

Consumer Expenditure Survey Microdata Users' Workshop, July 2012

Geoffrey Paulin and Ian Elkin

The Consumer Expenditure Survey (CE) is the most detailed source of expenditures, demographics, and income collected by the federal government. Every year, the Bureau of Labor Statistics (BLS) CE program releases microdata on the CE website from its two component surveys (i.e., the Quarterly Interview Survey and the Diary Survey), which researchers in a variety of fields use, including academia, government, market research, and other private industry areas.¹ In July 2006, the CE program office conducted the first in a series of annual workshops to help users to better understand the structure of the CE microdata; provide training in the uses of the surveys; and, through presentations by current users and interactive forums, promote awareness of the different ways the data are used and explore possibilities for collaboration. In addition to the CE program staff, speakers have included economists from BLS regional offices and researchers not affiliated with the BLS. Last year, an additional day was added to the event for exploring topics in survey methods research to support the major project to redesign the CE, called Gemini.² This report describes the Survey Methods Symposium, which occurred on July 17, and the most recent workshop, which occurred July 18–20, 2012.

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Survey methods symposium

The goals of the 2012 Survey Methods Symposium were to (1) provide an overview of the CE methods program and the CE redesign project (Gemini), (2) outline upcoming redesign recommendations from the Committee on National Statistics (CNSTAT) Consensus Expert Panel, (3) discuss other large-scale survey redesign efforts by major survey producers in other statistical agencies, and (4) share findings from academic researchers on analyses of survey error. Four sessions were held, one on each topic goal.

Survey redesign. The first symposium session largely focused on discussions pertaining to the CE redesign. Federal survey staff delivered papers and presentations related to the CE redesign Gemini Project and an overview of the CE research program. Specifically, research highlights and motivations were discussed that provide the foundation for the redesign process, and regardless of the final approach or approaches chosen, the CE must monitor the results of the redesign(s) implemented to ensure that it is not affected negatively by unforeseen consequences. This session included two speakers: Adam Safir and Kathy Downey (BLS).

Outline of upcoming CNSTAT redesign recommendations. The second symposium session provided insight into how perspectives from several relative disciplines were brought to bear on redesign issues regarding the CE and described issues associated with the CE from a survey methodology perspective. However, presentations were limited because the final CNSTAT report was under review; subsequently, the speakers stopped short of recommendations. This session included

two speakers: Carol House and Don Dillman (CNSTAT).

Large-scale survey redesign efforts. The third session provided an overview of the survey redesign efforts by major survey producers in other statistical agencies, including representatives from the National Household Education Survey (NHES), the National Crime Victimization Survey (NCVS), the National Survey on Drug Use and Health (NSDUH), the Survey of Income and Program Participation (SIPP), and the BLS. Each survey redesign presentation included elements such as survey overview, redesign motivations, redesign challenges, redesign constraints, research overview, and pertinent timeline and cost considerations. This session included five speakers: Andy Zukerberg (NHES), James Lynch (NCVS), Joel Kennet (NSDUH), Jason Fields (SIPP), and Kathy Downey (BLS).

Survey error. The final symposium session focused on findings from research into the reduction of survey error by reducing nonresponse bias through responsive design and external benchmarks, as well as reducing measurement error through cross-survey imputation. The first presentation by Julia Lee (University of Michigan) postulated that current nonresponse bias reduction techniques have worthwhile alternatives. These alternatives include controlling for nonresponse by adaptively improving respondent representativeness and effectively using frame data, contextual data, paradata, and benchmark information to obviate the need for nonrespondent information. The final presentation by Geoffrey Paulin (BLS) provided an overview of the current Diary to Interview imputation project and provided insight into the process of determining the proper imputation

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method. The presenter also highlighted complications that have emerged as the project has developed.

