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Do Older Workers Respond to Changes in Social Security Benefits? A Look at the Time Series Evidence

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A Look at the Time Series Evidence

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ABSTRACT

This paper uses time series data to examine the effect of Social Security on the participation rates of older men. The evidence indicates that changes in the level of Social Security benefits have a large affect on the participation rates of 62-64 and 65-69 year-old men, and that this effect occurs with a lag of 1-3 years. Increases in Social Security benefits accounted for 37% of the decrease in participation rates of 65-69 year-old men between 1954 and 1990. For 62-64 year-old men, Social Security accounts for 40% of the decline since 1963.

I. Introduction

Over the past 30 years, the labor force participation rates of older men have decreased sharply. At the same time, Social Security benefits have increased dramatically. Naturally, one suspects a link between these two trends. A number of studies examine this link, and attribute the high retirement rates at ages 62 and 65 to kinks in the budget constraint caused by the Social Security benefit formulas.[1] Despite this effect on retirement age, these studies also find that changes in the level of Social Security benefits (and hence, Social Security wealth) have little effect on participation rates.

Burtless and Moffitt [1984,1985] estimate a structural model of retirement using the Retirement History Survey (RHS). They find that Social Security has a statistically significant effect on retirement age. But this effect is rather small; a 20% reduction in benefits would increase retirement age by only 2-3 months. Studies by Burtless [1986] and Hausman and Wise [1985] come to similar conclusions: that the benefit increases of the early 1970's had a very small effect on retirement age. Both studies use the RHS data, but use different techniques. Hausman and Wise estimate a proportional hazard model, while Burtless estimates a structural model

Fields and Mitchell [1984a,1984b] estimate the combined effect of Social Security and private pensions on retirement age. Their results imply that the proposed changes in Social Security benefits will have a rather small effect on retirement ages. For example, if the normal retirement age is increased to 67, benefits would fall by 13%. But average retirement age would increase by only 1.1 months.

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[1] See Ippolito [1990]. He argues that increases in Social Security benefits in the early 1970's caused the age 62 spike to increase and the age 65 spike to decrease. Diamond and Hausman [1984] find that the availability of Social Security benefits accounts for half of all retirements of men aged 62-64.

Another set of papers by Fields and Mitchell [1984b,1984c,1987] examines the effect of Social Security reforms on retirement age and retirement incomes of older workers using the RHS. They find that increasing actuarial reductions for early retirement would increase retirement age by 3 months, while increasing the normal retirement age to 68 would increase retirement age by 1.6 months. Other changes, such as delaying cost of living adjustments (COLAs) by 6 months and increasing the delayed retirement credit, would have negligible effects on retirement age. Hence, Fields and Mitchell conclude that changes in the Social Security benefit formulas will have only a small effect on retirement ages.

Krueger and Pischke [1991] use evidence from the "notch" cohorts[2] to estimate the effect of Social Security on labor supply. They construct synthetic cohorts from aggregated Current Population Survey (CPS) data and find that, despite the decrease in benefits, participation rates continued to fall.

These results imply that, while Social Security is largely responsible for the spike in the retirement hazard at ages 62 and 65, changes in Social Security wealth have a small impact on the retirement decision. This implies that the decrease in benefits brought about by the 1983 reform will not have the desired effect of substantially increasing participation rates.[3]

The studies mentioned above use microdata - most use the RHS - to estimate the effects of Social Security on retirement behavior. Microdata has the advantage of permitting the researcher to control for individual characteristics. But, as Moffitt [1987] points out, these studies do not properly measure the effect of changes in the system because *the same law covers all individuals*. Differences in Social Security wealth reflect differences in lifetime earnings across individuals, rather than any change in the general level of benefits.

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[2] The notch cohorts, those born between 1917 and 1921, received lower benefits than previous cohorts as a result of the 1977 legislation.

[3] However, Gustman and Steinmeier [1985,1986] find the reverse. In the long run, the 1983 reforms will increase the percentage of older workers (65+) who are full time workers.

To remedy this, Moffitt uses time series data to estimate the effect of Social Security on labor supply. He bases his estimation procedure on a life-cycle model of labor supply, where workers maximize a Stone-Geary utility function subject to a lifetime wealth constraint. From this model he derives a labor supply function, which he then estimates using aggregate data from the CPS and the Social Security Administration. Regressing average annual hours on Social Security wealth, he finds that unanticipated increases in Social Security wealth had a small effect on labor supply in the 1965-75 period; they can explain at most 20% of the decline in labor supply.

