

ESPlannerTM

-- A Revolution in Financial Planning

Tutorial

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U.S. Patent No. 6,611,807.

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Introduction

Thank you for purchasing *ESPlanner*, a unique patented financial planning software package based on the life-cycle model of saving. The life-cycle model, developed by Nobel Laureate Franco Modigliani, is the standard framework used by economists to understand consumption, saving, and insurance behavior. The model is grounded in the common-sense notion that households seek to achieve and maintain the highest possible living standard through time. Economists refer to the desire to avoid abrupt changes over time in one's living standard as *consumption smoothing*.

ESPlanner recommends annual levels of consumption, saving, and life insurance holdings to achieve consumption smoothing. Specifically, given its inputs, the program's recommendations maintain your family's living standard at the highest affordable level and guarantee potential survivors that same living standard. Solving the problem of both maximizing and smoothing your household's living standard over time and across survival contingencies is not easy. *ESPlanner* uses a patented dynamic programming method to solve this problem. Dynamic programming is an advanced mathematical technique that has not been used in previous commercial financial planning applications.

In providing its basic recommendations for how much your family should consume, save, and insure each year, *ESPlanner* considers how much your regular and retirement account assets will yield, each year. *ESPlannerPlus* incorporates all the features of *ESPlanner*, but it also recognizes that future rates of return are uncertain. Its Monte Carlo simulations show the annual variability of your family's living standard and other economic variable arising from the household's asset allocation decisions.

Our approach to financial planning differs markedly from conventional financial planning. Conventional planning makes you plan for yourself by making you specify retirement spending targets. This is very difficult and can be dangerous. If you set your target too low, you'll be advised to under save and underinsure and your family's living standard will drop, if not plunge, at retirement. If you set your target too high, you'll be advised to over save and over insure and your family's living standard will jump up, if not soar, at retirement. In either case, there's an abrupt change in living standard – precisely the opposite of consumption smoothing.

Rather than asking you to find future spending targets that are consistent with lifetime consumption smoothing, *ESPlanner* finds the right targets automatically by determining your household's highest sustainable living standard along with the savings and amount of life insurance needed to preserve that living standard through time. These calculations are made taking into account the taxes you will pay in each future year and the borrowing limitations you face.

ESPlanner recommends annual levels of consumption, saving, and life insurance holdings. Consumption refers here to all living expenses apart from housing expenses, special expenditures, contributions to a reserve fund, taxes, contributions to retirement accounts, and life insurance premium payments, all of which are treated as "off-the-top" expenditures that have to be made when they come due. Annual consumption

recommendations are adjusted for the household composition in the year in question; i.e., when children are young and still in the household, the program recommends higher consumption expenditures. In so doing, the program takes into account the fact that two can live more cheaply than one and that children may be less or more expensive to support than adults.

Another key feature of *ESPlanner* is *contingent planning*. Contingent planning permits you to plan in detail for the possible early deaths of your family's earners. Specifically, it allows you to specify how your family's earnings, special expenditures, special receipts, retirement plans, dates of Social Security retirement benefit collection, and contributions to retirement accounts would differ were a spouse/partner to die. *ESPlanner* provides easy ways of inputting these data when one's contingent and regular amounts are identical. *ESPlanner* defaults to the household's regular amounts for these expenditures, but permits you to override the defaults as necessary.

You can activate contingent planning using the *Family Information* screen. *ESPlannerPlus*' Monte-Carlo simulations allow you to construct ten different portfolios (combinations of financial assets), which your family might want to hold in the future. You can then specify for each future year which of these ten portfolios will apply to your family members' regular assets and retirement account assets. When you run the program's Monte-Carlo reports, it generates a variety of tables and charts that display the variability of your family's living standard, income, and assets over time given the portfolios your family intends to hold now and in the future. If you purchased *ESPlannerPlus*, you can also activate the Monte Carlo simulations on the *Family Information* screen.

Unlike the other reports, which run in a matter of seconds on a fast machine, the Monte Carlo calculations involve very extensive and time-consuming calculations. Indeed, for young families, generating the Monte Carlo reports can take several minutes even on today's most advanced desktops. If your computer is not very fast and has limited memory, you will need to be patient. On the other hand, if you just want to run the main, detailed, or survivor reports, you can deactivate the Monte Carlo simulations on the Family Information Screen.

A hallmark of *ESPlanner* is the precision with which it calculates annual federal and state income taxes, FICA taxes, and social security benefits. Even small mistakes in determining a household's future taxes and benefits can lead to major mistakes in current saving and insurance recommendations because they are generally repeated for a large number of future years, making their aggregate effect sizable.

In *ESPlanner* all taxes and Social Security benefits are calculated separately for each year the household head and spouse/partner could both be alive and for each year that the household head and spouse/partner could be widowed. In the latter case, *ESPlanner* calculates taxes and benefits conditional on the age of death of the decedent. In the case of *partners* – unmarried couples – the program calculates taxes treating each partner as a single tax payer.

The amount of taxes a household pays over time depends on how much it earns and how much asset income it receives. The amount of asset income depends, in turn, on the amount of assets, which depends on decisions about spending and saving. Hence, one can't determine how much in taxes a household will pay over time without knowing how much it will spend over time. But one can't determine a household's spending over time without knowing its taxes over time.

If taxes depend on spending, but spending depends on taxes, how can we resolve this chicken and egg problem, which economists call a *simultaneity problem*? The answer is by developing iterative algorithms that simultaneously determine how much is spent and how much taxes are paid over the household's entire life cycle, include the life cycles of survivors conditional, in the case of couples, on all the possible different dates of death of spouses and partners.

As part of these algorithms, the program's federal income tax calculator decides if the household should itemize deductions, whether it is eligible for the earned-income and child-tax credits, and the extent to which its Social Security benefits are subject to taxation. It also includes the Alternative Minimum Tax. And it takes into account the most recent changes in federal and state income tax provisions. The state income tax calculator incorporates the progressive rate structure, deductions, and exemptions in each state's income tax law.

As indicated, *ESPlanner* lets households declare themselves as partnered, in which case the software calculates federal and state income taxes for each partner separately using singles or head of household tax tables and provisions. This is a very important feature given the large number of unmarried couples in American society.

The program's Social Security benefit calculator determines retirement, spousal, survivor, divorcee, child, and mother and father benefits subject to the remaining earnings test, benefit-re-computation provisions, delayed retirement credits, early retirement reduction factors, increases in the age of normal retirement scheduled by law, maximum family benefits, etc. Since the amounts of survivor and child, mother, and father benefits depend on the precise earnings history of the deceased spouse, *ESPlanner* calculates these benefits separately conditional on each and every possible date of death of each spouse. *ESPlanner* also applies special formulae for calculating the benefits of government employees who receive pensions based on non-Social Security covered employment.

Given the complex nature of the calculations needed to achieve a consumption-smoothing financial plan, a natural question to ask is whether one can really tell if *ESPlanner* is making the correct calculations. The answer is yes. First, one can immediately verify that the program's recommendations never put the household in debt or in more debt than the household is willing to incur. Second, one can easily check that the household's living standard is being smoothed. Third, one can readily verify that the program's recommended life insurance holdings are, to the dollar, what is needed to preserve survivors' living standards. And fourth, one can see from the software's reports that all the inputs, such as housing

expenses, bequests, contributions to reserve funds, and special expenditures, are being included in the program.

The only thing users can't immediately verify is the program's calculation of taxes and Social Security benefits. These are the only variables shown in the reports not directly inputted by users. But, as just indicated, taxes and Social Security benefits are calculated with great care.

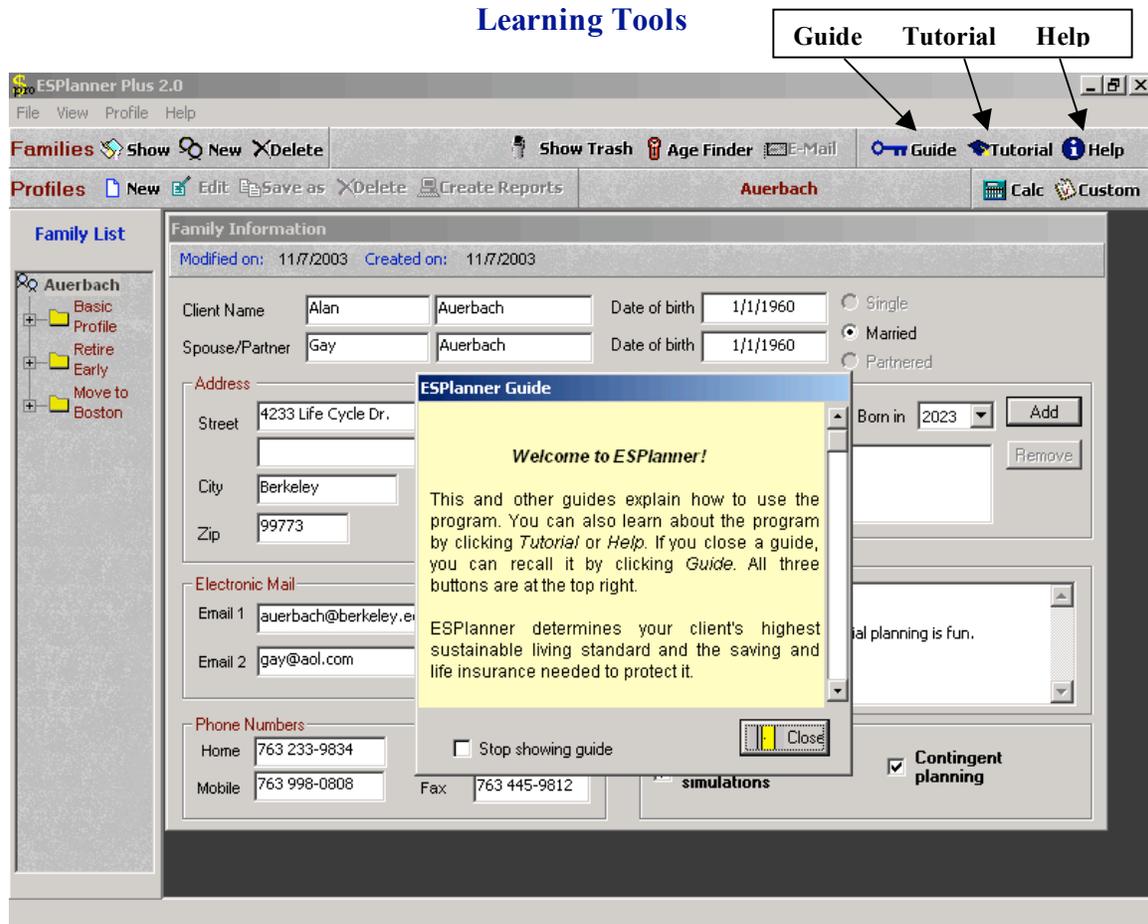
ESPlanner was developed by Professor [Laurence J. Kotlikoff](#), Chairman of the Department of Economics at Boston University and Dr. Jagadeesh Gokhale, a Senior Fellow at the Cato Institution, who served for many years as Senior Academic Advisor to the Federal Reserve Bank of Cleveland. The two economists are leading authorities on the economics of consumption, saving, insurance, portfolio choice, and fiscal policy.

