FIGURE 3: Change in Credit Use and Personal Income

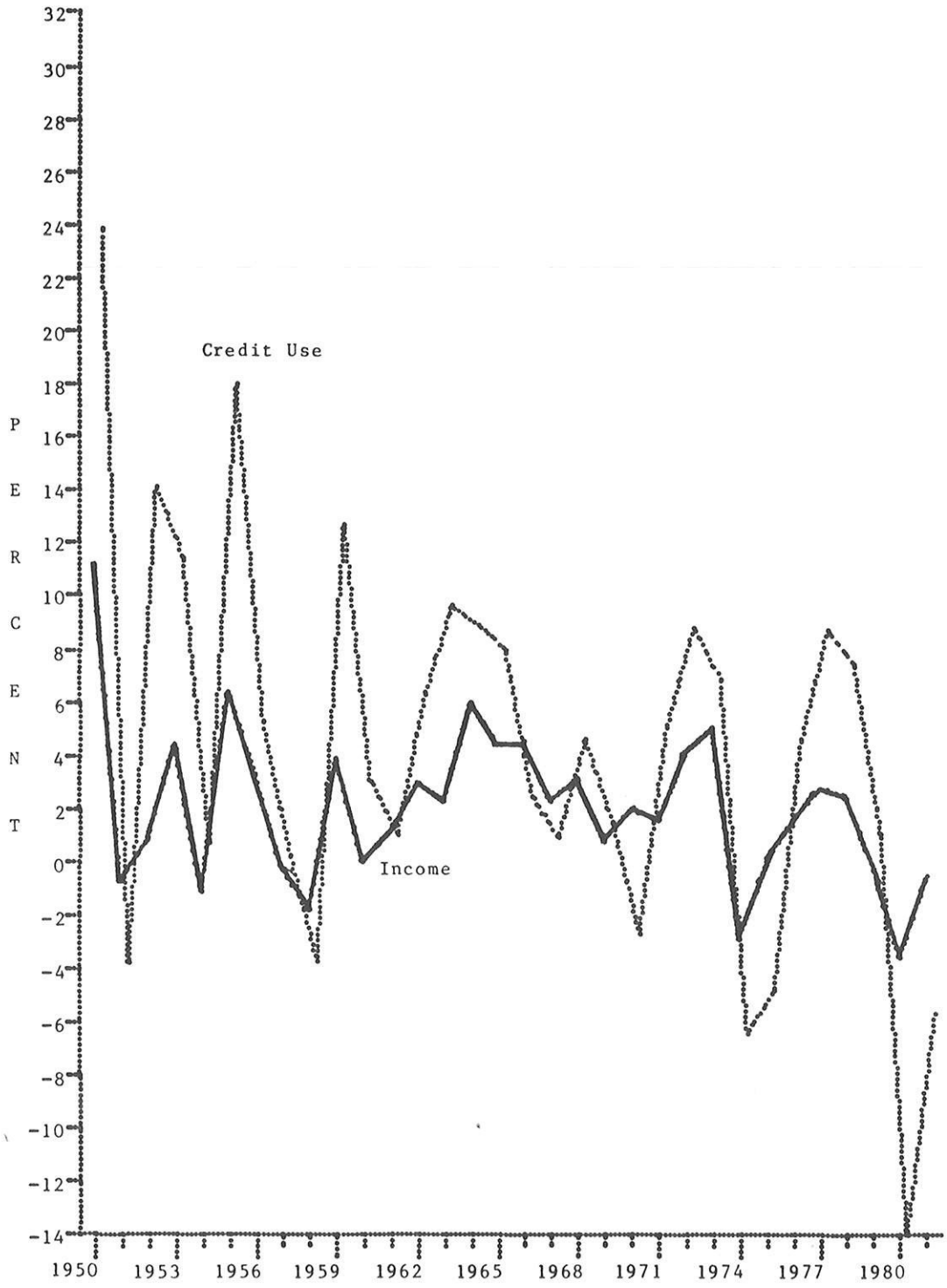
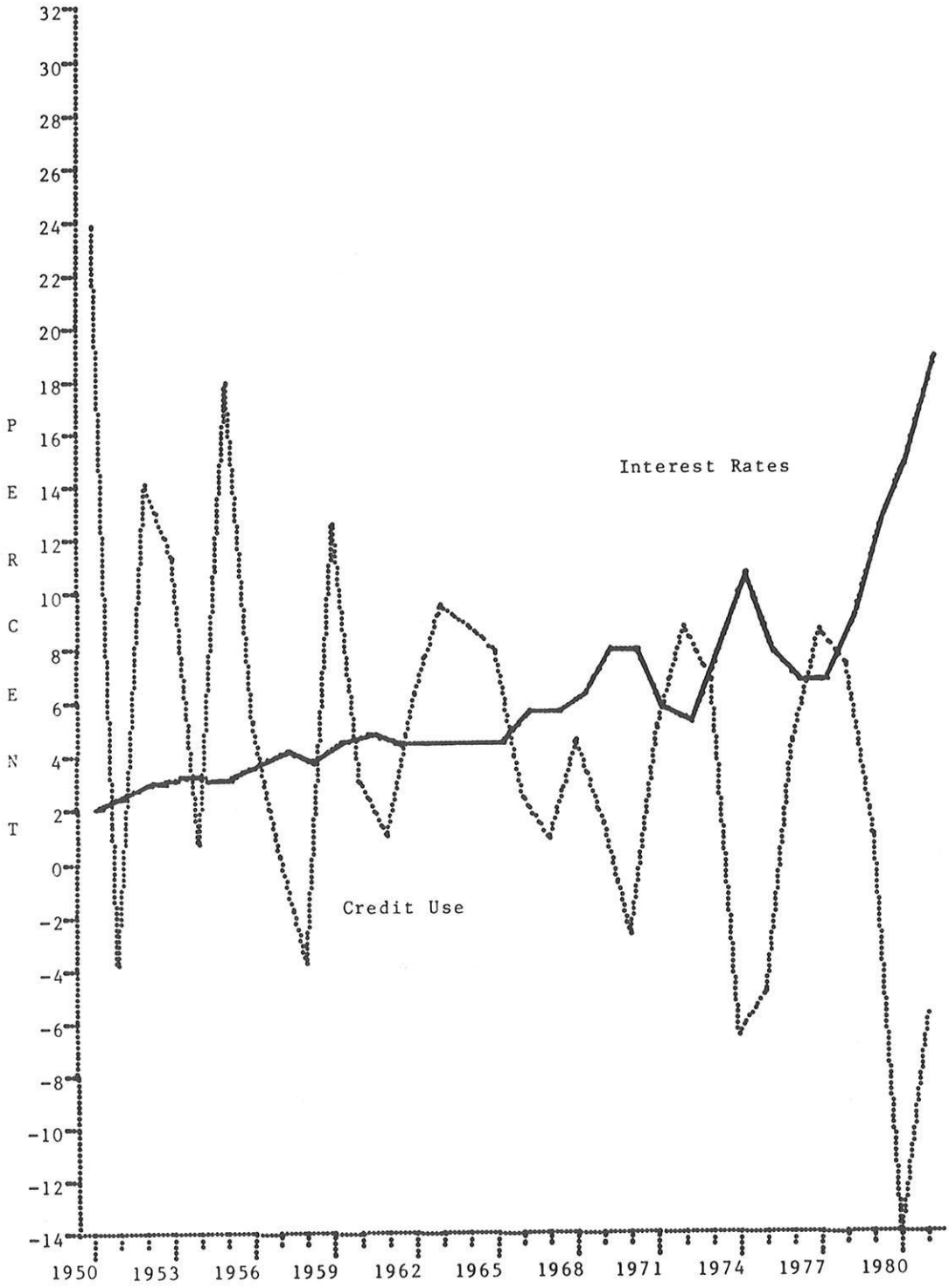


FIGURE 4: Change in Credit Use and Interest Rates



employing different real interest rate and inflation measures. It also prevailed in preliminary analysis of consumer per capita consumer mortgage balances (M):

Levels:

$$M = 515.82 + 0.56\ Y - 8.92\ R - 16.09\ P$$
$$\qquad\quad (4.20)\quad (1.65)\quad (1.68)$$

$R^2 = .99$ D.W. = 1.44

First Differences:

$$M = 43.12 + 8.28\ Y - 16.54\ R - 36.29\ P$$
$$\qquad\quad (2.52)\quad (2.71)\quad (3.06)$$

$R^2 = .68$ D.W. = 1.84

In inflationary times, consumers appear to curtail their exposure to financial risks by reducing their leverage. It is clear this factor swamps the speculative motive to buy more now and pay later when one expects prices to rise.

Improvements could be suggested for the manner in which this rather rough model has been specified. For example, it might be well to examine the question of credit use in a simultaneous environment. Additional attention could also be devoted to analyzing the impact of inflation on various types of consumer credit. Nevertheless, when taken together with the data presented graphically, the statistical results lend at least tentative support to the hypothesis that it was inflation that led consumers in the mid-1960's abruptly to halt their ever-greater propensity to take on nearly all forms of installment and noninstallment debt. They also give consumer economists reason to inquire in their future researches how and why inflation alters the capital structure of the representative consumer's balance sheet.

DISINFLATION

Given inflation's persistent influence in shaping the savings alternatives and borrowing behavior of consumers, it is highly significant that a period of price stability appears now to be upon the United States. Following 15 years of rapid inflation and its attendant maladies--sluggish growth, unemployment, reduced investment and record interest rates--the Federal Reserve System has adopted the creed monetarists have favored for decades by accepting as its target variable measures of the money stock rather than interest rates, money's rental price. While some have very recently voiced concern that the Fed has relaxed its monetary stricture, it is very clear that the policy to date has had its intended impact. Following relative price stability during the 1950's and early 1960's, the Consumer Price Index rose at an average annual compound rate of 7.1 percent between 1965 and 1980. Its average annual increment during the last three years of that period was 11 percent. The G.N.P. deflator for personal consumption, a somewhat less flawed gauge, exhibited a similar performance. However, during the most recent year, the C.P.I. has risen at an annual rate of less than 4 percent. For the first time in an economic generation, consumers in the United States are confronting relative price stability.

In balance, the prospects for disinflation to continue appear to be good. Having come so far at such cost to end inflation, it seems unlikely that monetary authorities will abandon their resolve and once again inflate the economy by increasing the stock of money at a significantly faster rate than the economy's real rate of growth, its increment in output of goods and services. While unprecidented federal deficits loom in the future, the past year illustrates that deficit spending need not be inflationary. In the simplest of terms, inflation occurs when aggregate demand exceeds production. Government spending need be inflationary only if it adds to total demand by printing money, competing with consumers and business for a quantity of goods and services that is fixed in the short run. By adopting money stock targets, the Federal Reserve Board of Governors has put the nation on notice that it will not monetize the deficit. Instead, government deficits will be financed by borrowing, which will raise the rental price of money but need not raise other prices since there will be no net addition to aggregate demand. The increment in demand associated with the excess of government spending over its revenues will merely displace the demands of Treasury creditors who choose to hold bills, bonds and notes rather than goods and services.

