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# Consumer Demand for Convenience Foods: Demographics and Expenditures

J. Michael Harris and Rimma Shiptsova

About 90 percent of Americans purchase convenience foods and nearly 25 percent use more timesaving convenience foods today than in 2001 (Hales 2003). Sixty-one percent of those surveyed indicated that “reduced time” and “less effort” to prepare were the primary reasons for purchasing convenience foods. This finding is especially interesting since most consumers considered convenience foods to be slightly more expensive than non-convenience products.

A recent ACNielsen *Consumer Pre\*View* survey of household attitudes and behaviors also provides evidence that time and effort expended on food preparation is important to U.S. consumers.<sup>1</sup> Half of all heads of households indicated that they are too tired to expend much time or effort on evening meal preparation. The greatest number of consumers who felt this way were in the youngest and highest-income households surveyed. Nearly 75 percent of the youngest households also indicated that they were constantly looking for new ways to get household chores like shopping, cooking, and cleaning done faster.

Is time and effort the primary factor driving the growth of convenience foods? Cutler, Glaeser, and Shapiro (2003) seem to think that this is the case. They suggest that convenience has been driven by the division of labor in food preparation. During

the 1960s, households prepared most of their own food and consumed it at home. Today, more preparation is being performed by food manufacturers and less at home. Manufacturers have been able to provide consumers with more foods where much of the preparation work has been done outside the home. This development has been facilitated by the use of technological innovations in preservation, packaging, freezing, artificial flavorings and ingredients, and by the use of microwaves. In 1965, non-working women spent more than two hours per day cooking and cleaning up after meals. By 1995, this time had been reduced by more than half. The authors attribute this development to a shift in food preparation from individuals to food manufacturers. They also argue that this convenience has lowered the cost of time associated with food consumption and increased the quantity and variety of foods consumed.

Could there also be other factors that are linked to this growth in convenience foods? Other researchers have, in fact, advanced several other possible factors (Senauer, Asp, and Kinsey 1998; Newman, Henschion, and Mathews 2001). However, these factors still relate to time and effort of preparation and are probably causative factors that have driven the phenomenon previously described:

- Modern American families have fewer formal eating occasions since more household members live individualistic lifestyles. All household members, especially children, are increasingly cooking their own meals.
- Increasing disposable incomes have led to higher levels of expenditure on time-saving and labor-saving food products. Consumers are unwilling to spend much time on food preparation due to the increasing value placed on leisure time.
- Redefinition of gender roles in households, with more women working outside the

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<sup>1</sup> Survey conducted in September and October 2002 and included responses from 21,500 households in the Homescan consumer panel. Over 60 percent of those 18–34 years and 56 percent of those with incomes over \$50,000 agreed somewhat or strongly with the statement that “they were too worn out to cook in the evenings” and 74 percent agreed with the statement that they were constantly looking for new ways to get chores done faster. Homescan is an official trademark of ACNielsen.

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Harris is an economist with the Economic Research Service, U.S. Department of Agriculture, and Shiptsova is an assistant professor at Utah State University.

The views expressed herein are not necessarily those of the U.S. Department of Agriculture.

home, has led to a general loss in traditional cooking skills and less time for food preparation. Household sizes have declined and the increasing number of one- or two-person households has led to an increase in demand for ready foods which are easy to serve and portion-controlled.

- Younger consumers with disposable incomes are more likely to try new products (many of which are convenience products), have non-traditional eating habits, and eat out more often.

The principal objective of this study is to examine the effect of these growth factors and differences in household preferences on expenditures for selected at-home convenience foods. An understanding of the decision process of food selection, purchase, and preparation is important in developing and implementing food policy. Food-consumption patterns determine diet-related health outcomes and influence the structure and composition of the food supply (ESCOP 1990). Identifying these behavioral relationships that determine food choice is critical to understanding food demand and developing insights into future consumption patterns. These relationships are especially important since today's consumer seems to be driving the demand for prepared foods. The availability of mass-produced convenience foods with a lower time cost may also be a factor in rising obesity rates, due to the increased quantity and variety of these foods which are consumed by consumers.

We first look at how manufacturers have responded to the factors driving convenience by looking at new product introductions and sales trends for selected product categories over the period 1987–2002. New product introduction data provide a view of the growth of new convenience (quick) food products. We analyze the impact of economic and socioeconomic variables on actual household expenditures for selected convenience foods. ACNielsen Homescan panel data are used in the analysis. Complex survey-design techniques are used to estimate population estimates and statistics since complex survey sampling can create potential problems for ordinary estimation techniques. The results are used to examine the impact of the outlined growth factors and household preferences on

expenditures for some common ready foods. The findings also present a picture of who consumes these foods.

### Manufacturer Response

Productscan<sup>2</sup> reports a significant increase in new product reports (which claim to be quick foods) since 1987 (Figure 1). They began reporting these products in 1987. Quick food products are defined as those with quick preparation times such as microwaveable meals, entrees, and dinners. The number of introductions of these products increased from 49 in 1987 to 419 in 2002—an increase of 755 percent. The number of introductions peaked at 474 in 2000.

