

NBER WORKING PAPER SERIES

THE ADEQUACY OF SAVINGS

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Working Paper No. 627

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
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February 1981

We wish to thank Peter Diamond and Jon Skinner for helpful discussions, and Paul Dorosh, David Reitman, and Jon Skinner for excellent research assistance. Research support was provided by the U.S. Department of Health, Education and Welfare and the National Bureau of Economic Research. The research reported here is part of the NBER's research program in Social Insurance and research projects in Capital Formation and Pensions. Any opinions and conclusions expressed in the paper are solely those of the authors and not those of either the U.S. Department of Health, Education and Welfare or the National Bureau of Economic Research.

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ABSTRACT

This paper uses newly available data from the Social Security Retirement History Survey to examine the adequacy of savings. This data source is particularly rich; survey data respondents covering 6 years have been matched with social security earnings records covering the years dating back 25 years. In addition to information on the path of lifetime earnings, the survey contains extensive data on asset holdings.

The results indicate that only a very small minority of couples face significant reductions in their standard of living during old age. This appears to be due in large part to compulsory savings institutions such as Social Security and private pensions.

If Social Security were eliminated and not replaced by private accumulation, a large fraction of the aged population would face a very sharp decline in living standards. Econometric evidence presented in the final section of the paper indicates that persons receiving more Social Security benefits have relatively higher levels of sustainable consumption at retirement.

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The Adequacy of Savings

Central to the formulation of public policy towards social security and private pensions is the question: How adequately do people save for their old age? The widely accepted life cycle and permanent income hypotheses of savings presume that individuals plan their consumption path over their lifetimes in a way that maximizes their satisfaction. Public policy regarding the financing of old age consumption is based on a very different view. The essential premise underlying the social security system, as well as government tax breaks for private pensions, is that left to their own devices, large numbers of people would fail to save adequately and find themselves destitute in their old age. While our social security and private pension systems perform a number of functions in the area of income redistribution and insurance, their primary function is to force individuals to save for their old age. This has the potentially important virtue of avoiding their turning to general welfare for assistance, as well as preventing personal suffering.

To date, very little empirical work has directly addressed the question of the adequacy of accumulation. In the first systematic study of this problem, Peter Diamond (1977) concluded that in the absence of Social Security, a substantial fraction of the population would be inadequately prepared for retirement. The Interim Report of the President's Commission on Pension Policy (1979) reached a similar conclusion.

I. Undersaving and Public Policy

Market economies traditionally respect consumer sovereignty. Economists typically do not attempt to examine the wisdom of consumers' choices between good x and good y, work and leisure, or risk and return. Nor do public policies typically seek to affect these decisions. Why then should choices regarding the intertemporal allocation of consumption be subject to special scrutiny?

There are several possible rationales for public intervention in private savings decisions. Paternalism may be appropriate in this context even if not in other static situations. Decisions about retirement savings are unique in their irreversibility. An individual cannot retrospectively enjoy his wealth nor can he undo his previous consumption. This problem of irreversibility is heightened by the likelihood of changing tastes. The saver may well have very different goals, tastes and desires when he retires than at the time the savings decision is made.

Costs of information processing and decision making provide a second possible justification for paternalistic policies. Individuals may find it difficult or unpleasant to confront the possibility of forced early retirement or disability. If these contingencies are sufficiently unlikely or remote, utility maximization recognizing the costs of choice may call for ignoring the possibility of their occurrence. Welfare might then be increased by public planning for these contingencies. A third element of

some or many non-myopic individuals could plan to consume at a significantly higher level during their youth than during their old age. Other individuals, in general, and public officials, in particular, may, from the perspective of their own preferences, view this intertemporal choice decision as "perverse" if not stupid. They may suspect that it will be regretted subsequently. Indeed, policymakers may be sufficiently disturbed to attempt to force these "irrational, but non-myopic" undersavers to save more for their old age. If this attempt to require additional savings takes the form of our current social security system, i.e., of forced contributions when young in return for retirement benefits when old, public policy will fail to achieve its desired goal. This is simply because of the existence of perfect capital markets. In the presence of perfect capital markets, private "irrational, but non-myopic" savers will undo a forced government savings plan of the social security variety by reducing their own savings out of disposable income and maintaining the original intertemporal consumption allocation plan. Note that if social security forced tax contributions are sufficiently large, these "irrational, but non-myopic" savers will borrow against their future social security benefits. Borrowing against future social security benefits would occur, however, only after the individual's private net worth was depleted.

