Contemporary Chinese Households' Food Away From Home Expenditure and Becker's Household Production Theory

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Abstract : This study examines factors determining contemporary Chinese households' food away from home (FAFH) expenditures using Becker's household production theory. Data came from the 2000 urban household survey in Guangdong Province, collected by National Bureau of Statistics (NBS) of China. It was revealed that the contemporary urban Chinese wives also substitute their household work by time-saving product, FAFH, as Becker's household production theory postulated. This suggests the important role of time-value (opportunity cost) in determining household FAFH expenditure across the cultures.

Key Words : Contemporary Chinese households, FAFH consumption, Becker's household production theory, Time-value

I. Introduction

China is rapidly enhancing its global status in terms of its potential economic power through pro-globalization agenda (Jussaume Jr., 2001). The rapid economic progress increased the income levels, and changed occupational structure and consumption patterns in China (Yau, 1994). Chinese liberalization policies have been practiced mainly via promotion of consumption. Changes in food consumption were encouraged by policy makers to improve nutritional well-being and to promote economic growth through expanded consumer demand in China (Jussaume Jr., 2001). As a consequence of drastic economic progress during the past two decades, Chinese Engel Coefficient dropped below 50% for the first time in 2000. In addition, the Chinese diet has also changed, shifting from grain to meat/poultry, indicating its nutritious improvement with more animal protein (China Internet Information Center, 2002).

The growing expenditure on FAFH often reflects the nation's increased prosperity. The positive association between national prosperity and FAFH is shown from the declined spending on FAFH and increased spending for Food At Home (FAH) during the 1990-91 recession in the U.S. (Food Service Director, 2000). Accompanied by recent economic growth, the FAFH share of total

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food expenditures has steadily increased from 5.0% to 14.7% during the past decade in China. FAFH expenditure in China is expected to continue to grow in the future due to the rising middle class and continuing urbanization (Min et al., 2004).

Despite its growing importance, Chinese FAFH consumption has not been explored well since FAFH industry is in the introductory stage in China unlike other developed countries (Anderson & He, 1998; Min et al., 2004). To better understand contemporary Chinese households' consumption decisions on eating out, this study examines the determinants of Chinese FAFH consumption on the basis of Becker's household production theory, using the 2000 Chinese food consumption data. The overall objective of this study is to investigate the effects of time-value and demographic variables on the decision to consume FAFH. Accompanied by fast growth of economy and liberalism, would Chinese households' eating out be explained by the "value of time" as it is in other western countries?

II. Related Research

1. Overview of Chinese Food Consumption

Since Chinese initial economic reform in 1978, the changes in market structure have improved the income level and wellbeing of Chinese people[1]. As a consequence of the income effect, the food consumption pattern also changed dramatically (Liu & Chern, 1999). According to the report from Chinese Academy of Agriculture (1996), Chinese per-capita consumption of meat and seafood increased. The trends of less grain and more meat consumption are mainly resulted from the recent national prosperity in China.

Halbrendt and Tuan (1994) reported a positive association between income and meat consumption in Chinese households. As income increases, Chinese consumers consumed more meats. They also noted that the increased meat consumption reduced demand for grain in China. Fan and Chern (1997) analyzed consumption patterns of seven major categories of food for Chinese urban households using data from the Income and Expenditure Survey of Chinese Urban Households. They reported that Chinese consumers' consumption behavior is consistent with the microeconomic utility maximization assumptions. During 1985-1990, the expenditure elasticities of meat, fruits, and eggs were very high among Chinese consumers. The authors also reported that grains were a necessity for low-income provinces, whereas they were an inferior good for high-income provinces.

