

Why Do So Few Elderly Use Food Stamps?

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Abstract

Recent estimates suggest that less than thirty-five percent of eligible elderly persons participate in the Food Stamp Program. Using longitudinal data from the Panel Study of Income Dynamics and other data sources, this paper uses a variety of methods, including pooled logit regression, individual fixed-effects models, and techniques from duration analysis, to investigate the reasons behind this low take-up and its implications for the well-being of the elderly. The results indicate that the low rate of participation of the elderly is best explained by a low initial rate of adoption of the program. Once enrolled, the elderly are no more likely to leave the program than the non-elderly. The evidence also suggests that participation is strongly motivated by economic incentives. The lower expected benefit level and relatively better financial situation of the elderly account for about one third of the difference in take-up between the elderly and the non-elderly. In addition, information deficiencies impede participation for elderly individuals. Nearly 60 percent of eligible nonparticipants are unaware of their eligibility or believe themselves to be ineligible. Finally, food assistance received under the Elderly Nutrition Program appears to crowd out participation in the Food Stamp Program, as some elderly individuals substitute toward group and home-delivered meals. The paper concludes by showing that despite the low take-up of food stamps, elderly eligible nonparticipants are, on average, more food sufficient, spend more on food consumption, and eat more nutritious food than participants. Low take-up in the Food Stamp Program does not appear to be a concern for the overall nutritional well-being of the elderly.

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I. Introduction

Low take-up by the elderly in most means-tested transfer programs is a persistently puzzling phenomenon. Approximately 3.6 million persons aged 65 and older live below the poverty line (Census Bureau, 2007), of whom over 40 percent report experiencing hunger (Ziliak and Gundersen, 2008). At the same time, far below 100 percent of the elderly population that is eligible for public assistance programs collects benefits. The Food Stamp Program (FSP),¹ the nation's largest program designed to ensure food security and provide adequate nutrition for low-income Americans, has the lowest rate of participation among the major public assistance programs for the elderly.² In 2006, only 34 percent of the elderly eligible to participate collected food stamp benefits, as compared with a take-up rate of 67 percent among the general population (Wolkwitz 2008).

This paper investigates the reasons for the low take-up of food stamps among the elderly and its implications for their well-being. The paper considers a broad array of explanations for the puzzling low incidence of take-up, including measurement error, behavioral factors, information barriers, and interactions between the FSP and other food assistance programs.

Low take-up of food stamps by the elderly should interest economists and policy makers for several reasons. First, poverty is a persistent problem among the elderly. Although the poverty rate has fallen for older adults over the past half century, forty percent of all individuals will experience a spell of poverty at some point in time between the ages of 60 and 90 (Rank and Hirschl 1999). Moreover, the number of the elderly in poverty would be nearly twice as high as the official measure suggests if medical care costs were accounted for in the poverty measure.³ Struggling with

¹ Since Oct. 1, 2008, the Food Stamp Program has been called the Supplemental Nutrition Assistance Program (SNAP).

² Estimated take-up rates for Supplement Security Income among the poor elderly range between 45 and 60 percent (Menefee and Schieber (1981); Warlick (1982); Coe (1985); Shields et al. (1990); McGarry (1996)), and over 60 percent of eligible elderly participate in Medicaid (Ettner 1998). Studies suggest that over 90 percent of eligible elderly take up Medicare Part B and Part D (GAO, 2002, Levy and Weir, 2007). In addition, between 64% and 78% of pensioners eligible for Income Support for Pensioners received the benefit (Department of Social Security, 2001).

³ The National Academy of Sciences (NAS) 's formula, which accounts for medical costs and geographic variation in the cost of living that the incumbent formula, the Census Bureau's formula does not, estimates that 18.6 percent

inadequate income, poor elderly persons often have to curb their spending on food to have money for prescription drugs, and so experience hunger and even malnutrition as a result (The Food Research and Action Center, 2008). At the same time, the FSP has the potential to help improve the well-being of the elderly if they were to participate in the program.

Second, the phenomenon of eligible individuals not participating in government transfer programs is a topic of general interest which has spurred an extensive literature.⁴ However, despite many years of research, relatively little is known about what factors matter most in the participation decision, and how enrollments in transfer programs might be increased (Currie, 2006). A better understanding of the decisions underlying food stamp take-up by the elderly may provide us with some insight into the take-up behavior of this population in other social programs, as well as contribute to studies evaluating the impact of transfers programs.

A third benefit of this study is that it may aid in making more accurate projections of government spending in the near future. If, for example, the low take-up rate of the elderly is a cohort effect, it may not persist into the next generation, leading food stamp expenditures to increase once baby boomers enter later life and confront the decision of whether or not to enroll in the program.

Using the Panel Study of Income Dynamics (PSID) for the period 1980-2005, this study focuses on the following issues. First, I ask whether measurement error may help explain the low take-up rate of the elderly. After considering this evidence, I investigate whether low take-up is caused by a low initial entry rate by eligible individuals for the program or by a high exit rate from the program. I then examine the determinants of participation both at a given point-in-time

of Americans over 65 live below the poverty line, compared with 9.7 percent, under the existing measure. At the same time, other scholars suggest poverty among the elderly is lower than the official rate suggests, if consumption-based poverty measures are used (Meyer and Sullivan 2009).

⁴ Examples being Anderson and Meyer (1997) on take-up of unemployment insurance, Blank and Ruggles (1996) on food stamp and AFDC, and Cutler and Gruber (1996) on Medicaid. Refer to the survey by Currie (2008).

and in a dynamic context, looking separately at entry and exit. In many specifications, I contrast the participation behavior of the elderly with that of the non-elderly to explore whether these two groups differentially response to costs and benefits of participation, and if so, whether this difference may help explain the low take-up rate of the elderly. In addition, I give special attention to the potential interaction between participation in the FSP and other food assistance programs, such as the Elderly Nutrition Program (ENP), which includes Meals on Wheels and the senior congregate meal programs. Taken as a whole, the paper provides a complete picture of factors determining food stamp participation among the elderly.

The study departs from the existing literature in several ways. First, I emphasize the importance of confronting measurement error when calculating program eligibility. I consider several types of measurement error, such as misclassification due to insufficient information, measurement errors of income/asset variables, and misreporting of participation status. While far from perfect, this study improves on the accuracy of take-up estimations, as compared to many of its predecessors.⁵

Second, while most of the existing literature treats take-up as a stock variable, the longitudinal nature of the PSID enables me to directly study the *flow* aspect of participation. A major advantage of this approach is that I am able to estimate two sets of hazard rates for movements into and out of the FSP, since both movements may potentially contribute to the low take-up rate.

Third, to my knowledge, the interaction between the FSP and the ENP has not been examined in the literature. The relationship between the use of food stamps and other forms of food assistance

⁵ Relying on the 1998 Health and Retirement Survey, Haider et al. (2003) conducts a thorough investigation on measurement error as a possible reason for nonparticipation. Since they only look at one year data, their analysis does not capture possible changes of measurement errors over time. While their paper acknowledged the under-reporting of program receipt in the HRS, the issue is not incorporated in their analysis of measurement error.

is potentially of great importance. The interaction with alternative food programs, such as the ENP, may provide an additional explanation for nonparticipation if there is a crowding-out effect.

My findings can be summarized as follows. First, I find that the low take-up rate of the elderly is best explained by a low initial rate of entry into the program. Once enrolled, the elderly are no more likely to leave the FSP than the non-elderly. Second, the participation decision is strongly related to economic incentives. The lower expected benefit level and relatively better financial situation of the elderly account for about one-third of the difference in take-up between the elderly and the non-elderly. Third, the evidence also suggests that a lack of information contributes to nonparticipation among the elderly. Responses to survey questions about reasons for nonparticipation indicate that about 60 percent of elderly eligible nonparticipants either believe that they are ineligible or report being unaware of their eligibility status. Finally, I find a strong negative correlation between food stamp take-up among the eligible elderly and the Elderly Nutrition Program caseload. This result suggests that for the elderly seeking food assistance, group and home-delivered meals largely substitute for, rather than supplement, food stamps.

Despite the low take-up rate for food stamps, I find that elderly individuals who are eligible for the program but do not participate appear to be less needy than participants. Over 70 percent of eligible nonparticipants report they have enough and the types of food they want. Objective measures also indicate that they spend more on food consumption and eat more nutritious foods. Therefore, low participation does not appear to be a concern of nutritional well-being at the population level for the elderly.

The paper proceeds as follows. Section 2 briefly outlines the FSP and reviews the existing literature. Section 3 describes the data. Section 4 documents the pattern of participation. This section also discusses measurement error in calculating eligibility, and examines whether low take-up is caused by low entry or by high rates of departure from the program. Section 5

discusses my empirical methods, and summarizes the main results. Section 6 presents the implications of the results. The interaction between the FSP and the ENP is examined in Section 7, followed by concluding remarks in Section 8.

2. Background

2.1. The Food Stamp Program

The FSP is the nation's largest nutrition program for low-income Americans and a mainstay of the federal safety net. In fiscal year 2007, the program served an average of 26.5 million people per month and paid out over \$30 billion in benefits (Committee on Ways and Means 2008). To receive food stamps, households⁶ must meet three financial criteria: a gross-income test, a net-income test, and an asset test. *Gross income* is defined as the total income for all household members, including that gained from working, investment, and transfers, but excluding most noncash income and in-kind benefits. The gross income limit is set at 130 percent of the poverty line (\$1,579 per month in 2009 for a two-person household, a typical household size for the elderly). *Net income* is then computed by allowing for various deductions from the household's gross income, with the net income limit set at 100 percent of the poverty line (\$1,215). The asset limit in 2009 was \$2,000. Appendix A-1 describes the eligibility requirements in detail.

As defined by FSP rules, the *elderly* are persons aged 60 and older. Eligibility rules for households with an elderly or a disabled member are more liberal than for the rest of the population in four respects. First, these households are exempt from the gross income test and are subject only to the net income test. Second, when computing net income, these households are allowed to deduct out-of-pocket medical expenses in excess of \$35 per month per household. Third, the shelter deduction is more generous for this group because no cap is placed on the amount of the deduction. Finally, the asset limit is increased from \$2,000 to \$3,000.

⁶ Under FSP rules, a household is defined as individuals who share a residential unit and purchase and prepare food together.

The amount of benefit that a household receives is equal to the maximum benefit level less 30 percent of the household's net income (this reflects the assumption that an average household will spend approximately 30 percent of its net income on food). As of 2009, an eligible household of two with no net income would receive \$367 each month in food stamp benefits.

2.2. Literature Review

Numerous studies have examined why people eligible for government transfer programs do not participate in these programs. First, the cost/benefit framework has been the basis for investigations of nonparticipation in social programs, which assumes that individuals are fully informed and make optimal decisions regarding their use of the program. They choose to enroll only if the benefits of participation exceed the costs. The findings of Blank and Ruggles (1996) support this claim. Using data from the Survey of Income and Program Participation (SIPP), they show that low participation stems from the expectation on the part of would-be participants that benefits are too low. McGarry (1996) also reports that participation is primarily determined by the financial situation of the eligible individuals and larger benefits significantly increase the probability that an individual will participate in the program. In this case, the most needy households will receive benefits, and so there is one the whole little reason for concern about nonparticipation.

Another strand of literature focuses on potentially more troubling reasons for nonparticipation, such as a lack of information. Eligible individuals may fail to participate because they are unaware of the existence of programs or their eligibility to participate in them. Using an experimental approach, Daponte et al. (1999) finds that certain individuals do not participate because of insufficient information about their eligibility. Similar conclusions were reached by Coe (1983) and Blaylock and Smallwood (1984), using alternative research methodologies and datasets. This perspective presents a challenge to the cost/benefit analysis of nonparticipation, since information barriers may cause an agent's behavior to deviate from the full-optimization

assumption, and so prevent many needy families from receiving benefits for which they are entitled and from which they might substantially benefit. In this case, the program may not be accomplishing its mandate of providing an effective social safety net.

Despite an extensive literature on nonparticipation, older adults have been largely overlooked, especially in studies of FSP participation, the exceptions being Haider et al. (2003) and Levy (2008).⁷ Using the Health and Retirement Survey (HRS), Haider and his co-authors report that take-up of food stamps declines precipitously with age. Even after a wide range of factors are taken into account, such as misclassification of eligibility status or behavioral considerations, the low take-up rate of older adults remains unexplained. Levy (2008) relies on a panel method to analyze the determinants of take-up among the eligible elderly. While pointing out that OLS and individual fixed-effects regressions yield quite different results on some explanatory variables, Levy's study, too, does not answer the question of what determines take-up among the elderly, and so the matter of why so few elderly use food stamps remains a puzzle.

3. Data

For the primary analysis, I use the PSID, a longitudinal dataset, for interview years 1980-2005. The analysis begins in interview year 1980 (calendar year 1979) because this is the year the FSP ended the so-called purchase requirement and began operating in its current form as a uniform national program. Making use of the most recent data allows me to update previous studies, taking into account more recent patterns in participation.

A wide array of financial and demographic information is necessary to determine accurately whether or not an individual is eligible for food stamps. The PSID income data are widely considered to be among the best available (Kim and Stafford 2000). The dataset also includes detailed information on the types of expenditures necessary for accurately calculating

⁷ The paper by Gundersen and Ziliak (2008) also includes the elderly in their analysis of food stamp take-up. But the main focus of their study is income volatility.

deductions. Although complete asset information is only available for interview years 1984, 1989, 1994, 1999, 2001, 2003, and 2005, the PSID collects detailed information on income from assets in each survey year, which can be used to impute the value of total asset holdings.⁸ A particularly attractive feature of the PSID is that it collects information concerning households' failure to use food stamps by using a set of direct survey questions, information not available in many other household surveys. Despite the fact that the PSID includes a smaller number of elderly persons in comparison to other surveys like the HRS, it is the only dataset that tracks respondents for a sufficient number of years, making it possible to examine long eligibility/participation spells and transitions into and out of the program.

My primary sample consists of elderly aged 60 and older in the survey year, and who participated in survey for at least three years. There are 3,889 elderly individuals and 38,269 person-year observations in my primary sample. In some analyses, I also include non-elderly who are 30-59 in order to provide a context for comparison. Appendix B contains detailed information of changes in sample composition over time and reasons for attrition.

In order to investigate the potential interaction between the FSP and the ENP, I use the March Current Population Survey (CPS) and administrative data for the ENP from the Administration on Aging (AOA), beginning with 1999 and continuing through 2004. I also supplement data from the Continuing Survey of Food Intakes by Individuals (CSFII) and the Consumer Expenditure (CE) Survey to explore the degree of need for food assistance.

4. Eligibility and Take-up Pattern over Time

4.1. Confronting Measurement Error: Are Elderly Take-up Rates as Low as They Seem?

I begin my analysis by calculating program eligibility and take-up rates. Since the determination of a unit's eligibility hinges on a number of assumptions and depends on the availability and

⁸ Appendix A-2 provides detailed information on the imputation procedure, assumptions as well as the robustness of the imputation results.

accuracy of income and asset information, the classification is prone to error. As pointed out in previous studies (Blank and Ruggle 1996, McGarry 1996, Daponte et al. 1998, Haider et al. 2003), if researchers incorrectly classify some individuals as eligible who are actually ineligible, this misclassification will result in a computed take-up rate that is biased downward. If the elderly are more susceptible to this sort of error, then this measurement error could cause the take-up rate to appear lower than it in fact is, explaining the low take-up by the elderly at least in part. At the same time, if respondents misreport participation status, this misreporting would also help to account for the low take-up if it turned out to be more prevalent among the elderly. Because of its crucial importance, I consider three types of measurement error when computing eligibility and take-up: misclassification due to a lack of some piece of information necessary for assessing eligibility, measurement errors on key variables such as income or assets, and incorrect reports of participation status.

4.1.1. Misclassification Due to Insufficient Information

Due to data limitations, many previous studies have used only the crudest eligibility criterion, the gross income test when assessing eligibility. The rich financial information from the PSID allows me to assess eligibility more accurately by accounting for various deductions and the asset limit.⁹ I calculate eligibility under three different definitions. Definition 1 estimates eligibility based solely on the gross income test. Definition 2 applies the age-specific income test to the population aged 60 and older, and includes the dependent, shelter, and medical expenditure deductions in the income eligibility calculation. The age-appropriate asset limit is also applied. In Definition 3, I define eligibility as accurately as possible given my data. In addition to income

⁹ Although FSP eligibility is determined on a monthly base, the PSID mainly collects annual data. Therefore, in the analysis, the eligibility and take-up history is constructed annually. Appendix Table A-1 provides a detailed discussion of the information that is available in the PSID for assessing eligibility, as well as the assumptions I make given its limitations.

and asset tests, I classify as eligible all individuals who would be categorically eligible based on participation in SSI or TANF. I also exclude individuals in nursing home.

Figures 1 A and B summarize patterns of eligibility under these three definitions for the elderly (aged 60 and older) and the non-elderly (aged 30 to 59) samples, respectively, while Figures 2 A and B report patterns of participation for the eligible. When richer and more complete information is used, the share of eligibles drops and the take-up rate rises. However, using a more stringent definition of eligibility does not diminish the gap in take-up between the eligible elderly and non-elderly. For instance, in the early 1980s, under definition three (the one adopted as the final measure for the remainder of this paper) on average only around 30 percent¹⁰ of the eligible elderly received the benefits to which they were entitled. This is 20 percentage points lower than that of the non-elderly. This gap holds over time, and even widens in the years after 2000.¹¹ In addition, I find that the difference in take-up rates between the elderly and the non-elderly samples is not a consequence of the differential eligibility rules they face, which are more liberal for the elderly. Even under the same eligibility rules—the gross income test only—relatively lower take-up rates among the eligible elderly persist.

