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Consumer Expenditure Survey Anthology, 2003

U.S. Department of Labor
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Report 967

Preface

This is the first in a series of reports presenting both analytical articles that use data from the Bureau of Labor Statistics (BLS) Consumer Expenditure (CE) Survey and methodological articles that discuss ongoing research and issues pertaining to the survey. In the past, the CE Survey Division published a biennial report that included analytical articles, standard tables of the most recent CE Survey data, a discussion of expenditure changes, and a description of the survey and its methods. The most recent of these was *Consumer Expenditure Survey, 1998–99* Report 955, published in November 2001. The biennial report will be replaced by two separate biennial reports that will be published in alternating years. One will continue the practice of publishing tables with recent survey data, a brief discussion of recent changes in expenditures, and a description of the survey and its methods. The first of this type of report is *Consumer Expenditure Survey, 2000–2001,* Report 969, published in September 2003. The other, of which this is the first, includes both methodological and analytical articles. The methodological articles are intended to provide data users with greater insight into both ongoing improvements in the survey and issues that are faced in collecting, processing, and publishing information from such a complex survey. The analytical articles furnish information on topics of interest pertaining to CE Survey data.

The CE Survey program provides a continuous and comprehensive flow of data on the buying habits of American consumers for use in a variety of economic analyses and in support of periodic revisions of the Consumer Price Index. BLS makes data available in news releases, reports, bulletins, and articles in the *Monthly Labor Review,* as well as on CD-ROMs and on the Internet.

This report was prepared in the Office of Prices and Living Conditions (OPLC), Division of Consumer Expenditure Survey (DCES), under the general direction of Steve Henderson, Chief of the Branch of Information and Analysis, and was produced and edited by John M. Rogers, Section Chief. Articles on research and methodology were contributed by Sioux Groves, Chief of the DCES, Jeff Blaha and Sally Reyes-Morales of the Division of Price Statistical Methods, Geoffrey Paulin of the Branch of Information and Analysis, Linda Stinson of the Office of Survey Methods Research (OSMR), and Nhien To and Jeanette Davis of the Branch of Research and Program Development. Analytical articles were contributed by Abby Duly, George Janini, Eric Keil, Laura Paszkiewicz, and Geoffrey Paulin of the Branch of Information and Analysis and Neil Tseng of the Branch of Production and Control.

The material that follows is divided into two sections: section 1 contains articles on survey research and methodology, and section 2 presents analyses of topics of interest based on CE Survey data. An appendix includes a general description of the survey and its methods and a glossary of terms.

Current and historical CE Survey tables classified by standard demographic variables are available at the BLS Internet site **http://www.bls.gov/cex**. Other survey information, including answers to frequently asked questions, a glossary of terms, order forms for survey products, and *Monthly Labor Review* and other research articles, also is available on the Internet.

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Contents

Part I.
Survey Research and Methodology

Creating a "User-Friendly" Expenditure Diary

LINDA S TINSON
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Interest in American expenditures has a long history dating back to the late 1800s, when the Bureau of Labor Statistics (BLS) first looked at the economic welfare of our early immigrants. Today, BLS is mandated to report detailed information on all the ways in which Americans spend their money. The Consumer Expenditure Diary (CED, Diary) is the instrument used to collect information on the many purchases made each week by sampled households.

When it comes to reporting detailed expenditure information, not all purchases are equally easy to remember and record. Some expenditures, such as daily busfare, are often part of a "work commute" mental script and may be readily recalled. Other purchases, like sodas and snacks from vending machines, tend to be more mundane, buried within the concerns of daily activities, and more easily overlooked. The diary mode of data collection has long been recognized as an especially useful tool for collecting daily records of these types of frequent, low-salience purchases before they are forgotten. The diary also makes it possible to collect followup details on purchases that can be used to produce the weights for the Consumer Price Index.[1] Such information would be difficult, if not impossible, to collect accurately without some means of recording the purchases during the week as they occur.

Over time, numerous economic researchers have adopted a diary approach to track household consumption, gauge reactions to new products appearing on the market, and observe social trends. Through their work, it has become abundantly clear that diaries are useful data collection tools. However, in order to attract and keep respondents, a diary must be user friendly and actively engage the respondents' interest in the data-reporting task.

Developing a BLS diary

Over the years, BLS created various expenditure diaries with the hope that they would produce high response rates and accurate estimates. But evidence from numerous research studies, expert reviews, and the reports of interviewers and respondents alike has indicated that these diaries were not particularly user friendly. From the perspective of the respondent, the main problem with the current CED Diary is that it is difficult to navigate; neither its logic nor its structure is apparent. (See exhibit 1.) The respondent must navigate both vertically and horizontally and must inspect every page thor-

[1] For example, reports for grocery items need to include details about the type of packaging and whether the item is fresh or frozen. Detailed information on clothing includes the gender and age range of the recipient. Meals away from home have followup details about purchase of alcoholic beverages.

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oughly in order to determine how to proceed. In addition, respondents have reported that Diary instructions are not easy to read or follow. (See exhibit 2.) For example, respondents do not understand some of the words, such as "consumer unit," used by BLS. Likewise, the pages used as examples in the current diary have been reported to be somewhat overwhelming and, worse, may contribute to, rather than ameliorate, respondents' confusion. Finally, the large size and landscaped layout (as opposed to the more typical book format) makes it difficult for some respondents to read and use the diary.

In response to these concerns, the Branch for Research and Program Development in the BLS Division of Consumer Expenditure Surveys chartered the Redesign and Analysis of Diary (RAD) team to develop a more attractive and appealing CED that would be less burdensome to complete. The first step in the process was to identify the many graphical features that might be used to guide respondents through a diary. Color, icons, highlighting, and shading were all considered as tools that could clarify the respondents' task and help them report information fully and accurately.

Working with a contractor, the RAD team developed three prototype diaries that were ready for evaluation by the spring of 2001. The prototypes were distinguished by the color of their covers, their internal structure, and their length.

Prototype 1 (the peach diary), also entitled "Your Daily Notebook," was identical to the current BLS production diary, but was reformatted with icons, color, and a portrait, booklike orientation. It was divided into seven days, within which were five major expenditure categories. Within each category were several subcategories identifying subsets of expenditures that should be recorded. Because of its peach-colored cover, Prototype 1 was referred to as the peach "current" diary. (See exhibit 3.) The copious subcategorization of expenditures rendered the peach diary the longest of the three, at 144 pages.

Prototype 2 (the yellow diary), entitled "Track How You Spend Your Money; also was divided into 7 days. As with the peach diary, all the expenditure categories and subcategories were repeated every day, with tabs indicating where each day began. Expenditures were recorded on the day of purchase and under the correct descriptive category. The difference between this diary and the peach "Current" diary was that in the former there were fewer subcategories within the major expenditure categories. Because of its yellow cover, Prototype 2 was referred to as the yellow "day" diary. (See exhibit 4.) With fewer subcategories, it was 132 pages long.

Prototype 3 *(*the teal diary), entitled "Your Daily Notebook," was divided into four major expenditure categories, instead of the days of the week. Respondents recorded purchases under the correct expenditure category, along with the day on which they were purchased. Because of its teal cover, Prototype 3 was referred to as the teal "parts" diary. (See exhibit 5.) By eliminating the repetition of the 7 days, it was the shortest of the prototypes, at only 36 pages.

The first step in the process of evaluating the strengths and weaknesses of each version of the diary was to submit all three to knowledgeable BLS staff for review.[2] The comments generated by this review process ranged from the correction of typos to more profound concerns about missing data elements and the quality of the data. The initial process of internal review resulted in the elimination of the peach "current" diary, which was almost universally disliked because of its length and complexity. This left the RAD team with two viable prototypes.

Round 1: Evaluation of Prototypes 2 and 3

Beginning in June, 2001, copies of the yellow and teal prototype diaries were distributed to 15 U.S. Census Bureau interviewers known as field representatives, 90 BLS staff and summer interns from the Office of Prices and Living Conditions and the Office of Survey Methods Research, and 11 managers and staff from the Census Bureau. The prototype diaries were randomly assigned, with roughly half of the participants receiving a yellow "day" diary and half receiving a teal "parts" diary.

All participants were asked to keep the assigned diary for their entire consumer unit for 1 week. In addition, the field representatives completed a short questionnaire developed by the Census Bureau, which they mailed to the RAD team at BLS, along with comments written in the margins of their diaries. All other BLS and Census Bureau participants took part in discussion groups to talk about their experiences using the diary, to identify potential problems, and to brainstorm ideas for improvements.

In total, the RAD team conducted 12 discussion sessions with 6 to 13 participants per session and a small-group interview with three Census Bureau managers. In each of the groups, there was a mix of participants, some of whom kept the yellow diary, and some, the teal diary. In this way, participants were able to discuss the relative merits of the two versions.

The strategy of choosing knowledgeable BLS and Census Bureau staff as participants in the first round of study was selected for many reasons. First, it was a way to generate interest in the new diary by disseminating information about proposed changes. Second, it provided BLS subject-matter experts and Census Bureau field staff with an opportunity to comment on the prototypes and to help determine the design of the new diary. Third, it was a chance to draw upon the expertise of those who know what data the diary should collect and to critique the prototypes in light of the estimates they would produce.

While each discussion group had its own unique flavor and focus of interest, the comments made throughout were remarkably similar. Unanimity on

[2] The first rounds of internal BLS evaluation included reviews by staff in the Consumer Expenditure Program, the Consumer Price Index Program, and the Office of Survey Methods Research.

certain key points was highly reassuring and made it relatively easy to decipher the main themes conveyed in many different ways.

As regards the yellow "day" diary, participants reported that having the diary divided by day of the week helped them to recall their purchases. However, at 132 pages, this version was still bulky, repetitive, and somewhat difficult to navigate and use.

The teal "parts" diary was more problematic. While it was considerably shorter and easier to manage, participants reported that they missed the day-of-purchase structure in attempting to recall their expenses. Apparently, these memories were not classified internally by expenditure category, but rather were associated with the activities of the day of the week.

The main results from the first round of study found their fullest expression in the following list of recommendations generated by the participants:

- Clarify the instructions, recording rules, and definitions for both prototype diaries; provide a set of "frequently asked questions" (FAQs).
- Eliminate the subcategories and simplify the recording task in the yellow "day" diary.
- Expand the examples and avoid needless repetition of examples in both diaries; use the pages with examples to convey as much new information as possible.
- Organize the teal "parts" diary by day of the week, as done in the yellow "day" diary.
- Make the yellow "day" diary as compact as possible, with a length similar to that of the 36-page teal "parts" diary.
- Provide a "mental map"—an overview of all the major categories—at the beginning of the diary so that respondents do not have to study the entire booklet in order to understand what lies ahead.
- Tell respondents about any expenses that should not be recorded.
- Use check boxes to collect followup details, such as the type of packaging for groceries or the type of meal eaten away from home.
- Make the diary look easy and user friendly, yet, at the same time, maintain a professional and official quality.

While these recommendations were directed specifically toward the development of a new prototype, other comments surfaced that addressed the overall task of keeping a diary:

1. *Keeping a diary is a difficult memory task*.
   - It is often difficult to remember to record expenditures in the diary.
   - If expenditures are not recorded close to the time of purchase, they generally become increasingly difficult to report accurately.
   - If a diary is not portable, it is sometimes difficult to remember what was purchased and what the price was by the time one returns home.
2. *Reporting for other people is difficult*.
   - Family members other than the respondent are less diligent about tracking their expenses and reporting them than the respondent is.
   - Family members other than the respondent may become irritated and annoyed when asked about their spending.
   - Adolescents are often uncomfortable and uncooperative about reporting their expenditures to their parents.
   - Household members not directly instructed by the FR tend to make more reporting errors.
3. *Mathematical calculations are difficult*.
   - It is often difficult to compute prices (with or without sales tax), even with the aid of a receipt.
   - Many respondents are unable to figure out the price of a purchase if a receipt for that purchase does not clearly specify discounted coupon amounts and sale prices.
   - Rebates also are difficult to compute and record.

Taking into account all of this information, the RAD team turned to expenditure diaries from other countries for ideas on how to apply what was learned. Many international diaries had appealing designs, but the diary used by the Household Budget Survey Program from the United Kingdom seemed to fit most closely the needs described by our study participants and answered many of their objections. The U.K. diary included check-box-style columns for followup details, a day-of-the-week structure with only five major categories each day, and an attractive, yet professional-looking, design. Consequently, the RAD team designed a new "Prototype 4" diary in the same vein as the one from the United Kingdom,[3] but incorporating additional beneficial features specified by BLS participants. (See exhibit 6.) For example, Prototype 4 included a "mental map" at the beginning of the diary, explaining its overall structure (exhibit 7), as well as expanded example pages (exhibit 8) and a series of FAQs addressing the most common recording difficulties that arose during the study (exhibit 9). Among the last were the following:

- How detailed should my descriptions be?

[3] The major categories in BLS Prototype 4 are (a) "food and drinks from grocery and other stores," (b) "catered events and meal plans," (c) "food and drinks from grocery and other stores," (d) "clothing, shoes, jewelry, and accessories," and (e) "all other products, services, and expenses."

- How should I record multiple purchases?
- How should I record prepayments, such as a subway fare card?
- How should I record credit card purchases?
- Should I record automatic deductions taken from my paycheck or bank account?
- Should I record typical monthly bills?
- What should I do when I use coupons, discount cards, or loyalty cards?
- Can I just give you receipts instead of writing the information down?
- How should I record items if I don't know whether they include tax?
- What if I make a contribution or a charitable donation?
- What about gift certificates or gift cards?
- What do I do about returns and exchanges?
- Should I record subsidized and reimbursed expenses?
- What should I do about shipping and handling costs?
- What's the difference between a concession stand and a mobile vendor?

Round 2: Evaluation of Prototype 4

Even though Prototype 4 was developed from information gathered during the first round of study, the new design still needed to be evaluated to identify both its strengths and weaknesses. A five-pronged strategy was formulated for a second round of study:

- Eight diaries were posted throughout the Division of Consumer with a request for review and comment.
- Fifteen diaries were mailed to the same Census Bureau FRs who participated from the first round of study, along with a short questionnaire to target key questions of interest.
- Fourteen diaries were distributed to a subgroup of BLS staff who participated in the first round of study, so that they could participate in another 2-hour review session comparing the prototypes.
- Fourteen diaries were distributed to staff of the Office of Prices and Living Conditions and the Office of Survey Methods Research who had *not* participated in the first study, so that they could record their expenditures for a week and participate in an interview.
- Twenty diaries were distributed to members of the public, so that they could record their expenditures for a week and participate in an interview.

During the course of the study, the participants mentioned several features of the new diary that they especially liked and found helpful: (a) The division of the diary into days of the week, (b) the book's graphical design and layout, (c) the FAQs, (d) the lists of products and services used as examples within each major category, and (e) the new example pages with more sample entries and information boxes used to highlight reporting details.

Participants also identified concepts and instructions that still needed to be clarified:

1. Some participants remained unsure how to record multiple purchases of the same item (for example, five cartons of yogurt). To resolve this uncertainty, an additional FAQ was included: "How should I record multiple quantities?"

2. In keeping with the requirements of the Consumer Price Index, respondents were told in the instructions not to record expenses incurred when they were away overnight. However, almost every participant in the study supplied a different interpretation of what being "away overnight" meant. To standardize reports, it was recommended that this instruction be clarified and highlighted in interviewer training sessions.

3. The diaries instructed respondents to record each meal that was eaten as "Food & Drinks from Food Service Places" as either "breakfast, lunch, dinner, or snack/other." However, only 72 percent of the meals from food service places recorded in Prototype 2 and Prototype 3 during round 1 of the study specified any one of the four types of meals listed. Similarly, low percentage also has been cited as one of the flaws of the current CED. One goal of the redesign project was to reduce the amount of information, including the number of records having to do with meals, that needed to be imputed because of missing data. Because this same error occurred in a number of diaries kept by Census Bureau field representatives, it was decided that the place to begin would be with improved interviewer training. In addition, Prototype 4 was redesigned to include check boxes for "breakfast, lunch, dinner, or snack/other" in order to standardize reporting and reduce the information burden on respondents. (See exhibit 10.)

4. The Consumer Price Index program requires additional information about grocery purchases, including whether the items are fresh, frozen, bottled, canned, or other. An ever-increasing variety of types of packaging, however, makes these distinctions difficult to describe and burdensome to use. Many of the par-

ticipants in the study requested more clarification of these distinctions, and it became clear that two separate questions had become intertwined in the minds of the respondents:

Question 1—

- How is the food packaged? That is, does it come in a can, a bottle, or some other type of packaging?

Question 2—

- Is the food fresh, frozen, or in some other condition?

To make explicit the twin possibilities that fresh food may be packaged (for example, fresh tomatoes may be wrapped in cellophane) and frozen food may be canned (for example, frozen orange juice may be sold in a can), the two followup questions were placed into two separate columns together with checkboxes. (See exhibit 6.)

These and other observartions collected during the evaluation phase of round 2 of the study translated into many small ideas for correcting minor flaws and tiny oversights—the traditional "tweaking." The overwhelming message, however, was that Prototype 4 is a user-friendly, attractive, and professional-looking data collection instrument.

Next steps

The final steps in the creation of the user-friendly expenditure diary involve

- transforming Prototype 4 into an image-scannable document according to Census Bureau specifications,
- updating interviewer training to mirror design changes in the diary, and
- conducting a field test to assess the effect of changes to the diary.

Producing an image scannable document. Because the Census Bureau has updated its system of managing and processing paper forms, it is now possible to move away from the old procedure of using microfiche to preserve documents. The goal is to produce paper forms, including diaries, that can be scanned into an electronic image. Data would be keyed directly from the computer image, which would also serve as the archived document, replacing microfiche.

In order to meet the demands of this automated process, the user-friendly diary must also be converted into a processing-friendly document. In other words, the final formatted diary must fit the color, font, and size constraints of the processing system's specifications. This work has been undertaken by the Census Bureau's Forms Design Office.

Updating interviewer training. As the new diary prototypes were being developed, it became apparent that certain aspects of the diary-keeping task needed more emphasis during interviewer training. For instance, BLS suggested that interviewer training needed to include more explanations and practice (1) identifying which "overnight" expenses should not be recorded, (2) specifying the different types of meals, and (3) explaining why the diary has a day-of-the-week structure, but the additional overflow pages do not.

Also, because many of the diary's new design features would be unfamiliar to the interviewers, a new training manual and procedures for both self-study and classroom study needed to be developed. Among the new features that required instructions were the following:

- FAQs
- example pages with information boxes
- check boxes
- pockets for receipts
- a daily reminder list

In addition, because the new diary will incorporate a computerized introductory segment to collect the household demographic details, new training on the computer will be required.

Conducting a field test. In September 2002, a field test was scheduled to assess the feasibility of using the new user-friendly diary and to evaluate the effects upon estimates and response rates. The redesigned diary will be placed in nine census regions for 4 months; it is anticipated that 1,600 completed diaries will be collected. These diaries will be analyzed and compared with those obtained from a control group, as well as with the regularly produced diaries.

The four main goals of the field test are as follows:

- to determine whether the new user-friendly diary yields higher response rates than those generated by the current production diary;
- to test whether there is a statistically significant difference between the estimates produced by the new diary, and those obtaintained from the curent production diary;
- to evaluate the user friendliness of the new diary in terms of the burden it places on respondents (for example, the length of time the respondent needs to complete the diary and the difficulty respondents experience in completing it); and
- to test the operation of the computerized segments of the data collection and operational control processes.

Only at the end of these final steps will we know whether BLS has, in fact, created a user-friendly diary that is at the same time "processing friendly," "image friendly," and "data quality friendly." If the final verdict is affirmative, the new user-friendly diary will be implemented in 2004. ■

Exhibit 1: Navigation problems in the former BLS expenditure diary

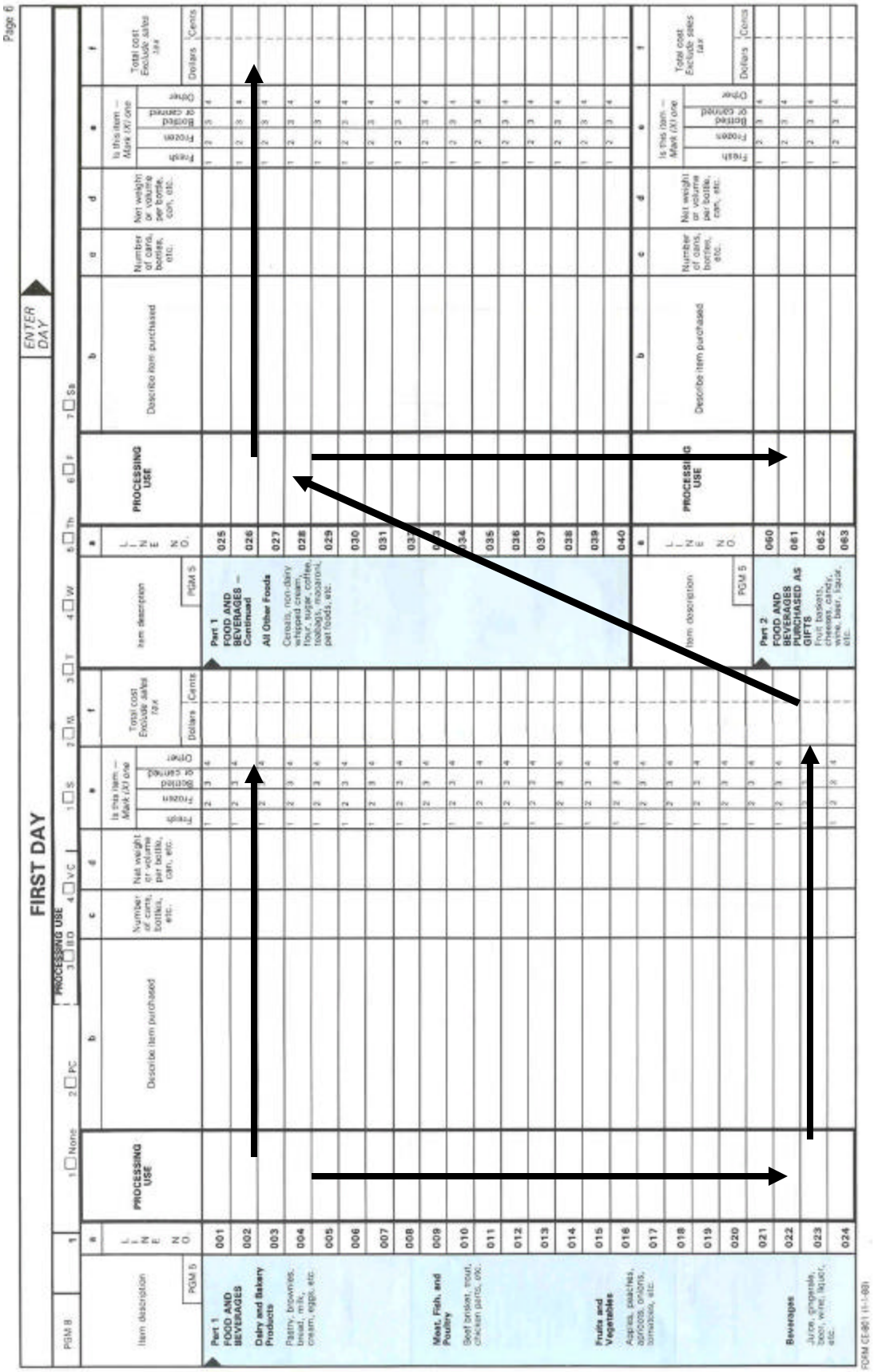


Exhibit 2: Instructions from the current BLS diary

INSTRUCTIONS

I. HOW IS THE CONSUMER EXPENDITURE DIARY USED?

The Consumer Expenditure Diary Survey is sponsored by the Bureau of Labor Statistics and is used to collect information on household expenditures. Data collected from the Diary enable government agencies and private corporations to:

- Calculate the Consumer Price Index (inflation rate) by identifying current American buying habits
- Help to develop economic policies such as: school programs and retirement benefits

II. GENERAL INSTRUCTIONS

Use this form to record **all your consumer unit's expenses** for the 7-day period indicated on the front page. Beginning on page 11 there are 7 pages for each day. Record each day's expenses on the appropriate pages under the most appropriate heading. The day should be entered at the top of the page as shown in the example below:

ENTER DAY OF THE WEEK ▶ Tuesday

III. WHO TO INCLUDE (CONSUMER UNIT)

Record ALL purchases and expenses for the following persons:

☐ All members of this household

OR

☐ The following persons

_____

_____

_____

The persons listed above are the members of your Consumer Unit (CU).

IV. BEST TIME TO RECORD

Most people find that keeping the diary is easiest if they record their purchases as soon as they return home from the store. Each day, the person who keeps this diary should check with their consumer unit members to obtain their expenditures during that day.

V. WHAT TO REPORT

Please use this diary to record purchases or expenses, no matter how small or inexpensive they are.

INCLUDE items such as:

- Food Away from Home such as costs for all snacks, beverages, and meals purchased at restaurants, carry-outs, vending machines, etc.
- Food for Home Consumption
- Non Food items such as clothing, shoes, jewelry, personal care items and services, medicines, and appliances
- Food and nonfood items purchased as gifts. A gift is any item purchased for someone other than those persons listed as CU members
- Any items rented such as tuxedos, videos, cars, etc.
- Any items purchased by catalog sales or mail orders

DO NOT INCLUDE these items:

- Expenses of CU members while they are away from home overnight
- Business or farm operating expenses
- Sales tax in the cost of the item, except for Food Away from Home

CREDIT CARDS

- If an item is purchased on credit through a charge account, record the full cost of the item on the day it is purchased. Do not record payments made on billing statements for items purchased on credit or through a charge account.

Exhibit 3: The peach "Current" diary

Day 1: _____

Grocery Food Items

Fruits and fruit juices — *Apple, banana, orange, orange juice, strawberries, kiwi, blueberries, tangerine, cantaloupe, etc.*

No.	What did you buy?	Is this item... (X one) fresh	frozen	bottled or canned	other	Total cost? Without sales tax dollars	cents
244.		❑	❑	❑	❑		.
245.		❑	❑	❑	❑		.
246.		❑	❑	❑	❑		.
247.		❑	❑	❑	❑		.
248.		❑	❑	❑	❑		.
249.		❑	❑	❑	❑		.
250.		❑	❑	❑	❑		.
251.		❑	❑	❑	❑		.

Vegetables and vegetable juices — *Lettuce, tomatoes, tomato juice, potatoes, beans, corn, collard greens, peas, etc.*

No.	What did you buy?	Is this item... (X one) fresh	frozen	bottled or canned	other	Total cost? Without sales tax dollars	cents
252.		❑	❑	❑	❑		.
253.		❑	❑	❑	❑		.
254.		❑	❑	❑	❑		.
255.		❑	❑	❑	❑		.
256.		❑	❑	❑	❑		.
257.		❑	❑	❑	❑		.
258.		❑	❑	❑	❑		.
259.		❑	❑	❑	❑		.
260.		❑	❑	❑	❑		.
261.		❑	❑	❑	❑		.

Form CE-801 (2-01)

10

Exhibit 4: The yellow "Day" diary

Day 3

Food and Drinks Purchased from Grocery and Other Stores

Examples
Cereal
Cookies
Crackers
Doughnuts
Pasta
Pies
Rice
Rolls
Wheat bread

Flour, cereal, bakery products and other grain products

No.	What did you buy?	Is this item... (X one) fresh	frozen	bottled or canned	other	Total cost? Without sales tax dollars	cents	Check if this was for someone NOT on your list
	Cake mix	☐	☐	☐	☒	2	50	☐
201.		☐	☐	☐	☐			☐
202.		☐	☐	☐	☐			☐
203.		☐	☐	☐	☐			☐
204.		☐	☐	☐	☐			☐
205.		☐	☐	☐	☐			☐
206.		☐	☐	☐	☐			☐
207.		☐	☐	☐	☐			☐
208.		☐	☐	☐	☐			☐
209.		☐	☐	☐	☐			☐
210.		☐	☐	☐	☐			☐

Examples
Bacon
Canned ham
Chicken parts
Ground beef
Hot dogs
Pork chops
Round roast
Shrimp

Beef, poultry, pork, seafood, and other meats

No.	What did you buy?	Is this item... (X one) fresh	frozen	bottled or canned	other	Total cost? Without sales tax dollars	cents	Check if this was for someone NOT on your list
	Chuck roast	☒	☐	☐	☐	7	45	☐
211.		☐	☐	☐	☐			☐
212.		☐	☐	☐	☐			☐
213.		☐	☐	☐	☐			☐
214.		☐	☐	☐	☐			☐
215.		☐	☐	☐	☐			☐

43

Form CE-801 (2-8-01)

Exhibit 5: The teal "Parts" diary

Food and Drinks Purchased from Grocery and Other Stores

Food and drinks (Both alcoholic and non-alcoholic)

Examples
Apples
Baby food
Bacon
Beer
Butter
Dog food
Peanut butter
Potato salad
Round roast
Wheat bread

No.	Day	What did you buy?	Is this item... (X one) fresh	frozen	bottled or canned	other	Total cost? *Without sales tax* dollars	cents	Check if this was for someone NOT on your list
	Tuesday	Boxed Chocolate Cake mix	☐	☐	☐	☒	2	50	☐
201.			☐	☐	☐	☐			☐
202.			☐	☐	☐	☐			☐
203.			☐	☐	☐	☐			☐
204.			☐	☐	☐	☐			☐
205.			☐	☐	☐	☐			☐
206.			☐	☐	☐	☐			☐
207.			☐	☐	☐	☐			☐
208.			☐	☐	☐	☐			☐
209.			☐	☐	☐	☐			☐
210.			☐	☐	☐	☐			☐
211.			☐	☐	☐	☐			☐
212.			☐	☐	☐	☐			☐
213.			☐	☐	☐	☐			☐
214.			☐	☐	☐	☐			☐
215.			☐	☐	☐	☐			☐

13

Form CE-801 (2-8-01)

Exhibit 6: Prototytpe 4

SUN MON TUE WED THU FRI SAT **Day 1**

Please unfold the RIGHT FLAP to see Frequently Asked Questions

3. Food & Drinks from Grocery and Other Stores

	What did you buy or pay for?	How is the item packaged? bottled / canned	How is the item packaged? other	Is the item: fresh	Is the item: frozen	Is the item: other	Total Cost without tax	Mark (X) if purchased for someone not on your list
301.								
302.								
303.								
304.								
305.								
306.								
307.								
308.								
309.								
310.								
311.								
312.								
313.								
314.								
315.								
316.								
317.								
318.								
319.								
320.								
321.								
322.								
323.								
324.								
325.								
326.								