The on-going problems of the Organization of Petroleum Exporting Countries promise to reverse another important inflationary pressure. As long as 10 years ago, informed economic opinion anticipated that OPEC's substantial demise would occur during the middle of this decade. While the oil cartel will no doubt continue to have successes from time to time, OPEC now finds itself wrestling with the central problem of mature cartel management: while it is collectively more profitable for producers to operate with a pricing pact than without one, for the individual producer it is still more profitable to "cheat" on the cartel by surreptitiously discounting the cartel's reference price in order to sell more than the producer's allotted market share [6, p. 233]. Ethnic differences and balance of payment exigencies compound this "prisoners' dilemma" problem in the case of OPEC. Economic theory, bostered by the long history of international price and output pacts, illustrates clearly that, while OPEC is not dead, gone are the days that it can double and triple prices. OPEC has clearly seen the apex of its market power.

For these reasons, disinflation appears to be here if not permanently, then at least for a sufficiently long duration as to make it important to understand both the obvious, direct and the more subtle, indirect impacts of price changes on consumer behavior. At first look, one might

conclude that the end of inflation, or at least its current hiatus, will be altogether good for consumers. However, note that inflation was not wholely bad. Some consumers benefited measurably from rising prices. To be sure, consumers who purchased and held real estate during the period were tremendously advantaged by inflation. By the same token, those government and union workers whose salaries were tied implicitly or explicitly to the Consumer Price Index made real gains since the CPI unequivocally overstates the costs of inflation due to its fixed weights that disallow the substitution opportunities available to consumers and its treatment of real estate, which assumes that the representative consumer buys and finances a new house each month [2]. It has even been argued, although it is not part of the present thesis, that some elements of the subsidized poor may have benefited in balance from inflation since rising prices led to the phenomenon known as "bracket creep", raising government revenues, making politically feasible the tenfold increase in transfer payments emanating from the federal government during the last 15 years [7, p. 266].

Just as inflation carried hidden benefits as well as its more conspicuous costs, so disinflation can be expected to have differential impacts. For example, the institutional changes in the personal savings markets that for the first time give consumers of moderate means a window on the money markets, have been a product of inflation. Will these advances be reversed if the economic environment of the 1980's continues to mirror the relative stability of the 1950's and early 1960's that made Regulation Q enforceable? By the same token, the important role of price expectations in explaining past credit practices suggests that the new era of disinflation may bring a renewed surge in consumer borrowing. The specter of price stability provides some reason to believe that unrelenting year-to-year growth in credit use in relation to disposable income will once again surface as a most conspicuous feature in the financial markets serving consumers. Perhaps most perplexing is the question of how moderation in inflation will affect consumer spending patterns. How will consumers who are accustomed to 10 percent cost of living salary adjustments react to price and income stability when those past inflationary increments in reality cost them only 5 percent to accommodate? It is well known that the Depression generation was permanently scarred by the 1930's into lives of thrift and fiscal conservatism. Will today's inflationary generation, people who gained economic literacy during the last 15 years of rapidly rising prices, be similarly scarred or will they change their spending habits to reflect the new economic environment?

CONCLUSION

In responding to the economic instability of the last 15 years, consumers have in many venues exhibited keen awareness of the signals the economy has given. They appear to have responded intelligently even opportunistically to incentives and the risks created by the inflationary environment. However, until those responses to inflation are better understood, consumers at least in part will be pictured as confused and irrational actors being buffeted by the unhappy macroeconomic circumstances which they confront. These are decidedly complex matters but few are more worthy of attention by those scientists whose pretensions include some claim to understanding the economic behavior of consumers.

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QUALITY OF GENERIC BRANDS: THE ROLE OF PRICE AND BRAND CUES IN PERCEIVED QUALITY

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ABSTRACT

An investigation of price-quality and brand-quality relationships was made to assess the relative position of low-priced generic brand food products. Results were generally consistent with established relationships for price and perceived quality and brand and perceived quality. However, price-brand choice was not found to be determined by consumer-related factors.

INTRODUCTION

Generics have been making inroads into the markets for many food and household products, and more recently, beer, wine, and cigarettes [25]. Their attraction lies in the 15 to 40 percent savings over private label or store brands and national brand competition. Marketing data indicate generics are primarily cutting into the market share held by private labels and store brands. Evidence from a national opinion survey suggests however that consumers are not indiscriminate about use of generics; some are considered as good or better than branded competitors, others not.

Although more recently attention has focused on objective price-quality relations [5, 20], introduction of generic brands suggests the value of re-examining the role of price and brand cues in consumers' perceptions of product quality. Do consumers see generic brands as extending the existing price-quality continuum or as substitutes for store brands? Does price-brand reliance depend on consumers' perceptions about products and themselves as shoppers?

Numerous marketing studies have examined the role of price as a single informational cue to product quality [2, 8, 9, 10, 11, 12, 13, 16, 17, 19, 22, 23, 26]. In general, the conclusions drawn were: price is consistently regarded as an indicator of quality; the price-quality relationship is often nonlinear; price could not overcome product preferences; and the use of price to judge quality is a generalized attitude. Although price-reliance appears to diminish as other cues are added [18], experiments designed to detect the effect of adding a brand cue have yielded conflicting results concerning which effect is dominant. Several investigators [6, 7] concluded that when the brand informational cue is provided the effect of price is replaced by the effect of brand. Others [1, 24] found the effect of price to dominate that of brand. Differences in conclusions may be related to differences in the types of products used in the several experiments since reliance on price as an indicator of quality appears to vary over products. Use of price and brand cues to guide choice has been found to be more likely in situations of greater perceived dissimilarity among brands [2, 8, 9, 11, 22]. Consumer characteristics have also been found to be associated with price-brand reliance. Consumers who choose the high-priced brand tend to have more confidence in price as an indicator of quality, see themselves as having much experience in purchasing the product and as good judges of quality [2, 4, 8, 9].

The objective of this study was to determine if an investigation which incorporated low-priced generic brands would provide results consistent with those of previous studies of price-brand reliance in ratings of product quality. Specific objectives of the study were: (1) To determine the extent to which consumers rely on price and brand information as cues in evaluating product quality. (2) To determine if price-brand reliance is associated with perception of degree of variation in quality among brands of a product and consumer-related perceptions of confidence in price and brand as indicators of quality, experience in purchasing a product, and confidence in ability to accurately judge product quality.

METHODS

Selection of Products

Food products were used in the study primarily because of greater availability of and consumer experience with generic brands, but also because these are products which are frequently and commonly purchased, relatively inexpensive, and readily categorized according to price and brand level. In a preliminary survey, 52 respondents were asked to use a five-point scale to rate similarity of quality among brands for each of fifteen products; specific brands or types of brands (e.g., national vs store) were not mentioned in these rating procedures. On the basis of the results, four products--all purpose flour, corn oil, catsup, and peanut butter--were selected for use in the main investigations; one criterion for selection was that products represent different levels of perceived similarity among brands. These four products are also frequently and commonly purchased and were available at the three brand levels (generic, store, and national) at the two grocery stores in the town of Fairbury, Illinois, where the survey for the main investigation was conducted.

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Instrument

Unlike most previous investigations, which obtained data through experimental methods, this study made use of survey methods. An instrument for collecting data was developed and tested on a random sample of 19 households prior to carrying out the actual data collection. As a result of this pilot study, two questions were eliminated because they did not appear to be measuring what they were intended to measure.

The first four questions, asked for each of the four products, required the respondent to indicate the price-brand combination he would be most likely to choose, to rate how similar in quality he perceived the three types of brands (generic, store, and national) to be, and to rate product quality at the three price levels and at the three brand levels. Ratings of both similarity in quality across brands of a product and product quality (at a given price or brand level) were based on a five-point scale. For rating similarity across brands, 1 indicated all brands alike and 5 indicated no brands alike. For rating product quality, 1 indicated very good and 5 indicated very poor. Then the respondent was asked how confident he was in using price and brand, respectively, as an indicator of quality, how much experience he felt he had in purchasing each product, and how much ability he felt he had in judging the quality of each product. Following these questions were eight demographic questions; demographic data were used primarily for purpose of describing characteristics of respondents in the sample.

The respondent was defined as that person who did most of the grocery shopping for the household. Before respondents were asked to rate product quality, they were asked about their familiarity with types of brands described as national brands, store brands, and generic brands. If not familiar with this classification scheme, the respondent was read an explanation of these types.

Sample

The population for the survey was defined as resident households in the town of Fairbury, Illinois. A random, systematic sample was drawn from the pool of all residential telephone numbers in Fairbury. The sample of 224 households represented about one out of seven or nearly 14 percent of the residential telephone numbers. Twenty percent of households in the sample drawn either could not be contacted (no answer after ten attempts at contact were made in the course of one week or telephone was disconnected) or were ineligible (residents did not do their own grocery shopping). Among the 180 households which could be contacted and were eligible the response rate was 85 percent, producing a final sample of 153 households.

Analysis

Hotelling's T-square statistic [14] was used to evaluate the difference among quality ratings of each of the four products at the three price levels and the three brand levels. For a check on consistency of quality ratings, analysis of variance [3] was used to determine if perceived similarity in quality across brands of a product was associated with quality difference scores across the three price levels and across the three brand levels. The quality difference score for a product was obtained by subtracting the rating of the level (price or brand) which was perceived as having the highest quality from the rating of the level which was perceived as having the lowest quality.

Contingency analysis [3] was used to test for association between price-brand combination choice (i.e., product choice as characterized by price and brand level) and rating of similarity in quality across brands of a product. Another test of this hypothesis was made using the variables quality difference scores for price and brand levels instead of the variable rating of similarity of quality across brands; analysis of variance was used.

The Chi-square statistic was used to measure degree of association between price-brand combination choice and each of four independent variables--confidence in using price as an indicator of quality, confidence in using brand as an indicator of quality, perceived experience in purchasing the product, and perceived ability to accurately judge quality of the product.

Manova, Anova, and Crosstabs were the computer procedures used to obtain statistical results [15, 21]. For each of the statistical tests the probability of making a Type I error was set at five percent.

RESULTS

Respondent Characteristics

In the 153 households surveyed, more than 90 percent of respondents were female and over four-fifths were married. The mean age of respondents was 49 years. On average, both respondents and their spouses had about 12 years of education. About 30 and 55 percent of respondents and their spouses, respectively, were employed full time. Average total household income before taxes was in the range of $20,000 to $25,000. The majority of households in the sample consisted of one or two adults. Elderly households were over-represented and households with children under-represented in the sample.

Variation in Product Quality

Among the four products, all purpose flour and corn oil were those for which brands are considered to be most similar in quality; they received mean ratings of 1.67 and 1.70, respectively. Brands of peanut butter and catsup were perceived to be less similar, receiving mean ratings of 2.16 and 2.33, respectively. Ratings of similarity in quality were not significantly different from those given by respondents in the initial survey used to select products for the main investigation.

