Retirement Benefits and Incentives for Work: New Evidence from Eligibility Criteria*

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Abstract

Social Security is the largest federal program in the US, yet it is not a universal program. To quality for benefits, individuals must have accumulated at least 40 quarters of coverage (QCs) during their work history. This requirement creates an upward notch in individuals' lifetime (earnings and retirement) income, providing a very large incentive for individuals to work at least 40 QCs. Using standard bunching methods, I show that individuals do indeed bunch at this threshold by working a few extra quarters, and that bunching increases as individuals get closer to the retirement age. The size of the response is however very small when compared to the size of the benefit, suggesting very small elasticities of work with respect to retirement benefits for this population.

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1 Introduction

Social Security (SS) is the largest federal program, with 85.9% of persons aged 65 or older receiving SS retirement benefits in 2010 (Whitman et al., 2011). However, while the reach of Social Security is wide, nearly 1.6 million people (or around 4% of the aged population) will never be eligible for benefits (Whitman et al., 2011). To be eligible for SS benefits, individuals must be fully insured, and full insurance status is obtained by having accumulated at least 40 quarters of coverage (QCs) during their work history. It is estimated that 95% of these 1.6 million people, or "never-beneficiaries", do not fulfill this requirement (Whitman et al., 2011). Despite the significant size of the "never-beneficiaries" population, little work has focused on understanding how SS eligibility rules, or financial incentives more generally, affect this population's labor force participation, retirement behavior, and earnings. In this paper, we study this question.

Our estimation strategy exploits the fact that the 40 QCs requirement creates a notch (and a kink) in individuals' budget set. Total lifetime consumption for individuals that do not fulfill this requirement is equal to their lifetime earnings. Total consumption for individuals with 40 quarters or more is instead equal to total earnings plus total retirement benefits, with retirement benefits being higher for individuals with higher earnings. This notch creates an incentive for some individuals to bunch at 40 QCs, and the size of this bunching is related to both individuals' elasticity of work to net wages and to optimization frictions, such as lack of information and adjustment costs.

Using administrative records for a 25% random sample of all individuals born between 1937–1950 from the Social Security Administration (SSA), we first document that the SS benefits individuals are eligible for and receive are indeed discontinuous at the QC threshold. Individuals with 40 or more QCs are eligible for an additional $5-6,000 in yearly benefits, and receive $2-4,000 additional yearly benefits. This effect is sizable, especially when considering that these individuals are expected to live 12-14 more years, and thus receive these higher benefits for that many years. Total lifetime consumption can thus increase by around 50% at the threshold.

We then estimate bunching around the QC threshold using standard bunching methods. The richness of our data allows us to study how bunching evolves as individuals age, and show that individuals bunch very little at age 60, and exhibit growing bunching behavior at age 65 and at age 70. By age 70, we estimate bunching to be around 2.43 for men and 1.44 for women. We also show that bunching has decreased across cohorts for men and increased for women. In the latest cohort in our data, 1950, bunching is similar for men and women. Overall, these results show that individuals respond to the QC criteria, and thus value retirement benefits.

Our paper is the first one to study how SS eligibility criteria affect incentives to work for individuals close to this threshold. It also contributes to the literature on work and retirement responses to financial incentives for retirement.[1] Our paper is closest to Brown (2013) and Manoli and Weber (2016), who also exploit budget set nonlinearities and use bunching methods to estimate individuals' responses to retirement benefits. Differently from these papers, we focus on a lower-income population in the US, which is less attached to the labor force and could therefore be less responsive to work incentives. We indeed see that this population exhibits very low elasticities of quarters of coverage with respect to retirement benefits, and these elasticities are even lower that those estimated in the prior literature.

2 Institutional Background

To be eligible for Social Security benefits in old age, individuals must be "fully insured". For individuals born from 1929 onward, this means that they must have accumulated at least 40 quarters of coverage (QCs) – also called SS credits – during their work history.[2] Before

[1] See Asch et al. (2005); Coile and Gruber (2007); Liebman et al. (2009); Mastrobuoni (2009).

[2] Individuals born before 1929 require fewer quarters of credit to be fully insured. However, as explained below, we do not use data from these cohorts since data on their quarters of coverage earned is measured with error.

1978, quarters of coverage were awarded for each quarter worked. Since 1978, they have been awarded according to yearly earnings. For example, in 2023 an individual will be awarded 1 quarter of credit if they earn at least $1,640 in that year, 2 quarters if they earn at least $3280, 3 quarters if they earn at least $4920, and 4 quarters if they earn $6560 or more. Hence after 1978, most full-time working individuals likely earn all 4 credits in each year.

When an individual applies for retirement benefits, SSA first determines if they are fully insured, and thus deemed eligible for own benefits. If eligible, SSA then calculates the "primary insurance amount" (PIA) – the benefit the individual is eligible for if they claim benefits at the normal retirement age – as a non-linear function of their earnings history.[3] In 2023, the PIA for newly eligible workers is 90 percent of the first $1,115 of average indexed monthly earnings (AIME), plus 32 percent of AIME between $1,115 and $6,721, plus 15 percent of AIME above $6,721. The three percentages in the PIA formula are constant over time, but the PIA dollar amounts are indexed to the average wage index (AWI). Finally, benefits paid are a function of the PIA and the age in which the benefits are paid, with lower benefits for those claiming them before the normal retirement age, and higher benefits for those claiming them after.

The requirement that individuals must have earned a minimum of 40 QCs in their work history to be eligible for SS benefits leads to a notch and a kink in an individual's budget constraint at 40 QCs, as illustrated by the red budget constraint in Panel (a) of Figure 1. Total consumption for individuals right below the QC threshold is equal to just total earnings. The consumption of individuals that have earned 40 QCs is total earnings plus retirement benefits. Moreover, individuals that have accumulated more than 40 QCs see a steeper relationship between their consumption and their earnings because the PIA formula depends on earnings. It is important to note that the size of the notch and of the kink are individual-specific, and will use our data to estimate their averages for our sample.

[3] Individuals can also apply for spousal benefits. If an individual is married, SSA calculates both own benefit eligibility and spousal benefit eligibility, which can be as much as half of the main worker's PIA. The SSA then pays the highest of the two (own vs spousal) benefits.

Individuals who would chose to work slightly below 40 QCs in the absence of the minimum QC requirement prefer to work exactly 40 QCs in its presence. Hence, we expect extra mass of individuals with 40 QCs or more, and less mass right below. The amount of bunching is proportional to the behavioral response to the eligibility requirement, which will depend on the elasticity of labor supply with respect to future SS retirement benefits, as well as possible frictions that individuals may face. In the next section, we will describe how the amount of bunching is related to the elasticity of labor supply to SS benefits.

