A Comparison of ORP to Other Retirement Planning Tools

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1 Abstract

Dorman, et al (2016) published an evaluation of 36 publically available retirement planning tools (the Study). The Optimal Retirement Planner (ORP) was not included. This paper measures how well ORP compares to the Study's standard for retirement planning tools. The results are that ORP exceeds the Study's standard in every way, most notably, ORP models the spouse as a separate but interacting entity.

2 Introduction

A retirement planning tool is computer software that accepts a set of parameters describing a retirement plan and computes some indication as to whether or not the plan will succeed, that is, savings will not be depleted before the end of the plan.

In 2016 Dorman, et al (2016) published an evaluation of 36 retirement planning tools (the Study). They reviewed the parameters used to input the assumptions of the user, compared their computational results, and evaluated the relationship between the number of parameters offered by the tool and the relevance of its results.

The **Optimal Retirement Planner (OR**P) (Welch 2017) was not included in the Study. The purpose of this paper is to compare ORP to the standards used to measure the tools in the Study.

The criteria for being included in the Study were:

1. Does the tool portray itself as one that provides the user "an answer", i.e. helps the user understand how much he or she needs to save for retirement and/or can the user realistically achieve his or her retirement goals?
2. Is the tool publicly-available, either for free or for a modest user fee?
3. Is the tool targeted towards households? (Dorman 2016)

ORP meets all three of these criteria. ORP is browser accessible on the Internet, at no charge and with no registration requirement, and models either a single retiree or a married couple. Unlike many of the planners in the Study, ORP is not affiliated with any retail financial institutions. ORP is offered as a public service to help the retiring novice.

The results are that ORP's parameters are more comprehensive than identified by the Study and that ORP correctly identified that the Study's test scenario would fail.

3 The Study

The Study proceeded as several sequential phases.

1. A list of 28 required tool parameters was defined by the authors from the idealized perspective of an economist.
2. 297 professional financial planners were surveyed to solicit their views on tool parameters.

3. The results from these two sources were merged to create a set of 24 required parameters for a retirement planning tool.
4. Eleven publically available planning tools that focused on the retail market were identified. The most popular tool among the professional was MoneyGuidePro (38%). The second most popular tool was Microsoft's Excel (260%) for home grown retirement tools.
5. A retirement plan was defined and applied to the tools. The scenario used only ten of the theoretical parameters and four from the survey. The scenario was defined so that the retirement goal of annual spending of $70K could not be supported by the scenario's assets.
6. Less than one third of the tools correctly identified the plan as unsustainable.

4 Required Parameters

Table 1 lists the 28 parameters identified by the Study as being required by a retirement planning tool. The Discussion column identifies the ORP equivalent or otherwise describes how the parameter is dealt with in an ORP model.

Italics indicates where the Study's model is lacking necessary parameters, which ORP supplies.

The parameters with asterisks (*) on their names require a separate spousal value.

Table 1: Required Parameters

Parameters	Discussion
Ages	
Current Age*	
Age to Retire*	
Life Expectancy*	Retirement calculators compute the consequences of adopting a particular retirement income management plan. Life Expectancy is a predicative value. *Ages the Plan is to End* is a planning number that includes all of these variables in an estimate of reasonable ages that the retiree and spouse are unlikely to outlive. If the plan end is age 92 and life expectancy is 78 then the savings balances at life expectancy is the estate at age 78.
Personal Health	
Smoker vs Non-Smoker	
Family Mortality History	
Current and Future Annual Income	
Pension Income *	Government or Private. Requires the additional parameter, the *Age to Begin*.
Social Insurance* Income	i.e. Social Security benefits, requires the additional parameter, the *Age to Begin Benefits*.
Trust Income	*Trust income is not included in ORP but it could be easily added if there was ever a call for it. It is basically an annuity with a termination age.*
Disability Income*	This is a Social Security program presumably in force at the beginning of the plan.
Pre-retirement Asset Withdrawals*	Withdrawals before age 59 ½ require either a 10% penalty or set up a SEPP program with the IRS for the tax-deferred account and the Roth IRA.

Other Sources of Retirement Income*	e.g. earned income after retirement, alimony. This category needs to include deferred and immediate annuities as well as contributions to all three savings accounts (tax-deferred, Roth IRA, Taxable) prior to retirement. These sources each require the additional parameter, the *Age to Begin for an annuity, Age to End for Earned Income*. Missing parameters include estimates of pre-retirement, annual contributions to all three savings accounts before retirement. *ORP computes these values in the context of tax efficient overall accumulation and distribution plan.*

Expenses

Retirement Living Expenses	Calculators in the Study require annual spending as an input parameter and their simulator computes the estate at plan end. *ORP's optimizer assumes a zero estate and computes maximum annual, after tax spending in today's dollars*.