Conclusions. The presentations and discussions at the Survey Methods Symposium underscored the importance of tailoring the redesign approach to the specific survey, accounting for all aspects that may be affected. More specifically, redesign rationales vary from survey to survey, depending on the needs of stakeholders, ranging from the need for more efficient data collection and estimation methods to the reduction of respondent burden. No matter the driving force behind the redesign process, one should bear in mind that total implementation of all recommended survey questionnaire improvements may not be possible. Subsequently, evaluation metrics, reflecting both instrument and interviewer, must expand beyond response rates to include measures adapted to the methodological modifications implemented during the redesign, with additional modifications to be incorporated as time, funding, and resources allow.

Microdata users' workshop

Day one. The first day of the 2012 workshop opened with presenters from the CE program. William Hawk provided an overview of the CE, featuring topics such as how the data are collected and published. Craig Kreisler, Bill Passero, and Laura Paszkiewicz then presented an introduction to the microdata, including an explanation of their features, such as data file structure and variable naming conventions. This session featured a new method in presenting "hands-on" training in the analysis of CE data: healthcare expenditures were used as a common theme to demonstrate how to obtain and merge data from the various microdata

files and to compute descriptive statistics. In previous workshops, instructors also had explained these concepts, but the presentations contained no unifying example.

The rest of the day featured several presentations by researchers not affiliated with the CE program, who have used the microdata for a variety of purposes (Richard Bavier, Jonathan Fisher, Rawley Heimer, Tami Ohler, and Geng Li), followed by a continuation of practical training. The day concluded with an information-sharing group session among workshop participants and CE program staff. This group session was an open forum in which attendees met informally to discuss their research and offer suggestions for improving the microdata. Moving this session to the first day also was an innovation in this workshop. Because the practical training is progressive, in prior years, this session was held on the second day to maximize overlap in attendance between newer and more experienced users. However, in response to comments from attendees at prior workshops, the session was scheduled for the first day of the 2012 workshop.

Day two. The second day opened with more advanced topics: Barry Steinberg of the BLS Division of Price Statistical Methods presented technical details about sampling methods and construction of sample weights, Evan Hubener (CE program) spoke on imputation and the allocation of expenditure data in the CE, and Laura Paszkiewicz talked about new procedures under investigation to estimate income tax payments for use in published tables and by microdata users.³

The next session addressed a topic of perennial interest to CE microdata users: how to apply longitudinal weights to the Interview Survey data. As Bill Passero noted in the introduction, the

Interview Survey collects data from respondents for four consecutive calendar quarters. During each interview, the respondent is asked to provide information on expenditures for various items during the past 3 months. However, not all participants remain in the sample for all four of these interviews. Those who do remain have different characteristics (e.g., higher rates of homeownership and average age) than those who do not. Therefore, attempting to analyze average annual expenditures by only examining respondents who participate for all four interviews yields biased results. Two of the presentations were given by researchers who had devised their own longitudinal adjustment methods for use with four-quarter interviewees: a proportion-based weight (Fisher) and a sophisticated weight derived from probability of attrition (Heimer). Based on comments from attendees, this session was a highlight of the workshop.

After a break for lunch, Craig Kreisler opened the afternoon sessions with a description of confidentiality measures in the CE microdata, including "topcoding."⁴ This presentation was followed by practical training (Kreisler, Passero, and Paszkiewicz) and a special presentation by Carol Boyd Leon, a technical writer–editor, of the *Monthly Labor Review*, who described the publication process, from submission to printing, for authors interested in having their works appear in that journal. The day concluded with a discussion on redesign options for microdata and documentation by Scott Curtin (CE program).

Day three. On the final day, CE staff featured advanced topics, starting with Meaghan Smith who explained how sales taxes are applied to expenditure reports during the data production process. Next, Geoffrey Paulin de-

scribed the correct use of imputed income data and sample weights in computing population estimates. The latter session noted that the proper use of weights requires a special technique to account for sample design effects that, if not employed, result in estimates of variances and regression parameters that are incorrect.⁵ The penultimate presentation featured Laura Paszkiewicz who described “paradata” regarding the interview process itself, such as the interviewee’s contact history and the interview mode—via personal visit or telephone. The session concluded with a “sneak peek” of developments for CE microdata (Steve Henderson). Of particular note was the announcement that the 2010 microdata for both Interview and Diary Surveys had just been released online and free of charge to all users for the first time. In addition, 2011 microdata would be released in the same way in September 2012, with data from 1996 to 2009 being released as soon as processing constraints would permit.