I take another look at the time series data and come to the opposite conclusion: Social Security has had a large impact on participation (and hence, retirement) rates. Between 1954 and 1990, Social Security accounted for 37% of the decrease in participation rates of 65-69 year-old men. And for 62-64 year-olds, Social Security accounts for 40% of the decrease in participation rates between 1965 and 1990.

The different results are due to the different time period used in estimation, and different definitions of the Social Security variable. Moffitt estimates his model over the 1955-1981 period. And as he notes, trends in Social Security wealth and income are highly correlated, which makes it difficult to distinguish between the effects of these two variables. My analysis extends the period of estimation another 10 years to 1991. This extension is important because the decline in Social Security benefits between 1981 and 1984 allows me to better distinguish between the effects of changes in income and changes in Social Security benefits.

In defining the Social Security variable, Moffitt makes the distinction between anticipated and unanticipated changes in the level of benefits, whereas I do not. When I make the distinction using my data, I find that (dollar for dollar) unanticipated changes in the level of benefits have a much larger effect on participation than do anticipated changes. But the magnitude of the unanticipated changes is so small that the total effect is negligible. Anticipated changes in benefits are an order of magnitude larger, which results in their having a larger impact on participation rates.

II. Social Security and Labor Force Participation

Theory predicts that exogenous increases in Social Security benefits, which increase wealth, lead workers to reduce labor supply by retiring earlier. To illustrate, suppose that individuals live for two periods; they are young in the first period, and old in the second period. Hence, individuals derive utility from leisure in period 1, leisure in period 2, and consumption of goods and services.[4] Further suppose that Social Security benefits exogenously increase at the beginning of period 2. If workers fully anticipate the increase at the beginning of the first period, the income effect causes them to increase consumption and reduce labor supply in both periods. However, individuals can draw Social Security benefits only if they stop working (or decrease labor supply sufficiently), which causes individuals to increase labor supply in period 1 and retire earlier in period 2. This implies that labor supply unambiguously decreases in period 2, but could increase or decrease in period 1.[5] On the other hand, if workers do not anticipate the increase in benefits they can adjust their labor supply only in period 2, which leads to a decrease in retirement age. In either case, increases in Social Security benefits cause individuals to retire earlier.

Time Series Evidence

Figures 1 and 2 show the relationship between the non-participation rate (1 minus Labor Force Participation Rate [LFPR]) of older men and the generosity of Social Security benefits. I measure generosity (PIA/Earnings) as the ratio of the average Primary Insurance Amount (PIA)[6]

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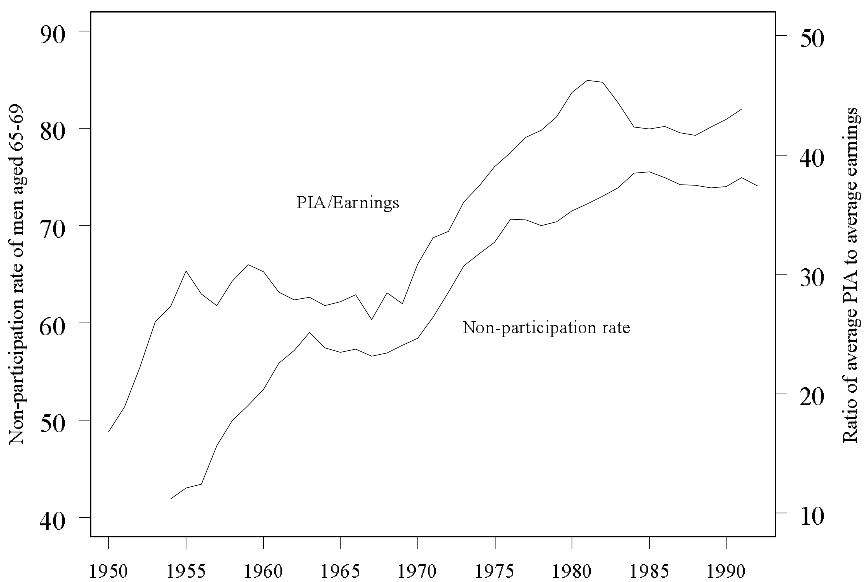
[4] I ignore the timing of consumption.

[5] If the increase in benefits also increases the marginal gain to working, then workers have an incentive to increase labor supply in all periods. This effect will be weaker when workers are old since they must quit working to collect benefits.

[6] The primary insurance amount is the benefit an individual would receive at age 65. I use average PIA rather than actual benefit amounts because PIA is not affected by early retirement decisions or number of dependents

of new awards to average taxable earnings,[7] both from the Social Security Bulletin Annual Statistical Supplement.[8] It is natural to measure generosity this way because workers weigh their Social Security benefits against what they could earn by working.[9] The bottom series in Figure 1 shows the non-participation rate of 65-69 year-old men, while the bottom series in

Figure 1. Non-participation rate of men 65-69



Sources: Social Security Annual Statistical Supplement, 1986,1992. Current Population Reports, Annual Report on the Labor Force, 1954-57. Labor Force Statistics Derived From the Current Population Survey, 1948-87. Employment and Earnings, Jan. 1989-92.