One of the most important frictions in this setting is lack of information about the QC requirements. Individuals cannot bunch if they are not aware of SS rules. Starting in 1995, however, SSA started mailing SS statements to inform individuals of their progress towards SS benefit eligibility. These statements included information about QC acquired up to that year as well as the total number of QCs needed, likely making the QC requirement more salient. Therefore, we expect that the cohorts that we analyze are at somewhat informed about the QC requirements.[4]

3 Methodology

3.1 Theoretical Predictions

Saez (2010) spearheaded a new literature in economics, the bunching literature. It showed that individuals respond to *kinks* – or changes in slopes – in their budget constraint that are caused by tax and transfer policies. They respond by locating close to these kink points, thus maximizing their utility. Saez (2010) showed that the size of this response can be measured by the "extra mass", or bunching, around the kink, and that this is related to the elasticity of taxable income to tax rates. Kleven and Waseem (2013) and Kleven (2016) extended this framework to the context of taxes that create *notches* – or sharp discontinuities in after-tax

[4]In future work, we plan to study how the staggered mailing of these statements across years and cohorts affected individual retirement and work behavior.

income – in the budget constraint.[5] Since SS eligibility criteria create an notch in individuals' budget constraint around the eligibility threshold, our framework follows Kleven (2016) by focusing on a *upward* notch in total lifetime consumption due to Social Security benefits that increases total consumption, instead of the more common *downward notch.* [6]

We assume individuals maximize the following quasi-linear and iso-elastic utility function:

$$U(c,q) = c - \frac{n}{1+1/e} \cdot \left(\frac{q}{n}\right)^{1+1/e} \tag{1}$$

subject to the budget constraint $c = w \cdot q$. Here, c is total lifetime consumption, q is total number of quarters of coverage worked, n is an ability parameter, and w is the net (after tax and transfers) quarterly wage. The utility function indicates that individuals experience disutility from working more quarters, and that this disutility varies by ability. However, individuals also earn higher earnings (and thus can consume more) by working more quarters. e is the elasticity of quarters worked with respect to the net quarterly wage. This quasi-linear utility function which rules out income effects. Utility is then maximized when:

$$q = n \cdot w^e \tag{2}$$

We assume that ability n follows a smooth density distribution $f(n)$, which generates a smooth distribution of q.

Now assume that Social Security awards retirement benefits to those that have earned at least a total of $q^\star$ quarters, and that these benefits are a function of total earnings. The new budget constraint is $c = w \cdot q + (\Delta b \cdot w \cdot q) \cdot \mathbb{I}(q \geq q^\star)$. Here, Δb represents the fact the retirement benefits are a function of earnings, and $\Delta b \cdot w \cdot q^\star$ represents the increase in total consumption at $q^\star$ quarters.[7]

Panel (a) of Figure 1 illustrates how the notch affects the budget constraint. The notch creates an incentive for individuals below $q^\star$ to work a few more quarters to qualify for

[5] This methodology has also been extended to notches created by transfer policy. For example, Ruh and Staubli (2019) then extended the notch approach to a notch created by Disability Insurance.

[6] See Kleven et al. (2014) for another example with an *upward* notch.

[7] The SS formula is in reality non-linear, and high-income people receive a lower share of their earnings in retirement benefits. However, the linear formula above is a good approximation for individuals with fewer than 20 years of work, the sample we will analyze.

benefits, and thus move to exactly $q^\star$. We assume that individual L is the marginal buncher, i.e. that she is indifferent between staying at $q^\star - \Delta q$ or moving to $q^\star$. We thus assume that all individuals who in the absence of SSA would have located below $q^\star - \Delta q$ will not change their behavior. Moreover, individuals that in the absence of SS benefits would locate above $q^\star$ will experience a substitution effect that incentivizes them to work more, as higher earnings lead to higher benefits. Our simple utility function excludes income effects, but we do expect individuals to work less because of the large increase in total consumption at the notch.

Panel (b)(i) of Figure 1 depicts the expected distribution of quarters of coverage with and without SS benefits according to our simple model. As mentioned above, we expect no difference in distributions for individuals located below $q^\star - \Delta q$. However, the notch induces individuals who were located between $q^\star - \Delta q$ and $q^\star$ to locate at $q^\star$. Hence we should see a hole in the quarters of coverage distribution between $q^\star - \Delta q$ and $q^\star$, and extra mass at $q^\star$. Since there are competing income and substitution effects above $q^\star$, we may see lower or higher density in this region. The current figure depicts the scenario in which the income effect prevails, hence there is a decrease in work.

The fact that the marginal buncher L is indifferent between staying at $q^\star - \Delta q$ or moving to $q^\star$, along with the fact that $n^\star - \Delta n^\star = \frac{q^\star - \Delta q^\star}{w^e}$ implies that:

$$\left(1 - \frac{\Delta q^\star}{q^\star}\right) + e\left(1 - \frac{\Delta q^\star}{q^\star}\right)^{-1/e} - (1+e)\left(1 + \frac{\Delta b \cdot w}{w}\right) = 0 \qquad (3)$$

Hence, the elasticity of quarters worked with respect to the net quarterly wage depends on the work response as measured by the bunching estimate $\Delta q^\star / q^\star$ as well as the size of the retirement benefit rate. While we cannot solve this equation explicitly for e, we can solve it numerically numerically after we have estimated $\Delta q^\star / q^\star$ and the value of Δb.

The model so far has assumed a homogeneous elasticity e at $q^\star$. Kleven (2016) showed that allowing for heterogeneity in e would lead to the density distribution illustrated by Panel (b)(ii) of Figure 1. Here, there is no sharp hole in density below $q^\star$, and the hole is more gradual. The estimated bunching should then be interpreted as the average quarters or coverage response $E[\Delta q^{\star}]$, and the elasticity calculated with Equation 3 is the elasticity at the average response $E[\Delta q^{\star}]$.

Finally, the model so far has ignored optimization frictions, such as imperfect information, job search costs, or other adjustment costs. Our estimated elasticity is this an *observed* elasticity, i.e. an elasticity that is a combination of both the structural parameter e and all unobserved frictions.

3.2 Empirical Analysis

The empirical analysis proceeds in two steps. First, we want to measure the effect of the 40 QCs requirement on SS benefit eligibility and receipt as well as total lifetime consumption. For this analysis, we estimate regression-discontinuity-type models, where we estimate the following equations:

$$Y_i = \beta_0 + \beta_1 FullyInsured_{ia} + \beta_2 QC_{ia} + \beta_3 FullyInsured_{ia} \cdot QC_{ia} + u_i \tag{4}$$

where Y_i represents the outcome of interest, $FullyInsured_{ia}$ is an indicator equal to one if the individual has accumulated 40 QCs or more at age a, and QC_{ia} represent the total number of QCs at age a. β_1 represents the change in Y at the QC threshold, and β_3 represents the change in the relationship between quarters of coverage and total consumption at the QC threshold. Note that β_1 and β_3 should not be interpreted causally, as bunching behavior may lead to changes in selection around the threshold and might bias these coefficients. While in the results section I will show that there is no large evidence for selective bunching behavior, β_1 and β_3 should be interpreted as approximate changes in retirement benefits at the threshold.

Second, we want to estimate bunching, or excess mass, around the 40 QCs threshold. To do so, we need to estimate a counterfactual distribution – the distribution of quarters of coverage in the absence of SS retirement benefits – and compare this counterfactual to the observed distribution. To construct the counterfactual, we estimate a model where we control for rounding at multiples of 4 and we fit a 7^{th} degree polynomial, excluding observations in a range $[q^L, q^U]$ below and above $q^\star$. This excluded region corresponds to the area affected by the QCs requirement because of bunching or missing mass. We then predict the counterfactual distribution for all quarters of coverage, including the excluded region. Bunching is then estimated from the difference between the actual distribution in the $[q^\star, q^U]$ region and the predicted counterfactual.

