APPRAISING THE DEMAND FOR DOMESTIC AND IMPORTED FRUIT AND FRUIT PRODUCTS IN TAIWAN*

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INTRODUCTION

The impacts and adjustment strategies of agricultural commodity importation due to economic internationalization and deregulation have been widely concerned to the public in Taiwan. Among numerous issues, the aim of this paper is to place on the demand side. Better understanding the demand structure is important in comprehending the implications of alternative decision making.

The demand analysis is a crucial guidepost in evaluating the anticipatory effect of public policies such as price fluctuation, farmer income, transfer payment, resource allocation and the like. In addition to the traditional determinants, price and income, the demographic, marketing, behavioristic and geographic variables have been widely adopted for demand modeling and exerted significant influence. The demand elasticities in price and income are vital factors in setting the degree of price discrimination and support price; the demographic and geographic variables are important in targeting market; the behavioristic and marketing variables are, however, also the must for selecting proper promotion alternatives.

The attempt of this paper is to analyze the factors that affect household quantity consumption of domestic and imported products (DFFP and IFFP) including grapefruit, grape, apple, pear, orange, fruit juice and canned fruit, and to explore the factors that influence household switch to purchase IFFP. Results of this study is expected to provide helpful information for the decision makers to execute more efficient strategy.

RESEARCH METHODOLOGY

This study explores DFFP and IFFP separately in terms of switching regression analysis. The demand functions are estimated by means of ordinary least squares or weighted least squares. The purchasing decision equations of IFFP are estimated by the used of probit analysis. The criteria for evaluating functional forms in this paper are fivefold:

(1) Sample Classification:To groupe household of consuming individual product into domestic, and imported categories, the quantity consumption is assumed to be a proxy for utility satisfaction. A household is assumed to be either a DFFP or IFFP sample on the basis of household's monthly quantity consumption between these two regimes. Per capita consumption

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rather than household consumption is used for the dependent variable of demand function.

(2)Mathematical Form: This study first to calculate the Box-Cox transformation by means of maximum likelihood estimation procedure in order to provide the comparison base. The transcendental function is finally employed for demand function. The application of logarithm form is often preferred in case of cross-sectional data, and in the case that explanatory variables are sufficiently narrow (Cheng and Capps P.535).

(3)High Degree of Multicollinearity: The higher the degree of multicollinearity, the higher the estimated standard error of the regressive coefficient will be, and therefore the esimatied coefficients tend to be insignificantly different from zero. The Belsley, Kuh, and Welsch diagnostic method is employed (Belsley, Kuh and Welsch P.112).

(4) Heteroscedasticity and Weighted Regressions: Heteroscedasticity, or unequal variances, does uaually occur in cross-sectional studies. To corrrect for heteroscedasticity, the Park-Glejser test is employed (Pindyck and Rubinfeld pp.150-2).

(5)Choice of Independent Variables:(a)Number of independent Variables: The rule of thumb is that the observations for each independent variable be at least equal to five.(b)Economic Meaning: The sign of parameter is consistent with what is expected. (c)Enough Dispersion: A variable is said to have limited dispersion when (mean-minimum)/range is not between 0.05 and 0.95. Such a variable has little chance of being declared significant. (d) Goodness-of-Fit: The F-statistic of OLS or WLS is the counterpart of the likelihood ratio test statistic:$-2\ln\lambda \sim \chi^2$, where λ = likelihood ratio for Ho: $\beta = 0$. The λ value ranges from 0 to 1 and has a smaller value as the goodness of fit improves. Therefore, λ is analogous to that of R^2 in OLS or WLS. The criterion of $|t| \geq 1$ (Houthakker and Taylor 1970) is employed for testing the significance of individual estimatd parameters.

