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Your Financial Future During Retirement

Paul C. Schauer
(Bowling Green State University, Bowling Green OH 43402, USA)

Abstract: Planning for retirement is generally not a priority until later in life. For a traditional graduating student, the time until retirement is twice their current age. They are concerned with purchasing a new vehicle, paying student loans, or just enjoying the income level they worked so hard to attain. For a couple in their early forties, retirement planning is not a priority, things like a mortgage and the education of their children are. Retirement is still 20 to 25 years away. While they may be contributing money to the company sponsored defined contribution plan; they have put little thought into the amount they are deferring. If people have done any retirement planning, either consulting with a financial planner or using a book or a web site as a reference tool, the result is generally a very large number designating how much money they will need to retire. For most, that number seems unattainable. Other experiences with retirement planning may include speaking with an individual who was more interested in selling their product than actually helping people formulate a viable plan. This paper takes a different perspective. It examines the amount a person is saving for retirement, and then determines the lifestyle they will be able to live once they retire. If that lifestyle is not acceptable, the retirement savings required to maintain their lifestyle at retirement calculated as a percentage of their current income is also presented.

Key words: retirement planning; retirement savings; 401k contribution rates
JEL codes: D140, D130, D190, I31

1. Introduction

When returning home from a business trip last year, I noticed an advertisement in the airport that read a quarter of all individuals who have reached retirement age had insufficient savings to pay their expenses for the next day. The likelihood that anyone reading this paper falls into that lower quartile is minimal; but a good number of the readers of this paper do not have sufficient retirement savings, or a defined process to get there, enabling them to maintain their current standard of living when they retire.

The statistics concerning retirement savings in the United States are quite alarming. The number of employees included in a private sector defined benefit plan has decreased by 64 percent from 1979 to 2011 (Employee Benefit Research Institute 2013). Nineteen percent of participants in defined benefit plans are in frozen plans; their benefits at retirement will never increase even though they may work another 20 years (United States Bureau of Labor Statistics 2010). Only 44 percent of individuals employed in the private sector participate in an employer defined contribution plan (Employee Benefit Research Institute 2013). Eighty-two percent of plan sponsors do not think their employees take full advantage of the savings and retirement tools available to them

Paul C. Schauer, Ph.D., Associate Professor, Bowling Green state University; research areas/interests: tax, personal finance, retirement planning. E-mail: Schauer@bgsu.edu.

(Mesirow Financial 2013). Thirty percent of individuals that have access to an employer provided defined contribution plan do not participate in the plan (Mesirow Financial 2013). Thirty-one percent of individuals over 55 years old have less than $10,000 in savings and only 22 percent have more than $250,000 (Eisenberg, 2013). Even more alarming is that 41 percent of persons over 65 have a median mortgage on their primary residence of $70,000 (Eisenberg, 2013). All that may give an individual who has been religiously saving for their retirement a warm feeling, but that warm feeling may be short lived.

Few people look forward to dying and even fewer view it as a reason they do not need to plan for retirement. For a couple, each age 35, the probability one of them will reach retirement age is 97.4% (Chief Actuary, Social Security Administration 2013). Retirement planning therefore is essential. The problem is that there are a number of things that complicate retirement planning. The number one problem is determining how long retirement income will be needed. People are living longer. Few would expect that a couple both age 67 has a 95 percent probability that at least one of them will be living ten years later. Even fewer would estimate that there is a 75 percent probability that one of them will reach the age of 84 and a 50 percent probability one of them will reach age 89 (Chief Actuary, Social Security Administration 2013). For most people, running out of retirement savings before they die is not preferred.

There are also a number of other issues that are significant. The dollar that was placed in the retirement account 20 years ago is only worth 62 cents today (U.S. Bureau of Labor Statistics 2013). Retirement savings can be invested in a portfolio that guarantees to preserve capital, but the return on the investment is seldom greater than inflation. Retirement savings can be invested in a portfolio that fluctuates in value to increase return on investment; but the time period where the portfolio value is the highest may not coincide with the date of an individual’s retirement. For most individuals, their standard of living continues to improve with age as they advance in their careers. The standard of living an individual wants to maintain during retirement is their standard of living at retirement, not the one they had when they were 30. All these issues make retirement planning complex. This paper incorporates these issues into the analysis to better explain their impact.