Myopic savers, in contrast to "irrational, but non-myopic" savers, may simply not think about the future in deciding how much to consume today. In the extreme they may consume all their disposable income as well as inherited assets in each

markets and would provide a better test for "irrational, but non-myopic" saving in a world with imperfect capital markets.

For myopic savers public policy will be effective whether or not capital markets are imperfect; myopic savers by definition do not foresee or think about future resource streams and, hence, will never be in a position of desiring to borrow against those streams. As in the case of non-myopic, but possibly borrowing-constrained savers, the strongest test for myopic undersaving will be among that group of savers who have been least affected by forced savings policies. These points about the effectiveness of forced savings policies are summarized in Figure 1.

Fig. 1. Effectiveness of Forced Savings Policies

	Unconstrained Savers	Constrained Savers
non-myopic savers	Ineffective	Effective
myopic savers	Effective	Effective

of old age consumption resources with lifetime consumption resources ignoring those forced savings assets. In addition to presenting results based on total old age assets, we present results that are based on the counter-factual assumption that social security had never existed, i.e., both social security taxes and benefits are ignored in computing the levels of lifetime and old age consumption. This will obviously bias our results towards a finding of undersaving for those non-myopic as well as myopic savers who would have saved some fraction, if not all, of their social security taxes.

So far, the discussion has carefully avoided questions of uncertainty. One major risk that affects intertemporal consumption decisions is the uncertainty of the date of death. Economic theory suggests that this risk can be completely hedged by the purchase of actuarially fair annuities. In the U.S., private markets do not appear to provide actuarially fair, or indeed, even indexed annuities. Private purchase of annuities is rare. Less than 3 percent of respondents in the Retirement History Survey (RHS) report ownership of annuities. On the other hand, virtually everyone owns annuities in the form of social security benefits, pension benefits, and old age labor earnings. In addition, Kotlikoff and Spivak (1981) suggest that a sizable fraction of the risk of death can be hedged by risk pooling within families. Furthermore, even very small families can substitute to a significant degree for an actuarially fair annuities market. For example, two member families, such as a husband and a wife, or a father and son, can capture close to 50 percent of the insurance gains from perfect markets; three member families can capture close to 70 percent. Given the significant risk pooling opportunities among family and friends, and

the ratio R, where:

$$(3) \quad R = \frac{C^O}{C^L} .$$

The terms C^O and C^L are, respectively, the constant levels of planned consumption based on the present value of old age resources and the present value of lifetime resources that can be financed over all the possible remaining years of one's life. In this study, 88 is taken to be the maximum age of death. The formulae for C^O and C^L are simply the ratio of present resources from the age in question to the present value factor from the age in question through age 88.

In the case of married couples, the terms C^O_A , C^L_A , C^O , and C^L refer to the constant streams that each spouse could consume based on the combined lifetime and old age resources of the two spouses. The present and present expected value factors used to compute C^O_A , C^L_A , C^O , and C^L are the sum of the husband's and wife's present and present expected value factors.

respondent and his (her) spouse is computed using the 1969 Social Security Benefit Schedules. Across the board increases in real social security benefits after 1969 are not included in the calculations. The Social Security Primary Insurance Amount (PIA) is calculated from the respondent's reported earnings history. The SSW calculation takes into account dependent and survivor benefits as well as basic retirement benefits. Benefits are taken to begin at the age of retirement. An individual's age of retirement was determined, if possible, from the Social Security earnings file. If a respondent was still working in 1974, his (her) retirement age was taken to be his (her) 1973 expected retirement age. Respondents who said they would never retire were assumed to retire at age 70.

