The Efficacy of Publicly-Available Retirement Planning Tools

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Abstract

Publicly-available retirement planning tools are publicized to aid households in their retirement planning efforts, but households are likely overestimating tool effectiveness. The authors conclude that the advice provided from a majority of these tools is extremely misleading to households, and propose a more systematic approach to tool development by improved choice of input variables. Analyzing professional advisor opinion and theory, critical input variables are identified and recommended. A case scenario is developed incorporating these critical variables and used to test the efficacy of 36 publicly-available retirement planning tools.

"Annual income twenty pounds, annual expenditure nineteen six, result happiness. Annual income twenty pounds, annual expenditure twenty pound ought and six, result misery"

- *Charles Dickens, David Copperfield*

Retirement planning is complex and continues to be a challenge for American households, financial professionals, and researchers due to uncertainties about the future (see Bernheim, Skinner, and Weinberg, 2001; Skinner, 2007). Consumer questions abound: Will I be able to retire? Do I have enough to retire? Will I run out of money in retirement? And, how do I find the correct answer to these fundamental questions? Even after decades of research, the challenge of producing lifetime income remains a conundrum (see Siegel 2015). Therefore, it is no surprise that the CFA Institute's Future of Finance initiative considers "Retirement Security" as one of its six areas of focus (see CFA Institute, 2015).

One approach to answering the difficult retirement questions is for households to seek a financial professional (see Campbell, 2006; Fischer and Gerhardt, 2007). But not all households can afford professional advice, and those who can struggle to discern good advice from bad advice (see Mullainathan, Noeth, and Schoar, 2012; Hung, Clancy, Dominitz, Talley, and Berrebi, 2008; Inderst and Ottaviani, 2012; Bodie, 2003; Del Guercio and Reuter, 2012). Finding a trustworthy advisor may be difficult because not all financial professionals provide unbiased, high quality advice. Consequently, search cost may be high for many households who desire financial advice,

thus causing them to seek alternatives for their retirement planning needs, even "do-it-yourself" options.

One alternative is to conduct a web-based search for a publicly-available retirement planning tool that may attempt to answer the plethora of retirement questions in one place. Some households may think these tools are trustworthy because they come from third-party sources, or that they are cost effective since they may significantly reduce search cost.

We define publicly-available retirement planning tools as tools that provide an answer as to whether or not a household can meet its unique retirement goals. These are tools that households can find and use, either for free or for a modest fee, without the assistance of a financial professional. There are dozens of publicly-available retirement planning tools, many of which are found on well-known company websites. The variation of tool inputs and default settings invites the question: Which demographic, financial, and economic inputs, including their default settings, are necessary for publicly-available retirement planning tools to provide an appropriate recommendation?

This paper investigates the necessary inputs and default settings of publicly-available retirement planning tools while focusing on three important outcomes. First, it identifies the relevance of the advice provided to households using these tools. Second, it highlights the risk household's face by using these tools. And third, it provides tool developers with critical information to convert their tools, as necessary, from their current state, into more valuable guides.

Households that plan their retirement savings on a do-it-yourself basis are likely looking for tools that will help them make informed decisions. Households that use financial professionals may be looking for ways to improve their level of trust in the advice they receive. Thus, households

may use publicly-available retirement planning tools to double check the advice given by financial advisors (see Powell, 2015).

Employer plan participation is positively related to the number of decumulation options offered to participants (see Brown and Weisbenner, 2014). Yet, many publicly-available retirement planning tools may reduce the probability of a household participating in employer retirement plans because they fail to provide efficient decumulation options, such as the option to annuitize 401k plan assets. Additionally, most publicly-available retirement planning tools do not recognize that some households prefer to retire gradually, rather than identifying a date that acts as a light switch that is instantly changed from "not retired" to "retired."

Providers of publicly-available retirement planning tools have the opportunity to exploit naïve users through information asymmetry (see Akerlof, 1970). Many tools market themselves as sufficient to answer the most common retirement question: how much do I need to save for retirement? However, tool inputs and default settings are established to guide households into purchasing financial products or speaking to a financial professional who may be paid for selling proprietary products. Due to their design, allowing tool providers to exploit the information asymmetry suggested byAkerlof, households may view tool results as retirement advice, without the understanding that the tools provide directed "advice" that benefits the vendor, not the investor.

The lack of consistency in inputs and default settings make these tools questionable for planning and educational purposes for households, financial professionals, and academics alike. If households are to use these tools either for planning or educational purposes, it is clear that the tools need to offer appropriate and similar input options and default settings.

In this study, we explore the current state of publicly-available retirement planning tools, examine their potential impact on households and the financial planning industry, and assess their validity as planning or educational tools. We employ both a theoretical framework and the expertise of financial professionals to determine the recommended variables necessary for these tools to provide better information to households. We expand upon prior studies and provide guidance on the proper variables to be included in publicly-available tools in order to improve their effectiveness. To the best of our knowledge, this is the largest study regarding the efficacy of publicly-available retirement planning tools.

This paper is structured as follows: We first look at a brief background of publicly-available tools; we then discuss prior research related to both retirement savings and the effectiveness of publicly-available tools; we next discuss our methodology for identifying appropriate variables and testing the effectiveness of current tools; we then discuss our results and finish with our conclusions.

Background

In January of 2000, a patent was granted to a life insurance company for a computer-based tool that performed financial planning calculations, primarily for retirement. The goal of this tool was to create graphical results for financial advisors in an understandable format for presentations to households. However, it appears, the tool was never meant for direct personal use. By 2003, there were at least twenty-four electronic tools for retirement analysis. Six of those tools were for public use while eleven were for professionals, and at least two were proprietary tools. Five tools were unidentified (see Sondergeld, 2003). The number of publicly-available tools has grown substantial since then.

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Since the beginning, publicly-available retirement planning tools have long been known to be inefficient for retirement planning (see Warshawsky and Ameriks, 2000). Many have imprecisely calculated critical retirement planning variables such as social security, investment rates of return, longevity risk, and income replacement rates (see Turner and Witte, 2009). And, such tools may cause households to make detrimental retirement planning decisions (see Turner, 2014).