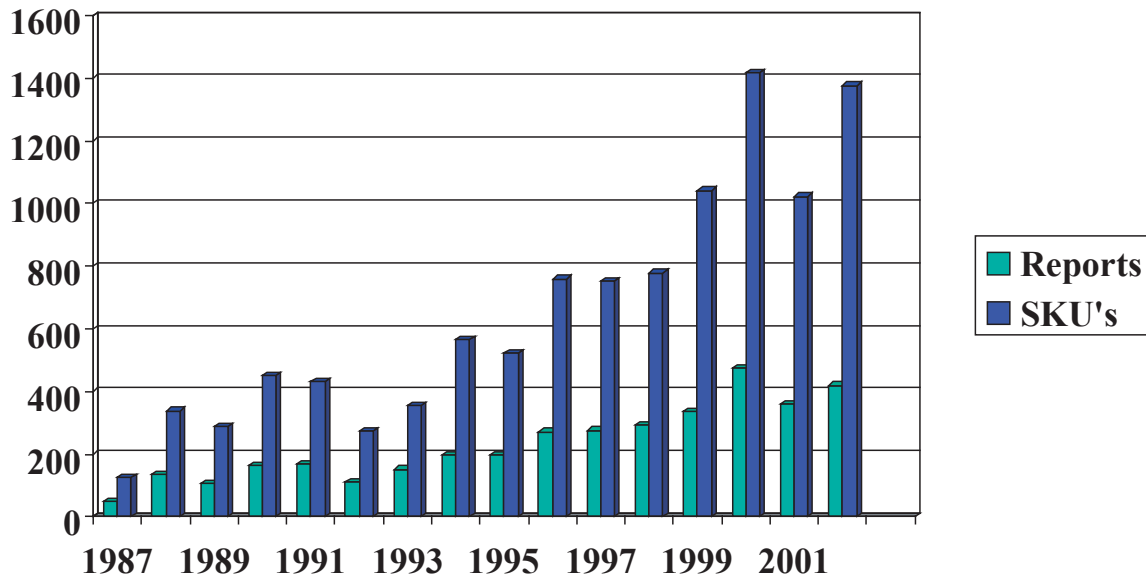
New quick food product numbers become even more dramatic when one realizes that the product reports do not totally reflect the number of SKUs (shelf keeping units) or items represented. The number of SKUs usually exceeds the number of reports since a reported new product may come in different flavors and sizes. Looking at introductions this way yields 126 SKUs in 1987 and grew to 1,377 in 2002. In calendar year 2000, 1,477 SKUs were introduced.

The top food categories with new quick product reports (Table 1) were meals and entrees, pizza, hot snacks, and sandwiches (26.4 percent); soup (7.9 percent); pasta and pasta side dishes (7.8 percent); vegetables and vegetable side dishes (5.4 percent); and mixes, other bakery, and non-baking (5.0 percent). These five categories accounted for over 50 percent of new quick food reports. Meat, bread products, poultry, and sauces and gravies round out the top ten; these ten categories accounted for 72 percent of new quick-product reports.

### Previous Research

Dealing with convenience is difficult since multiple characteristics can contribute to the convenience attribute of food products. For example, preparation method, preparation time, preservation, packaging, and added culinary skills are all characteristics which contribute to the convenience attribute of

<sup>2</sup> Productscan is a database of new product introductions over time compiled by Marketing Intelligence, Inc. Sources of information come from trade shows, trade and other publications, and agents in the field who look for products.



**Figure 1. Number of New Quick Food Products Introduced, 1987-2002.**

Source: Productscan, Marketing Intelligence, Inc.

**Table 1. Top Category Totals of New Quick Food Product Introductions, 1987–2002.**

Category	Reports (number)	Reports (percent)	SKUs (number)	SKUs (percent)
Meals & entrees, pizza, hot snacks & sandwiches	981	26.4	2770	26.4
Soup	292	7.9	980	9.3
Pasta & pasta side dishes	288	7.8	886	8.4
Vegetables & vegetable side dishes	199	5.4	539	5.1
Mixes, other baking & non-baking	187	5.0	456	4.3
Rice & rice side dishes	177	4.8	418	4.0
Meat	165	4.5	460	4.4
Bread products	138	3.7	280	2.7
Poultry	137	3.7	456	4.3
Sauces and gravies	102	2.8	343	3.3
Top ten total	2,666	72.0	7,588	72.2
All new quick products	3,709	100.0	10,503	100.0

The database includes new products in stores. In addition to reporting new products, the database also includes different sizes of these products. Source: *Productscan*, Marketing Intelligence, Inc.

food products. According to Webster's dictionary, convenience is "anything that adds to one's comfort or saves work." This is a very broad definition. Researchers looking at food products have, in general, focused on either the degree of processing or preparation time when they address convenience.

Traub and Odland (1979) identified convenience foods as those that are "fully or partially prepared foods in which a significant amount of preparation time, culinary skills, or energy inputs have been transferred from the home kitchen to the food processor and distributor." Their approach zeroed in on products where manufacturers and marketers added convenience features to foods that did not have to be undertaken or added at home by homemakers.