The procedure of using actual outcomes in calculating the present expected value of pension and social security streams in 1969 was also followed in computing the present expected value of future labor earnings (FUTW). The actual value of earnings was estimated from the Social Security earnings records up to 1974. If a respondent indicated in 1973 that he (she) expected to work after 1974, we assumed that the respondent continued to earn his (her) 1974 real earnings level until retirement. Earnings between 1951 and 1969 were obtained from the Social Security earnings records. Earnings prior to 1951 are not reported in the data. Each respondent's earnings back to age 30 are estimated by taking his (her) average earnings between 1953 and 1956 and extrapolating this figure backwards starting in 1950 and

worth (NW), future net labor earnings (FUTW), social security net wealth (SSW), and pension wealth (PENW). The present value calculations used to generate R are based on the same flows described above, with the exception that social security survivor benefits are ignored in the calculation.

These two measures of lifetime and old age resources are both potentially biased because they fail to account for inheritances as well as contributions from children, items that are quite poorly reported in the survey. To the extent that these inheritances and contributions from children have occurred prior to the respondent's attaining retirement age, the estimate of lifetime resources will be undermeasured, while the estimate of future resources is correct. If, on the other hand, such family transfers primarily arrive in the future, both future and lifetime resources will be undermeasured. The former case is the more problematic for our estimate of the ratio of old age to lifetime sustainable consumption since the omission of preretirement transfers in the lifetime resources calculation will bias upwards the computed ratio of sustainable old-age consumption to sustainable lifetime consumption. However, the potential bias here seems benign; social policy towards savings is presumably concerned not with the intertemporal consumption allocation of family transfers, rather the intertemporal allocation of lifetime earnings and other lifetime resources, e.g., pensions and social security that individuals can rely on receiving. In this context, family transfer payments can be thought of as a bonus. For purposes of this study, the appropriate lifetime resources base to consider can be thought of as excluding family

Table I

R-RATIO OF OLD AGE CONSUMPTION STREAM
TO LIFETIME CONSUMPTION STREAM, NO-ANNUITY CASE

Couple's Average Earnings

FREQUENCY	40	50	60	70	80	90	100	110	120	130	140	TOTAL
PERCENT												
ROW PCT												
\$ 3000	0	0	0	4	4	6	8	15	20	18	9	182
	0.00	0.00	0.20	0.20	0.31	0.41	0.76	1.02	0.92	0.46	4.99	9.27
	0.00	0.00	2.20	2.20	3.30	4.40	8.24	10.99	9.89	4.95	53.85	
4000	0	3	2	2	11	10	13	12	15	15	15	143
	0.00	0.15	0.10	0.10	0.56	0.51	0.66	0.61	0.76	0.76	3.05	7.28
	0.00	2.10	1.40	1.40	7.69	6.99	9.09	8.39	10.49	10.49	41.96	
5000	0	0	1	5	6	12	22	19	27	19	19	170
	0.00	0.00	0.05	0.25	0.31	0.61	1.12	0.97	1.37	0.97	3.00	8.66
	0.00	0.00	0.59	2.94	3.53	7.06	12.94	11.18	15.88	11.18	34.71	
6000	0	0	1	4	11	20	26	30	20	26	26	215
	0.00	0.00	0.05	0.20	0.56	1.02	1.32	1.53	1.02	1.32	3.92	10.95
	0.00	0.00	0.47	1.86	5.12	9.30	12.09	13.95	9.30	12.09	35.81	
7000	0	0	3	3	10	23	31	32	38	29	29	240
	0.00	0.00	0.15	0.15	0.51	1.17	1.58	1.63	1.93	1.48	3.62	12.22
	0.00	0.00	1.25	1.25	4.17	9.58	12.92	13.33	15.83	12.08	29.58	
8000	0	0	2	3	15	17	28	42	52	33	33	253
	0.00	0.00	0.10	0.15	0.76	0.87	1.43	2.14	2.65	1.68	3.11	12.88
	0.00	0.00	0.79	1.19	5.93	6.72	11.07	16.60	20.55	13.04	24.11	
9000	0	0	0	5	15	20	25	26	23	27	27	208
	0.00	0.00	0.00	0.25	0.76	1.02	1.27	1.32	1.17	1.37	3.41	10.59
	0.00	0.00	0.00	2.40	7.21	9.62	12.02	12.50	11.06	12.98	32.21	
10000	0	1	1	7	6	10	12	21	29	28	28	165
	0.00	0.05	0.05	0.36	0.31	0.51	0.61	1.07	1.48	1.43	2.55	8.40
	0.00	0.61	0.61	4.24	3.64	6.06	7.27	12.73	17.58	16.97	30.30	
11000	0	0	1	1	6	13	15	18	12	15	15	111
	0.00	0.00	0.05	0.05	0.31	0.66	0.76	0.92	0.61	0.76	1.53	5.65
	0.00	0.00	0.90	0.90	5.41	11.71	13.51	16.22	10.81	13.51	27.03	
12000	1	0	5	8	17	18	31	38	29	39	39	277
	0.05	0.00	0.25	0.41	0.87	0.92	1.58	1.93	1.48	1.99	4.63	14.10
	0.36	0.00	1.81	2.89	6.14	6.50	11.19	13.72	10.47	14.08	32.85	
TOTAL	1	4	20	42	103	151	218	258	263	240	664	1964
	0.05	0.20	1.02	2.14	5.24	7.69	11.10	13.14	13.39	12.22	33.81	100.00