The program took a decade to develop and is used routinely for research, results of which are posted at www.esplanner.com. Much of this research was supported by Boston University, the National Institute of Aging (an institute of the National Institutes of Health), the Smith-Richardson Foundation, and TIAA-CREF, for which we are most grateful. The National Institute of Aging also provided critical and early support for research on this product via a STTR grant.

Learning Tools

ESPlanner provides three tools to help you learn the program. The first is this document, which you can access at any time by clicking the *Tutorial* button at the top right corner of the interface. The second tool is the *Guide*. This refers to small instructional screens that tell you how to set up a new family, establish input files for your family, and enter data for each input file. There is a separate guide for each input screen. We **strongly** recommend reading the guides in their entirety. If you have turned the *Guide* off, you can reactivate it at any time by clicking on the *Guide* button, which is adjacent to the *Tutorial* button. There is also a hyper-linked help file that will launch in your browser, which includes a glossary of terms. The button for *Help* is also located next to the *Tutorial* button. Another way to learn about our software is to read the research papers we've posted at www.esplanner.com.

Learning Tools



Customer Support

Economic Security Planning, Inc. prides itself on providing fast customer support. If you have questions or technical problems, please email us at info@esplanner.com. Please include your phone number in case we want to call you.

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System Requirements

ESPlanner runs on Windows. It can also run on Linux using VMWare or the Macintosh using Virtual PC. Other PC emulators on either Linux or the Macintosh may work but have not been tested. We do not provide emulator installation support for either Linux or the Macintosh.

ESPlanner reports are displayed using Microsoft *Word* and Microsoft *Excel* (2000, XP, or 2003 only). Having both programs is a requirement for running the program. *ESPlanner* may be installed on any version of Windows supporting the required versions of Microsoft *Word* and Microsoft *Excel*.

Your computer will need a minimum clock speed of 500 megahertz and a minimum of 256 megabytes of random access memory. If your computer meets only these minimum requirements, the program may run rather slowly (from 6 to 10 minutes per execution for input files involving married couples and 3 to 6 minutes per execution for input files involving single individuals). If your computer's clock speed is much faster and you have much more RAM, the program will execute rapidly – usually within 1 minute for input files involving married couples and within 30 seconds for input files involving single individuals.

These estimates pertain to running the main, survivor, and detailed reports. The Monte Carlo simulations can take several minutes even on the world's fastest machines. Our Monte Carlo simulations are done with considerable care. When the Monte Carlo option is activated and the Monte Carlo reports are requested, the program runs a separate dynamic program, which takes into account the variability of rates of return on regular and retirement account assets. As part of the dynamic program, *ESPlanner* makes separate tax calculations for each possible configuration of rates of return that your family could experience in each future year. Stated differently, the Monte Carlo results take full account of the tax implications of the household's receiving the time path of returns that is drawn in each simulation.

Overview of the Software

ESPlanner has a simple interface. There is a *Families Tool Bar* that allows you to enter a new family, delete old families, and list entered families. And there is a *Profiles Tool Bar* that allows you to start new files for your families, edit existing files, save existing files under different names, delete existing files, and compute (process) existing files.

Other buttons across from the Families Tool Bar permit you to activate the *Guide*, the *Tutorial*, and *Help*. You can also see and retrieve deleted families and files by clicking *Show Trash*, determine the age of your families in a particular year by clicking *Age Finder*, and email your families by clicking *E-Mail*. Finally, there are *Calc* and *Custom* buttons to activate the Windows calculator and to customize the program by providing your own professional information. (In a future release of the program, we will incorporate the information you enter under Custom on an automated summary statement.)

Before beginning to use the software, you will need to collect your financial data. The following list itemizes the principal data required for a through planning session using *ESPlanner*:

- 1) Your pay stub (and that of your spouse/partner)
- 2) The age that your (and your spouse/partner) plan to retire
- 3) Your projected employee and self-employment labor earnings through retirement
- 4) Projected special expenses for college, weddings, emergency funds, travel, nursing home care, loan repayments, etc.
- 5) Projected special receipts from bonuses, inheritances, sale of business, etc.
- 6) The current market value of your (and your spouse/partner's) regular assets.
- 7) The current market values of your (and your spouse/partner's) 401(k), 403(b), IRA, Roth IRA, Keogh, SRA, and other retirement accounts. Separate balances are needed for each individual and for employer and employee accounts.
- 8) The current market value of your assets that are held in a reserve/emergency fund. Projection of how you'd like that fund to grow or decline through time.
- 9) Monthly rental expenses for your principal and vacation homes, if any.
- 10) For each principal and vacation home owned by you (and your spouse/partner) clients, its estimated market value, annual property taxes, annual homeowners insurance, original purchase price (basis), annual condo fees and maintenance expenses, if any.
- 11) For each mortgage/loan for each home the outstanding mortgage balance, the monthly mortgage payment (excluding escrow payments for property taxes and homeowners insurance), and years left to pay.
- 12) Projected funeral expenses and desired special bequests
- 13) Face and cash values of all individual, employer-provided, and group life insurance policies.

- 14) The amount you (and your spouse/partner) expect to add or subtract this year from regular assets. (ESPlanner uses this information in helping determine what your clients are actually saving.)
- 15) Projected annual contributions to retirement accounts by you (and your spouse/partner)
- 16) For each defined benefit pension and annuity you (and your spouse/partner) will receive, the year it will start, the amounts of lump-sum and annual benefits, the degree of inflation indexation or growth rate, and the degree of survivor benefit protection.
- 17) Your (and your spouse/partner's) Social Security earnings records. These records can be ordered at www.ssa.gov or by calling the Social Security Administration at 1-800-772-1213 and then pressing 1 followed 2 followed by 1.
- 18) For the Monte Carlo portion of ESPlanner, the distribution of your (and your spouse/partner's) portfolios of regular and retirement account assets.

When you select a family from the Family List, the family's basic demographic and contact information is displayed.

Tool Bars

The screenshot displays the ESPlanner Plus 2.0 software interface. On the left side, three callout boxes with arrows point to specific tool bars:

- Families Tool Bar:** Points to the top menu bar containing 'Families', 'Show', 'New', and 'Delete'.
- Profiles Tool Bar:** Points to the second menu bar containing 'Profiles', 'New', 'Edit', 'Save as', 'Delete', and 'Create Reports'.
- Family List with Files:** Points to the 'Family List' sidebar on the left, which shows a tree view of families including 'Auerbach' and 'Uncle Joe'.

The main window displays the 'Family Information' form for the 'Auerbach' family. The form includes the following fields and sections:

- Client Information:** Client Name (Alan Auerbach), Date of birth (1/1/1960), Spouse/Partner (Gay Auerbach), Date of birth (1/1/1960). Marital status options: Single, Married (selected), Partnered.
- Address:** Street (4233 Life Cycle Dr.), City (Berkeley), State (CA), Zip (99773).
- Electronic Mail:** Email 1 (auerbach@berkeley.edu), Email 2 (gay@aol.com).
- Phone Numbers:** Home (763 233-9834), Work (763 245-9812), Mobile (763 998-0808), Fax (763 445-9812).
- Children under 19:** Name, Born in (2023), Add, Remove buttons. Existing children: Andy, born in 1993; Ethan, born in 2005.
- Notes:** Reminder: financial planning is fun.
- Activate:** Monte Carlo simulations (checked), Contingent planning (checked).

When you click on *Inputs* under the name of a file (all of which are listed below the family's name in the Family List) or when you click on the file name and click *Edit* on the Profiles Tool Bar, the program will display a list of input folders. The idea is to click on an input folder, enter data for each screen in that folder, and then proceed to the next folder. In the figure below, the earnings folder has been selected. The wage earnings screen is shown, but the self-employment earnings screen can be accessed by clicking on that tab.

Entering Inputs

The screenshot shows the ESPlanner Plus 2.0 interface. On the left is a 'Folder List' with various categories like Earnings, Special, Estate, etc. The 'Earnings' folder is selected. The main window displays the 'Earnings' input screen. At the top, there are tabs for 'Employee Wages' and 'Self-Employment Earnings'. A callout box labeled 'Input Screen Tabs' points to these tabs. Below the tabs, there are input fields for retirement dates for 'Alan' and 'Gay'. A table titled 'Annual Employee Wages for Alan' shows data from 2003 to 2011. A callout box labeled 'Input Folders' points to the 'Folder List' on the left.