In spite of recent drastic improvement in Chinese food consumption pattern, several studies noted the disparate food consumption pattern among Chinese people. Liu and Chern (1999) argued that there are drastic differences in diet and nutrition intakes between urban and rural populations in China. They pointed out that urban Chinese need to improve food quality by consuming food with more protein, less

1) The per capita income for Chinese urban households increased from 739 Yuan in 1985 to 6,859 Yuan in 2001 (National Bureau of Statistics of China, 2002).

cholesterol, more fibers, and less fat; whereas, rural Chinese still need to work on quantity to increase protein and fat intakes in order to overcome their food insufficiency. Stookey, Zhai, Zohooei, and Popkin (2000) supported the argument about unequal distribution of nutrition among Chinese people. This disparity in food consumption was particularly related to income and location. They reported that urban residency and income were positively associated with energy from fat and protein intakes. They concluded that under and over nutrition coexist among Chinese.

The progressive changes in Chinese diet towards simplicity and convenience have been reported (Beijing Review, 1996). By the end of 1993, more than 300 fast food companies and more than 800 chain restaurants were established in China. Chinese people expressed positive views toward these restaurants. The restaurants were perceived to be nutritious, fast, inexpensive, and clean (People's Daily, 1995). Anderson and He (1998) reported that many Chinese have eaten out at fast food restaurants. According to them, more than half of the respondents used those places. However, the authors pointed out that FAFH is in the introductory stage in China, whereas it is a mature market in developed countries. Min et al. (2004) also stated that the FAFH consumption market in China has yet to reach its full potential.

2. Determinants of FAFH Expenditure

Studies about FAFH consumption frequently found that household FAFH expenditure has a close relationship with women's labor force participation and their time-values (opportunity costs). It has often been reported that the critical determinant of household FAFH consumption decision was women's "time-value" (Bellante & Foster, 1984; Manrique & Jensen, 1998; McCracken & Brandt, 1990; Nayga, 1996) under the assumption that FAFH is a time-saving commodity. In addition to time-value, socioeconomic/ demographic characteristics have been found to play an important role in influencing FAFH consumption (Byrne & Capps, 1996; McCracken & Brandt, 1990; Min et al., 2004; Piggott, 2003). Byrne and Capps (1996) suggested that age, ethnicity, regionality, urbanization, and education have potential effects on FAFH consumption due to differences in preferences, availability, and price.

Nayga (1996) examined the impact of women's employment on household food demand using sample households with husband and wife. The author found a positive association between the number of hours spent by the wife in the labor market and the FAFH expenditure. The author also estimated elasticity of FAFH, prepared food, and FAH with respect to income and women's work hours. The author found that food expenditures are inelastic with respect to income. However, FAFH expenditure would increase more than the other food expenditures.

McCracken and Brandt (1990) measured the influence of the value of time on FAFH. The time-value was estimated based on a household head's opportunity cost of doing household work. In addition, the authors compared the effect of the time value on FAFH by type of facility. They reported that value of time, income, household size and composition, and environmental factors were

significantly associated with FAFH. The value of time significantly affected time-saving fast food consumption, while it only marginally affected restaurant expenditures.

Bellante and Foster (1984) examined the relationship between wife's employment and time-saving household service expenditures, including FAFH. They reported that the positive effect of household income and wives' working hours on FAFH spending. They noted that full-time working wives spent more on FAFH than full-time home makers, whereas part-time working wives did not have a significantly different spending pattern on FAFH. However, it was not clear which factor directly affects FAFH expenditure between reduced amounts of income and reduced working hours.

Manrique and Jensen (1998) examined the relationship between women's work and expenditures on FAFH in contemporary Spain, using data from 1991 Spanish government conducted household-level surveys. They used opportunity cost in estimating women's time-value. They reported a positive effect of women's time-value on FAFH expenditure. They also noted the positive effect of household income, urban residency, having older family members, having fewer children, and younger women on FAFH spending. They also reported the positive impact of wife's education, white race, and income on FAFH.

Lazaridis (2002) examined the determinants of FAFH consumption among Greek households. He reported that total household expenditure, household size and composition, opportunity cost of time, urbanization, age, and education of the family food manager were all important determinants of FAFH consumption.