After a break, other researchers not affiliated with the CE program (Juan Du, Steve Mitnick, and Anthony Murray) concluded the morning presentations. In the afternoon, practical training included a presentation of a computer program available with the microdata for use in computing correct standard errors for means and regression results when using unweighted nonimputed data; population-weighted nonimputed data; and multiply-imputed income data, both unweighted and population weighted (Paulin).

2013 symposium and workshop

The next survey methods symposium will be held July 16, 2013, once again concomitant with the next microdata users’ workshop (July 17 through 19). Although the symposium and workshop will remain free of charge

to all participants, advance registration is required. For more information about these and previous events, visit the CE website (www.bls.gov/cex) and look for “Public-Use Microdata Annual Users’ Workshop” under the left navigation bar entitled “CE MICRODATA.”⁶

Highlights of workshop presentations

Following are highlights of the papers presented during the workshop, listed in the order of presentation. They are based on summaries written by the respective authors.

Richard Bavier, policy analyst, U.S. Office of Management and Budget (retired), “Recent trends in U.S. income and expenditure poverty” (Interview Survey), day one.

After decades of following similar trends, U.S. poverty rates measured by household spending fell after 2000 while poverty measured by household income rose. Comparisons of trends in spending and income poverty using the CE data with trends in income poverty from the Current Population Survey and trends in income and spending poverty in the Panel Study of Income Dynamics, as well as with a time series of the ratio of employment to population, find CE to be the outlier. The findings do not bear directly on the primary use of CE data in providing category weights for calculation of the Consumer Price Index but do require explanation not available in CE public-use files.

Jonathan Fisher, U.S. Census Bureau, “The demography of inequality for individuals and families: income and consumption” (Interview Survey), day one.⁷

Research indicates that since the 1980s, economic inequality has increased in the United States. Research-

ers, however, dispute which resource— income or consumption—should be used to measure economic well-being and the extent of the change in inequality of well-being. Part of this discussion included a question of which groups of people benefit or lose when both income and consumption are considered. In this paper, income and expenditure data from the CE are used to obtain various measures of income and consumption from 1984 to 2010. This paper examines a variety of income and consumption measures to illustrate their complementary nature as well as their differences. Although permanent income would be the preferred measure of economic well-being, obtaining an estimate of permanent income using cross-sectional survey data is difficult. For this reason, this paper suggests that using measures of both income and consumption—a maximum–minimum approach—provides useful information. In so doing, this paper provides which groups of people benefitted or lost in both dimensions. That is, the methods given are useful in determining which households may be better or worse off in both dimensions: consumption and income.

Finally, although the CE includes imputed income from 2004 to 2010, imputed income is not available before 2004. This paper’s research followed the basic CE methodology as much as possible and imputes income from 1984 to 2010 for the public-use data. The imputations are compared with the official CE imputations from 2004 to 2010, and inequality measures using reported before-tax income in the CE files are compared with imputed before-tax income over the entire period.

Rawley Heimer, Ph.D. candidate, Brandeis University, International Business School, “Friends do let friends buy AAPL, and F, and IPET. . .” (Interview Survey), day one.

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This research is the first to provide empirical evidence that social interaction is more prevalent among active rather than passive investors. Although previous empirical work shows that proxies for sociability are related to participation in asset markets, the literature is unable to distinguish between the types of participants because of data limitations. This paper addresses this shortcoming by using data from the CE Quarterly Interview Survey on individual holdings and buying and selling financial assets as well as expenditure variables, which imply variation in the level of social activity. The paper's findings offer a new explanation for the overtrading puzzle and lend microfounded support to asset-pricing models that incorporate consumption externalities (i.e., "keeping up with the Joneses") in consumer preferences.