4.1.2. Measurement Error in Income/Asset Variables

Income under-reporting in survey data is well documented (Edin 1994, Cody and Tuttle 2002, Meyer and Sullivan 2009). Studies suggest that asset information is also likely to be measured with error (Avery and Kennickell 1988; Curtin and Morgan 1989). If measurement error of key variables relating to eligibility, such as income or assets, is more likely to occur for the elderly as compared to the non-elderly, such errors could at least partially account for the relatively low

¹⁰My estimates are similar to those reported by Haider et al. (2003) and Levy (2008) using the HRS, as well as Gundersen and Ziliak (2003) who relied on the PSID. These participation rates are lower than the “official” participation rates calculated by the Food and Nutrition Service of the U.S department of Agriculture. This difference is primarily due to the different method used to calculate the “official” rate, which is calculated using administrative records in the numerator and survey data in the denominator.

¹¹ The estimates still can not rule out the possibility that some eligibility units are defined incorrectly. As we can see from Table 8, a small fraction of individuals I classified as eligible reported being told ineligible by welfare office.

take-up among the eligible elderly. To explore this possibility, I calculate the take-up rate for those who are categorically eligible for food stamps because of SSI or TANF receipt. An assumption of this approach is that participation in other programs is measured/ reported with less error than income and asset information. As seen in Figure 3, for the elderly and the non-elderly, take-up rates are both nearly doubled when the sample is restricted to people who participate in SSI or TANF. The high take-up rate for this subsample is not unexpected, as it has already been documented in the literature that participation in one public assistance program may increase the likelihood of participating in another, either due to reduced stigma or increased access to information about government programs. Nevertheless, the difference in take-up between the elderly and non-elderly does not change; in fact, the gap grows even bigger, at roughly 35 percentage points over time.

4.1.3. Misreporting of Participation Status

Even if program eligibility could be assessed entirely without error, the calculated take-up rate will still be biased if respondents' reports of participation contain errors. Response errors include both errors of commission (false positives) and errors of omission (false negatives). While the former has been less studied, a number of studies have documented significant underreporting of program receipts in large national surveys (Marquis and Moore 1990; Bollinger and David 1997; Bilter et al. 2003; Meyer and Sullivan 2008; Meyer et al. 2009).

To investigate how response errors might affect low take-up rates, I first calculate the participation rate of those individuals who I classify as *not eligible*. I find that false positives are rare. Over time, roughly two percent of elderly individuals classified as not eligible report having received food stamps (Appendix Table C-1).¹² The errors of commission are slightly more

¹² Because FSP eligibility is determined on a monthly base, it is possible that some individuals determined to be ineligible using annual income data, are in fact eligible for and collect benefits for a couple of months in a year. Over time, 50 to 70 percent of those false positive cases reported taking up food stamps for less than 12 months.

frequent (about 2.9 percent) for the non-elderly compared to the elderly, but the difference is not statistically significant.

To assess the extent to which the elderly and nonelderly under-report benefits receipt, I compare the average monthly reporting rates from the weighted PSID to administrative aggregates (FSP Program Operations data) beginning with 1980 and continuing through 2005. I do this separately for the elderly and non-elderly sample (Appendix Figure C-1 to 3). Consistent with findings of Meyer et al. (2009), my estimates indicate that the PSID undercounts months of food stamp receipt. For the non-elderly sample, I find approximately 80 percent of food stamp receipts were reported in the 1980s, and 70 percent in the 1990s, with a recent improvement occurring after 2003. For the elderly, however, the reporting pattern differs. While the PSID overcounted elderly months of participation in the 1980s, receipts reported by the elderly are systematically lower than those calculated using administrative data since the early 1990s, with roughly 80 percent of food stamp receipts were reported in the 1990s, and only less than 50 percent after 2000.

Taking advantage of the methodology employed by Meyer et al. (2009), I scale up the calculated take-up rate by using the inverse of reporting rates for the elderly and non-elderly sample, respectively. Figure 4 shows that even after adjusting for under-reporting, food stamp take-up by the elderly is still much lower than by the non-elderly, with an average gap of 28 percentage points over time. Therefore, while the elderly report food stamp receipts more than the non-elderly in some periods, and less in others, overall, under-reporting does not explain the low take-up by the elderly.

Although misreporting of participation status does not in itself explain the low take-up among the elderly, under-reporting of the PSID raises the concern of whether the data are adequate to support analyses of program participation. As found in Meyer et al. (2009), under-counting of

Another possible source of false positive is administrative errors. According to the USDA, the rate of payment to ineligibles ranges from one to three percent over time.

benefit receipts is not a PSID-specific problem. High rates of understatement of program receipts are found in datasets such as the CPS, the SIPP, the American Community Survey (ACS), and the CE Survey. In addition, reporting rates vary sharply across programs and over time: approximately 80 percent of food stamp months received is reported in the PSID and the SIPP, while in the CPS and the CE, the figure is close to 60 percent. Therefore, it is not clear whether those other household surveys provide more reliable coverage reports than the PSID for those who are actually in the FSP.

One way to assess potential biases that might arise when using the PSID to study the FSP is to compare the characteristics of elderly food stamp recipients in the PSID with those reported in the FSP Quality Control (QC) data. As can be seen in Appendix Table C-4, the demographic characteristics of recipients in the PSID track the FS caseload fairly well.¹³ Moreover, average reported benefits for the elderly in the PSID is \$806.40 per year, which is comparable to the average benefit of \$876.58 reported in the QC data for the same population. Overall, these comparisons suggest that missing elderly recipients appear to be randomly distributed across elderly food stamp participants, at least with respect to observables. This suggests that the PSID can be used to analyze determinants of FSP participation among the elderly.¹⁴

4.2. Program Entry vs. Exit

The previous sub-section suggests that take-up of food stamps is quite low among the eligible elderly. The low take-up could be a consequence of a low initial rate of entry into the program, or the result of individuals leaving the program while still eligible. Since most of the existing literature treats take-up as a stock variable of the receipt of benefits, this way of explaining the low participation has yet to be explored. The longitudinal nature of the PSID enables me to consider

¹³ The elderly food stamp recipients in the PSID are older than those in the FSPQC; there is also evidence that males are less likely to report in survey data.

¹⁴ Meyer and Sullivan (2008) point out that estimates of the relationship between observable characteristics and food stamp participation can be biased due to underreporting, even when the differences in observable characteristics between the survey data and administrative data are small. I acknowledge this may be a problem; however, correcting for underreporting bias is beyond the scope of this paper.

participation as a flow variable and estimate it using two sets of hazard rates for movements into and out of the FSP, both movements potentially contributing to the low take-up rate.

I first summarize spell patterns. The top panel of Appendix D provides information on spells of food stamp eligibility and participation for the elderly. There are substantially fewer spells of receipt than of eligibility (710 versus 2,617) and a large share of both eligibility and participation spells are left censored.¹⁵ The mean length of non-left-censored participation spells is 2.6 years, which is slightly longer than the mean length of non-left-censored eligibility spells. The bottom panel gives eligibility and participation spell information for the non-elderly who are 30 to 59. Compared to the elderly, both eligibility and participation spells are relatively shorter for the non-elderly, which is not unexpected given the higher variance in income of this population.

Panel A of Table 1 shows the sequential use of food stamps after an eligibility spell begins for an elderly individual. Among the 1,854 non-left-censored¹⁶ eligibility spells, 263 begin receipt in the first year, 234 are right-censored, and 687 close without receipt after a year. This leaves 670 ongoing eligibility spells without receipt in year two. The most striking finding is that only 19 percent of these elderly eligibility spells are ever taken up.¹⁷ Among those who do take-up, there is little evidence of delayed entry: 71 percent start immediately after becoming eligible, with 91 percent initiating within three years. Figure 5 graphs the hazard function for ongoing non-receipt eligibility spells that are at risk of being taken up, over a period of seven years. The empirical hazard of the elderly spells confirms the finding of minimal delayed entry: the hazard is about 0.14 in the first year, and declines to 0.07 in the second year.

¹⁵ For the elderly population, a spell is defined as left-censored if it starts before age 60.

¹⁶ I eliminate left-censored spells because we do not know how far into the spell a person is when he/she is first observed, so total spell length cannot be estimated. I also ignore the fact that in some cases I have multiple spells for the same person (45 percent of eligibility spells and 27 percent of participation spells are multiple spells).

¹⁷ This is lower than the overall take-up rate of 29 percent over time. This is because 29 percent represents the share of years of eligibility where food stamps was received, while 19 percent represents the share of spells of food stamp eligibility where food stamp benefit is ever received. Once an elderly individual starts receiving food stamps, they may receive it for many years. On the other hand, most of eligibility spells without take-up are very short spells.

Panel B presents an identical analysis for the non-elderly. While less than 19 percent of the elderly spells will ever been taken up, the corresponding number for the non-elderly is around 39 percent, approximately two times higher. In addition, 80 percent of all non-elderly spells that will ever be taken up start receipt once eligibility starts. The corresponding empirical hazard rate for non-elderly spells is 0.31 in the first year and drop to 0.18 the year after.

While Table 1 shows the transition into, and the timing of, FSP participation, Table 2 shows whether and to what extent the elderly drop out of the program while remaining eligible, and how this differs from the non-elderly. For the elderly, 72 percent of all participation spell endings occur simultaneously with the end of eligibility spells. This implies that 28 percent of all participation spells end in the face of ongoing eligibility. The corresponding number for the non-elderly is approximately 27 percent. In terms of exit rates, the elderly seem not so different from the non-elderly.

The information presented in Table 1 and 2, especially the comparison between the elderly and the non-elderly, suggests that the lower rate of participation by the elderly is best explained by a low initial rate of adoption of the program; once enrolled, the elderly are no more likely to leave the FSP while remaining eligible.

5. Empirical Determinants of Food Stamp Take-up

The previous section suggests that the lower take-up of the elderly is neither an artifact of measurement error, nor explicable in terms of the more liberal eligibility rules that the elderly face. Entering the program is more a problem for the elderly than for the non-elderly. To explore the reasons for nonparticipation, I start with a simple model that motivates the empirical work.

5.1. A Simple Model of Food Stamp Take-up

I model the FSP participation decision within a utility maximizing framework. Let the expected utility of an elderly nonparticipant i at time t be $U_{it}(Y_{it})$, where Y_{it} represents initial

consumption level. The expected utility of a participant then is $U_{it}(Y_{it} + B_{it}) - C_{it}$, where B_{it} stands for food stamp benefits and C_{it} represents the costs of participation. The benefits of participation B_{it} can be further defined as a function of the expected benefit level b_{it} and the length of eligibility spell λ , with $B_{it} = \lambda_{it} b_{it}$. To illustrate the role of information, I incorporate information barriers I_{it} into the utility function. The implied probability of participation is thus

$$P_{it}^* = f(U_{it}(Y_{it} + \lambda_{it} b_{it}) - U(Y_{it}) - C_{it} - I_{it}) \quad (1)$$

The effect of changes in various parameters of the model can be determined by differentiating this probability. Higher participation costs decrease the probability of participation, while higher expected benefits raise the take-up. Participation will always increase as the size of the benefit increases and with increases in the potential duration. Rising information barriers lowers participation. An increase in initial consumption decreases the probability of take-up as long as U'' is negative. $P_{it}^* > 0$ implies participation and $P_{it}^* \leq 0$ implies nonparticipation at time t .

Equation (1) describes a model of participation choices over time. It suggests that as these factors change, the participation decision may change over time.

5.2. Empirical Specification

Based on this conceptual framework, I first explore what distinguishes, at a given point-in-time, individuals who do and do not take-up benefits. The specifications that I estimate are variants of the equation:

$$TK_{it} = \beta_1 B_{it} + \beta_2 \psi_{it} + \beta_3 I_{it} + \beta_4 C_{it} + \gamma_t + \delta_{state} + \varepsilon_{it} \quad (2)$$

where TK_{it} is a binary variable that is equal to 1 if participating and 0 if not. B_{it} is the expected benefit level. Since the amount of benefits are observed only for those who actually receive food stamps, I calculate the expected benefit level for each eligible elderly individual based on survey information and the FSP rules. The correlation between the calculated benefits and reported

payment levels is over .75 during the period from 1979 to 2004. Thus, it appears that the calculated benefit is a good approximation of the actual amount to which a particular filing unit is entitled.

The vector ψ includes variables that proxy for the initial consumption level. I include dummies for home ownership and liquid asset holdings, with the underlying hypothesis being that possession of more financial resources potentially increases the consumption, thus making an individual less likely to participate. Variables such as race, education, gender, marital status, and disability indicators which are commonly used to proxy for permanent income in the literature are also included. Presumably, currently married, nondisabled white males with higher education have higher permanent incomes and higher initial consumption levels, and so are less likely to participate.

To account for the effect of information barriers on participation, I include age-group dummies (in five-year intervals) which capture the combination of age and cohort effects,¹⁸ family size, and participation in other programs. Younger cohorts/individuals may, on average, be better informed about assistance programs than their older counterparts, and this greater familiarity with the FSP leads to greater participation. Those who live with relatives or friends are more likely to have additional information channels. Receiving other forms of assistance provides a gateway to the FSP because public programs learn from each other.

However, these variables may also capture the effect of participation costs. For instance, while living with others may reflect informational differences, it might also capture decreased difficulty in contacting and visiting the welfare office. Age-group dummies may also capture differences in welfare stigma, an important component of participation costs (Moffitt 1983). Older cohorts or individuals that grew up before the major expansion in government transfer programs may have a greater distaste for government assistance. At the same time, those

¹⁸The major challenge of estimating separate age, period, and cohort effects is the identification problem: arising from the exact linear dependency among age, period, and cohort. While year dummies are separately controlled, the age-group dummies in the regression capture the combination of age and cohort effects.

receiving welfare from more than one program are presumably less stigmatized by participation in the FSP. Interpreting this type of variables is difficult when estimating a descriptive version rather than structural model, since in some cases the association of a variable with FSP participation is consistent with more than one reason for nonparticipation. The interpretation of these variables will be discussed in section 6.

The remaining factors in equation (2) capture location and time effects. δ is a vector of state indicators; γ_t are calendar year dummies, and ε_{it} denotes an idiosyncratic error term. While the primary focus is elderly individuals aged 60 and over determined to be eligible, I also include eligible non-elderly aged 30 to 59 in each survey year. The contrasting between the elderly and non-elderly illustrates whether or not these two groups respond differently to the costs and benefits of participation.

Table 3 presents descriptive information for these individuals. The values of the variables are reported separately for participants and nonparticipants by age. At any age, participants are more likely to be female or minorities, less likely to be married, have a larger family, and have somewhat less schooling. On average, the income/poverty line¹⁹ is lower for the participants, and participants are less likely to own a home, a car or hold any positive liquid assets; they also have a higher level of expected benefits and are much more likely to receive SSI or TANF. Additionally, participants have a higher propensity to be disabled. Finally, participants are also more likely to report food insecurity.

When comparing the elderly with the non-elderly, it is worth noting that the calculated benefit level is lower for the elderly (\$1,338 per household per year) than the non-elderly (\$2,408) and benefits decline with age. Additionally, the elderly possess far greater assets.

¹⁹ In the study, data on income, benefits, and expenditure is expressed in 2005 dollars using CPI-U. As is customary in these types of analyses, I adjust total income, wealth, and expenditure using equivalence scales recommended by Citro and Micheal (1995): $(\text{number of adults} + \text{number of children} * 0.7)^{0.7}$.

5.3. Regression Estimates

I present estimates from logit models for the elderly in Panel A of Table 4. The derivatives, evaluated at the means of the covariates, are reported. These estimates clearly show that participation decision is strongly associated with economic incentives. A higher expected monetary benefit²⁰ increases the probability of participation. The effects of most of the variables assumed to influence the initial consumption level further confirm the role of economic incentives on participation. Even after controlling for the size of food stamp benefits, elderly individuals who own a home are less likely to participate, as are males, whites, those who are currently married, better-educated, and non-disabled.

Other variables that are significant are assumed to be related to either information or costs of participation. While the probability of take-up declines with age, it increases in family size. Those receiving SSI or TANF are significantly more likely to participate in the FSP. These variables all operate in directions consistent with the predictions of both information and costs hypotheses, suggesting possible effects of both factors on participation.

Panel B in Table 4 reports estimates for the non-elderly. Most of the results are quite similar to the estimates of the elderly. *t* statistics further illustrate that there is no evidence that the elderly and the non-elderly respond differently to costs and benefits of participation. Nevertheless, given the differential benefits and wealth between the elderly and the non-elderly, in a counterfactual scenario—assuming the elderly have the same level of benefits and wealth possession as the non-elderly, holding other factors constant—a back-of-the-envelope calculation suggests that the take-up rate of the elderly would increase by six percentage points, about one third of the difference in take-up between the elderly and the non-elderly.

