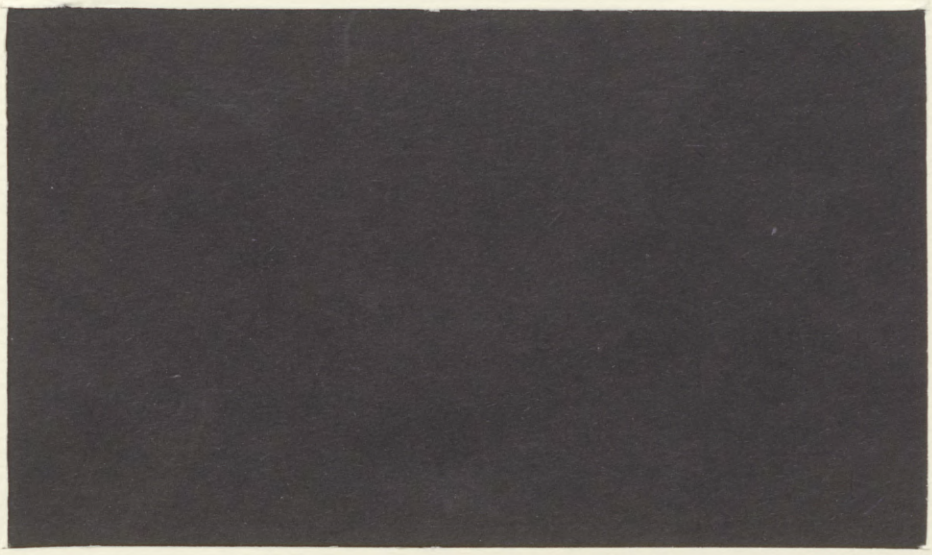
MODELLING RESEARCH GROUP



DEPARTMENT OF ECONOMICS
UNIVERSITY OF SOUTHERN CALIFORNIA
UNIVERSITY PARK
LOS ANGELES, CALIFORNIA
90089-0152

MODELLING RESEARCH GROUP

SOCIAL SECURITY WEALTH AND WEALTH ACCUMULATION: FURTHER MICROECONOMIC EVIDENCE

IAN NOVOS

MRG WORKING PAPER #M8726

DEPARTMENT OF ECONOMICS
UNIVERSITY OF SOUTHERN CALIFORNIA
UNIVERSITY PARK
LOS ANGELES, CALIFORNIA
90089-0152

SOCIAL SECURITY WEALTH AND WEALTH ACCUMULATION: FURTHER MICROECONOMIC EVIDENCE

IAN NOVOS

MRG WORKING PAPER #M8726

July 1987

ABSTRACT

This study involves an empirical analysis of the effect of social security wealth on wealth accumulation. My analysis takes as its point of departure a study by Feldstein and Pellechio on this subject. Their study used the same data source as analysed in this paper. Feldstein and Pellechio found strong support for the notion that increases in social security wealth caused families to reduce their wealth accumulation. My resuts indicate the strong conclusions reached by Feldstein and Pellechio are not robust. In particular, first, when I excluded a group of farmers from our sample increases in social security wealth did not result in families reducing their wealth accumulation. Second, Feldstein and Pellechio calculated social security wealth using income measures from a single year. When I applied their methodlogy to income measures from a different year results were markedly affected.

I thank Arthur Kennickell for extensive discussions at an early stage of this project. I am also grateful to Hassan Arvin-rad, Jeffrey Nugent, Kenneth Sokoloff, Michael Waldman and Andrew Weiss for valuable comments on an earlier draft.

This paper is concerned with the effect of social security on wealth accumulation. This area of research has been largely pioneered by Feldstein, building on the insights provided by the life cycle hypothesis. Basically, the theoretical insights provided by Feldstein on this issue can be summarized as follows.

If individuals adhere to life cycle behavior in their consumption decisions then, assuming a fixed retirement date, the existence of a social security system will lead them to reduce their wealth accumulation.[1] Thus an individual would likely reduce his (private) savings upon an increase in his expected social security benefits.

Of course, individuals are able to change their retirement decisions and thus may choose to use the existence of a social security system as an opportunity to retire earlier.[2] In this case, as Feldstein has pointed out, individuals may end up saving more during their preretirement years. The net effect on saving is thus theoretically indeterminate. Hence, Feldstein and Pellechio (hereafter F-P) stress the central importance of empirical findings on the effects of social security on wealth accumulation: "the implication of the theories discussed...is that the question of whether social security increases or decreases capital accumulation cannot be answered from theoretical considerations alone. Only by the analysis of data on private saving or wealth can we hope to assess the actual effect of social security." The importance of the results of any empirical study must then be considered in the light of the sensitivity of those results to realistic perturbations of the experimental design.

The empirical research that has been carried out on this subject at the micro level is not particularly extensive. Feldstein-Pellechio, Kotlikoff and Munnell have all examined this issue,[3] with F-P and Munnell claiming strong support for the view that social security reduces savings[4] (or, more particu-

larly in the F-P case, wealth accumulation). Kotlikoff, using a Bureau of Census survey, found mixed support for "the notion that the microeconomic mechanisms of the life cycle are at work." Kennickell, in a highly original study of savings behavior in the U.S., found little support for the Feldstein hypothesis. The issue of just how social security affects wealth accumulation thus remains unsettled, particularly in light of the paucity of micro empirical approaches to an issue which needs, after all, to be decided on empirical grounds.

This paper examines the sensitivity of F-P's results to a variety of perturbations in their approach, using the same data source they did. This issue is particularly relevant in light of the fact that the greatest offset of private wealth accumulation by social security wealth in micro-empirical studies is found in F-P's study. The outline of this paper is as follows: First, we discuss the data used in our analysis. We here also focus on the F-P sample. A discussion on the calculation of social security wealth follows. We then discuss our attempt to replicate their results, examine the sensitivity of these results to various perturbations, and conclude by analyzing the implications of this analysis for the state of knowledge on the effects of social security on savings behavior.

The Data and the Sample

The data were collected in two companion surveys conducted in 1962-63 by the Federal Reserve Board, the Survey of Financial Characteristics of Consumers (often hereafter referred to as SFCC or the Survey) and its follow up, the Survey of Changes in Family Finances (often hereafter referred to as SCFF or the Reinterview sample since not everybody who responded to the initial survey did so to the SCFF).[5] The information on individual wealth holdings in the U.S. in these data sets is still among the most comprehensive available in

any data set. Thus, even though it is more than 20 years old, its value as a source of information on individudal wealth accumulation behavior should not be underestimated. Given that the sampling procedure adopted involved a purposeful oversampling of the wealthy, a sample weighting scheme was devised when the survey was conducted.

In our analysis, as in F-P's, use is made only of a subset of households whose head is an employed male between ages 55 and 64, inclusive. The aim here is better to focus on households having a stock of assets closest to those actually desired. That is, since there will always be deviations from one's desired stock of assets, any empirical analysis using the actual stock of assets will be a "more" reliable indicator of desired behavioral patterns, if this deviation were minimized. The years from ages 55 to 64 offer people the opportunity to bring their actual stock of assets in line with their desired stock because these years follow the peak earnings period. Hence the 55-64 age group is a particularly useful one to focus on for our purposes here.

