The Downside Risk of Postponing Social Security Benefits

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Abstract

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The point that only live participants may initiate or receive Social Security benefits is typically overlooked. Thus a postponement of benefits at any eligible retirement age may be likened to participation in a game of chance in which the participant is subject to a variant form of gambler's ruin at death. The typical assumption, therefore, that a participant should automatically opt for a postponement if the present value of the resulting benefits, discounted to breakeven age, higher than the present value of the opportunity costs, carries with it the implication of risk neutrality in relation to the consequence of dying before reaching breakeven death age. While this implication of risk neutrality is sometimes correct, it is more likely not. In marked contrast to conclusions reached in previous studies, this paper shows that a single Social Security participant, who is risk averse as regards the chances– and contingent consequences– of dying before reaching breakeven death age, would be well advised to initiate benefits at the earliest age at which he or she would not be subject to earned income tax penalties.

The Downside Risk of Postponing Social Security Benefits

Joseph Friedman and Hebert E Phillips

1. Introduction

Under current law, the normal retirement age [NRA] for Social Security participants born between 1943 and 1954 is 66. Participants may claim benefits as early as early as age 62, which is the presently designated early eligibility age [EEA], or at any age thereafter– but there is no financial incentive to postpone benefits beyond age 70.[1] Participants who elect to start receiving benefits at the NRA receive a full retirement benefit [FRB] amount initially, with subsequent monthly payments increased by an annual inflation adjustment factor. The FRB is determined by a Principal Insurance Amount [PIA], which the Social Security Administration calculates on the basis of the number and amount of payments made into the system prior to the initiation of Social Security Benefits.

[1] A participant may initiate benefits at the beginning of any month following his or her 62ed birthday. To simplify the analysis that follows later in the paper, however, we will assume that initiation versus postponement decisions are made annually, starting at age 62, and that any participant who has not initiated benefits by age 69 will do so at age 70.

The Social Security Administration [SSA] adjusts benefit payments for Participants who initiate Social Security benefits before or after reaching NRA relative to the FRB, using adjustment factors that vary by age. The maximum discount is 25% if benefits are initiated at age 62 and the maximum premium is 32% if initiation takes place at age 70. The delay of benefits by postponement at any eligible age *x*, between 62 and 70, therefore, is tantamount to the forfeiture of a single benefit payment, in exchange for a incremental Social Security benefit annuity (amount) that will begin one month later and terminate at death.

It is generally assumed that a participant's decision to initiate benefits or postpone may result in just two mutually exclusive outcomes: lower lifetime annuity payments for a longer period of time in the case of initiation or higher benefit payments for a shorter period of time in the case of postponement. Though mutually exclusive, these outcomes are not collectively exhaustive. In the case of postponement there are at least two other possible outcomes:

- A participant may die before initiating benefits, in which case the effective yield on his or her cumulative postponement investments is -100%.
- A participant may eventually initiate benefits but not live to his or her

breakeven death age, in which case the yield on his or her cumulative postponement opportunity costs must, by definition, be negative.

Unlike standard life annuities offered by many private insurers which guarantee a minimum number of benefit payments regardless of when an annuitant dies, Social Security benefit payments terminate at death. From the SSA's point of view, benefit payouts may be averaged over the individual lifetimes of the population of participants presently alive and receiving benefits. As the survival of one beneficiary is balanced against the death of another, the SSA is risk neutral as regards the longevity any particular Social Security participant. From the vantage point of an individual participant, by contrast, as Social Security benefits are paid only to live beneficiaries, a postponement of benefits at any eligible age may be likened to participation in a game of chance in which he or she is subject to a form of gambler's ruin at death – or non-diversifiable downside risk, since for individual participants there can be no averaging out from beyond the grave.

The opportunity cost, measured in terms of benefits forgone, of a postponement of benefits is represented in this paper, as in a number of previously published works, as a variant form of (annuity) investment. Little if any account has previously been taken, however, of the varied financial objectives and attitudes towards risk of individual participants when contemplating such postponement of benefits investment decisions. Indeed, the common assumption– that a participant will or should opt for postponement if the present value of the incremental benefits, discounted to life expectancy, is higher than the present value of the benefits forgone– carries with it the implication of ***risk neutrality*** in relation to the probability of dying before reaching breakeven death age.

