Online Appendix

Changes in Nutrient Intake at Retirement

Melvin Stephens Jr. and Desmond Toohey

A Data Appendix

A.1 NFCS 1977-78

The 1977-78 Nationwide Food Consumption Survey was a survey of American eating patterns conducted from the second quarter of 1977 through the first quarter of 1978. The survey was fielded by National Analysts, Inc. under contract with the United States Department of Agriculture (USDA). Approximately 15,000 households in the contiguous US were selected to participate in the main arm of the survey through a stratified, multistage sampling design. In addition to this representative sample, the survey also included oversamples of the elderly and low-income populations and samples from Alaska, Hawaii, and Puerto Rico. Basic interviews were conducted in-home, with the main meal planner and food preparer answering questions about household food either consumed or disposed of over the previous seven days. Households were contacted in advance requesting that they maintain records, if necessary, for the prior week's household food consumption. Household data were also collected on demographics, location, lodging, income, shopping behavior, usual food expenditure, participation in food programs, and patterns of eating at and away from home.

Labor force data were collected for the male and female heads of household. We code heads of household as retired if they did not work during the week prior to the interview and they reported being retired. The day of the initial interview, all individual household members completed a 24-hour food recall for the day prior to the interview. They were also given two-day food diaries to be completed for the interview day and the following day. In the first quarter of the survey, all household members completed individual food records. In the final three quarters, they were completed by all members aged 18 or younger and half of adults aged 19 or older. A few days after initial interviews, interviewers returned to collect diaries, check for errors or inconsistencies, and provide compensation. The main portion of the survey was intended to be self-weighting, but completion rates varied significantly across PSUs. Weights were calculated at the PSU-by-quarter level to recover the expected number of completed intake schedules.

A.2 NFCS 1987-88

The 1987-88 Nationwide Food Consumption Survey collected data on American food consumption between April 1987 and August 1988. The survey was conducted by National Analysts, Inc. under contract with the USDA. Households from the contiguous US were selected to participate through a stratified, multistage sampling design. Interviewers visited homes to conduct the main portion of the interview, in which the main meal planner and food preparer answers questions about household food either consumed or disposed of over the previous week. Households were contacted in advance requesting that they maintain records, if necessary, for the prior week's household food consumption. Household data were collected on demographics, location, lodging, income, shopping, usual food expenditure, participation in food programs, and patterns of eating at and away from home.

The survey asked what each of the household members aged 15 and older were doing most during the prior week. A follow-up question asked whether those who did not report working performed any work in the prior week. We code individuals as retired if their response to the first question was "retired" and their response to the follow-up question was that they did not work at all. Household members performed 24-hour food recall with the interviewer at the time of the in-home interview. They were then given two-day food diaries and instructed in their use for completing intake data for the interview day and the following day. Interviewers later returned one more time to collect the diaries and provide compensation. Weights were developed to match the population mean values of household size and 14 characteristics related to household food consumption.

A.3 CSFII 1989-91

The 1989-91 Continuing Survey of Food Intakes by Individuals surveyed Americans on their food consumption from April of 1989 through March of 1992. The survey was conducted by National Analysts, Inc. under contract with the USDA. The 1989-91 Diet and Health Knowledge Survey

(DHKS) was administered to household main meal preparers at the same time. A stratified, multistage sampling design selected households for a main sample and an oversample of low-income households. Interviewers visited every address in person and attempted to meet with the main meal preparer. A household questionnaire collected data on demographics, location, lodging, income, shopping, usual food expenditure, participation in food programs, and patterns of eating at and away from home.

The survey asked what each of the household members aged 15 and older were doing most during the prior week. A follow-up question asked whether those who did not report working performed any work in the prior week. We code individuals as retired if their response to the first question was "retired" and their response to the follow-up question was that they did not work at all. Household members performed 24-hour food recall with the interviewer at the time of the in-home interview. They were then given two-day food diaries and instructed in their use for completing intake data for the interview day and the following day. Interviewers later returned one more time to collect the diaries and provide compensation. Inverse probability of selection was computed for each household, then adjusted to account for nonresponse at the area segment level. This was done individually for basic and low-income samples. The samples were then combined and weights were adjusted using regression techniques to match a number of population characteristics.