SWITCHING REGRESSION ANALYSIS AND PROBIT ANALYSIS

In analyzing household consumption behavior, theorectical technique employed is the switching regression analysis (Schwartz et. al.). To maximize their utilities, households are assumed to choose between the correspondent DFFP and IFFP. Assume that household's decision is a linear function of product characteristics (Z), social economic variables (W) and error term (V). U_{h0} and U_{h1} are defined as the h^{th} household's utility function of consuming DFFP and IFFP. We have

$$U_{h0} = \alpha_0+\beta'Z_{h0}+r_0'W_h+V_{h0} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$
$$U_{h1} = \alpha_1+\beta'Z_{h1}+r_1'W_h+V_{h1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

The lower bound index 0 and 1 represent DFFP and IFFP, respectively. The h^{th} respondent is classified as IFFP household if $U_{h0}<U_{h1}$ and DFFP household if $U_{h0}>U_{h1}$. v_{h0} and v_{h1} are continuous random variables, therefore the probability of $U_{h0}=U_{h1}$ is zero. Defining $Y_h = 1$ if the h^{th} household purchase IFFP. We have

$$\begin{aligned} P(Y_h=1) &= P(U_{h0} > U_{h1}) \\ &= P[V_{h1}-V_{h0}<\alpha_1-\alpha_0+\beta'(Z_{h1}-Z_{h0})+(r_0-r_1)'W_h] \\ &= \Phi[(\alpha_1-\alpha_0)+\beta'(Z_{h1}-Z_{h0})+(r_1-r_0)'W_h] \quad \ldots\ldots(3) \end{aligned}$$

Φ is the cumulative standard normal distribution function of $\varepsilon_h=V_{h0}-V_{h1}$. Equation (3) can be simplified as

$$P(Y_h=1) = (r'Z_h) \quad \text{.....(4)}$$

Where $r'Z_h = (\alpha_1-\alpha_0) + \beta'(Z_{h1}-Z_{h0}) + (r_1-r_0)'W_h$

The demand equations of DFFP and IFFP can be estimated as follows.

$$\text{DFFP} \quad Y_{h0}=\beta_0' X_{h0} + \varepsilon_{h0} \quad \text{iff } r'Z_h < \varepsilon_h \quad \text{.....(5)}$$
$$\text{IFFP} \quad Y_{h1}=\beta_1' X_{h1} + \varepsilon_{h1} \quad \text{iff } r'Z_h \geq \varepsilon_h \quad \text{.....(6)}$$

Where Y_{h0}, Y_{h1} = household's per capita consumption of DFFP and IFFP, respectively

X_{h0}, X_{h1} = vectors of exogeneous variables
β_0, β_1 = parameters
ε_{h0}, ε_{h1} = random terms

For specific product, a household is assumed to pruchase either imported or domestic, and are multually exclusive. Equation (5) is for estimating the pruchasing household of domestic product, if $r'Z_h < \varepsilon_h$ is satisfied. Equation (6) is otherwise. The error terms ε_{h0}, ε_{h1} and ε_h are assumed to be trivariately normally distributed with zero mean and non-singular covariance matrix.

As to the probit function, which is an integrated standard normal curve. The maximum likelihood estimates are found by maximizing the likelihood function with respect to the parameters. The probability that the h^{th} household purchases IFFP is presumed to be the following probit function:

$$P_h=F(Z_h)=F(\beta' X)_h=\int_{-\infty}^{z_1} \frac{1}{\sqrt{2\pi}} \exp \frac{-S^2}{2} ds \quad \text{.....(7)}$$

where $-\infty < Z < \infty$, $0 \leq P_h \leq 1$

In practice, the inverse function of expression (7) is operated. We have

$$Z_h = F^{-1}(Z) = (\beta' X)_h \quad \text{.....(8)}$$

DATA SOURCES AND MODEL

Data used in this study are from January 1988 survey. The household manager whoever (mostly the female head) responsible for food shopping is the questionaire respondent. The investigation area only limited to the first three biggest cities and their near district(Taipei, Taichung and Kaoshiung). Data of 400 households were collected through stratified random sampling method. Descriptive statistics of variables are available from the author's upon request. The statistical models are as follows:

(1)Demand model

$$\ln QBY_{h1\,d}=\beta_0+\beta_1 \ln PRI_{h1\,d}+\beta_2 \ln INC_h+\beta_3 \ln EDU_h+\beta_4 REL_h+\beta_5 \ln HSZ_h$$
$$+\beta_6 \ln WWK_h+\beta_7 \ln TAS_{h1\,d}+\beta_8 \ln CON_{h1\,d}+U_{h1\,d} \quad \text{.....(9)}$$

Equation (9) can be rewritten as

$$QBY_{hi,d}=e^{\beta_0}(PRI_{hi,d})^{\beta_1}(INC_h)^{\beta_2}EDU_h^{\beta_3}e^{\beta_4 REL_h}(HSZ_h)^{\beta_6}(WWK_h)^{\beta_6}(TAS_{hi,d})^{\beta_7}$$

$$(TAS_{hi,d})^{\beta_7}(CON_{hi,d})^{\beta_8}e^{U_{hi,d}} \quad \cdots\cdots\cdots\cdots\cdots\cdots (10)$$

where h=1,2,...,H represent household unit
i=1,2,...,n represent product class
d=0,1 represent DFFP and IFFP, respectively

(2)Decision model

$$BUI_{hi}=\alpha_0+\alpha_1 PIN_{hi}+\alpha_2 INC_h+\alpha_3 NAT_h+\alpha_4 ED1_h+\alpha_5 ED2_h+\alpha_6 TAS_{hi}+\alpha_7 GIF_{hi}$$
$$+\alpha_8 CON_h+\alpha_9 SUP_{hi}+\alpha_{10} DIS_{hi}+\alpha_{11} RE1_h+\alpha_{12} RE2_h+\varepsilon_{hi} \quad \cdots\cdots (11)$$

The variable names and notations are shown in table 1. The parameters $\beta_1, \beta_2, \ldots, \beta_8$ measure the changes in per capita monthly quantity purchase for a product due to changes in price, household income, and sociodemographic variables. All variables (both dependent and independent) are in a logarithm form with the only exception of religion. The regression coefficients associated with all explanatory variable in demand model are interpreted as the elasticities. The expoanatory variables except religion (REL) employed for demand model are: price (PRI), household income (INC), education (EDU), religion (REL), household size (HSZ), housewife's working time away from home (WWK), product taste (TAS) and convenience to shop(CON). The explanatory variables used in decision equation are slightly different from that of demand equation. Major changes are:using price differential index(PIN) in substitute of own price(PRI), deleting religion (DEL) and housewife's working time away from home (WWK), adding respondent's native place status (WWK), gift motivation (GIF), visit supermarket experience (SUP), discount strategy (DIS) and regional variables (RE1 and RE2). Price differential between DFFP and IFFP is hypothesized to be an important factor to affect people's switiching behavior. Owing to insufficient data of price, the variable, price differential index is used as a proxy. The NAT, ED1, ED2, REL, SUP, RE1 and RE2 are treated as binary, or zero-one variables, i.e. hypothesized only affect the purchasing probability not slope.

EMPIRICAL RESULTS

1. Demand Equation

The goodness of fit (R^2) measures of DFFP ranged from 0.071 to 0.181, and for IFFP, the $\bar{R}^2$'s ranged from 0.117 to 0.286. All equations rejected null hypotheses under 5% statistically significant.

All own-price elasticities of DFFP and IFFP are inelastic except for imported grapefruit price. The own-price elasticities of DFFP, and IFFP ranged from -0.1392 to -0.5364, and -0.3026 to -1.1681, respectively. Results of four same products (grapefruit, grape, apple and fruit juice) revealed that own-price elasticities of DFFP are smaller than those of respective IFFP's.