While the assumption of risk neutrality by an insurance company might be perfectly reasonable, the normative implications of a risk neutrality assumption – whether by explicit assertion or by implication– are inconsistent with now standard investment theory precepts regarding individual behavior in the face of uncertain outcomes, and attitudes towards risk. Accordingly, the investment objectives and behavior of individual Social Security participants would seem better characterized by ***risk aversion***.[2]

This paper shows that the downside risk associated with the postponement of benefits by any single participant– of either gender and/or at any eligible age– is an order of magnitude higher than the potential gain. In the case of a single Social

[2]By definition, a risk adverse individual is simply one who is made happy by anticipation of gain but is vexed by uncertainty.

Security participant who is risk averse as regards the consequence of dying before reaching breakeven death age, therefore, it follows that he or she would be well advised to initiate benefits at the earliest age at which she or he would not be subject to earned income tax penalties. Postponement of benefits versus initiation decisions made by married couples are, in general, more complex, and the implications of risk aversion– which may depend on a myriad of possible unique contingencies– therefore are less clear cut. The married couple issue was taken up in a recent paper by Munnell and Soto (2007) but is not formally addressed in this paper.

2. Review of Recent Literature

Cook, Jennings, and Reichenstein (2002) calculate the present values of SSA benefit streams, discounted at 3% to life expectancy, categorized by initiation age. They identify the initiation ages for single male and single female participants, respectively, that maximize the present values of the expected benefit streams, then contrast these results– for males and females separately– with the calculated present value obtained for each alternative initiation age, and conclude that the SSA's actuarial benefit adjustments are fair and that that it makes no difference at what age a beneficiary initiates benefits.

Detweiler (1999) considers multiple real rates return and investment scenarios. He defines negative cash flow as being created by initiation at age 62 and positive cash flow as being created by initiation at the NRA, which at the time of his study was age 65, and breakeven death age as the time of death at which a net present value to life expectancy function would go to zero. Based on this logic he calculates breakeven death ages under a variety of different real interest rate assumptions, and accounts for the probability of dying at or before one's breakeven death age using cumulative distribution mortality data. Restricting his analysis to individuals who will invest their benefits rather than spend them and who feel comfortable managing their own investments, he concludes that a male beneficiary whose expected real rate of return on investments is in excess of approximately 2.25% should probably initiate benefits at age 62, but that a female would require an expected real rate of return in excess of approximately 4.5% to justify doing so.

Like Detweiler (1999), Spitzer (2006) considers multiple real rates return, but he also attempts to account for the stochastic nature of rates of return, and their relationship to alternative financial market conditions and asset allocation strategies. He performs breakeven analyses for unmarried single male and single female participants, born between 1943 and 1954, contemplating initiation at age 62 or 66.

His results indicate that postponement is more easily justified for female than male participants because of longer life expectancy, but for either group– all other things equal– the breakeven initiation age is later the higher discount rate and/or the later the beneficiary's age at initiation.

McCormack and Perdue (2006) first consider the case of single male and female participants, born in 1943, who at age 62 will decide whether to initiate at age 62, 66, or 70. The analysis is then extended to married couples. Having taken note of the stochastic implications of a median life expectancy statistic by referencing a paper by Milevsky, Kwok and Robinson (1997) that reminds us, in effect, that the median marks the 50th percentile of a distribution, calculate internal rates of return using a present value to life expectancy model using five percentiles of a cumulative life expectancy distribution for single male and single female participants. They explicitly assume, however, that, in each case, the beneficiary will live to an age commensurate with life expectancy, receive benefits to that date, and nothing more thereafter.

Munnell and Soto (2007) discuss initiation decision issues confronting married participants. This situation is more complex. A married women may, for example, receive benefits based on her own contributions starting at age 62, but can trade her benefit for a maximum of 50% of her husband's adjusted benefit when he initiates, provided that her adjusted benefit does not exceed 50% of his. A married woman at or beyond age 62, by contrast, who would not qualify for benefits on her own nevertheless qualifies to receive a spousal benefit equal to a maximum of 50% of her husband's adjusted benefit. Either way, spousal benefits are subject to actuarial adjustment depending on the wife's age when and if she initiates. Upon a husband's death, however, regardless of the wife's age when he passes, she is entitled to 100% of her husband's benefits in exchange for her own benefit or spousal benefit. These authors conclude that a wife with a living and healthy spouse who happens to be the same age as she, will typically be better off initiating early. The husband, on the other hand, should take into account not only his own expected benefit stream over his lifetime, but also the impact that his age on initiation decision will have on his wife's spousal and/or contingent benefit streams. Accordingly, the authors argue, that married men should typically initiate later.