Furthermore, age-group dummies, which impact elderly participation, do not seem to affect the participation of the non-elderly. It is certainly plausible to attribute some of the difference in

²⁰ Since the benefit level is a function of gross income and deduction, a higher benefit may also imply a lower income, or a higher deduction, with both factors reflecting economic incentives.

take-up between the elderly and the non-elderly to the factor(s) captured in these age-group dummies. Potential candidates for these factor(s) are a lack of information, or stigmatization, or both, on the part of the elderly. At the same time, having children significantly increases the probability of taking up food stamps for the non-elderly.

The longitudinal nature of the data also enables me to look at what determines variation in FSP participation for a given elderly individual over time. Table 5 summarizes the results from the individual fixed-effects model for the elderly. Compared to the OLS, the individual fixed-effects model takes into account time-invariant individual unobservable heterogeneity, which affects the participation decision. The estimates from the individual fixed-effects model confirm those from the pooled logit. For example, an increase in family size or participation in other programs increases the probability of take-up. At the same time, losing a spouse to death or divorce also triggers participation. Age coefficients are not reported due to the identification issue.²¹ Some of the coefficients that are significant in a cross-sectional setting are not significant in the fixed effects model, such as the expected benefit level, education, disability status, and home ownership, which may be due to a lack of variation in the variables for a given elderly individual.

5.4. Duration Model Estimates

Up to this point, the participation decision is examined at a given point in time. Point-in-time estimation does not take into account the duration of eligibility/participation spells, nor does it account for the differences in the period of time during which each person is at risk of entering in or exiting from the program. Hazard models provide a sensible way of addressing these concerns. The findings from previous section indicate that for the elderly, entering in the program is more a problem than exiting. Hazard models further enable me to examine the

²¹ Given the fact that the individual fixed effects regression implicitly controls for birth year for each person, and calendar-year dummies are also included to control for time trend, the identification of age-group dummies strongly depends on the functional form assumption. Therefore, the interpretation of these coefficients warrants caution.

determinants of take-up along different decision margins, such as the initial decision to adopt the program and maintenance of enrollment.

I first focus on program entry. I estimate a series of specifications for the hazard of ongoing non-receipt eligibility spells at the risks of being taken up. Other types of endings are treated as censored. The hazard is the function of the expected benefit level, initial consumption, information barriers, and costs of participation. I use a semi-parametric discrete-time proportional hazard model with a separate dummy variable for each year in a spell. Formally, the hazard for person i in spell year j is

$$h_i(t) = 1 - \exp(-\exp[c(j) + \beta X_i])$$

where X_i is a vector of covariates, $c(j)$ is the baseline hazard function, and β is the corresponding vector of parameters. In addition to the variables I included in regression analysis, I also control for the length of the spell and for whether or not a person has previously taken up benefits. Most of the covariates will vary with each year in the spell; a few, such as race, education, and age at the start point of an eligibility spell, are fixed over the duration of the spell. To account for the potential attenuation bias due to unobservable heterogeneity, I use a mixture model assuming a Gamma distribution for an included individual heterogeneity term.²²

Panel A of Table 6 presents the estimates for the elderly. The results are largely consistent with those from the regression analysis. Economic incentives are strongly associated with the participation decision. The probability of take-up increases with increases in the length of eligibility spell. The effect of expected benefit level also operates in the expected direction, though is not statistically significant. Those who are relatively disadvantaged, such as minorities or the disabled, are more likely to end a spell of food stamp eligibility by taking up benefits.

²² I have tested the null hypothesis that the unobserved heterogeneity variance component is equal to zero and the null is rejected at the one-percent level.

The evidence also suggests a possible effect of information and/or stigma on participation. Those who have previously been in the FSP are more likely to move from an eligibility spell into participation, with a hazard of taking up being 4.6 times higher as compared to the baseline hazard rate. Elderly who are older or belong to older cohorts are less likely to end an eligibility spell with receipt. At the same time, receiving other benefits or living in a big family increases the likelihood of participation.

Just as it is interesting to look at what affects initial adoption of the program, it is also interesting to explore why the elderly exit the program while remaining eligible. I estimate the determinants of ongoing participation spells at risks of being ended because individuals voluntarily drop out of the programs while remain eligible. Other types of ending are treated as censored. The results indicate that in comparison to the endings of eligibility spells, the endings of elderly participation spells are determined to a much lesser degree by personal characteristics (Table 6, Panel B). It is interesting to note that higher education decreases the hazard of exiting the program while still eligible. This could reflect the fact that better-educated elderly individuals may better understand program rules, or may feel relatively easy to get through the rectification procedures. Both increase their likelihood of staying in the program through the end of their eligibility.

6. Interpreting the Results

Empirical results shed light on a number of explanations of nonparticipation that have been put forth in the literature. However, because in many cases the association of a characteristic with FSP participation is consistent with more than one reason for nonparticipation, we are not able to offer a conclusive explanation. One contribution of this study is that I offer evidence in support of each inference drawn from empirical estimation. This approach bridges the link between observable characteristics and the actual behavioral reasons behind the decision to participate.

6.1. Information Impedes Participation

While we assume variables such as age-group dummies, family size, and participation in other programs affect participation through the channel of information barriers, it is necessary to formally establish the correlation of those variables with the inferred. In Table 7, I separately report hazard estimates for those who have previously taken up food stamps and those who have not.²³ The non-participation of those with previous experience in the program clearly cannot be explained by a lack of knowledge on their part. Accordingly, covariates that proxy for information, such as age-group dummies and large family size, do not seem to affect the participation decision of this group. On the other hand, these covariates significantly influence the participation decision of elderly individuals who have not been on the program. At the same time, the magnitude of coefficients of participating in other programs is smaller for the former group. The results confirm our hypothesis that these variables play the role of information barriers.

However, we still can not rule out the existence of a stigma effect if it turns out that those who have previously taken up food stamps also feel less stigmatized. Nonetheless, responses to direct survey questions asking about reasons for nonparticipation suggest that a significant portion of nonparticipation is explained not by the notion of stigma, but by information barriers.

In the 1980, 1981, and 1987 PSID surveys, respondents were asked why they failed to use food stamps. First, they were asked whether they thought they were eligible for food stamps at any time in the previous year. Those who replied "No" or "Don't Know" were then asked why they thought they were not eligible. Respondents who replied "Yes" or "Maybe" to the eligibility question were asked whether they had tried to get food stamps in previous year. If they had not tried, they were asked why not.

²³ Since I don't have complete histories for individuals in the sample, it is likely that some persons that I defined as never being on the FSP actually have received food stamps previously.

Table 8 summarizes responses for both elderly and non-elderly eligible nonparticipants. It is evident that ignorance and confusion about eligibility is substantial, especially among the elderly. Over 40 percent of eligible elderly nonparticipants did not think they were entitled to benefits, with another 18 percent reporting “*Do not know*”. The corresponding numbers for the non-elderly is 36 and 10 percent, respectively. In addition, the probability of having faulty information and confusion about eligibility increases with age. For instance, among those ages 80 or older, over 70 percent of those who were eligible for benefits either believed that they were ineligible or reported being unaware of their eligibility status.

Misperceptions about eligibility arose either because respondents did not believe they met the financial criteria for eligibility or their perceived need level is too low. About 40 percent of elderly individuals who thought they were ineligible responded in this way because they believed their income was too high or their assets too valuable. The response “*Do not need food stamps*” was given by 30 percent of elderly nonparticipants as the primary reason for thinking they were ineligible. It was also cited as an obstacle to getting food stamps by another 23 percent of elderly nonparticipants who believed themselves to be eligible for the program. It thus appears that the misperception may arise partly out of a perceived lack of need. This finding is consistent with the findings of Hill (1990) and Daponte et al. (1999). Both studies conclude that information acquisition is endogenous, and those who are in great need or have bigger anticipated benefits had the greatest incentive to learn about the program. In addition, in comparison to the non-elderly, “*Do not know anything about the eligibility rule*” or “*Did not know how to go about it (food stamps)*” were more likely to be given by elderly individuals as reasons for believing themselves to be ineligible or for preventing them from applying.

While empirical estimates suggest the possible negative effect of stigma on participation, only two percent of elderly individuals who thought they were ineligible cited negative personal

attitudes toward welfare as the source for their misperception about eligibility, while just seven percent of those who did not try to apply for food stamps reported that “distaste” for public assistance prevented their participation. The notion of welfare stigma, then, does not appear to affect the participation decision of the elderly to a significant extent.

6.2. Nonparticipants Are Less Needy

The empirical results presented here also suggest that the take-up of food stamps is strongly motivated by economic incentives. If this view holds, the degree of need for food assistance should be lower for elderly nonparticipants than for participants. In this sub-section, I investigate a set of food security measures, comparing eligible nonparticipants to those who participate. The answer to whether nonparticipants are food-secure also has important implications for the well-being of the elderly.

The first piece of evidence comes from a set of self-assessed food-security questions posed in the 1999, 2001, and 2003 PSID surveys. Table 9 presents several indicators of food security for elderly people who are eligible for food stamps, displayed separately by FSP participation status. Specifically, individuals are asked, “*Did you ever run out of the food that you needed to make a meal and didn’t have money to get more?*” and are then asked, “*Do you have enough and the kinds of food wanted?*” Virtually every indicator suggests a lower level of need among eligible nonparticipants. Compared to participants, elderly eligible nonparticipants are more likely to report food sufficient: about 85 percent of them answer that they do not/never run out of food because of money and over 70 percent state that they always have enough and the kinds of food they want. The level of need is also far lower among older eligible nonparticipants.

However, previous work has expressed general skepticism about how accurately self-perceived measures map “true” food security status, because people’s reports of food hardship are also likely to reflect the respondent’s subjective notions regarding appropriate food

standards. It has been noted that correlations between self-reported hardship measures and objective measures are weak (Gundersen and Ribar 2005). For these reasons, I further investigate the two other standard objective measures of food security: food expenditure and nutrition intake, which measure the quantity and quality of food consumed, respectively.

In the PSID, total food expenditure is defined as the sum of expenditures on food consumed at home, food consumed away from home, and the face value of food stamps received. Figure 6 summarizes the equivalence-scale adjusted total food expenditure by participation status for eligible elderly individuals over time. It also compares the amount spent on food by eligible elderly individuals with the budget amounts suggested by the Thrifty Food Plan (TFP), the least expensive of several USDA-created food plans, which is designed to provide adequate nutrition with minimum quantities of food. We see that both participants and nonparticipants spent more than the amount suggested by the TFP. Moreover, food expenditure is higher for nonparticipants as compared with participants: on average, nonparticipants spend \$340 more per year,

To summarize and quantify the differences in food expenditure between elderly participants and nonparticipants, I estimate a series of regressions with food consumption expenditure as the dependent variable (Table 10). The coefficient of interest is an indicator variable for FSP participation.²⁴ The estimates from OLS shows that eligible nonparticipants have higher food expenditures relative to participants: on average, they spend 9 percent more on total food consumed, and 12 percent more on food eaten at home, and 44 percent more on food consumed outside home. The results from the individual fixed-effects model are consistent with those of OLS, but the magnitude of the coefficients is slightly smaller (Column 2 of Table 10).

While the level of food expenditure does not necessarily reflect the quality of food intake, if the low level of food expenditure for participants is caused by excessively limited resources,

²⁴ Other controls include demographic characteristics, financial resources, health indicators, and indicators of participating in other public assistance programs. State dummies and year dummies are also included.

we should expect to observe a deterioration in the quality or quantity of food they consume. The CSFII,²⁵ which provides tremendously detailed accounts of a respondent's dietary habits, is a suitable dataset for investigating actual food consumption. I focus on eight nutritional measures: total calories, vitamin A, vitamin C, vitamin E, calcium, saturated fat, cholesterol, and protein, and regress the log of the nutrition measure in participation status, controlling for income, race, sex, family composition, health indicators, as well as state and year dummies. As seen in Table 11, the only statistically significant coefficients suggest that, if anything, eligible nonparticipants eat better: they consume more vitamins (about 15% more vitamin A), which have higher income elasticities,²⁶ and consume less fat and cholesterol, which is relatively cheap. In addition, the CSFII data confirms the findings of the analysis using the PSID, that both the food security level and food expenditures are higher for the elderly nonparticipants.

The final piece of corroborating evidence comes from alternative methods of measuring elderly poverty. Previous research has argued that consumption is a more direct and appropriate measure of economic well-being than income. Given the fact that the elderly are more likely to have accumulated liquid assets, and to own houses and cars that can be used to maintain consumption even when income is low, income- and consumption-based poverty measures might display distinct patterns among the elderly. Eligibility for the FSP is determined primarily by income-poverty measures. While both elderly participants and eligible nonparticipants are income poor, it is quite plausible that many of those nonparticipants would not be considered poor if consumption-based poverty measures were used. If they are not poor, this would provide an additional rationale for their non-participation.

²⁵ Appendix E describes the survey and the sample.

²⁶ According to Aguiar and Hurst (2005), nutritional measures vary with lifetime resources. Vitamins and calcium are a strictly increasing function of income, while cholesterol and saturated fat are inferior goods.

To further explore this matter, I use the CE Survey and construct a consumption-based poverty measure following Meyer and Sullivan (2008).²⁷ Under this measure, this person is poor if her/his total household consumption is below the poverty line. Figure 7 reveals, strikingly, that no more than 30 percent of elderly eligible nonparticipants are poor under the consumption-based poverty measure, while of those who take up benefits, over 70 percent are still considered poor. In addition, of eligible nonparticipants, the ratio of their consumption to the poverty threshold ranges from 1.4 to 1.7, with an increasing tendency over time.

In summary, all the evidence presented in this sub-section points to a single conclusion: on the whole, elderly individuals opting out the program are less needy. Therefore, low participation does not appear to be a concern of nutrition well-being at the population level for the elderly.

7. The Interaction between the FSP and the ENP

While the take-up rate of food stamps among the elderly is low, the use of the ENP, another food assistant program which targets on the elderly, is high, particularly among the oldest and home-bound elderly. One plausible explanation for the low take-up of the FSP among the elderly is that the FSP is being crowded out by the ENP, the program more effectively targeting the elderly population. This part of paper aims to explore the interaction of the FSP with the ENP.

7.1. The Elderly Nutrition Program

The ENP is the largest Older American Act program and is designed to address problems of dietary inadequacy and social isolation among older persons. It was officially established in 1972, providing meals for senior citizens at sites where people congregate, such as senior centers, churches, and schools, and later expanded by Congress in 1978 to include the provision of home-delivered meals to homebound elderly. All seniors aged 60 and older, regardless of income, are eligible to participate in

²⁷ The consumption poverty measure is constructed as the sum of: 1) all money expenditures; 2) the value of public and private health insurance; 3) the value of a service flow for vehicle consumption based on the market value of the vehicle; 4) the value for the service flow of housing consumption.

the ENP. Participants are encouraged to make voluntary contributions for services they receive, but they cannot be denied services if they fail to contribute.

One might think that in comparison to the FSP, the ENP is a small program; in fact, there are more elderly individuals participating in the ENP than in the FSP. As shown in Table 12, there are on average about 1.65 times the number of elderly individuals participating in the ENP during the 1995-2004 period, and the value of meals served by the ENP equals about 70 percent of food stamp benefits received by the elderly. Because appropriations are limited, the elderly are not entitled to services and may face waiting lists or no services at all in their particular community. According to a recent report from Mathematica, 41 percent of home-delivered meal providers and 9 percent of congregate meal sites have a waiting list for participants. If all elderly individuals who applied for the ENP were to receive the service, the number of the elderly in the ENP and the value of meals served would be even greater.

Although all seniors aged 60 and over are eligible to participate in the ENP, the program mainly targets those with the greatest economic or social need, particularly low-income and minority persons. In 2004, half of home-delivered meal recipients and more than one-third of group meal recipients had income below the federal poverty level.

7.2. Is the FSP being crowded out by the ENP?

The relationship between use of the ENP and food stamp take-up is not well understood. On the one hand, individuals who use one form of food assistance may be more likely than others to use another form, either because of issues related to stigma or because these individuals are "plugged in" to the food assistance network. It is nonetheless possible that the FSP is being crowded out by the ENP. The design of the ENP program offers competitive advantages over the FSP, especially for the elderly. While group meal sites and home-delivered meals provide elderly individuals with ready-to-consume food products, utilization of food stamps requires the capacity

to acquire food and prepare meals, which often decreases with age due to physical disabilities and geographical/social isolation (Osteraas et al.1983). If low-income elderly individuals view the ENP as a substitute for food stamps, this crowding-out effect may provide an additional explanation for low take-up of food stamps among the elderly.

I use cross-state variations in the ENP caseloads and in the FSP take-up rates among the elderly to identify the effects of ENP participation on food stamp take-up, because the expansion of the ENP at the state level is correlated with an individual's participation status in the ENP but uncorrelated with other variables related to the take-up of food stamps.

Previous literature reports substantial variations in participation rates of the FSP from state to state (Cunningham 2008). This variation is likely a function of two types of factors. First, the composition of the FSP eligible population in each state may affect its participation rate if the likelihood of participation differs substantially across-sub-groups. Second, state participation rates may be influenced by state characteristics, specifically policies such as income-reporting requirements, certification periods, access to welfare offices, and an individual state's eligibility rules for other assistance programs like TANF, as well as its economic conditions.

