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The Role of Habit Formation in Explaining Consumer Behavior and Welfare

Dong Hee Suh
Department of Food and Resource Economics
Korea University
dhsuh@korea.ac.kr

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Introduction

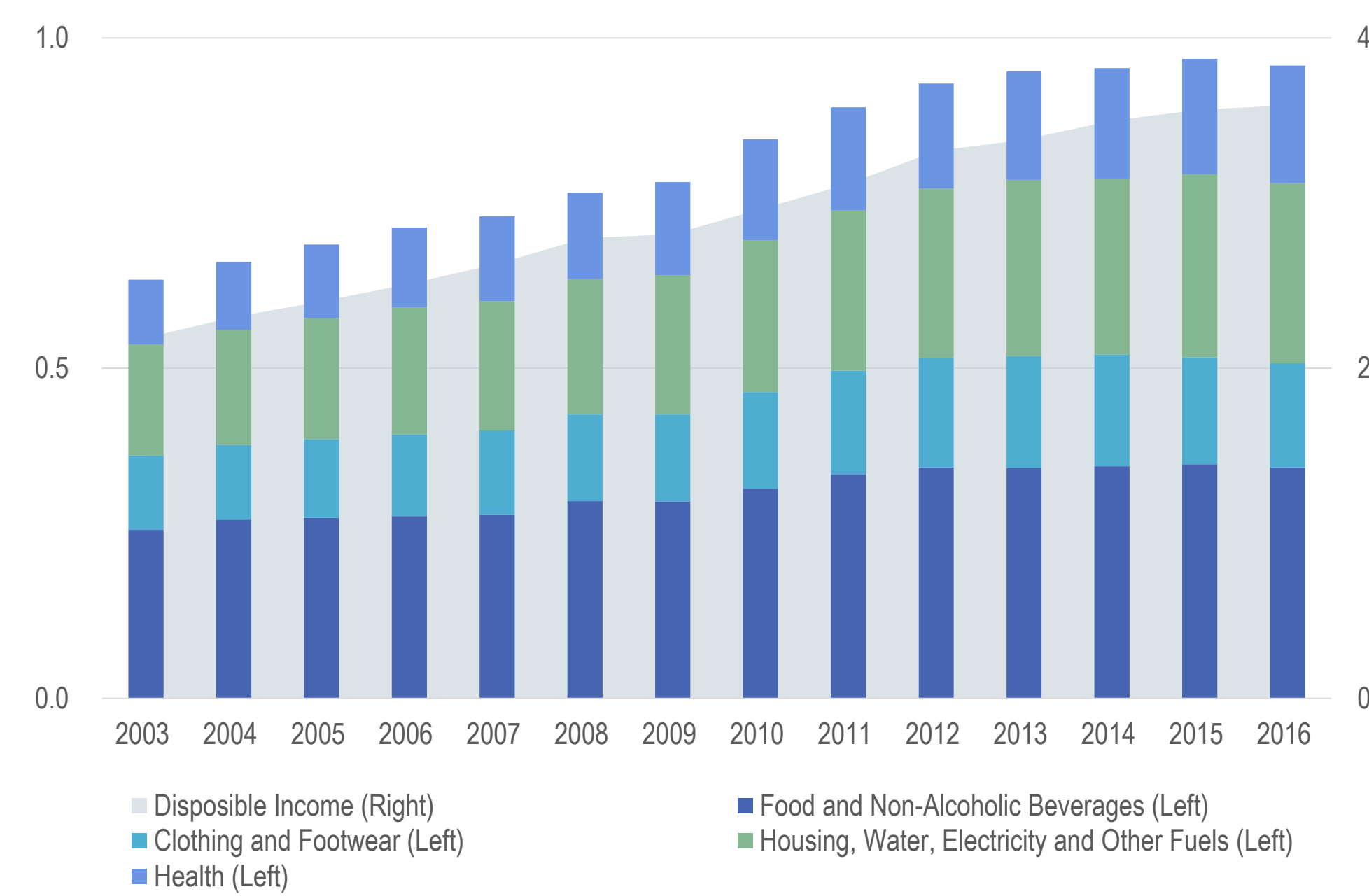
• Investigating the household expenditure structure is important in welfare economics because consumption inequality reflects income inequality (Aguiar and Bils, 2015).

