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Early Claiming of Social Security Benefits and Labor Supply Behavior of Older Americans†

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Abstract

The labor supply incentives provided by the early retirement rules of the United States Social Security Old Age benefits program are of growing importance as the Normal Retirement Age (NRA) increases to 67, and the labor force participation of Older Americans starts to increase. These incentives allow individuals who claim benefits before the NRA but continue to work, or return to the labor force, to increase their future rate of benefit pay by having benefits withheld. Since the adjustment of the benefit rate takes place only after the NRA is reached, benefits received before the NRA can become actuarially unfair for those who continue to work after claiming. Consistent with these incentives, estimates from bivariate models of the monthly labor force exit and claiming hazards using data from the Health and Retirement Study indicate that early claimers who do not withdraw from the labor force around the time they claim are increasingly likely to stay in the labor force.

Keywords

Retirement Benefits; Actuarial Reduction Factor; Earnings Test; Duration Analysis; Health and Retirement Study

1 Introduction

As of June of 2007, 70.7% of men and 75.6% of women in the U.S. claimed Social Security benefits before the Normal Retirement Age (NRA) compared to 36% and 59% in 1970, respectively.[1] The U.S. Social Security system provides fairly complex incentives that can affect the labor supply behavior of workers between the early and NRA. Some of the most important incentives are the Earnings Test, which determines the maximum level of earnings

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that do not result in a benefit reduction for individuals who have claimed retirement benefits before the NRA, and the Actuarial Reduction Factor (ARF), which determines the permanent reduction in benefits that individuals face if they claim benefits early. However, these incentives are also some of the most widely misunderstood features of Social Security. This is due in part to the relatively little research on labor supply and claiming behavior of early retirees, and the absence of any formal analysis of the possibility of affecting the Actuarial Reduction Factor by working after claiming benefits. This research is an attempt to fill this gap by jointly modeling labor supply and claiming decisions in a duration analysis framework, at a time when these incentives, which affect all Americans reaching retirement age, will be in place for a longer and longer period as the NRA increases to 67 in the next few years, and maybe further as a way of reforming the Social Security system to assure its future sustainability.

Individuals who claim benefits before the NRA but continue to work or re-enter the labor force after a leisure spell can reduce the early retirement penalty by suspending benefit payments.[2] The early retirement reduction factor, in turn, will be increased proportionally to the number of months without benefits, raising benefits permanently after the individual reaches the NRA. Any benefits received before the NRA are subject to the (unadjusted) reduction factor that corresponds to the respondent's age when benefits were initially claimed. The adjustment mechanism of the Actuarial Reduction Factor allows those who become beneficiaries before the NRA to partially or completely reverse the financial consequences of their decision, averting being locked-in at the reduced rate.[3]

To illustrate these rules we present the following example assuming a NRA of 66: Think of two otherwise identical individuals who turn 62 on July 1*st* of a given year[4], and earn $30,000 of labor income between July of that year and the following June. They had the same earnings history and hence the same implied Primary Insurance Amount (PIA) of $11,680.[5] One of them claims benefits in the month she turns 62 while the other waits until her 63*rd* birthday to claim benefits. Suppose first that both decide to withdraw from the labor force for good at the time when they claim benefits. In this case, the early claimer receives yearly benefits of $8,760 (=$11,680 * (1-0.25)) between age 62 and her death while the later claimer receives benefits of $9,344 (=$11,680 * (1-36*5/9)) between age 63 and her death. Assuming average longevity, and assuming that the reduction factor is actuarially fair, the benefit streams for these two individuals should be approximately equal from the point of view of a 62 year old person. Alternatively, suppose the early claimer continues to work after claiming until her 63*rd* birthday and earns at least $17,520 (=2*$8,760) above the assumed earnings limit of $12,480. In this case, she faces the same lower benefit rate associated with claiming at age 62 between age 63 and 66, i.e. her annual benefits would be $8,760 between age 63 and 66. After age 66, however,

[1]The early retirement age is 62. The NRA will increase from the current 65 and ten months to 67 for cohorts born in 1943 to 1960 and thereafter. The shift towards early claiming of benefits has happened in many countries as described for example in Fenge and Pestieau (2005).

[2]In this paper we are not considering spousal benefits or the incentives provided by the disability programs. The complexities introduced by those considerations are out of the scope of this analysis. Benítez-Silva, Buchinsky, and Rust (2003) present an empirical model of retirement and disability in the United States, Dahl, Nilsen, and Vaage (2000) analyze disability as a possible exit route for older Norwegians, and Riphahn (1997) models disability retirement in Germany, while Votruba (2003) discusses spousal benefits. By ignoring spousal benefits we are not taking into account the fact that approximately 5.96% of the individuals who receive some type of Old Age, Survivors, or Disability Insurance (OASDI) benefits receive them as spouses of an entitled retiree. This percentage comes from the Public-Use Microdata File provided by the SSA and refers to a 1% random sample of all beneficiaries as of December of 2001.

[3]Gustman and Steinmeier (1991), Myers (1993, p. 52), Gruber and Orszag (1999 and 2000), and Benítez-Silva and Heiland (2007) discuss this mechanism in some detail.

[4]The calculations are based on a scenario for individuals born between 1943 and 1954.

[5]The PIA is calculated as a concave piece-wise linear function of the worker's average earnings subject to Social Security taxes taken over her highest 35 years of earnings. The assumed PIA is the product of a given history of earnings. With this PIA, someone who claims at age 62 would be entitled to a benefit amount of $8,760 a year, assuming a NRA of 66. If that person has a labor income of $30,000 in the year after turning 62, all her benefits would be withheld. This calculation uses an Earnings Test limit of $12,480 a year, the one prevailing in 2006, and assumes that the $30,000 labor income does not affect the PIA.

her adjusted rate is $9,344 per year, i.e. the same rate for the early and the later claimer since the benefit rate of early claimers after the NRA is adjusted to reflect the actual benefit pick-up before the NRA.[6] We note that from the point of view of a 62 (or 63) year old person the later claimer receives a higher benefit stream at any reasonable discount rate, assuming average longevity.

This example illustrates important incentives provided by OASDI. An early claimer can reduce the early retirement penalty by continuing to work and earn above the earnings limit, but cannot avoid that benefits received at any time before the NRA reflect the retirement reduction factor as of the time of claim initiation, since the adjustment of that rate does not apply until the NRA is reached. This suggests that the early retirement penalty is only actuarially fair for individuals who either claim and receive benefits continuously thereafter, or claim and have all benefits withheld due to the Earnings Test. Since the rate of benefit pay of a person who claimed benefits before the NRA, and has some benefits withheld due to earnings, is not adjusted until the NRA, the rate becomes increasingly actuarially unfair as the number of months between benefit initiation and receipt increases. Thus, on the one hand, individuals have an incentive to claim and exit the labor force (or work and earn below the Earnings Test limit) at about the same time. On the other hand, and not explored in previous studies, once an individual has (some) benefits withheld due to earnings, she faces an incentive to continue to work or return to the labor force and earn above the Earnings Test limit.

In order for the Social Security Administration to suspend benefits an individual has to earn enough above the Earnings Test limit such that the implied taxes completely offset at least one month of benefits. Consequently an increase in the Earnings Test limit makes it more difficult for these individuals to affect their future benefit rate. Even if the benefit reduction were actuarially fair for individuals with low earnings potential, they may be made worse off by a higher Earnings Test limit since it eliminates the option to affect the rate of future benefit pay for them. In this sense increases in the Earnings Test limit can be regressive. This effect may be offset, however, if individuals with lower incomes also expect to have a shorter life, and therefore benefit from a higher Earnings Test limit. In this case the Earnings Test itself can be seen as regressive since lower income individuals who see their benefits withheld may be taxed more than high income earners from a lifetime perspective (e.g., Gruber and Orszag 1999).

