

**The Influence of Gender and Race on the
Social Security Early Retirement Decision for Single Individuals**

by

**Diane Scott Docking
Northern Illinois University
Department of Finance
DeKalb, IL 60115
815-753-6396
ddocking@niu.edu
(Corresponding Author)**

**Richard Fortin
New Mexico State University
MSC 3 FIN, Box 30001
Las Cruces, NM 88003
575-646-3009
rfortin@nmsu.edu**

and

**Stuart Michelson
Stetson University
School of Business – Unit 8398
421 N. Woodland Blvd.
DeLand, FL 32723
386-822-7376
smichels@stetson.edu**

July 4, 2011

Abstract

There has been an extensive amount of research into the social security early and delayed retirement decision for single individuals. The results have been mixed. This paper extends the analysis of prior research to the early and delayed retirement decision for single men and women. We analyze the decision for single individuals by gender and by race. Our results show two optimal ages for retirement for both men and women: age 64 and age 67. Various factors play into the retirement decision, but if early retirement is desired, one should wait until age 64. If an individual does not retire at age 64, then they should retire no later than age 67.

1. Introduction

The United States Census Bureau considers a baby boomer to be an individual born between 1946 and 1964.¹ Those born in 1946 will reach full retirement age (FRA) in 2012, while those born in 1964 must wait until 2031 to retire with full social security benefits. Boomers have the option to retire earlier or later than their FRA. Early retirement is attractive for many reasons: social security benefits (SSB) and rules can change, health concerns, and increased demand for leisure, to name a few. However, SSB are permanently reduced by an actuarial reduction factor ($5/9^{\text{ths}}$ of 1% for the first 36 months and $5/12^{\text{ths}}$ of 1% per month thereafter for early retirement). Delayed retirement is attractive because SSB are increased by a delayed retirement credit (DRC) of 8% for each year of delay after FRA up to age 70.

There has been an extensive amount of research into the social security early and delayed retirement decision for single individuals. The results have been mixed. This paper will extend the analysis of prior research to the early and delayed retirement decision for the baby boom generation now at or rapidly approaching retirement. We will analyze the decision for single individuals by gender and by race. We will create a spreadsheet to model this and other early retirement scenarios that will be beneficial for individual investors and their advisors.

2. Literature Review

Many prior studies have looked at the optimal age for a person to retire. Depending upon the methodology chosen, the assumptions made, and the life expectancies tables used, the optimum retirement age for men and women has ranged from 62 to 70. Table 1 presents a synopsis of those studies using a present value (PV) analysis. These studies find the retirement age that maximizes the PV of future SSB over some life expectancy.

/***Insert Table 1 here ***/

The simplest studies assume one discount rate (DR), no taxes, no cost of living adjustments (COLA), no dependents, no other earnings such that SSB are not subject to the Earnings Test (ET), and no other income such that no SSB are taxed. Among these studies, Rose

¹ <http://www.census.gov/population/www/socdemo/age/general-age.html#bb>

and Larimore (2001) find 62 to be the optimal retirement age for both men and women; while Munnell and Soto (2007) find the optimal age to be 62 for men and 68 for women. Kinderman and Jennings (2006) find that the desired retirement age increases as cost of living adjustments increase and discount rates decrease, as illustrated in Table 2.

/***/Insert Table 2 here***/

Sun and Webb (2009) find the preferred retirement age to be 62 or 69 for men and 67 or 70 for women depending on their risk aversion. As complexities are added to these PV analysis studies, such as different discount rates, tax considerations, COLA assumptions, and taxability of SSB, other retirement ages become optimal.

Another group of studies looks at finding an internal rate of return (IRR) between various retirement ages. Table 3 presents a synopsis of two such studies.

/***/Insert Table 3 here ***/

Both are simple studies assuming no taxes, no cost of living adjustments, no dependents, no other earnings such that SSB are not subject to the Earnings Test, and no other income such that no SSB are taxed. The advantage of the IRR studies over the PV studies is that the optimum retirement age is not subject to the whims of the discount rate choice.

McCormack and Perdue (2006) find the optimal retirement age to be 66 for both white males and females. In their IRR calculation, they assume SSB are received monthly and the retirement decision is made annually. However, a shortcoming of their study is that they assume the median life expectancies at age 62 (as provided by the U.S. Life Tables) remain constant; when, in fact, the U.S. Life Tables show that life expectancy changes as one ages (See Table 6). In their study, a white male, retiring at age 62, has a median life expectancy of 19 years (age 81). If the man decides to retire at age 65, they adjust the life expectancy to 16 years (age 81). But, according to the life expectancy tables (See Table 6), a white male, age 65, has a life expectancy of 17 years (age 82). A more accurate IRR would have been attained had they applied the revised life expectancy.

Friedman and Phillips (2008) find the optimal age for both males and females to be 63. Their IRR calculations are less exact in that they assume SSB are received in an annual lump sum, when in fact they are received monthly. They, like McCormack and Perdue (2006), do not

correct for the change in life expectancies at subsequent retirement ages.

3. How Social Security Works

3.1. Who is eligible for benefits?

The Social Security system pays benefits to retirees, spouses, children, survivors, the disabled, and the aged. Individuals aged 62 or older who had earned income that was subject to the Social Security payroll tax for at least 10 years (40 quarters) since 1951 are eligible for retirement benefits. This study will focus on single individuals with their own earnings and ignore married couples, divorced spouses, surviving spouses, single individuals with dependents, and disabled workers.

3.2. Early Retirement Age (ERA) versus Full Retirement Age (FRA) versus Delayed Retirement

The following chart contains the retirement ages and SSB adjustments for workers born 1943 and later.

*/**/Insert Table 4 here/**/*

3.2.1. Early Retirement Claiming

No matter what your FRA is, you may start receiving benefits as early as age 62. However, if you start your benefits early, they will be reduced a fraction of a percent for each month before your FRA. This reduction is permanent. Workers claiming before FRA have their SSB reduced by a factor of 5/9 of 1% per month for the first 36 months prior to FRA and 5/12 of 1% per month for every month thereafter. Thus, a worker with a FRA of 66 who claims early at age 62 receives 75% of their FRA benefit amount; a worker with a FRA of 67 who claims at age 62 receives only 70% of their FRA benefit amount.

3.2.2. Delayed Retirement Claiming

A worker may choose to defer receipt of SSB past his FRA. In this case a delayed retirement credit (DRC) will be added to the FRA benefit. For each month in which the worker is at least FRA, but not yet age 70, his SSB will increase. For workers reaching FRA in 2009 or later, their monthly percentage increase will be 2/3 of 1% or a yearly percentage increase of 8%. Thus, a worker with a FRA of 66 who delays claiming until age 70 receives 132% of their

FRA benefit amount; a worker with a FRA of 67 who claims at age 70 receives only 124% of their FRA benefit amount.

