# Widowed Before Retirement: Social Security Benefit Claiming Strategies

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## Executive Summary

- Financial planners should be aware of Social Security program rules unique to widows approaching retirement. This paper examines these rules and their implications for benefit claiming strategies, complementing recent studies on Social Security claiming decisions.
- Using present value analysis, we examine the effects of claiming benefits at different ages. Results vary depending on whether a widow is only eligible for a survivor benefit from Social Security or eligible for a survivor benefit and a retirement benefit (based on the widow's work record).
- When a widow is only eligible for a survivor benefit based on her deceased husband's work record, we find the present value of lifetime benefits is only modestly affected by the age at which benefits are claimed. Benefits claimed at ages before Social Security's full retirement age are reduced using factors specified in the law. These reduction factors are not dependent on interest rates, but, roughly, they maintain the present value of benefits in the face of different claiming ages when a real interest rate of around 3 percent is used for discounting.
- In dually eligible cases, benefit claiming strategies can be important. Usually, claiming one benefit early and waiting to claim the second benefit at the point it reaches its maximum monthly value is a dominant and important strategy.
- Which benefit should be claimed first in dually eligible cases depends on the ratio of the two basic benefit amounts. We develop cutoffs using these ratios, as a guide to strategies that maximize the present value of benefits.

The economic well-being of widows in retirement is a longstanding concern among policymakers and academics. Widows exhibit higher rates of poverty than the general population, experience declines in economic well-being following the loss of a spouse, and have been the focus of several Social Security policy proposals. Concern over the well-being of widows continues to prompt new lines of research including recent efforts that examine the effects of early Social Security benefit claiming by married men on benefits that are ultimately paid to their widows (Munnell and Soto, 2007). In this paper, we expand on the work of Munnell and Soto by examining the claiming strategies available to individuals who, around the time of retirement age, are not part of an intact married couple.

Lawmakers constructed unique Social Security benefit claiming rules to ensure the financial security of widows, and many of these rules affect individuals who are widowed at relatively young ages. The early retirement age for widows is 60, as compared with 62 for retired workers or spousal beneficiaries.[1] Additionally, widows can claim survivor's benefits separately from worker's benefits, therefore increasing one type of benefit by waiting, while receiving another type of benefit by claiming

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early. These rules are important to a sizeable number of widows, as about 30 percent of the widow benefit awards processed by the Social Security Administration in 2005 were to widows at or under their full retirement age (FRA).[2]

The structure of the paper is as follows. We review the literature on Social Security claiming decisions in the first section, with a focus on issues relevant to survivors. In the next section, we discuss Social Security widow benefits and the effect of claiming on benefit levels. After that, we analyze the effects of different claiming strategies on the present discounted value of benefits using general life tables and current program rules. We conclude with some general observations about strategies that maximize the present discounted value of benefits and interpret these findings in the context of other possible outcome measures.

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## Previous Literature

Although little current research focuses specifically on the value of different claiming strategies for widows, previous work on optimal claiming strategies for other groups, as well as other considerations of Social Security and poverty among widows, provides a useful background for the analysis presented in this paper.

Journals in the areas of financial planning and accounting, as well as newspapers, often publish articles discussing methods to maximize the amount of Social Security benefits a person receives. The most directly relevant research in the current context is Munnell and Soto (2007), which examines optimal claiming strategies for women and couples seeking to maximize discounted lifetime Social Security benefits. Using increased life expectancy for women as a critical consideration, Munnell and Soto argue women should usually claim benefits as early as possible and their husbands should delay claiming for as long as possible. The delayed retirement credits earned by husbands will be passed on to their (usually) longer-lived spouses in the form of higher survivor benefits. Munnell and Soto assume married couples would like to maximize household lifetime benefits, not individual lifetime benefits. Although they provide a careful treatment of widow benefit rules, their focus is largely on intact couples at the time of retirement.[3] This paper expands Munnell and Soto's analysis by determining optimal claiming strategies in cases in which the death of a spouse occurs prior to retirement age.

