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The influence of race on the social security early retirement decision for married couples

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Abstract

There has been an extensive amount of research into the social security early and delayed retirement decision for married couples. The results have been mixed. This article extends the analysis of prior research to the early and delayed retirement decision for married men and women. We analyze the decision for married couples by race. More specifically, we analyze the nine married couple combinations for the following races: Whites (W), Hispanics (H), and Blacks (B). The nine husband/wife combinations are: WW, BB, HH, WB, BW, WH, HW, BH, and HB. We develop an Excel model to compute the breakeven (BE) internal rate of return (IRR) for each of the nine race combinations from age 62 through age 70. The BE IRRs can be interpreted as follows: If a couple's opportunity cost of capital (that can be considered a hurdle rate) is greater than (less than) the computed BE IRR, the couple should retire at the earlier (later) age. This study is limited to same age couples and we compute the BE IRR starting: at age 62 for all other years through age 70, at age 63 for all other years through age 70, at age 64 for all other years through age 70 and so on. Our results are fairly uniformly consistent across the nine race combinations: BE IRRs for a given "base age" are, in general, monotonically decreasing compared with older ages (the exceptions are when comparing age 62 to ages 63, 64, and 65). We conclude that, from a given base age, it is generally more optimal to retire now with a longer time horizon because the hurdle rate is lower and later with a short time horizon because the hurdle rate is higher.

JEL classifications: D14; H55; J14

Keywords: Social security; Optimal retirement age; Benefit optimization; Married couples; Age; Race

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1. Introduction

The United States Census Bureau considers a "baby boomer" to be an individual born between 1946 and 1964 (U.S. Census Bureau, 2011).[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 (SSB). "Boomers" have the option to retire earlier or later than their FRA. Early retirement is attractive for many reasons: social security benefits 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 of 1% for the first 36 months and 5/12 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.

The results of the extensive amount of research into the social security early and delayed retirement decision for married couples have been mixed. This article extends 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 married couples 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 married person to retire (see Coile, Diamond, Gruber, and Jousten, 2002; Cook, Jennings, and Reichenstein, 2002; Munnell and Soto, 2007; Rose, 2007; Mahaney and Carlson, 2008; Sass, Sun, and Webb, 2008; Sun and Webb, 2009; Tucker, 2009). Depending upon the methodology chosen, the assumptions made, and the life expectancies tables used, the optimum retirement age for married men and married women has ranged from 62 to 70. These studies find the retirement age that maximizes the present value (PV) of future SSB over some life expectancy.

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), no other income such that no SSB are taxed, the husband and wife are the same age, and a one-earner (husband) household. Among these studies, Coile, Diamond, Gruber, and Jousten (2002) find the optimal retirement age for the husband is 65 and the wife is 62; while Cook, Jennings, and Reichenstein (2002) find the optimal retirement age for the husband to be 69 and the wife 66. On the other hand, Rose (2007) says both should retire at their FRA of 66; while Mahaney and Carlson (2008) says the husband should delay retirement to age 70 and the wife begin at age 62. Sass, Sun, and Webb (2008) find that PV is maximized if the wife retires at age 62 and the husband at age 65.

As assumptions are relaxed optimal retirement ages change. The age difference between the spouses is an important factor. Coile, Diamond, Gruber, and Jousten (2002) find that if the husband is older than the wife, then he should delay retirement to age 65; but if the wife is five years older than her husband, he should retire early at age 62. Munnel and Soto (2007)

show as the age difference between the spouses (husband minus wife) increase, the wife should claim earlier (age 62) and the husband should claim later (age 69). Sun and Webb (2009) show that if the wife is three or more years older than her husband, he should retire at 69 and she at 66. Tucker (2009) says both should retire at age 62 no matter the age difference. As complexities are added to these PV analysis studies, such as different DRs, 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 (see McCormack and Perdue, 2006; Friedman and Phillips, 2008; Docking, Fortin, and Michelson, 2012). Both are simple studies assuming no taxes, no COLA, no dependents, no other earnings such that SSB are not subject to the ET, 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 DR choice.

McCormack and Perdue (2006) assume the husband is seven years older than his wife and the husband has the higher earnings. They conclude that both should retire at age 62 to produce a maximum IRR of 5.2%. 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 1). 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 1), 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) assume the husband and wife are the same age and the wife's SSB are <50% of her husband's SSB. They find the couple should retire at age 63 to earn a maximum IRR of 5.06%. 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.