2. The Model

To determine the amount of retirement savings that an individual would accumulate prior to their retirement, a model was developed that utilizes a Monte Carlo simulation with 10,000 observations.

The first step was to determine the rate of return for each month during the accumulation period. One of the 316 observations of monthly rates of return for ten year Treasury bills, the Dow industrials, the S & P 500, the NASDAQ, and the Russel 2000 (Yahoo Financial 2013; Federal Reserve Economic Data 2013) were then selected based on a random number generated utilizing the uniform distribution for each observation for each month. The consumer price index for that same month was also identified (U.S. Department of Labor Statistics 2013).

The second step was to determine the income for each observation during each year in the accumulation period. Wage growth is different depending on the amount of the wage received. Therefore, wage growth was segmented into five quintiles (US Census Bureau, 2012). The annual inflation adjusted wage growth from the next 30 years was then determined randomly from a normal distribution based on the mean and the standard deviation of the inflation adjusted wage growth for each quintile in the study. Annual inflation is then calculated based on the monthly inflation rates determined above. Wages then increase by the amount of that inflation adjusted wage growth and annual inflation rates. If the accumulation period was less than 35 years, the base for the Social

Security benefit calculation described below, earnings were calculated using the same methodology, but the earnings were deflated by the inflation adjusted growth rate and annual inflation for periods prior to the beginning of the accumulation period.

The third step was to determine the amount of retirement savings an individual would accumulate during the various potential accumulation periods. Total retirement savings was then determined based a ten percent of wages (seven percent contribution and a three percent employer match) for each year in the accumulation period and any investment returns the portfolio would receive.

The fourth step was to determine the family's Social Security benefit. Social Security benefits are based on the highest 35 years of Social Security earnings. Social Security earnings are based on Social Security income which has a ceiling for each year adjusted to current dollars. The ceiling is adjusted each year based on annual wage growth. Benefits are based on three brackets. In 2013, an individual's benefit is calculated as 90 percent of the first $816 of monthly Social Security income, 32 percent of the next $4,101, and 15 percent of the remaining monthly Social Security income (Social Security Administration 2014). These numbers are adjusted for inflation annually. To calculate Social Security benefits in the future, each of the brackets were adjusted for inflation and the ceiling was adjusted for wage growth. Income was based on the calculation from step two.

The final step was to determine what the total retirement income would be. Retirement income was determined based on the individual's Social Security benefit and withdrawals from retirement savings for the mean wages in each quintile. Withdrawals from retirement savings were based on a four percent of initial retirement savings determined to be a safe withdrawal methodology by William Bengen (1994). Social Security payments were based on the calculated earnings history for the individual. The results were then adjusted to reflect current dollars.

3. Results

The average person who participates in their defined contribution plan contributes between five and a half and seven percent of their income. Ninety-six percent of plans have a company match. The most common company match is fifty cents on the dollar for the first six percent of participant contribution (Employee Benefit Research Institute 2013). Table 1 presents the percent of current income an individual would receive during retirement for each of the five quintiles. Income is calculated based on their Social Security benefit and the anticipated acceptable withdrawal rate based on a contribution rate of ten percent, the high end of personal contributions and a company match for the accumulation period specified.

The results in Table 1 require analysis to fully understand the data presented. For the first two quintiles, the majority of the family income comes from their Social Security benefits. Social Security is based on a single wage earner and the spouse receiving half the wage earners' benefit. The probability that families in these first two quintiles could save ten percent of their wages or that they work for an employer with a company match is relatively low. The income for a significant portion of the second quintile and thus all of the income in the first quintile is below the poverty level of $23,850 (Department of Health and Human Services 2014). Thus for most if not all families in these quintiles, they will not reach the percentages of retirement savings specified.

