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The Role of Time in Fast-Food Purchasing Behavior in the United States

Karen S. Hamrick

Abigail M. Okrent

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The Role of Time in Fast-Food Purchasing Behavior in the United States

Karen S. Hamrick, khamrick@ers.usda.gov
Abigail M. Okrent, aokrent@ers.usda.gov

Abstract

Meals, snacks, and beverages purchased at fast-food restaurants account for an increasingly large share of a typical American's food budget and have been blamed for Americans' expanding waistlines and poor diet quality. This study uses data from the 2003-11 American Time Use Survey to examine the effects of time-use behaviors, prices, sociodemographic characteristics, labor force participation, and prices on fast-food purchasing patterns in the United States before and after the Great Recession. Fast-food purchasers spend less time sleeping, doing housework, eating and drinking, and watching television than nonpurchasers, and more time traveling from place to place. They also tend to have higher incomes and higher education levels. While the time that Americans spent eating out at all restaurants declined during and after the 2007-09 recession, the share of the population eating at fast-food restaurants on a given day stayed fairly constant, seemingly unaffected by the economic downturn, but the share for sit-down restaurants declined.

Keywords: Food away from home, FAFH, fast food, time use, American Time Use Survey, ATUS, Eating and Health Module, Great Recession, time pressure, eating patterns, sleep

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A report summary from the Economic Research Service November 2014

Find the full report at *www.ers.usda.gov/publications/err-economic-research-report/err178*

The Role of Time in Fast-Food Purchasing Behavior in the United States

Karen S. Hamrick and Abigail M. Okrent

What Is the Issue?

Food away from home (FAFH) is an important part of a typical American's diet and continues to increase as a share of the food budget. Rising consumption of a particular kind of FAFH—fast food—has been blamed for American's expanding waistlines and poor diet quality. Previous studies have attributed this increase in purchases of fast foods to many factors, including budget and time constraints, demographic and health characteristics, and market-level forces, but no study has been able to rigorously address the effects of all of these variables on fast-food purchasing behavior. This study is the first to extensively examine the effects of time-use behaviors, prices, sociodemographic characteristics, labor force participation, and prices on fast-food purchasing patterns in the United States before and after the Great Recession. Because fast food accounts for a large share of U.S. food expenditures and calorie consumption, a better understanding of the motivation behind trends in fast-food purchasing behaviors may help inform policies designed to improve the diet quality of Americans. This research complements previous studies that used food expenditure and food intake data (but not time-use data) to analyze the effects of demographic characteristics, prices, and income on fast-food purchases and consumption.

What Did the Study Find?

Americans purchase fast food to save time. Those that purchase fast food on a given day spend less time eating and drinking as a primary (main) activity, sleeping, doing housework, and watching television than the average for the total population. The difference in sleep time is considerable—fast-food purchasers spent 23 fewer minutes sleeping on a given day over 2003-11 than the average for the total population. In addition to spending less time in primary eating and drinking, fast-food purchasers were more likely than the average person to report no primary eating/drinking on a given day. Fast-food purchasers spent about the same amount of time as others in "secondary" eating; that is, eating while engaged in another, primary activity. However, fast-food purchasers were more likely to eat while at work or while driving a vehicle than others. To the extent that eating quickly may not be ideal and that eating is done while one is engaged in activities that demand focus suggests that fast-food purchasers have different, and perhaps poorer, eating habits than others.

Effects of employment. On a given day in 2003-11, those who were employed were more likely to purchase fast food than those not employed. And those who were employed but on their day off were even more likely to purchase fast food than those employed and on a workday or those not employed.

Effects of household characteristics. Consistent with findings in other studies, household composition, income, age, and education play an important role in fast-food purchasing behavior. Relative to married and unmarried couple households with no children, a single-person household had a higher probability of fast-food purchase by 1.4 percent on a given day in 2003-11. "Other" households with and without children, typically multigenerational households, had the same increased probability. Single-parent households, however, had an increase in the probability of fast-food purchase of 2.5 percent relative to married households. Married and unmarried couple households with children had the same probability of fast-food purchase as couple households without children. Households with higher incomes and households with higher education were also more likely than other households to purchase fast food.

Effects of the Great Recession and time spent eating out. During and after the Great Recession, the overall time that Americans spent eating out declined, which was associated with a drop in the share of the population who ate at sit-down restaurants. However, the share of the population that purchased fast food on a given day stayed fairly constant during and after the 2007-09 recession, seemingly unaffected by the economic downturn, while those employed were even more likely to purchase fast food than before the recession. In particular, employed single parents were 3.9 percent more likely to purchase fast food than others pre-recession and 5.2 percent more likely during and after the recession—a large increase in fast-food purchase behavior.

For the total population, there were small but statistically significant changes in time-use patterns during and after the recession—less time spent in paid work and in travel, more time spent in meal preparation and in watching television. However, time-use patterns of fast-food purchasers stayed faily stable and exhibited less change than those of the total population.

How Was the Study Conducted?

The study used data on time use and demographic and other characteristics from the American Time Use Survey (ATUS). The ATUS is a continuous, nationally representative survey of time use by Americans that has been conducted by the U.S. Bureau of Labor Statistics since 2003. ATUS data enabled researchers to compare time-use patterns of those who purchased fast food with those of the total population and other subgroups. An advantage of using these data rather than food intake data (i.e., National Health and Nutrition Examination Survey) or expenditure data (i.e., Consumer Expenditure Survey) is that the ATUS provides detailed information on time use by Americans and offers a unique perspective on the relationships between fast-food purchasing behavior and time variables that have been previously unexplored in the literature. Information on secondary eating was derived from the 2006-08 ATUS Eating & Health Module.

Descriptive statistics on time and frequency of purchase were estimated for subpopulations (gender, employment status, and fast-food purchaser) between 2003 and 2011 and also before and after the onset of the Great Recession in December 2007. Researchers conducted multivariate analysis on the probability of fast-food purchase by household type (i.e., single person, single parent, couple no children, couple with children, other households no children, and other households with children).

The Role of Time in Fast-Food Purchasing Behavior in the United States

Introduction

Meals, snacks, and beverages purchased at fast-food and sit-down restaurants have become a large and growing portion of a typical American's food budget. In 1929, food purchased for away-from-home consumption constituted only 13.4 percent of the average U.S. household's food budget, while in 2012, this share was 43.1 percent (USDA-ERS, 2013). During the past decade, however, the growth in food-away-from-home (FAFH) expenditures by establishment type has been uneven. Expenditures at fast-food restaurants decreased from about 4 percent to 3 percent of the total budget for all goods and services for an average U.S. household between 1998 and 2010 but seemed to be unaffected by the Great Recession (December 2007-June 2009). On the other hand, the share of total expenditures for goods and services attributed to sit-down restaurant meals grew from 1998 until 2006 and fell just before the Great Recession (Okrent and Alston, 2012). While consumers have decreased expenditures on fast food, this segment of consumption still accounts for a relatively large and growing share of the calorie intake by Americans (Lin and Guthrie, 2012).

The calories consumed from fast-food and sit-down restaurants constitute nearly a third of the energy intake by adults in the United States, and study findings suggest that the nutritional quality of these foods is lower than foods purchased for at-home consumption (Lin and Guthrie, 2012). In addition, fast food has been found to contribute to obesity (Chou et al., 2004; Davis and Carpenter, 2009; Currie et al., 2010; Chen et al. 2013; Alviola et al., 2013). On the whole, this evidence suggests that consuming FAFH may lower dietary quality and increase body weight and that different types of FAFH may affect dietary quality and individual body weight differently. The linkage between food consumed at fast-food and sit-down restaurants and poor nutritional outcomes has led to Federal initiatives to promote consumption of healthier options and limit marketing and access of these foods to children (White House Task Force on Childhood Obesity, 2010). For example, in response to First Lady Michelle Obama's *Let's Move* campaign, several food companies, including McDonald's, pledged to limit the marketing of "unhealthy" products to children (Federal Trade Commission, 2012).

However, what if purchasing decisions at fast-food and sit-down restaurants are influenced not only by relative prices and marketing but by time constraints? In particular, Mincer (1963) argued that ignoring the value of time in demand relationships could produce biased results. In the new household economics, the value of time is an important factor affecting consumption, which suggests that households may substitute time-saving services for their own time (Becker, 1965).

Harms (2014) found that married women in the rural United States spent an average of 122 minutes cooking and an additional 68 minutes in meal cleanup on an average day in the 1920s. Zick and Stevens (2009) found that food preparation time for women declined from an average of 92 minutes a day in 1975 to 51 minutes in 2006; for men, food preparation time increased by only 3 minutes during the same period and still averaged under 20 minutes per day. The authors conclude that these are secular trends that persist after controlling for demographic, economic, and household

changes that have taken place over the three decades. Hence, households with two wage earners may consume more time-saving goods and services than do households with full-time homemakers.

This is the first study to extensively examine the effects of time-use behaviors, prices, sociodemographic characteristics, labor force participation, and prices on fast-food purchasing patterns in the United States before and after the Great Recession using data from the 2003-11 American Time Use Survey (ATUS). The advantage of using ATUS data versus food intake or food expenditure data (e.g., National Health and Nutrition Examination Survey (NHANES) and Consumer Expenditure Survey, respectively) is that time-use data enable researchers to examine the relationship of time spent in work, household production, and leisure activities to fast-food purchasing decisions. In addition, time diaries are considered a neutral method of collecting data on time spent in various activities and are less subject to under- and overreporting than surveys that ask for estimates of time spent on specific activities (Robinson and Godbey, 1997, chapter 4; Robinson et al., 2011).

Because the data range from 2003 to 2011, we could also test the impact of the Great Recession on the probability of purchasing fast food. Specific research questions addressed in this study include the following: (1) What individual- and household-level characteristics, including how individuals spend time, are associated with fast-food purchases? and (2) Did fast-food purchasing behavior change over the recent business cycle? A better understanding of the motivation behind the trends in fast-food purchasing behaviors will help inform policy designed to improve the diet quality of Americans.

Relevant Literature on Determinants of FAFH Demand

Demand for FAFH is typically modeled as being a function of prices and income—the standard utility maximization framework. With the exception of Okrent and Alston (2012) and Richards and Mancino (2013), most previous studies have modeled demand for FAFH as a composite good and have generally found demand for FAFH to be more responsive to price- and income-induced expenditure changes than food at home (FAH) (see Okrent and Alston (2011) for a review of these studies). Okrent and Alston (2012) found demand for fast foods to be almost perfectly inelastic to changes in prices (-0.13) and demand for meals from sit-down restaurants to be quite price elastic (-1.96). On the other hand, Richards and Mancino (2013) found the price elasticity of demand for meals at fast-food and various types of sit-down restaurants to be between -0.5 and -0.9. Demand for different types of FAFH—in particular, fast foods—may depend on time constraints and convenience, sociodemographic characteristics, and macroeconomic forces like the business cycle rather than just relative prices and income.

Becker (1965) developed the theory of time allocation, which accounted for the time input into the commodities and activities that a household produces via a household production function, as well as the time constraint faced by individual household members. The household's utility function contains the commodities and activities and is maximized subject to the two constraints. One household commodity is meals. An increase in the value of an individual's time would lead to a substitution toward goods. "For example, an increase in the value of a mother's time may induce her to enter the labour force and spend less time cooking by using pre-cooked foods...." (p. 514). Becker's theory of time allocation spawned an extensive literature on home production (see Gronau (1986) and Gronau (1997) for thorough literature reviews). Indeed, Gronau commented that the household production function highlights that "one cannot separate the analysis of consumption behavior from the analysis of time use" (1997, pg. 199).

In keeping with the Becker household production model, several studies have argued that increased consumption of meals and snacks at fast-food restaurants has largely been driven by opportunity cost of time within a typical American household (e.g., Davis, 2013). Most studies account for the opportunity cost of time by using wage, labor hours, women's labor force participation, presence of working spouse, and employment status to proxy for the time constraint faced by households making food purchasing decisions. With the exception of Huffman (2011), most of these studies use cross-sectional data and assume that prices faced by consumers in a particular period are constant. All of these studies also include sociodemographic variables, arguing that household size, age, race, and other characteristics are important determinants of FAFH consumption. More recently, studies have begun to analyze structural changes in food consumption (i.e., substitution out of FAFH and into FAH) due to the most recent recession.

Much of the research that investigates the impact of the time constraint on household production and demand for FAFH treats FAFH as a composite. These studies generally found that the value of time for a household manager (the household member responsible for meal preparation, including grocery shopping, cooking, baking, assembling, and serving food, and cleanup after the meal, sometimes assumed to be the female) has a positive effect on demand for total FAFH (Prochaska and Schrimper, 1973; Sexauer, 1979; Soberon-Ferrer and Dardis, 1991; Yen, 1993; Nayga and Capps, 1994; Byrne et al., 1996; and Dong et al., 2000). However, a few studies, namely Huffman (2011), Redman (1980), and Kinsey (1983), found the household time constraint to be a less important deter-

minant of demand for FAFH. Kinsey (1983) argued that while this result may appear to contradict theory, household managers need not increase FAFH expenditures to substitute relatively inexpensive goods and services for time if the cost of purchasing certain types of FAFH (i.e., fast foods) is cheaper than food at conventional sit-down restaurants.

Several studies investigated whether the value of time has a differential effect on FAFH by establishment and meal type. McCracken and Brandt (1987) and Stewart et al. (2004) found that an increased value of the household food manager's time increased expenditures on fast food more than on meals from sit-down restaurants. Similarly, Byrne et al. (1998) and Stewart and Yen (2004) found the effect of household manager hours to have a positive impact on demand for fast foods but negative impact on demand for sit-down foods. Contrary to previous findings, Jekanowski et al. (2001) did not find any significant effect of this variable on per capita fast-food sales. Jensen and Yen (1996) examined the demand for FAFH by meal type—breakfast, lunch, and dinner—and found that the effects of wife's employment are positive on both the probability and level of expenditures on lunch and dinner as FAFH, but wife's employment did not seem to affect breakfast as FAFH.

Related to opportunity cost of time, the above studies also acknowledge that meal preparation, and, hence, demand for FAFH is also determined by household composition, including presence of children, family size, martial status, and gender of household heads (primary wage earners in the household). Prochaska and Schrimper (1973) and Soberon-Ferrer and Dardis (1991) found that even though the presence of children in the household negatively affected demand for total FAFH, the size of the household increased demand for total FAFH. The argument is that additional number of adults in the household lead to additional FAFH because of time constraints related to employment and social activities. Byrne et al. (1996) found household size had a negative effect on demand for total FAFH, arguing that there are economies of household size in meal preparation at home. Byrne et al. (1998) found that family size was only negatively related to expenditures at sit-down restaurants and positively related to expenditures at fast-food restaurants.

Later studies began investigating "nontraditional" households by including marital status in the analysis because of changes in traditional household structure (e.g., from married to single or multigenerational households). Byrne et al. (1998) found that unmarried households spent less on FAFH than married households regardless of restaurant type, arguing that fewer people were involved in the FAFH occasion. Contrary to this finding, Stewart and Yen (2004) and Stewart et al. (2004) found that single-person households spent around $0.5-$3.0 **more** per week at fast-food and sit-down restaurants than married households but single-parent households spent $0.30-$1.70 **less** than married households at both types of FAFH establishments.

Lastly, gender of the household manager also seems to affect demand for FAFH, but empirical evidence is mixed. Byrne et al. (1996) found that households with female household managers had lower expenditures than those with male household managers, which they attributed to males having less culinary skills than females. Byrne et al. (1998) found that female household managers who worked spent less at upscale and midscale sit-down restaurants but more at fast-food restaurants than male household managers.[1]

Only recently have extensive time-use data been applied to time allocation models to examine tradeoffs between time and market prices in meal preparation and consumption of prepared foods.

[1]According to Byrne et al. (1998), upscale restaurants offer full alcohol service and accept credit cards whereas midscale restaurants do not.