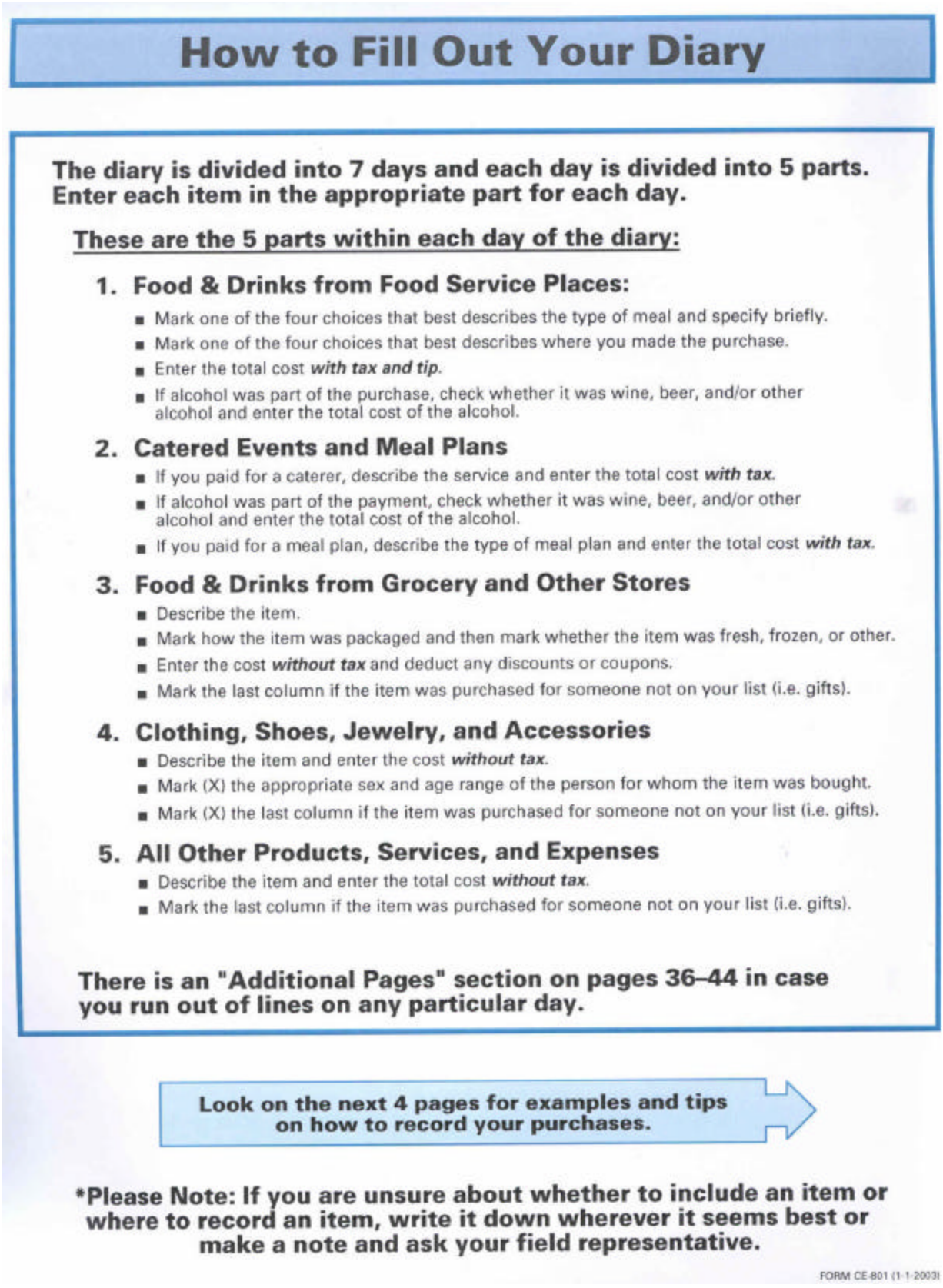
If there are not enough lines in this part, please continue recording your expenses on pages 38 – 41.

06037082700169260 080101

9

FORM CE-801

Exhibit 7: The "mental map" in Prototype 4



How to Fill Out Your Diary

The diary is divided into 7 days and each day is divided into 5 parts. Enter each item in the appropriate part for each day.

These are the 5 parts within each day of the diary:

1. **Food & Drinks from Food Service Places:**
   - Mark one of the four choices that best describes the type of meal and specify briefly.
   - Mark one of the four choices that best describes where you made the purchase.
   - Enter the total cost ***with tax and tip***.
   - If alcohol was part of the purchase, check whether it was wine, beer, and/or other alcohol and enter the total cost of the alcohol.
2. **Catered Events and Meal Plans**
   - If you paid for a caterer, describe the service and enter the total cost ***with tax***.
   - If alcohol was part of the payment, check whether it was wine, beer, and/or other alcohol and enter the total cost of the alcohol.
   - If you paid for a meal plan, describe the type of meal plan and enter the total cost ***with tax***.
3. **Food & Drinks from Grocery and Other Stores**
   - Describe the item.
   - Mark how the item was packaged and then mark whether the item was fresh, frozen, or other.
   - Enter the cost ***without tax*** and deduct any discounts or coupons.
   - Mark the last column if the item was purchased for someone not on your list (i.e. gifts).
4. **Clothing, Shoes, Jewelry, and Accessories**
   - Describe the item and enter the cost ***without tax***.
   - Mark (X) the appropriate sex and age range of the person for whom the item was bought.
   - Mark (X) the last column if the item was purchased for someone not on your list (i.e. gifts).
5. **All Other Products, Services, and Expenses**
   - Describe the item and enter the total cost ***without tax***.
   - Mark the last column if the item was purchased for someone not on your list (i.e. gifts).

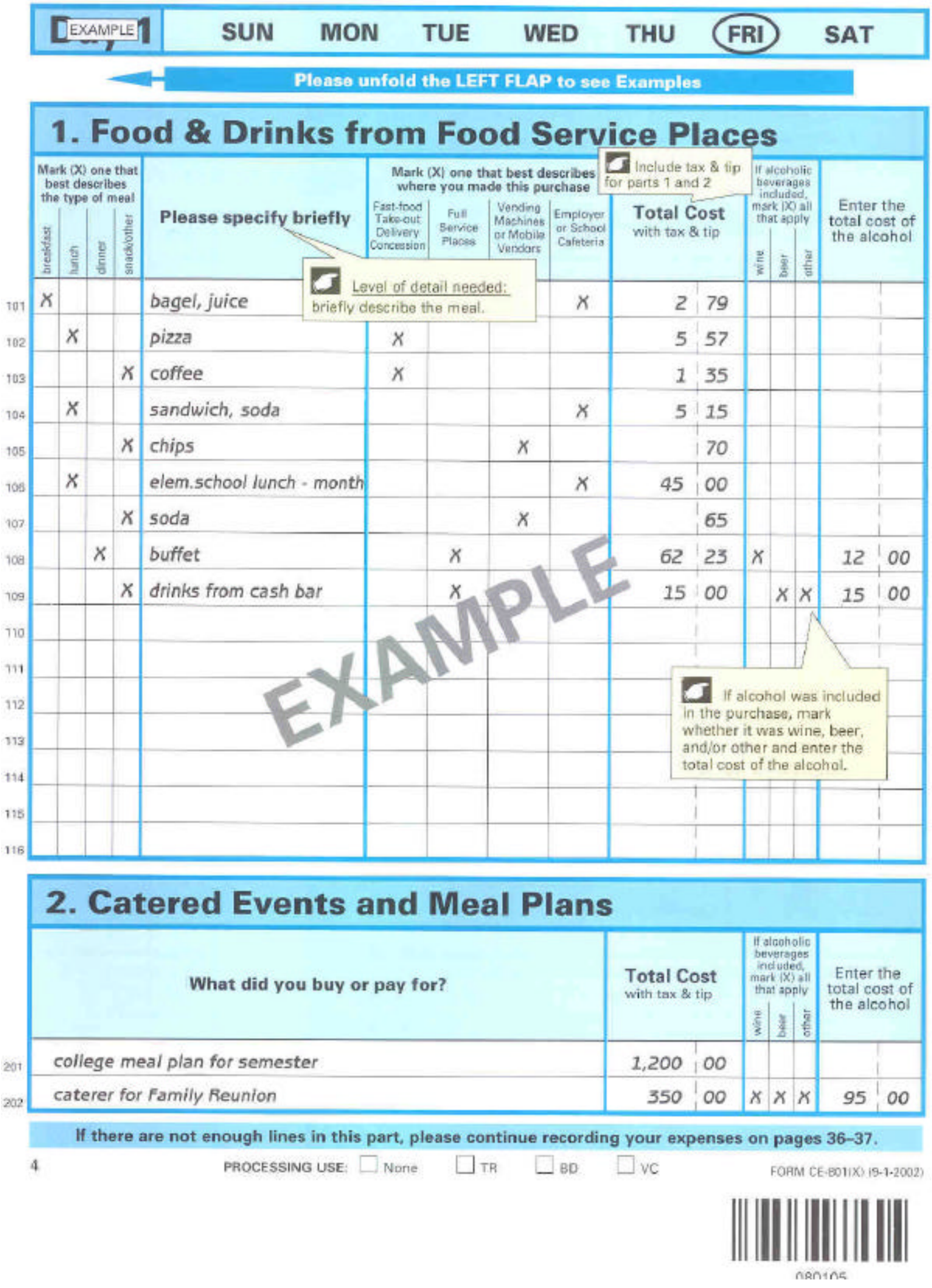
There is an "Additional Pages" section on pages 36–44 in case you run out of lines on any particular day.

Look on the next 4 pages for examples and tips on how to record your purchases.

***Please Note: If you are unsure about whether to include an item or where to record an item, write it down wherever it seems best or make a note and ask your field representative.**

FORM CE-801 (1-1-2003)

Exhibit 8: An example page in Prototype 4



EXAMPLE 1 — SUN MON TUE WED THU (FRI) SAT

Please unfold the LEFT FLAP to see Examples

1. Food & Drinks from Food Service Places

Include tax & tip for parts 1 and 2

	Mark (X) one that best describes the type of meal: breakfast	lunch	dinner	snack/other	Please specify briefly	Mark (X) one that best describes where you made this purchase: Fast-food Take-out Delivery Concession	Full Service Places	Vending Machines or Mobile Vendors	Employer or School Cafeteria	Total Cost with tax & tip	If alcoholic beverages included, mark (X) all that apply: wine	beer	other	Enter the total cost of the alcohol
101	X				bagel, juice				X	2 79				
102		X			pizza	X				5 57				
103				X	coffee	X				1 35				
104		X			sandwich, soda				X	5 15				
105				X	chips			X		70				
106		X			elem.school lunch - month				X	45 00				
107				X	soda			X		65				
108			X		buffet		X			62 23	X			12 00
109				X	drinks from cash bar		X			15 00		X	X	15 00
110														
111														
112														
113														
114														
115														
116														

Level of detail needed: briefly describe the meal.

If alcohol was included in the purchase, mark whether it was wine, beer, and/or other and enter the total cost of the alcohol.

EXAMPLE

2. Catered Events and Meal Plans

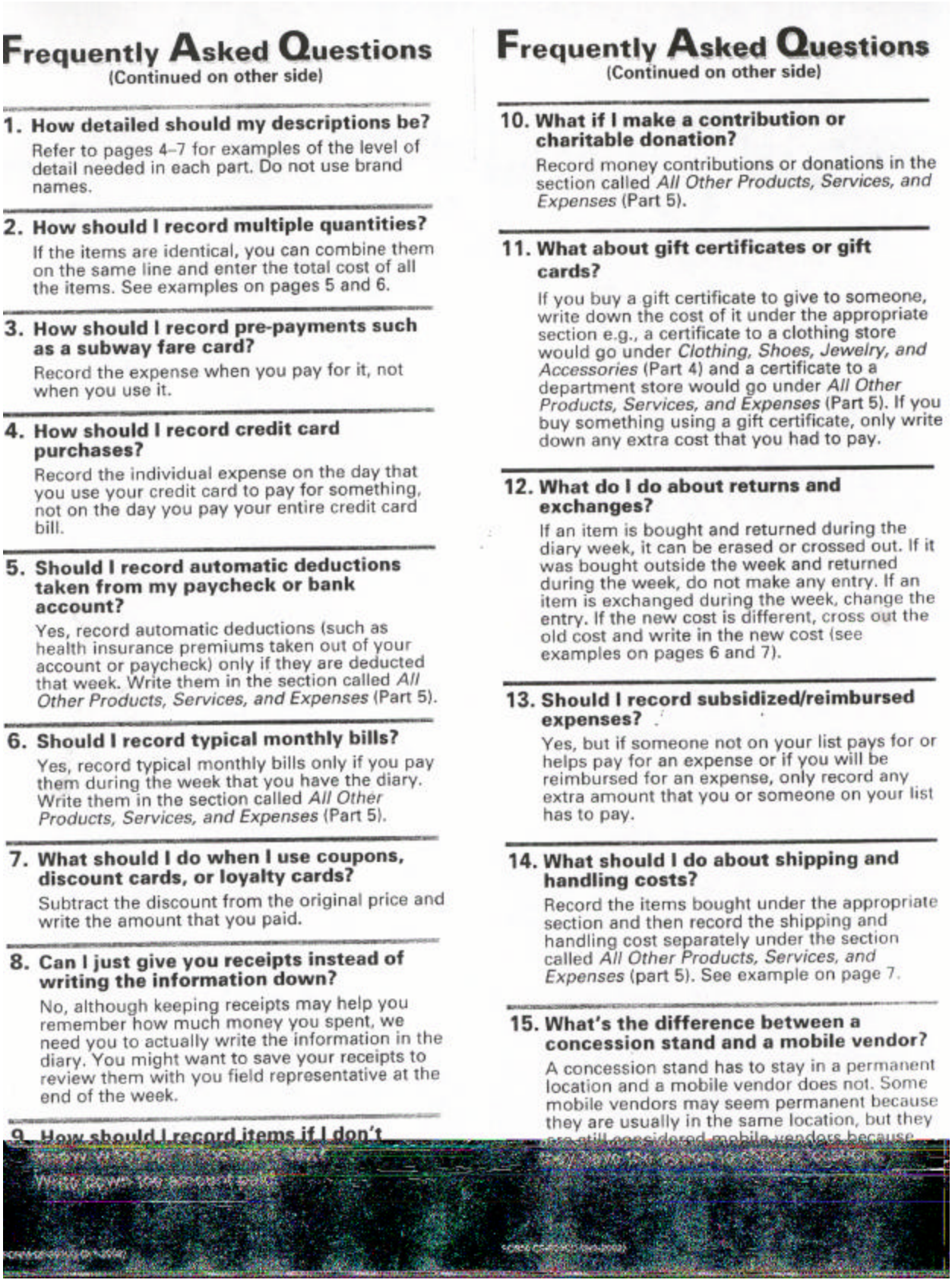
	What did you buy or pay for?	Total Cost with tax & tip	If alcoholic beverages included, mark (X) all that apply: wine	beer	other	Enter the total cost of the alcohol
201	college meal plan for semester	1,200 00				
202	caterer for Family Reunion	350 00	X	X	X	95 00

If there are not enough lines in this part, please continue recording your expenses on pages 36–37.

4 PROCESSING USE: ☐ None ☐ TR ☐ BD ☐ VC FORM CE-801(X) (9-1-2002)

080105

Exhibit 9: The "Frequently Asked Questions" in Prototype 4



Frequently Asked Questions
(Continued on other side)

1. How detailed should my descriptions be?

Refer to pages 4–7 for examples of the level of detail needed in each part. Do not use brand names.

2. How should I record multiple quantities?

If the items are identical, you can combine them on the same line and enter the total cost of all the items. See examples on pages 5 and 6.

3. How should I record pre-payments such as a subway fare card?

Record the expense when you pay for it, not when you use it.

4. How should I record credit card purchases?

Record the individual expense on the day that you use your credit card to pay for something, not on the day you pay your entire credit card bill.

5. Should I record automatic deductions taken from my paycheck or bank account?

Yes, record automatic deductions (such as health insurance premiums taken out of your account or paycheck) only if they are deducted that week. Write them in the section called *All Other Products, Services, and Expenses* (Part 5).

6. Should I record typical monthly bills?

Yes, record typical monthly bills only if you pay them during the week that you have the diary. Write them in the section called *All Other Products, Services, and Expenses* (Part 5).

7. What should I do when I use coupons, discount cards, or loyalty cards?

Subtract the discount from the original price and write the amount that you paid.

8. Can I just give you receipts instead of writing the information down?

No, although keeping receipts may help you remember how much money you spent, we need you to actually write the information in the diary. You might want to save your receipts to review them with you field representative at the end of the week.

9. How should I record items if I don't

Frequently Asked Questions
(Continued on other side)

10. What if I make a contribution or charitable donation?

Record money contributions or donations in the section called *All Other Products, Services, and Expenses* (Part 5).

11. What about gift certificates or gift cards?

If you buy a gift certificate to give to someone, write down the cost of it under the appropriate section e.g., a certificate to a clothing store would go under *Clothing, Shoes, Jewelry, and Accessories* (Part 4) and a certificate to a department store would go under *All Other Products, Services, and Expenses* (Part 5). If you buy something using a gift certificate, only write down any extra cost that you had to pay.

12. What do I do about returns and exchanges?

If an item is bought and returned during the diary week, it can be erased or crossed out. If it was bought outside the week and returned during the week, do not make any entry. If an item is exchanged during the week, change the entry. If the new cost is different, cross out the old cost and write in the new cost (see examples on pages 6 and 7).

13. Should I record subsidized/reimbursed expenses?

Yes, but if someone not on your list pays for or helps pay for an expense or if you will be reimbursed for an expense, only record any extra amount that you or someone on your list has to pay.

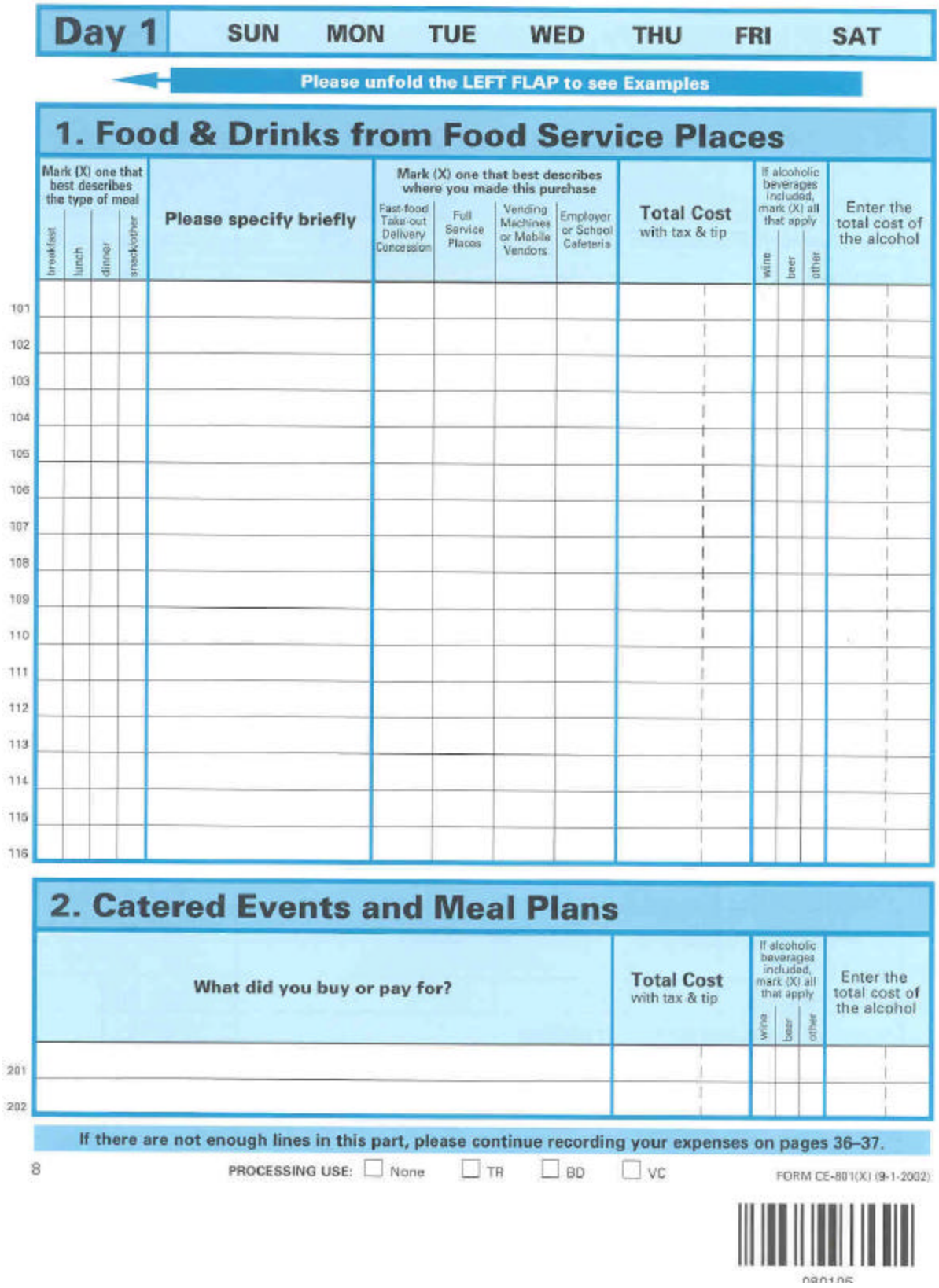
14. What should I do about shipping and handling costs?

Record the items bought under the appropriate section and then record the shipping and handling cost separately under the section called *All Other Products, Services, and Expenses* (part 5). See example on page 7.

15. What's the difference between a concession stand and a mobile vendor?

A concession stand has to stay in a permanent location and a mobile vendor does not. Some mobile vendors may seem permanent because they are usually in the same location, but they

Exhibit 10: The "food from food service places" page in Prototype 4



Day 1 SUN MON TUE WED THU FRI SAT

Please unfold the LEFT FLAP to see Examples

1. Food & Drinks from Food Service Places

	Mark (X) one that best describes the type of meal: breakfast	lunch	dinner	snack/other	Please specify briefly	Mark (X) one that best describes where you made this purchase: Fast-food Take-out Delivery Concession	Full Service Places	Vending Machines or Mobile Vendors	Employer or School Cafeteria	Total Cost with tax & tip	If alcoholic beverages included, mark (X) all that apply: wine	beer	other	Enter the total cost of the alcohol
101														
102														
103														
104														
105														
106														
107														
108														
109														
110														
111														
112														
113														
114														
115														
116														

2. Catered Events and Meal Plans

	What did you buy or pay for?	Total Cost with tax & tip	If alcoholic beverages included, mark (X) all that apply: wine	beer	other	Enter the total cost of the alcohol
201						
202						

If there are not enough lines in this part, please continue recording your expenses on pages 36–37.

8 PROCESSING USE: ☐ None ☐ TR ☐ BD ☐ VC FORM CE-801(X) (9-1-2002)

0801105

Computer-Assisted Personal Interviewing for the Consumer Expenditure Interview Survey

LINDA SIOUX GROVES

Beginning in April 2003, the Consumer Expenditure (CE) Interview survey will be conducted by computer-assisted personal interviewing (CAPI). The survey will continue to be conducted in person by U.S. Census Bureau interviewers in the respondent's home; however, the interviewer will administer the questions and record the answers on a laptop computer in place of the current paper-and-pencil questionnaire. This article describes the process whereby the CE CAPI questionnaire was designed and developed and discusses some of the benefits expected to be realized from CAPI data collection in the areas of data quality, operational efficiency, and opportunities for future improvements.

Design and development of CAPI

The Census Bureau collects the data for the CE Survey under contract with the Bureau of Labor Statistics (BLS). The administration of the survey is very much a collaborative effort between the two agencies. Discussions and planning regarding converting the CE Interview Survey to CAPI began in 1997. The Census Bureau was already collecting several other surveys in CAPI mode at that time, including the Current Population Survey and the Health Interview Survey. However, all of the CAPI surveys being collected by the Census Bureau, as well as all the peripheral systems that support collection activities, such as the Case Management System, had been developed in a DOS computing environment. The availability of new instrument-authoring software and more powerful laptops led to an early decision that CE CAPI would be developed in a Microsoft Windows® environment. The authoring software chosen was Blaise, which was developed by Statistics Netherlands and is in wide use in Europe and in other U.S. survey organizations.

The CE CAPI development project was an interagency effort, with management representatives from both BLS and the Census Bureau serving on the CAPI Steering Group (CSG). The steering group developed the strategic plan for the project and chartered numerous working teams that were then assigned to establish instrument design standards, write specifications, program and test the CAPI instrument and related systems, develop a new Case Management System, establish new-interviewer training, and plan a large "dress rehearsal" to assess the impact of CAPI on CE estimates. The steering group approved the project plans for each of the teams, facilitated communication among teams, and monitored progress throughout the project. Among the goals of the Census Bureau were (1) to use the CE CAPI development process to set Windows® stan-

Linda Sioux Groves is Chief, Division of Consumer Expenditure Surveys, Bureau of Labor Statistics.

dards for any future CAPI development of other surveys and (2) to create a Case Management System that all of the surveys that the Census Bureau administers could use. The latter aim was important because Census Bureau interviewers typically work on many different surveys.

A great emphasis was placed on testing during the CE CAPI development process, with numerous different kinds of tests designed to accomplish various goals. During the design standards stage, instrument prototypes were developed and examined by experts from several survey organizations. Once basic design features, such as colors and fonts, were established, development of the CE instrument began. The decision was made to program the questionnaire, which consists of 22 sections roughly corresponding to different topics, in three modules.

The first module consisted of sections of the questionnaire representing as many different design issues as possible. For example, it included sections in which the interviewer reads long lists of items to the respondent, sections wherein screening questions are used to skip the respondent to the correct set of detailed questions, and sections in which reported data from the previous interview are used extensively. Functionality testing was done to ensure that the module met the specifications. Following this testing, a panel of Census Bureau CE data collectors was brought in to test the usability of the module. The results from these two rounds of testing and the decisions made on program design issues were then applied to the development of the next module, and the process was repeated until the entire data collection instrument was programmed. The early input from data collectors during the development process resulted in a more "interviewer-friendly" collection instrument.

Concurrently with the development of the CAPI instrument, the new Case Management System and postcollection processing system were developed and tested. Once all of these pieces were complete, they were integrated with the CAPI questionnaire and a systems test was performed. The test was used to make final adjustments to the CAPI system for the dress rehearsal.

The CE CAPI dress rehearsal began in January 2002 in all 12 Census Bureau regional offices. Lasting 9 months, with three quarterly interviews per respondent in a sample of about 3,000 households, the purpose of the dress rehearsal was to analyze the impact of CAPI on response rates and on expenditure estimates. A secondary purpose of the test was to make final adjustments to training and procedures by involving a larger pool of data collectors.

The CAPI system was fully implemented in April 2003. Interview cases that began their five-interview cycle with the paper questionnaire were converted to CAPI at that time. In an effort to ease the transition of cases from paper to CAPI, changes that were anticipated in the CAPI questionnaire were largely incorporated into the paper questionnaire in advance (during 2001). Thus, the content of the paper instrument and that of the CAPI instrument are nearly identical.

CAPI and data quality

The CE interview is long and complex and usually takes from 60 to 90 minutes to complete. In addition to collecting information on expenditures for a wide range of items, the survey collects detailed demographic and income data pertaining to consumer unit members, data on assets and liabilities, and descriptive information about expenditures for classification and bounding purposes. The interviewer is required to navigate correctly through numerous screening questions and on to the detailed questions, all the while skipping inapplicable questions. In some cases, the interviewer is required to carry forward information from one part of the survey to another and make decisions about which subsequent parts to administer or questions to ask, all on the basis of a complex decision table.

Reviews of the collected data reveal that, because of the complexity involved, interviewers sometimes make mistakes in administering the paper-and-pencil interview, resulting in inconsistencies or gaps in the reported data. If these errors are detected early enough, the interviewer may recontact the respondent to fill in the missing data. Otherwise, the errors must be resolved through postcollection editing.

One of the advantages of a CAPI collection instrument is that many of these types of data problems can be eliminated. The logic programmed into the instrument forces the interviewer to stay on the correct path and does not allow questions to be inadvertently skipped. For example, in the section of the paper questionnaire dealing with properties owned by the respondent, interviewers ask (1) one set of questions for each new property reported, (2) different sets of questions, depending on what type of mortgage the respondent has and whether there are also home equity loans on the property, and (3) yet another set of questions if the property was disposed of or the mortgage payment amount changed from what was reported in the previous interview. The CAPI instrument will ensure a more seamless flow through all of the applicable questions for each property. In addition, the instrument is able to keep track of long lists of items and ensure that the correct set of detailed questions is asked for each item. As a result, there is much less postcollection editing and error resolution with CAPI.

Another way in which CAPI will improve the quality of the data is by requiring the interviewer to verify unusually high or low values with the respondent. Range edits are programmed into the CAPI instrument, based on previously reported data. When a value outside of the allowable range for a particular item is entered, an edit message is triggered, requiring the interviewer to explicitly accept the value or change it, thus checking for typos. The interviewer is also allowed, and even encouraged, to enter textual notes to explain unusual values. An unusually high expenditure for dresses or cut flowers, for example, could be accompanied by the note "Respondent is pre-

paring for daughter's wedding." The interviewer might also use the note field to indicate uncertainty about the classification of an item. A $45,000 expenditure under "Hobbies," for instance, might be accompanied by a note "Respondent collects antique cars." Notes such as these can prove useful to analysts who examine the data later, because items with notes associated with them are flagged in the data file and the text of the notes will be stored with the data. An outlier detection system will automatically display the notes to the data reviewer.

Another feature of the CAPI instrument is that help screens will be made readily available to interviewers as they administer the questionnaire, rather than in a separate collection manual that might be difficult to consult during an interview. The CE CAPI help screens include examples, such as what to include under "small household appliances," and definitions, such as those of "PPO" and "IPA" with regard to the type of health insurance that each offers.

Finally, another way in which CAPI may improve the quality of CE data is by allowing new items to be added to the questionnaire more quickly as they enter the marketplace. This feature is highly important to one major user of CE data—the Consumer Price Index program—in terms of keeping the index as current as possible, as well as being important to CE data users in the private sector.

Operational advantages of CAPI

From a survey operations perspective, a CAPI instrument has several advantages over paper-and-pencil data collection.

Currently, interviewers send their completed CE paper questionnaires to the Census Bureau's National Processing Center in Jeffersonville, IN. There, the clerical staff checks questionnaires against a master control list, applies codes to certain items (for example, on the basis of the interviewer's description, the make and model of a vehicle are coded), and keys in and verifies the data. With the implementation of CAPI, the data are input directly into the computer with no separate keying-in step. Coding is done as the data are entered. (In the case of a vehicle's make and model, the interviewer will select the correct description from an alphabetical popup list.) Instead of physically sending paper questionnaires to a central location for processing, the data are transmitted nightly from the interviewer's home via a modem. Consequently, CAPI data collection should make the data available for tabulation sooner.

Other survey operations also will be streamlined by the conversion to CAPI. Currently, at the National Processing Center, clerical staff transcribes certain information from each completed paper questionnaire onto the next quarter's blank questionnaire and mails both back to the Census Bureau regional office, which, in turn, mails them out to the appropriate interviewer in time for the next collection cycle. The transcribed data include inventoried items, which the interviewer does not recollect each time, but rather updates with current information (for example, on properties owned), as well as expenditure data collected in the previous period and now used for bounding in the current interview. These bounding procedures minimize telescoping errors that are common in retrospective interviews and result from a tendency to report past events in the reference period of the survey. With CAPI data collection, once these data are captured in electronic form and then transmitted, an input file is created for the next quarter's interview and is transmitted directly to the interviewer's laptop.

Certain survey management and control functions will also improve under CAPI. Field supervisors can easily reassign cases to a different interviewer, if needed, simply by retransmitting information about the case. Supervisors in the field, as well as headquarters staff, can get much more timely reports on the status of data collection activities than they could using paper questionnaires.