For an expanded discussion of how F-P arrive at their subsample see F-P [1977] and Novos (1985). Here we will highlight one or two aspects of their selection criteria which seem particularly pertinent to our analysis and conclusions. Perhaps the most important is that F-P, although they exclude households headed by self-employed males, do not exclude their farm-operator headed households. Now, farm operators are as self-employed as any non-farm self-employed person and, we would claim, as subject to the line of reasoning F-P employ in excluding the non-farm self-employed.

F-P's sample selection criteria leaves them with a sample of 138 households — 126 of them being headed by a married individual. Although we F-P's selection criteria we could only come up with 110 households. Of these 110,

99 were headed by a married person. Most of F-P's regressions were carried out on the sample comprising the households headed by married individuals. We will thus focus on this subsample in this analysis.

Calculation of Social Security Wealth

An individual's social security benefits are based on that individual's earnings history. In particular, the Social Security Administration (hereafter SSA) calculates what was referred to in 1963 as an individual's average monthly wage. This average monthly wage is based on a certain number of quarters of an individuals earnings history between certain ages or dates. The measures of social security wealth to be used in our analysis were calculated using the approach adopted by F-P in their REStat paper.[6] In addition, imputations were made for social security taxes so that we are dealing with net social security wealth, as F-P did. Here follows a description of their approach.

F-P link an individual's earnings to a benefit level by first finding in what percentile of the 1963 earnings distribution[7] the individual's 1963 wage, salary, and proprietary, partnership and farm income would place him or her.[8] Using the 1963 benefits distribution for new retirees — again for each sex separately — they assigned individuals the benefit level appropriate for this percentile.[9] The rationale behind their approach is, of course, the idea that as long as individuals remain in the same position in the earnings distribution of their cohort, and the benefit distributions used are the ones relevant for these individuals, then this approach will be reasonably accurate. The implicit assumption that individuals remain in the same position in the earnings distribution of their cohort is of course a strong assumption. It will be discussed further below. Also inherent in this approach is a high premium on using the right earnings and benefit distributions.

Because of a number of implementation issues[10] involving earnings and benefit distributions and the way in which income is reported in the data sets there are a number of feasible measures of income one could use to place individuals in a given percentile of the earnings distribution.[11] Each of the alternative approaches potentially places individuals in a different earnings percentile, thus possibly yielding different benefit levels. F-Ps approach results in each pair of benefit level variables for a household (one of the pair for the head, the other for the spouse) yielding a measure of social security wealth for that household. We shall be concerned in this paper with four alternative social security wealth measures based on the F-P approach to calculating a household's social security wealth.

The alternative approaches to finding a benefit level will be used both to attempt replication of the F-P results and to analyze how sensitive these results are to reasonable perturbations of their basic experimental design.

The Empirical Results

We have already mentioned that we could not exactly recreate F-P's sample. In our analysis we did, however, use their set of criteria for sample selection. We can thus analyse the sensitivity of results on social security a la P-P within a similar empirical framework, where the social security wealth calculations are as close to the F-P description as its specificity permits. Sensitivity of such results to reasonable perturbations in experimental design and data usage will provide strong indication as to the sensitivity of the F-P results to similar perturbations within the context of their sample.

Thus, we aim here to analyze the pattern of results that emerges from using a number of different constructions of the social security variable in tandem with variations in sample composition.[12] In particular we use four

alternative social security variables whose construction is discussed below and in footnote 13.[13] We also examine the robustness of our results to the exclusion of farm operators from our sample.

(i) Alternative Measures of Social Security Wealth

We have already discussed the fact that there are a number of alternative income measures that could be used to assign individuals a percentile ranking in the earnings distribution. The ambiguity arises because of the way in which information is provided in the data. Wage and salary income is provided for the husband and wife separately. Farm, proprietorship and partnership income were not reported separately. Thus one could either use only wage and salary income in assigning individuals a percentile ranking or choose ways of allocating farm, proprietorship and partnership income between husband and wife.

We chose three alternative approaches to calculating the income figure on which the assignment of an individual's percentile ranking in the earnings distribution depended. In addition, because both 1962 and 1963 income data were available to us, we used both the 1962 and 1963 income figures for one of these approaches. We thus had four sets of percentile ranks on which to base calculations of social security wealth using F-P's basic methodology. The four resulting sets of social security wealth measures are used in the analysis that follows. In footnote 13 we discussed the income constructions relevant for each measure of social security wealth.[14]

The forms of the regressions considered in this analysis are the same as those presented in PF-P (1978). Left-hand side variables include an income measure, an age-income interaction term, a social security wealth term and a variable that is a transformation of an income-squared term. Our focus here

is of course on the coefficient of social security wealth. Feldstein's theory predicts a coefficient of -1.

We can now turn to an examination of the regressions in table 1.[15] What strikes one about the regressions in table 1 is the relatively high level of income at which a marginal increase in income has a positive effect on wealth accumulation. This is true in general for the F-P regressions as well. Below we discuss why this might be so.

A significant point about the regressions in table 1 is the difference between the results using social security variable SW1 and those using social security variable SW2. The coefficients of SW1 are uniformly negative and have t-statistics of at least |1.72|. The coefficients of SW2, on the other hand, are both positive and negative in sign with the "best" t-statistic being -1.09 for a coefficient of magnitude -0.51 in a regression with only a linear income term, an age interaction term and an R^2 of 0.0191, low even by the standards of table 1. Significantly when SW2 is used in a weighted least squares regression with a quadratic income term — either with or without an age interaction term — its coefficient increases to be in a range between -0.25 and -0.35, depending on the functional form and weighting scheme used. The t-statistics in this cas are between -0.76 and -0.63. In one of the corresponding unweighted regressions, the coefficient of SW2 is actually positive, although with a t-statistic of only 0.28, when both a quadratic income term and an age interaction term are present.

Recall from footnote 13 that the method used in constructing these two measures of social security wealth was identical except for the fact that SW2 was calculated using 1963 incomes wheras SW1 used 1962 incomes. The results derived from these two measures differ so starkly that one must seriously question the F-P approach of assigning individuals to a particular percentile of the earnings distribution on the basis of income data from a single year in

order to calculate their social security wealth. We refer of course to the fact that for this approach to provide a reliable measure of social security wealth the percentile to which an individual is assigned should be an accurate measure of his "lifetime" position in the earnings distribution of his cohort. The likelihood of this happening when individuals, often having different age-earnings profiles, are assigned to a percentile of the earnings distribution on the basis of their earnings in a single year, is evidently not high. This issue will be dealt with further below, when discussing the group of farm operators that F-P did not exclude from the ambit of their analysis.