4 Data

4.1 Data Sources

Our analysis relies on administrative data from the Social Security Administration. We draw data from four main sources: the Numident, the Master Earnings File (MEF), the Master Beneficiary Record (MBR), and the Supplemental Security Record (SSR).

The Numident is the source for individuals demographic information, including first, middle, and last names, sex, date of birth, date of death, and citizenship status. This information comes from three main sources: the application for a Social Security number, Social Security claims files, and the Master Death File.

The MEF is the source for individuals' annual earnings, which are defined as wages from which Federal Income Security Administration (FICA), i.e. Social Security contributions, have been withheld. The MEF also contains information on annual quarters of coverage (QCs). For both outcomes, we have information from 1951-2020.[8]

The MBR is the source for individuals' claim information. The MBR contains information on individuals' monthly benefits as well as all the inputs that are needed to calculate such benefits, such as the average indexed monthly earnings (AIME) amount and the Primary

[8]The MEF also contains information on total quarters of coverage in 1937 –1946 and 1947–1951, but these data are likely measured with error.

Insurance Amount (PIA). The MBR also contains variables pertaining to initial and current entitlement as well as benefit termination, usually at death. Finally, the MBR also contains information on the type of payment, usually either retired worker, survivor, or disability.

The last source of SSA data that we draw from is the SSR, which includes data on all individuals that have ever applied for SSI benefits. The SSR provides monthly data on both federal and state SSI payments, starting in 1972. Moreover, it contains information on whether the SSI applicant is aged or a child, and whether the SSI eligibility is based on blindness or disability.

4.2 Sample Construction

To construct our sample, we started by extracting a 25% random sample of all individuals born between 1937–1950 from the Numident file, which yielded 12.9 million records.[9] We then merged these records to the MEF data and calculated individuals' total quarters of coverage in each year. Given that this dataset was too large, we used the QC information to exclude from the sample individuals that were never close to 40 QCs, and thus for which the requirement for fully insured status was never relevant. More specifically, we restricted our sample only to individuals that had 1-80 QCs at least once between the ages 55-70. This is our final MEF sample, and it contains almost 5 million unique individuals.

Second, we proceeded to clean the MBR data, which contains data on both primary claimants, such as retired and disabled workers, and non-primary claimants, such as spouses and survivors insured under another worker. We restricted our MBR data to primary claimants who were recorded as retired workers, who possessed entitlement information, and who were positively recorded as having received benefits in the form of the monthly primary insurance amount (PIA) or monthly benefit paid (MBP) for at least one year. We also limited our population to beneficiaries whose age of current eligiblity was 62 or older, to screen out individuals on disability benefits. While nearly all retired workers born after

[9]We originally extracted also individuals born 1910–1936, but we do not include these individuals in our analysis since these earlier cohorts had noisy measures of quarters of coverage.

1929 need 40 QCs to achieve insured status, workers who have spent considerable periods outside of the U.S. may be covered under a Totalization agreement and thus be subject to different requirements.[10] Since we want to analyze how individuals respond to the 40 QC requirement, we excluded from the MBR workers covered under Social Security Totalization agreements.[11] This is our "cleaned" MBR.

Third, we cleaned the SSR data. The SSR data contained data on aged beneficiaries, disability beneficiaries and applicants that did not become beneficiaries. We restricted the data to aged beneficiaries to obtain our "cleaned" SSR.

Finally, we merged our final MEF sample to the "cleaned" versions of the MBR and the SSR files using SSN.

4.3 Variable Construction

Once we created our final sample, we proceeded in creating all variables of interest. For all variables containing dollar values, we converted them into current, 2020 dollars using CPI adjustments from the 2020 Social Security Trustees Report.

QCs We summed individuals' annual QC data to create a lifetime QC measure by year. From this new variable we could obtain how many total QCs a worker had at any age. We ultimately created four variables to record the workers' total QCs at ages 60, 65, 70, and 75, for individuals that were not recorded as already dead by that age.

Earnings We used individuals' annual earnings data to calculate total lifetime earnings as well as total earnings before and after age 60.

Benefit Estimates Because not all individuals in our MEF population were eligible or applied for Social Security retirement benefits, we used information about earnings and QCs from the MEF to estimate a monthly PIA for all workers in our sample. As mentioned

[10] For more information on Totalization and totalization Agreements, see "Social Security Totalization Agreements" by Brent W. Jackson and Scott Cash. 2018. Social Security Bulletin, Vol. 78, No. 4. https://www.ssa.gov/policy/docs/ssb/v78n4/v78n4p1.html

[11] In the MBR, workers insured under Totalization are identified through the Primary Insurance Factor (PIFC) variable's label 'K'.

earlier, the PIA is a non-linear function of prior average indexed monthly earnings (AIME). In 2023, the PIA was 90 percent of the first $1,115 of AIME, plus 32 percent of AIME between $1,115 and $6,721, plus 15 percent of AIME above $6,721.[12] For each individual, we estimate eligible benefits at age 60, 65, and 70, for individuals that were not recorded as already dead by that age.

5 Results

5.1 First Stage: Effects on SS Eligibility and SS Received

We begin by examining how the QC requirement for fully insured status affects eligibility and receipt of Social Security benefits. Knowing the effect of the QC requirement on SS eligibility is important, because if the requirement leads to small differences on retirement benefits we should not expect large behavioral responses to the requirement – and thus bunching at the QC threshold. Figure 2 presents average retirement benefits across quarters of coverage for all cohorts within our sample, categorized by gender. In this figure, blue diamonds indicate estimated annual retirement benefits relative to quarters of coverage earned at age 70. Empty and solid diamonds correspond to benefit estimates made without considering and with consideration of the 40 QC requirement, respectively. On the other hand, black circles represent the average annual retirement benefits received after reaching the age of 70.

The findings reveal that without considering the QC requirement, individuals with fewer than 40 QCs have similar benefit eligibility as those who have earned more. However, the inclusion of the QC requirement introduces a notable discontinuity in benefit eligibility for individuals falling short of the 40 QC threshold. The first column of Table 1 present the size of this discontinuity, and shows that it is significant. Male and female workers who have accumulated 40 QCs are, on average, eligible for an additional $6,061 and $4,861 in

[12]Details about the current PIA formula and its application since 1979 can be found at the website of the Office of the Chief Actuary, www.ssa.gov/oact/COLA/piaformula.html

annual benefits, respectively. This difference in eligibility then translates into a difference in benefits received. Interestingly, the size of this discontinuity is comparable to the gap in eligibility for females ($4,203), while being notably smaller for males ($1,920). Furthermore, Appendix Figure A.1 demonstrates that the discontinuity magnifies as we assess quarters of coverage at later ages, as these measurements provide a more accurate measure of fully insured status.[13]

One might worry that individuals that are not fully insured have access to Supplemental Security Income (SSI). If that is the case, and the gap in retirement benefits is mostly closed by increased SSI benefits, then individuals might not bunch at the threshold because the net (SS+SSI) gap in benefits is small. Columns 3 and 4 of Table 1 and Appendix Figure A.2 show that this is not the case, as the discontinuity in average yearly SSI benefits received is very small and positive. Males that have at least 40 QCs receive on average of $44 additional dollars, and this is statistically insignificant. Females receive a statistically significant $123 increase in yearly SSI benefits, but again, this is positive and opposite of the concern listed above. On net, men and women that are fully insured receive $1,964 and $4,326 additional income in retirement and SSI benefits.