We argue that, at a minimum, a respectable tool will be goal oriented, provide both accumulation and decumulation strategies, and use inputs and default settings that agree with both theory and practice. This paper focuses on the variability in tool inputs and default settings as it pertains to theory and practice.

Prior Research

Industry and academic literature examines both professional and publicly-available retirement planning tools. Professional software attracts most of the attention from these two groups, but a considerable amount of the literature draws common conclusions on, and recommendations for, improving publicly-available retirement planning tools.

The consumer press focuses almost exclusively on the publicly-available retirement planning tools. A recent Google search for the term "recommended retirement calculator" generated over 1 million results. But many of those results are investment companies or news sites that are recommending their own tools. Digging deeper, it is possible to find recommendations that are not pushing their own tools, unfortunately those articles appear to have a similar focus – the authors have tried several available tools and are recommending the tools with minimal due diligence about their effectiveness.

Consumer bloggers and members of the financial planning press who have more closely examined and compared retirement planning tools are generally critical of the available tools. Tresidder (2011) argues that the available tools appear easy to use but suggests that the primary problem they suffer is the inaccurate assumptions. These include important variables such as inflation, longevity, investment returns, and retirement spending. Kirkpatrick (2014a) adds that assumption problems exist for social security timing, marital status, tax rates, and other retirement income sources. Additionally, Tresidder argues that user input flexibility impacts tool results, with many tools relying on rules-of-thumb or assuming an average value for user inputs. But real retirees are unique with few of them actually retiring at exactly age 65 and living exactly to the average life expectancy. Consequently, rules-of-thumb at best become meaningless and at worst, dangerous.

Clear, unbiased guidance is difficult to obtain with publicly-available retirement planning tools when they provide opaque advice. Consumer Reports (2011) suggests that tools offered by investment companies are biased because they focus on proprietary products or make assumptions that inefficiently demonstrate what retirement planning really is.

To improve retirement planning tools and their use, different approaches are suggested by non-academics. Vernon (2010), an actuary, identifies important features in publicly-available tools. These include detailed expenses – not just rules of thumb on expenses; savings withdrawal flexibility – to see the impact of changes; saving the inputs and results – to compare current and prior projections; adjustable future economic scenarios – to see the impact of future downturns; outputs that show the components of retirement income sources – to understand the impact and quality of each source on retirement income; and "what if" scenario testing – to asses different situations that households are interested in testing. Kirkpatrick (2014b) attempts to categorize a

large number of available tools based upon several criteria to allow his blog readers the opportunity to choose the better tool that meets their needs. His sorting criteria includes the level of realism of the output, how stock returns are modeled, the software platform the tool operates on, and cost.

Academic research shows that publicly-available retirement planning tools fail to meet retirement planning needs for a variety of reasons. Warshawsky and Ameriks (2000) suggest that many programs fail to recognize household uncertainties such as life expectancy and returns on financial and human capital. Sondergeld, Chamerda, Drinkwater, and Landsberg (2003) explore how programs work with retirement decumulation when attempting to address different types of risk such as longevity, health, investment, and inflation. They find that not only do inputs vary tremendously from tool to tool, but results are just as inconsistent. Bodie (2003) examines four online retirement planning programs and finds that publicly-available retirement planning tools lack sufficient recognition of post-retirement risk, thus making them dangerous for public use. Dowd, Atherly and Town (2008) suggest that publicly-available retirement planning tools be improved to include either annual or monthly health care spending.

Researchers continue to explore the challenges of planning for retirement with some pessimism and some optimism. Skinner (2007) examines the conflicting views that Americans are either not saving enough or are saving too much. He concludes that retirement planning is a complex task and that even the most sophisticated retirement planning tools cannot get it right. Sexauer and Siegel (2013) believe that retirement preparation by individuals is possible as long as the individual sets up a saving plan and sticks to it. However, determining the optimal saving plan is a complicated and dynamic procedure. The key is that different people may end up with different retirement solutions or combinations of solutions (see Siegel, 2015). For example, a single replacement rate may not be practical because retirees' spending ratio may change based on their

investment returns (see Waring and Siegel, 2015; Scott and Watson, 2013). Kotlikoff (2008) concludes that retirement planning programs should use a dynamic programming style instead of a Monte Carlo simulation because households make spending adjustments over time.

A number of researchers conduct academic studies of publicly-available retirement planning tools. John Turner is the primary contributor of studies about these tools. First, Turner and Witte (2009) suggest that users may not be financially sophisticated enough to understand how or what to test. Turner (2010) also suggests that tool rating systems are subjective to input criteria and likely provide inaccurate advice to users. Later, he finds that publicly-available retirement planning tools may harm risk-averse investors because tools may be biased toward equity investing (see Turner 2012). Turner's work, to date, concludes that users of publicly-available retirement planning tools may be making irrational retirement planning decisions because the tools provide sub-optimal advice (see Turner, 2014).

Overall, prior academic researchers, industry press, and consumer advocates conclude that publicly-available retirement planning tools are lacking attention to important factors. The tools give highly variable and confusing results, and households are naive to this fact. And as suggested by Kirkpatrick (2013), while households may be using these tools to determine how they are doing in their savings plans or how much to save, these tools are not meant to be used once with no adjustments to the planning as the household situation changes. Yet, the consensus of most literature on these tools is that they are useful if their limitations are understood by the users. And if the number of available tools is any indication, clearly there is a demand by households for help with retirement planning. Turner suggests in an interview about retirement calculators that

calculators, even with their flaws, provide some help (see Powell, 2010). This study challenges Turners suggestion.