While the details of the effect of the reduction factor on labor supply behavior and earnings have been documented, their role in initiating the receipts of benefits early, continuing employment after reaching the early retirement age, and the level of earnings has not been formally investigated. Most existing early retirement research has focused on individuals who claim benefits and withdraw from the labor force at the same time. However, benefit receipt data from SSA indicate that an estimated 8.5% of all individuals who claim benefits before the NRA in 2001 had some benefits withheld because of their earnings (SSA 2002, p. 256).[7] This suggests that there is a sizable group of individuals who have claimed benefits and either worked continuously or re-entered the labor market.

Descriptive evidence from the Health and Retirement Study (HRS) also supports the importance of the group of individuals who claim benefits before they withdraw from the labor market. Figure 1 plots the month-claiming and labor force exit behavior of the individuals in

[6]We note that the earnings of $30,000 in this example are just large enough to phase out *all* benefits for the 12 months period. In general in order for the Social Security Administration to withhold benefits an individual has to earn enough above the Earnings Test limit such that the implied taxes completely offset at least one month of benefits. We note that individuals, in general, may also be able to replace a past year of (lower) earnings and increase their Primary Insurance Amount when they work after claiming.

[7]The SSA provides estimates based on a 1% random sample of all beneficiaries as of December of 2001 from the Master Beneficiary Record. An estimated 100,000 of all individuals who claimed benefits early in 2001 saw their benefits withheld, and therefore had their Actuarial Reduction Factor affected by their labor supply decisions after claiming benefits.

our sample. Points along the diagonal represent individuals who claimed and exited the labor force around the same time whereas points to the right of the diagonal represent those who exited the labor force later than the month they claimed benefits.[8] This latter group which contains more than 200 individuals is the one we are most interested in. Although the behavior associated with this group, continuation of work after claiming, is not as common as claiming and exiting at the same time or claiming after exiting (1,730 cases), this group is still substantial, and a majority of these individuals claimed within three months of turning 62, but continued working up to 30 months after. This is evidence of the potential importance of the mechanisms we describe and analyze in this paper.

Our hypothesis is that the possibility to reverse part or all of the (lifetime) penalty associated with claiming benefits early, and the fact that the reduced rate associated with early retirement is not adjusted before the NRA for those who claim early and have some benefits withheld, has important consequences for early retirement behavior and labor supply between age 62 and the NRA. We expect the majority of early claimers to withdraw from the labor force around the time of claiming since the reduction factor is actuarially fair for those who claim and receive all benefits. Moreover, we conjecture that early claimers who continue to work after claiming and have (some) benefits withheld due to the Earnings Test, are increasingly more likely to stay in the labor force and earn above the Earnings Test limit. The reason is that the rate of benefit pay that these individuals face before the NRA becomes actuarially more unfair as the number of months where benefit were withheld increases.

We present estimates of exit and claiming continuous time proportional hazard models in a simultaneous equations framework, using data from the HRS to investigate the role of the time of initiation of Social Security benefits in labor force participation behavior of Americans between ages 62 and 65. We find labor force exit patterns among claimers that are consistent with the trade-offs provided by the early retirement incentives. The results confirm that many early claimers exit the labor market around the time of claiming. Furthermore, the model predicts that an individual who has been working for one year since claiming benefits early is about 16 percentage points less likely to drop from the labor force in the following month than an individual who has been working for only 6 months since claiming early.

The remainder of the paper is structured as follows. Section 2 provides a short literature overview, Section 3 describes the incentives provided by the ARF and the Earnings Test for individuals' labor supply decisions and earnings, and the empirical strategy to identify the role of the option to adjust the ARF on exit from the labor force. Section 4 describes the data, and the econometric models we estimate. Section 5 presents the empirical results from a simultaneous model of labor force exit and claiming behavior. Section 6 offers some concluding remarks.

2 Overview of the Literature

The general retirement literature is vast.[9] Its main objective has been to try to understand the effect of Social Security on labor supply and wealth accumulation, but it has paid relatively little attention to the implications of work after claiming benefits between the early and normal retirement age. In particular the implications of affecting future benefits by working more and

[8]Notice that this is not a density plot, therefore each dot can represent multiple individuals. However, the density plots (not shown) did not add much information to what Figure 1 already shows. Points in the boundaries ('−1', '0', '39', '40') represent censored observations, which account for individuals that are either right censored ('40') or do not claim by age 65 ('39'), do not exit the labor force by age 65 ('39'), or were not working on their 62nd birthday and not working ('0') or with missing work data ('−1') the month before turning 62, depending on the quadrant in the figure.

[9]For a recent survey of this broad retirement literature see Lumsdaine and Mitchell (1999). Hurd (1990), Lumsdaine (1995), and Ruhm (1996) provide good discussions of the earlier literature.

earning above the earnings limits, for retirement behavior before the normal retirement age have not been carefully investigated yet. These incentives are becoming an increasingly more important aspect of the social insurance system in the United States as the period between the early and normal retirement age widens. This study provides one of the first empirical investigations of the behavioral implications of these incentives.

Within the literature on early retirement and labor supply one line of research has focused on the taxation aspects of the Earnings Test (Vroman 1985, Burtless and Moffitt 1985, Honig and Reimers 1989, Leonesio 1990, Reimers and Honig 1993, Reimers and Honig 1996, Friedberg 1998, Baker and Benjamin 1999, Friedberg 2000, and Votruba 2003), but has paid little attention to the potential impact that having the option to affect the reduction factor even after claiming benefits early (i.e. before NRA) may have on retirement behavior. Other related literature has approached the issue by estimating structural models of retirement (Rust and Phelan 1997; French 2005; Gustman and Steinmeier 2002; van der Klaauw and Wolpin 2005, to name some of the most recent research efforts), but in that work there is little discussion of the mechanism we are emphasizing, and it is unclear to what extent the findings from that literature reflect this particular set of incentives provided by Social Security.

Reimers and Honig (1993 and 1996) do analyze the trade-offs of claiming early versus late in the context of re-entry into the labor market. However, the possibility that individuals can affect the reduction factor by continuing to work is ignored. Friedberg (1998 and 2000) studies the effect of changes in the Earnings Test rule prior to 2000 on labor supply and finds that up to 5 percent of individuals bunch just below the Earnings Test limit and appear to adjust with the Earnings Test limit. This suggests that there are individuals who consider benefits withheld due to the Earnings Test as a loss, either due to misinformation or differences that make the adjustment actuarially unfair for them (e.g., lower life expectancy). However, this does not rule out that a second group of individuals exists that is aware that benefits withheld before the NRA increase the rate of future benefit pay and that take this option of adjusting the reduction factor into account.

The study of the claiming of retirement benefits has received considerably less attention than retirement itself. Rust and Phelan (1997) explicitly model retirement and application for Social Security benefits, and find that their dynamic programming model performs quite well in matching the data from the Retirement History Survey regarding employment and claiming of benefits. However, they do not directly model the possibility of affecting future benefits by working after claiming benefits. Instead, they include a series of dummies for individuals who claim benefits and continue to work in their structural estimations (p. 813–815). Their estimates of these dummies are positive, and they interpret them as leisure ‘bonuses’ that represent lower disutility of work after claiming benefits. In the absence of the complete incentive scheme, we believe these parameters were probably capturing the incentives we emphasize in this paper. It is our contention that future structural models will likely choose to include the incentives we describe and test as a better alternative to explaining work among Social Security claimers.[10]

Finally, Coile et al. (2002) analyze the Social Security benefit claiming behavior and emphasize the importance of taking into account that individuals are utility maximizers who are likely to be averse to risk. However, their focus is not on the connection between claiming and labor supply, but on understanding why some individuals delay claiming beyond age 62. Those authors, however, acknowledge the importance of modeling the claiming decision jointly with the retirement decision.

