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COMPARING THE ECONOMIC AND CONVENTIONAL APPROACHES TO FINANCIAL PLANNING

Jagadeesh Gokhale
Laurence J. Kotlikoff
Mark J. Warshawsky

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Comparing the Economic and Conventional Approaches to Financial Planning
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ABSTRACT

The conventional approach to retirement and life insurance planning, which is used throughout the financial planning industry, differs markedly from the economic approach. The conventional approach asks households to specify how much they want to spend before retirement, after retirement, and in the event of an untimely death of the head or spouse. It then determines the amounts of saving and life insurance needed to achieve these targets. The economic approach is based on the life-cycle model of saving. Its goal is to smooth households' living standards over their life cycles and to ensure comparable living standards for potential survivors. In the economic approach, spending targets are endogenous. They are derived by calculating the most the household can afford to consume in the present given that it wants to preserve that living standard in the future. Although spending targets under the conventional approach can be adjusted in an iterative process to approximate those derived under the economic approach, there are practical limits to doing so. This is particularly the case for households experiencing changing demographics or facing borrowing constraints. This paper illustrates the different saving and insurance recommendations provided by economic financial planning software and the practical application of traditional financial planning software. The two software programs are Economic Security Planner (ESPlanner), developed by Economic Security Planning, Inc., and Quicken Financial Planner (QFP), developed by Intuit. Each program is run on 24 cases, 20 of which are stylized and 4 of which are actual households.

The two software programs recommend dramatically different levels of saving or life insurance in each of the 24 cases. The different saving recommendations primarily reflect ESPlanner's adjustment for household demographics and borrowing constraints. The different life insurance recommendations reflect these same factors as well as ESPlanner's accounting for contingent household plans and for Social Security's survivor benefits. The less detailed tax and Social Security retirement benefit calculations used in our implementation of QFP also explain some of the differences between the two programs.

Jagadeesh Gokhale
33375 Tandem Court
Solon, Ohio 44139
ajgokhale@stratos.net

Laurence J. Kotlikoff
Department of Economics
Boston University
270 Bay State Rd.
Boston, MA 02215
and NBER
kotlikof@bu.edu

Mark Warshawsky
TIAA CREF
730 Third Avenue
New York, NY 10017-3206

mwarshawsky@tiaa-cref.org

I. Introduction

The conventional approach to retirement and life insurance planning asks households how much they want to spend after retirement and in the event of the untimely death of the head of household or spouse. It then determines the amounts of saving and life insurance needed to achieve these targets. This approach, which is used throughout the financial planning industry, has received remarkably little attention from economists. This is surprising not only because of the practical importance of traditional financial planning, but also because of its apparent differences with the economic approach.

The economic approach is based on the life-cycle model of saving developed by Ando and Modigliani (1963) and the canonical model of life insurance developed by Yaari (1965). The goal of the economic approach is to smooth households' living standards over their life cycles and to ensure comparable living standards for potential survivors. In the economic approach, spending targets are endogenous. The targets are derived by calculating the most that each household can afford to consume in the present given that it wants to preserve that living standard into the future. And as stressed by Hubbard and Judd (1987) among others, a household's ability to consume may in the short term also be circumscribed by its ability to borrow.

Although spending targets under the conventional approach can be adjusted to approximate those derived under the economic approach, there are practical limits to such "trial and error" re-targeting. Because of the complexity of the relevant factors, these limits especially exist for households experiencing changing demographics, enjoying economies to shared living, or facing borrowing constraints. This paper illustrates the different saving and insurance recommendations provided by economic financial

planning software and conventional financial planning software. The two software programs are Economic Security Planner (ESPlanner) (the economic financial planning software), developed by Economic Security Planning, Inc., and Quicken Financial Planner (QFP) (the conventional financial planning software), developed by Intuit, Inc. Each program is run on 24 cases, 20 of which are stylized and 4 of which are actual households.

We used both programs in a manner that did not require data or information external to the program beyond that provided in direct interrogatives from the programs. In particular, for QFP, we tried to emulate how a somewhat sophisticated household might use the program. QFP begins by asking a household what it is currently spending and whether it wants to continue spending that amount in the future. We expect that most households would answer the latter question in the affirmative. Next QFP asks the household to enter earnings, net worth, and a variety of other data. Finally, QFP determines if the household's specified time-path of expenditure is feasible. If its plan puts the household into debt (or further into debt if the household started in debt) at any point in the future, QFP tells the household that its plan has failed. A plan can also fail if there are insufficient resources to finance consumption in retirement.[1] By contrast, if a household saves lots of money, it will almost certainly get a passing grade. We then expect that the household would adjust its initial consumption spending to, as closely as possible, "die broke", that is, to end up with zero financial net worth at the end of its planning horizon. Thus, in running QFP on the 24 cases, we choose the level of

[1] By this we mean that the household's present value of resources doesn't suffice to pay for its present value of its targeted consumption expenditure, including its post-retirement consumption expenditure. As mentioned, the program will "fail" even if this restriction is satisfied, if the targeted trajectory of expenditure puts the household into debt or further into debt prior to reaching retirement.

consumption expenditure by iterating until the household's terminal net worth is close to zero. This "trial and error" iteration process is time consuming, which reinforces our view that even sophisticated households are unlikely to further fine tune their expenditure plans to deal with demographic change, particularly the arrival and departure of children from the household, or with borrowing constraints.

The two software programs recommend dramatically different levels of saving and life insurance in each of the 24 cases with the discrepancies between the two sets of recommendations generally increasing with the complexity of the case. In some cases ESPlanner recommends substantially more saving in early years and substantially less saving in later years than does QFP. In other cases, the opposite is true. The differences in life insurance recommendations are more systematic, with ESPlanner generally recommending significantly less life insurance than QFP.

The different saving recommendations primarily reflect ESPlanner's adjustments for household demographics, economies in shared living, and borrowing constraints, as well as its different, and more detailed, approach to the calculation of federal and state income taxes and Social Security retirement benefits. The two programs' different life insurance recommendations reflect these factors, ESPlanner's contingent planning, and ESPlanner's integration in its life insurance calculations of Social Security's survivor benefits.

Our comparison of ESPlanner and QFP illustrates some, but certainly not all, of the differences in the conventional and economic approaches. There are a plethora of financial planning software programs adopting the conventional approach. Many of these programs have specific features that differ from those of QFP. Hence in comparing

ESPlanner with just QFP, we may be over- or understating typical differences between the two approaches. In addition, although ESPlanner captures the essential items of what economists would stress in financial planning, it does not incorporate labor earnings uncertainty, rate of return uncertainty, and other non-life contingencies that can influence life-cycle consumption choice.[2] ESPlanner does not explicitly consider the premiums, paid whether by the employer or by the household, for health and long-term care insurance, nor the expenditures arising from uninsured health and long-term care contingencies. Nor does ESPlanner optimize, subject to legal constraints, contributions to tax-deferred retirement accounts. Furthermore, although ESPlanner considers life contingencies for the purpose of determining the optimal amount of life insurance, it does not evaluate the optimal amount of life annuities to hold in the retirement period of the life cycle. Hence in comparing ESPlanner only with QFP, which also does not consider these uncertainties and factors, we may be understating the differences between the two approaches.

The paper proceeds as follows. Sections II and III describe ESPlanner and QFP, respectively. Section IV summarizes the main conceptual and technical differences between the two programs. Sections V and VI compare ESPlanner's and QFP's recommendations for the 20 stylized and 4 actual cases, respectively. Section VII summarizes the paper and draws conclusions.

[2] See Hubbard, Skinner, and Zeldes (1995) for a treatment of consumption choice in the presence of lifespan and earnings uncertainty and Campbell et al. (1999) for a treatment of consumption choice in the presence of rate of return uncertainty.

II. Economic Security Planner

The economists Douglas Bernheim, Jagadeesh Gokhale, and Laurence Kotlikoff and software engineer Lowell Williams established Economic Security Planning, Inc. to develop ESPlanner – a software package whose primary goal is to foster appropriate saving and insurance decisions.[3] Their stimulus was the findings in Kotlikoff, Spivak, and Summers (1982), Auerbach and Kotlikoff (1987, 1991), Bernheim (1991, 1995), and other studies that a significant fraction of households undersaves and underinsures. Undersaving in these studies means that a household can't sustain its current living standard in the future, and underinsuring means it can't sustain its current living standard if the household head or spouse were to die. ESPlanner's objective is to permit households to achieve the highest living standard that they can afford to sustain both through time and in the event of the early death of the head or spouse.

Unlike many other financial planning programs, ESPlanner's life insurance, consumption, and saving recommendations are fully integrated. The program's consumption and saving recommendations take into account the need to pay life insurance premiums, and its life insurance recommendations are set to ensure the same living standard through time for survivors as the consumption time-path that the otherwise intact household is able to afford.

What Factors Does ESPlanner Consider?

[3] The three economists are also using ESPlanner under two National Institute of Aging grants to study the adequacy of saving and insurance. The National Institute of Aging also supported research on ESPlanner through an STTR grant. Economic Security Planning, Inc. is willing to provide academic researchers with copies of the program for free. To contact the company, go to www.ESPlanner.com.

In determining the extent to which a household can smooth its living standard, ESPlanner takes into account the maximum amount of money the household says it can borrow apart from housing-related debt. It also considers the current and future labor, pension, social security, inheritance, and other income the household will receive and the federal and state income taxes and federal payroll taxes that it will pay. The Appendix describes ESPlanner's tax and Social Security benefit calculations in detail. ESPlanner also takes account of 401k, 403b, and other tax-favored saving vehicles, housing plans, special expenditures, estate plans, and preferences about how the household would, if not borrowing constrained, like its living standard to change through time.[4] Finally, ESPlanner recognizes that a household's expenditures do not directly translate into its standard of living. Adjustments are made for household composition and household "economies of scale" -- the fact that people can live more cheaply together than apart.[5] To be precise, ESPlanner provides for children until they reach age 19, and takes into account that children may cost more or less than adults and that the relative costs of children can vary by age. It also adjusts for the number of adult equivalents based on a user-specified degree of economies to scale in shared living.

ESPlanner's Recommendations

ESPlanner's principal outputs are recommended time-paths of consumption expenditure, taxable saving, and term-life insurance holdings (for each spouse in the case

[4] "Borrowing constrained" refers to a household's inability to get credit on the security of its future anticipated earnings, for example, through a credit card or an unsecured line of credit. "Liquidity constrained" often refers to that as well as to the inability to sell assets (whether financial or real) to finance consumption.

[5] From the perspective of economic theory, the household is viewed as maximizing a Leontief intertemporal utility function with year-specific time preference and demographic weights subject to borrowing constraints and non-negativity constraints on life insurance.

of married households). All outputs are displayed in current-year (i.e., real) dollars. Consumption in this context is everything the household gets to spend after paying for its "off-the-top" expenditures – its housing expenses, special expenditures, life insurance premiums, taxes, and net contributions to tax-favored accounts. As mentioned, the amount of recommended consumption expenditures varies from year to year in response to changes in the household's composition. It also rises when the household moves from a situation of being liquidity constrained to one of being unconstrained. Finally, recommended household consumption will change over time if users intentionally specify that they want their living standard to change. For example, if users specify that they desire a 10 percent higher living standard after a certain year in the future, the software will incorporate that preference in making its recommendations, provided that it does not violate a borrowing constraint.

ESPlanner's recommended taxable saving in a particular year equals the household's total income (non-asset plus asset income) in that year minus that year's sum of (a) recommended spending on consumption and insurance premiums, (b) specified spending on housing and special expenditures, (c) taxes, and (d) net contributions to tax-favored accounts (contributions less withdrawals).

ESPlanner's recommendations for annual term insurance are either positive or zero.[6] If recommended term insurance is positive for a particular potential decedent (the household head or, if married, spouse) in a particular year and if the decedent dies at the end of that year, the surviving household will have precisely the same living standard as the household would have had absent the decedent's premature death. If the potential

decedent's recommended insurance in a particular year is zero, the surviving household will have the same or higher living standard if the decedent dies in that year. These statements are, of course, conditional on the household actually buying the amounts of life insurance being recommended and on the correctness of its assumptions and information concerning future income, current asset holdings, rates of return, special expenditures, and so forth.

Checking ESPlanner's Recommendations

ESPlanner's algorithm is very complicated. But users of the software can check ESPlanner's reports to see that, given their data inputs, preferences, and borrowing constraints, the program recommends the highest and smoothest possible living standard over time. Take, as an example, Case 1 -- the first and simplest of our 20 stylized cases. It involves a Massachusetts couple in which the husband, George, is initially age 29 and the wife, Jane, is initially age 27. George works through age 65 earning $50,000 each year in 1999 dollars. Jane doesn't work. They have no children, no special expenses, no housing expenses, no estate plans, no private defined benefit pension income, no self-employment income, no special receipts, no tax-favored saving accounts, no employer-funded defined contribution accounts, and no coverage under Social Security.

Turn, now, to Table 1, which presents the non-tax-favored balance sheet for Case 1. All values reported in the table and all other ESPlanner reports are in 1999 dollars.[7]

[6] Negative life insurance is formally identical to the purchase of an inverted life annuity, that is, the receipt of annual payments for life purchased by, in a predetermined lump sum amount, the estate of the deceased.

[7] ESPlanner produces the following main reports: current recommendations, annual recommendations, non tax-favored balance sheet, income, spending, non-asset income (for each spouse), housing, taxes, tax-favored balance sheets (for each spouse), estate reports (for each spouse and for couples if both spouses die in the same year), social security benefit reports (for the household and for each spouse). ESPlanner's survivor reports are essentially the same as its main reports.

Because Table 1 is a balance sheet, the changes from one year to the next in non tax-favored net worth equal the latter year's non tax-favored saving. Apart from this adding up property, note that terminal non tax-favored net worth is zero, that is, the household's recommended time-path of spending precisely exhausts the household's economic resources assuming each spouse lives as long as possible. In this particular case, household spending simply includes consumption, life insurance premiums, and funeral expenses of $5000 for each spouse. In general, spending also includes special expenditures and housing expenses.