Min, Fang, and Li (2004) examined household FAFH expenditure across the two time periods and across regions using Chinese urban household-level survey data. They found that income is a significant determinant of FAFH consumption levels. Income elasticities increased from 1992 to 1998 and are much higher than in the United States. They also reported that household size is an important factor determining FAFH consumption. According to them, the three-person households spend the most on FAFH.

III. Framework

Becker's household production theory is used to examine Chinese households' FAFH consumption behavior. Household production theory postulates that utilities are not from goods but from household produced commodities, unlike the neo-classical economic theory. That is, the inputs of market goods are combined with time resource to produce "commodities", which can provide utility (Bryant, 1992; Magrabi et al., 1991). Followings are the household production function suggested by Becker:

$$Z_i = z_i (X_i, T_i, E)$$

where Z_i = commodities

X_i = a vector of market goods ($X_{i1}, X_{i2}, \cdots, X_{in}$)

T_i = time required to produce Z_i

E = environment al factors

The utility function can then be expressed as

$$U = u(Z_1, Z_2, \cdots, Z_m)$$
$$= u(x_1, x_2, \cdots, x_n; T_1, T_2, \cdots, T_m)$$

where U = utility function

The most critical point in the household production theory is that it takes into account time constraint in addition to monetary budget. According to Becker, individuals allocate given limited time into the market work and the household work. Individuals' different time allocation between the market and the household leads to their different time-values (opportunity cost). That is, individuals who are participating in labor market develop higher time-values or opportunity costs than individuals who are not in the market place.

This "time-value" concept in the household production theory explains individuals' substitution behavior between time needed for household production and market-produced commodities. When an individual working in the market place has a certain level of wage rate and relatively less time, the individual would purchase more of time-saving commodities at costs of money to maximize his/her utility. Hence, individuals with relatively more valuable time may use less time-intensive commodities, whereas they may use more service-intensive commodities to attain a higher household utility (Bellante & Foster, 1984; Nayga, 1990).

IV. Methods

1. Data

The data came from the 2000 urban household survey in Guangdong Province, a southern province adjacent to Hong Kong, collected by National Bureau of Statistics (NBS) of China. The five counties in this data set are Guanzhou, Zhanjiang, Shenzhen, Puning, and Shunde. This data set contains prices and quantities of food items consumed by each of 600 households. The food items are grain, rice, flour, oils, meat, pork, beef, poultry, slaughtered chicken, live chicken, eggs, fish, fresh vegetables, dried vegetables, sugar, fresh fruits, fresh milk, powered milk, and yogurt. The data set also includes other basic demographic information, such as household disposable income, age of household heads, and FAFH expenditures. All prices are in "Yuan", and quantities are in "Kg".

2. Variables and Concepts

"FAFH expenditure share of total food expenditures" instead of absolute value of FAFH expenditures was used as a dependent variable, since increased income or increased household size may automatically increase FAFH expenditures regardless of its real impact.

To explain FAFH consumption behavior, respondents' time-value and other controlling variables were selected as independent variables in this study. Respondents' "time-value" was captured by "number of wage earners" on the basis of the availability of variables in a given data set. Two (or more) earner-households may have stricter time constraints and higher time-values than (zero or) one earner-households. Those with two earners may substitute household prepared food by eating out.

In addition to respondents' time-value, several

controlling variables were selected based on previous research in this study. "Household disposable income" and "household size" were used to capture households' capability of eating out. Higher income may positively affect FAFH expenditures by increasing household budget. Larger household size with given amount of income may negatively affect FAFH expenditures by reducing the affordability of the household. In addition, the economies of scale and increased household productivity of larger households may contribute to making FAH a more competitive choice (Byrne & Capps, 1996).

"Age of householder" was selected to reflect decreased household productivity of the elderly. Older people may need more efforts to prepare FAH than do younger people. Also, older people may be incapable of preparing food due to their physical and mental frailty. In the same context, "gender" was also used to explain FAFH consumption behavior in this research. Men may purchase FAFH commodity more frequently than women due to their lower household productivity compared to women[2].

3. Hypotheses

Based on Becker's household production theory and previous research about determinants of FAFH expenditure (refer to p.5-7), several hypotheses were developed as follows.