Friedman and Phillips (2008) invoke the same behavioral assumptions as in the preceding papers, which imply risk neutrality, but replace the discreet aggregative approaches employed by Detweiler (1999), Spitzer (2006), and McCormack and Perdue (2006), respectively, with a sequential model that views an initiation versus postponement analysis as an iterative process that plays out over time. According to this sequential approach, which is also employed in this paper, the question asked at each decision point is not whether to initiate at that point or postpone until some critical age, such as 62, 66, or 70, but whether to initiate now or postpone for just one year. By means of this sequential model, Friedman and Phillips (2008) conclude that the minimum investment yield required to justify initiation at any eligible age varies from one eligible retirement age to the next, and that while early initiation might me beneficial at one age it might not be at the next. This oscillation is not duplicated this paper– where downside risk and risk aversion are explicitly taken into account…

3. Background, Issue, and Model

A participant may initiate benefits at age 62, or, failing to do so, may revisit his or her initiation versus postponement decision one month later, and each month after that until the decision to initiate benefits is made or death occurs– whichever comes first. As only a live participant can initiate or receive Social Security benefits, previous works that cast a participant contemplating a postponement of benefits versus initiation decision as an unbridled present value or yield on investment maximizer– one who would or should opt for postponement if the present value of the incremental benefits discounted to life expectancy is higher than the present value of the benefits forgone– *carry the implications of participant risk neutrality* as regards the non-diversifiable downside risk of dying before reaching breakeven death age.

3.1 The Issue

Though the assumption of risk neutrality is never explicitly stated, and in the past may never have been intended, this implication may, nevertheless, be appropriate in some cases– though we believe that this would be the exception rather than the rule. Consider, for example, the case of a reasonably affluent, unattached, "after me the flood" type of individual: it seems reasonable to suppose that such a person– while not indifferent to dying– might be indifferent to the downside risk of dying before reaching breakeven death age, as previously defined. Such unbridled self-centeredness is not a prerequisite for downside risk neutrality however. An active investor, for example, with significant holdings outside the Social Security system may view the return on a traditional Social Security account as return on a riskless asset. Accordingly, as explained by Friedman and Phillips (2009), a guaranteed (for life) benefit plan, in the framework of a total retirement portfolio analysis, may be valued more for its contributions to the reduction of diversifiable risk than as a source of retirement income or estate wealth. In this framework of total portfolio diversification, paradoxically, an investor/participant might simultaneously be risk averse as regards risk-return tradeoffs on a total retirement portfolio and risk neutral as regards the downside risk of dying before reaching breakeven death age. The operative word, of course, is "might;" there is no reason to suppose that every participant with financial holdings outside the Social Security system is efficiently diversified– in the sense fashioned by Markowitz (1952)– or subscribes to this investment logic.

3.2. The model

The model assumes that a Social Security participant views the initiation versus postponement of benefits decision process as a sequential decision process, started at age 62 and revisited annually, on the occasion of each subsequent birthday, until the decision is made to initiate benefits or the beneficiary dies– whichever comes first.[3] The incremental cost of postponing benefits at any age, therefore, is measured in terms of the benefits sacrificed in that single year.[4]

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[3]Please see footnote 1.

[4]It might be argued that each monthly incremental cost-benefit tradeoff should be considered, but this would be neither beneficial nor practical. As SSA benefit and cost of living

Let SSB_x denote the benefit that would be received by a beneficiary who initiates benefits at age x, $x < 70$. A beneficiary who initiates benefits at the NRA, $x = 66$, for example, would receive $SSB_{66} =$ FRB. Thus we may represent the retirement age benefit adjustment factor applied by the SSA at age x in terms of ratio, SSB_x / FRB, and define the *delayed retirement credit per dollar* at age x in terms of a relative change in benefits:

$$(1) \qquad \lambda_x = (SSB_{x+1} - SSB_x) / SSB_x$$

Initiation at the earliest the retirement age, $x = 62$, would result in the fixed lifetime annuity payment $SSB_{62} = 0.75*FRB$, while initiation at age 63 would result in a higher benefit, $SSB_{63} = 0.8*FRB = (1+\lambda_{62}) * SSB_{62}$.[5] A single year's postponement at any eligible age x, therefore, results in the establishment of an

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adjustments are made on an annual basis, more frequent compounding (i.e., monthly versus annual) would not appreciably alter the results in this study. As the survival probability data required in this study, as in the previous one, are available only on an annual basis, moreover, all calculations are on an annual basis.

[5]At the time of this writing (2010), Social Security benefits for recipients who have not reached NRA are reduced by $1 for each $2 of earnings in excess of $14,100. This incremental benefit definition, therefore, would strictly apply to participants who, at any age before reaching NRA, would be subject to this earned income penalty.

incremental present value of future wealth position based on SSB_{x+1} = SSBx * $(1 + \lambda_x)$. That is, the opportunity cost of postponing benefits for one year at any eligible age is SSBx. but what does one receive in exchange? What one receives in exchange for investing SSB_x to postpone benefits for one year at any eligible age x, is an incremental Social Security benefit wealth position at age x+ 1– defined by the present value of a difference (SSB_{x+1} - SSB_x).