• While households allocate their income to purchase luxuries and necessities, recent increases in necessities prices are expected to affect high- and low-income households' consumption habits in necessities consumption.

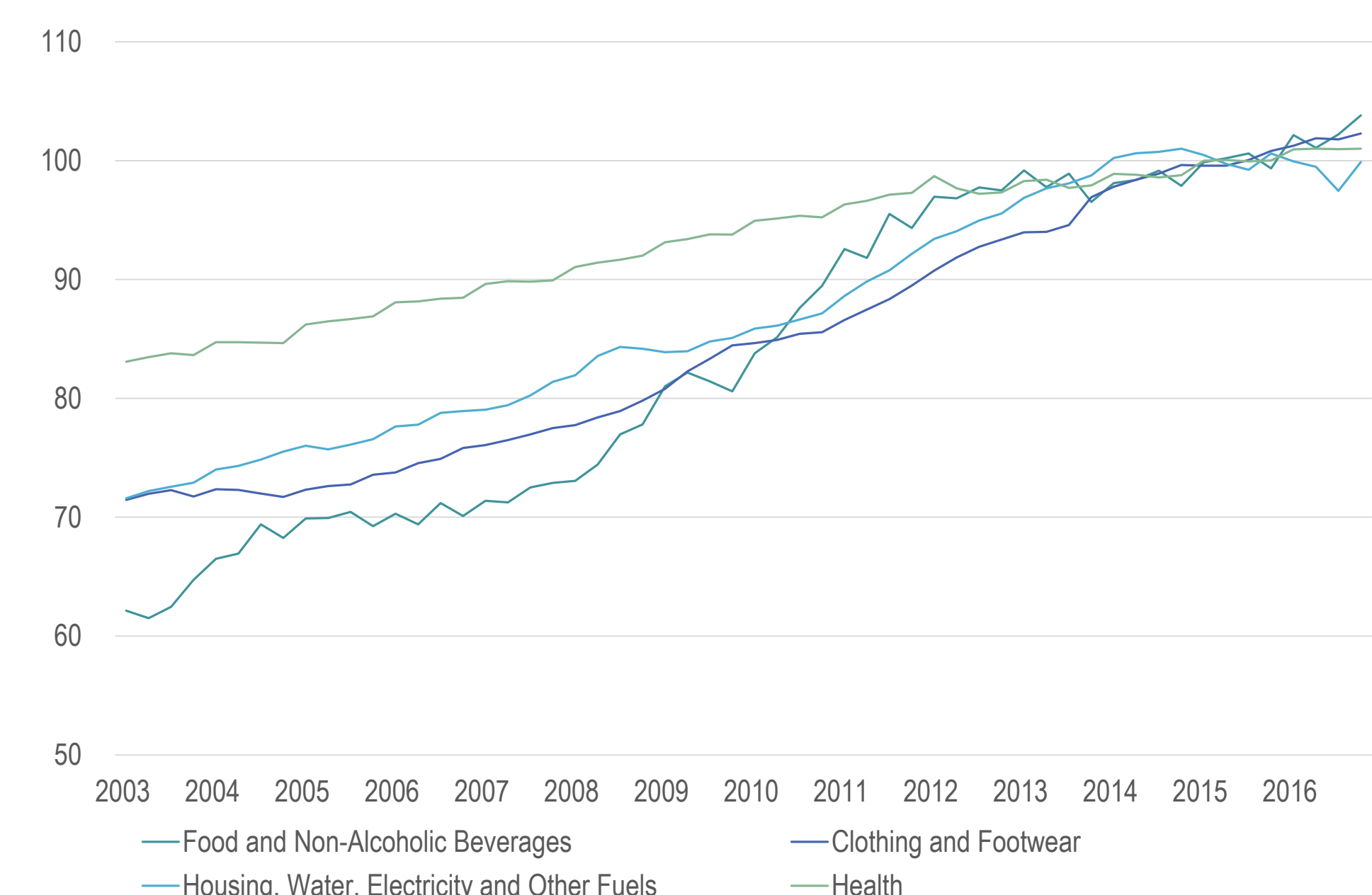
• Accordingly, it is valuable to examine how high- and low-income households' expenditures are allocated to necessities in response to changes in necessities prices.