Theoretical Framework

Our theoretical framework draws directly from the work of Bi, Finke, and Huston (2015). For their examination of five retirement planning tools used by large 401(k) providers, they first create a theoretical framework to guide their selection of variables. Starting with the traditional Modigliani and Brumberg (1954) life-cycle model and with an initial assumption of no retirement income source other than savings, they reinterpret the model to identify the important input variables required for consumption smoothing throughout the life-cycle. We group the variables into four major categories:

- Ages: Current age, target retirement age, and life expectancy

- Income: Current annual income, and expected future income

- Assets: Current accumulated assets, and bequest amounts

- Rates: Expected constant rates of return on assets, inflation rates, and tax rates

Of these variables, life expectancy, the average age that a person will live to given their current age, has proven to be problematic in retirement needs calculations. Since life expectancy determines planning horizon, Bi, Finke, and Huston (2015) suggest the life expectancy assumption is the most important assumption in this group of variables, though many folks get it wrong while planning for their future. A MetLife (2008) survey finds that about 60% of respondents underestimate the likelihood of a person living to age 85. If a tool relies on the typical resource for determining life expectancy in the U.S., the Social Security Administration's Period Life Tables

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for 2011 (see SSA, 2011), then there is a 50% chance the individual will surpass their indicated life expectancy.

Studies indicate that smoking significantly affects life expectancy. Several studies estimate that individuals who smoke throughout adulthood will shorten their life expectancy by 6.5 to 15 years (see Shaw, Mitchell, and Dorling, 2000; Gohlke and Yusef, 2007), suggesting smoking is an important factor in determining longevity. With such strong evidence of the negative impact of smoking on an individual's life expectancy, the following additional variable should be included:

- Lifestyle: Smoker/Non-smoker.

Bi, Finke, and Huston (2015) note that households with retirement income from pensions or social security during the decumulation (retirement) stage will have lower income replacement rates, reducing required savings during the accumulation (earnings) stage. We suggest that any form of household income during either the accumulation or decumulation stages will have the same effect on the required savings needs for retirement. This includes forms of income supplements such as the receipt of public or private pensions, annuity income, rental income, financial windfalls such as inheritance or life insurance death benefit, or replacement of income through disability insurance payments. Therefore, the following additional variables should be included:

- Income: Government or private pensions, social security income, trust income, disability insurance income
- Assets: Windfall receipts

Life cycle hypothesis relates to household consumption (see Modigliani and Brumberg, 1954). All household income and savings should be included in any calculation of savings needs

for the retirement stage of the lifecycle. Because most government social insurance includes benefits for spouses, the marital status of the household members becomes an important variable. And while marital status naturally indicates that retirement need planning should carry through the lifespan expectations of both spouses, current social norms suggest the inclusion of a non-married partner in the planning model seems appropriate. Thus, a fifth major category, household structure, is included:

- Household Structure: Marital status, with a non-married partner option

In conclusion, the life cycle hypothesis, with adjustment for current social norms, suggests the variables listed in Table one are necessary for any retirement savings tool to be effective.

[Insert Table 1 Here]

Data and Methods

Our data gathering process consists of two parts. Analysis begins with gathering professional opinion data on the important variables required for a basic publicly-available retirement planning tool. Combining these results with the variables identified in our theoretical analysis, we then test how these variables are used in 36 tools to collect tool output data. The original tool sample size consisted of 41 tools, but five tools were eliminated due to accessibility issues. Professional opinion data was obtained through an online survey (survey), consisting of 344 responses from financial professionals. The sample size was reduced to 297 responses due to incomplete response information. Results from the survey quantify the level of importance for 24 possible retirement planning variables. Respondents are asked to indicate whether each variable is "extremely necessary," "extremely important," "important," or "not applicable."

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Sondergeld et al. (2003) and Dowd, Atherly, and Town (2008) are two of the few studies that focus on specific variables. They note that variable use among tools is inconsistent, and suggest households should not rely on any given tool for retirement planning because it is difficult to compare tools. Because effective retirement planning can involve a large number of variables, we permit respondents to comment openly on any additional variables they believe should be added to the list of 24 variables provided by the survey.

The survey results capture demographic data for each respondent, including details on age, gender, years of professional experience, and credentials as the descriptive statistics show in Tables two and three. Eighty percent of survey respondents are older than age 40, 75% are males, and 53% have more than 15 years of industry experience. Sixty percent of the respondents use the CFP® mark. About one-third of respondents furthered their education beyond an undergraduate degree, with 26% obtaining an MBA, one-quarter of those specifically in financial planning.

[Insert Tables 2 and 3 Here]

In order to evaluate tool precision, the survey asks respondents to indicate which retirement planning software they use in their practice. From these data, and comparing with the results from the 2014 *Financial Planning Magazine* technology survey (see Bruckenstein, 2014), we choose a professional software package to purchase and use as our benchmark. Figure one indicates that MoneyGuidePro[1] is the primary professional software package and, as a result, our choice of professional software to act as our reference point. With this software containing Monte Carlo simulation capability, we design a very basic base case scenario (answer key) representing a potential user of a publicly-available retirement planning tool.

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[1] In the interest of full disclosure, co-author Harold Evensky holds a 1-1/2% equity interest in PIEtech, the developers of MoneyGuidePro, and he has served as a professional consultant to the firm for over a decade.

[Insert Figure 1 Here]

We collect tool data while testing the 36 publicly-available retirement planning tools. These data identify the tools that use variables consistent with theory and professional opinion. One of the most important pieces is the tool output data, which provides details on tool deviation from our answer key. In addition, the tool data contains information on default settings and input flexibility. Because variables may be defined differently across tools, for data gathering purposes we homogenize variables that fluctuate in their input description, but are serving the relatively same purpose.

Tools we select to test against our answer key are required to meet all of the following criteria:

- 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?
- Is the tool publicly-available, either for free or for a modest user fee?
- Is the tool targeted towards households?

The tools we test are listed in Appendix A and qualify under these criterion. However, Appendix A also shows that tools may change or get removed over time.

Some of the key characteristics of the base case scenario are as follows:

- Couple (male age 59 & female age 57)
- Each earns $50,000 annually
- Expected retirement age of 65 and 63 respectively
- Expected annual real retirement expenses net of income taxes of $70,000

- Social Security income to begin at age 66

- Life expectancy of 90 and 92 respectively

- Total current investment assets of $700,000

We build our answer key to deliberately indicate that the client has a less than acceptable probability of a successful retirement. More specifically, that the client has a 53% probability, an indication that we classify as "cannot retire." After testing our scenario in all of the tools, we classify the results of each of the 36 tools as "failed" or "successful." If a tool indicates that the user can retire with a significant degree of success such as a 70%+ confidence level, or if it provides opaque results such as saying "Congratulations, you can retire" without any quantitative justification, we classify it as a "failed" tool. Tools that indicate the user cannot retire are classified as "successful" tools. We further investigate any tools that succeed by identifying which variables are used and attempt to identify any commonalities.

