Journal of Pension Economics and Finance (2025), **24**, 31–46
doi:10.1017/S1474747223000239

CAMBRIDGE UNIVERSITY PRESS

ARTICLE

Two decades of Social Security claiming

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(Received 18 January 2023; revised 1 September 2023; accepted 20 October 2023; first published online 12 December 2023)

Abstract

Twenty years ago, the adjustment to monthly Social Security benefits for early or delayed claiming was, on average, roughly actuarially fair, although some subsets of individuals could gain from delay. Since then, delaying claiming has become much more attractive thanks to three factors: a more generous delayed retirement credit, improvements in mortality, and historically low real interest rates. In this article, I examine how these three factors influence optimal claiming behavior. I also discuss empirical patterns of claiming across individuals and over time, as well as explanations for these patterns. I argue that although many people appear to claim suboptimally early, this behavior may be changing as information spreads about the importance of the claiming decision. Finally, I discuss policy toward claiming and the impact that an increase in strategic claiming could have on Social Security's finances.

Keywords: annuities; retirement; Social Security
JEL Code: D15; H55; J14; J26

1. Introduction

The Social Security system designates 67 as the full retirement age (FRA) for those born in 1960 or later. However, Social Security benefits for retired workers can be claimed at any age from 62 to 70. Delaying claiming results in a larger monthly benefit, an actuarial adjustment reflecting the fact that an individual who delays claiming can expect to collect benefits for fewer total months. The following statement used to appear in the Social Security Administration's (SSA's) publication entitled, 'When to Start Receiving Retirement Benefits' (Social Security Administration, 2014):

> If you live to the average life expectancy for someone your age, you will receive about the same amount in lifetime benefits no matter whether you choose to start receiving benefits at age 62, full retirement age, age 70 or any age in between.

Twenty years ago, that statement may have been true. The adjustment to monthly Social Security benefits for early or delayed claiming relative to FRA was, on average, close to actuarially fair, although important subsets of individuals could gain from delay. Since then, delaying claiming has become much more attractive – and notably, the statement about actuarial fairness has been dropped from the current version of the SSA publication (Social Security Administration, 2023*a*). With tens or even hundreds of thousands of dollars of lifetime income at stake, the Social Security claiming decision has arguably become one of the most important financial decisions a person can make.

Three factors have contributed to the increase in gains from delay over the past two decades. First, the delayed retirement credit – the increase in monthly benefit from delaying beyond a person's FRA (which has ranged from 65 for those born in 1937 and earlier to 67 for those born in 1960 and later) –

has become more generous. Cohorts born in 1933–1934 could receive a benefit increase of 5.5% of their primary insurance amount (PIA) – the benefit an individual would receive if they claimed at FRA – for each year of delay. In contrast, cohorts born in 1943 or later receive a benefit increase of 8% of their PIA for every year of delay (for details, see Social Security Administration, 2023*b*). Second, mortality has improved steadily. Although the COVID-19 pandemic and an increase in drug overdose deaths have caused declines in period life expectancy at birth (i.e., life expectancy based on applying current-year mortality rates throughout a hypothetical newborn's life) in 2020 and 2021 (Centers for Disease Control and Prevention, 2022), preliminary data suggest that period life expectancy at age 65 began to recover in 2021 (Social Security Trustees, 2023, Table V.A4). Moreover, the actuaries at the SSA project that period life expectancy will resume its steady increase over the next 75 years (Social Security Trustees, 2023, Table V.A4). Finally, real, safe interest rates have been at historically low levels for much of the past decade. Data from the Federal Reserve Bank of St. Louis's FRED database (Federal Reserve, 2023) suggest that the interest rate on 10-year Treasury Inflation Protected Securities (TIPS) hovered around 2% in 2003. However, between 2011 and 2022, this interest rate was consistently below 1%. While the 10-year TIPS rate has increased since late 2022 – it was 2.16% on November 22, 2023 – it remains to be seen whether this recent increase will persist. Thus, for many recent claimers, the internal rate of return from delaying Social Security – an inflation-indexed obligation of the United States government – has looked particularly attractive compared to the return on equivalent investments like TIPS. Due to the combination of these three factors, delay has become actuarially advantageous for many people. Even if real interest rates remain at their new, higher level, the first two factors will be enough to make Social Security claiming a high-stakes decision for most people.

In this article, I examine the growing importance of the Social Security claiming decision. First, I provide a conceptual framework for analyzing Social Security claiming. To be more specific, I examine alternative approaches to valuing the gains from delay, including present discounted value calculations and life cycle model analyses. I also use life cycle model to illustrate the roles played by the actuarial fairness of the adjustment for delay, liquidity constraints, and the annuity value of the increased benefit payments. Second, I discuss the increased trend toward delaying benefits, and I document growing awareness of the Social Security claiming decision using data from Google Trends. Finally, I discuss public policy and claiming. I describe how policy makers have responded to the growing stakes involved in Social Security claiming, as well what impact changes in claiming behavior may have on Social Security's finances.

2. Conceptual issues in Social Security claiming

Social Security retired worker benefits are based on the monthly average of a person's highest 35 years of earnings, indexed for economy-wide wage growth to the year in which the worker turns 60. This amount is known as average indexed monthly earnings (AIME).[1] A progressive benefit formula is applied to a person's AIME to arrive at their PIA, a baseline monthly benefit amount that is adjusted for price inflation starting at age 62 (regardless of claiming age). An individual who claims a Social Security worker benefit at their FRA – which has ranged from 65 for those born in 1937 or earlier to 67 for those born in 1960 or later – receives a monthly benefit equal to their PIA. Benefits may be claimed as early as 62, with an actuarial reduction applied to the PIA based on the number of months before FRA that the benefit is claimed (for the exact reduction, see Social Security Administration, 2023*c*). Benefits may also be delayed beyond FRA; an actuarial increase known as the delayed retirement credit is applied to PIA for each month of delay through age 70. While the SSA refers to claiming before FRA as 'early' claiming and claiming after FRA as 'delayed' claiming, for all practical purposes, the designation of an FRA is arbitrary and monthly benefits increase steadily

[1]Earnings through age 60 are indexed to the year in which the worker turns 60. Additional years of earnings, even after claiming, count at their nominal value and can result in revisions to AIME if they are among the highest 35.

https://doi.org/10.1017/S1474747223000239

with delay between ages 62 and 70. Thus, I generally refer to any increase in claiming age – regardless of whether it occurs before or after FRA – as a 'delay'.