3.3. *Earnings Test Adjustments to SSB*

Workers who claim early retirement benefits, but continue to work, may have their SSB reduced. This is referred to as the Earnings Test (ET). The Social Security Administration (SSA) withholds \$1 in benefits for every \$2 of earnings in excess of the lower exempt amount. In the year a worker reaches FRA, monthly benefits are reduced \$1 for every \$3 of earnings in excess of the higher exempt amount. Earnings in or after the month you reach FRA do not count toward the earnings test. The low and high exemption amounts for 2011 are \$14,160 and \$37,680.² Since 2000, there has been no ET above the FRA.³

For example, assume Michael, a black male, whose FRA is 66 decides to retire at age 62 and to continue working at his \$24,000 per year salary. Assuming his SSB at FRA are \$1,600 per month (\$19,200 annual), his early retirement benefit will be 75% of \$1,600 or \$1,200 per month (\$14,400 annual). Since Michael's earnings of \$24,000 will be \$9,840 over the lower exemption amount of \$14,160, his SSB will be further reduced by \$1 for every \$2 in his excess earnings of \$9,840. This amounts to another reduction of \$4,920. His annual SSB are now \$9,480 (\$14,400 - \$4,920). The SSA does not adjust each monthly SSB check by a proportional amount.⁴ Instead, Michael will receive no SSB for months one through four, \$1,080 in month five, and then \$1,200 per month for months six through twelve, for an annual amount of \$9,840.⁵

The question for Michael is: Do I retire early at reduced benefits and continue working, or do I wait until FRA to retire? Michael's before tax earnings and SSB total \$24,000 + \$9,480 = \$33,480. Had Michael's salary been less than the lower exemption amount, his before tax

² <http://www.socialsecurity.gov/pubs/10003.html>

³ <http://www.socialsecurity.gov/pubs/10003.html>

⁴ <http://articles.moneycentral.msn.com/RetirementandWills/RetireEarly/the-social-security-catch-22.aspx>

⁵ Annual reduction amount of \$4,920/\$1,200 = 4.1 months. Months 1 – 4 recovers 4 x \$1,200 = \$4,800 of the reduction amount. \$4,920 - \$4,800 = \$120 is subtracted from the \$1,200 month five benefit to yield a \$1,080 SSB payment. The remaining seven months Michael receives his \$1,200 per month benefit.

earnings and SSB would have been $\$14,160 + \$14,400 = \$28,560$. If Michael waits until FRA his before tax earnings and SSB total $\$24,000 + \$19,200 = \$43,200$. Of course, the decision to retire early or wait is more complicated than the simple scenario presented above and will be the subject of future research.

4. Model

Similar to McCormack and Perdue (2006), we avoid the problem of an uncertain discount rate by computing the internal rate of return (IRR) equating two retirement options. The IRR can be solved for by using the following equation:

$$\frac{\text{---}}{\text{---}} = \frac{\text{---}}{\text{---}} + \frac{\text{---}}{\text{---}}$$

where:

%Benefit_x = percent of SSB received based on retirement age

i = 1 to months to life expectancy for Age 1

j = 1 to months to life expectancy for Age 2

N2 – N1 = difference in months between Age 1 and Age 2, where Age 2 is greater than Age 1.

The left-hand side of the equation, $\frac{\text{---}}{\text{---}}$, represents the present value of initiating receipt of benefits at age 1. The first term on the right-hand side of the equation,

$\frac{\text{---}}{\text{---}}$, represents the present value of initiating receipt of benefits at age 2;

the second term on the right-hand side, $\frac{\text{---}}{\text{---}}$, discounts the present value of benefits at age 2 back to age 1 so that comparisons can be done at the same point in time.

4.1. Assumptions in the Model

Table 5 displays a summary of the model's assumptions.

/**/Insert Table 5 here***/

4.1.1. Retirement decision

We assume benefits are received monthly. The retirement decision is made annually because life expectancy tables only provide annual data. As suggested by Friedman and Phillips (2008), in the retirement decision, an individual is faced with a trade-off: to retire now or to delay retirement for 1 more year. For each year one delays retirement, SSB will permanently increase; however, for each year one delays, the time that one will draw benefits shortens.

4.1.2. Life expectancies

The 2006 United States Life Tables and the 2010 National Center for Health Statistics provide life expectancies.⁶

/**/Insert Table 6 here***/

Life expectancy is adjusted for when a worker retires. For example, a white male who retires at age 62 is expected to live approximately 19 more years to age 81; whereas if he waits and retires at age 66 he is expected to live approximately 16 more years to age 82. This is a correction to previous studies which would have said that if he retired at age 66 he only lived 15 more years to age 81. We look at life expectancies based on gender and race.

4.1.3. Earnings Test

As previously mentioned, the SSA may reduce SSB if a worker retires early, but continues to work. For simplicity, we assume excess earnings are \$0 and that early retirement SSB are not further reduced.

4.1.4. Taxation of SSB

If a retiree has substantial income (earned and unearned) in addition to his SSB, up to 85% of his annual benefits may be subject to Federal income tax. The amount of SSB subject to Federal income tax is the smaller of 1) one-half of annual SSB, or 2) one-half of the amounts by which Adjusted Gross Income (AGI) plus tax-exempt interest plus one-half of SSB exceeds

⁶ National Vital Statistics Report, June 28, 2010, Volume 58, Number 21; United States Life Tables, 2006 provides life expectancies for black and white males and females. Arias E., United States life tables by Hispanic origin. National Center for Health Statistics. Vital Health Stat 2(152). 2010 provides life expectancies for Hispanic males and females.

\$25,000 for singles, or 3) one-half of SSB plus all other income exceeds \$34,000 for singles.⁷ In our analysis we assume other income is below the minimum such that 0% of SSB are taxed. However, by using the IRR method to find the optimal retirement age, taxation of SSB really becomes irrelevant, since (1-tax rate of SSB) shows up on both the left- and right-hand sides of our equation, effectively cancelling out one another.

4.1.5. COLA

Since 1983, the SSA provides for an automatic increase in SSB if there is an increase in the CPI-W from third quarter last year to third quarter of the current year. For 2009 and 2010 this change in CPI-W has been negative and SSB have not been increased. Spitzer (2006) finds that only longevity and expected rates of return are determining factors as the optimal time to retire and that inflation and taxes play no significant role. As a consequence we assume COLA is zero.

4.1.6. Other Assumptions

We also assume the retiree has no dependents. If a retiree also receives a government pension, their SSB may be reduced due to the Government Pension Offset provision; consequently, we assume no government pension is received. Furthermore, an individual may be forced into a higher federal or state tax bracket due to other income; this, too, is irrelevant in our analysis and is ignored.

5. An Example

Let us look again at Michael, a black male born in 1948, who is trying to decide if he should retire early at age 62 or wait until his FRA of 66. According to Table 6, his life expectancy at age 62 is an additional 16.9 years (202.8 months) to age 78.9; while his life expectancy at age 66 is an additional 14.5 years (174 months) to age 80.5. According to Table 4, he will receive 100% of his SSB at age 66, but only 75% of his FRA benefits at age 62.

⁷ <http://www.irs.gov/publications/p915/ar02.html>

Using Excel and Solver we can find the IRR that will equate both sides of the equation to equal 4.60%. If Michael's opportunity costs are less (greater) than 4.60%, then he should retire at the later (earlier) age.