Docking, Fortin, and Michelson (2012) is unique in that they look at the impact of race on the retirement decision for single men and women. They find two optimal retirement ages for men and women. The earliest age one should retire is 64 and the latest is age 67. Race is not a factor, but $IRR_{women} > IRR_{men}$ and $IRR_{Hispanics} > IRR_{Blacks} > IRR_{Whites}$. This article will expand on their study and explore the effect of race on married couples.

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

Table 1 Average life expectancy given current age

Age	Avg. no years remaining	Avg. no. years remaining	Avg. no. years remaining
	White males	Black males	Hispanic males
62	19.32	16.90	21.26
63	18.57	16.29	20.48
64	17.83	15.69	19.71
65	17.10	15.10	18.96
66	16.38	14.51	18.21
67	15.67	13.93	17.48
68	14.97	13.36	16.77
69	14.28	12.80	16.07
70	13.60	12.25	15.38
	White females	Black females	Hispanic females
62	22.18	20.72	24.24
63	21.37	19.99	23.39
64	20.56	19.27	22.55
65	19.76	18.57	21.72
66	18.97	17.87	20.90
67	18.18	17.17	20.10
68	17.41	16.48	19.30
69	16.64	15.80	18.51
70	15.89	15.14	17.74

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.

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 married couples. We do not study divorced spouses, surviving spouses, surviving spouses with dependents, and disabled workers.

3.2. Early retirement age (ERA) versus FRA versus delayed retirement

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 percentage 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 before 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/her 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. ET adjustments to SSB

Workers who claim early retirement benefits, but continue to work, may have their SSB reduced. This is referred to as the 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 ET. 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 (Social Security Administration, 2012).[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 12, 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 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.

3.4. Spousal benefits

A spouse has dual entitlements to SSBs. A spouse is entitled to the larger of 100% of benefits at FRA based on his or her earnings record or up to 50% of the spouse's benefits at FRA.

$$SSB_{spouse1} = Max\{SSB_{own}; 0.5(SSB_{spouse2})\}$$

Once one begins SSB based on his or her own work record they cannot later switch to SSB based on the spouse's record. Furthermore, one cannot begin SSB based on the spouse's record and then later switch to SSB based on his or her own work record. However, there is an exception: a wife (husband) can retire and begin collecting her (his) own SSB while her

(his) husband (wife) still works and delays benefits. Upon her (his) husband's (wife's) retirement, she (he) can switch over to 50% of his (her) benefits, if spousal benefits are greater than her (his) own benefits. Spouse's benefits do not include any accrued delayed retirement credits.

For example, assume Richard and Jane, are both 62 with a FRA of 66. Currently, Richard's SSB at FRA are $2,000 per month and Jane's SSB at FRA are $1,000. Jane retires at 62 and receives 75% of 1,000 or $750 per month. Richard continues to work until age 66. His SSB at FRA are still $2,000 per month and he retires at FRA. Assuming no COLA for Jane SSB, she can now switch over to spousal benefits of 50% × $2,000 = $1,000 per month.

4. Model

Similar to McCormack and Perdue (2006), we avoid the problem of an uncertain DR by computing the IRR equating two retirement options. For single individuals, the IRR can be solved for by using the following equation:

$$\%\text{Benefit\_1} \times \sum_{1}^{i} \left(\frac{1}{1 + \frac{\text{IRR}}{12}} \right)^{i} = \%\text{Benefit\_2} \times \sum_{1}^{j} \left(\frac{1}{1 + \frac{\text{IRR}}{12}} \right)^{j} \times \left(\frac{1}{1 + \frac{\text{IRR}}{12}} \right)^{\text{N2}-\text{N1}}$$

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,

$$\%\text{Benefit\_1} \times \sum_{1}^{i} \left(\frac{1}{1 + \frac{\text{IRR}}{12}} \right)^{i},$$

represents the present value of initiating receipt of benefits at age 1. The first term on the right-hand side of the equation,

$$\%\text{Benefit\_2} \times \sum_{1}^{j} \left(\frac{1}{1 + \frac{\text{IRR}}{12}} \right)^{j},$$

represents the present value of initiating receipt of benefits at age 2; the second term on the right-hand side,

$$\left(\frac{1}{1+\frac{IRR}{12}}\right)^{N2-N1},$$

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.

For married couples, the IRR can be solved for by using the following equation:

$$\%Benefit\_1 \times \sum_{1}^{i}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{i} + \%Benefit\_2 \times \sum_{1}^{j}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{j}$$

$$= \%Benefit\_3 \times \sum_{1}^{m}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{m} \times \left(\frac{1}{1+\frac{IRR}{2}}\right)^{N2-N1}$$

$$+ \%Benefit\_4 \times \sum_{1}^{n}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{n} \times \left(\frac{1}{1+\frac{IRR}{12}}\right)^{N4-N3}$$

where:

%Benefit_x = percent of SSB received based on retirement age
i = 1 to months to life expectancy for Age 1 male
j = 1 to months to life expectancy for Age 1 female
m = 1 to months to life expectancy for Age 2 male
n = 1 to months to life expectancy for Age 2 female
N2 – N1 and N4 – N3 = difference in months between Age 1 and Age 2, where Age 2 is greater than Age 1.