At any eligible age, therefore, the ***ex ante*** present value of a beneficiary's guaranteed Social Security benefit wealth, whether or not he or she initiates in that age, has already been established. But benefits may be paid only to live participants. For each dollar of benefits forfeited by postponement at any age eligible *x*, therefore, the participant receives in exchange only the ***claim*** to an incremental annuity, λ_x, defined by Equation 1, that may begin at age *x*+ 1, or by initiation at any subsequent age, but this claim terminates death whether or not the participant has initiated benefits by then.

The investment yield, IRR_S, on each such forfeiture may be obtained by solving:

$$(2) \qquad 1 = \lambda_x \sum_{x+1}^{x+S} (1 + IRR_S)^{-t}$$

for any S, where S denotes the number of years beyond age x (the age at which a forfeiture was made) that the participant survives. But benefits may be initiated only by live participants. If a participant dies before reaching age $x+1$, therefore, or before initiating benefits at any subsequent eligible age, then the ex post investment yield, IRR_S, on each postponement forfeiture, and/or on the total of all such forfeitures, is -100%.

For reasons that will be made clear below, we call IRR_S the ***unweighted yield*** on a one period postponement made at age x by a beneficiary who survives to age $x+S$. The average unweighted yield on a postponement decision made at age x [$AUWY_x$] may then be calculated as follows:

$$AUWY_x = \sum_{S=0}^{100-x} IRR_S \,/(100-x) \quad (3)$$

A single individual in poor health at any age would generally have no incentive to postpone benefits and a beneficiary older than 70 would never have an incentive to do so. An individual at any eligible age x, who is in good health, by contrast, would nevertheless have no way of knowing when the end of life will come. In the case of outwardly healthy individuals, therefore, prior estimates of death age are typically based on published longevity and survival probability data. Let P_x^S represent the probability that a beneficiary who is alive at age *x* survives for precisely *S* years after postponing benefits (S = $0, \ldots, T$). We may now define the ***average probability weighted yield*** [$APWY_x$] as follows:

$$APWY_x = \sum_{S=0}^{100-x} P_x^S * IRR_S \qquad (4)$$

3.3 Data, Empirical Results, and Discussion

The SSA retirement age benefit adjustment factors, SSB_x / FRB, for participants born between 1943 and 1954, sorted by age, are shown in Column 2 of Table 1; the annual benefit per dollar of FRB differences, $(SSB_{x+1} - SSB_x)$ / FRB, are shown in Column 3; and the delayed retirement credits per dollar, $\lambda_x = (SSB_{x+1} - SSB_x) / SSB_x$, are shown in Column 4. It should first be noted that the annual benefit per dollar of FRB differences reported in Column 3 of the table increases between age 62 and 63, remains flat between ages 63 and 65, increases once again at age 66, and then remains flat. The delayed retirement credits showed in Column 4 peak at ages 63 and 66, reaching its highest level at age 63 and second highest at age 66.

TABLE 1 GOES APPROXIMATELY HERE

The delayed retirement credits shown in Column 4 of Table 1 were used in equation (3) to calculate the unweighted yields, IRR_S, $S = 0, \ldots, (100\text{-}x)$. The $AUWY_x$, and the $APWY_x$, for males and females, separately, for one-year postponement decisions, were then calculated using equations (4) and (5) respectively. The results are reported in Table 2.

TABLE 2 GOES APPROXIMATELY HERE

Table 2 suggests that a postponement of Social Security benefits at any eligible age is more akin to a crap-shoot than a prudent financial investment. Even before accounting for beneficiary's survival probabilities, we see from Column 2 of the table that the Average Unweighted Yield on a one-period postponement is negative at any age *x*, fluctuates between ages 62 and 65, but is monotonic decreasing beyond age 65. What explains this? It should first be noted that a beneficiary's yield on a postponement decision made at any age *x* will be -100% if he or she dies before the first payment is received; that is if she or he does not survive to age $x+1$.[6] Indeed, by definition, IRR_S is negative until one reaches the

[6] If this annual analysis were replaced by a monthly analysis, the up-front losses would be of the same order of magnitude and the table would simply be longer.

breakeven death age. For participants who initiate at age 63, for example, Figure 1 shows that the calculated IRR_S statistics remain in a double digit negative range for years following initiation. For those who initiate benefits at a later age, the picture would be much the same.

