies on demand analysis for clothing and footwear in Korea. Yuh and Yang (2001) found that income elasticity for clothing and footwear ranges from 1.07 to 2.058, that is, elastic, with different household patterns. Sung and Yang's research (1997) on consumption comparison between non-elderly and elderly household shows clothing and footwear is consumption expenditure elastic ranged from 1.52 to 1.71. A study on urban household consumption (Kim & Choe, 2002) reported that income elasticities of outerwear, underwear, and footwear are 2.71, 1.11 and 1.25 respectively.

Focusing on the US context, several time-series analyses have shown that clothing expenditures are income inelastic, which indicates necessity goods. Mack (1954) reported that consumer shoes expenditure is income inelastic (0.75). Winakor (1962) reported that demand for clothing or shoes as a whole is price inelastic. Blanciforti et al. (1986) conducted a research on the demand analysis for 11 commodity groups using the AIDS model. They found that clothing demand was inelastic with respect to total consumption expenditures and own price. Mokhtari (1992) found that, in the short run, clothing expenditures are highly price elastic but, in the long run, have unitary elasticity. Bryant and Wang (1990) found that the price elasticity of clothing and shoes is almost unitary in the short run. Interestingly, Fan et al. (1996), using an AIDS model, estimated the income elasticity for apparel to be 1.46 and the own price elasticity to be -1.75 , suggesting that apparel is a luxury and is very price elastic. Kim (2003) also conducted a study on clothing and shoe demand analysis with the AIDS model. In the result of the study he mentioned that total non-durables expenditure elasticities of women's and children's clothing, men's and boys' clothing and shoes are 1.16, 1.1 and 1.11; the price elasticities of them are -0.74 , -0.8 and -0.39 respectively.

Cross-sectional studies have presented that clothing

expenditures were elastic with respect to total consumption expenditure, and they categorized clothing as a luxury on this basis. According to Dardis et al. (1981), when disposable income was used as the income measure, the income elasticity is less than one (i.e., necessity) but, when total expenditure was used as a proxy for income, the elasticity is slightly greater than one. However, Norum (1989) and Zhang and Norton (1995) found that the income elasticity of clothing expenditure was less than one with respect to disposable income. In particular, Zhang and Norton (1995) showed that all categories of clothing were income inelastic. Horton and Hafstrom (1985) found higher permanent income elasticity than current income elasticity for clothing.

In demand analysis, structural changes are often framed in terms of change in tastes and preferences of consumer or household (Moschini & Moro, 1996). It can be brought about by various sources of the environment surrounding individuals. The changes of macroeconomic factors, of demographic composition or of firm strategies such as advertising and product innovation are the examples (Moschini & Moro, 1996). Kim's work (2003) is a study on structural changes in the demand for clothing and shoes. Albeit the US cases, Kim (2003) conducted the demand analysis for those items along with the various demographic variables such as median age and ethnic composition of the US population as well as a dummy variable for World War II. The results of his study show that, among the demographic variables examined in the study, the median age and non-white population were significant variables affecting the US aggregate non-durable expenditure allocation on men's and boy's clothing and shoes. It also showed that the dummy variable was significantly related to the consumption expenditure shares for women's and children's clothing and men's and boys' clothing. The findings of the study imply that World War II significantly influenced the expenditure shares for women's and children's clothing and men's and boys' clothing, and brought about the structural changes in the consumption for those categories. The study presented the estimations of the elasticities with respect to the demographic variables.