In comparing the just-discussed results with those presented by F-P a few things need to be noted. First, it is important to emphasize at the outset that our lack of knowledge both about the exact sample F-P used and about their precise procedures for calculating variables means that we cannot compare our results to those of F-P using a strictly formal statistical procedure such as a variant of Hausman's specification test. This lack of knowledge precludes us from constructing the sample statistics needed to carry out such a test. Nevertheless, we can still compare our results with F-P's using the "naive" procedure of contrasting the confidence intervals of F-P's variables with those of our analogues. In cases where this procedure leads us to conclude that results are statistically significantly different we would have also reached this conclusion had we been able to apply the more formal tests described above. Where the "naive" procedure suggests statistical insignificance, however, the purist approach would not necessarily lead us to the same conclusion. In this case, therefore, all we can do is attempt a judgment on what outcome the formal procedure would indicate on the basis of the degree to which our naive procedure suggests statistical insignificance. Therefore, in the ensuing analysis comparing F-P's results to ours we will adopt as the basis for our discussion the "naive" procedure, bearing in mind the flaws inherent in this approach.

Second, F-P used 1963 income measures (except for those observations where the head turned 65 in 1963, in which case '62 income measures were used) in calculating their measures of social security wealth. When we used 1963 income measures to calculate social security wealth variable SW2 our coefficients of social security wealth were insignificant and, depending on the functional form chosen, either positive or negative. The fact that, when using 1963 income measures, we were not able to obtain qualitatively similar results to F-P should not lead one to rash conclusions about the reliability of either F-P's results or ours using the 1963-income based social security variable. Rather we should consider the experimental design context within which each of these sets of results emerged. That is, the two analyses were based on data sets of different sample size. Not surprisingly, key simple correlations we calculated between wealth and various income measures are sensitive to sample size. Regression results are also likely to differ due to different sample composition.[16,17,18]

This is particularly so when looked at in the light of the fact that results using our 1962-income based social security measure SW1 are qualitatively similar to F-P's results, leading us to conclude that there is nothing inherent in our calculation of the social security variables which makes results a la F-P unobtainable. In fact, in a "naive"[19] statistical sense, notwithstanding the fact that F-P's intercepts are lower and their income coefficients higher and more significant, the results derived from social security variable SW1 are in general insignificantly different from F-P's at the 5% level.

Our simple correlation calculations indicate quite clearly that the labor earnings based income measures (LI1, LI2, LI3) in general have significantly lower simple correlations with our wealth measure than do total income measures (TI1 and TI2 being total household income for 1962 and 1963, respec-

tively). This is not necessarily surprising when one considers that total income includes income derived from wealth holdings. This alone, of course does not ensure that this will reflect itself in simple sample correlations when there is measurement error in the data. Nevertheless, given the manner in which individuals are likely to provide information on wealth holdings and income, it is reasonable that such a result will emerge.

The low simple correlations between the wealth variable W and the income variable LI1 account for the high constant terms and low income coefficients in the table 1 regressions, inclusive of F-P's we would argue. This point is driven home quite forcefully when one considers the ranges of W (our wealth measure) and LI1 (our income measure) in the sample upon which results in table 1 are based. W ranges from a high of $149,667 to a low of $-1,120. LI1, on the other hand has a range of [930.5, 12,922]. This, together with the low income-wealth correlations discussed earlier,[20] should thus minimize any surprise at the size of the intercepts and income coefficients in table 1, as well as any at the fact that most of the income coefficients are insignificant. It is worth stressing here that the latter statement holds for the F-P results as well, i.e., of 20 income and income squared terms in their table, 13 are insignificant.

The above also serves as an explanation for the fact that in regressions having both an income and an income-squared term the level of income at which increases in income lead to an increase in wealth holdings are uniformly high.[21] This holds with one exception for the F-P results as well.

(ii) Do the Farm-Operators Belong Here?

We have already made mention of the sensitivity of a number of simple statistics in our analysis to even small changes in sample composition, supporting our belief that it is highly likely that results on the effect of

social security wealth on wealth holdings are not robust to changes in sample composition. Here we present concrete evidence of this lack of robustness. One nice feature of the change in sample composition carried out here is that it gives effect to a rather natural distinction between two groups in our sample, namely, farm operators and non-farm operators. In our earlier discussion of the F-P criteria for sample composition we took issue with F-P's inclusion of farm operators, particularly since they had excluded the self-employed. Their reasons for excluding the self-employed, we argued, were just as applicable to the group of farm operators. As long as farm operators were included, however, we would claim that the ensuing regression analysis should allow for differences between this group and all other occupational categories. Given that F-P did not specify their equations so as to test for such differences it was our strong feeling that this question should be investigated.

Accordingly, we ran regressions--with like functional forms to those of F-P--on a set of observations exclusive of farm operators.[22] Results of these regressions can be found in table 2. Clearly, in no case where farm operators have been excluded is the coefficient of social security wealth significant and negative. In fact, both positive and negative coefficients are observed, none being significant at the 5% level. Thus, even in cases where a particular social security variable was found to have a coefficient both negative and significant when the regression was run on a set of observations that included farm operators, that same coefficient became insignificant and sometimes even positive when farm operators were excluded. That the exclusion of a group of observations which clearly is, in at least one important sense, distinct from all other observations, can so markedly alter results should give one pause.

Then too, as mentioned previously, a number of the reasons F-P give for excluding the self-employed from their analysis apply to farm operators. In particular, farm income, just like the income of the self-employed non-farm

population, has a high degree of variance. Support for this point is found by contrasting the results of regressions using different social security variables in the cases where farm operators are respectively included in, and then excluded from, the sample. When farm operators are included the regressions using different social security variables have coefficients which differ much more in magnitude than do the coefficients in those regressions where farm operators are excluded from the sample. That is, the differences between the coefficients of social security wealth across regressions with alternative social security variable constructions in table 1 is much more pronounced than between analyogous regressions in table 2. Contrast for example equations 1 and 2 in table 1 with 1 and 2 in table 2; equations 6 and 7 in table 1 with 4 and 5 in table 2. A check on the difference between other appropriate pairings reinforces this point.

While one cannot definitively claim that this is due solely to the high variability in the value of a farm household's social security wealth across the different approaches used here to calculate it, the likelihood that this is a significant contributing factor is very high, particularly when one recalls that the various approaches we adopted in calculating social security wealth differ in the context of our sample primarily in their treatment of farm income. Thus, for households having no farm income the different approaches will not yield very different measures for social security wealth.

All this has potentially serious implications when one is calculating social security on the basis of income data from a single year, as F-P did. This is illustrated quite clearly by contrasting the results using the social security variable SW1--constructed on the basis of 1962 income-- with those obtained using the social security variable SW2--constructed on the basis of 1963 incomes. While the results are insignificantly different when farm operators are excluded from the analysis they are significantly and qualita-

tively different when farm operators are included in the analysis. Thus, depending upon which year is chosen as the basis for the analysis, one would arrive at very different conclusions.

The results presented thus far indicate that whether or not one finds support for the F-P hypothesis on social security wealth depends both on sample composition and on the particular social security wealth construct used.[23] For the moment it is primarily the issue of sample composition which is of interest to us.