Overall, these results suggest that the 40 QC requirement for full insured status led to significant differences in SS benefit eligibility and receipt. The last three columns of Table 1 and Appendix Figure A.3 put the size of the discontinuity in perspective by showing how the QC requirement affected total income during retirement, calculated as the sum of total earnings before age 60 and total SS income. Prior to age 60, men and women with accumulated QCs between 25 and 60 at age 70 had earned a total of $248,100 and $187,700, respectively. The QC requirement leads to only small differences in earnings prior to age 60. Given that life expectancy at age 70 is around 14 for males and 16 for females, we can calculate expected increased SS eligibility by multiplying the yearly increase in eligibility

[13]It's worth noting that if we consider quarters of coverage accumulated by age 60, individuals with 39 quarters, which would we deem ineligible in out benefit estimation, might accrue additional quarters in the following years and consequently become eligible.

by life expectancy. The QC requirement could thus lead to a $97,200 and $83,700 increase in total income eligibility for men and women respectively, which would represent a 31% and 34% increase. Using a discount of 6%, the discontinuity in lifetime, discounted SS eligibility is almost $60,000 and around $50,000 for males and females, respectively. The discontinuity in lifetime, discounted total income received is instead around $19,000 and $43,000, respectively.

5.2 Bunching Evidence

Figure 3 presents density distribution of the accumulated quarters of coverage at age 60, 65, and 70, by gender. There are usually around 10,000 males in each bin, though there are clear peaks at a multiples of 4. As mentioned earlier, anyone earning more than $6560 in year automatically qualifies for all 4 credits, and hence there is expected heaping at multiples of 4. The number of females with 15-65 QCs is much larger than the number of males, as men are usually more attached to the labor force, and hence more likely to have more than 80 QCs (and be not included in our sample). Figure 3 shows that while there might be a small amount of bunching at age 60, bunching increases over time. We then formally estimate the size of this bunching, and we present it in Figure 4, together with the estimated counterfactual density distribution. These results confirm that bunching is smaller at earlier ages, that it grows over time, and that is generally larger among men. By age 70, we estimate bunching to be around 2.43 for men and 1.44 for women.

One natural question is to ask whether bunching has changed across cohorts. Fig 5 plots the discontinuity in benefits eligible and received in Panels (a) and (b), respectively, as well as the estimated bunching across cohorts, for each gender separately. Panel (a) shows that the the discontinuity in eligible benefits is stable across cohorts, while Panel (b) shows that the discontinuity in benefits received has decreased over time for females. Panel (c) displays the amount of estimated bunching across cohorts, and shows that bunching has generally decreased for males and increased for females, almost converging by our latest cohort of

1950.

5.3 Elasticity Estimates

So far we have show that bunching around 40 QCs is present and increasing closer to the retirement age. What does this estimate imply for the elasticity of quarters worked to SS benefits? As mentioned in Section 3, the elasticity of quarters worked with respect to the net quarterly wage can be expressed as a function of our bunching estimate $\Delta q^{\star}$ and the benefit rate $\Delta b/w$ – the relationship between earnings and retirement benefits. Table 2 presents these estimates and their implied elasticities, by gender and age at which we measure QCs.

Consistent with our bunching estimates, the elasticities grow as individuals become older. Howeover, they are generally extremely very small. By age 70, the elasticity is 0.015 for men and 0.008 for women. This suggests that a 100% increase in the net quarterly wage leads to a 1.5% and a 0.8% increase in quarters of coverage worked for men and women, respectively. These elasticities are even smaller than the small estimated labor supply elasticities in other settings (see overview in Chetty (2012)).

6 Conclusion

While Social Security is a large federal program, a significant portion of the elderly population remains ineligible due to the requirement that individuals must have accumulated at least 40 quarters of coverage (QCs) during their work history to be eligible for benefits. This eligibility requirement creates a large notch in individuals' budget sets, providing an incentive to strategically work a few more quarters to accumulate the required quarters. Using bunching methods, we measure individuals' response to this incentive.

The findings suggest that individuals do respond to the QC criteria and value retirement benefits. While there is no evidence of bunching when individuals are 60, bunching grows and is sizable when they are 70. Moreover, we find that mex exhibit larger effects than women, though these gender gaps have closed for more recent cohorts. Despite estimating significant bunching, the response is very small when compared to the magnitude of the benefits offered, suggesting that either individuals not attached to the labor force have very small elasticities of work with respect to retirement benefits or that they have very little information about SS eligibility criteria. Future work should try to understand whether information about eligibility rules could increase individual's quarters of coverage.

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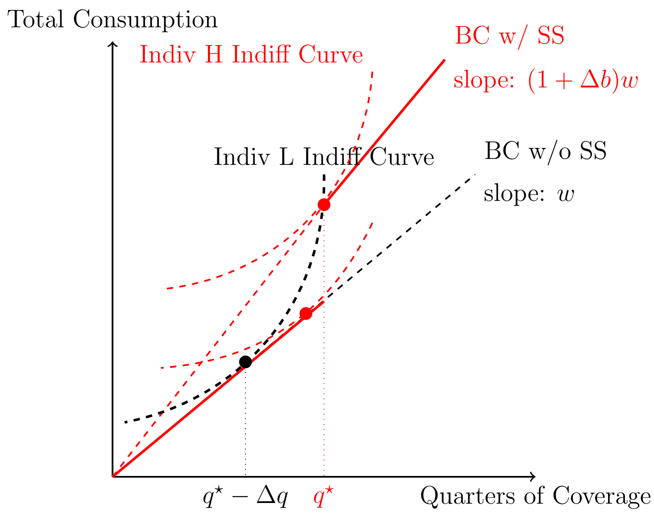
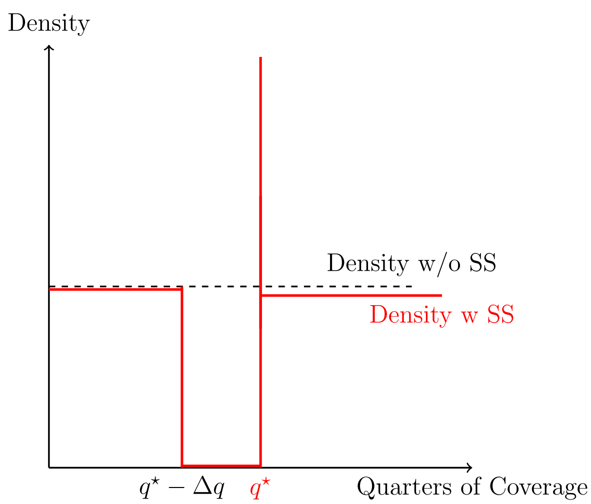
Figure 1: Budget Sets and Density Distributions with SS Eligibilty Rule