2. Functional Forms for Demand Model

The present study focuses on a demand analysis. Thus it requires understanding of demand models to achieve the goals of the empirical work in the demand analysis. This section briefly sketches topics for empirical demand estimation models. Neoclassical economic theory of demand assumes that consumer demand is derived from utility (i.e., a feeling of happiness or satisfaction caused by consumption of goods) maximization process from the feasible set of consumption bundles allowed by consumer's budget. The properties of demand include adding-up, homogeneity, symmetry and negativity. The adding-up property means that the sum of the estimated expenditures on the different goods equals the consumer's or household's total expenditures. The homogeneity property is that if all prices and total expenditures are changed by an equal proportion, the quantity demanded must remain unchanged. The symmetry property means symmetry between the cross price effects, for example, $b_{ij} = b_{ji}$. The last property of demand is negativity, which implies downward sloping demand curve. In many empirical works, these properties have been tested to confirm the theoretical plausibility of estimated demand functional forms (Deaton & Muellbauer, 1993). Many efforts have been made to model the functional forms which satisfy the demand properties and can practically estimate parameters easily. Several functional demand forms have been developed by applied economic analysts. The followings are the functional forms of demand widely applied to consumption studies and demand analyses.

First, the linear expenditure system (LES) is derived from the Klein-Rubin utility function. LES made by Stone (1954) is represented as follows:

$$p_i q_i = p_i \gamma_i + \beta_i (x - \sum_j p_j \gamma_j)$$

where p_i is the price of good i , q_i is the quantity of good i , x is total expenditures, $0 < \beta_i < 1$, $\sum_i \beta_i = 1$, $q_i > \gamma_i$; $p_i \gamma_i$ is the minimum expenditure to attain a minimal subsistence level, and $x - \sum_j p_j \gamma_j$ is supernumerary expenditure which is allocated between the goods in the fixed proportions β_i . It is a theoretically acceptable functional form without losing its linear-

ity; that is, adding-up, homogeneity, symmetry and negativity hold in it (Philips, 1983).

Second, the Rotterdam model developed by Theil (1965) and Barten (1969) is expressed by a double-logarithmic system. Its derivation does not use any utility functional form. The model is derived by totally differentiating a double logarithmic demand form. The model is as follows:

$$w_i d\ln q_i = b_i(d\ln x - \sum_j w_j d\ln p_j) + \sum_j c_{ij} d\ln p_j$$

where w_i is the budget share of good i , b_i is the marginal propensity to spend on the good i and c_{ij} estimates the net effect of a price change. Basic properties, adding-up, homogeneity and symmetry, hold in it.

Third, the indirect translog model can be derived from an indirect utility form (inversion of cost minimization process). Christensen et al. (1975) developed this model by a second-order Taylor approximation to an indirect utility form. The model is expressed as follows:

$$w_i = \{\alpha_i + \sum_j \beta_{ij} \log(p_j/x)\} / \{\sum_j \alpha_j \sum_i \sum_j \beta_{ij} \log(p_i/x)\}.$$

Major limitations of this model for estimating a demand model are the number of structural parameters required and the accuracy of the approximation only in the locality of some point, that is, at a particular value of x or p , not over an entire sampling period nor over an entire sample (Deaton & Muellbauer, 1993; Philips, 1983).

Fourth, Deaton and Muellbauer (1980) proposed a demand system that they call "Almost Ideal Demand System" (AIDS). This system allows exact nonlinear aggregation in demand estimations. The merit of the representation of market demands, as if they were the outcome of decisions by a rational representative consumer, has made for extensive application of the AIDS model to many demand system estimations. The AIDS model can be derived from the PIGLOG class of cost functions (see Deaton & Muellbauer (1993) for details). The model is given by

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \log(x/P^*)$$

where P^* is Stone's price index, $\log P = \sum_i w_i \log p_i$, and the above model is referred to as the linearized AIDS (LAIDS) model because the Stone's price index

(1954) makes the original nonlinear model linearized. This model also holds the properties of demand which are adding-up, homogeneity, symmetry and negativity. Specifications of the LAIDS model for the present study are discussed in more detail in methods section.