Clearly, in our analysis the fact that excluding farm operators can cause the coefficient on social security wealth to become insignificant and sometimes even positive is an indication of heterogeneity as between the farm operators and all other observations in the sample, particularly when one considers that there are only 6 farm operators in our basic sample of 110. To clarify just how much this heterogeneity contributes to obtaining support for the F-P hypothesis when using social security variables SW1 and SW3 we conducted what essentially amounts to a number of analysis of covariance experiments. That is, we ran a series of regressions using these social security variables, introducing dummy and/or dummy interaction terms for farmers for the variables of interest in our analysis. For example, all regressions in table 3, in addition to the terms in table 1 equations, include a dummy intercept term for farm operators, while some also include a slope differential term for the social security wealth variable for farm operators.

Results from this set of regressions are strongly supportive of the idea that it is the interaction between the relevant variables of the farm operators and that of the rest of the sample that is largely responsible for the significantly negative coefficients on social security wealth variables SW1 and SW3. Adding, for example, even just a dummy intercept term for farm operators causes the social security wealth coefficients of SW1 and SW3 in equa-

tions 24 and 29 of table 1 to change from -0.99 (with a t-statistic of -2.28) and -1.02 (with a t-statistic of -2.40), respectively to 0.18 (with a t-statistic of 0.36) and 0.13 (with a t-statistic of 0.26), respectively. Results are qualitatively similar when adding various combinations of farm operator dummy terms. For ease of presentation table 3 contains the results of only two of the functional forms used here for each of the two social security variables.

Where only an intercept dummy for farm operators has been added to the list of "usual" variables, this dummy is strongly significant in each such regression in table 3. In each case the magnitude of this dummy is such that the value of the intercept relevant for farm operators is more than double that for the rest of the sample. As mentioned above, including this term results in the coefficient of social security wealth becoming insignificant and positive. Not surprisingly the intercept term in the equations without this dummy intercept was almost twice as high as the overall intercept in the equations with this dummy term for each of the two social security variables dealt with here. The significant and negative coefficients on social security wealth observed in equations 26 and 29 of table 1 should thus not too hastily be attributed to any underlying propensity amongst individuals to reduce wealth accumulation should their social security wealth increase. Rather the result should more reasonably be attributed to an interaction between heterogeneous elements of the sample under discussion, namely, that sample including farm operators. With farm operators having significantly higher wealth than the rest of the sample on average, as well as in the cases being discussed here, lower social security wealth, the interaction between the farm operator and non-farm operator groups results in the significantly negative social security wealth coefficients. The qualitative nature of this basic argument is supported by examining the other functional form for which results were

reported in table 3. In fact, interestingly this functional form, which permits a differential slope for social security wealth, results in a positive, although insignificant, social security wealth coefficient for farm operators with both social security wealth coefficients. Seen in the context of negative, and significant, social security coefficients for these two social security wealth variables in equation 26 and 29 of table 1, where no differential impact was permitted as between farm operators and others, this result reinforces forcefully the cruciality of the interaction between the farm and non-farm sector to results in table 1.

As a further way to gain corroborating evidence on the difference between the farm and non-farm groups of observations in our sample we conducted Chow tests on a number of the pairs of regressions including and excluding farm operators. Specifically, we performed Chow tests, for each social security variable and weighting scheme, on the regressions in table 3.[24] The F-ratios are given in table 3. The lowest F-ratio is 12.31. This implies that we reject H_0 (the hypothesis that the vector of regression coefficients is the same with and without farm operators) even at the 99.5% level.

The conclusion that emerged from our application of the ANOCOVA procedure is thus strongly substantiated by results here, using the Chow test. The evidence as to a significant difference between the farm and non-farm group therefore appears to be fairly conclusive, suggesting that F-P's results be viewed in light of these findings.

Conclusion

This analysis took as its point of departure the results of Feldstein and Pellechio on the effects of social security wealth on capital accumulation. While many involved in the policy debate surrounding social security have seized on much of Feldstein's work on the subject either to herald its

insights or to attack its accuracy, little attention has been given to the many issues raised by the F-P study, the one micro-empirical analysis on social security by Feldstein. Our aim here has been to replicate the F-P results and then proceed to examine their robustness to a number of perturbations in experimental design which a priori one would have hoped would leave the results unchanged.

Essentially our results indicate that F-P's approach raises two major questions casting doubt as to the reliability of their results. First, there is the apparent dependence (of obtaining coefficients of social security wealth supporting the F-P hypothesis) on including farm operators in the analysis. In none of our regressions which excluded farm operators did we obtain a coefficient of social security wealth which was negative and significant at the 5% level. Given the number of cogent reasons cited earlier for excluding farm operators from the analysis, this should be rather troublesome to those claiming anything approximating generality for the F-P results, particularly in light of the results of the ANOCOVA type experiments, together with the Chow tests, shown in table 3.

Second, there are the issues surrounding the approach adopted by F-P in calculating social security wealth. In the case of the sample inclusive of farm operators our results indicate the inherent sensitivity of this approach to even a change in the year--from 1963 to 1962--from which income data was used to assign individuals to percentiles in the earnings distribution. Considering that the Social Security Administration bases benefits on the income one earned over a longer time frame, results obtained using a social security wealth variable based on a single year's--or even a relatively small number of years--income data should be viewed skeptically.

Added support for skepticism in viewing the F-P results came from a part of our analysis of social security wealth and capital accumulation not pre-

sented in the body of this paper. Results using a social security wealth measure calculated from Social Security Administration regulations on the basis of predicted earnings histories for individuals in our basic sample are anything but supportive of the F-P hypothesis.[25] Even though the social security wealth measure used here is based on a lifetime earnings history the fact that the earnings histories used are only estimates, and thus too subject to a set of criticisms, implies that these results are also to be regarded skeptically.

The question that naturally arises is thus how much importance to attribute to results from any given analytic approach. We would argue that in situations where a single "correct" analytic framework does not exist a thorough examination of results from alternative analyses is crucial before accepting or rejecting a hypothesis. In light of the results presented here, therefore, much remains to be done before the social security issue can be regarded as settled.

Ultimately, however, at the end of any analysis that has not provided support for what would appear to be a reasonable proposition, one is left casting around for bits of intuition to explain this lack of support. This analysis is, in some sense, no different; although Feldstein might have claimed too much for the social security offset, the basic idea appears sound, given the usual assumptions of economic behavior. There are, however, two "bits of intuition" that might go some way to help explain our findings on the sample without farmers.

The first concerns the idea that social security wealth cannot necessarily be thought of as wealth in the conventional sense. Social security coverage gives one rights to a stream of monthly payments but not to the control to utilize the present value of that stream. In this sense, then, social security wealth does not substitute perfectly for wealth, over which, even in

various degrees of illiquidity, the owner usually has rights of control to dispose of or utilize as quickly as markets will allow. Individuals desiring to have control over assets so as to, should the need arise, have access to a substantial sum of money, will thus not in the sense just described necessarily alter their wealth accumulating behavior in response to an increase in their social security wealth.