(any adjustments for early retirement or dependents are expressed as percentages of PIA) and hence, measures the general level of benefits.

[7] This measure of generosity was first used in Ward [1984].

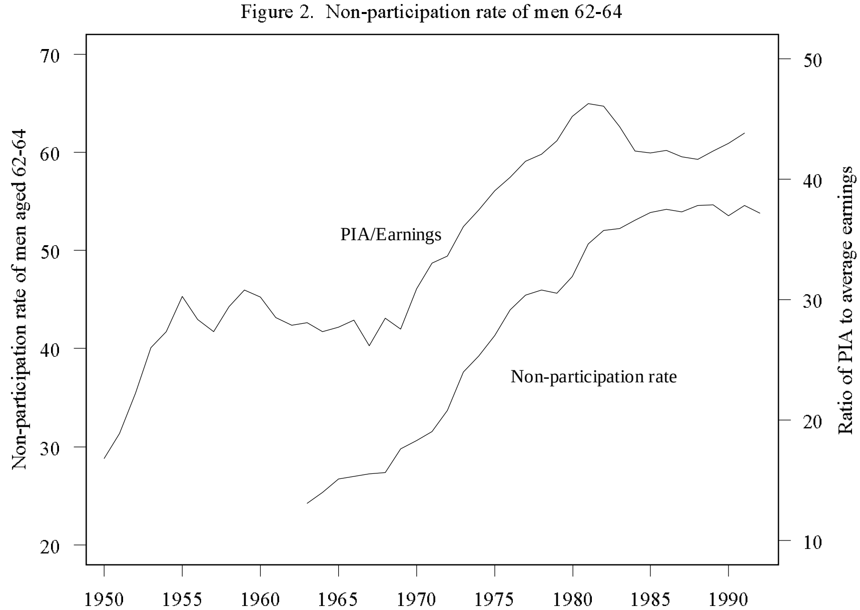
[8] The Social Security Administration estimates earnings for individuals who exceed the maximum taxable earnings.

[9] Note that PIA/Earnings does not measure replacement rates because the average earnings figures include all covered workers. As noted in Moffitt [1987], earnings data are not available by age group.

Figure 2 shows the non-participation rate of 62-64 year-old men. Both series are computed from the Current Population Survey (CPS).[10]

These figures suggest a strong relationship between the generosity of Social Security benefits and the non-participation rate of older workers. Beginning in 1963, the non-participation rate follows changes in generosity with a 2-4 year lag. Prior to 1963, the lag was closer to 8 years. A similar pattern exists for 62-64 year-old men (see Figure 2). However, a notable difference between the two series is that the non-participation rate of 62-64 year-olds increases between 1963 and 1970, while the non-participation rate for 65-69 year-olds is

Figure 2. Non-participation rate of men 62-64



Sources: Social Security Annual Statistical Supplement, 1986,1992. John Stinson of Bureau of Labor Statistics.

[10] I thank John Stinson of BLS for providing me with the data for 62-64 year-old men.

relatively constant. The increase in the non-participation of 62-64 year-olds coincides with the availability of Social Security benefits, which began in 1962.

To better estimate the effect of Social Security on the participation rates of older men, I used the above data to run two sets of regressions. In both sets, the dependent variable is the labor force participation rate. The independent variables include current and lagged values of PIA/Earnings, and a time trend. Since I estimated the equations in first differences, the time trend reduces to a constant term.[11]

Tables 1 and 2 contain regression results for 65-69 and 62-64 year-old men. The regressions indicate that increases in Social Security benefits cause a decrease in the participation rates, but with a lag. The lag is 2-3 years for 65-69 year-olds and 1-3 years for 62-64 year-olds .

The regression in column (1) of Table 1 includes the current value of PIA/Earnings as well as values lagged 1-4 years. Here, PIA/Earnings(t-3) has the largest effect, and PIA/Earnings(t-2) has the next largest effect, although only the former is statistically significant. Moving from column (1) to column (5), one can see the effect of shortening the lag structure. Clearly, dropping PIA/Earnings(t-3) has the largest effect on R^2, which indicates that it explains the bulk of the variation in participation rates. The next largest drop in R^2 occurs when I drop PIA/Earnings(t-2) from the regression. The regression that "performs the best" includes PIA/Earnings(t-2) and PIA/Earnings(t-3), and is reported in column (6).[12]

For 62-64 year-olds, the effects are distributed over a three year period, and the lag is shorter. Although none of the coefficients in column (1) of Table 2 are statistically significant,

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[11] I tried alternative specifications that used moving averages of GNP (a 5 year or a 10 year average) and the current unemployment rate instead of the time trend. Since there was very little difference in the results, I report the simpler specification.

