

**Is it Really Just the Poor Who Eat Fast Food?**  
**The Impact of Income and Wealth on U.S. Consumption**

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**Abstract:** U.S. obesity rates have risen and are inversely related to income and wealth. Fast food restaurants are typically located in poor neighborhoods. Many policy makers assume these facts are related and assume it is primarily the poor that eat fast food. These assumptions are checked using data from a large nationwide longitudinal study. Results show fast food is eaten more by the middle class than the poor. Regression results suggest income and wealth have only a small impact on the probability of eating fast food. Instead, a person's nutritional awareness and soda drinking habits have larger impacts.

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## Introduction

Who eats in fast food restaurants? This question is important to answer because public policies are being implemented based on the assumption that health, nutrition and economic status are all tightly interlinked. For example, Los Angeles in 2008 (Los Angeles City Council, 2007) banned all new fast food restaurants from opening in the poor neighborhoods of South L.A. because “fast-food businesses in low-income areas, particularly along the Southeast Los Angeles commercial corridors, intensifies socio-economic problems in the neighborhoods, and creates serious public health problems.”<sup>1</sup> Policy makers in L.A. believe that one way to improve health and nutrition is to change what and where people eat (Medina, 2011). Other bans to improve the health of residents of poor neighborhoods have been used frequently in the past. Numerous cities have limited access to alcohol in poor neighborhoods by restricting the number of bars and their hours of operation.<sup>2</sup>

The Los Angeles proposal came about because of four facts. First, a growing health problem in modern society is obesity. In the U.S the Center for Disease Control (CDC) estimated 13.3% of adults in the early 1960s were obese (Center for Disease Control and Prevention, 2013, Table 68). Almost fifty years later the CDC’s survey found 35.3% of adults were obese. Second, poor people suffer from higher obesity rates than the rich (Smith, 2009). The CDC estimates that 37.2% of people living below the poverty level were obese, compared to 31.3% among people whose income is four or more times the poverty level. Third, fast food restaurants sell meals at a relatively low price. Calculations, shown later, reveal fast food meals cost less than half the price of a meal ordered in a full-service restaurant. Fourth, fast food restaurants are much more likely to be located in poor neighborhoods than in wealthy neighborhoods.<sup>3</sup>

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<sup>1</sup> The ban includes the West Adams, Baldwin Hills, and Leimert Park neighborhoods. Fast food restaurants that are integrated into food courts of malls and office buildings are allowed under the ban. The quote is from the original bill written in 2007 and passed in 2008.

<sup>2</sup> Morland et al. (2002) find that poor neighborhoods, based on housing values, have three times the number of places to consume alcohol and 1/3 as many supermarkets.

<sup>3</sup> Fraser et al. (2010) literature review of 33 articles that examine where fast food restaurants are located finds in most studies a strong positive association between the availability of fast food restaurants and poverty. Cummins et al. (2005) find in Scotland and England a strong relationship between the number of McDonald’s restaurants and a deprivation index based on a lack of income, employment, health, education, and housing. Pearce et al. (2007) find similar results in New Zealand

Fast food is convenient, cheap and located close to poor people. Fast food meals are often less nutritious than home cooking because they contain more fat and sodium (Stender et al., 2007). Nevertheless, the typical U.S. adult consumed about 11% of their total daily calories from fast food (Fryer and Ervin, 2013)<sup>4</sup>. This leads many policy makers to assume that eating fast food is fueling the epidemic of obesity among poor people.

This research uses U.S. data to test the belief that poor people eat more fast food than richer.<sup>5</sup> Using a very large nationally representative U.S. sample of young baby boomers, the impact of both income and wealth on eating fast food is tested. This research is the first to use wealth information and one of the first to use an income measure calculated from an extensive set of financial questions.

Results show that neither income nor wealth are important determinants for the probability an individual eats fast food anytime in a 14 day retrospective period, for the number of times an individual eats fast food or for the change in their fast food eating habits over time. Instead, the results show that fast food is eaten by all income and wealth groups, with the middle class eating slightly more fast food than either the poor or the rich. While it is impossible to prove causation the results suggest that instead of money being a key determinant, soda drinking, reading nutritional labels and paying attention to ingredients are major factors influencing fast food consumption.

Beyond analyzing specific public policies, understanding who eats fast food is important because spending on restaurant meals comprises a large fraction of the typical U.S. family's food budget (Bureau of Labor Statistics, 2013). Figure 1, based on the Bureau of Labor Statistics' Consumer Expenditure Survey, shows the typical family in 1992 spent 38% of all food spending on restaurants and take-out. The share spent on outside meals rose to a peak of 44% in 2005 and then fell to about 41% by 2012.

[Put Figure 1 About Here]

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<sup>4</sup> Figure 3 in Fryer and Ervin (2013) suggests calories consumed from fast food do not differ by income.

<sup>5</sup> Mohr et al. (2007) investigating Australian data find age has a strong negative relationship with fast food consumption. Income has a smaller but positive relationship than age. Interestingly, occupational status and educational attainment have no impact.

Figure 1 shows that restaurant meals are an important part of U.S. families' lives. However, the figure does not distinguish between fast food and full-service restaurants. The U.S. Census Bureau surveys all businesses every five years. Table 1 contains information from the Census about limited service restaurants, which tracks fast food restaurants, pizza parlors, delicatessens and sandwich shops.<sup>6</sup>

The table shows limited service restaurants are a large and growing portion of the U.S. economy. The top part of the table show that by 2007, there were over 200 thousand restaurants selling over \$150 billion worth of food each year. The table's middle shows the U.S. is gaining about 2% more restaurants per year and that the industry is selling about 5% more food annually. The table's bottom section shows limited service restaurants comprise about 1/3 of all eating and drinking establishments.

[Put Table 1 About Here]

Calculations using the 2007 Economic Census data show that meals at limited service restaurants cost less than at other types of eating establishments. The typical limited service restaurant meal cost about seven dollars (\$7.05). A full-service restaurant's average meal costs about seventeen dollars (\$16.96). Cafeteria and buffet average meals cost nine dollars (\$9.01).<sup>7</sup>

This information in table 1 shows that eating out at a fast-food restaurants is a cheaper alternative than eating a meal in a full-service restaurant. However, this table does not shed any light on the economic status of fast-food patrons. The rest of the paper investigates if it is really the poor who eat fast food by first overviewing the data in section 2. Then section 3 investigates the chance that a person ever ate fast food, section 4 investigates the number of times a person eats fast food, and section 5 uses longitudinal data to understand why people change the number of times they eat fast food. Finally a discussion of the results and a conclusion are presented.

## **Model**

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<sup>6</sup> Table EC0772SXS04 from the 2007 Economic Census (factfinder2.census.gov) shows that 24.4% of limited service restaurants stated their primary menu item was hamburgers, 18.3% was sandwiches, 16.9% was pizza, 8.2% was Mexican, 7.2% was Chinese, 7.1% was chicken, 6.9% listed no food specialty and the remaining 10.9% stated other foods.

<sup>7</sup> Data are from Table EC0772SXS02 found on factfinder2.census.gov. Meal costs are weighted based on restaurant revenue.