All income elasticities of DFFP and IFFP are positive (normal goods) but generally with pretty small value. Except for domestic orange, grape and fruit juice, and imported fruit juice, income elasticities of the remaining seven products are insignificant. The income elasticity of fruit juice (0.21) is the largest in DFFP's. The remainders, in order, are orange (0.19), grapefruit (0.16) and grape (0.14). The income elasticity of imported fruit juice (0.48) is also the largest in IFFP's. The

Table 1. Variable Names in the Model

Variate	Variable Name	Description
Endogenous Variable	QBY	Per capita quantity consumption (kilograms/ month)
	BUI	1 if belong to IFFP household; 0 otherwise
Price	PRI	Price of product (N.T.$/kilogram)
Price differential index	PIN≠	Compare to price of repective DFFP, the IFFP is unreasonable
Household income	INC	Household income (ten thousand N.T.$ in 1987)
Race	NAT	Household head's native place (1 if Taiwanese; 0 otherwise)
Education	EDU	Household head education (years)
	ED1	1 if less than or equal to nine years education; 0 otherwise
	ED2	1 if at least one year college; 0 otherwise (omitted group:10-12 years of education)
Religion	REL	1 if Buddhist; 0 otherwise
Household size	HSZ	Number of household size
Employment status of housewife	WWK	Working hours away from home per week of housewife
Taste	TAS≠	I like the taste of respective product
Gift	GIF≠	I purchase respective product as a gift
Shopping convenience	CON≠	It is very convience for me to shop the respective product
Suppermarket	SUP	1 if yes; 0 otherwise
Discount	DIS≠	Discount activity of respective product is important to influence my pruchasing quantity
Geographic Region	RE1	1 if in Taipei city; 0 otherwise
	RE2	1 if in Taichuung city; 0 otherwise (omitted group:Kaoshiung city)

≠ Data treated as ordinal numbers from one to five. One represents definitely disagree, and five represents definitely agree.

remainder, in order, are grape fruit (0.20), grape(0.15) and apple (0.13).

The statement "the more educated consume more product" is found coincidentally significant in domestic orange, grapefruit, and imported apple

Table 2. OLS or WLS Parameter Estimates of DFFP's Demand Equation

Variable	Grapefruit[a]	Grape[a]	Apple[a]	Fruit Juice[a]	Pear[a]	Orange[b]
PRI	-0.5364*	-0.2252*	-0.1392*	-0.1338	-0.2128	-0.1753*
	(-2.429)[1]	(-1.235)	(-1.193)	(-0.863)	(-0.995)	(-1.604)
INC	0.1556	0.1444*	0.0503	0.2069*	0.0242	0.1894*
	(0.512)	(1.235)	(0.312)	(1.039)	(0.130)	(1.650)
EDU	0.3299*	0.0801	-0.1077	0.1635	0.1813	0.2629*
	(1.010)	(0.357)	(-0.518)	(0.612)	(0.613)	(1.379)
REL	0.5032*	0.1095	0.1124	0.4069*	0.2597	0.1461
	(2.225)	(0.607)	(0.660)	(1.942)	(0.974)	(0.715)
HSZ	-0.9000*	-1.3275*	-1.0501*	-0.8090*	-1.5236*	-1.0576*
	(-3.094)	(-5.305)	(-4.468)	(-2.813)	(-4.046)	(-5.391)
WWK	0.0051*	0.0035	0.0097*	0.0055*	-0.0033	0.0046*
	(1.034)	(0.918)	(2.675)	(1.235)	(-0.644)	(1.489)
TAS	0.3198*	0.3087*	0.4089*	-0.0049	0.6217*	0.5143*
	(1.053)	(1.129)	(1.704)	(-0.018)	(1.147)	(1.642)
CON	0.5144*	0.1419	0.3198*	0.4808*	0.1901	0.4011*
	(1.445)	(0.490)	(1.233)	(1.317)	(0.367)	(1.385)
INTERCEPT	0.1364	1.4098*	1.3526*	-0.0466	1.6140*	0.2647
	(0.094)	(1.325)	(1.436)	(-0.040)	(1.039)	(0.476)
F	4.754	4.922	4.935	3.653	3.020	8.976
R^2	0.165	0.124	0.125	0.071	0.113	0.181
n	154	222	222	175	128	289