Effects of Price and Brand Cues

For each of the four products, the difference among quality ratings at the three price levels was statistically significant (see Table 1). Results indicated that price was positively related to perceived quality, although the relationship was not necessarily linear. For corn oil, peanut butter, and catsup, difference in perceived quality per unit of price between the low- and medium-priced brands was about three times greater than that between the medium- and high-priced brands. The precise opposite was true for all purpose flour.

Table 1. Perceived Quality Ratings by Price Level (N=153)

	Price Level		
	Low	Medium	High
All Purpose Flour	2.81	2.31	1.56
		F=159.75*	
Corn Oil	2.41	1.99	1.35
		F=126.00*	
Peanut Butter	2.75	1.98	1.35
		F=225.54*	
Catsup	3.14	2.32	1.33
		F=333.63*	

*p < .001

Results also confirmed the hypothesis that brand was significantly associated with perceived quality (see Table 2). National brands were perceived as being of higher quality than store brands and store brands of higher quality than generic brands.

Table 2. Perceived Quality Ratings by Brand Level (N=153)

	Brand Level		
	Generic	Store	National
All Purpose Flour	2.77	2.28	1.57
		F=146.53*	
Corn Oil	2.73	2.26	1.56
		F=126.61*	
Peanut Butter	3.13	2.30	1.41
		F=227.64*	
Catsup	2.97	2.34	1.44
		F=208.94*	

*p < .001

Consumers were consistent in their assessments of quality; those who considered brands of a product to be relatively dissimilar in quality when given no price or brand cue reported larger differences in quality ratings across price and brand levels than did consumers who felt brands are relatively similar. Rating of similarity in quality across brands were significantly related to quality difference scores across both price and brand levels for each of the four products.

Degree of Price-Brand Reliance

Variation in Quality. Results were generally consistent with the hypothesis that the more variation in quality a person perceives among brands of a product, the more he will rely on price-brand cues to judge quality. Price-brand choice and ratings of similarity in quality across brands were significantly associated for all four products. Price-brand choice was also significantly related to quality difference scores across price levels for all purpose flour and corn oil and catsup, but not for peanut butter. A significant association was also found between price-brand choice and quality difference scores across brand levels for each of the four products.

Confidence in Using Price-Brand Cues. For each of the products price-brand choice was not associated with confidence in using price as an indicator of quality. Confidence in using brand as an indicator of quality was significantly associated with price-brand choice for peanut butter only.

Purchasing Experience. Price-brand choice was significantly related to perceived experience in purchasing a product for peanut butter and catsup. This suggests that the more experience a person perceives himself as having in purchasing a product, the more likely he is to rely on price-brand cues in rating product quality.

Ability to Judge Quality. Results did not confirm the hypothesis that the more ability a person perceives himself as having in making accurate judgments of quality for a product, the more likely he is to rely on price-brand cues in making ratings of quality for that product. For none of the four products was there a statistically significant association between price-brand choice and perceived ability in judging product quality.

DISCUSSION

Consumers were found to rely on both price and brand in making judgments about quality of products when generic brands were included in the set of brands examined. This result is consistent with findings of previous studies of the effects of price and brand cues on consumers' perceptions of product quality. No conclusion was possible concerning the relative importance of the two types of cues, however, because of the research design we used.

Consumers were also found to be consistent in their ratings of quality. Those who considered brands of a product to be relatively dissimilar

in quality when given no price or brand cue reported larger differences in quality ratings across price and brand levels than did consumers who felt brands were relatively similar.

Based on these results, it appears that consumers perceive generic brands of these food products as extending the existing price-quality continuum. Obviously, for some consumers generics are considered relatively close substitutes for store brands but for the average consumer in this sample are not similar enough in quality to displace store brands. The nonlinearity of the price-quality relationship observed in this study suggests that the savings of 10 to 25 cents per item produced by buying generics rather than store brands--as opposed to savings of 30 to 60 cents between store and national brands--are not sufficiently large to offset perceived loss in quality. This suggests that quality ratings by consumers are not based on an equal interval scale. Consumers may apply more critical standards to judgment of quality differences at the lower end of the price scale.

Support was found for the hypothesis that price-brand reliance is related to the perceived degree of variation in quality among brands of a product; this result is again consistent with those of previous studies. This result was consistently observed except for the product of peanut butter, for which brand but not price cue was significantly related to choice.

Consumer characteristics which the literature suggested would be related to price-brand reliance were not found to be significantly related to price-brand choice in this study, except again for the product of peanut butter. Even in the case of peanut butter only two of the four indicators of consumers' perceptions about themselves as shoppers were significantly related to price-brand choice; these were confidence in using brand as an indicator of quality and perceived experience in purchasing the product. Together with results concerning perceived degree of variation in quality among brands, these findings suggest that consumers are more brand-loyal with respect to peanut butter than the other four products--all purpose flour, corn oil, and catsup. Although there was a significant relationship between experience in buying catsup and price-brand choice, other indicators did not suggest that price-brand reliance is related to consumer characteristics for this product.

Inconsistencies between findings of this research and previous studies might be related to several factors. Survey research methods instead of experimental methods were used to obtain the data. Food products rather than some other type of nondurable or durable products were used. The sample size, while large compared to that for most experimental designs, produced results that were based on a small number of cases in some cells.

CONCLUSIONS AND COMMENTS

Despite its possible limitations, this study was useful in demonstrating that use of low-priced generic brand food products provides results generally consistent with established relationships between price and perceived quality and brand and perceived quality. Choice among price-brand combinations is broadened as a result of the introduction of generic food products. This is consistent with the observation [25] that generics have forced retailers to clarify the price-quality relationships among national brands, private labels, and generic varieties. Consumers who wish to trade off quality and price gain from the introduction of low-priced generic products, especially when products are perceived as being of similar quality across brands.

Assuming the measurement of concepts was valid and reliable, results seem to suggest that brand-loyalty does not operate very strongly for three of the four products. Previous studies yielded more evidence of brand-loyalty. It is not clear whether this finding results from the nature or type of products used in the study, from changes in consumers' perceptions about themselves as shoppers, or the addition of generics to the set of brands.

Measurement problems are a continued plague in research on consumers' perceptions. The validity of measurement of the relationship between price and perceived quality depends on how accurately an interval scale measures product quality perceptions and whether consumers perceive equal price intervals as being equal.

Perceived quality of products will continue to be an important topic for research. Together with research into the relationship between objective quality and price, investigations of the dimensions of quality offer great promise for further understanding of consumer choice.

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BUYING THE LARGEST SIZE: IT'S EASIER BUT DOES IT COST MORE?

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ABSTRACT

As a substitute for unit pricing grocery products, consumers often use the economy size rule which assumes the largest size is always less expensive per unit. Previous research has established, however, that the rule may not always be a valid one. The purpose of this research was to estimate for a selected set of grocery products the frequency with which use of the rule results in dissavings. Additionally, the amount of the dissavings as well as the savings from purchasing the largest size were estimated. Results indicated that among the 19 products surveyed, dissavings occurred frequently and in relatively large amounts for some products, (tuna), infrequently and in large amounts for others (salad and cooking oils), and were virtually nonexistent among others. Recommendations which take into consideration the time costs of shopping are given for choosing an appropriate strategy when dissavings exist.

INTRODUCTION

Consumers are frequently frustrated by the difficulty of making value-price comparisons on the multitude of products they purchase due to the proliferation of products, brands, and sizes. As a substitute for the time-intensive job of securing accurate price per unit information, consumers may adopt the economy size rule. Use of this rule assumes that the largest size is always less expensive per unit.

The economy size regulation of the Fair Packaging and Labeling Act provides some justification for consumers' use of the largest size/less expensive rule [7]. According to the Act, "economy size" or a similar term can be used by a labeler on only one package size of a brand if at least one other size is offered and the price per unit is reduced at least 5 percent from the actual prices of all other sizes. Since the rule only applies to labelers at their points of sale, the cheaper price per unit of the economy size is not necessarily passed on to the consumer. However, the spirit of the Act provides some basis for consumers adopting the largest size/less expensive rule of thumb.

Widrick [5,6] and Walker and Cude [4] established that larger sizes of grocery products are not always better buys than smaller sizes. Specifically, the researchers frequently found instances in which selecting a larger size resulted in dissavings rather than savings. In the three studies, from 18.5 percent [4] to 33.8 percent [6] of the larger sizes were more expensive per unit than smaller sizes. Products for which larger sizes most frequently resulted in dissavings were tuna fish, pork and beans, and dry laundry detergent. Walker and Cude [4] found that dissavings occurred more frequently among larger sizes of laundry products as a class (25%) than on food (16%) or personal care products (14%). Dissavings on larger sizes also occurred more often when a greater number of brand sizes were available and when noninteger size comparisons were required (as 24 ounces and 10 ounces rather than 24 ounces and 12 ounces) [4,6].

Since it is clear that larger sizes are not always better buys, the economy size rule may be invalid for some products. If so, there are potential payoffs to consumers who make unit price comparisons rather than using the rule. However, the absolute dollar amount of the payoff is not known. Since unit pricing requires more time to implement than does the economy size rule, the value of the time required to make price comparisons may exceed the economic gain.

Furthermore, in past research [4,5,6] no distinction was made between dissavings on a larger size and those on the largest size. If a product was offered in four sizes, dissavings identified were those occurring among any of the three larger sizes. Thus, implications for consumers who use the economy size rule are unclear.

It was therefore the purpose of this research to:

1) determine the frequency with which the selection of the largest size results in dissavings for a selected set of products,
2) estimate the absolute dollar amount of dissavings and savings produced by the selection of the largest sizes of grocery products, and
3) compare the frequency with which dissavings occur as well as the absolute dollar amount of savings and dissavings among food, personal care, and laundry products.

In the final section of the paper, guidelines are given for use by consumers in choosing a shopping strategy when dissavings exist.

METHODOLOGY

During the week of October 19, 1981, trained surveyors collected data from 15 grocery stores located throughout Jackson County. Carbondale, population 30,000, is the largest city in the county, a rural area in southern Illinois. Although there were 45 grocery stores in the county, the sample included only the 15 which had multiple sizes in at least 19 of the 23 products. Three of the stores in the sample were chain stores, representing one regional and one nationwide chain; the remaining stores were equally distributed among large and small independents and Mom and Pop stores.

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A two-stage selection process was used to select the 23 products for which data were collected. First, 25 products were randomly selected from among those used by 50 percent or more of U.S. households [1,2]. Secondly, products not occurring in multiple sizes, products not measured in ounces, and those not available in smaller groceries were eliminated. Price, size, and processor information on the final set of 23 products, which included four personal care and five laundry products, was collected. (See Appendix for a list of specific product variants for which data were collected.)

DEFINITIONS AND PROCEDURES

Estimation of Savings and Dissavings

A three-step procedure was used to determine the mean maximum and minimum savings as well as the mean maximum dissavings for each product. First, maximum and minimum savings as well as maximum dissavings were computed for each brand/product variant combination in each store. A product variant was defined as a specification of the form, packing liquid, and packaging of the product. One example of a product variant is chunk light tuna packed in oil. An example of a brand/variant/store combination is Starkist chunk light tuna in water sold at Store A.