A simple model suggests that demand for fast food depends on four factors; money, access, health and time. This model will be used to test what factors impact fast food consumption. Money, denoted as M, has two different effects. First, there is an income effect. The more money a person has, the more fast food meals they can afford. This means that as income and wealth increase we expect to see the probability someone eats fast food and the amount of fast food they eat increase.

There is also a substitution effect. The more money a person has, the larger the variety of food choices available. While a poor person can only eat in low cost restaurants such as fast food chains, rich people have the option of eating in low, medium and high cost restaurants. The substitution effect means that as income and wealth increase we expect to see a decreasing probability of eating fast food since richer people have more options. It is unclear before doing empirical tests which of the two effects dominates.<sup>8</sup>

The second determinant is access, denoted as A. The further a restaurant is from a customer the less likely a customer is to eat there.<sup>9</sup> The more convenient fast food is, the higher the demand. This means people in urban areas, which have a higher concentration of fast food restaurants, should be more likely to eat fast food than people in rural areas, which typically have few fast food locations.

The third determinant is health concerns, denoted as H. Fast food is designed to taste good. This good taste occurs because fast food is typically high in salt (Rudelt et al., 2013)<sup>10</sup> and fat. People who think more about nutrition, exercise or their body image are expected to be less likely to consume fast food and more likely to consume healthier choices with lower salt and fat levels.

The last determinant is time, denoted as T. Home cooking is time intensive. Fast food, by its very name, is quick. People with a lot of free time should be more likely to cook their own food.

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<sup>8</sup> Kim and Leigh (2011) using mid-1990s Continuing Survey of Food Intake data found among people with below average income, more money increased fast-food purchases. However, for people with above average income, more money reduced fast food purchases.

<sup>9</sup> Chen et al. (2013) using a very detailed dataset for Indianapolis, Indiana find a positive relationship between respondents' BMI and the number of fast food restaurants located within a ½ mile of their home.

<sup>10</sup> Rudelt, French and Harnack (2013) look at how much sodium (Na) is in meals sold by fast food restaurants at seven points in time from 1997 to 2009. They show the sodium in the median lunch/dinner entree rose from 883 mg in 1997 to 1,015 mg by 2009, a 15% increase.

People who are working long hours are expected to eat out more often since they have less free time. Including demographic indicators, denoted as  $D$ , gives us the following model that fast food consumption is a function,  $f(\cdot)$ , of money, access, health concerns, time and demographics.

1) Fast Food Consumption =  $f(M, A, H, T, D)$ .

The next section describes the data used to fit this model. Then regression results are presented which show the actual impact money, access, health, time and demographics have on eating fast food.

## **Data Description**

The data used to fit the model come from the National Longitudinal Survey of Youth 1979 cohort (NLSY79). The NLSY79 tracks changes in the same group of people over time. The NLSY79 is a large randomly selected nationally representative ongoing U.S. panel survey of over 9,000 respondents. The survey's primary funding is from the Bureau of Labor Statistics. General survey details and the raw data used in this research are available online at [www.bls.gov/nls](http://www.bls.gov/nls). The survey has questioned the same group of young baby boomers to date 24 times; annually from 1979 to 1994 and every other year since 1994. These boomers are individuals born between 1957 and 1964, at the tail end of the birth spike that began after World War II. In 2014, Young Baby Boomers are people in their 50s.

Since the NLSY79 is a multi-stage random sample that over-sampled blacks and Hispanics, all graphics and descriptive statistics are shown after being adjusted by the survey weights. The weights remove the over-sampling effects, adjust for attrition and allow answers to be considered national totals. Regression results are adjusted following the recommendations in Zagorsky (1997, Chapter 3.9).

### **A. Fast Food Data**

While NLSY79 data start in 1979, this research focuses on data from the 2008 and 2010 surveys. In both 2008 and 2010 the survey included a general health module. One part of the module asked "In the past seven days, how many times did you eat food from a fast food restaurant such as McDonalds, Kentucky Fried Chicken, Pizza Hut, or Taco Bell?"<sup>11</sup> Interviewers also marked

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<sup>11</sup> The fast food survey questions are labeled Q11-GENHLTH\_7C\_1 and Q11-GENHLTH\_7C\_2.

down if the respondents stated the answer in daily or weekly terms. Combining both surveys shows almost three-quarters (73.3%) of young baby boomers ate fast food in the fourteen day period and over one-seventh (15.2%) were heavy fast food diners, which this research defines as consuming fast food more than three times in either seven day period.

Figure 2 combines the results from the two surveys and shows the number of times young baby boomers reported eating fast food over the 14 day period. The far left column shows slightly more than one-quarter (26.8%) did not eat fast food. One-fifth (20.4%) ate fast food just once, but more than half (52.8%) ate fast food multiple times.

One in ten people (10.4%) ate fast food seven or more times, which is at least every other day. About one out of every sixty people (1.6%) reported eating fourteen or more times in the past week, which means eating on average at least one fast food meal daily.

In 2004 a documentary film titled “Super Size Me” followed Morgan Spurlock as he ate only McDonald’s food for one month to allegedly show the deleterious effects on human health. While Mr. Spurlock ate only fast food as a publicity stunt, eating only fast food is not reserved just for people in movies. The NLSY79 has 26 respondents who reported eating twenty-eight or more fast food meals in the 14 day period, which is two or more per day, and 1 respondent who reported eating fast food at least 42 times, which is three meals every day.

In 2008 none of the top ten most frequent eaters worked for a fast food business. The person who ate at least 42 times worked two jobs, as both a truck driver and a clerk. The next nine most frequent eaters were a plumber, bartender, car mechanic, warehouse manager, nurse, construction manager, college secretary, nursing home cleaner and a building supplies store worker. Almost all frequent eaters were in the same jobs two years later. The ninth most frequent eater became a restaurant waiter.

[Put Figure 2 About Here]

Multiplying the number of visits, found on Figure 2’s x-axis, by the column percentages on the y-axis shows the average boomer ate fast food 2.6 times during the two week period. Since the NLSY79 represents the experiences of almost 34 million people, this means young boomers as a group consumed about 44 million fast food meals a week or about 2.3 billion fast food meals a year.

## **B. Money Data**

To understand the amount of money available to a person it is important to examine both income and wealth. Income is the amount of money received periodically from doing activities like working. Wealth is the amount of money stored in bank accounts, stocks, homes and possessions. Some individuals, like retirees, have low income but high wealth. Some, like new doctors, have little or even negative wealth but high income. The NLSY79 is one of the few data sets that collect both income and wealth. The Pearson correlation of 0.59 between income and wealth in the 2008 data shows while the two measures are related they are not identical.

Wealth, or net worth, is calculated by subtracting all debts from a family's assets. The NLSY79 contained a detailed wealth module 14 out of the 24 times the survey has been fielded. Each module asked respondents to report details about their assets, such as the current market value of their home, mortgage, savings, possessions, stocks, and bond holdings, and their liabilities, such as mortgages, credit card debt and unsecured loans. Because a wealth module was fielded in 2008 but not in 2010 this research uses the 2008 money information as the explanatory variables in the regressions. More details on response rates, handling of missing values, and accuracy of the NLSY79 wealth data are found in Zagorsky (1999).