Hamermesh (2007) paired data from the 1985 Time Use Survey and ATUS with data from the Consumer Expenditure Survey for 1985 and 2003 to examine how married households combined expenditures on goods and time to prepare or purchase meals and snacks. Hamermesh found large decreases in the time inputs into eating over the period, where eating appears to be a relatively goods-intensive commodity. Using the 2005 ATUS, Tashiro (2009) found that more time in paid work resulted in less time preparing food at home for all respondents; that time spent in purchasing prepared food increases with time spent in leisure activities for Whites and Hispanics; that Blacks increase their time spent purchasing prepared food with increases in paid work time; and that purchases of prepared food tend to increase with a person's education level. Lastly, Van der Lippe et al. (2004) examined outsourcing of domestic tasks in the Netherlands and found that income was the most important determinant of a household's likelihood to outsource. In particular, Van der Lippe et al. found that dual-earning households who spent more time in the labor market were more likely to outsource—which includes purchasing takeout meals—and that takeout meals were strongly related to the presence of children in the household.

The last thread of literature that investigates the determinants of FAFH demand addresses how economic downturns and the business cycle affect demand for different types of foods. In the most recent literature, some researchers have begun to analyze the effects of the most recent recession (December 2007 to June 2009)[2] and recovery on time-use patterns food expenditures, and dietary intake. Using 2003-10 ATUS data and analyzing cross-State variation, Aguiar et al. (2013) found that the bulk of the foregone market work hours was spent in leisure, and 30 percent of this time was reallocated to nonmarket home production, which includes a 12-percent increase in hours spent in core home production (cooking, cleaning, and laundry). Beatty and Senauer (2012) documented that food spending shifted into FAH from FAFH over the 2007-09 recession and into the recovery and also noted that low-income households spent more time on food preparation. In addition, Todd (2014) found that dietary quality improved between 2005-06 and 2009-10, which could be partly attributable to a 127-calorie decline in daily energy intake from FAFH (of which a 53-calorie decline is from fast-food consumption). Looking at how labor force status—employment and unemployment—affects consumption, Dave and Kelly (2010) found that a higher risk of unemployment is associated with reduced consumption of fruits and vegetables and increased consumption of snacks and fast food.

The literature on the determinants of FAFH purchase behavior in the United States examines a number of competing hypotheses as to why demand for FAFH has grown, including market prices, income, opportunity cost of time, household composition and demographics, and macroeconomic shocks. However, none of these studies were able to simultaneously explore many of these competing hypotheses due to data limitations. This study uses data from the 2003-11 ATUS to directly analyze demand for FAFH by type (fast-food and sit-down restaurant) as a function of individual- and household-level time-constraining activities (time spent in work, personal care, meal preparation, and leisure activities over the day); demographic, labor force, and household characteristics; and market-level characteristics. Also, since these data cover the 2007-09 recession, the longest and deepest post-World War II U.S. recession, the study addresses the effects of business cycle events on fast-food purchase behavior.

[2]See the National Bureau of Economic Research, US Business Cycle Expansions and Contractions, http://www.nber.org/cycles/cyclesmain.html

Data and Definitions

To identify various FAFH activities and estimate frequency and time duration, we used data from the pooled 2003-11 ATUS. Although these data do not indicate dollars spent or calories consumed on FAFH, they do draw from survey respondents' time diaries of activities, as well as provide extensive demographic and labor-force participation information, information on all members of the household, and some geographic information. This enables researchers to identify different FAFH behaviors in different subgroups. As discussed in the literature, other data sources exist that can be used to model demand for fast food; for example, food intake data from NHANES and food expenditure data from the Consumer Expenditure Survey have been used to look at the effects of fast-food consumption on diet quality and the effects of prices and expenditures on fast-food consumption. However, these data sets do not contain information on all of the ATUS respondents' activities, as there may be important tradeoffs in time use that affect fast-food purchasing behavior.

The U.S. Bureau of Labor Statistics' ATUS is a continuous survey that began in 2003. Survey interviews are conducted by the U.S. Census Bureau nearly every day of the year to allow for analysis of weekdays versus weekends, holidays, and seasonality. One individual age 15 or older from each sampled household is interviewed about his or her activities for the 24-hour period from 4 a.m. the day before the interview to 4 a.m. on the interview day.[3] Survey respondents are asked to identify their primary activity if they were engaged in more than one activity at a time. They are also asked to report where they were and whom they were with for most diary activities.

The pooled 2003-11 ATUS microdata files contain 124,517 completed interviews, yielding a total of 2,462,919 activities in the respondents' time diaries. ERS used the ATUS Respondent, Roster, Activity, Activity Summary, Who, ATUS-Current Population Survey, Replicate Weights, and Methodology Case files.[4] (See references for Web site links.)

Estimation procedures outlined in the ATUS User's Guide (U.S. Bureau of Labor Statistics, August 2012) were followed. All estimates presented were weighted to be nationally representative. Averages were calculated as the mean. Standard errors were calculated according to Section 7.5 of the ATUS User's Guide, using the balanced repeated replication method and the ATUS Replicate Weights file. A 90-percent level of confidence was constructed around each estimate and used to determine statistical differences. All differences between estimates discussed in the text are statistically different at the 90-percent level unless indicated as otherwise. SAS 9.2 and Stata 12 were used for estimatation.

[3]One potential drawback of the ATUS diary data is that information on only 1 time-diary day per person was collected. There may be concern that some activities, such as eating fast food or engaging in sports and exercise, are not daily activities and, thus, a 1-day diary lacks intrapersonal variability. However, some activities, such as eating patterns, have a large degree of persistency, meaning that day-to-day variation is minimal. Wansink (2007) discusses the myriad external influences that result in eating habits. Exercise is also considered to be a habit, and researchers have studied what contributes to habitual exercise (Aarts et al., 1997; Finlay et al., 2002). Indeed, much of an individual's daily activities can be classified as habitual repetition (Neal et. al., 2006). Another argument for using the ATUS 1-day time diary data is that the ATUS is large and nationally representative, and so intrapersonal variability would not be an issue.

[4]Supplemental analysis was done using the 2006-08 ATUS Eating & Health Module (EHM). The pooled 2006-08 microdata files contain 37,832 completed interviews. The EHM Respondent and Replicate weights files were used. Estimation procedures outlined in the EHM User's Guide (Hamrick, 2010) were followed.

ERS used the ATUS time diaries to infer whether an individual made a fast-food/carryout purchase (hereafter referred to as fast food) or ate at a restaurant (or related venue). ATUS "where" codes denoted the respondent's location during an activity, and researchers used this information in conjunction with the sequence of events relating to a fast-food purchase. Generally, if an individual reported time to travel to a restaurant and purchase food, the food purchase was classified as fast food; if an individual reported time to travel to a restaurant, eat the food, and then pay for the food, this purchase was classified as sit down. Note that ATUS data do not indicate the type of food and/or beverage purchased, so the purchase could have been just a cup of coffee, or the food could have been purchased at a convenience store rather than a restaurant. For a small number of respondents, researchers applied other rules to identify fast-food and sit-down purchases (see appendix for more details and a discussion of the limitations to identifying fast-food purchase).

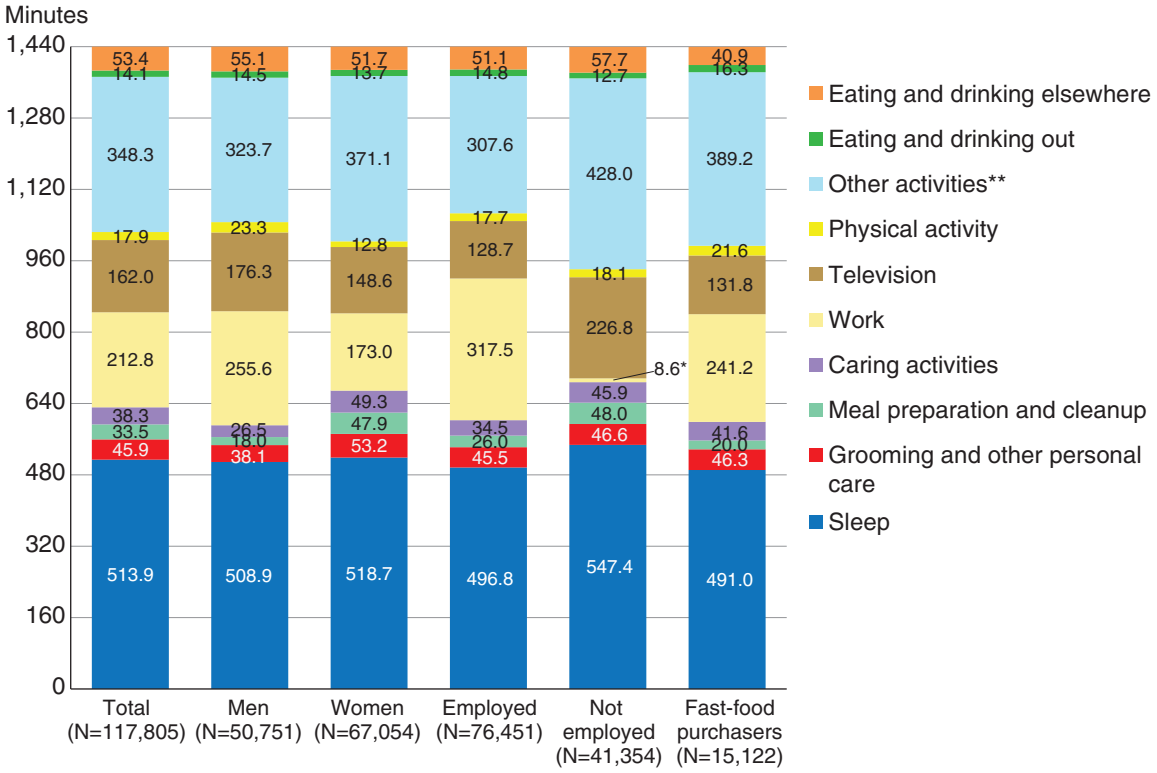
Descriptive Statistics

This section describes differences in fast-food and sit-down restaurant purchasing behavior between subpopulations and over time. Because of evidence that the Great Recession has had a lasting impact on FAFH purchasing behavior, the first subsection discusses differences in time spent eating and drinking, and engaging in other household activities, and fast-food and sit-down restaurant participation rates by gender and employment status. The second subsection analyzes changes in fast-food and sit-down participation rates over the business cycle. All estimates are weighted to be nationally representative, and a 90-percent level of confidence was used to determine whether estimates were statistically different between subpopulations.

Differences Among Gender, Employment Status, and Fast-Food Purchasing Groups

In 2003-11, on an average day, Americans age 18 and older spent 67.5 minutes engaged in primary eating and drinking (i.e., eating and drinking as an individual's main activity) (fig. 1; see appendix tables 1 and 2 for more detailed time-use estimates, participation rates, and distributions of eating behaviors). This total comprises 14.1 minutes eating out, mostly at sit-down restaurants, and 53.4

Figure 1
Time spent in various activities on an average day, 2003-11, age 18 and older

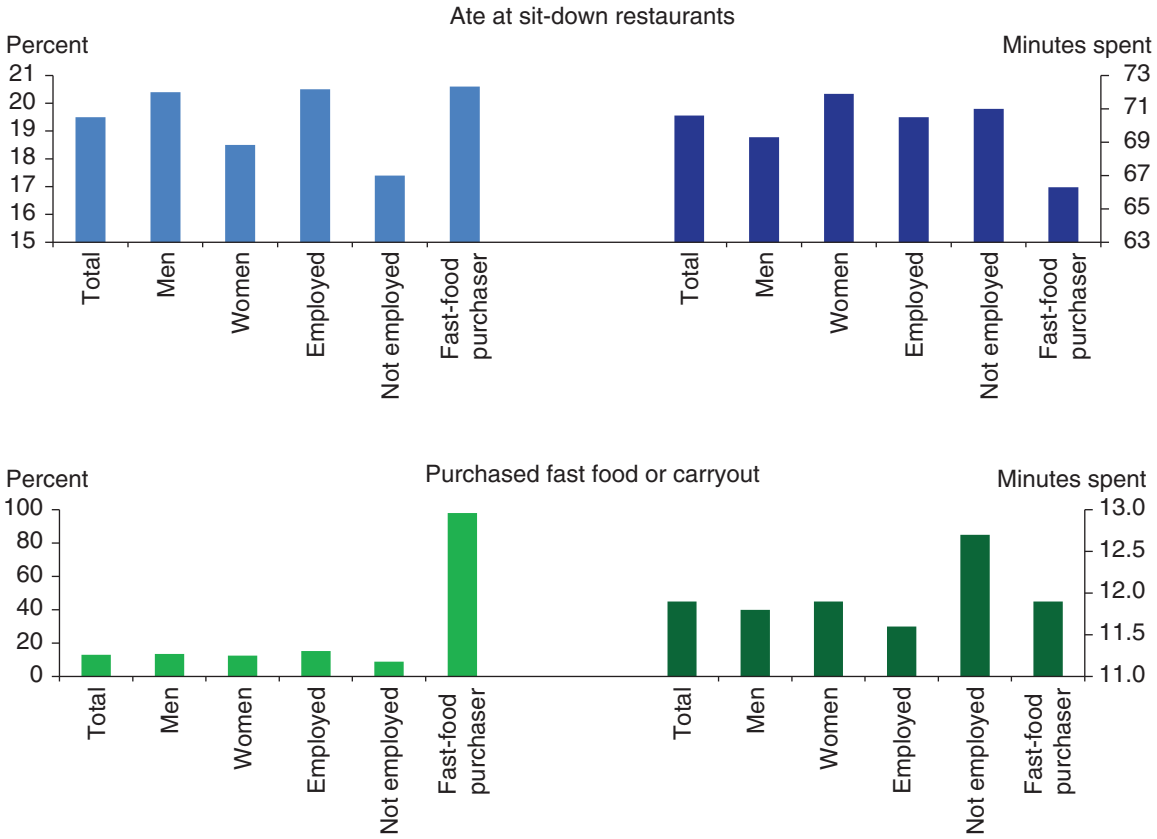


Notes: N = number of observations.
*Time spent looking for employment is considered work.
**Other activities includes all travel time.
Source: USDA, Economic Research Service estimates calculated from American Time Use Survey data.

minutes eating elsewhere.[5] In addition, 19.5 percent of the population ate at a sit-down restaurant on an average day in 2003-11, and 13 percent purchased fast food or carryout food (fig. 2). Eating at a sit-down restaurant and purchasing fast food are not mutually exclusive, as 1.7 percent of Americans did both on an average day during the period (not shown). Only about one-third of those who purchased fast food reported eating at the restaurant (not shown).

Time-use patterns of men and women over 2003-11 reveal many of the same differences identified by other ATUS researchers; in particular, men spend more time in eating/drinking activities, paid work, and watching television, whereas women spend more time in grooming; meal preparation, cleanup, and other household tasks; and caring for others. Interestingly, compared with women, more men ate at a sit-down restaurant (20.4 percent versus 18.5 percent) and purchased fast food (13.5 percent versus 12.5 percent). These findings are in line with Byrne et al. (1996), who argued that households with female household managers may purchase less FAFH because they have better cooking skills.

Figure 2
Participation rates for FAFH, on an average day, 2003-11, age 18 and older



Note: Travel time is not included in the calculation of participation rates.
FAFH = Food away from home.
Source: USDA, Economic Research Service estimates calculated from American Time Use Survey data.

[5]Totals do not always add up exactly due to rounding, and may be off by ±0.1 minute or ±0.1 percentage point.

The population that was not employed spent 8.6 minutes per person on an average day looking for work, which is considered a work-related activity. Because the ATUS data span the 7-day week, including holidays, and most people work only 5 days a week, employed averages reflect both those who are employed and engaged in paid work on an average day and those who are employed but did not engage in paid work. Those who were employed spent, on average, less time in eating/drinking than those not employed (65.9 minutes versus 70.5 minutes) and also less time in meal preparation and cleanup (26 minutes versus 48 minutes), on the average day.

However, 20.5 percent of those employed ate at a sit-down restaurant on the average day in 2003-11, a higher rate than those not employed (17.4 percent), although the average amount of time spent at the restaurant was about the same for the two groups, about 71 minutes. Similarly, 15.2 percent of those employed also purchased fast food, compared with only 8.8 percent of those not employed.