III. Methods

1. Variables and Data

Statistics Korea classifies Korean household expenditures into two categories which are consumption expenditure and non-consumption expenditure. The newly classified household consumption expenditure category in the Household Income and Expenditure Survey of Statistics Korea (KOSIS, 2012b) composes 12 big categories of goods and services consumed by the households in Korea. These 12 categories are as follows: food and soft drinks; alcoholic beverages and cigarette; clothing and footwear; housing, water, electricity, gas and other fuels; household equipment and housekeeping services; health; transportation; communication; entertainment and culture; education; restaurants and hotels; other miscellaneous goods and services. The clothing and footwear consumption expenditure category includes six sub-consumption expenditure categories such as fabric and outer clothing, underwear, other clothing, services related to clothing, footwear, and footwear services. The main objective of the study is to analyze clothing and footwear consumption and demand. Thus, in the present study fabric and outer clothing, underwear, and other clothing were reclassified as one clothing item. And also services related to clothing and footwear services (repair, laundry and cleaning etc) combined into one clothing services item. The remainder of big categories combined into other consumption goods (OT). The consumption expenditure items estimated in the clothing and shoe demand model of the study are clothing (CL), footwear (FW), clothing services (CS) and OT. The average composition ratios of CL, FW and CS expenditures to total clothing footwear expenditures are about 0.841, 0.127 and 0.031 respectively during the period explored in the study.

The independent variables, right hand side of the

demand model equation (see proposed LAIDS model in the next section), are as follows: total household consumption expenditures (THCE), that is, the sum of 12 big consumption expenditures; price of CL; price of FT; price of CS; price of OT; household consumption expenditure shares (HCES) for each item in one quarter lagged; dummies for the IMF bailout crisis (IMF) and the global financial crisis (GFC). These dummy variables were employed to capture the structural change in the consumption for clothing and footwear items brought about by economic crisis. The quarterly time-series data from the first quarter of 1990 to the second quarter of 2012 ($n = 90$) for independent variables were obtained from the Household Income and Expenditure Survey of Statistics Korea (KOSIS, 2012b). The household consumption expenditures (HCE) data are available with both real and nominal HCE of urban households with two persons and over.

The price data of each item are extracted by the calculation of implicit price index which is calculated by dividing the nominal HCE series by its real HCE counterpart; that is, (current won HCE/constant won HCE) $\times 100$. Thus the price data used in the study are the implicit price index such as GNP deflator index. The lagged HCES for each category was calculated by dividing one quarter lagged HCE for each category by one quarter lagged THCE. The IMF period for IMF dummy variable was set in the period from the fourth quarter of 1997 to the first quarter of 1999. For another dummy variable of GFC, the GFC period from the fourth quarter of 2008 to the fourth quarter of 2009 was set for the demand model. The dependent variables, left hand side of the demand model equation, are HCES for CL, HCES for FW, HCES for CS, and HCES of OT. The HCES for each item was calculated by dividing HCE for each item by THCE. The data for the dependent variable were also obtained from the same source as the data for independent variables.

2. Proposed Demand Model and Estimation Method

This study used the LAIDS model to analyze the

demand of clothing and footwear. The model has been most widely used in the studies of demand analysis for its "flexible functional form"; that is, the model very satisfies the microeconomic theory of demand, and for its easiness to apply for empirical studies (Phillips, 1983). The original LAIDS model was $w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \log(x/P^*)$, but the Stone price index $\log P^*$ is transformed into log-linear Laspeyeres price index because the Stone price index is not appropriate for the LAIDS model, which is suggested by Moschini (1995). The proposed LAIDS model is

$$w_{it} = \alpha_i + \sum_j \gamma_{ij} \log p_{jt} + \beta_i (\log x_t - \sum_j w_j^0 \log p_{jt}) + \sum_k D_{ik} + \kappa_{jk} D_j$$