Extensive data on income are also available in the NLSY79. Every survey asked respondents four sets of questions. The first set asked respondents questions that determine income from wages, salaries, tips, and self-employment. The second set asked for details about government transfers and welfare payments. The third set asked about private transfers such as child support, alimony, and gifts. Finally, respondents listed income from other sources such as scholarships, interest, dividends, and rent. For the most important items, such as wages, the questions are asked once about the respondent's income and then repeated a second time to capture income for a spouse or partner. For less important items, such as interest or dividends, a single question asks how much money both the respondent and spouse, if one exists, received. The NLSY79 releases in each survey a variable called Total Net Family Income (TNFI) which is created by summing the various components from each survey's income module.

The average (median) TNFI in 2008 of a young baby boomer that ate fast food was \$63,000. This is eleven thousand dollars less than the \$74,200 median for boomers who did not eat in a fast food restaurant. Examining wealth shows young baby boomers that ate fast food had a

median wealth of \$122,500 compared to non-diners wealth of \$207,000. While diners' income and wealth are lower than non-diners, both the income and wealth figures show the average fast food eater is far from being poor. The \$63,000 income of fast food diners is almost three times the \$22,025 poverty threshold (Social Security Administration, 2013, Table 3.E) for a family of 4 in 2008 and almost eleven thousand dollars higher than the 2008 median household income (\$50,303) in the entire United States (DeNavas-Walt et al., 2009). Wealth levels suggest fast food eaters have saved about two years of income, while non-eaters have saved about three years of income.

### **C. Access**

The NLSY79 data set contains enough information to construct three variables. The first and second indicate if the respondent lived in an urban area or a suburban area. The third indicates if they live in the Southern Census region of the USA. Using these three factors the regression results indicate ease of access increases fast food consumption.

### **D. Health**

Health related habits were tracked by using a number of different variables. The first variable included was if the respondent "ever smoked" more than 100 cigarettes in their lifetime. The second variable was a Boolean that showed if they typically read nutritional labels. Respondents were asked "When you buy a food item for the first time, how often would you say you read the nutritional information about calories, fat and cholesterol sometimes listed on the label - would you say always, often, sometimes, rarely or never?" Respondents who stated always or often were marked as people who "checked nutrition."

The third variable was a Boolean which showed if they looked at the ingredient list before eating new foods. Respondents who stated always or often to the question "When you buy a food item for the first time, how often would you say you read the ingredient list on the package" were marked as "checked ingredients."

The fourth variable was a Boolean indicating if they drank any soda or soft drinks in the same 14 day period used to track fast food eating. The survey question asked "how many times did you have a soft drink or soda that contained sugar? (Do not include diet soft drinks or sodas, or

carbonated water.)” People who reported one or more sugared drinks were classified as “soda drinkers.”

To check if respondents’ physical size mattered, regressions also included their body mass index (“BMI”) in 2008 and if they were trying to lose weight. The respondent’s current absolute weight, a proxy for their IQ, the highest grade they completed, if they currently smoked, if they currently drank alcohol and a Boolean variable which tracked if they currently exercised were all tried in the regressions, but these variables did not have statistically significant regression coefficients and are not included in the results.

### **E. Time**

Time is important because the model section hypothesized that people with little free time were more likely to eat fast food than individuals who had enough free time to cook. Time in this research is tracked by two variables. The first is if the person “worked.” The variable is true if they were employed at least one week in the past calendar year (2007). The second time variable tracks the number of “hours worked” in that year.

### **F. Demographics**

Demographic information tracked the fixed factors of race, age in 2008, if the respondent was born in the United States, their gender and if the respondent was married in 2008. The final variable indicates if the respondent did both the 2008 and 2010 survey. This variable adjusts for the 9.3% of respondents who only completed one survey and reported fast food eating habits over just a seven instead of a fourteen day period.

### **G. Mean Values**

Table 2 shows the mean values for the explanatory variables. Column (1) contains the means for people who did not eat fast food. Column (2) contains the means for people who ate one or more fast food meals in the 14 day period. Column (3) compares the mean values and contains “\*”s if the column (1) and (2) are statistically distinct.

[Put Table 2 About Here]

The data in Table 2 show the NLSY79 data match the societal trends noted in the introduction. People who do not eat fast food have more income and wealth than fast food eaters. Non-eaters

weigh less and have a lower BMI. Among fast food eaters, people who eat a lot of fast food have less income, less wealth, and a higher BMI than those that partake less frequently.

The bottom rows show the number of NLSY79 respondents and the number of young baby boomers they represent. Combining the numbers at the bottom of column (1) and (2) show the research is based on the responses of 7,509 people, who represent 33.6 million young boomers.

Columns (4) to (6) show mean values for heavy eaters and non-eaters. Heavy eaters ate fast food more than 3 times per week in either the 2008 or 2010 surveys or both. Not-heavy eaters ate fast food at least once in either survey, but never more than 3 times in a particular survey.

These columns show the highest levels of income and wealth are held by non-fast food eaters. Moderate fast food eaters (3 or less meals per week) have the second highest levels and heavy eaters have the least money. BMI follows the same pattern. Non-fast food eaters have the lowest BMI (27.3), moderate eaters are in the middle (BMI 28.6) and heavy eaters are the heaviest (BMI 29.3).

The table lends preliminary support to the assumption that time influences fast food eating, since the non-eaters worked the fewest hours (1,712), moderate eaters worked the middle number of hours (1,793) and heavy eaters worked the most hours (2,004). The other rows suggest heavy eaters are more likely to be male, black and younger than moderate or non-eaters.

## **Graphical Results**

This section shows graphically the relationship between money and fast food eating. The first part of the section examines the chance someone eats fast food based on their economic status. The second part of the section examines the number of times they eat fast food.

### **A. Chance Fast Food is Eaten**

Figure 3 shows the percentage of fast food eaters broken down by income (cross-hatched columns) and wealth deciles (solid columns). For example, the far left column shows results for the poorest 10%, the next column to the right shows results for people whose income or wealth ranks then between the bottom 10 and 20th percentile. The richest group is on the far right. The picture shows there is relatively little variation in eating fast food across the various income and wealth groups. The variation that does exist shows an inverted U shaped pattern with the poorest and richest eating the least and the middle class eating the most.

The inverted U shaped pattern matches what was found in a recent Gallup Poll (Dugan, 2013). Gallup found only 39% of people with incomes under \$20,000 ate fast food weekly. Among people with income between \$20,000 and \$30,000 the figure rose to 42%. Among people with income between \$30,000 and \$50,000 the figure was 51% and among people with income between \$50,000 and \$75,000 the figure was 50%.

Examining wealth shows the highest (80.6%) percentage of fast food eaters is found in the 40% to 50% wealth decile. Along the income dimension the groups with the most fast food eaters are the 20% to 30% income bracket (81.2%) and the 40% to 50% bracket (80%).

The poorest income (73.8%) and wealth (75.8%) groups (0% to 10% decile) had lower probabilities of eating fast food than those in the middle of the income and wealth distributions. People in the highest bracket (90% to 100%) had the lowest chance (income 68.4%; wealth 62.6%), but still about two-thirds ate fast food in the fourteen day period.