Hypothesis1: Two earner-households have higher FAFH consumption than one earner-households.

Hypothesis2: Other controlling variables affect FAFH consumption.

H2a: Household income and FAFH consumption are positively related.

H2b: Household size and FAFH consumption are negatively related.

H2c: Age of household header is negatively related to FAFH consumption.

H2d: Male household headers have more FAFH consumption than female household headers.

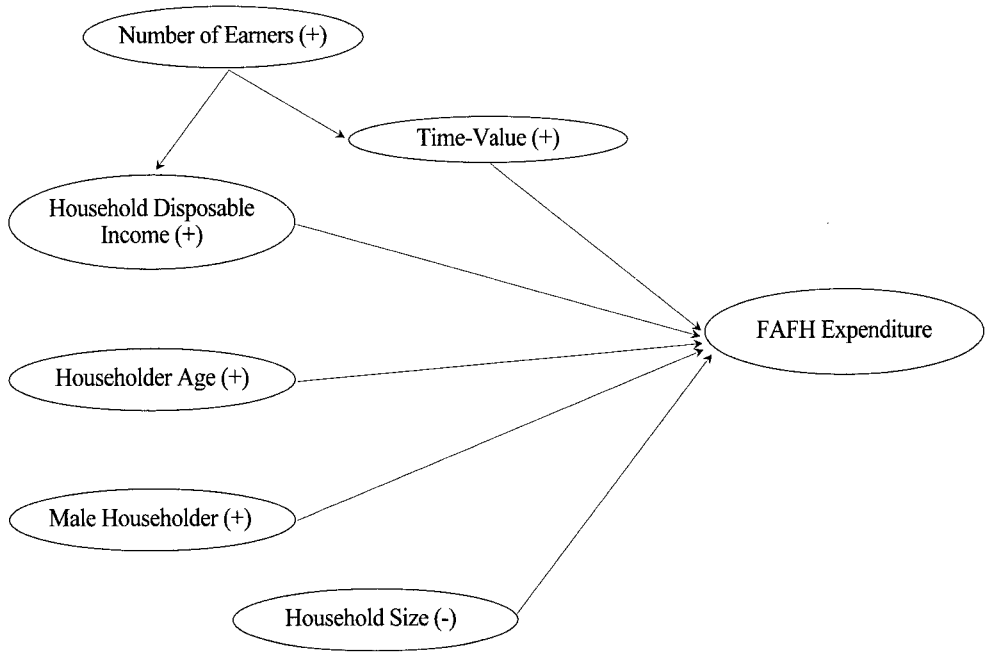
<Figure 1> elaborates the determinants of FAFH expenditure.

4. Sample Description

There were large variances in household income level by counties in this data set. Since those in the three counties-Guangzhou, Shenzhen, and Shenzhen--have much higher income level than that of remaining two counties-Puning and Shunde, it seems to be appropriate to divide the data into two groups. Total 600 households were divided into two groups according to the disposable income level-high-income counties (n=450) and low-income counties (n=150). <Table 1> summarized the sample characteristics of each group.

The average household disposable income for total households was 13,600 Yuan. The average household size was 3.3. The average age of householder was approximately 45 years old. The average number of wage earners in households was 1.7. Male headed-householders occupied 62% of total sample households. The demographic

2) According to Becker's "division of labor" (1964), men have higher productivity in the labor market, whereas women have higher productivity in household.



<Figure1> Determinants of FAFH Expenditure

<Table 1> Sample Mean Statistics

	Total Households	Households in High-Income Counties	Households in Low-Income Counties
Household Annual Disposable Income (Yuan)	13,600	15,813	9,174
Household Size	3.3	3.2	3.6
Age of Householder	44.8	45.0	44.0
Number of Wage Earners	1.7	1.7	1.8
Gender of Householder			
Male	62%	57%	79%
Female	38%	43%	21%

characteristics for those in high income-counties and low income-counties were similar except the average household income and the proportion of male householders. The average household disposable income for the high-income group was 15,813 Yuan, whereas that for the low-income group was only 9,174 Yuan. Households in low-income group exhibit more traditional family structure than those in high-income counties. An average 79% of the households in low-income counties had male householders, whereas the proportion of male householders in high-income counties was only 57%.