The second piece of intuition that one might find useful in evaluating the results presented in this analysis concerns the range of social security benefits. This is not very large at all and the small amount of variability might be such that it is effectively "swamped" by the measurement error or noise inherent in other variables, resulting in the usual problem of the bias toward zero. This is particularly relevant in light of the small sample size used in the analysis.

There are, of course, a multitude of other ways one might choose to rationalize our results, among them a fear of the bankruptcy of the social security system. Given the nature of the data available to us, many plausible explanations, including some discussed here, cannot be adequately tested. For tests of such explanations, one would need information on the attitude individuals hold on their social security benefit stream, as well as on other aspects of the social security system. One would hope that surveys containing such information would soon be forthcoming.

Footnotes

1. If the social security system is actuarially fair then the reduction in private wealth accumulation would come about because individuals would be paying taxes, while leaving their consumption decisions unchanged. This would result in lower private savings and thus lower wealth holdings. Also, where the system was actuarially fair "rational" individuals would not change retirement decisions even if free to do so.

2. This may occur, for example, when the increase in social security benefits has a net positive effect on an individual's lifetime wealth, causing him to "purchase" leisure.

3. Cagan and Katona separately examined the issue of private pensions, finding support for the idea that private pension coverage tended to increase saving. Interestingly, in light of the arguments to be made later in this section, Munnell, in a footnote in her paper, claims to have obtained contradictory results to Cagan's using a subsample from his survey.

4. Munnell used a subsample from a Bureau of the Census survey, the subsample being composed of male-headed households--with the head employed--where the head was aged 45-59. Her analysis, however, used dummy variables for pension and social security coverage and her results should thus be seen in this light. F-P's analysis will be discussed extensively in the text.

5. In the course of our discussion we will often refer to the body of data comprising the two surveys as the Projector data set, in tribute to the first person who worked with the data, Mrs. Dorothy Projector.

6. In the conclusion to this paper reference is made to a social security wealth variable calculated using an earnings history approach. Basically that approach entailed estimating earnings histories for individuals in our sample and using these to calculate individuals' estimated average montly wages, which were then used to calculate social security wealth just as the Social Security Administration did in 1963.

7. Of course, the earnings distribution desired is one effectively truncated at the top end at the maximum earnings level taxable for social security coverage, because above this level social security benefits do not increase.

8. They do this separately for men and women as there do exist separate distributions for men and women.

9. What I have referred to here as the benefit level should be thought of as F-P's equivalent of the previously described primary insurance amount.

10. See Novos (1985) for a discussion of these issues.

11. F-P's discussion of the income measures they use is not crystal clear. Thus there are two leading alternatives as to which approach they followed. In addition, they do not give a citation for the earnings and benefit distribution they use. We here used an earnings distribution for men for the

55-64 age group, clearly the appropriate one. Because our sample was selected on the basis of men's ages the women's ages in the sample were spread over a much broader range. We thus used an overall earnings distribution for women. For more details on this issue see Novos (1985).

12. Preliminary to the presentation and discussion of these results it is worthwhile to examine some summary statistics — shown in Table 1 — of a number of alternative measures of social security wealth for our basic sample and contrast these with the analogous statistics provided by F-P for their measure of social security wealth. Such a comparison is particularly relevant here because of the uncertainty as to exactly how F-P constructed their social security variable. Compatibility between our statistics and F-P's would at least reassure us that in key respects the measures are compatible. An examination of table 1 shows that the various measures of social security wealth seem to be commensurable.

13. The social security variable SW4 was calculated interpreting F-P quite literally. That is, farm, proprietorship and partnership income for 1963 was split between husband and wife only when both spouses had no wage and salary income in 1963 (cf. Feldstein-Pellechio (a) Page A-1). The variables SW1 and SW2 were calculated (for 1962 and 1963, respectively) counting farm, proprietorship and partnership income as part of the income measure for an individual whenever that individual was listed as having worked during the relevant year while having no wage and salary income. If both spouses fulfilled this criterion then farm, proprietorship and partnership income was split between them. If only one had a zero wage and salary income while being classified as having worked then that spouse was allocated all the farm, proprietorship and partnership income for purposes of placing that individual in a given percentile of the earnings distribution. The SW3 variant of social security wealth was calculated using only wage and salary income for 1962 to allocate individuals to a percentile of the earnings distribution. The reason such a variant was calculated relates to the fact that, as mentioned earlier, proprietorship, partnership and farm income are aggregated for the husband and wife. This makes it well nigh impossible to ascertain how much of the earnings in those categories was actually earned by the husband and wife, respectively. Thus, to examine results when we could be sure that there was no confounding in earnings between husband and wife, this measure was calculated.

14. See Novos (1985) for a detailed discussion of this issue.

15. In table 2 the reader will find regressions having the same functional form as most of those F-P ran for married heads of households. The only regressions not included are those with only a linear income term, a social security wealth variable and an intercept. Given the fact that the results for regressions having this form did not differ substantively in a significant way from those shown in table 2, together with the fact that a richer specification seems called for given the construction of F-P's social security wealth variable, not including regressions of this form seemed reasonable.

16. Both our wealth measure and F-P's are as of the beginning of 1963. From the information they provide on their wealth measure one cannot determine exactly what variables are included in their wealth measure.

17. When observations are excluded due to their evincing characteristics (e.g as in section (iv) of table 3) which are likely to lead to atypical behavior the correlations are noticeably higher.

18. For example, the unweighted simple correlation between the total wealth variable and the income variable used in our regressions is 0.058 for a sample of 99 observations comprising all the married couples in our basic sample, 0.012 when farm operators (who number only 6) are excluded from this group, and 0.044 when six randomly selected observations are excluded from the original 99 observations. The analogues of these correlations when using the Projector weights are, respectively, -0.081, -0.135 and -0.101, and when using our alternative set of weights, -0.144, -0.033 and -0.029.

19. Compare above discussion.

20. To cite just one example of why the income-wealth correlations are low. The household having the maximum wealth level ($14966) has a value for VAVN (the income measure used in our regressions) of $930, the lowest in its head-of-household age group.

21. The only F-P regression for which this turning point is much lower than the ones implied by our results is the unweighted regression for only married couples, and neither the income nor the income squared term was significant at the 5 percent level in this regression.

22. Table 2 contains no regressions using social security variable SW4 because the sample used to calculate these regressions excluded farm operators. Given the method of construction for variable SW4 (cf. footnote 13) it would have been inappropriate to use the variable here.

23. By social security construct we mean a combination of which income measure was used to place individuals in a particular earnings percentile and which year's income data — 1962 or 1963 — was used to do this.

24. Results obtained when using the other two social security wealth variables (SW2 and SW4) are analogous, with F-ratios at least as large. They are thus not presented here, but are available from the author.