[Put Figure 3 About Here]

The popularity of fast food is shown by restricting the analysis to respondents reporting over a million dollars of wealth. Over sixty percent (61.4%) of millionaires ate fast-food at least once in the 14 day period and almost ten percent (9.7%) were heavy eaters, who ate fast food more than three times in either seven day period.

### **B. Number of Times Fast Food Is Eaten**

It is possible that including people who don't eat any fast food biases the results. This section analyzes only young baby boomers that did eat fast food to eliminate possible bias. The typical young baby boomer ate fast food an average (mean) of 2.6 times in the 14 day period. Eliminating the non-eaters and focusing just on young boomers who ever ate fast food, the average rises to 3.6 times. Figure 4 shows the number of meals consumed at fast food restaurants, broken down by income (cross-hatched columns) and wealth deciles (solid columns) among all young boomers. The pattern is similar to figure 3. It shows relatively little variation in eating fast food across the various income and wealth groups. The variation that does exist reveals another inverted U shaped pattern with the poorest and richest eating the least (around 2.5 meals) and the middle class eating the most (around 3 meals).

[Put Figure 4 About Here]

Again, the popularity of fast food across the financial spectrum is shown by restricting the analysis to respondents reporting over a million dollars of wealth. The average millionaire respondent ate fast food twice (1.98) in the 14 days. Focusing just on the roughly 60% of millionaires who visited a fast food chain at least once, shows this group on average ate 3.2 meals in the 14 day period, which is roughly similar to the 3.6 meal average for all young boomers who ate fast food.

So if the wealth and income do not correlate with how much fast food people eat, then what does? The regression section will investigate other factors.

### **Regression Results**

The two graphs above, while interesting, show only the relationship between eating fast food and economic status. To account for the other factors listed in the model this section uses regressions, whose results are shown in table 3.

The table's left two columns are logistic regressions which model probabilities. Column (7) models the chance that a person ate any fast food in the 14 day period. Column (8) models the chance a person was a heavy fast food eater. The regressions' explanatory variables are those found in table 2, plus squared values of wealth and income to capture the slight curvatures seen in figures 3 and 4.

In logistic regressions positive coefficients signify factors that increase the chance of eating fast food while negative coefficients indicate factors that reduce the chance. Logistic coefficients provide the ability to compute the overall probability or chance by a two-step process. First, multiply each coefficient by the relevant right-hand-side characteristic. Then sum the results of these multiplications and insert the summed value into the equation  $e^{\text{value}}/(1+e^{\text{value}})$  to produce the probability (Pindyck and Rubinfeld, 2000).

Columns (9) and (10) use Ordinary Least Squares (OLS) to calculate the specific impact various characteristics had on the number of times a person ate fast food. Column (9) includes all respondents who answered the 2008, the 2010 or both surveys. Column (10) includes only those people who reported ever eating fast food. OLS coefficients are easier to directly interpret than the logistic regressions since they show the change in times a person is expected to eat fast food when the relevant characteristic changes by one unit.

Overall, both types of regressions show the income and wealth coefficients have very small magnitudes and less than half of the 16 money coefficients are statistically distinct from zero. This corroborates the graphs, which suggest money has relatively little impact on eating fast food.

The coefficients on the three geographic variables, which track access, are all relatively large and all but one is statistically distinct from zero, suggesting access matters. The health coefficients present a mixed story. Variables which track if the respondent ever smoked and if they are trying to lose weight do not have a consistent sign in all the regressions. This suggests sometimes these factors increase fast food consumption and sometimes decrease. The BMI coefficient has a consistent sign but a relatively small magnitude. However, the coefficients on checking nutritional labels, reading ingredient lists and drinking soda all have consistent signs, large magnitudes and many are highly statistically significant suggesting these are important factors.

The coefficients on the demographic factors suggest minorities eat more fast food than whites, young people eat more than old and people born in the USA eat more than immigrants after holding all other factors constant. The inconsistent coefficients on being female and married suggest these factors are not key elements for understanding fast food consumption.

[Put Table 3 About Here]

## **B. Model Predictions**

Using the regression coefficients it is possible to calculate the chance a person with a particular set of characteristics eats fast food and how often they eat it. This is useful because by varying the person's characteristics it is easy to see which factors have the largest impact on visiting a fast food restaurant.

The baseline characteristics are taken from rounding all values in table 2's column (2), which shows the mean values of a fast food eater. The baseline person is a 47 year old suburban married white male, who was born in the USA, lives outside the southern states, worked last year for 1,837 hours, smoked at some time in their life, currently drinks soda, has a BMI of 29 and did both NLSY79 fast food surveys.

Table 4 shows what happens to the chance they ate fast food (column 11), were a heavy fast food eater (column 12) and number of times they ate fast food (column 13) as wealth and income vary from poor to rich. The top line shows if the baseline person has no income and no wealth they would have an 84.3% chance of eating fast food, a 28.2% chance of being a heavy fast food eater and is expected to eat fast food 3.5 times in the 14 day period.

These numbers are extremely similar to the figures seen at the 50<sup>th</sup> percentile line. This line shows that giving the baseline person a median income (\$65,000) and median wealth (\$138,500) results in an 83.3% chance of them eating fast food, a 29.7% chance of being a heavy eater and they are expected to consume 3.6 meals over 14 days.

Moving the baseline person to the 90<sup>th</sup> percentile, which means they are in the richest 10% of the group, has only a small impact on two of the indicators. The chance someone is a heavy eater is almost identical if the baseline respondent has no income and wealth (28.2%) or if they are in the 90<sup>th</sup> percentile (28.3%). The difference between the number of meals eaten by the bottom (3.5) of the economic spectrum and the top (3.2) is not large. The only large difference between the poor and rich is the chance they ate any fast food (84.3% versus 75.6%).

[Put Table 4 About Here]

Table 4 shows that changes in the baseline person's income and wealth have relatively little impact in eating fast food. However, a large impact is seen by changing three of the health habits. For example, the baseline person with income and wealth at the 50<sup>th</sup> percentile has an 83.3% chance of eating fast food. Changing just three of their characteristics, so that they read nutritional labels, check ingredients and not drink sugared soda lowers their probability of eating fast food to 56.9%, a drop of over twenty-six percentage points. The same change in characteristics lowers the probability they are heavy eaters from 29.7% to 15.5%. Changing these three health factors reduces the number of fast food meals eaten in 14 days by more than half, from 3.6 to 1.7.

Changing BMI by large amounts has a small but noticeable impact. Reducing the BMI from 29, which is the top of the overweight category to 24, the top of the normal category, reduces the probability the baseline person eats any fast food to 80.9%, the chance they are a heavy eater to 28% and the number of meals to 3.4.

Changes in access impact being a heavy eater and impact the number of meals eaten, but do not impact the chance of ever eating fast food. Moving the baseline person with income and wealth in the 50<sup>th</sup> percentile from the suburbs to the center city increases the chance they eat fast food from 83.3% to 83.7%. Moving them to a rural area lowers the chance to 80.8%. Moving from the suburbs to an urban area slightly lowers the chance they are a heavy eater (29.7% to 28.5%). Moving the baseline suburban person to a rural area lowers the chance of being a heavy eater to 22.9% from 29.7%. Urban residents consume slightly more fast food meals than suburbanites (3.7 versus 3.6) but people in rural areas eat fewer (3.3).