net worth or if they indicated receiving a pension benefit, but failed to state the level.¹ The ultimate sample used contains about 1900 married couples. There are small variations in the tables because of differing data requirements.

Tables I and II report the distributions of old age to lifetime consumption ratios, cross-tabulated by the average earnings level (in 1969 dollars) of the couple between 1951 and 1969. Both tables indicate that over 90 percent of married couples can afford an old age level of consumption that exceeds 80 percent of their affordable lifetime consumption level. 84 percent of the couples can afford to purchase a larger annuity in their old age than they could afford to purchase at age 30; and 60 percent of elderly couples in the absence of annuity markets could afford to consume until age 88 at a constant higher level than the constant level of consumption they could have financed at age 30. The lower tails of the distribution are also of interest. Fewer than 1 percent of elderly respondents in 1969 faced an implied reduction in their standard of living of more than 40 percent; no respondents faced more than a 60 percent reduction. While these tables are based on an assumed two percent interest rate, tables based on a 4 percent interest rate yielded virtually identical distributions.

¹The consumption ratios do not appear to be biased upwards because of the omission of those respondents who fail to report either their value of their expected pension benefits or components of their wealth. Making the extreme assumption that all unreported components of wealth were zero and including respondents with unreported wealth in the analysis generated virtually no change in the distribution of R and R_A . The inclusion of those couples who have pensions, but who do not indicate their value in the analysis also has a trivial impact on the distributions even under the assumption that these couples will receive no pension whatsoever.