Capps, Tedford, and Havelick (1985) followed up on the previous study and also defined and analyzed convenience foods based on the degree of processing or added features. Three classifications of convenience were used: 1) basic-convenience foods,<sup>3</sup> products where the processing is more related to preservation rather than to ease of preparation (foods with a single or limited number of ingredients, and foods with time or energy inputs but not culinary expertise built in); 2) complex convenience foods,<sup>4</sup> which encompasses multi-ingredient prepared mixtures and foods which have high levels of time saving and/or energy inputs as well as culinary expertise built into the products; and, 3) manufactured convenience foods,<sup>5</sup> which deals with foods which have no home-prepared counterparts. They also create a non-convenience food class<sup>6</sup> composed of fresh (unprocessed) foods and home-produced, home-frozen, home-canned or home-preserved food items.

Neither of these approaches explicitly considers preparation time, focusing instead primarily on the degree of processing. A second set of studies take a different approach and have focused only on the degree of readiness, the preparation method, or the

amount of preparation that must be performed before the food can be consumed. Preparation method and preparation time are truly important since not all convenience foods are ready to eat when the consumer gets them home, and some non-convenience foods can be eaten with little or no work by the consumer.

Paulus (1978) concluded that one has to differentiate between different levels of readiness, not just different levels of processing. She lays out the spectrum from raw material to prepared complete meals in five phases: 1) ready to process; 2) ready to kitchen process; 3) ready-to-cook foods; 4) ready-to-heat; and, 5) ready-to-eat foods. Ready-to-serve foods are further classified by three criteria. First, foods that receive adequate treatment and processing, including preservation, that have added a certain shelf life; second, foods which can be eaten directly after heating up to eating temperature; and third, foods sold alone or in combination with other components with corresponding pre-treatment as a complete meal.

Pepper (1980) looks at the degree of preparation required. Foods used both at home and by the fast food industry were broken down into five classes based on methods of preparation: 1) no preparation; 2) mixing; 3) heating; 4) mixing and cooking; and 5) cooking. This approach gets away from processing and focuses more on the amount of preparation and time consuming methods needed to produce a ready-to-eat food.

Pearson et al. (1985) also used preparation time as the focal point to classify convenience foods, but also considered the use of the food in the household meal. The first component part of the categorization is a detailed system consisting of 14 categories. These 14 categories are then represented by a condensed three-category form consisting of no preparation, some preparation, and considerable preparation.

A later study by Park and Capps (1997) incorporates perhaps the largest degree of all the previously mentioned convenience concepts—processing, readiness, and preparation time. Their classification system goes beyond the notion that convenience should be based on the relative amount of preparation done by the processor or retailer versus the remainder that is to be done by consumers. The core of their taxonomy is based on the notion that convenience or time saved is really at the core of

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<sup>3</sup> Examples include processed cheese, french fries, shelled nuts, and peanut butter.

<sup>4</sup> Examples include potato chips, cheese balls, and ready-to-eat canned and frozen entrees and side dishes.

<sup>5</sup> Examples include ready-to-eat breakfast cereals, gum drops, jelly beans, soft drinks.

<sup>6</sup> Examples include cooking oils, flour, fresh eggs, coffee, and tea.

the household consumption decision and that any classification should not be focused totally on the degree of processing or the degree of readiness, but rather on the household manager's opportunity costs of time and preparation time. They proceed in this framework and set up their analysis based upon three categories of food products: unprepared, semi-prepared, or prepared. Within each of these categories they further classified foods as either snacks, components, or meals. Their prepared meals are further defined as meals ready-to-eat and those ready to cook. In general, ready-to-eat meals are away-from-home-foods either consumed at home or away. By taking this approach, the authors implicitly consider degree of processing and explicitly look at the degree of preparation required plus the use of the food in a meal (e.g. ingredient, component, dessert, meal, etc.).

The present study of convenience foods takes the approach of Newman, Henschion, and Mathews (2001), who analyzed a group of convenience food products they call "ready meals." Ready meals can be defined as meals that include meat, poultry, fish, seafood, pasta, and vegetable dishes and can be classified as traditional, continental, ethnic, vegetarian, and low-calorie. These are also products that have had culinary or recipe "skills" added to them by manufacturers that result in a high degree of readiness, completion, and convenience. These types of products can be divided into five different categories: canned, ambient,<sup>7</sup> frozen, chilled, and dry.

Ready meals comprise a subset of the complex convenience category developed by Capps, Tedford, and Havelick (1985) and similar to the prepared-meals category specified by Park and Capps (1997). Some products that could be classified as meal components (entrees and pot pies) have been included. Pearson et al. (1985) classified products which could be considered either components or meals by their lowest use (components). Entrees were included since many consumers eat entrees as a whole meal.<sup>8</sup> Pot pies were included since most are family-size whole meals instead of the smaller,

individual pies. These meals are expected to represent the highest level of at-home ready-to-cook or ready-to-prepare convenience foods.

The list is essentially the result of mapping the AC Nielsen Homescan data onto the classification of foods developed by Park and Capps (1997) from the 1987–88 National Food Consumption survey. That is, selected meals from the Homescan data (with the exception of added pot pies and entrees) are the same as Park and Capps' (1997) prepared-meals classification except for the addition of entrees and pot pies.