[12] I could have included PIA/Earnings(t-4) in the regression in column (6). There is no difference in the explanatory power of the two equations, but excluding PIA/Earnings(t-4) makes it comparable to column (6) in Table 2.

<u>Table 1</u>

65-69 Year-Old Men

Dependent variable: Labor Force Participation Rate.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PIA/Earnings(t)	-.0800 (.1335)	-.0716 (.1327)	-.0792 (.1425)	-.1194 (.1453)	-.1193 (.1411)		
PIA/Earnings(t-1)	.0986 (.1345)	.0941 (.1340)	.0432 (.1422)	-.0003 (.1447)			.0932 (.1343)
PIA/Earnings(t-2)	-.1434 (.1300)	-.1639 (.1276)	**-.2396** **(.1330)**			-.1607 (.1255)	*-.1736* *(.1277)*
PIA/Earnings(t-3)	**-.2703** **(.1256)**	**-.2987*** **(.1212)**				**-.2863** **(.1202)**	**-.2999** **(.1227)**
PIA/Earnings(t-4)	-.1099 (.1225)						
Observations	37	37	37	37	37	38	38
F Statistic	2.28	2.67	1.33	0.35	0.72	4.87	3.36
Significance Level	.0707	.0500	.2820	.7089	.4034	.0136	.0299
R^2	.2691	.2501	.1077	.0200	.0200	.2178	.2288
Adjusted R^2	.1512	.1563	.0266	-.0376	-.0080	.1731	.1607

Standard Errors are in parentheses.
Bold* with and asterisk indicates significance at the 1% level using a 1-tailed test.
Bold indicates significance at the 5% level using a 1-tailed test.
Italics indicates significance at the 10% level using a 1-tailed test.
All regressions were estimated in first differences and include a constant term. The data used for these regressions come from the CPS (participation rates) and the Social Security Bulletin Statistical Supplement (average PIA and average earnings) and cover the period from 1954-1992. Since the Social Security data are available only to 1991, omission of PIA/Earnings(t) in columns (6) and (7) yield an additional observation.

Table 2

62-64 Year-Old Men

Dependent variable: Labor Force Participation Rate.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PIA/Earnings(t)	-.0939 (.1672)	-.0820 (.1591)	-.0963 (.1649)	-.1719 (.1580)	*-.2379* *(.1671)*		
PIA/Earnings(t-1)	*-.2286* *(.1640)*	*-.2328* *(.1598)*	**-.3190** **(.1565)**	**-.3480** **(.1579)**			*-.2338* *(.1655)*
PIA/Earnings(t-2)	-.1688 (.1757)	-.1904 (.1572)	*-.2199* *(.1620)*			*-.2449* *(.1563)*	*-.2158* *(.1546)*
PIA/Earnings(t-3)	*-.2498* *(.1613)*	*-.2564* *(.1564)*				**-.3337** **(.1562)**	*-.2561* *(.1626)*
PIA/Earnings(t-4)	-.0501 (.1648)						
Observations	26	26	26	26	26	27	27
F Statistic	2.45	3.18	3.10	3.60	2.03	4.35	4.68
Significance Level	.0690	.0344	.0474	.0435	.1674	.0245	.0266
R^2	.3799	.3771	.2974	.2386	.0779	.2659	.3245
Adjusted R^2	.2249	.2584	.2016	.1724	.0395	.2047	.2363

Standard Errors are in parentheses.
Bold* with and asterisk indicates significance at the 1% level using a 1-tailed test.
Bold indicates significance at the 5% level using a 1-tailed test.
Italics indicates significance at the 10% level using a 1-tailed test.
All regressions were estimated in first differences and include a constant term. The data used for these regressions come from the CPS (participation rates) and the Social Security Bulletin Statistical Supplement (average PIA and average earnings), and cover the period from 1966-1992 (I omitted the first three years because the start-up period is not representative of the rest of the sample). Since the Social Security data are available only to 1991, omission of PIA/Earnings(t) in columns (6) and (7) yield an additional observation.

one can see that the coefficients on PIA/Earnings are the largest for values lagged 1-3 periods. Omitting PIA/Earnings(t-4) has only a slight effect on R^2, but R^2 drops significantly when PIA/Earnings(t-3), (t-2), and (t-1) are dropped (columns (3), (4), and (5)). The equation in column (7), which includes PIA/Earnings (t-1) through (t-3), seems to perform the best.