Assume Michael's SSB at FRA of 66 is \$1,600 per month and his early retirement benefit is 75% or \$1,200 per month at age 62. If the current market interest rate is 5%, then present value (PV) of the left-hand side of the equation (retire early at age 62) is \$164,070 and the PV of the right-hand side of the equation (delay retirement to age 66) is \$161,962; a difference of \$2,108. If Michael believes he could invest his monthly SSB at 4.6% or greater over the next four years, then he should retire early, at age 62; if not he should delay retirement until age 66. Of course, this assumes Michael does not need any of his SSB on which to live – a highly unlikely assumption.

6. Results

6.1. 1943-1954 Birth Year Cohort Group

6.1.1. By Gender

Table 7 reports IRRs by gender. The breakeven IRRs reported in Table 7 may be variously interpreted as the minimum investment yield (or hurdle rate) required to justify retirement at Age 1 versus Age 2.

*/***/Insert Table 7 here***/*

Table 7, Panel A1 shows the breakeven IRR for single men. For example, Ralph, a single male born in 1948, turns 62 in 2010 and 66 in 2014. Ralph is faced with the decision to retire today, at age 62 or wait another year and retire at age 63. According to Table 7, Panel A1, Ralph's breakeven IRR between ages 62 and 63 is 3.75%. In deciding whether to retire early or wait another year, Ralph needs to consider current market rates. If Ralph could invest his monthly SSB at a rate greater than the 3.75% hurdle rate, then he should retire at age 62, if not, then he should delay retirement to age 63. In 2010 the 1-year U.S. Treasury Bond rate was 0.32%.⁸ This rate is less than Ralph's 3.75% breakeven IRR and thus dictates that Ralph should

⁸ Source: <http://www.federalreserve.gov/releases/h15/data.htm>

postpone retirement one more year, to age 63. Next year in 2011, Ralph will be faced with the same decision, retire at age 63 or postpone retirement to age 64. The breakeven IRR between age 63 and age 64 is 5.76%. Ralph will then need to compare this rate to current market rates to make an informed retirement decision.

Results for women are similar. Table 7, Panel B1 shows the breakeven IRR for a single female. The major difference between the sexes is that in all cases the breakeven IRR is higher for women than it is for men. The higher hurdle rates for women are due to their longer life expectancies. For example, Mary's breakeven IRR between retirement ages of 62 and 63 is 4.17%, or 0.42% higher than Ralph's 3.75% breakeven IRR. Market rates hereby must be higher in order to entice women to entertain the idea of early retirement. For example, if a 1-year investment yields 4.00% in 2010, then Ralph would retire at age 62 ($4.00\% > 3.75\%$), while Mary would postpone retirement for another year ($4.00\% < 4.17\%$).

The breakeven IRR between consecutive ages are highlighted in red in Table 7, Panels A1 and B1. Note that the IRR oscillate back and forth from age to age sometimes increasing, other times decreasing. This oscillation between consecutive years is supported by Friedman and Phillips (2008). Although the magnitude of the breakeven IRR differs between the two studies, the change in IRR between consecutive years is in the same direction. Thus, we support Friedman and Phillips conclusion that the minimum investment yield required to justify initiation at any eligible age varies from one age to the next within a cohort group, and while it may be advantageous to initiate benefits at a particular age, early retirement might not be advantageous a year later.

Table 7, Panels A2 and B2 show the marginal change in breakeven IRR between different retirement ages. The optimal time to retire would then be at the point when the marginal change turns from positive to negative. This occurs at two points for both men and women: age 64 and age 67. The highest IRR is at age 64, the second highest at age 67. The choice to delay retirement past age 67 is suboptimal since the marginal change in IRR decreases.

Kinderman and Jennings (2006), who do not consider the DRC, found that the desired retirement age decreases as discount rates increase. We concur. As one's opportunity costs (discount rate) increases, earlier retirement is preferred over later retirement up to age 67.

Spitzer (2006), who does consider the DRC found that if one's opportunity costs (discount rate) are less than 4%, delayed retirement is preferred. As discount rates increase above 4%, early retirement is preferred. Again, our results support this conclusion.

6.1.2. By gender and race.

/***/Insert Table 8 here***/

Table 8 reports IRRs by gender and race. Irrespective of race or gender, ages 64 and 67 are the optimum retirement ages. Table 8, Panels A1, A2, and A3 show that white males have a lower IRR than black males who have a lower IRR than Hispanic males. Likewise, Table 8, Panels B1, B2, and B3 show that white females have a lower IRR than black females who have a lower IRR than Hispanic females. Hispanic men and women have the highest life expectancies so it seems logical that their breakeven IRR is the highest. Black men and women have the lowest life expectancies so they should have the lowest breakeven IRR; however, this is not the case. Breakeven IRR for black men and women are greater than those for white men and women. This seems counterintuitive because life expectancies for whites are greater than it is for blacks.

If the decision to retire is simply between age 62 and FRA, or FRA and age 70, then we concur with McCormack and Perdue (2006) that it is better to delay retirement until FRA, but not beyond. Where we differ is the IRR hurdle rate. A comparison of our results with McCormack and Perdue appears in Table 9.

/***/Insert Table 9 here***/

The difference in our hurdle rates with those of McCormack and Perdue (2006) result from their use of a constant median life expectancy at age 62, where as we adjust the life expectancies to the revised life expectancy at a later retirement age.

6.2. Other Birth Year Cohort Groups

6.2.1. By Gender.

We go a step further than other studies and compare different birth-year cohort groups. For simplicity, we present only the breakeven IRR between the earliest retirement date (age 62) and FRA, between FRA and the latest retirement date (age 70), and between age 62 and 70.

/***/Insert Table 10 here***/

Table 10 shows breakeven IRR for all men and all women. For all birth-year cohort groups, the highest IRR is at FRA. Women again have higher hurdle rates than men.

6.2.2. By gender and race.

*/**/Insert Table 11 here***/*

Table 11 shows breakeven IRR for men and women by race. For all birth-year cohort groups, the highest IRR is at FRA. Women again have higher hurdle rates than men. Again white males have a lower IRR than black males who have a lower IRR than Hispanic males. Likewise, white females have a lower IRR than black females who have a lower IRR than Hispanic females.

7. Conclusion

Table 12 presents retirement statistics for new retirees since 1985.

*/**/Insert Table 12 here***/*

Statistics show that approximately 72% of men and 75% of women retired early in 2009; a significant increase from previous years. Results of our studies show two optimal ages for retirement: age 64 and age 67. Various factors play into the retirement decision, but if early retirement is desired, one should wait until age 64. If an individual does not retire at age 64, then they should retire no later than age 67.