Further assumptions also have to be made regarding the selections used here. Ready foods are assumed to be produced by processors or retailers with marketing inputs. Convenience foods produced in the household are not considered, nor are foods consumed away from home. Also, the Homescan data do not provide information on foods produced at-home or food-away-from-home. Therefore, this initial study only looks at convenience in terms of food products purchased for at-home use.

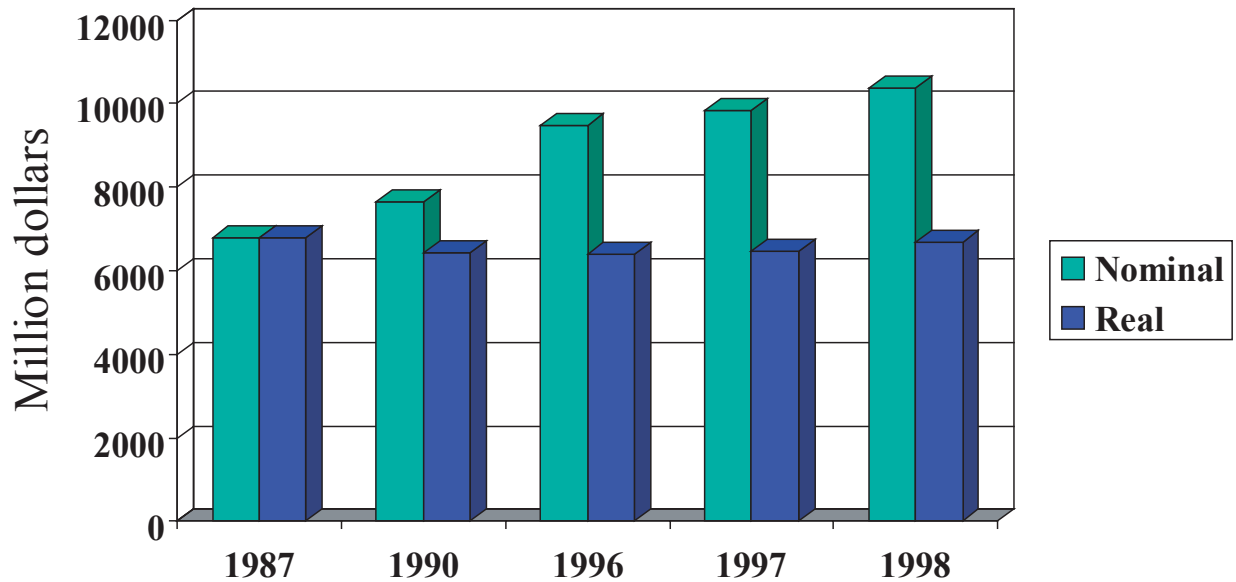
Based on retail scan data, sales of ready meals as defined here increased from \$6.8 billion in 1987 to \$10.4 billion in 1998, a 53-percent increase (Figure 3).<sup>9</sup> However, in 1987 dollars, sales declined slightly over the period. All of the categories gain sales (in nominal terms) except for frozen dinners, which declined slightly.

Frozen dinners and entrees are the largest categories in frozen food. According to recent statistics, the average U.S. consumer eats frozen food about 71 times a year. Frozen-entree sales increased 14.5 percent from 1987 to 1998 and quantity increased 3.4 percent. Entrees have helped drive the frozen food phenomenon. Consumers are relying more and more on frozen entrees to provide quick and convenient tasty meals. Sales of frozen dinners declined 12.1 percent over the period, and quantity decreased 10.3 percent. Originally known as TV dinners in the 1950s, these products take advantage of flash freezing to keep ice crystals and quality loss at a minimum. Frozen pizza and dry pasta dinners were also high-growth categories.

<sup>7</sup> Actually, the correct phrase is ambient-temperature foods, which are foods that can be stored at the temperature of their surroundings. Some examples include shelf-stable entrees, jars of coffee, etc.

<sup>8</sup> Frozen dinners and entrees was the largest sales category in 2001, with over \$5.9 billion in sales.

<sup>9</sup> These sales numbers are based on ACNielsen retail scanner data.



**Figure 2. Sales of Ready Meals, 1987–1998.**

Real sales derived using the CPI.

Frozen dinners, refrigerated and frozen pizza, dry pasta dinners, canned/dry/kit dinners, frozen pot pies, frozen entrees, and instant meals.

### Homescan Panel Data

Our analysis uses ACNielsen Homescan panel data, a nationally representative panel of U.S. households, which provides food purchase data for at-home consumption. Panel households scan in either the Uniform Product Code (UPC) or a designated code (for random-weight food items) for all of their purchases at all retail outlets. The data include detailed product characteristics, quantities, expenditures, and promotion information for each food item purchased by the households plus demographic information for each household in the panel.

The full Homescan panel consists of more than 50,000 households, but only 12,000 households reported both random and UPC purchases in 1999. Data from 7,195 of these households, which reported purchases for at least 10 months in 1999, were used. This data will be used to provide more-recent estimates of coefficients and elasticities than earlier studies, which used data from 1987 and earlier. The new study provides expenditure and price data; other surveys only provide expenditure data.