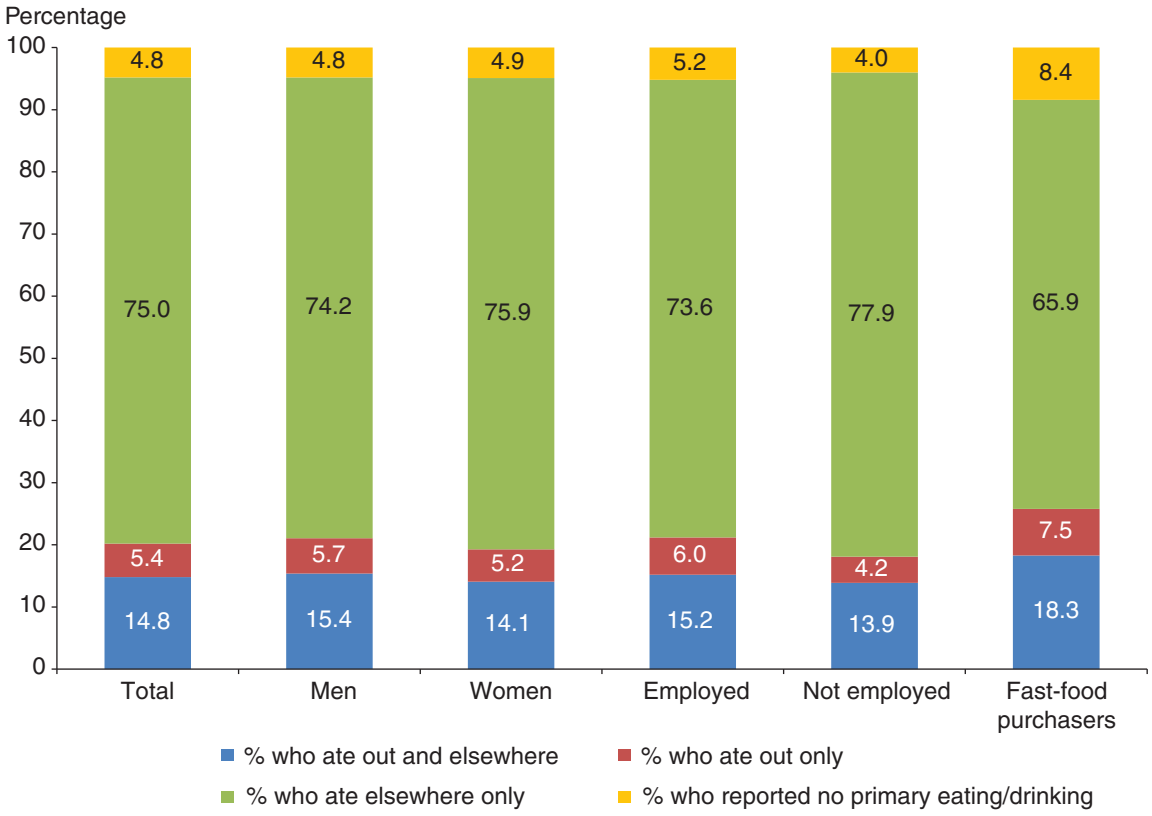
Of particular interest is time use among those who purchased fast food. Compared with averages for the total population, fast-food purchasers spent less time in primary eating/drinking, sleeping,[6] meal preparation and cleanup and other household activities, and watching television, and more time in caring for household and nonhousehold members and in paid work and accompanying travel. Fast-food purchasers were considerably more likely than the total population to report no primary eating/drinking (8.4 percent versus 4.8 percent) and more likely to report that all their eating/drinking was at an eating-out establishment (7.5 percent versus 5.4 percent) (fig. 3).

Because fast-food purchasers are more likely to report no primary eating/drinking, there was the possibility that they engage in more secondary eating, that is, eating while doing another "main" activity. Based on data from the 2006-08 ATUS Eating & Health Module, fast-food purchasers spent about the same amount of time in secondary eating on an average day as the total population (23.1 minutes versus 23.9 minutes) but more time in secondary drinking (76.9 minutes versus 65.4 minutes). In addition, fast-food purchasers were more likely to engage in secondary eating or drinking while at work or driving a vehicle than non-fast-food purchasers.

[6]Fast-food purchasers spent, on average, 3.0 minutes in sleeplessness and 488.0 minutes actually sleeping, for a total of 491.0 minutes. The total population spent, on average, 3.5 minutes in sleeplessness and 510.5 minutes actually sleeping, totaling 513.9 minutes.

Figure 3

Distribution of eating behaviors, 2003-11, age 18 and older



Source: USDA, Economic Research Service estimates calculated from American Time Use Survey data.

Changes Before and After the Business Cycle Peak

The National Bureau of Economic Research dates the last U.S. business cycle peak as December 2007, the end of an expansion, and the beginning of a recession that would last until the business cycle trough June 2009, ending the Great Recession. Although a new expansion started at the trough, economic recovery was slow post-recession, and, in particular, the labor market was slow to recover. It was not until May 2014 that the economy recovered the 8.7 million jobs lost during the recession, fully 5 years after the trough. Although time-use patterns change little if any year to year, the economic impact of a recession, especially one with the depth of the 2007-09 recession, would be expected to cause changes in Americans' activities due to higher unemployment, lower household income, lower consumer confidence, and other factors, such as a decreased rate of household formation.[7]

In this study, we analyzed the time-use patterns of Americans during January 2003-November 2007 (the ATUS data available for the 2001-07 expansion) and during December 2007-December 2011 (post-Great Recession peak)[8] (table 1). For the total population, time-use patterns reveal small but systematic changes in Americans' time-use patterns from one period to the next—less time, on average, spent in paid work and in travel; more time spent in meal preparation; less time spent in making purchases as households' discretionary income decreased or households' uncertainty about future income caused them to cut back on spending; and more time watching television. However, average time spent in primary eating/drinking stayed essentially the same in both periods, but the amount of time spent eating out decreased and the amount of time spent eating elsewhere (e.g., at home, at work) increased.

The share of the population who reported no primary eating/drinking on an average day dropped from 5.1 percent pre-peak to 4.5 percent post-peak (table 2). Although the difference in these estimates is statistically significant, this drop is likely due to a statistical artifact—the ATUS had a large number of respondents (9 percent) who reported no primary eating/drinking in the first year of the survey (2003). As a result, changes were made in the survey instrument in 2004. The share of the population with no primary eating/drinking has been consistently lower in the years that followed.

Among the differences in pre- and post-peak changes between men and women, the most notable is the increase in men's meal preparation time from 17.0 to 19.2 minutes. This finding is consistent with Berik and Kongar (2013), who found that gender difference in housework hours narrowed during the recession from a small increase in fathers' unpaid work and a decrease in mothers' unpaid work.

Time-use patterns of fast-food purchasers were fairly stable between the two periods and exhibited less change than those of the total population. Particularly striking is that the share of fast-food purchasers who ate at a sit-down or fast-food restaurant stayed about the same, while the share of the total population who ate out declined.

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[7]The rate of household formation—people setting up new households—dropped considerably over 2007-11 as families and unrelated individuals "doubled up" in the same household (Elliott et al., 2011; Paciorek, 2013).

[8]We also analyzed data for the time periods January 2003-November 2007, December 2007-June 2009, and July 2009-December 2011 and found little difference between time-use patterns for December 2007-June 2009 and for July 2009-December 2011. This is likely due to the soft labor market during the recovery.

Table 1

Time spent in various activities on an average day, 2003-11, age 18 and older, by time period, in minutes

	Total				Men				Women			
	Pre-BCP		Post-BCP		Pre-BCP		Post-BCP		Pre-BCP		Post-BCP	
Number of observations	67,746		50,059		29,017		21,734		38,729		28,325	
Eating and drinking	67.4	[±.37]	67.5	[±.54]	69.5	[±.60]	69.7	[±.74]	65.6	[±.49]	65.3	[±.73]
Eating/drinking out	14.7	[±.30]	13.4	[±.32]	15.0	[±.48]	13.9	[±.47]	14.4	[±.40]	12.9	[±.46]
Sit-down restaurant	14.4	[±.30]	13.0	[±.31]	14.8	[±.47]	13.5	[±.46]	14.1	[±.39]	12.5	[±.45]
Fast food/carryout	0.3	[±.03]	0.4	[±.04]	0.3	[±.04]	0.4	[±.07]	0.3	[±.05]	0.4	[±.07]
Eating/drinking elsewhere	52.7	[±.37]	54.1	[±.47]	54.4	[±.57]	55.8	[±.66]	51.2	[±.44]	52.4	[±.64]
Personal care:												
Sleep	511.1	[±1.04]	517.2	[±1.22]	505.9	[±1.70]	512.2	[±1.74]	515.9	[±1.44]	521.8	[±1.62]
Other personal care	45.8	[±.50]	46.0	[±.59]	38.2	[±.75]	38.0	[±.86]	52.9	[±.68]	53.5	[±.90]
HH activities:												
Meal prep and cleanup	32.8	[±.39]	34.2	[±.47]	17.0	[±.43]	19.2	[±.55]	47.5	[±.60]	48.3	[±.74]
Other HH activities	80.0	[±.88]	75.4	[±1.08]	66.4	[±1.44]	63.9	[±1.50]	92.6	[±1.21]	86.1	[±1.48]
Caring activities:												
Caring for HH members	29.2	[±.51]	27.8	[±.61]	18.0	[±.52]	18.2	[±.78]	39.6	[±.78]	36.8	[±.83]
Caring for non-HH members	10.2	[±.40]	9.2	[±.50]	8.7	[±.59]	8.0	[±.63]	11.6	[±.57]	10.3	[±.63]
Work-related activities	216.8	[±1.71]	208.2	[±2.28]	262.1	[±2.90]	248.1	[±3.44]	174.8	[±1.94]	170.8	[±2.93]
Educational activities	13.9	[±.70]	14.3	[±.97]	12.8	[±1.05]	13.1	[±1.33]	14.9	[±.86]	15.4	[±1.26]
Purchases:												
Grocery purchases	6.4	[±.15]	6.5	[±.19]	4.4	[±.19]	4.8	[±.23]	8.3	[±.21]	8.1	[±.28]
Other purchases	25.2	[±.45]	23.1	[±.45]	20.0	[±.64]	18.6	[±.65]	30.0	[±.67]	27.3	[±.72]
Fast-food/carryout purchases	1.6	[±.04]	1.5	[±.04]	1.6	[±.06]	1.6	[±.07]	1.5	[±.06]	1.5	[±.06]
Volunteer activities	16.1	[±.42]	17.7	[±.56]	13.9	[±.62]	15.5	[±.75]	18.0	[±.56]	19.9	[±.86]
Leisure activities:												
Watching television	156.7	[±1.25]	167.9	[±1.52]	170.2	[±2.06]	183.3	[±2.33]	144.2	[±1.36]	153.6	[±2.04]
Other leisure	118.7	[±1.13]	114.6	[±1.36]	118.4	[±1.97]	112.1	[±2.03]	119.0	[±1.43]	117.0	[±1.76]
Sports and excercise	17.9	[±.50]	17.8	[±.54]	23.2	[±.82]	23.4	[±.96]	12.9	[±.53]	12.7	[±.49]
Communication	6.3	[±.21]	6.2	[±.22]	3.4	[±.18]	3.7	[±.26]	9.0	[±.32]	8.5	[±.34]
Travel	76.2	[±.70]	72.3	[±.70]	79.2	[±1.16]	75.0	[±1.09]	73.4	[±.86]	69.9	[±.94]
Other activities NEC	9.2	[±.33]	14.0	[±.48]	8.7	[±.53]	13.3	[±.75]	9.6	[±.42]	14.7	[±.62]

Continued—

The rate of eating out at sit-down restaurants declined from 20.4 percent of the population on an average day pre-peak to 18.4 percent post-peak (table 2). With the rate of fast-food purchase staying essentially the same, 13.2 to 12.8 percent (not a statistically significant difference), Americans maintained their pattern of purchasing fast food, despite or because of the recession.

The share of the population age 18 and older purchasing fast food on an average day appears to have trended upward between 2003 and 2005 but then leveled off and declined slightly in 2011 (fig. 4). The rate at which these individuals purchased food from sit-down restaurants, however, appears to be in secular decline since before the recession began, at the start of the financial crisis in February

Table 1

Time spent in various activities on an average day, 2003-11, age 18 and older, by time period, in minutes — continued

	Fast-food purchasers*				Employed				Not employed			
	Pre-BCP		Post-BCP		Pre-BCP		Post-BCP		Pre-BCP		Post-BCP	
Number of observations	8,739		6,383		44,685		31,766		23,061		18,293	
Eating and drinking	56.9	[±1.17]	57.6	[±1.22]	65.8	[±.43]	66.0	[±.68]	70.9	[±.72]	70.1	[±.86]
Eating/drinking out	16.4	[±.88]	16.3	[±.93]	15.2	[±.38]	14.3	[±.41]	13.7	[±.49]	11.7	[±.44]
Sit-down restaurant	14.1	[±.85]	13.2	[±.89]	14.9	[±.38]	13.9	[±.41]	13.4	[±.48]	11.3	[±.44]
Fast food/carryout	2.2	[±.25]	3.1	[±.33]	0.3	[±.04]	0.4	[±.05]	0.4	[±.07]	0.4	[±.08]
Eating/drinking elsewhere	40.5	[±.92]	41.3	[±1.04]	50.6	[±.43]	51.7	[±.56]	57.1	[±.70]	58.4	[±.77]
Personal care:												
Sleep	488.7	[±2.97]	493.7	[±3.24]	494.8	[±1.36]	499.1	[±1.55]	544.6	[±1.85]	550.4	[±2.24]
Other personal care	45.5	[±.83]	47.3	[±1.21]	45.4	[±.48]	45.7	[±.64]	46.8	[±1.08]	46.5	[±1.28]
HH activities:												
Meal prep and cleanup	19.7	[±.84]	20.4	[±1.01]	25.2	[±.40]	27.0	[±.45]	48.5	[±.90]	47.5	[±1.06]
Other HH activities	62.9	[±2.25]	57.7	[±2.49]	65.5	[±.95]	62.0	[±1.06]	109.9	[±1.94]	99.9	[±2.25]
Caring activities:												
Caring for HH members	30.4	[±1.31]	30.2	[±1.78]	27.0	[±.53]	26.1	[±.68]	33.8	[±1.20]	31.0	[±1.12]
Caring for non-HH members	11.5	[±1.17]	11.0	[±1.10]	8.3	[±.46]	7.4	[±.46]	14.2	[±.75]	12.6	[±1.04]
Work-related activities	247.5	[±5.89]	233.8	[±7.11]	319.2	[±2.31]	315.6	[±2.96]	6.8	[±.71]	10.6	[±.94]
Educational activities	19.0	[±2.46]	18.3	[±2.81]	11.5	[±.71]	11.7	[±1.09]	18.8	[±1.59]	19.1	[±1.73]
Purchases:												
Grocery purchases	5.3	[±.35]	5.7	[±.43]	5.5	[±.17]	5.5	[±.21]	8.3	[±.31]	8.3	[±.38]
Other purchases	43.8	[±1.43]	41.7	[±1.47]	23.3	[±.46]	21.3	[±.51]	29.1	[±.84]	26.4	[±.85]
Fast food/carryout purchases	11.6	[±.18]	11.7	[±.22]	1.8	[±.06]	1.8	[±.06]	1.1	[±.07]	1.1	[±.06]
Volunteer activities	17.8	[±1.65]	18.3	[±1.74]	13.4	[±.47]	14.6	[±.57]	21.5	[±.87]	23.5	[±1.04]
Leisure activities:												
Watching television	128.7	[±2.96]	135.5	[±3.94]	125.8	[±1.18]	132.1	[±1.60]	220.2	[±2.85]	233.9	[±2.98]
Other leisure	113.3	[±3.17]	116.8	[±3.84]	96.1	[±1.19]	91.9	[±1.45]	165.1	[±2.45]	156.4	[±2.66]
Sports and excercise	22.2	[±1.49]	20.9	[±1.59]	17.7	[±.62]	17.8	[±.71]	18.2	[±.80]	18.0	[±.88]
Communication	7.4	[±.61]	7.5	[±.74]	5.0	[±.21]	4.7	[±.23]	9.0	[±.39]	9.0	[±.48]
Travel	110.4	[±2.29]	111.1	[±2.27]	83.4	[±.78]	80.5	[±.83]	61.4	[±1.29]	57.3	[±1.17]
Other activities NEC	9.0	[±1.21]	12.8	[±1.23]	7.3	[±.39]	11.0	[±.52]	13.1	[±.64]	19.5	[±1.06]

Notes: NEC = not elsewhere classified. HH = household. BCP = business cycle peak. 90-percent confidence interval in brackets. Eating out is defined as primary eating/drinking at the ATUS locations restaurant or bar, grocery store, other store/mall, and other place. Eating elsewhere is any other place, including at home or at the workplace. The pre-BCP time period is January 2003 to November 2007, and the post-BCP time period is December 2007 to December 2011. *Fast-food purchasers are individuals with at least one fast-food purchase.