This balance sheet tracks the evolution of the household's non-tax-favored net worth assuming the household head and spouse both live to their maximum ages of life – assumed to be age 95. As just suggested, ESPlanner's planning horizon extends through the maximum ages of life of the household head and, if married, his or her spouse. The emphasis here on the maximum, rather than the expected, length of life is a part of ESPlanner's general philosophy, namely to plan conservatively.

Consumption spending in this case is constant at $25,784 until George reaches age 95. It then declines to $16,115 – the amount Jane gets to spend on herself after George has passed away. The former value is 1.6 times the later value reflecting the assumed degree of economies in shared living, namely that two can live as cheaply as 1.6. Hence, the household's living standard remains the same until its last possible year – when Jane reaches age 95. Table 1's total spending amounts differ from $25,784 when both George and Jane are alive by annual amounts equal to the life insurance premiums on George's recommended holdings of life insurance.

The fact that (a) the household just exhausts its resources when Jane dies at age 95 (i.e., does not die in debt) and that (b) the recommended consumption expenditure path entails a uniform living standard for all household members in each year the household exists means that ESPlanner has maximized the household's sustainable living standard given the household's economic resources. That is, raising consumption spending in each year to produce a slightly higher uniform living standard would lower saving in each year and leave the household in debt in its last period of existence. Married users can also check ESPlanner's survivor reports to verify that surviving spouses who follow ESPlanner's life insurance recommendations will, if the household's inputs assumptions prove correct, be able to maintain as high a living standard as the household would have had if the spouse had not died early.

The survivor reports for Jane (George) can be produced for any hypothetical ages at which George (Jane) might die. As an example, Table 2 shows Jane's survivor non tax-favored balance sheet if George dies at age 51. Note that Jane's spending as a survivor, which, in this case, consists only of consumption, equals $16,115 – precisely 62.5 (1 divided by 1.6) percent of the amount Jane and George would jointly spend on consumption were George not to die. Hence, Jane's recommended consumption as a widow entails the same living standard as she would have had when married. Table 2 also shows that Jane can, as a survivor, afford to spend this amount each year on consumption and not end up in debt even if she lives to her maximum age of life, 95. Also note that the initial amount of non tax-favored wealth with which Jane begins widowhood is $518,691. This amount equals (up to rounding error) the sum of George's and Jane's $382,833 in non tax-favored assets at age 50, plus the $140,858 amount of

term insurance recommended for George at age 50, less $5000 for George's funeral. Were ESPlanner to recommend even a dollar less in life insurance for George at age 50, Jane would not be able to finance the same living standard as a survivor without ending up in debt at age 95 if she were to live that long.

III. Quicken Financial Planner

There is an expanding universe of financial planning software programs and Internet sites available to the general public that offer advice on saving for retirement and other goals, and on asset allocation. These programs include proprietary packages offered by mutual fund and insurance companies with investment and insurance products to sell, as well as independent packages marketed by financial experts and consumer software companies. In addition, there are packages sold to professional financial advisors who use these programs in the course of financial planning sessions given to clients.

The packages on the market differ in focus, sophistication, and level of detail. As mentioned above, however, they all share certain conceptual features. A goal is set by the household for the desired income or expenditure flow in retirement (usually a set percentage of earned income expected to be received just prior to retirement). Then the appropriate saving rate (usually assumed to be level over the work life) and optimal asset allocation are calculated by the program, given certain assumptions, preferences, and information provided by the household, to enable the household to reach its goal. This conventional approach is consistent with the way actuaries traditionally have designed

pension plans, that is, a retirement income goal (a replacement rate) is set and the contribution rate (usually level) necessary to achieve that goal is calculated.

As representative of the conventional approach, we employ the Quicken Financial Planner (QFP), manufactured by Intuit, Inc., makers of Quicken and TurboTax software. To our knowledge, QFP is the most sophisticated and comprehensive planning package available to the general public; it rivals professional software in its detail and use of advanced techniques. QFP seems appropriate for households at most income and wealth levels, perhaps with the exclusion of those households with unusual financial circumstances and those at the bottom and the very top of the income and wealth distributions. (QFP, and ESPlanner for that matter, provides little detail on government assistance programs and estate taxes.)

Inputs and Outputs of QFP

A detailed description of the QFP is provided in the Appendix of Warshawsky and Ameriks (1999, forthcoming). Here we summarize that discussion and highlight certain features of QFP that we employ in our analysis.

QFP is designed to aid in financial planning for retirement, children's college education, and life insurance needs; we ignore here its advice on asset allocation. Basic demographic and economic (both current and expected future) information is collected about the household. In the "Income Taxes" section, the respondent household inputs combine federal and state average income tax rates expected in the periods before and after retirement. The respondent is given a choice of two methods to do this estimation: (1) the "demographic average" – the average tax rate paid by the average person in the

respondent's state of residence within the same range of household income and demographic situation, or (2) the "tax return" approach – the average tax rate calculated based on the household's adjusted gross income and the actual taxes paid in the prior year. Because we do not know actual taxes paid in the prior year, we employ QFP's demographic average method in our analysis; an actual user might input his or her own tax information using the tax return approach.

QFP asks for a myriad of details concerning the household's current and expected future pension coverage, current investment, real estate holdings, loans, and mortgages outstanding. In the "Living Expenses" section, the respondent household is given a choice of two estimation methods: "Rough Estimate" and "Itemized List". In the first method, QFP simply asks for the household's estimated living expenses before and after retirement, and offers as guidance an abbreviated statement for the current year of cash flow less "off-the-top" expenditures like taxes, loan payments, housing expenses, and planned contributions to pension and savings plans. In the second approach, the household fills out a detailed budget for the current and future years, and the QFP sums up pre- and post-retirement living expenses from this list. We employ the first method.

In the "Social Security estimated benefits" section, QFP again gives the user two choices in estimation methods: "Rough Estimate" and "Social Security Administration Estimate." In the first method, the respondent household is asked to sort itself into one of four earnings bands; an estimate of Social Security benefits is then generated based on planned age at retirement. In the second method, the respondent is simply invited to input the number from the official response to the Request for Personal Earnings and

Benefits Estimate Statement form mailed to the Social Security Administration. We employ the first method in our analysis.

QFP has certain advanced planning options allowing for more sophisticated modeling. In particular, in "Cash Shortfalls", the respondent is asked whether it plans to sell investments to cover pre-retirement shortages; although the default answer, which is conservative, is no, in our analysis, we respond yes.[8] In "Realized Gains", the respondent is asked to estimate the percentage of the gains in the taxable investment portfolio subject to taxes every year; we employ the default answer of 100 percent. In "Sweep", the respondent is asked what percent of surplus cash flow is swept into taxable savings; we answer 100 percent, although QFP suggests a more conservative answer of 0%. QFP defines surplus cash flow as the excess of planned sources over planned uses of annual money flows. With the cash shortfalls and sweep options employed, the QFP is able to produce non-constant savings recommendations; these options are unusual in the conventional approach and narrow the contrast somewhat with the economic approach.

Another helpful feature of QFP is its comprehensive information about the current cost of college. Using data from the College Board, QFP reports, by state, for public and private colleges and universities and community colleges, the cost of (in-state and out-of-state) tuition, room and board, books, fees, and other expenses. A worksheet is also available to input expected financial aid, the student's own income, and gifts from relatives. This feature would seem to be especially valuable to households with children

[8] Regardless of the answer to the cash shortfall question, QFP uses the following rules regarding sales of investments. After retirement, the mandatory minimum distributions from tax-deferred retirement accounts are made first. Then taxable investments are sold. Finally, if more resources are still needed, tax-deferred accounts are again drawn upon. Before retirement, shortfalls due to special expenses or home down payments are funded, first by the sale of taxable investments and then by withdrawals from tax-deferred accounts (along with the payment of tax penalties, if applicable). If the answer to the cash shortfall

approaching the age of college entrance with knowledge about the type, or the specific identity, of the college their children will attend. Because all of the cases we examine involve young families we did not employ this feature of QFP which is not available in ESPlanner.

QFP processes all this information in an easy-to-see fashion. It initially gives one result: whether or not the household can anticipate having the money needed to retire. If the news is bad, a brief statement of the nature of the problem is given, including the year when net worth becomes negative or assets are depleted. This is the manner in which QFP alerts users to infeasible plans as well as to violations of borrowing constraints. If the household provides QFP with an initial level of expenditure and tells it to maintain that expenditure level through time and if that expenditure level leads the household in any future year into debt or into more debt than the household initially had or insufficient assets to finance retirement, QFP will announce that the household's plan has failed.

Once users have generated a plan that hasn't failed, they can do "What If" analysis. Specifically, users can change, one at a time, key assumptions and items of information, such as retirement age or pension contribution rate, and see whether their original consumption expenditure plan is still feasible with the new inputs.

QFP's Insurance Planner uses data already inputted on the household's demographic and economic makeup, and asks the respondent for its preferences on the size of a desired estate and other post-mortem expenses, such as children's college tuition and the spouse's living expenses, to be covered. The Insurance Planner then advises on the optimal amount of term insurance to hold in the first year of the financial plan. The

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question is yes, then shortfalls due to taxes, living expenses, loan payments, and planned saving are covered by the sequential sale of taxable and tax-deferred investments.

Insurance Planner is semi-autonomous; none of its outputs, including the premiums on its recommended insurance coverage, is used in the main corpus of QFP.

IV. Conceptual and Technical Differences in ESPlanner and QFP

There are three main conceptual differences between the conventional approach to financial planning represented by QFP and the economic approach represented by ESPlanner. These are the determination of expenditure targets, the treatment of demographics and economies of scale, and the handling of borrowing constraints.

Smoothing a household's standard of living refers to maintaining the same living standard for each person in the household at each point in time. As mentioned above, ESPlanner does this for the household, subject to the household's resources (including social security), its exogenous housing expenses, its exogenous special expenses, its endogenous tax liabilities, and its exogenously specified non-mortgage debt limit. In solving for the time-path of consumption that smooths, to the maximum feasible and desired degree, the household's living standard, ESPlanner is endogenously determining the household's expenditure targets as well as the amounts the household must save, in non tax favored form, and insure to achieve these targets.

By contrast, QFP asks households to set their own expenditure targets. It then accumulates the household's excess cash flow (income less expenses less all planned saving) and sees whether the accumulated sum ever becomes negative given its financial plans (or, if the household was initially in debt, whether its debt becomes more negative than the initial level of debt). If the household's accumulated cash flow never goes into the red (or too far into the red) and if enough assets are available to finance consumption

in retirement and to meet other user-determined goals, the household's expenditure plan is scored a success. Indeed, QFP effectively scores such a plan a complete success in that it doesn't encourage users to adjust their expenditure target to keep them from, in effect, leaving money on the table. One defense of this practice is that because households face lots of future risks, planning to leave money on the table which can be used on future rainy days is not such a bad thing. The counter argument is that the amount of money being left on the table may be far smaller or far greater than the household feels it needs to protect itself against future risks. Because, QFP, like ESPlanner, permits users to treat the accumulation of an emergency fund and bequests as special expenditures, the inclusion of these items would seemingly obviate the need to plan for unspent funds.

As mentioned in the introduction, in preparing this paper we ran QFP in a manner that avoids leaving money on the table. The procedure involves (a) setting an initial level of consumption expenditures, (b) telling QFP that we want to maintain the same level of expenditure through time, and (c) iterating on this initial level of consumption expenditure until the household has very few assets remaining at the end of life.

The second conceptual difference involves the goal of smoothing through time household members' living standards. ESPlanner does this by determining, at each point in time, the number of adult equivalents and adjusting for economies in shared living. QFP, in contrast, invites users to make these adjustments for themselves in setting their consumption expenditure targets.

The third conceptual difference is the treatment of borrowing constraints. ESPlanner builds borrowing constraints directly into its consumption expenditure recommendations. QFP, on the other hand, tells users whether their exogenously

specified consumption trajectory will, at some point, violate the program's implicit zero constraint on future borrowing. QFP users whose plans are failed by the software because they run into borrowing constraints are free to rerun the program by lowering their current and raising their future consumption. But users might also respond by lowering their initial consumption and continuing to tell QFP that they want to spend the same amount in the future as in the present. In so doing, they will arrive at an expenditure plan that passes QFP's feasibility criterion, but leaves money on the table.

Interestingly, in the 24 cases examined below, we never encountered negative net worth in our use of QFP, whereas we quite often encountered borrowing constraints in our use of ESPlanner. The reason is the interaction of demographics with borrowing constraints. In those cases in which ESPlanner generates borrowing constraints, the household has young children and, therefore, higher consumption expenditure needs when young than when old. Our application of QFP ignores this. Consequently, compared to economic theory, our practical application of QFP set consumption expenditure too low when the household is young and too high when the household is old. Because the households we examine have relatively high housing and special expenditures when young, the inappropriately low short-run QFP consumption expenditures are needed to avoid short-run borrowing constraints. Also, in order to make the results of ESPlanner and QFP as comparable as possible, we set the maximum amount able to be borrowed in ESPlanner to zero.

In addition to these conceptual differences, there are several technical differences between the two programs. First, ESPlanner formulates more precise estimates of federal and state income taxes as well as Social Security benefits compared to QFP's average

approach. Second, QFP apparently does not adjust for inflation in the first year of planning, whereas ESPlanner does. This may, however, simply reflect a difference in the timing conventions of the two programs. Third, ESPlanner integrates life insurance with the financial plan; premiums need not be entered as an itemized expense. Fourth, ESPlanner assists users in comparing their actual current saving with the amount being recommended, whereas QFP encourages users to compare their actual current expenditures with the amount they ultimately end up targeting.