A married person who claims benefits receives the higher of their retired worker benefit (their PIA, with an actuarial reduction for claiming before FRA and an actuarial increase for claiming after FRA), or a spousal benefit (50% of their spouse's PIA, with an actuarial reduction for claiming before FRA but no actuarial increase for claiming after FRA). Spousal benefits are generally relevant for secondary earners, and the primary earner must have claimed their own worker benefit for a spousal benefit to be paid. A married individual can also – upon the death of their spouse – give up their retired worker or spousal benefit and begin receiving a survivor benefit equal to the deceased spouse's benefit (including actuarial adjustments resulting from the deceased spouse's original choice of claiming age). This switch is generally optimal for secondary earners, who can trade a lower benefit for a higher one, but not for primary earners.

Delaying Social Security is equivalent to purchasing an inflation-indexed annuity. It requires individuals to forgo current benefits in exchange for an increase in future inflation-indexed benefits for life. For unmarried individuals, the annuity purchased through delay is a single-life annuity, and gender differences in mortality imply that women tend to gain more from delay than men. For married individuals, survivor benefits play a key role. Delay by the primary earner amounts to purchasing a joint-and-survivor annuity, as the higher payments get passed on to the secondary earner in the form of survivor benefits. In contrast, delay by the secondary earner is equivalent to buying a first-to-die annuity, as any gains from delay cease upon the death of either the primary earner (at which point the secondary earner switches to a survivor benefit) or the secondary earner.

To calculate the value of these annuities that are available through delay, many economists and other analysts have examined the impact of claiming age on the monetary value of benefits over the lifetime. For example, many researchers have evaluated the actuarial fairness of these annuities by calculating the expected present discounted value of Social Security benefits at alternative claiming ages. This approach has also been incorporated into some publicly available Social Security calculators.[2] Even before the recent changes in interest rates and rules, Coile *et al.* (2002) documented that some subsets of individuals could increase the present value of their benefits by delaying. More recent papers have used similar calculations to demonstrate the growing stakes involved in the claiming decision (e.g., Mahaney and Carlson, 2008; Meyer and Reichenstein, 2010; Shoven and Slavov, 2014*a*, 2014*b*; Reichenstein and Meyer, 2021). Sass *et al.* (2013) find that delay by husbands results in a small increase in the present value of household benefits; however, it results in a large reduction in widow poverty due to the enhanced survivor benefit. Shuart *et al.* (2010) use a present value approach to examine optimal claiming of survivor benefits.

However, an approach based purely on the lifetime value of benefits has two major drawbacks. First, it ignores liquidity constraints, which may make early claiming optimal even if delay increases the present value of benefits. For a liquidity constrained individual, delaying benefits requires working longer, sacrificing consumption, or some combination. Second, it ignores the insurance value of the additional Social Security annuity. This insurance value can be considerable even for those with high mortality. Milevsky (2020) suggests that, because they face greater lifespan uncertainty, people with higher mortality derive more value from pooling their longevity risks. Thus, although Social Security delayers with higher mortality subsidize delayers with lower mortality on an expected value basis, those with higher mortality may benefit disproportionately from the insurance value of Social Security delay. Using a utility maximization approach – rather than a present value maximization approach – allows consideration of the insurance value of the annuities purchased through delay (which tends to make delay more desirable), as well as the presence of liquidity constraints (which tends to make delay less desirable). Sun and Webb (2011) and Coile *et al.* (2002) compare the two approaches and show that the present value approach underestimates the gains from delay.

[2]Websites providing such calculators include https://maximizemysocialsecurity.com and https://www.aarp.org/retirement/social-security/benefits-calculator/.

A growing number of papers have used the utility-maximization approach to study Social Security claiming behavior. Some of these papers have modeled people's joint labor supply and claiming decisions and have examined the extent to which observed claiming behavior may be explained by factors such as shocks to income and health, family composition, individual preferences regarding risk and time discounting, misinformation, or beliefs about asset returns (e.g., Imrohoroğlu and Kitao, 2012; Gustman and Steinmeier, 2015; Hubener *et al.*, 2016; Maurer *et al.*, 2021; Bairoliya and McKiernan, 2022). In these models, retirement (stopping work) and claiming arise endogenously and may (or may not) occur at the same time. Two recent papers (Munnell *et al.*, 2022; Horneff *et al.*, 2023) examine optimal Social Security claiming when people have access to other retirement assets, such as 401(k)s, that can be used to purchase immediate or deferred annuities, or alternatively to finance a delay in claiming.

In the remainder of this section, I use a utility maximization framework to illustrate some basic principles regarding optimal delay. Relative to the papers cited above, this model is simple. It is based on a single individual, labor supply is exogenously fixed at zero (i.e., the individual has already retired), there is no uncertainty other than mortality, and the modeling of private annuities is highly stylized. While these simplifications make the model less realistic, they allow me to cleanly illustrate the impact of each of the three factors that influence the incentive to delay – the real interest rate, mortality risk, and the delayed retirement credit.