Finally, large changes in time results in a small but noticeable impact. Changing the baseline person from working 1,837 hours, or about 46 weeks a year to having no job reduces the chance of eating fast food to 77.3%, reduces being a fast food eater to 20.5%, and reduces the number of meals to 2.8.

### **Longitudinal Analysis**

Because the NLSY79 tracks the same people in each survey it is possible to investigate how people change their fast food eating habits. While the previous section tracked fast food eating over the past 14 days, this section tracks fast food eating over the past 7 days since each survey covers only a week.

Figure 5 graphs the change in the number of fast food meals reported from 2008 to 2010 for people who did both surveys and reported eating at least one fast food meal in either survey. One-fifth (21.9%) of the respondents reported eating the same number of fast food meals over the past seven days in both surveys. About one-third (34.5%) reported an increase in the number of fast food meals and almost half (44.4%) reported a decrease from 2008 to 2010.<sup>12</sup>

[Put Figure 5 About Here]

To understand what potentially causes changes in fast food eating, another set of regressions were run and the results are shown in table 5. These regressions use all variables which

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<sup>12</sup> It is doubtful changes in macroeconomic conditions are the reason why people ate fewer fast food meals. First, the majority of NLSY79 surveys in 2008 were completed before Lehman Brothers went bankrupt, which was the event that focused people's attention on the deteriorating economy. Second, research by Dave and Kelly (2012) find U.S. unemployment is positively, not negatively, associated with consumption of snacks and fast food.

potentially changed between the 2008 and 2010 surveys. For example, respondents were asked how many sodas they drank in the past seven days in both surveys. Subtracting the 2010 value from the 2008 information shows the change in soda drinking. Fixed demographics and wealth are not included in the regressions because there is no recorded change in a person's race or sex and wealth was not collected in 2010.

Regression results in table 5 are based on individuals who participated in both surveys. Coefficients in column (14) are based on individuals who ate at least one fast food meal, while the results in column (15) drop this requirement.

In both columns only four variables beside the intercept are statistically distinct from zero. The coefficient on "improved nutrition" (-0.262; -0.207) is statistically significant and the large negative value suggests people who reported paying more attention to nutritional labels from 2008 to 2010 reduced the number of times they ate fast food by about one-quarter of a visit over the past 7 days.. The coefficients on "change in soda" are 0.039 and 0.033. These suggest that people who increase their consumption of soda by 10 drinks a week will eat fast food about 0.35 more times per week.

The coefficient on "change in hours" (2.0E-4; 1.6E-4) suggests that working more hours is associated with eating more fast food. However, the magnitude of these coefficients is small. Working 100 more hours per year, or two and a half weeks, increases the number of fast food visits in a week by around 0.018. The -0.119 and -0.111 coefficients on the "Number Times Ate" suggests that people reduced their fast food eating from 2008 to 2010. This is expected since the regressions in columns (7) to (10) suggest as people age they eat less fast food.

[Put Table 5 About Here]

### **Discussion and Conclusion:**

The graphical and regression results show that a person's income and wealth have only a small quantitative impact on the overall probability and number of meals eaten in fast food restaurants. The results clearly show the poor and rich eat slightly less fast food than the middle class. However, the more important finding is that people from all parts of the economic spectrum eat fast food. Even the very richest eat fast food, with over sixty percent of young baby boomer with

wealth in the millions of dollars eating fast food in the 14 day period and almost ten percent eating more than 3 times in a week.

The results show that like money measures, access to fast food restaurants also has only a small quantitative impact on the chance and frequency of eating fast food. Combined, these two findings suggest that efforts by policy makers, like in Los Angeles, to ban or zone away fast food restaurants from poor neighborhoods are unlikely to be effective policy for improving the health of neighborhood residents.

Instead, the results suggest that policy makers who want to reduce fast food eating should first get people to read nutritional labels and check the ingredient list before they eat. Second they should encourage people to reduce the amount of soda they drink.

Policy makers and health advocates are already attempting these changes. Health advocates recently forced major meat processors (Strom, 2013a) to include in the ingredient list when they were using a binder called “finely textured beef,” that had been nicknamed “pink slime.” Meat processors did not want to label products containing the binder because they feared people who read food labels would stop eating all food containing the ingredient. Another example is Burger King’s (Strom, 2013b) recent unveiling of a healthier French fry with lower fat and calories. Burger King is posting in its stores expanded nutritional information to show customers why these fries are better than competitors. Panera Bread is posting calorie counts clearly next to each menu item. New York City’s Mayor Michael Bloomberg attempted in 2012 to regulate the maximum size of soda sold in New York City (Grybaum, 2012). While a judge struck down this particular regulation (Grybaum, 2013), New York City’s health department is still thinking about methods of reducing citizens’ soda consumption.

The results must be tempered with two caveats. First, the survey data do not include information on the amount spent or the types of foods purchased in fast food restaurants. This means the research treats a visit to McDonald’s for a lunchtime salad identically to eating two super-sized Big Mac meals. Second, the respondents are all in their 40s and early 50s. The eating habits of younger people are missing from this research.

Future research can improve the findings. The NLSY79 asked the same fast food questions in the 2012 survey. When this paper was written the 2012 data were not publically available but including them will help show if results are robust. Researchers who are able to obtain special

clearance can merge more detailed geographical information about where the respondent lives with the location of specific fast food restaurants. Doing this will further the understanding that access has on fast food consumption.

The paper asked “is it really just the poor who eat fast food?” This research has a clear unambiguous answer, no. At least among young baby boomers fast food is eaten by the poor and rich alike.

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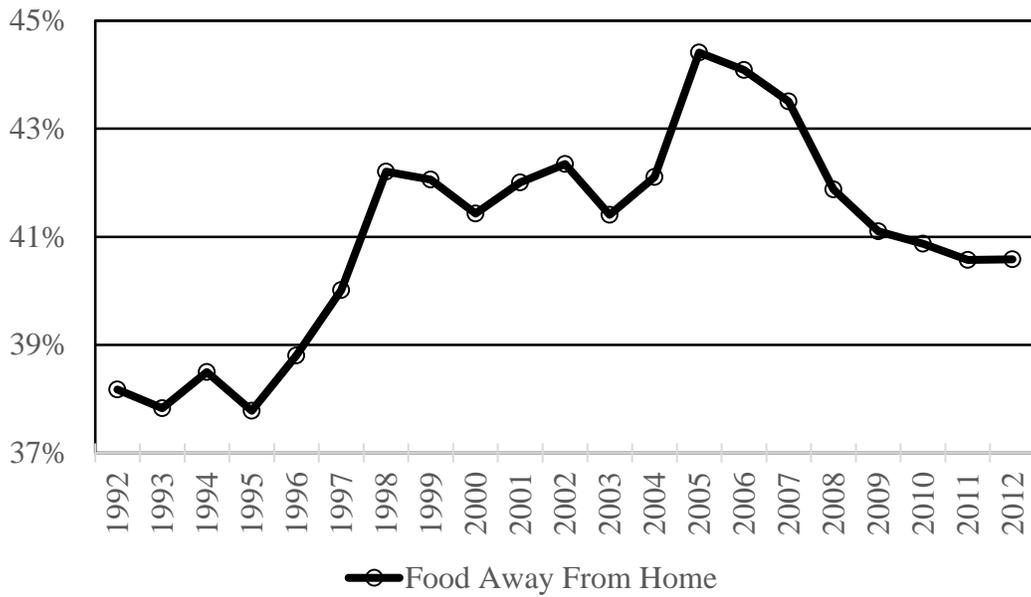
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Figure 1: Percentage Spent on Meals Away from Home as a Share of Total Food Expenses.