The cross-state differences in ENP caseload are also quite significant. This cross-state difference is first due to the federal funds allotment: each state receives funds based on their relative share of the U.S. population age 60 and over. Additionally, a state may have a low participation rate in the ENP primarily because of its outreach efforts. A recent evaluation of the ENP report that for every federal (Title III) dollar spent, the program leveraged between \$1.70 (for congregate meals) to \$3.35 (for home-delivered meals) in other funding sources, including state, local and private funds, and participant contributions.²⁸ Cross-state variation in terms of funding leverage is quite substantial. In 2005, while Wyoming, New Mexican, and Idaho

²⁸ Administration on Aging, *Serving Elders at Risk: The Older Americans Act Nutrition Programs — National Evaluation of the Elderly Nutrition Program, 1993-1995*.

leveraged about \$4 to \$5 from other funding sources, the corresponding number for states like Florida, Connecticut, and Washington is around \$ 0.2 (The AOA, 2005).

I use the 1999-2004 March CPS data to estimate participation rates for the FSP among the eligible elderly²⁹ by state, and use administrative data from the AOA to estimate state-specific ENP caseload. For most states the CPS has small sample sizes for the elderly, so I pool each three-year surveys—1999 to 2001 and 2002 to 2004—in order to maintain adequate sample size.

The cross-state variation evident in the statistics is striking. Table 13 shows that during 1999-2001 period, state-specific participation rates of the FSP among eligible elderly vary from 8 percent (tenth percentile) to 28 percent. The corresponding numbers for the ENP vary from 4 percent to 35 percent. Similarly, there are substantial differences in the growth of participation rates in the FSP and the ENP across state over two time-periods. I estimate:

$$FS_{st} = \beta_1 Share_{st} + \beta_2 Poverty_{st} + \lambda ENP_{st} + \gamma_t + \delta_{region} + \varepsilon_{st} \quad (3)$$

where FS_{st} is the take-up rate of food stamps among the eligible elderly for state s in period t .

ENP_{st} is the ENP caseload for state s in period t . $Share_{st}$ represents the share of the state population age 60 and older in period t and $Poverty_{st}$ denotes state-specific poverty rate for the elderly. Controlling for these state-specific demographic characteristics is necessary, as these factors affect both the expansion of the ENP and the take-up rate of the FSP. δ is a vector of region indicators; γ_t are period dummies, and ε_{st} denotes an idiosyncratic error term.

Table 14 reports results from a state-level OLS regression. To account for the presence of heteroskedasticity related to the use of state-level information, I estimate equation 3 using a

²⁹ In this part of analysis, the eligibility for the FSP is only based on age specific income test, accounting for dependent care deduction, ignoring the more detailed program rules that determine eligibility.

feasible GLS procedure.³⁰ This shows that the ENP caseload has a significant negative effect on FSP participation among the eligible elderly: a 24 percentage-point increase in the average state ENP enrollment of the elderly is associated with a 10 percentage-point decrease in the probability of their taking up food stamps.

I next ask if *changes* in ENP enrollment over time are correlated with state-specific participation trends in the FSP for elderly individuals. The first difference estimation also captures any unobserved characteristics of states that are related to both FSP take-up rate and the ENP caseload. Results are presented in Table 14, Column (2). I again find a significant negative relationship between the change in the ENP caseload in a state and the change in the FSP participation rate of the eligible elderly in that state; states in which the ENP has expanded most rapidly generally also experienced decline/slower growth in FSP participation. The magnitude of the coefficient of interest is larger compared to that of the pooled OLS.

One possible concern is that states having higher enrollment in the ENP are states that have a higher underlying need for welfare. If that is the case, then the positive bias arising from the endogenous expansion of the ENP suggests that the estimates presented above are likely lower bound estimates. The true effect of the ENP on the FSP will only be bigger in magnitude.

To illustrate how big this crowding-out effect is, I conduct a simple calculation by using 2004 data. In 2004, 4.8 million individuals aged 60 and above reported having income below poverty line, which make them potentially eligible for food stamp benefits. At the same time, administrative data shows that 2.8 million elderly individuals received group or home delivered meals from the ENP, and about half of this group lived in poverty. Using the point estimate, -.24, from GLS regression, in a counterfactual scenario, were there no the ENP, take-up rate of food

³⁰ I first regress FS_{st} on all explanatory variables and obtain residuals, \hat{u} . Then I created $\log(\hat{u}^2)$ and run the regression of $\log(\hat{u}^2)$ on all explanatory variables to obtain the fitted values \hat{g} . I next exponentiate the fitted value and created $\hat{h} = \exp(\hat{g})$. Finally, I estimate equation (3) by weighted least squares procedure, using weights $1/\hat{h}$.

stamps by the elderly will increase by seven percentage point, which represents an increase of 24 percent from the mean (29 percent over 1979-2004 period).³¹

The findings suggest that for the elderly seeking food assistance, group and home-delivered meals largely substitute for, rather than supplement, the FSP. From a policy perspective, this finding makes the low take-up of food stamps among the eligible elderly a less troubling matter. The ENP provides an important alternative for needy elderly individuals. On the other hand, the success of the ENP raises concerns as to the effectiveness of the FSP in reaching eligible older Americans. The program design of the FSP itself may provide an additional explanation for the low take-up: the FSP may not be well-suited to the elderly population. How the FSP should be altered to meet the needs of the elderly more effectively in the future will clearly require further research.

8. Conclusion

The decision of so many elderly poor not to accept additional food stamp benefits is puzzling. The goal of this study is to help understand the underlying reasons. The evidence points to several conclusions. First, the low rate of take-up by the elderly is more the result of a low initial rate of adoption of the program, than failure to maintain enrollment. Second, take-up of food stamps is strongly motivated by economic incentives. The lower expected benefit level and relatively better financial situation of the elderly account for about one third of the difference in take-up between the elderly and the non-elderly. Third, information deficiencies significantly impede participation among the elderly. Ignorance or confusion regarding eligibility status is substantial among the elderly. Finally, the Elderly Nutrition Program substitutes for the Food

³¹ This calculation is likely upper-bound estimate given the elderly may take up both food stamps and group/home delivered meals. The evidence from the PSID 1999-2005 surveys indicates that among people receive meals for elderly, 31 percent of them also take up food stamps.

Stamp Program among the elderly population: for the elderly in need of food assistance, group and home-delivered meals are important alternative options.

The policy implications of these results are straightforward. First, as enrollment in the FSP is strongly related to economic incentive, those in great need ought to enroll. The finding that eligible elderly nonparticipants are on average less needy indicates that the utility loss to the nonparticipants is not as high as the problem sounds. Given the fact that over 85 percent of eligible nonparticipants report they do not/never run out of food because of money (Table 9), low take-up does not appear to be a concern of nutritional well-being at the population level for the elderly. Nevertheless, the average food stamp benefit that these nonparticipant leave on the table is about \$750 per year. Were they to participate, this extra income could not only free up household funds, allowing them to be spent on medicine or energy bill, but would lead to an increase of \$180 in their annual food expenditure,³² a change of eight percent relative to the mean.³³

The results also suggest that information barriers prevent some elderly persons from benefiting from the program. The effort aimed at informing low-income elderly must entail more than simply making them aware that certain programs exist. In addition, it is not clear whether making more information available will solve the nonparticipation problem, because information acquisition is endogenous. More research is required in order to determine which channels would most efficiently and effectively convey the information.

The interaction between the ENP and the FSP provides interesting policy insights as well. While the program design of the ENP is well-suited to meeting the needs of the elderly, the high enrollment rates for the ENP are anticipated. It is thus important for policy makers to focus on the ways the FSP should be altered to more effectively serve the elderly population.

³² According to Hoynes and Schanzenbach, the marginal propensity to consume food out of food stamp income equals to 0.238 for low income households.

³³ Estimated mean food expenditure for elderly nonparticipants is \$2,267 per year during 1979-2004. Refer to Figure 6.

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Figure 1 A. Food Stamp Eligibility Rate for the Elderly by Year Using Various Eligibility Criteria (PSID, Age 60+ in Each Survey Year, Weighted)

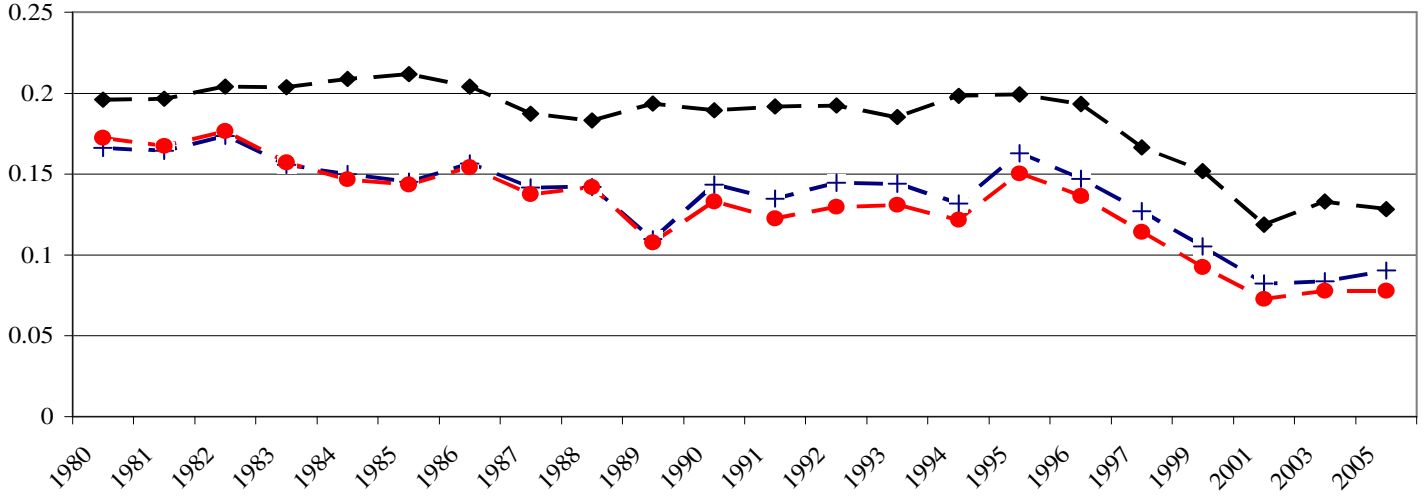
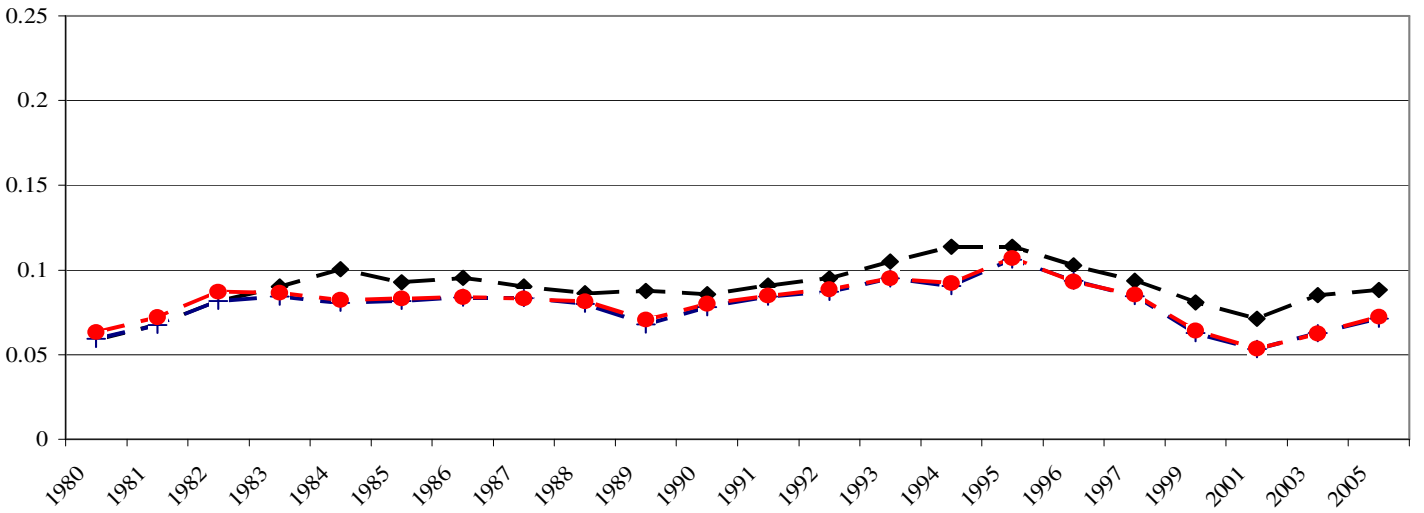


Figure 1 B. Food Stamp Eligibility Rate for the Non-Elderly by Year Using Various Eligibility Criteria (PSID, Age 30-59 in Each Survey Year, Weighted)



- ◆ 1. Gross income test
- + 2. Age specific test with dependent, shelter and medical expenditure deductions, as well as asset test
- 3. Age specific test with dependent, shelter and medical expenditure deductions, asset test, categorical eligibility, excluding nursing home

Figure 2 A. Food Stamp Take-up Rate for the Eligible Elderly by Year Using Various Eligibility Criteria (PSID, Age 60+ in Each Survey Year, Weighted)

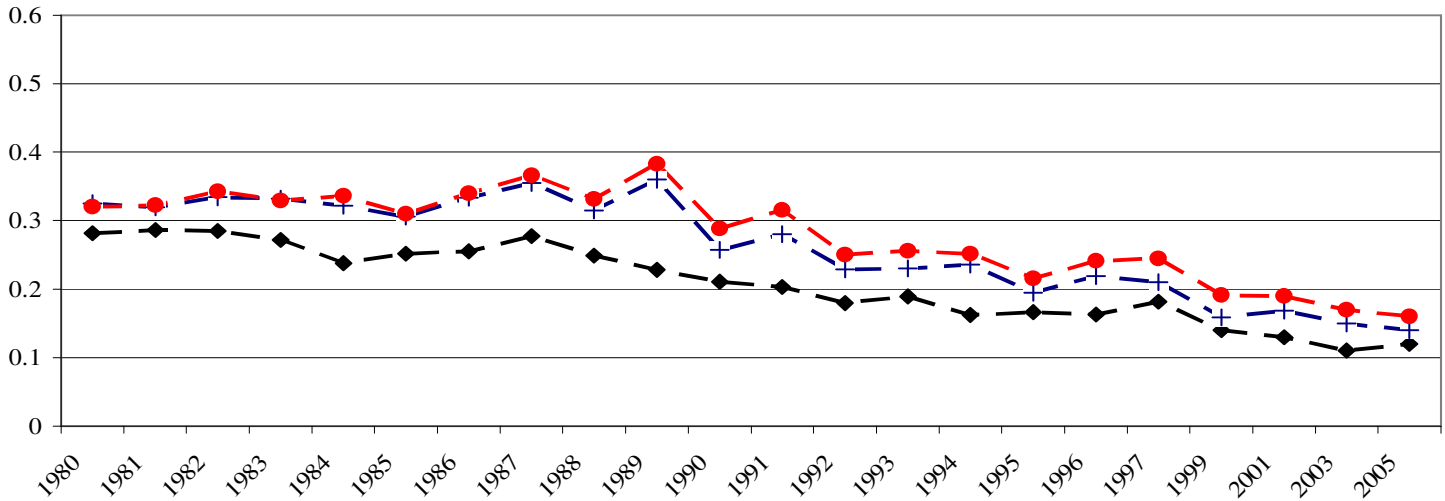
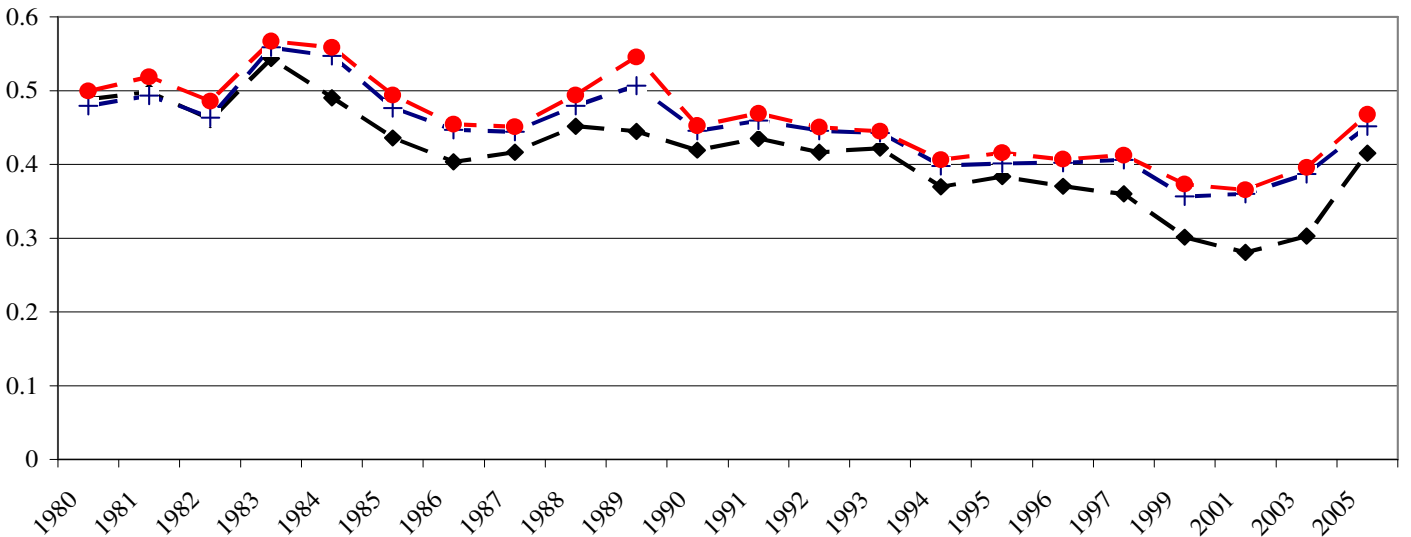