Accumulated Savings and Debts

Taxable	Cash, Brokerage Accounts account balance
Tax-deferred*	401k, Traditional IRA account balance
Tax-free*	Roth 401k, Roth IRA account balance
Mortgage Details	Original cost of an illiquid asset (home), age to sell, loan balance due at sale
Windfall Receipts	Extraordinary, onetime income event. Program should also include one time, major expenses.
Bequests	Out of scope, the simulator computes estate; how it is divided up is estate planning.

Rates

Stocks	Rate of return
Bonds	Interest yield
Inflation	Anticipated average rate of change in consumer price index.
Tax Assumptions	State income tax deduction and percent tax. ORP computes Federal personal income taxes from IRS tax table.

Household Structure

State of Residency	State income tax parameters specified under Tax Assumptions, above
Gender	Already included in age plan is to end
Marital Status	Redundant, already specified by spouse age.
Goal Specifics	Does not fit in a quantitative model.
Risk Tolerance	Out of scope of income modeling, belongs in portfolio management.

5 Computational Results

The Study defines a retirement plan to be applied to all the tools under consideration. **Table 2** defines the assumptions of the plan. The Study defines 24 parameters to be required by a retirement planning tool. The Study's scenario specifies values for twelve parameters.

Table 2: Scenario Parameters

Parameter	Value	Discussion
Age	59	Current age of retiree
Age, Spouse	57	If spouse age exists then model is for a married couple
Age to retire	65	Expected age for worker to retire
Age to retire, Spouse	63	Expected age for spouse to retire
Annual Earnings	$50K	ORP assumes that 15% of annual earnings is saved before retirement in retirement savings accounts, or each contributed $7.5K to their 401K plan annually.
Annual Earnings, Spouse	$50K	
Annual Spending	$70K	Expected annual real retirement expenses net of income taxes. *ORP assumes an estate of zero at the end of the plan and computes maximum, real, annual spending, net of taxes.*
Age to begin Social Security	66	Age for worker to begin Social Security
Social Security Benefits	$16K	Worker's initial Social Security benefits. (Not specified in the Study.) $16K is the national average. Spouse to receive spousal benefits.
Life expectancy	90	Actually the planning horizon. The planning horizon is longer that Life expectancy to model longevity risk.
Life expectancy, spouse	92	Longer plan end reflects that spouse is female.
401K account balance	$700K	Amount of tax-deferred savings, subject to personal income taxes upon withdrawal.
Portfolio allocation	60/40	*Although unspecified by the Study, it is conventional in tests such as these to allocate savings to 60 stocks and 40% bonds.*

The Study reports the results of running all 36 planning tools under consideration. All of the tools have the similar mechanics; using the Monte Carlo or some other stochastic simulation method. The process is to specify the desired spending level ($70K) and compute the probability that the plan will not deplete savings during the term of the plan. The scenario assumptions are defined so that there is only a 47% probability that the plan's savings will fund the plan for its full term. That is, there is a 53% probability that the plan will fail. The expectation is that all of the tools will compute a plan failure. In fact, only 11 out of 36 tools correctly called for a plan failure.

ORP's Monte Carlo method computed an average of $44K of annual retirement income, well short of the desired $70K of annual spending. ORP calculated a first standard deviation of $30K so the first standard deviation above the mean is $74K with 84% of plans finishing below this. ORP correctly called for the plan to be unsuccessful more than half of the time.

Unlike most of the tools of the Study ORP made use of all 12 of the parameters defined for the comparison scenario by the Study.

6 Conclusion

The Optimal Retirement Planner met all of the criteria used to select retirement planning tools for inclusion in the Study.

ORP contains a full set of parameters equivalent to the 24 identified as required by the Study. ORP actually has 110 parameters covering everything from Affordable Care Act (ACA) income limitation to Social Security disability eligibility.

ORP correctly identified the Study's test scenario as likely to fail.

Table 1 identifies required parameters that are used by ORP that are not in the Study. In particular the Study omits parameters having to do with the spouse. The Social Security and pension parameters are missing the beginning age parameter.

7 Reverences.

Dorman, Taft and Mulholland, Barry S. and Bi, Qianwen and Evensky, Harold, The Efficacy of Publicly-Available Retirement Planning Tools (February 18, 2016). Available at: "https://www.i-orp.com/modeldescription/dormantools.pdf"

Welch, James S. Jr. 2017. "Mitigating the Impact of Personal Income Taxes on Retirement Savings Distributions" *Journal of Financial Planning* 30 (8): 45–55. Available at: "https://www.i-orp.com/modeldescription/mitigatedtaxes.pdf"