[10]Although Rust and Phelan (1997) emphasize that their results are robust to including these dummies, we believe the fit of their model would improve if work after claiming is allowed to influence future benefits.

3 Analytical Framework and Identification Strategy

Public pensions are a major source of income to older Americans. Under the Old Age and Survivor Insurance (OASI) system, the Social Security program that pays benefits to eligible workers who claim their benefits, 40 million individuals received about $399.8 billion in benefits in 2004, and during that same year around 157 million individuals had earnings covered by Social Security and paid payroll taxes.

3.1 Benefit Calculation

Individuals aged 62 or older who had earned income that was subject to the Social Security payroll tax for at least 10 years since 1951 are eligible for retirement benefits under the Old Age benefits program. Earnings are subject to the tax up to an income maximum that is updated annually according to increases in the average wage. Around 6% of the 157 million workers with Social Security taxable earnings in 2004 had earnings at or above the maximum amount. To determine the monthly benefit amount (MBA), the Social Security Administration calculates the Primary Insurance Amount (PIA) of a worker. The PIA is calculated as a concave piece-wise linear function of the worker's average earnings subject to Social Security taxes taken over her 35 years of highest earnings. The PIA of all individuals eligible for OA benefits is computed and updated (increased) annually in January to reflect changes in the individual's earnings history (see SSA-H, §706. *Determining the PIA*, §721. *Recomputation of the PIA*).[11]

If the benefits are claimed at the NRA (66 for those born between 1943 and 1954, and currently 65 and 10 months) the MBA equals the PIA. If an individual decides to begin receiving benefits before the NRA and exits the labor force or stays below the earnings limit, her MBA is reduced by up to 25 percent. This reduction due to claiming benefits before the NRA is approximately actuarially fair (Myers 1993), i.e. for a person with average life expectancy the total amount of Social Security benefits received is the same regardless of the initiation date. Under the current regulation of the OA program, the monthly benefit amount received upon first claiming benefits depends on the age (month) of initiation of Social Security benefits, in the following way, assuming an NRA of 66,

$$MBA_t = \begin{cases} \{0.75 + 0.05 * \frac{1}{12} * (\text{Months not claimed in the period prior to 3 years before NRA})\} * PIA & \text{if claimed more than 3 years before} \\ \{0.80 + 0.20 * \frac{1}{36} * (\text{Months not claimed in 3 years before NRA})\} * PIA & \text{if claimed within the 3 years before} \end{cases} \quad (1)$$

where MBA_t represents the monthly benefit amount before the NRA (see SSA-S 2003, p.17). Assuming that the individual continues to receive benefits, her MBA_t is permanently reduced. The Actuarial Reduction Factor (ARF) underlying this calculation is a permanent reduction of benefits by 5/9 of 1 percent per month for each month in which benefits are received in the three years immediately prior to the NRA. The reduction of benefits is 5/12 of 1 percent for every month before that. Thus, the maximum actuarial reduction will reach 30% as the NRA increases to 67 over the next few years (see SSA-S 2003, p.17).[12]

[11]This recomputation is done regardless of the level of earnings that the individual obtains after claiming benefits. Therefore individuals will benefit as long as they can substitute a low year of earnings, which could mean in some cases to substitute a year without covered earnings. Notice that this recomputation is done implicitly for non-claimers, therefore the incentive to work to affect the PIA directly through higher earnings affects claimers and non-claimers in the same way.

3.2 Actuarial Reduction Factor

One important feature of the process of benefit reduction due to early retirement is the possibility to reduce the penalty even after initiating the receipt of benefits.[13] To illustrate this feature of the system, suppose the NRA is 66 years, and an individual claims benefits at age 62 and n months, where $n << 48$, receives checks for x months where $(n+x << 48)$, and suspends receiving checks after that until she turns 66 (after which she retires for good). In this case she receives x checks of

$$MBA_t = \begin{cases} (0.75+0.05 * \frac{1}{12} * n) * PIA & \text{if claimed more than 3 years before NRA;} \\ (0.80+0.20 * \frac{1}{36} * n) * PIA & \text{if claimed within the 3 years before NRA.} \end{cases} \quad (2)$$

After turning 66, her *MBA* will be permanently increased to

$$MBA_t = \left[0.75 + \left(0.20 * \frac{1}{36} * n \right) + \left(0.20 * \frac{1}{36} * (36 - n - x) \right) + 0.05 \right] * PIA. \quad (3)$$

It is important to note that any benefits received before reaching the NRA remain at the same (reduced) rate that corresponds to the time of early benefit initiation.[14] As a result, the *MBA* for individuals who do not receive benefits for some months after claiming (e.g. due to the Social Security Earnings Test withholding as discussed below) becomes increasingly actuarially unfair as the number of months no benefits have been received since claiming rises. Thus, among individuals who have claimed benefits early and consider continuing to work (or returning to work after a leisure spell), those who had benefits withheld face a greater incentive to be in the labor force and suspend the receipt of Social Security benefits before the NRA.

3.3 Earnings Test

The earnings limit defines the maximum amount of income from work that a beneficiary who claims benefits before the NRA under OASI may earn while still receiving the 'full' *MBA*. Earnings above the limit are taxed at a rate of 50 percent for beneficiaries between age 62 and the January of the year in which they reach the NRA, and 33 percent from January of that year until the month they reach the NRA (SSA-S 2003, p.18; SSA-S 2004, Table 2.A18). For the latter period, the earnings limit is higher, $31,080, compared with $11,640 for the earlier period as of 2004 (SSA-S 2004, Table 2.A29). Starting in 2000 the Earnings Test was eliminated for individuals over the NRA. In the context of the reversibility of an early retirement penalty we want to stress that an increase in the Earnings Test limit would make it more difficult for individuals to undo this penalty. This is due to the fact that the higher the Earnings Test limit, the higher the earnings of an individual have to be in order to affect her ARF once she has claimed benefits.

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[12] During the post NRA period additional adjustments exist: Workers claiming benefits after the NRA earn the Delayed Retirement Credit. For those born in 1943 or later it is 2/3 of 1% for each month up to age 70 which is considered actuarially fair. For those born before 1943 it ranges from 11/24 to 5/8 of 1% per month, depending on their birth year.

[13] The specifics of this adjustment to the Actuarial Reduction Factor are documented in the Social Security Handbook (SSA-H, §724. *Basic reduction formulas*, §728. *Adjustment of reduction factor at FRA*) and in the internal operating manual used by Social Security field employees when processing claims for Social Security benefits (SSA-M, RS00615. *Computation of Monthly Benefits Amounts*). We note that the Social Security Administration does not use the term Actuarial Reduction Factor in their publications, but a number of the people we have talked to within the administration do use this terminology. In publications the related concept of "Reduction Factor (s)" (RF) which is simply the number of months in which benefits were received before the NRA is used. The RF maps into a "Fraction" that ranges between 0.7 and 1. The latter corresponds to what we refer to as ARF. The ARF ("Fraction") is adjusted upwards at the NRA according to the number of months before the NRA in which benefits were withheld.

[14] Beneficiaries can withdraw their application for benefits. If it is retroactive, any Social Security benefits received must be returned. As a result, those who are aware of this option and who time their applications well may be able to adjust their reduction factor before the NRA, at the expense of temporarily losing the insurance function that claiming early may serve as discussed below.