Future improvements

Respondent burden is a significant issue for the CE Interview survey, likely contributing to underreporting of expenditures and to refusals by respondents to participate in later waves of the survey. Unfortunately, CAPI will probably not make the interview any less burdensome to the respondent, and early indications are that the interview may even take slightly longer.

However, future research might permit CAPI's capabilities to be used to streamline the interview and reduce respondent burden. More customization of the interview could be possible, based, for example, on respondents' characteristics or previously reported data. Also, the added flexibility of CAPI might allow more experimentation with global questions and randomization of topics, so that not all parts of the questionnaire would need to be asked during each wave of the survey.

CAPI will certainly afford survey researchers much more quantitative information about the interview process itself. For example, each CAPI interview produces an audit trail that allows one to "replay" the interview. This can be used to diagnose trouble spots in the interview, detect whether the interviewer jumped around in the instrument or followed the default path, and count how many times help screens were invoked or warning messages were suppressed. Similarly, timing data from the CAPI instrument can be used not only to measure overall interview length, but also to access how revisions to questions affect timing in individual sections. These are valuable tools in the CAPI instrument that are not available in a paper interview. Through them, investigators can gain a much better understanding of some of the difficulties facing interviewers, and that increased understanding will lead to further improvements in the data collection process. ■

Introducing Brackets: Quality in the Consumer Expenditure Interview Survey

GEOFFREY PAULIN

Nonresponse is a problem in surveys. Some potential participants may refuse to participate at all in a survey, while others may provide answers to some, but not all, questions asked. For those who participate at least partially, reasons for not responding to certain questions may include the sensitivity of the respondent to the question asked or simply a lack of knowledge on the part of the respondent. One situation in which either of these two reasons may be cited is when respondents are asked about income levels and sources. Some respondents may refuse to answer questions about income because they consider the matter too personal to divulge. Others may be willing to answer, but may not be able to do so completely, because they lack specific or detailed knowledge. This is often the case in "proxy reporting," wherein the respondent reports income information for another member of the consumer unit.[1] For example, a parent may not know precisely the amount of income earned by a teenaged daughter who is employed after school at a neighborhood fast-food restaurant.

In the case of complete refusal to participate in the survey, little can be done to obtain information. By contrast, as regards sensitive questions or lack of knowledge, information may be gained by allowing the respondent to give an answer that is not precise. For example, a person earning a salary of $300,000 may refuse to divulge that information precisely, but may be comfortable saying that the salary is "greater than $120,000." Similarly, the aforementioned parent may not know the precise salary of his teenaged daughter, but may know with confidence that it is "less than $5,000" per year. Prior to the second quarter of 2001, such information was lost in the Consumer Expenditure (CE) Interview survey, because the respondent could only report a value, assert "don't know," or refuse to answer. However, starting in April 2001, respondents were given the opportunity to provide an income range, or "bracket," when they were unable or unwilling to give a specific value. This article describes the collection of income data and the development of income brackets in the CE Interview survey.

Income data are collected in the second and fifth interviews for those who participate in those interviews. If the consumer unit does not complete its second interview (for example, if the family is unavailable during the survey period or if the family originally residing at the address during the second interview has moved away and the new

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[1] See "Glossary" in Appendix A at the end of this anthology for the definition of a *consumer unit*.

residents are now participating instead), the information is collected at the earliest possible interview (the third, fourth, or fifth). In either case, incomes are collected for the past year, as determined by the date of the interview. For example, a consumer unit interviewed in July 2002 would have been asked to recall income received from July 2001 to June 2002.

Data are collected on several sources of income. Some of these, such as data on wages and salaries, are collected for members of the consumer unit who are at least 14 years old. Others, such as information on interest income, are collected for the consumer unit as a whole. In addition to data on "labor" (wage and salary or self-employment) income and "nonlabor" (interest or dividend) income, information on other sources (such as alimony, child support, Food Stamps, and welfare income) also is collected. (For a complete listing of sources, see the appendix to this article.)

History of bracketing in the Interview survey

In May 1998, a 2-day seminar was held at Princeton University to discuss the utility of the CE Survey for measuring poverty and related issues. During the course of the seminar, many ideas for improving the quality of the data were proposed. One of these was to investigate the use of brackets for collecting data on income, assets, and liabilities, because these data are important, but frequently missing. Katharine G. Abraham, Commissioner of the Bureau of Labor Statistics (BLS) at the time, asked her organization's Division of Consumer Expenditure Surveys to study the feasibility of collecting bracketed data, starting with the 2000 survey.

In September 1998, a team was chartered to investigate and recommend strategies for the implementation of bracketing if it was deemed feasible. The team had two major questions to answer: first, does bracketing reduce nonresponse in practice? Second, which type or types of brackets, if any, should be used? Starting with a review of the literature on the subject, the team discovered that, as expected, bracketing was useful for collecting data, because respondents with imprecise knowledge could provide at least some information. However, one unintended consequence described in the literature is that bracketing can lead to a loss of precision, because some respondents who report bracketed data might have reported actual values if the interviewer had probed sufficiently.[2] In addition, the team reasoned that brackets would increase respondents' burden, because, without them, a respondent could simply refuse to answer or respond "I don't know," and the next question would be asked. With brackets, once either of these occurs, the interviewer attempts to collect a bracketed value. Still, the team concluded that brackets would be useful despite these concerns. For example, the loss of precision might be outweighed by an increase in overall response when brackets were used. Interestingly, the literature also supported the hypothesis that brackets do *not* seriously increase respondents' burden: although it is true that there is one more question in cases where the initial response is "I don't know" or a refusal, it also is true that a large number of those who initially respond in either of those ways is subsequently willing and able to provide a bracketed value.[3]

Constructing the brackets

Given that brackets are indeed useful in data collection, the second question becomes operative. The team discovered that there are at least two types of brackets used in practice: "conventional" brackets and "unfolding" brackets. With both types, the respondent is first asked for a specific value. If he or she is unable to provide one, then, in a conventional-bracketing framework, the respondent is asked to identify, from a predetermined list, the range in which the income or asset is likely to fall (for example, less than $5,000; $5,000 to $9,999; $10,000 to $19,999; and so forth). In an unfolding-bracketing framework, the respondent is asked a series of questions designed to elicit ranges of values. For instance, the interviewer might say, "Is it at least $5,000?" If the response is "No," then a range of less than $5,000 would be recorded. If the response is "Yes," then the respondent would be asked, "Is it at least $10,000?" If "No," then a range of $5,000 to $9,999 would be recorded. If "Yes," the respondent would be asked, "Is it at least $20,000?" If "No," then a range of $10,000 to $19,999 would be entered. If "Yes," then a response of "at least $20,000" would be recorded, and the next question in the survey would be asked. The team recommended that conventional bracketing be adopted, for a couple of reasons: first, more precise answers would be obtained. (For some sources of income, such as wages and salaries, it is likely that a large percentage of recipients could accurately respond that their income from those sources was "at least $20,000"; narrower ranges, such as $20,000 to $29,999 and so forth, allow a more precise estimate of the value of such income.) Second, conventional brackets were thought to be less burdensome, because the respondent could be handed a card with the appropriate ranges and quickly scan it to find which was appropriate for the source in question. With unfolding brackets, the respondent might be asked three additional questions, instead of one.

Once the type of bracketing was selected, the next question was what the ranges of the brackets should be. One idea was to use standard publication ranges as a guide. For example, data currently are published for families whose total income is less than $5,000; $5,000 to $9,999; $10,000 to $14,999; and so forth. However, the Interview survey collects information from a variety of sources, some for each

[2] Kennickell, Arthur B., "Using Range Techniques with CAPI in the 1995 Survey of Consumer Finances on the Internet at **http://www.federalreserve.gov/Pubs/oss/oss2/papers/rangepap0197.pdf**, January 1997.

[3] Juster F. Thomas and James P. Smith, "Improving the Quality of Economic Data: Lessons from the HRS and AHEAD," *Journal of the American Statistical Association*, vol. 92, no. 440, December 1997, pp. 1268–1278.

member aged 14 and older, some for the consumer unit as a whole. The publication ranges may be appropriate for some sources of income (for instance, wage and salary income), but may not be appropriate for other sources. For example, almost all respondents who reported interest income reported a value less than $5,000, so, for this source, the publication range is too broad to be meaningful. To determine the most useful ranges, the distribution of each source was analyzed. Then, through a combination of empirical examination and normative analysis, a few sets of brackets were developed to fit the different kinds of data. The empirical examination involved looking at the percentiles for each source of income and seeing where breaks occurred. Normative analysis involved finding "reasonable" cutoff values for the data.

Refining the brackets, using the BLS cognitive laboratory

The next step in the implementation process required testing the results in the BLS cognitive laboratory. At this stage, a new team was formed that included a member of the Survey Research branch of the Division of Consumer Expenditure Surveys and a cognitive psychologist from the BLS Office of Survey Methods Research. Cognitive psychologists are trained in how respondents perceive certain questions. That is, when the interviewer asks about interest income, does the respondent correctly perceive what the interviewer is asking for (such as interest earned on checking and savings accounts), or might the respondent be confused and include other sources of income (such as dividends from stocks), or might the respondent even report no income received, when, in fact, he or she did receive such income, but thought it was something else? In the cognitive laboratory, tests are performed in which respondents are asked for their answers and then are debriefed by the psychologist. During the testing, the psychologist might ask the respondent to define certain terms, to make sure that the respondent's definition matches the interviewer's; or the respondent might be asked questions about the survey in general—were the questions posed easy or difficult to understand and answer, for example.

After the brackets were refined on the basis of findings from the cognitive tests, the brackets were ready to be implemented. Various steps were involved in their implementation, including revising the survey instrument designed to collect the data, field-testing the instrument, and obtaining appropriate approvals from offices that regulate Government surveys. Bracketing finally appeared in the CE Interview Survey in the second quarter of 2001. That is, the first respondents to the survey who were asked to provide bracketed information began their participation in April 2001.[4] Currently, only income brackets have been implemented. The original team investigated the possibility of using brackets for assets and liabilities as well, but decided to start with income only and then apply any lessons learned therefrom to the implementation of assets and liabilities.

Conclusions

At present, the first year (2001) of data gathered with the use of brackets has been published, and a new team has been chartered to study how brackets have changed the collection of income data. Among the questions being investigated are the following: are many "don't knows" and refusals to answer being converted to bracketed values? Have brackets improved the percentage reporting various sources of income? Has average income reported risen as a result of using brackets? and Are there any demographic differences in the propensity to provide bracketed information? As these issues are analyzed, further research results will be published documenting the findings.

[4] Although the initial goal was for implementation in 2000, it became apparent that to implement bracketing properly would require cognitive testing and other processes. Therefore, the implementation was delayed until 2001.

APPENDIX: Income Sources and Bracket Ranges

Data on the following sources of income are collected for each individual member of the consumer unit who is at least 14 years old: Wages or salary; income (or loss) from nonfarm business, partnership, or professional practice; income (or loss) from own farm; Social Security or Railroad Retirement Income; and Supplemental Security Income.

The following sources of income are collected for the consumer unit as a whole: Unemployment compensation; workers' compensation and veterans' payments, including education; public assistance or welfare, including money received from job training grants such as Job Corps; Food Stamps and electronic benefits transfers; interest on savings accounts or bonds; regular income from dividends, royalties, estates, or trusts; pensions or annuities from private companies, the military, or government; income (or loss) from roomers or boarders; income (or loss) from payments from other rental units; child support; regular contributions from alimony or other sources, such as persons outside the consumer unit; and other money income, including money received from care of foster children, cash scholarships, fellowships, or stipends not based on working.

Table 1 shows the brackets applied by the interviewer to each source of income.

Table 1. Data collected by source of income and income brackets

Income source	Range for bracket—												
	0	1	2	3	4	5	6	7	8	9	10	11	12
Wages and salaries; nonfarm business income; own-farm income	Loss[1]	0–4,999	5,000–9,999	10,000–14,999	15,000–19,999	20,000–29,999	30,000–39,999	40,000–49,999	50,000–69,999	70,000–89,999	90,000–119,999	120,000 or more	—
Social Security and Railroad Retirement Income	—	Less than 300	300–999	400–499	500–599	600–699	700–799	800–899	900–999	1,000–1,499	1,500 or more	—	—
Supplemental Security Income	—	0–999	1,000–1,999	2,000–2,999	3,000–3,999	4,000–4,999	5,000–9,999	10,000–14,999	15,000–19,999	20,000–29,999	30,000–39,999	40,000–49,999	50,000 or more
Data collected for the consumer unit as a whole	Loss[2]	0–999	1,000–1,999	2,000–2,999	3,000–3,999	4,000–4,999	5,000–9,999	10,000–14,999	15,000–19,999	20,000–29,999	30,000–39,999	40,000–49,999	50,000 or more

[1]Self-employment income only
[2]Rental income only

NOTE: The foregoing brackets shown for sources collected for the consumer unit as a whole are also collected for the following sources of money, which are not considered income in the CE Interview survey: lump-sum payments received from estates, trusts, royalties, alimony, prizes, or games of chance or from persons outside the consumer unit; and sales of household furnishings, equipment, clothing, jewelry, and pets or other belongings, excluding the sale of vehicles or property.

Characteristics of Complete and Intermittent Responders in the Consumer Expenditure Quarterly Interview Survey

SALLY E. REYES-MORALES

The Consumer Expenditure (CE) Quarterly Interview Survey collects data from consumer units (CUs) across the United States. Some CUs complete all five interviews, others complete some, but not all, of the interviews, and some choose not to participate in the survey at all. These CUs can be called complete responders, intermittent responders, and nonresponders, respectively. Do the nonresponses of the intermittent responders and nonresponders affect the published CE estimates? Are the CUs who stay in the survey for all five interviews different from those who do not?

To answer these questions, this study uses the CE Interview Survey data collected from 1997 to 2000. In the study, characteristics and expenditures of complete responders and intermittent responders are compared. Nonresponders are excluded because very little information about them is collected.

Background and definitions

The CE Interview Survey is a rotating panel survey in which a random sample of residential addresses is selected and the CUs living at those addresses are asked to report their expenditures during the previous 3 months. The U.S. Census Bureau collects these data for the Bureau of Labor Statistics. The random sample of residential addresses is selected by means of systematic sampling, and the CUs at those addresses are interviewed by the Census Bureau field representatives once per quarter for five consecutive quarters. After the fifth quarter, the CU leaves the sample and a new address is selected to replace it. The CE sample is representative of the total civilian population of the United States not living in institutions.

In the initial CE Interview, respondents are asked to report all of the expenditures they made during the previous month. This interview is used only for "bounding" purposes—that is, to make sure that the expenditures reported in the second through fifth interviews reflect the correct periods. In the second through fifth interviews, expenditure data are collected for the 3 months prior to the interview. Only the expenditure data collected in the second through fifth interviews are used to compute official CE estimates. Data collected in each quarter are treated independently, so annual estimates do not depend upon any CUs participating for all five quarters.

Following are some of the terms that will be used in this article, together with their definitions:

Household. The people who occupy a housing unit. A housing unit is a house, an apartment, a mobile home, a room, or a group of rooms occupied (or intended to be occupied) as separate living quarters.

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INTERI. Interview number (1 through 5).

INSTAT. Final interview status (01 through 19):

01 = Interview

Type A noninterviews:
02 = No one home
03 = Temporarily absent
04 = Refused
05 = Other Type A noninterviews

Type B noninterviews:
06 = Vacant (for rent)
07 = Vacant (for sale)
08 = Vacant (other)
09 = Occupied by person whose usual residence is elsewhere
10 = Under construction (not ready)
11 = Other Type B noninterviews

Type C noninterviews:
12 = Demolished
13 = House or mobile home moved
14 = Converted to nonresidential use
15 = Merged
16 = Condemned
17 = Located on military base
18 = CU moved
19 = Other Type C noninterviews

Interview. An interview is completed by an eligible CU (INSTAT = 01).

Type A noninterviews. An address is within the scope of the survey and eligible for interview, but an interview is not obtained (INSTAT = 02 through 05).

Type B noninterviews. An address is within the scope of the survey, but is not eligible for interview (INSTAT = 06 through 11).

Type C noninterviews. An address is out of the scope of the survey or permanently ineligible for the CE sample (INSTAT = 12 through 19).

CU (consumer unit). See "Glossary" in Appendix A at the end of this anthology.

Reference person. See "Glossary" in Appendix A at the end of this anthology.

Consumer units used

In this study, selected demographic characteristics of CUs who completed the last four interviews (INTERI = 2 through 5) were compared with corresponding characteristics of those who did not. To make these comparisons, the universe of CUs from which data were collected was subdivided, using the following criteria:

- Only CUs scheduled to participate in all five interviews between January 1997 and December 2000 were used, in order to follow CUs' history in the survey.

- Only CUs who completed one or more of the last four interviews (INTERI = 2 through 5) were used, because the demographic characteristics examined in the study are not collected in the first interview.

The response rates for the CUs used in the current study are different from the CE response rates published in CE reports, because not all CUs were used in the study. Table 1 shows the response rates computed from all records in the CE sample, compared with the response rates computed from only the records used in the study. The study's CUs had higher response rates and lower nonresponse rates than the complete universe of CUs had, because the study excludes CUs who completed none of the last four interviews (INTERI = 2 through 5).

Typically, Type B and Type C noninterviews are not used in response rate calculations, because they are ineligible or out of the scope of the survey. Response rates usually are computed with the following formula:

$$\text{Response Rate} = \frac{\text{Interviews}}{\text{Interviews} + \text{Type A}} \times 100.$$

Table 2 shows response rates for CUs who completed the third interview; the third and fourth interviews; and the third, fourth, and fifth interviews, given that they completed the second interview. Of the CUs who completed the second interview, 93.1 percent also completed the third interview, 88.7 percent completed the third and fourth interviews, and 85.9 percent completed the third, fourth, and fifth interviews.

Demographic characteristics of complete and intermittent responders

Table 3 compares some demographic characteristics of the CUs who completed all of the last four interviews (complete responders) with those of CUs who did not (intermittent responders). The complete responders tend to have more members and to be older than the intermittent responders and also are more likely to be homeowners and married couples. The average number of persons in a complete-responder CU is 2.6, compared with 2.3 for the intermittent responders. Likewise, the average age of the reference person in complete-responder CUs is greater (50.6, compared with 40.9), the average quarterly expenditure per CU on all items is greater ($8,981, as opposed to $7,504), and the average quarterly expenditure per person is greater ($3,442, as against $3,212) than in intermittent-responder CUs. Complete-responder CUs also are more likely to have both husbands and wives present in the household (57.2 percent, compared with 39.8 percent), less likely to be single consumers (25.3 percent versus 37.5 percent), more likely to be homeowners (73.2 percent, as opposed to 41.0 percent), and more likely to be the only CU living in the household (98.3 percent, compared with 87.3 percent).

Table 4 shows some of the same CU characteristics, by type of noninterview. CUs who had one or more Type B or Type C noninterviews tend to be relatively young (the average age of the reference person is 36.0), have few people in them (2.2 persons, on average), have a low average expenditure per CU ($6,863), and have a low average expenditure per person ($3,124).

CUs who drop out of the survey

CUs are considered to have dropped out of the survey permanently when no more of their interviews are completed with interview status code INSTAT = 01. These CUs are a subset of the intermittent responders. The reason they have dropped out of the survey can be identified by the interview status code of the first noninterview

after their last completed interview. Table 5 shows that the most common reason for dropping out of the survey is "refusal" (23.7 percent), followed by "other" unspecified Type C noninterviews (19.5 percent), "vacant, for rent" (19.4 percent), and "vacant, other" (14.1 percent).

Table 6 shows the percentage of CUs who came back and participated in the survey after a refusal. Of the CUs whose first refusal was in the second interview, only 30.8 percent completed one or more of the remaining interviews. Of the CUs whose first refusal was in the third interview, 52.7 percent completed one or more of the remaining interviews, and of the CUs whose first refusal was in the fourth interview, 47.4 percent completed the fifth interview. Overall, there were 5,554 CUs whose first refusal was in one of interviews 2 through 4, and 36.8 percent of them eventually came back to participate in the survey.

The effect of intermittent responders on CE expenditure estimates

Table 7 shows the total number of interviews completed by both the complete and intermittent responders. There were 24,860 CUs used in the study and 56.5 percent of them completed all four interviews. Those CUs accounted for 73.1 percent of all interviews. By contrast, 43.5 percent of the CUs in the study responded intermittently, and they completed 1.9 interviews, on average. The intermittent responders accounted for only 26.9 percent of all interviews.

The average quarterly expenditure is higher for CUs who completed all four interviews than for those who did not ($8,981, compared with $7,504); the overall average expenditure was $8,584. To estimate the effect that intermittent responders have on the CE expenditure estimates, the average quarterly expenditure per CU can be computed in two different ways by changing the weights used for the intermittent respondents. In table 7, the overall average expenditure per CU can be computed by weighting the two sets of CUs by the actual number of completed interviews:

$$\$8{,}584 = \frac{(56{,}160 \times \$8{,}981) + (20{,}702 \times \$7{,}504)}{56{,}160 + 20{,}702}.$$

If the response rates could be increased so that the intermittent responders completed all four interviews, then those CUs would have completed 43,280 (= 4 × 10,820) interviews. If, in addition, their expenditures are independent of their (non)participation in the CE Survey, the weighted average would be $8,339, because

$$\$8{,}339 = \frac{(56{,}160 \times \$8{,}981) + (43{,}280 \times \$7{,}504)}{56{,}160 + 43{,}280}.$$

The $8,339 figure is a 2.9-percent decrease from the $8,584 calculated the first way, indicating that the effect of intermittent responders on the overall average expenditure is relatively small. Moreover, every CU in the CE Survey has a weight associated with it, and the weights include adjustments for nonresponses. As a result of these adjustments, the 2.9-percent difference computed here can be viewed as an upper bound on the true difference; hence, the effect of intermittent responders on the published CE estimates is probably considerably less than 2.9 percent.

Conclusions

The study presented in this article looked at CE data collected from 1997 to 2000 and found that CUs who completed all of the survey's last four interviews (INTERI = 2 through 5) are different from CUs who responded only intermittently. CUs who completed all four interviews are larger and older and are more likely to be homeowners and married couples than are CUs who responded only intermittently. The study also found that the nonresponses of the intermittent responders appear to have a relatively small effect on the published estimates. An upper bound on this effect was calculated to be 2.9 percent, but, because CU weights in the CE Survey include adjustments for nonresponses, the actual effect is probably considerably smaller. ■

Table 1. Response and nonresponse rates for all records, compared with those for records from CUs in this study

Item	All records (INTERI = 1–5)		Records from CUs in this study	
	Number	Percent	Number	Percent
Interviews (*I*)	135,383	65.6	76,862	84.3
Type A noninterviews (*A*)	32,982	16.0	6,992	7.7
Refusals (*R*)	27,095	13.1	5,272	5.8
Other Type A noninterviews	5,887	2.9	1,720	1.9
Type B noninterviews	29,980	14.5	4,852	5.3
Type C noninterviews	7,994	3.9	2,442	2.7
Total	206,339	100.0	91,148	100.0
Response rate of the total sample (*I*/Total)		65.6		84.3
Response rate of the eligible units ($I/(I + A)$)		80.4		91.7
Refusal rate of the eligible units ($R/(I + A)$)		16.1		6.3

Table 2. CU response rates, given that the second interview was completed

Item	Interviews			
	2	2,3	2,3,4	2,3,4,5
CUs who completed the interviews	19,310	16,819	15,145	14,040
CUs with at least one Type A noninterview		1,242	1,921	2,309
CUs with only Type B or Type C noninterviews		1,249	2,244	2,961
Total Interview + Type A		18,061	17,066	16,349
Probability of completing interview		3	3,4	3,4,5
Response rate ($I/(I + A)$) (percent)		93.1	88.7	85.9

Table 3. Demographic characteristics of complete responders and intermittent responders

Demographic characteristics	Did the CU complete all four interviews (INTERI = 2–5)?	
	Yes	No
Average size of CU	2.6	2.3
Average age of reference person	50.6	40.9
Average quarterly expenditure per CU	$8,981	$7,504
Average quarterly expenditure per person	$3,442	$3,212
Percent distributions		
Type of family:		
Husband-and-wife families	57.2	39.8
Husband and wife only	23.7	15.6
Husband and wife with children	29.0	20.9
Other husband-and-wife families	4.5	3.3
One parent, own children	5.5	8.3
Single consumers	25.3	37.5
Other families	12.0	14.4
Housing tenure:		
Homeowner	73.2	41.0
Renter and other	26.9	59.0
Multiplicity household:		
Single-CU household	98.3	87.3
Multiple-CU household	1.7	12.7

Table 4. CU characteristics by type of interview

Characteristic	Number of completed interviews	Means, 1997–2000			
		Age of reference person	Number of persons in CU	Quarterly expenditure per CU on all items	Quarterly expenditure per person on all items
Total	76,862	48.0	2.5	$8,584	$3,385
Completed all interviews (2–5)	56,160	50.6	2.6	8,981	3,442
At least one noninterview	20,702	40.9	2.3	7,504	3,212
At least one Type A noninterview	9,084	47.2	2.5	8,324	3,309
No refusals	2,462	46.0	2.4	8,991	3,811
At least one refusal	6,622	47.6	2.6	8,077	3,138
At least one Type B or Type C noninterview (no Type A noninterview)	11,618	36.0	2.2	6,863	3,124

Table 5. Reasons for dropping out of the survey

Reason	Percent
Refusal	23.7
Other unspecified Type C noninterviews (INSTAT = 19)	19.5
Vacant, for rent (INSTAT = 06)	19.4
Vacant, other (INSTAT = 08)	14.1
Other Type A (INSTAT = 02,03,05)	9.4
Other Type C (INSTAT = 12–18)	7.3
Other Type B (INSTAT = 07,09–11)	6.6

Table 6. CUs who came back after a refusal in the Interview survey

First refusal	Came back	Did not come back	Total	Came back (percent)	Did not come back (percent)	Total (percent)
2	1,186	2,665[1]	3,851	30.8	69.2	100.0
3	523	469	992	52.7	47.3	100.0
4	337	374	711	47.4	52.6	100.0
Total	2,046	3,508	5,554	36.8	63.2	100.0

[1]These CUs were excluded from the study because they completed none of the last four interviews.

Table 7. The effect of intermittent responders on consumer expenditure estimates

Category	Did the CU complete all four interviews (INTERI = 2–5)?		Total
	Yes	No	
Number of CUs	14,040	10,820	24,860
Percent of CUs	56.5	43.5	100.0
Number of interviews	56,160	20,702	76,862
Percent of interviews	73.1	26.9	100.0
Average quarterly expenditure per CU	$8,981	$7,504	$8,584

Standard Errors in the Consumer Expenditure Survey

JEFFREY L. BLAHA

Data for the Consumer Expenditure (CE) Survey are collected from a sample of all the consumer units (CUs) in the United States. Estimates of the average (mean) annual expenditure per CU in the CE tables for the year 2000 were based on a sample of about 30,000 CUs, out of a total of about 109 million in the Nation. These mean estimates differ from the true population values because a subset, rather than the whole population, is observed. *Sampling error* is the difference between the survey estimate and the true population value. The most common measure of the magnitude of the sampling error is the *standard error* of the estimate. The standard error provides data users with information about the variability associated with the estimate.

Prior to the publication of the 2000 data, the CE program made available separate tables of standard errors for the Interview and Diary components of the CE Survey. Starting with the 2000 data, the CE program began using tables with *integrated* data from both surveys. Integrated data provide a complete accounting of consumer expenditures and income, which neither survey component alone is designed to do. The tables, which correspond to standard integrated tables of CU expenditures published in the CE reports and on the CE Web site, are provided by standard demographic characteristics (except for region).[1] This article gives a summary description of the half-sample replication method used to calculate the standard error statistics and demonstrates the proper interpretation of these statistics.

Methodology

Standard textbook formulas for calculating standard errors assume simple random sampling and do not apply to the CE Survey, because it does not use a simple random sample. Instead, the Survey uses stratified random sampling, with systematic sampling within the strata. Hence, a different method for calculating standard errors is needed. *Replication methods* make up a class of techniques that provides a way to produce unbiased and design-consistent estimates of standard error for complex survey designs when the usual assumptions are not satisfied. The fundamental idea behind replication methods is to select subsamples repeatedly from the full sample, calculate the statistic of interest for each subsample, and use the variability among the subsamples to estimate the standard error of the full-sample statistic.

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[1] The replication methodology used to calculate the standard errors is designed to work at the national level and is not applicable to regional estimates.

The *balanced repeated replication* method is used to estimate the standard error in the CE Survey. In this method, sampled geographic locations are divided into 40 groups (called *strata*). The CUs within each stratum are randomly divided into two *half samples*. Half of the CUs are assigned to one half sample, and the other half are assigned to the other half sample. Because there are 40 strata and 2 groups of CUs in each stratum, we can compute 2^{40} (approximately 18 trillion) different estimates of expenditure in which we use exactly half of the collected data. With this information, we can estimate the standard error of CE estimates by examining how the different estimates compare with the full-sample estimate. In the balanced repeated replication method, we use a 44 × 44 Hadamard matrix to choose the 44 "best" combinations of groups out of the 18 trillion possible combinations.

A *variance* estimate for each category of item is obtained by first computing the mean estimate of the item for each replicate, then summing the squared deviations of the replicate mean estimates from the full-sample mean estimate, and then dividing by the number of replicates. Thus,

$$V(\bar{x}_i) = \frac{1}{44}\sum_{r-1}^{44} \left(\bar{x}_{i\,r} - \bar{x}_i\right)^2,$$

where $x_{i\,r}$ is a calendar-period estimate of the mean expenditure for item *i*, using the rth replicate data and x_i is the calendar-period estimate of the mean expenditure for item *i*, using the full-sample data.

The *standard error* is calculated as the square root of the variance:

$$\mathrm{SE}(\bar{x}_i) = \sqrt{V(\bar{x}_i)}.$$

The *coefficient of variation* (CV) is the standard error expressed as a percentage of the sample mean estimate and thus is independent of the scale of measurement. The CV is calculated as

$$\mathrm{CV}(\bar{x}_i) = \frac{\mathrm{SE}(\bar{x}_i)}{\bar{x}_i} \times 100.$$

These formulas apply to aggregated categories as well as individual component items. In producing a table that uses integrated data from both surveys, the aggregated categories may be composed of items from one survey or the other, or they can be based on integrated data from both surveys.

Interpretation of the statistics

The primary purpose of calculating standard errors for the mean estimates is to provide data users with a measure of the variability associated with the estimates. This variability measures how close different estimates would be to each other if it were possible to repeat the survey over and over, using different samples of CUs. While it is not feasible to repeat the survey over and over, statistical theory allows the standard error to be estimated anyway. A small standard error indicates that multiple independent samples would produce values that are consistently very close to each other, whereas a large standard error indicates that multiple independent samples would produce values that are consistently not very close to each other.

Table 1 is an extract from one of the standard published CE demographic tables. The table shows the mean estimate, standard error, and coefficient of variation for a list of expenditure items and categories, using integrated data from both the Interview and Diary Surveys in 2000. For example, the table shows that the average annual expenditure by all CUs on personal care products and services for 2000 was $563.62, with a standard error of $7.94. Because it was impossible to ask all CUs in the country how much they spent on personal care products and services, the $563.62 mean figure is an estimate, and we have a *margin of error,* usually defined as ± 2 standard errors. In this example, the average annual expenditure on personal care products and services has a margin of error of ± $15.88. Thus, we can say that the average CU probably spent between $547.74 and $579.50 ($563.62 ± $15.88) annually on personal care products and services.