Figure 2 B. Food Stamp Take-up Rate for the Eligible Non-Elderly by Year Using Various Eligibility Criteria (PSID, Age 30-59 in Each Survey Year, Weighted)



- ◆ 1. Gross income test
- + 2. Age specific test with dependent, shelter and medical expenditure deductions, as well as asset test
- 3. Age specific test with dependent, shelter and medical expenditure deductions, asset test, categorical eligibility, excluding nursing home

Figure 3. Food Stamp Take-up Rate for Adjunctive Eligible Individuals by Year (PSID, Weighted)

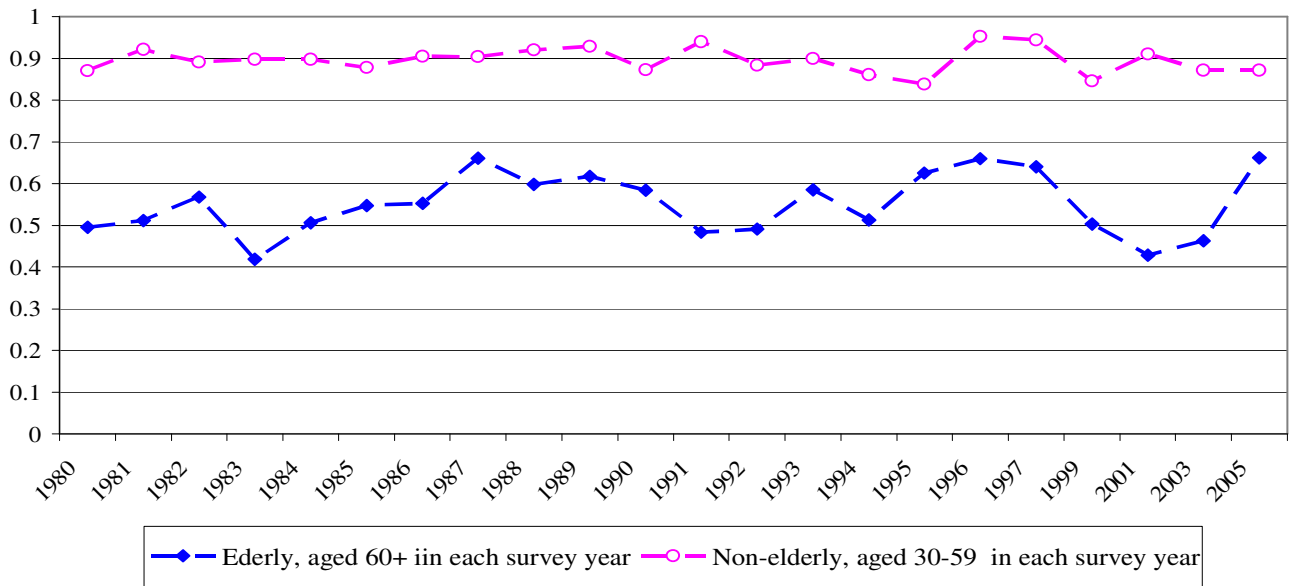


Figure 4. Food Stamp Take-up Rate for Eligible Elderly and Non-elderly Individuals by Year (PSID, Weighted, Adjusted for Under-reporting)

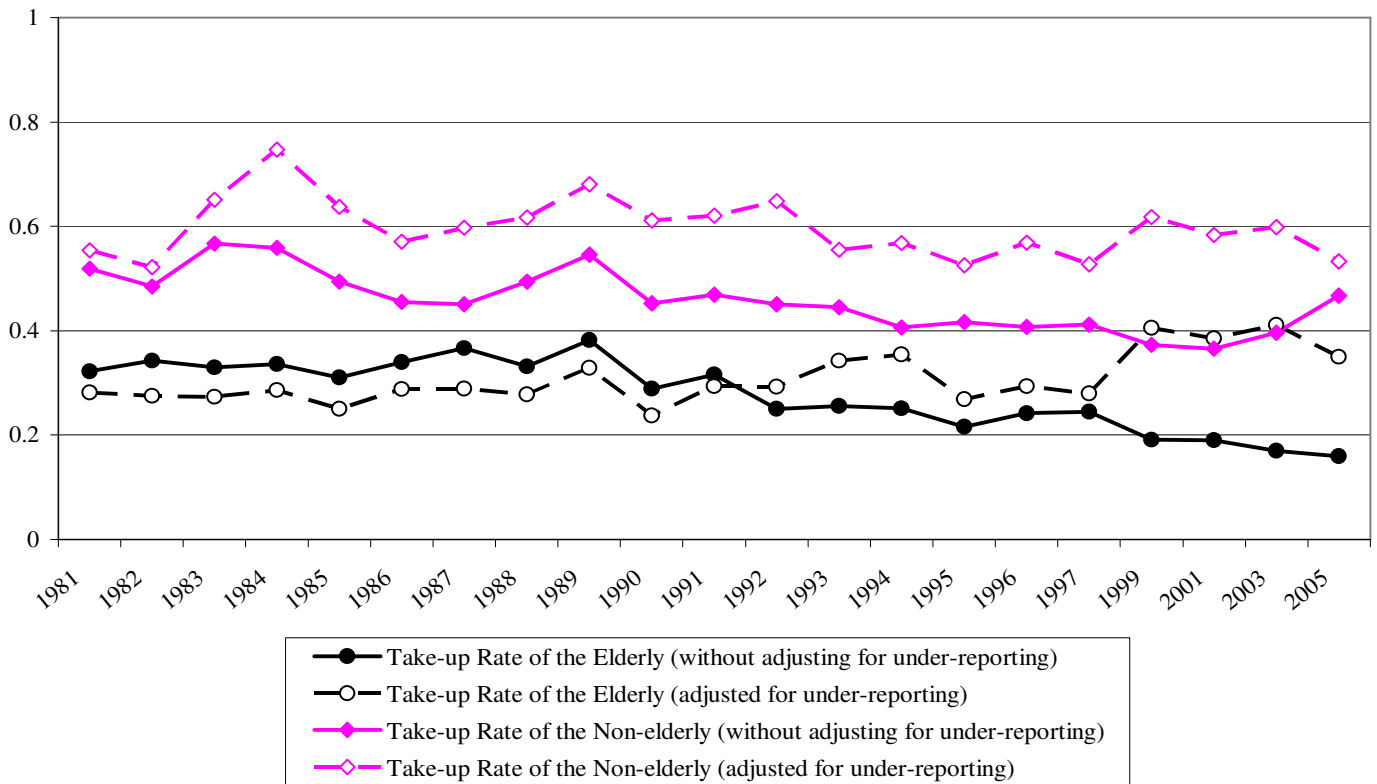


Figure 5. The Empirical Hazard for Ongoing Non-receipt Eligibility Spells that At Risk of Being Taken Up (PSID, 1980-2005)

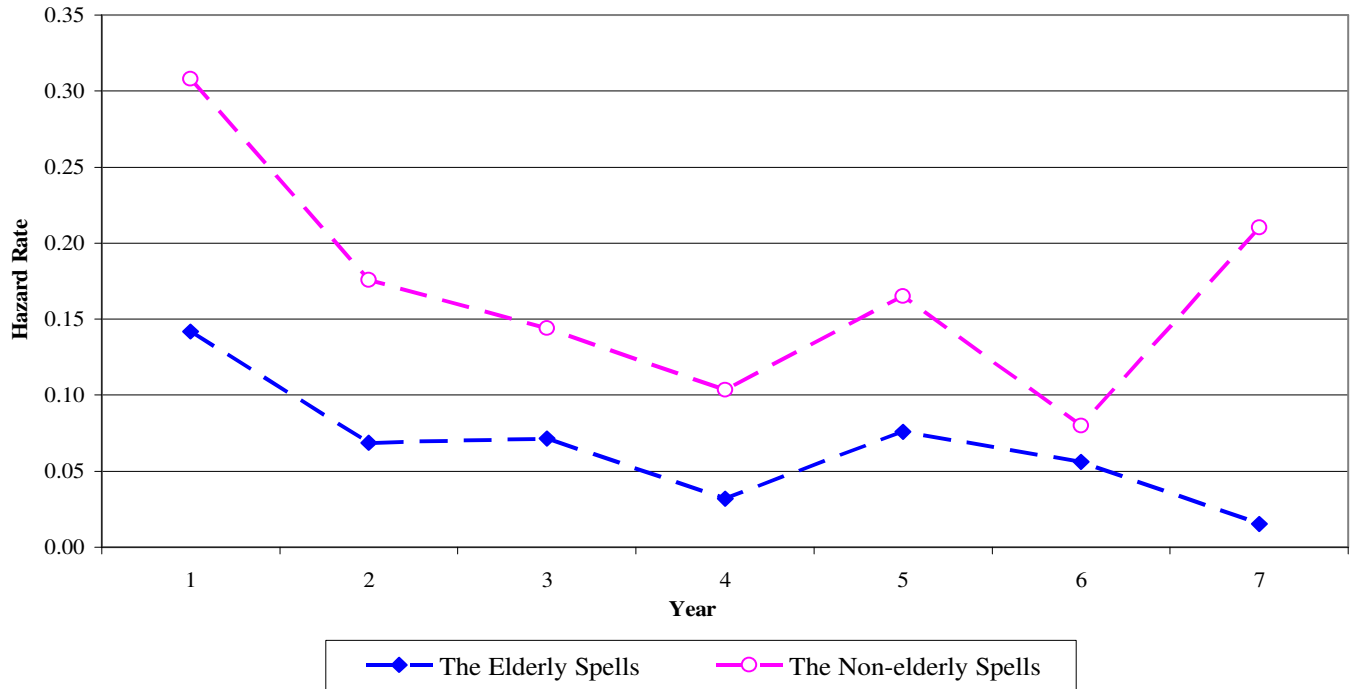
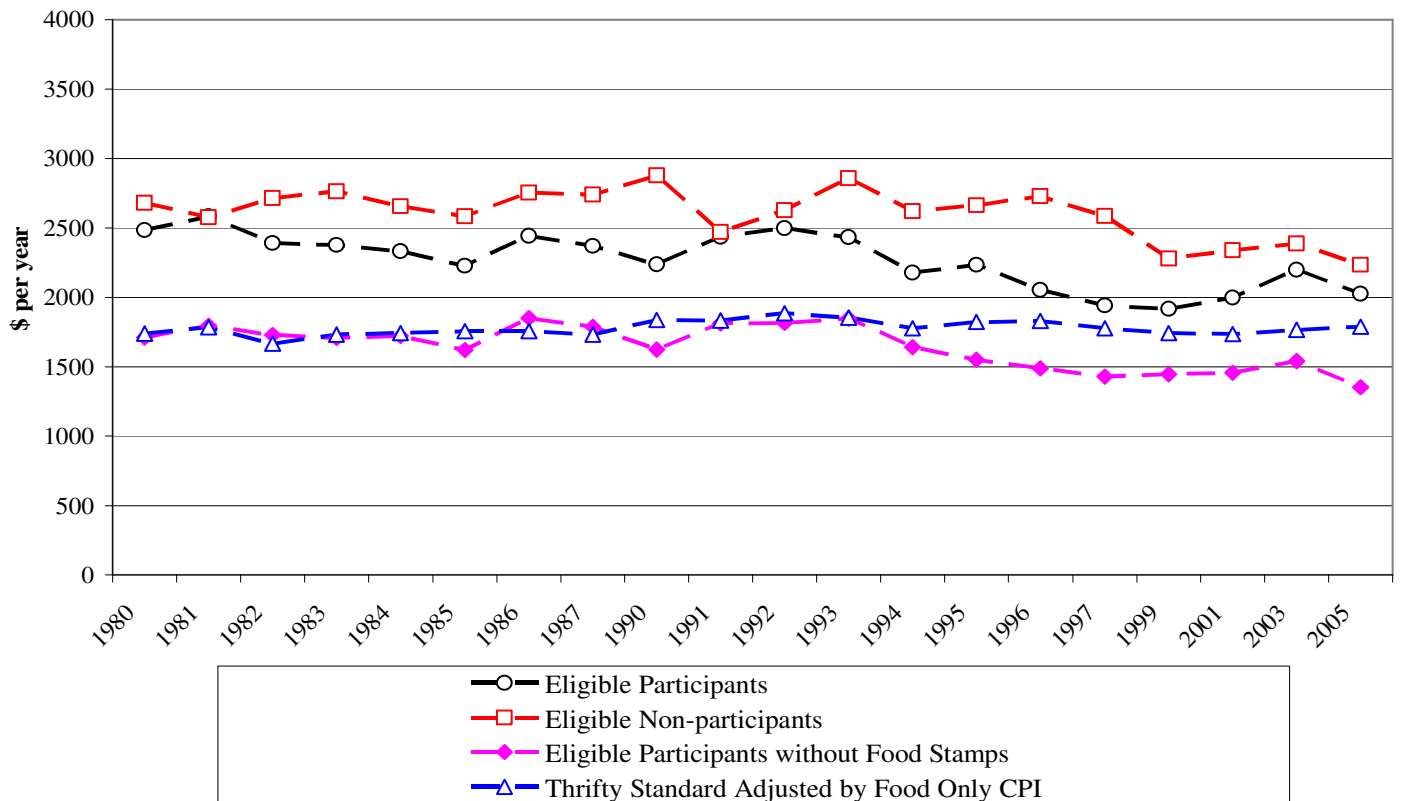
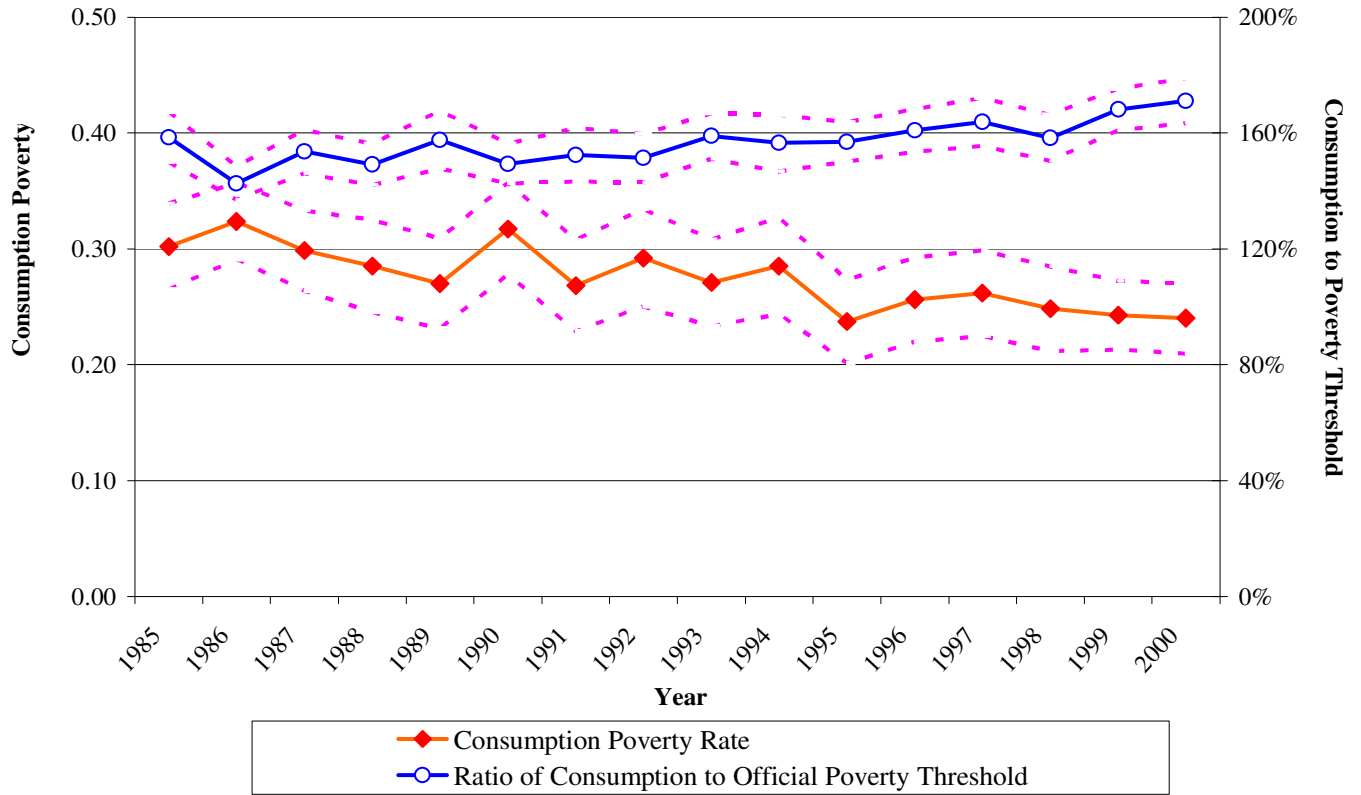


Figure 6. Food Consumption Expenditures by Food Stamp Program Participation Status among the Eligible Elderly by Year (PSID, 1980-2005, Age 60+)



**Figure 7. Consumption Poverty for Eligible Non-participants of the Food Stamp Program
(CE Survey, 1985-2000, Age 60+)**



**Table 1. The Sequential Use of Food Stamps after an Eligibility Spell Begins
(PSID, 1980-2005)**

Panel A: The Elderly (60+)				
Duration of Eligibility Spell (Include only Non-Left-Censored Spells)	Ongoing Eligibility Spells without Previous Receipt	Beginning Receiving This Year	Right Censored This Year without Receipt	Ending This Year without Receipt
	number	number	number	number
1 Year	1854	263	234	687
2	670	46	61	171
3	392	28	59	86
3+	219	29	101	89
Among all food stamp eligibility spells	1854	366* 19.74% **	455 24.54%	1033 55.72%

Panel B: The Non-elderly (30-59)				
Duration of Eligibility Spell (Include only Non-Left-Censored Spells)	Ongoing Eligibility Spells without Previous Receipt	Beginning Receiving This Year	Right Censored This Year without Receipt	Ending This Year without Receipt
	number	number	number	number
1 Year	3518	1083	298	1227
2	910	160	43	256
3	451	65	74	119
3+	193	57	58	78
Among all food stamp eligibility spells	3518	1365 38.80%	473 13.45%	1680 47.75%

*This number differs from the total number of nonleft-censored participation spells showed in Appendix D. Because within the time range of one eligibility spell, there may be multiple participation spells. People may take up for a while, and drop out while still remain eligible, then take up again. About 4.5 percent elderly participation spells and 6 percent non-elderly spells falls into this category.