[a] Ordinary least squares.
[b] Weighted least squares, weight(δ) = 1.50 - 0.31lnHSZ_h-0.19REL_h
(6.90) (-2.14) (-2.29)
[1] Numbers in parentheses are t-statistics. The asterisk indicates significant at $|t| \geq 1$.

and canned fruit. In contrast, the quantity consumption of imported grape and canned fruit revealed negative relationship with education level. In comparison between DFFP and IFFP, the higher the education, the quantity consumption of imported apple, and domestic grapefruit, grape and fruit juice are relatively better off.

With the exception of imported canned fruit, per capita consumption of Buddhist is higher than omitted category both in DFFP and IFFP. Both domestic and imported grapefruit and fruit juice, and imported apple are especially statistically significant. This is mainly affected by the offering behavior due to larger size and nice looking of grapefruit and imported apple, and durable characteristics of fruitjuice.

Household size elasticities of DFFP and IFFP are negative and statistically significant. The DFFP's ranged from -0.81 to -1.5, and ranged from -0.94 to -1.6 for IFFP's. The quantity consumption of DFFP is more sensitive to the changes of household size than that of respective IFFP. Per capita consumption of IFFP is relatively better off with the decreasing

Table 3. OLS or WLS Parameter Estimates of IFFP's Demand Equation

Variable	Grape-fruit[a]	Grape[a]	Apple[a]	Fruit Juice[a]	Canned Fruit[b]
PRI	-1.1681* (-3.726)[1]	-0.3026* (-1.221)	-0.4130* (-3.165)	-0.5949* (-2.726)	-0.7979* (-3.880)
INC	0.1951 (0.662)	0.1465 (0.968)	0.1273 (0.450)	0.4816* (1.223)	0.0564 (0.333)
EDU	-0.3051 (-0.863)	-0.3074* (-1.003)	0.5348* (2.037)	-0.3872* (-1.013)	0.6125* (2.062)
REL	2.9457* (3.688)	0.1053 (0.470)	0.2391* (1.131)	0.8191* (3.312)	-0.2886 (-0.431)
HSZ	-0.9719* (-2.601)	-1.6218* (-4.999)	-1.0908* (-3.838)	-1.2128* (-2.913)	-0.9360* (-2.845)
WWK	0.0018 (0.034)	0.0063* (1.133)	0.0038 (0.862)	0.0109* (1.801)	-0.0003 (-0.067)
TAS	0.1957 (0.668)	0.1720 (0.582)	0.2248 (0.881)	-0.2636 (-0.770)	0.2666 (0.900)
CON	0.2058 (0.676)	-0.0264 (-0.075)	-0.1046 (-0.280)	0.6301* (1.561)	-0.2990 (-0.942)
INTERCEPT	3.5530* (2.755)	2.8858* (1.898)	1.6008* (1.433)	3.7768* (2.147)	2.9058* (1.328)
F	3.820	3.803	3.919	4.580	7.567
R^2	0.172	0.180	0.117	0.226	0.286
n	110	103	178	100	132

[a] Ordinary least squares.
[b] Weighted least squares, weight(δ) of grapefruit = $1.31 - 0.50REL_h$ (10.86) (-3.46)
weight(δ) of canned fruit = $0.66 + 0.24REL_h$ (6.64) (1.98)

[1] Numbers in parentheses are t-statistics. The asterisk indicates significant at $|t| \geq 1$.

trend of family size, ceteris paribus.

Per capita consumption of DFFP and IFFP are, in general, positively related to housevife's working time away from home. Nevertheless, the coefficient of domestic pear and importd canned fruit are not supported by this statement. In comparison between the same product of DFFP and IFFP, as the percentage of housevife's working time away from home increases, the domestic apple, grapefruit and imported fruit juice indicate more competitive advantage.