(a) Budget Set



(b) Density Distributions

(i) Homogeneous e



(ii) Heterogenous e

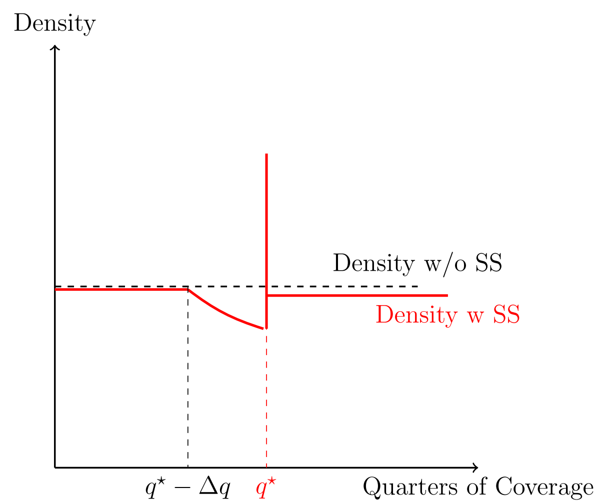
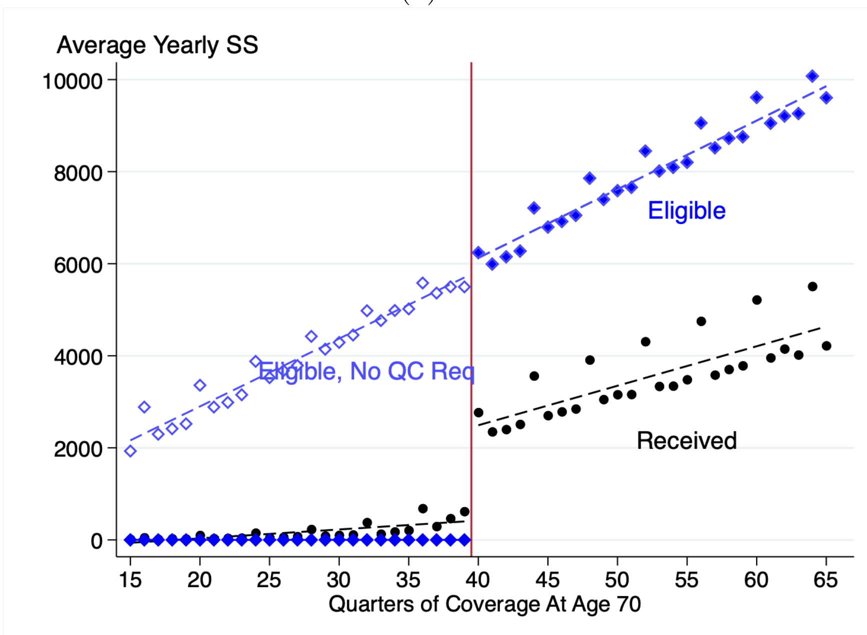


Figure 2: Effect of Fully Insured Status on Retirement Benefits

(a) Males



(b) Females

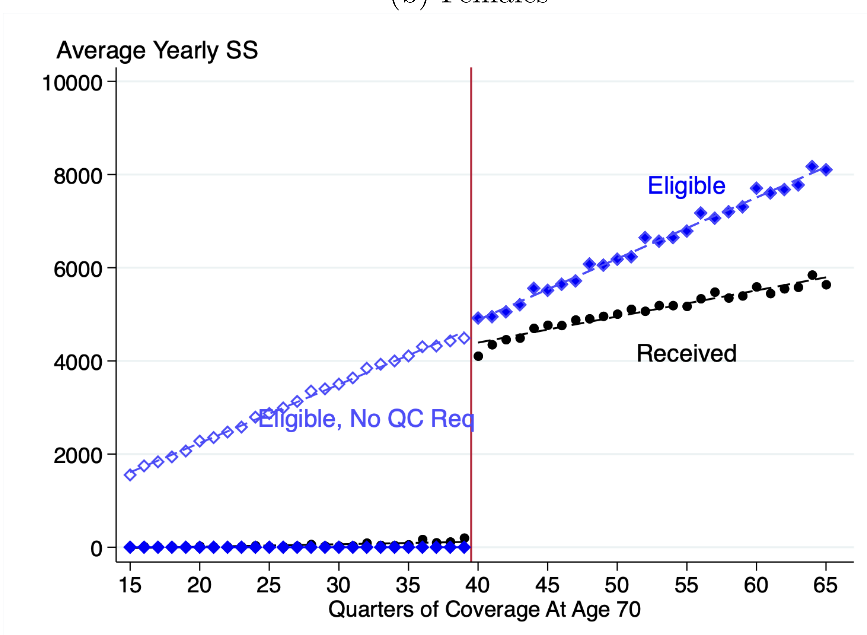


Figure 3: Quarters of Coverage Density Distributions Around Fully Insured Status – By Sex and Age