Because the CV is the standard error as a proportion of the mean estimate, it provides an indication of the spread of the data around the mean. The smaller the CV, the smaller is the spread of the data around the mean. The CV also makes possible comparisons of the spread of data around the mean of different items. For example, in the 2000 integrated survey, the CV for education is 4.55 percent and the CV for personal care products and services is 1.41 percent. Comparing the CVs for the two items, we can say that the spread of the data around the mean for education expenditure is larger than the spread of the data around the mean for personal care products and services. ■

Table 1. Quintiles of income before taxes, annual means, standard errors, and coefficients of variation, Consumer Expenditure, 2000

Item	Complete reporting of income							
	All consumer units	Complete income reporters	Lowest 20 percent	Second-lowest 20 percent	Third-lowest 20 percent	Fourth-lowest 20 percent	Highest 20 percent	Incomplete income reporters
Mean	$44,649	$44,649	$7,683	$19,071	$32,910	$53,295	$110,118	[1]
SE	517.9	517.9	137.6	87.1	84.6	193.3	1613.4	[1]
CV(percent)	1.2	1.2	1.8	0.5	0.3	0.4	1.5	[1]
Average annual expenditures								
Mean	$38,041.03	$40,234.86	$17,939.45	$26,547.37	$34,713.42	$46,791.00	$75,093.08	$32,059.31
SE	336.7	356.8	399.9	622.2	412.3	626.7	850.8	713.0
CV(percent)	0.9	0.9	2.2	2.3	1.2	1.3	1.1	2.2
Food								
Mean	$5,157.88	5,434.76	2,673.31	4,178.21	5,183.19	6,451.56	8,679.37	4,516.56
SE	65.8	77.4	97.0	106.8	143.6	127.7	184.0	93.3
CV(percent)	1.3	1.4	3.6	2.6	2.8	2.0	2.1	2.1
Alcoholic beverages								
Mean	371.81	422.87	206.4	247.93	366.12	512.9	780.2	253.67
SE	15.6	21.2	32.7	24.7	22.3	53.7	75.4	17.9
CV(percent)	4.2	5.02	15.9	10.0	6.1	10.5	9.7	7.1
Housing								
Mean	12,318.51	12,527.38	6,508.78	8,482.33	10,857.48	14,151.75	22,610.61	11,788.92
SE	148.8	172.1	202.2	125.9	144.9	267.4	326.7	267.7
CV(percent)	1.2	1.4	3.1	1.5	1.3	1.9	1.5	2.3
Apparel and services								
Mean.	1,852.53	2,000.22	843.47	1,298.60	1,612.83	2,261.46	3,980.12	1,500.88
SE	38.9	54.3	61.3	72.3	86.6	79.1	198.4	62.1
CV(percent)	2.1	2.7	7.3	5.6	5.4	3.5	5.0	4.1
Transportation								
Mean	7,417.36	7,567.51	3,211.97	5,042.68	7,028.41	9,223.30	13,315.32	6,985.40
SE	101.2	110.7	133.4	222.5	234.9	211.0	322.1	211.2
CV(percent)	1.4	1.5	4.2	4.4	3.3	2.3	2.4	3.0
Health								
Mean	2,065.67	2,120.04	1,469.87	1,987.62	1,964.07	2,312.36	2,864.12	1,919.38
SE	30.1	31.6	71.7	63.7	50.6	61.7	64.0	60.3
CV(percent)	1.5	1.5	4.9	3.2	2.6	2.7	2.2	3.1
Entertainment								
Mean	1,863.50	1,957.63	836.92	1,146.62	1,609.18	2,324.39	3,866.21	1,602.97
SE	35.6	39.1	66.4	50.7	64.0	74.7	117.7	70.3
CV(percent)	1.9	2.0	8.0	4.4	4.0	3.2	3.0	4.4
Personal care products and services								
Mean	563.62	595.33	318.28	441.98	533.59	698.91	982.91	490.56
SE	8.0	9.8	13.1	14.8	22.7	23.0	23.0	14.3
CV(percent)	1.4	1.7	4.1	3.4	4.3	3.3	2.4	3.0
Reading								
Mean	146.47	156.11	73.04	105.17	135.61	174.92	291.47	118.38
SE	2.2	2.3	3.2	4.3	3.9	5.9	7.0	5.0
CV(percent)	1.5	1.5	4.4	4.1	2.9	3.4	2.4	4.3
Education								
Mean	631.93	635.52	430.25	290.47	393.09	600.05	1,461.94	625.79
SE	28.8	35.7	59.5	41.8	48.9	53.5	107.4	56.3
CV(percent)	4.6	5.6	13.8	14.4	12.4	8.9	7.4	9.0
Tobacco products and smoking supplies								
Mean	318.62	333.3	257.24	316.91	366.31	390.04	335.94	275.75
SE	8.1	11.1	13.0	18.3	19.6	16.9	17.4	10.4
CV(percent)	2.5	3.3	5.1	5.8	5.3	4.3	5.2	3.8
Miscellaneous								
Mean	775.78	831.81	364.53	594.94	832.71	1,047.19	1,318.23	619.2
SE	19.6	22.8	50.1	53.4	55.0	67.1	55.8	49.6
CV(percent)	2.5	2.7	13.7	9.0	6.6	6.4	4.2	8.0
Cash contributions								
Mean	1,192.44	1,344.06	332.27	1,162.95	953.01	1,217.29	3,050.11	749.99
SE	96.8	116.2	39.0	452.9	125.6	117.0	285.9	128.1
CV(percent)	8.1	8.6	11.7	38.9	13.2	9.6	9.4	17.1
Personal insurance and pensions								
Mean	3,364.92	4,308.33	413.14	1,250.97	2,877.80	5,424.88	11,556.55	611.86
SE	54.7	58.2	28.0	34.0	76.5	110.3	229.4	30.5
CV(percent)	1.6	1.4	6.8	2.7	2.7	2.0	2.0	5.0

[1] Components of income and taxes are derived from complete income reporters only; see glossary.

Part II.
Analyses Using Survey Data

Consumer Spending for Necessities

ABBY DULY

The proportion of household[1] spending used to purchase basic necessities is of interest to policymakers and social researchers as an elementary indicator of economic well-being. There are several complexities, however, in this application of the data; for example, the definition of "well-being" itself is not necessarily universal, and, even when the term is defined, the criteria upon which to evaluate well-being also are subjective and debatable. This article does not attempt to address these complexities; rather, data on consumer spending for necessities are presented in a manner that may be interpreted by a variety of readers for a variety of uses.

The discussion that follows is organized into three main sections. The first is a description of the data, including the definition of "necessities" used in this study and the demographic variables chosen for comparison. The second section is an evaluation of the Prussian mathematical statistician Ernst Engel's proposition, using data from the 2000 Consumer Expenditure (CE) Survey to determine whether the relationship between income and the proportion of expenditures spent on necessities that Engel observed in 1857 still holds true. In the third part of the text, spending on necessities as a share of total spending is presented for various additional demographic groups.

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[1] The basic unit of measurement in the Consumer Expenditure Survey is the consumer unit. (See the glossary at the end of this anthology for the definition of a *consumer unit*. For convenience, *consumer unit* and *household* are used interchangeably throughout this article.)

Study methodology

The study uses the expenditure shares tables published in the CE Survey. These tables provide the proportions of average annual expenditures (or total spending) allocated to various categories of items. The categories of interest here are those designated to be necessities: Food, housing, and apparel. These three types of expenses are chosen to be consistent with the work done by Engel, which, as previously mentioned, is used as a basis for analyzing spending for necessities by households of differing income levels. For consistency, the same definition of necessities is used in the comparisons among demographic groups. It is important to note that, while food, housing, and apparel are certainly reasonable candidates for necessities in 2000, there have been changes to these spending categories over time. For example, within the necessity category of food, the allocation among subcomponents has shifted such that the share of the food dollar spent on food away from home (including meals at restaurants or fast food, carryout, and home delivery) has grown from 3.0 percent in

1909, to 29.0 percent in 1987,[2] to 41.0 percent in 2000.[3]

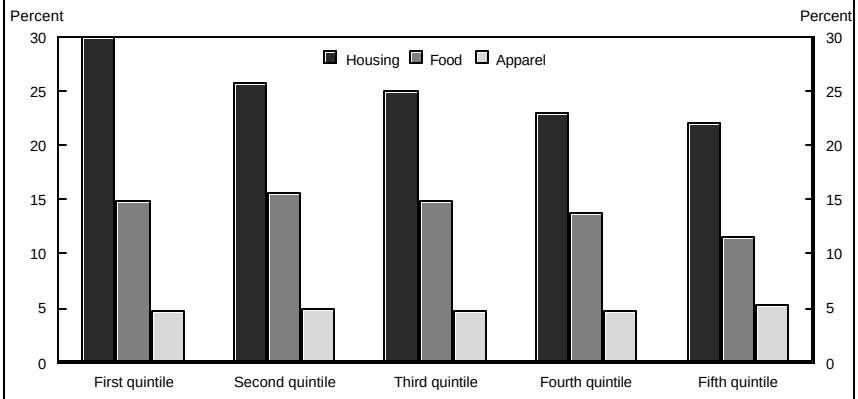
While data on food and apparel presented here are taken directly from the published CE tables, the housing category is constructed specifically out of two main subcomponents: Shelter[4] and utilities. This is an important deviation from the published data. The reason is that, arguably, shelter and utilities are the actual necessities of housing and that other components collected in the CE Survey, such as household furnishings and equipment, are not, in fact, basic goods.

In the next section, necessity shares are compared across income quintiles, using Engel's proposition as a guide. The final analyses presented here provide a broad overview of necessity spending by additional demographic groups: Homeowners and renters, urban consumers and rural consumers, black households and white and other households, Hispanic and non-Hispanic households, consumer units living in different regions, and consumer units of varying compositions.

Spending on necessities by income group

In 1857, Engel observed a relationship between household income and the proportion of total expenditures used to purchase food, housing, and apparel. He found that, as income increases, the proportion of spending devoted to food decreases, while the shares of expenditures used to provide housing and apparel remain stable.[5] Are the same patterns visible in the most recent CE Survey? Chart 1 illustrates the shares of total spending allocated to each of the three categories of necessity.

Chart 1. **Shares of average annual expenditures allocated to necessities by income quintile, Consumer Expenditure Survey, 2000**



In support of Engel's proposition, the share of average annual expenditures used to purchase food declines from 14.9 percent to 11.6 percent as income increases from the third quintile to the fifth quintile. (See table 1.) However, consumer units in the first quintile allocate a smaller proportion of total spending to food (14.9 percent) than do consumer units in the second quintile (15.7 percent), which would seem to violate Engel's proposition. But, as published by the CE Survey in 2000, the average income before taxes of the lowest income quintile is $7,683, whereas the average annual (total) expenditures for the same quintile are **$17,940.** Although this sounds contradictory, there are some explanations for the discrepancy. One is the effect of missing income: even though the responses of complete income reporters[7] are used, the respondents may not have provided a complete accounting of all income from all sources. Also, some consumer units in the lowest quintile—retirees and full-time students, for example—may be able to spend beyond their apparent means by using loans or cashing in on investments that are not included as income in the CE Survey. Therefore, caution should be used in interpreting the food share of the first income quintile as a violation of Engel's proposition.

Expenditure shares for housing clearly decline across income quintiles, as shown in chart 1. While consumer units in the highest income quintile devote 22 percent of their total spending to shelter and utility costs, those in the lowest income quintile spend almost 30 percent. This pattern is not the same one observed by Engel in 1857, and it may be related to rather large differences in housing tenure. In 2000, 57 percent of consumer units in the first income quintile are renters, while 88 percent of consumer units in the fifth quintile are homeowners.

The shares of average annual expenditures allocated to apparel are barely discernible in chart 1, supporting Engel's observation that spending on apparel remains stable across income levels. In fact, the range of apparel shares is less than 1 percentage point, from 4.7 percent spent by those in the lowest income quintile to 5.3 percent spent by those in the highest income quintile.

Spending on necessities by selected demographic characteristics

As mentioned previously, the share of total spending allocated to housing is much greater for lower income households, and those households are also more likely to be renters. Looking at

[2] Eva Jacobs and Stephanie Shipp, "How family spending has changed in the U.S.," *Monthly Labor Review,* March 1990, pp. 20–27.

[3] "Table 1. Quintiles of income before taxes: Average annual expenditures and characteristics, Consumer Expenditure Survey, 2000," **http://www.bls.gov/cexann00.pdf**, January 2003.

[4] Shelter includes out-of-pocket expenditures for mortgage interest and charges, property taxes, rent, and maintenance and repair services and commodities.

[5] Louis Philips, *Applied Consumption Analysis: Revised and Enlarged Edition* (Amsterdam, Elsevier Science Publishers, B.V., 1990), p. 103.

[6] "Table 1. Quintiles of income before taxes: Average annual expenditures and characteristics, Consumer Expenditure Survey, 2000."

[7] See "Glossary" in Appendix A at the end of this anthology for the definition of a *complete income reporter*.

Table 1. Shares of average annual expenditures allocated to necessities, by selected demographic characteristics, Consumer Expenditure Survey, 2000

Characteristic	Food	Housing[1]	Apparel
All consumer units	13.5	25.2	4.9
Income quintile[2]			
First	14.9	29.9	4.7
Second	15.7	25.7	4.9
Third	14.9	25.0	4.7
Fourth	13.8	22.9	4.8
Fifth	11.6	22.0	5.3
Housing tenure			
Homeowner	13.1	24.2	4.7
Renter	15.0	28.5	5.4
Type of area			
Urban	13.5	25.7	5.0
Rural	14.1	21.2	4.2
Race of reference person			
White and other	13.5	24.8	4.8
Black	14.5	29.3	6.0
Hispanic or non-Hispanic origin of reference person			
Hispanic	16.4	26.3	6.3
Non-Hispanic	13.3	25.2	4.8
Region of residence			
Northeast	13.8	27.7	5.4
Midwest	13.4	23.3	4.9
South	13.6	24.3	4.7
West	13.4	26.4	4.7
Composition of consumer unit			
Husband and wife only	13.2	23.3	4.1
Husband and wife with oldest child under 6	11.5	26.0	5.1
Husband and wife with oldest child 6 to 17	13.9	24.4	5.2
Husband and wife with oldest child 18 or older	14.4	22.0	4.9
One parent with at least one child under 18	14.7	30.0	6.6
Single-person and other consumer units	13.4	27.9	4.9

[1] Shelter plus utilities.
[2] Complete income reporters only.

the data classified by housing tenure, one readily sees that consumer units who rent their homes also devote a greater share of their total expenditures to food (15.0 percent) and apparel (5.4 percent) than do their homeowning counterparts (13.1 percent and 4.7 percent, respectively).

Urban consumers spend a higher proportion of their total expenditures on housing (25.7 percent, as opposed to the 21.2 percent spent by consumers living in rural areas) and on apparel (5.0 percent, compared with 4.2 percent, respectively). Food, however, makes up a slightly greater proportion of total spending among rural households (14.1 percent) than among urban households (13.5 percent).

Race and Hispanic origin, which are based on the reference person[8] of the consumer unit, are the next demographic characteristics listed in the table. Black consumer units spend higher shares of total expenditures on all three of the necessity categories than do white and other[9] consumer units. The same is true for Hispanic compared with non-Hispanic households, although the relevant housing shares are not very different, with Hispanic consumer units allocating 26.3 percent of total spending to housing and non-Hispanics allocating 25.2 percent.

There is little variation in the necessity shares of consumer units living in different regions. For example, the range of expenditure shares used to purchase food is from 13.4 percent in the West and Midwest to 13.8 percent in the Northeast. (Households in the South spend a comparable 13.6 percent on food). Housing shares across regions are more variable, with consumer units in the Midwest having the lowest share (23.3 percent) of total spending and consumer units in the Northeast region having the highest share (27.7 percent).

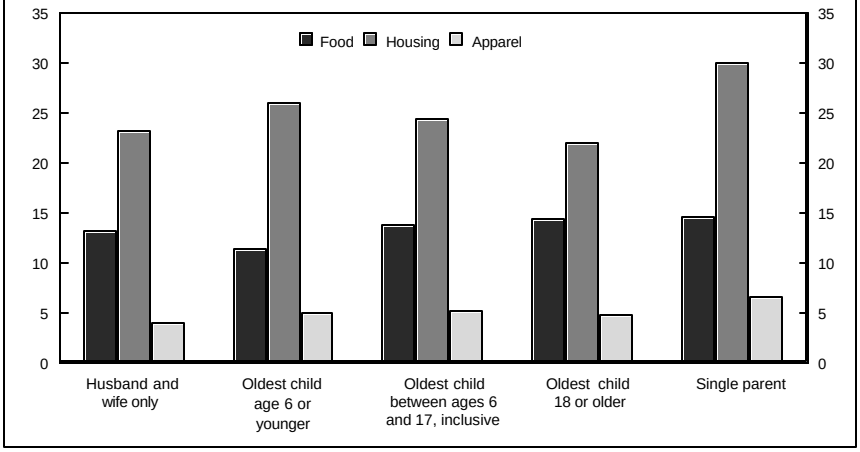
Chart 2 depicts the shares of average annual expenditures allocated to necessities by the composition of the consumer unit.The household types selected for this analysis are husband and wife only, husband and wife with the oldest child under 6 years of age, husband and wife with the oldest child between the ages of 6 and 17, husband and wife with the oldest child aged 18 or older, and single parents with at least one child under the age of 18 years. (Table 1 also provides data for single-person and other consumer units.) The chart indicates that single parents devote greater proportions of their total spending to food (14.7 percent), housing (30.0 percent), and apparel (6.6 percent) than do other types of household. Also, the age of the oldest child in the household is inversely related to the share of total spending allocated to housing and directly related to the share allocated to food. Interestingly, the expenditure share for food is greater for husband-and-wife-only consumer units (13.2 percent) than for those with young children (11.5 percent). This difference is attributable to a decline in food away from home, as parents of young children may not eat outside of the home as often, or in restaurants as expensive, as do couples without children.[10]

[8] See the glossary at the end of this anthology for the definition of *reference person.*

[9] The "other" race group includes Native Americans, Alaska Natives, Asians, and Pacific Islanders.

[10] The expenditure shares for food at home are roughly equivalent for husband-and-wife consumer units (7.5 percent) and households with children under 6 years of age (7.2 percent). However, the former allocate 5.7 percent of total spending to food away from home while the latter allocate just 4.3 percent.

Chart 2. **Shares of average annual expenditures allocated to necessities by consumer unit composition, 2000**



In sum, this article has presented a variety of data on spending for necessities as a proportion of total expenditures, from the 2000 Consumer Expenditure Survey. With respect to Engel's proposition, the expected trends are observed for food and apparel, while a contradictory decrease in housing shares occurs as income increases. Necessity spending also varies among consumer units with different demographic characteristics. ■

Consumer Expenditures for Alcohol in 2000

GEOFFREY PAULIN

In 2000, per capita consumption of alcoholic beverages was 24.9 gallons, mostly in the form of beer (21.7 gallons).[1] That same year, according to the Consumer Expenditure (CE) Survey, the average consumer unit[2] reported expenditures of $372 for alcoholic beverages; that is, about $1 was spent on alcohol for every $8 spent on food at home.[3] Other recent studies have cited similar figures, as well as health and social concerns, as reasons for studying the consumption of alcoholic beverages.[4] These studies examine either the consumption of a specific beverage by a specific group or the consumption of alcohol in countries other than the United States. By contrast, this article focuses on U.S. domestic consumer expenditures on alcohol in 2000—specifically, the demographic patterns involved, the mean weekly expenditure on alcohol, the probability of purchase of alcohol either at home or away from home (such as a drink at a restaurant or bar), and the type of alcohol purchased (beer, wine, or other alcohol, such as whiskey).

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[1] *Statistical Abstract of the United States, 2002* (U.S. Census Bureau, 2002), p. 130, table 197, "Per Capita Consumption of Selected Beverages by Type: 1980 to 2000."

[2] See the glossary at the end of this anthology for the definition of a *consumer unit.*

[3] *Consumer Expenditure Survey, 1999–2001,* Report 966 (Bureau of Labor Statistics, April 2003), table A, "Average annual expenditures of all consumer units and percent changes," p. 3.

[4] J. R. Blaylock and W. N. Blisard, "Wine Consumption by U.S. Men," *Applied Economics,* May 1993, pp. 645–51; and Mohamed Abdel-Ghany and J. Lew Silver, "Economic and Demographic Determinants of Canadian Households' Use of and Spending on Alcohol," *Family and Consumer Research Journal,* September 1998, pp. 62–90.

The Data

Data for the CE Survey are derived from two sources: The Interview survey, which is a rotating-panel quarterly recall survey, and the Diary survey, in which respondents record all their expenditures during the 2-week survey period. Data from the two sources are integrated into tables for analysis and subsequent publication. The data for this article are taken from the Diary component of the 2000 CE Survey. In the published CE Survey, one item—alcoholic beverages purchased on trips—is taken from the Interview component. However, this item (which is collected solely in the Interview survey) accounts for only about $34, or less than 10 percent of average total expenditures for alcohol in 2000, so it is safe to exclude it from the current analysis. Using only Diary data also allows the regression results (described later) to be compared with the expenditure data examined herein.

Caution should be exercised in attempting to interpret some of the data shown. Expenditures for alcohol are subject to a great deal of "allocation" during the publication process. That is, when a respondent records "expenditures for alcohol" or "meal at restau-

rant, including alcohol," but provides no details on the type or amount of alcohol purchased, the expenditure is estimated on the basis of the total expenditure reported by the respondent for alcohol or the meal at the restaurant, together with an allocation factor that is in turn based on responses from those who record specifically what was purchased. At the aggregate level, this technique presumably has little impact on total expenditures for alcohol, but it could cause a larger share of those expenditures to be accounted for by either beer, wine, or other alcoholic beverages than is actually the case; in addition, at the individual-record level, a consumer unit might show expenditures for beer, wine, and other alcohol, even though that consumer unit purchased only one of those items. For example, suppose a respondent purchases beer for $10 and records a $10 expenditure for alcohol. Then, because the fact that all $10 went for beer is not recorded, the consumer unit might show expenditures of $7 for beer, $2 for wine, and $1 for other alcohol, assuming allocation factors of 70 percent for beer, 20 percent for wine, and 10 percent for other alcohol. The actual number of records created through allocation as opposed to reporting varies by the type of alcohol purchased. (For example, 43 percent of beer-at-home reports[5] are the result of allocation, compared with 76 percent of wine-at-home reports and 92 percent of other-alcohol-at-home reports.) Overall, about 46 percent of expenditures reported for specific types of alcohol are created by allocation from general reports of alcohol either at home or away from home.

[5] The CE Survey uses the terminology "at home" and "away from home" to describe places at which goods are purchased, rather than where they are ultimately consumed. For example, when an expenditure is reported for "food at home," it means that the food was purchased at a grocery store or similar vendor, rather than at a restaurant, cafeteria, or bar. The food purchased may have been consumed elsewhere—for example, a person buys fruit and takes some to the office for lunch or packs a sandwich for the child's lunch at school. Even though the food was not eaten in the home, the food was purchased at a grocery store and is therefore designated as "food at home." Similarly, when a person has a pizza delivered from a local restaurant, the amount paid is classified as an expenditure for "food away from home," despite the fact that the pizza was eaten in front of the living room television. The reason is that the vendor was a restaurant. With alcoholic beverages, the same rules apply. An expenditure for beer, wine, or other alcohol that is purchased from a grocery, liquor, or convenience store is considered an expenditure for "alcohol at home," even though the purchaser may have taken the bottle of wine to a dinner party or taken the beer to a local park to drink at a picnic or while watching a softball game. In the case of alcohol, however, it is not likely that alcohol classified as "away from home" would have been consumed inside the home, because restaurants and bars usually restrict alcohol purchased to be consumed on the premises. For consistency with the classifications used in the CE Survey, the terms "at home" and "away from home" will be used in this article to describe expenditures for alcohol, regardless of where the alcohol was actually consumed.

Methodology

This article investigates expenditures in several ways. First, expenditure values and the percent of consumer units that report purchasing alcohol (that is, the percent reporting) are examined for three demographic categories: Income quintile, age of reference person, and sex of reference person for single consumers only.[6] The analysis is extended through the use of logistic regression, or "logit," a technique that enables one to predict the probability that an event (in this case, the purchase of alcohol) will occur, given that certain conditions (in this case, demographic characteristics) are held constant. By means of regression analysis, it is possible to isolate relationships between these characteristics and the probability of purchase of some kind of alcohol. For example, the probability of purchasing wine rises steadily with income and increases with age until the reference person is 45 to 54, after which it decreases with age. Given that income also increases with age until the reference person is 45 to 54 and starts to decrease with age thereafter, it is difficult, in the absence of regression analysis, to say which characteristic—age or income—is more strongly related to the purchase of alcohol. Logit is used to estimate the probability of purchasing alcohol in general, as well as that of purchasing alcohol at home, away from home, or both. Logit also is used to predict the probability of purchasing beer, wine, or some other alcoholic beverage. (The appendix to this article describes the use of logit in more detail.)

[6] See "Glossary" in Appendix A at the end of this anthology for the definitions of *reference person* and *income quintile*.

Except for the data in the logit analyses, the data used in this article are weighted to reflect the population. (The reasons why the data employed in the logit analyses are not weighted will be presented shortly.) The data used in the article also are limited to consumer units whose reference person is at least 21 years old—that is, the legal age to purchase alcohol in the United States. (Those under the legal age may be more likely than those who are at least 21 years old to omit expenditures for alcohol from their diaries.) Specific income data (such as mean values and quintile assignments) are derived from complete income reporters only, unless otherwise specified.[7] For best results, families that reported income losses (for example, through self-employed business loss or rental property loss) also are excluded from the sample.[8]

[7] See "Glossary" in Appendix A at the end of this anthology for the definition of *complete income reporter*.

[8] The income used in the CE Survey results is found by summing the value of all sources of income reported. When losses occur, the negative income is added to the total (or the loss is subtracted, depending on how one looks at it), which has the result of artificially lowering total income. Sometimes, the losses are large enough to cause total income to be negative. Losses make comparison across consumer units difficult. For example, a family in which one member receives $50,000 in salary appears to have the same income as another family in which one member receives $75,000 in income, but in which another member incurs a loss of $25,000. Both consumer units have $50,000 in income, according to the survey results, but each may have different spending patterns; the losses may be temporary and anticipated, for example, causing the consumer unit incurring the losses to spend differently than the unit that regularly receives $50,000 in income. Including the loss could substantially increase the variance for the income data and could also bias parameter estimates in the regression section. For these reasons, consumer units reporting losses are omitted from the sample.

Demographic analysis

By any measure shown in table 1, beer is the most popular form of alcohol purchased by the average consumer unit. Whether one looks at percent reporting or mean weekly expenditure, beer is at the top of the list, both at home and away from home. However, this ranking changes when one looks at the mean weekly expenditure of only those consumer units reporting purchases of alcohol, a figure that can be calculated by dividing mean weekly expenditure by percent reporting. In this case, the largest average expenditure for all consumer units is for wine at home ($23.29). Other alcohol at home is second ($19.36), with beer at home a distant third ($16.39). In contrast, the largest expenditure for alcohol away from home is for other alcohol ($12.08). The smallest expenditure obtained by using this measure is that for wine away from home ($9.73).

Income. As one might expect, expenditures for alcohol increase with income. (See table 2.) This statement holds true regardless of the type of alcohol purchased and regardless of whether it is alcohol at home or away from home. What is more interesting is the *rate* of increase with income. For example, while the fifth income quintile spends about 3.5 times as much for alcohol as does the first income quintile, it spends only 2.7 times as much for alcohol at home, compared with more than 7.1 times as much for alcohol away from home. When the types of alcohol purchases are analyzed, the ratios of the fifth to the first income quintile range from 1.6 (for beer at home) to 9.2 (for other alcohol away from home).

The percent reporting follows a similar pattern. For alcohol at home, the percent reporting for the fifth quintile (29.1 percent) is more than double the percent reporting for the first quintile (11.9 percent). For alcohol away from home, the differences across quintiles are even more dramatic, ranging from 6.9 percent for quintile 1 to 25.6 percent for quintile 5. The smallest range is for other types of alcohol at home, which only doubles from the lowest to the highest quintile (2.3 percent to 5.1 percent). The largest range in absolute terms is for beer away from home (6.1 percent to 22.6 percent). However, the percent reporting other alcohol away from home is still more than 6 times higher for the fifth quintile (11.8 percent) than it is for the first (1.8 percent).

Age. In all cases, expenditures for alcohol away from home rise with age up to a point and then decline. (See table 2.) The pivotal age group is the one whose reference persons are 35 to 44 years old. For alcohol at home, wine follows the pattern, except that expenditures peak for those aged 45 to 54. However, expenditures for beer and other (that is, nonwine) alcohol at home actually decline with age. For beer at home, expenditures range from a high of $5.48 for the under-25 group to a low of $0.65 for the 75-and-older group, a decrease of 88 percent over that entire age range. Stated another way, the youngest group spends 8.4 times as much for beer at home as does the oldest group. The percent of those reporting expenditures for beer at home follows a similar pattern: nearly 1 in 4 consumer units in the youngest group report such expenditures, compared with fewer than 1 in 20 consumer units in the oldest group. Most other expenditures for alcoholic beverages follow the same pattern for percent reporting, peaking either for the under-25 group or the 25- to 34-year-old group. The lone exception is wine: the percent reporting expenditures for wine peaks with the 45- to 54 year-old group (13 percent), and the group with the lowest percent reporting is again the 75-and-older group (6 percent). The percent reporting wine away from home is only about 4 to 5 percent for those under 65, but decreases for those aged 65 and older (of whom less than 2 percent report such expenditures).

Singles. Single individuals spend their money differently than do nonsingles. (See table 3.) Interestingly, though, when the data are classified by the sex of the reference person, it becomes clear that single men spend more, on average, than do nonsingles (of both sexes) for all alcoholic beverages, except wine at home, while single women spend less than non-singles on all alcoholic beverages (including wine at home). The same pattern holds for the percent of consumer units reporting expenditures on alcohol. That is, except in the case of wine at home, single men have the largest percent reporting, followed by nonsingles and then single women. The difference also affects the total percent reporting expenditures for wine generally, but here single men run a close second (10.3 percent reporting) to nonsingles (10.7 percent reporting), with fewer single women reporting purchases (6.2 percent).

Predicted probabilities

Given the similarity in trends for expenditures for alcoholic beverages at home and for those away from home (for example, percent reporting increases steadily with income for both types of purchase), logit is used only to analyze total purchases of beer, wine, and other alcohol once the probability of purchase for alcohol in general is examined by type of purchase. Accordingly, the first set of analyses to follow examines the probability of purchasing alcohol in general. The rest of the analyses examine probabilities of purchasing specific beverages. In other words, what is the probability of purchasing alcohol at home as opposed to the probability of purchasing alcohol away from home? What is the probability that a consumer will purchase both alcohol at home and alcohol away from home, rather than one or the other? What is the probability of purchasing beer, wine, or other alcohol? The results of the logits, used to answer these questions, should be interpreted with caution. Those who did not purchase alcohol may have chosen not to do so for any number of reasons, including the fact that they had enough liquor in the cabinet to last for the week during which they filled out the diary or that they may be persons who choose not to consume alcohol on any occasion at all. Because it is not possible to distinguish "potential" purchasers from "nondemanders" in the Diary survey,

the answers can be interpreted to predict only the probability of actual purchase during the previous week, rather than the probability of actual use (or nonuse) of alcohol by the consumer unit over longer periods.