Results

We reference the original two questions in this study: "Which demographic, financial, and economic variables are recommended for publicly-available retirement planning tools to provide appropriate information to households?" and "In their current state, how effective are these tools in providing an output that is useful or educational to the households using them?" The results we derive regarding the efficacy of publicly-available retirement planning tools is consistent with prior research.

Figure two illustrates the results of professional opinion regarding which variables, by the level of importance, should be included in a basic publicly-available retirement planning tool. If a variable received an average rating greater than 2.0, it is classified as "not important." The

average rating for all variables is 1.55, indicating that at the average, all the variables listed in the survey should be included in a basic tool. Nearly 90% (21 of 24) of the variables listed in the survey were classified as "extremely necessary", "extremely important", or "important" (earning a score of 2.0 or less). It is worthy to note that all of the variables suggested from the theoretical framework, except "Smoker vs. Non-Smoker," qualified as being "important" for a basic publicly-available retirement planning tool. Age, annual pension income, and variables requesting the value of specific financial accounts (i.e. Roth IRA, 401k, taxable accounts, etc.), as well as variables requesting other sources of retirement income are the most important variables, according to both theory and professional opinion.

Numerous variables which theory suggests are critical for retirement planning, are of lesser importance by professional opinion. Variables that are barely classified as "important," by the surveyed professionals include life expectancy, state of residency, gender, and personal heath. Variables that are of average importance are marital status, risk tolerance, and savings that are withdrawn during working years. Results suggest that for most variables, practitioners agree on the level of importance.

[Insert Figure 2 Here]

We find it interesting that "smoker vs. non-smoker" fell outside the "important" or higher importance classifications given the overwhelming evidence in empirical research of the strong negative impact smoking has on an individual's longevity. In addition, Figure three shows that there is a noticeable gap in responses for the "smoker vs. non-smoker" and "personal health" variables among financial planning professionals. In aggregate, 43% of the respondents believe the variable "personal health" is "extremely important," compared to 28% of the respondents believe it is "important," one level from being classified as "not applicable." In contrast, 45% of

the respondents believe a tobacco use variable, such as smoker vs non-smoker, is "important" with only 29% of the respondents believing it is "extremely important." Given the significant potential impact on mortality estimates, we are surprised that three times as many respondents believe a tobacco use variable is "not applicable" to building a retirement plan, as compared to respondents indicating "personal health" is "not applicable." We wonder if the respondents considered the "personal health" variable a more inclusive variable.

Examining the results by years of experience, 36% of the respondents who believe "personal health" is "not applicable" to calculating an effective retirement plan have more than 15 years of experience. About two-thirds of the respondents who believe "personal health" is "not applicable" have either 15 years or less of industry experience.

[Insert Figure 3 Here]

To understand the impact these variables have on actual tool outcomes, we evaluate variable usage among each of the 36 tools we test. Figure four provides the results of each of the 36 tools, as a comparison to the answer key. Additionally, it shows how many theoretical variables and additional variables from the survey are included in each tool. On average, the tools we test carry 57% of the variables recommended by theory and only 36% of the total recommended variables from theory and professional opinion. Tables four and five show that 70% of the tools "failed," of which only 12% use all of the variables recommended by theory, and only 16% use at least half of the overall recommended variables from this study.

[Insert Tables 4 and 5 Here]

Because less than one-third of the tools succeeded in our test, we look at how many of the theoretical variables and additional variables from the survey are included in each of the

"successful" tools. Figure four shows that, of the eleven tools that succeeded, there is a large variation in the amount of variables this study recommends, and although each of the eleven are classified as "successful," there is a significant variation in the probability of success. For example, the tool identified as tool #1 provides no evidence of using any of the variables recommended by theory. This tool produces a 1.8% probability of success, a significantly different result from our answer key. Tool #1 only uses one of all the variables recommended by this study, retirement living expenses. In contrast, tool #11 uses all the variables recommended by theory, and 85% of all the variables recommended by this study. These results confirm those of Sondergeld et al. (2003) and Dowd, Atherly, and Town (2008).

[Insert Figure 4 Here]

Conclusion

The opportunity for a secure retirement is becoming increasingly elusive for many investors. As often noted in the media, the traditional three-legged stool – pensions, social security, and savings – are morphing into a system where retirement income is being transferred from government and private-sector employers to the individual investor. Compounding the risk of this transition, the investment universe has become increasingly complex, mortality risk is growing, and for the most part individual investors lack the knowledge and experience to plan adequately for their retirement income needs. As the CFA Future of Finance project notes, "Delivering financial security in retirement is critical for both individuals and societies as most countries are now grappling with the social, economic, and financial effects of aging populations" (see CFA Institute, 2015).

The financial services industry responds to this issue by developing and offering to the public a variety of retirement planning tools. This paper studies the efficacy of these tools. In contrast to prior research that reviewed a limited number of tools and primarily focused on the assumptions made by the tools or the users' lack of sophistication in tool use, we consider the issue holistically from both an academic and a practitioner perspective. Using a basic scenario that relies on the necessary inputs suggested by life cycle theory, combined with the criteria suggested by a survey of experienced practitioners, we evaluate 36 publicly-available retirement planning tools that provide the user "an answer," such as you can meet your unique retirement goals – yes or no.

Our results are consistent with prior research that finds the available tools provide highly variable results. However, with too results ranging from "Congratulations!!! It appears that you saved enough to meet your goal. In fact, it appears that at age 90 you may still have $2,777,469 in your retirement accounts" to "The client will run out of money by age 89. The client needs $1,268,208 at retirement age…," we conclude that, in most cases, the available offerings are, extremely misleading. Therefore, we disagree with John Turner's suggestion that tools, even with their flaws, provide some help to consumers (see Powell, 2010).