Munnell and Soto's analysis, as well as our current work, focuses on present discounted values of different claiming strategies. Other research has examined the claiming decision using utility or preference functions, mortality data, and plausible assumptions about preference parameters and compared findings with those using a present discounted value approach. Coile et al. (2002) found delayed claiming beyond the early retirement age was optimal for workers under a variety of assumptions using both present value criteria and a utility maximization approach and, further, the utility-based approach suggested longer delays in claiming than the present discounted value method. The latter finding occurs because individuals in general are considered risk-averse and, in the face of uncertain longevity, value the higher level of consumption afforded by higher Social Security benefits (or annuities in general) in case a long life depletes assets or wealth. Sun and Webb (2009) also find the utility-maximization approach (assuming risk aversion) indicates optimal claiming is later than that which would be found through a present value approach. For example, for single women, the authors conclude the present discounted value of benefits is maximized by claiming worker benefits at age 67, whereas the utility maximizing age of claiming is 70. Although Coile et al. (2002) and Sun and Webb (2009) do not examine the case of widowhood before retirement, their findings suggest present discounted value findings understate the value of delayed claiming because the approach does not take account of the longevity insurance that, in effect, is purchased by waiting for benefits to start.[4]

The longevity insurance Social Security provides is likely to be particularly important to the financial well-being of widows, as research highlights the substantial economic difficulties facing this group in retirement. The transition from marriage into widowhood may be accompanied by a sizable financial shock. Holden and Zick (2000) show that upon becoming widowed, 17 percent of their sample of women, drawn from the 1990, 1991, and 1992 SIPP, moved into poverty. Compared to the general population, widows are far more likely to live below the poverty line. The percentage of widows ages 55 and older living in poverty is 15.7 percent, which is three times that for their married counterparts.[5] Several proposals to increase Social Security benefits for widows have been offered (Hurd and Wise and Sandell and Iams (1997)).

The widespread concern over the adequacy of survivor benefits for widows, and their overall economic condition, demonstrates the importance of examining the relative value of the existing claiming

strategies available to this group.[6] Claiming strategies can differ depending on individual circumstances, including health history, caregiving responsibilities, lifetime and future earnings, and life expectancy. These considerations are unique for each individual, but every widow's claiming of Social Security benefits is governed by a common set of benefit rules that set the boundaries for determining an optimal claiming strategy for maximizing the present discounted value of lifetime benefits when using generalized assumptions.

## Benefit Rules and Claiming Options

To be eligible for widow benefits, an individual must be 60 or older and currently unmarried (or have remarried at or after age 60). Surviving divorced spouses who meet the above requirements are also eligible for aged survivor benefits provided the marriage that ended in divorce lasted 10 years or more.[7] Finally, for a widow to qualify for benefits, the deceased spouse must have achieved fully insured status, based on Social Security covered employment.

The benefit amount received by a widow is generally determined by the deceased spouse's primary insurance amount (PIA), based on an average of the deceased spouse's lifetime earnings in Social Security covered employment, and the age at which the widow claims benefits. For our purposes, the most important rules are those related to claiming ages. Widows who claim survivor benefits at the early eligibility age of 60 can receive a monthly benefit amount equal to 71.5 percent of the deceased spouse's PIA. Widows who claim benefits between ages 60 and the FRA receive prorated amounts between 71.5 and 100 percent of the PIA. A widow who claims a survivor benefit at or after her FRA can receive a monthly benefit amount equal to 100 percent of the deceased spouse's PIA. Therefore, if a widow's FRA is age 66, the monthly benefit would be 71.5 percent of the PIA if claimed at age 60, 85.75 percent of the PIA if claimed at 63, and 100 percent of the PIA if claimed at age 66 or later.

Two important exceptions to these general rules occur because of the widow's limit provision and, separately, the government pension offset (GPO) provision of Social Security. The widow's limit provision applies to cases in which the deceased worker received reduced retirement benefits. In these cases, the widow benefit cannot exceed the greater of 82.5 percent of the deceased spouse's PIA or the benefit the deceased spouse would be receiving if alive.[8] As we note later, the limit provision is a factor in some optimal claiming strategies. The GPO applies to a widow who has a pension based on her work in government employment that is not covered by Social Security. In these cases, the Social Security widow benefit is reduced by two-thirds of the pension amount. Usually, GPO-affected widows have an incentive to postpone benefit receipt, as it may be the only way in which a positive benefit can be paid. Nevertheless, for this subset of the widow population, there is often no optimal claiming strategy, per se, because the offset reduces the amount to zero regardless of when the widow benefit is claimed.[9]