A.4 CSFII 1994-96

The 1994-96 Continuing Survey of Food Intakes by Individuals initially surveyed Americans on their food consumption initially from the beginning of 1994 through the end of 1996. A later fielding in 1998 sampled only children aged nine or under. The survey was conducted by Westat, Inc. under contract with the USDA. In each household, one adult who had completed dietary intake data was surveyed as part of the 1994-96 DHKS. A stratified, multistage sampling design selected households for a main sample and an oversample of low-income households. Interviewers visited every address in person and attempted to meet with the main meal preparer. A household questionnaire collected data on demographics, location, lodging, income, shopping, usual food expenditure, participation in food programs, and patterns of eating at and away from home.

Household members aged 15 or older were asked if they worked at all in the previous week. If they did not work and did not report being temporarily absent from work, they were asked the reason for not working. We code individuals as retired if they did not work during the previous week and were described as retired when asked for a reason. Household members performed a 24-hour food recall with the interviewer at the time of the first in-home interview. A second day of 24-hour recall data was collected between three and ten days after the first day of recall while avoiding the same day of the week as the first recall day. In a small number of cases (3% in 1994), the second day of recall data was collected by telephone. Base weights were calculated as the inverse of sampling probability, where sampling probability incorporated the probability of selecting the PSU, the segment, the household, retaining the dwelling, and the probability of selecting a sample person in the household. Within sample person classes (given by grouping segments by region, MSA status, percent of the segment that was black or Hispanic, and quarter of operations), weights were increased to correspond to nonresponse. Weights were then scaled so the sum of weights matched the March CPS totals within a number of demographic, geographic, timing, and labor force cells.

A.5 NHANES I

The first National Health and Nutrition Examination Survey (NHANES I) was a detailed study of the health and dietary intake of Americans conducted by the National Center for Health Statistics (NCHS) from 1971 to 1975. The target population was the civilian, noninstitutionalized population ages 1 to 74 in the contiguous US, excluding Native American reservations. Low-income individuals, young children, women of childbearing age, and the elderly were oversampled. Households and sample persons were selected using a stratified, multistage sampling design. Data was collected using three Mobile Examination Centers (MECs) that moved between stands associated with primary sampling units over the survey period. The MECs stayed at each stand from three to six weeks and examined 300 to 600 people. The main dietary and health portion of the survey was fielded over two 2-year cycles from 1971 to 1974. A subset of respondents aged 25 to 74 completing the main portion of the survey also completed a more detailed supplemental health examination. Additional respondents examined in 1974 and 1975 completed only the detailed health examination and not the dietary survey.

Initial screening was completed and household data were collected during in-home visits. As part of the household questionnaire, data was collected on the working activity of adults aged 17 and over. Specifically, respondents were coded as working, keeping house, or doing "something else" over the prior three months. An additional question was asked about those who were doing something else, allowing for these respondents to be reported as retired. Follow-up questions probed whether respondents participated at all in the labor force during the prior week. We code individuals as retired if they were reported as being retired and diid not perform any work, have a job, or look for work during the prior week. If household members were selected for the full examination, appointments were made for these sample persons to visit the MECs. In addition to a completing a detailed health examination, sample persons also recorded food intake during their MEC visits. A small number of respondents provided their intake data when interviewed at home. Both a 24-hour dietary recall and a food frequency questionnaire were completed by most respondents. Sampling weights were constructed to account for nonresponse and adjust the sample to match the US population in age-sex-race groups at the survey midpoint.

A.6 NHANES II

The second National Health and Nutrition Examination Survey (NHANES II) was a detailed study of the health and dietary intake of Americans conducted by the NCHS from 1976 to 1980. The design of the survey was broadly similar to that of NHANES I. Dietary data was collected for all sample persons and a detailed health questionnaire and examination was completed for those over the age of 12. The target population was the civilian, noninstitutionalized population of all 50 states between six months and 74 years of age. Children and households living in poverty were oversampled. Households and sample persons were selected using a stratified, multistage sampling design. Data was collected using three MECs that moved between stands associated with primary sampling units over the survey period. The MECs stayed at each stand from four to six weeks and examined 300 to 600 people.