Secondly, maximum and minimum savings and maximum dissavings were determined for each product within each store. Finally, an across-store mean was obtained for each product. Each step in the procedure is outlined below.

Step 1. The absolute dollar amount of savings (dissavings) for each price comparison within a brand/variant/store combination was computed as:

$$S(DS) = Oz_L\ (UP_S - UP_L)$$

where $S(DS)$ = savings (dissavings)

UP_L = the unit price of the largest size,

UP_S = the unit price of a smaller size,

and Oz_L = the number of ounces in the largest size.

Price comparisons were made between the unit price of the largest size and each of the smaller sizes in each brand/variant combination. Using Brand X of frozen orange juice concentrate as an example the following computations were made in reference to the largest size at Store A.

Ounces	Item Price	Unit Price	$UP_S - UP_L$	Savings	Dissavings
6	$ .78	$.13	+$.02	+$.48	0
12	1.44	.12	+ .01	+ .24	0
16	1.60	.10	- .01	0	-$.24
24	2.64	.11			

To identify savings (dissavings), three unit price comparisons were made; the unit price of the 24 ounce container was compared to the unit prices of each of the three smaller sizes. Buying the 24 ounce size rather than the 6 ounce size resulted in savings of $.48 [24 oz. x ($.13 - $.11)]. In other words, if purchasing the 24 ounce container rather than the smallest size offered no savings, the largest size would have been priced at $3.12 rather than $2.64. Buying the largest size rather than the 12 ounce size also resulted in savings, amounting to $.24. However, selecting the 24 ounce size rather than the 16 ounce size resulted in dissavings of $.24 [24 oz. x ($.10 - $.11)]. Stated differently, if the unit price of the largest size had been $.10, the item price would have been $2.40 and not $2.64. Thus, for this example, maximum savings from buying the largest size were $.48, minimum savings were $.24, and maximum dissavings were $.24.

Step 2. Maximum and minimum savings as well as maximum dissavings were computed for each product in each store. Within each store, maximum savings for each product were defined as the largest dollar savings possible from buying a largest size in any of the brand/variant combinations in that store. Thus, in the example given above, if purchase of the largest size of Brand X produced savings larger than in any other brand/variant combination, maximum savings for orange juice at Store A would be $.48. Minimum savings for each product were defined as the smallest nonzero savings possible from buying a largest size in any brand/variant combination in a store.

Step 3. For each product, maximum and minimum savings as well as maximum dissavings were totaled and divided by the number of stores offering the product to obtain means.

Frequency of Dissavings

The frequency with which dissavings occurred was computed for each product in a two-step procedure. First, within each store the number of brand/variant combinations with dissavings was divided by the total number of brand/variant combinations. The percent of brand/variant combinations with dissavings in each store was then totaled across stores and divided by the number of stores offering the product to obtain a mean frequency for each product.

Price Comparisons

The number of price comparisons required to unit price rather than to use the economy size rule was also computed. This computation was made by totaling the number of sizes offered in each brand/variant combination and subtracting one. It represented a measure of the time-intensity of unit pricing. The number of price comparisons in each store was then totaled across stores for each product and divided by the number of stores offering that product. Similarly, the number of brand/variant combinations was determined in each store and averaged across stores to obtain a mean for each product.

RESULTS

Table 1 shows maximum and minimum savings as well as maximum dissavings for 19 products. Four of the

Table 1. Mean Dissavings and Savings for 19 Grocery Products in 3 Product Classes.

Products	Mean Savings		Mean Dissavings		Mean Number of Price Comparisons	Mean Number of Brand/Variant Combinations	N of Stores
	Maximum	Minimum	Maximum	Percent With			
Tuna	$.13	$.06	$-.22	50%	6	3	13
Frozen orange juice	.21	.07	-.15	35	9	2	11
Pork and beans	.66	.06	-.11	35	9	2	15
Salad and cooking oils	1.15	.09	-.28	9	17	5	14
Cottage cheese	.16	.15	-.02	9	3	2	13
Saltine crackers	.86	.48	-.00*	8	2	1	13
Shortening and lard	.47	.25	-.02	7	2	2	14
Peaches	.57	.27	-.003	4	5	3	14
Mayonnaise	.80	.34	-.01	3	5	2	12
French dressing	.36	.18	-.002	2	5	3	12
ALL FOOD PRODUCTS	.55	.22	-.08	18	6	3	
Toothpaste	1.58	.22	-.15	24	27	6	13
Mouthwash	3.27	.44	-.24	12	20	4	12
Deodorant	.90	.23	-.001	3	15	7	6
Powder	1.70	.45	-.02	2	5	2	8
ALL PERSONAL CARE	2.03	.34	-.11	14	18	5	
Fabric softener	.56	.10	-.13	41	7	2	13
Liquid laundry detergent	.51	.13	-.25	35	6	2	13
Dry laundry detergent	1.28	.09	-.70	21	24	7	15
Dishwashing liquid	.47	.07	-.09	15	19	6	15
Bleach	1.02	.40	-.01	3	5	2	15
ALL LAUNDRY PRODUCTS	.78	.16	-.24	22	13	4	

*Less than .0005.

original set of 23 products were eliminated because analysis revealed that buying the largest size always resulted in savings, never dissavings. These products were: canned corn and tomato juice, corn flakes, and instant pudding.

Mean maximum savings from buying the largest size rather than a smaller size ranged from $.13 (tuna) to $3.27 (mouthwash) across the 19 remaining products. Minimum savings ranged from $.06 (tuna, pork and beans) to $.48 (crackers). Mean maximum dissavings were highest for dry laundry detergent ($.70) and lowest for crackers and deodorant (less than $.01). On average, buying the largest size of tuna, offered in 13 of the 15 stores, resulted in dissavings in 50 percent of the brand/variant combinations. In contrast, the frequency of dissavings for several products was 3 percent or less (mayonnaise, french dressing, deodorant, powder, and bleach).

The mean number of price comparisons required to unit price and the number of brand/variant combinations are also shown in Table 1. Products with the largest number of price comparisons were toothpaste (27), dry laundry detergent (24), mouthwash (20), dishwashing liquid (19), and salad and cooking oils (17). Products requiring a large number of price comparisons to unit price were also those offered in many brand/variant combinations.

Differences existed among food products. Tuna, orange juice, and pork and beans were the products with the highest frequency of dissavings. Dissavings on tuna and orange juice were substantial compared to most other products, averaging $.22 for tuna and $.15 for orange juice. Savings from buying the largest size rather than a smaller size of tuna and orange juice were also lower than for most other products.

The food product with the largest dissavings ($.28) was salad and cooking oils, although the frequency was only 9 percent. However, large maximum savings ($1.15) were also possible from use of the economy size rule. Unit pricing would require 17 price comparisons in 5 brand/variant combinations.

The remaining food products were generally characterized by small and infrequent dissavings. Although few price comparisons would be required to identify dissavings, savings from using the economy size rule were generally high.

Among personal care products, mean savings from buying the largest size were substantial, ranging from $.22 to $3.27. The frequency of dissavings was 24 percent for toothpaste and 12 percent for mouthwash; unit pricing would require an average of 20 or more price comparisons for each product.

Among laundry products, the greatest savings resulted from purchase of the largest sizes of dry laundry detergent ($1.28) and bleach ($1.02).

Bleach also had a very low frequency of dissavings (3 percent) and dissavings were small when they occurred. In contrast, dissavings resulted from the selection of 21 percent of the largest sizes of dry laundry detergent, with an average maximum of $.70. Twenty-four price comparisons would be required to avoid the dissavings. Fabric softener had the highest frequency of dissavings among laundry products, but a relatively small average maximum of $.13.

Comparison of the overall means for each of the three product classes summarizes the differences that existed. Use of the economy size rule produced the largest mean savings among personal care products, ranging from $.34 to $2.03. Personal care products as a class had the lowest frequency of dissavings and required the most price comparisons (18) to avoid dissavings, which averaged a maximum of $.11.

In contrast, laundry products had the highest frequency of dissavings (22 percent) as well as the largest mean maximum dissavings ($.24). However, savings from buying the largest size ranged from $.16 to $.78. An average of 13 price comparisons would be required to unit price.

Food products as a class required the fewest price comparisons to unit price. An average maximum dissavings of $.08 on 18 percent of the largest sizes of food products would be detected by unit pricing.

ASSUMPTIONS AND LIMITATIONS

Prior to identifying implications for consumers, several assumptions which were made about consumer shopping behavior should be stated. First, it was assumed that time spent in grocery shopping has an opportunity cost. A second assumption was that the primary motive in shopping is economic gain. That is, the consumer wants to purchase the desired items with the lowest possible expenditure of time and money. It is recognized, however, that some individuals view shopping as a game with the psychic rewards of finding the lowest price far outweighing the time costs. Also, consumers who experience great utility from shopping as a recreational or social activity may perceive a low opportunity cost for the time spent.

A third assumption was that consumers perceive no quality differences among the various varieties and brands of a product. This is an invalid assumption for those consumers who are brand loyal and those reluctant to purchase generic and store brands because of a belief that they are of low quality. A fourth assumption was that consumers use a single shopping strategy. In actuality most probably use a combination of strategies -- unit pricing some products, buying the largest size of others, and buying their favorite brand of yet others -- all in a single shopping trip.

A fifth assumption was that consumers have no size preferences. This is not realistic for consumers in small households who may find it practical to purchase only smaller sizes of perishable products due to limited storage space and/or spoilage of leftovers when larger sizes are purchased. However, even in small households, there may be products, such as liquid laundry detergent or toothpaste, for which no size preferences exist.

Finally, the computed savings and dissavings shown in Table 1 assumed both unit pricing and the economy size rule were applied with 100 percent accuracy. Five research studies have shown error rates in unit pricing ranging from 34 to 54 percent (3). Although the economy size rule is simpler, errors may also occur in its implementation. If errors were made in the use of either strategy, the savings would be lower than those reported in the results.

IMPLICATIONS FOR CONSUMERS

In choosing a strategy, consumers probably consider its cost-reducing potential as well as the amount of time required to implement it. Although numerous strategies are available, two were considered in this research. One, unit pricing, assures the consumer of the maximum savings possible (if computations are accurate) although it often requires much time and numerous price comparisons. The time required depends, of course, on the individual's expertise and whether unit prices are posted. A second strategy, buy the largest size, is relatively simple and quick to implement, although savings may be lower than unit pricing when the largest size is not the best buy.

The results indicate that, for some products, the largest size is rarely more expensive than a smaller size. For six of the food products studied, unit pricing, requiring from 2 to 7 price comparisons, would identify dissavings in at most 9 percent of the brand/variant combinations, reducing costs by only a few cents. In the personal care category, an average of 15 price comparisons would be required to unit price deodorant; in only 3 percent of the brand/variant combinations would savings result, averaging less than $.01. For products such as these there appears to be no economic advantage to unit pricing rather than using the economy size rule, especially when the value of the shopper's time is considered.