(a) Males (b) Females

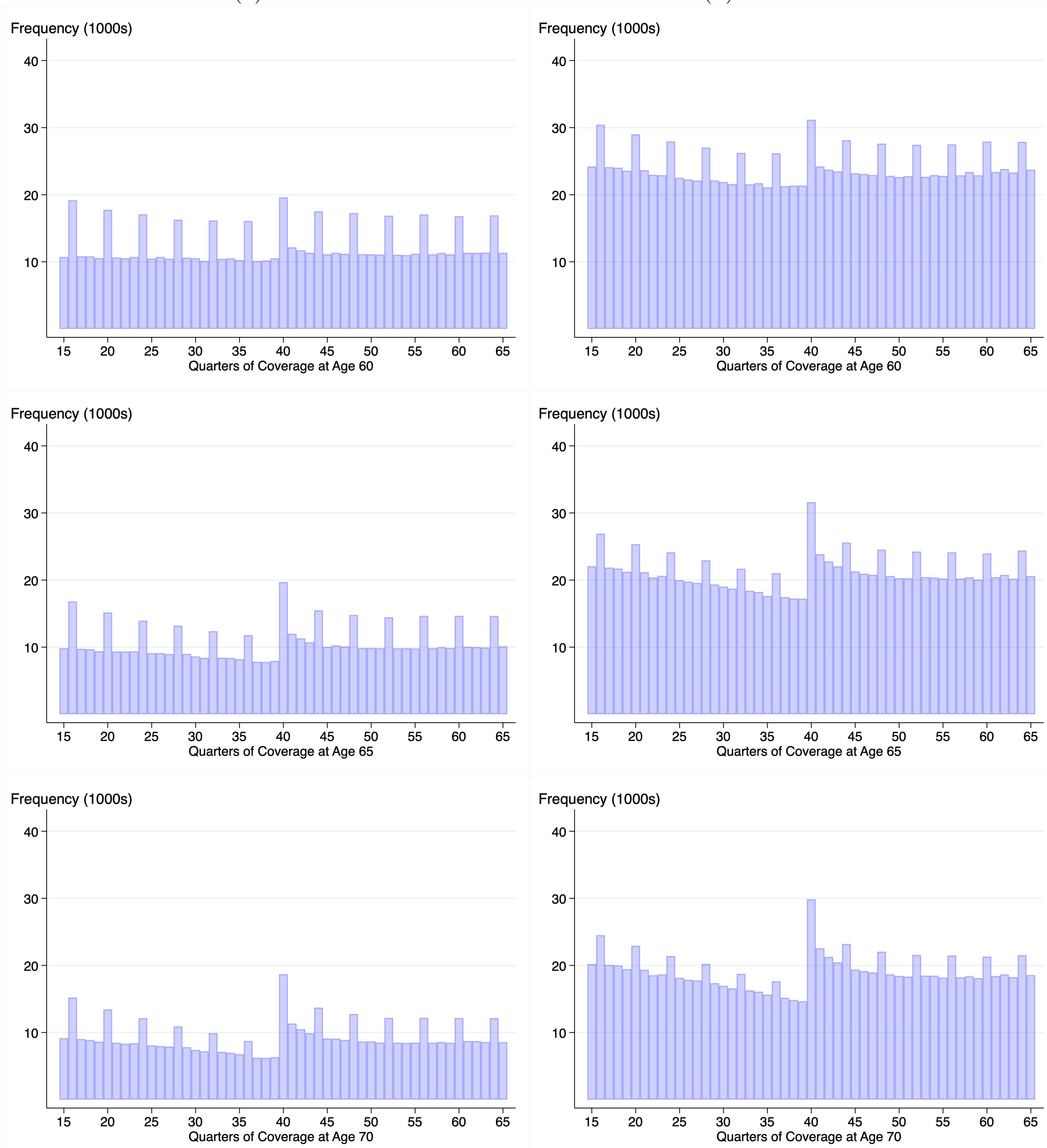


Figure 4: Bunching Around Fully Insured Status – By Sex and Age

(a) Males (b) Females

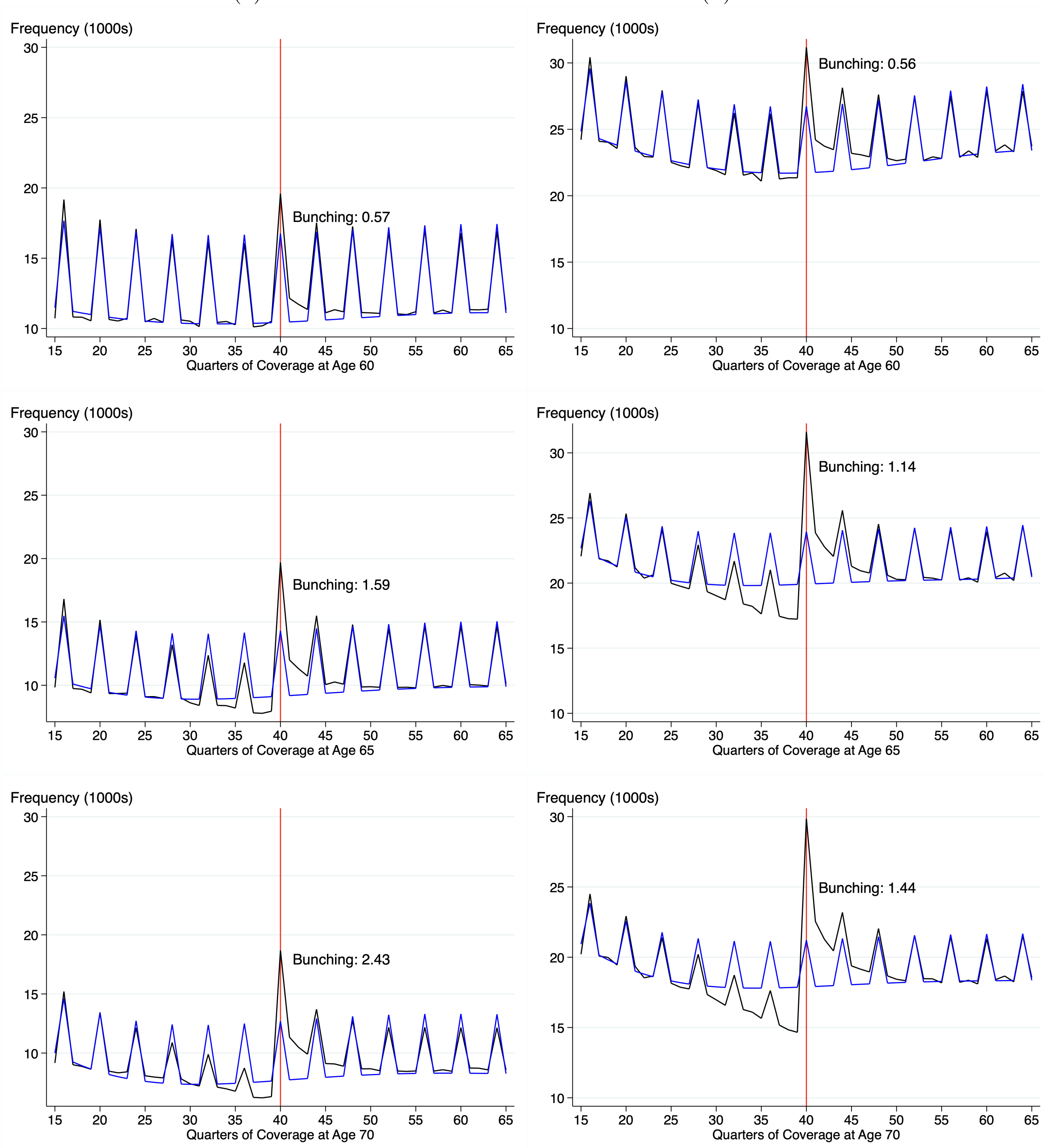
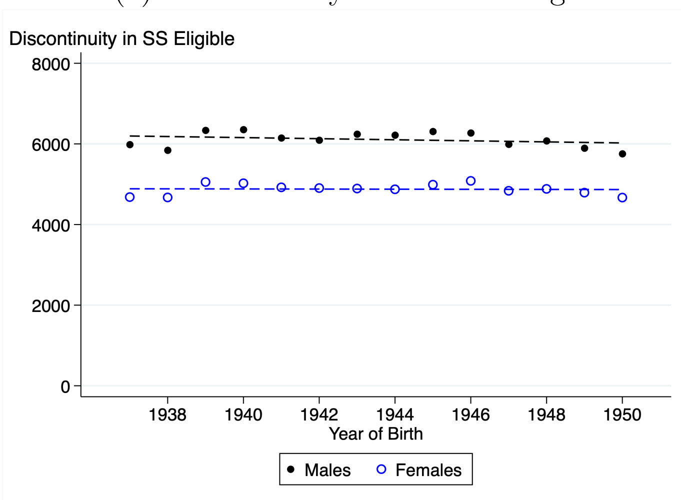
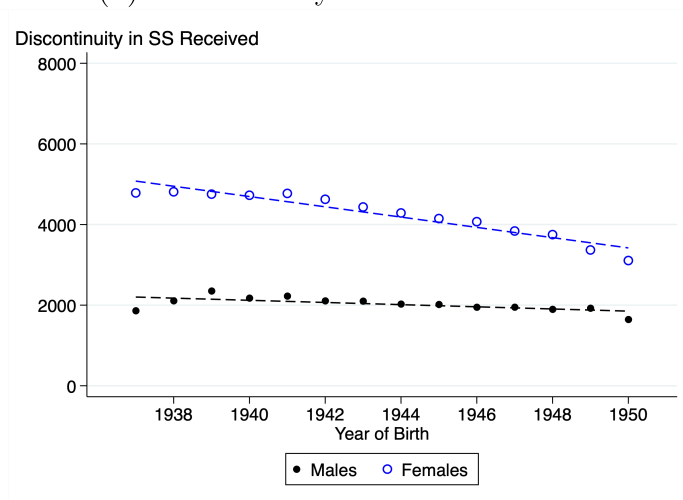