Table 1 Retirement Income as a Percentage of Current Income
Retirement Contribution Ten Percent of Salary
Accumulation Periods as Specified

	10	15	25	35	45
First Quintile - Median Family Income = 11,490					
Ten Year Treasury	106.43%	96.43%	83.64%	77.99%	76.73%
S&P 500	107.07%	98.01%	89.32%	92.07%	107.42%
Dow	107.17%	98.27%	90.29%	94.74%	114.02%
NASDAQ	108.13%	101.03%	102.65%	134.87%	226.97%
Russel 2000	107.51%	99.23%	94.07%	105.73%	142.38%
Second Quintile - Median Family Income = 29696					
Ten Year Treasury	69.96%	67.85%	67.22%	70.47%	75.01%
S&P 500	70.60%	69.46%	73.02%	85.08%	107.21%
Dow	70.70%	69.72%	74.02%	87.86%	114.10%
NASDAQ	71.68%	72.52%	86.71%	129.46%	232.73%
Russel 2000	71.05%	70.70%	77.91%	99.24%	144.03%
Third Quintile - Median Family Income = 51,179					
Ten Year Treasury	57.38%	55.54%	55.13%	58.11%	63.41%
S&P 500	58.01%	57.12%	60.76%	72.07%	93.81%
Dow	58.11%	57.37%	61.73%	74.74%	100.33%
NASDAQ	59.08%	60.12%	74.02%	114.39%	211.23%
Russel 2000	58.46%	58.33%	65.49%	85.58%	128.35%
Fourth Quintile - Median Family Income = 82,048					
Ten Year Treasury	51.24%	48.71%	47.38%	48.26%	51.45%
S&P 500	51.86%	50.24%	52.74%	61.22%	78.92%
Dow	51.96%	50.49%	53.66%	63.67%	84.77%
NASDAQ	52.90%	53.15%	65.30%	100.34%	184.59%
Russel 2000	52.30%	51.42%	57.21%	73.68%	110.03%
Fifth Quintile - Median Family Income = 181,905					
Ten Year Treasury	29.15%	30.08%	30.27%	32.10%	36.35%
S&P 500	29.75%	31.54%	35.24%	43.70%	60.24%
Dow	29.85%	31.78%	36.09%	45.90%	65.32%
NASDAQ	30.77%	34.33%	46.82%	78.51%	150.95%
Russel 2000	30.18%	32.67%	39.37%	54.85%	87.07%

Families in the third through fifth quintiles rely more heavily on retirement savings than Social Security benefits to attain sufficient retirement income. Based on the data presented in Table 1, they can obtain sufficient retirement savings to live comfortably in retirement, but it requires contributions to their retirement plan throughout their careers and the right investment selection. For example, a family with an income of $51,179, the median for the third quintile, whose total contributions to their retirement plan are ten percent of that amount for 25 years and receives the average return for the NASDAQ could have retirement income equal to 91.17 percent of their current income. That is probably sufficient since they are currently living on 93 percent of their income, their income less their retirement contribution. Again, further analysis is necessary since the result is based on the average amount for ten thousand observations.

Table 2 presents the probability that for a given accumulation period, investment strategy, and a seven percent contribution rate and a three percent match will provide sufficient retirement savings to maintain people’s

standard of living during retirement. Accumulation periods of less than 35 years provide less than a 50 percent chance that people will meet that goal and then for only some investment mediums. Many of the smaller accumulation periods and investment medium combination have less than a 0.01 percent chance of meeting the goal. The results presented also show those investments which provide the greatest potential reward, are also the riskier portfolios.

Table 2 Retirement Income as a Percentage of Current Income
Retirement Savings Seven Percent of Current Income with Three Percent Company Match
Probability of Maintaining Their Standard of Living during Retirement
Accumulation Period as Specified

	10	15	25	35	45
Third Quintile-Median Family Income = 51,179					
Ten Year Treasury	< 0.01%	< 0.01%	< 0.01%	< 0.01%	< 0.01%
S&P 500	< 0.01%	< 0.01%	0.14%	20.95%	50.59%
Dow	< 0.01%	< 0.01%	0.29%	25.64%	54.81%
NASDAQ	< 0.01%	< 0.01%	27.95%	57.41%	63.61%
Russel 2000	< 0.01%	< 0.01%	7.15%	44.33%	60.86%
Fourth Quintile-Median Family Income = 82,048					
Ten Year Treasury	< 0.01%	< 0.01%	< 0.01%	< 0.01%	< 0.01%
S&P 500	< 0.01%	< 0.01%	< 0.01%	9.09%	38.65%
Dow	< 0.01%	< 0.01%	0.01%	12.56%	43.92%
NASDAQ	< 0.01%	< 0.01%	18.34%	52.81%	61.73%
Russel 2000	< 0.01%	< 0.01%	2.25%	34.25%	55.92%
Fifth Quintile-Median Family Income = 181,905					
Ten Year Treasury	< 0.01%	< 0.01%	< 0.01%	< 0.01%	< 0.01%
S&P 500	< 0.01%	< 0.01%	< 0.01%	1.07%	22.27%
Dow	< 0.01%	< 0.01%	< 0.01%	2.01%	27.95%
NASDAQ	< 0.01%	< 0.01%	5.24%	43.84%	58.51%
Russel 2000	< 0.01%	< 0.01%	0.06%	18.78%	47.65%