**This number=366/1854

Table 2: Post Program Spells and Ongoing Eligibility (PSID, 1980-2005)

Panel A: The Elderly (60+)			Panel B: The Non-elderly (30-59)		
Total Number of Post Program Spells	102 equal to 27.87% of total participation spells that ever been taken-up		Total Number of Post Program Spells	367 equal to 26.88% of total participation spells that ever been taken-up	
Years after Food Stamp Participation Spell Ends	# of Ongoing Spells that Still Eligible	Percent Still Eligible*	Years after Food Stamp Participation Spell Ends	# of Ongoing Spells that Still Eligible	Percent Still Eligible
1 Year	61	59.80%	1 Year	205	55.86%
2 Year	31	30.39%	2 Year	103	28.07%
3 Year	28	27.45%	3 Year	65	17.71%
3+ Year	21	20.59%	3+ Year	37	10.08%

*Numbers in this column=# of ongoing spells that still eligible in period t/ total number of post program spells

Table 3. Descriptive Characteristics of FSP Eligible Participants and Non-participants by Age

	Age															
	30-59		60+		60-69				70-79				80+			
	Eligible	Individuals	Eligible	Individuals	Non-Participants	Participants	Non-Participants	Participants	Non-Participants	Participants	Non-Participants	Participants	Non-Participants	Participants		
	Mean	Standard Deviations	Mean	Standard Deviations	Mean	Standard Deviations	Mean	Standard Deviations	Mean	Standard Deviations	Mean	Standard Deviations	Mean	Standard Deviations	Mean	Standard Deviations
Demographics																
Female	0.62	(0.48)	0.69	(0.46)	0.68	(0.47)	0.73	(0.44)	0.67	(0.47)	0.75	(0.43)	0.72	(0.45)	0.78	(0.42)
Family size	3.36	(1.79)	2.09	(1.38)	2.31	(1.36)	2.52	(2.03)	1.95	(1.26)	2.09	(1.50)	1.62	(1.01)	1.79	(1.14)
Married	0.35	(0.45)	0.37	(0.45)	0.46	(0.49)	0.31	(0.45)	0.37	(0.47)	0.28	(0.42)	0.21	(0.39)	0.18	(0.35)
Never married	0.24	(0.41)	0.06	(0.23)	0.06	(0.22)	0.05	(0.22)	0.05	(0.21)	0.05	(0.22)	0.07	(0.26)	0.05	(0.22)
Education	11.25	(2.45)	8.78	(3.32)	8.98	(3.28)	8.16	(3.12)	8.43	(3.23)	7.40	(3.01)	8.70	(3.39)	7.17	(3.12)
White	0.26	(0.44)	0.35	(0.48)	0.26	(0.44)	0.15	(0.36)	0.36	(0.48)	0.20	(0.40)	0.54	(0.50)	0.37	(0.49)
Financial resources																
Income/poverty line	0.78	(0.32)	0.83	(0.26)	0.85	(0.30)	0.79	(0.22)	0.82	(0.26)	0.77	(0.20)	0.76	(0.29)	0.76	(0.19)
Positive wealth holding	0.11	(0.26)	0.13	(0.25)	0.11	(0.27)	0.07	(0.20)	0.14	(0.30)	0.10	(0.23)	0.17	(0.31)	0.10	(0.24)
Housing ownership	0.35	(0.45)	0.56	(0.47)	0.59	(0.48)	0.37	(0.47)	0.60	(0.47)	0.47	(0.48)	0.57	(0.47)	0.52	(0.48)
Car ownership	0.58	(0.46)	0.49	(0.47)	0.59	(0.48)	0.33	(0.45)	0.51	(0.49)	0.39	(0.47)	0.39	(0.47)	0.26	(0.41)
SSI receipts	0.08	(0.23)	0.22	(0.35)	0.15	(0.32)	0.38	(0.43)	0.18	(0.36)	0.49	(0.45)	0.14	(0.32)	0.49	(0.47)
AFDC receipts	0.13	(0.27)	0.02	(0.12)	0.01	(0.10)	0.07	(0.23)	0.01	(0.07)	0.03	(0.14)	0.00	(0.06)	0.03	(0.17)
Calculated benefit per household**	2408	(1520)	1338	(1098)	1432	(1167)	1539	(1397)	1213	(1062)	1254	(1355)	1064	(1040)	1073	(1089)
Calculated benefit per person***	1161	(569)	805	(496)	816	(547)	820	(453)	752	(509)	745	(504)	724	(534)	718	(467)
Health condition																
Disabled	0.28	(0.39)	0.60	(0.40)	0.54	(0.44)	0.73	(0.38)	0.57	(0.43)	0.71	(0.38)	0.60	(0.43)	0.70	(0.37)
Food Security																
Insufficient food because of money problem	0.27	(0.40)	0.20	(0.36)	0.22	(0.39)	0.31	(0.42)	0.18	(0.36)	0.28	(0.41)	0.13	(0.31)	0.17	(0.35)
Number of observations	3171*		1381		697		418		538		259		296		87	

* One individual can appear more than once in the table

** Data on benefits is expressed in 2005 dollars using CPI-U

*** Adjusted using equivalence scales recommended by Citro and Micheal (1995): (Number of adults+number of children*0.7)^0.7

Table 4. Food Stamp Program Participation among the Eligible (Logit, Marginal Effects)

Panel A: The Elderly (60+)			Panel B: The Non-elderly (30-59)		
	Coef.	Std.		Coef.	Std.
Age 65-69	-0.071	(0.025) ***	Age 35-39	-0.006	(0.018)
Age 70-74	-0.117	(0.030) ***	Age 40-44	-0.024	(0.024)
Age 75-79	-0.072	(0.036) **	Age 45-49	-0.042	(0.028)
Age 80+	-0.155	(0.040) ***	Age 50+	-0.009	(0.026)
Female	0.067	(0.041) *	Female	0.076	(0.020) ***
Married	-0.073	(0.038) *	Married	-0.056	(0.022) **
High school and above	-0.064	(0.041) *	High school and above	-0.036	(0.019) *
White	-0.104	(0.040) ***	White	-0.085	(0.025) ***
Family size	0.022	(0.013) *	Family size	0.008	(0.007)
Have kids under 18	0.013	(0.047)	Have kids under 18	0.101	(0.024) ***
Own home	-0.139	(0.032) ***	Own home	-0.113	(0.021) ***
Positive asset holding	-0.023	(0.032)	Positive asset holding	-0.069	(0.026) ***
Disabled	0.131	(0.024) ***	Disabled	0.142	(0.016) ***
FS benefit (\$000s)	0.021	(0.011) **	FS benefit (\$000s)	0.043	(0.008) ***
Receive SSI	0.320	(0.032) ***	Receive SSI	0.243	(0.023) ***
Receive TANF	0.396	(0.064) ***	Receive TANF	0.447	(0.015) ***
State controls	Yes		State controls	Yes	
Year controls	Yes		Year controls	Yes	
Baseline	Age 60-64		Baseline	Age 30-34	
Number of observations	5196		Number of observations	11651	

Standard deviations clustered by individual are in parentheses

* Significant at 10% confidence level; ** significant at 5% confidence level; *** significant at 1% confidence level

**Table 5. Food Stamp Program Participation
among Eligible Elderly
Individual Fixed-Effects (Age 60+)**

	Coef.	Std.
Age 65-69	-	-
Age 70-74	-	-
Age 75-79	-	-
Age 80+	-	-
Female	-	-
Married	-0.064	(0.036) *
High school and above	-	-
White	-	-
Family size	0.026	(0.013) **
Have kids under 18	0.028	(0.041)
Own home	-0.011	(0.030)
Positive asset holding	-0.041	(0.053)
Disabled	0.015	(0.015)
FS benefit (\$000s)	0.002	(0.008)
Receive SSI	0.095	(0.026) ***
Receive TANF	0.161	(0.058) **
State controls	Yes	
Year controls	Yes	
Baseline	Age 60-64	
Number of observations	5560	
Number of individuals	1332	

**Table 6. Hazard Models for Food Stamp Spells, With Controlling for Gamma Heterogeneity
(PSID, 1980-2005, the Elderly Spells)**

Panel A: Eligibility Spells			Panel B: Participation Spells		
	FS Eligibility Spells Ending with Receipt			FS Participation Spells Ending with Continued Eligibility	
	Coef.	Std.		Coef.	Std.
Starting age: 65-69	-0.184	(0.231)	Starting age: 65-69	-0.246	(0.502)
Starting age: 70-74	-0.698	(0.296) **	Starting age: 70-74	-0.463	(0.666)
Starting age: 75-79	-0.725	(0.317) **	Starting age: 75-79	0.668	(0.613)
Starting age: 80+	-1.013	(0.347) ***	Starting age: 80+	0.388	(0.713)
Have taken-up fs before	1.518	(0.258) ***	Have taken-up fs before	-0.694	(0.400)
White	-0.456	(0.186) ***	White	-0.083	(0.415)
Family size indicator	0.183	(0.076) **	Family size indicator	-0.235	(0.173)
Highschool and above	-0.279	(0.225)	Highschool and above	-1.495	(0.756) **
Married	-0.312	(0.206)	Married	0.899	(0.528) *
Have kids under 18	0.389	(0.306)	Have kids under 18	0.749	(0.694)
Female	0.088	(0.186)	Female	0.151	(0.422)
Disabled	0.507	(0.154) ***	Disabled	-0.570	(0.313) *
Receive SSI	1.199	(0.216) ***	Receive SSI	-0.407	(0.415)
Receive TANF	1.692	(0.641) ***	Receive TANF	-0.026	(0.814)
Home ownership	-0.076	(0.166)	Home ownership	0.389	(0.385)
Positive asset holding	0.056	(0.237)	Positive asset holding	-0.026	(0.030)
FS benefit (\$000s)	0.009	(0.013)	FS benefit (\$000s)	-0.160	(0.401)
Length of eligibility spells	Yes	Significant	Length of eligibility spells	Yes	Not significant
Region controls	Yes		Region controls	Yes	
Year controls	Yes		Year controls	Yes	
Baseline	Age 60-64		Baseline	Age 60-64	
Likelihood value	-836.975		Likelihood value	-246.496	
Number of obs	3242		Number of obs	903	
Number of subject	1751		Number of subject	313	

* The results are estimated via the complementary log-log model, with a very flexible specification of the hazard function

* Significant at 10% confidence level; ** Significant at 5% confidence level; *** Significant at 1% confidence level.

**Table 7. Hazard Models for Food Stamp Eligibility Spells
(PSID, 1980-2005, The Elderly Spells)**

Panel A. Never Taken-up Before			Panel B. Taken-up Before		
	FS Eligibility Spells Ending with Receipt			FS Eligibility Spells Ending with Receipt	
	Coef.	Std.		Coef.	Std.
Starting age: 65-69	-0.343	(0.353)	Starting age: 65-69	-0.084	(0.207)
Starting age: 70-74	-0.777	(0.430) *	Starting age: 70-74	-0.235	(0.245)
Starting age: 75-79	-0.926	(0.312) ***	Starting age: 75-79	-0.215	(0.275)
Starting age: 80+	-1.590	(0.536) ***	Starting age: 80+	0.048	(0.316)
White	-0.515	(0.259) **	White	-0.255	(0.206)
Family size indicator	0.248	(0.125) **	Family size indicator	0.147	(0.097)
Highschool and above	-0.566	(0.329) *	Highschool and above	0.268	(0.241)
Married	-0.335	(0.322)	Married	-0.276	(0.224)
Have kids under 18	0.447	(0.447)	Have kids under 18	-0.075	(0.307)
Female	-0.041	(0.256)	Female	0.140	(0.207)
Disabled	0.533	(0.221) **	Disabled	0.428	(0.179) **
Receive SSI	1.064	(0.325) ***	Receive SSI	0.929	(0.193) ***
Receive TANF	1.391	(0.821) *	Receive TANF	1.323	(0.453) ***
Home ownership	-0.474	(0.233) **	Home ownership	0.221	(0.174)
Positive asset holding	-0.128	(0.332)	Positive asset holding	0.366	(0.304)
FS benefit (\$00s)	0.003	(0.018)	FS benefit (\$00s)	0.014	(0.016)
Length of spell	Yes	Significant	Length of spell	Yes	Not significant
Region controls	Yes		Region controls	Yes	
Year controls	Yes		Year controls	Yes	
Likelihood value	-479.280		Likelihood value	-327.310	
Number of obs	2488		Number of obs	754	

* The results are estimated via the complementary log-log model, with a very flexible specification of the hazard function

* Significant at 10% confidence level; ** Significant at 5% confidence level;*** Significant at 1% confidence level.

Table 8. Food Stamp Participation Questions for Eligible Nonparticipants (PSID, 1980, 1981, and 1987)

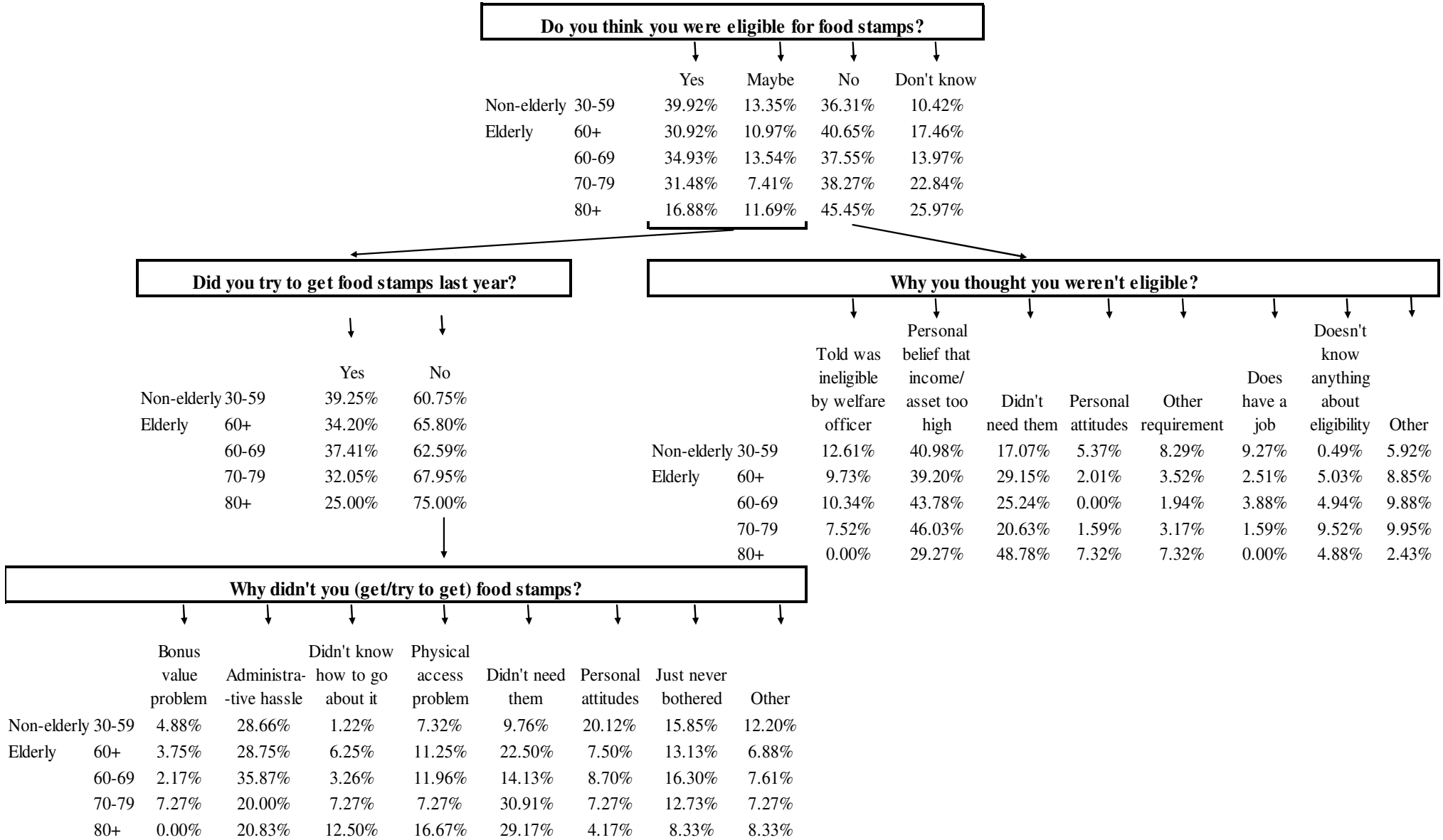


Table 9. Food Security Questions by Age Group (PSID, 1999, 2001, 2003, Among the Eligible Elderly)