Data for the ready meals previously specified were drawn from the Nielsen Homescan data set. The data set contains 614 product categories (called product modules by Nielsen) (Table 2). The grocery

**Table 2. Homescan Panel Product Characteristics.<sup>a</sup>**

Department	Categories	Purchases <sup>b</sup>	Brands	Items (UPCs)
Dairy	43	873,899	4,420	26,108
Dry grocery	410	4,111,719	38,537	157,403
UPC produce, frozen, meat	118	1,002,851	11,374	39,791
Random weight	43	1,521,918	1,037 <sup>a</sup>	9,970
Total	614	7,510,387	55,368	233,452

<sup>1</sup> Includes 43 brand codes labeled all other brands.

<sup>2</sup> Individual item purchases.

department contains 410 categories, followed by 84 in the frozen department. The total number of purchases by the households totaled slightly more than 7.5 million for 1999, and the largest number of purchases were made in the grocery department (4.1 million). A total of slightly more than 55,000 brands were purchased. These purchases comprised over 233,000 items or products—dry grocery purchase items accounted for over 157,000. UPC produce, frozen, and meat categories plus dairy and random weight make up the remainder of the categories.

### Analytical Framework

The ready-foods market is most appropriately analyzed using the household production model (Becker 1965; Lancaster 1971). Studies that have employed the model have stressed the importance of accounting for time constraints in the household decision framework. Nayga (1998) provides an excellent description of the framework. This theory is especially relevant here because it takes into account that household decision-making is based on efficient use of market goods, time, and human capital as inputs into the production of utility-yielding non-market goods (Deaton and Muellbauer 1996). Households are considered to be both production and consumption entities. The household utility function ( $U$ ) can be expressed as

$$(1) U = U(c_1, c_2, \dots, c_n),$$

where the  $c_i$  are amounts of commodities produced within the household, e.g., a nutritious meal. The

household utility function is constrained by the household production function, time constraints, and full income constraints. The amount of a commodity  $c_i$  produced in the household is a function of time, market good  $X_i$  utilized in production, and the environment. For the full mathematical description of the model, see Nayga (1998).

The model leads to household-derived market-good demand equations that are analogous to derived demand equations for factor inputs in traditional production theory (Becker 1965):

$$(2) X = X_{ij}(P_j, Y_j, W_j, E_j),$$

where  $X_{ij}$  is the  $j^{\text{th}}$  household's consumption of the  $i^{\text{th}}$  market good,  $P_j$  is a vector of market prices faced by the  $j^{\text{th}}$  household,  $Y_j$  is the  $j^{\text{th}}$  household's income,  $W_j$  is the value of time for the  $j^{\text{th}}$  household, and  $E_j$  is a vector of variables reflecting the environment. These environmental factors can be household characteristics or socioeconomic factors (McCracken and Brandt 1987).

Equation 2 implies that household behavior varies across consuming household units due to prices, income, time, and socio-demographic factors. Here the household production model attempts to account for the environmental factors explicitly. For example, the model accounts for household size, education, and age. In other words, expenditures depend on income, prices, household working hours, and other preference variables.

Wage rates are not provided in the Nielsen Homescan data. The number of wage earners and income are used as a proxy for the value or op-



portunity cost of time. This variable is expected to have a positive effect on household expenditures for ready foods. Income is also hypothesized to have a positive relationship with expenditures on prepared foods. Higher-income households have been found to spend more on food than do lower income households.

The socioeconomic variables include: region, age, race, marital status, education, and presence of children. Regional differences in expenditures have been found in previous food studies. Age is a variable used to reflect the position of the household in the life cycle. Younger households are expected to have higher expenditures on ready foods than others. Whites and more-educated households have also been found to consume more food away from home (convenience) than do others (Nayga and Capps 1992). According to household production theory, the presence of children should be positively related to expenditures on time-saving foods such as ready foods (Nayga 1998). We estimate the following expenditure equation:

$$(3) E_{ij} = f_{ij}(\text{income, price, price of substitute foods, household size, region, age of household head, race, ethnicity, marital status, household head education, presence of children in the household, number of wage earners in household}).$$

The list of variables can be found in Table 3.

The expenditure equation was estimated using regression techniques which take into account complex survey design. The need for a censored approach was considered. However, Tobit estimates were found to produce essentially the same estimates and the Heckman procedure reduced to an Ordinary Least Squares (OLS) problem during estimation.

### Population Estimates of Household Statistics

Complex survey-design techniques are used to estimate population statistics and the expenditure regression model. This procedure is used because of three data characteristics: sampling weights, clustering, and stratification (Stata 2003). These characteristics arise from the design of the data-collection procedure. Sampling weights result from designs where observations are selected using a ran-

dom process but different observations may have different probabilities of selection. Post-sampling adjustments may also be performed on the weights as well, and in fact some extra weighting is done to the Nielsen Homescan. Using sampling weights in the analysis provides estimators that are approximately unbiased for statistics and coefficients that are estimated for the population, and also produces unbiased standard errors.

Clustering can result when household observations are not sampled independently. However, there is no intentional clustering in the data according to ACNielsen. Due to the sample design, some observations in a cluster, if they occur, are not independent. If estimates are based on independence, standard errors may be smaller than actual. Accounting for clustering is necessary to produce “better” estimates of standard errors, p-values, and confidence intervals.