The results in Tables 1 and 2 are similar in that they indicate that increases in Social Security benefits reduce the participation rates of both groups with a lag of 2-3 years for 65-69 year olds and 1-3 years for 62-64 year olds.

To interpret the lag in the effect of Social Security on participation rates, one must remember that the dependent variables represent age groups. Since there is no strong contemporaneous effect, decreases in the participation rate have two possible interpretations. The decrease in participation could be due to increased retirement at ages 62 and 65. Or it could reflect increased retirement at earlier ages. Consider the former interpretation first.

It is well known that the kinks in the budget line at ages 62 and 65 give workers an incentive to retire at one of those ages. Given the strong incentive to retire at age 62, workers who have not retired by age 63 or 64 have exhibited a strong attachment to the labor force, and are likely to wait until 65 or later to retire. For workers in the labor force beyond age 65, the bond is even stronger. Assume, for now, that increases in Social Security benefits affect whether workers retire at ages 62 or 65, so that any observed decrease in labor force participation rates is due to an increase in the number of people who retire at these ages, rather than any change in the retirement rate of 63-64 year-olds or 66-69 year-olds.[13]

Consider the effect of an increase in Social Security benefits in year t. By assumption, this increase does not immediately affect the retirement decision of 63-64 year-old workers because these workers cannot retroactively retire at 62. However, the coefficient on PIA/Earnings(t) indicates that there may be a small (though not statistically significant)

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[13] This assumption is a reasonable approximation to observed changes in the retirement hazard over time.

contemporaneous effect on 62 year-olds. In year t+1, the 62-64 year-old group now includes people who were 61 in year t and excludes people who were 64 in year t. The higher retirement rates at age 62 will reduce the participation rates of the 62-64 year-old group. The coefficient on PIA/Earnings(t-1) in column (1) suggests that this is the case. A similar argument applies to years t+2 and t+3 regarding workers who were 60 and 59 in year t. As each cohort reaches 62, a larger proportion of them retires.

The above argument holds for 65-69 year-olds as well. First, 65-69 year olds who are still in the labor force in year t have already displayed a strong attachment to the labor force so that one is not surprised by the small coefficient on PIA/Earnings(t). However, one expects a higher percentage of people who are 62-64 in year t to retire when they reach 65. This is consistent with the large negative coefficients on PIA/Earnings(t-2) and PIA/Earnings(t-3).

Note that the results in Table 1 are also consistent with the second interpretation that retirement rates are higher at younger ages. The large coefficients on PIA/Earnings(t-2) and PIA/Earnings(t-3) could be due to higher retirement rates at ages 62-64 in years t and t+1. However, if this were the case, I would have found a large contemporaneous effect in the regression on 62-64 year-olds. Thus, it appears that changes in the level of Social Security benefits affect retirement rates primarily at ages 62 and 65.

To summarize, an increase in Social Security benefits in year t has a negligible contemporaneous effect on the retirement rates of men aged 62-64 and 65-69. But the increase in benefits causes a larger proportion of 59-61 year-olds to retire when they reach 62. Similarly, a larger proportion of 62-63 year-olds will retire when they reach 65.

These results suggest a simple way of capturing the effect of Social Security; use a single variable that is a moving average of PIA/Earnings. The simplified regressions in Table 3 tell the same story as Tables 1 and 2. For 65-69 year-olds, equations with 3 year moving averages lagged 2 or 3 years explain the most variation. Note that the contemporaneous 3 year moving average explains the least variation, confirming the findings in Table 1 that Social Security affects retirement behavior with a lag of 2-3 years. Note also that the 10 year moving average

<u>Table 3</u>

Moving Average Equations

Dependent variable: Labor Force Participation Rate
Independent variable: Moving average of PIA/Earnings

	PIA/Earnings	Standard Error	R^2	F Statistic	Significance Level	Obs.
<u>65-69 Year-Old Men</u>						
5 Year	**-.5689***	.2063	.1786	7.61	.0092	37
10 Year	**-.7933***	.2980	.1684	7.09	.0117	37
3 Year	-*.2939*	.1996	.0583	2.17	.1499	37
3 Year (t-1)	**-.4268**	.1811	.1337	5.56	.0240	38
3 Year (t-2)	**-.5191***	.1591	.2283	10.65	.0024	38
3 Year (t-3)	**-.5017***	.1572	.2205	10.18	.0029	38
<u>62-64 Year-Old Men</u>						
5 Year	**-.8109***	.2264	.3482	12.82	.0015	26
10 Year	**-.7312**	.3381	.1661	4.78	.0388	26
3 Year	**-.6233***	.2091	.2701	8.88	.0065	26
3 Year (t-1)	**-.7080***	.2047	.3237	11.96	.0020	27
3 Year (t-2)	**-.6012***	.2131	.2415	7.96	.0092	27
3 Year (t-3)	**-.5701***	.2086	.2300	7.47	.0114	27