References

- Arias E. United States life tables by Hispanic origin. National Center for Health Statistics. *Vital Health Stat* 2(152). 2010.
- Cook, K.A., Jennings, William W., and Reichenstein, William. (2002). When Should You Start Your Social Security Benefits? *AAll Journal*, 24, 27-34.
- Cunningham, Donald F. and Erickson, Paul R. (2009). The “Combined Income” Tax Effect on Early versus Normal Social Security Benefits for Single Individuals. *Journal of Financial Service Professionals*, March, 49-57.
- Friedman, Joseph and Phillips, Herbert E. (2008). Optimizing Social Security Benefit Initiation and Postponement Decisions: A Sequential Approach. *Financial Services Review*, 17, 155-168.
- Federal Reserve Historical Statistical Data on Interest Rates. Available at:
<http://www.federalreserve.gov/releases/h15/data.htm>
- Kinderman, Albert and Jennings, William P. (2006). When People Who Have Stopped Working Should Take Social Security Retirement. *Financial Counseling and Planning*, 17:1, 4-13.
- McCormack, Joseph P. and Perdue, Grady. (2006). Optimizing the Initiation of Social Security Benefits. *Financial Services Review*, 15, 335-348.
- Muksian, Robert. (2004). The Effect of Retirement Under Social Security at Age 62. *Journal of Financial Planning*, 17, 64-71.
- Munnell, Alicia H. and Soto, Mauricio. (2007). When Should Women Claim Social Security Benefits? *Journal of Financial Planning*, 20:6, 58-65.
- National Vital Statistics Report, June 28, 2010, Volume 58, Number 21; United States Life Tables, 2006
- Rose, Clarence C. and Larimore, L. Keith. (2001). Social Security Benefit Considerations in Early Retirement. *Journal of Financial Planning*, 14, 116-121.
- Ryan, Charles. (2010). Social Security Reset: When Does It Make Sense? *Journal of Financial Planning*, June, 62-70.
- Social Security Handbook, February 9, 2011. Available at http://www.socialsecurity.gov/OP_Home/handbook/.

- Social Security Annual Statistical Supplement, 2010. Available at <http://www.socialsecurity.gov/policy/docs/statcomps/supplement/2010/index.html>.
- Spitzer, John J. (2006). Delaying Social Security Payments: A Bootstrap. *Financial Services Review*, 15, 233-245.
- Sun, Wei and Webb, Anthony. (2009). How Much Do Households Really Lose by Claiming Social Security at Age 62? *Center for Retirement Research at Boston College*, CRR WP 2009-11, March, 1-28.
- Tucker, Michael. (2009). Optimal Retirement Age Under Normal and Negative Market Conditions Considering Social Security and Private Savings. *Journal of Financial Planning*, July. 42-49.
- U.S. Census Bureau. Available at <http://www.census.gov/population/www/socdemo/age/general-age.html#bb>.

Appendix A

<u>Abbreviation</u>	<u>Meaning</u>
COLA	Cost of Living Adjustment
DR	Discount Rate
DRC	Delayed Retirement Credit
ERA	Early Retirement Age
ET	Earnings Test
FRA	Full Retirement Age (receive full 100% of benefits)
IRR	Internal Rate of Return
PV	Present Value
SSA	Social Security Administration
SSB	Social Security Benefit

Table 1: Summary of Methodology, Assumptions, and Results of Previous Studies on Optimal Retirement Age for Single Individuals

These studies find the retirement age that maximizes the present value of future SSB over a life expectancy of the beneficiary.

Authors	Assumptions									Findings		Shortcomings of study
	Life Expectancies	SSB received	Retirement decision made	FRA	Delayed Retirement Credits	Discount rate	Tax rate	COLA	Other Income - % of SSB taxed	Male	Female	
Rose and Larimore, 2001	Uses a constant life expectancy at age 62: men 17.5 years, women 21.5 years.	annually	annually, birthdate	66 and 67	not considered	4%	n/a	n/a	none	62	62	Life expectancies not adjusted for different retirement ages. SSB received annually, instead of monthly. Retirement decision made annually. DRC not considered. Analysis stops at FRA.
Cook, Jennings, and Reichenstein, 2002	Uses a constant life expectancy of living 20 years after retiring.	monthly	annually, birthdate	66 and 67	considered	3%	n/a	0% - 1%	none	COLA = 0%: 64 or 65 if FRA=66; 62 or 63 if FRA=67. If COLA = 1%: 67 or 68 if FRA=66, 68 if FRA=67.	COLA = 0%: 67 if FRA=66; 68 if FRA=67. If COLA = 1%: 69, irrespective of FRA.	Life expectancies not adjusted for different retirement ages or gender. Retirement decision made annually.
Muksian, 2004	Finds breakeven age equating PV of SSB at different retirement ages.	monthly	monthly	66	considered	2%	n/a	2%	none	66	66	Life expectancies not adjusted for different retirement ages or gender.
Kinderman and Jennings, 2006	Uses a constant life expectancy at age 62: men 19.1 years, women 22.5 years.	monthly	annually, birthdate	66	not considered	5% - 7%	25%	2% - 4%	85%	Varies with DR and COLA. Retirement age increases as COLA increases and decreases as DR increases. Optimum age is 66 with DR=5% and COLA=4%. (See Table 2)	Varies with DR and COLA. Retirement age increases as COLA increases and decreases as DR increases. Optimum age is 66 with DR=5% and COLA=4%. (See Table 2)	Life expectancies not adjusted for different retirement ages. Retirement decision made annually. DRC not considered. Analysis stops at FRA.
Spitzer, 2006	Finds breakeven age equating PV of SSB at different retirement ages and compares to longevity tables.	annually	annually, birthdate	66	considered	0% - 7%	n/a	n/a	none	62 if DR ≥ 4% and normal life expectancy; else defer.	62 if DR ≥ 4% and normal life expectancy; else defer.	Life expectancies not adjusted for different retirement ages. SSB received annually, instead of monthly. Retirement decision made annually. DRC not considered. Analysis stops at FRA.

Table 1: Summary of Methodology, Assumptions, and Results of Previous Studies on Optimal Retirement Age for Single Individuals (continued)												
Authors	Assumptions									Findings		Shortcomings of study
	Life Expectancy	SSB received	Retirement decision made	FRA	Delayed Retirement Credits	Discount rate	Tax rate	COLA	Other Income - % of SSB taxed	Male	Female	
Munnell and Soto, 2007	Finds breakeven age to be 81 - where PV of SSB at 62 = PV of SSB at 66 and compares to 1948 mortality tables.	monthly	annually, birthdate	66	considered	3%	n/a	n/a	none	62	68	Life expectancies not adjusted for different retirement ages. SSB received annually, instead of monthly. Retirement decision made annually.
Cunningham and Erickson, 2009	Uses a constant life expectancy of 44 years at age 62 and SSB adjusted for probability of being alive to age 108	annually	annually, birthdate	66	not considered	5%	9.8% - 11.9%	2.30%	0% - 85%	62 if other income \leq \$30,000; else 66	66; other income irrelevant	Life expectancies not adjusted for different retirement ages. SSB received annually, instead of monthly. Retirement decision made annually. DRC not considered. Analysis stops at FRA.
Tucker, 2009b - FPA July	SSBs adjusted for probability of living one more year (SSA Life Tables, 2004).	monthly	annually, birthdate	66	considered	1% - 5%	n/a	n/a	none	62; The greater SSBs as % of total income, more advantageous to delay.	-	Retirement decision made annually. Looks at other income, but does not consider taxation of SSB consequences. Does not look at women.
Sun and Webb, 2009	Max E(PV of SSBs) where mortality based on birth year of 1946.	monthly	annual, birthdate	66	considered	3%	n/a	n/a	none	Varies with risk aversion: Low risk - High risk: 62, 69	Varies with risk aversion: Low risk - High risk: 67, 70	Life expectancies not adjusted for different retirement ages. Retirement decision made annually. DRC not considered. Analysis stops at FRA.
Ryan, 2010	Yes. SSA 2005 period life tables.	monthly	annual, birthdate	66	considered	2%	25%	3%	85%	M retires at 62, then resets at 70 gets a 7.1% increase in PV of total benefits	F retires at 62, then resets at 70 gets a 17% increase in PV of total benefits	Retirement decision made annually.