Source: USDA, Economic Research Service estimates using American Time Use Survey (ATUS) data.

2007 (Federal Reserve Bank of St. Louis, 2014). So, despite the decline in 2011, it appears that the fast-food rate weathered the recession better than the sit-down rate.

For individuals who are employed, the moving average fast-food participation rate stayed fairly level since the start of the recession whereas the sit-down rate declined (figs. 5a and 5b). Both rates appear to have declined for those not employed. Not surprisingly, both sit-down and fast-food rates are lower for those not employed than for those employed.

Table 2

Participation rates and distribution of eating behaviors, 2003-11, age 18 and older, by time period

	Total				Men				Women			
	Pre-BCP		Post-BCP		Pre-BCP		Post-BCP		Pre-BCP		Post-BCP	
Participation rates (percent) and time spent by participants (minutes):												
% who ate out, sit-down	20.4	[±.34]	18.4	[±.37]	21.2	[±.54]	19.5	[±.57]	19.6	[±.46]	17.4	[±.53]
Ave. time spent eating at sit down	70.7	[±.76]	70.5	[±.92]	69.6	[±1.21]	69.0	[±1.33]	71.9	[±.97]	72.0	[±1.29]
% who purchased fast food/carryout	13.2	[±.30]	12.8	[±.33]	13.8	[±.47]	13.0	[±.51]	12.5	[±.36]	12.6	[±.43]
Ave. time spent in purchasing FF	11.8	[±.18]	11.9	[±.22]	11.7	[±.24]	12.0	[±.33]	11.9	[±.24]	11.8	[±.28]
% who ate out, FF restaurant	0.8	[±.08]	1.0	[±.10]	0.7	[±.10]	1.0	[±.16]	0.8	[±.10]	1.0	[±.13]
Ave. time spent eating at FF	41.2	[±2.04]	42.7	[±2.40]	38.8	[±2.81]	41.4	[±3.16]	43.1	[±2.97]	43.8	[±3.63]
Distribution of eating behaviors:												
% who ate out and elsewhere	15.3	[±.31]	14.1	[±.34]	15.9	[±.48]	14.9	[±.52]	14.8	[±.39]	13.3	[±.50]
% who ate out only	5.7	[±.19]	5.1	[±.19]	5.9	[±.32]	5.3	[±.30]	5.4	[±.25]	4.9	[±.28]
% who ate elsewhere only	74.0	[±.38]	76.3	[±.41]	73.2	[±.57]	75.3	[±.62]	74.7	[±.50]	77.2	[±.60]
% who reported no primary E/D	5.1	[±.18]	4.5	[±.22]	5.1	[±.25]	4.4	[±.30]	5.1	[±.25]	4.7	[±.31]
	Fast-food purchasers				Employed				Not employed			
	Pre-BCP		Post-BCP		Pre-BCP		Post-BCP		Pre-BCP		Post-BCP	
Participation rates (percent) and time spent by participants (minutes):												
% who ate out, sit-down	21.0	[±.96]	20.2	[±1.16]	21.3	[±.42]	19.6	[±.47]	18.6	[±.54]	16.2	[±.53]
Ave. time spent eating at sit-down	67.4	[±2.21]	65.0	[±2.25]	70.2	[±.95]	70.9	[±1.16]	72.1	[±1.39]	69.6	[±1.36]
% who purchased fast food/carryout	98.0*	[±.32]	97.7*	[±.34]	15.2	[±.39]	15.1	[±.46]	8.9	[±.45]	8.5	[±.41]
Ave. time spent in purchasing FF	11.8	[±.18]	11.9	[±.22]	11.5	[±.21]	11.7	[±.25]	12.8	[±.39]	12.6	[±.45]
% who ate out, FF restaurant	5.4	[±.56]	7.3	[±.74]	0.7	[±.09]	1.0	[±.13]	0.8	[±.15]	0.9	[±.13]
Ave. time spent eating at FF	41.5	[±2.11]	42.9	[±2.44]	39.7	[±2.35]	40.4	[±2.17]	44.0	[±3.89]	47.7	[±5.83]
Distribution of eating behaviors:												
% who ate out and elsewhere	17.7	[±.96]	19.0	[±1.16]	15.6	[±.39]	14.6	[±.44]	14.7	[±.48]	13.2	[±.51]
% who ate out only	7.6	[±.66]	7.3	[±.67]	6.2	[±.26]	5.8	[±.25]	4.6	[±.31]	3.7	[±.30]
% who ate elsewhere only	66.1	[±1.20]	65.6	[±1.27]	72.8	[±.47]	74.6	[±.48]	76.4	[±.62]	79.4	[±.65]
% who reported no primary E/D	8.6	[±.70]	8.1	[±.83]	5.4	[±.21]	5.0	[±.29]	4.3	[±.31]	3.7	[±.29]

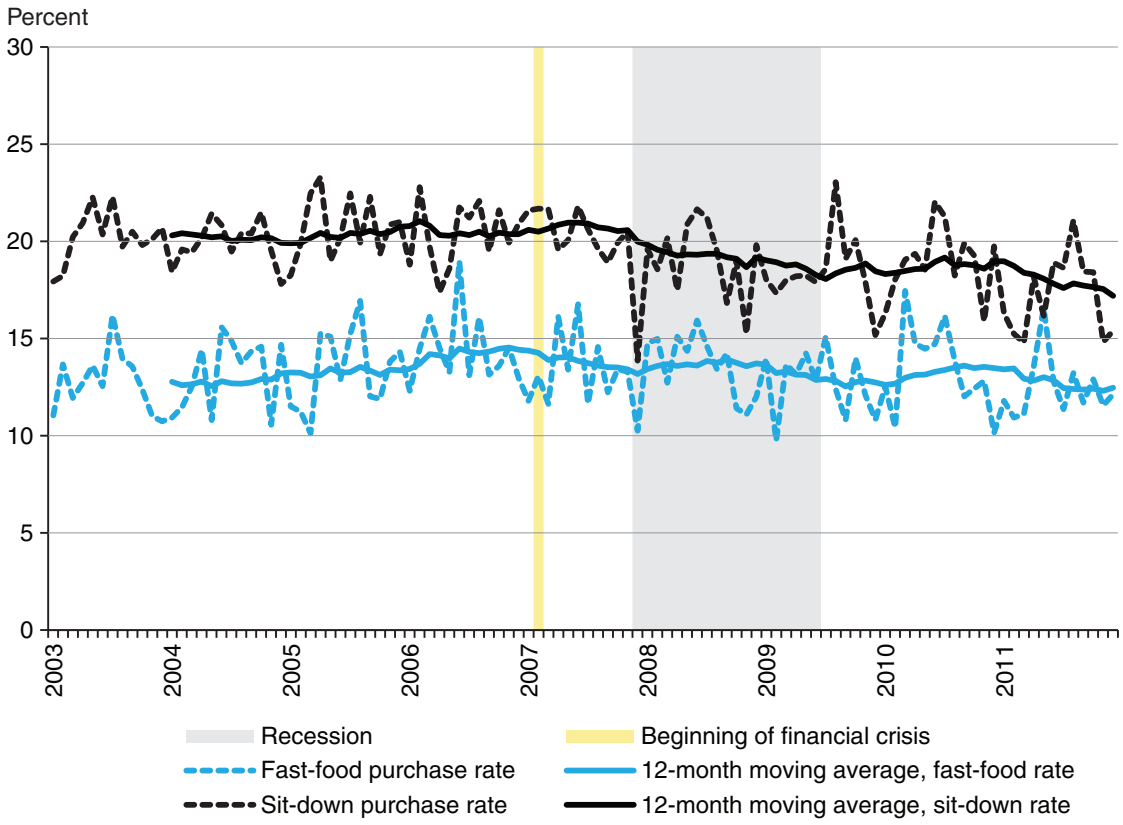
Notes: FF = fast food. E/D = eating/drinking. BCP = business cycle peak. Confidence interval in brackets. Eating out is defined as primary eating/drinking at the ATUS locations restaurant or bar, grocery store, other store/mall, and other place. Eating elsewhere is any other place, such as at home or at the workplace. The pre-recession period is January 2003 to November 2007, and the mid/post-recession period is December 2007 to December 2011. *Percent who purchased fast food/carryout is not 100 percent because some individuals do not report purchase time, only eating/drinking time. Here, the category "Only those who purchased fast food" includes those with zero purchase time but some fast-food eating/drinking time.

Source: USDA, Economic Research Service estimates using American Time Use Survey (ATUS) data.

Overall, the summary statistics show fast-food and sit-down purchasing behavior varied by gender and employment status in that men and those employed purchased more fast food and sit-down food than women and those not employed. Also, fast-food purchasers had very different time-use patterns than the total population, with fast-food purchasers spending less time in eating and drinking, meal preparation and other household activities, and watching television but more time in caring for household members and in paid work. Over the business cycle, fast-food purchase behavior in terms of the share of the population purchasing fast food on an average day held fairly steady through and after the recession, while the share eating at sit-down restaurants declined. While there may seem to be certain associations between fast-food purchasing behavior and gender, employment, and time use, many other factors changed over the study period that may confound any associations discussed here.

Figure 4

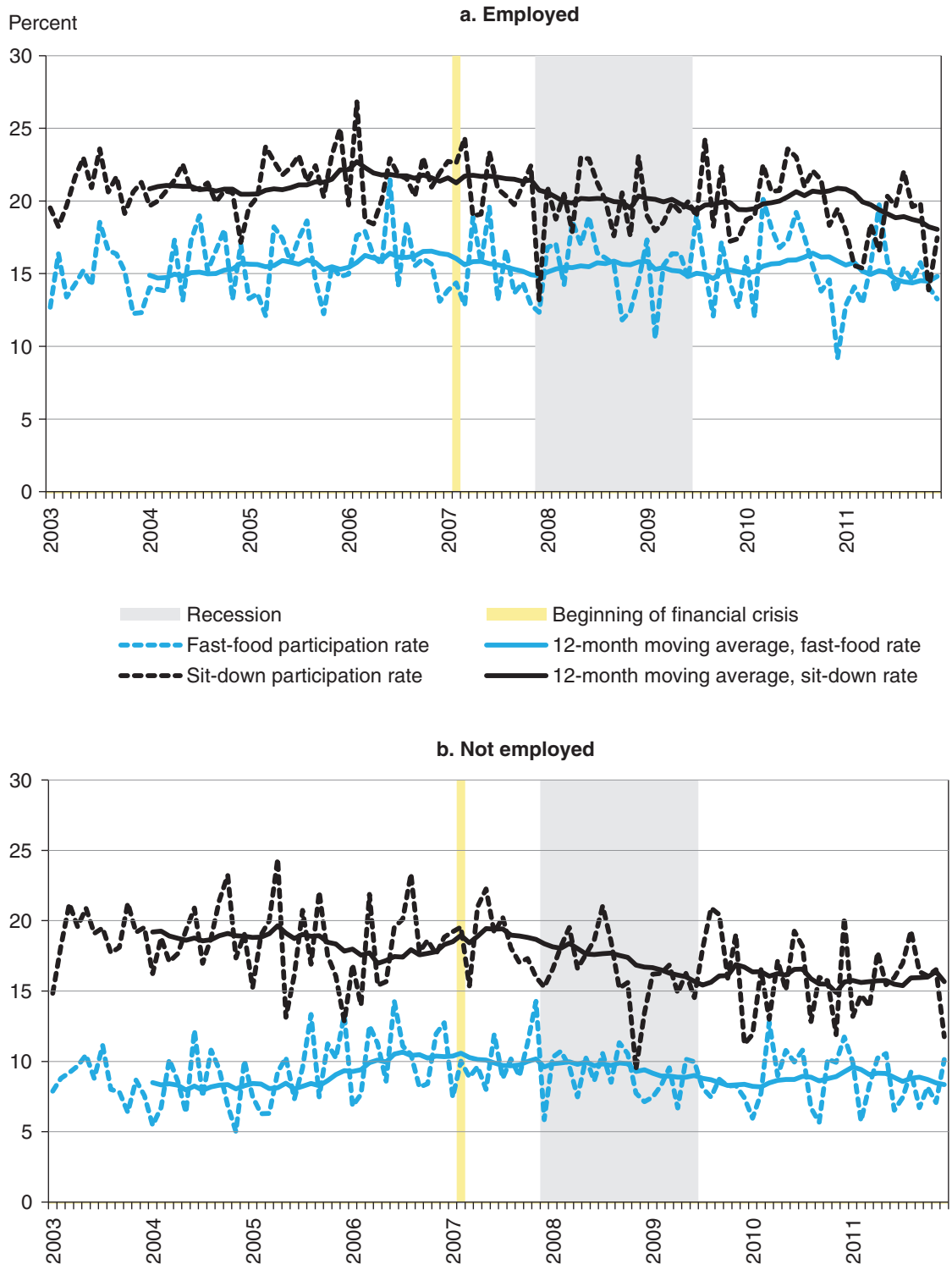
Participation rates of fast-food and sit-down purchasers, age 18 and older



Source: USDA, Economic Research Service estimates calculated from American Time Use Survey data.

Figure 5

Participation rates of fast-food and sit-down purchasers, age 18 and older, by employment status



Source: USDA, Economic Research Service estimates calculated from American Time Use Survey data.

Multivariate Analysis

The descriptive results provide a motivation for multivariate treatment because many of the explanatory factors are correlated, which makes it difficult to determine the direct associations of these factors. For example, fast-food purchase appears to be related to employment and also to time spent in travel. However, those who are employed tend to spend more time in travel on an average day than those not employed, as travel includes their work commute. In addition, fast-food purchasers tend to spend less time than others in certain activities, such as household tasks and watching television, but spend more time in paid work. Lastly, men are more likely than women to eat out and are also more likely to be employed. As a consequence, time patterns are interrelated with labor force status and demographic characteristics, and with fast-food purchasing behavior as well.

We modeled whether individual j purchased fast food, y_j, as a function of a matrix of demographic, employment status, and household composition characteristics of individual j ($\boldsymbol{D_j}$), the value of time as proxied by time spent in market labor, household, and leisure activities ($\boldsymbol{W_j}$), geographic covariates including price for market m ($\boldsymbol{M_{mt}}$), which vary over time, t, and household income (V_j).[9] Note that we modeled whether the individual, not the household, purchased fast food. Specifically, we adopted a probit model such that

$$(1) \qquad p_j = \Pr[y_j = 1 \mid \mathbf{D}_j, \mathbf{W}_j, \mathbf{M}_{mt}, V_j] = \Phi(\mathbf{D}_j'\beta_1 + \mathbf{W}_j'\beta_2 + \mathbf{M}_{mt}'\beta_3 + V_j\beta_4) \ ,$$

where $\Phi(\cdot)$ is the cumulative distribution function for the standard normal distribution. We used a probit model as the vast majority of fast-food purchasers made one purchase on an average day.[10] The marginal effect of the kth explanatory variable, x_k, on the probability of fast-food purchase is calculated as

$$(2) \qquad dp_j / dx_k = \phi(\mathbf{X}'\beta)\beta_k \ ,$$

where $\mathbf{X}$ is the matrix of $\mathbf{D}_j$, $\mathbf{W}_j$, $\mathbf{M}_{mt}$, and V_j, and $\phi(\cdot)$ is the density of the standard normal distribution. We evaluated the marginal effects in (2) at the means of the data[11] and used the Delta method to calculate the standard errors of the marginal effects.