- 1) First, this study examines the households' habit formation with a focus on the consumption of necessities. A dynamic demand system incorporating habit formation is used to investigate the consumption expenditure for necessities.
- 2) Second, this study compares the response of high- and low-income households' demand for necessities. The consumption of necessities is compared using the expenditure and price elasticities of the demand for food, clothing, housing, and health.

Consumption Allocated to Necessities



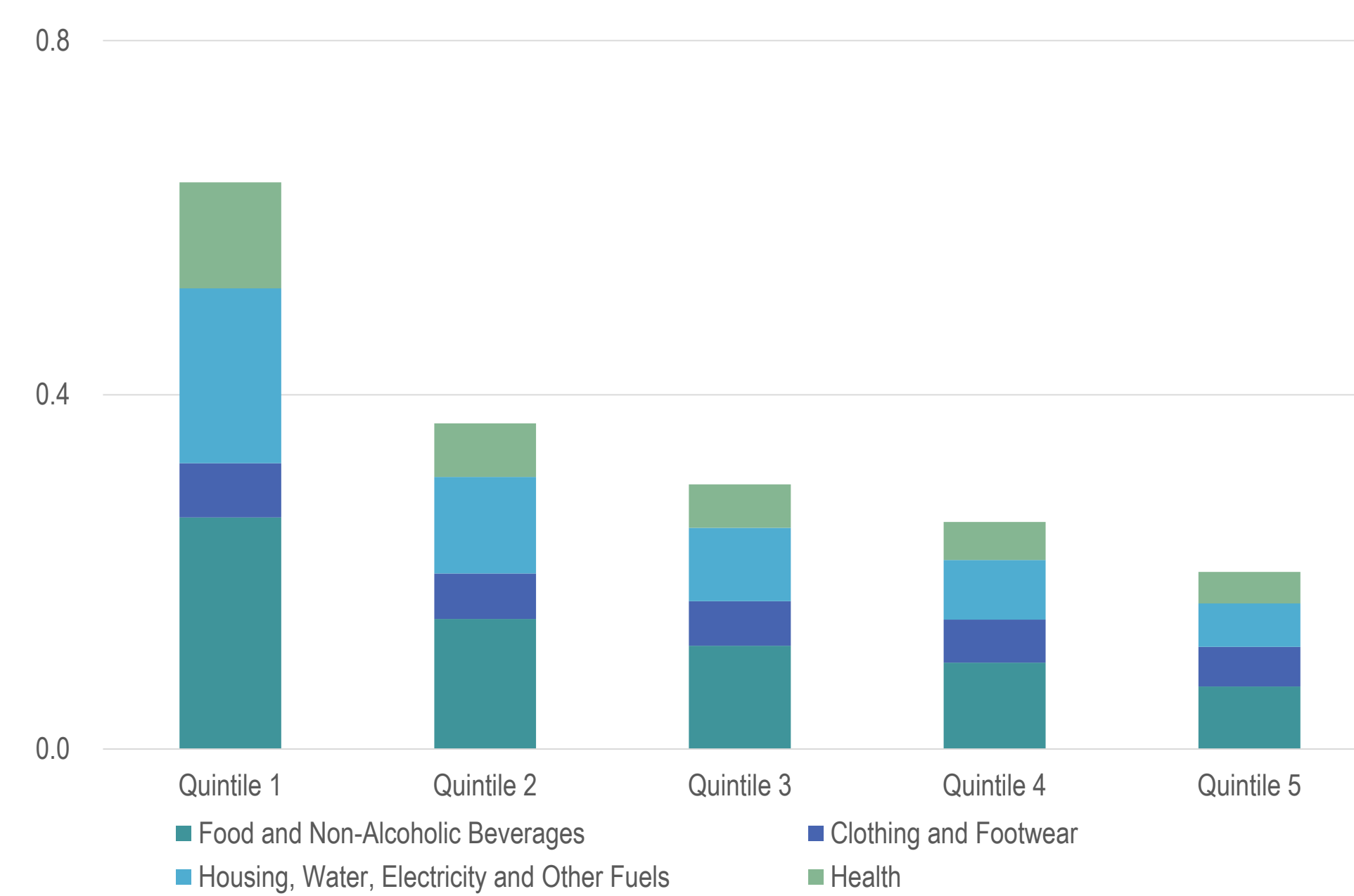
Necessities Prices



Data

• Quarterly data are obtained mainly from the Korean Statistical Information Service of the Statistics Korea. The data cover the period between 2003 and 2016, which consist of monthly households' incomes and expenditures by items. In addition, the data for consumption prices are collected from the Economic Statistics System of the Bank of Korea.

• Following Phipps and Garner (1994), we consider food, clothing, housing, and health as necessities for households' well-being. In this expenditure categories, food consists of food and non-alcoholic beverages, and clothing includes apparel and footwear. In addition, housing includes actual rentals, maintenance and repair of the dwelling, electricity, gas and other fuels, and health includes medical products, appliances, equipment, outpatient services, and hospital services.



Dynamic Almost Ideal Demand System

• Habit Formation in Almost Ideal Demand System (Blanciforti and Green, 1983; Chen and Veeman, 1991)

$$s_{it} = \alpha_i + \beta_i q_{it-1} + \sum_j \gamma_{ij} \ln p_{jt} + \delta_i (\ln e_t - \ln p_t) + \varepsilon_{it}$$