Using the benchmark of retirement income being 93 percent of current income, the results for the fourth and fifth quintiles presented in Table 2 are quite alarming. In the fourth quintile, there is less than a 50 percent chance that people can maintain their standard of living during retirement except for accumulation periods of 35 to 45 years. Even in these longer accumulation periods, the probability of people maintaining their standard of living is less than 62 percent. As one would expect, the fifth quintile is even worse since more of people's retirement income must come from retirement savings. Only the 45 year accumulation period has more than a 50 percent chance of reaching the retirement goal and then in only one portfolio.

Summarizing the results thus far, families in the first and second quintile have little probability of saving significant amounts for retirement; all of the families in the first quintile and a significant portion of the second quintile are living below the poverty line. Generally, for families in the third, fourth, and fifth quintiles, placing seven percent of their income in a defined contribution plan with a three percent company match will not provide them sufficient retirement income even if they save throughout all of their careers. Saving less or having shorter accumulation periods only compounds the problem. So how much does a family have to save in order to maintain their lifestyle during retirement? The results are quite alarming.

Thus far this paper has been using a ten percent of income savings rate as a benchmark in the presentation of

results. That amount is consistent with the upper limits of current contributions to a 401k and a three percent contribution as a company match. However as shown in Tables 1 and 2, this is generally insufficient for people to maintain their current lifestyle upon retirement. Table 3 uses a concept that if you save X percent for retirement, you only need to have 100–X percent of income upon retirement since you have been maintaining your lifestyle on that amount for years. Table 3 identifies X for the quintiles three to five for various investment choices and accumulation periods.

Some explanation of the results is necessary to fully understand the data provided in Table 3. The ten year accumulation period in the third quintile for retirement income invested in Ten Year Treasury Bills will be used as an example. The 32.42 percent of current income is the retirement savings required to maintain their current lifestyle at retirement. Note that they only need 67.58 percent of their current income at retirement to maintain their current lifestyle for they do not have to save for retirement. It also assumes that they can currently live on 67.58 percent of their income. Continuing in the third quartile for Ten Year Treasury Bills, one would expect that if people saving 32.42 percent of their current income for ten years resulted in sufficient retirement savings to maintain their income at retirement, they would not need 27.40 percent of their current income if they saved for retirement for 20 years. One would expect the percentage to be closer to 16 or 17 percent or about half of the 32.42 percent. There are two reasons that this is not the case.

First, since their saving amount decreased from 32.42 percent to 27.40 percent of their current income, their standard of living was based on 72.60 percent of their current income rather than 67.58 percent or a 7.43 percent increase. That income must come completely from savings for their Social Security benefit would not increase. The four percent safe withdrawal rate provided by Bengen (1994) is based on a maximum retirement period of thirty years. Thus one must have sufficient retirement savings to fund the 7.43 percent increase for 30 years.

Table 3 Retirement Savings as a Percentage of Income Required to Maintain the Standard of Living at Retirement throughout Retirement - Accumulation Period as Specified