The two terms on the left-hand side of the equation,

$$\%Benefit\_1 \times \sum_{1}^{i}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{i} \quad \text{and} \quad \%Benefit\_2 \times \sum_{1}^{j}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{j},$$

represent the present value of initiating receipt of benefits at age 1. The two terms on the right-hand side of the equation,

$$\%Benefit\_3 \times \sum_{1}^{m}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{m} \quad \text{and} \quad \%Benefit\_4 \times \sum_{1}^{n}\left(\frac{1}{1+\frac{IRR}{12}}\right)^{n},$$

represent the present value of initiating receipt of benefits at age 2; the two second terms on the right-hand side,

$$\left(\frac{1}{1+\frac{IRR}{12}}\right)^{N2-N1} \quad \text{and} \quad \left(\frac{1}{1+\frac{IRR}{12}}\right)^{N4-N3},$$

discount the present value of benefits at age 2 back to age 1 so that the IRR can be computed at the same point in time. For example, if the first retirement age is 62 and the second retirement age is 66, the IRR computation for the age 66 term must be discounted back to the same point in time as the age 62 term.

4.1. Assumptions in the model

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 one 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] 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 that 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 in 2012 is the smaller of (1) one-half of annual SSB, (2) one-half of the amounts by which Adjusted Gross Income (AGI) plus tax-exempt interest plus one-half of SSB exceeds $32,000 for married couples, or (3) one-half of SSB plus all other income exceeds $44,000 for married couples.[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, because (one minus the 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. Age differences between spouses

In our initial analysis we assume the couple is the same age. This assumption will be relaxed in future research.

4.1.7. Spousal income

In our initial analysis we assume a one-earner family. This assumption will be relaxed in future research. A spouse receives one-half of the retired worker's full benefit unless the spouse begins collecting benefits before FRA. If the spouse begins collecting benefits before FRA, the amount of the spouse's benefit is reduced by a percentage based on the number of months before he/she reaches FRA. For example, based on the FRA of 66, if a spouse begins collecting benefits:

> At age 65, the benefit amount would be about 46% of the retired worker's full benefit; at age 64, it would be about 42%; at age 63, 37.5%; and at age 62, 35%.

4.1.8. Other assumptions

We also assume the couple has no dependents. If a retiree also receives a government pension, their SSB may be reduced because of 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 because of 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. Michael is married to Angela, a Black female born in 1948, who has no SBB of her own. According to Table 1, Michael's life expectancy at age 62 is an additional 16.90 years (202.8 months) to age 78.9; while his life expectancy at age 66 is an additional 14.51 years (174.12 months) to age 80.51. Angela's life expectancy at age 62 is an additional 20.72 years (248.64 months) to age 82.72; while her life expectancy at age 66 is an additional 17.87 years (214.44 months) to age 83.87. Based on current social security requirements, Michael will receive 100% of his SSB at age 66, but only 75% of his FRA benefits at age 62. Angela is able to claim up to 50% of Michaels SSBs at FRA.