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[9]We considered modeling demand for fast food as hurdle model such that the hurdle would be the probability of purchasing fast food, and then the second model would be predicting the time spent in purchasing and/or eating fast food conditional upon fast-food purchase. However, since the distribution of the time duration of purchasing fast food is fairly narrow, and the time spent eating fast food is not straightforward, we concluded that a double-hurdle model would not be useful. First, almost half of fast-food purchasers do not report eating fast food as a primary activity within 90 minutes of purchasing fast food, and those that do report eating fast food typically do so in a small window of time (between 15 and 30 minutes). Looking at the 2006-08 ATUS Eating & Health Module data, which included data on secondary eating and drinking (i.e., eating/drinking while doing something else), we found that of those who reported no primary eating/drinking time after fast-food purchase, only 22.5 percent reported secondary eating and only 9 percent reported secondary drinking after fast-food purchase. Consequently, we concluded that estimating the amount of time spent eating/drinking fast food would be difficult, likely to contain measurement error, and not particularly revealing because fast-food purchasers reported relatively short durations of eating/drinking occurrences, if any at all.

[10]Results show 85.3 percent of fast-food purchasers had only 1 purchase, 13.0 percent had 2 purchases, 1.4 percent had 3 purchases, and the remainder had 4-6 purchases. As a robustness check, we also modeled the number of fast-food purchases within a day by an individual as a zero-inflated Poisson model. The results of the zero-inflated Poisson models were consistent with the findings presented in this study.

[11]Wooldridge (2002) stated that "Putting in the averages for the binary variables means that the effect does not really correspond to a particular individual. But often the results are similar, and the choice is really based on taste" (p. 466).

We proxied the value of time by including indicators for employment and part-time schedule and the amount of time spent at various "necessary" and "committed" activities. Following Kalenkoski et al. (2011), "necessary" activities are sleeping and grooming, whereas "committed" activities are household activities (includes meal preparation), caring for household members, paid work and work-related activities, and travel associated with these activities. These definitions are in line with the time poverty literature.[12] If individuals have greater necessary and committed activities, they may be more likely to purchase fast food due to time pressures. We included time-use variables such as work time (1-12 hours and more than 12 hours), personal care time (sleep and grooming), household activities, care of household children and adults, and total travel time. Indeed, results show that fast-food purchasers spent less time in personal care activities due to less sleep and spent more time in paid work and travel than the total population. This indicates that time constraints are likely a factor in the fast-food purchase decision. We included the recreational activity watching television, which is by far the dominant recreational activity with the longest average time duration (2.7 hours a day) over the total population and usual subgroups.[13] We also included primary eating and drinking time because in table 2 we found that fast-food purchasers were more likely to have no primary eating/drinking time over the day, and we wanted to determine if a relationship exists between primary eating/drinking time and fast-food purchases while controlling for other factors.

A problem with several of our time-use variables that proxy for the opportunity cost of time is that they may be endogenous. Endogeneity can arise if the household decision to prepare meals or go out to eat and the time associated with this decision is correlated with omitted variables that capture household production patterns not observed in equation (1).[14] However, it is very difficult to find appropriate instruments for these time-use patterns (Cawley and Liu, 2012). To address the endogeneity that may arise from unobserved differences in household production patterns, we modeled fast-food purchasing behavior by household type (i.e., single person, single parent, couple no children, couple with children, other households no children, and other household with children).[15]

Endogeneity of the time-use variables can arise from division of labor decisions in household production for the different types of households, as they face different preferences and pressures and have different decisionmaking processes. For example, a single-person household would have

[12]See Bittman (2002) and Burchardt (2008).

[13]Looking at total population (age 15 and older) averages, watching television has been the third-longest duration activity each year since the ATUS started. For 2011, sleeping was the longest duration activity at 8.71 hours on an average day, paid work was 3.20 hours, and watching television was 2.75 hours. Watching television dominates the combined major categories of leisure and sports, which have an average time of 5.21 hours on an average day. The next-longest duration activity was eating and drinking, at 1.24 hours (U.S. Bureau of Labor Statistics, American Time Use Survey—2011 Results News Release, USDL-12-1246, June 22, 2012).

[14]We performed the Smith-Blundell endogeneity test on time spent in household activities (including meal production time) for our probit model of fast-food purchase. The instrument used was female (=1 if respondent was female). Based on this test, we could not reject the null hypothesis that the model is specified properly and, hence, concluded endogeneity was not a problem.

[15]These categories are based on the ATUS respondent and not the totality of the household, as we have information only on the individual who did or did not purchase fast food. The "other household" categories occur because of this focus on the respondent. For example, a household with a married couple with two children, one age 20 and the other age 15, would have different categorizations depending on which family member was the respondent. If either parent was the respondent, then the category would be "married couple with children." If either of the children was the respondent, then the category would be "other household with children." Another example is a household that included just a married couple and a child age 20. If either parent was the respondent, then the household category would be "married couple without children" (because the child is age 18 or older), or if the 20-year-old child was the respondent then the household category would be "other household without children."

different meal and snack behavior than a married couple with children. In particular, the individual in the single-person household would make time-use decisions independent of others, as there are no others in the household. An individual in a married or unmarried couple may have meal and snack patterns without meal preparation if the other household member does those tasks. Hence, we estimate the model for the different household types to control for differences in division of labor. In these models, we include proxies for the division of labor decision, the employment status of the spouse/partner, the spouse/partner's usual weekly work hours, or whether the spouse/partner's usual weekly work hours vary. These proxies are in line with the home production literature.[16] We acknowledge that estimation by household type may not completely eliminate the endogeneity issue, and, therefore, we only discuss results as associations between the time-use variables and fast-food purchase behavior in the analysis that follows.

The demographic characteristics include gender, age group, education level, citizenship status, race, and Hispanic ethnicity. Employment status of the respondent is also included to account for potential changes in employment during the Great Recession and its effect on fast-food purchasing status. In the "All" model with all individuals, we included household type and then estimated models for each household type.

We also included several market-level and time-varying variables. We included indicators for Census region and metro/nonmetropolitan area of residence because previous studies found that nonmetro residence would be expected to have a negative relationship with the probability of fast-food purchase due to less access to fast-food establishments. While such regional indicators proxy for price effects, we also included the price of a limited-service meal.[17] This is the average quarterly price of meals and entrees in a Census division at an establishment that does not have table service (Kumcu and Okrent, 2014). We inflated the price to 2011 dollars using the Census region Consumer Price Index for all items (BLS, 2013a). Indicators for quarter and year were included to account for seasonality in eating-out behavior. Also, an indicator of day of week was included—weekday day (Monday through Friday, and not a holiday) and weekend day or holiday (Saturday, Sunday, or holiday). We also included time-trend variables (1-9) because we used pooled cross-section data. Lastly, we included a monthly unemployment rate variable (BLS, 2013b) as well as an indicator of whether the ATUS respondent's diary day occurred during the recession (December 2007-June 2009) or after to capture the effects of the Great Recession.

For household income, we include a fairly blunt variable to define "high-income" for 2003-11, indicating whether the household had income greater than 200 percent of the poverty threshold for a family of four. A more precise indicator was not used because of the difficulty working with the ATUS income variable.[18]

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[16]See Davis (2013) for a comprehensive review.

[17]We also tried the ratio of the price of limited-service meals to the price of full-service meals, but that variable was not successful. In some Census divisions, the prices would move in lockstep, resulting in a constant ratio over the time period; in other divisions, the ratio varied considerably. With both these price patterns in the same variable, the net result was that the ratio variable was not significant.

[18]The income survey question—household income over the previous 12 months—was asked of the respondent's household in the first month of the Current Population Survey, which would have been 18-21 months before the ATUS interview. In addition, the CPS income variable has a large amount of nonresponse, which is why we included an "income value missing" variable in the model. To complicate the variable, imputation of missing income values began in January 2010. These income imputations start appearing in the ATUS in March 2010.

We present the marginal effects at the mean of the data for the probit model in two sections: (1) the entire ATUS sample for the period 2003-11 (table 3, coefficient estimates in appendix table 4); and (2) a subsample of the ATUS for the pre-recession period (i.e., January 2003-November 2007) and a subsample for the recession and post-recession period (i.e., December 2007–December 2011) (table 4). All estimates are weighted to be nationally representative (see appendix table 3 for the mean values of the variables used in the models).[19]

Analysis of the Entire Sample Period, 2003-11

Looking at the "All" model with individuals from all household types and controlling for other covariates shows many of the demographic variables to be associated with the probability of fast-food purchase. Specifically, individuals age 18-24 were 3.5 percentage points (marginal probability of 0.035) *more* likely to make a fast-food purchase on an average day than the excluded group of individuals age 25-64, and those age 65 or older were 3.7 percentage points *less* likely to purchase fast food. Individuals with more education were more likely to purchase fast food than lesser educated individuals, and the probablity that noncitizens would purchase fast food, with a marginal probability of -0.059, was lower than that of citizens. Although we found a statistically significant difference in the rate of fast-food purchase between men and women in the descriptive statistics, the gender difference was not statistically different from zero after controlling for other factors.

In terms of employment status, those employed were 2.4 percentage points more likely to purchase fast food than those unemployed, although having a part-time work schedule did not seem to make a difference. However, the analysis finds that the association between time spent in paid work on an average day and probability of fast-food purchase was nonlinear and negative. Compared with the excluded group (individuals with 0 minutes of paid work), those who engaged in paid work or work-related activities (such as job search) for some positive amount of time (up to and including 720 minutes, or 12 hours) reduced the marginal probability of purchasing fast food by 1.8 percentage points. However, the net effect (2.4 - 1.8 = 0.6) was that those who were employed and who worked up to 12 hours on the average day still had a higher probability of purchasing fast food than others.

Working more than 12 hours[20] was associated with a reduction of the marginal probability of fast-food purchase of 8.8 percentage points, one of the larger model results. Closer investigation shows that the individuals who reported working more than 12 hours were more likely to own a business or farm (30.4 percent) and were concentrated in the management, health care, or transportation fields. For these individuals, the long hours indicate that it was difficult for them to get away from their jobs, due to either the nature of the work or the isolation of the work location—so they perhaps brought their own food or had food provided for them. Although this result may seem counterintuitive, note that it is those who were employed who did not work on the average day (i.e., on their day off) that had the largest marginal probability of fast-food purchase among the labor force and work-time groups (marginal probability of employment is 0.024). This finding may suggest that the time pressure of the work week spills into days off, making fast food a desirable option.

[19]The "All" model and the household-type models include gender as an independent variable. We did not find evidence in either the descriptive statistics or the multivariate analysis to warrant dividing our analysis into more detailed subgroups, such as estimating the household-type models by gender.

[20]We analyzed the behavior for paid work hour by hour to determine whether a break point existed and found that the time-use patterns were noticeably different for those with more than 12 hours of paid work versus those with 1-12 hours of paid work.

Table 3
Marginal estimates at the mean based on probit model of fast-food purchase, 2003-11, by household type

	All	Single person	Single parent	Couple, no children	Couple with children	Other HH, no children	Other HH with children
Demographic characteristics:							
Female	0.001	-0.023***	0.022	-0.002	0.011	0.006	0.011**
Age 18-24	0.035***	0.036***	-0.020	0.035**	0.019	0.055***	0.022***
Age 65+	-0.037***	-0.031***		-0.017**		-0.044***	-0.038**
Education, less than high school	-0.019***	-0.022**	0.028	-0.022**	-0.017	-0.007	-0.030***
Education, some college	0.013***	0.010	0.017	0.013**	0.011	0.018*	0.008
Education, college degree	0.015***	0.003	0.034**	0.021***	0.005	0.024**	0.006
Education, advanced degree	0.005	0.005	-0.017	0.001	-0.007	0.002	0.011
Noncitizen	-0.059***	-0.038***	-0.074**	-0.028**	-0.071***	-0.060***	-0.075***
African-American/ Black	-0.002	0.004	-0.011	-0.001	0.002	-0.003	-0.008
Asian	-0.028***	-0.033	-0.021	-0.004	-0.022	-0.061**	-0.027**
Mixed race	0.001	0.010	-0.118**	-0.002	-0.005	0.025	-0.020
Hispanic	-0.011**	-0.013	-0.024	0.007	0.005	-0.019	-0.014**
Geographic characteristics:							
Midwest region	-0.059	-0.059	-0.007	0.005	0.015	-0.024*	0.006
South region	-0.002*	-0.002	-0.001	0.004	0.015	-0.001	0.014**
West region	-0.028	-0.028	-0.018	-0.001	0.012	-0.001	0.016**
Nonmetro residence	0.001**	0.001	0.010	-0.001	0.013	-0.013	-0.010*
Labor force characteristics:							
Employed	0.024***	0.021**	0.043**	0.017**	0.010	0.025**	0.027***
Employed part-time schedule:	-0.005	-0.011	-0.024	-0.010	0.053	-0.014	0.001
Household type:							
Single person HH	0.014***						
Single parent HH	0.025***						
Couple with child(ren) HH	0.008						
Other type of HH, with children	0.018***						
Other type of HH, no children	0.012***						
Household characteristics:							
Number in HH			-0.015		0.013	-0.028	-0.006
Number in HH squared	-0.001*		-0.001		-0.002	0.003	0.001

Continued—

Table 3

Marginal estimates at the mean based on probit model of fast-food purchase, 2003-11, by household type—continued

	All	Single person	Single parent	Couple, no children	Couple with children	Other HH, no children	Other HH with children
Child less than age 6 in HH	0.001		-0.003		0.017		0.003
Spouse employed				0.017	-0.027		
Spouse's usual weekly work hrs				-0.001	0.001		
Spouse's weekly work hrs vary				-0.028	0.058*		
HH income> 200% poverty threshold	0.020***	0.007	0.014	0.010	0.055***	0.027***	0.025***
HH income value missing	0.018***	0.012	0.007	-0.005	0.049**	0.055***	0.017**
Time use:							
Work and work related,1-12 hrs	-0.018***	0.002	-0.040**	-0.009	-0.010	-0.025**	-0.027***
Work and work related, >12 hrs	-0.088***	-0.051***	-0.135***	-0.047**	-0.082**	-0.120***	-0.112***
Primary eating/ drinking, hours	-0.034***	-0.029***	-0.032***	-0.028***	-0.028***	-0.033***	-0.044***
Personal care time, hours	-0.007***	-0.006***	-0.008***	-0.006***	-0.006*	-0.009***	-0.006***
Housework, hours	-0.011***	-0.011***	-0.011***	-0.010***	-0.011***	-0.012***	-0.011***
HH child/adult care, hours	-0.001		-0.001	-0.001	-0.003	0.014**	-0.002
Watching TV, hours	-0.004***	-0.006***	-0.003	-0.003***	-0.004	-0.006***	-0.004***
Travel time, hours	0.027***	0.024***	0.035***	0.023***	0.026***	0.025***	0.034***
Calendar variables:							
Weekend/holiday	-0.001	-0.003	0.002	0.005	0.016	-0.010	-0.001
Quarter 2	0.015***	0.012*	-0.008	0.006	0.014	0.032***	0.018***
Quarter 3	0.008**	0.005	0.023	0.001	0.011	0.019*	0.007
Quarter 4	-0.002	-0.006	-0.007	-0.012*	0.002	0.008	0.004
Time trend 1-9	0.002**	-0.001	0.001	-0.001	-0.003	0.011***	0.001
Unemployment rate	-0.002**	-0.003*	-0.002	-0.001	0.004	0.001	-0.006***
Fast-food meal price (2011 $)	-0.007**	-0.010	-0.017	0.002	0.004	-0.018*	-0.009
Post-business cycle peak (12/07)	-0.001	0.019*	0.002	0.010	0.001	-0.057***	0.013

Notes: HH = household. Alaska and Hawaii are not included due to missing fast-food meal prices. Other variables have missing values due to "Don't know" and "Refused" responses. See appendix table 1 for means and more discussion of missing values. For the household types single parent and couple with children, analysis excludes those age 65 and older. Excluded group is male, age 25-64, high school diploma, not employed with zero hours worked on average day, citizen, White, non-Hispanic, Northeast and metro residence, couple without children household, household income less than 200 percent of the poverty threshold, weekday day, pre-December 2007, and first quarter (January, February, March). See appendix table 4 for coefficient estimates and model statistics. *indicates significance at the 90-percent level; **indicates significance at the 95-percent level; and ***indicates significance at the 99-percent level. Shading = not applicable.