Tami Ohler, University of Massachusetts, "Measuring the effect of gender on consumption in single-parent households" (Interview Survey), day one.

The assignment was to replicate and extend an article for an econometrics class project. The article chosen was "Expenditures of single parents: How does gender figure in?" by Geoffrey Paulin and Yoon Lee.⁸

Paulin and Lee use two types of econometric models to describe two aspects of expenditure patterns: ordinary least squares (OLS) models (for items that are frequently purchased) and logistic models (for infrequently or nonpurchased items). The coefficients generated by these models are used to calculate four measures of consumption behavior: probability of expenditure, predicted expenditure, marginal propensity to consume, and income elasticity. Using these models, they report two main findings. First, they conclude that probabilities of expenditure differ for just one house-

hold consumption item: child apparel. Second, they report that expected expenditures (among those who spend at all on a particular item) differ significantly in just four cases: food at home; food away from home; apparel for adults; and pets, toys, and playground equipment.

Their article provides a valuable opportunity to look more closely at the debated issue of whether gender matters in household consumption patterns. The current paper uses Paulin and Lee's results (and variations on them) to examine the effects of two types of issues embedded in empirical studies of household decisionmaking: model specification and sample selection bias.

To uncover the effect of the authors' model specifications and sample selection on the conclusions they draw, the present paper describes two types of changes to their model. First, the interaction terms are eliminated, and second, the sample to include cohabiting parents is expanded. Individually and jointly, these changes lead to the loss of significance of the coefficient on the male dummy variable, the regressor of interest in both their OLS and logit models. With one exception (food away from home), the authors have overstated the differences in consumption patterns between moms and dads. Although gender differences exist among working-age adults who live alone, parenting (with or without unmarried cohabiting partners) appears to lead to convergence of expenditure patterns.

Geng Li, Federal Reserve Board, "Gamblers as personal finance activists" (Interview Survey), day one.

This research uses some of the less used CE questions and exploits the CE paradata on survey time to explore

- how gambling costs fit in household budgets,

- how gamblers' balance sheets compare with those of other consumers,
- how gamblers manage (financial and nonfinancial) risks, and
- why gambling takes place.

Jonathan Fisher, U.S. Census Bureau, and **Rawley Heimer**, Ph.D. candidate, Brandeis University, International Business School, special session, "Applying longitudinal weights: examples from CE microdata users" (Interview Survey), day two.

Although the Interview Survey attempts to collect information from participants for four consecutive quarters, this procedure is not possible for a portion of the sample. In addition, the same address is designed to be visited for four consecutive quarters;⁹ however, the consumer unit present during one visit may no longer participate in subsequent interviews. Reasons include moving, extended absence, or refusal to participate. At the same time, researchers are often interested in examining annual, rather than quarterly, expenditures. Although one way to obtain these estimates is to add expenditures for the four quarters using only those consumer units that participated in all four quarters, the resulting sample no longer represents the U.S. population as a whole. This result is because those who participate for fewer than four quarters are not a random subset of the total sample. For example, they are younger on average and more likely to be renters than those who participate in all interviews. Although the CE program has no official procedure to recommend for applying weights to adjust for the bias in the sample, Jonathan Fisher and Rawley Heimer were known to have computed adjustment weights in their own research using CE data and were invited to present their methods at the workshop. Fisher's method involves proportion-

based adjustment, whereas Heimer's involves regression-based adjustment.

Juan Du, Old Dominion University, "Health insurance and labor market conditions during the Great Recession" (Interview Survey), day three.¹⁰