Table 2 Breakeven IRRs for a sample of married retirement ages

Male retirement age1	Female retirement age1	Male retirement age2	Female retirement age2	WW BE IRR	BB BE IRR	HH BE IRR
62	62	63	63	4.0963%	4.1565%	4.4219%
62	62	64	64	5.5911%	5.6194%	5.9117%
62	62	65	65	5.6378%	5.6872%	5.9764%
62	62	66	66	5.4648%	5.5291%	5.8151%
62	62	67	67	4.6271%	4.7168%	5.0184%
62	62	68	68	3.9611%	4.0816%	4.3885%
62	62	69	69	3.3936%	3.5540%	3.8568%
62	62	70	70	2.8949%	3.1006%	3.3919%
63	63	64	64	7.0231%	7.0293%	7.3335%
63	63	65	65	6.3835%	6.4295%	6.7253%
63	63	66	66	5.9094%	5.9753%	6.2662%
63	63	67	67	4.7593%	4.8562%	5.1663%
63	63	68	68	3.9338%	4.0664%	4.3817%
63	63	69	69	3.2739%	3.4520%	3.7611%
63	63	70	70	2.7182%	2.9467%	3.2412%
64	64	65	65	5.7305%	5.8220%	6.1052%
64	64	66	66	5.3377%	5.4387%	5.7179%
64	64	67	67	3.9615%	4.0988%	4.4026%
64	64	68	68	3.1036%	3.2809%	3.5883%
64	64	69	69	2.4586%	2.6868%	2.9840%
64	64	70	70	1.9324%	2.2155%	2.4937%
65	65	66	66	4.9393%	5.0498%	5.3233%
65	65	67	67	3.0272%	3.1924%	3.5012%
65	65	68	68	2.1634%	2.3772%	2.6848%
65	65	69	69	1.5719%	1.8452%	2.1358%
65	65	70	70	1.1047%	1.4391%	1.7044%
66	66	67	67	0.9256%	1.1714%	1.5071%
66	66	68	68	0.6368%	0.9242%	1.2387%
66	66	69	69	0.3356%	0.6856%	0.9698%
66	66	70	70	0.0497%	0.4623%	0.7119%
67	67	68	68	0.3491%	0.6783%	0.9705%
67	67	69	69	0.0420%	0.4448%	0.7019%
67	67	70	70	−0.2401%	0.2292%	0.4481%
68	68	69	69	−0.2653%	0.2134%	0.4335%
68	68	70	70	−0.5336%	0.0074%	0.1881%
69	69	70	70	−0.7998%	−0.1965%	−0.0558%

Continued

$$75\% \times \sum_{1}^{202.8} \left(\frac{1}{1+\frac{IRR}{12}}\right)^{i} + 35\% \times \sum_{1}^{248.64} \left(\frac{1}{1+\frac{IRR}{12}}\right)^{j}$$

$$= 100\% \times \sum_{1}^{174.12} \left(\frac{1}{1+\frac{IRR}{12}}\right)^{m} \times \left(\frac{1}{1+\frac{IRR}{12}}\right)^{(66-62)\times 12}$$

Table 2 (Continued)

Male retirement age1	Female retirement age1	Male retirement age2	Female retirement age2	WB BE IRR	BW BE IRR	WH BE IRR
62	62	63	63	4.0900%	4.1625%	4.2051%
62	62	64	64	5.5712%	5.6393%	5.7156%
62	62	65	65	5.6252%	5.6997%	5.7708%
62	62	66	66	5.4566%	5.5371%	5.6061%
62	62	67	67	4.6511%	4.6923%	4.7540%
62	62	68	68	4.0090%	4.0330%	4.0706%
62	62	69	69	3.4645%	3.4819%	3.4914%
62	62	70	70	2.9863%	3.0080%	2.9830%
63	63	64	64	6.9949%	7.0578%	7.1537%
63	63	65	65	6.3688%	6.4440%	6.5237%
63	63	66	66	5.9008%	5.9838%	6.0587%
63	63	67	67	4.7903%	4.8246%	4.8904%
63	63	68	68	3.9927%	4.0065%	4.0432%
63	63	69	69	3.3590%	3.3655%	3.3690%
63	63	70	70	2.8258%	2.8378%	2.8018%
64	64	65	65	5.7325%	5.8196%	5.8799%
64	64	66	66	5.3416%	5.4344%	5.4961%
64	64	67	67	4.0218%	4.0375%	4.0865%
64	64	68	68	3.1972%	3.1856%	3.1959%
64	64	69	69	2.5815%	2.5619%	2.5317%
64	64	70	70	2.0786%	2.0674%	1.9913%
65	65	66	66	4.9453%	5.0435%	5.1062%
65	65	67	67	3.1278%	3.0898%	3.1278%
65	65	68	68	2.3023%	2.2353%	2.2164%
65	65	69	69	1.7411%	1.6726%	1.6032%
65	65	70	70	1.2959%	1.2450%	1.1223%
66	66	67	67	1.1793%	0.9075%	0.8882%
66	66	68	68	0.8824%	0.6703%	0.5724%
66	66	69	69	0.5922%	0.4224%	0.2723%
66	66	70	70	0.3148%	0.1922%	−0.0123%
67	67	68	68	0.5852%	0.4360%	0.2564%
67	67	69	69	0.2985%	0.1836%	−0.0351%
67	67	70	70	0.0271%	−0.0411%	−0.3106%
68	68	69	69	0.0121%	−0.0672%	−0.3250%
68	68	70	70	−0.2511%	−0.2764%	−0.5912%
69	69	70	70	−0.5129%	−0.4828%	−0.8546%

Continued

$$+ 50\% \times \sum_{1}^{214.44} \left(\frac{1}{1+\frac{IRR}{12}}\right)^{n} \times \left(\frac{1}{1+\frac{IRR}{12}}\right)^{(66-62)\times 12}$$