The results of taste show somewhat different between DFFP and IFFP. The taste of DFFP's are, in general, positive and significant, whereas the coefficients of IFFP are positive but not statistically different from zero. Both domestic and imported coefficients of fruit juice are negative but statistically insignificant. The taste elasticities of DFFP are roughly twice those of respective IFFP. The taste elasticities of DFFP

ranged from 0.31 to 0.62, revealed that as taste perference increases 10%, per capita consumption are expected to mount up from 3.1% to 6.2 %. Taste is not an important factor of IFFP may be due to the degree of harvest maturity is low as well as the purchasing behavior is not yet developed.

2. Decision Equation

The probit likelihood decision equation was maximized by the Newton-Raphson iterative procedure. All likelihood ratio test ($-2\ln\lambda \sim \chi^2$) are significant at 1% level. The percentage of right prediction ranged from 0.63 to 0.88. Estimated coefficients of the price differential index demostrated that the smaller the difference between DFFP and IFFP, the greater the probability that households are likely to shift to purchase IFFP.

Household income level has positive effect on purchasing probability of IFFP. The impact of income on both quantity consumption and consumption probability of imported fruit juice are significant. An increase in household income would favor the market outlet of imported fruit juice.

People's native place is, in general, not a factor in discerning the consumption probability of IFFP. People with less than 10 years schooling show the least pruchasing probability of IFFP. The pruchasing probability of imported canned fruit in between people with less than 10 years education and 10-12 years education and imported grapefruit, apple and fruit juice in between people with at least one year college and 10-12 years education are all insignificant. The consumption probability of imported grape, pear and canned fruit of people with 10-12 years education are higher than those people with at least one year college.

All estimated coefficients of behavioristic and marketing variable in decision equations of IFFP confirm stated expectations with only a few exceptions. Taste and convenience to shop, however, revealed insignificant in IFFP's demand equation. These results imply that "both variables are crucial in consumption probability, but not quantity consumption." The influence of convenience to shop to imported fruit juice proved of significance to the consumption probability and quantity consumption. As expected, the estimated coefficients of gift motivation and visit supper-market experience are positive in all decision equations. The gift motivation effect on apple, orange and canned fruit are insignificant, however. The influence of discount activity has a positive effect on consumption probability of all IFFP's. Three out of seven products expressed significant impact. Their order are: grapefruit, canned fruit and pear.

The estimated dummy coefficients of Taichung city are, in general, insignificant. This result suggests that consumption probability of IFFP between Taichung city and omitted city (Kaoshiung) are similiar. The consumption probability of imported apple in Kaoshiung city is significantly higher than that of Taipei. People in Taipei, nevertheless, exhibit greater consumption probability of imported grapefruit, grape, fruit juice and canned fruitthan do people in Kaoshiung.

CONCLUDING REMARKS

Main findings of this paper show that (1) All price and income elasticities of DFFP and IFFP are inelastic with the only exception of imported grapefruit price. Both smaller price differential between DFFP and IFFP, and the income level have positive effects on households' consumption probability of IFFP; (2) Higher education has higher expected consumption on domestic orange and grapefruit, and imported apple and canned fruit. The education has negative effects on the imported grape and fruit juice,