Stratification can also affect standard errors. In the survey design, different group (strata) clusters may be sampled separately, and sampling is done independently across strata. Strata are assumed to be independent and are analyzed as such. However, in some cases, if the strata are not independent, this can reduce the size of standard errors. ACNielsen indicated that clustering should not be a problem in their sample. The strongest argument for using complex survey design techniques was to weight the data to generate population estimates based on appropriate standard errors.

Estimates for the means and standard errors for the households that purchased ready meals are shown in Table 4. These numbers constitute a demographic profile of households who purchase ready meals. The average household expenditure was \$118.55, average annual income is \$42,600.60, and average age is slightly over 47. The average quality adjusted price is also shown for both ready meals and all other at-home foods—\$2.84 and \$0.83 per pound, respectively. The average number of full-time wage earners was found to be 1.02.

The remaining variables provide a demographic picture of households which consume these convenience foods. Here, the means are proportions (dummy variable means) which have been expressed as percentages. The largest number of households are located in the South (36 percent), followed by households in the cCentral region (24 percent). For all regions, 78 percent of households were located

**Table 3. Dependent and Independent Variables in the Expenditure Equation.**

Expenditure	Annual household expenditure on ready meals (dependent variable)
Income	Household income <sup>a</sup> (dollars)
Priceadj	Quality adjusted price of ready meals <sup>b</sup> (dollars)
Othpriceadj	Quality adjusted price of all other at-home foods <sup>b</sup> (dollars)
Hhsize	Number of persons in household (number)
East	1 if household is located in the Eastern U.S.
South	1 if household is located in the Southern U.S.
Central (base)	1 if household is located in the Central U.S.
West	1 if household is located in the Western U.S. <sup>c</sup>
Age	Age of household head <sup>d</sup> (years)
Metro	1 if household is located in a urban/suburban area
Rural (base)	1 if household is located in a rural area <sup>c</sup>
White	1 if household race is white
Black	1 if household race is black
Other races (base)	1 if household race is other than white or black <sup>c</sup>
Hispanic	1 if household is Hispanic
Non-hispanic (base)	1 if household is non-hispanic <sup>c</sup>
Single (base)	1 if the household head is single <sup>c</sup>
Married	1 if the household head is married
High school (base)	1 if the household head has a high school education or less <sup>c</sup>
College	1 if the household head has a college education
Post graduate	1 if the household head has a post graduate education
Children	1 if the household contains children
Childless (base)	1 if the household contains no children <sup>c</sup>
Wage earners	Number of wage earners in the household (number)

<sup>a</sup>Income is recorded as interval data and the midpoint was used to represent household income. Income is assumed to be a continuous variable based on a further assumption that mid income values are randomly and normally distributed within the interval (Byrne, 1994).

<sup>b</sup>Quality adjusted using a technique suggested by (Cox and Wohlgenant, 1986). Prices are regressed on the demographics. The quality adjusted price is the sum of the intercept +/- the residual value.

<sup>c</sup>Base, omitted dummy variable.

<sup>d</sup>Same technique as described in footnote 1.

**Table 4. Estimated Population Means.**

Variable	Units	Estimate	Standard error	Deff <sup>a</sup>
Expenditure	Dollars	118.55	2.47	3.08
Income	Dollars	42600.60	584.73	3.64
Adj. own price	Dollars/pound	2.84	0.02	3.24
Adj. other prices	Dollars/pound	0.83	0.005	3.29
East	Proportion	0.19	0.005	1.21
West	Proportion	0.21	0.005	1.21
South	Proportion	0.36	0.01	2.46
Central	Proportion	0.24	0.01	1.38
Age	Years	47.41	0.30	4.24
Household size	Number	2.59	0.03	4.08
Metro	Proportion	0.78	0.01	3.55
Rural	Proportion	0.22	0.01	3.55
Poverty	Proportion	0.25	0.01	6.03
Non-poverty	Proportion	0.75	0.01	5.19
White	Proportion	0.85	0.01	4.64
Black	Proportion	0.11	0.01	5.40
Other race	Proportion	0.04	0.003	2.08
Hispanic	Proportion	0.09	0.01	4.48
Non-Hispanic	Proportion	0.91	0.009	4.44
Single	Proportion	0.48	0.01	3.81
Married	Proportion	0.52	0.01	3.81
High school or less	Proportion	0.74	0.01	2.81
College	Proportion	0.19	0.01	2.68
Postgraduate	Proportion	0.07	0.005	2.27
Child	Proportion	0.34	0.01	4.00
No children	Proportion	66.01	0.01	4.00
Wage earners	Number	1.02	0.02	3.73
Number of observations	7195	Population size		1.033e+08
Number of strata	10	Subpopulation observations		7,043
Number of PSUs <sup>b</sup>	7195	Subpopulation size		1.008e+08

<sup>a</sup>The deff ratio is used to compare the variance obtained from complex survey design estimation with the variance that would have been obtained using random weight sampling (Kish 1965).

<sup>b</sup> PSU refers to primary sampling units (households).

in metropolitan areas and 75 percent had incomes more than 200 percent of the U.S. poverty level. Most of the household heads were white, married, and had a high school education or less. However, 48 percent of the households were single. Only 34 percent of the households had children.