Note: All studies assume: 1) if younger than FRA excess earnings are less than exemption amount such that SSB are not subject to the Earnings Test; 2) no dependents.

**Table 2: Kinderman and Jennings, 2006:
Summary of Findings**

Optimal Retirement Age for MEN			
DR \ COLA	5%	6%	7%
2%	62	62	62
3%	65	64	62
4%	66	66	64
Optimal Retirement Age for WOMEN			
DR \ COLA	5%	6%	7%
2%	66	65	62
3%	66	66	65
4%	66	66	66

Optimum PV of SSB at DR = 5% and COLA = 4% for both.

Table 3: Summary of Methodology, Assumptions, and Results of Previous Studies on Optimal Retirement Age for Single Individuals

These studies find the retirement age that maximizes the Internal Rate of Return.

Authors	Assumptions										Findings		Shortcomings of study
	Life Expectancies	SSB received	Retirement decision made	FRA	Delayed Retirement Credits	Discount rate	Tax rate	COLA	Other Income - % of SSB taxed	Male	Female		
McCormack and Perdue, 2006	Uses a median life expectancies for white males and white females at age 62.	monthly	annually, birthdate	66 and 67	considered	n/a	n/a	n/a	none	White male at 66, IRR=2.4%	White female at 66, IRR=3.9%	Life expectancies not adjusted for different retirement ages. Race not considered. Uses median life expectancies, not actual. Retirement decision made annually.	
Friedman and Phillips, 2008	SSBs adjusted for survival of probability to age 100 at age 62	annually	annually, birthdate	66	considered	n/a	n/a	n/a	none	63; IRR = 3.73%	63; IRR = 4.92%		SSBs received annually. Retirement decision made annually. Life expectancies not adjusted for different retirement ages.

Note: All studies assume: 1) if younger than FRA excess earnings are less than exemption amount such that SSB are not subject to the Earnings Test; 2) no dependents.

Table 4: Age for Early, Full, and Delayed Retirement Benefits, and Reductions and Credits for Early and Delayed Benefits

Year of birth ^a	Year of attainment of age 62	Year of attainment of FRA	Year of attainment of age 70	Full retirement age	Per month reduction if SSB begin prior to FRA ^b	Maximum reduction months	Maximum reduction at age 62	Age 62 SSB as % of FRA	Per year DRC	Age 70 SSB as % of FRA
1943	2005	2009	2013	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1944	2006	2010	2014	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1945	2007	2011	2015	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1946	2008	2012	2016	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1947	2009	2013	2017	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1948	2010	2014	2018	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1949	2011	2015	2019	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1950	2012	2016	2020	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1951	2013	2017	2021	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1952	2014	2018	2022	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1953	2015	2019	2023	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1954	2016	2020	2024	66 years	5/9% for 36 mos. + 5/12%/ mos.	48	25%	75%	8%	132%
1955	2017	2021	2025	66 years and 2 months	5/9% for 36 mos. + 5/12%/ mos.	50	25 5/6%	74 1/6%	8%	130 2/3%
1956	2018	2022	2026	66 years and 4 months	5/9% for 36 mos. + 5/12%/ mos.	52	26 2/3%	73 1/3%	8%	129 1/3%
1957	2019	2023	2027	66 years and 6 months	5/9% for 36 mos. + 5/12%/ mos.	54	27 1/2%	72 1/2%	8%	128%
1958	2020	2024	2028	66 years and 8 months	5/9% for 36 mos. + 5/12%/ mos.	56	28 1/3%	71 2/3%	8%	126 2/3%
1959	2021	2025	2029	66 years and 10 months	5/9% for 36 mos. + 5/12%/ mos.	58	29 1/6%	70 5/6%	8%	125 1/3%
1960 or later	2022 or later	2027	2030	67 years	5/9% for 36 mos. + 5/12%/ mos.	60	30%	70%	8%	124%

^a If birthday is January 1, refer to previous year

^b The monthly reduction is 5/9% per month for the first 36 months prior to FRA, and 5/12% per month for every month after the first 36 months.

Source: Social Security Act of 1935 as amended through December 31, 2007. <http://www.socialsecurity.gov/regulations/index.htm>; Jennings and Reichenstein, "Planning for Retirement: What to Expect from Social Security," AAIJournal, February 2002, p.12.

Table 5: Summary of Methodology and Assumptions on Optimal Retirement Age for Single Individuals

Authors	Assumptions								
	Life Expectancies	SSB received	Retirement decision made	FRA	Delayed Retirement Credits	Discount rate	Tax rate	COLA	Other Income - % of SSB taxed
Docking, Fortin, & Michelson, 2011	Use life expectancy at age retire, by gender and race.	monthly	annually, birthdate	66 and 67	considered	n/a	n/a	n/a	none

Note: This study assumes: 1) if younger than FRA excess earnings are less than exemption amount such that SSB are not subject to the Earnings Test; 2) no dependents.

Table 6: Average life expectancy given current age

Age	All Males		White Males		Black Males		Hispanic Males	
	Avg # years remaining	Expected age to die	Avg # years remaining	Expected age to die	Avg # years remaining	Expected age to die	Avg # years remaining	Expected age to die
62	19.2	81.2	19.3	81.3	16.9	78.9	21.3	83.3
63	18.5	81.5	18.6	81.6	16.3	79.3	20.5	83.5
64	17.7	81.7	17.8	81.8	15.7	79.7	19.7	83.7
65	17.0	82.0	17.1	82.1	15.1	80.1	19.0	84.0
66	16.3	82.3	16.4	82.4	14.5	80.5	18.2	84.2
67	15.6	82.6	15.7	82.7	13.9	80.9	17.5	84.5
68	14.9	82.9	15.0	83.0	13.4	81.4	16.8	84.8
69	14.2	83.2	14.3	83.3	12.8	81.8	16.1	85.1
70	13.6	83.6	13.6	83.6	12.3	82.3	15.4	85.4
Age	All Females		White Females		Black Females		Hispanic Females	
	Avg # years remaining	Expected age to die	Avg # years remaining	Expected age to die	Avg # years remaining	Expected age to die	Avg # years remaining	Expected age to die
62	22.1	84.1	22.2	84.2	20.7	82.7	24.2	86.2
63	21.3	84.3	21.4	84.4	20.0	83.0	23.4	86.4
64	20.5	84.5	20.6	84.6	19.3	83.3	22.6	86.6
65	19.7	84.7	19.8	84.8	18.6	83.6	21.7	86.7
66	18.9	84.9	19.0	85.0	17.9	83.9	20.9	86.9
67	18.2	85.2	18.2	85.2	17.2	84.2	20.1	87.1
68	17.4	85.4	17.4	85.4	16.5	84.5	19.3	87.3
69	16.6	85.6	16.6	85.6	15.8	84.8	18.5	87.5
70	15.9	85.9	15.9	85.9	15.1	85.1	17.7	87.7

Source: National Vital Statistics Report, June 28, 2010, Volume 58, Number 21; United States Life Tables, 2006; and Arias E. United States life tables by Hispanic origin. National Center for Health Statistics. Vital Health Stat 2(152). 2010.