Individuals who continue or re-enter employment after initiating Social Security benefits before the NRA, and whose earning power or hours constraints are such that their income from work is around or below the earnings limit, are mailed their monthly check from Social Security and are locked-in at the reduced benefit rate permanently. Those with earnings above the limit will not receive checks for some months and thereby increase their ARF.[15] During the first year after claiming benefits, SSA performs a monthly test to determine whether the person should receive the monthly check. As a result, an early claimer who is not working or earns below the limit in the months after claiming will receive all monthly benefits even if earnings for that calendar year ("grace year") exceed the Earnings Test limit due to high earnings before claiming.[16] After the first year, the test is typically yearly and it depends on the expected earnings of the individual. Individuals can inform Social Security to suspend the monthly benefit payment if they believe they will be generating earnings that exceed the Earnings Test limit. Those who are initially not aware that their benefits withheld due to the Earnings Test are not lost, may learn about this feature of Social Security when discussing the consequences of continuing to work or re-entering the labor market on a job that generates earnings above the limit with their claim specialist or upon inquiry after receiving fewer monthly benefit checks.

3.4 Hypothesis and Identification Strategy

The ability to affect the reduction factor even after claiming, and the fact that the adjustment to the rate only occurs after reaching the NRA has important implications for labor force exit behavior. For those who claimed before the NRA ("early claimers"), continuing to work or returning to work and earn above the annual Earnings Test limit ($11,640 in the years before reaching the NRA $31,080 for the time between January and the month when the NRA is reached in the year thereafter) is the only way to achieve a higher permanent benefit rate after the NRA. Someone who has not yet claimed benefits ("non-claimer"), on the other hand, can affect his or her rate of future benefit pay independently of working simply by continuing to not claim benefits.

As discussed above, the lifetime benefits of early claimers who continue to work after claiming would only be actuarially fair if either none or all of the benefits were withheld before the NRA, since the benefit rate of early claimers is not adjusted for months without benefits prior to NRA. Consequently, we expect that early claimers exit at a higher rate than non-claimers around the time of benefit initiation. As Social Security benefits received before the NRA become increasingly actuarially unfair with the number of months benefits were withheld compared to those who have not claimed at that time, or those who claimed and retired immediately, we expect to see those who have claimed benefits withdrawing from the labor force in a different pattern than those who have not claimed at the time. The increasingly actuarially unfair benefit level constitutes a (negative) income effect on labor supply, suggesting that the labor force exit rate of early claimers should decrease in the time since claiming Social Security benefits. By continuing to work and earning above the Earnings Test limit, early claimers can not only suspend the receipt of monthly benefits for a longer time, thereby trading off reduced benefits today for upwards-adjusted benefits after reaching the NRA, but also avoid receiving the unadjusted benefits before the NRA which are (increasingly) actuarially unfair.

[15]A beneficiary may receive a partial monthly benefit at the end of the tax year if there are excess earnings that do not completely offset the monthly benefit amount (see SSA-H, §1806).

[16]Social Security claim specialists emphasized to us that during the first year after claiming they do what is most advantageous to the claimer, the monthly or the yearly test, if they have enough information. However, they failed to clarify what that means, some of them said the number of checks individuals receive is maximized, but we were unable to find documentation of such practices. In any case, the internal operating instructions used by Social Security field employees when processing claims for Social Security benefits state that the monthly Earnings Test only applies for the calendar year when benefits are initiated unless the type of benefit changes (see SSA-M, RS02501.030).

The identification strategy presented above relies on the variation in claiming and working behavior. Specifically, our identification of the incentives of the adjustment of the rate of benefit pay after claiming provided by the current rules of the Earnings Test and the ARF, relies on the variation in the length of working spells of early claimers and later claimers. The latter includes both individuals who claim at a reduced rate but closer towards the NRA or those who claim at NRA or thereafter. Given that the reduction in benefits associated with early retirement is actuarially fair for the average individual (average life expectancy) it is clear that early claiming and continuation of work will be less prevalent behavior than claiming and withdrawing at about the same time. And in fact, the evidence from the HRS provided in Figure 1 demonstrates such a pattern. However, Figure 1 also shows a sizable percentage of early claimers continue to work as discussed above.

There are several motivations for claiming benefits at or after age 62 while continuing to work or expecting a return to work, since having filed for benefits provides a type of insurance. First, individuals who face uncertain job prospects or uncertain income streams in general (and those who are more risk averse) may file for Social Security benefits as soon as they are eligible to secure benefit payments if needed. Processing the initial Social Security claim takes up to 3 months. Reinstating the monthly payments takes around 6 weeks. Also, in most states unemployment benefits are not deducted from Social Security benefits and vice-versa, i.e. unemployment benefits and Social Security benefits can be received at the same time.[17] Second, with the ongoing debate about reforming the Social Security system, individuals eligible for early retirement benefits may become claimers even though they do not plan to withdraw from the labor force. Their motivation is to insure that they cannot be made worse off by subsequent changes to the Social Security system.[18]

Benítez-Silva and Heiland (2007), using a dynamic model of labor supply and claiming behavior, estimate that around 40% of older Americans may know about these incentives, suggesting that it may be difficult to draw inference about them.[19] Lack of information may lead individuals to consider benefits withheld as lost. This would provide further incentive to withdraw from the labor force at the time of benefit initiation. If individuals who continue to work and see their benefits withheld do not realize that their benefit rate upon withdrawal is actuarially unfair before the NRA, it is unclear why their dropout likelihood should be systematically related to the time since claiming. This is especially true once other determinants of labor force exit behavior are accounted for, as in the models presented below. In addition, it seems unlikely that early claimers lack knowledge of the rate of benefit pay prior to the NRA. Even if individuals are initially unaware that they can affect their benefit reduction factor after claiming or are misinformed about the benefit adjustment process, they may seek to obtain more information about these rules as: (a) they have some benefits withheld due to earnings, (b) they realize that the reduced rate is not sufficient to achieve the current or future desired

[17]Hutchens (1999), accounting for demand side effects, shows that early retirement benefits can be a form of unemployment insurance that can lead to inefficiently high levels of early retirement.

[18]Benítez-Silva et al. (2006) show that a model that accounts for uncertainty over possible Social Security reforms that result in a reduction in benefits, can explain the large proportion of Americans claiming benefits early.

[19]Some anecdotal evidence we have gathered indicates that future retirees can have a hard time finding the appropriate information to make truly informed decisions regarding the effects of work after claiming benefits. For example, the benefits calculator provided by the Social Security Administration (www.ssa.gov) does not have any reference to the mechanism that allows individuals to affect their Actuarial Reduction Factor by earning above the Earnings Test after claiming and receiving benefits. In recent months SSA has been updating a number of its publications regarding the role of work after claiming benefits. In the package of information that individuals receive once they claim benefits it now includes a considerably clearer statement about the consequence of working while claiming benefits. These statements do not only focus on the taxation aspects, but describe in simple terms the adjustment mechanism. These are SSA Publication No. 05-10077, and SSA Publication No. 05-10069. However, these incentives have been in place in this form for more than two decades and the specifics of benefit withholding due to the Earnings Test and subsequent adjustment of the reduction factor are documented in the Social Security Handbook (SSA-H) and the internal operating manual used by Social Security field employees when processing benefit claims (SSA-M). In addition, several employees from the Social Security Administration, including claim representatives at a local SSA, office confirm that these rules are implemented by the government when calculating retirement benefits.

standard of living, or (c) as job opportunities arrive that would put them above the Earnings Test limit.