Lack of health insurance has long been a concern for policymakers, and health insurance mandate has become the main issue in the current debate of healthcare reform. This paper examines how health insurance coverage at the household level has changed during the Great Recession and how insurance status has been affected by labor market conditions, such as the state-level unemployment rate. This paper uses the CE (Interview Survey data) because it tracks households' insurance status at a higher frequency than other microeconomic datasets. This feature allows the effect of macroeconomic conditions to be estimated more accurately. Since the focus is the most recent recession, the sample period selected for this study is January 2007 to March 2011, which includes some postcrisis months because the conditions of the labor market did not bounce back until early 2012. In this paper's sample, 17.1 percent of the households were without health insurance during this period. The monthly state-level labor market data are matched with household-level data in the CE. After controlling for state and year fixed effects as well as households employment status and other characteristics, the paper findings show that a 1 percentage point increase in the state-level unemployment rate is associated with a 2.1 percentage points (12 percent)

increase in the probability of losing insurance. This effect is statistically significant. Robust analysis also was performed using data from a longer sample period 2006 to 2010, which include both the recession in the early 2000s and the current recession. Statistically significant results are found for this sample as well.

Steve Mitnick and Austen Talbot, Bates White Economics Consulting, "Using the Consumer Expenditure Survey to deeply understand how electricity expenditures of American households vary" (Interview Survey), day three.

CE microdata reaffirm the research regarding the skewed nature of electricity bill distributions. The data allow this paper to expound upon this research by providing details on utility bills, expenditures, income, and a host of demographic characteristics. These details allow the relationships between electricity expenditures and a variety of other factors to be examined. CE microdata have thus far proven to be a powerful tool for confirming work with other datasets on how much American households pay for electricity, including the Department of Energy's EIA-826, its Residential Energy Consumption Survey, and several utilities' confidential residential customer monthly billing data.

Anthony Murray, Ph.D. candidate, Virginia Tech, "Heat or eat' or 'food or fuel'? Measuring trade-offs between food and energy consumption" (Interview Survey), day three.

Recent research finds many low-income households face a "heat or

eat" dilemma. These households make the difficult choice between providing sufficient food for their family to eat or paying utility bills to meet their heating and cooling needs. This work in Murray's dissertation uses an Almost Ideal Demand System to generate own-price, cross-price, and income elasticities for household utilities and food using price and expenditure data from the BLS and the American Chamber of Commerce Researcher Association. These elasticities can be used to determine how energy price shocks affect household food insecurity levels but have not been calculated in previous research. Southern households traditionally spend a larger share of their income on utility expenditures compared with the rest of the United States because of higher summer electricity use to cool residences. Using the Almost Ideal Demand System model, calculating Southern elasticities and testing differences between the elasticities of other Census regions are possible. Simulations examine the impact of energy price shocks on Southern household food insecurity levels. When price shocks dramatically worsen food security levels of Southern households, Southern congressional leaders have additional leverage to request more funding from federal energy assistance programs, such as the Low Income Home Energy Assistance Program. Traditionally, these programs have disproportionately allocated benefits to Northeastern and Midwestern states. The research results also can increase policymakers' and social assistance designers' understanding of how energy price shocks may affect household food insecurity. □

BLS speakers

Staff of the CE program

Scott Curtin, Economist, Branch of Information and Analysis; day two
 William Hawk, Economist, Branch of Information and Analysis; day one
 Craig Kreisler, Economist, Branch of Information and Analysis; days one and two
 Steve Henderson, Supervisory Economist, Chief, Branch of Information and Analysis; day three
 Evan Hubener, Economist, Branch of Production and Control, day two
 Bill Passero, Senior Economist, Branch of Information and Analysis; all days
 Laura Paszkiewicz, Supervisory Economist, Chief, Microdata Section, Branch of Information and Analysis; all days
 Geoffrey Paulin, Senior Economist, Branch of Information and Analysis; day three
 Meaghan Smith, Supervisory Economist, Chief, Phase 2 Section, Branch of Production and Control; day three

Other BLS speakers

Carol Boyd Leon, Technical Writer–Editor, Office of Publications and Special Studies, *Monthly Labor Review Branch*; day two
 Barry Steinberg, Mathematical Statistician, Division of Price Statistical Methods; day two

Speakers from outside BLS

Richard Bavier, Policy Analyst, U.S. Office of Management and Budget (retired), “Recent trends in U.S. income and expenditure poverty” (Interview Survey); day one

