Exploring the Food Expenditure Patterns of College Students

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Abstract

This study explored the food expenditure patterns of college students. Information on monthly

food expenditures and income from a sample of students was used to estimate the proportion of

income that the average student spends on food and analyze the Engel relation between food

expenditures and income. The average college student was found to spend about 30 percent of

income on food. The estimated marginal share is 0.076. These findings indicate that food and

related establishments that sell to mostly to college students will receive very little of any

potential increases in student income. However, increases in student income may be a boon for

businesses that sell non-food items.

Introduction

The average American spends about 10 percent of income on food. The percent of income spent

on food varies by groups based on income and other characteristics. A group of interest consists

of millennials and college students whose spending is an important component of local economic

activity and act as catalysts for total economic development (Onear, 2007). Students in the

United States spent a total of $30 billion in 1995 (Ring, 1997). About 77 percent ($23 billion) of

the expenditures were on essential items such as food, rent, gas, car insurance tuition and books.

Only 23 percent of income was spent on non-essential items. The limited nature of student

incomes suggest that some essential expenditures may be based on borrowed money especially

as the average student was found to have a credit card balance of $2,700 in 2006 (Barrett, 2003).

As with others, food is one of the most essential needs of students. However, expenditures on

food by students are expected to be constrained, and vary, by income. Such expenditures support

many local businesses especially food-at-home and food-away-from-home establishments. Such

establishments may do a better job of marketing their products and services to students if, in addition to others, they have better information on the relation between student food expenditures and income. This study explores the relation between food expenditures and the incomes of college students.

Theoretical Model

The model for the study is based on consumer demand theory. The rational consumer seeks to maximize utility with a combination of food and non-food goods and services. Utility is maximized subject to the constraint that the sum of expenditures (E) on food and non-food goods and services should not exceed the consumer's income (I). Maximization of the constrained utility function with respect to expenditures results in a set of three first order equations whose simultaneous solution results in a system of two expenditure equations – one for food and one for non-food – which are functions of prices and income. For constant prices, the expenditure equations could be expressed as functions of income.

Data and Methods

Data used for this study was obtained from a convenience sample of undergraduate students and were collected between January and April 2015. Each of 54 students in the sample provided information on monthly food expenditures and income. In addition, each student provided information on his/her gender, ethnic affiliation, classification and frequency of eating out. The mean monthly food expenditure and income for the sample was calculated. The proportion of income that each respondent spent on food was calculated as a ratio of the monthly food expenditure to income. A scatter plot of the relation between monthly food expenditures and

incomes was used to assess the nature of the Engel curve for the sample. A second scatterplot

was used to assess the relation between the proportion of income spent on food and income.

Based on the relation suggested by the scatterplots, a simple linear regression was used to

estimate the relation between monthly food expenditures and incomes. In addition, four different

regression equations were estimated for the relation between income and the proportion of

income spent on food. The functional forms for the four equations are linear, linear-log, log-log

and inverse.

Results

The average monthly food expenditure for the respondents is about $160 (Table 1). The reported

food expenditure ranged from a low $30 to a high of $540 and has a standard deviation of $114.

The mean monthly income reported by respondents ranged from a low of $100 to a high of

$4,000. The reported monthly income has a mean of $868 and standard deviation of $968. The

average student spent about 30 percent of income on food. This implies that, compared to the

average American, the average student spends a higher proportion of his or her income on food

and has only 70 percent of income to spend on non-food goods and services. The lowest

proportion of income spent on food is 2 percent while the highest proportion is 57 percent.

Table 1: Summary Statistics on Student Monthly Food Expenditure and Income

Variable	Mean	Std. dev.	Low	High
Food Expenditure ($/mo)	160	114	30	540
Income ($/mo)	868	968	100	4,000
Proportion of income spent on food (%)	30.4	17.5	2	57

Some of the estimated Engel equations are presented in Table 2. Equation 1 in the table is the

estimated equation for of monthly food expenditures (E_f) as a function of monthly income (I).

The estimated intercept for the equation is 93.9 and could imply that students with little or no

income spend an average of about $94 per month on food (autonomous food expenditure). The

estimated coefficient for income is 0.076 and is statistically significant at the 5 percent level.

This estimate is the marginal share and implies that students will spend about $7.60 on food for

each $100 of additional income. As expected, the estimate indicates that food is a necessity.

Based on statistical properties, equation 5 is better than equations 2 and 3. The estimated

coefficient for equation 5 is -0.51 which indicates that a percent increase in income will decrease

the proportion of income spent on food by 0.51 percent. This finding is consistent with Engel's

law which states that the proportion of income spent on food decreases as income increases.

Equation 4 was used to test the applicability of the Workings (1943) model (marginal share =

w_f+b_i). The 0.175 (0.304 -0.128) estimate of the marginal share given by the Workings model is

consistent within the margin of error

Table 2: Estimated Regression Coefficients for Engle Equations.

Equation #	Dependent Variable	Intercept	Income (I)	Ln(I)	I^{-1}	R^2	Std. Error
1	E_f	93.90 (5.85)	0.076*** (6.09)			41	87.53
2	w_f	0.40 (5.81)	-0.0001*** (-5.82)			38	0.13
3		0.182 (7.67)			37.20*** (7.27)	49	0.12
4		1.10 (12.17)		-0.128*** (-8.94)		60	0.11
5	lnw_f	1.81 (4.84)		-0.51*** (-8.68)		58	0.46

E_f = proportion of income spent on food, I = monthly income, w_f = proportion of income spent on food. Numbers in parenthesis are t-values, no = 54, *** = statistically significant at the 5 percent level.

Conclusion

The high proportion of income that college students spend on food is mostly likely due to their limited income. Given that food is a necessity, only a small proportion, about 8 percent, of additional income received by students will be spent on food. Budget allocations to food decrease by about one half percent for each percent increase in student income. During periods of rising incomes, businesses that sell food to college students could get more of the student dollar if they find ways to diversify into selling non-food items.

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