Notes: Data from [www.bls.gov/cex](http://www.bls.gov/cex) multi-year tables. Percentages are a fraction based on total food spending recorded in the survey. Food away from home includes spending on all meals including tips at fast food, take-out, delivery, cafeterias, full-service restaurants, vending machines and catered affairs.

Figure 2: Number of Times Young Baby Boomers Ate Fast Food over 14 Day Period.

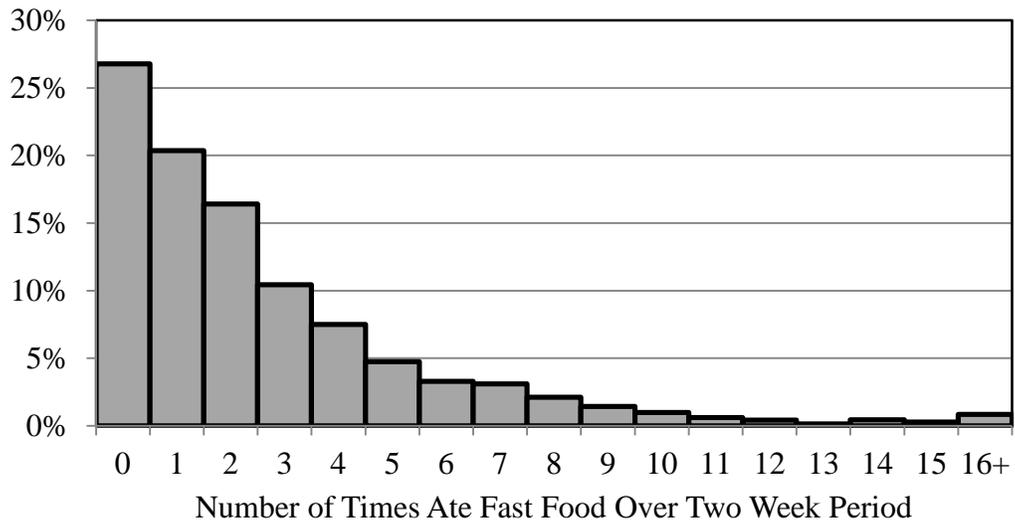
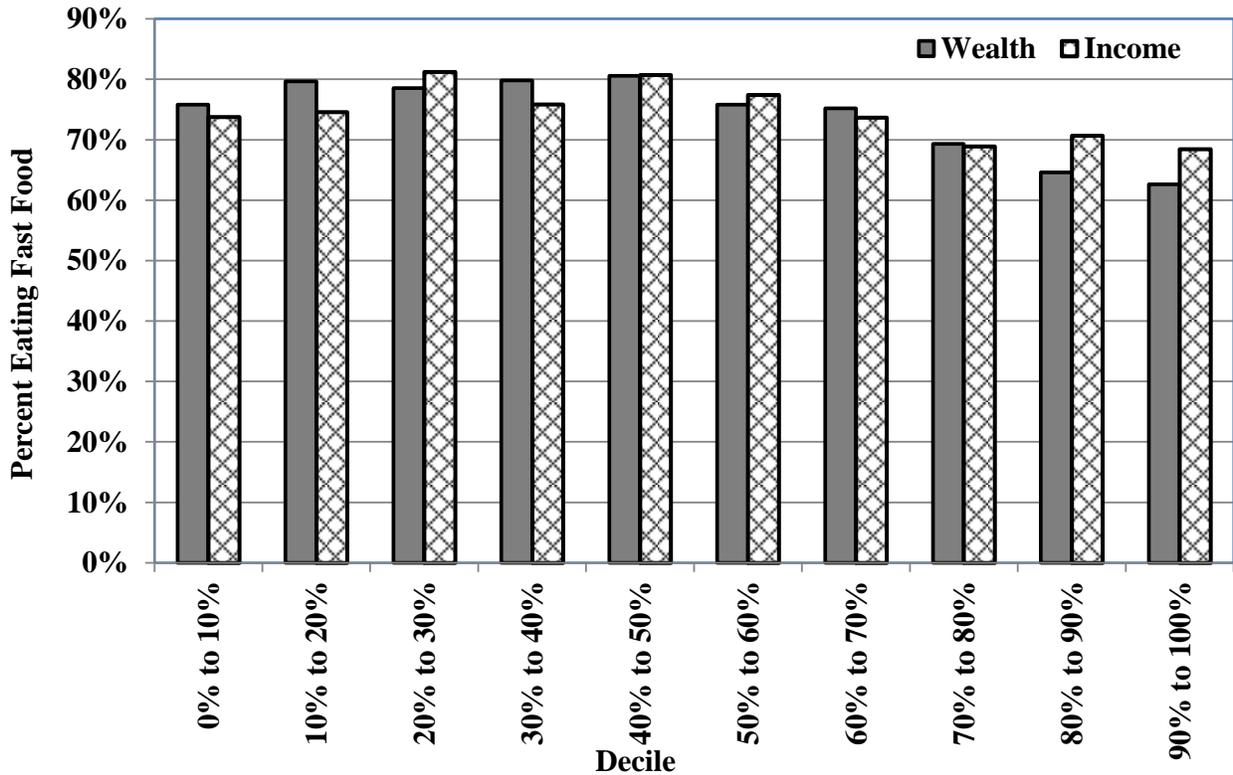
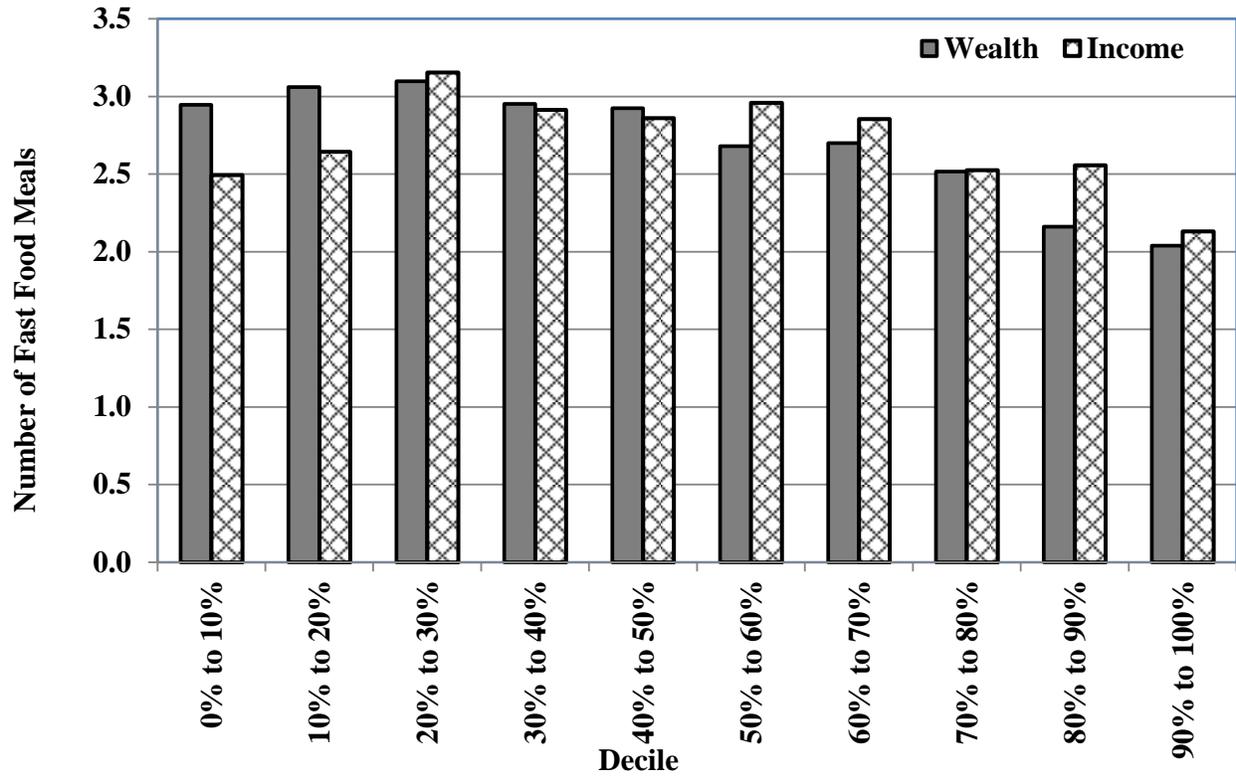