As many of these tools that are offered by well-known and respected organizations, we believe that in light of the issues raised by this study, a reevaluation of the underlying inputs in the current offerings is in order. We believe that updates to the existing tools should start with the inclusion of the important variables as recommended by both economic theory and practitioner experience. We conclude that the following variables should be included, at a minimum, in any basic publicly-available retirement planning tool:

Age
- ✓ Current Age*
- ✓ Age to Retire*
- ✓ Life Expectancy*
- ✓ Personal Health
- ✓ Smoker vs Non-Smoker*
- ✓ Family Mortality History

Income (and Expenses)
- Current and Future Annual Income
- ✓ Pension Income (Government or Private)*
- ✓ Social Insurance Income (i.e. social security)*
- Trust Income
- Disability Income
- ✓ Pre-retirement Asset Withdrawals
- ✓ Other Sources of Retirement Income (e.g. part time work, alimony)
- Expenses
- ✓ Retirement Living Expenses (prioritized with time & dollar specificity)

Assets (and Debts)
- Accumulated Savings & Debts
- ✓ Taxable (e.g. Cash, Brokerage Accounts)
- ✓ Tax-deferred (e.g. 401k, Traditional IRA)
- ✓ Tax-free (e.g. Roth 401k, Roth IRA, 529)
- ✓ Mortgage Details
- Windfall Receipts
- Bequests

Rates
- Future Return Assumptions
- ✓ Stocks
- ✓ Bonds
- ✓ Inflation Assumptions
- ✓ Tax Assumptions

Household Structure
- ✓ State of Residency
- ✓ Gender
- ✓ Marital Status*
- ✓ Goal Specifics
- ✓ Risk Tolerance

* Variable included in both the professional survey and theoretical results
✓ Recommended variable from this study that should be included in any basic publicly-available retirement planning tool

Including these recommended variables is an important step toward more consistent, and thus reasonable, outcomes from publicly-available retirement planning tools. However, the underlying assumptions used by the tool designers need to be questioned for their validity. Therefore, we believe future research should identify reasonable default assumptions for the highly subjective variables from the above list, including the impact of smoking, personal health, and family mortality history on life expectancy. In addition, appropriate assumption ranges for forward looking economic assumptions for such variables as inflation and future returns should be identified. This will allow tool developers to create tools that better provide consumers with more trustworthy recommendations and better education.

Table 1: Variables from Life Cycle Theory

Major Category	Variables
Ages	Current age, target retirement age, and life expectancy
Income	Current annual income, expected future income, government or private pensions, social insurance income, trust income, and disability insurance income
Assets	Current accumulated assets, windfall receipts, and bequest amounts
Rates	Expected constant rates of return on assets, inflation rates, and tax rates
Household Structure	Marital status, with a non-married partner option

Table 2: Descriptive Statistics of Practitioner Survey, by Age (N = 297)

Age	Total		Gender				Years of Experience				Credential* CFP®	
			Male		Female		<=15		>15			
20-25	4	(1%)	4	(2%)	0	(0%)	4	(3%)	0	(0%)	0	(0%)
26-30	19	(6%)	14	(6%)	5	(7%)	19	(13%)	0	(0%)	14	(8%)
31-35	14	(5%)	11	(5%)	3	(4%)	14	(10%)	0	(0%)	7	(4%)
36-40	23	(8%)	18	(8%)	5	(7%)	18	(13%)	5	(3%)	19	(11%)
41-45	37	(12%)	26	(12%)	11	(15%)	25	(18%)	12	(8%)	29	(16%)
46-50	25	(8%)	17	(8%)	8	(11%)	12	(9%)	13	(8%)	17	(10%)
51-55	35	(12%)	21	(9%)	14	(19%)	17	(12%)	18	(12%)	22	(12%)
56-60	50	(17%)	35	(16%)	15	(20%)	16	(11%)	34	(22%)	31	(18%)
61-65	35	(12%)	29	(13%)	6	(8%)	9	(6%)	26	(17%)	15	(8%)
> 65	55	(19%)	47	(21%)	8	(11%)	7	(5%)	48	(31%)	23	(13%)

*N=177 due to not all respondents holding the CFP® mark.

Table 3: Descriptive Statistics of Practitioner Survey, by Respondent Credential(s)

Professional	N	%	Academic	N	%
Certified Financial Planner (CFP)	177	(60%)	MBA	59	(20%)
Certified Public Accountant (CPA)	20	(7%)	MBA in Financial Planning	19	(6%)
Personal Finance Specialist (PFS)	7	(2%)	PhD	4	(1%)
Chartered Life Underwriter (CLU)	78	(26%)	JD	13	(4%)
Chartered Financial Consultant (ChFC)	71	(24%)			
Enrolled Agent (EA)	8	(3%)			
Certified Financial Analyst (CFA)	8	(3%)			
Certified Retirement Counselor (CRC)	6	(2%)			
Certified Fund Specialist (CFS)	5	(2%)			

Certified Investment Management Analyst (CIMA)	4	(1%)
Accredited Investment Fiduciary (AIF)	14	(5%)
Chartered Retirement Planning Counselor (CRPC)	6	(2%)

Note: Respondent could select more than one answer, thus results may not total 100%