The theoretical discussion suggests that individuals' likelihood of labor force exit rate of individuals who claimed benefits is high at the time of claim initiation and falls with the number of months since benefit initiation (but before the NRA). To test for this non-linear effect of the time since benefit claiming on labor force spells, we analyze the exit hazard of Americans of early retirement age conditional on the time since benefit claiming. Two issues that need to be addressed in the empirical analysis of our hypothesis, are individual-specific factors that may independently affect a person's risk of labor force exit, and the potential endogeneity of claiming behavior.[20] Failure to control for such independent factors, and failure to account for the possibility that individuals consider the optimal timing of the benefit claiming when choosing the working spell after age 62 (or after they returned to the labor force), may at best obscure the interpretation of the effect of the duration since claiming on labor force exit and at worst lead to biased estimates.

As shown in greater detail below, we address the first concern by controlling for a large set of background characteristics of the individual including time-varying covariates and measures of physical and mental health and subjective survival probability. If the covariates proxy well for differences in the determinants of individual's labor force exit risks including tastes and endowments (health and cognitive ability), the estimated effects are more likely to capture the predicted effect of time since claiming on a person's labor force exit risk. To address the potential endogeneity of the timing of benefit claiming on the labor force participation spell, we use Lillard's (1993) simultaneous equations for hazards approach, which also allows us to further tackle the first concern by including unobserved heterogeneity components in each hazard.

4 Data and Econometric Models

4.1 Data Description and Summary Statistics

Using monthly employment data of 7,203 men and women from the first five waves of the Health and Retirement Study (HRS), we construct measures of the time-to-exit from the labor force for individuals who are employed continuously from age 62.[21] We also construct monthly indicators of claiming behavior which—given data limitations—reflect the month the individual started receiving Social Security Old Age benefits.[22]

Given our research question we do not follow individuals past the month of their 65^{th} birthday. The employment spell for individuals who have not withdrawn from the labor force prior to that month will be right-censored.[23] Subjects with missing data that imply left-censoring are dropped. In our sample the observed spells start from the month of the respondent's 62^{nd} birthday (minimum age of eligibility for early retirement).[24] To illustrate how the sample is obtained, we note that of the 7,203 individuals in the HRS who are 62 or older, 3,381 have a

[20]Unobserved heterogeneity in survival analysis is particularly problematic. If some individuals are more at risk to exit the labor force due to an unobserved characteristic, then the group of individuals remaining in the labor force tend to be a selected group with lower exit risk. What we interpret as evidence for a causal relationship between the time since an individual initiated benefits and her risk of dropping from the labor force may be the result of differences in the proneness to exit the labor force across individuals, if no effort to account for observed and unobserved heterogeneity is made.

[21]Within the group of individuals whose status changed from employed to not employed ('exited'), we do not distinguish individuals who became unemployed, since the fraction of respondents exiting due to unemployment is less than 2% in the relevant age group.

[22]Given the structure of the questions in the HRS we are unable to verify whether the respondent continuously receives benefits. If none of the respondents in the sample had their benefits withheld our identification strategy, as explained in the previous section, should fail to capture any effect of the time since claiming on labor force exit.

[23]Since we use data up to the year 2000, the NRA for most individuals in our samples is 65. Only individuals who turn 62 in 2000 have the higher NRA of 65 and 2 months. It is clear that the latter individuals are right-censored (or have completed the employment spell) before reaching their NRA in our samples.

complete work history after turning 62, and among those the 1,723 individuals who are working at 62 constitute our sample.

The frequency distributions of the employment spells in our sample are shown in Table 1. We observe that males have longer working spells than females, and that claimers have slightly longer spells than non-claimers. The latter is due mainly to the fact that non-claimers are likely to be younger and therefore more likely to be censored.

Table 2 provides summary statistics for the earnings and hours of work in the calendar year corresponding to each month of the event of work/not work, claim/not claim. Males have higher earnings on average, and so do non-claimers. Claimers have earnings higher than the limits of the Earnings Test, which suggests that the average claimers who work might seek to increase the rate of future benefit pay, i.e. increase the ARF. Notice, however, the large standard deviations of the earnings measures, suggesting that there are also a substantial number of individuals below the Earnings Test limit. The distribution of average hours of work is consistent with the earnings distribution.

As shown in Table 3 our sample consists of single employment-spell data on individuals who turn 62 between 1992 and 2000. We employ a large set of explanatory variables. To construct the time-varying covariates we assign characteristics from the closest previous survey wave available in each month. The sample of all employed individuals at age 62 consists of 1,723 individuals with 24,097 person-months observed.

To capture the effect of the incentives provided by the benefit rate adjustment process in the decision of when to exit the labor force, we include time since claiming and the time before claiming in the exit hazard. To distinguish those who have not claimed yet in a particular month we construct a dummy variable, *Not Claimed Yet*, that equals 1 if the month is prior to becoming a claimer and 0 otherwise. We also include an indicator for the month when benefits are initiated.

Consistent with the incentives discussed above, we expect that—on average—the labor force exit hazard will be higher for individuals who have claimed benefits than for those who have not, as many individuals claim at the time they retire, or soon afterwards, once they reach age 62. Moreover, we expect that time since claiming exhibits positive duration dependence on the working hazard, i.e. the longer someone who has claimed benefits early stays in the labor force the smaller her exit hazard becomes. To capture this potentially non-linear effect the exit hazard models include a linear and a quadratic term for the time since benefits were claimed.

To be able to identify the hypothesized non-linear effect of time since claiming on labor force exit, we control for a large set of factors that are expected to influence the labor force exit decision independently of the time since claiming, such as measures relating to financial constraints, health limitations, opportunity costs, and tastes.[25] As proxies of a person's market earnings power we use measures of educational attainment, cognitive ability and work-related health limitations as reported in Table 3. Together with marital status and subjective life expectancy, poor health may also capture leisure preferences. The availability and type of health insurance, pension wealth, and asset wealth are expected to play an important role in the decisions of when to withdraw from the labor force. Hence we have constructed an indicator for individuals without health insurance (non-missing for 84-88% of the respondents in the

[24]In this paper we do not extend the analysis to multiple spells. Notice that this could be done in two ways. (a) The two samples that are used separately in this paper can be combined into one. In that case some individuals experience two exit spells. (b) One can include higher order exit spells of individuals from the second sample.

[25]We follow standard specifications used in the empirical literature on labor supply of older workers (see e.g., Lumsdaine and Mitchell 1999).

samples) and for those with private health insurance (84-88% non-missing). The individual's wealth during this part of the life cycle is measured by net total household wealth (77-83% non-missing), and an indicator for whether they have a private pensions (97-99% non-missing). Using the restricted earnings data from the HRS we have constructed a person's PIA, i.e. a measure of the respondent's actuarially fair Social Security wealth based on their history of earnings (79% non-missing).[26] The PIA is potentially important—in conjunction with private pensions and net (non-pension) wealth—not only as a control for wealth in the labor supply decision but also to understand the claiming behavior as investigated in the simultaneous hazard model below.

4.2 A Simultaneous Hazard Model of Labor Supply and Claiming Decisions

Given the incentives set up by the social insurance programs in the United States, it is natural to study the risk of claiming benefits and the risk of withdrawing from the labor force as a jointly determined process. Individuals are likely to consider the optimal timing of benefit claiming when choosing whether to continue working after age 62. In that case, the risk of claiming at some month and variables derived from this outcome, which include our main variable of interest, the time since claiming, is not likely to be exogenous in the working hazard. They may be subject to the same unobserved characteristics (such as tastes and endowments) that affect the length of the working spell.