Initial screening was completed and household data were collected during in-home visits. As part of the household questionnaire, data was collected on the working activity of adults aged 17 and over. Specifically, respondents were coded as working, keeping house, or doing something else over the prior twelve months. An additional question was asked about those who were doing something else, allowing for these respondents to be reported as retired. Follow-up questions probed whether respondents participated at all in the labor force during the prior two weeks. We code individuals as retired if they were reported as being retired and did not perform any work, have a job, or look for work during the prior two weeks. If household members were selected for the full examination, appointments were made for these sample persons to visit the MECs. In addition to a completing a detailed health examination, sample persons also recorded food intake during their MEC visits. Both a 24-hour dietary recall and a food frequency questionnaire were completed by most respondents. Sampling weights were constructed to account for nonresponse and adjust the sample to match the US population in age-sex-income groups at the survey midpoint.

A.7 NHANES III

The third National Health and Nutrition Examination Survey (NHANES III) was a detailed study of the health and dietary intake of Americans conducted by the NCHS through a contract with Westat, Inc. from 1988 to 1994. Dietary data was collected for all sample persons and a detailed health questionnaire and examination was completed for those over the age of 17. The target population was the civilian, noninstitutionalized population of all 50 states older than two months. Areas with high shares of black and Mexican-American populations were oversampled, as were young children and elderly individuals. Households and sample persons were selected using a stratified, multistage sampling design. The survey was fielded in two three-year phases, allowing for individual estimates of outcomes for each phase. Data was collected using three MECs that moved between stands associated with primary sampling units over the survey period. The MECs stayed at each stand from four to six weeks and examined 300 to 600 people.

Initial screening was completed and household data were collected during in-home visits. Household questionnaires were given and examination appointments were made. As part of the household adult questionnaire, respondents were asked about their labor force status during the prior 12 months. We code respondents as retired if that was the given status and they did not work during the prior two weeks, did not have a job during the prior two weeks, and were not on layoff or looking for a job. A food frequency questionnaire was completed by individuals 17 and older in the home interview. If household members were selected for the full examination, appointments were made for these sample persons to visit the MECs. A small proportion of individuals were examined at home. Sample persons provided 24-hour food recall during the MEC visit. In the first three-year phase, a subset of these respondents aged 50 and older were also eligible to participate in a follow-up telephone 24-hour recall data collection. Base weights were generated from the inverse probability of sampling. These were adjusted for nonresponse, generally by weighting classes defined by age group, sex, race-ethnicity, income, SMSA residence, and region. Final weights were further adjusted to match the total population in each age-sex-ethnicity group at the midpoint of the study.

A.8 Continuous NHANES

The Continuous National Health and Nutrition Examination Survey (Continuous NHANES) is a survey of the health and diet of Americans conducted by the NCHS through a contract with Westat, Inc. It was born out of two-year NHANES cycles starting in 1999. In 2003, the program was combined with the CSFII to officially become the Continuous NHANES that is ongoing in two-year cycles as of 2016. Households and sample persons are selected using a stratified, multistage sampling design for each cycle. Although each individual year is a representative sample of the population, data is released in two-year cycles because of the imprecise estimates and potential loss of confidentiality associated with single years of data. Non-Hispanic black persons have always been oversampled. Low-income white persons have been oversampled since 2000 Mexican-American persons and pregnant women were oversampled in the first four two-year cycles (1999-2006). Hispanic persons have been oversampled since 2007. Persons aged 70 and over were oversampled in the first four two-year cycles after which persons aged 80 and over have been oversampled. An oversample of adolescents aged 12 to19 was discontinued in 2007.

A screener and basic questionnaire are completed as part of initial in-home visits. A randomizing computer algorithm selects sample persons from household rosters. Sample individuals complete a questionnaire covering demographic, dietary, socioeconomic, and health topics. A questionnaire covering consumer behavior has been included since the 2007 survey cycle. Family questionnaires are given for any family unit including a sampled person. The data do not include a flag for household head, so we count individuals as household head if their gender, age, education, marital status, and place of birth match those recorded for the household head. Data on labor force activity is recorded for respondents aged 16 and over. We code the individuals as retired if the given reason is retired and the respondent is not working, looking for work, or with a job but absent. Following the in-home interview, selected sample persons make appointments to visit MECs for detailed examination. Intake data is recorded using a 24-hour recall in the MEC. Since the 2003 survey cycle, a second recall has been completed over the phone 3 to 10 days after examination. Weights are calculated by survey cycle and are designed to account for the probability of selection, the rate of nonresponse, and the differences between the final sample and the total population.