Bold* with and asterisk indicates significance at the 1% level using a 1-tailed test.
Bold indicates significance at the 5% level using a 1-tailed test.
Italics indicates significance at the 10% level using a 1-tailed test.
The data used for these regressions come from the CPS (participation rates) and the Social Security Bulletin Statistical Supplement (average PIA and average earnings) and cover the period from 1954-1992 for 65-69 year-olds and 1966-1992 for 62-64 year-olds. Each row represents one regression. All regressions were estimated in first differences and include a constant term. Since the Social Security data are available only to 1991, equations with lagged moving averages have an additional observation.

does not explain very much variation. This indicates that changes in the level of Social Security benefits affect retirement behavior primarily in the short term. Longer term changes may be captured by the constant (time trend) term, or may result in changes in labor supply at younger ages.

For 62-64 year-olds the 5 year moving average and the 3 year moving average lagged 1 year explain the most variation, while the 10 year moving average explains the least. This implies that, for 62-64 year-olds, changes in the level of Social Security benefits affect retirement with a shorter lag.

To estimate the magnitude of Social Security's effect on participation rates relative to the time trend, I used estimates from the moving average equations. For 65-69 year-olds, I used the 3 year moving average lagged 2 years. And for 62-64 year-olds, I used the 3 year moving average lagged 1 year. I estimate that increases in Social Security benefits account for 37% of the total decline in participation rates of 65-69 year-old men between 1954 and 1992. The general downward trend in participation rates accounted for the rest. For 62-64 year-old men, the figure is slightly larger. Social Security accounted for 40% of the total decrease in the participation rate between 1963 and 1990.[14]

Comparisons to Moffitt [1987]

These estimates are so much larger than the 20% reduction in labor supply found in Moffitt [1987] that it is worth noting some of the differences in approach. The primary

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[14] I also broke down the effect of Social Security into (1) the effect of the availability of Social Security on the trend in the participation rate, and (2) the effect of increasing benefit levels on participation. I found that Social Security accounted for 43 percent of the decline in the participation rate of 62-64 year old men. Of this, 19% was due to acceleration of the downward trend in participation rates after 1963 caused by the availability of benefits to 62-64 year olds in 1962. The direct effect of increased benefits accounted for the remaining 24%. To estimate the effect on the time trend, I needed participation rates from the pre-1963 period. Since these data are not available for 62-64 year-olds, I used the changes in the rates for the 60-64 year-old group. Although the participation rates of the two groups differ, the first differences are quite close.

differences are: the specification of the Social Security variable, the age groups included in the sample, and the time period covered.

Moffitt defines his Social Security variable as unanticipated changes in Social Security wealth net of taxes. He computes actual and expected Social Security wealth, and uses the difference to measure unanticipated changes in Social Security benefits. This variable enters into the equations as either a 5 year or a 10 year moving average.

My specification uses current and lagged values of average PIA divided by average earnings. Expressing the Social Security variable as a ratio of average PIA to average earnings does not affect the results. I estimated several equations entering PIA and Earnings separately, and got very similar results. Table 3 indicates that the 5 and 10 year moving averages do not perform as well as the 3 year moving averages, but the parameter estimates are reasonably close. I chose not account for taxes because the link between benefits and taxes is weak; current taxes do not finance future benefits, but rather the payments of those currently receiving benefits.

Moffitt's use of unanticipated benefits does seem to matter. I estimated moving average equations that included separate variables for anticipated and unanticipated changes in Social Security benefits, and found that unanticipated changes in Social Security benefits had very little effect on participation rates.[15] Table 4 contains the results of these regressions. For both 65-69

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[15] The equation used to estimate anticipated changes in SS benefits is a variation on the model proposed by Turner [1984] and Doescher and Turner [1988] to explain the relationship between group size and the level of benefits that a group will receive. I assume that workers make 5 year predictions so that current values of the predicting variables are used to predict real PIA 5 years in the future. The variables used in the prediction equations are: the ratio of 65-69 year olds to the number of people aged 25-59 in the labor force, the number of people aged 25-59 in the population, the number of 65-69 year olds in the population, real PIA, real GDP ("current" and lagged 1 year), the unemployment rate ("current" and lagged 1 year). The independent variables are the estimated anticipated and unanticipated changes in SS benefits divided by real earnings (I do not break down earnings into anticipated and unanticipated components).