Table III

R--RATIO OF OLD AGE CONSUMPTION STREAM TO LIFETIME CONSUMPTION STREAM, NO-ANNUITY CASE

Retired Sample

Couple's Average Earnings

FREQUENCY PERCENT ROW PCT	50	60	70	80	90	100	110	120	130	140	TOTAL	
\$3000	0	2	7	8	14	20	15	14	14	8	25	113
	0.00	0.56	1.97	2.25	3.93	5.62	4.21	3.93	3.93	2.25	7.02	31.74
	0.00	1.77	6.19	7.08	12.39	17.70	13.27	12.39	12.39	7.08	22.12	
4000	0	1	3	4	8	5	4	5	5	6	10	46
	0.00	0.28	0.84	1.12	2.25	1.40	1.12	1.40	1.40	1.69	2.81	12.92
	0.00	2.17	6.52	6.70	17.39	10.87	8.70	10.87	13.04	13.04	21.74	
5000	0	2	1	5	8	6	8	10	10	6	3	49
	0.00	0.56	0.28	1.40	2.25	1.69	2.25	2.81	2.81	1.69	0.84	13.76
	0.00	4.08	2.04	10.20	16.33	12.24	16.33	20.41	20.41	12.24	6.12	
6000	0	0	1	4	12	3	5	2	2	4	6	37
	0.00	0.00	0.28	1.12	3.37	0.84	1.40	0.56	1.12	1.12	1.69	10.39
	0.00	0.00	2.70	10.81	32.43	8.11	13.51	5.41	10.81	10.81	16.22	
7000	0	0	0	0	2	7	9	5	5	6	9	38
	0.00	0.00	0.00	0.00	0.56	1.97	2.53	1.40	1.40	1.69	2.53	10.67
	0.00	0.00	0.00	0.00	5.26	18.42	23.68	13.16	15.79	15.79	23.68	
8000	0	0	0	0	2	4	5	5	5	3	6	25
	0.00	0.00	0.00	0.00	0.56	1.12	1.40	1.40	1.40	0.84	1.69	7.02
	0.00	0.00	0.00	0.00	8.00	16.00	20.00	20.00	20.00	12.00	24.00	
9000	1	0	1	3	6	2	1	2	2	1	0	17
	0.28	0.00	0.28	0.84	1.69	0.56	0.28	0.56	0.56	0.28	0.00	4.78
	5.88	0.00	5.88	17.65	35.29	11.76	5.88	11.76	5.88	5.88	0.00	
10000	0	0	1	0	1	0	1	2	2	1	2	8
	0.00	0.00	0.28	0.00	0.28	0.00	0.28	0.56	0.56	0.28	0.56	2.25
	0.00	0.00	12.50	0.00	12.50	0.00	12.50	25.00	25.00	12.50	25.00	
11000	0	1	0	0	1	0	3	2	2	1	1	9
	0.00	0.28	0.00	0.00	0.28	0.00	0.84	0.56	0.56	0.28	0.28	2.53
	0.00	11.11	0.00	0.00	11.11	0.00	33.33	22.22	22.22	11.11	11.11	
12000	0	0	0	0	0	3	4	3	3	0	4	14
	0.00	0.00	0.00	0.00	0.00	0.84	1.12	0.84	0.84	0.00	1.12	3.93
	0.00	0.00	0.00	0.00	0.00	21.43	28.57	21.43	21.43	0.00	28.57	
TOTAL	1	6	14	24	54	50	55	50	50	36	66	356
	0.28	1.69	3.93	6.74	15.17	14.04	15.45	14.04	14.04	10.11	18.54	100.00

Interest rate is zero.

Table IV.

AGE CONSUMPTION AND AGE WEALTH PATHS.
FOR SINGLE MALE WITH NO ANNUITIES

Age	Risk Aversion	Consumption	Wealth
55	.75	6825	\$100,000
65	.75	4720	47,415
75	.75	2250	13,830
85	.75	395	1,420
95	.75	10	30

55	1.25	5465	100,000
65	1.25	4395	57,200
75	1.25	2810	23,675
85	1.25	990	5,165
95	1.25	110	475

55	1.75	4795	100,000
65	1.75	4100	52,680
75	1.75	2980	30,680
85	1.75	1415	9,505
95	1.75	295	1,690

Interest rate is 1 percent. Rate of time preference is 1 percent.

consumption that is as large or larger than they enjoyed in their youth.

Analysis of the rate at which the elderly consume their retirement resources provides another test of the ability of the elderly to cogently plan their old age consumption. Table V presents the ratio of the annuity that elderly couples could have financed in 1971 to the annuity they could have financed in 1969. A ratio close to unity suggests that couples are managing to provide a level consumption stream as they age. Table V indicates that roughly 60 percent of couples have ratios of the 1971 affordable annuity that is within 10 percent of the 1969 affordable annuity. In 1971, over 15 percent of couples could have financed an annuity that was more than 10 percent larger than they could have financed in 1969. On the other hand, almost 25 percent of 1971 couples could not have financed an annuity as large as 90 percent of the 1969 annuity; 6 percent of couples could not afford an annuity that was 70 percent of the 1969 annuity.