For example, some individuals may have above average attachment to the labor force for reasons unrelated to the incentives provided by the benefit adjustment rules (e.g. since they are initially in a job that is a particularly good match). If they are also more likely to claim benefits early (e.g. since they are also more risk averse) an estimated negative effect, in a single equation framework, of the time since claiming on the exit hazard may reflect their unobserved motives for delaying exit after claiming rather than the incentives provided by the early retirement rules of Social Security. To address potential problems of unobserved heterogeneity in exit risk that are transmitted via the outcome of the claiming process, we estimate the claiming and the labor force exit process jointly, allowing for unobserved components in each process, and the possibility that these determinants are correlated.[27]

Our estimation approach is based on the full information maximum likelihood 'simultaneous equations for hazards' model of Lillard (1993).[28] This approach assumes that the duration processes may be correlated via individual-specific unobserved heterogeneity components that follow a bivariate normal distribution. Specifically, we estimate the following system of labor force exit and claiming hazard equations

$$h_i^E(t) = exp\left(T_E(t)'\gamma_1 + X_{Ci}(t)'\beta + Y_{1i}(t)'\theta_1 + \varepsilon_E\right), \tag{4}$$

[26]The restricted earnings data provide the history of earnings for the 9,472 individuals, as of the first wave of interviews, that gave permission to link their files, from 1951 to 1991. Haider and Solon (2000) find little evidence of non-randomness and lack of representativeness in this sub-sample of individuals. The PIA we include in our estimations uses these histories and then imputes earnings up to the individuals' 62nd birthday in order to calculate the retirement benefits as of that age. For the months after that we just use the monthly actuarial adjustment factor.

[27]Benítez-Silva and Heiland (2007 and 2005) present results of the single equation model that assumes claiming is exogenous. The qualitative results regarding the early retirement incentives are unchanged in that simpler model, and the quantitative evidence is in line with the results of the bivariate hazard model. However, that model is statistically rejected in favor of the bivariate model, and in the former framework we cannot analyze the determinants of the Social Security claiming decision. In Benítez-Silva and Heiland (2005) the authors also investigate the effect of these incentives among labor market re-entrants, but the coefficients of that model are very imprecisely estimated, likely due to the small sample size of that group.

[28]The framework is commonly adopted to estimate multiprocess duration problems. This methodology has been applied, for example, to study the determinants of welfare participation, family formation and resolution, and education (see Brien and Lillard 1994, Brien et al. 1999, Upchurch et al. 2002, and Fitzgerald and Ribar 2004, among others).

$$h_i^C(t) = exp\left(T_C(t)'\gamma_2 + X_{Ei}(t)\,\delta + Y_{2i}(t)'\theta_2 + \varepsilon_C\right), \tag{5}$$

where the baseline duration patterns are equation-specific piece-wise linear functions, and the exogenous control variables, Y_1, Y_2 can be the same. X_{Ci} contains measures that capture the effect of claiming on the exit from the labor force. In the baseline specification we control for whether a person has *Not Claimed Yet* in a given month, and conditional on that, the *Month when Claimed*, the *Time Since Claiming* was initiated (in months), and its square. We note that we also allow the claiming hazard to depend on the outcome of the labor force participation process via X_E.

The joint probabilities of observed outcomes and events (claiming dates, exit dates, completed or censored) conditional on the vector of unobserved heterogeneity components (ε_E, ε_C) is the product of the individual conditional probabilities (say, $L_{i,E}(\varepsilon_E)$ and $L_{i,C}(\varepsilon_C)$ for individual i) since they are statistically independent.[29] Consequently, the contribution to the joint likelihood of individual i's complete set of outcomes is the integral of the joint conditional likelihood over the range of the jointly normal heterogeneity components. That is,

$$L = \int_{\varepsilon_E}\int_{\varepsilon_C} \frac{\phi\left(\frac{\varepsilon_E}{\sigma_{\varepsilon_E}}, \frac{\varepsilon_C}{\sigma_{\varepsilon_C}} | \rho_{\varepsilon_E \varepsilon_C}\right)}{\sigma_{\varepsilon_E}\sigma_{\varepsilon_C}} \times \Pi_{i=1}^{Nind}\left(L_{i,E}(\varepsilon_E)\,L_{i,C}(\varepsilon_C)\right) d\varepsilon_E d\varepsilon_C. \tag{6}$$

The coefficient vector is estimated using the aML Multiprocess Multilevel Modeling software (Lillard and Panis 2003). Estimation of this type of multiprocess hazard model using single spell data required additional distributional assumptions. In the estimation of our sample we only identify the correlation coefficient. The variances of the two unobserved heterogeneity terms are set to unity.[30]

5 Empirical Results

Table 4 shows the results of estimating the claiming and the labor force exit hazards simultaneously following the identification strategy described in Lillard (1993).[31] All models include a large set of covariates that control for socio-economic background and health characteristics of the individual. Also included—but not shown in the table—are a set of indicators for region of residence and calendar year of the 62nd birthday. In the table a positive coefficient indicates an increased hazard, or higher likelihood of dropping from the sample of workers. The second model in the table includes a variable that captures the fraction of the year before turning 62 that a respondent participated in the labor market. We include this measure to assess if the results are driven by individual heterogeneity with regard to labor force attachment. The results of both models are essentially the same.

Notice that the correlation coefficient between equations is estimated to be positive, large, and significantly different from zero. This is evidence in support of the joint estimation strategy. Its positive sign is consistent with the presence of unobserved characteristics of the individual

[29]The heterogeneity this procedure allows us to control for is individual-specific. Notice that any unobserved heterogeneity due to transitory shocks, beyond those captured by our time controls, cannot be identified with this approach.

[30]The identification of the variance components has been shown theoretically (Heckman and Honoré 1989).

[31]We did not find the results reported below to be sensitive to considering specifications where some exclusion restrictions (more or less difficult to defend) are made. Given that the estimates below support the evidence we have presented throughout the paper, we argue that the structural assumptions imposed in the estimation of the bivariate hazard model do not buy us the main results of this research, but rather show the robustness of those results.

that affect the exit and claiming behavior in a similar way. While we cannot identify the exact nature of these characteristics we suspect they are related to productivity and preferences for leisure across individuals that are not captured otherwise.

For example, highly productive individuals whose characteristics are not perfectly captured by the cognitive test variable, the PIA variable, educational attainment, and measures of wealth, are expected to be more likely to continue in the labor force after age 62, and also less likely to claim benefits early, resulting in a positive correlation in the bivariate framework. Individuals with a greater disutility from working will on average drop from the labor force earlier and claim benefits earlier than individuals who value leisure less.[32] After controlling for the previous attachment to the labor force the correlation weakens somewhat indicating that this variable is an important determinant that affects the exiting and claiming probabilities in the same (negative) way.

The *Time Since Claiming* variable has the sign hypothesized and is statistically significant. The longer it is since someone has claimed early benefits, the more likely they are to stay in the labor force compared with someone who has not claimed benefits at that time. The square term is positive and significant, indicating that the exit hazard decreases at a decreasing rate in the number of months since claiming. The net effect of time since claiming is negative, indicating a lower likelihood of dropping out of the labor force, which supports the importance of the incentives provided by the rules regarding the adjustment of the reduction factor, i.e. the increasingly actuarially unfair rate before the NRA for those who have (some) benefits withheld. The finding that the exit hazard decreases at a decreasing rate is consistent with the incentive to continue in the labor force to have benefits withheld diminishing as a person gets closer to the NRA.

Recall that the benefit rate is approximately actuarially fair for individuals who receive benefits continuously after claiming early. Consistent with this incentive, the indicator of not having claimed yet has a large negative effect on the likelihood of dropping from the labor force. This control account for the level shifter that indicates that those who have not claimed as of that month are unconditionally more likely to participate in the labor market. The sizable coefficient captures the increased exit probability associated with becoming eligible for early retirement benefits after turning 62 typically found in studies of retirement behavior during the 1990s. Also consistent with the fact that many early claimers retire when they claim, the indicator of month of claim increases the retirement hazard, which indicates that a number of respondents retire in the same month they claim benefits.