2.1 Utility maximization approach: a simple model

Consider a retired person with assets $A_1 \geq 0$ who will live for either one or two additional periods and can either claim Social Security now ($t = 1$) or delay until next period ($t = 2$). As retirement has already occurred, the only decision to be made is whether to claim Social Security immediately or delay. The retirement and claiming decisions are therefore independent. Moreover, if the individual delays Social Security, the only way to finance consumption is to draw down on assets; working longer is not an option. If the individual claims Social Security now, she will receive a benefit B this period and next period if she is still alive. If she delays claiming, she will receive a Social Security benefit of $B(1 + d)$ if she is still alive. The individual chooses her level of consumption this period (c_1) and – if alive – next period (c_2). The probability of surviving to next period is p. Let A_2 denote assets carried into period 2, and let i denote the real, safe interest rate. Let r denote the real return on assets. Assets earn a return of $r = i$ (the safe interest rate) if actuarially fair annuities are not available and $r = (1 + i)/p - 1$ (the safe interest rate adjusted for mortality risk) if they are. Let y_1 denote income in period 1 and y_2 denote income in period 2. If the individual claims Social Security now, $y_1 = y_2 = B$. If she delays, $y_1 = 0$ and $y_2 = B(1 + d)$.

The individual consumes all remaining wealth plus any income in period 2. Thus, $c_2 = A_2 + y_2$. Assets evolve between periods 1 and 2 according to $A_2 = (1 + r)(A_1 + y_1 - c_1)$. Thus, if $U(c)$ is the utility derived from consumption level c in each period and δ is the subjective discount rate, the optimization problem in period 1 is:

$$\max_{c_1} \; U(c_1) + \delta p U((1 + r)(A_1 + y_1 - c_1) + y_2)$$

Assume $U(c)$ is CRRA with intertemporal elasticity of substitution σ. If borrowing is allowed at interest rate r, or if there is a borrowing constraint that is not binding, it is straightforward to show that optimal consumption in the two periods, and the optimal level of assets carried into period 2 are respectively given by

$$c_1^d(y_1, y_2) = \frac{A_1 + y_1 + y_2/(1 + r)}{\theta + 1} \tag{1}$$

$$c_2^d(y_1, y_2) = \frac{\theta(A_1 + y_1 + y_2/(1+r))(1+r)}{\theta + 1} \tag{2}$$

$$A_2^d(y_1, y_2) = \frac{(A_1 + y_1)\theta(1+r) - y_2}{\theta + 1} \tag{3}$$

where

$$\theta \equiv (\delta p)^{1/\sigma}(1+r)^{1/\sigma - 1}.$$

In the subsequent analysis, I refer to (1)–(3) as the *desired* levels of consumption and assets (denoted by superscript d): they are the levels that would be chosen in the absence of a binding liquidity constraint. These desired consumption levels are a function of income in each period (as well as the initial level of assets). The individual consumes a fraction of initial assets (A_1) plus the present value of lifetime income $y_1 + y_2/(1+r)$ each period.

In this scenario, in which there is no binding liquidity constraint, Social Security delay is optimal if it increases the present value of lifetime income, or $y_1 + y_2/(1+r)$. With delay, the present value of lifetime income is $B(1+d)/(1+r)$. With early claiming, the present value of lifetime income is $B + B/(1+r)$. Thus, delay is optimal if and only if

$$\frac{B(1+d)}{1+r} > B + \frac{B}{1+r}$$
$$\Rightarrow d > 1 + r$$

If actuarially fair annuities are available, $r = (1+i)/p - 1$, and this calculation can be rewritten as

$$\frac{pB(1+d)}{1+i} > B + \frac{pB}{1+i}$$
$$\Rightarrow pd > 1 + i$$

The above suggests that delay is optimal if it increases the expected present value of lifetime benefits. Improved mortality (higher p), a more generous actuarial adjustment for delay (higher d), and a lower real interest rate (lower i) all make delay more attractive. Studies that use the expected present value approach perform such a calculation to draw conclusions about the desirability of delay. In other words, the expected present value approach implicitly makes two assumptions: (1) there is no binding constraint on borrowing and (2) actuarially fair annuities allow individuals to hedge mortality risk (i.e., Social Security provides no insurance value).

If actuarially fair annuities are not available, then the individual compares the present value of lifetime income under the two claiming strategies and delays if and only if $d \geq 1 + i$. In this case, the mortality rate does not enter the delay decision. Delay is more attractive when the delayed retirement credit (d) is larger and when the real interest rate (i) is lower. If borrowing is not allowed, then optimization is subject to the constraint $A_2 \geq 0$. The borrowing constraint is binding if desired period 2 assets, given by equation (3), are negative – that is, $y_2 > \theta(1+r)(A_1 + y_1)$. Without delay, the borrowing constraint binds if $B > \theta(1+r)(A_1 + B)$. With delay, the borrowing constraint binds if $B(1+d) > \theta(1+r)A_1$. Delaying makes the liquidity constraint more likely to bind, as

$$B > \theta(1+r)(A_1 + B) \Rightarrow \quad B(1+d) > \theta(1+r)A_1$$

https://doi.org/10.1017/S1474747223000239

Intuitively, delaying Social Security increases future income and decreases current resources. When an individual delays, it is more likely that current assets will need to be completely depleted to finance current consumption.

If the borrowing constraint is binding regardless of the claiming decision – that is, if $B > \theta(1+r)(A_1 + B)$ – then the individual consumes all her income each period. Let $c_1^l(y_1, y_2)$ and $c_2^l(y_1, y_2)$ denote the liquidity constrained levels of consumption in periods 1 and 2, as a function of income in each period. With delay, consumption in period 1 is $c_1^l(0, B(1+d)) = A_1$, and consumption in period 2 is $c_2^l(0, B(1+d)) = B(1+d)$. With early claiming, consumption in period 1 is $c_1^l(B, B) = A_1 + B$, and consumption in period 2 is $c_2^l(B, B) = B$. It is optimal to delay if

$$U(A_1) + \delta p U((1+d)B) \geq U(A_1 + B) + \delta p U(B)$$
$$\Rightarrow \delta p U[((1+d)B) - U(B)] \geq U(A_1 + B) - (A_1)$$

The left-hand side of the above equation is the expected present value of the period 2 utility gain from delaying, and the right-hand side is the period 1 utility loss from delaying. In this situation, the decision to delay does not depend on the interest rate. As the individual does not participate in financial markets, the cost of delay is measured in terms of utility. The desirability of delay depends on the survival probability (p) and the delayed retirement credit (d) – an increase in either variable makes delay more attractive.