Also, unlike the data in the previous section, the logit results here are not weighted to reflect the population. Previous experience has shown that weighting logistic regressions for that purpose yields parameter estimates similar to the unweighted results, but with much smaller standard errors. This has the effect of making every parameter estimate appear to be statistically significant. Therefore, to be conservative in the estimates, unweighted regressions are used to estimate probabilities of purchase in this article.

In using regression analysis, a "control group" is standardly identified to serve as a reference point for the analysis. In this article, parameter estimates that have negative coefficients are predicted to have lower probabilities of purchase than the control group, while those with positive coefficients have a higher predicted probability of purchase than the control group. Here, the control group consists of consumer units whose reference person (1) is 35 to 44 years old; (2) reports income in the middle quintile; (3) is a single, white, non-Hispanic male employed as a manager or professional receiving a wage or salary; (4) owns his home, but pays a mortgage; and (5) is living in the urban South. Comparisons with the control group are made by changing one characteristic at a time; for example, in attempting to find the relationship of region of residence to purchases of alcohol, one assumes that all characteristics of the members of the group to be tested are identical to those of the members of the control group (that is, every member of each group is a single, white, non-Hispanic male, aged 35 to 44 years old, with an income in the middle quintile, and so forth), except that the members of the group to be tested live in the Northeast instead of the South. Such comparisons are known as "ceteris paribus" comparisons in economics—comparisons in which "all else is held equal."

General purchases of alcohol. The probability of purchasing alcohol for the general adult population appears to follow the trends already described, at least with respect to age, income, and sex of the reference person. That is, the predicted probability of purchase, which is about 38 percent for the control group, is highest for the youngest group (46 percent) and lowest for the oldest group (22 percent). Similarly, the probability of purchase is lowest for the first income quintile (29 percent) and highest for the fifth (50 percent). Single women are less likely to purchase (23 percent) than are single men (38 percent).

The logit regressions also allow comparisons across a variety of other characteristics. For example, ethnicity appears to have little relationship to the probability of purchasing alcohol in general: the parameter estimate for "Hispanic" is small in magnitude (–0.0628) and is not statistically significant. Race, by contrast, appears to play a role in probability of purchase: black and Asian consumers have much lower probabilities of purchase than do white consumers, and those of other races appear to be similar to Asians in their purchasing behavior. (The coefficient associated with "other race" is nearly equal to that of Asians, while it is not statistically significant.) Occupation has a less strong relationship: although persons in technical, sales, or service positions and those in agricultural fields (forestry and farming) have positive, statistically significant coefficients, no other working group is predicted to be statistically significantly different from salaried (or wage-earning) managers and professionals in their purchases of alcohol in general. Of those who do not work, retirees have a fairly small coefficient that is not statistically significant. The long-term unemployed[9] have a large, but not statistically significant, negative coefficient, indicating that they are a lot less likely to purchase than are managers and professionals. The sample size for this group is small, so it is difficult to say whether the negative relationship is indicative of the general population in the group. However, those who are not working for reasons other than that they are a member of the long-term unemployed (for example, they may be attending school, working without pay, too ill to work, or doing something else) also have a large negative coefficient that, this time, is statistically significant. The predicted probability of purchase for this group is 31 percent, compared with 38 percent for managers and professionals. Finally, the South appears to be the region with the lowest probability of purchasing alcohol (38 percent); persons in other regions have predicted probabilities ranging from 44 percent to 46 percent. Rural men are about 9 percent less likely than their urban counterparts to purchase alcohol. (That is, their predicted probability of doing so is 29 percent, about 9 percentage points lower than that of urban single men.)

Probabilities for specific purchases of alcohol. The remaining sets of regression results are for specific types of alcohol purchase—at home, away, or both; and for beer, wine, or other alcohol. Once again, several demographic characteristics appear to be related to the probability of purchase. For example, the probability of purchasing alcohol at home is negatively related to age, as is the purchase of alcohol in general. The youngest age group has a 30-percent predicted probability of purchase at home compared with a 12-percent probability for the oldest group. The coefficients for each of these groups are statistically significant at the 99-percent confidence level, as are all of the age coefficients, with the exception of the 25- to 34-year-old age group (significant at the 95-percent level) and the 45- to 54-year-old age group (not statistically significant). Income, by contrast, is positively related to the purchase of alcohol at home,

[9] The survey question on occupation asks at what profession the person earned the most money in the previous year. If the reference person received unemployment insurance and then did not work or worked only sporadically, the person could be reported to have "earned" the most through unemployment.

ranging from 18 percent for the lowest quintile to 29 percent for the highest. Interestingly, the presence of children or a single adult woman in the home appears to lower the probability of purchasing alcohol at home. Single men (the control group) have a predicted probability of purchase of 24 percent, while single women have only an 11 percent probability. Single mothers have an even lower predicted probability: 9 percent. Husband-and-wife families with children have a lower probability of purchasing alcohol at home (20 percent) than the 24-percent probability of single men. Families with a husband and wife only, however, with a 23-percent probability of purchasing alcohol at home and a coefficient that is not statistically significant, are similar to single men in that type of purchase. Like husband-and-wife-only families, other-husband-and-wife families in which children are present have a predicted probability of purchase of alcohol at home of 23 percent, with a coefficient that is not statistically significant.) Here, too, ethnicity appears to play no role in the probability of purchase, but race does: both black and Asian families have a lower predicted probability of purchase (18 percent) than that of the control group, and both coefficients are statistically significant at the 99-percent confidence level. Families of other nonwhite races appear to have a similarly lower probability (17 percent), but their coefficient is not statistically significant. Occupation also appears to play a role: technical, sales, and service workers (29 percent), as well as blue-collar workers (28 percent), have slightly higher probabilities of purchasing alcohol at home than do managers and professionals (24 percent); however, agricultural workers (40 percent) and armed-service workers (41 percent) have substantially higher probabilities of purchase. Work status, by contrast, plays less of a role: the self-employed, with a probability of purchase of 24 percent, are not statistically significantly different from wage or salaried families, and, although retirees are predicted to have a higher probability of purchase (29 percent) than wage or salaried families, those who are unemployed or who are not working for another reason are not statistically different from wage or salaried families. Region plays a role (the Northeast has the highest predicted probability of purchasing alcohol at home, 28 percent), as does degree of urbanization (with rural "control" families 7 percent less likely than similar urban families to purchase). Finally, the purchase of alcohol away from home is also positively related to the purchase of alcohol at home. The coefficient is positive and significant at the 99-percent level. However, it is so small (0.0173), that it is economically not significant in its relationship to the probability of purchase.

For purchases of alcohol away from home, the findings are similar, but not identical. First, the probability of purchase is lower (21 percent) for the control group in this case than it is for the probability of purchase of alcohol at home (24 percent). Second, the probability of purchase of alcohol away from home is higher for 25- to 34-year-olds than for those under 25, but it peaks for the former (at 27 percent) and declines with age thereafter. It is also positively related to income, but the range of predicted probabilities is wider (from 14 percent to 33 percent) than it is for alcohol purchased at home. Although husband-and-wife-only families are not statistically significantly different from single men in respect of purchasing alcohol away from home, all other types of family are. Single women have a 16-percent predicted probability of purchase, compared with 21 percent for single men. The presence of children also appears to be related to the probability of purchase, with single fathers, single mothers, and husband-and-wife families with their own children only all having a lower probability of purchasing alcohol away from home (12 percent) than single men without children. Other husband-and-wife families with children have a higher probability of purchase (16 percent), but it is still lower than that for single men. Perhaps this is because the other members of the consumer unit also are likely to be adults (such as the parent or sibling of one of the spouses), and, therefore, the additional adults contribute to the total probability of purchasing alcohol away from home. Unlike its weak relationship to alcohol purchased at home, ethnicity now is strongly related to the probability of purchase. Hispanics (15 percent) have a much lower probability of purchase than do non-Hispanics (21 percent); the same is true for Asians (16 percent) and, especially, blacks (11 percent). Region makes a difference, but now the Midwest is the region with the highest predicted probability of purchase (26 percent). Rural families are still less likely to purchase (18 percent), and the purchase of alcohol at home also makes a statistically, but not economically, significant difference in the probability of purchasing alcohol away from home.

The probability of purchasing both alcohol at home and alcohol away from home is only about 12 percent. The probability of purchasing both appears to be negatively related to age: the youngest group (those under 25) has the largest coefficient, but it is not quite significant at the 95-percent confidence level. Taken at "face value," though (that is, without regard to statistical significance), the predicted probability for the youngest group is 16 percent, compared with 5 percent for the oldest group (75 and older). The positive relationship to income still holds, with the predicted probability of purchase ranging from 7 percent to 20 percent. Again, the presence of children or a single woman appears to lower the probability of purchasing alcohol for both purposes. Single women have a predicted probability of purchase of 5 percent, while single mothers have an even lower 3-percent probability. The lowest probability of all, however, is that for single fathers: 2 percent. Married couples whose children are biologically related to both parents or have been jointly adopted by them have a 6-percent probability of purchasing both alcohol at home and alcohol away from home. This probability, although larger than that for single parents, is still only about half the predicted probability for

single men (12 percent). Hispanics also have a lower predicted probability of purchase (9 percent) than do non-Hispanics (12 percent), but race lowers the predicted probability even more: both blacks and Asians are about half as likely (6 percent) as whites to purchase both alcohol at home and alcohol away from home. Finally, neither occupation nor region plays a major role in the predicted probability of purchase. Rural consumers (9 percent) appear to be less likely than urban consumers (12 percent) to purchase alcohol for both purposes, but the coefficient is significant only at the 10-percent confidence level.

It is also interesting to examine predicted probabilities for purchasing specific types of alcohol. Although, in these regressions, the same variables are retained as predictors of probability, three new independent variables are added to each equation. The first two are binary variables and indicate that the purchaser purchased some other type of alcohol than the type under study. For example, in predicting the probability of purchasing beer, the first binary variable describes whether the consumer unit did or did not purchase wine, and the second variable describes whether the consumer unit did or did not purchase other alcohol. In predicting the probability of purchasing wine, the first binary variable describes whether the consumer unit did or did not purchase beer, and the second describes whether the consumer unit did or did not purchase other alcohol. And in predicting the probability of purchasing other alcohol, the first binary variable describes whether the consumer unit did or did not purchase beer, and the second describes whether the consumer unit did or did not purchase wine. The third term is an "interaction term" indicating that the consumer unit purchased both remaining types of alcohol, given the particular dependent-variable alcohol. (For example, if the probability of purchasing beer is being predicted, the interaction term will be equal to unity if the consumer unit purchased *both* wine *and* other alcohol, but will be equal to zero if the consumer unit bought *only* wine *or* other alcohol or bought *neither* wine *nor* other alcohol.) These variables are added to the analysis to see whether different types of alcohol are "substitutes" or "complements," at least in terms of their probability of purchase. Once again, the total sample includes all consumers who purchased at least some type of alcohol during the week they filled in the diary.

Beer. As mentioned earlier, beer is the most popular alcoholic beverage. The parameter estimate associated with the intercept is –1.1944, indicating that the control group's predicted probability of purchasing beer is 23 percent. The probability of purchase is strongly related to age, declining from 29 percent for the youngest group (under 25) to 10 percent for the oldest group (75 and older). The probability of purchase also is related to income, although only the lowest and highest quintiles have statistically significant coefficients. The probability for the lowest quintile is 17 percent, compared with 27 percent for the highest quintile. Single men are again the most likely to purchase beer (23 percent), single women (12 percent) and single mothers (9 percent) the least likely. Married couples without children are not different from single men to a statistically significant degree, but when children are added to the family, the probability of purchase drops slightly, to 17 percent. When ethnicity and race are considered, only blacks (16 percent) are significantly different from the control group. Among salaried workers, occupation makes a difference, with technical, sales, and service workers (28 percent), blue-collar workers (30 percent), agricultural workers (35 percent), and members of the armed services (38 percent) all having higher predicted probabilities of purchasing beer than do managers or professionals (23 percent). Neither the self-employed nor nonworkers are significantly different from wage and salaried workers, although retirees appear to have a higher probability of purchasing beer (28 percent) than do wage and salaried workers. (The coefficient is positive, but statistically significant only at the 90-percent level.) The Midwest has the highest probability of purchase (29 percent), and the purchase of wine (57 percent) or of some other alcohol (65 percent) strongly increases the probability of the purchase of beer. However, the purchase of both wine and another alcohol does not significantly increase the probability beyond what is predicted when the coefficient for purchasing wine alone and that for purchasing another alcohol alone are incorporated into the equation. (That is, without including the interaction effect, a member of the control group who purchases both wine and another alcohol has a predicted probability of purchasing beer of 89 percent. When the interaction term is incorporated, the probability rises to 91 percent. This 2-percent difference is not statistically significant, because the coefficient for the interaction term is not statistically significant.)

Wine. The probability of purchasing wine is much lower than the probability of purchasing beer: only 1 in 20 consumer units (5 percent) in the control group is predicted to buy wine during the week its respondent fills out the diary. Age does not appear to be strongly related to the purchase of wine, although 45- to 54-year-olds have the only statistically significant coefficient and thus the highest predicted probability of purchase of any age group. However, at 6 percent, this difference is not economically significant. The probability of purchasing wine increases with income, although only the highest quintile has a statistically significant coefficient associated with it. Once again, without regard to statistical significance, the lowest quintile has a predicted probability of purchase of 4 percent, compared with a predicted probability of purchase of 7 percent for the highest quintile. Family type is not related to the purchase of wine to a statistically significant degree, while ethnicity is perhaps weakly related: the predicted probability for Hispanics (4 percent) is different from the probability for non-Hispanics (5 percent) only

at the 10-percent confidence level. However, blacks (4 percent) and Asians (3 percent) do have statistically significant coefficients at the 95-percent confidence level. (The coefficient for Asians actually is significant at the 99-percent confidence level.) Occupation plays little role; although blue-collar workers have the lowest predicted probability of purchasing wine (3 percent) of all working consumers. Similarly, those who are not working for reasons other than retirement or unemployment have a lower probability than other groups (3 percent). Region plays little role in predicting the probability of purchasing wine, but rural consumers also are less likely (3 percent) than urban consumers (5 percent) to purchase. However, both the purchase of beer (18-percent probability) and the purchase of other alcohol (17-percent probability) substantially increase the probability of purchasing wine. Nevertheless, purchasing both beer and some other alcohol adds little to the probability of purchasing above what purchasing beer or another alcohol alone adds.

Other alcohol. As with wine, the predicted probability of purchasing other alcohol is low—only 4 percent for the control group. However, demographics play a larger role in predicting the probability of purchasing some other alcohol than wine, in that more coefficients are statistically significant.

Although age does not have a statistically significant relationship to the probability of purchasing some alcohol other than wine or beer, both the fourth and fifth income quintiles (6 percent) are more likely to purchase than is the control group. Family type plays a role as well, with female-headed consumer units having lower predicted probabilities (3 percent for single women and 2 percent for single mothers) than do single-male households. In addition, husband-and-wife couples with their own children only have a lower predicted probability of purchasing some other alcohol (2 percent) than have single men. Hispanics and Asians both have lower predicted probabilities (2 percent) than do white non-Hispanics (4 percent). In respect of occupation, only blue-collar workers have a statistically significant coefficient, with a predicted probability of purchase of 3 percent. By region, only the Midwest has a statistically significant coefficient, raising its probability of purchasing some other alcohol to 5 percent. Once again, the predicted probability of purchase rises sharply when either beer (21 percent) or wine (16 percent) is purchased, but purchasing both beer and wine has no additional effect on the probability of purchasing some other alcohol than is accounted for by including the coefficients for purchasing beer and wine separately. (That is, the expenditures on alcohol of those who purchase beer, but not wine, or wine, but not beer, are not statistically significantly different from those who purchase both beer and wine.)

Summary

This article has examined expenditures for alcohol from several perspectives, including mean weekly expenditures, percent reporting expenditures, and predicted probability of purchase for consumers with different demographic characteristics. Expenditures for alcohol are analyzed both by place of purchase (at home or away) and by type of alcohol purchased (beer, wine, and other alcohol, such as whiskey). Consistent with national sales figures, beer appears to be the most popular form of alcohol purchased, both at home and away from home. Beer has the largest average weekly expenditure for all consumer units and the largest percent of all consumer units reporting the purchase of alcohol. However, when the average expenditure for those who actually purchase alcohol is examined, wine has the largest average expenditure, followed by other alcohols.

Expenditures for alcohol at home rise substantially with income and decrease with age. The exception is expenditures for wine at home, which peak for consumers aged 45 to 54. Expenditures for alcohol away from home also rise with income, but, like expenditures for wine at home, rise with age to a point and then decline. Regardless, single men spend more on alcohol than do single women, with nonsingles in the middle for expenditures on all alcoholic beverages except wine at home, for which nonsingles spend the most, on average, followed by single men.

When characteristics are held constant by means of regression analysis, the trends in the predicted probability of reporting appear generally to match those described for the observed percent reporting. Other characteristics also appear to be related to the purchase of alcohol, including race and ethnicity, occupation, and region of residence. However, the parameter estimates associated with these variables are not always statistically significant, especially for specific categories of characteristics. (For example, with regard to the purchase of specific types of alcohol, Asians are predicted to be less likely than whites to purchase wine, but the Asian coefficient for the predicted purchase of beer is not statistically significant.) Also, the probability of purchasing one type of alcohol is strongly related to the purchase of another type of alcohol. For instance, consumers who purchase wine or some other alcohol are more likely to purchase beer as well, but the coefficient for the purchase of both wine and another alcohol is not statistically significant, indicating that there is no "additional effect" on the probability of purchasing beer when both wine and another alcohol are purchased than is captured by including the effects of wine and other purchases of alcohol separately.

APPENDIX:

The Use of Logistic Regression (LOGIT) as a Probability Predictor

Logistic regression, or "logit," is often used to predict the probability that an event will occur, based on a series of

observed variables. In this approach, the probability of incurring expenditures for alcoholic beverages away from home, given a series of demographic characteristics, is examined.

One of the advantages of logit is that the coefficients are easily converted into probabilities without having to resort to special tables or other means of calculation. The formula for such a probability is

$$Pj = \exp(a + b_1X_{1j} + \ldots + b_nX_{nj})/[1 + \exp(a + b_1X_{1j} + \ldots + b_nX_{nj})],$$

where $b_1,\ldots,b_n$ are parameter estimates and $X_{1j},\ldots, X_{nj}$ are characteristics for the jth unit.

In the simplest example in this study, suppose one wants to calculate the probability of purchasing alcohol away from home for the control group described in the text of this article (that is, single men in the middle-income group, and so forth). Because all the independent variables in this case are binary, the only coefficient of concern is that for the intercept. In other words, using the results for the purchase of alcohol in general yields

$$P = \exp(-0.4741)/[1 + \exp(-0.4741)] = 0.384.$$

However, suppose one wanted to know the predicted probability for single women instead of single men. That probability is

$$P = \exp(-0.4741 - 0.7493)/[1 + \exp(-0.4741 - 0.7493)] = 0.227.$$

The coefficient for single women (– 0.7493) is simply added into the equation as appropriate. ■

Table 1. Purchases of alcohol by income quintile and selected demographic characteristics, 2000

	All consumer units (21 and older)	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Incomplete reporters
Number of consumer units	80,020,767	13,215,599	14,720,627	14,628,126	14,613,513	14,653,034	8,189,868
Sample size	11,276	1,727	2,010	2,063	2,138	2,202	1,136
Income before taxes (complete reporters only, except where designated otherwise)	$48,248	$8,914	$20,191	$34,647	$55,141	$118,611	$7,576
Age of reference person	49.3	56.4	50.7	45.6	44.5	45.3	57.3
Percent							
Family type:							
Husband and wife only	21.5	8.9	22.4	21.8	23.7	25.8	27.4
Husband and wife, all children under 18	20.3	4.8	12.0	19.3	30.9	38.1	11.2
Husband and wife, at least one child 18 or older	6.4	1.8	2.9	6.2	8.1	11.4	8.7
Single parent (male)	7	0.5	0.4	1.3	1.0	0.2	0.3
Single parent (female)	5.4	8.7	10.5	5.9	2.2	0.6	4.7
Single man	12.3	20.0	17.6	13.4	9.4	5.9	5.6
Single woman	15.7	42.3	16.2	11.8	6.6	2.1	19.9
Other family	17.7	13.0	18.1	20.2	18.2	16.0	22.3
Ethnic origin:							
Hispanic	9.1	10.9	13.8	11.4	7.5	4.4	5.4
Non-Hispanic	90.9	89.1	86.2	88.6	92.5	95.6	94.6
Race:							
White	83.4	78.3	81.4	84.6	84.7	88.5	82.1
Black	12.4	18.0	14.6	12.0	11.2	6.2	13.7
Asian	3.4	2.7	2.7	2.8	3.3	5.1	3.4
Other race	0.8	1.0	1.3	0.6	0.8	0.2	0.8
Occupation:							
Works for wage or salary:	65.1	36.5	57.0	74.7	84.8	85.2	37.9
Managers and professionals	20.3	4.4	8.3	16.8	28.2	48.2	9.9
Teachers	3.7	1.3	1.8	4.6	6.4	5.6	1.7
Technicians, sales, and services	25.6	21.5	29.8	32.2	29.4	20.9	14.2
Blue collar	14.2	8.5	15.1	18.9	19.4	9.6	12.0
Agriculture (farming, forestry, or fishing)	0.9	0.8	1.9	1.6	0.6	0.2	0.1
Armed services	0.4	0.0	0.1	0.6	0.8	0.7	0.0
Self-employed	5.0	4.1	4.6	5.9	3.1	5.9	7.4
Not working:	32.1	59.3	38.6	19.3	12.2	9.0	54.5
Retired	19.9	37.9	27.7	12.1	7.7	3.7	41.0
Unemployed	2.4	1.1	0.0	[1]	0.2	0.0	0.2
Other not working	9.8	20.3	10.9	7.2	4.3	5.3	13.3
Housing tenure:							
Homeowner:	66.8	48.3	56.9	61.4	75.2	86.7	73.2
Has mortgage	41.8	14.0	24.5	39.2	59.3	75.5	30.5
Owns without mortgage	25.0	34.3	32.4	22.2	15.9	11.2	42.7
Renter	33.2	51.7	43.1	38.6	24.8	13.3	26.8
Region of residence:							
Northeast	19.6	17.5	17.6	22.3	18.5	20.3	22.8
Midwest	24.1	21.2	22.8	24.3	28.0	23.6	25.2
South	35.1	40.3	39.5	32.7	32.0	30.8	35.5
West	21.2	21.0	20.1	20.7	21.5	25.3	16.5
Degree of urbanization:							
Urban	86.9	82.2	85.4	85.5	88.3	91.3	88.8
Rural	13.1	17.8	14.6	14.5	11.7	8.7	11.2

Table 1. Purchases of alcohol by income quintile and selected demographic characteristics, 2000

	All consumer units (21 and older)	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Incomplete reporters
Percent reporting							
Purchase of alcohol:							
Alcohol, total	29.0	16.7	22.9	30.9	35.8	43.2	18.6
At home	20.4	11.9	16.9	22.3	24.8	29.1	13.4
Away from home	14.6	6.9	9.2	14.4	19.8	25.6	8.5
Both types purchased[2]	6.0	2.1	3.2	5.8	8.8	11.5	3.3
Beer:	23.7	13.1	19.8	26.1	28.9	35.2	13.7
At home	14.4	8.4	13.5	17.3	17.0	18.7	8.5
Away from home	12.8	6.1	8.1	12.4	17.3	22.6	7.4
Wine:	9.9	4.3	5.5	9.0	12.4	19.3	7.3
At home	7.0	3.3	3.9	6.1	8.4	13.9	5.5
Away from home	3.7	1.2	1.9	3.3	5.0	7.7	2.1
Other alcohol:	8.3	4.0	4.9	7.4	11.2	15.1	5.8
At home	3.7	2.3	2.3	3.6	4.8	5.1	3.9
Away from home	5.3	1.8	3.0	4.4	7.2	11.4	2.3
Mean weekly expenditure							
Alcohol, total	$7.05	$3.72	$4.09	$6.49	$9.22	$13.15	$3.94
At home	4.71	3.05	3.07	4.51	5.37	8.35	3.01
Away from home	2.34	0.67	1.02	1.98	3.85	4.80	0.93
Beer:	3.70	2.24	2.68	4.18	4.93	5.48	1.70
At home	2.36	1.83	2.06	2.92	2.67	2.96	1.15
Away from home	1.34	0.41	0.62	1.26	2.26	2.52	0.55
Wine:	1.98	0.93	0.77	1.12	2.34	5.00	1.37
At home	1.63	.83	0.65	0.85	1.76	4.19	1.22
Away from home	0.36	0.10	0.12	0.27	0.58	0.81	0.15
Other alcohol:	1.36	0.55	0.64	1.19	1.95	2.67	0.87
At home	0.72	0.39	0.36	0.74	0.94	1.20	0.64
Away from home	0.64	0.16	0.28	0.45	1.01	1.47	0.23

[1] Less than 0.5 percent.
[2] This group is included in both alcohol-at-home and alcohol-away-from-home groups. When the figure shown is subtracted from the at-home and the away-from-home totals, the total percent reporting alcohol is obtained.

Table 2. Purchases of alcohol by age group and other selected demographic characteristics, 2000

	All consumer units (21 and older)	Under 25	25–34	35–44	45–54	55–64	65–74	75 and older
Number of consumer units	80,020,767	4,271,663	14,262,057	18,057,721	14,844,186	10,265,925	9,498,725	8,820,490
Sample size	11,276	591	2,073	2,517	2,093	1,477	1,287	1,238
Income before taxes (complete reporters only, except where designated otherwise)	$48,248	$24,207	$46,818	$60,703	$61,814	$49,729	$33,191	$22,659
Age of reference person	49.3	22.5	29.8	39.4	49.2	59.4	69.4	80.5
Percent								
Family type:								
Husband and wife only	21.5	12.2	12.5	8.9	19.1	37.6	42.7	28.3
Husband and wife, all children under 18	20.3	12.7	36.9	40.6	17.4	4.6	0.3	[3]
Husband and wife, at least one child 18 or older	6.4	0.0	0.2	5.6	15.0	9.5	6.3	3.1
Single parent (male)	0.7	0.4	0.7	1.5	0.8	0.2	[3]	[3]
Single parent (female)	5.4	9.9	8.9	10.1	5.3	0.3	[3]	[3]
Single man	12.3	24.2	12.3	10.9	11.9	10.6	10.0	14.9
Single woman	15.7	14.3	9.3	6.1	10.4	18.5	24.9	42.4
Other family	17.7	26.3	19.1	16.3	20.0	18.6	15.9	11.3
Ethnic origin:								
Hispanic	9.1	11.1	16.6	9.6	9.6	5.3	4.6	3.7
Non-Hispanic	90.9	88.9	83.4	90.4	90.4	94.7	95.4	96.3
Race:								
White	83.4	82.2	78.8	82.8	82.1	84.3	86.9	90.0
Black	12.4	12.8	14.0	13.7	12.7	12.9	11.1	7.8
Asian	3.4	4.8	6.2	2.1	4.0	2.8	1.7	2.1
Other race	0.8	0.2	1.0	1.4	1.2	[1]	0.3	0.1
Occupation:								
Works for wage or salary:	65.1	89.9	86.7	84.3	79.7	59.5	22.6	4.4
Managers and professionals	2.3	15.7	26.9	27.8	25.3	19.8	8.3	1.4
Teachers	3.7	3.4	5.3	3.3	6.2	4.9	0.5	0.1
Technicians, sales, and services	25.6	50.7	33.4	30.5	31.5	21.0	10.3	2.5
Blue collar	14.2	15.7	18.9	21.9	15.9	12.8	3.3	0.4
Agriculture (farming, forestry, or fishing)	0.9	3.5	1.4	0.1	0.8	0.6	0.2	[3]
Armed services	0.4	0.9	0.8	0.7	[3]	0.4	[3]	[3]
Self-employed	5.0	2.0	3.2	5.3	6.1	6.4	6.1	3.9
Not working:	32.1	8.2	10.2	9.3	14.2	34.0	71.3	91.6
Retired	19.9	0.4	0.1	0.2	1.2	18.3	65.1	86.3
Unemployed	2.4	[3]	0.3	0.3	0.3	[1]	0.5	[3]
Other not working	9.8	7.8	9.8	8.8	12.7	15.7	5.7	5.3
Housing tenure:								
Homeowner:	66.8	15.5	47.5	66.2	73.8	73.8	83.4	78.1
Has mortgage	41.8	11.9	42.3	58.2	58.1	58.1	24.9	9.8
Owns without mortgage	25.0	3.6	5.2	8.0	15.7	15.7	58.5	68.3
Renter	33.2	84.5	52.5	33.8	26.2	26.2	16.6	21.9
Region of residence:								
Northeast	19.6	9.5	18.9	18.6	19.7	21.8	21.6	23.0
Midwest	24.1	22.8	23.5	25.1	23.9	22.2	24.3	26.3
South	35.1	38.6	32.7	35.2	35.0	36.4	38.2	31.8 West
West	21.2	29.1	24.9	21.1	21.4	19.6	15.9	18.9
Degree of urbanization:								
Urban	86.9	91.3	88.2	86.9	88.6	85.4	80.4	88.1
Rural	13.1	8.7	11.8	13.1	11.4	14.6	19.6	11.9

Table 2. Purchases of alcohol by age group and other selected demographic characteristics, 2000

	All consumer units (21 and older)	Under 25	25–34	35–44	45–54	55–64	65–74	75 and older
Percent reporting								
Purchase of alcohol:								
Alcohol, total	29.0	34.6	36.5	31.7	31.5	27.4	21.3	14.3
At home	20.4	26.4	26.1	22.6	22.5	18.3	14.2	9.2
Away from home	14.6	14.9	19.4	16.0	15.6	14.9	9.9	7.1
Both types purchased[2]	6.0	6.7	9.0	6.9	6.6	5.8	2.8	2.0
Beer:	23.7	31.3	32.1	27.1	24.9	21.3	14.8	9.9
At home	14.4	23.2	21.4	17.5	14.4	10.6	7.6	4.6
Away from home	12.8	13.8	16.7	14.1	14.2	13.0	8.2	6.1
Wine:	9.9	9.1	11.1	10.4	12.7	10.0	7.0	5.9
At home	7.0	5.8	7.5	7.1	9.3	7.1	5.5	4.3
Away from home								
Other alcohol:	8.3	8.7	10.3	8.9	8.9	8.6	6.5	4.3
At home	3.7	4.8	3.4	3.8	3.2	4.5	4.2	2.6
Away from home	5.3	4.7	8.0	5.8	6.2	4.9	2.8	2.0
Mean weekly expenditure								
Alcohol, total	7.05	9.65	8.18	8.57	7.60	6.69	4.72	2.81
At home	4.71	7.46	5.18	5.33	5.10	4.35	3.78	2.12
Away from home	2.34	2.19	3.00	3.24	2.50	2.34	0.94	0.69
Beer:	3.70	6.85	4.95	4.58	3.91	3.09	1.56	1.05
At home	2.36	5.48	3.24	2.77	2.50	1.69	0.97	0.65
Away from home	1.34	1.37	1.71	1.81	1.41	1.40	0.59	0.40
Wine:	1.98	1.34	1.66	2.29	2.40	2.23	2.13	1.05
At home	1.63	1.04	1.23	1.79	2.00	1.86	2.00	.92
Away from home	0.36	0.30	0.43	0.50	0.40	0.37	0.13	0.13
Other alcohol:	1.36	1.46	1.57	1.70	1.29	1.37	1.03	0.71
At home	0.72	0.94	0.71	0.77	0.60	0.80	0.81	0.55
Away from home	0.64	0.52	0.86	0.93	0.69	0.57	0.22	0.16

[1] Less than 0.5 percent.
[2] This group is included in both alcohol-at-home and alcohol-away-from-home groups. When the figure shown is subtracted from the at-home and the away-from-home totals, the total percent reporting alcohol is obtained.
[3] No data reported.