Using Excel and Solver we can find the IRR that will equate both sides of the equation to equal 5.53%. If Michael's opportunity costs are less (greater) than 5.53%, 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. Based on Michael's FRA benefit of $1,600 per month,

Table 2 (Continued)

Male retirement age1	Female retirement age1	Male retirement age2	Female retirement age2	HW BE IRR	BH BE IRR	HB BE IRR
62	62	63	63	4.3216%	4.2725%	4.3166%
62	62	64	64	5.7960%	5.7647%	5.7781%
62	62	65	65	5.8531%	5.8331%	5.8421%
62	62	66	66	5.6842%	5.6786%	5.6773%
62	62	67	67	4.9033%	4.8199%	4.9264%
62	62	68	68	4.2911%	4.1431%	4.3358%
62	62	69	69	3.7714%	3.5800%	3.8368%
62	62	70	70	3.3166%	3.0957%	3.3998%
63	63	64	64	7.2113%	7.1893%	7.1845%
63	63	65	65	6.5948%	6.5846%	6.5817%
63	63	66	66	6.1276%	6.1331%	6.1203%
63	63	67	67	5.0475%	4.9565%	5.0771%
63	63	68	68	4.2849%	4.1166%	4.3397%
63	63	69	69	3.6787%	3.4609%	3.7567%
63	63	70	70	3.1707%	2.9208%	3.2679%
64	64	65	65	5.9669%	5.9689%	5.9696%
64	64	66	66	5.5716%	5.5922%	5.5762%
64	64	67	67	4.2909%	4.1632%	4.3472%
64	64	68	68	3.5087%	3.2783%	3.5943%
64	64	69	69	2.9230%	2.6350%	3.0338%
64	64	70	70	2.4465%	2.1255%	2.5770%
65	65	66	66	5.1690%	5.2096%	5.1757%
65	65	67	67	3.4137%	3.1914%	3.5059%
65	65	68	68	2.6420%	2.2886%	2.7669%
65	65	69	69	2.1131%	1.7035%	2.2633%
65	65	70	70	1.6946%	1.2613%	1.8627%
66	66	67	67	1.5445%	0.8685%	1.7651%
66	66	68	68	1.2989%	0.6034%	1.5114%
66	66	69	69	1.0295%	0.3565%	1.2504%
66	66	70	70	0.7710%	0.1275%	0.9983%
67	67	68	68	1.0548%	0.3399%	1.2577%
67	67	69	69	0.7733%	0.1036%	0.9931%
67	67	70	70	0.5147%	−0.1146%	0.7429%
68	68	69	69	0.4910%	−0.1300%	0.7276%
68	68	70	70	0.2444%	−0.3375%	0.4847%
69	69	70	70	−0.0011%	−0.5414%	0.2427%

Angela's will be 35% of that amount at $560 per month at age 62. At age 66 Michael will receive $1,600 per month and Angela will receive 50% of this amount or $800 per month.

If the current market interest rate is 5%, then PV of the left-hand side of the equation (retire early at age 62) is $164,070 (Michael) plus $86,603 (Angela) for a total of $250,673. The PV of the right-hand side of the equation (delay retirement to age 66) is $162,038 (Michael) and $92,787 Angela for a total of $254,825. This results in a difference of $4,152 implying that Michael should wait until age 66 to retire. If Michael believes he could invest his monthly SSB at 5.53% 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.