Table 4. Purchasing Decision Equations of IFFP

Variable	Grape Fruit	Grape	Apple	Pear	Orange	Fruit Juice	Canned Fruit
PIN	-0.1148*	-0.1567*	-0.0414	-0.0650*	-0.1212*	-0.0617*	-0.1161*
	(-1.816)[1]	(-2.641)	(-0.902)	(-1.405)	(-2.482)	(-1.341)	(-1.651)
INC	0.0024*	0.0021*	0.0047*	0.0039*	0.0069*	0.0106*	0.0047*
	(1.139)	(1.107)	(1.715)	(1.414)	(2.435)	(3.879)	(1.761)
NAT	-0.1111	-0.1400*	-0.1334	0.141	0.2315*	0.0831	-0.1625
	(-0.508)	(-0.707)	(-0.749)	(0.775)	(1.233)	(0.483)	(-0.621)
ED1	-0.3940*	-0.3858*	-0.4632*	-0.5201*	-0.2369*	-0.3144*	-0.0920
	(-2.144)	(-2.453)	(-3.245)	(-3.502)	(-1.625)	(-2.298)	(-0.454)
ED2	0.1326	-0.2302*	0.0367	-0.2296*	-0.1935*	-0.0700	-0.4848*
	(0.646)	(-1.238)	(0.207)	(-1.265)	(-1.070)	(-0.421)	(-1.866)
TAS	0.0953*	0.2912*	0.2146*	0.2679*	0.2699*	0.2801*	0.1221*
	(1.224)	(4.340)	(3.667)	(4.437)	(4.416)	(4.428)	(1.324)
CON	0.1933*	0.0414	0.2622*	0.0809*	0.0997*	0.1029*	0.1061*
	(2.561)	(0.635)	(4.512)	(1.413)	(1.769)	(1.892)	(1.244)
GIF	0.1895*	0.1934*	0.0520	0.1646*	0.0407	0.1645*	0.0391
	(2.649)	(3.141)	(0.947)	(3.002)	(0.764)	(3.292)	(0.516)
SPU	0.4024*	0.3406*	0.5658*	0.5432*	0.5966*	0.6064*	0.4081*
	(2.032)	(2.069)	(4.160)	(3.931)	(4.109)	(4.408)	(1.858)
DIS	0.1399*	0.0033	0.0513	0.0613*	0.0492	0.0408	0.1410*
	(1.873)	(0.055)	(0.968)	(1.122)	(0.896)	(0.773)	(1.787)
RE1	0.2767*	0.1884*	-0.1380*	-0.0643	-0.0436	0.1834*	0.2255*
	(1.797)	(1.409)	(-1.234)	(-0.530)	(-0.357)	(1.601)	(1.281)
RE2	-0.0001	0.000001	-0.00002*	-0.00003*	-0.00001	0.00001	-0.00008
	(-0.917)	(0.048)	(-1.061)	(-1.185)	(-0.077)	(0.092)	(-0.652)
INTERCEPT	-3.4998*	-2.9241*	-2.4195*	-2.0160*	-2.2813*	-2.7510*	-3.3365*
	(-6.326)	(-6.182)	(-5.761)	(-4.699)	(-5.295)	(-6.644)	(-5.546)
$-2\ln\lambda \sim \chi^2$	98.50	100.61	167.12	150.52	104.36	182.89	40.41
Percentage of Correctly Predicted	0.82	0.76	0.64	0.67	0.63	0.64	0.88
n	273	376	394	153	392	315	195

[1] Asymptotic t-statistics appear in parentheses. The asterisk indicates significant at $|t| \geq 1$.

however; (3) Per capita consumption of Buddhist is higher than others both in DFFP and IFFP with the only exception of imported canned fruit; (4) Per capita consumption of DFFP and IFFP are negatively related to household size and positively related to working time away from home of housewife; (5) The taste of DFFP other than fruit juice has close relationship with the magnitude of consumption but not IFFP. However, those of taste,

switching purchase behavior of IFFP; (6) With few exceptions, people's native place and regional variable are, in general, insignificant in discerning the consumption probability of IFFP.

In order to effectively marketing DFFP, strategies suggested are to increase raw material processes, to create foreign market opportunities and to subsidize school lunch program. In so doing, the right shifting demand curve as well as the price and income elasticities of demand can be enhanced. Target market of DFFP should be placed on those people with higher education, Buddhist, smaller household size, and housewife with longer working hours away from home per week. To promote the quality image, degree of maturity and retailing location advantage of DFFP, to encourage vertical and horizontal integration, to fulfil marketing information system, and to explore the plausibility of promoting marketing boards should also be treated as the priority.

As to IFFP's promotional activities, marketing strategies should be emphasized not only on economic variables, the different influences of demographic, behavioristic, and marketing variables are also deserved attention.

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