HOUSEHOLD EXPENDITURE ON MEAT VERSUS NONMEAT SOURCES OF PROTEIN IN THE UNITED STATES

Barbara J. Redman

In the last decade, vegetarianism has become more prevalent in the United States, although by no means dominant (Adrian and Daniel). Even households which have not become vegetarian have considered decreasing their consumption of meat. This trend has been due to several factors. First, meat is relatively more expensive than other sources of protein. Second, inflation has diminished consumer purchasing power. Third, recent health reports have focused on carcinogenic agents in meat and the dangers of too much cholesterol. Fourth, concern with ecology and world food supplies has increased. Meat is thought to be less efficient in feeding the masses than grains and other nonmeat protein sources.

Some research (Webster) has examined the relationship of social consciousness (particularly ecological consciousness) to behavior. Until now, however, the socially conscious dimemsion of meat/nonmeat consumption has received little attention. Any shifts in consumer preferences for meat versus nonmeat protein sources would affect the industries producing those foods, some of which (such as soybeans and poultry) are concentrated in the South. The purpose of this article is to provide a knowledge of the factors affecting expenditures for meat versus nonmeat protein sources, which would benefit the industries and indirectly the Southern region as a whole.

HYPOTHESES

Four major types of factors besides price may affect a household's purchase of meat versus nonmeat protein sources: social consciousness, income, family size and composition, and cultural preferences.

Social consciousness. A lesser consumption of meat protein in relation to nonmeat protein may be associated with social consciousness. In the limit, this consumption pattern will approach complete vegetarianism. Relevant social concerns include health and ecology, as well as philosophical objections to animal slaughter and waste. In general, people who have strong concerns about society tend to extend them in varying degrees to their own private behavior (Webster); therefore it is reasonable to suppose that social consciousness on food-related issues should be reflected in food consumption patterns.

Social consciousness in itself is difficult to measure. Factors found to affect it (Berkowitz and Lutterman) include education (positive effect), age (negative effect), and community involvement (positive effect). Income is also positively associated with social consciousness, not entirely because of its association with education (Kinnear, Taylor, and Ahmed). Contrary to the usual patterns of consumer behavior, socially conscious behavior is predicted better by personality variables such as dominance (leadership) and tolerance than by demographic and socioeconomic variables (Webster). Still, if these demographic variables relate to social consciousness they should also relate to nonmeat protein consumption as opposed to meat consumption.

Income. In addition to the indirect effect through social consciousness, income should have a direct economic effect on protein consumption. Although both meat and nommeat protein sources should be normal goods (Adrian and Daniel; Brandow), previous research (George and King) indicates a higher expenditure elasticity for meats than for other foods. On these grounds, then, income should negatively affect nonmeat protein expenditure in relation to meat protein expenditure.

Family size and composition. Family size should positively affect the household purchase of all forms of protein, as should the ages of the children (Adrian and Daniel). In particular, with progressively older children meat protein consumption (and thus expenditures) should increase faster than nonmeat protein consumption.

Cultural preferences. Lifestyle and culture, and the preferences reflected therein, should also determine the form of protein consumed. Race, region, and rural/urban/metropolitan location should all reflect subcultural differences.

Barbara J. Redman is Assistant Professor, Department of Agricultural Economics, The University of Georgia College of Agriculture.

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DATA AND METHODOLOGY

Data from the Bureau of Labor Statistics 1972-73 and 1973-74 Consumer Expenditure Surveys provided the 9392 observations used in multiple regression analysis. For each dependent variable, two regression models were developed, one to test the effect of family size and the other to test the effect of family composition. If family size in the one regression was significant, the other regression served to locate the source of this observed effect as well as to test the effect of progressively older children.