Year	Age	Today's Dollars	Dollars
2003	43	60,000	60,000
2004	44	60,000	61,800
2005	45	60,000	63,654
2006	46	60,000	65,564
2007	47	60,000	67,531
2008	48	60,000	69,556
2009	49	60,000	71,643
2010	50	60,000	73,792
2011	51	60,000	76,006

You can return to the Family Information screen by clicking *Show* on the Family Tool Bar after you have entered all the data. Next click the *Create Reports* button. This will tell the program to display the *Reports* Menu, where you select the reports you'd like to generate.

The Main Report, which shows annual consumption, saving, and life insurance recommendations and a number of other key features of your family's plan, is always generated. If you want additional detailed reports, click *Detailed Reports*. You can also ask the program to generate survivor reports. Finally, you

can choose to generate Monte Carlo reports if you purchased *ESPlannerPlus* and previously activated Monte Carlo on the Family Information screen.

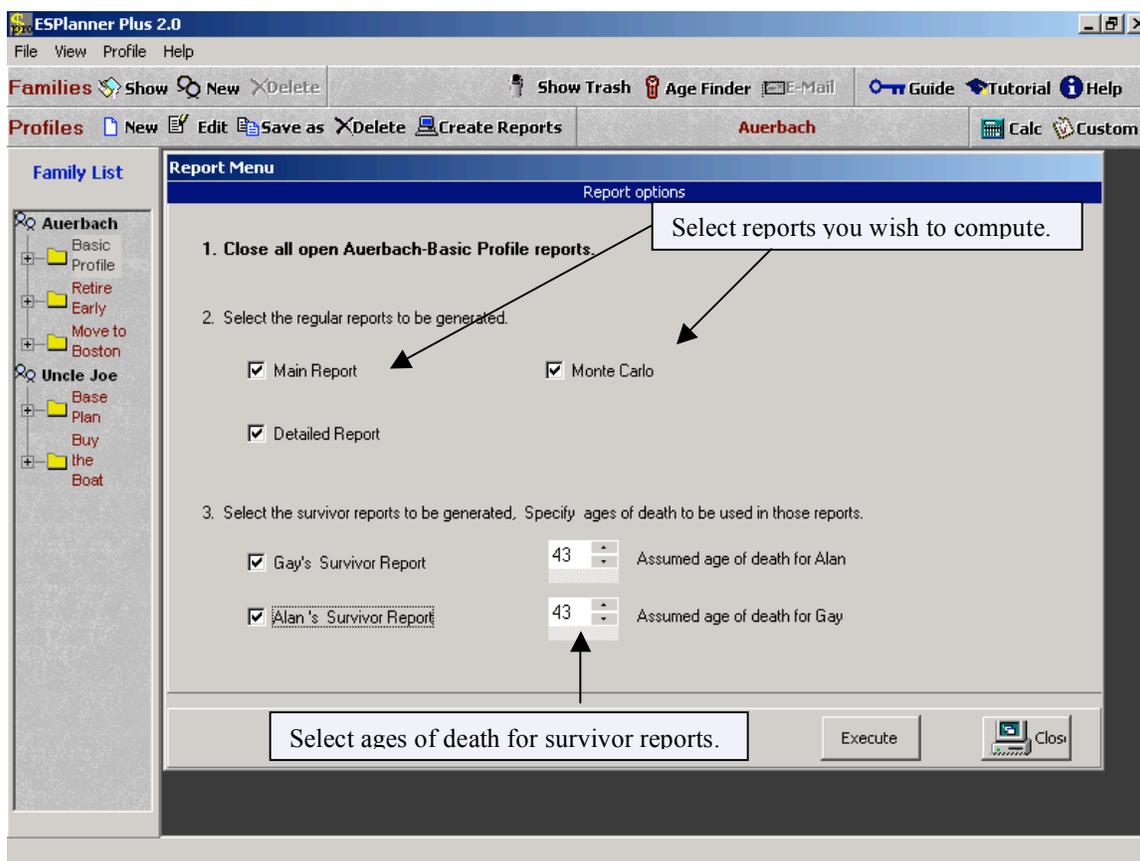
The Monte Carlo results are based on 500 simulations. In each simulation, the program draws rates of returns at random for regular assets as well as retirement account assets in each future year based on the portfolio that users indicate will be held in that year. In the case of married or partnered households in which each spouse/partner has retirement account assets, separate rates of return are drawn for each future year for the couple's regular assets and for each spouse's/partner's retirement account assets taking into account the separate portfolios specified for regular assets and for each spouse's/partner's retirement account assets.

As indicated below, there are a number of pre-programmed assets. But you can also enter your own assets. All assets are assumed to be joint log normally distributed. The rates of return used to generate mean returns and the variance/co-variance matrix of returns are based on data reported by Ibbotson and Morgan Stanley. In all cases, we use the longest time series available.

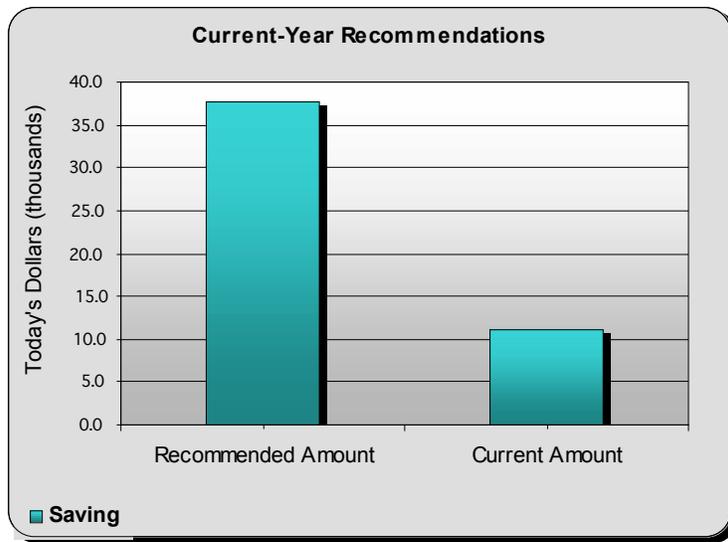
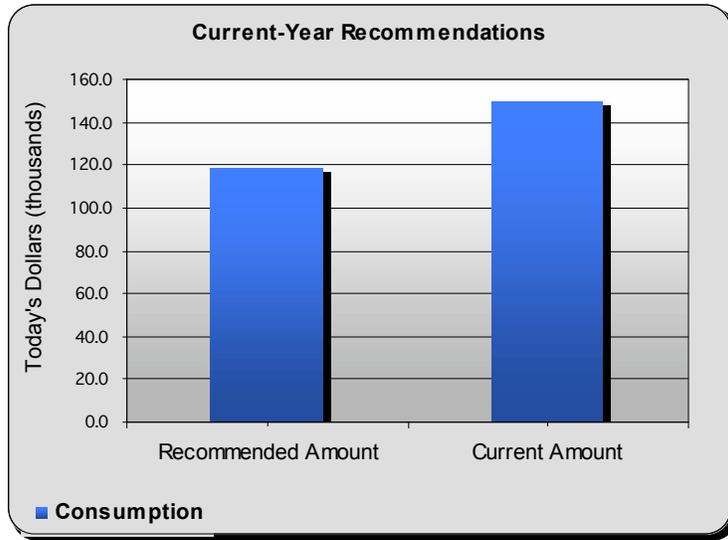
In the cases of families who are married or partnered, *ESPlanner* generates survivor reports. These reports show how survivors will fare if one of the two spouses/partners passes away, assuming the program's recommended amount of life insurance had been purchased and the couple had followed the program's recommended saving plan. The program generates these reports for every possible age at which each spouse or partner may die. To see these survivor reports, you need to specify that ages at which you want to assume the spouse and partner will die. The *Report Menu* screen also asks you to specify these ages

After you click *Create Reports* on the reports menu, the program will produce Excel files containing the reports selected. The reports consist of charts and tabular displays of recommendations, balance sheets, etc. You can use the Excel charting function to make additional charts and graphs. All of these reports can be printed.

