Exploring the Food Expenditure Patterns of College Students

Joel Fatto Amoakon (M.S)
Godfrey Ejimakor (PhD)
Deric Hardy (M.S)
North Carolina A&T State University, Greensboro, U.S.A.

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 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.

Keywords: Expenditure, marginal share, Engel, elasticity

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

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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 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 Engel 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, n = 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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