Table 3 Marginal change in BE IRRs for a sample of married retirement ages

Male retirement age1	Female retirement age1	Male retirement age2	Female retirement age2	WW marginal change	BB marginal change	HH marginal change
62	62	63	63	0.0000%	0.0000%	0.0000%
62	62	64	64	1.4948%	1.4629%	1.4898%
62	62	65	65	0.0467%	0.0679%	0.0647%
62	62	66	66	−0.1730%	−0.1582%	−0.1613%
62	62	67	67	−0.8377%	−0.8123%	−0.7967%
62	62	68	68	−0.6660%	−0.6353%	−0.6299%
62	62	69	69	−0.5676%	−0.5276%	−0.5317%
62	62	70	70	−0.4987%	−0.4534%	−0.4649%
63	63	64	64	0.0000%	0.0000%	0.0000%
63	63	65	65	−0.6396%	−0.5999%	−0.6083%
63	63	66	66	−0.4741%	−0.4541%	−0.4591%
63	63	67	67	−1.1501%	−1.1192%	−1.0998%
63	63	68	68	−0.8254%	−0.7897%	−0.7846%
63	63	69	69	−0.6600%	−0.6144%	−0.6206%
63	63	70	70	−0.5556%	−0.5053%	−0.5200%
64	64	65	65	0.0000%	0.0000%	0.0000%
64	64	66	66	−0.3928%	−0.3833%	−0.3873%
64	64	67	67	−1.3762%	−1.3399%	−1.3153%
64	64	68	68	−0.8579%	−0.8179%	−0.8143%
64	64	69	69	−0.6450%	−0.5941%	−0.6043%
64	64	70	70	−0.5262%	−0.4713%	−0.4903%
65	65	66	66	0.0000%	0.0000%	0.0000%
65	65	67	67	−1.9121%	−1.8574%	−1.8221%
65	65	68	68	−0.8638%	−0.8152%	−0.8164%
65	65	69	69	−0.5915%	−0.5320%	−0.5490%
65	65	70	70	−0.4672%	−0.4061%	−0.4314%
66	66	67	67	0.0000%	0.0000%	0.0000%
66	66	68	68	−0.2889%	−0.2473%	−0.2684%
66	66	69	69	−0.3011%	−0.2385%	−0.2689%
66	66	70	70	−0.2860%	−0.2233%	−0.2579%
67	67	68	68	0.0000%	0.0000%	0.0000%
67	67	69	69	−0.3071%	−0.2335%	−0.2687%
67	67	70	70	−0.2821%	−0.2156%	−0.2538%
68	68	69	69	0.0000%	0.0000%	0.0000%
68	68	70	70	−0.2684%	−0.2060%	−0.2454%
69	69	70	70	0.0000%	0.0000%	0.0000%

Continued

6. Results

Table 1 provides the average life expectancies for both males and females for the three race categories (White, Black, and Hispanic) that the BE IRR in Tables 2 and 3 are based on. The results presented in Tables 2 and 3 are based on applying the previously described Excel model for a representative baby boom birth year of 1948 for both spouses.

Table 2 provides the BE IRRs for the nine race combinations where W = White, B = Black, and H = Hispanic. The nine husband/wife combinations are: WW, BB, HH, WB, BW, WH, HW, BH, and HB. We first compare the early retirement age 62 with ages 63

Table 3 Continued

Male retirement age1	Female retirement age1	Male retirement age2	Female retirement age2	WB marginal change	BW marginal change	WH marginal change
62	62	63	63	0.0000%	0.0000%	0.0000%
62	62	64	64	1.4812%	1.4768%	1.5105%
62	62	65	65	0.0540%	0.0604%	0.0552%
62	62	66	66	−0.1686%	−0.1626%	−0.1647%
62	62	67	67	−0.8055%	−0.8448%	−0.8521%
62	62	68	68	−0.6421%	−0.6593%	−0.6834%
62	62	69	69	−0.5445%	−0.5511%	−0.5792%
62	62	70	70	−0.4782%	−0.4739%	−0.5084%
63	63	64	64	0.0000%	0.0000%	0.0000%
63	63	65	65	−0.6260%	−0.6138%	−0.6299%
63	63	66	66	−0.4681%	−0.4602%	−0.4651%
63	63	67	67	−1.1105%	−1.1592%	−1.1683%
63	63	68	68	−0.7976%	−0.8180%	−0.8472%
63	63	69	69	−0.6337%	−0.6410%	−0.6742%
63	63	70	70	−0.5332%	−0.5277%	−0.5673%
64	64	65	65	0.0000%	0.0000%	0.0000%
64	64	66	66	−0.3909%	−0.3852%	−0.3839%
64	64	67	67	−1.3198%	−1.3969%	−1.4095%
64	64	68	68	−0.8245%	−0.8519%	−0.8907%
64	64	69	69	−0.6158%	−0.6237%	−0.6641%
64	64	70	70	−0.5029%	−0.4945%	−0.5404%
65	65	66	66	0.0000%	0.0000%	0.0000%
65	65	67	67	−1.8174%	−1.9537%	−1.9785%
65	65	68	68	−0.8255%	−0.8545%	−0.9114%
65	65	69	69	−0.5612%	−0.5627%	−0.6131%
65	65	70	70	−0.4452%	−0.4276%	−0.4810%
66	66	67	67	0.0000%	0.0000%	0.0000%
66	66	68	68	−0.2969%	−0.2372%	−0.3158%
66	66	69	69	−0.2902%	−0.2480%	−0.3001%
66	66	70	70	−0.2774%	−0.2302%	−0.2845%
67	67	68	68	0.0000%	0.0000%	0.0000%
67	67	69	69	−0.2866%	−0.2524%	−0.2915%
67	67	70	70	−0.2715%	−0.2247%	−0.2756%
68	68	69	69	0.0000%	0.0000%	0.0000%
68	68	70	70	−0.2631%	−0.2091%	−0.2662%
69	69	70	70	0.0000%	0.0000%	0.0000%

Continued

through 70. We then sequentially compare age 63 with ages 64 through 70 and so on for the other "base retirement" years of 64 through 69.