A more interesting situation arises if the borrowing constraint does not bind when the individual claims early but binds when the individual delays. That is

$$B(1+d) > \theta(1+r)A_1$$
and
$$B \leq \theta(1+r)(A_1 + B)$$

In this situation, the individual's assets can only partially finance a delay. If the individual does not delay, optimal consumption is given by (1) and (2). If the individual delays, then the liquidity constraint binds, which means consumption is given by $c_1^l(0, B(1+d)) = A_1$ and $c_2^l(0, B(1+d)) = B(1+d)$. The individual is forced to reduce period 1 consumption below the desired level in (1) and increase period 2 consumption above the desired level in (2).[3] If the individual does not delay, consumption levels are given by (1) and (2). Delay is optimal if

$$U(A_1) + \delta p U((1+d)B) \geq U(c_1^d(B, B)) + \delta p U(c_2^d(B, B))$$

To see the role played by the delayed retirement credit, mortality, and the interest rate, note that the above expression can be rewritten as:

$$\delta p[U((1+d)B) - U(c_2^d(B, B))] \geq U(c_1^d(B, B)) - U(A_1)$$

An increase in the delayed retirement credit d always increases the attractiveness of delay. An increase in the survival probability p increases the incentive to delay provided the term in brackets is positive, which is true if delay increases the present value of benefits.[4] However, the interest rate has an ambiguous effect on claiming. When the liquidity constraint binds – which happens when the individual delays – consumption in period 1 falls below the desired level of consumption given in equation

[3]It is straightforward to show that when the liquidity constraint binds – that is, $B(1+d) > \theta(1+r)A_1$ – then $c_1^l(0, B(1+d)) < c_1^d(0, B(1+d))$ and $c_2^l(0, B(1+d)) > c_2^d(0, B(1+d))$.

[4]To see this, note that $c_2^l(0, (1+d)B) = (1+d)B > c_2^d(0, B(1+d))$. Thus, the term in brackets is positive if $c_2^d(0, B(1+d)) > c_2^d(B, B)$. From (1) and (2), this occurs if delay increases the present value of lifetime income.

https://doi.org/10.1017/S1474747223000239

(1). This deviation of actual consumption from desired consumption has a utility cost. A decrease in r reduces desired consumption in both periods via the income effect; however, it increases the desired share of lifetime consumption in period 1 via the substitution effect. The decrease in desired period 1 consumption (via the income effect) tends to incentivize delay, as the utility cost of deviating from the desired path by delaying decreases. The decrease in desired period 2 consumption (via the substitution and income effects) also tends to incentivize delay, as the delayed retirement credit needs to be less generous to achieve that goal. However, the increase in desired period 1 consumption (via the substitution effect) tends to incentivize early claiming.

2.2 Utility maximization approach: numerical simulations

In this section, I examine optimal claiming within a more realistically calibrated life cycle model.[5] I consider a single female aged 62 in 2022 who has already retired and is now deciding when to claim Social Security retired worker benefits.[6] The individual's utility function exhibits constant relative risk aversion with a coefficient of relative risk aversion of 3, and future utility is discounted at a rate of 3%. As the individual's birth year is 1960, her FRA is 67. Her PIA – the monthly benefit she would receive if she claimed at age 67 – is $2,223.60. Claiming at age 62 results in a monthly benefit that is 70% of this amount. Delaying to age 70 results in a monthly benefit that is 124% of this amount.[7] The individual can live up to age 110 and faces mortality risk each period. I obtain the applicable mortality rates from the SSA's cohort mortality table for the 1960 birth cohort.[8] Assets in each period are required to be nonnegative; that is, the individual cannot borrow against future Social Security benefits.

I vary the individual's initial level of assets. When the individual begins with zero assets, she is forced to claim at age 62. However, with a positive level of initial assets, she has the option to draw down on these assets while delaying Social Security. I consider initial assets of $50,000, $250,000, and $5 million. In the first case, the individual can delay Social Security for several years, but must make a significant sacrifice of consumption to do so. The last case – while not representative of the typical individual – represents a situation in which liquidity constraints essentially do not play a role. I also consider two alternative scenarios with respect to private annuities. In the first, annuities are not available, and assets earn the safe, real interest rate, i. In the second, assets are invested in actuarially fair annuities and earn a return of $r_t = ((1 + i)/p_t) - 1$, where p_t is the probability of surviving to the next period. I consider alternative values of the real interest rate, $i = 0$, 3, and 8%.

For illustration, the top panel of Figure 1 shows the paths of optimal consumption, income, and assets for a female with $50,000 in assets, who faces a real interest rate of 3% and does not have access to annuities. The optimal Social Security claiming age is 65. To finance the three-year delay, during which income (dotted line) is zero, the individual sacrifices consumption (solid line) and exhausts assets (dashed line). At age 65, consumption increases to match the individual's Social Security income of $23,124, where it remains for the rest of her life. The inability to borrow against future Social Security forces the individual to deviate from her desired consumption path even later in life. Without access to annuities, the desired consumption path (if the borrowing constraint did not bind) would be slightly downward sloping, reflecting mortality risk. Indeed, consumption during the delay period – which is financed from savings – does have a slight downward slope. The bottom panel of Figure 1 shows the optimal paths of consumption, income, and assets for a female with $250,000 in assets who faces a real interest rate of 0% and does not have access to annuities. In this case, the individual optimally delays Social Security to age 69, exhausting most of her assets to

[5]The model in this section comes from Scott *et al.* (2020).

[6]Results for single males are similar and available upon request.

[7]After applying the adjustment for early or delayed claiming, the monthly benefit amount is rounded down to the nearest dollar (Social Security Administration, 2023d, chapter 7, section 738).