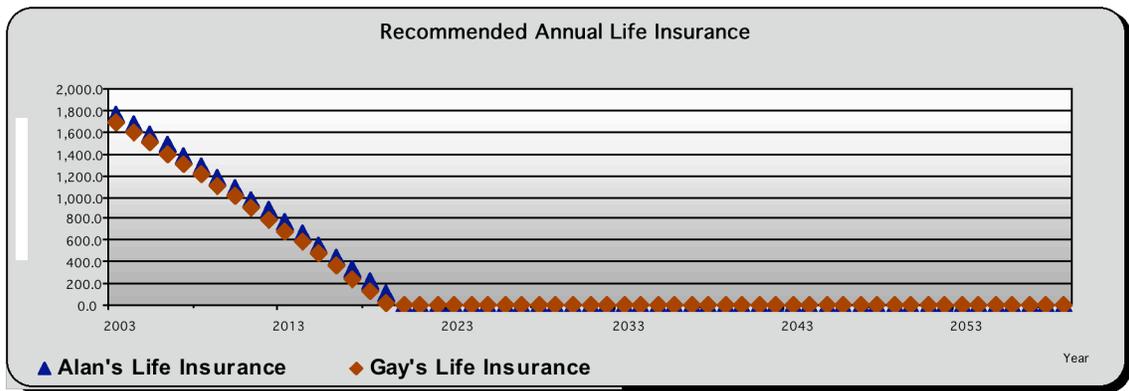
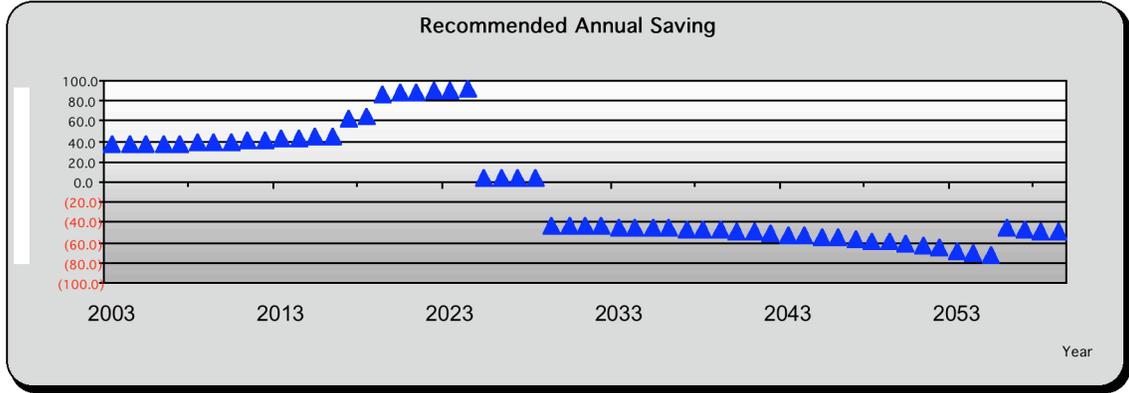
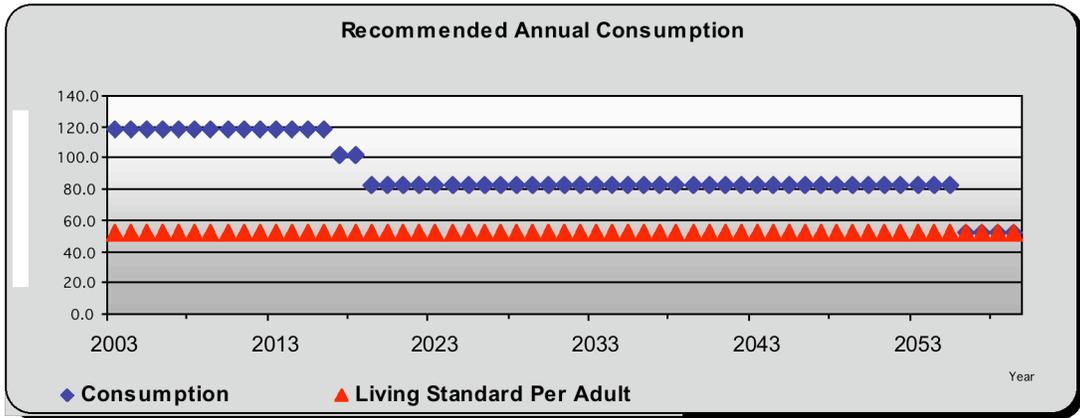
Selecting Reports



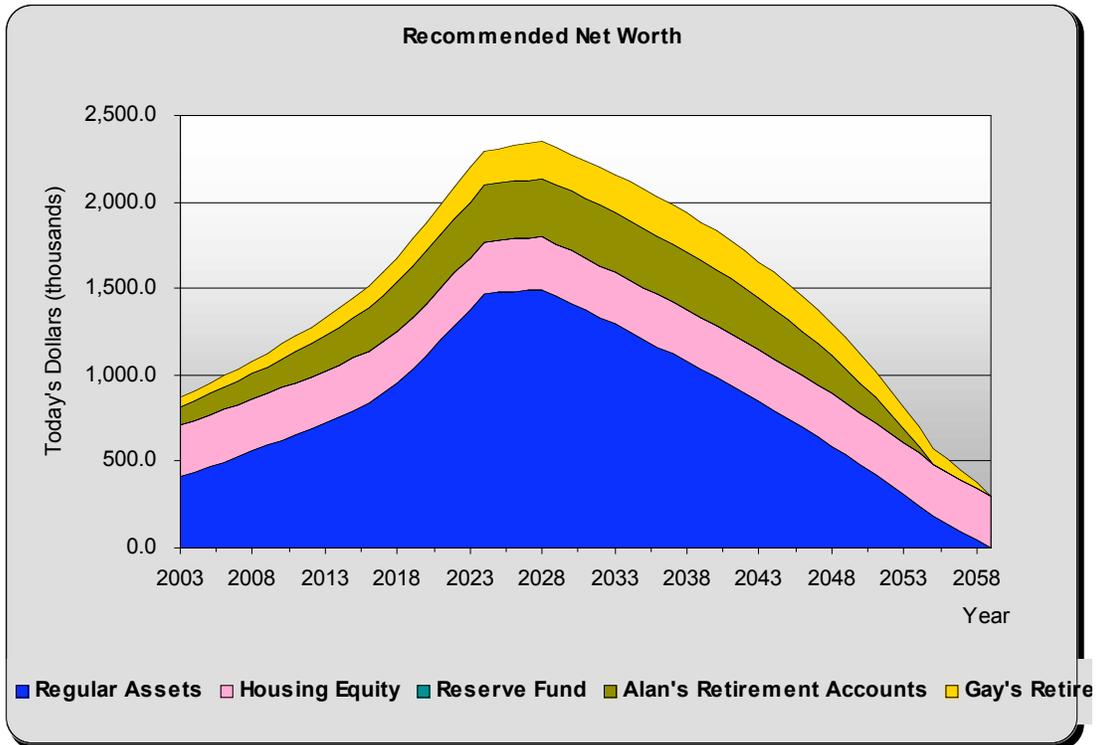
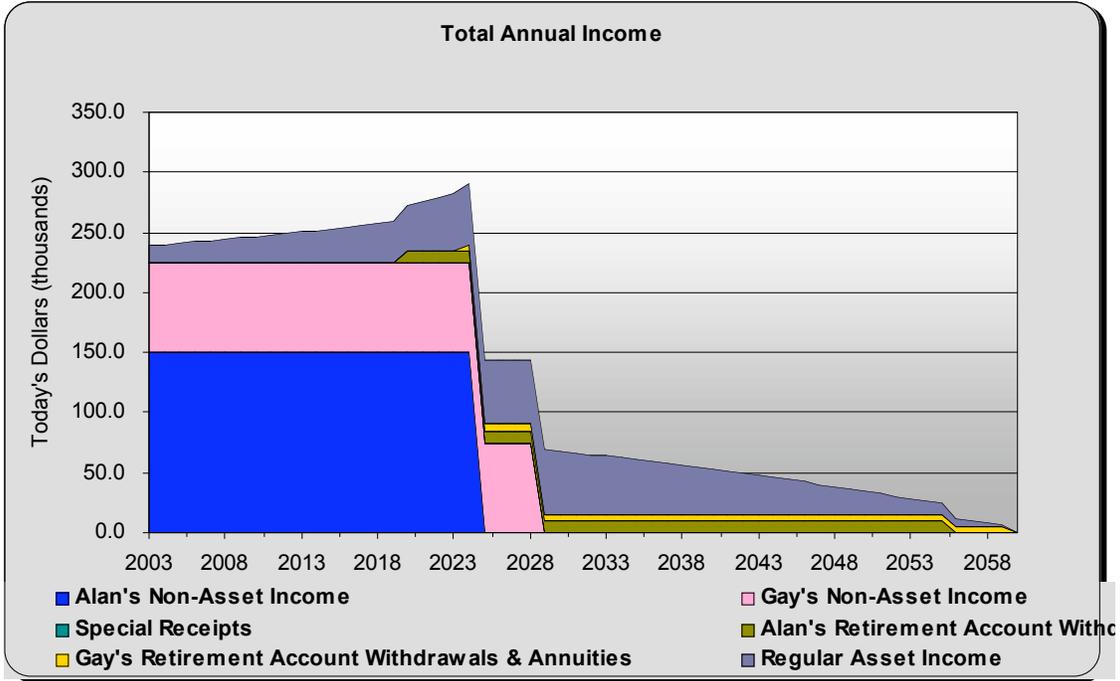
Examples of ESPlanner Charts