Figure 1: Determine Professional Benchmark Software

Software Used by Respondents to Our Survey

Software	Percent
MoneyGuidePro	37.82%
Excel	26.47%
eMoney	17.65%
Advicent Solutions (i.e. NaviPlan)	15.13%
MoneyTree	11.34%
None	7.65%
SunGard	4.62%
Financeware	1.68%
ESPlanner	0.42%
Fiserv (AdvisorVision)	0.42%
Tamarac	0.24%
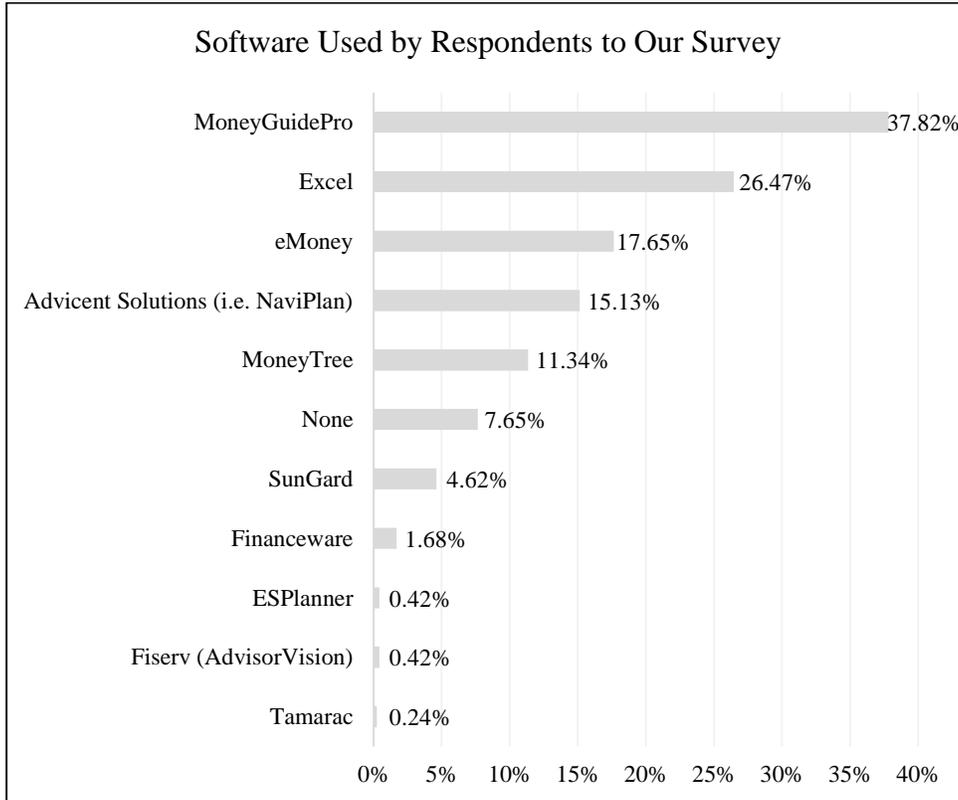
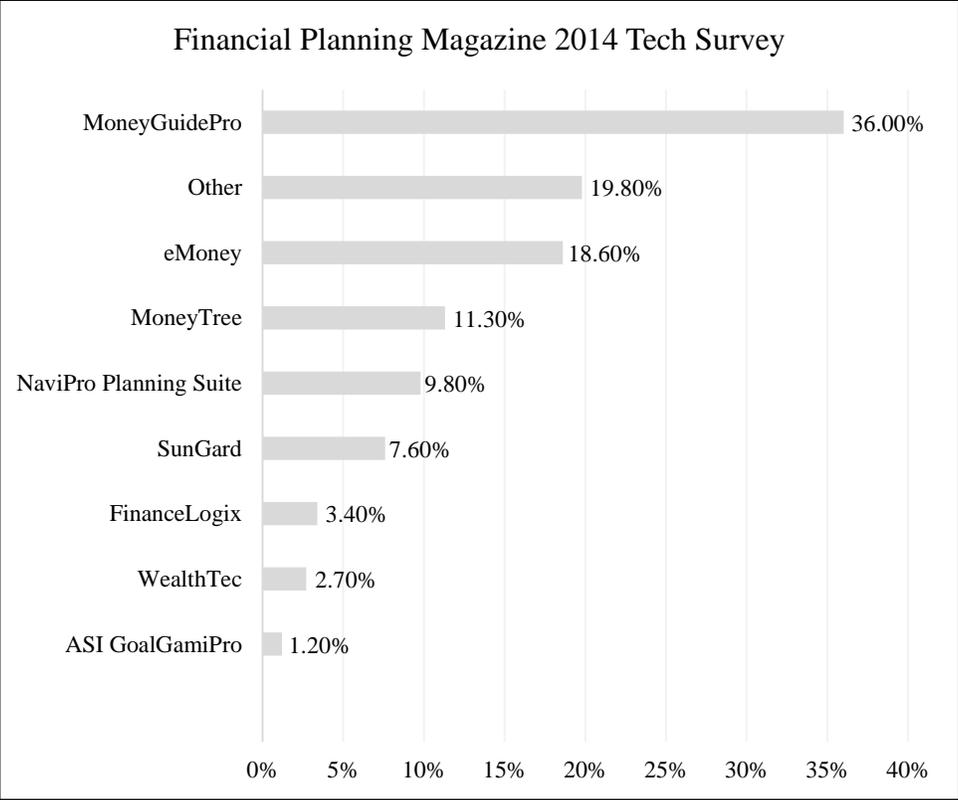Figure 2: Results of Professional Survey on Variable Importance (Average Ratings)
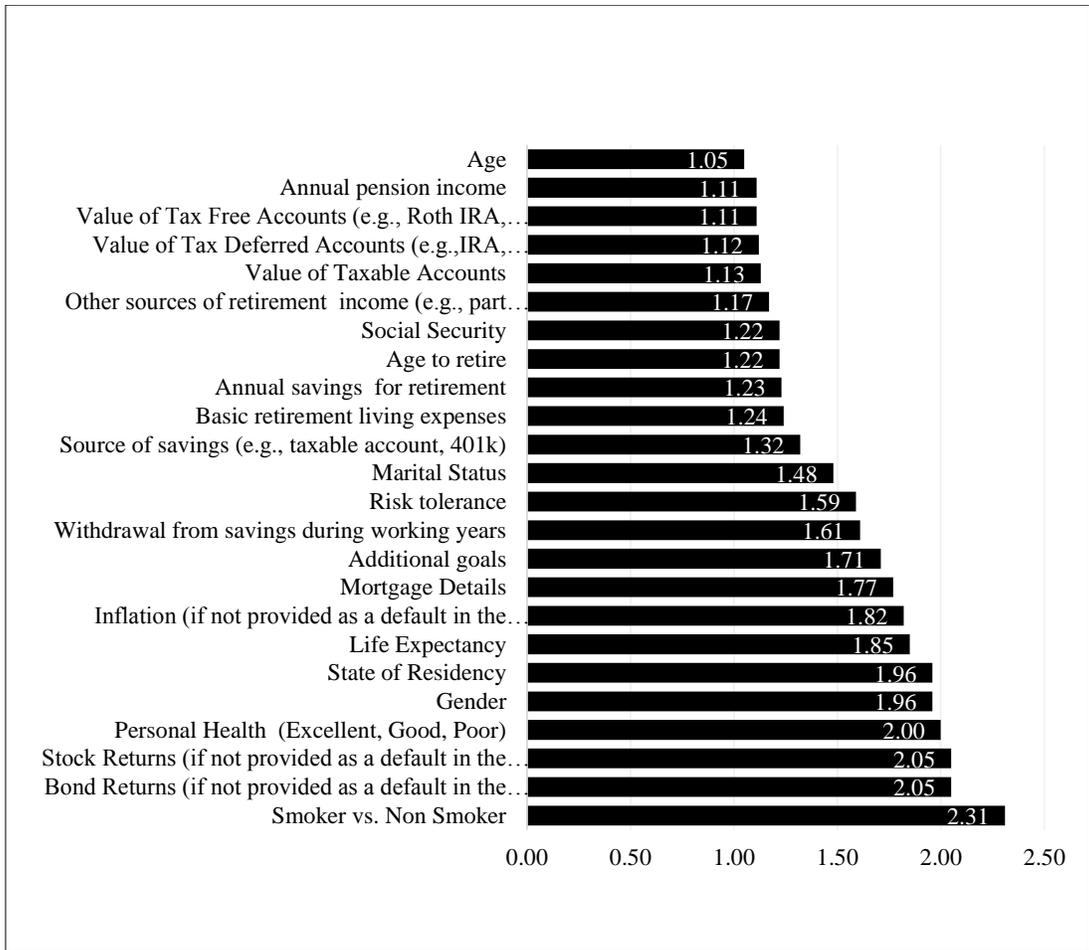
Figure 3: Comparison of Tobacco Use and Personal Health Variable