[8]I utilize the cohort mortality tables underlying the intermediate assumptions in the 2022 Trustees Report (Social Security Trustees, 2022).

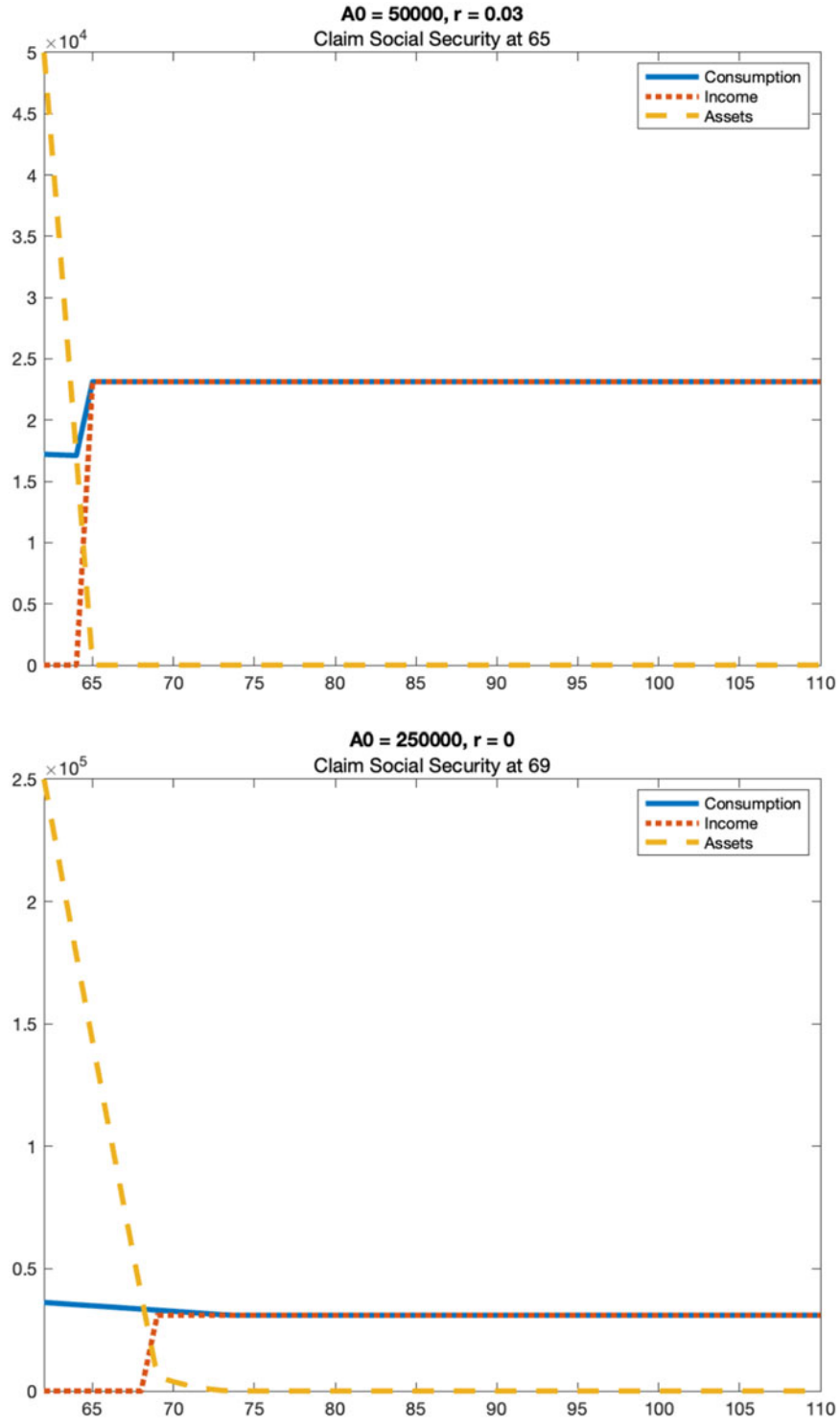

Figure 1. Optimal consumption, income, and asset paths (female born in 1960).
Notes: Based on calculating optimal consumption path and claiming age in life cycle model for female born in 1960. Top panel assumes actuarially fair annuities are available. Bottom panel assumes annuities are not available. See text for details.

https://doi.org/10.1017/S1474747223000239

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Table 1. Social security claiming and private asset depletion strategies

	Assets = $50,000			Assets = $250,000			Assets = $5,000,000		
Interest rate	0%	3%	8%	0%	3%	8%	0%	3%	8%
				No Annuities					
Claim social security	64	65	62	69	70	62	70	70	62
Exhaust assets	69	65	97	74	75	104	106	110	111
				Annuities					
Claim social security	65	65	62	69	69	62	70	69	62
Exhaust assets	65	65	111	78	111	111	111	111	111

Notes: Based on calculating optimal consumption path and claiming age in life cycle model for female born in 1960. See text for details.

do so. The more pronounced downward slope of consumption initially reflects the 0% real interest rate (which lies below the rate of time preference) in addition to mortality risk. However, when assets are fully exhausted at age 74, the individual's consumption is constant (deviating from the desired pattern in the absence of borrowing constraints) and matches her Social Security income of $30,948.