where w_{it} is the household consumption expenditure share of good i in period t ; p_{jt} is the price of good j in period t ; x_t is the total household consumption expenditures in period t ; w_j^0 is the base expenditure share, that is, the expenditure share of good j in time $t-1$; D_i and D_j are dummy variables to capture structural changes in demand. The α_i , β_i , γ_{ij} and κ_{jk} are the parameters to be estimated. The β_i is the parameter to estimate the effect of total consumption expenditure on the expenditure share of each consumption item. The γ_{ij} estimates the effect of prices on the expenditure share of each consumption item. The κ_{jk} parameter also estimates the effects of dummy variables on the expenditure share of each consumption item. The elasticities for the LAIDS model are expressed as follows (Buse, 1994; Kim, 2003; Moschini, 1995):

$$\text{total household consumption expenditure elasticity} = 1 + \beta_i/w_i,$$

price elasticity = $-\delta_{ij} + \{\gamma_{ij} - \beta_i(w_j^0 + \sum_k \log p_j)\}/w_i$ where $\delta_{ij} = 1$ for $i = j$ or $\delta_{ij} = 0$ otherwise. The proposed LAIDS model is a type of simultaneous equation model, seemingly unrelated equation system, which composes a series of equations. Thus the iterative seemingly unrelated regression (ITSUR) estimation method was used for the estimation of the demand model with SAS/ETS computer program. The adding-up, homogeneity and symmetry properties (or restrictions) of demand, as defined earlier in the above section, were imposed in the model. The feasible LAIDS model is represented as follows:

$$w_1 = \text{HCES of CL} = \alpha_1 + \gamma_{11}(\log p_1 - \log p_4) + \gamma_{12}(\log p_2 - \log p_4) + \gamma_{13}(\log p_3 - \log p_4) + \beta_1(\log x - w_1^0 \log p_1 - w_2^0 \log p_2 - w_3^0 \log p_3 - w_4^0 \log p_4) + \kappa_{11} \text{IMF} + \kappa_{21} \text{GFC},$$

$$w_2 = \text{HCES of FW} = \alpha_2 + \gamma_{12}(\log p_1 - \log p_4) + \gamma_{22}(\log p_2 - \log p_4) + \gamma_{23}(\log p_3 - \log p_4) + \beta_2(\log x - w_1^0 \log p_1 - w_2^0 \log p_2 - w_3^0 \log p_3 - w_4^0 \log p_4) + \kappa_{12} \text{IMF} + \kappa_{21} \text{GFC},$$

$$w_3 = \text{HCES of CS} = \alpha_3 + \gamma_{13}(\log p_1 - \log p_4) + \gamma_{23}(\log p_2 - \log p_4) + \gamma_{33}(\log p_3 - \log p_4) + \beta_3(\log x - w_1^0 \log p_1 - w_2^0 \log p_2 - w_3^0 \log p_3 - w_4^0 \log p_4) + \kappa_{13} \text{IMF} + \kappa_{23} \text{GFC},$$

$$w_4 = \text{HCES of OT} = \alpha_4 + \gamma_{14}(\log p_1 - \log p_4) + \gamma_{24}(\log p_2 - \log p_4) + \gamma_{34}(\log p_3 - \log p_4) + \beta_4(\log x - w_1^0 \log p_1 - w_2^0 \log p_2 - w_3^0 \log p_3 - w_4^0 \log p_4) + \kappa_{14} \text{IMF} + \kappa_{24} \text{GFC},$$

where w_i , p_i , w_i^0 , IMF and GFC are the variables defined previously; α_i , γ_{ij} , β_i and κ_{jk} are parameters to be estimated. Again w_1 is HCES of CL; w_2 is HCES of FW; w_3 is HCES of CS; w_4 is HCES of OT. However, the adding-up condition in the model implies that the contemporaneous variance-covariance matrix is singular. One of the equations, consequently, must be deleted (Barten, 1969). Thus the equation of OT (w_4) was omitted in the model estimation.