Table 7: Breakeven IRR and Changes in IRR between Alternative Retirement Ages, 1943-1954 Birth Year Cohort, by Gender

Panel A1: All Single Males - Breakeven IRR

Retirement Age 1 \ Retirement Age 2		Retirement Age 2							
		63	64	65	66	67	68	69	70
62		3.75%	4.77%	4.73%	4.51%	4.56%	4.44%	4.23%	3.97%
63			5.76%	5.21%	4.76%	4.76%	4.57%	4.31%	4.00%
64				4.64%	4.25%	4.42%	4.27%	4.02%	3.70%
65					3.85%	4.31%	4.15%	3.86%	3.51%
66						4.77%	4.29%	3.86%	3.43%
67							3.81%	3.40%	2.97%
68								3.00%	2.55%
69									2.09%
70									

Panel A2: All Single Males - Marginal Change in IRR

Retirement Age 1 \ Retirement Age 2		Retirement Age 2							
		63	64	65	66	67	68	69	70
62		-	1.02%	-0.04%	-0.22%	0.05%	-0.13%	-0.20%	-0.26%
63			2.01%	-0.55%	-0.45%	0.00%	-0.19%	-0.26%	-0.31%
64				-1.12%	-0.39%	0.17%	-0.15%	-0.25%	-0.32%
65					-0.79%	0.46%	-0.17%	-0.29%	-0.35%
66						0.92%	-0.48%	-0.43%	-0.44%
67							-0.96%	-0.40%	-0.43%
68								-0.81%	-0.45%
69									-0.91%
70									

Table 7: Breakeven IRR and Changes in IRR between Alternative Retirement Ages, 1943-1954 Birth Year Cohort, by Gender (continued)

Panel B1: All Single Females - Breakeven IRR									
Retirement Age 2 \ Retirement Age 1		63	64	65	66	67	68	69	70
62	62	4.17%	5.19%	5.15%	4.95%	5.00%	4.89%	4.68%	4.42%
63	63		6.19%	5.63%	5.21%	5.21%	5.03%	4.76%	4.46%
64	64			5.05%	4.71%	4.88%	4.74%	4.47%	4.16%
65	65				4.37%	4.79%	4.63%	4.32%	3.98%
66	66					5.21%	4.76%	4.30%	3.88%
67	67						4.31%	3.84%	3.43%
68	68							3.36%	2.98%
69	69								2.60%
70	70								

Panel B2: All Single Females - Marginal Change in IRR									
Age 2 \ Age 1		63	64	65	66	67	68	69	70
62	62	-	1.03%	-0.05%	-0.19%	0.05%	-0.12%	-0.21%	-0.25%
63	63		2.02%	-0.56%	-0.41%	0.00%	-0.18%	-0.27%	-0.30%
64	64			-1.13%	-0.34%	0.17%	-0.14%	-0.27%	-0.31%
65	65				-0.68%	0.42%	-0.16%	-0.31%	-0.34%
66	66					0.83%	-0.45%	-0.46%	-0.42%
67	67						-0.90%	-0.47%	-0.41%
68	68							-0.94%	-0.38%
69	69								-0.76%
70	70								

Notes: Breakeven IRR between consecutive ages denoted in red
 FRA age is 66.

Table 8: Breakeven IRR and Changes in IRR between Alternative Retirement Ages, 1943-1954 Birth Year Cohort, by Gender and Race

Panel A1: Single White Males - Breakeven IRR									Panel A1.1: Single White Males - Marginal Change in IRR								
Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70	Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70
62	3.74%	4.76%	4.71%	4.51%	4.56%	4.43%	4.21%	3.94%	-	1.02%	-0.04%	-0.21%	0.05%	-0.13%	-0.22%	-0.27%	
63		5.75%	5.19%	4.76%	4.76%	4.56%	4.29%	3.97%		2.01%	-0.56%	-0.43%	0.00%	-0.19%	-0.28%	-0.32%	
64			4.63%	4.26%	4.42%	4.26%	3.99%	3.66%			-1.12%	-0.37%	0.16%	-0.16%	-0.27%	-0.32%	
65				3.89%	4.32%	4.14%	3.82%	3.47%				-0.74%	0.43%	-0.18%	-0.31%	-0.35%	
66					4.74%	4.26%	3.80%	3.37%					0.86%	-0.48%	-0.46%	-0.44%	
67						3.77%	3.33%	2.90%						-0.97%	-0.45%	-0.43%	
68							2.88%	2.46%							-0.90%	-0.42%	
69								2.03%								-0.84%	
70																	

Panel A2: Single Black Males - Breakeven IRR									Panel A2.1: Single Black Males - Marginal Change in IRR								
Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70	Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70
62	3.83%	4.81%	4.79%	4.60%	4.65%	4.55%	4.36%	4.13%	-	0.98%	-0.02%	-0.19%	0.06%	-0.11%	-0.19%	-0.23%	
63		5.77%	5.26%	4.85%	4.86%	4.69%	4.45%	4.17%		1.94%	-0.51%	-0.41%	0.01%	-0.17%	-0.24%	-0.27%	
64			4.74%	4.38%	4.55%	4.42%	4.18%	3.90%			-1.03%	-0.36%	0.16%	-0.13%	-0.24%	-0.28%	
65				4.02%	4.45%	4.31%	4.04%	3.73%				-0.72%	0.43%	-0.15%	-0.27%	-0.30%	
66					4.88%	4.45%	4.04%	3.66%					0.85%	-0.43%	-0.40%	-0.38%	
67						4.01%	3.62%	3.26%						-0.86%	-0.39%	-0.37%	
68							3.23%	2.88%							-0.78%	-0.36%	
69								2.52%								-0.71%	
70																	

Panel A3: Single Hispanic Males - Breakeven IRR									Panel A3.1: Single Hispanic Males - Marginal Change in IRR								
Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70	Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70
62	4.09%	5.11%	5.09%	4.90%	4.97%	4.87%	4.68%	4.44%	-	1.02%	-0.02%	-0.19%	0.07%	-0.10%	-0.19%	-0.24%	
63		6.10%	5.58%	5.16%	5.18%	5.02%	4.77%	4.49%		2.01%	-0.52%	-0.42%	0.02%	-0.16%	-0.25%	-0.29%	
64			5.06%	4.68%	4.87%	4.74%	4.50%	4.21%			-1.05%	-0.37%	0.18%	-0.13%	-0.24%	-0.29%	
65				4.31%	4.77%	4.64%	4.36%	4.04%				-0.75%	0.47%	-0.14%	-0.28%	-0.32%	
66					5.23%	4.80%	4.38%	3.97%					0.92%	-0.43%	-0.42%	-0.40%	
67						4.36%	3.95%	3.55%						-0.87%	-0.42%	-0.40%	
68							3.52%	3.14%							-0.84%	-0.39%	
69								2.74%								-0.78%	
70																	

Notes: Breakeven IRR between consecutive ages denoted in red
 FRA age is 66.