FIGURE 1 GOES APPROXIMATELY HERE

$APWY_x$ as defined by equation (4), on the other hand, is a weighted average taken over all possible survival years after making a one-period postponement decision at age x. Why do things not average out and become positive? IRR_S does not turn positive unless one survives beyond his or her breakeven death age, and, as seen from the figure, even then increases very slowly. If one lives long enough his or her ex post yield might reach the 5% or 6% range, depending on age at initiation, but ex ante, even with a time horizon up to age 100, there are simply not enough potential positive yields in the range beyond breakeven death age, and those that do exist are not high enough to balance the downside postponement risks, illustrated in Figure 1, below breakeven death age.

Turning to the average probability weighted yields reported in columns 3 and 4 of the table, we see that $APWY_x$ for both males and females follow substantially the same pattern as the $AUWY_x$ results shown in Column 2. In no sense are these results consistent with the previously published and widely held view that, by virtue of longer life expectancy, females should initiate later than males. On the contrary, Table 2 suggests, all other things equal, that the postponement of Social Security benefits by any risk averse participant, who is not indifferent to the downside risk of dying before reaching breakeven death age, would be a poor bet at any eligible age regardless of gender, but that single males suffer greater losses on average than single females. This analysis cannot be easily extended to married couples, for reasons explained by Munnell and Soto (2007).

Finally, contrasting the difference between AUWY_x and $APWY_x$, at any age and for either gender, we see that the differences are monotonic decreasing with age for males, but are relatively constant beyond NRA for females. It is intuitively obvious that because females live longer on average than men, a proportionately greater number survive to and beyond their breakeven death age than their male counterparts, and that there are relatively more old age outliers among females than males.

4. Conclusions

Previously published papers that contrast the financial implications of initiation versus postponement decisions, by employing quite different assumptions about participant behavior, decision prerogatives, and attitudes towards risk, reach very different conclusions than those arrived at in the present study. We did not miss the point in our previous study that benefits are paid only to live participants, [7] but we did overlook the relationship between downside financial risk and one's prior uncertainty about when he or she might die.

In light of this prior uncertainty about death age, the decision to postpone benefits at any eligible age may be likened to participation in a game of chance in which the beneficiary is subject to a variant form of gambler's ruin at death. The same law of large numbers that applies to an insurer or the SSA, therefore, that calculates averages taken over the lives of many individuals, does not also apply to an individual participant– for whom there can be no averaging out from beyond the grave.

The breakeven age was defined as the age at which the present value of the benefits resulting from postponement is just equal to the opportunity cost of

[7] See Friedman and Phillips (2008).

postponement. It may seem intuitively obvious that the longer one postpones the initiation of benefits, the later is breakeven age, and the less likely that he or she will live so long. This is in the nature of risk, but it does not fully explain the downside risk envisaged in this paper. As explained above and illustrated in Figure 1, even for participants who survive to their breakeven ages and beyond, there will not be enough high positive yields to offset the high negative yields that would result from dying before reaching breakeven age. The downside risk is explained by two factors: The high negative yields that would be realized by participants who may not survive to their breakeven ages and by the ex ante financial reward that is too small to compensate those who manage to live beyond their breakeven ages.

The major conclusion reached in this paper is that risk adverse participants would be advised to claim their Social Security benefits as soon as they would not be subject to the earned income benefit penalty

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Table 1:
Retirement Age Adjustment Factors and Delayed Retirement Credit

Age of Decision	Retirement Age Benefit Adjustment Factors	Credit For Each Year After Minimum Retirement Age	Delayed Retirement Credit Per $1.00
	In Fractions of $1.00		
62	0.75000	0.05000	0.06667
63	0.80000	0.06666	0.08332
64	0.86666	0.06667	0.07693
65	0.93333	0.06667	0.07143
66	1.00000	0.08000	0.08000
67	1.08000	0.08000	0.07407
68	1.16000	0.08000	0.06897
69	1.24000	0.08000	0.06452
70	1.32000	NA	NA

Table 2:
Average Unweighted and Probability Weighted Yields on One-Year Postponement Decision

Age of Decision	Average Unweighted Yield (%)	Average Probability Weighted Yield (%)	
		Men	**Women**
62	-9.6	-5.9	-2.5
63	-5.1	-2.1	-0.6
64	-6.5	-4.4	-1.0
65	-7.8	-6.0	-2.6
66	-6.9	-5.6	-2.0
67	-8.3	-6.6	-3.7
68	-9.7	-9.0	-5.2
69	-11.0	-10.5	-6.5

Figure 1: Unadjusted Yields of One Year Postponement at Age 62