IV. Results

1. Results of LAIDS Model Analysis

1) Effects of Total Household Consumption Expenditures

The effects of changes in total household consumption expenditures were estimated by the demand model estimation. The estimated THCE parameters for the demand model are presented in <Table 2>. As indicated by the estimated β_j coefficients, THCE variable is significantly related to CL ($p < .05$). Only CL has a positive sign which means that the change of HCES of CL moves in the same direction to THCE. For example, the HCES for CL increases by 0.0314% with a 1% increase in THCE, which implies that if the THCE increases, households increase the expendi-

ture allocation for CL. The value of the estimated CL coefficient, 0.0314, was the highest among the items. Particularly the HCES for FW, CS and OT have negative effects from the THCE change, which means that increased the THCE is accompanied by decreased the HCES allocations for those items. The effects, however, on FW and CS were very small, and not statistically significant.

2) Effects of Price

The own price variables represented by the estimated γ_{ij} coefficients (i.e., γ_{11} , γ_{22} , γ_{33} , γ_{44}) in <Table 2> appeared to be statistically significant ($p < .05$) except FW and CS. The signs of the own price coefficients in clothing and footwear items are positive, suggesting that as the own prices of such items increase or decrease, the HCES counterparts increase or decrease. The price coefficient represents the effect on the HCES of a 1% increase in the own price. For example, the HCES of CL (i.e., w_1) increased by 0.1382% with a 1% increase in the price of CL. The value of the estimated coefficient CS (0.0007) was the lowest in the clothing and footwear category, albeit statistically not significant, which shows that the HCES of CS is the least sensitive to a change in its own price among the items. The negative sign of the coefficient means that the effect of price change moves the HCES change to the opposite direction.

The cross price effects on each item of HCES indicated by the estimated γ_{ij} coefficients (i.e., γ_{12} , γ_{13} , γ_{23} , γ_{24}) in <Table 2> show the relationships between the price change and other HCES. Each price effect has positive or negative signed coefficients that indicate the price and HCES move in the same or opposite direction with respect to the price changes. For example, OT has the highest value (0.1519) of the CL price effects, which implies HCES of OT is the most highly responsive to the CL price change among the items estimated in the model. The HCES for FW and for CS increase (or decrease) by 0.0111%, 0.0026% respectively with a 1% increase (or decrease) in the price of CL since their signs are positive.

In the case of OT price CL has the highest value (|0.0374|, negative sign). FW has positive signs in the cases of CL and CS prices and the lowest absolute

Table 2. Parameter Estimates of the Demand Model ($n = 90$)

	CL (w_1)	FW (w_2)	CS (w_3)	OT (w_4)
Intercept (α_j)	-0.3886 [†] (0.2154)	0.0323 (0.0301)	0.0068 (0.0124)	1.3497* (0.2391)
THCE (β_j)	0.0314* (0.0151)	-0.0016 (0.0021)	-0.0003 (0.0008)	-0.0295* (0.0152)
CL Price (γ_{1j})	0.1382* (0.0208)	0.0111* (0.0029)	0.0026 [†] (0.0013)	0.1519* (0.0229)
FW Price (γ_{2j})	0.0111* (0.0029)	0.0011 (0.0028)	0.0002 (0.0008)	0.0124* (0.0044)
CS Price (γ_{3j})	0.0026 [†] (0.0013)	0.0002 (0.0008)	0.0007 (0.0004)	-0.0570* (0.0015)
OT Price (γ_{4j})	-0.0374* (0.0147)	-0.0352* (0.0075)	0.0156* (0.0063)	-0.1073* (0.0234)
IMF (κ_{1k})	0.0018 (0.0053)	-0.0015 (0.0007)	0.0002 (0.0003)	-0.0004 (0.0059)
GFC (κ_{2k})	-0.0047 (0.0048)	-0.0001 (0.0006)	-0.0001 (0.0002)	0.0048 (0.0053)
R^2	.6595	.6889	.4654	

* $p < .05$, [†] $p < .1$

Standard errors are in parentheses. R^2 is the R-squared statistic (R^2 for w_4 is unavailable due to omission). Symmetry property in demand theory was imposed for price estimations (i.e., $\gamma_{ij} = \gamma_{ji}$). The parameters of the deleted equation (w_4) were recovered using the adding-up restriction of demand properties.

value (0.0002) in CS price. CS price impacts highest (0.0026) on HCES of CL in clothing and footwear category. The cross price effect (0.0002) between FW and CS appeared to be not statistically significant in the estimation ($p > .1$).