A.9 MRFIT

The Multiple Risk Factor Intervention Trial for the Prevention of Coronary Heart Disease (MRFIT) was a randomized controlled trial aimed at studying the effectiveness of counseling men at high risk for coronary heart disease to change to modifiable risk factors. Screening of potential participants began in the early 1970s and ultimately produced 12,866 men who appeared to be at high risk for coronary heart disease but could possibly lower their risk through modified behavior. Nearly half the sample was assigned to a treatment program, in which they were counseled to follow particular nutritional guidelines, cease smoking, and manage hypertension through weight maintenance and medication. The remaining participants, the control sample, was instructed to continue any standard care through their physicians or other providers and were not given specific counseling or instructions on behavior through the study. We restrict our main analysis to this latter (control) group.

Individuals in both the treatment and control groups participated in an initial screening as well as follow-up visits which occurred at annual intervals. At these visits, respondents completed questionnaires covering various activities and behaviors and also participated in a number of tests to record biomarker data. At the initial screening, as well as the visits that occur one, two, three, and six years after program enrollment, participants also completed 24-hour recall questionnaires covering food consumption during the prior day.

Current retirement status was asked directly at the initial screening visit and the sixth annual visit. At the initial screening, in response to a question whether the participant holds two or more jobs, the possible responses are yes, no, and retired. At the sixth annual visit, respondents were asked to describe their present job status as “working at a job full-time for pay,” “working at a job part-time for pay,” or “unemployed.” Those who reported “unemployed” were then asked an additional question allowing themselves to report as one of “temporarily laid off,” “temporarily disabled,” “permanently disabled,” “retired,” or “other.”

We use five health conditions as controls in the analysis: high blood pressure, heart disease, stroke, diabetes, and cancer. At baseline, participants are asked if a doctor has ever told them that they have each of these conditions (plus a number of additional conditions). For the remaining annual visits, participants are asked if a doctor told them in the last twelve months that they have each condition. We construct a cumulative measure of having been ever told that you have a condition equals one if participants state that they were affirmatively told they had the condition at baseline or if they responded yes to being told they had the condition in the last twelve months either at the current annual visit or at any of the prior annual visits.

B Understanding the Retirement Impact Across Food Indices

This section provides a formal discussion of why first predicting permanent income as opposed to directly using observed income when estimating equation (8) attenuates the impact of retirement on consumption. We can illustrate the difference in the estimated retirement consumption response between these two approaches beginning with a stylized version of the estimating equations. Let

$$\ln(y^{perm}) = \pi_0 + \pi_1 \mathcal{C} + u \tag{1}$$

be an equation that is analogous to (8) but relates permanent income to a single measure of household consumption, $\mathcal{C}$. The OLS regression of *observed* income on $\mathcal{C}$, where $\mathcal{C}$ is correlated with permanent but not transitory income, yields

$$\widehat{\pi}_1 = \frac{Cov(\ln(y^{observed}), \mathcal{C})}{Var(\mathcal{C})} = \frac{Cov(\ln(y^{perm}), \mathcal{C})}{Var(\mathcal{C})}$$

The resulting consumption index is $\ln \widehat{C} = \widehat{\pi}_0 + \widehat{\pi}_1 \mathcal{C}$.

To generate a consumption index as in AH, we first estimate

$$\ln(y^{perm}) = \delta_0 + \delta_1 W + v \tag{2}$$

where W is a single regressor that is associated with permanent income but uncorrelated with transitory income (e.g., educational attainment). The OLS regression of *observed* income on W yields

$$\widehat{\delta}_1 = \frac{Cov(\ln(y^{observed}), W)}{Var(W)} = \frac{Cov(\ln(y^{perm}), W)}{Var(W)}.$$

Comparable to the method used by AH, the predicted measure of permanent income, $\ln(\widehat{y^{perm}}) = \widehat{\delta}_0 + \widehat{\delta}_1 W$, can be used as the outcome when estimating (1) which results in the OLS estimator for the coefficient on $\mathcal{C}$ being

$$\widetilde{\pi}_1 = \frac{Cov(\ln(\widehat{y^{perm}}), \mathcal{C})}{Var(\mathcal{C})} = \frac{Cov(\widehat{\delta}_1 W, \mathcal{C})}{Var(\mathcal{C})} = \widehat{\delta}_1 \frac{Cov(W, \mathcal{C})}{Var(\mathcal{C})} = \widehat{\delta}_1 \cdot \widehat{\omega}_1$$

where $\widehat{\omega}_1$ is the OLS estimator for the coefficient on $\mathcal{C}$ in the equation

$$W = \omega_0 + \omega_1 \mathcal{C} + \varepsilon \tag{3}$$

Thus, the resulting consumption index is $\ln \widetilde{C} = \widetilde{\pi}_0 + \widetilde{\pi}_1 \mathcal{C} = \widetilde{\pi}_0 + \widehat{\delta}_1 \widehat{\omega}_1 \mathcal{C}$.