Did you ever run out of the food that you needed to make a meal and didn't have money to get more?											
Eligible non-participants					Participants						
		Yes/often	Sometimes	Never	No			Yes/often	Sometimes	Never	No
Elderly	60+	9.2%	5.8%	37.9%	47.1%	Elderly	60+	16.9%	11.6%	24.2%	47.3%
	60-69	11.5%	5.0%	31.0%	52.5%		60-69	24.2%	8.1%	23.2%	44.4%
	70-79	10.8%	5.6%	40.2%	43.4%		70-79	14.6%	10.4%	29.2%	45.8%
	80+	6.2%	6.8%	42.4%	44.6%		80+	11.1%	22.2%	16.7%	50.0%

Do you have enough and the kinds of food wanted?											
Eligible non-participants					Participants						
		Enough and the kinds of food we wanted	Enough but not always the kinds of food	Sometimes not enough	Often not enough			Enough and the kinds of food we wanted	Enough but not always the kinds of food	Sometimes not enough	Often not enough
Elderly	60+	70.50%	25.18%	4.32%	0.00%	Elderly	60+	42.31%	43.59%	11.54%	2.56%
	60-69	58.16%	37.76%	4.08%	0.00%		60-69	48.48%	39.39%	12.12%	0.00%
	70-79	78.33%	19.17%	2.50%	0.00%		70-79	41.03%	43.59%	10.26%	5.13%
	80+	76.09%	18.48%	5.43%	0.00%		80+	40.00%	46.67%	13.33%	0.00%

**Table 10. Differences in Food Expenditure,
by Food Stamps Participation Status, among the Eligible Elderly
(PSID, 1980-2005, Age 60+)**

	Column (1) Received Food Stamps (OLS)	Column (2) Received Food Stamps (Individual FE)
Total Food Expenditure b	-0.093 *** (0.020) a	-0.051 *** (0.023)
Food Eaten at Home	-0.115 *** (0.022)	-0.085 *** (0.025)
Food Eaten away from Home	-0.440 *** (0.062)	-0.266 *** (0.073)
Number of Observations	6289	6289
Number of Individuals		1499

a. Standard deviations clustered by individual, are in parentheses.

b. Other controls include demographic characteristics, financial resources, health indicator, and indicators for whether or not participate in other welfare programs. State dummies and year dummies are also included.

*Significant at 10% confidence level; **Significant at 5% confidence level;***Significant at 1% confidence level.

**Table 11. Differences in Nutritional Measures,
by Food Stamps Participation Status, among the
Eligible Elderly (CSFII)**

	Received Food Stamps
Log calories	0.022 (0.026)
Log vitamin A	-0.154 ** (0.068)
Log vitamin C	-0.093 (0.065)
Log vitamin E	0.006 (0.043)
Log calcium	-0.014 (0.039)
Log cholesterol	0.075 * (0.046)
Log saturated fat	0.059 * (0.035)
Log protein	0.011 (0.028)
Total food expenditure	-137.122 * (73.375)
Food home	-60.614 (65.416)
Food away	-80.766 *** (29.145)
Food security	-0.200 *** (0.035)
Individuals	1383

Huber-White standard deviations are in parentheses.

Other controls include income, race, sex, family composition, health indicators as well as state and year dummies

*Significant at 10% confidence level; **Significant at 5% confidence level;

***Significant at 1% confidence level.

**Table 12. Comparing the Elderly Nutrition Program to the Food Stamp Program,
FY1995-FY2004**

	Total number of persons participate in home- delivered meals	Total number of persons participate in congregate meals	Total elderly participants of the food stamp program	# of persons in the ENP/# of persons in the FSP
1995	988,738	2,412,468	1,921,000	177.05%
1996	875,093	2,147,756	1,710,000	176.77%
1997	890,489	2,112,923	1,834,000	163.76%
1998	896,153	1,901,555	1,637,000	170.90%
1999	883,942	1,760,068	1,699,000	155.62%
2000	953,038	1,743,292	1,702,000	158.42%
2001	927,894	1,747,984	1,660,000	161.20%
2002	1,000,662	1,905,416	1,687,000	172.26%
2003	985,760	1,861,464	1,788,000	159.24%
2004	966,809	1,775,804	1,919,000	142.92%
	Total values of home- delivered meals (valued as \$3.5 per meal)	Total values of congregate meals (valued as \$2 per meal)	Annual FS benefits of the elderly	Value of meals served by the ENP/FS benefits received by the elderly
1995	\$416.50	\$246.77	\$1,129.55	58.72%
1996	\$416.89	\$237.27	\$964.44	67.83%
1997	\$432.09	\$232.93	\$1,066.54	62.35%
1998	\$453.98	\$228.16	\$891.54	76.51%
1999	\$471.04	\$225.60	\$956.67	72.82%
2000	\$502.41	\$231.73	\$926.94	79.20%
2001	\$502.12	\$224.16	\$888.74	81.72%
2002	\$496.86	\$216.67	\$996.63	71.59%
2003	\$499.19	\$211.46	\$1,122.31	63.32%
2004	\$500.12	\$210.86	\$1,487.96	47.78%

* Numbers in bottom panel are in millions

Data source: FSP Program Operations data and Administrative data from the AOA

**Table 13. Summary of The ENP Caseload and The FSP Participation Rate among The Eligible Elderly by States
(March CPS and the Administrative Data from AOA, 1999-2004)**

	Participation in the ENP among the elderly	Participation in the FSP among the eligible elderly	Participation in the ENP among the elderly	Participation in the FSP among the eligible elderly	Participation in the ENP among the elderly	Participation in the FSP among the eligible elderly
	Period 1: 1999-2001		Period 2: 2002-2004		Changes: Period 2 -Period 1	
10th percentile	3.95%	7.93%	3.49%	8.80%	-1.70%	-5.74%
20th percentile	4.25%	11.07%	3.93%	10.28%	-0.99%	-3.94%
30th percentile	4.89%	12.96%	4.99%	11.83%	-0.49%	-2.98%
40th percentile	5.81%	14.21%	5.99%	12.88%	-0.39%	-1.84%
Median state	6.56%	15.21%	6.50%	15.08%	-0.23%	-0.59%
60th percentile	7.26%	16.43%	6.91%	16.72%	-0.12%	1.03%
70th percentile	8.27%	17.87%	8.47%	18.43%	0.18%	2.73%
80th percentile	10.47%	20.19%	10.56%	21.23%	0.60%	4.81%
90th percentile	12.85%	22.52%	12.90%	24.04%	2.16%	6.40%
95th percentile	18.71%	23.65%	13.64%	25.63%	3.00%	11.41%
Highest state	34.58%	28.22%	36.90%	28.01%	3.90%	14.31%

* The estimates of the FSP participation among the eligible elderly is lower using the CPS, compared to those using the PSID. The lower participation rates in the CPS may be due to: 1) Under-reporting in the CPS: the reporting rate of the benefit receipts in the CPS is lower than that in the PSID; 2) The eligibility criterion adopted in the estimation, which is less stringent than I used when using the PSID data. This is due to the difference in the availability of the information in two data sets.

Table 14. Correlation between the Eldert Nutrition Program Caseload and the Food Stamp Program Participation among the Eligible Elderly by State

(Average of 1999-2001, 2002-2004)

	Column (1)		Column (2)	
	Pooled OLS (GLS)		First Difference	
	Coef.	Std.	Coef.	Std.
Fraction of the elderly that participate in the ENP	-0.240	(0.079) ***	-0.386	(0.206) ***
Fraction of the elderly population	1.299	(0.306) ***	-0.892	(2.624)
The elderly poverty rate	0.037	(0.276)	0.819	(0.413) **
Region controls	Yes		No	
Year controls	Yes		Yes	
State fixed effects	No		Yes	
Number of Observations	98		98	
Number of States	49a		49	

a. The data for Massachusetts are not available from the AOA.

* Significant at 10% confidence level; **Significant at 5% confidence level;***Significant at 1% confidence level.

Appendix A: Determining Program Eligibility

Appendix A-1: Eligibility Criterion for Food Stamp Program

(Effective for Oct. 1, 2008 through Sept. 20, 2009)

To get benefits from the Food Stamp Program (now called Supplemental Nutrition Assistance Program), households must meet certain tests, including income and resources tests:

Income:

Households have to meet income tests unless all members are receiving TANF, SSI, or in some places general assistance. Most households must meet both the gross and net income tests, but a household with an elderly person or a person who is receiving certain types of disability payments has to meet only the net income test.

Gross income means a household's total, nonexcluded income, before any deductions have been made. The gross income limit is set at 130 percent of the poverty line. *Net income* means gross income minus allowable deductions. In 2008, deductions are allowed as follows:

- A 20 percent deduction from earned income;
- A standard deduction of \$144 for households sizes of 1 to 3 people and \$147 for a household size of 4 (higher for some larger households);
- A dependent care deduction not exceed \$200 for each child younger than two and \$175 for all other dependents;
- Legally-owed child support payments;
- Medical expenses for elderly or disabled members that are more than \$35 for the month if they are not paid by insurance or someone else;
- Excess shelter costs that are more than half of the household's income after the other deductions. Allowable costs include the cost of fuel used for heating and cooking, electricity, water, the basic fee for one telephone, rent or mortgage payments and taxes on the home. The amount of the shelter deduction cannot be more than \$446 unless one person in the household is elderly or disabled. The limit is higher in Alaska, Hawaii and Guam.

The net income limit is set at 100 percent of the poverty line.

Resources:

Households may have \$2,000 in countable resources, such as a bank account, or \$3000 in countable resources if at least one person is age 60 or older, or is disabled. Excluded assets include the equity value of one's home and lot, licensed vehicles that are used for income-producing purposes or as a home, or for long distance travel for work, the first \$4,650 of the fair market value of one licensed car³⁴, and most retirement (pension) plans³⁵.

³⁴ With passage of the *Farm Security and Rural Investment Act of 2002*, States have the option to expand state SNAP asset and categorical eligibility. Currently 26 States exclude the value of all vehicles entirely. Of the

Appendix A-2: Asset Imputation

For interview years 1984, 1989, 1994, 1999, 2001, 2003, and 2005, there is complete asset information available in the PSID data and this asset information is used to evaluate asset eligibility for the Food Stamp Program. For years other than these, asset eligibility is evaluated using household annual asset income, including income from dividends, interest, trust funds, and rent, adjusted by a three-year average return of the 6-month certificate of deposit interest rate (information sources: http://www.federalreserve.gov/releases/h15/data/Annual/H15_CD_M6.txt). Other percentage returns were tried without measurable effect.

Asset eligibility evaluated using household annual asset income agrees well with that evaluated using complete asset information. In the robustness check, I applied the imputation methods to years that complete asset information is available. The correlation between asset eligibility evaluated using asset income and that evaluated using complete asset information is **.92** for calendar year 1983, and over **.85** for 1989, 1994, and 1999, and over **.80** for 2001, 2003, and 2005. Thus, it appears that the asset criterion evaluated using asset income is a good approximation of that evaluated using actual complete asset information.

Considering only liquid assets still ignores some assets counted by the Food Stamp Program, therefore, a bias remains that overstates asset eligibility.

remaining 25 States, 16 totally exclude the value of at least one vehicle per household. The other 9 states exempt an amount higher than the SNAP's standard auto exemption to determine the countable resource value of a vehicle.

³⁵ The 2008 Farm Bill excluded most retirement accounts from resources when determining eligibility for SNAP. Before 2008, individual retirement account (IRAs) were not exempt from the Food Stamp asset test.

Table A-1: PSID Information and Adjustments for Determining Program Eligibility

	Eligibility Rules for Nonelderly and Nondisabled Households	Differences in Rules for Elderly and Disabled Households	Source of Information in the PSID	Data Limitations and Adjustments Made
Gross Income Test	Total income <=130 percent of HHS poverty line	Not subject to gross income test	Total family money. It is the sum of taxable income of head and wife; total transfers of head and wife; taxable income of others, and total transfers of others	Annual income reported. No monthly income information
Net Income Test	Total income less deductions <=100 percent of HH poverty line	No difference	See above	See above
Deductions				
Standard	Standard deduction	No difference	No information necessary	N/A
Earned Income	20 Percent of earned income	No difference	Using taxable income subtract asset income. Taxable income is the sum of head's labor income, wife's labor income, asset part of income from farm, business, roomers, etc., rental, interest and dividend income, and wife's income from assets, plus other's taxable income	Labor income only available for head and wife, not other family members.
Dependent Care	max \$200 for kid <2 years old and \$175 for dependents older than two.	No difference	Amount paid in support of dependents	No dependents age information
Excess Shelter Deduction	Excess shelter costs >1/2 of the household's income. Capped	No cap	Mortgage+ property tax+ insurance+ rent	The variable indicating the inclusion of property tax in mortgage payment only available for 1984-87; 1990-05. Using 1984 to impute 80-83, 1987 for 88 and 90 for 89. Insurance information only available after 1990 Utility expenditures are not collected
Child Support Payment	Legally owned child support to a non-household member	No difference	Head's and Wife's/"Wife's" child support paid	Ignored
Medical Expense	None	Elderly medical expenses >=\$35 per month	Amount for all medical care	Only available for 99, 01, 03, 05 waves

Asset Test				
Limit	Assets<=\$2000	Assets<=\$3000	Bond, business, cash, real estate, stock, IRA	Only available for 84, 89, 94, 99, 01, 03, 05. For other years, I impute the value of asset holding by assuming that reported income from assets represents a x percent rate of return on total asset holdings. The rate of return comes from 6 month CD rate.
Excluded Assets	Primary home and vehicle under \$4,650	Value of vehicle used to transport a disabled household member, no maximum	Asset income: the sum of head, wife, and others' income from rent, interest, dividends, trust funds, and royalties, etc.	
Vehicle	Value of vehicle above \$4,650	No difference	Number of cars; the household will be treat as ineligible if the household has more than one car	Use and value of vehicles not collected. Number of cars only available for 1980-1986, 1999-2005. Ignored.
Other				
AFDC/TANF	If all household members receive program then eligibility presumed	No difference	Respondent SSI and AFDC/ADC receipt collected	For SSI, only consider single and couple households received SSI cases, ignored households with co-resident
Work Requirements	Able-bodied household head may be required to work	Not subject to work requirements		Ignored
Citizenship	Some permanent residents are eligible	Eligible if >65 years older and in U.S. on 8/22/96	U.S. born	Ignored
Institutionalized	No eligible if institutionalized	In nursing home is not eligible	Institution and nursing home residence	N/A

Appendix B: Changes in Sample Composition over Time and Reasons for Attrition

My primary sample consists of 3,889 individuals and 38,269 person-year observations. Appendix Table B-1 shows the distribution of the number of person-years in the sample by age group (in five-year intervals) and by year of PSID interview. By moving along the diagonals of the table one can observe the changes in sample size in the particular birth cohorts over time. Table B-2 summarizes the reasons for sample attrition. The larger decline in sample size that occurs as the cohort ages is, for the most part, the result of attrition from the PSID due to the death. Some of this decline is also due to design features of the PSID, most notably to an approximate one-third reduction in sample size occurring between the 1996 and 1997 interviews. The reduction in the PSID sample occurred disproportionately among members of the SEO (Survey of Economic Opportunity), a sub-sample of the PSID consisting of low-income households. Table B-3 illustrates changes of sample composition over time. Because of the structure of these data, I am cautious about drawing conclusions with respect to variations in FSP participation over time. While I expect that the patterns of take-up for given individuals over time are the results of changes in life-cycle phenomena, they also may be influenced by the design features of the PSID.