25. Basically, the estimated earnings histories were calculated as follows. First, we estimated a number of cross-sectional age-earnings equations (for males and females, separately) using different combinations of the demographic information available in the sample. This then enabled us to forecast and backcast using one of the estimated age-earnings equations to obtain a complete earnings history for each household. The particular age-earnings equation used depended on the combination of demographic information available for the particular household. Applying the appropriate Social Security Administration regulations to these earnings histories provides us with an alternative estimate of a household's social security wealth. The results obtained using these measures can be found in Novos (1985).

References

Auerbach, Alan and Kotlikoff, Laurence [1983] "An Examination of Empirical Tests of Social Security and Savings," in Social Policy Evaluation: An Economic Perspective, Academic Press, New York.

Bureau of the Census [1943, 1953, 1963, 1973] Census of the United States: 1940 (1950, 1960, 1970), Washington.

_____ [1963] Current Population Reports, Series P-20, No. 121, Washington.

Feldstein, M. [1974] "Social Security, Induced Retirement and Aggregate Capital Accumulation," Journal of Political Economy, vol. 82, pp. 905-926.

_____ [1976] "Social Security and Saving: The Extended Life Cycle Theory," American Economic Review, vol. 66, pp. 77-86.

_____ [1976] "Social Security and the Distribution of Wealth," Journal of the American Statistical Association, vol. 71, pp. 800-807.

_____ [1982] "Social Security and Private Saving: Reply," Journal of Political Economy, vol. 90, no. 3, pp. 630-642.

_____ and Pellechio, A. [1978] "Social Security and Household Wealth Accumulation: New Microeconomic Evidence," Review of Economics and Statistics, pp. 361-368.

_____ and Pellechio, A. [1977] "Social Security and Household Wealth Accumulation: New Microeconometric Evidence," National Bureau of Economic Research Discussion Paper No. 206.

Kennickell, Arthur B. [1984] "An Investigation of Life Cycle Saving Behavior in the United States," unpublished dissertation, University of Pennsylvania, Philadelphia, PA.

Kotlikoff, Laurence J. [1979] "Testing the Theory of Social Security and Life Cycle Accumulation," American Economic Review, vol. 69, pp. 396-410.

Projector, Dorothy [1968] Survey of Changes in Family Finances, Board of Governors of the Federal Reserve System, Washington.

_____ and Weiss, Gertrude [1966] Survey of Financial Characteristics of Consumers, Board of Governors of the Federal Reserve System, Washington.

Social Security Administration [1973, 1982] Social Security Bulletin Annual Supplement, Washington.

_____ [1973] Social Security Programs in the United States, DHEW Publication No. (SSA) 73-11915, Washington.

Table 1

REGRESSIONS OF TOTAL WEALTH ON NUMEROUS SOCIAL SECURITY WEALTH VARIABLES, TOGETHER WITH OTHER VARIABLES, ON A SAMPLE OF MARRIED MEN (99 observations)

	REMARKS	UNWEIGHTED/ WEIGHTED	S.S. VARIABLE	INTERCEPT	LI1	S.S.W.	AGLI1	$LI1^2$/ 1000	R^2
1)	one analogue of F-P's eq. (3)	unweighted	SW1	55525 (3.97)	-6.04 (-1.42)	-0.86 (-1.74)		0.53 (1.88)	0.0918
2)	one analogue of F-P's eq. (3)	unweighted	SW2	44873 (3.06)	-9.25 (-2.22)	0.10 (0.19)		0.68 (2.45)	0.0632
3)	one analogue of F-P's eq. (3)	unweighted	SW4	45954 (3.13)	-9.04 (-2.18)	0.01 (0.49)		0.67 (2.43)	0.0629
4)	one analogue of F-P's eq. (3)	unweighted	SW3	56532 (4.05)	-6.01 (-1.43)	-0.91 (-1.91)		0.53 (1.91)	0.0976
5)	F-P's eq. (3)	unweighted	F-P's	34920 (2.86)	-1.16 (-0.38)	-0.72 (-1.64)		0.29 (1.61)	0.168
6)	one analogue of F-P's eq. (4)	weighted	SW1	75593 (6.09)	-11.56 (-2.83)	-0.99 (-2.34)		0.88 (3.17)	0.1885
7)	one analogue of F-P's eq. (4)	weighted	SW2	70473 (5.28)	-14.57 (-3.67)	-0.32 (-0.76)		1.04 (3.78)	0.1469
8)	one analogue of F-P's eq. (4)	weighted	SW4	71511 (5.36)	-14.43 (-3.65)	-0.40 (-0.94)		1.04 (3.78)	0.1469
9)	one analogue of F-P's eq. (4)	weighted	SW3	76219 (6.15)	-11.57 (-2.86)	-1.02 (-2.46)		0.89 (3.21)	0.1931
10)	F-P's eq. (4)	weighted	F-P's	57140 (6.09)	-9.56 (-3.49)	-0.69 (-2.03)		0.86 (4.78)	0.261
11)	one analogue of F-P's eq. (5)	unweighted	SW1	39041 (3.59)	-1.53 (-0.220)	-1.16 (-2.39)	0.06 (0.44)		0.0599
12)	one analogue of F-P's eq. (5)	unweighted	SW2	20124 (1.79)	0.07 (0.01)	-0.12 (-0.23)	0.01 (0.07)		0.0039
13)	one analogue of F-P eq. (5)	unweighted	SW4	21396 (1.91)	-0.13 (-0.02)	-0.19 (-0.37)	0.01 (0.11)		0.0048
14)	one analogue of F-P's eq. (5)	unweighted	SW3	39416 (3.70)	-1.76 (-0.23)	-1.20 (-2.50)	0.06 (0.48)		0.0650
15)	F-P's eq. (5)	unweighted	F-P's	25870 (2.29)	2.06 (0.29)	-0.96 (-2.09)	0.025 (0.20)		0.51

Table 1 (cont'd)