When a person is eligible only for a widow benefit from Social Security, the program rules offer a relatively straightforward choice of claiming now or claiming later. If, however, the widow is also eligible for a retired worker benefit on her own work record, the choice is more complicated because special rules apply. Widows can claim one type of benefit first and then switch to another type at a later age.[10] Reduced retired worker benefits are payable as early as age 62, but monthly benefit amounts are higher at later claiming ages (through age 70). For example, for persons with FRA of 66, the age 62 benefit equals 75 percent of the worker's PIA, the age 66 benefit equals 100 percent of the PIA, and the age 70 benefit equals 132 percent of the PIA.[11]

Table 1 illustrates the year-by-year benefit type for beneficiaries under 20 different claiming options. In all of the situations discussed in this paper, widows are assumed to be eligible for widow benefits payable based on their deceased husband's earnings. Additionally, some widows may be eligible for retired worker benefits because of their own earnings. The first options (1–7) are for widows who claim only widow benefits because they do not have sufficient earnings to qualify for retired worker benefits. The remaining options (8–20) apply to widows who can claim both the widow benefit based on their deceased husband's earnings record and their own retired worker benefits.[12] These 20 options represent only some of the claiming options that exist, but are expansive enough to illustrate general results. On the far right hand side of Table 1, the relevant adjustment factors, either reductions for early claiming or credits for delayed claiming, are included. Each scenario assumes that the individual was widowed prior to age 60. For women widowed later in life, many of these options would be unavailable, because eligibility for widow benefits would not have been established at these earlier claiming ages. For the purposes of this paper, we use eligibility ages and mortality probabilities for women born in 1945 (that is, the 1945 birth "cohort"). The full retirement age for widow benefits and worker benefits for women in this cohort is 66.

## Optimal Claiming Strategies Analysis

Our goal is to determine optimal claiming strategies (using a present discounted value criterion) for widows approaching retirement in the current period. Widows from the 1945 birth cohort will reach the early and full retirement ages in 2005 and 2011, respectively, and are thus—in terms of program rules and expected mortality—reasonably representative of widows now approaching their retirement years. We focus on widows because survivor benefits are disproportionately paid to women. The inputs to our analysis are program rules that apply to this birth cohort and cohort life tables produced by the Social Security Administration (SSA).[13]

**Table 1: Benefit Type by Age Under Different Claiming Strategies**

| | | | | | | | | | | | | Benefit Adjustment | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age / Option | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | Reduction for Early Claiming —Widow | Reduction for Early Claiming —Worker | Credit for Delaying Claiming —Worker |
| 1 | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | 28.5% | None | None |
| 2 | None | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | 23.7% | None | None |
| 3 | None | None | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | 19.0% | None | None |
| 4 | None | None | None | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | 14.2% | None | None |
| 5 | None | None | None | None | Widow | Widow | Widow | Widow | Widow | Widow | Widow | 9.5% | None | None |
| 6 | None | None | None | None | None | Widow | Widow | Widow | Widow | Widow | Widow | 4.7% | None | None |
| 7 | None | None | None | None | None | None | Widow | Widow | Widow | Widow | Widow | None | None | None |
| 8 | Widow | Widow | Worker | Worker | Worker | Worker | Worker | Worker | Worker | Worker | Worker | 28.5% | 25% | None |
| 9 | Widow | Widow | Widow | Worker | Worker | Worker | Worker | Worker | Worker | Worker | Worker | 28.5% | 20% | None |
| 10 | Widow | Widow | Widow | Widow | Worker | Worker | Worker | Worker | Worker | Worker | Worker | 28.5% | 13.3% | None |
| 11 | Widow | Widow | Widow | Widow | Widow | Worker | Worker | Worker | Worker | Worker | Worker | 28.5% | 6.7% | None |
| 12 | Widow | Widow | Widow | Widow | Widow | Widow | Worker | Worker | Worker | Worker | Worker | 28.5% | None | None |
| 13 | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Worker | Worker | Worker | Worker | 28.5% | None | 8% |
| 14 | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Worker | Worker | Worker | 28.5% | None | 16% |
| 15 | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Worker | Worker | 28.5% | None | 24% |
| 16 | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Worker | 28.5% | None | 32% |
| 17 | None | None | Worker | Widow | Widow | Widow | Widow | Widow | Widow | Widow | Widow | 14.2% | 25% | None |
| 18 | None | None | Worker | Worker | Widow | Widow | Widow | Widow | Widow | Widow | Widow | 9.5% | 25% | None |
| 19 | None | None | Worker | Worker | Worker | Widow | Widow | Widow | Widow | Widow | Widow | 4.7% | 25% | None |
| 20 | None | None | Worker | Worker | Worker | Worker | Widow | Widow | Widow | Widow | Widow | None | 25% | None |

Note: Benefit adjustments are those for the 1945 birth cohort.