V. Comparing Economic Security Planner and Quicken Financial Planner

The main table of this paper, Table 3, provides a detailed comparison of the output of the two software programs. The first 20 situations, labeled Case 1 through Case 20, are based on the same stylized household considered above, in which the husband, George, is aged 29 and the wife, Jane, is aged 27. George earns $50,000 per year in 1999 dollars and expects to retire at age 65. Each case adds some demographic or economic complexity to their initial situation. Cases 21 through 24 consider four actual households with quite different economic and demographic circumstances. To save space, we present results only for selected years of life, and only for key variables (stated in inflation-adjusted terms), namely, consumption, taxable savings, taxes, tax-deferred and taxable assets, and life insurance. We use ESPlanner's definitions of these variables, and had to combine several items from QFP's output tables to make the numbers comparable.

For all cases and for both Planners, we make the following economic assumptions, unless otherwise stated. The expected nominal rate of return on investments (whether taxable or tax-favored) is 6 percent, and the expected general

inflation rate is 3 percent. When relevant, the expected rate of inflation for college tuition is assumed to be 5 percent. Federal and state tax rates and rules, as well as government benefit programs (mainly Social Security), are expected to remain unchanged in the future. All households spend their entire lives in Massachusetts. Version 3.3 (r4) of QFP and version 1.10.37 of ESPlanner were used. Both programs were run with the computer's date set to January 1, 1999.

Case 1 – Husband Works

ESPlanner's output for Case 1 was discussed above. Recall that the household's living standard is perfectly smoothed with the couple spending $25,784 on consumption until the husband reaches age 95 and passes away. Thereafter, the surviving spouse, Jane, spends $16,115 on consumption, which suffices to maintain the same living standard she enjoyed when married. These and all other dollar figures discussed below are quoted in 1999 dollars.

QFP recommends a somewhat higher level of consumption expenditure in Case 1: $27,810 when both George and Jane are alive and $16,686, when Jane is surviving by herself. It should be recalled, however, that premiums for life insurance are an "off-the-top" expenditure in ESPlanner, whereas they are (implicitly) included in living expenses in QFP. Although their 1999 income levels are identical, the two programs recommend quite different amounts of non tax favored saving for 1999. ESPlanner recommends about $1,400 more non tax-favored saving in 1999 than QFP! The reason is that QFP calculates higher levels of taxes for 1999 than does ESPlanner. Although QFP generates

higher taxes than ESPlanner when the couple is young, it generates lower taxes than ESPlanner when the couple is middle-aged and older.

In considering these differences, it's important to bear in mind that QFP is making approximations in calculating taxes. Specifically, QFP is applying a single average tax rate over time, independent of the household's expected schedule of taxable income over time. In contrast, as described in the Appendix, ESPlanner makes very precise federal and state tax calculations that include determining whether or not the household should itemize its deductions, computing the household's taxable income, and using exact federal and state tax rate schedules to determine the household's tax liabilities. Correct calculation of state taxes is particularly important as households age and accumulate taxable capital income. The fact that ESPlanner produces much higher taxes when the couple has significant non tax-favored asset income reflects its incorporation of the very high rate of capital income taxation by the State of Massachusetts. This rate is roughly two times higher than the rate levied on labor income.[9]

Although the two programs recommend significantly different 1999 levels of non tax-favored saving, their 1999 life insurance recommendations are nearly identical. Neither program recommends life insurance for the non working wife. QFP's recommended life insurance for the husband is $680,000. ESPlanner's is $667,948. ESPlanner, but not QFP, provides life insurance recommendations for all future years as well: The husband's recommended level of life insurance declines over time, and is zero after he reaches age 57. At age 45, the recommended amount is $293,459.

[9] The Massachusetts legislature is currently considering lowering the tax on personal capital income to the same rate as is levied on labor income.

Case 2 Wife Works

Case 2 assumes that Jane works through her 64th year of life and earns $25,000 per year in 1999 dollars. Because the couple has greater economic resources, it can sustain a higher living standard, which is what each program recommends. However, the two programs now differ by almost $6,000 annually with respect to the level of the couple's sustainable living standard. ESPlanner has George and Jane consuming $35,883 when both are alive, compared with QFP's $41,720, a 16 percent difference. Again, tax calculations and, to a lesser extent, life insurance premiums appear to explain this difference. ESPlanner's 1999 taxes are almost $3,000 higher than QFP's, and ESPlanner's taxes are significantly higher when the couple is middle aged and approaching retirement. For example, when George is 45, ESPlanner's taxes are almost $8,000 higher. These differences appear to reflect ESPlanner's inclusion of the Massachusetts' 12 percent tax on non tax-sheltered capital income as well as our use in QFP of the "demographic average" method.

Associated with these differences in recommended consumption are differences in recommended non tax-favored saving. ESPlanner recommends 1999 non tax-favored saving be set at $21,937, whereas QFP recommends it be set at $20,069. When George is age 45, ESPlanner's recommended non tax-favored saving is much less than QFP's -- $24,352 versus $32,354. At George's age 65, ESPlanner's recommends much more dissaving than does QFP -- $21,975 versus $13,491. Thus, compared with QFP, ESPlanner recommends slightly more saving when George and Jane are young, and less

saving in middle age and the start of old age, when George and Jane face higher taxes than QFP says they will face.

The non-trivial differences between the two programs in saving recommendations and tax estimates eventuates in non-trivial differences in accumulated assets when the couple reaches retirement age. According to ESPlanner's plan, the couple has $871,921 in taxable assets when George reaches 65. According to QFP's plan, the couple taxable assets in George's 65th year are almost 15 percent larger -- $996,629.

Turning to the life insurance recommendations, both programs tell George he needs less life insurance because Jane now has earnings that can help sustain her if George dies prematurely. ESPlanner is now recommending slightly more insurance than QFP, but the difference is quite small.

Case 3 Adding Social Security Benefits

Case 3 adds the assumption that both George and Jane are in Social Security-covered employment, and are, therefore, paying payroll taxes and can expect benefits at levels currently legislated. According to ESPlanner, George and Jane receive $18,843 and $10,515, respectively, in Social Security retirement benefits when each reaches age 65. These benefit levels are substantially higher than the corresponding $10,049 and $5,266 figures calculated by QFP. The differences here apparently reflect the wage indexation of Social Security earnings histories by ESPlanner. (ESPlanner follows very precisely the rules for determining Social Security benefits as detailed in the Social Security Handbook.[10])

[10] ESPlanners's calculation of the "primary insurance amounts" for the earning members of the household, on which all benefits are based, are identical to those produced by Social Security's own ANYPIA program.

Because ESPlanner expects the couple to receive significantly more in future Social Security benefits than does QFP, it recommends less saving prior to retirement. Indeed, ESPlanner's 1999 recommended level of non tax-favored saving of $9,629 is one third lower than QFP's recommendation of $14,257. The couple's sustainable living standard is higher in Case 3 than Case 2 in both programs. For example, with Social Security, ESPlanner recommends that the couple consume $43,737 each year that both George and Jane are alive. Without Social Security it recommends they consume $35,883.[11]

Case 3's life insurance recommendations are not much different from those of Case 2. This is not surprising. On the one hand, the availability of Social Security survivor benefits reduces the need for life insurance for George. On the other hand, the couple's higher living standard when both spouses are alive means that Jane's needs as a survivor are greater.

Case 4 Adding Housing

This case builds on Case 3 by adding housing. Specifically, we assume that George and Jane own a home with a market value of $200,000, annual property taxes of $2,500, annual maintenance of $1,500, annual homeowners insurance of $400, and a 30-year mortgage with remaining balance of $170,000 and annual principal and interest mortgage payments of $1,124 (the mortgage interest rate is 8 percent). The couple is assumed to remain in their house until the end of their lives.

[11] This difference may suggest that Social Security is, on balance, a plus for George and Jane in terms of their sustainable living standards. But this is not necessarily so because in Case 2 we did not ascribe to George and Jane the contributions their employers would otherwise be making on their behalf to Social Security. Those contributions represent a form of compensation to George and Jane that would, in the absence of Social Security, presumably be paid directly to them.

The need to pay housing expenses reduces the amount of resources that can be devoted to consumption. The consumption decline is over $10,000 in QFP and over $8,000 in ESPlanner. The difference between the two programs is again due to taxes. Because ESPlanner takes into account the deductibility of mortgage interest payments, ESPlanner's taxes decline by almost $3,000 annually in moving from Case 3 to Case 4. In contrast, QFP's taxes using the demographic average rates are essentially unchanged.

The need to pay off the household's mortgage and other housing expenditures raises recommended life insurance for George under both programs. And both programs now recommend roughly $60,000 in life insurance for Jane. Intuitively, unlike Jane's consumption, which disappears if she dies, the household's housing expenditures are no different when Jane passes away. Because Jane's income contributes to meeting these expenditures when Jane is alive, insuring that income is important.

Case 5 Adding Children

In Case 5 we add two children – one born in 1997 and the other born in 2001. Because QFP doesn't adjust for household demographics, its recommended annual levels of consumption and taxable saving are unchanged by the presence of children. Stated differently, our application of QFP involves smoothing consumption expenditures over the household's life cycle, rather than smoothing its living standard. Smoothing a household's living standard requires spending more (although not proportionately more) on consumption in those years when the household has more members.

Unlike QFP, ESPlanner's objective is to smooth households' living standards to the extent the household desires a smooth living standard and to the extent such smoothing

doesn't violate the household's borrowing constraint. Hence ESPlanner's consumption recommendations take into account the assumed changes over time in household composition. In particular, ESPlanner assumes that children remain in their parents' household through age 18. In determining how much additional consumption is needed to equalize the living standards of children with those of their parents, ESPlanner permits users to input child-adult consumption equivalency factors that are child-age specific. These factors together with the program's specification of economies to scale in shared living are used to determine how much household consumption rises or falls when children enter or leave the household. The household's recommended consumption expenditure will vary with changes in its demographic composition even during intervals of time when the household is liquidity or borrowing constrained.

For example, consider a household that desires a perfectly smooth living standard through time, that lives for 60 years (the household head or spouse specifies a maximum remaining lifespan of 60 years), and that is borrowing constrained over its first 20 years. ESPlanner will (a) smooth the household's living standard over the first 20 years, (b) smooth the household's living standard over the last 40 years, and (c) make the discrepancy in living standards between the first 20 years and the last 40 years as small as possible.

Case 5 illustrates these features of ESPlanner because the additional expenditures on consumption arising from the presence of the children pushes the household into a liquidity constrained position. (We assume in all cases that no borrowing is possible.) Indeed, the household is liquidity constrained over its first 13 years, by which we mean that its living standard in the first 13 years is lower than in subsequent years. As the Case 5

ESPlanner results show, initial (1999) consumption is $37,105 and initial taxable saving is $2,981. The corresponding QFP recommendations are $32,600 and $7,299.

Why is the household saving in 1999 in the ESPlanner results if it is liquidity constrained? The answer is that the household still attempts to smooth its living standard over the first 13 years even if it can't perfectly smooth its living standard over its entire lifetime. To do so, it needs to save at the beginning of the 13-year interval in anticipation of the arrival of the second child. Once the second child is born, ESPlanner's recommended consumption expenditure (*but not the living standard per person)* rises to $43,383 and ESPlanner's recommended taxable saving becomes negative. The household slowly spends down its small stock of net worth, so that by 2008 its net worth is zero. Between 2009 and 2012 the household's consumption rises in step with increases in its disposable income -- the income it has after paying for taxes and housing expenditures. After 2012 the household again saves positive amounts. In that year, its consumption equals $43,705. This level is lowered to $40,366 in 2016 when the first child leaves the household and reduced again to $32,933 when the second child leaves the household.

In addition to recommending markedly different levels of initial consumption and taxable saving, QFP and ESPlanner recommend quite different levels of life insurance for Case 5. QFP's 1999 recommendations are $520,000 for George and $60,000 for the wife. The corresponding ESPlanner recommendations are $362,076 and zero. Although ESPlanner recommends no initial life insurance holdings for Jane, it does recommend she start buying life insurance in 2003.

What explains these differences? The answer is Social Security survivor benefits. The availability of these benefits reduces the need for life insurance on both the husband

and the wife, and the timing of their potential receipt disproportionately reduces the need for life insurance during years when the children are young. ESPlanner includes these benefits in forming its life insurance recommendations. QFP, we suspect, does not.[12] The survivor benefits to which we refer here are not simply widow and widower benefits that are available to surviving spouses starting at age 60, but also child, and mother/father benefits that are available to survivor households with children. Because child benefits are paid in the form of annual income streams until the children reach age 19 and mother/father benefits are paid in the form of annual income streams until the children reach age 16, their remaining present values are smaller the older are the children when the household first begins receiving these benefits.

Case 6 Financing College Tuition for Children

Case 6 augments the previous case by incorporating special expenditures in the form of college tuition payments of $30,000 per year for each child between age 19 and 22. The need to save for these expenditures raises recommended 1999 taxable saving in both programs, but the recommended increase (relative to Case 5) is almost 30 percent greater in ESPlanner than in QFP. And the need to guarantee payment of tuition regardless of who survives also alters life insurance recommendations. In this case the increases (relative to Case 5) are roughly the same across the two programs.

The need to pay for future college expenses changes the timing of the household's liquidity constraints in ESPlanner's calculations. Now the household experiences one long period of liquidity constrained consumption – between 1999 and 2023. The year

[12] In moving from Case 4 to Case 5, QFP's recommended life insurance for the husband drops by $60,000, but we don't believe this is due to the presence of Social Security survivor benefits.

2023 (when George is 53 and Jane is 51) is the year their youngest child finishes college; that is, once George and Jane are free from paying college tuition they experience a discrete increase in their living standard.