I also experimented with concurrent predictions and 10 year predictions. The 5 and 10 year predictions seemed to perform a little better than the concurrent predictions. I chose to use the 5 year predictions because the 10 year predictions used up 5 more degrees of freedom.

Table 4

Moving Average Equations

Dependent variable: Labor Force Participation Rate
Independent variable: Moving average of Anticipated and Unanticipated PIA/Earnings

65-69 Year-Old Men

	PIA/Earnings Unanticipated Anticipated	Standard Error	R^2	F Statistic	Significance Level	Obs.
5 Year	**-1.171***	.3090	.4696	11.07	.0004	28
	-.5979*	.2275				
10 Year	.0037	.8424	.0448	.47	.6325	23
	-.4243	.4565				
3 Year	*.3516*	.2437	.1986	3.35	.0503	30
	-.5441*	.2186				
3 Year (t-1)	**-.6610***	.2346	.2927	5.59	.0093	30
	-.5442*	.2104				
3 Year (t-2)	**-.7560***	.2241	.3503	7.01	.0037	29
	-.5161*	.2026				
3 Year (t-3)	**-.5608**	.2325	.2174	3.47	.0467	28
	-.3618	.2102				

Table 4 (continued)

62-64 Year-Old Men

	PIA/Earnings Unanticipated Anticipated	Standard Error	R^2	F Statistic	Significance Level	Obs.
5 Year	**-1.022**	.4276	.3578	6.41	.0061	26
	-.7231*	.2742				
10 Year	*-1.299*	.9440	.1434	1.67	.2128	23
	-.3918	.5115				
3 Year	**-.6204**	.2872	.2702	4.26	.0267	26
	-.6251*	.2421				
3 Year (t-1)	**-.6643**	.2705	.3255	5.79	.0089	27
	-.7373*	.2384				
3 Year (t-2)	*-.4190*	.2735	.2754	4.56	.0210	27
	-.7371*	.2483				
3 Year (t-3)	**-.4909**	.2704	.2370	3.73	.0389	27
	-.6353	.2531				

Bold* with and asterisk indicates significance at the 1% level using a 1-tailed test.
Bold indicates significance at the 5% level using a 1-tailed test.
Italics indicates significance at the 10% level using a 1-tailed test.
The data used for these regressions come from the CPS (participation rates) and the Social Security Bulletin Statistical Supplement (average PIA and average earnings) and cover the period from 1954-1992 for 65-69 year-olds and 1966-1992 for 62-64 year-olds. Anticipated changes in Social Security benefits were computed from a regression using values of the predicting variables lagged 5 years (see text for a description of the prediction equations). Each row represents one regression. All regressions were estimated in first differences and include a constant term. Since the Social Security data are available only to 1991, equations with lagged moving averages have an additional observation.

year olds and 62-64 year olds, the 5 year moving average equations explain more of the variation in participation rates than the other equations. As before, the 10 year moving average explains the least variation. The coefficients on anticipated and unanticipated changes in SS benefits indicate that, dollar for dollar, unanticipated changes have a much larger effect than do anticipated changes. However, the prediction equation does such a good job of predicting benefits that the average unanticipated change in benefits is an order of magnitude smaller than the average anticipated change. As a result the total effect of unanticipated changes in Social Security benefits is quite small.[16] On the other hand, anticipated changes in SS benefits explain a sizable portion of the decrease in participation rates. The equations reported in Table 4 attribute even more of the decline in participation rates to SS than the equations using actual levels in Table 3.

For 65-69 year olds, unanticipated changes in benefits were negative on average, which means that they tended to increase the participation rate. After netting out the effect of unanticipated changes in benefits, Social Security accounted for 47 percent of the decline in the participation rate of 65-69 year old men. Social Security accounted for a smaller portion, 39 percent, of the decline in participation rates of 62-64 year old men. In this equation, unanticipated changes in benefits are positive on average[17] so that they tend to reduce participation rates. Unanticipated changes in Social Security benefits accounted for 3.4 percent of the decline in the participation rate of 62-64 year old men, while anticipated changes in benefits account for the remaining 35.6 percent.

These results are rather surprising in that one would not expect anticipated changes in benefits to have a very large effect on participation rates. But one must consider the time

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[16] In most equations, the unanticipated changes were *negative* so that the effect of unanticipated changes in benefits was to *increase* participation rates.