To determine the optimal strategy for claiming benefits in terms of maximizing lifetime benefits (referred to as "options" and "claiming options" in the tables and elsewhere), we determine expressions for the present discounted value of each strategy. These expressions, which are presented in the appendix, are functions of the widow PIA (based on the deceased worker's PIA) and, in dual eligibility cases, the worker PIA (based on the widow's own work record). Coefficients in these expressions are derived from mortality probabilities, relevant reduction factors for reduced benefits or delayed retirement credits, and an assumed real interest rate of 2.9 percent.[14]

The expressions for the present discounted value of lifetime benefits for each option yield a series of ratios that identify the optimal claiming strategy under different scenarios, based on the relative value of the widow and worker PIA. Those ratios and the corresponding strategy are presented in Table 2. We organize our discussion of these results based on the relative size of the relevant PIAs.[15]

**Widows with No or Relatively Small Worker PIAs.** For widows who have not worked enough to be insured for benefits on their own work records or who have a very low relative worker PIA (less than 16.5 percent of the widow PIA), the present discounted value is maximized by claiming at age 61. We emphasize, however, that present discounted values are reasonably close for several different claiming ages. Claiming at ages 60, 62, or 63 would only lower the present discounted value by 0.4, 0.3, and 0.95 percent respectively. For example, waiting until age 63 only lowers the present discounted value by about 1 percent, but yields a higher monthly benefit amount than claiming at age 61. This higher monthly amount may have value in its own right (provides a more adequate monthly income) and may have value should the widow live longer than average. As noted earlier, both Coile et al. (2002) and Sun and Webb (2009) emphasize the longevity insurance value of delayed claiming, particularly to risk-averse individuals.

**Widows with Modest Worker PIAs.** For widows with relatively modest worker PIAs, the optimal claiming strategy is to take worker benefits at age 62 and defer claiming of widow benefits. The length of time that widow benefits should be deferred depends on the specific ratio of the worker PIA to the widow PIA (see the Modest Worker PIAs section of Table 2). For example, if the

worker PIA is 50 percent of the widow PIA, the maximizing strategy is to take worker benefits at 62 and claim widow benefits at 66.[16] Figure 1 illustrates this case using hypothetical values (the worker PIA is equal to $625 and the widow PIA is equal to $1,250). Note that, again, present discounted values from the maximizing option may only be modestly higher than other claiming options.

**Widows with Substantial Worker PIAs.** For widows with relatively high worker PIAs, there is some variation in claiming strategies (last three rows of Table 2). As a rule of thumb, however, the maximizing approach is to take widow benefits early and delay claiming of worker benefits for several years (to around age 70). Figure 2 displays the present discounted value of claiming options for the hypothetical case in which the widow PIA is $1,000 and the worker PIA is $1,250. Unlike prior examples, the claiming strategy in this case has a sharp effect on the present discounted value of lifetime benefits. The maximizing strategy (claim widow benefits at 60 and retirement benefits at 70) produces a lifetime present discounted value of benefits of $235,661. This is 9.8 percent higher than an alternate strategy of taking the worker benefit at age 66. Intuitively, this result occurs because the delayed retirement credits associated with worker benefits are about actuarially fair in single benefit cases; dually eligible widows, however, can earn delayed retirement credits on their full worker PIAs while receiving some benefits from Social Security (that is, the widow benefits).