Specifying the equation relating the consumption index to the binary retirement indicator, R, as

$$\ln C = \lambda_0 + \lambda_1 R + e \tag{4}$$

the IV estimators for the effect of retirement on consumption corresponding to the two approaches for constructing the consumption indexes, where A (e.g., age) is the single instrumental variable, are

$$\widehat{\lambda}_1 = \frac{Cov(\widehat{\pi}_1 \mathcal{C}, A)}{Cov(R, A)} = \widehat{\pi}_1 \cdot \frac{Cov(\mathcal{C}, A)}{Cov(R, A)} \text{ and } \widetilde{\lambda}_1 = \frac{Cov(\widetilde{\pi}_1 \mathcal{C}, A)}{Cov(R, A)} = \widetilde{\pi}_1 \cdot \frac{Cov(\mathcal{C}, A)}{Cov(R, A)}$$

The relative estimated impact of retirement on consumption across the two methods for creating the consumption index reduces to

$$\frac{\widehat{\lambda}_1}{\widetilde{\lambda}_1} = \frac{\widehat{\pi}_1 \cdot \frac{Cov(\mathcal{C},A)}{Cov(R,A)}}{\widetilde{\pi}_1 \cdot \frac{Cov(\mathcal{C},A)}{Cov(R,A)}} = \frac{\widehat{\pi}_1}{\widehat{\delta}_1 \widehat{\omega}_1} = \frac{\rho_{perm,C}}{\rho_{perm,W} \cdot \rho_{W,C}}$$

where $\rho_{perm,C}$ is the correlation between permanent income and $\mathcal{C}$, $\rho_{perm,W}$ is the correlation between permanent income and W, and $\rho_{W,C}$ is the correlation between W and C.[1]

To the extent that changes in permanent income are perfectly reflected by changes in consumption, as AH assume when using the first order condition to relate permanent income and consumption, we anticipate that $\rho_{perm,\mathcal{C}} = 1$. At the same time, we have no reason to believe that *both* changes in permanent income are perfectly correlated with changes in the observable characteristic, W, *and* changes in the observable characteristic are perfectly correlated with changes in consumption. Thus, $\rho_{perm,C} \geq \rho_{perm,W} \cdot \rho_{W,C}$ and, as such, $\widehat{\lambda}_1 \geq \widetilde{\lambda}_1$ where the inequality is almost certainly non-binding.[2] Thus, the method for constructing the consumption index implemented by AH almost certainly will yield an estimate of the impact of retirement on consumption that is smaller in magnitude than one generated by the valid alternative proposed above.

We next extend the analysis by replacing the single permanent income instrument, W, with j instruments, $W_1, W_2, \ldots, W_j$. Using the resulting predicted permanent income measure, $\ln(\widehat{y^{perm}})' = \widehat{\delta}'_0 + \widehat{\delta}'_1 W_1 + \cdots + \widehat{\delta}'_j W_j = \widehat{\delta}'_0 + \sum_{m=1}^{j} \widehat{\delta}'_m W_m$, to estimate (1) yields the consumption index $\ln \widetilde{C}' = \widetilde{\pi}'_0 + \widetilde{\pi}'_1 \mathcal{C}$ where

$$\widetilde{\pi}'_1 = \frac{Cov(\ln(\widehat{y^{perm}})', \mathcal{C})}{Var(\mathcal{C})} = \frac{Cov(\sum_{m=1}^{j} \widehat{\delta}'_m W_m, \mathcal{C})}{Var(\mathcal{C})} = \sum_{m=1}^{j} \widehat{\delta}'_m \frac{Cov(W_m, \mathcal{C})}{Var(\mathcal{C})}$$