On the other hand, if a consumer used the economy size rule to buy tuna, dissavings would result in 50 percent of the brand/variant combinations. Only 6 price comparisons would be necessary to unit price, avoiding dissavings which averaged a rather substantial maximum of $.22. Therefore, even consumers who place a high value on their shopping time might find it worthwhile to unit price tuna rather than to buy the largest size.

Dissavings also occurred in relatively large amounts among salad and cooking oils, toothpaste, mouthwash, and most laundry products. However, in contrast to tuna, consumers who value their shopping time may choose not to make price comparisons since 15 to 20 would be required for most of the products. To choose a strategy the consumer would have to evaluate the economic loss that would occur by buying the largest size in relation to the time costs of unit pricing.

Table 2. Sizes, Prices, and Unit Prices of Items Offered in Toothpaste and Liquid Laundry Detergent in a Local Supermarket.

TOOTHPASTE

Brand 1			Brand 2			Brand 3			Brand 4		
Size	Item Price	Unit Price	Size	Item Price	Unit Price	Size	Item Price	Unit Price	Size	Item Price	Unit Price
8.2 oz.	$2.05	25.0¢	8.2 oz.	$1.89	23.1¢	8.2 oz.	$2.05	25.0¢	9.5 oz.	$1.99	20.9¢
6.4	1.67	26.1	6.4	1.42	22.2	6.4	1.67	26.1	7.0	1.39	19.9
4.6	1.43	31.1	4.6	1.33	28.9	4.6	1.43	31.1	5.0	1.33	26.6
2.7	1.03	38.2	2.7	.99	36.7	2.7	1.03	38.2	3.0	1.03	34.3
1.4	.67	47.9	1.4	.63	45.0				1.5	.67	44.7

Brand 5			Brand 6			Brand 7		
Size	Item Price	Unit Price	Size	Item Price	Unit Price	Size	Item Price	Unit Price
7.0 oz.	$1.54	22.0¢	6.5 oz.	$1.37	21.1¢	6.0 oz.	$1.63	27.2¢
5.0	1.33	26.6	4.7	1.15	24.5	4.3	1.39	32.3
3.0	.99	33.0	2.8	1.26	45.0	2.6	1.03	39.6

7 brand/variant combinations
27 price comparisons
12 item price
15 noninteger
16 unique sizes

LIQUID LAUNDRY DETERGENT

Brand 1			Brand 2			Brand 3		
Size	Item Price	Unit Price	Size	Item Price	Unit Price	Size	Item Price	Unit Price
128 oz.	$6.53	5.1¢	128 oz.	$7.39	5.8¢	128 oz.	$7.19	5.6¢
64	3.15	4.9	64	3.89	6.1	64	3.43	5.4
32	1.54	4.8	32	1.69	5.3	32	1.84	5.8
						16	1.02	6.4

3 brand/variant combinations
9 price comparisons
5 item
4 integer
4 unique sizes

Factors other than the opportunity cost of time spent in shopping may also influence the choice of strategies. The frequency with which a product is purchased may be a relevant factor. If a consumer purchases orange juice three times a week and each time uses the economy size rule to select a large size with dissavings of $.15, for example, total annual dissavings would be $23.40. In this situation, the consumer may find it worthwhile to periodically unit price to determine if dissavings exist. On the other hand, if a product is purchased infrequently total losses due to dissavings may be quite low in comparison to the value of the time required to unit price.

Secondly, the choice of strategies may also be influenced by the complexity of the purchase decision. Consider Table 2, which shows the brands and sizes of toothpaste and liquid laundry detergent that might be offered in a local supermarket. Seven brands of toothpaste are shown compared to three brands of liquid laundry detergent. Assume first that unit prices are posted. It would seem that finding the lowest unit price among the 28 brand sizes of toothpaste, although possible, would require more time than locating the best buy among the ten choices of liquid laundry detergent.

Consider, however, what the consumer faces if unit prices are not posted. Without a calculator and an excellent memory the authors believe that many consumers, including themselves, would be at a loss in choosing toothpaste. Of the 28 offerings, 16 are unique sizes. Additionally, only 12 of the 27 price comparisons are item price comparisons (comparing the item prices of two 8.2 ounce tubes for example). All of the remaining 15 comparisons are nonintegers (comparing the item prices of a 6.4 ounce and an 8.2 ounce size). When the sizes in which a product is offered differ across brands and when package size ratios are nonintegers, price comparisons become difficult and time consuming for some consumers and impossible for others without posted unit prices.

In such situations many consumers may choose to use the economy size rule, selecting the 9.5 ounce size of Brand 4. If so, dissavings of 9.5¢ (9.5 oz. x 1¢) would result. When the purchase decision is complex, even knowing dissavings are present many may choose to use a simpler strategy when unit prices are not posted.

In contrast consider the purchase decision for liquid laundry detergent when unit prices are not posted. The sizes offered across brands are consistent, with only four unique sizes. Additionally the sizes offered within each brand are integer multiples. As a result, five of the nine price comparisons are item price and the remaining four are integers. To compute the price per 32 ounces rather than the price per ounce seems easier and the possibility of accuracy seems greater than in the toothpaste example. Furthermore, if the economy size rule is used, dissavings of 38.4¢ (Brand 1: 128 ounces x .3¢) would result. Since price comparisons are relatively simple, it may be worthwhile to compare prices to avoid the dissavings.

In summary, the presence of dissavings suggest shoppers who use the economy size rule incur monetary losses. Therefore some may find it worthwhile to compare prices periodically for items they regularly purchase using the rule. Realistically, however, many consumers who value their shopping time may choose the simpler strategy when unit prices are not posted and the purchase decision is complex.

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APPENDIX

Below are listed the varieties of the 19 products for which data were collected. Single items in unique containers were excluded from data collection in all product categories.

Products	Varieties
Canned tuna	Chunk and grated light, solid and fancy white
Frozen orange juice concentrate	Sweetened and unsweetened
Pork and beans	All varieties except beans with added seasonings
Salad and cooking oils	Vegetable, corn, and sunflower oil
Cottage cheese	Large and small curd, 4% and lowfat
Saltine crackers'	Salted, boxed
Shortening and lard	All varieties
Canned peaches	Cling, freestone; sliced, halves, and whole; light and heavy syrup
Mayonnaise	All varieties
French dressing	All varieties
Toothpaste	Flavored and unflavored regular toothpaste
Mouthwash	Flavored and unflavored
Deodorant	Scented and unscented roll-on
Powder	Baby, body, medicated, and cornstarch powders in shake-on containers
Fabric softener	Liquid regular and concentrated
Liquid laundry detergent	Regular and concentrated
Dry laundry detergent	Regular and concentrated
Dishwashing liquid	Regular and concentrated
Bleach	Liquid; all varieties

VALUE ADDED: ACCOUNTING FOR MORE THAN TIME USE IN PREPARATION OF FOOD IN HOUSEHOLDS[1]

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ABSTRACT

The study explored the potential of estimating value added to food within the household through such inputs of labor and management, household durables, and fuel. The data source was the 1977-78 USDA Food Consumption Survey. The mean weekly value added per household was $40.28 in 1977. The most important predictor of value added was whether the female head was employed outside the home.

The study of household time use is not a new idea. In the 1920's the United States Department of Agriculture's Home Economics Bureau sponsored studies of household time use of farm women. Wilson's (18) study was a quite intensive investigation of tasks and time use of Oregon farm homemakers. Both Wilson and Margaret Reid were students of Hazel Kyrk, a family economist at the University of Chicago. Reid's doctoral dissertation culminated in a book, The Economics of Household Production (10).

Throughout the years, home economics researchers have continued to study time used in household activities (4,16,17,13,14,15). More recently, a USDA-sponsored study of household time use was carried out in 11 states (12). Sociologists and others also have begun examining work done in the home (11,2).

TIME AND ECONOMIC THEORY

Economics had, in general, rather ignored time use until Becker (1) prepared an essay that included time as an input in the production process. Becker stated, "At the heart of the theory is an assumption that households are producers as well as consumers; they produce commodities by combining inputs of goods and time according to cost-minimization rules of the traditional theory of the firm," (1, p. 516). Resources were measured by Becker as "full income", which is the sum of money income and income foregone while producing commodities for direct consumption. Commodities were seen as being "more" than goods and services. They could consist of such activities as "seeing a play", for example. Thus, utility could be obtained from "activities" as well as goods and services.

At about the same time, Lancaster (7) offered his theory that it is the characteristics or attributes of goods and services that provide utility -- not the goods and services, themselves.

Michael and Becker (8) further reformulated the traditional consumer behavior theory by specifying a household production function that included production within the home, but also extended it to all non-market activities.

The recognition of the importance of time was exhibited in several empirical applications of the household production-function approach. Principal applications were in three main areas: (a) fertility and marriage decisions, (b) human capital development and education, and (c) the use of nonmarket time, including time spent in leisure activities. Many applications were done by people closely associated with the University of Chicago as staff or students, such as Gary Becker, Robert Michael, Reuben Gronau, James Heckman, Marc Nerlove, T. W. Schultz, Robert Willis, and others. Nerlove christened the household decision-making framework, "the new home economics" (9).

Researchers and educators in the field of home economics have been rather uncomfortable with the unofficial, yet rather widespread, use of Nerlove's term. Their discomfort arose, first, because of his use of a term (home economics) already in use with other meanings, and which encompassed many areas not dealt with in the analyses by those from the Chicago school -- such as textiles, clothing, food and nutrition, education in home economics, and housing, to name a few. Second, it implied that this was an improvement over whatever the "old" home economics was; and third, because, in many respects, it wasn't new at all. Home economics researchers had been studying household time use for years. And they also had recognized that household activities result in satisfaction (utility). Nevertheless, the ideas of Becker, Lancaster, Michael, Gronau, and others have provided some important contributions from which economists, home economists, sociologists, and others can benefit.

The study of time use is important: it is necessary to "open up" the household to observe what is being done, how long it takes, who does it, and what the result is. Time, however, is only one aspect of household production. Production within the household, as within the firm, has a number of inputs. Only one of these is labor and management (for which time provides the unit of measurement).

Household members combine labor and management time

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with raw materials, capital in the form of durable goods, and other inputs such as fuel to produce goods and services for use by family members.

VALUE ADDED IN HOUSEHOLD PREPARATION OF FOOD

The national accounts use the value-added approach to measure the production occurring within each firm. Such an approach seems appropriate for measuring production or preparation within the household. Hawrylyshyn (5) suggested that:

HVA = f(L, K, I)

where HVA = household value added,
L = labor and management inputs
K = capital in the form of durable goods,
and I = intermediate inputs.

This is the form used in the national income and product accounts. If production within the household is to be viewed in the same way as production within the firm, it seems logical to use the same general form, that of value added.

The value-added approach measures only the value that is added at any particular location or stage of the production process. Thus, value added in the household is accomplished by adding inputs to the product in whatever form it enters the household. Such inputs are labor and management, capital in the form of durable goods, and intermediate inputs such as fuel. This approach avoids double counting of value contributed by inputs.