3) Effects of Economic Crisis

The effects of economic crisis on the clothing and footwear category were investigated by employing the IMF and GFC variables as dummies in the demand model. The estimated κ_{jk} coefficients show the effects on the HCES for the clothing and footwear items (Table 2). In the IMF case the coefficient values of CL, FW and CS are 0.0018, -0.0015 and 0.0002 respectively; the values of these items in the GFC case are -0.0047, -0.0001 and -0.0001, very close to zero, respectively. The estimation results of these dummy variables suggest that the effects of the IMF and GFC on the HCES for clothing and footwear items were very low. The dummy variable for the IMF and GFC also appeared to be not statistically significant in the model ($p > .1$). The findings imply that IMF and GFC did not significantly influence the HCES for CL, FW and CS. This might be explained by the fact that the Korean economy rapidly escaped from such crises without the period enough to be in deep and long recession (Financial Supervisory Service Blog, 2010). A study of the US aggregate demand (Kim, 2003), not fully comparable to the present study, reported that the special situation of the US economy such as

World War II significantly influenced the US consumers' consumptions for clothing items.

2. Demand Elasticity

1) Total Household Consumption Expenditure Elasticity

The elasticities of demand in the study were estimated by the average value of each variable in the demand model. The estimated THCE elasticities of demands for the consumption categories are presented in <Table 3>. All of the THCE elasticities of demands have positive signs, and were statistically significant ($p < .05$). CL was THCE elastic, greater than one, and the other ones are inelastic, less than one. CL has the highest value, 1.5027, which implies that a 1% increase (or decrease), for example, in THCE increases (or decreases) the quantity demanded for CL by about 1.5%. CS was THCE inelastic, 0.865, which shows that a 1% change in THCE brings about 0.865% change in the demand for CS. The lowest value, the least sensitive in demand, was 0.825 of FW.

THCE was used as a proxy variable for house-

Table 3. Estimated total household consumption expenditure (THCE) elasticities

CL	FW	CS	OT
1.5027* (0.2412)	0.8250* (0.2254)	0.8650* (0.3668)	0.9681* (0.0181)

* $p < .05$

Standard errors are in parentheses.

hold's income in the present study. All the THCE elasticities estimated in the study show that all items are normal goods with the elasticity greater than zero. Necessities are defined as consumption goods with the elasticity greater than zero and less than one, while luxuries have the elasticity greater than one. The evaluated THCE elasticity for CL indicates that Korean households are very sensitive to changes in THCE, which implies that clothing is a luxury with the elasticity greater than one while the other items are necessities with the elasticity less than one. The case of clothing almost corresponds with results of previous studies (Blanciforti et al., 1986; Dardis et al., 1981; Fan et al., 1996; Kim & Choe, 2002; Kim, 2003; Sung & Yang, 1997; Yuh & Yang, 2001). There, however, still exist some contradictions of income elasticity; that is, the elasticity can be elastic or inelastic. It depends on what income variables (i.e., total expenditure, income, permanent income, disposable income) are used to measure the elasticity. As mentioned in the literature review section, for example, when disposable income was used as the income measure, the income elasticity is less than one but, when total consumption expenditure was used as a proxy for income, the elasticity is slightly greater than one (Dardis et al., 1981).