5. Statistical Methods

The One-way Analysis of Variance (ANOVA) between groups is used to examine whether there are any mean differences in fresh vegetable consumption by number of wage earners in households. In addition, the multivariate regression analysis is used to examine the statistical association between the FAFH expenditures and explanatory variables.

The dependent variable is the "FAFH share of total food expenditures". FAFH share of total food expenditures is used rather than absolute amount of FAFH expenditures because the expenditure term is sensitive to the household's income level. High income households may spend more on FAFH than do low income households; however, the expenditure share of FAFH for the high-income households could be lower than that for the low-income households.

Independent variables are "household disposable income", "number of wage earners", "household size", "gender of householder", and "age of householder". To avoid multicollinearity problem, three variables-"educational level of householder" (correlated with household income level), and "number of children under 17 years old" (correlated with household size)--were excluded from the regression analyses.

The multivariate regression analysis is conducted for the total households, the households in high-income counties, and households in low-income counties separately to examine factors affecting FAFH expenditures in each group.

V. Results

<Table 2> displays the average shares of FAFH expenditure to total food expenditures and the average shares of food expenditures to household income. The average shares were measured not only for total households but also for those in high-income counties and those in low-income counties. Consistent with the Engel's Law, households in low-income counties spent more proportion of income on food than did those in high-income counties ($p < .001$). In addition, households increased the share of FAFH spending as income increased ($p < .001$).

For the total sample, the average FAFH expenditure share was 26%. The average share of food expenditures to household income was 38%. For the households in high-income counties, the average FAFH expenditure share was 32%. Their share of food expenditures to household income was 36%. For the households in low-income counties, the average FAFH expenditure share was

<Table 2> Sample Means T-Test for FAFH and Food Expenditure Shares

Expenditure Share (%)	Total Households	High-Income Counties Households	Low-Income Counties Households	P-value
FAFH to Total Food Expenditures	26.0	32.0	15.0	.000***
Total Food Expenditures to Income	38.0	36.0	42.0	.000***

15%. The food expenditure share of household income was 42%.

<Table 3> exhibits results from multiple regression analysis regarding determinants of FAFH expenditure share of Chinese households[3]. Income, household size, and householder's gender were statistically significant variables to explain the household expenditure share on FAFH.

As hypothesized, household income and FAFH expenditures were positively associated. As income increases by 1,000 Yuan, the share of FAFH expenditure to income increased by 1% (b= 0.001, p <. 001). As expected, household size was negatively associated with the share of household FAFH expenditure. Each member of household decreased FAFH expenditure by 2.5% (b= -2.49, p <. 01). Consistent with the hypothesis, male householders spent more on FAFH than did their female counterparts. Specifically, male householders' FAFH expenditure share was 4.7% higher than that of female householders (b= 4.71, p <. 001). There positive association between the number of wage earners and the share of household FAFH was only marginal significant at p=.10 level (p=.094).

Additional multivariate regression analyses were conducted for two sub samples--households in high-income counties and households in low-income counties (Table 4). As expected, household income and number of wage earners were significant variables explaining household FAFH expenditure in high-income counties. Income and household FAFH expenditure share were positively associated. Every 10,000 Yuan increase in income increased household FAFH expenditure share by 3% (b=.0003, p<.01). Number of wage earner and household FAFH expenditure share were also positively related. Each addition of a wage earner increased household FAFH expenditure share by 3.7% (b= 3.7, p<.05). Other explanatory variables in the model equation were not statistically significant.

3) "Fresh vegetable consumption" variable is not included in the regression analysis because of multicollinearity with "number of wage earners" variable.