Juan Du, Old Dominion University, “Health insurance and labor market conditions during the Great Recession” (Interview Survey); day three¹
 Jonathan Fisher, U.S. Census Bureau, “The demography of inequality for individuals and families: income and consumption” (Interview Survey), day one;² special session, “Applying longitudinal weights: examples from CE microdata users” (Interview Survey); day two
 Rawley Heimer, Ph.D. candidate, Brandeis University, International Business School, “Friends do let friends buy AAPL, and F, and IPET. . .” (Interview Survey), day one; special session, “Applying longitudinal weights: examples from CE microdata users” (Interview Survey); day two
 Geng Li, Federal Reserve Board, “Gamblers as personal finance activists” (Interview Survey); day one
 Steve Mitnick and Austen Talbot, Bates White Economics Consulting, “Using the Consumer Expenditure Survey to deeply understand how electricity expenditures of American households vary” (Interview Survey); day three
 Anthony Murray, Ph.D. candidate, Virginia Tech, “Heat or eat’ or ‘food or fuel’? Measuring trade-offs between food and energy consumption” (Interview Survey); day three
 Tami Ohler, University of Massachusetts, “Measuring the effect of gender on consumption in single-parent households” (Interview Survey); day one

Notes

¹ This work was coauthored with Takeshi Yagihashi, Old Dominion University.
² This work was coauthored with David S. Johnson, U.S. Census Bureau, and Timothy M. Smeeding, University of Wisconsin.

Notes

¹ The Quarterly Interview Survey is designed to collect expenditures for big-ticket items (e.g., major appliances, cars, and trucks) and recurring items (e.g., payments for rent, mortgage, or insurance). In the Interview Survey, participants are visited once every 3 months for five consecutive quarters. Data from the first interview are collected only for bounding purposes and are not published. In the Diary Survey, participants record expenditures daily for 2 consecutive weeks. The survey is designed to collect expenditures for small-ticket and frequently purchased items, such as detailed types of food (e.g., white bread, ground beef, butter, lettuce). The CE microdata may be downloaded on the CE website at <http://www.bls.gov/cex/pumhome.htm>.

² For more information on the CE redesign Gemini Project, visit <http://www.bls.gov/cex/geminiproject.htm>.

³ Currently, respondents are asked to report values paid for both federal and state taxes. However, this question results in a large

proportion of missing data, because many respondents do not know, or refuse to report, this information. The CE program has been working with the National Bureau of Economic Research to use TAXSIM, a program designed to estimate tax values based on several input values, as a mechanism to replace the collected tax data.

⁴ For preserving the confidentiality of the data, values for some variables, such as income sources and certain expenditures (e.g., rent, among others), are topcoded. In this process, values that exceed a predetermined critical value are replaced with a new value. In each case, changed values are flagged for user identification. Details about topcoding are provided in the public-use microdata documentation for the year of interest. (See, for example, *2011 Consumer Expenditure Interview Survey*, Public Use Microdata, User’s Documentation, September 25, 2012, <http://www.bls.gov/cex/2011/csx-intvw.pdf>.)

⁵ The CE sample design is pseudorandom.

The proper use of weights requires the use of the method of balanced repeated replication.

⁶ For direct access to this information, see “Consumer Expenditure Survey (CE) Microdata Users’ Workshop and Survey Methods Symposium, July 17–20, 2012” (U.S. Bureau of Labor Statistics, March, 9, 2012), <http://www.bls.gov/cex/cxannualworkshop.htm>.

⁷ This work was coauthored with David S. Johnson, U.S. Census Bureau, and Timothy M. Smeeding, University of Wisconsin.

⁸ Geoffrey Paulin and Yoon Lee, “Expenditures of single parents: How does gender figure in?” *Monthly Labor Review*, July 2002, pp. 16–37, <http://www.bls.gov/opub/mlr/2002/07/art2full.pdf>.

⁹ Exceptions include cases in which the housing unit present on one visit is demolished on the next and other infrequent events.

¹⁰ This work was coauthored with Takeshi Yagihashi, Old Dominion University.