Table 3. Purchases of alcohol by marital status and other selected demographic characteristics, 2000

	All consumer units (21 and older)	Singles only		Not single
		Men	Women	
Number of consumer units	80,020,767	9,882,436	12,584,190	57,554,141
Sample size	11,276	1,365	1,708	8,203
Income before taxes (complete reporters only, except where designated otherwise)	$48,248	$35,788	$22,042	$56,108
Age of reference person	49.3	48.2	60.0	47.1
Percent				
Family type:				
Husband and wife only	21.5	[1]	[1]	29.8
Husband and wife, all children under 18	20.3	[1]	[1]	28.2
Husband and wife, at least one child 18 or older	6.4	[1]	[1]	8.9
Single parent (male)	0.7	[1]	[1]	0.9
Single parent (female)	5.4	[1]	[1]	7.6
Single man	12.3	100.0	[1]	[1]
Single woman	15.7	[1]	100.0	[1]
Other family	17.7	[1]	[1]	24.6
Ethnic origin:				
Hispanic	9.1	5.7	3.1	11.0
Non-Hispanic	90.9	94.3	96.9	89.0
Race:				
White	83.4	85.6	84.8	82.7
Black	12.4	10.9	12.0	12.8
Asian	3.4	2.9	2.8	3.6
Other race	0.8	0.6	0.4	0.9
Occupation:				
Works for wage or salary:	65.1	65.4	45.6	69.4
Managers and professionals	20.3	20.7	15.0	21.4
Teachers	3.7	2.4	4.6	3.8
Technicians, sales, and services	25.6	23.7	22.3	26.6
Blue collar	14.2	16.4	3.4	16.2
Agriculture (farming, forestry, or fishing)	0.9	1.7	0.3	0.9
Armed services	0.4	0.5	[3]	0.5
Self-employed	5.0	6.4	2.6	5.3
Not working:	32.1	28.0	52.0	25.4
Retired	2.4	0.1	0.2	0.3
Other not working	9.8	8.2	9.2	10.2
Housing tenure:				
Homeowner:	66.8	49.4	58.2	71.6
Has mortgage.	41.8	26.2	20.5	49.1
Owns without mortgage	25.0	23.2	37.7	22.5
Renter	33.2	50.6	41.8	28.4
Region of residence:				
Northeast	19.6	19.8	21.3	19.2
Midwest	24.1	23.5	27.4	23.5
South	35.1	35.0	32.0	35.8
West	21.2	21.7	19.3	21.5
Degree of urbanization:				
Urban	86.9	90.5	89.0	85.8
Rural	13.1	9.5	11.0	14.2

Table 3. Purchases of alcohol by marital status and other selected demographic characteristics, 2000

	All consumer units (21 and older)	Singles only		Not single
		Men	Women	
Percent reporting				
Purchase of alcohol:				
Alcohol, total	29.0	34.4	16.9	30.7
At home	20.4	25.0	9.3	22.0
Away from home	14.6	17.4	10.1	15.2
Both types purchased[2]	6.0	8.0	2.5	6.5
Beer:	23.7	30.0	12.0	25.2
At home	14.4	19.8	4.4	15.7
Away from home	12.8	15.3	8.6	13.3
Wine:	9.9	10.3	6.2	10.7
At home	7.0	5.7	4.3	7.8
Away from home	3.7	5.7	2.2	3.7
Other alcohol:	8.3	11.2	4.6	8.6
At home	3.7	4.4	2.2	3.8
Away from home	5.3	7.7	2.7	5.4
Mean weekly expenditure				
Alcohol, total	7.05	10.44	2.79	7.40
At home	4.71	6.08	1.69	5.14
Away from home	2.34	4.36	1.10	2.26
Beer:	3.70	5.80	1.38	3.86
At home	2.36	3.57	0.67	2.53
Away from home.	1.34	2.23	0.71	1.33
Wine:	1.98	2.43	0.80	2.16
At home	1.63	1.55	0.65	1.85
Away from home	0.36	0.88	0.15	0.31
Other alcohol:	1.36	2.21	0.61	1.38
At home	0.72	0.96	0.37	0.76
Away from home	0.64	1.25	0.24	0.62

[1] Not available.
[2] This group is included in both alcohol-at-home and alcohol-away-from-home groups. When the figure shown is subtracted from the at-home and the away-from-home totals, the total percent reporting alcohol is obtained.
[3] No data reported.

Table 4. Parameter estimates and other results of the logit regressions on alcohol purchase patterns, 2000

Characteristic (control group value in parentheses)	Logit results			
	Parameter estimate	Standard error	Chi-square	Pr > chi-square
	Alcohol, total			
Intercept	–0.4741	0.1047	20.4963	<0.000
Age of reference person (35 to 44):				
Under 25	0.3076	0.1053	8.5411	0.0035
25 to 34	0.2466	0.0659	13.9996	0.0002
45 to 54	–0.1135	0.0678	2.7993	0.0943
55 to 64	–0.3159	0.0828	14.5675	0.0001
65 to 74	–0.4296	0.1100	15.2484	<0.0001
75 and older	–0.8070	0.1300	38.5615	<0.0001
Income quintile (quintile 3):				
Quintile 1	–0.4375	0.0878	24.8015	<0.0001
Quintile 2	–0.2861	0.0739	14.9804	0.0001
Quintile 4	0.1532	0.0685	5.0008	0.0253
Quintile 5	0.4824	0.0727	44.0884	<0.0001
Incomplete income reporters	–0.4096	0.0920	19.8067	<0.0001
Family type (single man):				
Husband and wife only	–0.0925	0.0791	1.3676	0.2422
Husband and wife, own children only	–0.4797	0.0814	34.6906	<0.0001
Other husband and wife with children	–0.1951	0.1057	3.4057	0.0650
Single father	–0.2906	0.2414	1.4494	0.2286
Single mother	–1.0723	0.1316	66.4027	<0.0001
Single woman	–07493	0.0905	68.5886	<0.0001
Other family	–0.2896	0.0795	13.2701	0.0003
Ethnic origin of reference person (non-Hispanic):				
Hispanic	–0.0628	0.0779	0.6499	0.4201
Race of reference person (white):				
Black	–0.5253	0.0810	42.0712	<0.0001
Asian	–0.3847	0.1096	12.3303	0.0004
Other race	–0.3502	0.2669	1.7217	0.1895
Occupation of reference person (manager or professional, wage or salaried):				
Teacher	–0.0911	0.1173	0.6039	0.4371
Technical, sales, or services	0.1292	0.0626	4.2587	0.0390
Blue collar	0.0346	0.0751	0.2122	0.6451
Agricultural	0.4531	0.2136	4.5014	0.0339
Armed services	0.2514	0.2837	0.7854	0.3755
Self-employed	0.0129	0.1073	0.0144	0.9046
Retired	0.0723	0.1059	0.4662	0.4948
Unemployed long term	–0.6179	0.6308	0.9596	0.3273
Not working, other reason	–0.3305	0.0950	12.1095	0.0005
Housing tenure (homeowner with mortgage):				
Homeowner no mortgage	–0.0477	0.0674	0.4992	0.4798
Renter	–0.0155	0.0575	0.0723	0.7880
Region of residence (South):				
Northeast	0.2978	0.0639	21.6987	<0.0001
Midwest	0.2903	0.0602	23.2703	<0.0001
West	0.2285	0.0600	14.5163	0.0001
Degree of urbanization (urban):				
Rural	–0.4238	0.0842	25.3511	<0.0001
	Alcohol at home			
Intercept	–1.1579	0.1168	98.2728	<0.0001
Age of reference person (35 to 44):				
Under 25	0.3185	0.1138	7.8368	0.0051

Table 4. Parameter estimates and other results of the logit regressions on alcohol purchase patterns, 2000

Characteristic (control group value in parentheses)	Logit results			
	Parameter estimate	Standard error	Chi-square	Pr > chi-square
	Alcohol at home—Continued			
25 to 34	0.1773	0.0720	6.0620	0.0138
45 to 54	–0.0441	0.0745	0.3503	0.5540
55 to 64	–0.3031	0.0934	10.5272	0.0012
65 to 74	–0.4555	0.1263	13.0060	0.0003
75 and older	–0.8446	0.1518	30.9599	<0.0001
Income quintile (quintile 3):				
Quintile 1	–0.3573	0.0995	12.8953	0.0003
Quintile 2	–0.2210	0.0823	7.2202	0.0072
Quintile 4	0.0545	0.0759	0.5164	0.4724
Quintile 5	0.2399	0.0802	8.9408	0.0028
Incomplete income reporters	–0.3521	0.1038	11.5177	0.0007
Family type (single man):				
Husband and wife only	–0.0521	0.0875	0.3543	0.5517
Husband and wife, own children only	–0.2185	0.0891	6.0163	0.0142
Other husband and wife with children	–0.0531	0.1156	0.2113	0.6457
Single father	–0.3249	0.2718	1.4284	0.2320
Single mother	–1.1369	0.1574	52.1439	<0.0001
Single woman	–0.9314	0.1089	73.1263	<0.0001
Other family	–0.1672	0.0872	3.6803	0.0551
Ethnic origin of reference person (non-Hispanic):				
Hispanic	0.1099	0.0830	1.7526	0.1855
Race of reference person (white):				
Black	–0.3580	0.0899	15.8760	<0.0001
Asian	–0.3680	0.1246	8.7175	0.0032
Other race	–0.4521	0.3068	2.1715	0.1406
Occupation of reference person (manager or professional, wage or salaried):				
Teacher	–0.1204	0.1363	0.7798	0.3772
Technical, sales, or services	0.2559	0.0697	13.4980	0.0002
Blue collar	0.2208	0.0823	7.1906	0.0073
Agricultural	0.7617	0.2191	12.0920	0.0005
Armed services	0.7945	0.2840	7.8288	0.0051
Self-employed	–0.0083	0.1229	0.0045	0.9464
Retired	0.2674	0.1217	4.8284	0.0280
Unemployed long term	–0.1551	0.6299	0.0606	0.8055
Not working, other reason	–0.1162	0.1054	1.2149	0.2704
Housing tenure (homeowner with mortgage):				
Homeowner no mortgage	–0.0192	0.0761	0.0636	0.8009
Renter	0.0035	0.0635	0.0030	0.9567
Region of residence (South):				
Northeast	0.2379	0.0710	11.2192	0.0008
Midwest	0.1854	0.0674	7.5557	0.0060
West	0.1813	0.0665	7.4371	0.0064
Degree of urbanization (urban):				
Rural	–0.4292	0.0964	19.8406	<0.0001
Type of alcohol purchased:				
Alcohol for consumption away from home	0.0173	0.0022	61.4922	<0.0001
	Alcohol away from home			
Intercept	–1.3053	0.1314	98.6242	<.0001
Age of reference person (35 to 44):				
Under 25	0.1957	0.1380	2.0110	0.1562
25 to 34	0.3044	0.0824	13.6458	0.0002

Table 4. Parameter estimates and other results of the logit regressions on alcohol purchase patterns, 2000

Characteristic (control group value in parentheses)	Logit results			
	Parameter estimate	Standard error	Chi-square	Pr > chi-square
	Alcohol away from home—Continued			
45 to 54	–0.1808	0.0864	4.3757	0.0365
55 to 64	–0.2171	0.1045	4.3120	0.0378
65 to 74	–0.3970	0.1441	7.5897	0.0059
75 and older	–0.5690	0.1716	10.9909	0.0009
Income quintile (quintile 3):				
Quintile 1	–0.4909	0.1225	16.0642	<0.0001
Quintile 2	–0.3016	0.1011	8.8954	0.0029
Quintile 4	0.2862	0.0873	10.7341	0.0011
Quintile 5	0.6007	0.0910	43.5773	<0.0001
Incomplete income reporters	–0.3696	0.1280	8.3396	0.0039
Family type (single man):				
Husband and wife only	–0.0995	0.0984	1.0234	0.3117
Husband and wife, own children only	–0.6775	0.1035	42.8473	<0.0001
Other husband and wife with children	–0.3196	0.1351	5.5944	0.0180
Single father	–0.6523	0.3300	3.9073	0.0481
Single mother	–07275	0.1724	17.7999	<0.0001
Single woman	–0.3575	0.1131	9.9967	0.0016
Other family	–0.3951	0.1023	14.9156	0.0001
Ethnic origin of reference person (non-Hispanic):				
Hispanic	–0.4688	0.1153	16.5228	<0.0001
Race of reference person (white):				
Black	–0.7365	0.1202	37.5312	<0.0001
Asian	–0.3744	0.1436	6.7928	0.0092
Other race	–0.1918	0.3554	0.2914	0.5893
Occupation of reference person (manager or professional, wage or salaried):				
Teacher	–0.0630	0.1384	0.2073	0.6489
Technical, sales, or services	–0.0965	0.0757	1.6263	0.2022
Blue collar	–0.3175	0.0966	10.8138	0.0010
Agricultural	–0.4291	0.3224	1.7721	0.1831
Armed services	–0.4104	0.3782	1.1774	0.2779
Self-employed	–0.0111	0.1305	0.0073	0.9319
Retired	–0.2224	0.1377	2.6092	0.1062
Unemployed long term	–11.5682	201.4000	0.0033	0.9542
Not working, other reason	–0.6136	0.1330	21.2917	<0.0001
Housing tenure (homeowner with mortgage):				
Homeowner no mortgage	–0.1362	0.0886	2.3609	0.1244
Renter	–0.0819	0.0740	1.2256	0.2683
Region of residence (South):				
Northeast	0.2340	0.0824	8.0587	0.0045
Midwest	0.2829	0.0769	13.5133	0.0002
West	0.1778	0.0779	5.2164	0.0224
Degree of urbanization (urban):				
Rural	–0.2208	0.1095	4.0682	0.0437
Type of alcohol purchased				
Alcohol for consumption away from home	0.0181	0.0016	125.3391	<0.0001
	Alcohol at home and alcohol away from home			
Intercept	–1.9918	0.1829	118.5713	<0.0001
Age of reference person (35 to 44):				
Under 25	0.3589	0.1880	3.6434	0.0563
25 to 34	0.3085	0.1132	7.4340	0.0064
45 to 54	–0.1963	0.1205	2.6563	0.1031

Table 4. Parameter estimates and other results of the logit regressions on alcohol purchase patterns, 2000

Characteristic (control group value in parentheses)	Logit results			
	Parameter estimate	Standard error	Chi-square	Pr > chi-square
	Alcohol at home and alcohol away from home —Continued			
55 to 64	–0.3268	0.1507	4.7008	0.0301
65 to 74	–0.8113	0.2330	12.1242	0.0005
75 and older	–0.8939	0.2811	10.1150	0.0015
Income quintile (quintile 3):				
Quintile 1	–0.6653	0.2013	10.9182	0.0010
Quintile 2	–0.3272	0.1535	4.5440	0.0330
Quintile 4	0.3343	0.1249	7.1651	0.0074
Quintile 5	0.5858	0.1295	20.4516	<0.0001
Incomplete income reporters	–0.3699	0.1991	3.4501	0.0632
Family type (single man):				
Husband and wife only	–0.1450	0.1363	1.1324	0.2873
Husband and wife, own children only	–0.7011	0.1415	24.5382	<0.0001
Other husband and wife with children	–0.2276	0.1837	1.5344	0.2154
Single father	–1.7053	0.7267	5.5062	0.0189
Single mother	–1.3269	0.3028	19.2059	<0.0001
Single woman	–0.8691	0.1854	21.9819	<0.0001
Other family	–0.4285	0.1423	9.0715	0.0026
Ethnic origin of reference person (non-Hispanic):				
Hispanic	–0.3771	0.1595	5.5871	0.0181
Race of reference person (white):				
Black	–0.8317	0.1873	19.7237	<0.0001
Asian	–0.7441	0.2331	10.1877	0.0014
Other race	–0.3315	0.5238	0.4007	0.5268
Occupation of reference person (manager or professional, wage or salaried):				
Teacher	–0.3262	0.2108	2.3936	0.1218
Technical, sales, or services	–0.0185	0.1044	0.0315	0.8591
Blue collar	–0.2494	0.1349	3.4196	0.0644
Agricultural	–0.0917	0.4091	0.0503	0.8226
Armed services	0.3739	0.3985	0.8807	0.3480
Self-employed	–0.0689	0.1903	0.1310	0.7174
Retired	–0.0978	0.2171	0.2032	0.6522
Unemployed long term	–11.2583	288.2000	.0015	0.9688
Not working, other reason	–0.6011	0.1988	9.1399	0.0025
Housing tenure (homeowner with mortgage):				
Homeowner no mortgage	–0.2426	0.1356	3.2030	0.0735
Renter	–0.1114	0.1052	1.1221	0.2895
Region of residence (South):				
Northeast	0.1459	0.1183	1.5218	0.2174
Midwest	0.1402	0.1107	1.6050	0.2052
West	0.1514	0.1095	1.9114	0.1668
Degree of urbanization (urban):				
Rural	–0.2788	0.1624	2.9457	0.0861
	Beer			
Intercept	–1.1944	0.1202	98.7746	<0.0001
Age of reference person (35 to 44):				
Under 25	0.2794	0.1160	5.8050	0.0160
25 to 34	0.2044	0.0733	7.7706	0.0053
45 to 54	–0.2487	0.0776	10.2743	0.0013
55 to 64	–0.4444	0.0965	21.2240	<0.0001
65 to 74	–0.6851	0.1323	26.8169	<0.0001
75 and older	–1.0011	0.1579	4.1924	<0.0001

Table 4. Parameter estimates and other results of the logit regressions on alcohol purchase patterns, 2000

Characteristic (control group value in parentheses)	Logit results			
	Parameter estimate	Standard error	Chi-square	Pr > chi-square
	Beer—Continued			
Income quintile (quintile 3):				
Quintile 1	–0.3618	0.1002	13.0291	0.0003
Quintile 2	–0.1609	0.0830	3.7578	0.0526
Quintile 4	–0.0241	0.0784	0.0944	0.7587
Quintile 5	0.1772	0.0832	4.5310	0.0333
Incomplete income reporters	–0.5580	0.1101	25.6931	<0.0001
Family type (single man):				
Husband and wife only	–0.1248	0.0908	1.8898	0.1692
Husband and wife, own children only	–0.3699	0.0919	16.1972	<0.0001
Other husband and wife with children	–0.2430	0.1226	3.9307	0.0474
Single father	–0.6450	0.2922	4.8720	0.0273
Single mother	–1.0858	0.1514	51.4280	<0.0001
Single woman	–0.8272	0.1072	59.5817	<0.0001
Other family	–0.2681	0.0905	8.7658	0.0031
Ethnic origin of reference person (non-Hispanic):				
Hispanic	0.1383	0.0862	2.5710	0.1088
Race of reference person (white):				
Black	–0.4405	0.0934	22.2337	<0.0001
Asian	–0.0272	0.1217	0.0500	0.8231
Other race	–0.4034	0.3142	1.6487	0.1991
Occupation of reference person (manager or professional, wage or salaried):				
Teacher	–0.0312	0.1386	0.0506	0.8220
Technical, sales, or services	0.2266	0.0724	9.7906	0.0018
Blue collar	0.3630	0.0846	18.3947	<0.0001
Agricultural	0.5969	0.2294	6.7688	0.0093
Armed services	0.6854	0.3022	5.1442	0.0233
Self-employed	0.0699	0.1261	0.3075	0.5792
Retired	0.2404	0.1279	3.5300	0.0603
Unemployed long term	–0.4230	0.6913	0.3744	0.5406
Not working, other reason	–0.0920	0.1084	0.7199	0.3962
Housing tenure (homeowner with mortgage):				
Homeowner no mortgage	–0.0777	0.0791	0.9634	0.3263
Renter	0.0446	0.0654	0.4655	0.4951
Region of residence (South):				
Northeast	0.2833	0.0738	14.7555	0.0001
Midwest	0.3047	0.0693	19.3346	<0.0001
West	0.1180	0.0693	2.9012	0.0885
Degree of urbanization (urban):				
Rural	–0.1413	0.0933	2.2920	0.1300
Type of alcohol purchased:				
Purchased wine	1.4732	0.0826	318.0120	<0.0001
Purchased another alcohol	1.8090	0.0953	360.5648	<0.0001
Purchased wine and another alcohol	0.2146	0.1938	1.2265	0.2681
	Wine			
Intercept	–2.9972	0.1783	282.7000	<0.0001
Age of reference person (35 to 44):				
Under 25	0.2933	0.1799	2.6567	0.1031
25 to 34	0.0643	0.1094	0.3451	0.5569
45 to 54	0.3258	0.1072	9.2425	0.0024
55 to 64	0.2068	0.1334	2.4022	0.1212
65 to 74	0.0941	0.1800	0.2729	0.6014
75 and older	0.0200	0.2115	0.0090	0.9246

Table 4. Parameter estimates and other results of the logit regressions on alcohol purchase patterns, 2000

Characteristic (control group value in parentheses)	Logit results			
	Parameter estimate	Standard error	Chi-square	Pr > chi-square
	Wine—Continued			
Income quintile (quintile 3):				
Quintile 1	–0.3014	0.1582	3.6306	0.0567
Quintile 2	–0.2527	0.1330	3.6102	0.0574
Quintile 4	0.1887	0.1137	2.7517	0.0972
Quintile 5	0.4614	0.1158	15.8821	<0.0001
Incomplete income reporters	0.1291	0.1490	0.7513	0.3861
Family type (single man):				
Husband and wife only	0.0787	0.1300	0.3666	0.5449
Husband and wife, own children only	0.1395	0.1345	1.0765	0.2995
Other husband and wife with children	0.1119	0.1690	0.4380	0.5081
Single father	0.2328	0.3951	0.3472	0.5557
Single mother	–0.0507	0.2258	0.0504	0.8224
Single woman	0.0302	0.1515	0.0397	0.8420
Other family	–0.0376	0.1345	0.0781	0.7798
Ethnic origin of reference person (non-Hispanic):				
Hispanic	–0.2494	0.1394	3.2015	0.0736
Race of reference person (white):				
Black	–0.2846	0.1397	4.1493	0.0417
Asian	–0.6004	0.1989	9.1125	0.0025
Other race	–0.1145	0.4709	0.0591	0.8079
Occupation of reference person (manager or professional, wage or salaried):				
Teacher	–0.1149	0.1780	0.4167	0.5186
Technical, sales, or services	–0.1094	0.0955	1.3115	0.2521
Blue collar	–0.5779	0.1294	19.9599	<0.0001
Agricultural	–0.6064	0.4275	2.0118	0.1561
Armed services	–0.7662	0.5178	2.1895	0.1390
Self-employed	–0.1024	0.1652	0.3845	0.5352
Retired	–0.1846	0.1684	1.2029	0.2727
Unemployed long term	–0.9262	1.1455	0.6537	0.4188
Not working, other reason	–0.6230	.1689	13.6054	0.0002
Housing tenure (homeowner with mortgage):				
Homeowner no mortgage	0.0162	0.1098	0.0218	0.8827
Renter	–0.2146	0.0967	4.9199	0.0265
Region of residence (South):				
Northeast	0.1805	0.1014	3.1686	0.0751
Midwest	–0.1860	0.1003	3.4416	0.0636
West	0.1555	0.0960	2.6234	0.1053
Degree of urbanization (urban):				
Rural	–0.5842	0.1591	13.4874	0.0002
Type of alcohol purchased:				
Purchased beer	1.4781	0.0823	322.3686	<0.0001
Purchased another alcohol	1.4416	0.1669	74.6139	<0.0001
Purchased beer and another alcohol	0.2136	0.1931	1.2230	0.2688
	Another alcohol			
Intercept	–3.1624	0.1913	273.2494	<0.0001
Age of reference person (35 to 44):				
Under 25	–0.0362	0.1899	0.0363	0.8489
25 to 34	0.1603	0.1150	1.9423	0.1634
45 to 54	–0.1186	0.1200	0.9763	0.3231
55 to 64	–0.0669	0.1460	0.2098	0.6469
65 to 74	0.1273	0.1915	0.4417	0.5063
75 and older	–0.0402	0.2326	0.0299	0.8628

Table 4. Parameter estimates and other results of the logit regressions on alcohol purchase patterns, 2000

Characteristic (control group value in parentheses)	Logit results			
	Parameter estimate	Standard error	Chi-square	Pr > chi-square
	Another alcohol—Continued			
Income quintile (quintile 3):				
Quintile 1	–0.2224	0.1700	1.7113	0.1908
Quintile 2	–0.1768	0.1425	1.5397	0.2147
Quintile 4	0.3201	0.1233	6.7399	0.0094
Quintile 5	0.4278	0.1287	11.0468	0.0009
Incomplete income reporters	0.0696	0.1686	0.1703	0.6799
Family type (single man):				
Husband and wife only	–0.1649	0.1327	1.5440	0.2140
Husband and wife, own children only	–0.7449	0.1433	27.0278	<0.0001
Other husband and wife with children	–0.1470	0.1794	0.6718	0.4124
Single father	0.2641	0.3785	0.4868	0.4854
Single mother	–0.5883	0.2501	5.5334	0.0187
Single woman	–0.4545	0.1621	7.8643	0.0050
Other family	–0.2688	0.1363	3.8901	0.0486
Ethnic origin of reference person (non-Hispanic):				
Hispanic	–0.5377	0.1629	1.8983	0.0010
Race of reference person (white):				
Black	–0.1530	0.1496	1.0460	0.3064
Asian	–0.5739	0.2180	6.9304	0.0085
Other race	0.2898	0.4528	0.4098	0.5221
Occupation of reference person (manager or professional, wage or salaried):				
Teacher	–0.1699	0.2024	0.7042	0.4014
Technical, sales, or services	–0.1351	0.1050	1.6558	0.1982
Blue collar	–0.4466	0.1387	1.3688	0.0013
Agricultural	–0.1272	0.4046	0.0988	0.7533
Armed services	–0.1766	0.4906	0.1296	0.7189
Self-employed	0.0741	0.1778	0.1735	0.6770
Retired	–02470	0.1856	1.7713	0.1832
Unemployed long term	0.6229	0.8580	0.5272	0.4678
Not working, other reason	–03382	0.1806	3.5049	0.0612
Housing tenure (homeowner with mortgage):				
Homeowner no mortgage	–0.0551	0.1242	0.1971	0.6570
Renter	0.0717	0.1034	0.4814	0.4878
Region of residence (South):				
Northeast	–0.1086	0.1173	0.8579	0.3543
Midwest	0.2482	0.1059	5.4901	0.0191
West	0.1782	0.1063	2.8119	0.0936
Degree of urbanization (urban):				
Rural	–0.4489	0.1700	6.9713	0.0083
Type of alcohol purchased:				
Purchased beer	1.8210	0.0950	367.7814	<0.0001
Purchased wine	1.4733	0.1662	78.6136	<0.0001
Purchased beer and wine	0.1604	0.1918	0.6989	0.4032

The Cost and Demographics of Vehicle Acquisition

LAURA PASZKIEWICZ

Transportation costs make up a large part of a consumer's budget. Consumer Expenditure (CE) Survey data for 2000 indicate that 88 percent of all consumer units[1] either owned or leased a vehicle,[2] and expenditures for leasing and purchasing (the latter defined as a net outlay) vehicles made up almost 10 percent of the average consumer unit's total expenditures.

In April 1991, the CE Survey began to ask for detailed information on the leasing of vehicles. Since that time, the incidence of leasing a vehicle increased steadily before tapering off in recent years. With the introduction of the more detailed data, it is possible to investigate the factors that contribute to a consumer's decision to lease a vehicle, as opposed to purchasing it. The main factor contributing to this decision is the varying cost of each option. Using recent CE Survey data, this article examines the initial and monthly costs involved in leasing a vehicle, purchasing a new vehicle, and purchasing a used vehicle. The article presents details on the demographic breakdown of consumers who lease, buy new, or buy used vehicles.

[1] See the glossary at the end of this anthology for the definition of *consumer unit*.

[2] In the published CE data, vehicles are defined as cars, trucks (including minivans, vans, sports utility vehicles (SUVs), and jeeps), and other vehicles (motorcycles and aircrafts). Henceforth, the term vehicle will encompass only cars and trucks.

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Methodology

The sample used for this article includes all Interview survey participants from 1999 or 2000 who reported a new lease[3] or purchase of a vehicle in the year in which the interview took place. (In other words, the sample consists of all participants in the 2000 Survey who leased or purchased a vehicle in 2000, as well as all participants in the 1999 Survey who leased or purchased a vehicle in 1999.) Respondents who reported using the vehicle for business, or, alternatively, receiving complete or partial payment for the vehicle by an employer are excluded from the sample.

Costs involved in leasing versus buying are investigated. Average downpayments and monthly payments are compared, as are the average durations over which payments are made. The investigation further includes analyses of leasing and buying by the following demographic characteristics: Age, race, gender, income quintile, geographical region, and type of area (urban vs. rural).

Background

The increase in the frequency of leasing vehicles in recent years has been captured in a new section of the CE Survey added in April 1991. Leases

[3] The time at which a lease is started is determined by the year in which the first payment was made on the lease.

made up 2.7 percent of all new acquisitions of vehicles[4] in 1991. By 1997, leasing had reached 10.0 percent of all recent car acquisitions. (See chart 1, top panel.) After 1997, the incidence of leasing began to decline, falling to 7.2 percent of vehicle acquisitions in 2000. With the increasing popularity of leasing during 1991–97, new-vehicle purchases decreased as an overall percentage of vehicle acquisitions, dropping from 27 percent in 1991 to 21 percent in 1997. After 1997, the incidence of new-vehicle purchases began to rise, reaching 25.6 percent of vehicles acquired in 2000. Used-vehicle purchases made up 70.4 percent of all acquisitions of vehicles in 1991. From 1991 to 1996, the percentage rose to 72.7 percent, after which it began to fall. In 2000, used-vehicle purchases made up 67.2 percent of all vehicle acquisitions.

In 1999 and 2000, the total percentage of consumer units acquiring a vehicle was just under 4 percent of the entire population. Of those who reported a recent acquisition, 66 percent bought a used vehicle, 26 percent bought a new one, and the remaining 8 percent leased a vehicle. (See table 1.)

Costs

One of the factors involved in choosing a method of acquisition is cost. Among the costs incurred in acquiring a vehicle are downpayments and monthly payments for leasing and purchasing.

Overall, 81 percent of new-vehicle purchasers financed their purchases, compared with 56 percent of used-vehicle purchasers. The CE Survey asks questions regarding the amount of downpayments and monthly payments for purchased vehicles of those respondents in the sample who financed the vehicle and have monthly payments remaining. Of those purchasers who financed, 87 percent of new-vehicle purchasers and 79 percent of used-vehicle purchasers had payments remaining.