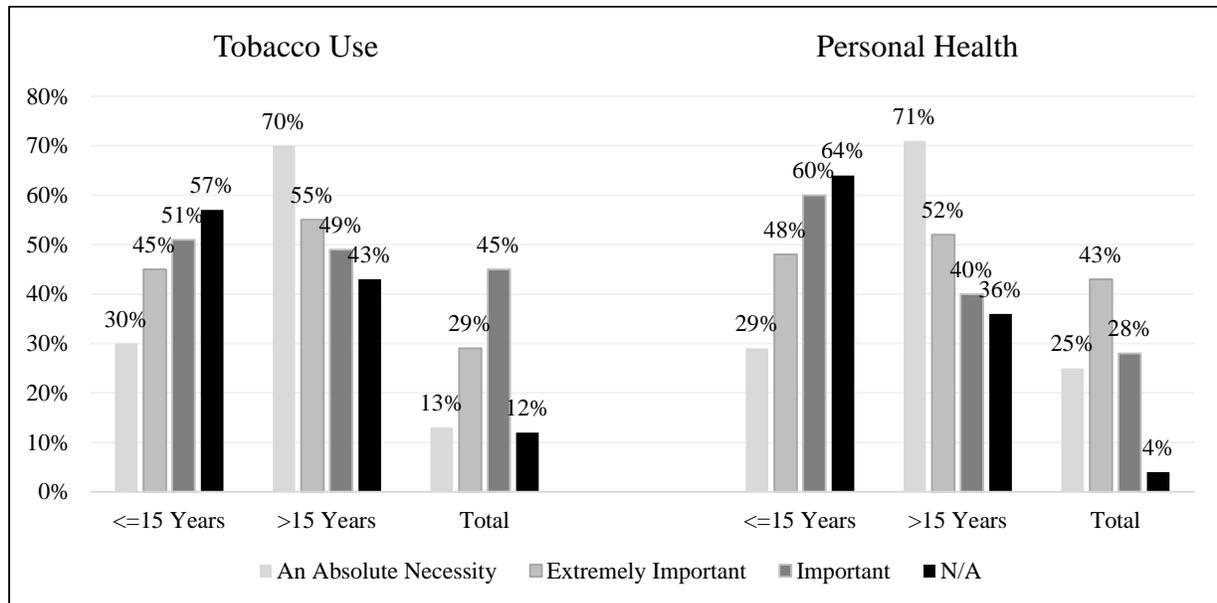| Table 4: Accounting for Recommended Variables				
Tool	Result	Theoretical Variables (10)	Additional Variables from Professional Survey (14)	Total Recommended Variables (24)
1	Fail	9	5	14
2	Fail	5	3	8

3	Fail	5	3	8
4	Fail	6	5	11
5	Fail	6	2	8
6	Fail	5	3	8
7	Fail	10	8	18
8	Fail	10	9	19
9	Fail	10	9	19
10	Succeed	7	2	9
11	Succeed	4	2	6
12	Succeed	0	1	1
13	Fail	8	4	12
14	Fail	4	1	5
15	Fail	5	1	6
16	Fail	8	2	10
17	Fail	2	2	4
18	Fail	6	0	6
19	Succeed	10	2	12
20	Fail	4	2	6
21	Fail	2	0	2
22	Succeed	2	1	3
23	Fail	8	2	10
24	Fail	1	2	3
25	Succeed	7	4	11
26	Fail	1	1	2
27	Succeed	5	3	8
28	Succeed	8	3	11
29	Fail	9	3	12
30	Succeed	4	3	7
31	Fail	8	4	12
32	Succeed	4	1	5
33	Fail	5	2	7
34	Fail	5	2	7
35	Succeed	8	6	14
36	Fail	5	3	8
Average		5.7	2.9	8.7

Table 5: Publicly-available Tool Output Results

Result	Number of Tools	%	Analysis
Can Retire (i.e. 70%+ Confidence)	25	70%	Fail
Shortfall (Cannot Retire)	11	30%	Succeed
Total Tools	**36**		