[17] The average change in unanticipated benefits are different signs in the two equations because the sample periods are slightly different, and the changes are so small in absolute value.

horizon over which expectations are formed. That is, when do workers anticipate changes in benefits? To illustrate, consider the reduction in benefits brought about by the 1977 legislation. These changes started to take effect in 1979, and were in full effect in 1983. It would be difficult to argue that workers foresaw these changes during the 1960's. Given rapid increase in benefits in the early 1970's coupled with demographic trends, workers may have anticipated these changes as early as the mid 1970's. By 1977, the handwriting was on the wall. The benefit decreases were already law so that the coming benefit decreases were fully anticipated. At the other end of the spectrum, some of the benefit decreases resulting from the 1983 legislation will not take effect for 20-30 years. Presumably these changes will be fully anticipated.

The bottom line is that the "anticipated" changes in benefits used in the equation were probably *not* anticipated when workers were making important labor supply decisions earlier in life. As a result, they have had a large effect on the retirement pattern.

Moffitt estimates his model on 4 age groups (25-34, 35-44, 45-64, and 65+) over the period from 1955 through 1981. He combines these four age groups into one large dataset rather than estimating separate equations for each group. Although his theoretical model predicts that increases in Social Security wealth will reduce labor supply at all ages, it does not account for the possibility that workers might increase labor supply when young so they can retire earlier. This substitution effect dampens the effect of any increase in Social Security benefits at younger ages, which reduces the total effect of Social Security on labor supply. To determine the effect of a broader sample, I reestimated the 5 year and 10 year moving average equations on the same age groups used by Moffitt, and found that aggregating all age groups into a single equation weakens the results. When I estimated the equations by age group, I found that Social Security had no effect on the participation rate of younger workers (25-34 year-olds and 35-44 year-olds), and a strong effect on older workers (45-64 year-olds and 65-69 year-olds). These results are consistent with the discussion above: it is difficult for workers to anticipate changes in the level of benefits that occur in the distant future. Overall, Moffitt's aggregation over the four age groups accounts for a relatively small part of the difference in results.

Moffitt's shorter estimation period explains much of the difference in results. During the 1955-1981 period covered by Moffitt's data, Social Security benefits were rising and participation rates were falling. In contrast, during the 1980's, Social Security benefits declined. As a result, regressions estimated on the 1955-1980 data attribute relatively more of the decline in participation rates to the time trend than do regressions estimated over the 1955-1991 period. I found considerable differences in the estimated effect of Social Security when the equations were estimated over the shorter time series. Regressions on the 1955-1981 data explain less variation in participation rates and estimated coefficients are smaller and less significant. The difference is more pronounced for the 10 year moving average equations because computation of the 10-year moving average requires omission of 5 years during which benefits were rising rapidly.

Why Does Social Security Affect Retirement With a Lag?

The time series evidence implies that changes in the level of Social Security benefits affect retirement with a lag, which is consistent with work done by Bernheim [1987]. He finds that individuals are fairly accurate in estimating their retirement dates, but that forecasts become less accurate[18] as they predict retirement dates that are further in the future. Interestingly, accuracy drops off sharply after 2 years. That is, predictions 3 years into the future are considerably less accurate than predictions 2 years into the future. This suggests that workers make firm plans only 2 years into the future, and implies that changes in Social Security benefits will primarily affect people who are 3 or more years away from retirement.

Liquidity constraints may explain why workers do not change their plans immediately. To illustrate, Kahn [1988] argues that liquidity constraints are responsible for the spike in the retirement hazard at age 62. Many individuals who retire at age 62 would prefer to retire earlier,

[18] For a given current year/predicted year of retirement cell accuracy is the percent who predict their retirement date to within one year.

but do not have sufficient liquid assets to retire without Social Security. To carry the argument further, suppose that workers set a target retirement date and choose a desired level of liquid assets based on their current wealth and expected Social Security benefits. An unexpected increase in Social Security benefits reduces the desired level of liquid assets, and moves up the target retirement date. But unless they have already reached their new target, they will not retire immediately.

IV. Conclusions

The time series evidence presented here implies that Social Security has had an enormous impact on the participation rates of 62-69 year old men. For 62-64 year-old men, Social Security affects retirement rates with a 1-3 year lag. For the 65-69 year-old group, the lag is slightly longer, 2-3 years. Increases in Social Security benefits account for 37% of the decline in participation rates of 65-69 year-old men between 1954 and 1990. For 62-64 year-olds, Social Security accounted for 40% of the decline between 1963 and 1990.

These results imply that increasing the normal retirement age will slow the decrease in participation rates by reducing benefits. But raising the age of first eligibility from 62 would have an even larger effect because liquidity constraints would force many individuals to delay retirement if they cannot draw Social Security benefits.

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