Source: USDA, Economic Research Service estimates using American Time Use Survey and other data discussed in text.

Similar to findings in the literature, the results of this analysis show that household composition and income had a significant effect on fast-food purchasing behavior. All households with the exception of couples with children were more likely to purchase fast food than the control of couples with no children. The coefficient for number in household squared was negative as expected and significant at the 90-percent level, although the effect was very small. This finding is consistent with McCracken and Brandt (1987), who found that more people in the household increased the probability of fast-food purchase except for larger families, who had a lower probability.

Despite the bluntness of the income indicator variables, having household income greater than 200 percent above the poverty threshold for a family of four or having missing income values had positive, significant coefficients, meaning increased probability of fast-food purchase. A positive coefficient was expected for missing income value because higher income households tend to be less likely to report income.[21] This is consistent with other studies that found that higher household incomes are associated with fast-food purchase (Stewart et al., 2004; Kim and Leigh, 2011).

Personal care time, which is mostly sleep, was negatively related to fast-food purchase. An increase of an hour of personal care time was associated with a decrease in the probability of fast-food purchase of about 1 percentage point (-0.007 marginal probability). This finding is consistent with the descriptive statistics earlier. Personal care activities are considered necessary activities, and the less time spent in personal care and committed activities, the more discretionary time that an individual has. However, with the finding of fast-food purchase being associated with less sleep, it is possible that these individuals who sleep less may be so time pressured that they do not have enough time to tend to their necessary tasks so they sacrifice sleep time.[22] This finding is also consistent with other research that found less sleep is associated with poorer food choices (Buxton et al., 2009; Chaput et al., 2011; Nishiura et al., 2010).

Time spent in household tasks was negatively related to fast-food purchase, as expected. Meal preparation is part of household tasks, so by definition, fast-food purchasers would not be expected to spend as much time on meal preparation. Although the descriptive statistics showed fast-food purchasers spent slightly more time in caring for household children and adults than the total population, after controlling for other factors, time spent in caring activities does not seem to contribute to the probability of fast-food purchase. Greater travel time was associated with a greater probability of fast-food purchase as expected because of the need for individuals "on the go" to find fast and convenient food and because of the time restraints on eating typically associated with more hours of travel.[23]

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[21]The authors' analysis of missing income observations in the Current Population Survey Food Security Supplement found that the prevalence of food insecurity of the unknown income group was about the same as that for households with income 185 percent of the poverty threshold (Nord et al., 2007). Indeed, for other measures of food security in the report, the estimates of the missing income group were similar to those for households with income 185 percent of the poverty threshold. The authors concluded that the households with missing income were disproportionately households with income above 185 percent of the poverty threshold.

[22]In a variation of the model presented, we included a variable for time poverty of the individual (not shown) and found that time poverty was associated with a lower probability of fast-food purchase, which is consistent with Kalenkoski and Hamrick (2013). In this analysis, we explore the components of time poverty and their association with fast-food purchase because we speculated that fast-food purchasers may be time pressured in a way that is not captured by a time-poverty threshold. Time-poor individuals have shorter average sleep time than the total population, which may be the result of time pressure and appears to give these individuals more discretionary time. In particular, fast-food purchasers had an average total discretionary time of 516.0 minutes, compared with 498.1 minutes for the total population, and the difference, 17.9 minutes, is similar to the difference between the average sleep time for fast-food purchasers (491.0 minutes) and that for the total population (513.9 minutes).

[23]Using the 2006-08 ATUS Eating & Health Module data, we found that fast-food purchasers were more likely to engage in secondary eating or secondary drinking while driving a vehicle than other individuals.

Watching televison, the one recreational time variable in the model, was negatively related to fast-food purchase. This was expected because watching TV is a discretionary activity, and fast-food purchase would be more likely to occur with time-pressured individuals. However, the effect is small—an additional hour of TV watching is associated with a 0.4-percentage-point decline in the probability of fast-food purchase. Perhaps this small result reflects the dominance of television as Americans' main recreational activity.

Time spent in primary eating and drinking, the other discretionary activity variable in the model, was negative and significant—an additional hour of primary eating/drinking time is associated with a reduction of 3.4 percentage points in the probability of fast-food purchase. This is one of the larger marginal effects estimated. There is no inherent reason that actual eating/drinking time is less for a fast-food meal or snack than for other food, although there would be less waiting time to eat fast food, such as between courses at a sit-down restaurant.[24] However, this result could also indicate different eating patterns, as several studies found an association between speed of eating and energy intake, satiety, and/or body mass index (Andrade et al., 2008; Leong et al., 2011; Greene et al., 2008; Sasaki et al., 2003).

In short, although it appears that fast-food purchasers have more discretionary time than others—they spend less time sleeping, doing household tasks, and caring for others—they work more hours and spend more time traveling from place to place. They spend less time eating/drinking and are more likely to report no primary eating/drinking. It appears that fast-food purchasers are time pressed but not in a way that is easily measurable. Their time-use patterns stand out from those of other groups, and the differences suggest that fast-food purchasers have distinctly different eating patterns.

The market-level variables had mixed effects on the probability of fast-food purchase. Regional factors were not particularly strong. It is not surprising that the regional dummies are mostly insignificant because the model included the price of fast foods in each region, and previous studies used region to proxy for regional price differences (e.g., Jensen and Yen, 1996). Indeed, the analysis found that the real price of fast food was also negatively related, as expected. A dollar increase in the price (in 2011 $) of a fast-food meal was associated with a decline of about 1 percentage point of the probability of fast-food purchase, which is consistent with demand theory. The unemployment rate was negatively related to the probability of fast-food purchase, as expected. An increase in unemployment would lead to both lower household incomes for some and overall increased economic uncertainty that may curtail purchases.

Looking at behavior over the business cycle, being in the post-business cycle peak period did not seem to affect the probability of fast-food purchase. The coefficient is negative, although very small and not statistically significant. This is consistent with the visual inspection of the fast-food purchase participation rates during 2003-11 (see fig. 3), findings based on expenditure data (e.g., Okrent and Alston, 2012), and data that show sales at fast-food restaurants did not change much between 2008 and 2009 (USDA-ERS, 2013). In addition, the time trend variable is positive and significant, indicating that there may be a secular trend toward more individuals purchasing fast food on a given day. This could be due to the increased number of fast-food establishments and expanded food/beverage choices during the 2000s.

[24]Waiting to eat time (activities 1102xx) is infrequently reported in the ATUS diaries. Fast-food purchasers and those who ate at sit-down restaurants both reported average "waiting associated with eating time" as less than 1 minute. It is likely that respondents instead report their wait time as socializing, grooming (restroom visit), reading, or cell phone use.

Models by Household Type

The models of fast-food purchase behavior by household type included spouse's labor force participation information as a means of proxying the household division of labor decision (table 3). These models were estimated to account for endogeneity. The household-type marginal effects are generally the same as the "All" model in direction and significance with some exceptions. Interestingly, a woman living alone was 2.3 percentage points less likely to purchase fast food, but a woman in an "Other household with children" was 1.1 percentage points more likely to purchase fast food. The proxies for household division of labor had mixed results. For a couple with no children, the spouse being employed increased the probability of fast-food purchase of 1.7 percentage points, although not significant. For a couple with children, the only significant variable in this group is work hours vary, with a marginal effect of 5.8 percentage points, one of the larger marginal effects. This means that individuals with children and with a spouse who works varied hours had a larger probability of fast-food purchase than others. Perhaps these individuals chose fast food because of the spouse's nonstandard and irregular work hours, making it harder to plan meals.

Although the post-recession peak indicator was not significant in the "All" model, it is significant and positive in the single-person household—these individuals were 1.9 percentage points more likely to purchase fast food on the average day during or after December 2007 than before, whereas other households with no children were 5.7 percentage points less likely to purchase fast food after the business cycle peak. At the same time, these households had a positive and significant time trend, indicating that the secular upward trend of fast-food purchase mitigated the lower probability of fast-food purchase post peak. An increase in the unemployment rate was associated with a lower probability of fast-food purchase, as expected, but only for single-person households and other households with children. The remaining households did not have behavior associated with the unemployment rate.

Results of the household-type models, acknowledging the endogeneity of household decisons, support the "All" model but also reveal associations not apparent when all household types are aggregated. However, about half of individuals are in other households, typically multigenerational families. Households categorized as other are a growing segment of the U.S. population, and in 2011, over 20 percent of all U.S. households had one additional adult, frequently an adult child between ages 18 and 34 (U.S. Census, 2011). Consequently, the model results for this growing segment are relevant and not just a catchall for those who do not fit the traditional household categories.

Analysis of Pre- and Post-Business Cycle Peak

The effects of the business cycle on fast-food purchasing behavior were investigated by estimating the model for the time periods January 2003 through November 2007 and December 2007 through December 2011. First, likelihood ratio tests for structural change were conducted on a probit model using the Chow test. Chi-squared value for the probability of fast-food purchase was found to be greater than the upper tail critical value of chi-square at the 0.1 level (i.e., probability less than the critical value is 0.999), indicating a structural break in the data when evaluating 2003-07 and 2007-11. Even though figure 4 shows that the participation rates for fast-food purchase seemed unaffected by the recession and that the indicator for post-business cycle peak in the probit model of all data (table 4) was statistically insignificant, the Chow test indicated that the slope and intercept coefficients for the period before the recession were statistically different from those during and after the recession.

Table 4
Selected marginal estimates at the mean based on probit model, pre- and post-BCP, by household type

	All	Single person	Single parent	Couple no children	Couple with children	Other HH, no children	Other HH with children
Labor force and HH characteristics:			Pre-BCP (January 2003 – November 2007)				
Employed	0.015***	0.007	0.039*	0.014	-0.018	0.018	0.016*
Employed part-time schedule	-0.030**	0.002	-0.076	-0.018	0.057	-0.072*	-0.026
HH income > 200% poverty thresh	0.022***	0.011	0.001	0.011	0.036*	0.025**	0.035***
HH income value missing	0.022***	0.015	0.030	-0.005	0.036	0.064***	0.022**
Time use:							
Work and work related,1-12 hours	-0.011**	0.008	-0.042*	-0.007	0.011	-0.019	-0.015*
Work and work related, >12 hours	-0.086***	-0.048**	-0.100*	-0.075***	-0.057	-0.126***	-0.090***
Primary eating/drinking, hours	-0.036***	-0.027***	-0.041***	-0.028***	-0.028***	-0.036***	-0.050***
Personal care time, hours	-0.007***	-0.005***	-0.009**	-0.006***	-0.011**	-0.009***	-0.006***
Housework, hours	-0.010***	-0.011***	-0.006	-0.009***	-0.010***	-0.010***	-0.011***
HH child/adult care, hours	-0.002		-0.002	-0.008	-0.006	0.014	-0.002
Watching TV, hours	-0.004***	-0.007***	-0.006*	-0.003**	-0.002	-0.006***	-0.002*
Travel time, hours	0.026***	0.022***	0.041***	0.021***	0.024***	0.022***	0.035***
Time trend 1-9	-0.003	-0.014**	0.009	-0.014*	0.006	0.002	0.005
Business cycle and price variables:							
Unemployment rate	-0.018*	-0.040**	0.035	-0.036*	0.029	-0.032	0.004
Fast-food meal price (2011 $)	-0.009*	-0.006	0.017	0.005	-0.013	-0.029*	-0.014
Labor force characteristics:			Post-BCP (December 2007 – December 2011)				
Employed	0.034***	0.034***	0.052**	0.021**	0.044**	0.032**	0.040***
Employed part-time schedule	0.026	-0.024	0.042	-0.002	0.061	0.046	0.043
HH income > 200% poverty threshold	0.017***	0.002	0.030	0.008	0.071***	0.028**	0.012*
HH income value missing	0.009	0.006	-0.054	-0.009	0.068**	0.033*	0.010
Time use:							
Work and work related,1-12 hours	-0.027***	-0.004	-0.034	-0.011	-0.031	-0.033**	-0.043***
Work and work related, >12 hours	-0.089***	-0.051**	-0.198***	-0.020	-0.106	-0.115**	-0.142***
Primary eating/drinking, hours	-0.032***	-0.031***	-0.025**	-0.027***	-0.028**	-0.030***	-0.038***
Personal care time, hours	-0.007***	-0.007***	-0.008**	-0.006***	0.001	-0.009***	-0.006***

Continued—

Table 4
Selected marginal estimates at the mean based on probit model, pre- and post-BCP, by household type—continued

	All		Single person		Single parent		Couple no children		Couple with children		Other HH, no children		Other HH with children	
Housework, hours	-0.012	***	-0.011	***	-0.016	***	-0.012	***	-0.012	***	-0.014	***	-0.010	***
HH child/adult care, hours	0.001				0.002		0.006		-0.001		0.014		-0.002	
Watching TV, hours	-0.005	***	-0.005	***	-0.001		-0.002		-0.005		-0.005	**	-0.006	***
Travel time, hours	0.029	***	0.027	***	0.029	***	0.026	***	0.026	***	0.027	***	0.034	***
Time trend 1-9	-0.002		-0.004		0.009		-0.005		0.007		0.001		-0.002	
Business cycle and price variables:														
Unemployment rate	0.001		-0.001		-0.010		0.004		-0.002		0.006		-0.004	
Fast-food meal price (2011 $)	-0.009	*	-0.013		-0.051	**	-0.004		0.027		-0.017		-0.009	

Notes: HH = household. BCP = business cycle peak. Alaska and Hawaii are not included due to missing fast-food meal prices. Other variables have missing values due to "Don't know" and "Refused" responses. See appendix table 1 for means and more discussion of missing values. For the household types single parent and couple with children, analysis excludes those age 65 and older. Excluded group is male, age 25-64, high school diploma, not employed with zero hours worked on average day, citizen, White, non-Hispanic, Northeast and metro residence, couple without children household, household income less than 200 percent of the poverty threshold, weekday day, pre-December 2007, and first quarter (January, February, March).* indicates significance at the 90-percent level; ** indicates significance at the 95-percent level; and *** indicates significance at the 99-percent level. Shading = not applicable.

Source: USDA, Economic Research Service estimates using American Time Use Survey and other data discussed in text.

Table 4 presents estimates for the two periods for all household types. Results are similar to those for the model for 2003-11, with small changes post-business cycle peak. Several of the variables have slightly smaller marginal effects for the post-peak period, reflecting the decline in jobs, income, and consumer confidence due to the recession and the recovery's soft labor market. The biggest change pre- and post-peak is for those employed—being employed added 1.5 percentage points to the probability of fast-food purchase pre-peak but added 3.4 percentage points post-peak. Perhaps those who were employed shifted expenditure from sit-down restaurants to fast food during the recession and afterward. This increase in probability of fast-food purchase by those employed seems to hold up the participation rate (see figs. 4 and 5), as many of the post-peak changes decreased the probability or increased the probability by very small amounts.

Results for the household-type models show that individuals who were single parents had a large change in behavior following the business cyle peak (BCP). For this group, the probability of purchasing fast food pre-BCP for those employed was 3.9 percentage points greater than that for those not employed but then increased to 5.2 percentage points post-BCP. Single parents' fast-food purchase was not associated with the meal's real price pre-peak, but post-peak, a $1 increase (2011$) was associated with a reduced probability of 5.1 percent.

Discussion

The analysis addressed questions on fast-food purchasing behavior that have not been addressed in the literature due to data limitations. Specifically, what characteristics are related to fast-food purchase? And, did fast-food purchase behavior change during or after the Great Recession?

First, findings show that Americans purchase fast food as a means of saving time. Supporting this claim, the probability of fast-food purchase is negatively correlated with time in primary eating and drinking (and, in some cases, no primary eating and drinking at all), in personal care activities (primarily sleep), and in meal preparation and was positively correlated with employment and time spent in travel from place to place.