Figure 4: Variable Usage in "Successful" Tools
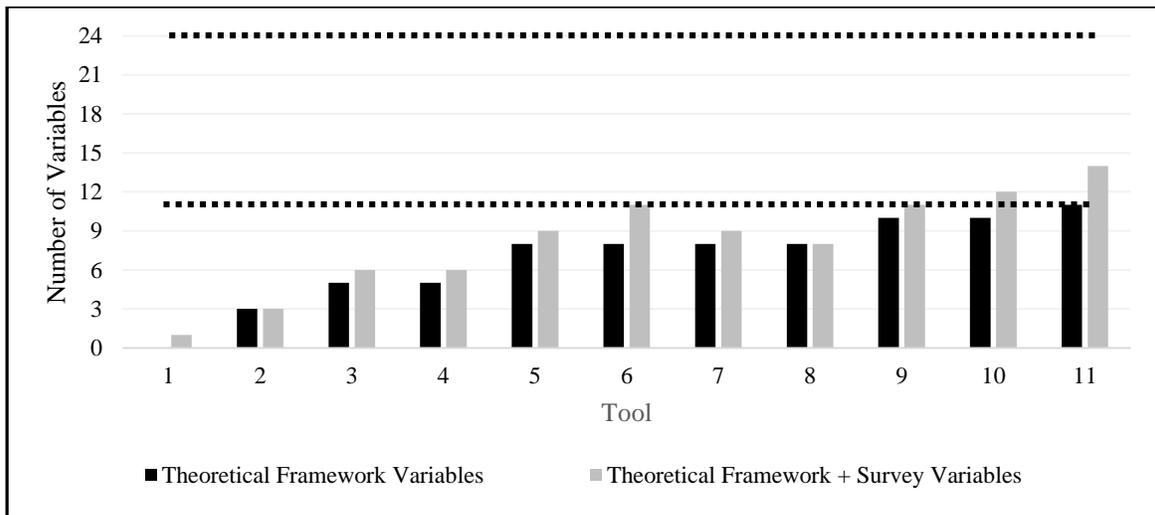
Appendix A

List of Tools Used for this Study
AARP Retirement Calculator

Ameriprise Retirement Calculator
Bankrate.com Financial Goal Calculator
Chase Retirement Calculator
Dailyfinance.com Retirement Calculator
ESPlanner Basic
E-Trade Retirement Planning Calculator
Fidelity Retirement Tools
Financial Mentor Ultimate Retirement Calculator
FINRA Tools & Calculators
FireCalc
Flexible Retirement Planner
InCharge Retirement Planner
Voya
J&L Retirement Planning Software
John Hancock Tools
Kiplinger.com Tools and Calculators
Lincoln Financial Calculators
Marketwatch (SmartMoney) Retirement Planning Tool
Mass Mutual Retirement Calculators
Merrill Edge Retirement Calculator
MetLife Retirement Planning Tools
Motley Fool Personal Finance Tools
MSN Money Retirement Calculator
Nationwide Retirement Planning Tools
Prudential Retirement Planning Calculator
Schwab Retirement Calculator
Scottrade Tools
TD Ameritrade WealthRuler
TIAA-CREF Retirement Advisor Tool
T. Rowe Price Comprehensive Tools
USAA Retirement Planning
Vanguard Retirement Tools
WealthTrace
Yahoo Finance Retirement Calculator
Choose to Save Ballpark Retirement Estimator

Still Exist?	In this Study?	Tool	Turner (2010)	Turner (2014)	Turner & Witte (2009)	Dowd et al., (2008)	Madden (2008)	KotliKoff (2006)	Sondergeld et al., (2003)	Bodie (2003)	Warshawsky & Ameriks (2000)
No	No	AARP Retirement Nest Egg Calculator		x							
Yes	Yes	AARP Retirement Planning Calculator	x	x	x	x					
Yes	No	American Funds						x			
Yes	Yes	Ameriprise Retirement Planner*		x							
No	No	Annplan (ANNROC Retirement Financial Planning Corp.)							x		
No	No	AOL Retirement Planning Calculator		x							
Yes	No	Bloomberg.com Retirement Planner		x							
Yes	Yes	Choose to Save Ballpark	x	x		x					
Yes	No	CNNMoney.com		x		x					
Yes	No	EBSA, Taking the Mystery Out of Retirement Planning	x	x	x						
Yes	Yes	Economic Security Planner (ESPlanner)		x	x			x			
Yes	Yes	Fidelity Retirement Income Planner				x					
Yes	Yes	Fidelity Retirement Quick Check		x				x			
Yes	No	Fidelity Investments (Fidelity Customers only)				x					
Yes	No	Financial Engines						x		x	
Yes	Yes	FINRA Retirement Calculator		x							
Yes	No	First American Bank*				x					
Yes	Yes	InCharge Education Foundation Retirement Income Calculator		x							
Yes	No	ISG Personal Version 1.0 (ISG)**							x		
Yes	Yes	John Hancock Retirement Planning Calculator		x							
Yes	Yes	Kiplinger Retirement Savings Calculator		x							
No	No	LifeFocus V 7.5-0405 English (The Rouse Companies)							x		
Yes	Yes	Mass Mutual Retirement Income Calculator*		x							
Yes	No	McRetire (Monte Carlo Retire) by Efficient Solutions Inc.**							x		
Yes	Yes	MetLife Retirement Income Snapshot		x	x						
No	No	Mind Your Finances				x					
Yes	Yes	Motley Fool Retirement Calculator		x							
Yes	Yes	MSN Money Retirement Planner		x						x	
Yes	Yes	Nationwide RetirAbility Check	x	x							
No	No	Pacific Life				x					
No	No	Plan for life after Work (Fidelity)							x		
Yes	No	Principal Financial Group				x					
Yes	Yes	Prudential Retirement Calculator*		x							
Yes	No	Quicken						x		x	x
Yes	No	Retirement Calculator				x					
No	No	Simple Joe				x					
Yes	No	Simple Planning.com				x					
Yes	Yes	Smart Money (Now MarketWatch.com)								x	
Yes	No	SunTrust Retirement Planner		x							
Yes	Yes	T. Rowe Price Retirement Income Calculator	x	x	x	x			x		
Yes	Yes	TIAA-CREF Retirement Goal Evaluator		x				x			
Yes	Yes	Vanguard Retirement Income Calculator		x							
Yes	No	Wells Fargo Retirement Planning Calculator		x	x						

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