Figure 3: Percentage of Young Baby Boomers Eating Fast Food by Income and Wealth Decile.



Notes: People with income below \$12,360 were in the 0% to 10% decile. People with income greater than equal to \$14,106 but below \$27,000 were in the 10% to 20% decile. The other income decile cutoffs are \$40,000, \$53,000, \$65,000, \$80,000, \$98,000, \$120,000, and \$165,000. Wealth decile cutoffs were below \$1, \$8,500, \$38,000, \$80,880, \$138,500, \$209,232, \$306,400, \$467,000, and \$827,000.

Figure 4: Number of Fast Food Meals by Income and Wealth Decile.



Notes: See notes for figure 3 for decile cutoffs.

Figure 5: Change in the Number of Fast Food Meals Reported.

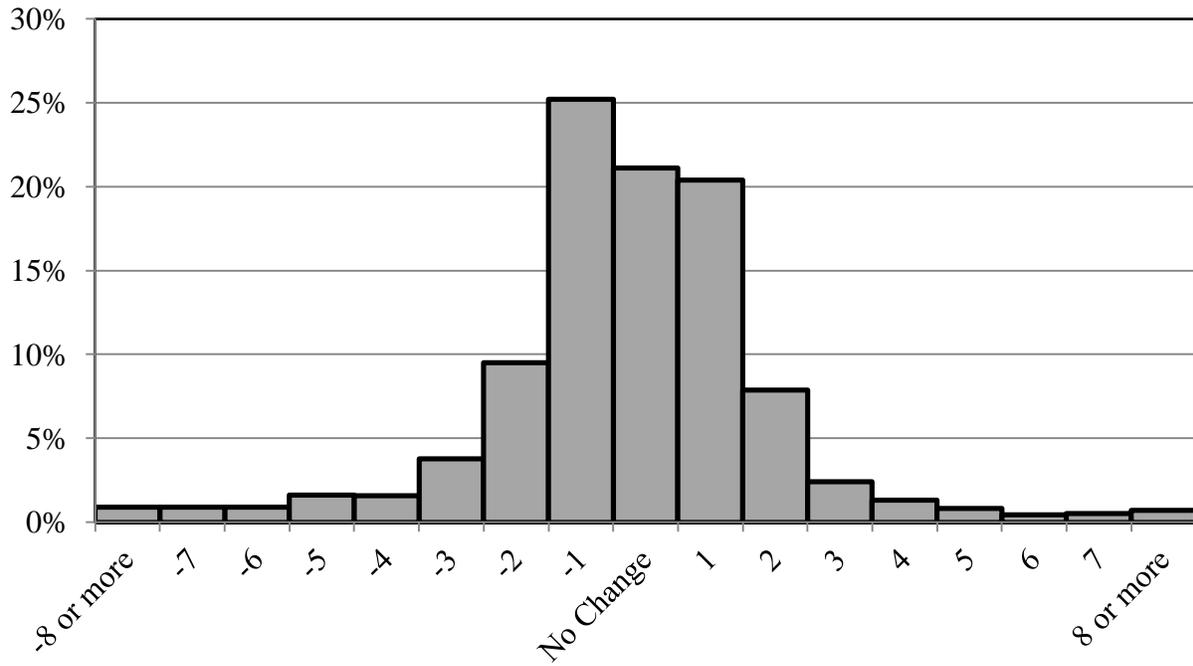


Table 1: Overview of Limited Service Restaurants from U.S. Economic Census.

<b>Year</b>	<b>Establishments</b>	<b>Sales</b>	<b>Payroll</b>	<b>Employees</b>
1997	174 thousand	\$94.7 billion	\$24.0 billion	2.9 million
2002	187 thousand	\$116.5 billion	\$30.4 billion	3.1 million
2007	211 thousand	\$151.4 billion	\$38.0 billion	3.4 million
<b>Annual</b>	<b>Growth Rate</b>			
1997 – 2002	1.5%	4.6%	5.3%	0.8%
2002 – 2007	2.6%	6.0%	5.0%	2.1%
<b>Share of all</b>	<b>Eating &amp; Drinking</b>	<b>Establishments</b>		
1997	36.0%	37.6%	34.2%	38.0%
2002	37.0%	36.3%	32.9%	36.8%
2007	37.0%	34.9%	30.5%	35.1%

Notes: Limited service restaurants is NAICS code 722211. All eating and drinking establishments is NAICS code 722. Data from factfinder2.census.gov.

Table 2: Mean Values for Variables Used to Explain Who Eats Fast Food.

	(1) Did Not Eat Fast Food	(2) Ate Fast Food	(3) Means Distinct	(4) Not Heavy Eater	(5) Heavy Eater	(6) Means Distinct
Wealth	\$443,157	\$308,467	***	\$321,357	\$259,719	***
Income	\$97,538	\$84,537	***	\$86,333	\$77,659	***
Live In Central City	22.8%	26.2%	***	25.8%	27.7%	
Live In Suburbs	59.1%	60.7%		60.6%	61.3%	
Live In South	27.0%	39.1%	***	37.1%	47.0%	***
Ever Smoked	61.8%	59.1%	**	58.8%	60.3%	
Check Nutrition	56.3%	43.2%	***	45.7%	33.6%	***
Check Ingredients	44.8%	32.3%	***	34.7%	23.0%	***
Soda Drinker	47.1%	68.0%	***	65.9%	75.8%	***
BMI	27.3	28.7	***	28.6	29.3	***
Trying To Lose Weight	44.1%	47.2%	**	48.6%	42.0%	***
Worker	81.7%	86.2%	***	85.3%	89.6%	***
Hours Worked	1,712.0	1,836.8	***	1792.8	2003.7	***
Black	10.6%	15.5%	***	14.9%	17.8%	**
Hispanic	5.3%	7.0%	***	7.0%	7.0%	
Age	47.0	46.7	***	46.7	46.5	***
Born in USA	95.2%	96.2%	*	96.0%	96.8%	
Female	52.0%	48.1%	***	51.0%	37.1%	***
Married	67.9%	68.9%		69.8%	65.6%	***
Did Both Surveys	85.0%	93.3%	***	93.2%	93.9%	
Number Respondents	1,739	5,770		4,530	1,240	
Number People Represented	9.0 million	24.6 mill.		19.5 mill.	5.1 mill.	