Findings also show that the greater the number of hours a person engaged in the labor market on an average day, the less likely he or she was to purchase fast food, even after controlling for income and education. This is somewhat surprising given that McCracken and Brandt (1987), Byrne et al. (1998), Stewart and Yen (2004), and Stewart et al. (2004) found that an increased value of and hours employed in a week by the household food manager increased demand for fast food. However, previous studies used weekly hours spent in work, whereas this study used daily hours spent in work and work-related activities, and the weekly hours worked may be a proxy for whether a person was employed full-time or part-time. Hence, these previous studies might actually be picking up the positive relationship between full-time work and demand for fast food, which this study also found. Also, the previous studies do not control for time spent in leisure, travel, and household activities, which this study found to have statistically significant relationships with demand for fast food. Lastly findings show that those employed but on their day off were more likely than others to purchase fast food, indicating that the time pressure from work days spills over into nonwork days.

Second, fast-food purchasers have different eating patterns than others. They spend less time eating meals and snacks on an average day and are more likely to report no primary eating and/or drinking beverages time. Although they spend about the same amount of time in secondary eating and drinking (i.e., eating and drinking during another "main" activity), they are more likely to engage in eating while at work and while driving. To the extent that eating quickly may not be ideal, that eating/drinking activities may be so inconsequental to an individual that they are not remembered as part of the day, and that eating is done while one is engaged in activities that demand focus—work and driving—it appears that fast-food purchasers may have poor eating habits.

Third, youth and household composition (single person, single parent, and households with children) were found to have a relatively large positive and statistically significant relationship with probability of fast-food purchase. Given that average ages and household composition have changed significantly over the last several decades, these factors will become important determinants of fast-food industry growth (Stewart et al., 2004). Also, income was found to be associated with an increase in probability of fast-food purchase by 1.7 percent, which is consistent with Stewart et al. (2004), Byrne et al. (1998), and McCracken and Brandt (1987), suggesting that households with more income purchase more leisure as well as dining amenities. Note that this effect may be attributable to the bluntness of the income variable, and usage of an income variable with finer income gradients or that was continuous may lead to a more complete interpretation of the association of income and fast-food purchasing behavior over all income levels.

Fourth, fast-food purchase behavior in terms of the share of the population purchasing fast food on a given day was found to stay fairly constant during and after the Great Recession. Indeed, those employed were even more likely to purchase fast food during the recession than before the recession. Purchasing fast food has become an established part of Americans' meal and snack habits, seemingly unaffected by an economic downturn. Another plausible explanation is that the downturn fueled the demand for low-priced fast food as Americans spent less money at sit-down restaurants. This is consistent with findings that average household expenditures on fast food remained unchanged or even increased slightly during the recession (Okrent and Alston, 2012). Also, according to ERS's Food Expenditure Series (USDA-ERS, 2013), sales of meals and snacks at sit-down restaurants declined between 2008 and 2009 from $750 to $725 per capita, while sales of meals and snacks at fast-food restaurants increased from $264 to $275.

Todd (2014) found a 166-calorie per day decline from FAFH for adults age 25-64 between 2005-06 and 2009-10, with fast-food consumption accounting for just over half of this decline (84 calories). However, once the analysis controlled for demographic and employment characteristics and income, energy from FAFH was found to decline by 134 calories per day, with a little over a third of this amount attributable to fast-food consumption. This may seem contradictory to this study's finding that the rate of fast-food purchase appeared to be unaffected by the recession. However, it may be the case that individuals purchased fast food at the same frequency during the recession but were choosing items of lesser calorie content. In fact, many fast-food restaurants have started offering "healthier" menu items, especially in States and municipalities that have implemented regulations requiring provision of nutrition information at chain restaurants (e.g., Bruemmer et al., 2012). Also, Todd (2014) found evidence that between 2005-06 and 2009-10, the quality of at-home food and away-from-home food increased, partly due to individuals demanding more nutritional foods.

A better understanding of fast-food purchase behavior can inform nutrition programs and education, especially since fast food may be higher in calories and less nutritious than some other foods. To the extent that fast-food purchasers appear to be more time pressured than others, the challenge for policymakers interested in improving the dietary quality of Americans is to develop policies that make lower calorie nutritious meals fast and convenient.

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Web sites

American Time Use Survey: stats.bls.gov/tus/

Eating & Health Module: ers.usda.gov/data-products/eating-and-health-module-(atus)

National Bureau of Economic Research Business Cycle page: www.nber.org/cycles/main.html

Appendix—Data Definitions and Limitations

This study used data from the 2003-11 American Time Use Survey (ATUS). The survey sample included respondents age 18 and older with "good" diaries, resulting in 117,805 respondents. "Bad" diaries are those with variable TUDQUAL2, "Collected from interviewer after interview: why do you think the data should not be used?," equal to 1 (Respondent intentionally providing wrong answer), 2 (Respondent trying to provide correct answer, but could not correctly remember his/her activities), 3 (Respondent deliberately reported very long duration activities), or 4 (Other). There were 861 of these cases.

Primary eating and drinking occurrences were ATUS activities 11xxxx (ATUS major activity group "Eating and Drinking") and 050202 ("Eating and drinking as part of job, which includes eating/drinking with clients, coworkers").

We defined **eating out** as primary eating/drinking activities that took place at restaurant or related, such that

TEWHERE = 4 (restaurant or bar),

6 (grocery store),

7 (other store/mall), or

11 (other place).

Eating/drinking at TEWHERE=11, other place, is usually an entertainment venue when eating/drinking is involved.[25] We include these food purchases, as concessions at movie theaters, sports venues, and other entertainment venues are essentially counter-service restaurants. We classified all other primary eating/drinking as eating/drinking elsewhere, which includes meals purchased at schools.

Diary entries were classified as **miscode** if the respondent reported primary eating/drinking at the same time as traveling[26] (i.e., activity is 11xxxx or 050202 and

TEWHERE = 12 (vehicle, driver), 13 (vehicle, passenger), 14 (walking),

15 (bus), 16 (subway/train), 17 (bicycle), 18 (boat/ferry), or

19 (taxi/limo), 20 (airplane), 21 (other mode), or 99 (unspecified mode).

It is unclear if the respondent's intention was to report primary eating/drinking while traveling, or if the interviewer recorded the activity on the wrong line. A total of 624 respondents have at least one travel miscode in their diaries, and the number of miscodes range from one to three in a diary. We reclassified these miscodes as travel time.

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[25]Secondary eating and secondary drinking (survey questions in the 2006-08 ATUS Eating & Health Module) that were coded as "Other place" mostly took place at a stadium, arena, ball field, or a movie theater. Personal correspondence with Dorinda Allard, U.S. Bureau of Labor Statistics, and Jennifer Montcalm, U.S. Census Bureau, via email on February 28 and 29, 2008.

[26]Email correspondence with Rachel Krantz-Kent dated May 16, 2014, and ATUS Coding Rules 2011, version 05/28/08, Miscellaneous rule #6.

Because some individuals reporting **long-duration eating/drinking activities** (11xxxx and 050202) at a restaurant or related location, we identify those eating/drinking activities greater than 180 minutes (3 hours) as "events" that are likely to be catered, such as receptions. Or, because TEWHERE=4 includes both restaurants and bars, long-duration activities could be watching sports at the bar or spending time at a nightclub. It is unlikely that these activities are regular sit-down dinners at a restaurant. For those who reported an eating activity that was over 120 minutes in their diaries, 180 minutes was the 75th percentile value. A total of 317 respondents reported eating/drinking occasions at a restaurant (or related) of 180 minutes or more, and these cases were reassigned from eating out to primary eating/drinking elsewhere.

We identified **carryout/fast-food** purchases as activity 070103, food (not grocery) purchase that immediately follows a travel activity (180782) in the time diary. This identifies food purchased at a counter or from a delivery person where the respondent reported paying first. The examples given in the ATUS 2011 lexicon for activity 070103 are: paying the pizza delivery person, paying for meal at restaurant, paying check for a meal/drink/snack, picking up takeout food, buying fast food, placing order at a deli/fast food place, paying for fast food at drive-through, and talking to fast-food cashier/talking to the waiter. So, we excluded cases of 070103 that are paying for food or talking to a waiter at a sit-down restaurant. After the food is purchased, the individual may travel away from the restaurant (carry out the food) or may eat the food at the restaurant. Hence, we define fast-food/carryout purchase as the sequence (1) activity 18xxxx (travel) and TEWHERE=mode of transport, and (2) activity 070103 (purchase food not groceries) and TEWHERE=4,6,7, or 11. A total of 11,908 respondents have at least one reported carryout/fast-food purchase in their diaries over the sample period, and the number of carryout/fast-food purchases over the day range from one to six.

A number of reported eating activities at restaurants and related locations are of short duration with no reported purchase of food. We identify **short-duration restaurant visits** as fast food if they are 20 minutes or fewer of eating/drinking (110101). Waiting time (110201) is not included in the 20-minute limit. The median time of those who purchased carryout/fast food and then reported eating/drinking within the next two activities was 20 minutes. As a consequence, we categorize restaurant visits of short duration of 20 or fewer minutes as carryout/fast food. The respondent may have neglected to report paying for the food, or the respondent may not have been the person who paid for the food. A total of 4,035 respondents reported eating at a restaurant (or related) for a duration of 20 minutes or less, and the number of such occurrences in a diary ranged from one to four. The time reported as eating/drinking at a restaurant for these short-duration restaurant visits was reassigned from eating/drinking to purchasing food (070103), and an indicator was added for fast food/carryout for these respondents. We analyzed eating/drinking times of fast-food purchasers with these short-duration eating activities classified as eating/drinking time and not fast-food purchase time, and the results do not change—fast-food purchasers still had less primary eating/drinking time and were still more likely to report no primary eating/drinking time than others. Including the short-duration restaurant eating times as primary eating/drinking activities reduces the gap between the average time spent by fast-food purchasers in eating/drinking and others, but the difference is still statistically different.

There are a number of reported **long-duration purchasing food activities** (070103). These are frequently not followed by an eating/drinking activity in the time diary. Above, we identify short-duration restaurant visits as fast food if they are 20 minutes or fewer. Here, we identify these long-duration 070103 activities as purchasing and eating/drinking food if the reported activity is more than 20 minutes. There are 458 respondents who reported purchasing carry out/fast food

for durations greater than 20 minutes, with two respondents reporting two such occurrences. The time spent in these long-duration food purchasing activities was reassigned from purchasing food (070103) time to eating/drinking time (11xxxx and 050202). Although we reassigned the time, these cases were still counted as fast-food purchases.

The adjustments on short-duration restaurant eating/drinking times and long-duration food purchases are a result of the ambiguity of respondents' reporting on food purchases and consuming of these food purchases. Many of the respondents who reported a food purchase did not report eating/drinking activities within 90 minutes of the purchase. The short-duration restaurant eating/drinking activities with no food purchase reported had to include a food purchase, either by the respondent or someone else. Our goal in doing the reclassifications was to best identify fast-food purchase.

Table A.1 defines each major activity group by ATUS activity code and TEWHERE.

A time diary is a narrative—the story of a person's day. Because of the way a respondent may report his/her day, and the way in which interviewers code the reported activities, the nuances of fast-food purchase versus eating a meal at a sit-down restaurant may be lost. A respondent may not report every step of the activity and, for example, may not report paying for the food first before eating the meal at a fast-food restaurant. Or, it may be the case that the respondent was at a fast-food restaurant, but someone else paid for the meal so the respondent did not engage in the activity of purchasing food. A respondent is unlikely to report a purchase at a vending machine due to the short amount of time involved. Because of the lack of this specific information pertaining to food away from home, we made the adjustments described above. In some cases, we needed to infer the type of restaurant and specific type of activity. For example, a respondent reporting eating/drinking at a restaurant for a 10-minute duration is unlikely to be at a sit-down restaurant. Also, a respondent reporting being at a restaurant or bar from 10:00 p.m. to 2:00 a.m. is unlikely to be eating dinner and more likely to be at a bar or nightclub. There is the possibility that we inferred incorrectly in making these adjustments. In addition, we cannot tell the specific type of fast-food/carryout restaurant that the respondent visited. It could be a national chain limited-service restaurant, or it could be carryout from a sit-down restaurant.

There is also the limitation that we do not know what foods or beverages the respondent ate/drank and, consequently, the caloric intake. An occurrence of fast-food purchase could be just for coffee and not a meal or snack. We also do not know how much money the respondent spent (or someone else spent) on the food/beverages.

More general limitations are that the ATUS asks the respondent to report his/her primary activity only, and this may miss eating as a secondary activity. Consequently, while the data contain the purchase of fast food, they may not contain the consumption of fast food.

Another possible limitation is that we use a blunt income variable to indicate if the household income is "high income"—above 200 percent of the poverty threshold. Were a continuous income variable available that was timely and consistent over 2003-11, we may have been able to better identify probabilities of fast-food purchase for various income groups before and after the business cycle peak.

A discussion of the reliability of the ATUS estimates, including sampling and nonsampling error, is in the Technical Note in each ATUS News Release.

Appendix table 1

Time spent in various activites on an average day, 2003-11, age 18 and older

	ATUS activity codes	Total		Men		Women		Employed		Not employed		Fast-food purchasers	
Number of observations		117,805		50,751		67,054		76,451		41,354		15,122	
		Minutes											
Eating and drinking	11xxxx, 050202	67.5	[±.32]	69.6	[±.47]	65.5	[±.45]	65.9	[±.39]	70.5	[±.57]	57.2	[±.80]
Eating/ drinking out	11xxxx, 050202 and TE-WHERE= 4,6,7,11	14.1	[±.23]	14.5	[±.36]	13.7	[±.31]	14.8	[±.28]	12.7	[±.34]	16.3	[±.64]
Sit-down restaurant	as defined in text above	13.7	[±.22]	14.2	[±.35]	13.3	[±.31]	14.4	[±.27]	12.3	[±.33]	13.7	[±.61]
Fast food/ carryout	as defined in text above	0.4	[±.03]	0.3	[±.04]	0.4	[±.04]	0.3	[±.03]	0.4	[±.05]	2.6	[±.20]
Eating/ drinking elsewhere*	11xxxx, 050202 and TEWHERE not 4,6,7,11	53.4	[±.29]	55.1	[±.41]	51.7	[±.41]	51.1	[±.33]	57.7	[±.53]	40.9	[±.65]
Personal care:													
Sleep	0101xx	513.9	[±.84]	508.9	[±1.23]	518.7	[±1.12]	496.8	[±1.06]	547.4	[±1.48]	491.0	[±2.13]
Other personal care	0102xx, 0103xx, 0104xx, 0105xx, and 019999	45.9	[±.38]	38.1	[±.55]	53.2	[±.49]	45.5	[±.40]	46.6	[±.80]	46.3	[±.75]
HH activities:													
Meal prep and cleanup	0202xx	33.5	[±.30]	18.0	[±.35]	47.9	[±.47]	26.0	[±.28]	48.0	[±.70]	20.0	[±.67]
Other HH activities	all 02xxxx activities (except 0202xx, 020904)	77.8	[±.73]	65.2	[±1.03]	89.6	[±.99]	63.9	[±.75]	105.0	[±1.53]	60.5	[±1.78]
Caring activities:													
Caring for HH members	03xxxx	28.6	[±.39]	18.1	[±.46]	38.3	[±.57]	26.6	[±.43]	32.5	[±.80]	30.3	[±1.08]
Caring for non-HH members	04xxxx	9.7	[±.31]	8.4	[±.42]	11.0	[±.39]	7.9	[±.32]	13.4	[±.62]	11.3	[±.82]
Work, work related, and educational activities:													
Work-related activities	all 05xxxx activities except 050202	212.8	[±1.38]	255.6	[±2.18]	173.0	[±1.72]	317.5	[±1.95]	8.6**	[±.62]	241.2	[±4.55]
Educational activities purchases	06xxxx	14.1	[±.56]	12.9	[±.87]	15.1	[±.70]	11.6	[±.62]	18.9	[±1.20]	18.7	[±1.92]
Purchasing activities:													
Grocery purchases	70101	6.5	[±.11]	4.6	[±.14]	8.2	[±.16]	5.5	[±.13]	8.3	[±.25]	5.4	[±.29]
Other purchases	All 07xxxx (except 080101), 08xxxx, and 09xxxx	24.2	[±.32]	19.3	[±.48]	28.7	[±.51]	22.4	[±.33]	27.8	[±.67]	42.8	[±1.02]
Fast-food/ carryout purchases	070103, specified in text above	1.5	[±.03]	1.6	[±.05]	1.5	[±.04]	1.8	[±.04]	1.1	[±.05]	11.6	[±.13]

Continued—

Appendix table 1

Time spent in various activites on an average day, 2003-11, age 18 and older—continued

	ATUS activity codes	Total		Men		Women		Employed		Not employed		Fast-food purchasers	
Government, civic, religious, volunteer activities	10xxxx, 14xxxx, 15xxxx except 150101	16.8	[±.36]	14.7	[±.48]	18.9	[±.55]	14.0	[±.37]	22.5	[±.69]	18.0	[±1.17]
Leisure and sports activities:													
Watching television	120303, and 120304	162.0	[±.95]	176.3	[±1.49]	148.6	[±1.26]	128.7	[±.94]	226.8	[±2.10]	131.8	[±2.27]
Other socializing, leisure, and screentime	all 12xxxx (except 120303 and 120304), 020904, 120307, 120308, and 150101	116.8	[±.85]	115.4	[±1.36]	118.1	[±1.20]	94.2	[±.97]	160.9	[±1.79]	114.9	[±2.40]
Sports and exercise	13xxxx	17.9	[±.38]	23.3	[±.65]	12.8	[±.37]	17.7	[±.50]	18.1	[±.53]	21.6	[±1.13]
Communication	16xxxx	6.3	[±.16]	3.5	[±.17]	8.8	[±.24]	4.9	[±.16]	9.0	[±.33]	7.4	[±.49]
Travel	18xxxx	74.4	[±.53]	77.2	[±.82]	71.8	[±.68]	82.1	[±.60]	59.4	[±.90]	110.7	[±1.71]
Other activities NEC	50xxxx	11.4	[±.29]	10.9	[±.46]	11.9	[±.37]	9.0	[±.32]	16.2	[±.61]	10.8	[±.89]
Total time		1440		1440		1440		1440		1440		1440	

Note: HH=household. NEC = Not elsewhere classified. 90-percent confidence intervals in brackets. Eating out is defined as primary eating/drinking at the ATUS locations restaurant or bar, grocery store, other store/mall, and other places. Eating elsewhere is any other place. The main elsewhere locations are at home or at the workplace. *Eating elsewhere is anywhere that is not in a restaurant. **Work activities for those not employed are job search activities.