2) Price Elasticity

The own price elasticities are shown on the diagonal sloping downwards to the right in <Table 4>. All the own price elasticities of demands were negative except CL, and statistically significant ($p < .05$). When the own prices of the negative signed items increase, the demands for those categories decrease. All the estimated own price elasticities indicate price inelas-

tic other than CL; that is, a 1% increase in FW and CS prices decreases FW and CS quantities demanded by about 0.87% and 0.68% each. CL has the highest own price elasticity (1.1767) among the items, which implies that its demand is price elastic, greater than one, and the most highly responsive to its own price change. The finding of price elastic clothing is supported by the results of previous studies (Fan et al., 1996; Kim, 2003). The sign of CL elasticity is positive, which means the quantity demanded moves in the same direction of the price. Thus it shows that a 1% increase (or decrease) in CL price increases (or decreases) CL quantity demanded by about 1.17%. The estimated own price elasticities indicate price inelastic except clothing of which elasticity value is great than one. Clothing has the highest own price elasticity among the items, which implies that its demand is the most highly responsive to its own price change. Interestingly the positive sign of clothing is contrastive to general cases; the positive signed one is so called "Giffen goods".

As presented in <Table 4>, the estimated cross price elasticities of demand for each item show the relationships between the price change and demands for other consumption items. The relationships between the demands for items and other item prices represented by positive (+) or negative (−) signs show the directions of change. For example, the cross price elasticity of CL demand with respect to FW price has a positive sign, and it indicates that a 1% increase in FW price increases CL demand by 0.1736%. The cross price elasticity of CL demand with respect to OT price has a negative sign (−2.8939) indicating a 1% increase (or decrease) in OT price decreases (or increases) CL demand by 2.8939%. The price effect

Table 4. Estimated own and cross price elasticities

		Demand			
		CL	FW	CS	OT
Price	CL	1.1767* (0.3185)	1.2043* (0.3025)	1.1120* (0.5459)	−0.1621* (0.0238)
	FW	0.1736* (0.0461)	−0.8716* (0.3081)	0.0997 (0.3677)	−0.0132* (0.0047)
	CS	0.0407 [†] (0.0211)	0.0254 (0.0936)	−0.6863* (0.2017)	−0.0038* (0.0016)
	OT	−2.8939* (0.5793)	−1.1831 [†] (0.6609)	−1.3902 (0.9542)	−0.7888* (0.0439)

* $p < .05$, [†] $p < .1$

Standard errors are in parentheses.

of CL on FW demand was higher than that of CL on CS demand (i.e., 1.2043 vs. 1.112). In the clothing and footwear category the cross price elasticities of CL for FW and CS demands are greater than one, elastic, but the remainders other than these elasticities are all inelastic. All the cross price elasticities are statistically significant ($p < .05$, $p < .1$) except the cases of CS price and FW demand (and vice versa). Of the cross price effects of OT FW showed the least change in demand; that is, the elasticity is -1.1831 . As the basic demand theory of microeconomics says, the signs of cross price elasticity indicate the relationships between two consumption goods, that is, a substitutes (+) or complement (−) relationship. These relationships were evaluated with the estimation of cross price elasticity for each item to the prices of other items.

V. Conclusions and Suggestions

This study was conducted to investigate the effect of changes in total household consumption expenditures, prices and economic situations on the demands for clothing and footwear category. The study also presents the parameter estimates for the household consumption expenditure shares of that category in Korea. The objectives of the study were to investigate (1) what is the effect of changes in total household consumption expenditures on the household demands and consumption expenditures for clothing and footwear in Korea; (2) what is the effect of changes in clothing and footwear prices on the household demands and consumption expenditures for clothing and footwear in Korea; (3) how much the economic crises, the IMF bailout crisis and the global financial crisis, in Korea influenced the household consumption expenditures for clothing and footwear. These research questions were answered by the estimation and analysis of the LAIDS model.

First, it can be concluded that THCE and prices of clothing and footwear are the factors that affect the households' expenditure budget allocations and demands for clothing and footwear. Despite statistical insignificance in some cases the changes of THCE and prices significantly influenced on the changes in the HCES of clothing and footwear items. Of the

clothing and footwear items the HCES of clothing showed the most sensitive and highest change to the change in THCE; contrastively the HCES of clothing services showed the least sensitive to the change in THCE. The total household consumption expenditure elasticities of demand for clothing and footwear items were also estimated in the LAIDS model.