Table 8: Breakeven IRR and Changes in IRR between Alternative Retirement Ages, 1943-1954 Birth Year Cohort, by Gender and Race (continued)

Panel B1: Single White Females - Breakeven IRR									Panel B1.1: Single White Females - Marginal Change in IRR								
Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70	Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70
62	4.18%	5.18%	5.14%	4.94%	4.99%	4.87%	4.65%	4.39%	-	1.01%	-0.04%	-0.20%	0.05%	-0.12%	-0.22%	-0.26%	
63		6.16%	5.62%	5.20%	5.19%	5.01%	4.73%	4.42%		1.99%	-0.55%	-0.42%	-0.01%	-0.18%	-0.28%	-0.31%	
64			5.06%	4.70%	4.86%	4.71%	4.43%	4.12%				-1.10%	-0.36%	0.16%	-0.15%	-0.28%	
65				4.34%	4.76%	4.59%	4.27%	3.93%					-0.73%	0.42%	-0.17%	-0.32%	
66					5.17%	4.72%	4.25%	3.83%						0.83%	-0.45%	-0.46%	
67						4.26%	3.78%	3.37%							-0.91%	-0.47%	
68							3.30%	2.91%								-0.96%	
69								2.52%									-0.78%
70																	

Panel B2: Single Black Females - Breakeven IRR									Panel B2.1: Single Black Females - Marginal Change in IRR								
Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70	Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70
62	4.19%	5.19%	5.18%	5.00%	5.05%	4.94%	4.75%	4.52%	-	1.01%	-0.01%	-0.18%	0.05%	-0.11%	-0.20%	-0.23%	
63		6.17%	5.67%	5.27%	5.27%	5.09%	4.84%	4.56%		1.98%	-0.50%	-0.40%	0.00%	-0.18%	-0.25%	-0.28%	
64			5.16%	4.81%	4.96%	4.82%	4.57%	4.29%				-1.01%	-0.35%	0.16%	-0.15%	-0.25%	
65				4.45%	4.86%	4.70%	4.42%	4.11%					-0.71%	0.41%	-0.16%	-0.28%	
66					5.27%	4.83%	4.41%	4.02%						0.83%	-0.45%	-0.42%	
67						4.38%	3.97%	3.60%							-0.90%	-0.41%	
68							3.55%	3.21%								-0.82%	
69								2.86%									-0.69%
70																	

Panel B3: Single Hispanic Females - Breakeven IRR									Panel B3.1: Single Hispanic Females - Marginal Change in IRR								
Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70	Retirement Age 1 \ Retirement Age 2	63	64	65	66	67	68	69	70
62	4.45%	5.48%	5.45%	5.27%	5.34%	5.23%	5.04%	4.80%	-	1.02%	-0.03%	-0.18%	0.07%	-0.11%	-0.20%	-0.24%	
63		6.47%	5.94%	5.53%	5.56%	5.39%	5.13%	4.85%		2.01%	-0.53%	-0.40%	0.02%	-0.17%	-0.25%	-0.28%	
64			5.40%	5.06%	5.25%	5.11%	4.86%	4.57%				-1.07%	-0.35%	0.19%	-0.14%	-0.25%	
65				4.71%	5.17%	5.01%	4.72%	4.40%					-0.70%	0.47%	-0.16%	-0.29%	
66					5.63%	5.16%	4.72%	4.32%						0.93%	-0.47%	-0.44%	
67						4.68%	4.25%	3.87%							-0.95%	-0.42%	
68							3.82%	3.45%								-0.85%	
69								3.08%									-0.74%
70																	

Notes: Breakeven IRR between consecutive ages denoted in red. FRA age is 66.

Table 9: Breakeven IRR between Alternative Retirement Ages, 1943-1954 Birth Year Cohort, White Men and Women

Panel A: Single White Males - Breakeven IRR

Retirement Ages	Breakeven IRR	
	Our Results	McCormack & Perdue*
62 vs 66	4.51%	2.4%
62 vs 70	3.94%	0.5%
66 vs 70	3.37%	0.0%

Panel B: Single White Females - Breakeven IRR

Retirement Ages	Breakeven IRR	
	Our Results	McCormack & Perdue*
62 vs 66	4.94%	3.9%
62 vs 70	4.39%	2.6%
66 vs 70	3.83%	1.3%

Table 10: Internal Rates of Return of Alternative Retirement Ages, by Birth Year and Gender

Panel A: All Single Males born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	4.51%						
	62	66 yrs. 2 mo.		4.62%					
	62	66 yrs. 4 mo.			4.75%				
	62	66 yrs. 6 mo.				4.84%			
	62	66 yrs. 8 mo.					4.93%		
	62	66 yrs. 10 mo.						5.05%	
	62	67							4.34%
Early vs. Delayed	62	70	3.97%	3.98%	4.01%	4.02%	4.04%	4.07%	4.08%
Full vs. Delayed	66	70	3.43%						
	66 yrs. 2 mo.	70		3.91%					
	66 yrs. 4 mo.	70			3.84%				
	66 yrs. 6 mo.	70				2.84%			
	66 yrs. 8 mo.	70					2.57%		
	66 yrs. 10 mo.	70						3.59%	
	67	70							3.65%
Panel B: All Single Females born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	4.95%						
	62	66 yrs. 2 mo.		5.03%					
	62	66 yrs. 4 mo.			5.15%				
	62	66 yrs. 6 mo.				5.22%			
	62	66 yrs. 8 mo.					5.29%		
	62	66 yrs. 10 mo.						5.39%	
	62	67							4.79%
Early vs. Delayed	62	70	4.42%	4.43%	4.47%	4.48%	4.49%	4.52%	4.54%
Full vs. Delayed	66	70	3.88%						
	66 yrs. 2 mo.	70		3.74%					
	66 yrs. 4 mo.	70			3.58%				
	66 yrs. 6 mo.	70				3.38%			
	66 yrs. 8 mo.	70					3.15%		
	66 yrs. 10 mo.	70						2.87%	
	67	70							4.12%
Note: Optimal retirement age in bold .									