Keep in mind that the BE IRRs can be viewed as "hurdle rates" where if a couple's expected return or opportunity cost of capital is less than (greater than) the computed BE IRR over the given time horizon, the couple should retire at the later (earlier) age. This analysis also assumes that the couple does not need the SSB to live on and can invest the benefits in the capital markets if the decision is made to retire early.

Our results are fairly uniformly consistent across the nine race combinations: BE IRRs for a given base age are, in general, monotonically decreasing compared with older ages (the

Table 3 Continued

Male retirement age1	Female retirement age1	Male retirement age2	Female retirement age2	HW marginal change	BH marginal change	HB marginal change
62	62	63	63	0.0000%	0.0000%	0.0000%
62	62	64	64	1.4745%	1.4923%	1.4615%
62	62	65	65	0.0571%	0.0684%	0.0640%
62	62	66	66	−0.1690%	−0.1545%	−0.1649%
62	62	67	67	−0.7808%	−0.8586%	−0.7508%
62	62	68	68	−0.6122%	−0.6768%	−0.5906%
62	62	69	69	−0.5197%	−0.5631%	−0.4991%
62	62	70	70	−0.4549%	−0.4843%	−0.4370%
63	63	64	64	0.0000%	0.0000%	0.0000%
63	63	65	65	−0.6165%	−0.6047%	−0.6028%
63	63	66	66	−0.4672%	−0.4516%	−0.4615%
63	63	67	67	−1.0801%	−1.1766%	−1.0432%
63	63	68	68	−0.7626%	−0.8399%	−0.7374%
63	63	69	69	−0.6062%	−0.6557%	−0.5830%
63	63	70	70	−0.5081%	−0.5401%	−0.4888%
64	64	65	65	0.0000%	0.0000%	0.0000%
64	64	66	66	−0.3954%	−0.3767%	−0.3935%
64	64	67	67	−1.2807%	−1.4289%	−1.2289%
64	64	68	68	−0.7822%	−0.8849%	−0.7529%
64	64	69	69	−0.5857%	−0.6434%	−0.5605%
64	64	70	70	−0.4765%	−0.5095%	−0.4569%
65	65	66	66	0.0000%	0.0000%	0.0000%
65	65	67	67	−1.7553%	−2.0182%	−1.6698%
65	65	68	68	−0.7717%	−0.9029%	−0.7389%
65	65	69	69	−0.5289%	−0.5851%	−0.5036%
65	65	70	70	−0.4185%	−0.4422%	−0.4006%
66	66	67	67	0.0000%	0.0000%	0.0000%
66	66	68	68	−0.2456%	−0.2651%	−0.2538%
66	66	69	69	−0.2694%	−0.2469%	−0.2610%
66	66	70	70	−0.2585%	−0.2290%	−0.2520%
67	67	68	68	0.0000%	0.0000%	0.0000%
67	67	69	69	−0.2814%	−0.2363%	−0.2646%
67	67	70	70	−0.2587%	−0.2182%	−0.2502%
68	68	69	69	0.0000%	0.0000%	0.0000%
68	68	70	70	−0.2466%	−0.2075%	−0.2429%
69	69	70	70	0.0000%	0.0000%	0.0000%

exceptions are when comparing age 62 to ages 63, 64 and 65). We conclude that, from a given base age, it is generally more optimal to retire now with a longer time horizon because the hurdle rate is lower or later with a short time horizon because the hurdle rate is higher.

It is also interesting and useful to compare the results across race categories at key comparison ages. From Table 2, the high and low BE IRR for the following retirement age comparisons are evident:

Retirement age comparison	high BE IRR	low BE IRR
62 versus 66	HH	WB
62 versus 70	HB	WW
66 versus 70	HB	WH