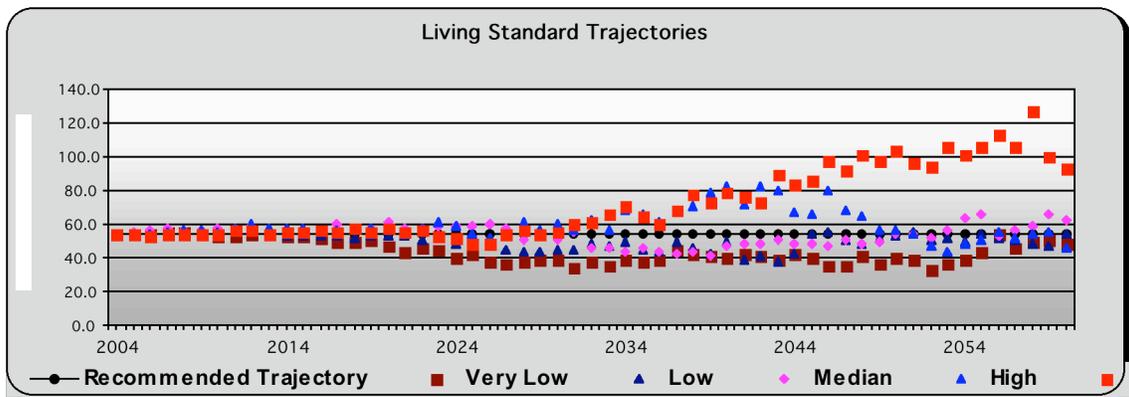
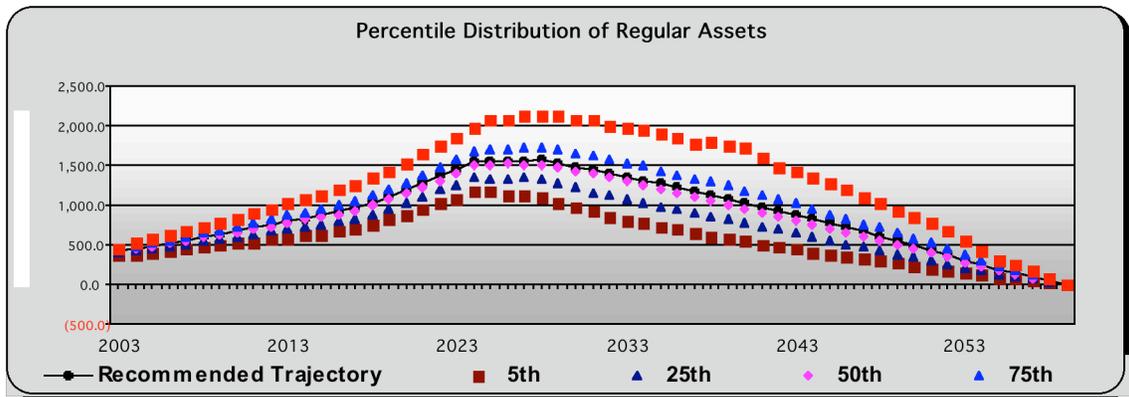
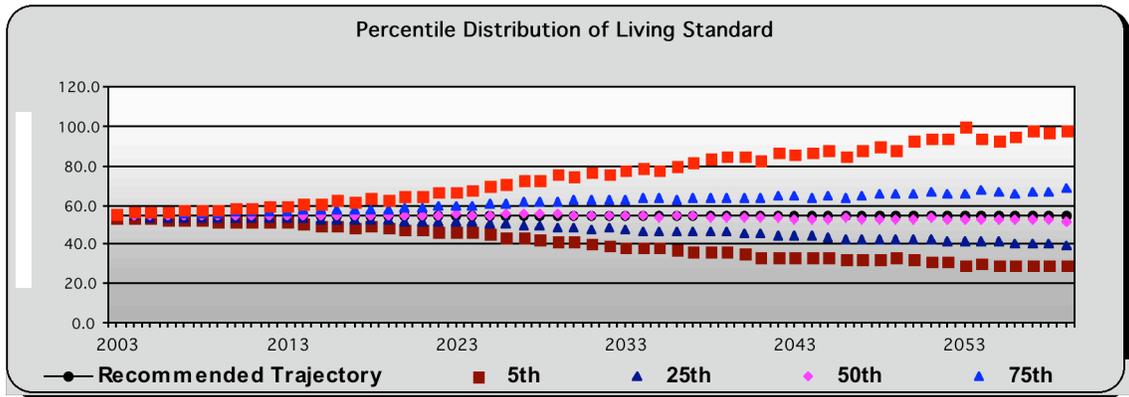
Additional Examples of *ESPlanner* Charts



Additional Examples of *ESPlanner* Charts



Examples of Monte Carlo Charts



Examples of ESPlanner Tables

Microsoft Excel - Auerbach_Basic Profile_Main_report2431

		2003 Recommendations		
1	Decision	Recommended Amount	Current Amount	Recommended Change
		2	Consumption	126,069
3	Saving	30,070	11,000	19,070
4	Alan's Life Insurance	1,687,790	300,000	1,387,790
5	Gay's Life Insurance	1,628,637	300,000	1,328,637
6	Household Life Insurance Premiums	5,895	1,062	4,833
7				
8				
9				
10				

Ready

Microsoft Excel - Auerbach_Basic Profile_Main_report2431

		Annual Recommendations						Living Standard Per Adult
1	Year	Alan's Age	Gay's Age	Consumption	Saving	Alan's Life Insurance	Gay's Life Insurance	
2	2003	43	39	126,069	30,070	1,687,790	1,628,637	54,983
3	2004	44	40	126,069	30,068	1,593,637	1,533,671	54,983
4	2005	45	41	126,069	29,163	1,499,610	1,438,821	54,983
5	2006	46	42	126,069	30,109	1,403,781	1,342,157	54,983
6	2007	47	43	126,069	30,283	1,306,942	1,244,471	54,983
7	2008	48	44	126,069	31,392	1,208,114	1,144,785	54,983
8	2009	49	45	126,069	31,791	1,108,321	1,044,375	54,983
9	2010	50	46	126,069	32,255	1,007,642	943,064	54,983
10	2011	51	47	126,069	32,823	905,857	840,631	54,983
11	2012	52	48	126,069	33,533	802,800	736,972	54,983
12	2013	53	49	126,069	34,345	698,421	632,026	54,983
13	2014	54	50	126,069	35,294	592,614	525,623	54,983
14	2015	55	51	126,069	36,407	483,962	416,075	54,983

Ready

Additional Examples of ESPlanner Tables

Microsoft Excel - Auerbach_Basic Profile_Main_report2431

File Edit View Insert Format Tools Data Window Help

AD89 =

1	Year	Alan's Age	Gay's Age	Regular Assets				
				Total Income	Total Spending	Taxes	Saving	Regular Assets
2								
47	2047	87	83	40,410	87,973	4,232	(51,794)	642,997
48	2048	88	84	38,520	87,973	3,454	(52,907)	590,090
49	2049	89	85	36,588	87,973	2,661	(54,046)	536,044
50	2050	90	86	34,615	87,973	1,931	(55,289)	480,756
51	2051	91	87	32,597	87,973	1,183	(56,558)	424,197
52	2052	92	88	30,532	87,973	415	(57,856)	366,342
53	2053	93	89	28,420	87,973	0	(59,552)	306,790
54	2054	94	90	26,246	87,973	0	(61,726)	245,064
55	2055	95	91	23,993	87,973	0	(63,979)	181,084
56	2056		92	12,117	54,983	0	(42,866)	138,218
57	2057		93	10,552	54,983	0	(44,431)	93,787
58	2058		94	8,930	54,983	0	(46,053)	47,734
59	2059		95	7,249	54,983	0	(47,734)	0

Ready

Microsoft Excel - Auerbach_Basic Profile_Main_report2431

File Edit View Insert Format Tools Data Window Help

X59 =

1	Year	Alan's Age	Gay's Age	Net Worth					
				Regular Assets	Housing Equity	Reserve Fund	Alan's Retirement Accounts	Gay's Retirement Accounts	Net Worth
2									
3	2003	43	39	408,248	300,000	0	106,760	53,380	868,388
4	2004	44	40	438,315	300,000	0	113,977	56,988	909,281
5	2005	45	41	467,478	300,000	0	121,682	60,841	950,000
6	2006	46	42	497,587	300,000	0	129,907	64,954	992,448
7	2007	47	43	527,870	300,000	0	138,689	69,345	1,035,904
8	2008	48	44	559,262	300,000	0	148,064	74,032	1,081,359
9	2009	49	45	591,053	300,000	0	158,074	79,037	1,128,164
10	2010	50	46	623,309	300,000	0	168,759	84,380	1,176,447
11	2011	51	47	656,131	300,000	0	180,167	90,084	1,226,382
12	2012	52	48	689,664	300,000	0	192,347	96,173	1,278,184
13	2013	53	49	724,009	300,000	0	205,349	102,675	1,332,033
14	2014	54	50	759,303	300,000	0	219,231	109,615	1,388,149
15	2015	55	51	795,710	300,000	0	234,051	117,025	1,446,786

Ready

Activating Contingent Planning and Monte Carlo Simulations

When you install the program and begin using it the first time, you'll notice that both the *Contingent Planning* and the *Monte Carlo* (if you purchased the *Plus* version) functions are turned off. This is to speed your initial use of the program and to ease your learning experience. Once you are comfortable with the program's interface and standard reports, you can activate either Contingent Planning or Monte Carlo functions or both by clicking on the check boxes at the bottom right corner of the Family Information screen.

Activating Contingent Planning and Monte Carlo Simulations

The screenshot shows the ESPlanner Plus 2.0 software interface. The main window is titled "Family Information" and displays various fields for client data. A callout box with a white background and black border is overlaid on the bottom right of the form, containing the text "Click here to activate Contingent Planning and/or Monte Carlo simulations." Two arrows point from this box to the "Activate" section at the bottom right of the form, which contains two checked checkboxes: "Monte Carlo simulations" and "Contingent planning".

Family Information
Modified on: 11/7/2003 Created on: 11/7/2003

Client Name: Auerbach Date of birth: 1/1/1960 Single
Spouse/Partner: Gay Auerbach Date of birth: 1/1/1960 Married Partnered

Address
Street: 4233 Life Cycle Dr.
City: Berkeley State: CA Zip: 94703

Electronic Mail
Email 1: auerbach@berkeley.edu
Email 2: gay@aol.com

Phone Numbers
Home: 763 233-9834 Work: 763 245-9812
Mobile: 763 998-0808 Fax: 763 445-9812

Children under 19
Name: Born in: 2023 Add Remove
Andy, born in 1993
Ethan, born in 2005

Activate
 Monte Carlo simulations Contingent planning

Optimizing Your Family's Plans

Once you have generated a basic plan, there are a number of options you can explore to raise your family's sustainable living standards. Any changes that you make that do raise your family's living standard will show up in the program's reports as higher recommended levels of consumption. Having your family retire later, send its children to less expensive colleges, downsize their homes, move to states with lower income taxes, and leave smaller bequests are examples of ways in which to raise your family's consumption levels. The great advantage of *ESPlanner* is being able to learn, within seconds, how these choices would affect your family's living standard (measured in terms of recommended consumption) knowing that all the tax and social security benefit implications of those choices are being fully considered.

Households that cannot perfectly smooth their living standards over their lifetimes, because doing so would require going into debt, are forced to live at a lower living standard when young than when old. For such households, one needs to consider how each particular input change affects not just consumption when young, but also when old.