Table 11: Internal Rates of Return of Alternative Retirement Ages, by Birth Year, Gender, and Race

Panel A1: Single White Males born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	4.51%						
	62	66 yrs. 2 mo.		4.61%					
	62	66 yrs. 4 mo.			4.75%				
	62	66 yrs. 6 mo.				4.84%			
	62	66 yrs. 8 mo.					4.93%		
	62	66 yrs. 10 mo.						5.04%	
	62	67							4.34%
Early vs. Delayed	62	70	3.94%	3.95%	3.98%	3.99%	4.01%	4.04%	4.05%
Full vs. Delayed	66	70	3.37%						
	66 yrs. 2 mo.	70		3.20%					
	66 yrs. 4 mo.	70			3.00%				
	66 yrs. 6 mo.	70				2.76%			
	66 yrs. 8 mo.	70					2.49%		
	66 yrs. 10 mo.	70						2.15%	
	67	70							3.58%
Panel A2: Single Black Males born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	4.60%						
	62	66 yrs. 2 mo.		4.69%					
	62	66 yrs. 4 mo.			4.82%				
	62	66 yrs. 6 mo.				4.90%			
	62	66 yrs. 8 mo.					4.98%		
	62	66 yrs. 10 mo.						5.09%	
	62	67							4.45%
Early vs. Delayed	62	70	4.13%	4.14%	4.17%	4.18%	4.19%	4.23%	4.24%
Full vs. Delayed	66	70	3.66%						
	66 yrs. 2 mo.	70		3.52%					
	66 yrs. 4 mo.	70			3.36%				
	66 yrs. 6 mo.	70				3.17%			
	66 yrs. 8 mo.	70					2.95%		
	66 yrs. 10 mo.	70						2.69%	
	67	70							3.89%
Panel A3: Single Hispanic Males born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	4.90%						
	62	66 yrs. 2 mo.		4.98%					
	62	66 yrs. 4 mo.			5.10%				
	62	66 yrs. 6 mo.				5.17%			
	62	66 yrs. 8 mo.					5.24%		
	62	66 yrs. 10 mo.						5.35%	
	62	67							4.75%
Early vs. Delayed	62	70	4.44%	4.45%	4.48%	4.49%	4.50%	4.54%	4.55%
Full vs. Delayed	66	70	3.97%						
	66 yrs. 2 mo.	70		3.84%					
	66 yrs. 4 mo.	70			3.69%				
	66 yrs. 6 mo.	70				3.51%			
	66 yrs. 8 mo.	70					3.30%		
	66 yrs. 10 mo.	70						3.04%	
	67	70							4.22%

Table 11: Internal Rates of Return of Alternative Retirement Ages, by Birth Year, Gender, and Race (continued)

Panel B1: Single White Females born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	4.94%						
	62	66 yrs. 2 mo.		5.03%					
	62	66 yrs. 4 mo.			5.14%				
	62	66 yrs. 6 mo.				5.21%			
	62	66 yrs. 8 mo.					5.28%		
	62	66 yrs. 10 mo.						5.38%	
	62	67							4.77%
Early vs. Delayed	62	70	4.39%	4.40%	4.44%	4.45%	4.46%	4.49%	4.51%
Full vs. Delayed	66	70	3.83%						
	66 yrs. 2 mo.	70		3.68%					
	66 yrs. 4 mo.	70			3.51%				
	66 yrs. 6 mo.	70				3.31%			
	66 yrs. 8 mo.	70					3.07%		
	66 yrs. 10 mo.	70						2.78%	
	67	70							4.06%

Panel B2: Single Black Females born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	5.00%						
	62	66 yrs. 2 mo.		5.08%					
	62	66 yrs. 4 mo.			5.19%				
	62	66 yrs. 6 mo.				5.25%			
	62	66 yrs. 8 mo.					5.32%		
	62	66 yrs. 10 mo.						5.42%	
	62	67							4.84%
Early vs. Delayed	62	70	4.52%	4.53%	4.56%	4.57%	4.58%	4.61%	4.62%
Full vs. Delayed	66	70	4.02%						
	66 yrs. 2 mo.	70		3.90%					
	66 yrs. 4 mo.	70			3.57%				
	66 yrs. 6 mo.	70				3.58%			
	66 yrs. 8 mo.	70					3.38%		
	66 yrs. 10 mo.	70						3.13%	
	67	70							4.26%

Panel B3: Single Hispanic Females born in			1943 - 1954	1955	1956	1957	1958	1959	1960
	Retirement Age1	Retirement Age2	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR	Breakeven IRR
Early vs. Full	62	66	5.27%						
	62	66 yrs. 2 mo.		5.33%					
	62	66 yrs. 4 mo.			5.43%				
	62	66 yrs. 6 mo.				5.49%			
	62	66 yrs. 8 mo.					5.54%		
	62	66 yrs. 10 mo.						5.63%	
	62	67							5.12%
Early vs. Delayed	62	70	4.80%	4.81%	4.84%	4.85%	4.86%	4.90%	4.91%
Full vs. Delayed	66	70	4.32%						
	66 yrs. 2 mo.	70		4.21%					
	66 yrs. 4 mo.	70			4.08%				
	66 yrs. 6 mo.	70				3.92%			
	66 yrs. 8 mo.	70					3.74%		
	66 yrs. 10 mo.	70						3.51%	
	67	70							4.55%

Note: Optimal retirement age in **bold**.

Table 12: Percent of New Retirees retiring at ERA, FRA and DRA, by Gender						
	Panel A: Male			Panel B: Female		
Year	ERA	FRA	DRA	ERA	FRA	DRA
1985	65.3	31.2	3.6	75.1	21.3	3.6
1986	67.0	29.2	3.8	74.9	21.6	3.6
1987	67.1	28.8	4.1	75.7	20.8	3.5
1988	66.2	28.6	5.2	74.2	21.8	4.0
1989	64.4	30.1	5.5	73.8	21.6	4.6
1990	66.1	27.6	6.3	72.9	21.5	5.6
1991	65.8	27.9	6.2	72.7	22.3	5.0
1992	66.9	27.2	5.9	73.4	21.5	5.1
1993	67.7	26.7	5.6	73.0	22.4	4.5
1994	67.8	27.1	5.1	74.5	21.0	4.6
1995	67.1	27.5	5.4	72.1	22.6	5.3
1996	66.7	27.6	5.7	72.7	22.7	4.7
1997	66.8	26.9	6.2	61.2	19.5	19.3
1998	66.6	27.3	6.1	69.0	22.0	9.0
1999	66.4	27.4	6.2	71.1	22.6	6.3
2000	57.1	31.7	11.2	67.4	23.6	9.1
2001	65.6	30.8	3.7	69.9	23.7	6.3
2002	67.3	29.7	3.0	71.7	23.9	4.4
2003	67.4	29.6	3.0	70.8	23.8	5.4
2004	66.6	30.0	3.4	70.4	24.3	5.4
2005	65.3	30.8	4.0	69.3	25.0	5.8
2006	62.5	34.5	3.2	67.1	27.4	5.6
2007	59.1	37.5	3.4	64.9	30.1	4.9
2008	58.0	38.4	3.6	64.2	30.7	5.1
2009	71.9	26.0	2.1	74.7	21.2	4.2

Source: Calculated from SSA Annual Statistical Supplement, 2010, Table 6.B5.