Source: USDA, Economic Research Service estimates calculated from American Time Use Survey (ATUS) data.

Appendix table 2

Participation rates and distribution of eating behaviors, 2003-11, age 18 and older

	Total		Men		Women		Employed		Not employed		Fast-food purchasers	
Participation rates (percent) and average time spent (minutes) by participants:												
% who ate out, sit-down	19.5	[±.26]	20.4	[±.41]	18.5	[±.36]	20.5	[±.33]	17.4	[±.39]	20.6	[±.75]
Ave. time spent by those who ate out, sit-down	70.6	[±.62]	69.3	[±.91]	71.9	[±.81]	70.5	[±.77]	71.0	[±.98]	66.3	[±1.62]
% who purchased fast food/carryout	13.0	[±.22]	13.5	[±.37]	12.5	[±.28]	15.2	[±.31]	8.8	[±.30]	97.9*	[±.20]
Ave. time spent in purchasing FF, those who purchased FF	11.9	[±.14]	11.8	[±.20]	11.9	[±.17]	11.6	[±.16]	12.7	[±.31]	11.9	[±.14]
Distribution of eating behaviors:												
% who ate out and elsewhere	14.8	[±.23]	15.4	[±.37]	14.1	[±.31]	15.2	[±.30]	13.9	[±.34]	18.3	[±.69]
% who ate out only	5.4	[±.13]	5.7	[±.23]	5.2	[±.18]	6.0	[±.17]	4.2	[±.22]	7.5	[±.49]
% who ate elsewhere only	75.0	[±.30]	74.2	[±.43]	75.9	[±.41]	73.6	[±.35]	77.9	[±.44]	65.9	[±.89]
% who reported no primary eating/ drinking	4.8	[±.14]	4.8	[±.20]	4.9	[±.18]	5.2	[±.17]	4.0	[±.21]	8.4	[±.51]
Total	100.00		100.00		100.00		100.00		100.00		100.00	

*Percent who purchased fast food/carryout is not 100 percent because some individuals do not report purchase time, only eating/drinking time. Here, the category "Only those who purchased fast food" includes those with zero purchase time but some fast-food eating/drinking time.
Notes: 90-percent confidence intervals in brackets. FF=fast food.

Source: USDA, Economic Research Service estimates calculated from American Time Use Survey data.

Appendix table 3
Mean values of variables used in probit models

	N	Mean	Min value	Max-value	Standard error	90% CI	
						Min	Max
Fast-food purchase (1=FF purchase, 2=no)	117,214	1.87	1	2	0.0014	1.865	1.870
Female (1=female, 0=male)	117,214	0.52	0	1	0.0004	0.517	0.519
Age 18-24	117,214	0.12	0	1	0.0006	0.124	0.125
Age 65+	117,214	0.17	0	1	0.0002	0.165	0.165
Education, less than high school diploma	117,214	0.14	0	1	0.0013	0.134	0.139
Education, some college	117,214	0.26	0	1	0.0014	0.262	0.267
Education, college degree	117,214	0.18	0	1	0.0014	0.180	0.184
Education, advanced degree	117,214	0.10	0	1	0.0011	0.096	0.100
Employed	117,214	0.66	0	1	0.0014	0.658	0.663
Employed part-time schedule	117,214	0.02	0	1	0.0005	0.014	0.016
Noncitizen	117,214	0.08	0	1	0.0011	0.082	0.085
African-American/Black	117,214	0.12	0	1	0.0005	0.115	0.116
Asian	117,214	0.04	0	1	0.0010	0.038	0.041
Mixed race	117,214	0.01	0	1	0.0005	0.012	0.013
Hispanic	117,214	0.13	0	1	0.0004	0.131	0.132
Midwest region	117,214	0.25	0	1	0.0020	0.242	0.248
South region	117,214	0.36	0	1	0.0022	0.353	0.360
West region	117,214	0.21	0	1	0.0018	0.212	0.218
Nonmetro residence	117,214	0.19	0	1	0.0045	0.178	0.193
Single-person household	117,214	0.15	0	1	0.0019	0.147	0.154
Single-parent household	117,214	0.03	0	1	0.0005	0.028	0.029
Couple with child(ren) household	117,214	0.05	0	1	0.0009	0.052	0.055
Other type of household, with children	117,214	0.30	0	1	0.0011	0.297	0.301
Other type of household, no children	117,214	0.21	0	1	0.0020	0.205	0.211
Number in household, squared	117,214	10.90	1	256	0.0663	10.794	11.012
Child less than age 6 in household	117,214	0.79	0	1	0.0012	0.791	0.794
Household income > 200% poverty threshold	117,214	0.54	0	1	0.0021	0.538	0.545
Household income value missing	117,214	0.12	0	1	0.0014	0.114	0.119
Work time>0 and ≤12 hours	117,214	0.45	0	1	0.0016	0.452	0.457
Work time>12 hours	117,214	0.02	0	1	0.0007	0.023	0.025
Primary eating/drinking time, hours	117,214	1.12	0	14.9	0.0033	1.119	1.130
Personal care time, hours	117,214	9.33	0	24.0	0.0092	9.316	9.346
Housework, hours	117,214	1.85	0	21.8	0.0083	1.840	1.868
Household child/adult care, hours	117,214	0.48	0	19.2	0.0040	0.469	0.482
Watching TV, hours	117,214	2.70	0	23.8	0.0097	2.686	2.717
Travel time, hours	117,214	1.24	0	24	0.0054	1.231	1.249
Weekend/holiday day	117,214	0.30	0	1	0.0005	0.297	0.298
Time trend 1-9 (2003=1,…,2011=9)	117,214	5.08	1	9	0.0017	5.073	5.079
Unemployment rate	117,214	6.65	4.4	10	0.0015	6.651	6.656
Fast-food meal price (2011 $)	117,214	3.68	2.431	5.798	0.0017	3.677	3.683

Continued—

Appendix table 3
Mean values of variables used in probit models—continued

	N	Mean	Min value	Max-value	Standard error	90% CI	
						Min	Max
Post business cycle peak (12/07)	117,214	0.47	0	1	0.0005	0.465	0.467
Quarter 2 (April, May, June)	117,214	0.25	0	1	0.0003	0.249	0.250
Quarter 3 (July, August, September)	117,214	0.25	0	1	0.0003	0.251	0.253
Quarter 4 (October, November, December)	117,214	0.25	0	1	0.0003	0.253	0.254

Notes: FF = fast food. The estimates above exclude all respondents who have missing values for any of the variables included in the probit models. Fast-food meal prices were unavailable for Alaska and Hawaii, so those respondents have missing values for prices. Variables from the household surveys (Current Population Survey and the American Time Use Survey) will have some missing values for every survey question except sex/gender, as some respondents may not know the answer ("Don't know" response) or refuse to answer the question. The time-use estimates for 2003-11 match those in table 1, indicating that there is likely not bias due to item nonresponse.

Source: USDA, Economic Research Service estimates using data from the American Time Use Survey with the appropriate sample weights for nationally representative means, and other data sources discussed in text.

Appendix table 4
Probit model coefficients, 2003-11

	All	Single person	Single parent	Couple, no children	Couple with children	Other HH, no children	Other HH with children
Intercept	-0.6713***	-0.3813**	-0.2611	-0.9271***	-1.4241***	-0.2949	-0.5006***
Demographic characteristics:							
Female	0.0059	-0.1290***	0.0997	-0.0090	0.0621	0.0292	0.0510**
Age 18-24	0.1819***	0.2029***	-0.0898	0.2070**	0.1066	0.2660***	0.1006***
Age 65+	-0.1925***	-0.1726***		-0.1010**		-0.2161***	-0.1787**
Education, less than high school	-0.0986***	-0.1216**	0.1255	-0.1323**	-0.0924	-0.0361	-0.1384***
Education, some college	0.0683***	0.0549	0.0752	0.0759**	0.0620	0.0847*	0.0386
Education, college degree	0.0776***	0.0157	0.1529**	0.1227***	0.0298	0.1166**	0.0268
Education, advanced degree	0.0242	0.0296	-0.0770	0.0028	-0.0363	0.0086	0.0496
Noncitizen	-0.3049***	-0.2150***	-0.3269**	-0.1640**	-0.3941***	-0.2893***	-0.3519***
African-American/Black	-0.0109	0.0205	-0.0469	-0.0073	0.0110	-0.0127	-0.0392
Asian	-0.1446***	-0.1843	-0.0944	-0.0224	-0.1245	-0.2942**	-0.1254**
Mixed race	0.0026	0.0556	-0.5201**	-0.0098	-0.0258	0.1234	-0.0942
Hispanic	-0.0580**	-0.0734	-0.1085	0.0402	0.0271	-0.0905	-0.0681**
Geographic characteristics:							
Midwest region	-0.0132	-0.0568	-0.0317	0.0276	0.0847	-0.1149*	0.0279
South region	0.0373*	0.0598	-0.0018	0.0217	0.0823	-0.0028	0.0637**
West region	0.0277	0.0343	-0.0810	-0.0036	0.0667	-0.0069	0.0759**
Nonmetro residence	-0.0313**	-0.0200	0.0462	-0.0041	0.0699	-0.0626	-0.0475*
Labor force characteristics:							
Employed	0.1236 ***	0.1171 **	0.1910**	0.0987**	0.0582	0.1210 **	0.1244***
Employed part-time schedule	-0.0256	-0.0598	-0.1075	-0.0613	0.2944	-0.0673	0.0065
HH type:							
Single-person HH	0.0724 ***						
Single-parent HH	0.1297 ***						
Couple with child(ren) HH	0.0394						
Other type of HH, with children	0.0930 ***						
Other type of HH, no children	0.0627 ***						
HH characteristics:							
Number in HH			-0.0647		0.0732	-0.1340	-0.0261
Number in HH squared	-0.0018 *		-0.0012		-0.0084	0.0133	0.0016
Child under age 6 in HH	0.0036		-0.0138		0.0923		0.0139
Spouse employed				0.1011	-0.1501		
Spouse's usual wkly work hours				-0.0003	0.0033		
Spouse's weekly work hours vary				-0.1680	0.3183*		
HH income>200% poverty threshold	0.1009 ***	0.0385	0.0610	0.0614	0.3017***	0.1329 ***	0.1176***
HH income value missing	0.0938 ***	0.0660	0.0309	-0.0306	0.2713**	0.2681 ***	0.0802**
Time use:							
Work and work related,1-12 hrs	-0.0930 ***	0.0125	-0.1751**	-0.0510	-0.0541	-0.1231 **	-0.1268***
Work and work related, >12 hrs	-0.4501 ***	-0.2849***	-0.5989***	-0.2808**	-0.4518**	-0.5798 ***	-0.5227***
Primary eating/drinking, hours	-0.1747 ***	-0.1639***	-0.1409***	-0.1663***	-0.1570***	-0.1592 ***	-0.2079***
Personal care time, hours	-0.0349 ***	-0.0333***	-0.0377***	-0.0358***	-0.0323*	-0.0448 ***	-0.0268***
Housework, hours	-0.0561 ***	-0.0624***	-0.0492***	-0.0601***	-0.0616***	-0.0578 ***	-0.0498***
HH child/adult care, hours	-0.0019		-0.0006	-0.0033	-0.0182	0.0658 **	-0.0095
Watching TV, hours	-0.0233 ***	-0.0318***	-0.0144	-0.0164***	-0.0194	-0.0270 ***	-0.0209***
Travel time, hours	0.1406 ***	0.1351***	0.1569***	0.1381***	0.1415***	0.1215 ***	0.1614***

Continued—

Appendix table 4
Probit model coefficients, 2003-11—continued

	All	Single person	Single parent	Couple, no children	Couple with children	Other HH, no children	Other HH with children
Calendar variables:							
Weekend/holiday	-0.0048	-0.0185	0.0074	0.0306	0.0865	-0.0488	-0.0049
Quarter 2	0.0793***	0.0662*	-0.0376	0.0384	0.0763	0.1542***	0.0829***
Quarter 3	0.0432**	0.0305	0.1024	0.0054	0.0615	0.0936*	0.0348
Quarter 4	-0.0102	-0.0359	-0.0317	-0.0703*	0.0103	0.0408	0.0162
Time trend 1-9	0.0115**	-0.0021	0.0021	-0.0012	-0.0166	0.0536***	0.0040
Unemployment rate	-0.0118**	-0.0188*	-0.0112	-0.0022	0.0225	0.0019	-0.0264***
Fast-food meal price (2011 $)	-0.0365**	-0.0563	-0.0735	0.0125	0.0195	-0.0854*	-0.0413
Post-business cycle peak (12/07)	-0.0066	0.1044*	0.0080	0.0594	0.0050	-0.2784***	0.0626
Number of observations	117,214	28,380	6,938	22,978	5,044	13,206	40,615
Percent of observations that are fast-food purchasers	12.8	11.1	16.0	10.4	13.0	12.8	14.9
Likelihood ratio, Pr>ChiSq	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Score, Pr>ChiSq	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Wald, Pr>ChiSq	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Association of predicted and observed:							
Concordant	70.2	71.3	67.3	70.5	67.9	71.2	69.3
Discordant	29.1	28.0	32.0	28.7	31.4	28.2	30.0
Tied	0.7	0.7	0.7	0.8	0.7	0.6	0.7

Notes: HH = household. Alaska and Hawaii are not included due to missing fast-food meal prices. Other variables have missing values due to "Don't know" and "Refused" responses. See appendix table 3 for means and more discussion of missing values. For the household types single parent and couple with children, analysis excludes those age 65 and older. Excluded group is male, age 25-64, high school diploma, not employed with zero hours worked on average day, citizen, White, non-Hispanic, Northeast and metro residence, couple without children household, household income less than 200 percent of the poverty threshold, weekday day, pre-December 2007, and first quarter (January, February, March). * indicates significance at the 90-percent level; ** indicates significance at the 95-percent level; and *** indicates significance at the 99-percent level. Shading = not applicable.

Source: USDA, Economic Research Service estimates using American Time Use Survey and other data discussed in text.