where

$$\ln p = \alpha_0 + \sum_j (\alpha_i + \beta_i q_{it-1}) \ln p_{jt} + \frac{1}{2} \sum_i \sum_j \gamma_{ij} \ln p_{it} \ln p_{jt}$$

• For the theoretical restrictions, we impose $\sum_i \alpha_i = 1$, $\sum_i \gamma_{ij} = \sum_i \delta_i = \sum_i \beta_i q_{it-1} = 0$, $\sum_j \gamma_{ij} = 0$, and $\gamma_{ij} = \gamma_{ji}$.

• The total expenditure for food, clothing, housing, and health depends on the total consumption expenditure, aggregate price, and social characteristics.

$$\ln e_t = a + b \ln ce_t + c \ln p_t + \sum_i d_i x_t$$

• To account for the endogeneity, we use the full information maximum likelihood estimation method (Zhen et al., 2011; Zheng et al., 2016).

Habit Formation

• Habit Formation ($\times 10^3$): A positive estimate indicates habit persistence, but a negative estimate indicates inventory depletion effects.

	All	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Food	0.084*** (0.012)	0.121*** (0.012)	0.097*** (0.012)	0.089*** (0.013)	0.066*** (0.017)	0.056*** (0.009)
Clothing	0.085*** (0.006)	0.122*** (0.012)	0.101*** (0.007)	0.084*** (0.006)	0.070*** (0.006)	0.057*** (0.005)
Housing	0.077*** (0.005)	0.117*** (0.007)	0.092*** (0.005)	0.069*** (0.006)	0.064*** (0.007)	0.048*** (0.005)
Health	-0.436*** (0.036)	-0.573*** (0.042)	-0.541*** (0.032)	-0.458*** (0.054)	-0.365*** (0.040)	-0.273*** (0.026)

Note. Bootstrapped standard errors are in parentheses.
 *** Denotes statistical significance at 1% level.
 ** Denotes statistical significance at 5% level.
 * Denotes statistical significance at 10% level.