Family income (INC), family size (SIZE), region (NE, NC, SO for the Northeast,[1] North Central,[1] and South,[1] respectively), age of women (AGE), and black racial identity[1] (BL) were obtained directly from the BLS tapes. For hypotheses that referred to personal characteristics, such as age and education, those of the women were used. In general, women are still responsible for most of the food purchasing and preparation decisions despite changing sex roles. College education (EDUC) of the women[1] meant that the women had completed at least some college. No direct measure of community involvement was available; employment of a wife outside the home (EMP) was the closest available proxy and could also reflect an aspect of lifestyle (Adrian and Daniel). If the head of the household was married and a positive income of spouse was reported, the wife was presumed to be employed outside the home.[1] The Western region, Caucasion and other races, non-college-educated women, and nonemployed wives were the bases for the respective dummy variables.

From the ages of children given, variables were constructed for number of preschool children (PSC, age under 6), number of elementary school children (ESC, age 6-12), and number of high school children (HSC, age 13-18). Metropolitan areas (MET)[1] were defined as SMSAs of 400,000-plus population; urban areas outside SMSAs (URB)[1] and rural (RUR)[1] areas were as defined by the BLS. SMSAs of population less than 400,000 served as the base for these dummy variables.

The dependent variables consisted of reported household expenditures. Therefore income elasticities could not be obtained and the region and location variables served the added function of controlling for geographic price variations. The coefficients thus represent the dollar influence of the various characteristics on sales of the categories of protein. Meat protein included beef and veal, pork, poultry, and canned meats. Nonmeat protein included fish, eggs, cheese, beans, and peanut butter. (In this study fish was not treated as meat, though many vegetarians do consider it to be meat.)

RESULTS

Meat Protein

The regression equations for meat, with standard deviations in parentheses, were estimated as follows.

$$\text{Meat} = \underset{(.87020)}{2.00282^a} + \underset{(.00003)}{0.00044^a}(\text{INC}) +$$

$$\underset{(.45756)}{2.17090^a}(\text{EMP}) + \underset{(.33746)}{231122^a}(\text{PSC}) +$$

$$\underset{(.29476)}{2.99682^a}(\text{ESC}) + \underset{(.32319)}{4.99775^a}(\text{HSC}) -$$

$$\underset{(.50292)}{1.63601^a}(\text{EDUC}) + \underset{(.61748)}{3.03348^a}(\text{NE}) +$$

$$\underset{(.57804)}{0.36228}(\text{NC}) + \underset{(.58570)}{1.05030}(\text{SO}) +$$

$$\underset{(.00905)}{0.07341^a}(\text{AGE}) + \underset{(.65410)}{3.40039^a}(\text{BL}) +$$

$$\underset{(.62531)}{1.24654}(\text{MET}) - \underset{(.78901)}{0.52710}(\text{URB}) -$$

$$\underset{(.75716)}{0.74136}(\text{RUR})\text{---}R^2 = 0.104265^a$$

$$\text{Meat} = \underset{(.89089)}{-2.85136^a} + \underset{(.00003)}{0.00033^a}(\text{INC}) +$$

$$\underset{(.45753)}{1.01110^a}(\text{EMP}) + \underset{(.14522)}{3.56933^a}(\text{SIZE}) -$$

$$\underset{(.49693)}{1.29277^a}(\text{EDUC}) + \underset{(.61213)}{2.69333^a}(\text{NE}) +$$

$$\underset{(.57281)}{0.35503}(\text{NC}) + \underset{(.58033)}{0.91321}(\text{SO}) +$$

$$\underset{(.00867)}{0.06486^a}(\text{AGE}) + \underset{(.64840)}{3.17207^a}(\text{BL}) +$$

$$\underset{(.61980)}{1.39901^a}(\text{MET}) - \underset{(.78199)}{0.41334}(\text{URB}) -$$

$$\underset{(.75058)}{1.07648}(\text{RUR})\text{---}R^2 = 0.119972^a$$

[a]Significantly different from zero at $\alpha = .05$ level.

Meat expenditures comprised three fourths of all protein expenditures. For meat protein

[1]Zero-one dummy variable.

considered alone, income, employment of wife (which interacts somewhat with family income), and family size graduated with the ages of the children had strong positive effects, as one would predict. College education of the women had a negative effect on meat protein expenditure, in accordance with the social consciousness hypothesis; although age of the woman had a positive effect on meat expenditure as hypothesized, it also positively affected nonmeat protein expenditure so no conclusions could be drawn. Blacks appeared to have a stronger preference than whites for meat, and residents of the Northeast spent more on meat than did residents of the rest of the country.