We performed a sensitivity analysis to see how the results for this scenario, when the widow PIA equals $1,000 and the worker PIA equals $1,250, would vary using: (1) the mortality assumptions for men in the 1945 birth cohort, (2) the mortality assumptions and modified reduction factors for women in the 1962 birth cohort, and (3) a lower (2.1 percent) interest rate for discounting. In all three instances, Option 16 was again the strategy that maximized the lifetime present value of benefits. These findings are instructive in several regards. First, even widows with somewhat higher age-specific mortality (for example, those whose underlying health puts them on par with the higher age-specific mortality of men in general), may be advantaged by postponing receipt of retirement benefits to age 70. Second, the results hold for scheduled changes in the Social Security program as the 1962 birth cohort has a higher full retirement age (age 67) and different reduction factors than the 1945 birth cohort. Finally, interest rates in the near term may be lower than the projected long-term rates used for the analysis in this paper, but even under a lower interest rate assumption, the strategy for maximizing the present discounted value of lifetime benefits is unchanged.[17]

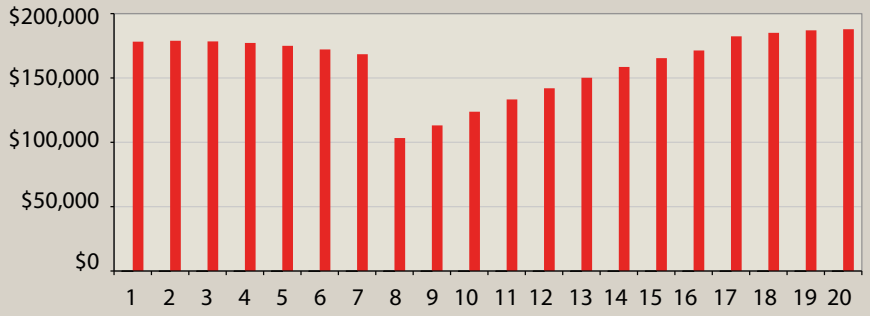
**Table 2: Claiming Strategy to Maximize Present Discounted Value of Lifetime Benefits Based on the Worker PIA to Widow PIA Ratio**

| Ratio of Worker PIA to Widow PIA | Strategy | Option Number |
|---|---|---|
| Widows with No or Relatively Small Worker PIAs | | |
| 0 <= Ratio < 0.165 | Widow at age 61<br>Do not claim worker | 2 |
| Widows with Modest Worker PIAs | | |
| 0.165 <= Ratio < 0.226 | Worker at age 62<br>Widow at age 63 | 17 |
| 0.226 <= Ratio < 0.297 | Worker at 62<br>Widow at 64 | 18 |
| 0.297<= Ratio < 0.406 | Worker at 62<br>Widow at 65 | 19 |
| 0.406 <= Ratio < 0.632 | Worker at 62<br>Widow at 66 | 20 |
| Widows with Substantial Worker PIAs | | |
| 0.632 <= Ratio < 2.628 | Widow at age 60<br>Worker at age 70 | 16 |
| 2.628 <= Ratio < 4.532 | Widow at 60<br>Worker at 69 | 15 |
| >= 4.532 | Widow at 60<br>Worker at 68 | 14 |

## Conclusion

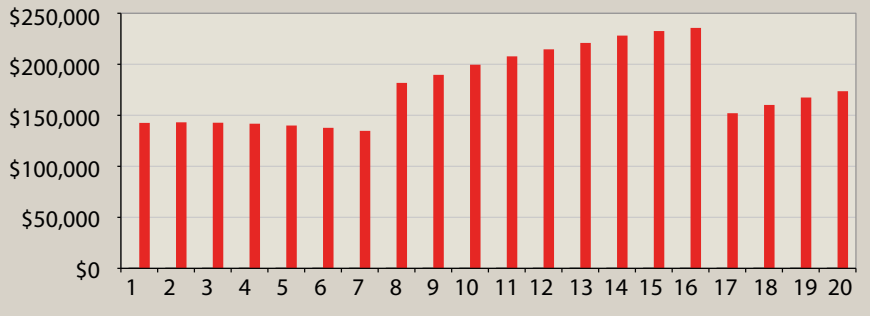
This paper identified claiming options available to beneficiaries who are widowed before retirement and developed algebraic expressions that reflect the present discounted value of those options. Strategies to maximize the value of lifetime benefits depend on whether the widow is dually eligible and, if dually eligible, the value of the worker PIA compared to the widow PIA. Specific results vary, but generally the findings indicate that dually eligible widows can maximize discounted lifetime benefits by claiming one benefit early and waiting to claim the second benefit. This strategy is particularly advantageous in cases in which the worker PIA is relatively high. In those cases, waiting until about age 70 to claim the worker benefit noticeably increases the present discounted value of benefits. We caution, however, that present discounted value considerations based on general assumptions cannot provide an answer for every individual on the appropriate claiming strategy. Important factors such as individual income and health status are not included in the general life tables used in this analysis. Furthermore, the present