	REMARKS	WEIGHT	S.S. VARIABLE	INTERCEPT	VAVN	S.S.W.	AGVAVN	$VAVN^2/1000$	R^2
16)	one analogue of F-P's eq. (6)	weighted	SW1	48475 (5.17)	-2.39 (-0.28)	-1.39 (-3.21)	0.06 (0.39)		0.1039
17)	one analogue of F-P's eq. (6)	weighted	SW2	33799 (3.41)	-1.79 (-0.20)	-0.51 (-1.09)	0.03 (0.18)	0.0191	
18)	one analogue of F-P's eq. (6)	weighted	SW4	34773 (3.53)	-2.02 (-0.22)	-0.58 (-1.23)	0.03 (0.22)	0.0224	
19)	one analogue of F-P's eq. (6)	weighted	SW3	48570 (5.22)	-2.60 (-0.30)	-1.40 (-3.27)	0.06 (0.42)	0.1071	
20)	F-P's eq. (6)	weighted	F-P's	33350 (3.71)	12.01 (1.52)	-1.12 (-3.11)	-0.160 (-1.16)		0.134
21)	one analogue of F-P's eq. (7)	unweighted	SW1	55573 (3.95)	-6.98 (-0.87)	-0.87 (-1.72)	0.02 (0.14)	0.52 (1.82)	0.0919
22)	one analogue of F-P's eq. (7)	unweighted	SW2	44499 (3.01)	-7.03 (-0.86)	0.15 (0.28)	-0.04 (-0.32)	0.69 (2.46)	0.0642
23)	one analogue of F-P's eq. (7)	unweighted	SW4	45652 (3.09)	-7.20 (-0.88)	0.06 (0.11)	-0.03 (-0.26)	0.68 (2.43)	0.0636
24)	one analogue of F-P's eq. (7)	unweighted	SW3	56599 (4.03)	-7.25 (-0.91)	-0.93 (-1.89)	0.02 (0.18)	0.52 (1.85)	0.0979
25)	F-P's eq. (7)	unweighted	F-P's	34840 (2.77)	-0.99 (-0.14)	-0.72 (-1.47)	-0.003 (-0.02)	0.29 (1.53)	0.161
26)	one analogue of F-P's eq. (8)	weighted	SW1	75597 (6.06)	-11.41 (-1.30)	-0.99 (-2.28)	-0.003 (-0.02)	0.89 (3.13)	0.1885
27)	one analogue of F-P's eq. (8)	weighted	SW2	70329 (5.24)	-12.56 (-1.38)	-0.29 (-0.67)	-0.04 (-0.25)	1.05 (3.76)	0.1475
28)	one analogue of F-P's eq. (8)	weighted	SW4	71395 (5.32)	-12.79 (-1.41)	-0.37 (-0.85)	-0.03 (-0.20)	1.05 (3.76)	0.1500
29)	one analogue of F-P's eq. (8)	weighted	SW3	76217 (6.12)	-11.65 (-1.33)	-1.02 (-2.40)	0.001 (0.01)	0.89 (3.17)	0.1931
30)	F-P's eq. (8)	weighted	F-P's	55310 (5.80)	-1.66 (-0.21)	-0.58 (-1.61)	-0.137 (-1.07)	0.85 (4.72)	0.261

Table 1 (cont'd)

NOTES: The variables used in the table are defined as follows:

- The dependent variable in all regressions is total household wealth.
- LI1 is the average (for 1962 and 1963) of after-tax wage and salary, farm and proprietorship income where taxes were imputed from an IRS tax table and prorated according to the contribution of wage and salary, farm and proprietorship income to a household's total income.
  - AGLI1 = LI1 times the age of the head of the household.
  - SW1 is the social security measure calculated using 1962 income; and using farm, proprietorship and partnership income as part of the income measure used to assign individuals to a percentile of the earnings distribution in the following cases: 1) whenever an individual was listed as having worked during 1962 while having no wage and salary income; 2) if both spouses met criteria in 1) then farm, proprietorship and partnership income was split between them; 3) if only one had a zero wage and salary income while being classified as having worked then that spouse was allocated all the farm, proprietorship and partnership income.
- SW2 is the measure analogous to SW1, for 1963.
- SW4 is the social security measure calculated interpreting F-P quite literally. That is, here farm proprietorship and partnership income for 1963 was used to assign individuals to a percentile of the earnings distribution only when both spouses had no wage and salary income in 1963. In this case farm, proprietor-ship and partnership income were all split equally between husband and wife.
- SW3 was calculated using only wage and salary income for 1962 to assign individuals to a percentile of the earnings distribution.
- Numbers in parentheses are t-statistics.

Table 2

REGRESSIONS OF TOTAL WEALTH ON NUMEROUS SOCIAL SECURITY WEALTH VARIABLES, TOGETHER WITH OTHER VARIABLES, ON A SAMPLE OF MARRIED MEN WHO ARE NOT FARM OPERATORS (93 observations)

	UNWEIGHTED/ WEIGHT	VARIABLE	INTERCEPT	LI1	S.S.W.	AGLI1	$LI1^2$/ 1000	R^2
1)	unweighted	SW1	40650 (2.94)	-8.09 (-2.13)	0.07 (0.13)		0.57 (2.29)	0.0577
2)	unweighted	SW2	40843 (3.01)	-8.06 (-2.13)	0.054 (0.11)		0.57 (2.29)	0.0577
3)	unweighted	SW3	42128 (3.06)	-7.81 (-2.08)	-0.04 (-0.08)		0.56 (2.25)	0.0576
4)	weighted	SW1	62380 (4.98)	-14.21 (-3.84)	-0.09 (-0.18)		0.97 (3.84)	0.1696
5)	weighted	SW2	61856 (4.94)	-14.34 (-3.93)	-0.05 (-0.10)		0.97 (3.91)	0.1694
6)	weighted	SW3	63257 (5.06)	-14.04 (-3.83)	-0.15 (-0.32)		0.96 (3.83)	0.1703
7)	unweighted	SW1	19518 (1.62)	6.70 (0.96)	-0.09 (-0.17)	-0.11 (-0.92)		0.0119
8)	unweighted	SW2	19189 (1.69)	6.75 (0.97)	-0.08 (-0.15)	-0.11 (-0.94)		0.0118
9)	unweighted	SW3	20591 (1.77)	6.50 (0.93)	-0.15 (-0.28)	-0.11 (-0.88)		0.0125
10)	weighted	SW1	32967 (2.93)	5.38 (0.654)	-0.48 (-0.91)	-0.10 (-0.72)		0.0379
11)	weighted	SW2	30336 (2.78)	5.83 (0.71)	-0.35 (-0.67)	-0.11 (-0.79)		0.0337
12)	weighted	SW3	33195 (3.00)	5.21 (0.63)	-0.49 (-0.96)	-0.10 (-0.69)		0.0388
13)	unweighted	SW1	38236 (2.75)	0.31 (0.04)	0.31 (0.56)	-0.16 (-1.36)	-.63 (2.50)	0.0772
14)	unweighted	SW2	38934 (2.87)	0.23 (0.03)	0.27 (0.51)	-0.16 (-1.34)	-.62 (2.49)	0.0766

Table 2 (cont'd)

	WEIGHT	VARIABLE	INTERCEPT	LI1	S.S.W.	AGLI1	$LI1^2$/ 1000	R^2
15)	unweighted	SW3	39846	0.24	0.19	-0.15	0.61	0.0752
			(2.86)	(0.03)	(0.36)	(-1.30)	(2.44)	
16)	weighted	SW1	60852	-4.97	0.10	-0.17	1.01	0.1851
			(4.85)	(-0.62)	(0.19)	(-1.29)	(3.99)	
17)	a	SW2	60455	-4.92	0.13	-0.17	1.01	0.1854
			(4.83)	(-0.61)	(0.25)	(-1.31)	(4.05)	
18)	a	SW3	61732	-5.05	0.03	-0.17	1.00	0.1848
			(4.93)	(-0.63)	(0.49)	(-1.25)	(3.97)	

NOTES: The variables used in the table are defined as follows:
- The dependent variable in all regressions is total household wealth.
- LI1 is the average (for 1962 and 1963) of after-tax wage and salary, farm and proprietorship income where taxes were imputed from an IRS tax table and prorated according to the contribution of wage and salary, farm and proprietorship income to a household's total income.
  - AGLI1 = LI1 times the age of the head of the household.
  - SW1 is the social security measure calculated using 1962 income; and using farm, proprietorship and partnership income as part of the income measure used to assign individuals to a percentile of the earnings distribution in the following cases: 1) whenever an individual was listed as having worked during 1962 while having no wage and salary income; 2) if both spouses met criteria in 1) then farm, proprietorship and partnership income was split between them; 3) if only one had a zero wage and salary income while being classified as having worked then that spouse was allocated all the farm, proprietorship and partnership income.
  - SW2 is the measure analogous to SW1, for 1963.
  - SW3 was calculated using only wage and salary income for 1962 to assign individuals to a percentile of the earnings distribution.
  - Numbers in parentheses are t-statistics.

