

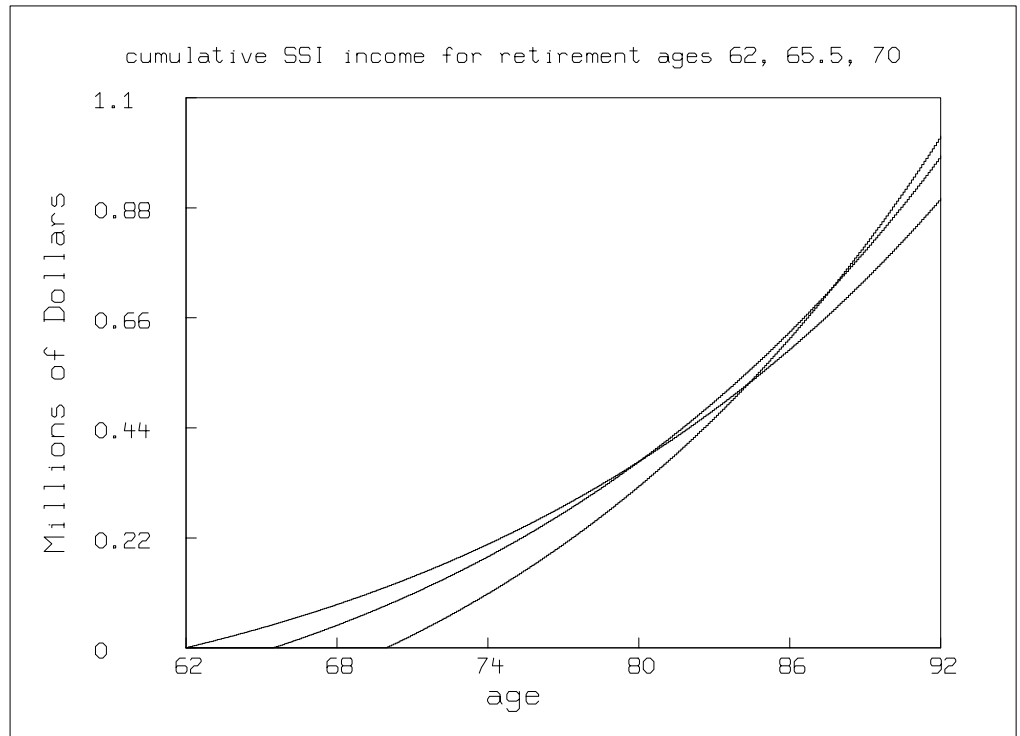
## Social Security Income and Retirement Age

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The Social Security Administration provides three options in response to a query about your retirement options. For an individual who has paid-in the maximum “contribution”, you can retire at age 62 with a monthly payment of \$1010, at age 65.5 with a monthly payment of \$1300, or at age 70 with a monthly payment of \$1700. (By the way, a principal amount of \$242400 invested so as to pay interest at the annual rate of 5% will yield \$1010 per month, \$312000 at 5% will yield \$1300, and \$410000 at 5% will yield \$1700. If, over 30 years, you and your employer started by paying \$300 per year, and increased this payment at a linear rate to \$7260 in year 30, and assuming this money were earning 4% per year compounded, then you would have paid-in \$250667. Thus, taking into account the increasing Social Security tax rate, and growth due to compound interest, many of us have “contributed” at least the lesser amount of \$242400, and thus can receive our Social Security check with a relatively clear conscience. The fact that projections predict that the amounts of money deposited into the Social Security trust fund will not be available to be drawn on is a consequence of various political decisions which caused the money to be invested in potentially unredeemable government bonds, and not a consequence of an actuarial unsoundness of the Social Security program.)

In order to compare these retirement options, you may compute the total amount received at each month in future after age 62, for each of the three options. To be fair, you need to assume an interest rate to apply to the money received as if it were invested (as of course, it could so be.) Let’s assume a relatively low rate of annual return on savings of 4%. You also need to assume a “cost-of-living” percentage that will be applied annually to all Social Security payments to compensate for inflation. Let’s take this cost-of-living rate to be 2% per year.

With these assumptions the graph below shows the cumulative income received at each future month after age 62 for each of our three options.



If you expect to live past age 88, the age 70 retirement option is best. The age 65.5 retirement option is best if you die after age 80, but before age 88. Otherwise the age 62 option is superior. (If you were to take into account the probability distribution of the age at death conditional on living beyond age 62, you could compute the “total expected” income for each of our three options as follows.

Expected option- $i$  income =  $\sum_{a=63}^{99} P(\text{death at age } a)(\text{total option-}i \text{ income at age } a)$ .

Without knowing the distribution of age-of-death, it seems plausible that the age-62 retirement option provides the greatest expected yield.

The MLAB mathematical and statistical modeling software was used to construct the above graph. (see [www.civilized.com](http://www.civilized.com)) Here is the MLAB do-file(script) that constructs the above graph.

```
/* file:sspay.do = Social Security Income projections */
reset
echodo=3
```

```

r=.04 /*annual interest rate on savings */
e=.02 /*annual cost-of-living increase */

/* m(g)=cumulative amount received at month g after age 62
   (v(g) is the assumed monthly payment for month g.)
*/
fct m(g)=if g=0 then v(0) else v(g)+(1+r/12)*m

/* age 62 retirement */
fct v(g)=(1+e)^floor(g/12)*1010
draw stepgraph(points(m,0:360))

/*age 65.5 retirement */
delete v;
fct v(g)=if g<42 then 0 else (1+e)^floor(g/12)*1300
draw stepgraph(points(m,0:360)) color green

/* age 70 retirement */
delete v
fct v(g)=if g<96 then 0 else (1+e)^floor(g/12)*1710
draw stepgraph(points(m,0:360)) color yellow

top title "cumulative SSI income for retirement ages 62, 65.5, 70", size .015
bottom title "age"
left title "Millions of Dollars"
yaxis w.yaxis, label list(0,.22,.44,.66,.88,1.1)
xaxis w.xaxis, label list(62,68,74,80,86,92)
view
/* end of sspay.do */

```