**Figure 1: Total Lifetime Present Discounted Value Under Different Claiming Strategies**




Widow PIA = $1,250 Worker PIA = $625
Ratio = 0.5

**Figure 2: Total Lifetime Present Discounted Value Under Different Claiming Strategies**




Widow PIA = $1,000 Worker PIA = $1,250
Ratio = 1.25

value of lifetime benefits may understate the importance of benefits received later in life in ensuring the economic well-being of widows in retirement because other sources of retirement income are more likely to be exhausted in this period.[18]

This work contributes to a broader literature on claiming strategies for Social Security. Recent work by Munnell and Soto examined the options available for women and couples seeking to maximize Social Security benefits. This analysis expands that discussion to include persons widowed before retirement. Further research could continue to examine the value of different claiming strategies for a variety of sub-groups under different scenarios. Additional research could also help quantify aspects of retirement planning other than present discounted value considerations, namely, the effect of claiming decisions on the adequacy of overall income late in life.

## Endnotes

1. The widow benefits discussed in this paper are aged widow benefits. Social Security also pays benefits to disabled widows and widows caring for minor or disabled children, but those benefits do not vary by age of claiming.
2. Authors' calculations from Table 6.D7 of the *Annual Statistical Supplement to the Social Security Bulletin, 2006* (data are for the year 2005). Calculations exclude disabled widows.
3. The Munnell and Soto analysis assumes the couple is intact "with a probability of 1 until the husband reaches age 62" (Munnell and Soto, 2007, p. 62).
4. Sun and Webb also examine the effect of differential mortality on claiming decisions and conclude that, even among socioeconomic groups with higher age-specific mortality, the incentives for delayed claiming are sizeable.
5. Authors' calculations from Table 8.1 of *Income of the Population 55 or Older, 2004* (Social Security Administration, 2006).
6. The measure used in this paper, the present discounted value of lifetime benefits, is not designed to necessarily identify the optimal strategy for reducing poverty among widows. As will be seen, however, some strategies that maximize the present discounted value of benefits are also associated with relatively high monthly benefit amounts that are paid late in life.
7. For ease of exposition, we use the term "widow" throughout, but program rules apply equally to surviving divorced spouses and the relatively small number of men who receive aged widower benefits.
8. See Weaver (2001) for a detailed discussion of the widow's limit provision.
9. In 2007, there were about 200,000 widows affected by the GPO. For about 75 percent of affected spouse and widow beneficiaries, Social Security benefits were completely offset (Haltzel, 2008).
10. The deemed filing provision of Social Security prevents many married persons (as opposed to widows) from following this type of strategy. The provision requires persons below the FRA to claim both spouse and retired worker benefits at the same time if they are eligible for each type of benefit.
11. The 1983 amendments to the Social

Security Act scheduled an increase in the FRA beginning with persons who attained the early eligibility age in 2000. Because the early eligibility age for widow benefits differs from retirement benefits (age 60 compared to age 62), the schedule for increases in the FRA is different for the two types of benefits. For example, the FRA for retirement benefits is age 66 for persons born in the 1943–1954 period; the FRA for widow benefits is age 66 for persons born in the 1945–1956 period. Unlike worker benefits and spousal benefits, the maximum reduction for widow benefits based on early claiming does not increase along with the change in the full retirement age.