These data provide no overwhelming prima facie support for our existing massive forced savings programs; they also provide no strong support for recommended expansion of the social security and private pension systems. While this evidence provides little positive justification for forced savings, does it provide any compelling evidence against forced savings? To consider this question, the distributions of R and RA were recomputed under the extreme assumption that in the absence of social

security, all individuals would have fully consumed their tax contributions. The effect of setting all social security taxes and benefits to zero has a dramatic effect on the distribution of the ratios of old age to lifetime consumption. In the case of annuities, over 40 percent of the sample would suffer at least a 20 percent reduction in their consumption levels in a world in which social security had no effect on private savings. Of the 40 percent, 20 percent would suffer over a 50 percent reduction in consumption, and 9 percent would suffer over a 70 percent reduction in consumption.

The results are even more impressive if one considers the subset of the population that is retired and that has no pension benefits. For this group, eliminating social security from the calculation and assuming no offsetting private savings response leaves 32 percent of the sample with a retirement annuity lower than one-third of their lifetime annuity. In the no annuity framework, 65 percent of the sample would face a 50 percent or greater reduction in their standard of living.

These numbers are sufficiently dramatic to conclude that no strong case could be made for or against social security and other forced savings programs, based on the adequacy of resources available during retirement, unless and until one pins down the exact savings response to these programs. This is a topic explored in the next section.

EXPLAINING THE INTERTEMPORAL ALLOCATION
OF CONSUMPTION

Dependent Variable	Equation 1	Equation 2	Equation 3	Equation 4
	R_A	R	R_A	R
Independent Variables				
Constant	-2.134 (5.523)	-0.581 (2.323)	-1.813 (4.716)	-0.279 (1.135)
Age	0.042 (6.833)	0.018 (4.563)	0.044 (7.307)	0.020 (5.209)
ED 1	-.063 (3.259)	0.036 (2.669)	-0.088 (4.255)	-0.053 (3.989)
ED 3	.085 (2.734)	0.045 (2.281)	0.079 (2.586)	0.047 (2.435)
RACE	-0.087 (2.907)	-0.052 (2.695)	-0.113 (3.847)	-0.071 (3.790)
HOME	0.102 (4.525)	0.064 (4.404)	0.120 (5.462)	0.078 (5.534)
SSRAT 1	2.517 (18.611)	1.571 (17.962)	2.509 (10.375)	1.372 (8.878)
PRAT 1	2.258 (13.686)	1.713 (16.051)	2.315 (5.490)	1.576 (5.848)
FRAT 1	2.027 (23.863)	1.243 (22.632)	2.191 (11.271)	1.357 (10.918)
DEN 1	--	--	1.5×10^{-7} (0.376)	-2.3×10^{-7} (0.891)
DSRAT 1	--	--	-1.2×10^{-5} (7.686)	-8.1×10^{-6} (8.276)
DPRAT 1	--	--	9.0×10^{-7} (0.505)	1.6×10^{-6} (1.402)
DFRAT 1	--	--	2.3×10^{-7} (0.247)	2.5×10^{-7} (0.409)
\bar{R}^2	0.3673	0.3595	0.4030	0.4009

Note: Absolute value of t-statistic in parentheses.

that the crowding out of private savings is substantially less than dollar for dollar.

It was hypothesized above that if capital markets constraints are an important reason for the positive relationship between social security and savings, the relationship should be relatively more attenuated for more affluent persons who have higher lifetime incomes and more access to the capital markets. This suggestion is borne out by equations (3) and (4), which reveal a significant negative interaction between the social security fraction of lifetime income and lifetime income. Interestingly, a similar effect is not found for private pensions or future labor income. This may be evidence that myopia is more prevalent with respect to pension than social security benefits.

understanding of the motivations for and determinants of individual saving.

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