Downpayments are a good indicator of upfront costs for acquiring a vehicle—costs that could dictate whether to lease a vehicle, buy a used vehicle, or buy a new vehicle. Lessees paid $868,[5] on average, as a downpayment, about 76 percent of the amount that a used-vehicle purchaser paid as a downpayment ($1,147) and only 30 percent of the amount that a new-vehicle purchaser put for a downpayment ($2,914). (See table 2.) The maximum downpayment was $8,500 for lessees, $37,000 for new-vehicle purchasers, and $19,000 for used-vehicle purchasers. These data suggest that the initial costs for leasing an automobile are lower than the costs for purchasing either a new or used vehicle. The difference in downpayments can be partially explained by the main difference between leases and purchases: with leases, the downpayment is for a service; with purchases, the downpayment is for an asset.

Monthly costs also could be a factor in deciding whether to lease, buy new, or buy used. The average monthly payment was $353 for lessees, $399 for new-vehicle purchasers, and $273 for used-vehicle purchasers. Thus, although lessees have a lower monthly payment than do new-vehicle purchasers, they still have a higher monthly payment than do used-vehicle purchasers.

The amount of time it takes to pay off a loan or to complete a lease also could have an effect both on a person's decision to lease, buy new, or buy used and on the total cost of the vehicle. On average, new-vehicle buyers made 54 monthly payments, used-vehicle buyers 43, and lessees 39. The most common term for leasing was 3 years, and 50 percent of lessees chose that term. For new-vehicle purchasers, the most common term for financing was 5 years, and 55 percent of new-car purchasers chose that term. For used-vehicle purchasers, a number of terms were common, but the top two were 5-year terms (chosen by 27 percent) and 4-year terms (selected by 24 percent).

Demographic analysis

The demographic analysis in this section examines the entire sample of those acquiring a vehicle in 1999 or 2000, including consumers who financed their vehicles and those who did not. (See table 1.)

Income. Consumers who purchased used vehicles had the least income, on average. The average annual income (based on complete income reporters[6]) of someone who bought a used vehicle was $48,004, compared with $72,992 for lessees and $69,875 for new-vehicle purchasers. Overall, nearly 30 percent of those who recently acquired a vehicle were in the highest income quintile; the 30-percent figure was more than that for the first and second income quintiles combined.[7] The percentage of used-vehicle purchases decreases and the percentages of both new-vehicle purchases and leasings of vehicles increases as one proceeds from a lower income quintile to a higher income quintile.

Among the consumer units that bought or leased a vehicle, those in the lowest income quintile were the most likely to buy a used car (80.9 percent). In comparison, only 54.1 percent of auto purchasers in the fifth quintile bought used vehicles. Almost 36 percent of those leasing or buying in the highest income quintile bought a new car; the figure was 10 percentage points higher than that of the fourth income quintile and more than 20 percentage points higher than that of the lowest income quintile.

Age.[8] Twenty-eight percent of those acquiring vehicles in 1999 and 2000

[4] New acquisitions of vehicles include purchases of new vehicles, purchases of used vehicles, and leases of vehicles.

[5] In computing these averages, those who recently acquired a vehicle and reported no downpayment were counted as having zero dollars for a downpayment.

[6] See "Glossary" in Appendix A at the end of this anthology for the definition of *complete income reporter*.

[7] See "Glossary" in Appendix A at the end of this anthology for the definition of *quintiles of income before taxes*.

[8] Both the age and race variables refer to the age or race of the reference person—the person first mentioned when the respondent is asked, "Start with the name of the person or one of the persons who owns or rents the home."

were in the 35-to 44-year-old age bracket, although that age group made up just 22 percent of the population. Both the 25- to 34-year-old age group and the 45- to 54-year-old age group also made up large portions of those acquiring vehicles. Each of the two groups accounted for more than 20 percent of all acquisitions, yet made up less than 20 percent of the population. The oldest group (75 and older) acquired the fewest vehicles, with only 2.6 percent of acquisitions, much less than their 9.6-percent share of the population.

The average age was 44 for consumers leasing vehicles, 47 for consumers buying new vehicles, and 42 for consumers buying used vehicles. As these data imply, the probability of choosing a used car over a new car decreases with age. The incidence of leasing ranges from 7.9 percent to 8.6 percent for those 25 to 64, peaking in the age range from 55 to 64. Consumers under the age of 25 or over the age of 75 who acquired a vehicle were the least likely to lease, with 5.4 percent and 4.9 percent, respectively, doing so.

Gender. In order to examine the statistics on vehicle acquisitions by gender, the sample was divided into subsets that include only single-member consumer units. The CE Interview survey collects expenditure data for all members within the consumer unit combined, not for each member separately. By using single consumer units instead, a differentiation can be made between the expenditures of men and those of women.

Men acquired a slightly larger percentage of vehicles than their share of the single population in 1999–2000. The figures were 58 percent and 54 percent, respectively.

Results of this portion of the study suggest that men and women acquire vehicles differently. A total of 9.6 percent of single men in the sample leased vehicles, 20.6 percent bought new vehicles, and 69.9 percent purchased used vehicles. By contrast, 11.5 percent of single women leased vehicles, 36.9 percent bought new vehicles, and 51.5 percent bought used vehicles.

Even though single women acquired a smaller percentage of vehicles than their share of the population, they purchased a greater percentage of new vehicles and leased a greater percentage of vehicles than their population share. In particular, women made up 46 percent of the singles population, yet purchased 56.9 percent of all new vehicles, and leased 46.9 percent of all leased vehicles, among singles.

Region. Acquisitions of vehicles vary by region. With 31 percent and 16 percent, respectively, of total acquisitions, consumer units in the South and the Northeast acquired smaller percentages of vehicles than their population shares in 1999–2000: 35 percent and 19 percent of the total U.S. population. By contrast, with 27 percent and 25 percent, respectively, of vehicle acquisitions, consumer units in the Midwest and the West acquired higher percentages of vehicles than their population shares of 24 percent and 22 percent of the total U.S. population.

Consumers acquiring vehicles in the Northeast were more likely to lease than were those in the West, at 12.6 percent, in contrast to 4.8 percent. Consumer units in the West were more likely to buy a used vehicle, with 66 percent of those acquiring vehicles doing so, compared with 58 percent of those in the Northeast. The Northeast and the West both had about 30 percent of their vehicle-acquiring population reporting a purchase of a new vehicle. The Midwest and the South varied only slightly in the three kinds of acquisitions: in the Midwest, 9 percent of those who acquired vehicles leased them, 23 percent bought them new, and 69 percent purchased them used; in the South, 8 percent leased their vehicles, 25 percent purchased them new, and 67 percent bought them used.

Type of area (urban vs. rural). Consumers in urban and rural areas each acquired roughly the same percentage of vehicles as their population share. The methods of acquisition that consumers in the two areas chose, however, were considerably different.

Consumer units in urban areas were more likely to lease or buy a new vehicle than were those in rural areas. Among consumer units acquiring vehicles, 3.3 percent of those living in rural areas leased their vehicles, whereas 8.5 percent of those living in urban areas did so. Almost 27 percent of consumer units in urban areas bought new vehicles, compared with 22.6 percent of those in rural areas. Someone living in a rural area was more likely to buy a used car (71.4 percent) than was someone in an urban area (64.8 percent).

Race.[9] The CE Survey has four race categories: White; black; Asian or Pacific Islander; and American Indian, Aleut, or Eskimo.

Persons of Asian or Pacific Islander heritage accounted for just 3.1 percent of the population acquiring vehicles and were the most differentiated in terms of the three ways of acquiring them, compared with the other races. A little more than half of their population acquiring vehicles bought a used vehicle, 42 percent purchased a new vehicle, and the remaining 7 percent leased a vehicle. Among the remaining racial groups, the most similar in terms of vehicle acquisition method was the white population, which accounted for most (88 percent) of the population acquiring vehicles: among whites, 65.5 percent bought used vehicles, 26.5 percent purchased new ones, and 8 percent leased vehicles.

The black population and the American Indian, Aleut, and Eskimo population were most different from the group of Asian and Pacific Islander descent in their distribution over the three kinds of arrangements for acquiring a vehicle. The two populations were similar to each other in having the lowest percentage of leases and new-vehicle purchases and the highest percentage of

[9] Both the age and race variables refer to the age or race of the reference person, the person who was first mentioned when the respondent is asked, "Start with the name of the person or one of the persons who owns or rents the home."

used-vehicle purchases. Among black consumer units acquiring vehicles, 5.3 percent leased, 19.6 percent purchased a new vehicle, and 75.2 percent bought a used vehicle. Among American Indians, Aleuts, and Eskimos, 4.2 percent leased a vehicle, 16.5 percent purchased a new vehicle, and 79.4 percent purchased a used one.

Conclusion

The 1999–2000 CE Survey data on vehicle acquisition indicates that, overall, purchasing used vehicles is the most common method of acquiring a vehicle. This is because it is typically less expensive to purchase a used vehicle than it is to buy a new vehicle or lease a vehicle. By contrast, cost is not the predominant factor in choosing to purchase a new vehicle over leasing one. Even though leasing a vehicle is financially less of a burden compared with purchasing a new vehicle, the next most common method of acquiring a vehicle is purchasing new vehicles. Leasing remains the least common method.

The 1999–2000 data also suggest that the choice of a vehicle acquisition method varies by age, race, gender, income level, region, and degree of urbanization. The largest differences occur with respect to income levels, gender, and race.

In addition to demographic differences and various expenses involved in the decision to lease a vehicle, purchase a new vehicle, or purchase a used vehicle, several other factors enter into the decision as well. The availability of leases or new vehicles in different regions may affect the frequency with which one can obtain a lease or find a suitable vehicle to purchase. Further, the desirability of owning an asset may spur an individual to purchase rather than lease. If, instead, the vehicle's intended use is most important to a person, then leasing might be preferred. Finally, the types of vehicles available under a lease may impel a consumer to lease rather than buy: if a consumer can drive a luxury car by leasing it for the same cost as purchasing a standard car, he or she may prefer to lease. ■

Table 1. Percent of consumer units reporting vehicle acquisitions, by type of acquisition, selected consumer unit characteristics, 1999–2000

	Among groups		Within groups		
	Percent of general population	Percent of all acquisitions	Leased	Bought new	Bought used
All	100.0	100.0	7.73	26.15	66.12
Income:[1]					
Quintile 1	20.0	9.3	4.7	14.4	80.9
Quintile 2	20.0	15.3	4.0	19.9	76.0
Quintile 3	20.0	20.4	5.5	20.0	74.5
Quintile 4	20.0	26.0	7.2	26.2	66.6
Quintile 5	20.0	29.0	10.2	35.8	54.1
Region:					
Northeast	19.3	17.2	12.3	29.0	58.7
Midwest	23.6	26.8	8.1	21.9	70.0
West	34.9	34.2	4.7	28.5	66.8
South	22.2	21.8	8.5	25.5	66.1
Degree of urbanization:					
Urban	87.6	85.6	8.5	26.8	64.8
Rural	12.4	14.5	3.3	22.6	74.1
Race:					
White	83.8	87.4	8.0	26.5	65.5
Black	12.1	8.9	5.3	19.6	75.2
American Indian, Aleut, Eskimo	1.0	1.1	4.2	16.4	79.4
Asian or Pacific Islander	3.1	2.7	7.4	42.3	50.3
Age:					
Under 25	7.5	7.2	5.4	16.9	77.7
25–34	17.6	21.5	7.9	22.5	69.6
35–44	22.3	27.5	8.1	22.4	69.4
45–54	19.6	23.4	8.2	26.1	65.7
55–64	12.7	11.4	8.6	37.1	54.3
65–74	10.7	6.4	5.8	39.1	55.1
75 and older	9.6	2.6	4.9	41.6	53.5
Gender:					
Male	54.3	57.7	9.6	20.6	69.9
Female	45.7	42.4	11.5	36.9	51.5

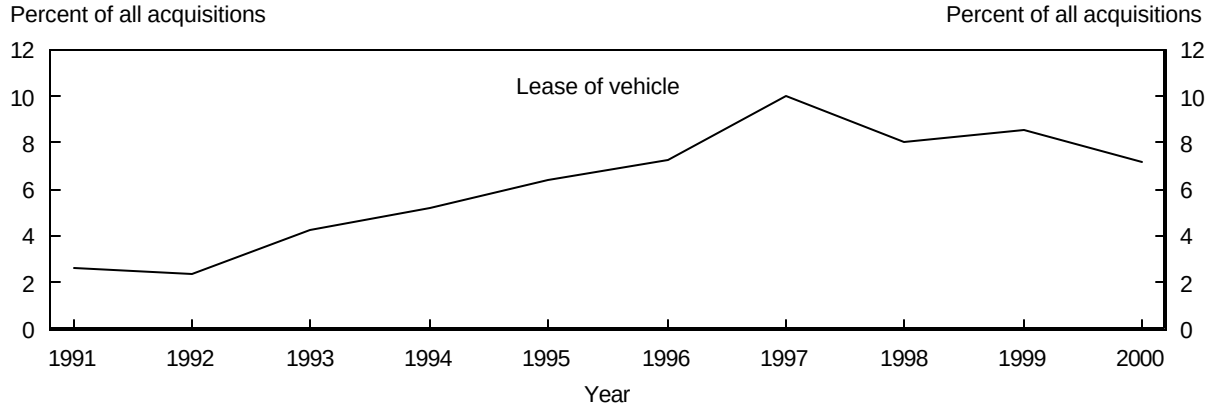
[1] Percentage represents the percent of complete reporters.

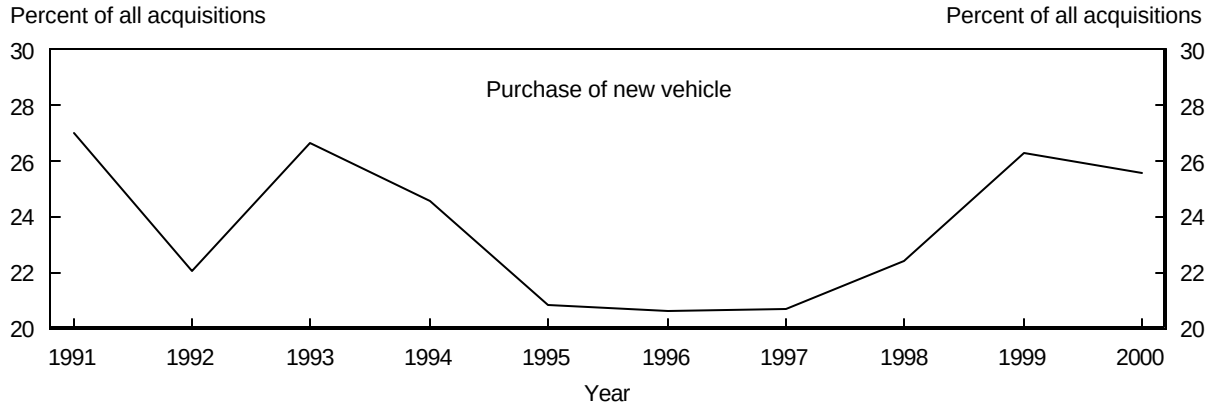
Table 2. Costs and term of vehicle acquisitions, by type of acquisition, 1999–2000

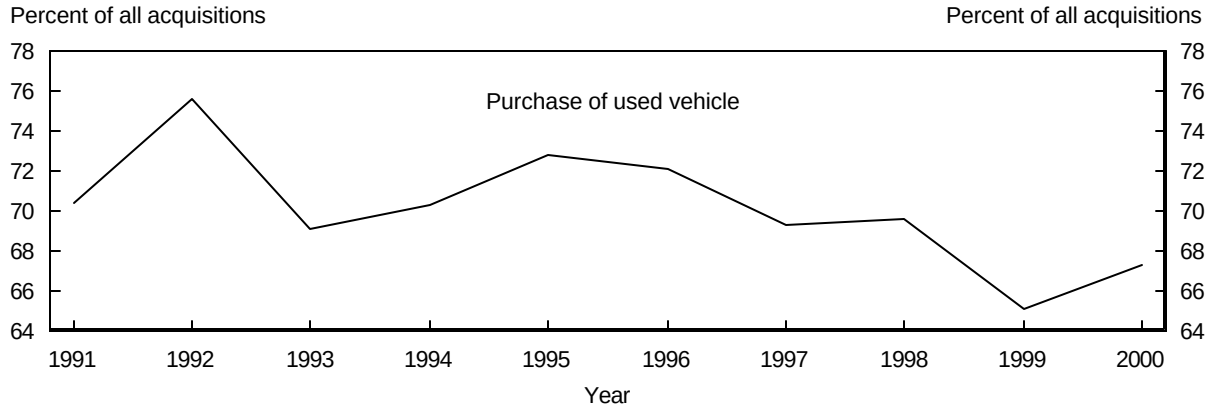
	Average monthly payment	Average downpayment	Average length of term (months)
Leased	$353	$ 868	39
Bought new[1]	$399	$2,914	54
Bought used	$273	$1,147	43

[1] The bought new and bought used categories represent vehicles that were financed and still had payments remaining.

Chart 1. **Trends in vehicle acquisition methods, 1991-2000**







Out-of-Pocket Expenditures by Consumer Units with Private Health Insurance

ERIC J. KEIL

Although managed-care health plans have been around for quite some time, rising medical costs in the 1970s, along with changes in Federal law, set the stage for increased interest in such plans. As a result, health maintenance organizations (HMOs) have grown steadily in popularity since the 1970s, while the popularity of more traditional fee-for-service health plans has declined.[1] Increases in health care costs continue to stir national debate and have prompted much criticism of current methods of dealing with high-cost health care. Although many solutions to the problem have been proposed, no significant changes have occurred.

In this article, data from the 1999 and 2000 Consumer Expenditure (CE) Interview surveys are used to show that there are differences in certain out-of-pocket medical expenditures between consumer units insured through HMOs and those insured through fee-for-service plans. Demographic characteristics of consumer units are examined as well, to aid in our understanding of spending patterns with regard to health insurance.

[1] Consumer expenditure data show increasing expenditure levels and percentages reporting for HMO insurance. (In 1984, average annual expenditures were at $15 with 3 percent reporting; by 1993, they stood at $110 with 10 percent reporting; and in 2000, expenditures reached $254 with more than 20 percent reporting.) The data also show decreasing expenditure levels and percentages reporting for fee-for-service insurance: in 1997, expenditures were $100 with 8 percent reporting; by 2000, they reached $77 with 5 percent reporting. Due to changes made to the Interview survey in 1996, it is not practical to show fee-for-service expenditure levels or percentage reporting prior to 1977.

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Study methodology

The sample for this study was restricted to those consumer units who completed all four quarterly interviews. All interviews must have occurred between January 1999 and December 2000. In addition, these consumer units must have had private health insurance for at least one quarter during the period in which they were interviewed. Because the CE Interview survey does not match medical expenditures with the health plans responsible for covering them, the sample was further restricted either to those consumer units who had one private health plan or to those whose multiple plans were all of one type, either HMO or fee for service. This strategy allowed consumer units to be grouped into two separate categories: Those with HMO coverage or those with fee-for-service coverage. In either case, it was possible for a consumer unit to have a member who was also covered by Medicare or Medicaid.

Health care expenditures from the CE Interview survey are out-of-pocket expenditures. They consist of expenditures paid for medical services, prod-

ucts, and supplies that are net of any payments or reimbursements from health insurance plans, government programs, or any other third-party payers.[2]

Definitions

Two definitions are essential to an understanding of the material presented in this article:

Health maintenance organization. There are two basic types of HMOs. The first is the group or staff type, in which the participant goes to a central facility (a group health center) to receive care. The second type is the independent practice association (IPA), in which providers work from their individual offices and are referred to as primary care physicians. Expenses in this type of plan are usually covered in full, or there is a modest copayment at the time of the visit.

Fee-for-service plan. Commercial health insurance plans encompass both traditional fee-for-service plans and preferred provider organizations. In these plans, a fee is charged for each medical service rendered or for all medical equipment purchased. In traditional fee-for-service plans, participants receive medical care from the providers they choose. The plan reimburses either the provider or the individual for some or all of the cost of care received. Participants in a preferred provider organization are given a list of doctors from which they may choose. If they choose to go to one of the doctors on the list, the amount of expenses covered is higher than if they had gone to a doctor who is not on the list.

The impact of health insurance on medical expenditures

As with most products and services, health care expenditures are affected by interactions between prices and quantities demanded. One major difference is that health insurance acts as a third-party payer for health-related products and services. This aspect can alter expenditure levels both directly and indirectly. In brief, the presence of health insurance can affect medical expenditures in the following ways:

1. Differences in payment and benefit structures between the two types of health plans can lead to direct differences in the out-of-pocket component of health care spending. In other words, given consumer units with identical medical consumption, those with HMO insurance may pay less for each medical bill in comparison with those with fee-for-service insurance. This difference effectively lowers the out-of-pocket price of heath care to HMO members, which, in turn, tends to lower expenditure levels for health-care-related items or services.

2. The aforementioned differences in payment and benefit structures can lead indirectly to different spending patterns between participants in the two types of health insurance plans. A consumer unit who expects to have high medical bills might decide to select insurance that will cover more of the costs. In addition, lower out-of-pocket costs may have an effect on the quantity of medical items and services demanded. Because HMO insurance plans cover a larger proportion of the bill, one might expect higher usage by those consumer units with that type of insurance. The different spending patterns translate into a higher quantity demanded by consumer units in HMO plans, which, in turn, tends to raise expenditure levels, all else held constant.

3. Administrative differences affect the selection of a health plan. A consumer unit who anticipates using medical services with greater frequency might seek an insurance plan with a low administrative burden or one that allows more flexibility in choosing providers. These considerations may tend to counteract each other. A common assumption is that HMOs tend to require less paperwork, whereas fee-for-service health plans offer greater flexibility in choosing physicians or other health care services. The overall effect on expenditures is difficult to determine.

Health care expenditures by type of insurance

The CE Survey collects comprehensive spending data for medical goods and services as well as detailed information regarding insurance coverage, including the type of health plan and the out-of-pocket costs for premiums. The Survey classifies these expenditures into 17 categories. (See table 1.) Summing up the medical expenditure components reveals that total out-of-pocket medical spending was significantly higher, on average, for those who had fee-for-service insurance, than for those who had HMO coverage ($2,315 per year, as opposed to $1,789). Of the 17 categories, 6 were found to be significantly different between the two groups of consumer units.

Differences were noted for health care insurance, physicians' services, laboratory tests and x rays, hospital services other than room, prescription drugs and medicine, and dental care. In each case, expenditures were greater for consumer units in fee-for-service health plans.[3] Table 1 shows that the largest difference in annual out-of-pocket spending, in absolute terms, was for health care insurance ($159):[4] consumer units with fee-for-service insurance paid $1,029 per year, on aver-

[2] Cash reimbursements paid directly to the consumer unit are reported only infrequently in the CE Survey.

[3] The following medical expenditure items were found not to be statistically different between the two types of health plans: Purchase of eyeglasses and accessories, including insurance; purchase of medical or surgical equipment for general use; purchase of supportive or convalescent medical equipment; hearing aids; eye exams, treatment, or surgery; services by other medical professionals; hospital room and meals; care in a convalescent or nursing home; other medical care services; rental of medical or surgical equipment for general use; and rental of supportive or convalescent equipment.

[4] Health insurance expenditures include those captured by payroll deductions.

age, while those with HMO insurance paid $870. Other significant differences in spending included physicians' services ($210 for fee-for-service plans, $129 for HMOs), laboratory tests and x rays ($38, compared with $15), hospital services other than room ($68 and $37), prescriptions drugs and medicines ($329 and $236), and dental services ($311, as opposed to $265).

A similar analysis shows that consumer units with fee-for-service insurance had a higher percentage reporting for several medical expenditure categories. In this article, percent reporting is defined as the percentage of consumer units having at least one, but possibly more, expenditures during the year they were interviewed. Table 2 shows that there were significant differences in percent reporting for laboratory tests and x rays (23 percent for fee-for-service plans, 13 percent for HMOs), hospital services other than room (16 percent and 13 percent), prescription drugs and medicines (80 percent and 75 percent), dental care (51 percent, compared with 48 percent), purchases of medical or surgical equipment (4 percent, as opposed to 2 percent), and eye exams, treatment, or surgery (32 percent and 28 percent).

Although the percentage reporting for all medical expenditures was higher for the fee-for-service group, the number of reported expenditures per medical expenditure item was generally higher for the HMO group. Significant differences in reported expenditure were noted for physicians' services (13,113 for HMO plans, 11,176 for fee-for-service arrangements),[5] prescription drugs (26,871, compared with 24,088), dental care (6,449 and 5,748), and eyeglasses and accessories (2,445 and 1,909). The number of reported expenditures was higher for the fee-for-service group only for lab tests and x rays (1,451, as against 940).[6]

[5] All figures in parentheses in this paragraph are in millions.

Demographic differences between the two insured groups

A demographic analysis shows that the two groups of insured were similar with respect to age, income, family size, and the number of children living in the consumer unit. There was no statistically significant difference between incomes ($43,226 for those in HMO plans, $43,728 for fee-for-service participants), but there were slight differences with respect to age, family size, and number of children. Although there was a statistical difference in age, it was small, with an average age of 50 for the fee-for-service group and 48 for the HMO group. Similarly, consumer units with fee-for-service plans, on average, were composed of 2.6 persons, of which 0.80 were children; consumer units with HMO insurance comprised 2.7 persons, of which 0.91 were children. The demographic differences between these two groups may not be large enough to be considered a contributing factor in expenditure differences.

Looking at distributions of insured consumer units by age of the reference person, one can see that there were more units with HMO insurance in the group aged 25 to 54, but more consumer units in fee-for-service plans in the upper age categories. [7] (See chart 1.) The distributions of insured consumer units with respect to their size do not show much difference (chart 2), but the distributions with respect to numbers of children in the unit indicate that there were more fee-for-service consumer units with no children than HMO units with no children. (See chart 3.)

In sum, out-of-pocket expenditures and spending patterns vary between fee-for-service and HMO health plans. Significant expenditure differences exist for health care insurance, physicians' services, lab tests and x rays, hospital services other than room, prescription drugs, and dental care. In each case, consumer units with HMO insurance had lower out-of-pocket expenditures for these items. They also had a lower percentage reporting for many of the items, but a higher number of actual reported expenditures within item categories. The higher frequencies for reported expenditures may be a result of perceived lower costs. Consumers who have HMO insurance generally incur lower out-of-pocket medical costs despite a higher number of reported expenditures. Their lower medical expenditures may be more the result of differences in plan benefits. The demographic makeup of the two groups of insured is similar with respect to income, age, family size, and the number of children in the consumer unit. Although some of the differences found are statistically significant, they are nonetheless small. ■

[6] Care must be taken in evaluating percentages of consumer units reporting a medical expenditure, as well as the total volume of expenditures, because medical goods and services that are completely paid for by a third party are not recorded in the CE Interview survey.

[7] Consumer units whose reference person is eligible for Medicare also can have members who are insured through a fee-for-service or HMO plan.

Chart 1. **Percentages of consumer units participating in health maintenance organizations (HMO) and fee-for-service (FFS) health care plans, by age of reference person, Consumer Expenditure Survey, 1999-2000**

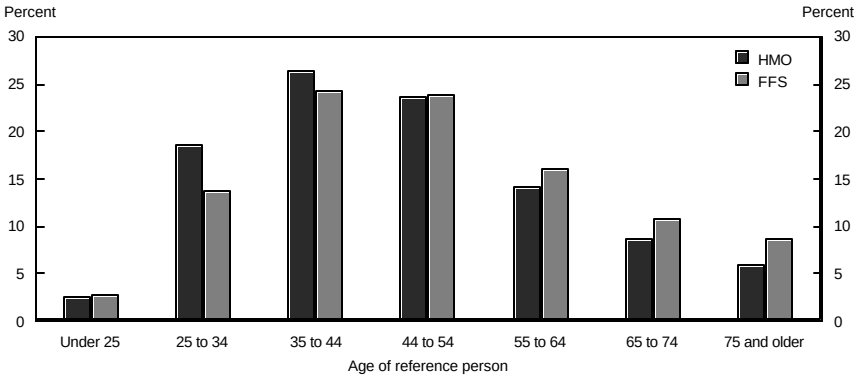

Chart 2. **Percentages of consumer units participating in health maintenance organizations (HMO) and fee-for-service (FFS) health care plans, by number of persons in the consumer unit, Consumer Expenditure Survey, 1999-2000**

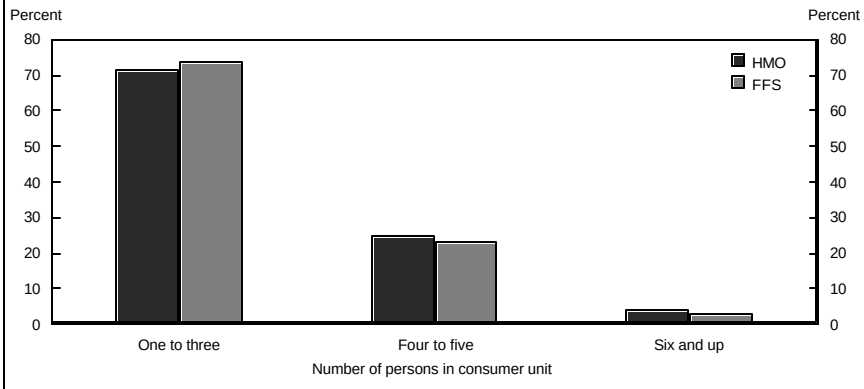

Chart 3. **Percentages of consumer units participating in health maintenance organizations (HMO) and fee-for-service (FFS) health care plans, by number of children in the consumer unit, Consumer Expenditure Survey, 1999-2000**

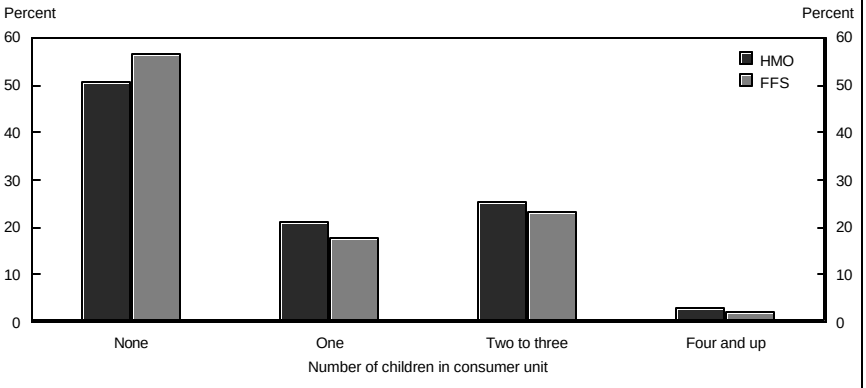

Table 1. Average annual health care expenditures by type of insurance, Consumer Expenditure Interview Survey, 1999–2000

Medical expenditure item	Fee-for-service insurance	Health maintenance organization	Difference in means
Total medical expenditures	$2,314.71	$1,789.24	[1] $525.47
Health insurance	1,028.67	870.45	[1] 158.22
Physicians' services	210.14	128.65	[1] 81.49
Lab tests and x rays	37.88	14.63	[1] 23.25
Hospital services other than room	67.64	37.34	[1] 30.30
Prescription drugs and medicine	329.02	236.47	[1] 92.55
Dental care	310.96	265.42	[1] 45.55
Eyeglasses and accessories, vision insurance	73.09	77.72	– 4.63
Purchase of medical or surgical equipment for general use	2.93	2.16	0.77
Purchase of supportive or convalescent medical equipment	3.52	6.21	– 2.69
Hearing aid	21.77	13.68	8.09
Eye examinations, treatment, or surgery	42.75	44.94	– 2.19
Services by other medical professionals	58.49	38.91	19.58
Hospital room and meals	56.42	31.24	25.18
Care in a convalescent or nursing home	58.70	9.05	49.66
Other medical care services	11.56	11.28	.28
Rental of medical or surgical equipment for general use	.50	.62	– .11
Rental of supportive or convalescent equipment	.69	.51	.18

[1] Significantly different at the 95-percent confidence level.