Figure 5: Retirement Benefits and Bunching around Insured Fully Status – By Sex and Cohort

(a) Discontinuity in Benefits Eligible



(b) Discontinuity in Benefits Received



(c) Size of Bunching

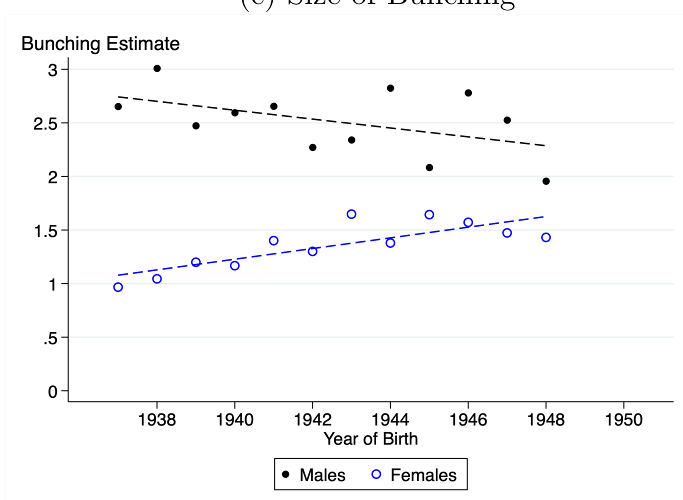


Table 1: Effect of Fully Insured Status on Retirement Income – Age 70

	Yearly SS		Yearly SSI		Total Earnings (1000s)		
	Eligible	Received	SSI Only	SSI+SS	Earns (Up to 60)	Earns + SS Elig	Earns + SS Rec
Panel A: Men							
Fully Insured	6060.6***	1920.2***	43.6	1963.9***	12.4	97.2***	32.4**
	(120.8)	(196.2)	(30.4)	(211.2)	(11.0)	(12.5)	(12.4)
QCs	0.0	35.2***	0.3	35.5***	5.6***	5.6***	5.9***
		(7.0)	(2.6)	(8.2)	(0.6)	(0.6)	(0.6)
QCs * Fully Insured	158.5***	57.0***	-13.6***	43.4*	3.1**	5.3***	3.8***
	(11.0)	(20.5)	(2.9)	(21.6)	(1.1)	(1.3)	(1.3)
Mean Y	4460.1	2069.0	374.0	2442.9	248.1	310.5	269.0
Observations	36	36	36	36	36	36	36
Panel B: Women							
Fully Insured	4860.5***	4202.5***	123.2***	4325.7***	5.9*	83.7***	59.3***
	(37.7)	(59.7)	(31.6)	(54.7)	(3.0)	(3.5)	(2.5)
QCs	0.0	10.3***	-3.7	6.7*	4.3***	4.3***	4.4***
		(2.2)	(2.2)	(3.8)	(0.1)	(0.1)	(0.1)
QCs * Fully Insured	134.1***	51.1***	-7.1**	44.0***	1.8***	3.9***	2.5***
	(3.8)	(4.8)	(2.9)	(5.0)	(0.3)	(0.4)	(0.3)
Mean Y	3617.3	2927.3	217.0	3144.3	187.7	245.6	224.7
Observations	36	36	36	36	36	36	36

Notes: This table presents

Table 2: Implied Elasticities

	Age 60	Age 65	Age 70
Panel A: Men			
Bunching ($\Delta q^\star$)	0.57	1.59	2.43
Change in benefits ($\Delta b/w$)	0.705	0.845	0.946
Implied Elasticity	0.003	0.009	0.015
Panel B: Women			
Bunching ($\Delta q^\star$)	0.56	1.14	1.44
Change in benefits ($\Delta b/w$)	0.745	0.864	0.907
Implied Elasticity	0.002	0.006	0.008

ONLINE APPENDIX
Retirement Benefits and Incentives for Work: New Evidence from Eligibility Criteria