PURPOSE AND METHOD

The major purpose of this study was to develop a method for estimating the value added in the transformation of food into meals by households.

The data source was the 1977-78 nationwide Survey of Household Food Consumption conducted by the United States Department of Agriculture. After being cleaned, the data set consisted of information from 11,036 households.

The method developed for estimating value added can be expresses as:

X = V - R, where
- X = Value added by the process of meal preparation in the home; and
- V = U x I with,
  - U = Average price of meals eaten away from home
  - I = Total number of meals eaten by family members from home food supplies; and
- R = Money value of home food supplies used to prepare meals at home, adjusted, where applicable, for food-stamp and WIC subsidies.

The imputed value for a given family's meals at home was based on that same family's average expenditure for meals it purchased away from home. This imputed value was used for two reasons. First, it was considered appropriate because it was based on the food-purchasing behavior of each household when its members purchased meals away from home. Thus, it reflects food preferences of <u>that</u> household rather than preferences that might be reflected in group data. Secondly, restaurant prices of meals were not available. Third, it reflects prices of the community in which each household lives, works, and spends.

One obvious limitation of using this method for imputing values to home-produced meals is that it was not possible to ascertain just which meals were eaten away from home and the relative quality of home-produced food and purchased meals. The Household Food Consumption Survey data were not amenable to such a determination. Industry sources, however, indicated that overall, more lunches are eaten away from home and that about equal numbers of breakfasts and evening meals are eaten away (6). Because an ascending order of prices is likely for breakfasts, lunches, and dinners, the average price of meals away from home seemed to provide a reasonable approximation under an assumption of equal quality on the average.

Although the major purpose of this study was to develop a method for estimating value added to food within the household, an attempt was made to partition that value added into its various components. This would allow examination of the value of labor and management inputs independent of the time spent and also make it possible to compare this study with others that place a value on time of household workers. The return to labor and management was calculated by subtracting out capital and energy costs from the value-added figures.

Capital costs were calculated by compounding a passbook rate of return over their life expectancies on the stocks of small electrical and major kitchen appliances, glassware, china, and utensils, then dividing that compounded value by the appropriate life expectancies of the various items. This resulted in a capital consumption allowance of $4.12 per week per household that includes both capital consumption and return to capital invested. The use of opportunity costs as a proxy for return meant that most of the returns to capital were offset by the inflation present during that period.

Surprisingly, data on fuel usage costs for food preparation are practically nonexistent. In this study, annual usage estimates were constructed (mostly from unpublished data) to reflect kilowatt hours of electricity or cubic feet of gas consumed by each appliance. These then were multiplied by the mean price paid by households in 1977 per unit of fuel. Each household was assigned a percentage of those annual costs to reflect the percentage of ownership of each appliance in the population as a whole. Fuel allowances then were summed to arrive at a fuel allowance per household. This resulted in an estimate of $124.14 annually per household for fuel allowance. Expressed on a weekly basis, it is $2.39.

FINDINGS

When a multiple regression analysis of value added on household characteristics was done, the most important predictor of value added in the household was whether the female head was employed outside the home (Table 1). In those households where the

female head was employed outside the home, the value added was significantly lower. This was the case whether or not there was also a male head present in the household.

TABLE 1. Multiple regression of value added on respondent characteristics

Variable	b	Beta	F
Female Employment[a]	-19.31	-.17	208.26*
Income	.21	.04	11.28*
Age of Head	.29	.09	47.04*
Family Size	3.64	.11	68.87*
Education of Head		.00	.04
Constant 23.16			
R^2 = .05			
F = 80.29*			
df = 5 and 7435			

aCoded (0) not employed (1) employed
*Significant at the .001 level

The mean value added in households where the female head was employed was $31.25. In households where the female was not employed the mean value added was $51.25. In addition, the more hours she worked, the less the value added. What contributed to this? Was it because employed females purchase more convenience foods? Do households with employed females eat less meals at home and more away?

As shown in Table 2, households that had an employed female head spent about the same weekly on food at home ($47.73 vs $46.57 for the households in which the female head was not employed). However, they ate fewer meals at home. Therefore, the cost per meal at home was higher for the households with employed female heads (93¢ vs 85¢). Indeed, the actual cost spread between the two in terms of cash outlay may have been even larger, because the value of home-grown food was included in the "cost" of food at home.

Households that had employed female heads ate more meals away, but spent less for each meal. They ate slightly fewer meals at home, but approximately the same total number of meals as those households with females not employed. Thus, households that had employed female heads ate a higher percentage of their meals away from home.

The mean weekly value added to food in 1977 over the entire United States sample was found to be $40.28 per household. After subtracting an allowance of $4.12 for capital in the form of durables and $2.39 for fuel inputs, the remaining value added is $33.77 per household. This is the portion that consists mainly of returns to labor and management.

Other researchers have attempted to measure the value of labor and management inputs by ascertaining time spent in various household tasks and assigning a dollar value to the time expended (14). Recently, time spent in household activities was examined in 11 states (12). That study was limited to households composed of two parents and two children under the age of 18. Although samples were selected randomly within sampling areas, only

TABLE 2. Comparisons of value added, numbers of meals, and costs in households where the female head was employed and those where the female head was not employed.

	Households with Female Head Employed	Households with Female Head Not Employed
Mean Value Added	$31.25	$51.25
Mean weekly cost of food at home	$47.73	$46.57
Mean cost per meal at home	$ .93	$ .85
Mean cost per meal away	$ 1.85	$ 2.25
Mean number of meals away weekly	12	6
Mean number of meals at home weekly	51	55
Mean total meals eaten weekly	63	61

certain areas within 11 states were studied. Thus, exact comparisons cannot be made between that study and ours. However, some comparisons may be of interest. In our study, the mean value added weekly in households of four that had both male and female heads was $44.56. After an allowance of $6.51 is subtracted for durables and fuel inputs, value added attributable primarily to labor and managerial inputs is $38.05.

In the regional household time-use study (12), it was found that two-parent households with two children under the age of 18 in the Syracuse, New York, area spent a total of 17.5 hours per week in food preparation and dishwashing activities (3). If our $38.05 weekly value added attributable to labor and management is divided by 17.5 hours, the imputed hourly wage would be $2.17. Utah families in the same regional study spent only 15.28 hours per week in food preparation and dishwashing activities (3). After $38.05 is divided by mean hours from the Utah sample, the hourly imputed wage is $2.49. Legal minimum wage in 1977 was $2.30.

No allowance is made here for joint production, however. Within households, several commodities or services often are produced simultaneously; for example, laundry, child care, planning, or cleaning may be taking place while food preparation is occurring. Our imputed figure is the dollar value added to food within the home -- not the total value of commodities produced within a given time period. In addition, minimum wages or any other stated wage rates are subject to taxes; returns to labor expended by household members within the household are not.

IN RETROSPECT

Use of the value-added approach to valuing household production seems to hold much promise. First, it includes other inputs as well as time in estimates of the value of productive activity within the household. For example, such things as managerial inputs are included. In addition, joint production is not as much of a problem because the only thing being determined is value added in a

productive activity such as meal preparation. Therefore, it is not necessary to try to separate out other activities that household members do simultaneously with the preparation of meals.

Clearly, one implication that flows from this analysis is that, as more women enter the paid labor force, it is likely the value added through the process of meal preparation has declined. Evidence on women in paid employment is more complete than that on the trend in value added, so the relative magnitude of two is not known. However, because in this study the influence (negative) of female head employment on value added is so salient, it seems likely that a decrease in the value added in the home has, in effect, to some degree offset the increase in GNP that has been reflected by women's movement into paid employment. Thus, GNP figures uncorrected for concurrent changes in traditionally non-measured economic phenomena such as value added in meal preparation overstate changes in real economic well-being to some extent.

Better estimates of contributions to value added could be made, however, if better information were available about household inventories, including true ages, prices, and life expectancies of small appliances, cookwares, and miscellaneous kitchen supplies in use in each household. Also, improved data about energy usage within the home would make possible better estimates of costs to attach to those inputs. Information about prices of comparable restaurant meals would be useful along with accurate information on serving size and number of servings. This information could serve as a check on estimates generated internal to the data source such as was done in this study, adding to the reliability of the estimates.

The value-added approach is an alternative to valuing household production through time inputs. None of the approaches for valuing household production, including this one, are able to capture either the important qualitative dimensions or the differences in efficiency between households. Better information at least would allow improved quantitative extimates by households as producers.

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MEASUREMENT OF THE VALUE OF TIME: A MODEL

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ABSTRACT

A measure of the marginal value of time is not observable in all activities. However, the econometric model presented here is fitted to data for all individuals--wage earners and other, disabled and able-bodied--to provide empirical estimates of wage offers for head and spouse from Black and non-Black households.

INTRODUCTION

A measure of the value of time in nonmarket activities is now possible using new methodological techniques of labor economics and econometric model-building. The new household economics has provided a methodology useful in measuring the value of time --which in equilibrium would be equal across all uses. The empirical measure of the marginal value of time is the wage offer derived from estimation of a modified wage equation.

The value of time is an important determinant of resource allocation. In the current economic environment nonmarket time commands attention. Likewise, continuing concern regarding exclusion of the value of nonmarket production from national accounting of Gross National Product (GNP) becomes more intense. If nonmarket contributions to household and consumer welfare are to be measured, it is an imperative first step that measurement of the value of time in nonmarket production be accomplished.

Measuring the value of time is the scope of this paper. The econometric model and empirical evidence presented here use a multi-stage estimation procedure. The purpose of this paper is twofold: 1) to provide insights into the methodological background on which the wage offer equations are based and 2) to present the empirical model fitted using econometric techniques for measuring the value of time. Section one presents the methodological considerations including a discussion of selection bias. Section two contains a discussion of the data set, sample, empirical definition of variables and empirical specification of the econometric model. Empirical results are presented in section three. Section four contains the summary.

I. SELECTION BIAS AND STATE-OF-THE-ART METHODOLOGY

Researchers are familiar with bias. The most frequently encountered bias is from questionnaire response. When particular segments of the population respond and others do not, the problem arises. Characteristics and traits of the respondents are not randomly assigned to the groups, i.e., the respondents are not a representative sample of the population. This is, of course, titled response bias. Another, less obvious or familiar, source of bias is selection bias. Examples of selection bias provided by Heckman [5, p. 153] help to point out the extent of potential bias:

> ...one observes wages for union members who found their nonunion alternative less desirable. The wages of migrants do not, in general, afford a reliable estimate of what nonmigrants would have earned had they migrated. The earnings of manpower trainees do not estimate the earnings that nontrainees would have earned had they opted to become trainees.