In addition to helping your family to sort out choices like those just mentioned *ESPlanner* can be used to make sure your family's plan minimizes lifetime tax payments and maximizes lifetime social security benefits. When it comes to reducing lifetime tax payments, there are several options to consider. One thing to check is whether your family should contribute more or less to tax-deferred accounts. Although it is commonly believed that maximizing contributions to tax-deferred accounts, including 401(k) and traditional IRA plans, lowers lifetime tax payments, this is not necessarily the case for three reasons. First, withdrawals of principal plus interest from tax-deferred accounts can put your family into higher tax brackets. Second, these withdrawals can trigger federal income taxation of your family's social security benefits. And third, tax rates may be higher when your family makes its withdrawals. Note, in this regard, that the *Assumptions* folder allows you to specify future increases in federal income tax rates, state income tax rates, or payroll tax rates.

Another option to consider is the timing of when you and your spouse/partner begin to make withdrawals from your tax-deferred accounts. The program allows you to choose the age of retirement account withdrawals. The longer one delays withdrawing benefits from tax-deferred retirement accounts, the greater the savings from being able to earn capital income on a tax-free basis. However, taking out smaller amounts over longer periods of time can affect the extend of social security benefit taxation as well as the income tax rates at which withdrawals are taxed.

A third option to explore is the timing of when your family begins to collect its social security benefits. Different initial dates of collection will affect not just the duration of benefit receipt, but also the amount of the benefits collected each year. The initial collection date can also affect the degree to which these benefits are subject to taxation under federal and state income taxes. For example, having a family member start receiving social security benefits at age 65 as well as initiating 401(k) withdrawals at age 65 may increase

lifetime tax payments relative to having the family member receive social security benefits starting at age 62 and wait until age 71 to begin withdrawing retirement account assets.

A fourth issue to explore is the order in which to withdraw funds from retirement accounts. One can, for example, tell the program to withdrawal funds first from 401(k) plans, next from traditional IRAs, and finally from Roth IRAs. But this may not minimize lifetime tax payments.

When it comes to decisions about when and how to make retirement account withdrawals and when to start collecting social security benefits, there are no general rules that minimize lifetime tax payments and maximize lifetime social security benefits. The best decision for a particular household depends on that household's other economic variables and life-style decisions. But *ESPlanner's* main and detailed reports run within seconds on reasonably fast computers, so you can very quickly explore alternative strategies and find the best combination for your family.

Monte Carlo Simulations

ESPlannerPlus' Monte Carlo simulations are designed to let you see how alternative portfolio choices will affect both the level and variability of your family's living standard, income levels, and regular and retirement account asset levels through time. Unlike other Monte Carlo simulators that only show the variability of a household's assets at retirement, *ESPlanner* recognizes that you will not wait until retirement to adjust its consumption to the returns it earns on its savings. The program uses dynamic programming to determine how your family would adjust its consumption spending level each year given the realized rates of return and a desire for a smooth living standard going forward.

The dynamic program also takes into account the fact that receiving higher or lower rates of return in a given year will affect one's tax liabilities in the current as well as all future years. Stated differently, our Monte Carlo simulations take full account of the tax implications of the path of returns that your family may earn on both its regular assets and retirement accounts.

The actual Monte Carlo simulations are the result of considering 500 paths of randomly drawn rates of return earned on both regular and retirement account assets. If, for example, your family is married, the program will draw rates of return for each year for regular assets as well as for each spouse's retirement accounts taking into account the composition of regular assets and of each spouse's retirement account assets in the particular year in question.

To be more precise, the program includes 12 "canned securities," such as large cap stock, corporate bonds, and European equities, which you can use to build up to 10 different portfolios for your family. The program takes into account how these 12 securities have performed and co-varied historically.

You can also add additional securities that you want to include in the 10 portfolios. In entering your own assets, the program asks you about their expected rates of return and variability relative to large cap stock. The program assumes that the returns on your own assets do not co-vary with the 12 canned securities.

Once you've built (specified) your portfolios, you can tell the program which of these portfolios the family will hold in each future year when it comes to his/her regular assets, which of these portfolios the family will hold in each future year when it comes to his/her retirement account assets, and which of these portfolios the family's spouse/partner will hold in each future year when it comes to the spouse's/partner's retirement account assets. The following screens indicate how you can build and implement portfolios.

In each of the 500 the Monte Carlo simulations the program draws rates of return at random and for each future year for each of the 12 canned securities as well as the individualize securities you've entered. These annual draws take into account the covariance (the co-movement) of the returns on these securities as well as their expected returns. The program then uses these rates of return to determine how the particular portfolios being held by the family in its regular assets and retirement accounts will fare. As the simulation moves forward from one year to the next, the program adjusts consumption and saving levels as dictated by the dynamic program, which is run prior to generating the simulations. Again, the dynamic program takes into account all possible return outcomes as well as their tax implications in determining how the household can expect to smooth its living standard going forward.

Borrowing Constraints

Many, if not most, young and middle-aged households are borrowing or credit constrained. Such households typically have large "off-the-top" expenses, including mortgage payments, loan payments, childcare, and college tuition. They also either can't or don't want to borrow against their future income. For these households, perfectly smoothing their members' living standards through time is infeasible because it requires going into debt.

Building Portfolios

ESPlanner Plus 2.0 File View Profile Help

Families Show New Delete Show Trash Age Finder E-Mail Guide Tutorial Help

Profiles New Edit Save as Delete Create Reports **Auerbach's Basic Profile** Calc Custom

Folder List x **Monte Carlo**

Build Portfolios | Implement Portfolios

Default Portfolio 2 Portfolio 3 Portfolio 4 Portfolio 5 Portfolio 6 Portfolio 7 Portfolio 8 Portfolio 9 Portfolio 10

Change portfolio name if desired

1. Select an asset

- Long-term gov bonds
- Long-term inflation-indexed gov bond
- Intermediate term gov bonds
- Short-term gov bonds
- Non-US equity
- Pacific basin
- Europe
- Emerging markets equity**

2. Set portfolio share and click Add %

To add a new asset click New

To delete an asset, select it and click Delete

Default			
Asset	Share	Av. R...	Risk
Cash	2.5%	-2.96%	4.5%
Long-term gov bonds	50%	2.34%	25.5%
Large cap stocks	14.5%	6.95%	100.0%
Small cap stocks	5%	8.46%	226.5%
Europe	23%	4.63%	95.3%
Emerging markets eq...	5%	6.80%	217.6%

To remove an entry, select it and click Remove

To restore original settings, click Restore

Implementing Portfolio Choices

ESPlanner Plus 2.0 File View Profile Help

Families Show New Delete Show Trash Age Finder E-Mail Guide Tutorial Help

Profiles New Edit Save as Delete Create Reports **Auerbach's Basic Profile** Calc Custom

Folder List x

- Earnings
- Special
- Estate
- Assets & Saving
- Retirement Accounts
- Pensions & Annuities
- Primary Home
- Vacation Home
- Social Security
- Assumptions
- Monte Carlo
- Contingent Plans

Monte Carlo

Build Portfolios Implement Portfolios

1. Select

Regular Assets

Alan's Retirement Account

Gay's Retirement Account

2. Choose a portfolio from the list

Portfolios	
Default	
Go for Broke	
Play It Safe	
Uncle Joe's Picks	
Portfolio 5	
Portfolio 6	
Come to Me Baby	
Portfolio 8	
Portfolio 9	
Portfolio 10	



3. Specify the years you'll hold the selected portfolio

First year: 2007

Last Year: 2016

Portfolio Choice			
Year	Regular Assets	Gay's Retirement Account	Alan's Retirement Account
2003	Go for Broke	Default	Uncle Joe's
2004	Go for Broke	Default	Uncle Joe's
2005	Go for Broke	Default	Uncle Joe's
2006	Go for Broke	Default	Uncle Joe's
2007	Go for Broke	Come to Me	Uncle Joe's
2008	Go for Broke	Come to Me	Uncle Joe's
2009	Go for Broke	Come to Me	Uncle Joe's
2010	Go for Broke	Come to Me	Default
2011	Go for Broke	Come to Me	Default
2012	Go for Broke	Come to Me	Default
2013	Go for Broke	Come to Me	Default
2014	Go for Broke	Come to Me	Default
2015	Go for Broke	Come to Me	Default

Clear Grid

ESPlanner takes borrowing limits into account in its calculations and recommendations. Specifically, it smoothes each household's living standard to the maximum extent possible without violating the household's self-declared non-mortgage borrowing limit. The software permits multiple intervals (time periods) during which the household is borrowing constrained. It not only minimizes difference in living standards across such intervals, it also smoothes living standards within each interval.

You can readily tell when borrowing limitations prevent your family from achieving a perfectly smooth living standard. All you need to do is to examine the regular asset report. If regular assets equal the borrowing limit (set at zero in most cases), you know that the household is borrowing constrained prior to and including the year that regular assets hit the limit. In the first subsequent year that regular assets rise about the limit, you'll see recommended consumption increasing as well. The reason is that the household is no longer constrained and can consume at a higher level.

To make this more concrete, consider the case of a low-income couple that will receive a \$2 million distribution from a trust in ten years. Assume the couple can't borrow against the future income. *ESPlanner* will recommend the couple spend down its assets so they reach zero in the year before the \$2 million is received. In the year it's received, asset will go from zero to a large positive amount and recommended consumption will rise. We illustrate this below in [*Joe and Sally Receive an Inheritance*](#).

Entering Borrowing Limit

The screenshot shows the ESPlanner Plus 2.0 interface. The main window is titled "Economic Assumptions" and has several tabs: "Economic Variables", "Standard of Living Index", "Cost of Children", and "Tax/Benefit Assumptions". The "Economic Variables" tab is active. On the left, there is a "Folder List" with various categories like Earnings, Special, Estate, Assets & Saving, Retirement Accounts, Pensions & Annuities, Primary Home, Vacation Home, Social Security, Assumptions, and Contingent Plans. The main area is divided into three sections: "Maximum Age of Life", "Nominal Rates of Return on", and "Other". The "Other" section contains the "Maximum indebtedness" field, which is currently set to 0. A callout box with an arrow points to this field, containing the text "Enter Maximum Indebtedness here." Other fields in the "Other" section include "Inflation rate" (3%), "Two can live as cheaply as" (1.6), "Transactions costs if selling homes" (6%), "Load charged on purchase of life insurance" (15%), and "Load charged on purchase of annuities" (15%).