Whereas $\widetilde{\pi}_1$ is the product of the OLS estimators resulting from the use of a single income instrument, W, the estimator $\widetilde{\pi}'_1$ is the sum of j products, one for each instrument W_m. Assuming that each W_m is positively correlated with permanent income and is also positively correlated with $\mathcal{C}$, we will find that $\widetilde{\pi}'_1 > \widetilde{\pi}_1$. It follows that, under these conditions, $\widetilde{\lambda}'_1 > \widetilde{\lambda}_1$ and the estimated impact

[1] This simplification makes repeated use of the fact that the slope coefficient from the two variable regression of Y on X equals $\rho_{X,Y} \cdot (SD_Y / SD_X)$ where $\rho_{X,Y}$ is the correlation between X and Y and SD_n is the standard deviation of n.

[2] For this result to hold, notice that it need not be the case that $\rho_{perm,\mathcal{C}} = 1$ but only that the correlation between permanent income and the consumption measure is larger than the product $\rho_{perm,W} \cdot \rho_{W,C}$.

of retirement on consumption will be increased when using multiple instruments for permanent income.

However, each term in $\widetilde{\pi}_1'$ accounts for the relationship between permanent income and consumption only through the correlations of each with the instruments W_m. The analogous estimator, $\widehat{\pi}_1$, from using observed income to construct the consumption index, directly captures the relationship between permanent income and consumption. Again assuming that each W_m is positively correlated with permanent income and is also positively correlated with $\mathcal{C}$, we will find that $\widehat{\pi}_1 > \widetilde{\pi}_1'$.[3] As such, we expect to find that $\widehat{\lambda}_1 > \widetilde{\lambda}_1'$ whereby the estimated impact of retirement on consumption will be larger when using observed income to construct the consumption index relative to using multiple instruments for permanent income.

We can also expand the analysis to allow for k consumption measures, $\mathcal{C}_1, \mathcal{C}_2, \ldots, \mathcal{C}_k$,

$$\ln(y^{perm}) = \pi_0 + \pi_1 \mathcal{C}_1 + \cdots + \pi_k \mathcal{C}_k + u \tag{1'}$$

Assuming that each consumption measure is correlated with permanent but not transitory income, the OLS estimators for the slope coefficients of (1') when using observed income as the dependent variable are

$$\widehat{\pi}_j'' = \frac{\sum_{i=1}^N \hat{r}_{ij} \cdot \ln(y_i^{perm})}{\sum_{i=1}^N \hat{r}_{ij}^2}, \quad j = 1, \ldots, k$$

where $\hat{r}_{ij}$ is the residual from regressing $\mathcal{C}_j$ on the remaining consumption measures.[4] Each estimator, $\widehat{\pi}_j''$, captures the relationship between permanent income and consumption measure $\mathcal{C}_j$. The resulting consumption index is $\ln \widehat{C}'' = \widehat{\pi}_0'' + \sum_{j=1}^k \widehat{\pi}_j'' \mathcal{C}_j$.

If we were to instead use the predicted permanent income measure as the outcome, then in the case with a single W predicting permanent income, the resulting OLS estimators for equation (1') become

$$\widetilde{\pi}_j'' = \frac{\sum_{i=1}^N \hat{r}_{ij} \cdot \widehat{\delta}_1 W_i}{\sum_{i=1}^N \hat{r}_{ij}^2} = \widehat{\delta}_1 \cdot \frac{\sum_{i=1}^N \hat{r}_{ij} \cdot W_i}{\sum_{i=1}^N \hat{r}_{ij}^2} = \widehat{\delta}_1 \cdot \widehat{\omega}_j'', \quad j = 1, , \ldots, k$$

[3]This result will hold except for the unlikely scenario in which the portion of permanent income that is unexplained by the W_m is negatively correlated with the consumption measure.

[4]This expression for the OLS estimators when using multiple regression can be found in Wooldridge (2016).

where the $\widehat{\omega}_j''$'s are the OLS estimators for the coefficients in

$$W = \omega_0 + \omega_1 \mathcal{C}_1 + \cdots + \omega_k \mathcal{C}_k + \varepsilon \tag{3'}$$

In this case, each estimator, $\widetilde{\pi}_j''$, captures the relationship between permanent income and consumption measure $\mathcal{C}_n$ to the extent that it works through the permanent income instrument W. Thus, the resulting consumption index is $\ln \widetilde{C}'' = \widetilde{\pi}_0'' + \sum_{j=1}^{k} \widetilde{\pi}_j'' \mathcal{C}_j = \widetilde{\pi}_0'' + \sum_{j=1}^{k} \widehat{\delta}_1 \widehat{\omega}_j'' \mathcal{C}_j$.