12. Dually eligible widows are not required to claim both benefits. In cases where the monthly retirement benefit would never be higher than the widow benefit, the individual might simply take widow benefits at age 60, 61, or 62 and never claim the retirement benefit.
13. SSA's Office of the Chief Actuary produces gender-specific single-year cohort tables with life table and actuarial functions. Those used in this analysis are consistent with the intermediate assumptions of the 2007 Social Security Board of Trustees and are available from the authors upon request. See Bell and Miller (2005) for a description of data and methods underlying SSA life tables.
14. See appendix for details on the methods used to derive these equations. Note we use a real interest rate and hold the PIA value constant (in practice, PIAs are increased by annual cost-of-living adjustments). The present value calculations ignore the taxation of Social Security benefits. Mahaney and Carlson (2007) find the taxation of benefits tends to increase the incentives to delay claiming of benefits. Medicare Part B premiums are also not included in our calculations.
15. All of these examples assume that the widow does not work sufficiently beyond age 60 to change her worker PIA and its relationship to her deceased husband's PIA.
16. The guidance changes slightly for widows affected by the widow's limit due to early claiming by the deceased spouse, because the highest monthly widow benefit will be payable before FRA. SSA's policy manual outlines a method for determining the earliest date at which the highest monthly widow benefit can be paid in widow limit cases (https://secure.ssa.gov/apps10/poms.nsf/lnx/0200204045!opendocument).
17. The 2.9 percent rate used throughout the rest of the text matches the Social Security Trustees' long-term, intermediate projections for the real annual interest rate on the bonds held by Social Security's trust fund, while the 2.1 percent real rate of return corresponds with the Trustees' high-cost (that is, more pessimistic) assumptions.
18. Widows placing more value on longevity insurance might prefer claiming options in which delayed benefit receipt results in higher monthly payments.
19. The $134.7592 figure can be derived approximately using the life table and actuarial functions $l(x)$ and $a(x)$ (the life table and function values for all ages $(x)$ for the 1945 cohort of women are available from the authors upon request). Specifically, with $a(66) = 13.5718$, $l(66) = 82424$, $l(60) = 87261$, and an interest rate of 2.9 percent, the present value at age 60 of lifetime monthly payments of $1 beginning at age 66 would be: $12 \times (13.5718 + (13/24)) \times (82424/87261) \times (1/1.029^{6})$. See Bell and Wade (1998) for definitions of the $l(x)$ and $a(x)$ functions. $a(x)$ measures the present value of a $1 annuity paid at the end of the year and $a(x)$ + $1 the value of a $1 annuity paid at the beginning of the year; $a(x) + (13/24)$ is an approximation of the value of $(1/12) paid at the beginning of each month.
20. The early retirement reduction factors and delayed retirement credits for each claiming option are seen in Table 1.
21. Using the notation from footnote 19, the values of $a(70)$, $a(60)$, $l(70)$, and $l(60)$ for the 1945 cohort of women are: 11.8616, 16.0742, 77693, and 87261. The temporary annuity of $1 per month from ages 60 to 70 can be calculated as: $[12 \times (16.0742 + (13/24))] - [12 \times (11.8616 + (13/24)) \times (77693/87261) \times (1/1.029^{10})]$ or $99.82. Multiplying by the reduction factor of 0.715 yields $71.37, which is the coefficient on the first term for Option 16. These results apply to women from the 1945 cohort, but life tables with actuarial functions for other cohorts are available from the authors upon request. For readers interested in more detail about the calculation of temporary annuities and life annuities, see www.ssa.gov/OACT/NOTES/as113/study113_I_II_III.html.

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## Appendix: Algebraic Claiming Strategy

The claiming strategies can be divided into three main categories: those without worker benefits included (Options 1–7 in Table 1), those with worker benefits where the widow benefit is claimed first (Options 8–16), and those with worker benefits where the worker benefit is claimed first (Options 17–20). All values are set to a present discounted value as of age 60, using a real interest rate of 2.9 percent.

For Options 1–7, the beneficiary is assumed to only claim survivor's benefits during her lifetime, the only difference is the claiming age. Option 1 starts with the widow claiming benefits at age 60 and each subsequent option pushes the claiming age back by another year, stopping with age 66 for Option 7. Delaying widow benefits past this age would not be a rational choice from a lifetime value of benefits standpoint, because delayed claiming credits are not available for widow benefits. The algebraic equations for Options 1–7 are as follows:

- *Option 1:* (Widow PIA × 142.5633)
- *Option 2*: (Widow PIA × 143.1270)
- *Option 3*: (Widow PIA × 142.7240)
- *Option 4:* (Widow PIA × 141.7721)
- *Option 5*: (Widow PIA × 139.9827)
- *Option 6*: (Widow PIA × 137.7278)
- *Option 7*: (Widow PIA × 134.7592)