Notes: Standard Errors in ( ). \*\*\* means  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Heavy eaters ate fast food more than 3 times per week in either the 2008 or 2010 surveys or both. Not heavy eaters ate fast food at least once, but never more than 3 times.

Table 3: Regressions to Determine Who Eats Fast Food and How Often

	(7) Ate Fast Food	(8) Heavy Eater	(9) Num Times All	(10) Num Times Eater
Wealth	-1.1E-6 (1.6E-7)***	-2.5E-7 (2.1E-7)	-9.3E-7 (2.3E-7)***	-4.4E-7 (2.7E-7)
Wealth <sup>2</sup>	2.7E-13 (4.7E-14)***	4.4E-13 (6.6E-14)	2.2E-13 (6.7E-14)***	1.0E-13 (8.1E-14)
Income	1.2E-6 (9.1E-7)	2.0E-6 (1.5E-7)	2.5E-6 (1.3E-6)**	2.1E-6 (1.5E-7)**
Income <sup>2</sup>	-1.5E-12 (1.5E-12)	-5.8E-12 (3.5E-12)*	-5.3E-12 (2.2E-12)	-5.1E-12 (2.5E-12)*
Live In Central City	0.204 (0.11)*	0.295 (0.13)**	0.459 (0.15)***	0.416 (0.17)**
Live In Suburbs	0.17 (0.1)*	0.355 (0.13)***	0.281 (0.14)**	0.243 (0.16)
Live In South	0.4 (0.07)***	0.316 (0.07)***	0.635 (0.08)***	0.52 (0.1)***
Ever Smoked	-0.211 (0.06)***	0.103 (0.07)	-0.122 (0.08)	-0.015 (0.1)
Check Nutrition	-0.224 (0.08)***	-0.115 (0.1)	-0.325 (0.11)***	-0.266 (0.13)**
Check Ingredients	-0.313 (0.08)***	-0.427 (0.1)***	-0.618 (0.11)***	-0.584 (0.13)***
Soda Drinker	0.791 (0.07)***	0.294 (0.09)***	0.87 (0.09)***	0.545 (0.11)***
BMI	0.032 (0.01)***	0.017 (0.01)***	0.026 (0.01)***	0.013 (0.01)
Trying To Lose Weight	0.093 (0.07)	-0.217 (0.08)***	-0.105 (0.09)	-0.193 (0.11)*
Worker	0.28 (0.11)**	0.214 (0.14)	0.442 (0.15)***	0.356 (0.18)**
Hours Worked	5.3E-5 (4.1E-5)	1.5E-4 (4.6E-5)***	1.9E-4 (5.4E-5)***	2.1E-4 (6.3E-5)***
Black	0.16 (0.08)*	0.015 (0.09)	0.175 (0.11)*	0.133 (0.12)
Hispanic	0.333 (0.09)***	0.013 (0.1)	0.4 (0.12)***	0.29 (0.14)**
Age	-0.036 (0.01)***	-0.039 (0.02)**	-0.052 (0.02)***	-0.043 (0.02)**
Born in USA	0.31 (0.13)**	0.203 (0.16)	0.484 (0.17)***	0.414 (0.21)**
Female	0.094 (0.07)	-0.384 (0.07)***	-0.373 (0.09)***	-0.542 (0.1)***
Married	0.238 (0.07)***	-0.119 (0.08)	0.077 (0.09)	-0.067 (0.11)
Did Both Surveys	0.698 (0.12)***	0.114 (0.17)	1.309 (0.18)***	1.362 (0.23)***
Intercept	0.057 (0.68)	-1.067 (0.79)	1.556 (0.91)*	2.689 (1.07)**
R <sup>2</sup>	0.13	0.07	0.09	0.06
Number Observations	6,899	5,348	6,899	5,348

Notes: Standard Errors in ( ). \*\*\* means  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Table 4: Chance and Number of Times Baseline Respondent Eats Fast Food as Money Changes

Wealth and Income	(11) Chance Ate Fast Food	(12) Chance Heavy Eater	(13) Number Meals Eaten
\$0 Both	84.3%	28.2%	3.5
10 <sup>th</sup> Percentile	84.4%	28.7%	3.6
20 <sup>th</sup> Percentile	84.3%	28.7%	3.6
30 <sup>th</sup> Percentile	84.3%	29.5%	3.6
40 <sup>th</sup> Percentile	83.9%	29.7%	3.6
50 <sup>th</sup> Percentile	83.3%	29.7%	3.6
60 <sup>th</sup> Percentile	82.5%	29.8%	3.5
70 <sup>th</sup> Percentile	81.4%	29.7%	3.5
80 <sup>th</sup> Percentile	79.5%	29.3%	3.4
90 <sup>th</sup> Percentile	75.6%	28.3%	3.2

Notes: Percentile cutoffs are shown in the notes to figure 3.

Table 5: Regressions to Determine the Change in Eating Fast Food

	(14) Did Both Surveys and Ate At Least 1 Meal	(15) Did Both Surveys
Income Change	-1.8E-7 (7.3E-7)	-1.9E-7 (5.6E-7)
Move To City	-0.013 (0.23)	-0.008 (0.18)
Move To Suburbs	-0.333 (0.23)	-0.274 (0.18)
Move To Rural Area	-0.114 (0.22)	-0.078 (0.17)
Move To South	0.081 (0.55)	0.045 (0.39)
Move From South	-0.25 (0.61)	-0.149 (0.42)
Improved Nutrition	-0.262 (0.11)**	-0.207 (0.08)**
Worse Nutrition	0.093 (0.11)	0.073 (0.09)
Improved Ingredients	-0.008 (0.1)	-0.008 (0.08)
Worse Ingredients	0.048 (0.11)	0.041 (0.08)
Change In Soda	0.039 (0.01)***	0.033 (0.01)***
Change In BMI	0.008 (0.01)	0.008 (0.01)
Change In Hours	2.0E-4 (4.5E-5)***	1.6E-4 (3.6E-5)***
Got Married	8.8E-5 (0.37)	0.005 (0.28)
Got Divorced	-0.031 (0.34)	-0.023 (0.27)
Number Times Ate	-0.119 (0.01)***	-0.111 (0.01)***
Intercept	0.22 (0.07)***	0.15 (0.05)***
R <sup>2</sup>	0.04	0.04
Number Observations	5,159	6,579