A Additional Results

Figure A.1: Effect of Fully Insured Status on Retirement Benefits - By Age

(a) Males (b) Females

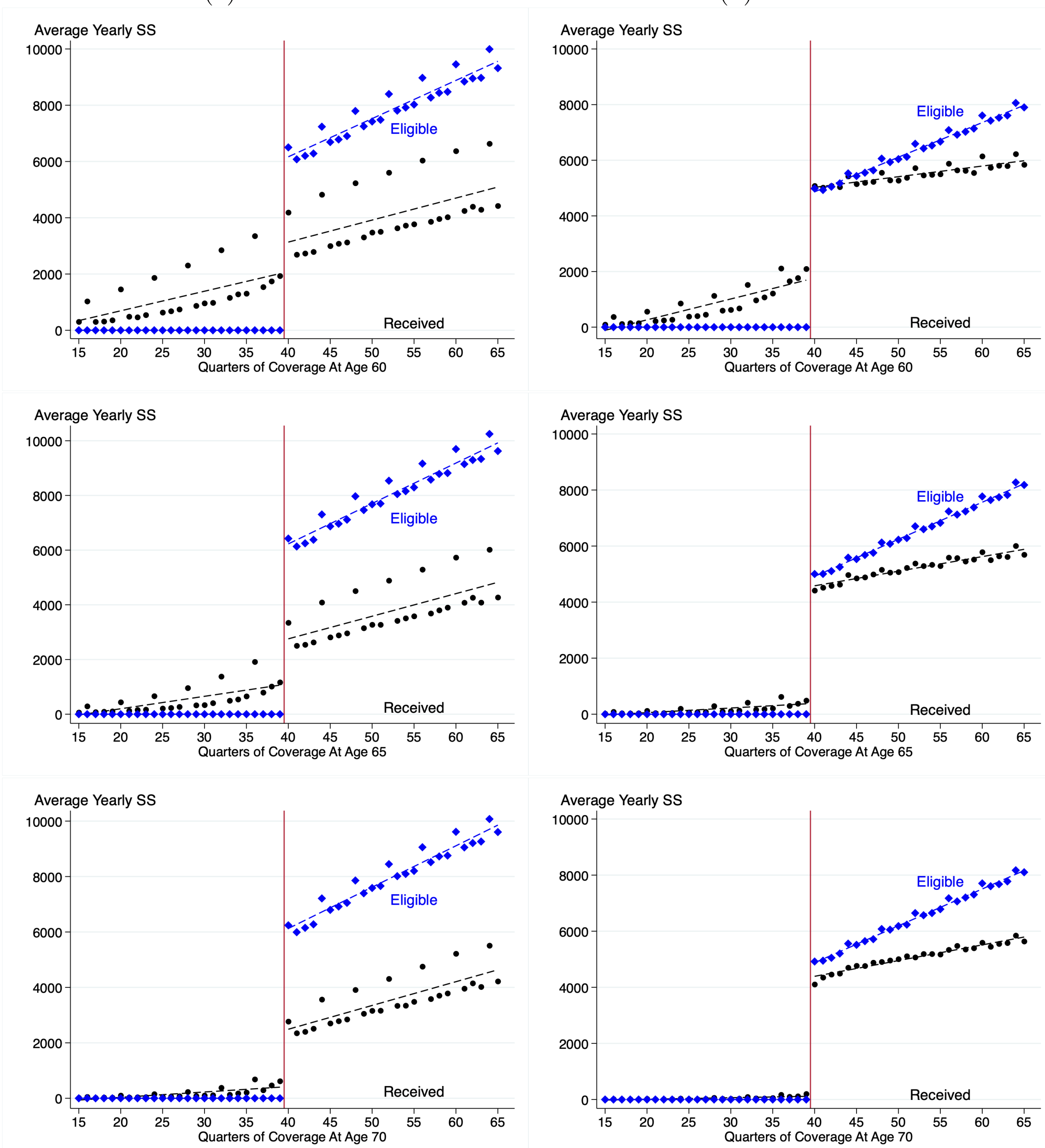
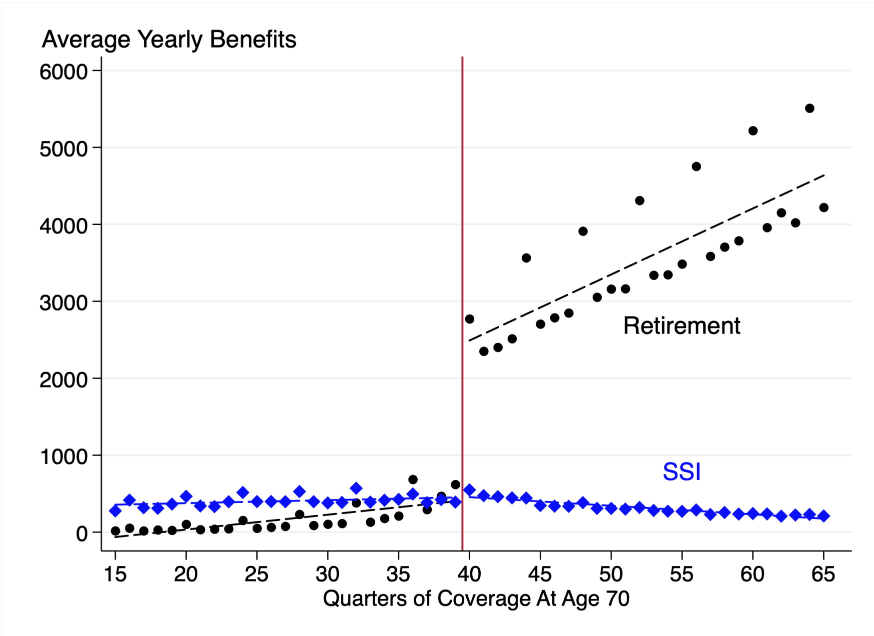


Figure A.2: Effect of Fully Insured Status on Retirement and SSI Benefits

(a) Males



(b) Females

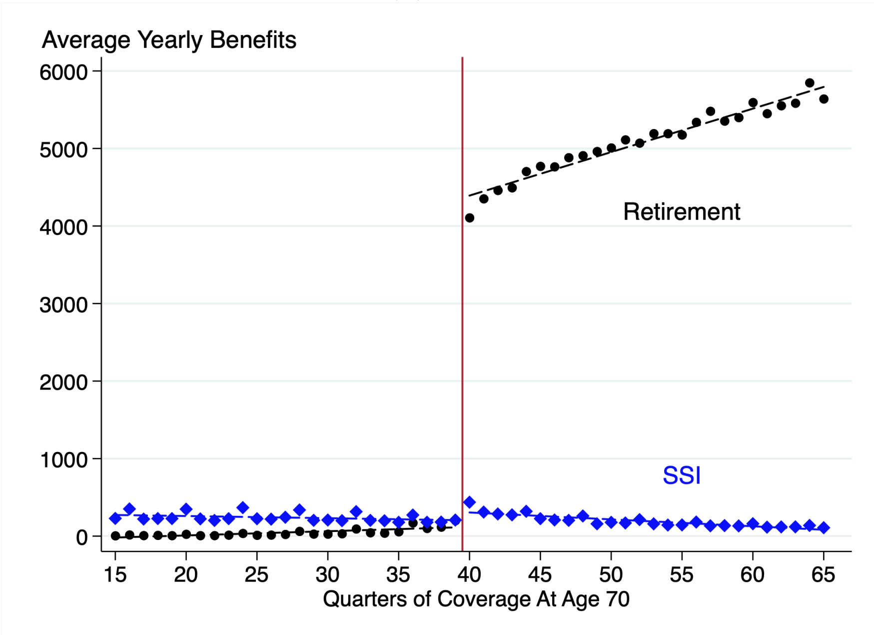
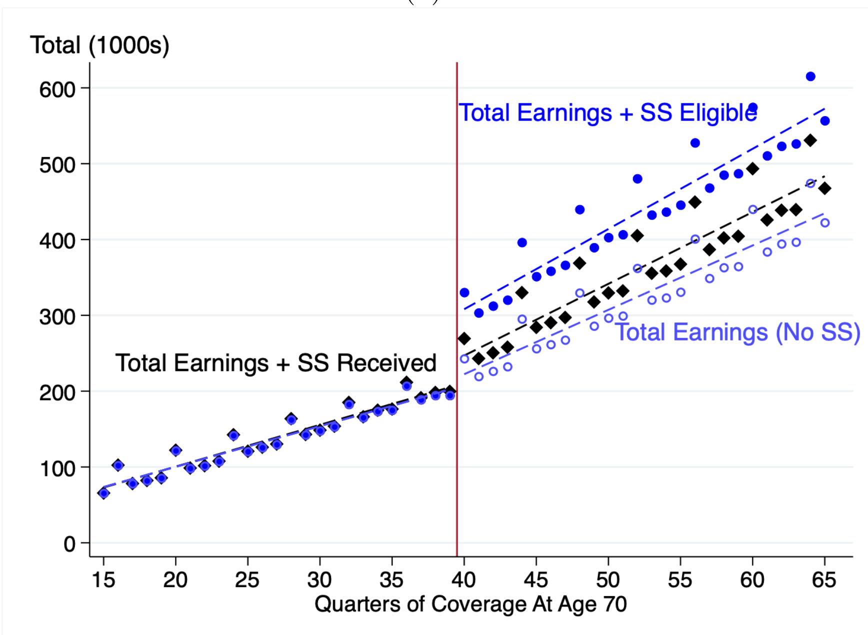


Figure A.3: Effect of Fully Insured Status on Total Earnings during Retirement

(a) Males



(b) Females