The steps used to derive the coefficients presented in these equations are described below using the 134.7592 coefficient in Option 7 as an example. At every age between 60 and 119, we use figures from an actuarial life table provided by the Social Security Administration's Office of the Chief Actuary to calculate the present discounted value at a given age of a lifetime annuity from that point forward. We then take this value and add an adjustment factor of (13/24) to take into account the monthly payment of benefits, as mortality probabilities are originally calculated on an annual basis. Then we multiply this value by $12 to get an annualized amount, because we assume a monthly annuity value of $1. To calculate the present discounted value of benefits at age 60, we deflate the value for an annuity starting at each age by the corresponding survival probability and a 2.9 percent real interest rate. For Option 7, in which the individual claims widow benefits at age 66 and receives them throughout her life, the value of a lifetime annuity of $1 per month is $134.7592.[19]

This annuity value is then multiplied by the appropriate benefit adjustments for early or delayed retirement under the specific claiming scenario. There are no adjustment factors for Option 7 because claiming widow benefits at age 66 does not incur early retirement reductions or delayed retirement credits.[20] Consequently, the value remains $134.7592. This coefficient, multiplied by the appropriate widow PIA value, can be used for determining the present discounted value of lifetime benefits under Option 7.

For Options 8–16, the widow claims survivor's benefits at age 60, but takes worker benefits at any age between 62 and 70. The delayed retirement credits are 8 percent per year until age 70, after which they cease. The algebraic equations for Options 8–16 are as follows:

- *Option 8*: (Widow PIA × 16.5786) + (Worker PIA × 132.1519)
- *Option 9*: (Widow PIA × 24.4199) + (Worker PIA × 132.1885)
- *Option 10*: (Widow PIA × 31.9693) + (Worker PIA × 134.1050)
- *Option 11*: (Widow PIA × 39.2314) + (Worker PIA × 134. 8374)
- *Option 12*: (Widow PIA × 46.2105) + (Worker PIA × 134.7592)
- *Option 13*: (Widow PIA × 52.9104) + (Worker PIA × 134.4198)
- *Option 14*: (Widow PIA × 59.3348) + (Worker PIA × 135.0281)
- *Option 15*: (Widow PIA × 65.4873) + (Worker PIA × 133.6704)
- *Option 16*: (Widow PIA × 71.3714) + (Worker PIA × 131.4313)

## Appendix: Algebraic Claiming Strategy *(continued)*

For Options 17–20, the widow claims her worker benefit starting at age 62 and then begins claiming widow benefits at any age between 63 and 66. Widow benefits do not receive delayed retirement credits past the full retirement age, so from a lifetime present discounted value perspective, delaying claiming past this age would not be beneficial.

- *Option 17*: (Worker PIA × 8.2252) + (Widow PIA × 141.7721)
- *Option 18*: (Worker PIA × 16.1441) + (Widow PIA × 139.9827)
- *Option 19*: (Worker PIA × 23.7617) + (Widow PIA × 137.7278)
- *Option 20*: (Worker PIA × 31.0824) + (Widow PIA × 134.7592)

The process for determining the coefficients used in the algebraic equations for Options 8–20 is slightly more complicated than that for Options 1–7 because, in addition to the lifetime annuity coefficient, there is a temporary annuity component. The equations used to represent any scenario in which an individual changes benefit types can include up to four elements: two variables (the widow PIA and the worker PIA) and two constant coefficients (the multiplicity factors for each PIA). For example, as reported above, the present discounted value for Option 16 (claiming widow benefits at age 60 and starting worker benefits at age 70) can be calculated using the equation *(Widow PIA × 71.3714) + (Worker PIA × 131.4313)*. In these instances, the steps for calculating the lifetime annuity component (for Option 16, this is the worker coefficient) are the same as described above. For the temporary annuity component (for Option 16, this is the widow coefficient), the value of a lifetime annuity starting at the age at which the lifetime annuity begins in the option is subtracted from the value of a lifetime annuity at the age at which the individual first starts receiving benefits under the option. For example, in Option 16 the value of a temporary annuity paid between ages 60 and 69 is the value of an annuity starting at 70 subtracted from the value of an annuity starting at age 60. The corresponding value is then multiplied by the appropriate adjustment factors for early or delayed benefit receipt.[21]

All of the values presented in these equations apply to women in the 1945 birth cohort; however, their utility is not limited only to women who are in that group. Changing mortality probabilities and adjustment factors for different birth cohorts would alter the multiplication factors in these formulas, but generally not in a way that would be sufficient to dramatically change the overall relationship between the present discounted value of lifetime benefits produced by the different claiming strategies (see body of paper for more information on our sensitivity analysis).

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