### **Empirical Results**

The effects of the economic and socioeconomic variables on expenditures are shown in Table 5. The table shows whether each variable is statistically significant, and its impact on expenditures (either positive or negative). The coefficients and standard errors are shown for both the continuous variables and the discrete effects for the categorical variables. The marginal effects of income and prices and their mean values are used to calculate elasticities for the continuous variables in the model. The statistical significance of computed elasticities are based on the significance of the marginal effects.

Income has a positive and significant effect on expenditures for ready meals. This result indicates that as household income increases, so do the expenditures on ready meals. The income elasticity with respect to expenditure, computed at the mean, is 0.15. That is, for every one-percent increase in household income, ready-meal expenditures will increase by 0.15 percent. This result is consistent with the elasticity found by Park and Capps (1997) for at-home ready-to-cook meals (0.13). This result is also consistent with the growth factor outlined in the introduction which suggests that as disposable income rises, expenditures on ready meals also rise.

Like income, the quality-adjusted price also had a positive and significant effect on expenditures. As expected, as price increases, expenditures also increase. The computed price elasticity is 0.41. This result is consistent with food products where the product is price inelastic and the percentage change in price dominates the quantity change. Therefore, an increase in price will increase total expenditure and, conversely, a decrease in price will decrease total expenditure. The quality-adjusted price of other food products was insignificant. The estimated price elasticities are similar to those found by Park and Capps (1997).

Household size and some regional effects are significant as well. The household-size variable was

positive and significant. For each extra person in the household, nearly \$15 more was spent. This result indicates that larger families consume more ready meals. Regional expenditures are measured relative to the central region of the United States. Only two regional variables were significant. Households in the West spent over \$15 dollars more for ready meals in 1999 compared to \$18 less for households in the East. Regional expenditures in the Central and Southern regions are not significantly different from each other.

The effect of age of the household head on expenditures is negative and significant. This result suggests that expenditure on ready meals declines with age of the household head. This implies that younger heads of households are more likely to purchase ready meals. That is, the younger the household head, more is spent on ready meals, on average. This result is also consistent with another factor identified in the introduction and suggests that younger households have a preference for a more convenient lifestyle and, compared to older households, purchase more ready meals.

The urban/suburban variable is positive and significant. The coefficient indicates that these households spend nearly \$14 more per year on ready meals than do rural households. This significant difference is probably due to the different lifestyles lived by the two groups. Urban/suburban households face greater time constraints due to commuting and/or traffic congestion to and from work and may be more likely to purchase ready meals and spend more for these products. Another possible explanation may be the greater availability and variety of foods in urban/suburban markets compared to rural markets.

The poverty variable is negative and significant. Households that have incomes less than 200 percent of the poverty threshold spend over \$15 a year less on ready meals. This finding is consistent with previous studies conducted at the Economic Research Service which indicate that higher-income households spend more on prepared foods than do low-income households.

The race variable measures ready-meal expenditure differences relative to non-white or non-black households—in other words, households of a race other than black or white. Both the white and black variables were found to be significant. However, the white variable was positive and indicates that

**Table 5. Regression Estimates for Ready Meals with Correction for Complex Survey Design.<sup>a</sup>**

Variable	Coefficient	Standard error
Income	0.0004**	0.0001
Adjusted price	16.70***	2.58
Other prices	7.00	10.54
Household size	14.94***	3.15
Base=central		
East	-18.79***	5.40
West	15.26**	6.28
South	-7.16	6.03
Age	-0.52**	0.24
Base=rural		
Metro	14.13***	5.25
Poverty	-15.08**	7.35
Base=other races		
White	21.91**	8.89
Black	-21.57**	10.43
Hispanic	-32.17***	8.27
Base=single		
Married	-17.59**	6.93
Base=high school		
College	-13.47**	5.88
Postgraduate	-14.24***	8.08
Base=no children		
Child	17.60**	7.75
Wage	4.78	3.61
Constant	17.72	19.75

N=7,195 F (18,7168)=17.36 R-squared=0.11 Root Mean Squared Error=120.71

\*\*\* Significant at the .01 level.

\*\* Significant at the .05 level

<sup>a</sup> The dependent variable is annual household expenditure on ready meals.

white households spent over \$21 per year more on ready meals than did the other races category. For blacks, the coefficient is negative and indicates that blacks spent over \$21 less per year on ready meal products. The Hispanic variable measures expenditure differences relative to non-Hispanic households. The coefficient is negative and significant. Hispanic households spent over \$32 less per year than did non-Hispanic households. One possible reason might be that in 1999 the range of ready meals might not have had a significant variety of ethnic Hispanic meals.

For marital status, married households were compared to single households. The coefficient is negative and significant. Married households spent over \$17 less per year on ready meals than did single households. Married households may stay in more and prepare more meals at home, especially if there are children in the household.

Educational level of the household head is measured relative to heads with a high school education or less. Both the college and postgraduate variables are negative and significant. Households with heads holding a college degree spent over \$13 less on ready meals relative to households headed by those with a high school degree. Postgraduates spent slightly over \$14 less on ready meals.