Table 1 summarizes the results for all cases considered. The top panel of the table considers cases in which annuities are not available. The bottom panel of the table considers cases in which actuarially fair annuities are available. In the top panel of the table, for the individuals with $50,000 and $250,000 of initial assets, a 0% real interest rate accelerates claiming relative to a 3% real interest rate. That phenomenon reflects the borrowing constraint. As discussed above, Social Security locks a liquidity-constrained individual into lower than desired consumption initially and constant consumption later in life. That pattern requires a greater utility sacrifice at a 0% interest rate than a 3% interest rate, as a lower real interest rate pushes in favor of more sharply declining consumption (via the substitution effect). This phenomenon is not observed when actuarially fair annuities are available, as the desired profile of consumption is flatter; it reflects only the real interest rate relative to the rate of time preference, rather than both mortality discounting and the real interest rate relative to the rate of time preference. Assets of $5 million are sufficient to overcome the liquidity constraint: the individual exhausts assets very late in life (if ever), and consumption declines consistently with age. For interest rates of 0 or 3%, claiming at age 70 (and maximizing the present value of benefits) is optimal if annuities are not available. An 8% real interest rate is sufficient to induce individuals to claim at 62 in all cases. With a high interest rate and actuarially fair annuities, assets are never fully exhausted before death, as the desired consumption profile is upward sloping. Without annuities, the desired hump-shaped pattern of consumption (increasing initially to reflect a real interest rate that exceeds the rate of time preference, then decreasing to reflect growing mortality risk) implies that assets are exhausted late in life (if ever). For most asset levels and interest rates, optimal claiming ages are weakly lower when annuities are available, reflecting the fact that the additional Social Security benefit no longer has insurance value.

This model is highly stylized compared to Munnell *et al.* (2022) and Horneff *et al.* (2023), whose models incorporate uncertainty and allow individuals to purchase realistically priced deferred annuities (which provide income starting at a later age, such as 80 or 85). Munnell *et al.* (2022) show that households with median wealth are best off delaying Social Security and using defined contribution assets to finance consumption during the delay period. In contrast, households at the 75th percentile of the wealth distribution are better off using their defined contribution assets to purchase deferred annuities than to delay Social Security. Households at the 90th percentile of the wealth distribution – who only need to spend a small fraction of their assets to Social Security to age 70 – are best off combining Social Security delay with the purchase of a deferred annuity. Horneff *et al.* (2023) show that less educated households are best off using defined contribution assets to delay Social Security, while more educated households are best off using defined contribution assets to purchase deferred annuities.

3. Claiming awareness and behavior

Empirical studies have found that claiming patterns are consistent with some of the predictions from theory. For example, individuals who face higher mortality risk – whether self-assessed or observed – tend to claim early (Waldron, 2002; Hurd *et al*., 2004; Delavande *et al*., 2006; Beauchamp and Wagner, 2012; Glickman and Hermes, 2015; Goda *et al*., 2018). Adverse wealth shocks (e.g., Huang *et al*., 2022) and labor market shocks (e.g., Haaga and Johnson, 2012; Card *et al*., 2014) – which presumably make liquidity constraints more binding – tend to be associated with early claiming. Moreover, as delay has become more attractive in recent decades, there has been a trend toward increased delay. For example, Purcell (2016) uses SSA data to document that 40% of eligible 62-year-old men and 45% of eligible 62-year-old women claimed retired worker benefits during the 2000–2004 period. Those fractions fell over the subsequent decade: during the 2010–2014 period, only 30% of eligible 62-year-old men and 33% of eligible 62-year-old women claimed retired worker benefits.

However, these figures also suggest that, despite the growing gains from delay, a large fraction of people still claim Social Security at the earliest eligibility age. Numerous hypotheses have been proposed to rationalize this behavior. In a nationally representative survey, Shoven *et al*. (2018) find that more than 20% of people report claiming Social Security early because they 'needed the money' – a response that suggests liquidity constraints may play a role. However, Goda *et al*. (2018) suggest that liquidity constraints are unlikely to be the whole explanation, as one-third of individuals who claim Social Security have individual retirement account (IRA) balances sufficient to finance at least two additional years of delay. The fraction of claimants who could have delayed by two more years may be as high as 64% when other assets are considered. Moreover, many individuals both claim Social Security at age 62 and delay withdrawals from their IRAs until they are forced to do so by required minimum distribution rules. Bequest motives could explain this pattern: in a utility-maximization framework, the presence of a bequest motive reduces the optimal claiming age, as individuals wish to preserve their other retirement assets for their heirs (Coile *et al*., 2002; Pashchenko and Porapakkarm, 2019). Another potential explanation for observed claiming behavior may be that economic models overstate the extent to which individuals value annuities. Standard economic models suggest that annuities have substantial insurance value; however, empirically, individuals are less willing to annuitize income than these models predict (e.g., Yaari, 1965; Mitchell *et al*., 1999; Warner and Pleeter, 2001). Indeed, Maurer *et al*. (2018, 2021) and Maurer and Mitchell (2021) suggest that individuals would be more willing to delay both Social Security claiming and retirement if the gains from delay were paid as a lump sum rather than an annuity.

While it may be possible to rationalize some early claiming behavior, empirical evidence suggests that many people who claim early are making mistakes. Bronshtein *et al*. (2020) explore this question by looking for forgone arbitrage opportunities in Social Security claiming. Specifically, Social Security delay is equivalent to buying an annuity at a relatively low price. Retail annuities are more expensive than the annuity available from delaying Social Security. Taking an annuity from a defined benefit pension when a lump sum is available also amounts to buying a higher priced annuity than the one that is available from delaying Social Security. Thus, consider an individual who claims Social Security early *and simultaneously* either buys a retail annuity or takes an annuity payment from a defined benefit pension when a lump sum was available. It is possible to say that this individual has made a mistake by forgoing an arbitrage opportunity. The individual could increase income in *every period* by using other retirement assets (either a lump sum payment from the defined benefit pension or the wealth that was used to purchase the retail annuity) to finance consumption while delaying Social Security. Moreover, in situtations where a defined benefit pension does not offer a lump sum distribution option, one can argue that early Social Security claimants and their employers are *jointly* forgoing an arbitrage opportuity. Bronshtein *et al*. (2020) perform a back-of-the envelope calculation to show that between 625,000 and 1.75 million households may be forgoing either arbitrage opportunities or near-arbitrage opportunities by purchasing more expensive (retail or defined benefit) annuities while selling cheaper ones (claiming Social Security early).