Table B-1. Distribution of Number of Person-Years in Sample by Age Group and Year of the PSID Interview

Year of Interview	Age					Total
	60-64	65-69	70-74	75-79	80+	
1980	480	410	286	156	138	1470
1985	544	433	362	233	194	1766
1990	582	485	352	281	256	1956
1995	487	523	405	259	308	1982
2001	288	293	314	227	206	1328
2005	340	301	290	288	336	1555
Total	2721	2445	2009	1444	1438	

Table B-2. Reasons for Attrition

Reasons for Attrition	Number of individuals dropped from the survey	Fraction of the total attrition
Individuals died	1128	58.84%
Individuals refuse to answer the survey	203	10.59%
Lost or respondent absent	27	1.41%
Individuals became institutionalized	20	1.04%
Individuals unable to cooperate because of disability	86	4.49%
Office error	11	0.57%
Individuals dropped from the survey due to budgetary constraints	433	22.59%
Individuals moved out	6	0.31%
Other reasons	3	0.16%

Table B-3. Sample Composition

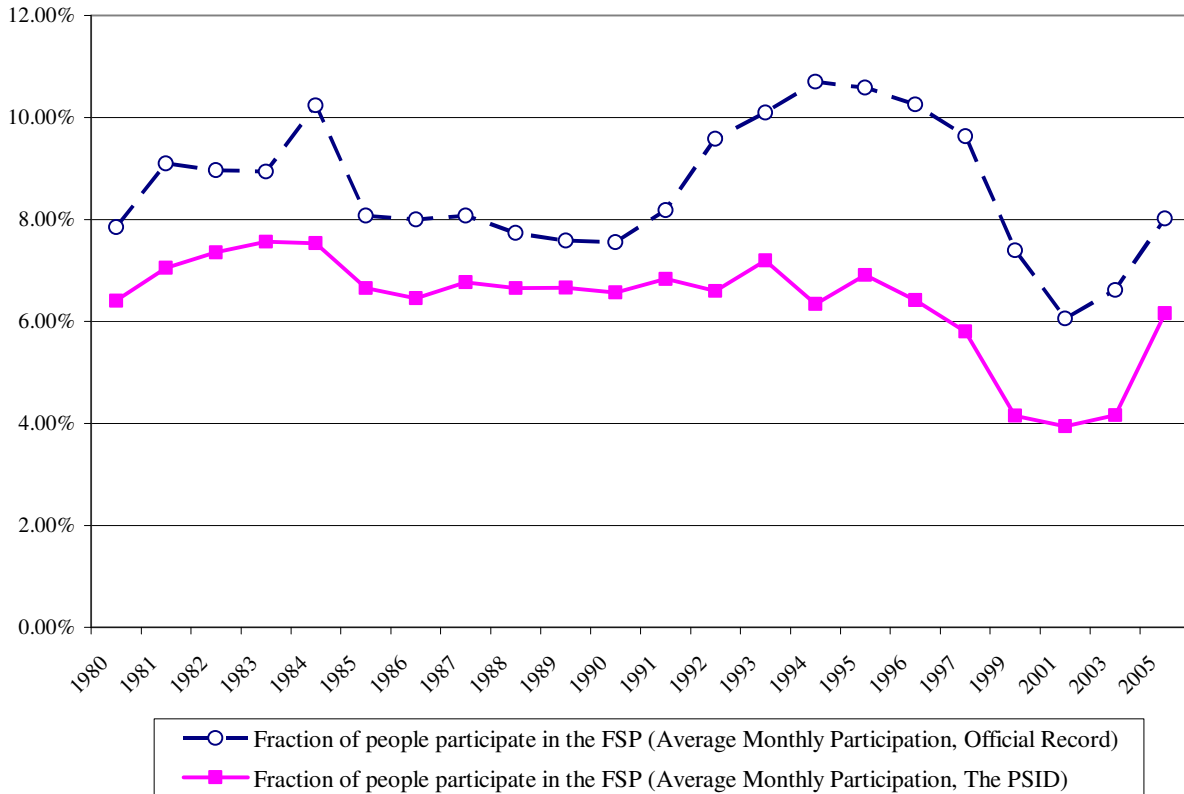
Year	Total	SRC	SEO
1980	1470	71.56%	28.44%
1985	1766	67.95%	32.05%
1990	1959	65.85%	34.15%
1996	1959	63.86%	36.14%
1997	1458	85.94%	14.06%
2005	1555	83.09%	16.91%

Appendix C: Investigating Measurement Error

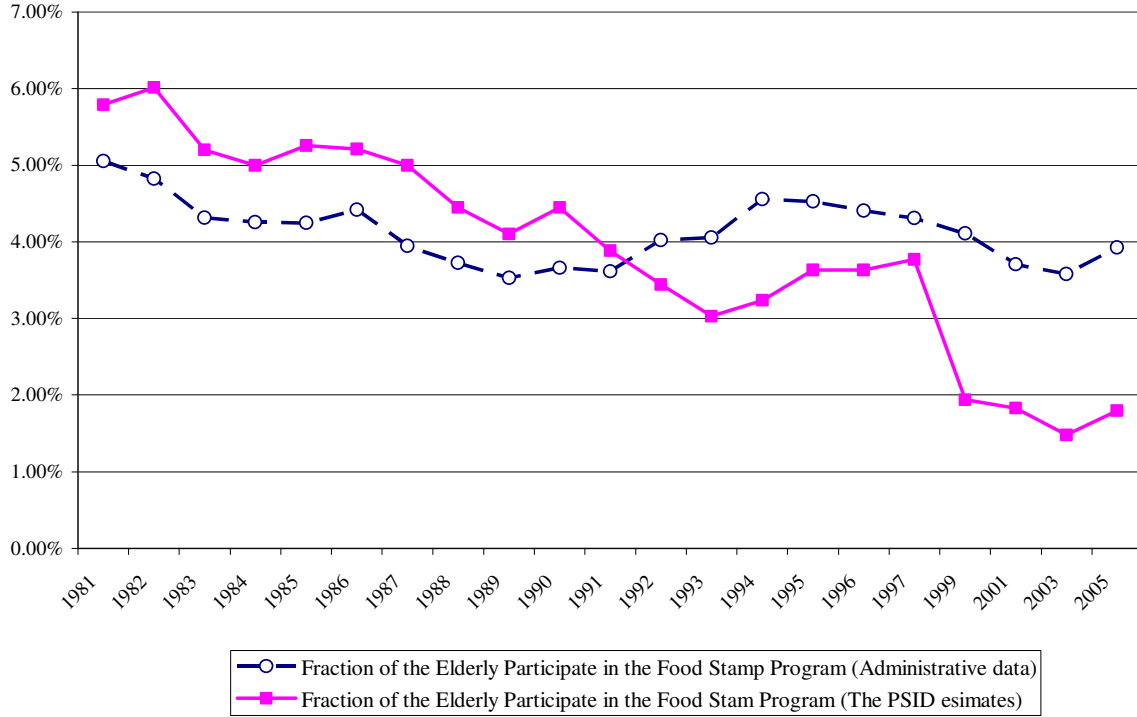
**Table C-1. The Error of Commission over Time
(PSID, Non-eligible Individuals)**

	1980	1990	2001
30-39	4.46%	3.10%	2.50%
40-49	4.40%	2.53%	2.20%
50-59	4.50%	3.40%	1.85%
60-69	3.90%	3.81%	0.95%
70-79	2.75%	2.76%	0.64%
80+	3.50%	1.02%	1.92%

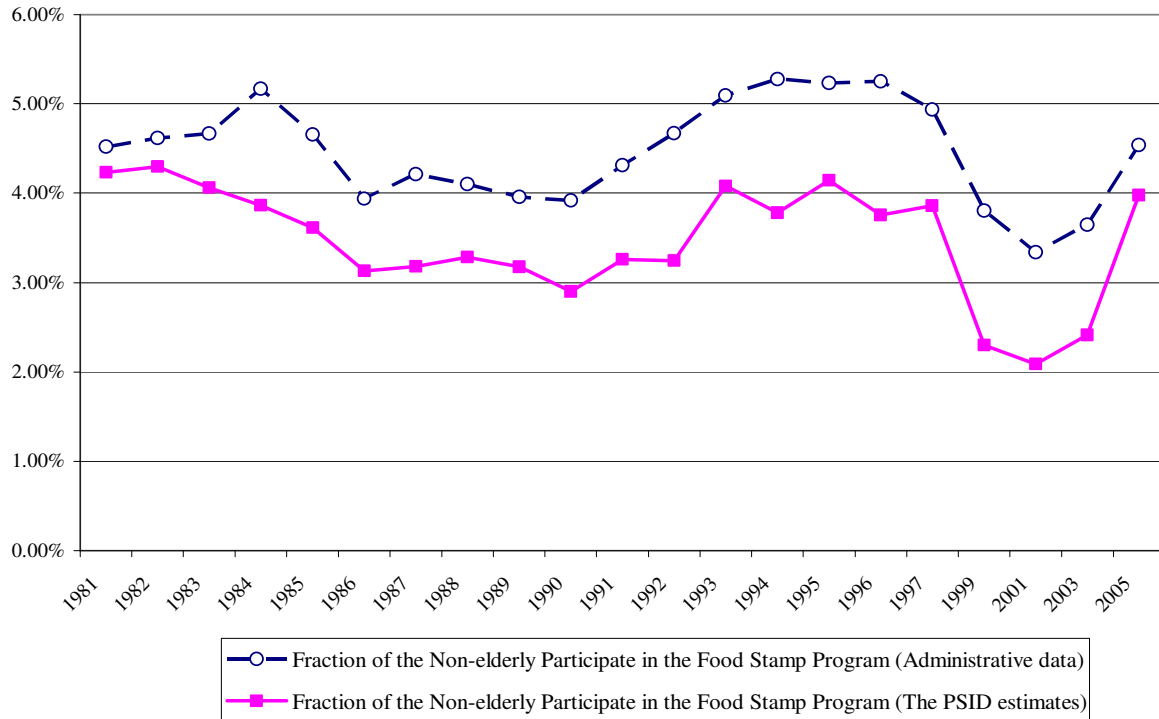
**Figure C-1. Fraction of People Participate in the Food Stamp Program
(The PSID estimates vs. Administrative reports, All age)**



**Figure C-2. Fraction of the Elderly Participate in the Food Stamp Program
(The PSID Estimates vs. The Administrative Data, Age 60+)**



**Figure C-3. Fraction of the Non-elderly Participate in the Food Stamp Program
(The PSID Estimates vs. The Administrative Data, Age 30-59)**



**Table C-4. Demographic Characteristics of the Elderly FSP
Participants, FSPQC and PSID
(Calendar Year 1996, 1998, 2000, 2002, and 2004)**

	FSP Quality Control	PSID	Difference
	(1)	(2)	(2)-(1)
Age	71.849 (0.038)	73.329 (0.482)	1.480 *** (0.483)
White	0.518 (0.002)	0.476 (0.032)	-0.042 (0.032)
High school or less	0.934 (0.003)	0.943 (0.015)	0.010 (0.016)
Female	0.777 (0.002)	0.820 (0.024)	0.043 * (0.024)
South	0.451 (0.002)	0.478 (0.032)	0.027 (0.032)
West	0.126 (0.002)	0.117 (0.020)	-0.009 (0.020)
Family size	1.378 (0.004)	1.449 (0.060)	0.071 (0.060)
Food stamp benefit amount	876.58 (4.326)	806.40 (51.375)	-70.18 (51.557)
Number of observations	47458	250	

Appendix D. Food Stamp Eligibility and Participation Spells of the Elderly and the Non-elderly (PSID, 1980-2005)

Panel A: The Elderly

Spells opens in their old-age (60+)

Eligibility Spells						Participation Spells					
		Left-Censored Spells		Nonleft-Censored Spells				Left-Censored Spells		Nonleft-Censored Spells	
Number of spells		763	29.16%	1854	70.84%	Number of spells		326	45.92%	384	54.08%
Mean Length		5.1		2.5		Mean Length		4.1		2.6	
Spell distribution						Spell distribution					
1	Year	237	31.06%	1010	54.48%	1	Year	107	32.82%	181	47.14%
2	Years	86	11.27%	299	16.13%	2	Years	48	14.72%	72	18.75%
3	Years	84	11.01%	190	10.25%	3	Years	45	13.80%	53	13.80%
4	Years	58	7.60%	93	5.02%	4	Years	27	8.28%	15	3.91%
5	Years	49	6.42%	74	3.99%	5	Years	22	6.75%	20	5.21%
6	Years	23	3.01%	40	2.16%	6	Years	10	3.07%	7	1.82%
7	Years	40	5.24%	37	2.00%	7	Years	14	4.29%	13	3.39%
8	Years	27	3.54%	24	1.29%	8	Years	8	2.45%	5	1.30%
9	Years	33	4.33%	21	1.13%	9	Years	11	3.37%	8	2.08%
10	Years	16	2.10%	14	0.76%	10	Years	2	0.61%	5	1.30%
11-15	Years	68	8.91%	43	2.32%	11-15	Years	22	6.75%	5	1.30%
16-20	Years	35	4.59%	4	0.22%	16-20	Years	10	3.07%	0	0.00%
20+	Years	7	0.92%	3	0.16%	20+	Years	0	0.00%	0	0.00%

Panel B: The Non-elderly

Spells opens in their nonold-age (30-59)

Eligibility Spells						Participation Spells					
		Left-Censored Spells		Nonleft-Censored Spells				Left-Censored Spells		Nonleft-Censored Spells	
Number of spells		1574	30.91%	3518	69.09%	Number of spells		900	38.01%	1468	61.99%
Mean Length		4.0		2.2		Mean Length		3.8		2.1	
Spell distribution						Spell distribution					
1	Year	594	37.74%	2067	58.75%	1	Year	311	34.56%	825	56.20%
2	Years	207	13.15%	560	15.92%	2	Years	137	15.22%	274	18.66%
3	Years	175	11.12%	371	10.55%	3	Years	114	12.67%	165	11.24%
4	Years	130	8.26%	146	4.15%	4	Years	79	8.78%	97	6.61%
5	Years	93	5.91%	117	3.33%	5	Years	57	6.33%	54	3.68%
6	Years	70	4.45%	61	1.73%	6	Years	39	4.33%	12	0.82%
7	Years	56	3.56%	64	1.82%	7	Years	40	4.44%	10	0.68%
8	Years	52	3.30%	34	0.97%	8	Years	28	3.11%	12	0.82%
9	Years	39	2.48%	37	1.05%	9	Years	23	2.56%	6	0.41%
10	Years	31	1.97%	21	0.60%	10	Years	20	2.22%	8	0.54%
11-15	Years	91	5.78%	33	0.94%	11-15	Years	41	4.56%	3	0.20%
16-20	Years	27	1.72%	5	0.14%	16-20	Years	8	0.89%	2	0.14%
20+	Years	9	0.57%	2	0.06%	20+	Years	3	0.33%	0	0.00%

* Multiple spells of the same individual are treated as independent spells

Appendix E: Data Appendix, the Continuing Survey of Food Intake of Individuals (CSFII)

A. Description of Survey

The Continuing Survey of Food Intake of Individuals (CSFII) is a food survey conducted by the Department of Agriculture. Cross-sectional in design, the survey was implemented annually in 1989-1991 (known as CSFII_89), 1994-1996 (CSFII_94) and 1998 (CSFII_98). The survey began with a household-level questionnaire (done via personal interview) which collects information such as the basic demographic characteristics of household members, household food expenditures, and current employment status. Three 1-day food diaries (per individual in household) then followed.³⁶ These food diaries record the total food intake of the individual in a particular 24 hour period. It is worthwhile to remind the reader that not all household members participated in the entire three 1-day diaries. The surveys were targeting the nationally representative individuals who lived in the 48 coterminous states, and those who were institutionalized, living away at school, traveling during the survey period and were excluded. After the food diaries, an optional follow-up survey regarding health perception, health status, and dietary awareness was implemented.

B. The Sample

In the analysis, I pool the two most recent surveys: the interview conducted between 1989 and 1991, and the interview of the 1994-1996 CSFII. I focus on those ages 60 and older, and only include those who complete three day survey in 1989-1991 wave and two day in 1994-1996 wave.

³⁶ For CSFII_94, only two 1-day diaries were given to the interviewees.

Table E-1. Descriptive Characteristics of FSP Eligible Participants and Non-participants (CSFII)

	All		Non-participants		Participants	
	Mean	Std	Mean	Std	Mean	Std
Receive food stamps	0.26	(0.44)				
Demographics						
Age	71.77	(8.09)	72.34	(8.16)	70.11	(7.63)
Male	0.37	(0.48)	0.38	(0.49)	0.33	(0.47)
Less than high school	0.70	(0.46)	0.67	(0.47)	0.78	(0.41)
Black	0.24	(0.43)	0.22	(0.42)	0.30	(0.46)
Living alone	0.50	(0.50)	0.49	(0.50)	0.52	(0.50)
Urban	0.35	(0.48)	0.33	(0.47)	0.40	(0.49)
Percentage of poverty cut	87.70	(27.62)	91.10	(27.90)	77.88	(24.31)
Self-assessed health condition						
Excellent	0.07	(0.26)	0.08	(0.27)	0.05	(0.21)
Very good	0.16	(0.37)	0.17	(0.38)	0.12	(0.33)
Good	0.32	(0.47)	0.34	(0.47)	0.24	(0.43)
Fair	0.28	(0.45)	0.26	(0.44)	0.36	(0.48)
Poor	0.16	(0.37)	0.14	(0.35)	0.22	(0.42)
Doctor diagnosed diseases						
Diabetes	0.19	(0.39)	0.17	(0.38)	0.23	(0.42)
High blood pressure	0.48	(0.50)	0.46	(0.50)	0.54	(0.50)
Heart disease	0.26	(0.44)	0.24	(0.43)	0.32	(0.47)
Cancer	0.10	(0.30)	0.10	(0.30)	0.10	(0.30)
Osteoporosis	0.08	(0.27)	0.07	(0.26)	0.11	(0.31)
High blood cholesterol	0.21	(0.41)	0.20	(0.40)	0.23	(0.42)
Stroke	0.09	(0.29)	0.07	(0.26)	0.14	(0.35)
Expenditure on Food						
Total food	1858	(1217)	1893	(1261.43)	1754	(1068.94)
Food home	1724	(1027)	1734	(1059.40)	1696	(925.67)
Food away from home	265	(473)	296	(495.68)	170	(378.54)
Self-assessed food security						
Have enough food	0.59	0.49	0.65	(0.48)	0.41	(0.49)
Individuals	1383		1041		361	