Table 2. Percentage reporting medical expenditures, Consumer Expenditure Interview Survey, 1999–2000

Medical expenditure item	Percent reporting fee-for-service plan	Percent reporting health maintenance organization	Difference in percent reporting
Health insurance	73	72	1
Physicians' services	70	67	3
Lab tests and x rays	23	13	[1] 10
Hospital services other than room	16	13	[1] 3
Prescription drugs and medicine	80	75	[1] 5
Dental care	51	48	[1] 3
Eyeglasses and accessories, vision insurance	34	35	– 1
Purchase of medical or surgical equipment for general use	4	2	[1] 2
Purchase of supportive or convalescent medical equipment	4	3	1
Hearing aid	3	3	0
Eye examinations, treatment, or surgery	32	28	[1] 4
Services by other medical professionals	16	15	1
Hospital room and meals	9	8	1
Care in a convalescent or nursing home	1	1	0
Other medical care services	6	4	2
Rental of medical or surgical equipment for general use	1	1	0
Rental of supportive or convalescent equipment	1	1	0

[1] Significantly different at the 95-percent confidence level.

Table 3. Frequencies of health care expenditures, Consumer Expenditure Interview Survey, 1999–2000

Medical expenditure item	Frequency of reporting, fee-for-service plans (in milions)	Frequency of reporting, health maintenance organizations (in millions)	Difference in frequency of reporting
Health insurance	34,612	41,852	[1] – 7,240
Physicians' services	5,748	13,113	[1] – 1,937
Lab tests and x rays	1,451	940	[1] 511
Hospital services other than room	1,124	1,062	62
Prescription drugs and medicine	24,088	26,871	[1] – 2,783
Dental care	5,748	6,449	[1] – 701
Eyeglasses and accessories, vision insurance	1,909	2,445	[1] – 536
Purchase of medical or surgical equipment for general use	225	186	39
Purchase of supportive or convalescent medical equipment	195	234	– 39
Hearing aid	212	216	–4
Eye examinations, treatment, or surgery	1,771	1,924	– 153
Services by other medical professionals	1,836	1,857	– 21
Hospital room and meals	544	628	– 84
Care in a convalescent or nursing home	127	81	46
Other medical care services	344	345	–1
Rental of medical or surgical equipment for general use	76	90	– 14
Rental of supportive or convalescent equipment	80	97	– 17

[1] Significantly different at the 95-percent level.

Expenditures on Entertainment

NEIL TSENG

Over the past half-century, the increase in incomes and decline in hours worked have allowed American consumers to enjoy more leisure time and increase their spending on entertainment. In 2000, spending on entertainment by American consumers totaled approximately $203 billion (see table 1), almost 3 times the amount that Americans spent on education. Using data from the Consumer Expenditure (CE) Survey, this article looks at the level of expenditures on entertainment, its share of national aggregate expenditures, and the ways in which selected demographic groups allocate these expenditures. The article highlights entertainment expenditures by consumer units[1] in 2000, classified by age of the reference person,[2] income quintiles[3] of complete income reporters,[4] and education of the reference person.

The CE Survey divides entertainment expenditures into four categories: Fees and admissions; televisions, radios, and sound equipment; pets, toys, and playground equipment; and other entertainment supplies, equipment, and services. Fees and admissions, which accounted for 28 percent of entertainment expenditures in 2000, include expenses for out-of-town trips, fees for recreational lessons, and the cost of admission to sporting events, cultural and theatrical events, the movies, and special events, such as live musical performances. Television, radios, and sound equipment accounted for 33 percent of entertainment spending and include color televisions, DVD players, VCRs, CD players, video game consoles and software, videotapes and discs, and speakers and various other home theater sound systems. Pets, toys, and playground equipment accounted for 18 percent of entertainment spending and includes toys, games, and playground equipment; hobbies and tricycles; and pet food, veterinarian services and pet services. Other entertainment supplies, equipment, and services accounted for 21 percent of entertainment spending and includes "volatile" expenditures, such as the rental or purchase of recreational vehicles and the purchase of boats. Expenditures on many of the items in the category tend to fluctuate from year to year, chiefly because, each year, relatively few consumers purchase these expensive items (such as a boat with a motor or a motorized camper) and increases or decreases in the percentage of consumers purchasing the items can

[1] See "Glossary" in Appendix A at the end of this anthology for the definition of a *consumer unit*.

[2] See "Glossary" in Appendix A at the end of this anthology for the definition of *reference person*.

[3] See "Glossary" in Appendix A at the end of this anthology for the definition of *quintiles of income before taxes*.

[4] See the glossary at the end of this anthology for the definition of *complete income reporter*.

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have a large effect on the mean expenditure. For example, consumer units who reported no expenditures on motorized recreational vehicles are counted as spending $0.00. In 1999, 0.33 percent of consumer units reported purchasing a motorized recreational vehicle, and they spent an average of $171, whereas, in 2000, the percent reporting was 0.24 percent, and the average amount spent was $82.

Age

In 2000, the share of total aggregate entertainment spending accounted for by consumer units with reference persons in two age groups—those under 35 and those 55 and older—was smaller than their population share. The under-35 group accounted for 25 percent of the total population, but spent 22 percent of the total of $203 billion that U.S. consumers allocated to entertainment in 2000, whereas those 55 and older had a population share of 33 percent and spent 25 percent of the total amount allocated to entertainment. Consumer units with reference persons in the age group from 35 to 54 had a population share of 42 percent, but accounted for more than half of the total of $203 billion dollars spent on entertainment.

As regards the individual categories of entertainment, persons under the age of 35 and those 55 and older spent less on entertainment than their population share in all four categories of entertainment, whereas those between the ages of 35 and 54 spent more than their population share on each of the categories. Although those under 35 made up 42 percent of the population, their share of spending on the four subcategories of entertainment was as follows: Fees and admissions, 55 percent of the aggregate entertainment share; TVs, radios, and sound equipment, 50 percent; pets, toys, and playground equipment, 53 percent; and other entertainment supplies, equipment, and services, 55 percent.

Education

This section examines consumer units in two broad categories of educational attainment. The first, those who did not graduate from college, comprises four classes: Those who did not graduate from high school, high school graduates, high school graduates with some college, and those with an associate's degree. The second category, college graduates, consists of two classes: Those with a bachelor's degree and those with a master's, professional, or doctoral degree. Consumer units with reference persons who did not graduate from college had a population share of 74 percent and accounted for 60.5 percent of the aggregate expenditures on entertainment, whereas college graduates had a population share of 26 percent, yet accounted for 39.5 percent of the aggregate expenditure on entertainment.

Of the 4 subclasses making up the group who did not graduate from college, 3 had an aggregate expenditure share that was lower than their population share: Those who did not graduate high school, 8 percent expenditure share, compared with 17 percent population share; high school graduates, 24 percent expenditure share, as opposed to 29 percent population share; and high school graduates with some college, 20 percent expenditure share and 21 percent population share. Only those with associate's degrees had a spending share exceeding their population share (9 percent, compared with 8 percent). These statistics are evidence that an increase in education level leads to an increase in average income, enabling the more educated to spend more on leisure and recreation. Average incomes for the four classes were as follows: Those who did not graduate high school, $23,329; high school graduates, $36,134; high school graduates with some college, $38,837; associate's degree, $50,060). Among the college graduates, those with a bachelor's degree and those with advanced degrees had aggregate expenditure shares of 25 percent and 15 percent, respectively, and population shares of 17 percent and 9 percent. These figures are likely attributable to the fact that, as their education levels increased, so did their incomes, providing them with more discretionary income to spend on entertainment.

Income quintiles

An examination of spending on entertainment by income quintile reveals that the proportion of aggregate expenditures allocated to entertainment ranged from 9 percent by the lowest quintile to 40 percent by the highest quintile. The aggregate amount spent on entertainment by complete income reporters was $158 billion. Not surprisingly, consumer units in the highest quintile contributed the most to each of the four categories of entertainment expenditure. These consumer units spent more than $22 billion on fees and admissions; approximately $17 billion on televisions, radios, and sound equipment; $10 billion on pets, toys, and playground equipment; and $13 billion on other entertainment supplies, equipment, and services. To put the figures in perspective, the $22 billion spent on fees and admissions was more than twice the amount spent by consumers in the fourth income quintile and almost 7 times the amount spent by those in the first quintile.

The proportion of total aggregate entertainment expenditures allocated to fees and admissions ranged from nearly 7 percent for those in the lowest quintile to more than 50 percent for those in the highest quintile. For pets, toys, and playground equipment, expenditures ranged from 7 percent for those in the lowest quintile to 37 percent for those in the highest quintile. Total entertainment expenditures allocated to other entertainment supplies, equipment, and services ranged from 8 percent for those in the lowest quintile to almost 38 percent for those in the highest. Although the lowest quintile contributed only 11 percent toward televisions, radios, and sound equipment, while the highest contributed 33 percent, the 11-percent figure accounted for the largest share of the bottom quintile's expenditures on entertainment. Apparently, the category may be the main form of entertainment for those in the lowest income quintile.

In sum, consumers spent approximately $203 billion on entertainment in 2000, with about $56 billion going to fees and admissions; $68 billion to television, radios, and sound equipment; $36 billion to pets, toys, and playground equipment; and $43 billion to other entertainment supplies, equipment, and services. Those with associate's or higher degrees accounted for 49 percent of the aggregate expenditure on entertainment, well above their population share of 34 percent. Consumer units with reference persons between the ages of 35 and 54 had a population share of 42 percent, but accounted for 53 percent of the aggregate expenditure on entertainment. Finally, consumer units with reference persons in the highest income quintile had a population share of 20 percent, but accounted for 40 percent of the aggregate expenditure on entertainment. ■

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Table 1. Average annual entertainment expenditures and aggregate expenditures, by age of reference person, Consumer Expenditure Survey, 2000

Age of reference person and type of expenditure	Average annual expenditure	Aggregate expenditure (in millions)	Aggregate share (in percent)	Population share (in percent)
Aggregate				
Total entertainment	$10,687	$203,712	100.0	100.0
Fees and admissions	2,911	56,308	100.0	100.0
Televisions, radios, and sound equipment	3,618	67,999	100.0	100.0
Pets, toys, and playground equipment	1,904	36,452	100.0	100.0
Other entertainment supplies, equipment, and services	2,254	42,910	100.0	100.0
Under age 35				
Total entertainment	1,485	44,530	21.9	24.9
Fees and admissions	366	10,923	19.4	24.9
Televisions, radios, and sound equipment	577	16,796	24.7	24.9
Pets, toys, and playground equipment	262	8,092	22.2	24.9
Other entertainment supplies, equipment, and services	280	8,719	20.3	24.9
Aged 35 to 54				
Total entertainment	4,695	107,837	52.9	41.9
Fees and admissions	1,352	31,082	55.2	41.9
Televisions, radios, and sound equipment	1,485	34,135	50.2	41.9
Pets, toys, and playground equipment	835	19,210	52.7	41.9
Other entertainment supplies, equipment, and services	1,023	23,410	54.5	41.9
Aged 55 and older				
Total entertainment	3,024	51,300	25.2	33.2
Fees and admissions	828	14,302	25.4	33.2
Televisions, radios, and sound equipment	980	17,068	25.1	33.2
Pets, toys, and playground equipment	545	9,149	25.1	33.2
Other entertainment supplies, equipment, and services	671	10,781	25.1	33.2

Table 2. Average annual entertainment expenditures and aggregate expenditures, by education of reference person, Consumer Expenditure Survey, 2000

Education of reference person and type of expenditure	Average annual expenditure	Aggregate expenditure (in millions)	Aggregate share (in percent)	Population share (in percent)
Did not graduate high school (Income before taxes = $23,329)				
Total entertainment	$896	$15,948	7.8	16.5
Fees and admissions.	132	2,365	4.2	16.5
Televisions, radios, and sound equipment	418	7,480	11.0	16.5
Pets, toys, and playground equipment	192	3,354	9.2	16.5
Other entertainment supplies, equipment, and services	54	2,749	6.4	16.5
High school graduate (Income before taxes = $36,134)				
Total entertainment	1,519	48,475	23.8	29.2
Fees and admissions	298	9,516	16.9	29.2
Televisions, radios, and sound equipment	566	18,088	26.6	29.2
Pets, toys, and playground equipment	303	9,660	26.5	29.2
Other entertainment supplies, equipment, and services	351	11,211	26.1	29.2
High school graduate with some college (Income before taxes = $38,837)				
Total entertainment	1,775	39,735	19.5	20.6
Fees and admissions	438	9,854	17.5	20.6
Televisions, radios, and sound equipment	624	14,008	20.6	20.6
Pets, toys, and playground equipment	308	6,853	18.8	20.6
Other entertainment supplies, equipment, and services	405	9,020	21.0	20.6
Associate's degree (Income before taxes = $50,060)				
Total entertainment	2,118	21,296	9.4	8.1
Fees and admissions	529	4,730	8.4	8.1
Televisions, radios, and sound equipment	678	6,052	8.9	8.1
Pets, toys, and playground equipment	376	3,499	9.6	8.1
Other entertainment supplies, equipment, and services	535	4,897	11.4	8.1
Bachelor's degree (Income before taxes = $64,201)				
Total entertainment	2,780	50,946	25.0	16.8
Fees and admissions	977	17,906	31.8	16.8
Televisions, radios, and sound equipment	802	14,688	21.6	16.8
Pets, toys, and playground equipment	444	8,129	22.3	16.8
Other entertainment supplies, equipment, and services	557	10,223	23.8	16.8
Master's, professional, or doctoral degree (Income before taxes = $84,438)				
Total entertainment	3,011	29,476	14.5	8.9
Fees and admissions	1,227	11,937	21.2	8.9
Televisions, radios, and sound equipment	787	7,684	11.3	8.9
Pets, toys, and playground equipment	500	4,958	13.6	8.9
Other entertainment supplies, equipment, and services	498	4,897	11.4	8.9

Table 3. Average annual entertainment expenditures and aggregate expenditures, by quintiles of income before taxes, Consumer Expenditure Survey, 2000

Quintile of income and type of expenditure	Average annual expenditure	Aggregate expenditure (in millions)	Aggregate share (in percent)	Population share (in percent)
Lowest quintile				
Total entertainment	$837	$13,545	8.6	20.0
Fees and admissions	198	3,227	7.4	20.0
Televisions, radios, and sound equipment	363	5,902	11.1	20.0
Pets, toys, and playground equipment	122	1,946	6.9	20.0
Other entertainment supplies, equipment, and services	154	2,470	7.5	20.0
Second quintile				
Total entertainment	1,147	18,527	11.7	20.0
Fees and admissions	250	4,100	9.4	20.0
Televisions, radios, and sound equipment	465	7,551	14.2	20.0
Pets, toys, and playground equipment	239	3,780	13.4	20.0
Other entertainment supplies, equipment, and services	192	3,096	9.4	20.0
Third quintile				
Total entertainment	1,609	25,986	16.4	20.0
Fees and admissions	331	5,408	12.4	20.0
Televisions, radios, and sound equipment	590	9,571	18.0	20.0
Pets, toys, and playground equipment	337	5,532	18.9	20.0
Other entertainment supplies, equipment, and services	351	5,475	16.9	20.0
Fourth quintile				
Total entertainment	2,324	37,476	23.7	20.0
Fees and admissions	547	8,897	20.4	20.0
Televisions, radios, and sound equipment	782	12,709	23.9	20.0
Pets, toys, and playground equipment	422	6,714	23.8	20.0
Other entertainment supplies, equipment, and services	573	9,156	27.8	20.0
Highest quintile				
Total entertainment	3,866	62,579	39.6	20.0
Fees and admissions	1,349	22,025	50.5	20.0
Televisions, radios, and sound equipment	1,071	17,441	32.8	20.0
Pets, toys, and playground equipment	656	10,466	37.1	20.0
Other entertainment supplies, equipment, and services	790	12,647	38.4	20.0

Table 4. Average annual expenditures of different demographic groups and shares spent on entertainment, by education, age, and income quintile, Consumer Expenditure Survey, 2000

Characteristic	Average annual expenditure	Average share of expenditure spent on entertainment (in percent)
Education		
Did not graduate high school	$23,386	3.8
High school graduate	32,447	4.7
High school graduate with some college	35,999	4.9
Bachelor's degree	50,785	5.5
Master's, professional, or doctoral degree	60,527	5.0
Age		
Under 25	22,543	4.8
25 to 34	38,945	4.8
35 to 54	45,655	5.1
55 and older	32,937	4.5
Income quintile		
Lowest	17,940	4.7
Second	26,550	4.3
Third	34,716	4.6
Fourth	46,794	5.0
Highest	75,102	5.1

Travel Expenditures in 2000

GEORGE JANINI

Although most of the average consumer's spending budget is devoted to food, housing, and transportation, consumer units that went on trips in the year 2000 spent an average of $875 in travel expenses. The total amount spent on travel by all consumers was roughly $32 billion. This article uses data from the 2000 Consumer Expenditure (CE) Interview survey to look at spending on trips and vacations by various demographic groups.

Methodology

Travel expenditures in the CE Survey are broken down into five main groups: Transportation, food, lodging, entertainment, and the purchase of gifts. Transportation expenditures include all costs of traveling to and from the destination, as well as transportation costs incurred on the trip. All modes of transportation, such as plane, boat, ship, car, taxi, truck, motorcycle, and camper, are considered. Food expenditures include all food and alcohol consumed on the trip. Lodging expenses encompass the costs for hotels, motels, cottages, trailer camps, and other lodging on the trip. Entertainment expenditures include all types of entertainment, such as admission to sporting events, parks, museums, and tours, as well as any type of fee related to these events. Gift expenditures are the total cost of all gifts purchased on the trip for persons outside the consumer unit.

Age, income, and the composition of the consumer unit are the characteristics used in the comparison. The data are reported as both average annual expenditures and aggregate expenditures, for each of the spending groups. The data are annual average amounts spent during the year 2000 on all trips and not the amount spent per trip. Average and aggregate expenditures are given only for those consumer units that actually reported a trip in 2000. All aggregate amounts were estimated with weights derived from the CE Survey. Excluded from the survey are all business-related expenditures for which the consumer unit is reimbursed.

Expenditures on travel

Overall, consumer units that went on trips in 2000 spent an average of $352 on transportation, $204 on food, $66 on entertainment, $76 on gifts, and $177 on lodging. These figures aggregated to about $13 billion spent on transportation, $7.6 billion on food, $2.4 billion on entertainment, $ 2.8 billion on gifts, and $6.5 billion on lodging. Out of approximately 109 million consumer units, 34 percent, or 37 million units, reported taking a trip or vacation in the year 2000.

Age

The highest percentage of trip takers was posted by the group aged 45 to 54, with 38 percent reporting a trip. The lowest percentage was that of the group aged 65 and older, 27 percent.

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This group, however, had the highest average expenditures on trips of any of the age groups. It is interesting to note that the group, consisting mainly of retirees, spent an average of 4 percent of its total average annual expenditures on trips and vacations, about twice the share spent by most of the other age groups. However, the 65-and-older group did not account for the highest share of aggregate trip expenditures. That distinction went to the group aged 45 to 54, with 24 percent of aggregate trip expenditures in 2000. The group aged 35 to 44 spent almost as much, followed by the 65-and-older group at 19 percent, with the groups aged 25 to 34 and 55 to 64 each accounting for 15 percent. The group aged 25 and under spent the least, accounting for only 4 percent of total trip expenditures. Except for consumer units in the two lowest age groups, aggregate expenditure shares were in proportion to the population share of the group.

Income

Fully 58 percent of consumer units with reported incomes[1] over $50,000 took a trip or vacation in 2000, almost double the share of consumer units with reported incomes of less than $25,000. With more discretionary income at their disposal, higher income consumer units would be expected to spend more on travel and trips than lower income groups. Consumer units in the highest income bracket, $75,000 or more, significantly outspent those in all other income groups and almost doubled the average spending on trips and vacations of the next highest income bracket, those reporting income ranging from $50,000 to $75,000. Not surprisingly, consumer units with reported incomes of $75,000 or more accounted for 41 percent of aggregate trip expenditures in 2000, whereas the travel expenditure of all of the other reported income groups combined was 52 percent. The classifications by income are based on complete reporters only, which account for 74 percent of all of consumer units.

Composition of the consumer unit

A few selected types of consumer units are included in this article: Husband-and-wife-only consumer units, husbands and wives with children younger than 17, single-persons, and one-parent consumer units. Forty-two percent of husband-and-wife-only consumer units reported taking a trip, compared with 20 percent of single-person units. Thirty-six percent of husband-and-wife consumer units with children younger than 17 reported taking a trip, as did 24 percent of one-parent consumer units. In all, husband-and-wife consumer units (with and without children) made about half of aggregate trip expenditures in 2000.

Overall, consumer units reporting incomes of $35,000 or more accounted for 76 percent of total travel expenditures, while making up only 35 percent of the population. Looking at the data by age reveals that the highest spenders, on average, were aged 65 and older, while the lowest were under the age of 25. The youngest group did not spend much, on average, on trips, but did have a relatively high percentage of trip takers. By comparison, the group aged 65 and older had the lowest percentage of trip takers, but spent the most money, on average, on trips. As regards a comparison of expenditure shares with population shares, the age groups older than 35 had similar overall travel expenditures and habits. The age groups 35 and under had far lower expenditure shares compared with their population shares. Even though single consumer units made up 43 percent of the population, they accounted for just 22 percent of aggregate expenditures. By contrast, husband-and-wife consumer units and single consumer units accounted for 40 percent of the population, but 58 percent of aggregate expenditures.

Tables 1, 2, and 3 give an annual summary of travel expenditures, by selected categories. ■

[1] The distinction between complete and incomplete income reporters is based, in general, on whether the respondent provided information on his or her major sources of income, such as wages and salaries, self-employment income, and Social Security income. In the survey, across-the-board zero income reporting was designated as invalid, and the consumer unit thus reporting was categorized as an incomplete reporter.

Table 1. Average annual travel expenditures, by age of reference person, Consumer Expenditure Interview survey, 2000

Item	All consumer units	Age of reference person					
		Under 25	25–34	35–44	45–54	55–64	65 and older
Number of consumer units (thousands)	109,367	8,306	18,887	23,983	21,874	14,161	22,155
Population share (percent)	100	8	17	22	20	13	20
Percent of group that reported a trip	34	36	34	34	38	36	27
Aggregate travel expenditures (billions)	$32.3	$1.2	$4.7	$7.6	$7.9	$4.9	$6.0
Share of aggregate expenditures (percent)	100	4	15	23	24	15	19
Average annual expenditures							
Total trip expenses	$875	$392	$717	$922	$973	$970	$1,025
Transportation	352	170	300	374	365	383	428
Food	204	106	177	218	233	228	212
Entertainment	66	33	59	74	70	72	67
Gifts	76	31	54	69	91	88	106
Lodging	177	52	127	187	214	199	212

Table 2. Average annual travel expenditures, by pretax income, Consumer Expenditure Interview survey, 2000

Item	All consumer units	Pretax income					
		Less than $25,000	$25,000 to $35,000	$35,000 to $50,000	$50,000 to $75,000	$75,000 or more	Incomplete reporting of income
Number of consumer units (thousands)	109,367	31,543	10,759	12,392	11,337	15,424	28,067
Population share (percent)	100	29	10	11	10	14	26
Percent of group that reported a trip	34	22	39	44	64	53	7
Aggregate travel expenditures (billions)	$32.3	$2.8	$2.3	$3.9	$6.5	$12.4	$4.4
Share of aggregate expenditures (percent)	100	9	8	13	22	41	7
Average annual expenditures							
Total trip expenses	$875	$404	$557	$718	$886	$1,510	$1,077
Transportation	352	177	221	282	358	585	475
Food	204	105	139	173	208	342	212
Entertainment	66	26	41	50	69	120	79
Gifts	76	35	51	71	77	135	66
Lodging	177	60	106	143	175	328	245

Table 3. Average annual travel expenditures, selected types of consumer unit, Consumer Expenditure Interview survey, 2000

Item	All consumer units	Husband and wife only	Husband and wife with children younger than 17	Single person	One parent
Number of consumer units (thousands)	109,367	22,805	20,687	46,948	6,132
Population share (percent)	100	21	19	43	6
Percent of group that reported a trip	34	42	36	20	24
Aggregate travel expenditures (billions)	$32.3	$10.1	$7.2	$6.5	$0.9
Share of aggregate expenditures (percent)	100	34	24	22	3
Average annual expenditures					
Total trip expenses	$875	$1,049	$957	$675	$642
Transportation	352	425	370	281	244
Food	204	244	231	149	158
Entertainment	66	75	85	43	56
Gifts	76	81	64	85	58
Lodging	177	225	207	118	126

Appendix A: Description of the Consumer Expenditure Survey

The current Consumer Expenditure (CE) Survey program began in 1980. Its principal objective is to collect information on the buying habits of American consumers. Consumer expenditure data are used in various types of research by government, business, labor, and academic analysts. The data are required for periodic revision of the Consumer Price Index (CPI).

The survey, which is conducted by the U.S. Census Bureau for the Bureau of Labor Statistics, consists of two components: A Diary, or recordkeeping, survey completed by participating consumer units for two consecutive 1-week periods; and an Interview survey in which expenditures of consumer units are obtained in five interviews conducted at 3-month intervals.

Survey participants record dollar amounts for goods and services purchased during the reporting period, regardless of whether payment is made at the time of purchase. Expenditure amounts include all sales and excise taxes for all items purchased by the consumer unit for him- or herself or for others. Excluded from both surveys are all business-related expenditures and expenditures for which the consumer unit is reimbursed.

Each component of the survey queries an independent sample of consumer units that is representative of the U.S. population. In the Diary survey, about 7,500 consumer units are sampled each year. Each consumer unit keeps a diary for two 1-week periods, yielding approximately 15,000 diaries a year. The interview sample is selected on a rotating-panel basis and yields reports for 7,500 consumer units each quarter. Each consumer unit is interviewed once per quarter, for five consecutive quarters. Data are collected on an ongoing basis in 105 areas of the United States.

The Interview survey is designed to capture expenditure data that respondents can reasonably recall for a period of 3 months or longer. In general, the data captured report relatively large expenditures, such as spending on real property, automobiles, and major appliances, or expenditures that occur on a regular basis, such as spending on rent, utilities, and insurance premiums. Including global estimates of spending for food, it is estimated that about 95 percent of expenditures are covered in the Interview survey. Expenditures on nonprescription drugs, household supplies, and personal care items are excluded. The Interview survey also provides data on expenditures incurred on leisure trips.

The Diary survey is designed to capture expenditures on small, frequently purchased items that are normally difficult for respondents to recall. Detailed records of expenses are kept for food and beverages—both at home and in eating places—tobacco, housekeeping supplies, nonprescription drugs, and personal care products and services. Expenditures incurred away from home overnight or longer are ex-

cluded from the Diary survey. Although the diary was designed to collect information on expenditures that could not be recalled easily over a given period, respondents are asked to report *all* expenses (except overnight travel expenses) that the consumer unit incurs during the survey week.

Integrated data from the BLS Diary and Interview surveys provide a complete accounting of consumer expenditures and income, which neither survey component alone is designed to do. Data on some expenditure items are collected in only one of the components. For example, the Diary survey does not collect data on expenditures for overnight travel or information on third-party reimbursements of consumer expenditures, as the Interview survey does. Examples of expenditures for which reimbursements are excluded are medical care; automobile repair; and construction, repairs, alterations, and maintenance of property.

For items that are unique to one or the other survey, the choice of which survey to use as the source of data is obvious. However, there is considerable overlap in coverage between the surveys. Because of this overlap, integrating the data presents the problem of determining the appropriate survey component from which to select expenditure items. When data are available from both survey sources, the more reliable of the two (as determined by statistical methods) is selected. As a result, some items are selected from the Interview survey and others, from the Diary survey.

Population coverage and the definition of components of the CE Survey differ from those of the CPI. Specifically, consumer expenditure data cover the total population, whereas the CPI covers only the urban population. In addition, home ownership is treated differently in the two surveys. Actual expenditures of homeowners are reported in the CE Survey, whereas the CPI uses a rental equivalence approach that attempts to measure the change in the cost of obtaining, in the rental marketplace, services equivalent to those provided by owner-occupied homes.

Interpreting the data

Expenditures are averages for consumer units with specified characteristics, regardless of whether a particular unit incurred an expense for a specific item during the recordkeeping period. The average expenditure for an item may be considerably lower than the expenditure by those consumer units that actually purchased the item. The less frequently an item is purchased, the greater is the difference between the average for all consumer units and the average for those purchasing the item. Also, an individual consumer unit may spend more or less than the average, depending on its particular characteristics. Factors such as income, the ages of family members, geographic location, taste, and personal preference also influence expenditures. Furthermore, even within groups with similar characteristics, the distribution of expenditures varies substantially. These points should be considered in relating reported averages to individual circumstances.

Users of these survey data also should keep in mind that prices for many goods and services have risen since the survey was conducted. For example, rent, as measured by the CPI, rose 8.2 percent between 2000 (annual average index) and September 2002.

In addition, sample surveys are subject to two types of error: Sampling and nonsampling. Sampling errors occur because the data are collected from a representative sample rather than the entire population. Nonsampling errors result from the inability or unwillingness of respondents to provide correct information, differences in interviewers' abilities, mistakes in recording or coding, or other processing errors.

Glossary

Consumer unit. Members of a household related by blood, marriage, adoption, or some other legal arrangement; a single person living alone or sharing a household with others, but who is financially independent; or two or more persons living together who share responsibility for at least two out of the three major types of expenses: Food, housing, and other expenses. Students living in university-sponsored housing are also included in the sample as separate consumer units.

Reference person. The first member mentioned by the respondent when asked to "Start with the name of the person or one of the persons who owns or rents the home." It is with respect to this person that the relationship of other members of the consumer unit is determined.

Total expenditures. The transaction costs, including excise and sales taxes, of goods and services acquired during the interview period. Estimates include expenditures for gifts and contributions and payments for pensions and personal insurance.

Income. The combined income earned by all consumer unit members 14 years or older during the 12 months preceding the interview. The components of income are wages and salaries; self-employment income; Social Security and private and government retirement income; interest, dividends, and rental and other property income; unemployment and workers' compensation and veterans' benefits; public assistance, Supplemental Security Income, and Food Stamps; rent or meals or both as pay; and regular contributions for support, such as alimony and child support.

Complete income reporters. In general, a consumer unit who provides information on at least one of the major sources of its income, such as wages and salaries, self-employment income, and Social Security income. Even complete income reporters may not provide a full accounting of all income from all sources.

Quintiles of income before taxes. Five groups with a similar number of complete income reporters, ranked in ascending order of income. Incomplete income reporters are not ranked and are shown separately in the quintiles-of-income tables. ■