https://doi.org/10.1017/S1474747223000239

Behavioral economics can help to explain why people may make mistakes in claiming Social Security early. Prior to 2008, SSA framed the claiming decision using 'breakeven' analysis, in which individuals were informed about the number of additional years they would need to live for the cumulative additional benefits from delay to equal the benefits that were forgone during the delay period. Brown *et al.* (2016) show that this framing encourages early claiming. Other studies suggest that misinformation, a lack of financial knowledge, or cognitive constraints may be a driver of at least some early claiming. Henriques (2018) shows that husbands' claiming decisions are sensitive to the increase in their own benefit from delayed claiming, but not to the increase in their wives' survivor benefits – a discrepancy that may be partly due to a lack of information about how survivor benefits are affected by early claiming. Along these lines, Perez-Arce *et al.*'s (2021) survey experiment suggests that providing information about survivor benefits may increase willingness to delay benefits among those with the least Social Security knowledge. Using a structural model, Bairoliya and McKiernan (2022) show that misinformation about both mortality and the actuarial adjustment for delay may be a plausible explanation for a portion of observed early claiming behavior. Gustman and Steinmeier (2015) argue that the best explanation for both the high level of early claiming *and* the recent downward trend in early claiming is that individuals expect asset returns to be higher than they have been historically. Finally, in their study of framing effects, Brown *et al.* (2016) show that the impact of framing on claiming behavior is greater among those with lower financial literacy, lower incomes, and higher credit card debt.

If misinformation plays a significant role in early claiming, then one driver of increased delay over the past two decades may be the spread of information. The gains from delay have only recently become significant for most people, and knowledge and behavior may simply take time to catch up to that reality. Over the past two decades, financial planning articles and books have contributed to the dissemination of information; for example, Kotlikoff *et al.*'s (2016) book entitled *Get What's Yours: The Secrets to Maxing out Your Social Security* presents claiming strategies for a general audience. Organizations like AARP and the National Academy of Social Insurance[9] have also started publicizing the stakes involved in the claiming decision. Data from Google Trends corroborate the growing awareness of the claiming decision.[10] The dotted line in Figure 2 presents the volume of search results for the terms 'Social Security claiming', 'Social Security delay', or 'Social Security strategies' over time since 2004. The volume of searches during each month is normalized as a share of all Google searches that month, and the series is indexed such that 100 represents the highest search volume during the full period (Rogers, 2016). The figure shows that there has been a clear increase in the volume of searches for these claiming-related search terms, particularly since 2011. Of course, it is possible that an aging population could be driving greater interest in retirement and Social Security topics more generally. To provide a benchmark, Figure 1 also includes the volume of searches for 'Social Security' over the same period (the solid line); this series too is indexed such that 100 represents the highest search volume over the period. (Without separate indexation of each series, the search volume for 'Social Security' would far exceed the search volume for the more specific, claiming-related terms.) A comparison of the two lines clearly suggests that claiming-related searches have increased relative to more general Social Security searches.

4. Policy toward claiming

Over the past two decades, the SSA has changed its messaging on Social Security claiming in a way that is consistent with emerging research. For example, the agency no longer presents the claiming decision using breakeven framing – which, as discussed above, has been shown to lead to early claiming. In addition, the agency has removed a statement from its claiming-related publications – quoted in the introduction – implying that the present value of benefits is the same regardless of claiming age.

Perhaps in response to growing publicity, policy makers have also shut down some options for strategic claiming involving spousal benefits. It used to be the case that one member of a two-earner

[9]See, for example, Sloan Foundation (2014).
[10]Google (2022).

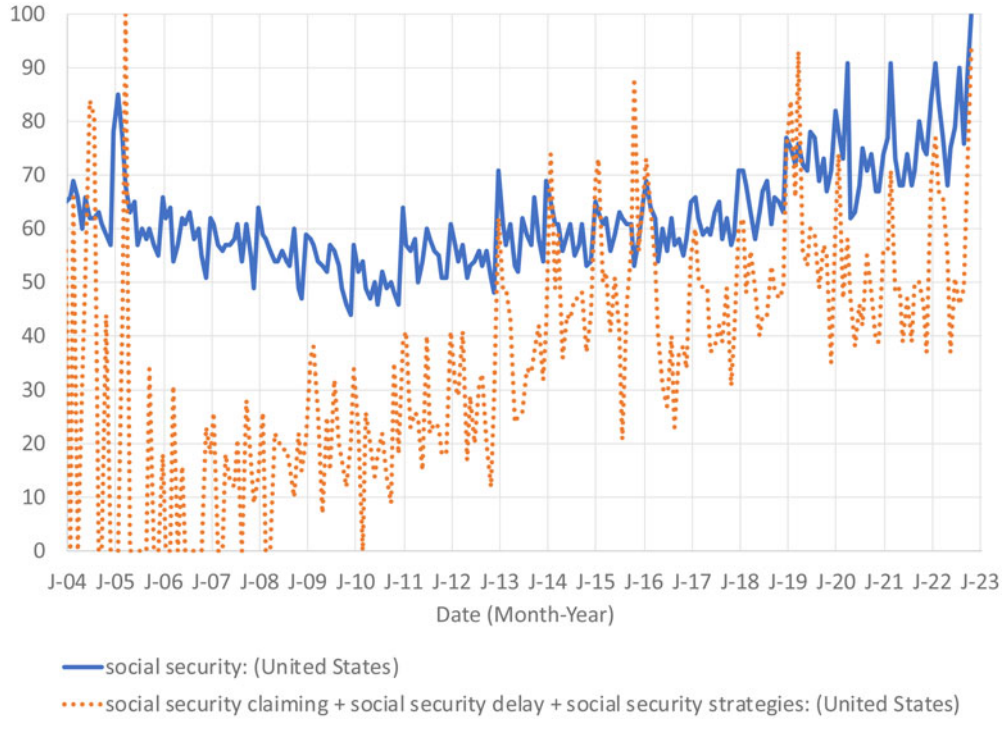

Figure 2. Google trends search interest (100 = maximum volume over time period).