Case 7 Establishing an Emergency Fund

Case 7 adds a need for a $50,000 (in 1999 dollars) emergency fund to be accumulated by 2035. Both software packages have the household put aside the $50,000 accumulated for an emergency fund in 2035, when George is age 65. This is reflected in large negative savings at that age in both sets of results. However, QFP recommends that an additional $671 be saved in 1999, whereas ESPlanner recommends only $26 more be saved initially, but an additional $1,118 in 2024 – the first year after the household has finished paying college tuition and is no longer liquidity constrained and is enjoying a higher living standard. Thus ESPlanner pays for the emergency fund when the couple can afford to, i.e., when it doesn't have such pressing needs for other expenditures. In contrast, QFP pays for the emergency fund by reducing consumption in each year of the household's life; this is consistent with the conventional approach's target-savings methodology.

Case 8 Adding Taxable Assets

Case 8 gives $50,000 in taxable assets to the household. ESPlanner uses these additional resources to finance additional consumption during the period 1999-2023 when the household is liquidity constrained. Hence, its recommended 1999 level of taxable saving decreases (compared with Case 7) by $1,701, whereas QFP's

recommended 1999 taxable saving rises by $1,679. ESPlanner has the household increase consumption by more than $2,000 in the liquidity-constrained years, whereas QFP recommends an annual increase of slightly more than $1,000 over the household's lifetime. Taxes are higher in QFP owing to the larger accumulation of taxable assets and the resulting investment income.

In contrast to this difference in taxable saving recommendations, there is little difference between the two programs in the response of their life insurance recommendations to the presence of the initial taxable net worth. Both programs recommend minor reductions in the life insurance holdings of both George and Jane.

Case 9 Adding Tax-Deferred Assets

Case 9 gives George $50,000 in non-taxable assets which he holds in a defined contribution plan. Because the household is liquidity-constrained through 2023 and because the income from these assets is not accessible to the household until late in life, ESPlanner recommends essentially no changes (compared to Case 8) in taxable saving for 1999. QFP, on the other hand, recommends that the household reduce its 1999 taxable saving by $1,858. Regarding consumption, QFP suggests a $1,800 increase over the household's lifetime, while ESPlanner increases consumption only slightly initially, but then bumps it up by about $3,000 for the remainder of life.[13]

Both programs recommend roughly similar reductions in life insurance holdings. This point notwithstanding, the recommended 1999 levels of life insurance for George and Jane remain quite different across the two programs. For example, QFP recommends

Jane have $80,000 of life insurance, whereas ESPlanner recommends she have only $8,525.

Case 10 Adding Tax-Deferred Saving

In this case we assume that both George and his employer each contribute $2,500 to a defined contribution plan on behalf of George. Once again we find large differences in recommended taxable saving responses. QFP tells George and Jane to save almost $5,000 less in taxable form in 1999. ESPlanner tells them to save just $61 less. Because George has more future income (his employer's contributions) to protect, both programs recommend that George have more life insurance in 1999. But ESPlanner now recommends that Jane have no insurance whereas QFP still recommends she purchase $80,000 of coverage.

Case 11 Adding Bequests

This case adds a $50,000 special bequest by both George and Jane. QFP responds by raising recommended life insurance for each spouse. ESPlanner raises recommended life insurance just for George; that is, it continues to recommend no life insurance for Jane. The reason is that were Jane to die, George would have enough resources from his own labor earnings, the couple's taxable net worth, and his taxable net worth to sustain a higher living standard on his own than were Jane alive.

Case 12 Adding a Defined Benefit Pension

[13] Taxes are higher in the last years of life in QFP compared to ESPlanner because taxable as well as tax-deferred assets are consistently higher in QFP. Also, QFP, as we utilize it, does not seem to recognize the

This case gives Jane a $10,000 (in 1999 dollars) defined benefit pension annuity beginning at age 63. The pension income is not indexed for inflation nor are there survivor benefits. Here again we have income coming to the household in the post-liquidity constrained period. Hence, ESPlanner recommends essentially no change in 1999 taxable saving or consumption. QFP, on the other hand, treats the household as effectively being able to spend this future income in the present. So it recommends a $1,600 higher level of 1999 consumption and a commensurate reduction in 1999 saving. Indeed, QFP's recommended saving for 1999 is now 13 percent less than ESPlanner's.

Both programs now recommend less life insurance for George. But QFP recommends $20,000 less in life insurance for Jane, while ESPlanner recommends $33,212 more. QFP's recommended reduction in life insurance for Jane is curious given that Jane now has more future income that she needs to protect for George against the possibility of her early death.

Case 13 Adding an Inheritance

Case 13 adds a $400,000 (in 1999 dollars) inheritance that Jane will receive in 2027 from her father, but only in the case that Jane is alive. Because this inheritance arrives too late to relieve the household's liquidity constraint, there is again very little change compared to Case 12 in ESPlanner's 1999 saving recommendations. However, there is a very large increase in ESPlanner's recommended life insurance for Jane. This makes sense; Jane's inheritance is only available if she's alive, so she must take out additional insurance to make sure that George and her children will enjoy this inheritance. Quicken also recommends more initial life insurance for Jane, but the

special tax credits, deductions, and exemptions available to the elderly.

percentage increase (relative to Case 12) is substantially smaller than for ESPlanner. This appears to reflect our specification in ESPlanner that Jane's inheritance is contingent on her being alive. Quicken, in contrast, does not differentiate between non contingent and contingent receipts or, for that matter, special expenditures.

The initial amount of insurance recommended by ESPlanner for George declines (compared with Case 12) because the inheritance (which is insured through Jane's life insurance) represents another asset George can use as a survivor to maintain his and the children's living standard.

QFP, because it ignores liquidity constraints, begins spending Jane's inheritance right away, raising consumption in 1999 by over $4,500 and reducing 1999 recommended saving to just $754. This $754 recommended level of saving stands in stark contrast to ESPlanner's $6,793 saving recommendation for 1999.

Both programs now recommend fairly similar initial levels of life insurance for Jane. But George's initial life insurance should, according to ESPlanner, be only about three fifths of the level recommended by QFP. Interestingly, when Jane is 43, ESPlanner recommends more life insurance for Jane than for George. Why? Again, because Jane needs to guarantee that her inheritance will effectively be available to George and the children if she dies prior to receiving it.

Case 14 Adding Real Wage Growth

This case leaves out the inheritance of Case 13 and instead assumes that George and Jane each experience 2 percent growth each year in their real labor earnings. Because the couple has a lot more income in the future than the present, each program

advocates dissaving in the short run in order to permit a higher level of current consumption. But ESPlanner recommends almost $8000 more in saving (actually, more than $800 less in dissaving) than does QFP. Again, liquidity constraints explain this. Once ESPlanner realizes that the couple can't perfectly smooth its living standard over its entire life, it focuses on smoothing the couple's living standard during the liquidity constrained interval and the non liquidity constrained interval. This means consuming less than QFP recommends in the former interval and consuming more than QFP recommends in the later interval. QFP also suggests a withdrawal (with tax penalties) from the defined contribution plan in mid-life, which ESPlanner will never recommend before age 59.

Case 15 Age 62 Retirement of Husband

This case is identical to Case 12 (that is, no inheritance or real wage growth) except the husband retires at age 62. Earlier retirement increases QFP's recommended 1999 taxable saving by almost 30 percent, but leaves ESPlanner 1999 saving recommendation essentially unchanged. QFP reacts to the reduced lifetime earnings by lowering current as well as future recommended consumption and thus raising saving. ESPlanner, in contrast, reacts by cutting consumption in the period after George and Jane are no longer liquidity constrained – the period when they are otherwise enjoying a higher living standard.

Because George has less future labor income to protect, both programs advise George to purchase less life insurance. QFP's recommended reduction in insurance for George is, however, 40 percent greater than ESPlanner's recommended reduction. Both

programs also advise Jane to buy less life insurance. Indeed, ESPlanner recommends zero life insurance for Jane, whereas QFP recommends a $100,000 policy.

Case 16 5 Percent Real Rates of Return

This case is identical to Case 12 except it assumes 8 percent rather than 6 percent nominal rates of return on taxable and non taxable assets. Because the inflation rate is still set at 3 percent, this implies real interest rates of 5 percent rather than 3 percent on these assets. Ignoring liquidity constraints, higher real interest rates permit higher levels of lifetime consumption. But the household is liquidity constrained. Indeed, the higher real interest rate generates so much accumulation in their non-taxable accounts that George and Jane now experience two intervals of liquidity constraints – one prior to their children completing college and the other between the time their children complete college and the time (when George is age 65) that they pay off their emergency fund, start withdrawing their non-taxable assets, and start collecting their Social Security benefits. Consequently, ESPlanner recommends very little change (compared with Case 12) in initial consumption and, therefore, in initial taxable saving. At George's age 65, when the household is in the last year of its second constrained interval, consumption is $43,489; that is, $2,078 more than in Case 12. At George's age 66, consumption rises to $61,057, which is $16,273 (36 percent) more than in Case 12! In contrast to ESPlanner, QFP cuts initial saving by more than one half. Hence, ESPlanner's recommended 1999 level of saving is more than twice that of QFP. Again QFP recommends large mid-life withdrawals from the household's defined contribution plan.

Case 17 5 Percent Inflation

This case differs from Case 12 in assuming a 5 percent inflation rate. The higher inflation rate lowers real returns on taxable and non taxable assets to 1 percent. It also reduces the real values of the couple's mortgage payments and Jane's pension benefits. QFP reacts to these offsetting factors by reducing (relative to Case 12) household saving in 1999 by about one quarter. ESPlanner leaves 1999 saving roughly as is.

Case 18 Ages of Death Are 85

Lowering the latest ages at which George and Jane could die from 95 to 85 would, absent liquidity constraints, permit George and Jane to consume more each year. Thus, QFP's initial consumption rises (relative to Case 12) from $31,270 to $35,570 lowering initial taxable saving from $5,994 to $4,653. ESPlanner's initial consumption is changed only slightly in reflection of a small change in recommended life insurance holdings and, thus, life insurance premium payments. Hence, initial ESPlanner taxable saving in Case 18 is 46 percent higher than the amount recommended by QFP. QFP's recommended life insurance holdings are unaffected by the change in the maximum age of life, whereas ESPlanner's recommended holdings decline because the household does not need to insure its living standard for as long a period of time.

Case 19 10 Percent Higher Post-Retirement Living Standard

In this exercise, we tell both programs that the household wishes to have a 10 percent higher living standard after George is age 65. Because the couple is liquidity constrained when young and would otherwise experience more than a 10 percent rise in

its living standard after retirement compared to their youth, this change in assumptions leads to essentially no change in ESPlanner's initial consumption and taxable saving recommendations. But QFP now recommends less initial consumption and more initial taxable saving. Consequently, the two programs recommend almost the same initial levels of taxable saving.

Case 20 Downsizing of Home at Retirement

In this scenario, the couple sells its home when George retires and moves into a rental property that charges $1,500 per month in rent. This decision frees up the couple's home equity for use in financing its consumption in retirement. On the other hand, it raises considerably the couple's post-retirement housing expenses. On balance, the decision reduces the couple's ability to finance consumption.

QFP encourages the couple to immediately cut its consumption and raise its taxable saving in anticipation of the higher post-retirement housing expenses. ESPlanner, in contrast, cuts future rather than immediate consumption and, thus, recommends roughly the same initial taxable saving. Both programs recommend that both spouses purchase more life insurance. However, as has been the case with the other scenarios, QFP's insurance recommendations are considerably higher than those of ESPlanner. Here, QFP's 1999 recommended insurance holdings for George and Jane combined total $800,000. The comparable ESPlanner figure is $561,041 – a 30 percent smaller amount.

Summary of Findings For First 20 Cases

In looking back at the 20 cases we've now considered, several things become clear. First, the two programs provide remarkably different recommendations even in simple settings despite the fact that each is designed to help households maintain their living standards or at least their consumption levels though time. Second, the two programs are calculating significantly different levels of taxes and Social Security benefits and these differences materially alter their saving and insurance recommendations. Because we have been able to check the accuracy of ESPlanner's tax and Social Security benefit calculations, it appears that QFP's calculation of these variables may be "soft". (Of course, there is a broader question applicable to all software packages and planning exercises about the accuracy of any projection of taxes and Social Security decades into the future, although QFP does allow the user to lower the estimate of Social Security benefits to be paid in the future.) Third, the fact that QFP does not automatically adjust for household composition and liquidity constraints leads it in many cases to recommend either much less or more taxable saving compared to ESPlanner. Finally, QFP generally recommends more life insurance than what ESPlanner has determined that households actually need in order to insure their current living standards for potential survivors; this may reflect an incomplete estimation of Social Security survivor benefits.

VI. Comparing QFP and ESPlanner for Four Actual Households

This section examines the recommendations of the two software programs when applied to four actual households.

Case 21 A Young, Low-Income Couple

This case involves a couple in which each spouse is age 35 and each retires at age 65. They plan to have two children, one in 2001 and one in 2003. The husband earns $43,000 initially, declining by 2001 to $35,000 and staying constant thereafter. The wife earns $37,000 in 1999, zero in 2000, $35,000 in 2001, $36,000 in 2002, $37,000 in 2003, and $38,000 thereafter. The husband receives a gift from his father of $10,000 in 1999 and 2000. As for special expenditures, the couple makes a $15,000 downpayment in 1999 to purchase a house and makes nominal truck loan payments of $4,500 in 1999 and 2000. The couple also plans to spend $20,000 on college tuition for each child between their ages 19 and 22. The couple plans for funerals of $5,000 each, but doesn't wish to leave a bequest. The couple currently has $14,000 in taxable net worth, and the wife has $3,000 in an IRA. Otherwise the couple has no assets.