Second, the own and cross prices were found to be significant variables in determining the Korean households' expenditure allocations for the clothing and footwear items although some of them appeared to be not significant statistically. All the own price parameters estimated in the model have positive values which imply that the households increase their budget allocations for clothing and footwear items with increased prices of these items. The increase levels, however, are very low in footwear and clothing services. The results also show that an increase in the price of other consumption goods decreases the households' expenditure allocations on clothing and footwear items. The own price elasticities of demands were negative other than clothing. The negative signed ones are called "ordinary goods". All the cross price elasticities of the items in the clothing and footwear category have positive values which imply the substitute relationships each other. This means that when the clothing price increases, households demand less clothing, and more footwear or clothing services. And it is also assumed that the consumption or demand is interchangeable each other within the clothing and footwear category as long as it supplies the same utility to households. That is, when the price of clothing increases, households decrease its consumption and can consume more footwear obtaining the same level of satisfaction within the given consumption budget. All the cross price elasticities of other consumption goods against the clothing and footwear items have negative values which indicate complement relationships between the other consumption goods and the clothing and footwear items. This implies that when the price of other consumption goods increases (or decreases) the household demand for the clothing and footwear items decreases (or increases).

Third, the present study investigated the structural change of clothing and footwear consumptions due

to economic crises. As discussed early in the result section, the investigation of whether this change existed or not was conducted through the analysis of the LAIDS model. The finding of the study implies that the IMF bailout crisis and the global financial crisis in Korea were not the periods of economic depression enough to bring about the structural change in the household consumption expenditures for clothing and footwear. The effect was very weak and not statistically significant either.

Through the parameter and elasticity estimations, the present study provided information about the responsiveness of household consumption expenditure allocations and demands with respect to price and total consumption expenditure changes. The information can be used to establish consumer policies of policy makers, and to plan marketing strategies of marketers. The information may be applied in assessing the gains and losses in consumers' or households' economic benefit due to predicted price changes. For example, based on the price coefficient estimated in this research, if the average prices of clothing were to increase by 10% due to increased prices of imported apparel brands, consumers respond by increasing their consumption budget allocation for clothing by about 1.38% to purchase the same amount as before the price rise. Thus, in order to protect consumers' benefit the policy makers may adjust their policies regarding imported clothing items in the way of lowering the price. First of all, apparel marketers need to understand the macro-environments surrounding their companies before planning a concrete marketing strategy. From a marketing point of view an economic environment is one of critical components of the macro-environments such as demographic/economic, political/legal, technological and socio-cultural environments (Jarnow & Guerreiro, 1991; Walker et al., 1992). Thus capturing the broad picture of consumers' or households' spending on clothing and their consumption changes responding to economic variables should be the first step of planning and implementation of the marketing strategy.

The primary contribution of this study is the examination and analysis of Korean households' consumption expenditure allocation and demand patterns for

clothing and footwear category with consideration of macroeconomic situation. The methods used in estimating parameters and elasticities provide a theoretical framework and tool for future consumption studies. However there exists some limitation of the study. The clothing and footwear and other consumption categories evaluated in the study are highly aggregated. The main objective is to analyze clothing and footwear consumption and demand. For the objectives of the study, fabric and outer clothing, underwear, and other clothing classified by KOSIS (2012b) were combined as one clothing item. Thus the study has a limitation in the generalization of the results applying to more specified clothing items. The consumption or demand analyses in outer clothing and underwear may show different results indicating outer clothing consumption influenced more by fashion and seasonableness than underwear consumption. Future studies on more disaggregated consumption category groups are recommended if a proper data source can be available. Caution should be made against over-generalization of the findings in comparison with the results of other demand analyses because this study was confined to the context of Korean economy. It might be hard to generalize the results to the cases of other countries.

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