couple – that is, a couple in which both individuals' retired worker benefits exceed their spousal benefits – could claim a spousal benefit at FRA and then switch to their own benefit (which would continue to grow through delay) at age 70. This option to separate the two benefit claims was only available to those who delayed to FRA; an individual claiming before FRA was required to claim any spousal and worker benefits at the same time and receive the higher of the two. With this rule in mind, consider a hypothetical two-earner couple in which the husband is the primary earner, and the wife is the secondary earner. An optimal claiming strategy for this couple might be for (1) the secondary earner to claim her own retired worker benefit at age 62, (2) the primary earner to claim a spousal benefit (equal to 50% of the secondary earner's retired worker benefit) at his FRA, and (3) the primary earner to switch to his own retired worker benefit at age 70 (see, e.g., Shoven and Slavov, 2014*a*, 2014*b*). In addition, a primary earner in a one-earner couple who wished to delay their own benefit to age 70 could 'file and suspend' their benefit at FRA, allowing their spouse to claim a spousal benefit immediately. The Bipartisan Budget Act of 2015 shut down both these strategies by requiring individuals turning 62 in 2016 or later to file for any retired worker and spousal benefits for which they qualify at the same time, regardless of whether they have reached FRA, and by ending file and suspend for claims made on or after April 30, 2016.

Given the *individual* stakes involved in the Social Security claiming decision, policy makers may wonder what impact claiming behavior has on the *program's* finances, or the government budget more generally. Indeed, the 2019 Social Security Technical Panel on Assumptions and Methods (which I served on) recommended that the Social Security Trustees Report incorporate sensitivity analysis to alternative claiming age patterns (Technical Panel on Assumptions and Methods, 2019). As discussed above, it is already the case that individuals who benefit the most from claiming early in an actuarial sense – those with high mortality – are more likely to claim early. If growing awareness of the Social Security claiming decision leads to an increase in strategic claiming (primarily through increased delay, though not

https://doi.org/10.1017/S1474747223000239

https://doi.org/10.1017/S1474747223000239

necessarily in all cases), there is likely to be a corresponding increase in the present value of benefit payments and therefore an acceleration of the trust fund exhaustion date. However, if individuals finance delays in Social Security by working longer, then increases in tax revenue may offset some of that effect. Maurer *et al.*'s (2018) survey suggests that paying the gains from delay as a lump sum would likely increase both delayed claiming and labor force participation. On the other hand, Gorry *et al.* (2022) examine a pension reform in the United Kingdom that provided a more generous credit for delaying pensions, as well as the option to receive the gains from delay as a lump sum, and find that the policy likely reduced early claiming but had no clear causal impact on labor supply.

I am not aware of any actuarial studies that directly quantify the impact of delayed claiming on Social Security's finances. However, indirect analysis has been nested within actuarial estimates pertaining to another Social Security provision – the retirement earnings test. It turns out that the earnings test and delayed claiming have similar impacts on Social Security's finances. The retirement earnings test effectively forces beneficiaries who earn above a certain amount of labor income to delay some fraction – possibly 100% – of their benefit. Prior to 2000, the earnings test applied to all beneficiaries under the age of 70, and those affected were forced to delay to age 70. As of 2000, beneficiaries who have reached FRA are no longer subject to the earnings test, and affected beneficiaries below FRA are now forced to delay to FRA. Research suggests that eliminating the earnings test for those above FRA caused people to claim earlier, as they could receive benefits and work at the same time (e.g., Gruber and Orszag, 2003; Song and Manchester, 2007). The Social Security Office of Chief Actuary has analyzed proposals to fully eliminate the retirement earnings test (i.e., for people below FRA as well). In their analyses, the main assumed effect of earnings test elimination on benefit payments is to accelerate claims (Office of the Chief Actuary, 2017, 2019). Part of this effect is passive: those who are currently affected by the earnings test are no longer forced to delay. Another part is active: a fraction of those who are currently working and have not yet claimed are assumed to claim earlier. Overall, eliminating the earnings test – in other words, reducing claiming ages for a subset of the population – initially increases benefit payments due to earlier claims. However, in the long-run, and over the 75-year projection period used in the analysis, costs decrease as individuals who accelerate their claims give up the gains from delay. A trend toward delayed claiming, as observed in recent decades, would likely have the opposite effect, increasing the present value of benefit payments.

5. Conclusions

Over the past 20 years, Social Security claiming has become a high stakes decision because benefit adjustments are not actuarially fair for large groups. That actuarial unfairness can have multiple effects on economic efficiency and distribution. For example, there may be administrative and computational burdens to claiming optimally or strategically, creating deadweight loss. On the other hand, if actuarial unfairness incentivizes delayed claiming, and if delayed claiming is accompanied by working longer, then actuarial unfairness may improve efficiency by offsetting some of the early retirement incentives in Social Security (e.g., Goda *et al.*, 2009). On the distributional front, to the extent that life expectancy has increased disproportionately at the high end of the income distribution (e.g., Chetty *et al.*, 2016), selective delay by those with longer life expectancies (documented empirically by Beauchamp and Wagner (2012), and other studies discussed above) may undo some of the progressivity in the Social Security benefit formula and widen lifetime income inequality. As the Social Security trust fund approaches its depletion date and lawmakers consider making changes to the program, an important normative question – beyond the scope of this paper – is whether the adjustment to monthly benefits should be actuarially fair on average (e.g., Warshawsky, 2021), or whether delayed claiming should be incentivized.

Acknowledgement. I thank the Special Issue Editor and two anonymous referees for helpful comments. I am also grateful to John G. Watson for assistance in adapting the model from Scott *et al.* (2020) for use in this paper.

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Cite this article: Slavov SN (2025). Two decades of Social Security claiming. *Journal of Pension Economics and Finance* **24**, 31–46. https://doi.org/10.1017/S1474747223000239