Nonmeat Protein

The regression equations for nonmeat protein, with standard deviations in parentheses, were estimated as follows.

$$\begin{aligned}\text{Nonmeat} = {} & 1.40813^{a} + 0.00012^{a}(\text{INC}) + \\ & (.20726) \quad (.00001) \\ & 0.13833(\text{EMP}) + 0.70032^{a}(\text{PSC}) + \\ & (.10898) \quad (.08038) \\ & 1.05118^{a}(\text{ESC}) + 1.12015^{a}(\text{HSC}) + \\ & (.07020) \quad (.07697) \\ & 0.14876(\text{EDUC}) + 1.08588^{a}(\text{NE}) - \\ & (.11978) \quad (.14707) \\ & 0.62305^{a}(\text{NC}) - 0.04836(\text{SO}) + \\ & (.13768) \quad (.13950) \\ & 0.01896^{a}(\text{AGE}) + 0.10672(\text{BL}) + \\ & (.00216) \quad (.15579) \\ & 0.44155^{a}(\text{MET}) + 0.06095(\text{URB}) + \\ & (.14893) \quad (.18792) \\ & 0.25267(\text{RUR}) \ldots . R^2 = 0.135508^{a} \\ & (.18034)\end{aligned}$$

$$\begin{aligned}\text{Nonmeat} = {} & 0.02194 + 0.00008^{a}(\text{INC}) - \\ & (.21028) \quad (.00001) \\ & 0.21762^{a}(\text{EMP}) + 1.05136^{a}(\text{SIZE}) + \\ & (.10800) \quad (.03428) \\ & 0.27177^{a}(\text{EDUC}) + 0.94470^{a}(\text{NE}) - \\ & (.11729) \quad (.14448) \\ & 0.61767^{a}(\text{NC}) - 0.07528(\text{SO}) + \\ & (.13520) \quad (.13697) \\ & 0.01526^{a}(\text{AGE}) + 0.01898(\text{BL}) + \\ & (.00205) \quad (.15304) \\ & 0.49480^{a}(\text{MET}) + 0.10317(\text{URB}) + \\ & (.14629) \quad (.18457) \\ & 0.15168(\text{RUR}) \text{---} R^2 = 0.16593^{a} \\ & (.17716)\end{aligned}$$

[a]Significantly different from zero at $\alpha = .05$ level.

As nonmeat protein is also a normal good and expected to increase with size and age of family, the coefficients of income and family size were positive. However, these variables do not affect expenditures for nonmeat protein to the same magnitude that they affect expenditures for meat protein. An increase in income will more greatly increase meat protein expenditures than nonmeat protein expenditures. The hypotheses on income as an economic variable seem to hold, not surprisingly, at the expense of hypotheses on income as an indicator of social consciousness. As children grow older they consume more meat at the expense of other protein sources and thus cause the household to spend more for meat. Again, Northeasterners spent more than residents of other regions, perhaps because of higher food prices in the Northeast. The fact that residents of metropolitan areas spent more on nonmeat protein than did other people could reflect higher prices and/or a measure of sophistication which tends to go with social involvement and social consciousness. These results diverge slightly from Adrian and Daniel's; the differences may be due to their use of an earlier time period and quantity rather than expenditure data, as well as the different construction of their variables.

CONCLUSIONS

Measures of all four types of hypothesized factors have significant effects on relative expenditure for meat and nonmeat protein. Education of the woman, family composition, and race have the most marked effects. However, on all equations the R^2 was very low. This may be due partly to the cross-sectional nature of the data, but probably due more to Webster's finding that personality variables carry more weight. Though these data can only indirectly measure preferences, the findings provide some useful information for manufacturers of meat and nonmeat protein products and suggest that the social consciousness dimension of food expenditure should be explored further.

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