Until the mid-1970's the practice in empirical research was to estimate wage functions based on samples of employed individuals only. The problem of an unobserved wage, i.e., the marginal value of time, was alleviated if only those reporting hours in the labor market and, therefore a wage rate, were included. An alternative procedure was to impute a wage to nonemployed persons from a wage equation estimated on a sample of workers. This was necessary, once again, due to the absence of data on the value of time for nonwage earners. Today it is recognized that if one estimates a wage equation using a sample of working individuals bias results. This is because the same set of variables that determine wages enter as a criterion for sample eligibility. The estimated wage function confounds the true wage function with the rules for inclusion in the sample [3, 4, 5, 6, 11, 12]. Heckman provides an insightful example [4, p. 477]:

> If the presence of children affects the work decision but does not affect market wages, regression evidence from selected samples of working women that women with children earn lower wages is not necessarily evidence that there is market discrimination against such women or that women with lower market experience--as proxied by children--earn lower wages. Moreover, regression evidence that such extraneous variables "explain" wage rates may be interpreted as evidence that selection bias is present.

Most empirical data regarding sample selection bias in wage equations is based on women. This is due to the higher proportion (relative to men) of nonemployed time use and current interest in the worth of household production. Ordinary least squares (OLS) regression was used to estimate the imputed wage based on the wages of workers. While, as will be explained below, the wage offer can also be estimated using OLS, a correction for selection bias must be included. Empirical estimates of the imputed wage exceed the mean wage offer for women by from 5.3 percent to 11.1 percent [12, p. 16]. An imputed wage predicts the same wage for an individual regardless of whether he/she participated in the labor force. The bias is most severe when

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wages are imputed to the nonemployed [12]. Studies by Heckman [6] and Hanoch [2] indicate that OLS imputed wages for nonparticipant women overestimate the true wage offer by more than 20 percent.

Much of the econometric work on labor supply of women in recent years has dealt with alternative methods of estimating wage and labor supply functions that are free of this selection bias. To resolve the problem of bias, when estimating the wage offer, requires understanding the decision to be or not to be in the labor market. Heckman [3] provided a major methodological contribution in labor supply estimation by identifying the relationship among components of labor supply: participation, wages and hours worked. This initial approach used a nonlinear maximum likelihood function to estimate the set of parameters underlying the function determining probability of working, hours of work, the observed wage rate, and the shadow price of time--wage offer. Although Heckman's original statistical method was a significant methodological advancement, it was quite expensive to implement and, therefore, not used in applied research.

Heckman [4, 5] presents selection bias as a variant of specification error. This second method requires two-stage estimation using a probit model. The probit equation estimates the probability of sample inclusion using a curvilinear estimation technique. Once again, the procedure is complex and moderately expensive.

The procedure became practical when Olson [11] developed a linear probability model to make the correction. The advantage of Olson's model is that it requires OLS regression techniques to estimate the correction factor rather than an iterative probit. The correction factor is the probability of having been included in the sample on which the modified wage equation is estimated. Then, using OLS, the estimated probability is used in modified wage equations as the missing variable--instrumental variable--when the wage rate of labor market participants is regressed on the demographic and economic characteristics known to effect marginal productivity of individuals. All estimated parameters, except the ones used to correct for potential biases, are then used to estimate the wage offer of all individuals whether they are wage earners or not.

The first source of selection bias considered in this paper involves the employed/nonemployed status as it relates to measuring the value of time for all individuals. If, as should be assumed, individuals choose other time use alternatives than labor in the market for a wage because of differential characteristics and preferences between wage earners and these other individuals, then the nonrandom differences must be accounted for. The observed differences in wage offers for persons with identical demographic and economic characteristics must not be systematically related to the market labor supply decision--the work/nonwork decision.

A second source of selection bias may exist in the estimation of the wage offer due to disability not being a random occurrence in the population. Consistent with Heckman's previous discussions of selection bias, if the disabled and the able-bodied are not homogeneous in other characteristics, the disabled, therefore, would not face the same wage offer as others, even if they were able-bodied [1].[2] To simply include a dummy variable, e.g., 1=disabled, 0 =able-bodied, in the modified wage equation is to ignore the fact that workers must be able-bodied to work.

Olson's [35] technique as employed here enables the researcher to use the estimated probability of being a wage earner (see equation 1) and the estimated probability of being able-bodied (see equation 2) as missing conditional means for each observation. These estimated conditional means are utilized as regressors in the modified wage equations for head and spouse (see equations 3 and 4).

Therefore, the entire sample can be used to estimate the wage offer, i.e., marginal value of time. As a result, the empirical findings can be generalized with confidence because selection of the sample has not biased the parameters used to estimate the wage offer.

II. DATA SET, SAMPLE, OPERATIONAL DEFINITION OF VARIABLES, AND EMPIRICAL MODEL

The data set used in the empirical analysis is the Panel Study of Income Dynamics [8, 9, 10]. The study's design is longitudinal and interviews have been taken once each spring since 1968[3]. The use of the data for this study is cross-sectional using the fifth year, 1972. Economic variables are reported for the year 1971. In a married household with spouse present, the husband is the head by definition. The weighted sample used in this study is representative of the two-adult-headed household population of the United States [8, p. 33].

The sample of households where both a head and spouse are present is subdivided by race[4] and used separately for head and spouse to estimate 1) the probability of being in the labor market for a wage, 2) the probability of being disabled, then each probability is used 3) in modified wage equations to estimate the wage offer for all individuals.

A measure of the marginal productivity of time is not observable in all activities. However, the general model presented here is based on models by Olson [11] and Huffman and Lange [7]. As modified, it is fitted to data for all individuals--

[2]The author is grateful to Wallace Huffman for pointing out this second potential source of bias.
[3]The data tape from which the samples used in this study were drawn is the nine-year tape, 1968-1976.
[4]The sample is divided by race where Orientals, Asians and races other than Black are combined with the Caucasian race to make up the non-Black sample. The methodology of labor supply indicates that asset levels and entrepreneurial skills are more similar between whites and other races than Blacks and others.

wage earners and others, disabled and able-bodied --to provide empirical estimates of the wage offer for each individual. Table 1 provides the operational definition of variables used in the model presented.

TABLE 1: Operational Definition of Variables

AGE	Age--in years--as proxy for stage in the life-style.
AGEAGE	Age squared--measures the marginal effect of age.
EDUC	Educational level--an ordinal scale indicating the amount of academic and nonacademic formal training.
HEALIMIT	Severe health limitation--dummy variable.
EDILIMIT	Education of head times disability indicator--interaction term.
YRSDIS	Years disabled--ordinal variable--measures adjustment times since onset of health impairment.
$V_N - T_N^a$	Estimated after-tax nonwage, earned income of head and spouse.
$V_I - T_I^a$	After-tax asset income from financial investments.
NUMCHILD	Number of children in the household--age less than 18 years.
ρ_D	Linear probability of being disabled.
ρ_M	Linear probability of being in the market for a wage.
TRANSFER	Noncontributory nonwage income--includes transfer income.
NONWAGEY	Contributory nonwage income--includes Social Security, unemployment and workers' compensation, private pensions, etc.
WAGEARN	Indicates wage earners--individuals participating in the labor market for a wage.
SMSA	Distance from the family's residence to the nearest SMSA.
REGION	Region of the country where 1971 income was generated. Dummy variable where: 1=northeast; 2=northcentral; 3=south; 4=west.
OCCUP	Set of dummy variables indicating broad occupational categories for head and spouse where: 0=retired, student, or housespouse; 1=professional; 2=manager or official; 3=businessperson; 4=sales or clerical; 5=craftsperson; 6=operator; 7=unskilled labor or service worker; 8=farmer; 9=misc. for head; missing for spouse.
ln W(1-t)	The after-tax wage offer.
$t = t_o + S_o$	The sum tax rates applicable at the margin--Social Security tax rate (S_o) plus income tax rate (t_o).
CHILD6	Youngest child less than 6 years old.
CHILD12	Youngest child six years to 12 years old.
CHILD18	Youngest child 12 years to 18 years old.
a_T	Share of total income tax from stated source.

The empirical model:

$$\rho_{iM} = \delta_0 + \delta_1 AGE_1 + \delta_2 AGE_2 + \delta_3 HEALIMIT + \delta_4 EDUC_1 + \delta_5 EDUC_2 + \delta_6 EDILIMIT + \delta_7 AGEAGE_1 + \delta_8 AGEAGE_2 + \delta_9 CHILD6 + \delta_{10} CHILD12 + \delta_{11} CHILD18 + \delta_{12} TRANSFER + \delta_{13} NONWAGEY + \delta_{14} V_N(1-T_N) + \delta_{15} WAGEARN_2 + \delta_{16} V_I(1-T_I) + \delta_{17} YRSDIS + \delta_{18} REGION_2 + \delta_{19} REGION_3 + \delta_{20} REGION_4 + \mu_i \quad (1)$$

$$\rho_{iD} = \zeta_0 + \zeta_1 AGE_1 + \zeta_2 AGE_2 + \zeta_3 HEALIMIT + \zeta_4 EDUC_1 + \zeta_5 OCCUPH_1 + \zeta_6 OCCUPH_2 + \zeta_7 OCCUPH_3 + \zeta_8 OCCUPH_4 + \zeta_9 OCCUPH_5 + \zeta_{10} OCCUPH_6 + \zeta_{11} OCCUPH_7 + \zeta_{12} OCCUPH_8 + \zeta_{13} REGION_2 + \zeta_{14} REGION_3 + \zeta_{15} REGION_4 + \zeta_{16} AGEAGE_1 + \zeta_{17} AGEAGE_2 + \zeta_{18} TRANSFER + \zeta_{19} NONWAGEY + \zeta_{20} V_N(1-T_N) + \zeta_{21} V_I(1-T_I) + \zeta_{22} CHILD6 + \zeta_{23} CHILD12 + \zeta_{24} CHILD18 + \zeta_{25} NUMCHILD + \xi_i \quad (2)$$

$$\ln w_1(1-t_1) = \alpha_0 + \alpha_1 AGE_1 + \alpha_3 EDUC_1 + \alpha_4 AGEAGE_1 + \alpha_5 YRSDIS + \alpha_6 EDILIMIT + \alpha_7 HEALIMIT + \alpha_8 REGION_2 + \alpha_9 REGION_3 + \alpha_{10} REGION_4 + \alpha_{11} SMSA + \alpha_{12}\hat{\rho}_{1M} + \alpha_{13}(1-\hat{\rho}_{1D}) + \varepsilon_1 \quad (3)$$

$$\ln w_2(1-t_2) = \dot{\alpha}_0 + \dot{\alpha}_1 AGE_2 + \dot{\alpha}_2 EDUC_2 + \dot{\alpha}_3 AGEAGE_2 + \dot{\alpha}_4 REGION_2 + \dot{\alpha}_5 REGION_3 + \dot{\alpha}_6 REGION_4 + \dot{\alpha}_7 SMSA + \dot{\alpha}_8\hat{\rho}_{2M} + \dot{\alpha}_9(1-\hat{\rho}_{2D}) + \varepsilon_2 \quad (4)$$

where i=1,2 for head and spouse, respectively.