	10	15	20	25	30	35	40	45
Third Quintile-Median Family Income = 51,179								
Ten Year Treasury	32.42%	29.98%	27.40%	24.75%	22.29%	20.07%	18.13%	16.37%
S&P 500	31.06%	27.47%	23.72%	19.99%	16.77%	13.93%	11.50%	9.47%
Dow	30.86%	27.10%	23.20%	19.35%	16.05%	13.16%	10.71%	8.69%
NASDAQ	29.02%	23.69%	18.43%	13.76%	10.05%	7.23%	5.06%	3.60%
Russel 2000	30.17%	25.80%	21.38%	17.21%	13.67%	10.75%	8.29%	6.41%
Fourth Quintile-Median Family Income = 82,048								
Ten Year Treasury	36.76%	34.17%	31.22%	28.45%	25.97%	23.72%	21.68%	19.80%
S&P 500	35.25%	31.37%	27.10%	23.10%	19.70%	16.64%	13.94%	11.66%
Dow	35.02%	30.95%	26.52%	22.37%	18.88%	15.75%	13.01%	10.72%
NASDAQ	32.97%	27.12%	21.16%	16.02%	11.94%	8.75%	6.23%	4.52%
Russel 2000	34.26%	29.50%	24.48%	19.96%	16.14%	12.92%	10.13%	7.95%
Fifth Quintile-Median Family Income = 181,905								
Ten Year Treasury	52.27%	45.54%	40.42%	36.70%	33.20%	30.10%	27.32%	24.77%
S&P 500	50.16%	41.90%	35.27%	30.03%	25.49%	21.46%	17.94%	14.94%
Dow	49.85%	41.36%	34.54%	29.12%	24.46%	20.35%	16.78%	13.78%
NASDAQ	46.98%	36.36%	27.75%	21.09%	15.71%	11.53%	8.22%	5.96%
Russel 2000	48.78%	39.47%	31.98%	26.09%	21.03%	16.82%	13.18%	10.34%

The second reason results from timing. The accumulation periods in Table 3 are defined as the time period occurring just prior to retirement. During one's employment, income continues to grow. The ten year accumulation period has ten years of income growth. The 20 year accumulation period has 20 years of income growth. During retirement, one does not want to maintain their standard of living today; they want to maintain their standard of living just prior to retirement. As a result, the standard of living at retirement is higher for the twenty year accumulation period than it is for the ten year accumulation period. Thus more retirement savings is required at retirement for the longer accumulation period.

The assumptions made in this paper to perform these calculations can affect the results both positively and negatively. The results are based on averages so actual results can be positively or negatively impact the data provided. Few people can attain the returns as an individual investor that market indices reflect, a negative impact. Most people who have a defined contribution plan, such as a 401k, invest in mutual funds. The fees associated with mutual fund expenses have a negative impact. The Social Security benefit is calculated as an individual's benefit and their spouse receiving half that benefit. Attaining any of the median incomes of the quintiles with two incomes rather than one will generally provide a greater Social Security benefit to the couple, a positive impact. However, since the Social Security benefit is such a small part of the overall retirement income for the higher quintiles, the effect may be minimal. Taxes have little impact if the retirement savings can be placed in a defined contribution plan such as a 401k for the tax can be deferred until the couple retires when they have the same or lower income. There is a more significant impact when people cannot defer all of their retirement savings for they are saving high tax bracket income that at least of a portion of that income would be taxed at a lower rate if the tax were deferred, a positive impact for they would require less savings to maintain their disposable income. In short, the negative impact on retirement savings the mutual fund expenses and actual return on investments that most people experience will generally outweigh any positive impact from the other factors. If the net impact of these factors is positive, it will in most cases not be significant. Even if it were significant, even decreasing the percentages in Table 3 by a quarter or a third would result in required retirement savings far greater than most Americans are currently accruing.

4. Conclusion

Planning for retirement is generally not a priority until later in life. The continuing decline in defined benefit plans in the private sector generally means the only annuity income received by most people is their Social Security benefit. To maintain an acceptable standard of living during retirement, people must depend on drawing from their retirement savings. The issue is most people have insufficient retirement savings to supplement their Social Security income to maintain their standard of living.

A significant number of people in America either do not have a defined contribution retirement plan or fail to contribute to the one they have. Of those who contribute to their plans, the most common contribution rates are between five and a half and seven percent with the most common company match being half of the employee contribution up to six percent. Even the ten percent contribution rate provides insufficient savings for a majority of people to maintain their standard of living at retirement during retirement. For people who delay saving for retirement until their later years, savings rates of approximately 25 to 30 percent of income are required for people with the median family income of $51,179 and in the 50 percent range for people in the fifth quintile of income of $181,905. In summary, begin saving for retirement early in life and be cognizant of the amount required to be placed in savings in order to maintain an acceptable standard of living throughout retirement.

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