Section	Field	Value
Maximum Age of Life	Maximum age of life for Alan	95
	Maximum age of life for Gay	95
Nominal Rates of Return on	Regular assets	6%
	Alan's retirement accounts	8.5%
	Gay's retirement accounts	6%
Other	Inflation rate	3%
	Two can live as cheaply as	1.6
	Transactions costs if selling homes	6%
	Maximum indebtedness	0
	Load charged on purchase of life insurance	15%
Load charged on purchase of annuities	15%	

Getting Started

To get started, you need to enter your family's demographic information. To do so, click *New* on the Family Tool Bar. A window will appear that solicits your name, that of your spouse/partner (if you have a spouse or partner) and you marital and whether the family is single, married, or partnered.

Once you have entered your family members' names and its marital status (single, married, or partnered), click *Add*. The family's last name will appear on the family list and you will be able to enter your family's basic demographic information. This includes your family members' dates of birth, names and years of birth of children, states of residence, addresses, and contact information.

Entering a New Family

Click the *New* button on the Families Tool Bar to Enter a New Family

Enter family's names and marital status in this window and click *Add*.

ESPlanner Plus 2.0
File View Profile Help
Families Show New Delete Show Trash Age Finder E-Mail Guide Tutorial Help
Profiles New Edit Save as Delete Create Reports Auerbach Calc Custom

ion
7/2003 Created on: 11/7/2003

Add New Family
Enter the new family's name and click add.

Spouse/Partner
Name Lowell Williams
Spouse Derek Jeter
Born in 1993 Add Remove

Marital Status
 Single Married Partnered
Add Cancel

Address
Street 4233 L
City Berkel
Zip 99773

Electronic Mail
Email 1 auerbach@berkeley.edu
Email 2 gay@aol.com

Phone Numbers
Home 763 233-9834 Work 763 245-9812
Mobile 763 998-0808 Fax 763 445-9812

Notes
Reminder: financial planning is fun.

Activate
 Monte Carlo simulations Contingent planning

Entering Basic Information for a New Family

ESPlanner Plus 2.0
File View Profile Help

Families Show New Delete Show Trash Age Finder E-Mail Guide Tutorial Help

Profiles New Edit Save as Delete Create Reports **Williams** Calc Custom

Family List

- Auerbach
- Uncle Joe
- Williams

Family Information
Modified on: 11/7/2003 Created on: 11/7/2003

Client Name Lowell Williams Date of birth 1 / 1 / 1968 Single

Spouse/Partner Derek Teber Date of birth 1 / 1 / 1974 Married Partnered

Address

Street 7744 Fifth Ave.

City NY State NY

Zip 87231

Electronic Mail

Email 1 derek@yankees.com

Email 2 williams@esplanner.com

Phone Numbers

Home 773 994-5544 Work 744 554-9832

Mobile 634 994-7343 Fax 773-774-0098

Children under 19

Name Roger Born in 2001 Add

Babe born in 2003 Remove

Roger born in 2001

Notes

Financial planning beats sex. |

Activate

Monte Carlo simulations Contingent planning

Enter names, dates of birth, addresses, names and birth years of children, contact information, and any special notes.

Joe and Sally

To help you learn how to use *ESPlanner's* interface and interpret its results, we start out with a simple case and then modify inputs to illustrate *ESPlanner's* versatility in handling multiple financial circumstances and objectives. This case was run without activating contingent planning or Monte Carlo simulations, which we illustrate in subsequent cases. Because contingent planning is turned off, the values of contingent variables, like the wife's earnings if the husband passes away, are assumed to be the same as the non-contingent variables (the wife's earnings if the husband doesn't pass away prior to reaching his maximum age of life). And because the Monte Carlo simulations are turned off, we enter the rates of return on regular and retirement account assets in the *Assumptions* input folder.

Note that if you set up and run the cases presented here, your results may differ from those presented because we are continuously updating tax and Social Security benefit formulae. Also, this tutorial was written in 2003, and it may be a later year as you read this.

Now, please meet Joe and Sally Whitney, who live in Oklahoma. Joe is 33, and Sally is 28. They have one child, Joe Jr., born in 1998. A second child, Sally Jr., is planned for 2005. After clicking *New* on the Family Tool Bar and entering the Whitney's names, we entered their demographic and contact data as shown below. Note that the program allows you to enter future children.

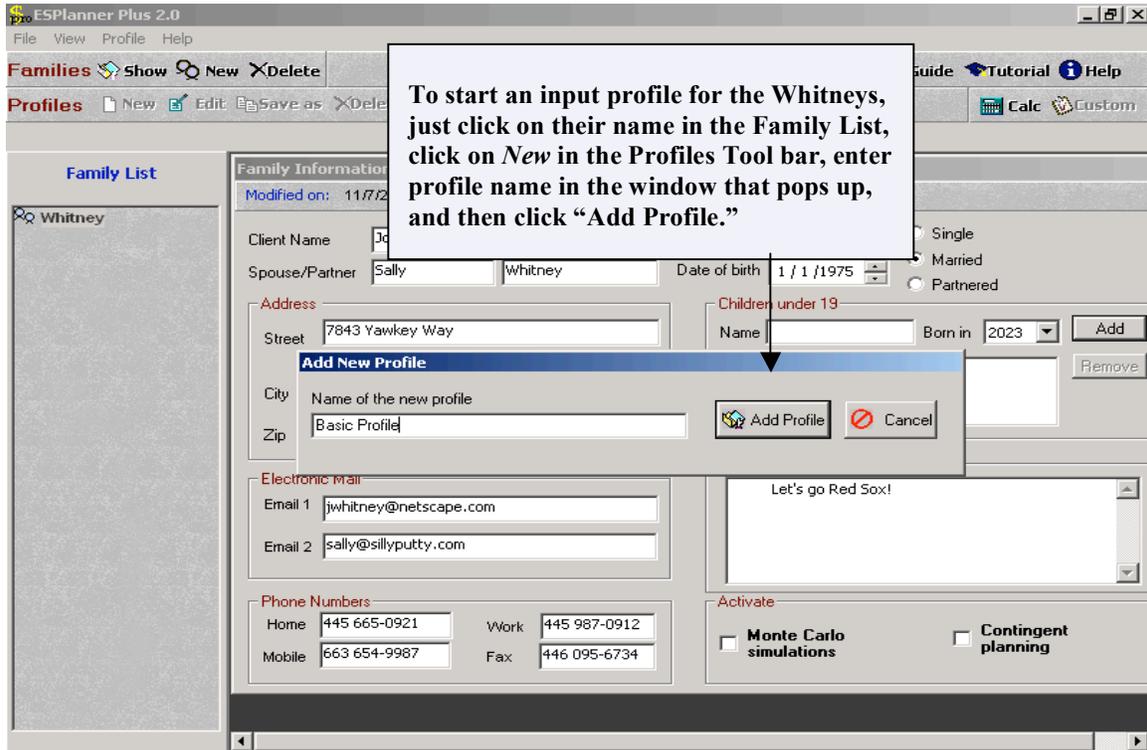
The Whitneys' Basic Data

The screenshot shows the ESPlanner Plus 2.0 interface. The main window is titled "Family Information" and contains the following data:

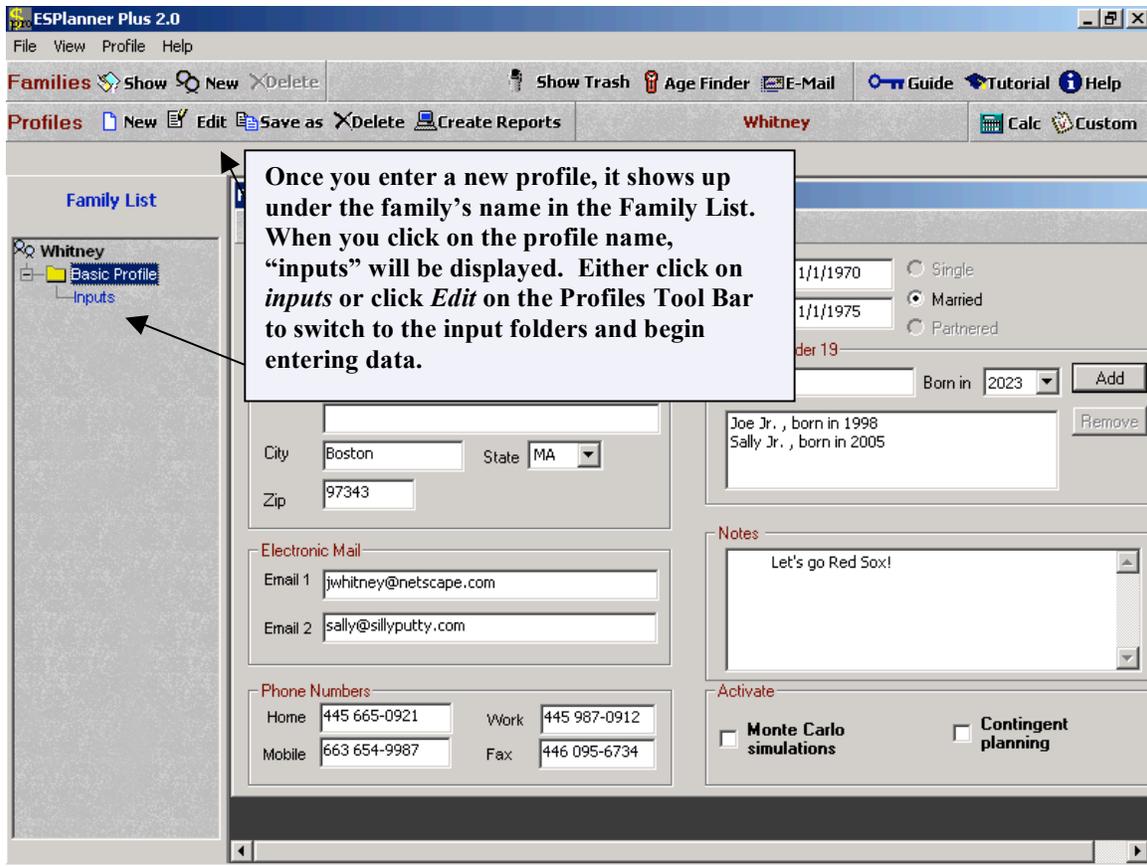
Client Name	Joe Whitney	Date of birth	1 / 1 / 1970	<input type="radio"/> Single				
Spouse/Partner	Sally Whitney	Date of birth	1 / 1 / 1975	<input checked="" type="radio"/> Married				
Address		Children under 19						
Street	7843 Yawkey Way			Name	Sally Jr.	Born in	2005	Add
City	Boston	State	MA	Joe Jr. , born in 1998				
Zip	97343			Sally Jr. , born in 2005				
Electronic Mail		Notes						
Email 1	jwhitney@netscape.com			Let's go Red Sox!				
Email 2	sally@sillyputty.com							
Phone Numbers		Activate						
Home	445 665-0921	Work	445 987-0912	<input type="checkbox"/> Monte Carlo simulations	<input type="checkbox"/> Contingent planning			
Mobile	663 654-9987	Fax	446 0955-6734					