Expenditure Elasticities

• Expenditure Elasticities

	All	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Food	1.092*** (0.042)	1.080*** (0.031)	1.084*** (0.132)	1.063*** (0.149)	1.104*** (0.050)	1.113*** (0.262)
Clothing	0.837*** (0.162)	1.185*** (0.228)	1.123*** (0.175)	0.912*** (0.181)	0.844*** (0.161)	0.917*** (0.208)
Housing	0.927*** (0.132)	0.968*** (0.078)	0.878*** (0.089)	0.975*** (0.127)	0.900*** (0.109)	0.962*** (0.126)
Health	1.075*** (0.158)	0.788*** (0.095)	0.916*** (0.420)	0.983*** (0.306)	1.098*** (0.160)	0.935 (0.721)

Note. Bootstrapped standard errors are in parentheses.
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Own-Price Elasticities

• Own-Price Elasticities

	All	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Food	-0.358*** (0.092)	-0.347*** (0.108)	-0.515*** (0.104)	-0.533*** (0.104)	-0.420** (0.164)	-0.202 (0.182)
Clothing	-0.530* (0.300)	-0.983* (0.538)	-0.836* (0.485)	-0.082 (0.477)	-0.691** (0.327)	-0.598 (0.435)
Housing	-0.747*** (0.230)	-0.898** (0.362)	-0.923** (0.400)	-0.726* (0.384)	-0.516 (0.427)	-0.713 (0.504)
Health	-1.393*** (0.282)	-1.611*** (0.320)	-2.067*** (0.433)	-2.181*** (0.345)	-1.395*** (0.409)	-0.433 (0.418)

Note. Bootstrapped standard errors are in parentheses.
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Cross-Price Elasticities

• Cross-Price Elasticities

	All	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Clothing-Food	0.017 (0.140)	-0.053 (0.297)	0.207 (0.235)	-0.072 (0.200)	0.130 (0.185)	0.010 (0.168)
Housing-Food	0.238** (0.113)	0.137 (0.144)	0.295*** (0.109)	0.372*** (0.108)	0.187 (0.145)	0.197 (0.218)
Health-Food	0.393* (0.204)	0.548* (0.310)	0.532*** (0.198)	0.705*** (0.242)	0.505** (0.239)	0.116 (0.383)
Food-Clothing	0.008 (0.063)	-0.013 (0.069)	0.072 (0.083)	-0.031 (0.091)	0.065 (0.091)	0.006 (0.123)
Housing-Clothing	0.098 (0.194)	0.215 (0.197)	0.034 (0.283)	-0.215 (0.302)	0.079 (0.260)	0.408 (0.399)
Health-Clothing	0.355*** (0.124)	0.168 (0.166)	0.468* (0.251)	0.517** (0.239)	0.504** (0.235)	0.171 (0.221)
Food-Housing	0.171** (0.080)	0.104 (0.109)	0.221** (0.090)	0.265*** (0.077)	0.129 (0.101)	0.136 (0.147)
Clothing-Housing	0.155 (0.310)	0.701 (0.643)	0.073 (0.610)	-0.356 (0.501)	0.110 (0.364)	0.449 (0.440)
Health-Housing	0.645*** (0.172)	0.895*** (0.275)	1.068*** (0.325)	0.959*** (0.242)	0.386 (0.280)	0.146 (0.302)
Food-Health	0.179* (0.093)	0.255* (0.143)	0.222** (0.091)	0.298*** (0.104)	0.226** (0.109)	0.059 (0.139)
Clothing-Health	0.357*** (0.126)	0.335 (0.329)	0.557* (0.305)	0.510** (0.233)	0.451** (0.210)	0.139 (0.180)
Housing-Health	0.411*** (0.109)	0.547*** (0.168)	0.594*** (0.142)	0.569*** (0.143)	0.249 (0.182)	0.108 (0.221)

Note. Bootstrapped standard errors are in parentheses.
 *** Denotes statistical significance at 1% level.
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