The wife intends to contribute $1,200 to her IRA annually until she retires. Her withdrawals from her IRA will begin at age 65 and will be taken out in equal annual payments. The couple is buying a house in 1999 for $150,000. Purchase of the house causes $2,500 in annual property taxes, $400 in annual homeowner's insurance payments, and $2,000 in annual maintenance. The couple intends in 1999 to take out a $135,000, 30-year mortgage with monthly principal and interest payments of $990. Both spouses will begin collecting Social Security retirement benefits at age 65. They both entered past labor income that we need to compute their Social Security benefits in ESPlanner. The economic assumptions the couple choose are ESPlanner's default values including 6 percent nominal interest rates on taxable and non-taxable assets, a 3 percent inflation rate, and a zero non-mortgage borrowing constraint.

In running the couple through ESPlanner, we also solicited their current saving and insurance holdings. Prior to running the software the couple planned to save $19,620 in 1999. The wife has no life insurance, while the husband has $30,000.

In ESPlanner we find that the couple is never liquidity constrained. On the other hand, the couple never accumulates a significant stock of taxable assets. As the table for Case 21 makes clear, the couple is advised to consume $26,866 initially and $38,500 when both children are at home. Our application of QFP, on the other hand, recommends constant consumption of $26,920 when both spouses are alive, regardless of the presence of children. Here ESPlanner gives a more intuitive recommendation; children cost a lot of money and this must be reflected in household savings decisions.

QFP and ESPlanner agree that husband and wife should have equivalent life insurance holdings, reflecting their equivalent economic contribution to the household. Again, however, ESPlanner suggests lower life insurance than QFP.

Case 22 A Middle-Aged, Upper-Income Couple

This case involves a couple with a 40 year-old wife and a 39 year-old husband. They have two children, one born in 1991, the other born in 1993. The wife doesn't work. The husband works earning $200,000 in 1999 and 2000. Starting in 2001 and continuing until his retirement at age 55, the husband expects to earn $100,000. They plan to send each of their children to college for four years at a cost of $30,000 per child per year. They have no special bequests and plan for funerals of $5,000 each. The husband currently has $800,000 in life insurance; the wife has none. The couple's taxable assets are $225,500. The wife has an IRA with a 1999 balance of $84,700, and

the husband has a 401k with a 1999 balance of $148,000. Both plan to withdraw their non-taxable assets (and make them taxable) at age 59. The couple is currently saving $11,765 in taxable form. The husband plans to contribute $9,500 into his 401k plan each year and expects his employer to contribute $6,000. The wife does not intend to make additional IRA contributions. The couple owns a $475,000 house with annual property taxes of $5,200, annual maintenance of $1,500, annual homeowners insurance of $500, and a 29-year-old $170,000 mortgage with monthly payments of $1,131. Each spouse intends to take his/her Social Security retirement benefits starting at age 62.

QFP and ESPlanner recommend vastly different amounts of consumption, taxable saving, and life insurance for this household. QFP recommends more than twice the life insurance for the husband than is recommended by ESPlanner. Differences in tax calculations, in the treatment of household composition, and in the treatment of liquidity constraints appear to explain the different consumption and saving recommendations. To begin, ESPlanner sets consumption much higher in earlier than in later years because it realizes that the couple needs to spend more when it has children. Second, ESPlanner calculates the couple's short-run taxes to be much higher than those generated by QFP, reflecting higher Massachusetts's income taxes on capital income. Note that QFP does not allow for the employer's matching contribution to the 401(k) plan to reflect inflation-induced increases in pay. Also QFP's Social Security benefits are lower than ESPlanner's.

Case 23 An Older, Very High Income Couple

This case involves a couple in which the husband is age 64 and the wife is age 57. The husband intends to work for two more years, earning close to $400,000 over the two years. The couple has a variety of large special expenses in the short run, including an expensive home renovation. The husband has two nominal pensions providing close to $200,000 annually that he expects to collect starting after retiring. Each spouse is planning for a $5,000 funeral. The couple also wants to give its children a $2 million gift in 2025. The couple's taxable net worth is close to $3 million. The wife has a very small IRA account, and the husband has a 401k account with balances that are close to three-quarters of a million dollars. Each spouse elects to withdraw the smallest amount of funds from these tax-favored accounts permitted by law. The couple owns a house with a market value of $1,200,000. The annual property taxes, maintenance, and homeowners insurance total $6,000, $13,000, and $1,000, respectively. There is a 25-year $525,000 mortgage on the property with a monthly payment of $3,318. The couple plans to sell its home in 2025 and use the proceeds as well as other funds to make the $2 million gift. After selling its home, the couple plans to rent a home for $4,000 per month. The couple uses the default economic assumptions.

QFP and ESPlanner agree in this case that neither spouse needs life insurance, but they disagree very strongly about the amount of taxes the couple will pay initially and over time and the rate at which the couple should dissave (spend down) its taxable assets. ESPlanner calculates the couple's 1999 taxes at $182,449, whereas QFP calculates them at $237,681. This is a 30 percent difference. ESPlanner takes into account the tax deductibility of special expenditures, and ESPlanner's much lower 1999 taxes may reflect the fact that some of the couple's very large 1999 special expenditures are tax deductible.

Interestingly, ESPlanner's calculated taxes are higher than are QFP's when the husband is age 75, but then fall below QFP's.

Because ESPlanner calculates that the couple will generally pay less in taxes initially and overtime, it recommends considerably higher consumption expenditures. In 1999, ESPlanner says the household can consume $204,510, whereas QFP tells the household not to consume more than $186,880. ESPlanner recommends the couple dissave $317,615 in 1999 – a very large sum, which reflects, in large part, the couple's very substantial special expenditures in 1999. QFP, in contrast, recommends the couple dissave $138,380.

Case 24 A Middle-Aged Low-Income Divorcee

This case describes a 59-year-old divorcee who plans to work until age 70 and whose life expectancy is age 85. She earns $35,000 a year, has $32,000 in assets (evenly divided between taxable and tax-deferred accounts), is making a nominal loan repayment of $4,500 for the next three years, and pays $10,200 a year for rent. Her current employer contributes 20 percent of pay to a defined contribution plan, and she will receive $4,000 a year in nominal benefits from a prior employer's defined benefit pension plan.

ESPlanner gives a higher standard of living than QFP and allows greater savings withdrawals for this woman. These recommendations are almost entirely due to ESPlanner's higher estimate of Social Security benefits -- $21,430 compared to $9,232 in QFP.[14] In fact, ESPlanner's higher estimate for Social Security benefits produces a

[14] In part, the benefit is high because a) our middle-aged divorcee doesn't plan to start collecting benefits until she is age 70 and b) ESPlanner incorporates delayed retirement credits and benefit recomputations in its calculation of retirement benefits.

liquidity constraint in the first decade of planning, as the replacement of income in retirement for this woman is so high.

VI. Summary and Conclusions

This paper used Economic Security Planner and Quicken Financial Planner to illustrate and contrast the economic and conventional approaches to financial planning. After clarifying the main conceptual and technical differences between the two programs, the paper compared their consumption, saving, and insurance recommendations for 20 stylized and 4 actual households. These recommendations are remarkably different even for very simple cases. The differences are, however, readily explained. They are due to very different tax and Social Security benefits calculations and to very different treatments of demographics and borrowing constraints.

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Table 1 George's and Jane's Non Tax-Favored Balance Sheet in Case 1

Year	George's Age	Jane's Age	Income	Spending	Taxes	Non Tax-Favored Saving	Non Tax-Favored Net Worth
1999	29	27	50,000	26,588	8,640	14,772	14,772
2000	30	28	50,430	26,562	8,872	14,996	29,769
2001	31	29	50,867	26,535	9,108	15,224	44,992
2002	32	30	51,310	26,509	9,347	15,454	60,446
2003	33	31	51,761	26,488	9,590	15,683	76,129
2004	34	32	52,217	26,460	9,837	15,920	92,049
2005	35	33	52,681	26,432	10,088	16,161	108,211
2006	36	34	53,152	26,435	10,342	16,375	124,586
2007	37	35	53,629	26,420	10,698	16,511	141,097
2008	38	36	54,110	26,422	11,083	16,605	157,702
2009	39	37	54,593	26,430	11,470	16,693	174,395
2010	40	38	55,079	26,421	11,859	16,799	191,195
2011	41	39	55,569	26,424	12,250	16,895	208,089
2012	42	40	56,061	26,437	12,644	16,980	225,069
2013	43	41	56,555	26,443	13,040	17,072	242,142
2014	44	42	57,053	26,445	13,437	17,171	259,312
2015	45	43	57,553	26,442	13,837	17,274	276,585
2016	46	44	58,056	26,425	14,240	17,391	293,976
2017	47	45	58,562	26,418	14,645	17,499	311,475
2018	48	46	59,072	26,388	15,053	17,631	329,106
2019	49	47	59,586	26,357	15,464	17,765	346,871
2020	50	48	60,103	26,320	15,878	17,905	364,777
2021	51	49	60,625	26,274	16,295	18,056	382,833
2022	52	50	61,150	26,218	16,716	18,216	401,050
2023	53	51	61,681	26,151	17,140	18,390	419,440
2024	54	52	62,217	26,063	17,569	18,585	438,025
2025	55	53	62,758	25,956	18,002	18,800	456,825
2026	56	54	63,306	25,820	18,440	19,046	475,871
2027	57	55	63,860	25,784	18,883	19,193	495,063
2028	58	56	64,419	25,784	19,331	19,304	514,368
2029	59	57	64,982	25,784	19,781	19,417	533,785
2030	60	58	65,547	25,784	20,233	19,530	553,316
2031	61	59	66,116	25,784	20,688	19,644	572,960
2032	62	60	66,688	25,784	21,146	19,758	592,719
2033	63	61	67,264	25,784	21,606	19,874	612,592
2034	64	62	67,842	25,784	22,069	19,989	632,582
2035	65	63	18,425	25,784	8,018	-15,377	617,205
2036	66	64	17,977	25,784	7,776	-15,583	601,622
2037	67	65	17,523	25,784	7,531	-15,792	585,830
2038	68	66	17,063	25,784	7,283	-16,004	569,826
2039	69	67	16,597	25,784	7,031	-16,218	553,608
2040	70	68	16,125	25,784	6,776	-16,435	537,173
2041	71	69	15,646	25,784	6,517	-16,655	520,518
2042	72	70	15,161	25,784	6,256	-16,879	503,639
2043	73	71	14,669	25,784	5,990	-17,105	486,534
2044	74	72	14,171	25,784	5,721	-17,334	469,201
2045	75	73	13,666	25,784	5,448	-17,566	451,635

Table 1 (Continued)

Year	George's Age	Jane's Age	Income	Spending	Taxes	Non Tax-Favored Saving	Non Tax-Favored Net Worth
2046	76	74	13,154	25,784	5,172	-17,802	433,833
2047	77	75	12,636	25,784	4,892	-18,040	415,793
2048	78	76	12,110	25,784	4,608	-18,282	397,512
2049	79	77	11,578	25,784	4,321	-18,527	378,985
2050	80	78	11,038	25,784	4,029	-18,775	360,210
2051	81	79	10,492	25,784	3,734	-19,026	341,184
2052	82	80	9,937	25,784	3,435	-19,282	321,903
2053	83	81	9,376	25,784	3,132	-19,540	302,363
2054	84	82	8,807	25,784	2,824	-19,801	282,562
2055	85	83	8,230	25,784	2,513	-20,067	262,495
2056	86	84	7,645	25,784	2,197	-20,336	242,159
2057	87	85	7,053	25,784	1,877	-20,608	221,551
2058	88	86	6,453	25,784	1,553	-20,884	200,667
2059	89	87	5,845	25,784	1,403	-21,342	179,326
2060	90	88	5,223	25,784	1,254	-21,815	157,511
2061	91	89	4,588	25,784	1,101	-22,297	135,214
2062	92	90	3,938	25,784	945	-22,791	112,424
2063	93	91	3,274	25,784	786	-23,296	89,129
2064	94	92	2,596	25,784	623	-23,811	65,318
2065	95	93	1,902	30,784	457	-29,339	35,980
2066		94	1,048	16,115	286	-15,353	20,627
2067		95	601	21,115	113	-20,627	0

Table 2 Jane's Survivor Non Tax-Favored Balance Sheet in Case 1

Year	Jane's Age	Income	Spending	Taxes	Non Tax-Favored Saving	Non Tax-Favored Net Worth
2021	49	518,691	0	0	518,691	518,691
2022	50	15,108	16,115	7,084	-8,091	510,599
2023	51	14,872	16,115	6,957	-8,200	502,399
2024	52	14,633	16,115	6,828	-8,310	494,090
2025	53	14,391	16,115	6,697	-8,421	485,668
2026	54	14,146	16,115	6,565	-8,534	477,134
2027	55	13,897	16,115	6,431	-8,649	468,486
2028	56	13,645	16,115	6,295	-8,765	459,722
2029	57	13,390	16,115	6,157	-8,882	450,840
2030	58	13,131	16,115	6,017	-9,001	441,839
2031	59	12,869	16,115	5,876	-9,122	432,718
2032	60	12,603	16,115	5,732	-9,244	423,475
2033	61	12,334	16,115	5,587	-9,368	414,107
2034	62	12,061	16,115	5,439	-9,493	404,615
2035	63	11,785	16,115	5,290	-9,620	394,995
2036	64	11,505	16,115	5,139	-9,749	385,246
2037	65	11,221	16,115	4,985	-9,879	375,366
2038	66	10,933	16,115	4,830	-10,012	365,354
2039	67	10,641	16,115	4,673	-10,147	355,208
2040	68	10,346	16,115	4,513	-10,282	344,926
2041	69	10,046	16,115	4,351	-10,420	334,507
2042	70	9,743	16,115	4,187	-10,559	323,947
2043	71	9,435	16,115	4,021	-10,701	313,247
2044	72	9,124	16,115	3,853	-10,844	302,402
2045	73	8,808	16,115	3,682	-10,989	291,413

Table 2 (Continued)