The model predicts that an individual who has been working for one year (12 months) since claiming benefits is about 16 percentage points less likely to drop from the labor force in the following month than an individual who has been working for 6 months.[33] The probability of exiting the labor force in the next month for an individual who claimed benefits a year and a half ago and continued working is about 4 percentage points lower than for a person after working for one year.

Notice the negative effect on the hazard of being the primary respondent and having more wealth. This negative effect can also be observed for those with higher self-reported probabilities of living to age 85, suggesting a coherent effect of self-assessed longevity. Having a health limitation, has a positive effect on the hazard of exiting the labor force. We also observe

[32]We have conducted extensive sensitivity analysis regarding the variances of the unobserved components in equations (4) and (5) using a grid search approach. The correlation coefficient is in all cases positive and significant, and the remaining coefficient estimates are not substantially different from those reported in Table 4.

[33]From Table 4 we use the linear and quadratic coefficients of the time since claiming variable and compute the difference in the exit probability as $100 \cdot (\exp(-0.243 \cdot 12 + 0.006 \cdot 12^2) - 1) - 100 \cdot (\exp(-0.243 \cdot 6 + 0.006 \cdot 6^2) - 1) = 16.07$.

the expected positive signs of the effect of the primary insurance amount and of having a private pension in the labor force exit hazard. However, these effects are not statistically significant at the 10% significance level.[34] The health insurance variables we include, lack of health insurance, and having private insurance, have mostly insignificant effects across specifications. Not having health insurance has the expected negative effect on dropping from the labor force, but this coefficient is very imprecisely estimated.[35]

Regarding the baseline hazard we observe that in the three months after turning 62 the retirement hazard increases, but decreases in the 3 to 6 months period, and increases again in the 6 to 12 month period. In this case the hazard keeps increasing after that, and is especially high at the time the individual turns 65 and the month after. This overall pattern replicates fairly well the known retirement peaks described in the literature.

Turning to the claiming hazard, continuous participation in the labor market reduces the likelihood that someone will claim benefits. Being the primary respondent increases the likelihood of claiming, but greater wealth and a higher score in a cognitive test decreases the claiming hazard. The wealth effect is consistent with the widely accepted believe that wealth proxies for a variety of characteristics likely to be correlated with delayed retirement, and it is also consistent with the fact that poorer individuals receive higher replacement rates from the social insurance system. The results also show that the primary insurance amount plays a more important role in the claiming than in the labor force participation decision. As expected, a higher PIA increases the likelihood that claiming of benefits is initiated at that time. Interestingly, the duration patterns for the claiming behavior in the months after age 62 matches the pattern in the same months for the exit hazard, with an increase in the first 3 month, a decrease in months 3 to 6, and an increase afterwards, with a clear peak around the person's 65^{th} birthday.

We have also considered alternative specifications for the models presented in Table 4. In addition to re-estimating all models controlling for labor supply during the 12 months period before the individual's 62^{nd} birthday, we have also included a dichotomous variable for self-employment status. While the effect of previous labor supply on the labor force exit hazard has the expected negative sign, the effects of claiming on employment tend to be unchanged. Furthermore, while self-employed individuals are significantly less likely to drop out of the labor force, the qualitative pattern of the claiming effects is unaffected by controlling for self-employment status.

6 Conclusions

This paper analyzes the effects of the incentives set up by Social Security regarding claiming of benefits and working, which individuals face between the Early Retirement Age and the Normal Retirement Age. These incentives have been largely ignored by researchers focusing on the retirement decision, and have not been analyzed in a framework that allows for the simultaneity of the decisions to start receiving benefits and working. We have presented evidence for the presence of positive duration dependence of employment associated with claiming benefits early. The labor supply incentives of the Social Security system for those

[34]We observe a stronger and statistically significant effect of private pension on the exit hazard across specifications if the PIA is excluded from the model (results available from the authors upon request), which suggests that the reported estimates of the pension effects may be subject to multicollinearity since individuals with high PIAs are also likely to have private pensions. In any case, the pattern of the claiming effects is robust to the pension specification. The effect of private pensions—if the PIA is not included—is consistent with the interpretations a number of researchers make of the fact that a considerable number of individuals are not working after age 62 but at the same time are not claiming benefits. A number of pension plans penalize individuals who receive Social Security benefits while accumulating pension balances, in other cases individuals prefer to wait to receive their full PIA while supporting themselves on their pensions. We thank John Sabelhaus for helping us understand this issue.

[35]Currie and Madrian (1999) review the literature on the effects of health insurance on labor market decisions.

that claim benefits early have real and sizable effects in a sample of individuals from the Health and Retirement Study.

Given that the option to affect the reduction factor even after claiming benefits early and the implications for the actuarial fairness of the benefits investigated in this study may not be a very well-known feature of Social Security, our evidence of their importance for behavior based on data from the Health and Retirement Study may be a lower bound estimate of their potential effect on retirement behavior if they were made better known. In particular, our findings suggest that we can expect more benefit claiming and greater labor force participation of early claimers before the NRA if the percentage of individuals who understand that benefits withheld due to the Earnings Test are not lost but will increase the rate of future benefit pay were to rise.

As the population ages and the NRA rises (possibly at an accelerated pace in the next few years in order to avoid even more radical and painful changes to Social Security), having the option to affect the reduction factor after claiming early may become more valuable to individuals. Since the adjustment of the benefit rate typically takes place only after the NRA is reached, benefits received before the NRA are likely to become increasingly actuarially unfair for those who continue to work after claiming in the next years. As a result future cohorts that reach ERA and consider their options regarding working and benefits will find information regarding the adjustment of the reduction factor increasingly useful. For that reason, the Social Security Administration should consider providing additional information about the Actuarial Reduction Factor, such as an updated version of the benefit calculator, and more direct information on their webpage and the many important details regarding these important policies.

Finally, one of the objectives of this paper is to foster further research on work after claiming benefits and the behavioral consequences of the option to affect the reduction factor after claiming. A natural extension is to assess the importance of the incentives we have described using a dynamic framework. That type of model will also allow researchers to analyze what the potential impact of these incentives is in the presence of a variety of policy reforms to the U.S. social insurance system, such as changes to the early and NRA, changes in the actuarial adjustment, changes in the Earnings Test, or the possibility of strengthening the link between Social Security taxes and Social Security benefits through the investment of part of the payroll taxes in individual accounts. Such a model would also help to assess the impact of these incentives provided by the social insurance system on the wealth accumulation and retirement planning behavior of older Americans.

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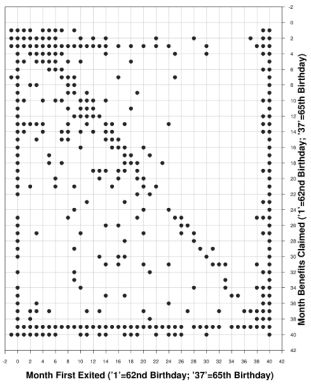

Figure 1.
Month Exiting and Claiming Decisions between age 62 and 65 (Source: Authors)

Table 1

Percentage Distribution of Working Spells

			Outcome	
Sample	**Total Number of Subjects**	**Mean Duration[a]**	**Not Working**	**Censored**
Worked at 62	1,723	14.0	36.7	63.3
Male	984	14.6	37.9	62.1
Female	739	13.2	35.2	64.8
Claimer[b]	474	14.5	53.0	47.0
Non-Claimer	1,249	13.8	30.6	69.4

[a] *Notes:* In months.