Table 3

REGRESSIONS OF TOTAL WEALTH ON NUMEROUS SOCIAL SECURITY WEALTH VARIABLES, TOGETHER WITH OTHER VARIABLES, ON A SAMPLE OF MARRIED MEN (99 observations)

	UNWEIGHTED/ WEIGHTED	S.S. VARIABLE	INTERCEPT	LI1	S.S.W.	AGLI1	$LI1^2$/ 1000	D1	D1 S.S.W.	R^2	F-RATIO
1)	unweighted	SW1	41918	-2.44	0.08	-0.12	0.68	43568	0.35	0.2869	12.58
			(2.97)	(-0.34)	(0.14)	(-0.98)	(2.65)	(2.03)	(0.38)		
2)	unweighted	SW1	39816	-2.28	0.18	-0.12	0.69	50686		0.2858	25.20
			(3.08)	(-0.32)	(0.36)	(-1.02)	(2.67)	(5.02)			
3)	unweighted	SW3	43596	-2.59	-0.01	-0.11	0.68	38480	0.61	0.2883	12.31
			(3.11)	(-0.36)	(-0.03)	(-0.93)	(2.65)	(1.80)	(0.63)		
4)	unweighted	SW3	40352	-2.26	0.13	-0.12	0.67	50318		0.2853	24.40
			(3.11)	(-0.31)	(0.26)	(-0.99)	(2.65)	(4.94)			
5)	weighted	SW1	64419	-8.84	-0.07	-0.11	1.09	28662	0.94	0.3649	12.78
			(5.08)	(-1.12)	(-0.15)	(-0.87)	(4.26)	(1.68)	(1.14)		
6)	weighted	SW1	58734	-8.35	0.19	-0.13	1.09	45063		0.3559	24.21
			(5.03)	(-1.06)	(0.41)	(-0.96)	(4.26)	(4.92)			
7)	weighted	SW3	65379	-9.02	-0.13	-0.11	1.08	26124	1.10	0.3668	12.62
			(5.18)	(-1.14)	(-0.26)	(-0.83)	(4.26)	(1.54)	(1.29)		
8)	weighted	SW3	59224	-8.34	0.14	-0.12	1.08	44570		0.3554	23.43
			(5.05)	(-1.06)	(0.30)	(-0.93)	(4.24)	(4.84)			

Table 3 (cont'd)

NOTES: The variables used in the table are defined as follows:
- The dependent variable in all regressions is total household wealth.
- LI1 is the average (for 1962 and 1963) of after-tax wage and salary, farm and proprietorship income where taxes were imputed from an IRS tax table and prorated according to the contribution of wage and salary, farm and proprietorship income to a household's total income.
  - AGLI1 = LI1 times the age of the head of the household.
  - D1 is a dummy variable which equals 1 if the household is headed by a farm operator, zero otherwise.
  - D1SSW = the dummy variable D1 times the appropriate social security variable.
  - SW1 is the social security measure calculated using 1962 income; and using farm, proprietorship and partnership income as part of the income measure used to assign individuals to a percentile of the earnings distribution in the following cases: 1) whenever an individual was listed as having worked during 1962 while having no wage and salary income; 2) if both spouses met criteria in 1) then farm, proprietorship and partnership income was split between them; 3) if only one had a zero wage and salary income while being classified as having worked then that spouse was allocated all the farm, proprietorship and partnership income.
- SW3 was calculated using only wage and salary income for 1962 to assign individuals to a percentile of the earnings distribution.
- Numbers in parentheses are t-statistics.

REPORTS IN THIS SERIES

M8706: DANIEL F. SPULBER: Optimal Environmental Regulation Under Asymmetric Information.

M8707: MARK PINGLE and LEIGH TESFATSION: Pareto-Efficiency of Stationary Competitive Equilibria in Overlapping Generation Economies.

M8708: S.Y. HUSSEINI, J.-M. LASRY and M.J.P. MAGILL: Existence of Equilibrium with Incomplete Markets.

M8709: JEFFREY B. NUGENT: Foreign Aid, Economic Development and Income Distribution: Some Inferences from a CGE Model for Egypt.

M8710: RICHARD A. EASTERLIN: The New Age Structure of Poverty: Permanent or Transient?

M8711: TIMUR KURAN: Preference Falsification, Policy Continuity and Collective Conservatism.

M8712: HARRISON H.C. CHENG: The Existence of Arbitrage-Free Equilibria in Banach Spaces.

M8713: DIANE J. MACUNOVICH and RICHARD A. EASTERLIN: Application of Granger-Sims Causality Tests to Monthly Fertility Data, 1958–1984.

M8714: VICTOR KIPNIS, I. SH. PINSKER and EUGENE GRECHANOVSKY: Comparing Some Estimators for MSPE in AR Time Series.

M8715: HARRISON H.C. CHENG: Equilibrium Theory Without Consumption Constraints.

M8716: JANET MITCHELL: Credit Rationing, Budget Softness, and Salaries in Yugoslav Firms.

M8717: TIMUR KURAN: The Tenacious Past: Theories of Personal and Collective Conservatism.

M8718: MONGI AZABOU, LOTFI BOUZAINE and JEFFREY B. NUGENT: Contractual Choice in Tunisian Fishing.

M8719: HARRISON H.C. CHENG: Arbitrage Theory and Equilibrium: The Case of Unconstrained Consumption.

M8720: HARRISON H.C. CHENG: The Principle of Equivalence.

M8721: MOHAMED SALAH MATOUSSI and JEFFREY B. NUGENT: The Switch to Sharecropping in Medjez-el-bab.

M8722: MONGI AZABOU and JEFFREY B. NUGENT: Tax Farming: Anachronism or Optimal Contract?

M8723: JANET MITCHELL: Financial Constraints and the Tradeoff Between Salaries and Savings in Yugoslav Firms.

M8724: HARRISON H.C. CHENG: General Constraint Problems in Equilibrium Analysis.

M8725: MUSTAPHA K. NABLI, JEFFREY B. NUGENT and LAMINE DOGHRI: The Size Distribution and Ownership Type of Firms in Tunisian Manufacturing.

M8726: IAN NOVOS: Social Security Wealth and Wealth Accumulation: Further Microeconomic Evidence.