Year	Jane's Age	Income	Spending	Taxes	Non Tax-Favored Saving	Non Tax-Favored Net Worth
2046	74	8,488	16,115	3,510	-11,137	280,276
2047	75	8,163	16,115	3,334	-11,286	268,990
2048	76	7,835	16,115	3,157	-11,437	257,553
2049	77	7,502	16,115	2,977	-11,590	245,963
2050	78	7,164	16,115	2,795	-11,746	234,217
2051	79	6,822	16,115	2,610	-11,903	222,314
2052	80	6,475	16,115	2,423	-12,063	210,252
2053	81	6,124	16,115	2,233	-12,224	198,028
2054	82	5,768	16,115	2,041	-12,388	185,640
2055	83	5,407	16,115	1,846	-12,554	173,086
2056	84	5,041	16,115	1,649	-12,723	160,364
2057	85	4,671	16,115	1,448	-12,892	147,472
2058	86	4,295	16,115	1,246	-13,066	134,406
2059	87	3,915	16,115	1,040	-13,240	121,166
2060	88	3,529	16,115	847	-13,433	107,733
2061	89	3,138	16,115	753	-13,730	94,003
2062	90	2,738	16,115	657	-14,034	79,969
2063	91	2,329	16,115	559	-14,345	65,625
2064	92	1,911	16,115	459	-14,663	50,963
2065	93	1,484	16,115	356	-14,987	35,976
2066	94	1,048	16,115	251	-15,318	20,658
2067	95	602	21,115	144	-20,657	0

Table 3 Comparing Results from ESPlanner and QFP

Case 1

***Husband Works*, Wife Doesn't Work, No Social Security Benefits, No Housing, No Children, No College, No Emergency Fund, No Taxable Assets, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement**

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	27,810	25,784	13,383	14,772	9,296	8,640	13,312	14,772	0	0	680,000	667,948	0	0
45	43	27,810	25,784	20,526	17,274	11,729	13,837	264,240	276,585	0	0	N.C.	293,458	N.C.	0
65	63	27,810	25,784	(9, 653)	(15,377)	6,457	8,018	664,601	617,205	0	0	N.C.	0	N.C.	0
85	83	27,810	25,784	(20, 963)	(20,067)	2,378	2,513	268,731	262,495	0	0	N.C.	0	N.C.	0
Deceased	95	16,686	16,115	(17,156)	(20,627)	10	113	1,064	0	0	0	N.C.	0	N.C.	0

N.C. – not computed

Case 2

Husband Works, *Wife Works*, No Social Security Benefits, No Housing, No Children, No College, No Emergency Fund, No Taxable Assets, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	41,720	35,883	20,069	21,937	13,944	16,624	19,962	21,937	0	0	460,000	461,763	0	0
45	43	41,720	35,883	32,354	24,352	17,594	25,223	396,258	393,396	0	0	N.C.	129,531	N.C.	0
65	63	41,720	35,883	(13,491)	(21,975)	9,683	12,128	996,629	871,921	0	0	N.C.	0	N.C.	0
85	83	41,720	35,883	(30,437)	(28,678)	3,561	4,261	402,571	365,003	0	0	N.C.	0	N.C.	0
Deceased	95	25,032	22,427	(25,757)	(26,776)	9	129	888	0	0	0	N.C.	0	N.C.	0

N.C. – not computed

Case 3

Husband Works, Wife Works, *Social Security Benefits*, No Housing, No Children, No College, No Emergency Fund, No Taxable Assets, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	42,700	43,737	14,257	9,629	18,564	21,093	14,182	9,628	0	0	420,000	449,205	0	0
45	43	42,700	43,737	21,867	10,724	21,156	24,882	281,513	173,344	0	0	N.C.	175,054	N.C.	0
65	63	42,700	43,737	(11,410)	(10,336)	8,897	7,464	706,929	384,790	0	0	N.C.	0	N.C.	0
85	83	42,700	43,737	(22,331)	(12,414)	4,986	2,939	285,399	155,930	0	0	N.C.	0	N.C.	0
Deceased	95	25,620	27,336	(17,480)	(13,124)	1,471	13	1,929	0	0	0	N.C.	0	N.C.	0

N.C. – not computed

Case 4

Husband Works, Wife Works, Social Security Benefits, *Housing*, No Children, No College, No Emergency Fund, No Taxable Assets, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	32,600	35,586	7,299	2,967	18,527	18,166	7,260	2,968	0	0	580,000	588,754	60,000	63,873
45	43	32,600	35,586	16,082	6,796	20,141	21,688	175,623	85,798	0	0	N.C.	299,112	N.C.	0
65	63	32,600	35,586	(9,363)	(7,246)	7,596	4,900	573,110	277,120	0	0	N.C.	0	N.C.	0
85	83	32.600	35,586	(17,934)	(8,935)	4,485	1,890	233,830	114,104	0	0	N.C.	0	N.C.	0
Deceased	95	19,560	22,241	(15,759)	(7,577)	1,477	0	2,309	0	0	0	N.C.	0	N.C.	0

N.C. not computed

Case 5

Husband Works, Wife Works, Social Security Benefits, Housing, *Children*, No College, No Emergency Fund, No Taxable Assets, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	32,600	37,105	7,299	2,981	18,527	16,982	7,260	2,981	0	0	520,000	362,076	60,000	0
45	43	32,600	43,705	16,082	(66)	20,141	17,997	175,623	0	0	0	N.C.	325,241	N.C.	39,248
65	63	32,600	32,933	(9,363)	(5,054)	7,596	3,113	573,110	202,142	0	0	N.C.	0	N.C.	0
85	83	32,600	32,933	(17,934)	(6,465)	4,485	1,177	233,830	85,817	0	0	N.C.	0	N.C.	0
Deceased	95	25,620	20,583	(15,759)	(5,966)	1,477	0	2,309	0	0	0	N.C.	0	N.C.	0

Assume for QFP, a $5,000 annual allowance per child in the life insurance calculator. N.C. -- not computed

Case 6

Husband Works, Wife Works, Social Security Benefits, Housing, Children, *College*, No Emergency Fund, No Taxable Assets, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	28,270	31,189	11,768	8,773	18,550	16,982	11,706	8,773	0	0	580,000	414,718	120,000	50,578
45	43	28,270	36,466	(8,241)	7,904	20,751	20,440	232,922	122,396	0	0	N.C.	362,119	N.C.	78,886
65	63	28,270	31,592	(7,842)	(3,944)	6,597	2,213	470,249	164,404	0	0	N.C.	0	N.C.	0
85	83	28,270	31,592	(14,643)	(5,216)	4,087	822	192,892	71,712	0	0	N.C.	0	N.C.	0
Deceased	95	16,962	19,745	(13,056)	(5,152)	1,484	0	3,257	0	0	0	N.C.	0	N.C.	0

N.C. – not computed

Case 7

Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, *Emergency Fund*, No Taxable Assets, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	27,620	31,130	12,439	8,799	18,554	16,982	12,374	8,798	0	0	600,000	427,175	140,000	66,224
45	43	27,620	36,397	(7,193)	7,905	20,880	20,449	246,186	122,829	0	0	N.C.	378,165	N.C.	97,426
65	63	27,620	30,312	(59,154)	(52,587)	6,433	2,513	453,403	128,708	0	0	N.C.	0	N.C.	0
85	83	27,620	30,312	(14,208)	(4,021)	4,007	491	184,689	58,602	0	0	N.C.	0	N.C.	0
Deceased	95	16,572	18,945	(12,723)	(4,375)	1,460	0	863	0	0	0	N.C.	0	N.C.	0

N.C. – not computed

Case 8

Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, *Taxable Assets*, No Tax-Deferred Assets, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	28,900	33,261	14,118	7,098	19,057	18,081	63,549	58,597	0	0	580,000	415,500	120,000	54,244
45	43	28,900	38,888	(7,518)	5,568	21,593	20,816	290,959	137,713	0	0	N.C.	373,522	N.C.	92,783
65	63	28,900	30,312	(59,838)	(52,587)	6,983	2,513	484,537	128,708	0	0	N.C.	0	N.C.	0
85	83	28,900	30,312	(15,211)	(4,021)	4,317	491	196,718	58,602	0	0	N.C.	0	N.C.	0
Deceased	95	17,340	18,945	(13,542)	(4,375)	1,464	0	247	0	0	0	N.C.	0	N.C.	0

N.C. – not computed

Case 9

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, *Tax-Deferred Assets*, No Tax-Deferred Saving, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	30,700	33,437	12,260	7,030	19,047	18,081	61,701	58,530	53,000	53,000	540,000	370,828	80,000	8,525
45	43	30,700	39,094	(10,500)	5,567	21,309	20,791	254,150	137,527	83,902	83,902	N.C.	323,502	N.C.	39,567
65	63	30,700	34,034	(64,543)	(51,371)	6,027	3,601	385,117	91,156	148,987	141,832	N.C.	0	N.C.	0
85	83	30,700	34,034	(11,078)	(2,652)	5,113	2,175	141,897	46,955	86,088	61,304	N.C.	0	N.C.	0
Deceased	95	18,420	21,271	0	(6,635)	4,365	0	0	0	4,921	0	N.C.	0	N.C.	0

N.C. – not computed

Case 10

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, *Tax-Deferred Saving*, No Bequests, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	33,020	31,910	7,285	6,769	19,021	17,274	56,752	58,268	58,161	58,000	600,000	458,962	80,000	0
45	43	33,020	37,308	(18,640)	5,787	20,694	20,002	155,433	137,586	195,168	191,910	N.C.	303,522	N.C.	0
65	63	33,020	40,821	(74,300)	(48,332)	3,262	6,395	120,357	0	478,571	446,422	N.C.	0	N.C.	0
85	83	33,020	41,031	0	817	7,194	6,126	0	17,857	273,608	192,956	N.C.	0	N.C.	0
Deceased	95	19,812	25,645	0	(10,890)	4,650	5	0	0	1,770	0	N.C.	0	N.C.	0

N.C. – not computed

Case 11

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, *Bequests*, No Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	32,670	31,851	7,646	6789	19,023	17,274	57,112	58,289	58,161	58,000	660,000	490,331	140,000	0
45	43	32,670	37,240	(18,036)	5,786	20,627	20,010	162,613	137,964	195,168	191,910	N.C.	335,521	N.C.	0
65	63	32,670	39,996	(73,432)	(47,454)	3,499	6,596	139,852	9,582	478,571	446,422	N.C.	0	N.C.	0
85	83	32,670	39,996	552	2,295	7,373	6,646	34,923	52,418	276,528	192,956	N.C.	0	N.C.	0
Deceased	95	19,602	24,998	(33)	(10,949)	14,842	713	0	0	1,943	0	N.C.	0	N.C.	0

In QFP, a bequest is entered separately in two locations: as a special expense at the end of the year of the wife's death and as a "specific bequest" in the life insurance calculator.

Case 12

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, *Pensions*, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	34,270	31,870	5,994	6780	19,014	17,274	55,469	58,280	58,161	58,000	620,000	449,309	120,000	33,212
45	43	34,270	37,262	(20,826)	5,747	20,605	20,002	129,758	137,562	195,168	191,910	N.C.	293,091	N.C.	54,671
65	63	34,270	41,411	(67,672)	(41,814)	4,659	9,097	95,865	0	422,254	446,422	N.C.	0	N.C.	0
85	83	34,270	44,784	870	2,017	7,775	7,970	37,896	62,323	243,987	192,956	N.C.	0	N.C.	0
Deceased	95	20,562	27,990	(4,816)	(11,094)	14,087	1,753	0	0	835	0	N.C.	0	N.C.	0

Case 13

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, *Inheritance*, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	38,930	31,813	754	6,793	19,336	17,274	50,266	58,293	58,161	58,000	520,000	315,383	220,000	202,813
45	43	38,930	37,196	(29,630)	5,785	20,766	20,011	30,305	138,000	195,168	191,910	N.C.	143,101	N.C.	248,239
65	63	38,930	55,126	(60,827)	(53,745)	8,619	16,234	503,385	294,359	116,943	446,422	N.C.	0	N.C.	0
85	83	38,930	55,126	(13,690)	(7,617)	6,640	10,802	237,575	174,230	67,572	192,956	N.C.	0	N.C.	0
Deceased	95	23,358	34,454	(52,462)	(17,431)	5,185	1,810	0	0	1,838	0	N.C.	0	N.C.	0

Case 14

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, No Inheritance, *Real Wage Growth*, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	49,950	43,664	(13,320)	(5,292)	21,458	17,274	36,327	46,208	58,161	58,000	700,00	693,279	40,000	19,965
45	43	49,950	51,051	(18,332)	9,332	25,319	27,316	17,470	41,951	142,660	191,910	N.C.	477,309	N.C.	40,363
65	63	49,950	54,816	(66,546)	(53,488)	9,431	16,022	481,141	285,514	247,912	446,422	N.C.	0	N.C.	0
85	83	49,950	54,816	(12,251)	(7,328)	8,848	10,717	213,715	170,862	143,248	192,956	N.C.	0	N.C.	0
Deceased	95	29,970	34,260	(36,065)	(17,240)	9,667	1,808	0	0	1,172	0	N.C.	0	N.C.	0

In QFP, the Social Security benefits are increased compared to earlier cases because final salary, in real terms, is higher than current salary.