[b] Ever benefit claimer.

Table 2

Distribution of Earnings and Hours

	Earnings[a]		Hours Worked[b]	
Sample	**Mean[c]**	**Standard Deviation**	**Mean**	**Standard Deviation**
Worked at 62	23,626 (18,474)	32,550	1,320 (21,699)	830
Male	30,177 (10,809)	39,178	1,410 (12,927)	872
Female	14,388 (7,665)	15,598	1,188 (8,772)	746
Claimer[d]	16,406 (5,264)	27,143	1,050 (6,167)	785
Non-Claimer	26,503 (13,210)	34,046	1,427 (15,532)	824

[a] *Notes:* Average calendar year earnings in current US-$.

[b] Average calendar year hours worked.

[c] Number of case(person-months) in parenthesis.

[d] Ever benefit claimer.

Table 3

Means of Variables in Labor Market Exit Analysis

Variable Name	Definition	Mean[a]
Subject-Invariant		
Male	1 if male, 0 otherwise	0.57 (1.00)
White	1 if white, 0 otherwise	0.78 (1.00)
No Diploma	1 if no high school diploma, 0 otherwise	0.68 (1.00)
Voc. Training	1 if vocational training received, 0 otherwise	0.23 (1.00)
BA	1 if Bachelor degree obtained, 0 otherwise	0.25 (1.00)
Prof. Degree	1 if professional degree obtained, 0 otherwise	0.09 (1.00)
Cogn. Test	Cognitive Ability Test Score (Scale: 0-14)	6.30 (0.90)
Worked Previously	fraction of months worked in the year prior to the 62 birthday	0.97 (0.96)
Others	9 regional dummies	
Sample Size[b]		1,723
Subject-Varying [c]		
Married	1 if currently married or living together, 0 otherwise	0.77 (0.85)
Primary Respondent	1 if respondent is the financially knowledgeable person, 0 otherwise	0.64 (0.86)
Month Claimed	1 if month when first received Social Security Benefits, 0 otherwise	0.02 (1.00)
Time since Claiming[d]	number of months since initiation of benefits	4.4 (0.28)
Pr. Living to 85	self-reported probability of living to age 85	0.47 (0.14)
Health Lim. for Work	1 if health limitations for work exist, 0 otherwise	0.09 (0.85)
PIA	nominal monthly primary insurance amount (PIA) (in $1,000s)	0.73 (0.79)
Net Wealth	total net household wealth (in $100,000s)	2.82 (0.83)
Private Pension	1 if has private pension, 0 otherwise	0.54 (0.99)
No Insurance	1 if no health insurance currently, 0 otherwise	0.06 (0.84)
Private Insurance	1 if has private health insurance, 0 otherwise	0.23 (0.84)
Hourly Pay	1 if job pays hourly, 0 otherwise	0.53 (0.20)
Hours Worked	total hours worked in the corresponding calendar year	1,320 (0.90)
Earnings	total earnings from wages in the corresponding calendar year	23,626 (0.77)
Sample Size[e]		24,097

[a] *Notes:* Mean for subject-varying variables is computed using the overall mean. Fraction of subjects with complete observations in parentheses.

[b] Data are based on the most recent available survey in each month.

[c] Number of subjects(=respondents).

[d] Excludes respondents who do not initiate benefits before age 65.

[e] Number of subject-months.

Table 4

Simultaneous Model of Labor Force Exit and Benefit Claiming

	Model 1		Model 2	
Variable Name	**Exit Hazard**	**Claiming Hazard**	**Exit Hazard**	**Claiming Hazard**
Month Claimed	0.262 (0.231)		0.246 (0.269)	
Time since Claiming	**−0.243***** (0.048)		−0.240*** (0.045)	
Time since Claiming Squared	**0.006*** (0.001)		**0.006*** (0.001)	
Not Claimed Yet	−2.346*** (0.362)		−2.408*** (0.228)	
Not Exited Yet		−1.216*** (0.233)		−1.194*** (0.263)
Male	−0.087 (0.132)	−0.293* (0.164)	−0.092 (0.139)	−0.303* (0.157)
White	−0.110 (0.151)	0.134 (0.201)	−0.118 (0.139)	0.109 (0.175)
BA	−0.193 (0.161)	−0.260 (0.205)	−0.201 (0.162)	−0.270 (0.181)
Prof. Degree	−0.020 (0.245)	0.061 (0.334)	−0.051 (0.245)	0.031 (0.273)
Married	0.016 (0.165)	0.304 (0.193)	0.021 (0.169)	0.326* (0.188)
Respondent 1	−0.609*** (0.140)	0.155 (0.177)	−0.610*** (0.128)	0.221 (0.156)
Cognitive Test	−0.028 (0.023)	−0.049* (0.027)	−0.024 (0.022)	−0.043 (0.026)
Pr. Living to 85	−0.642 (0.476)	0.007 (0.385)	−0.758* (0.434)	−0.108 (0.361)
Health Limitation for Work	0.700*** (0.184)	0.306 (0.224)	0.646*** (0.170)	0.260 (0.205)
No Insurance	−0.025 (0.319)	0.440 (0.410)	−0.053 (0.360)	0.441 (0.376)
Private Insurance	0.122 (0.243)	0.324 (0.289)	0.113 (0.228)	0.308 (0.263)
Net Wealth	−0.052*** (0.014)	−0.050*** (0.015)	−0.054*** (0.020)	−0.050*** (0.017)
PIA	0.186 (0.205)	0.258 (0.293)	0.259 (0.216)	0.338 (0.262)
Private Pension	0.002 (0.002)	0.000 (0.003)	0.002 (0.002)	0.000 (0.004)
Months Worked Before 62			−2.111*** (0.361)	−1.673*** (0.521)
Dur0-3	0.402*** (0.082)	0.561*** (0.088)	0.418*** (0.140)	0.583*** (0.088)
Dur3-6	−0.107 (0.067)	−0.725*** (0.099)	−0.104 (0.075)	−0.724*** (0.083)
Dur6-12	0.089*** (0.029)	0.155*** (0.054)	0.089*** (0.032)	0.155*** (0.047)
Dur12-36	−0.002 (0.011)	0.045*** (0.017)	−0.003 (0.011)	0.044*** (0.016)

	Model 1		Model 2	
Variable Name	**Exit Hazard**	**Claiming Hazard**	**Exit Hazard**	**Claiming Hazard**
Dur36+	1.261*** (0.200)	4.448*** (0.555)	1.250*** (0.193)	4.458*** (0.577)
Constant	−2.541*** (0.719)	−3.766*** (0.703)	−0.440 (0.697)	−2.235*** (0.819)
Correlation Coefficient	0.969** (0.458)		0.863** (0.376)	
Log Likelihood	−4,151.437		−4,131.405	

Notes: The dependent variable in the 'Exit Hazard' equation is the time-to-exit after age 62. The dependent variable in the 'Claiming Hazard' equation is time-to-claiming Social Security Benefits after age 62. The estimates indicate the direction and magnitude of a proportional shift of the hazard, i.e. a positive sign indicates that exit or claiming are more likely. Model 2 includes a measure of the months spent working in the year before turning 62. All models also include controls for missing observations on marital status, health, primary respondent, cognitive score, probability of living to 85, health insurance, net wealth, PIA, and private pension. Robust standard errors are presented in parenthesis. The variances of the error terms are set to 1 (i.e. $\sigma_{\varepsilon E} = \sigma_{\varepsilon C} = 1$) as explained in the text. Data are based on the most recent available survey in each month. Sample size is 24,097 person-months in both models.