Using these indexes comprised of multiple consumption measures as the outcome when estimating equation (4), the resulting IV estimators for the coefficient on retirement are

$$\widehat{\lambda}_1'' = \frac{Cov(\ln \widehat{C}'', A)}{Cov(R, A)} = \sum_{j=1}^{k} \widehat{\pi}_j'' \frac{Cov(\mathcal{C}_j, A)}{Cov(R, A)} \quad \text{and} \quad \widetilde{\lambda}_1'' = \frac{Cov(\ln \widetilde{C}'', A)}{Cov(R, A)} = \sum_{j=1}^{k} \widehat{\delta}_1 \widehat{\omega}_j'' \frac{Cov(\mathcal{C}_j, A)}{Cov(R, A)}$$

These estimators are different weighted averages of the impact of retirement on each individual measure that enters the consumption index. When using observed income to construct the consumption index, the weights are the relationship between permanent income and consumption measure $\mathcal{C}_n$. However, when first predicting permanent income, the weights only capture the relationship between permanent income and each consumption measure through their individual relationship with the instrument W. If the direct relationship is stronger than the product of the indirect relationship, then the impact of retirement on consumption using $\ln \widehat{C}_{ST}$ will be larger than that found by using $\ln \widehat{C}_{AH}$.

Table A1: Summary Statistics

	Pooled Studies (1)	NHANES I (2)	NHANES II (3)	NFCS 1977-78 (4)	NHANES III (5)	CSFII 1989-91 (6)	CSFII 1994-96 (7)	Continuous NHANES (8)
Age	63.4	63.0	63.3	63.4	63.7	64.1	63.8	63.3
Black	0.09	0.08	0.08	0.09	0.08	0.11	0.09	0.09
Hhld Size	2.25	2.36	2.30	2.39	2.32	2.27	2.33	2.18
Education:								
HS Grad	0.26	0.24	0.24	0.29	0.29	0.35	0.35	0.23
Some College	0.20	0.09	0.12	0.13	0.14	0.13	0.17	0.26
College Grad	0.26	0.10	0.12	0.12	0.21	0.26	0.25	0.32
Self-Reported Health:								
Very Good	0.24	0.23	0.21	0.00	0.24	0.25	0.29	0.27
Good	0.34	0.32	0.30	0.48	0.33	0.34	0.34	0.32
Fair	0.18	0.23	0.23	0.23	0.19	0.19	0.15	0.17
Poor	0.06	0.08	0.12	0.09	0.07	0.05	0.05	0.05
Retired	0.41	0.36	0.34	0.41	0.45	0.49	0.55	0.38
Calories	2,142	1,925	1,990	2,064	2,180	1,892	2,059	2,239
N	*9,120*	*570*	*1,938*	*1,181*	*1,395*	*607*	*1,047*	*2,382*

Notes - The sample is restricted to male household heads from ages 57 to 71. Sample weights are used to compute the statistics shown in the table. The excluded education and health categories are high school dropout and excellent, respectively.

Table A2: First Stage Estimates for MRFIT

	Cross-Sectional Analysis	Longitudinal Analysis
Age=54	0.014	0.016
	(0.014)	(0.014)
Age=55	0.027	0.029
	(0.012)	(0.013)
Age=56	0.060	0.059
	(0.015)	(0.015)
Age=57	0.040	0.043
	(0.016)	(0.016)
Age=58	0.085	0.092
	(0.028)	(0.029)
Age=59	0.115	0.120
	(0.020)	(0.020)
Age=60	0.150	0.155
	(0.032)	(0.031)
Age=61	0.161	0.165
	(0.038)	(0.037)
Age=62	0.254	0.257
	(0.042)	(0.041)
Age=63	0.312	0.320
	(0.039)	(0.041)
Age=64	0.391	0.406
	(0.096)	(0.095)
F statistic	23.3	24.7

Notes - The sample is restricted to individuals from the control sample from MRFIT who are ages 47 and older at the initial visit. The standard errors are clustered at the clinic level (22 clinics). See the notes to Table 5 for information on the additional regressors included in the analysis.