III. THE PARAMETER ESTIMATES

In this section the model used to estimate the value of time--wage offer--is for all individuals. Equation (1) is used to estimate parameters for the probability of being in the market for a wage. Equation (2) is used to estimate parameters for the probability of being disabled. The appropriate estimated probabilities are used as regressors in equations (3) and (4)--the modified wage equations[5]. The estimated wage offer can then be used as a measure of the value of time to each individual regardless of employment status and health status.

Probability of Allocating Time to the Market for a Wage

For the estimated parameters of the wage equation to be unbiased, the observed differences in wage offers for persons with identical demographic and economic characteristics must not be systematically related to the labor market supply decision--the work/no work decision. Statistically it is unimportant whether one predicts the probability of being in the market for a wage, i.e., being in the labor market is coded a value of one (1) as is the case here, and not being in the labor market for a wage receives a value of zero (0). However, it is essential to statistically correct for selection bias. When the natural log of the after tax wage rate is regressed on the independent variables identified in equations (3)-(4), one of the two independent variables used to correct for selection bias must be the probability of being in the labor market for a wage--the estimated probability of being in the market for a wage is constrained to values equal to or between zero and one: $(0 \leq \hat{\rho}_M \leq 1)$.

Probability of Being Disabled

If the probability of being disabled is not a random occurrence in the population, the disabled would not face the same wage offer as the able-bodied, even if they were able-bodied.

[5]Due to space limitations only information regarding statistical use of probabilities is provided here. Details of probability estimates are available from the author.

To predict the probability of being disabled the dependent variable was assigned the value one (1). Therefore, able-bodied assumes the alternate value of zero (0). For use in the wage estimation equation, the probability of being disabled is constrained to values equal to or between zero and one: $(0 \leq \hat{\rho}_D \leq 1)$. The probability of being able-bodied $(1-\hat{\rho}_D)$ is included in the modified wage equations (3) and (4).

The primary purpose of estimating probabilities of market work and disability is as correction factors in the modified wage equations rather than as estimators in their own right.

Head's Wage Equation

Estimates of the head's after-tax wage rate equations are reported in Table 2. In terms of expected signs, there is general agreement with other studies and labor theory. For all heads of households, non-Blacks and Blacks, the wage function is increasing in age of the head, i.e., the log of the after-tax wage offer increases with age. The marginal effects of this function are measured by age of the head squared. The negative estimated coefficient of the squared term indicates that the marginal effect of age on the after-tax wage offer declines as age increases--a relationship consistent with theory and other empirical evidence. Both age of the head and age of the head squared are statistically significant at the .001 level for Blacks and non-Blacks.

TABLE 2: Coefficients Estimated by the Modified Wage Equation for Heads of Households by Race[a]

Variables	Non-Black β	Black β
Age of Head of Household	0.08*	0.05*
Education of Head	0.04*	0.04*
Age of Head Squared	-0.0009*	-0.0005*
Years Head Disabled	-0.01	-0.11*
Education-Limitation Interaction	0.05*	0.11*
Health Limitation	-0.25*	-0.12
Northcentral Region	0.05*	-0.31*
South Region	-0.13*	-0.41*
West Region	-0.07*	0.06
Distance to SMSA	-0.005*	-0.007*
Probability of Head Being Wage Earner	1.66*	1.28*
Probability of Head Being Able-bodied	-0.04	0.57*
Constant	-2.02	
R^2	0.19	0.35
$\bar{R}^2$	0.19	0.34
F-ratio	1078.47	222.52
n	55571	5071

[a]Dependent variable is natural log of after-tax wage rate for heads participating in the labor market for a wage.

*Due to the weighting of the sample to assure randomness--a necessary condition to avoid bias--the number of cases is large. Therefore, the .001 level of significance is used regarding critical values referenced to determine statistical significance.

Likewise, educational level of the head is of the correct sign and statistically significant for both Blacks and non-Blacks. The log of the after-tax wage offer of the head is an increasing function of the head's educational level. The mean educational level of Black wage earners is junior high school. The mean for non-Blacks indicates completion of high school.

The variable correcting for disability or impairment is statistically significant for Blacks but not for non-Blacks. For Blacks the greater the probability of being able-bodied, the greater the after-tax wage offer. Interpreting the marginal wage rate as evidence of the marginal productivity of workers, one would expect the able-bodied to exhibit a higher marginal productivity per worker.

For Blacks and non-Black heads of household the greater the probability of being in the labor market the greater the wage rate. The correction factor for labor market participation of head of household is statistically significant for both Blacks and non-Blacks. The interaction of educational level and health limitation indicates for both races that higher educational levels increase the wage offer in the presence of a severe disability. The relationship is statistically significant for Blacks and for non-Blacks. For both races, a severely limiting disability reduces the wage offer. For non-Blacks, the relationship is statistically significant. Years the head has been disabled is negatively associated with the after-tax wage rate and statistically significant for Blacks only.

Distance from the prominent employment center is measured by distance from the nearest SMSA. The wage rate is assumed to decline with distance from the employment center. The relationship is negative and statistically significant for both races.

Spouse's Wage Equation

Table 3 reports the after-tax wage equation for spouses. For Black and non-Black spouses, the relationship between age and the after-tax wage offer is positive. The age squared term indicates the function is increasing at a decreasing rate--an expected relationship. These relationships are statistically significant for Black and non-Black spouses.

The wage rate is positively related to education for women in both races, a finding consistent with human capital theory. Black spouses have an average educational level of at least some high school. For non-Blacks, the educational level is slightly higher indicating completion of high school. The greater the probability of being able-bodied, the lesser the after-tax wage rate, regardless of race. The greater the probability of being in the labor market, the lesser the after-tax wage offer for Black spouses and the greater the after-tax wage offer for non-Black spouses. The only correction factor not statistically significant for spouses is the probability of being able-bodied for non-Black spouses.

TABLE 3: Coefficients Estimated by the Modified Wage Equation for Spouses by Race[a]

Variables	Non-Black β	Black β
Age of Spouse	0.02*	0.04*
Education of Spouse	0.13*	0.21*
Age of Spouse Squared	-0.0002*	-0.0005*
Northcentral Region	-0.14*	0.38*
South Region	-0.23*	0.14
West Region	-0.17*	0.33*
Distance to SMSA	-0.003*	-0.007*
Probability of Spouse Being Wage Earner	0.41*	-0.54*
Probability of Spouse Being Able-bodied	-0.19	-5.23*
Constant	-0.36	3.99
R^2	0.19	0.41
$\bar{R}^2$	0.19	0.40
F-ratio	905.76	273.35
n	35575	3619

[a]Dependent variable is natural log of after-tax wage rate for spouses in the labor market for a wage.

*Due to the weighting of the sample to assure randomness--a necessary condition to avoid bias--the number of cases is large. Therefore, the .001 level of significance is used regarding critical values referenced to determine statistical significance.

Distance from a major employment center, i.e., distance from the SMSA, is negatively associated with the wage rate for Blacks and non-Blacks. The coefficient is statistically significant for Black and non-Blacks. In general the relationships are as expected. The coefficients estimated here are used to construct the wage offers used to measure the value of time for all individuals.

IV. SUMMARY

Using human capital theory the natural logarithm of the heads' and spouses' hourly wage rates are regressed, separately, on demographic and economic characteristics that influence marginal productivity of individuals plus the sample-selection correction terms for sample inclusion: being a wage earner and being able-bodied.

This study provides econometric estimates and model-building techniques useful to researcher interested in estimating the value of time for all individuals. The continued and increasing interest in non-market productivity provides a need for these estimation procedures.

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DEMAND FOR CONVENIENCE FOODS IN THE UNITED STATES

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ABSTRACT

The factors that affect household demand for convenience food were the objects of this research. Food expenditure models were estimated. Model results show that female and non-wage-earning meal preparers use less convenience food than male and wage-earning meal preparers. As more women enter the work force and more men become meal preparers, the market demand for convenience foods should increase. Estimates of income elasticities are positive but less than typical estimates due to the consideration of the value of time. Household size elasticities are positive and less than one.

SITUATION

The food system in the United States has undergone a startling transformation in just a few decades. The services embodied in purchased food products have been expanded from those of basic nourishment to all aspects of what may be called "convenience". Many kinds of service or convenience are built into the various food products which make up the household shopping list. The purchase of prepared foods obviates the need for some of the homemaker's labor, time and culinary skill. Often the energy costs of preparation are reduced. Multiple ingredient products reduce shopping and planning time as well as storage space requirements when compared to the resources demanded by equivalent home-prepared meals. Further, processed product forms may increase shelf life over fresh ingredients and, in some cases, may even improve the quality of the product. Finally, the food processing industry provides products nearly impossible to produce at home, thereby expanding the opportunities of consumers to include goods they would otherwise do without. A natural question which arises in this atmosphere of change is, "What are the economic and nutritional consequences to users of convenience products?" As a first step in determining the effect of convenience foods on the household diet and budget, it would be useful to determine who uses them and why. Certain household characteristics, such as the age-sex composition, race, and region of residence, are likely to affect food expenditure patterns. Also, characteristics of the meal preparer are expected to influence the households' expenditure behavior. Trends in income, household size and female participation in the work force also affect the patterns of food expenditure.

Two objectives of this research were to identify household characteristics that affect convenience food use and to statistically test for differences among household types. To accomplish these objectives a theoretical model of the demand for convenience food was developed. Because convenience foods substitute purchased services for home produced ones (particularly labor), the motivation for demand must be analyzed using a framework which takes account of the tradeoffs involved between convenience foods and nonconvenience foods. Even a cursory review of available theory suggests that the appropriate framework for analyzing the demand for convenience food is the theory of the household production function. Based on the theory, household characteristics that affect the productivity, value and availability of time were identified as important factors. The final objective was to identify and measure effects of demand determinants in a model of food expenditure.

The definitions and classification of foods, taken from Havlicek, Capps and Axelson [4], provides for classes of nonconvenience, basic convenience, complex convenience and manufactured convenience food. This system provides for the mutually exclusive classification of all foods. Nonconvenience foods are raw, unprocessed foods or ingredient foods. Examples include fresh meats and poultry, whole milk and fresh fruits and vegetables. Basic convenience foods are single ingredient foods with limited culinary expertise embodied, usually providing a type of preservation convenience. Examples include frozen vegetables, frozen fruit juice concentrate and canned meats and vegetables. Complex convenience foods are multiple ingredient, highly prepared foods. Examples include baked breads and rolls, frankfurters and mixtures. Manufactured convenience foods include products which have no home prepared counterpart. Examples include carbonated soft drinks, distilled alcoholic beverages and puffed cheese snacks.

The most notable pieces of research on convenience foods that shed some light on the nature of the products and the issues of importance are Harp and Dunham [3] and Traub and Odland [11, 12, 13]. In their efforts to compare the costs of convenience foods and home prepared counterparts they adopted a cost-per-serving approach based on the costs of ingredients. Traub and Odland also included the costs of fuel and labor in their per-serving costs.

Careful consideration of the theoretical model based on the household production function has lead to the development of a statistical model which goes beyond specifications found in previous

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