<Table 3> Multivariate Regression Analysis: Total Households (n=600)

Variables	Coefficients	Standardized Coefficients	P-value
Constant	13.492		.021 *
Household Disposable income	.001	.356	.000***
Household Size	-2.490	-.106	.007**
Age of Householder	.0127	.007	.861
Number of Wage Earners	2.372	.069	.094
Male Householder	4.710	.134	.000***

Dependent variable is expenditure share of FAFH
Adjusted R^2 = .17
*p < .05, **p< .01, ***p< .001 (two-tailed)

<Table 4> Multivariate Regression Analysis: High-income vs. Low-income Counties

Variables	Households in Higher Income Counties(n=450)		Households in Lower Income Counties(n=150)	
	Coefficient	Standardized Coefficient	Coefficient	Standardized Coefficient
Constant	22.09**		7.027	
Household disposable income	.0003**	.139	.001***	.538
Household Size	-.455	-.019	-.339	-.019
Age of householder	-.049	-.030	-.025	-.017
Number of Wage Earners	3.701*	.127	.509	.015
Gender of householder	2.248	.074	-2.541	-.066

Dependent variable is expenditure share of FAFH
*p < .05, **p< .01, ***p< .001 (two-tailed)

For the households in low-income counties, household income was the only variable affecting household FAFH expenditure share. As hypothesized, household income and household FAFH share were positively associated. As income increased by 1,000 Yuan, household FAFH expenditure share increased by 1% (b=.001, p<.000). Other explanatory variables including the number of wage earners did not significantly affect household FAFH expenditure share.

VI. Conclusion and Discussion

Despite its growing importance accompanied by fast economic growth and liberalization in China, the determinants of contemporary Chinese households' FAFH expenditures have not been explored well. As we understand, this paper is the first to examine the determinants of households' FAFH consumption behavior in 21st century in China. Would contemporary Chinese households' expenditures on eating out be explained by the "value of time" as it is in other western countries?

It was found that there is a negative association between household income and the share of food expenditures on income in Chinese households, as Engel's Law postulated. In addition, a positive association between household income/ number of wage earners and household FAFH expenditure was found. This is consistent to previous findings from western and other developed countries (Bellante & Foster, 1984; Manrique & Jensen, 1998; McCracken & Brandt, 1990; Nayga, 1996). This finding suggests the important role of women's labor force participation (time-value/opportunity cost) as well as household income level in determining households' FAFH consumption across cultures in 21st century.

However, among the three household sample groups--total household sample, households in high-income counties, and households in low-income counties--, only high-income household group showed the significant association between

the number of wage earners and household FAFH expenditure in this research.

This may be simply because the poor households could not afford to eat out. Despite the rapid economic growth, China still remains poor compared to other western countries. Chinese low-income working wives may not have high enough wage rates (time-values/opportunity costs) to substitute their household work time by eating out.

Cultural differences may also lessen the impact of number of wage earners on Chinese households' FAFH consumption decision. Chinese men do a lot of household chores for wives-the gap in household chore hours between husbands and wives in China is less than one hour (China Today, June 1999), whereas that of U.S. is approximately eleven hours (University of Michigan, 2002). That is, household work is not necessarily wives' job in China. Time constraints may be more conservative for a Chinese working wife by pooling her time constraint with her husband's. Shared responsibility for household production between a wife and a husband may reduce the frequency of trade-offs between household production time and money, such as FAFH expenditure.

It is an interesting finding that the determinants of Chinese households' FAFH consumption were similar to western countries even though China is in the introductory stage in FAFH consumption[4] and has different ideology. Due to the economic development, growth of liberalization, and increasing FAFH facilities, the FAFH consumption may continue to grow in China.

VII. Limitations

Time-value was captured by number of wage earners in this study due to lack of information in a given data set. It would be more accurate if wage rates are used to examine the association between working wives' time-value and FAFH consumption behavior in future studies.

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4) China has relatively low FAFH share to total food expenditure compared to western and other developed countries: 14.7% in China, 40.3% in U.S., 35.6% in Canada (Min et al., 2004).

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