Case 15

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, No Inheritance, No Real Wage Growth, *Age 62 Retirement for Husband*, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	32,580	31,921	7,739	6,767	18,043	17,274	57,204	58,266	58,161	58,000	580,000	373,288	140,000	77,831
45	43	32,580	37,322	(17,881)	5,744	20,736	19,995	164,459	137,232	195,168	191,910	N.C.	225,327	N.C.	105,337
65	63	32,580	39,337	(16,527)	(45,168)	4,168	7,619	57,671	8,216	462,204	374,185	N.C.	0	N.C.	4,578
85	83	32,580	39,337	1,694	1,489	7,599	6,754	24,230	62,050	257,751	161,733	N.C.	0	N.C.	0
Deceased	95	19,548	24,586	(765)	(8,116)	14,700	1,706	0	0	356	0	N.C.	0	N.C.	0

N.C. – not computed

Case 16

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, No Inheritance, No Real Wage Growth, Age-65 Retirement for Husband, *5 Percent Real Returns*, 3 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	38,280	33,019	2,557	6,423	19,377	17,641	51,896	57,924	59,214	59,000	480,000	343,402	100,000	0
45	43	38,280	38,606	(26,219)	6,258	20,754	20,899	64,950	136,646	247,992	242,859	N.C.	221,604	N.C.	0
65	63	38,280	43,489	(72,394)	(27,374)	4,312	17,344	45,798	0	442,045	737,371	N.C.	0	N.C.	0
85	83	38,280	61,057	274	2,873	8,327	17,064	272	71,394	302,224	366,853	N.C.	0	N.C.	0
Deceased	95	22,968	38,161	0	(21,109)	15,538	2,299	0	0	2,616	0	N.C.	0	N.C.	0

N.C. – not computed

Case 17

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, No Inheritance, No Real Wage Growth, Age-65 Retirement for Husband, 3 Percent Real Returns, *5 Percent Inflation,* Max Death Ages are 95, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	36,200	32,944	5,013	5,714	19,175	17,466	54,326	58,214	59,214	59,000	640,000	523,737	80,000	0
45	43	36,200	38,518	(12,539)	5,705	20,499	20,867	121,785	130,820	196,577	192,255	N.C.	297,628	N.C.	17,509
65	63	36,200	42,473	(70,059)	(43,539)	5,555	9,048	129,525	0	477,833	442,959	N.C.	0	N.C.	0
85	83	36,200	42,854	117	1,715	8,243	7,855	52,689	68,786	273,140	190,622	N.C.	0	N.C.	0
Deceased	95	21,720	26,784	(3,510)	(12,185)	14,593	2,102	0	0	2,970	0	N.C.	0	N.C.	0

N.C. – not computed

Case 18

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, No Inheritance, No Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, *Death at Age 85*, Desired Stable Standard of Living, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	35,570	31,912	4,653	6,785	19,007	17,274	54,134	58,284	58,161	58,000	620,000	428,054	120,000	15,433
45	43	35,570	37,312	(23,169)	5,753	20,577	20,001	102,987	137,504	195,168	191,910	N.C	288,392	N.C	33,455
65	63	35,570	41,811	(69,568)	(37,751)	4,470	11,309	76,366	0	339,476	439,630	N.C	0	N.C	0
85	83	35,570	48,457	0	(52,075)	4,964	10,655	0	24,509	78,292	0	N.C	0	N.C	0
Deceased	85	21,342	30,286	0	(12,169)	15,205	1,899	0	0	518	0	N.C	0	N.C	0

N.C. – not computed

Case 19

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, No Inheritance, Real Wage Growth, Age 65 Retirement for Husband, 3 Percent Real Returns, 3 Percent Inflation, Max Death Ages are 95, *10 Percent Higher Post-Retirement Living Standard*, No Downsizing of Home at Retirement

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	33,550	31,871	6,738	6,779	19,018	17,274	56,208	58,279	58,161	58,000	640,000	449,185	120,000	32,823
45	43	33,550	37,264	(19,561)	5,748	20,650	20,002	144,552	137,550	195,168	191,910	N.C	294,626	N.C	54,213
65	63	36,355	44,900	(69,595)	(45,263)	4,736	9,254	103,720	3,282	467,578	446,422	N.C	0	N.C	0
85	83	36,355	44,900	1,021	1,909	8,233	8,001	37,987	63,541	249,381	192,956	N.C	0	N.C	0
Deceased	95	21,813	28,063	(3,074)	(11,165)	14,690	1,753	0	0	5,167	0	N.C	0	N.C	0

N.C. – not computed

Case 20

Stylized Couple: Husband Works, Wife Works, Social Security Benefits, Housing, Children, College, Emergency Fund, Taxable Assets, Tax-Deferred Assets, Tax-Deferred Saving, Bequests, Pensions, No Inheritance, No Real Wage Growth, Age-65 Retirement for Husband, 3 Percent Real Returns, 5 Percent Inflation, Max Death Ages are 95, Desired Stable Standard of Living, *Downsizing of Home at Retirement*

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Husband's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
29	27	32,430	31,728	7,894	6,827	19,024	17,274	57,358	58,327	58,161	58,000	660,000	497,077	140,000	63,964
45	43	32,430	37,096	(17,624)	5,746	21,752	20,020	167,536	138,403	195,168	191,910	N.C.	341,353	N.C.	91,374
65	63	32,430	37,311	(73,194)	(49,802)	7,012	14,379	329,501	225,243	478,571	446,422	N.C.	0	N.C.	0
85	83	32,430	37,311	(5,664)	(3,241)	9,276	10,932	133,455	188,583	276,528	192,956	N.C.	0	N.C.	0
Deceased	95	19,458	23,319	(11,183)	(74,708)	15,383	3,291	0	0	2,820	0	N.C.	0	N.C.	0

N.C. – not computed

Case 21
A Young, Low-Income Couple

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Wife's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
35	35	26,920	26,866	7,863	5,424	19,901	20,355	21,683	19,845	4,419	4,380	340,000	242,122	340,000	236,396
45	45	26,920	38,500	16,947	3,447	19,222	16,812	132,998	46,839	18,400	17,984	N.C.	169,566	N.C.	197,139
65	65	26,920	26,866	21,667	(797)	16,439	312	374,766	43,794	64,356	59,321	N.C.	25,735	N.C.	31,197
85	85	26,920	26,866	(16,730)	(2,414)	3,083	96	266,097	11,375	36,592	15,489	N.C.	9,477	N.C.	10,813
90	90	13,460	26,866	0	(1,030)	3,316	7	0	0	3,013	0	N.C.	0	N.C.	0

N.C. – not computed

Case 22

A Middle-Aged, Upper-Income Couple

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Couple's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
39	40	39,390	48,909	102,508	57,063	48,366	70,217	324,909	289,328	262,661	262,162	960,000	474,795	0	0
45	46	39,390	48,909	21,883	4,526	30,154	28,969	494,700	366,871	411,295	411,486	N.C.	184,907	N.C.	0
65	66	39,390	35,925	0	0	11,804	7,364	0	0	843,756	675,978	N.C.	0	N.C.	0
85	86	39,390	41,823	(632)	194	10,191	7,468	1489	3,130	343,461	288,373	N.C.	0	N.C.	0
95	Deceased	21,008	28,683	0	0	5,781	6,710	0	0	1,325	0	N.C.	0	N.C.	0

N.C. – not computed. Note: QFP does not allow the employer's matching contribution to a tax-deferred account to reflect inflation-induced increases in pay.

Case 23

An Older, Very High Income Couple

Age of Husband	Age of Wife	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Couple's Tax-Deferred Assets		Husband's Life Insurance		Wife's Life Insurance	
		Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
64	57	186,880	204,510	(138,380)	(317,615)	237,681	182,449	2,608,876	2,566,384	835,135	835,135	0	0	0	0
75	68	186,880	204,510	64,289	(64,357)	110,389	131,659	2,474,844	1,815,234	1,005,179	1,086,296	N.C.	0	N.C.	0
85	78	186,880	204,510	(37,627)	(133,145)	74,006	55,720	1,958,129	799,840	748,607	980,869	N.C.	0	N.C.	0
Deceased	90	24,917	127,819	0	(118,883)	8,961	46	0	0	7,131	0	N.C.	0	N.C.	0

N.C. – not computed

Case 24

A Middle-Aged Low-Income Divorcee

Age	Consumption (Living Expenses)		Taxable Saving		Taxes		Taxable Assets		Tax-Deferred Assets		Life Insurance	
	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp	Quicken	Esp
59	13,390	17,320	(119)	(5,517)	8,139	8,977	15,747	10,063	24,185	23,960	0	0
65	13,390	17,508	6,146	0	8,691	9,446	36,579	0	76,835	73,644	N.C.	0
70	13,390	21,654	(3,543)	987	3,865	1,550	60,103	987	114,696	106,266	N.C.	0
75	13,390	21,654	(5,592)	328	3,098	1,763	32,923	3,992	90,964	75,790	N.C.	0
85	1,116	21,654	0	(1,370)	326	2,007	0	0	2,053	0	N.C.	0

N.C. – not computed

Appendix

ESPlanner's Tax and Social Security Benefit Calculations

This appendix describes ESPlanner's tax and Social Security benefit calculations..

Federal Income Tax Calculations

ESPlanner's calculations of federal income taxes in each future year take into account the household's year-specific marital status. Thus, in the case of married households, the marital status is married when both spouses are alive and single when on is deceased. Households that are married are assumed to file jointly. The tax schedules for each filing status are taken from the federal income tax booklet for the latest available tax year—usually the year prior to the "current" year entered by the user. The tax schedule is applied to the program's calculation of federal taxable income. Federal taxable income equals federal Adjusted Gross Income (AGI) less personal exemptions and less the standard or itemized deduction, whichever is larger.

AGI for each year includes projected incomes in current dollars from the following sources: Labor income (wages and salaries), self-employment income, asset income projected by the program based on user inputs of initial non-tax-favored net worth and rates of return, and on the optimal spending plan computed by the program. AGI also includes taxable asset income, taxable social security benefits, taxable special receipts, taxable distributions from defined benefit pension plans and taxable withdrawals from tax-favored saving plans. Each of these items is based upon the user's inputs and preferences. Non-taxable special receipts and withdrawals from non-deductible tax-favored accounts are not included in AGI. Deductible contributions to tax-favored retirement accounts are subtracted from income in calculating each year's AGI. Employer contributions to tax-favored retirement accounts are not included in AGI. However, withdrawals from these accounts are included.

The Tax Schedule

The tax schedules for the two types of filing statuses implemented in ESPlanner are taken from the federal income tax booklet for the 1998 tax year—the latest year for which the federal schedules are available. These schedules are as follows:

(1) **If taxable income is over--**	(2) **but not over--**	(3) **the tax is--**	(4) **of the amount over--**
Married filing jointly:			
$ 0	$42,350	---------- 15 %	$0
42,350	102,300	$6,352.50 + 28 %	42,350
102,300	155,950	23,138.50 + 31 %	102,300
155,950	278,450	39,770.00 + 36 %	155,950
278,450	----------	83,870.00 + 39.6%	278,450

Single:

$ 0	$ 25,350	---------- 15 %	$0
25,350	61,400	$3,802.50 + 28 %	25,350
61,400	128,100	13,896.50 + 31 %	61,400
128,100	278,450	34,573.50 + 36 %	128,100
278,450	----------	88,699.50 + 39.6%	278,450

The Indexation of the Tax Schedule

Tax-rate brackets and infra-marginal tax amounts (all of the dollar amounts listed in the tax schedules) are adjusted for inflation in each year over the household's lifetime. This is done to ensure that the schedule keeps pace with the growth of income in current dollars. The indexation is done using the user-specified rate of inflation.

**Adjustment for the current year*

Because the tax schedules listed above are applicable for the 1998 tax year whereas the user will enter 1999 as the current year, all tax brackets and infra-marginal tax amounts [the dollar amounts shown in column (3) in the schedules listed above] are indexed for inflation at the user-specified annual rate. This is done to avoid subjecting 1999 taxable income to tax schedules appropriate for 1998—that is, based on the wage and price levels prevailing in 1998.

Standard Deductions and Exemptions

The standard deduction and personal exemption amounts are also taken from the tax year prior to the "current" year (tax year 1998 in the current version). The amount subtracted from AGI for each personal exemption was $2,700. The standard deductions were $7,100 for the "married filing jointly" filing status and $4,250 for the "single" filing status. These amounts are also indexed for inflation for each future year based on the user-specified future rate of inflation. The number of personal exemptions allowed equals 2 plus the number of children for "married and filing jointly" and 1 plus the number of children for the "single" filing statuses. The personal exemption amount that can be deducted from AGI in calculating taxable income is phased out if AGI is above certain dollar limits depending upon the filing status. ESPlanner takes account of the phase-out of personal exemptions based on these dollar limits indexed for inflation.

The Decision to Itemize

ESPlanner takes the maximum of the standard deduction or itemized deduction where the latter includes mortgage interest payments, property taxes, state and local income tax payments, and tax-deductible special expenditures that the user specifies—such as alimony payments, charitable contributions, and deductible medical expenses. Note that state and local income tax payments are deductible only if they are being withheld from pay or the user makes estimated tax payments during the during the tax year. ESPlanner assumes withholding or pre-payment in every case.

The Phase Out of Itemized Deductions

Federal income tax rules phase out itemized deductions for high income taxpayers (both, married filing jointly and single payers). For the 1998 tax year, the amount of the deduction is reduced by 3¢ for every dollar of AGI in excess of $124,500 with the total reduction limited to 80 percent of the original amount. The reduction does not apply to certain components of the itemized deductions claimed—such as medical care expenses, investment interest, and casualty and theft losses. Because ESPlanner does not distinguish between these and other sources of itemized deductions, the phase-out rules are applied to the entire itemized deduction.

The Child Tax Credit

The child tax credit equals $400 times the number of qualifying children in the household. The tax credit is phased out if AGI is over the threshold of $110,000 for the "married and filing jointly" status and of $75,000 for the "single" filing status. The phase-out rate is $50 for each $1000 of income in excess of the applicable threshold. The amount of the child tax credit equals the computed amount or the federal income tax liability net of the earned income tax credit, whichever is less. If the earned income tax credit exceeds the federal income tax liability, the child tax credit is applied against the payroll tax liability.

The Earned Income Credit

The program's calculation of the earned income credit adheres to the EIC worksheet in federal Form 1040. ESPlanner first checks for eligibility to take EIC based on investment income and on taxable and non-taxable (employer contributions to 401k plans, for example) earned income thresholds for households with no qualifying child and those with at least one qualifying child (adopted, foster, step-and grand-children are excluded in ESPlanner's calculations). Next, EIC is computed based on the EIC schedule for taxable and nontaxable income. If the EIC is non-zero, it applies if AGI is less than certain dollar thresholds ($5600 for households without a qualifying child and $ 12,300 for households with at least 1 qualifying child). If AGI is greater than these dollar amounts, EIC is based on the AGI.