It has been suggested that more-educated households are more health conscious than other households and therefore might consider ready meals less healthy. Another explanation might be that these two groups eat out more and consume fewer meals at-home. Unfortunately, the Nielsen data does not contain data on expenditures on food away from home. Including food-away expenditures would shed additional light on this finding.

The variable that indicates the presence of children in the household was positive and significant. Households with children spent over \$17 more per year on ready meals than did those without children. This finding is consistent with the notion mentioned in the introduction (factors driving ready-meals growth) that consumers increasingly are adopting more individualistic lifestyles. The implication is that the importance of formal family eating occasions is declining and family members, including children, are independently preparing and consuming their own meals (Newman, Henchion, and Mathews 2001). Senauer, Asp, and Kinsey (1998) reported that two-thirds of U.S. children prepared

at least one meal a week without adult supervision in 1990. Another implication of the finding in this study is that households with children are probably more likely to purchase ready meals which are much easier for children to prepare.

Contrary to expectation, the variable which measures the effect of the number of wage earners on expenditures was insignificant. However, the coefficient is positive and, if significant, would suggest that expenditures on ready meals would increase with more adult wage earners in the household. This result is somewhat surprising since one would expect that households where more members were working would have a higher opportunity cost of time, and in households where all adults work there would not be adult household members to engage in household tasks such as cooking. An interaction term combining the poverty level and number of wage earners was used in an alternative specification and was found to be insignificant as well.

The finding regarding the number of wage earners does not support the notion mentioned in the introduction that the redefinition of gender roles in households and the number of two-wage households has led to a general loss in traditional cooking skills and less time for food preparation. However, this finding could also suggest that all-working households could be eating out more and substituting food away from home for home cooked meals, even ready meals.

## **Summary and Conclusions**

The ready-foods market continues to grow in the United States. Nominal dollar sales have increased 53 percent from 1987 to 1998. Frozen products, especially entrees, appear to be leading the way. This work focuses on these products and looks at the impact of economic and socioeconomic factors on purchases of selected convenience foods. Techniques which allow for correcting estimates for complex survey design were used in order to produce estimates which reflect population behavior—that is, the impact for all U.S. households, not just sample households. This technique is employed to provide the necessary weights to the sample strata contained in the sample and to provide “better” estimates of standard errors for population coefficients.

Income turns out to be a significant factor that influences convenience-food growth. That is, as

income increases, expenditures on ready meals increase. This finding suggests that increasing disposable incomes and the resulting increasing opportunity cost of time are factors that drive expenditures of ready meals (household incomes were increasing over this period). Consumers are less willing to spend time cooking due to the increased value placed on leisure time.

Younger households also purchase more convenience foods. Age of the household head was significant; as age increases, expenditures decrease. This is consistent with life-cycle theory where incomes and expenditures rise until mid-age and then decline as consumers become elderly. It also suggests that younger consumers purchase more ready meals and ready foods (a growth factor driving ready-food expenditures mentioned in the introduction).

The finding for marital status does support the notion that smaller household sizes have led to higher expenditures for ready foods. Married households were found to spend considerably less than single households. Single consumers are looking for easy-to-serve, portion-controlled products which are easy to prepare and serve. The clean-up is even reduced by these products, since many meals can be placed in the microwave in the provided packaging.

We attempted to determine if children were consuming more ready foods. While our results are not definitive, we were able to show that households with children had a higher preference for more ready meals than did households without children. This finding suggests that Americans may indeed be pursuing more individualistic lifestyles. All household members, especially children, may indeed be cooking their own meals. Ready meals provide an easy, safer way for children to cook on their own.

Surprisingly, the number of wage earners in the households was not found to explain differences in expenditures. This finding does not agree with the notion that redefinition of gender roles households in the United States is leading to a general loss in traditional cooking skills and less time for food preparation. One would think such households would consume more ready meals. One possible explanation for this result might be that they are eating out and not preparing ready meals at home. Unfortunately, food-away-from-home was not available for this analysis.

One of the main implications of this work may be that economic factors alone—i.e., price and income—are not driving the demand for ready meals. Changing lifestyles and family structures also have had a significant effect on demand and expenditures. These factors will continue to shape this market, and it is important for marketers to identify and address the attributes demanded by the increasing numbers of consumers who want convenient foods. It is also important that they focus on quality and nutrition as well.

The finding on poverty status was also very interesting. Households below 200 percent of the U.S. poverty threshold level (income), spent significantly less than did households with higher incomes. This does not mean that they are not purchasing ready meals, but they are purchasing less. This is consistent with prior research which shows that higher-income consumers expend more on food and prepared meals. Ready meals are more expensive products than home-made meals from ingredients. This would possibly explain the lower expenditure level.

Finally, it should be noted that 1999 Nielsen data was used in the analysis—up-to-date data was not available at the time of the analysis. Readers should be aware that some factors might have changed since 1999. Care should always be exercised when extending these results to the present. While the fundamental driving factors remain the same, rising incomes, increasing numbers of new convenience food products, new processing technology, and changing demographics can alter the magnitudes of the factors we have examined in this analysis. However, changing lifestyles and cultural change from the latter twentieth century also continue to drive the demand for convenience foods—so far, this trend continues. A logical extension of this work would be to examine the sensitivity of the results to these types of changes over time.

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