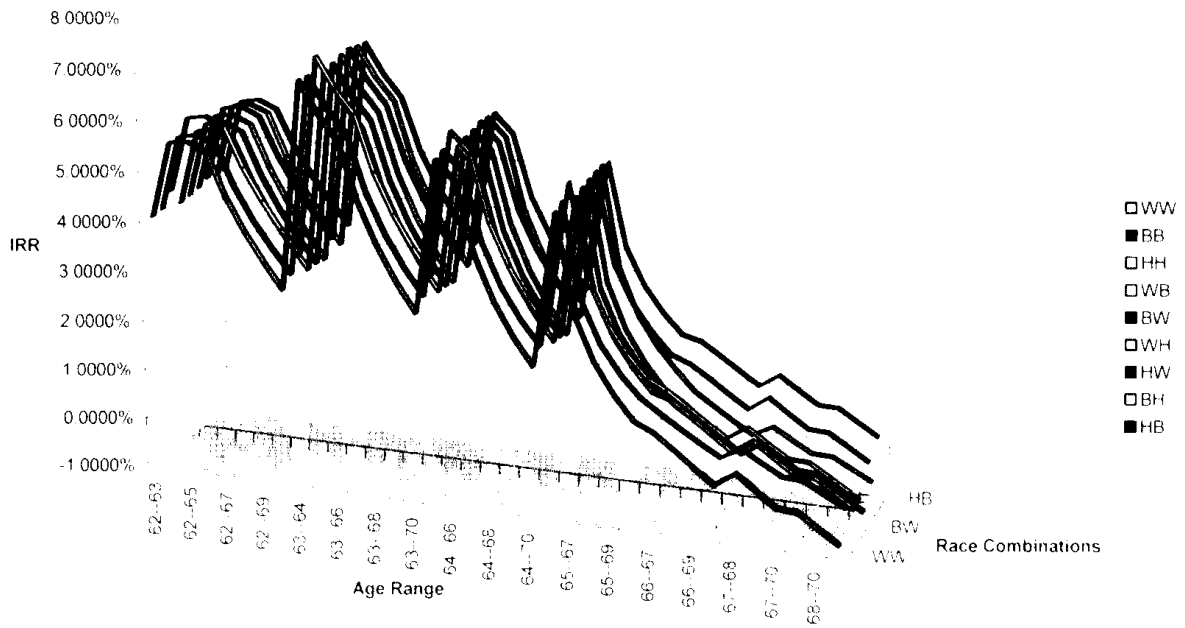

Fig. 1. Breakeven IRR's.

Recall that W = White, B = Black, and H = Hispanic and the husband is listed first and the wife second. Therefore, for example, WB refers to a White husband married to a Black spouse. Note that a higher (lower) BE IRR would imply retiring earlier (later) because the hurdle rate opportunity cost is more difficult (less difficult) to overcome. Given that, the above chart seems to imply that, for example, in the age 62 versus 66 decision that the HH grouping would have an incentive to retire earlier than the WB grouping. A similar interpretation could be given to the 62 versus 70 and 66 versus 70 comparisons. No obvious patterns exist here except for the fact that the High BE IRR group consistently has a Hispanic husband and Low BE IRR group consistently has a White husband.

Table 3 presents the marginal change in BE IRRs for each base age group. Note that these results (and the results from Table 2) should be examined separately by base age group. Again, in general, we can see a similar pattern of declining BE IRRs for each base age group as evidenced by the predominately negative marginal changes. The only positive marginal changes are for the base year age 62 comparison with ages 64 and 65 for all race combinations. Finally, Chart 1 graphs the nine race combination BE IRRs for the Table 2 data. Again, although the Chart is continuous, it should be examined by base age grouping.

7. Applications/implications

The practical applications/implications of our results primarily depend on the couple's opportunity cost of capital and available other resources. As the Michael and Angela example demonstrates in the Section 5 example, a portfolio expected return or opportunity cost of capital greater than (less than) 5.53% would suggest that this couple retire earlier at age 62 (later at age 66). These results should be useful for similarly aged couples facing the social

security early retirement decision and financial planners. Using the spreadsheet developed in this article, couples and/or their financial planners could first compute their BE IRR at various comparison ages and then compare this BE IRR to their expected portfolio return over the comparison period. If their BE IRR was greater than (less than) their expected portfolio return then they should consider retiring at the earlier (later) age.

8. Conclusion

The primary substantive conclusion from this study is that, from a given base age, it is generally more optimal to retire now with a longer time horizon because the hurdle rate is lower or later with a short time horizon because the hurdle rate is higher. This result applies to all husband/wife race combinations.

Notes

1 Age and Sex Composition: 2010 Census Brief. http://www.census.gov/population/.
2 http://www.socialsecurity.gov/pubs/.
3 http://www.socialsecurity.gov/pubs/.
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 × \$1,200 = \$4,800 of the reduction amount. \$4,920 to \$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.
6 National Vital Statistics Report, June 28, 2010, Volume 58, Number 21 (National Vital Statistics Report, 2006); 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 (Arias, 2010) provides life expectancies for Hispanic males and females.
7 http://www.ssa.gov/planners/taxes.htm; http://www.irs.gov/publications/p915/ar02.html.

Appendix A

Abbreviation	Meaning
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 benefits

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