Payroll Taxes

In each year, the payroll tax for a married household is the sum of the two spouses' payroll taxes. Each spouse's tax equals the employee share of the OASDI tax rate (6.2 percent) applied to labor earnings up to the taxable maximum level plus the employee share of the HI tax rate (1.45 percent) applied to total labor earnings. If earnings from self-employment are present, these are included in the calculation only to the extent that labor earnings fall short of the taxable maximum limit for the OASDI tax. The entire labor income from self-employment in taxed on account of the HI tax. In the case of self-employment income, the employer plus employee tax rates for OASDI and HI are applied.

The Taxation of Social Security Benefits

Social Security benefits are taxed by including these benefits in the federal income tax base in the following manner. If the sum of AGI and 50 percent of Social Security benefits falls short of $25,000 (adjusted for inflation for future years) if single and $32,000 (same qualifier) if married, then none of the benefits are taxable. If the sum exceeds the applicable dollar threshold, but the excess is less than $9,000 if single ($12,000 if married), then the smaller of one-half of the

excess or 50 percent of the benefit is taxable and is included in the federal income tax base. In addition, if the aforementioned excess is greater than the dollar thresholds, 85 percent of this excess or 85 percent of the benefit, whichever is smaller, is also added to the federal income tax base.

State Income Tax Calculations

State income taxes are calculated for each state that imposes an income tax according to the specific tax rules applicable in user's state of residence. In most cases, the state income tax base equals the federal AGI re-adjusted for taxable Social Security benefits. State income tax calculations incorporate special features peculiar to each state: For example, some states (such as Massachusetts) impose special taxes on asset incomes. State-specific personal, spousal, and dependent exemptions (including additional exemptions for the elderly) and the applicable standard deductions are used to calculate the state taxable income. State taxes are calculated by applying the state's tax rate schedule to the taxable income.

Social Security Benefit Calculations

Retirement Benefits

Eligibility – Before ESPlanner provides you (and your spouse if married) Social Security retirement benefits, it checks that you are *fully insured*. Individuals must be *fully insured* to receive retirement benefits based on their earnings records. Becoming fully insured requires sufficient contributions at a job (including self-employment) covered by Social Security. For those born after 1929, acquiring 40 *credits* prior to retirement suffices for fully-insured status. Earnings between 1937 and 1951 are aggregated and divided by $400, and the result (rounded down to an integer number) are the pre-1952 credits which are added to the credits earned after 1950 in determining insured status. After 1951, workers earn one credit for each quarter of the year they work in Social Security-covered employment and earn above a specified minimum amount. The year of *first eligibility* for retirement benefits is the year in which the individual becomes age 62. The individual is *entitled* to retirement benefits after an application for benefits is submitted, but never before age 62.

Determination of Primary Insurance Amount (PIA) -- The PIA is the basis for all benefit payments made on a worker's earnings record. There are several steps in computing the PIA. *Base years* are computed as the years after 1950 up to the first month of entitlement to retirement benefits begins. For survivor benefits, base years include the year of the worker's death.

Elapsed years are computed as those years after 1950 (or after attainment of age 21, whichever occurs later) up to (but not including) the year of first eligibility. The maximum number of elapsed years for an earnings record is 40 (it could be shorter, for purposes of calculating survivor benefits if the person dies prior to age 62).

Computation years are calculated as the number of elapsed years less 5, or 2, whichever is greater. Earnings in base years (up to the maximum taxable limit in each year, and through age 60 or two years prior to death, whichever occurs earlier) are wage-indexed according to

economy-wide average wages. Of these, the highest earnings in years equaling the number of computation years are added together and the sum is divided by the number of months in computation years to yield *Average Indexed Monthly Earnings* (*AIME*).

Bend Points -- The AIME is converted into a PIA using a formula with *bend points*. The bend point formula is specified as 90 percent of the first X dollars of AIME plus 32 percent of the next Y dollars of AIME plus 15 percent of the AIME in excess of Y dollars. The dollar amounts X and Y are also wage indexed and are different for different eligibility years. The dollar amounts pertaining to the year of attaining age 60 (or, for survivor benefits, the second year before death, whichever is earlier) are applied in computing the PIA.

Benefits- A person who begins to collect benefits at his or her "normal retirement age" (currently age 65) receives the PIA as the monthly retirement benefit. In subsequent years, the monthly benefit is adjusted according to the Consumer Price Index (CPI) to maintain its purchasing power.

Increases in Normal Retirement Ages -- After 2003 normal retirement ages are scheduled to increase by 2 months for every year that a person's 65th birthday occurs later than the year 2003. This progressive increase in the normal retirement age for those born later ceases between the years 2008 through 2020; those attaining age 65 in these years have a normal retirement age of 66. The postponement in retirement ages resumes after 2020 such that those born after 2025 have a normal retirement age of 67. All cohorts attaining age 65 after that year have a normal retirement age of 67.

Reductions for Age -- A person who begins to collect retirement benefits earlier than the normal retirement age receives a *reduction for age.* The reduction factor is 5/9 of 1 percent for each month of entitlement prior to the normal retirement age. The reduced benefit payment (except for the inflation adjustment) continues even after the person reaches or surpasses the normal retirement age. If the number of months of reduction exceeds 36 months (for example, in case of entitlement at age 62 when the normal retirement age is 67), then the reduction factor is 5/12 of 1 percent for every additional month of early entitlement.

Delayed Retirement Credits--Those who begin to collect benefits after their normal retirement age (up to age 70) receive *delayed retirement credits.* The amount of the delayed retirement credit for each month of delayed entitlement depends on the year in which a person attains normal retirement age. For example, those attaining age 65 in 1997 receive an additional 5 percent in monthly benefits for each year of delay in entitlement. However, those attaining age 65 in the year 2008 will receive an additional 8 percent in benefits for each year of delayed entitlement.

Earnings Test -- If a person continues to work and earn after the month of entitlement, benefits are reduced because of an *earnings test*. Beneficiaries under the normal retirement age, lose $1 for each $2 earned above an earnings limit. Those older than the normal retirement age, lose $1 for each $3 earned above a higher earnings limit. The earnings limits have already been specified

through the year 2000 and are scheduled to grow with average wages in subsequent years. All benefits payable on a worker's earnings record, including the worker's own retirement benefits and spousal and child dependent benefits, are proportionally reduced by the testing of the worker's earnings.

Recomputation of Benefits -- Earnings in any year after entitlement to benefits are automatically taken into account in a recomputation of the PIA for determining the subsequent year's benefit amount. However, these earnings are not indexed before they are included in the AIME calculation. If such earnings are higher than some prior year's earnings (indexed earnings through age 60 or unindexed earnings after age 60), they result in an increase in the PIA and benefit payable. If they are lower than all previous year's earnings, they will not lower the PIA or benefits since only the highest earnings in base years are included in the calculations.

Spousal and Child Dependent Benefits

Eligibility -- Wives and husbands of insured workers (including divorced spouses) are entitled to *spousal benefits* if the couple was married for at least 10 years at the time of application for spousal benefits, the spouse is over age 62 or has in care a child under age 16 entitled to benefits under the insured worker's record, and the insured worker is collecting retirement benefits. Children of insured workers under age 16 are entitled to *child dependent benefits* if the child is unmarried and the worker is collecting retirement benefits.

Benefits -- Spousal and child benefits equal 50 percent of the insured worker's PIA (each). Child dependent benefits may be lower only if the *family maximum* applies. Spousal benefits may be lower due to the family maximum, a reduction for age, the application of the earnings test, or the spouse's receipt of retirement benefits based or her or his own earnings record.

Family Maximum -- All benefits paid under a worker's record (except retirement benefits or divorced spousal benefits) are reduced proportionately to bring them within the family maximum benefit level. The maximum benefits payable on a worker's earnings record is determined by applying a bend point formula to the PIA similar to that applied to the AIME in calculating the PIA. For example, the family maximum equals 150 percent of the first $X of PIA plus 272 percent of the next $Y of the PIA plus 134 percent of the next $Z of the PIA plus 175 percent of the PIA greater than $X+$Y+$Z. The values X, Y, and Z are adjusted for each year of the calculation according to the growth in economy-wide average wages. In case the spousal benefit is eliminated for any reason, the benefits payable on the insured worker's record are subjected to the family maximum test again, treating the spouse as though he/she were not eligible for spousal benefits. This may result in higher benefits for children who may be eligible for dependent benefits under the worker's record.

Reduction of Spousal Benefits for Age -- Spouses eligible for the spousal benefit may elect to receive (may become entitled for) their benefits before normal retirement age. In this case the spousal benefit is reduced by 25/36 of 1 percent for each month of entitlement prior to normal retirement age. If the number of months of reduction exceeds 36 months (for example, in case of

entitlement at age 62 when the normal retirement age is 67), then the reduction factor is 5/12 of 1 percent for every additional month of early entitlement.

Earnings Testing and Redefinition of Spousal Benefits -- If a spouse is earning above the amount allowed by the earnings test, the spousal benefits he or she is eligible to receive will be earnings tested according to the pre- and post-normal retirement schedule described above. If a spouse is already collecting retirement benefits, the spousal benefit is redefined as the greater of the excess of the spousal benefit over the spouse's own retirement benefit or zero.

Survivor Benefits (Widow(er), Father/Mother, and Children)

Eligibility-- The surviving spouse of a deceased worker is eligible for *widow(er) benefits* if the widow(er) is at least age 60, is entitled (has applied for widow[er] benefits), the worker died fully insured, and the widow(er) was married to the deceased worker for at least 9 months. The widow(er) of a deceased worker is eligible for *father/mother benefits* if the widow(er) is entitled to benefits (has applied), the worker died fully insured, the widower has in care a child of the worker. A surviving child is eligible for *child survivor benefits* on the deceased worker's record if the child is under age 18 and is entitled (an application has been filed) and the worker was fully insured.

Survivor Benefits-- Monthly benefits equal 100 percent of the worker's PIA for a widow(er); they equal 75 percent of the PIA for father/mother and child survivor benefits. Widow(er) and child survivor benefits may be lower only if the family maximum applies. Widow(er)s may become entitled to (elect to receive) survivor benefits earlier than normal retirement age, but not earlier than age 60. In this case the reduction is 19/40 of 1 percent for each month of entitlement prior to normal retirement age. After the widow(er) is 62, he or she is may become entitled to (elect to receive) retirement benefits based on her own past covered earnings record. In this case the widow(er) benefits are redefined as the excess over own retirement benefit or zero, whichever is greater. Finally, widow(er) survivor and own retirement benefits are also subject to the earnings test. If the deceased worker was already collecting a reduced retirement insurance benefit, the widow(er)'s benefit cannot be greater than the reduced widow(er) benefit or the greater of 82.5 percent of the worker's PIA or the worker's own retirement benefit. If the deceased worker was already collecting a retirement insurance benefit greater than the PIA because of delayed retirement, the widow(er) or is granted the full dollar amount of the delayed retirement credit over and above the (reduced) widow(er) benefit. Father/mother benefits are not similarly augmented by delayed retirement credits that the deceased worker may have been receiving.

Father/Mother Benefits -- These benefits may be reduced if the family maximum applies or if the father or mother is entitled to the own retirement benefit. In this case the father/mother benefit is redefined as the excess over the father or mother's own retirement benefit or zero, whichever is greater. Father /mother benefits are also subject to the earnings test. On the other hand, they are not reduced for age. For those eligible to receive both widow(er) and father/mother benefits, the program calculates both and takes the larger benefit.

Calculation of a Deceased Worker's PIA -- The calculation of survivor benefits in the case of a widow(er) benefits uses the larger of two alternative calculation's of the deceased worker's PIA.

These are the "wage indexing" method and the "re-indexing" method. Moreover, the year up to which the worker's wages are indexed may be different depending upon whether the deceased worker would have become age 62 before or after the widow(er) attains age 60.

The wage-indexing method -- the last year for indexing earnings is the earlier of a) the year the worker dies minus 2 years or b) the year worker would have attained age 60. Bend point formula dollar amounts are taken from the earlier of the year the worker dies or the year the worker would have attained age 62. The PIA thus calculated is inflated by the CPI up to the year the widow(er) turns age 60 (if later) to obtain the PIA value on which widower benefits would be based. Where applicable, these benefits are then adjusted for the family maximum, reduction for age, delayed retirement credits, and the earnings test.

The reindexing method -- The worker's original earnings are indexed up to the earlier of the year the widow(er) attains age 58 or b) the year the worker attains age 60. The elapsed years are computed as the number of years from 1951 (or the worker's age 22 if later) through the year the widow(er) attains age 60. The computation years equal elapsed years minus 5 years (computation years cannot be less than 2). Bend point formula dollar values are applied from the year the widow(er) attains age 60. There is no subsequent indexing of the PIA for inflation.

The Sequencing of Widow(er) Benefit Calculations -- Widow(er) benefit reductions follow these steps: First the widow(er) plus children's benefits are subjected to the family maximum. Second, the widow(er) benefit is reduced for early entitlement (of the widow(er) prior to normal retirement age). Third, the widow(er) benefit is compared to the widow(er) own retirement benefit if entitled to the latter. Fourth, the widow(er) benefit is redefined as the excess over own benefit if own benefit is positive. Finally the earnings test is applied, first to the widow(er)'s own benefit and then to the widow(er) benefit that is in excess of own benefit. If the widow(er) benefit is eliminated as a result of these tests, the benefits payable on the insured worker's record are subjected to the family maximum test again, treating the widow(er) as though he/she were not eligible for the widow(er) benefit. This procedure can potentially increase children's benefits if the family maximum limit was binding the first time through.