Next we clicked *New* on the Profiles Tool Bar and named our file *Basic Plan*. (Note, “Basic Plan” is the default name, but you can overwrite it.) Once we clicked *Add Profile*, this file name showed up under the Whitney’s name on the Family List.

Starting a New Profile



Entering Inputs



Entering Joe's and Sally's Earnings

Both Joe and Sally plan to retire at age 65. Joe is a horticulturist and makes \$75,000 a year teaching at the University of SmartyPants. He expects his university wages to stay even with inflation through time. In addition, Joe does consulting through his company, We Grow Everything, Inc. After expenses, he clears \$25,000 a year from his company. Joe expects this self-employment income to stay fixed in today's dollars until he reaches age 50, after which he plans to stop consulting.

Sally plans to retire at age 60. She's making \$35,000 a year running a craps table at the local casino. She expects her wages to grow 3 percentage points faster than inflation for the next 6 years and then stay even with inflation.

To enter the Whitneys' earnings, we clicked once on the heading *Inputs* under Basic Plan. This opened the *Employee Wages* input screen. After leaving Joe's retirement age at the default value of 65, we noted that 2003 was selected as the first year for which we need to enter earnings. Hence, in step 3, we entered \$75,000 and clicked *Apply*. Voila! That amount showed up in the grid for 2003.

Since Joe expects no real earnings growth in the future, we filled in all future earnings by simply leaving the real growth rate in step 4 at zero, and clicking *Grow*. This filled in all future earnings, measured in

today's dollars, as \$75,000. The grid also displays the actual dollar amounts of future earnings in the column under the heading *Dollars*. The conversion of earnings measured into today's dollars into earnings in actual dollars is based on the assumed inflation rate, which is set in the *Assumptions* input folder. The default value for the annual inflation rate is 3 percent.

Next we entered Joe's self-employment earnings by clicking on the – yes, you got it – *Self-Employment Earnings* tab. We selected 2003 and entered \$25,000. Then we grew those earnings at a zero percent growth rate. Finally, we selected 2020, the year Joe becomes 50, entered earnings of zero for that year, and then hit the *Grow* button. This zeroed out Joe's self-employment earnings from age 51 through 65.

To enter Sally's earnings, we simply selected Sally's name in step 1. Next we set her retirement age to 60. But after entering her 2003 earnings at \$35,000, we set the real growth rate in step 3 at 3 percent and clicked *Grow*. This grew Sally's earnings, measured in today's dollars, by 3 percent through age 64 – her last year of work. But Sally's earnings are going to grow for only 6 years, so we next selected year 2009 in the grid, set the growth rate to zero, and clicked *Grow*. This generated the earnings inputs shown below.

Entering Joe's Employee Wages

The screenshot shows the ESPlanner Plus 2.0 interface. The 'Earnings' tab is active, and the 'Employee Wages' sub-tab is selected. The main window displays the following steps:

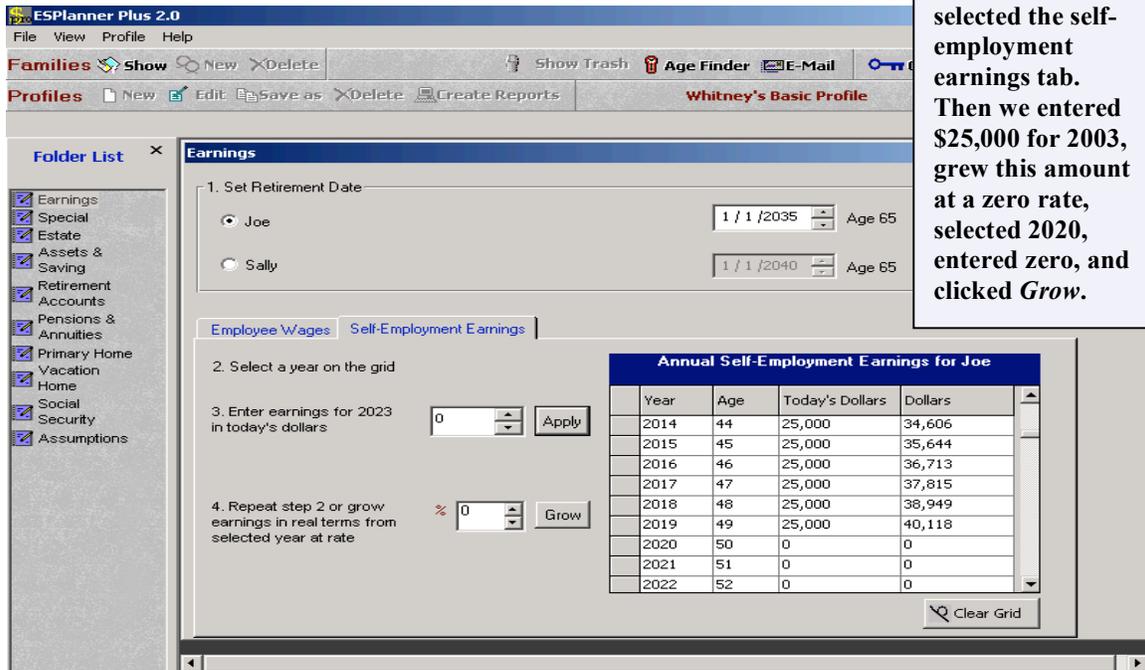
- Set Retirement Date:
 - Joe: 1 / 1 / 2035, Age 65
 - Sally: 1 / 1 / 2040, Age 65
- Select a year on the grid
- Enter earnings for 2003 in today's dollars: 75000 (with an 'Apply' button)

The 'Annual Employee Wages for Joe' grid is shown below:

Year	Age	Today's Dollars	Dollars
2003	33	75,000	75,000
2004	34	75,000	77,250
2005	35	75,000	79,568
2006	36	75,000	81,955
2007	37	75,000	84,413
2008	38	75,000	86,946
2009	39	75,000	89,554
2010	40	75,000	92,241
2011	41	75,000	95,008

A callout box states: **To enter Joe's earnings, measured in today's dollars, we entered \$75,000 for 2003 in step 3, and grew his earnings at a zero rate in step 4.**

Entering Joe's Self-Employment Earnings



ESPlanner Plus 2.0
File View Profile Help

Families Show New Delete Show Trash Age Finder E-Mail

Profiles Whitney's Basic Profile

Folder List

- Earnings
- Special
- Estate
- Assets & Saving
- Retirement Accounts
- Pensions & Annuities
- Primary Home
- Vacation Home
- Social Security
- Assumptions

Earnings

1. Set Retirement Date

Joe 1 / 1 / 2035 Age 65

Sally 1 / 1 / 2040 Age 65

Employee Wages Self-Employment Earnings

2. Select a year on the grid

3. Enter earnings for 2023 in today's dollars 0 Apply

4. Repeat step 2 or grow earnings in real terms from selected year at rate % 0 Grow

Annual Self-Employment Earnings for Joe				
Year	Age	Today's Dollars	Dollars	
2014	44	25,000	34,606	
2015	45	25,000	35,644	
2016	46	25,000	36,713	
2017	47	25,000	37,815	
2018	48	25,000	38,949	
2019	49	25,000	40,118	
2020	50	0	0	
2021	51	0	0	
2022	52	0	0	

Clear Grid

To enter Joe's consulting income, we selected the self-employment earnings tab. Then we entered \$25,000 for 2003, grew this amount at a zero rate, selected 2020, entered zero, and clicked *Grow*.

Entering Sally's Earnings

To enter Sally's earnings, measured in today's dollars, we set her retirement age to 69 and entered \$35,000 for 2003. Next we set the growth rate to 3%, clicked Grow, then selected 2009, set the growth rate to zero and clicked Grow.

Folder List

- Earnings
- Special
- Estate
- Assets & Saving
- Retirement Accounts
- Pensions & Annuities
- Primary Home
- Vacation Home
- Social Security
- Assumptions

Earnings

1. Set Retirement Date

Joe 1 / 1 / 2035 Age 65

Sally 1 / 1 / 2035 Age 60

Employee Wages Self-Employment Earnings

2. Select a year on the grid

3. Enter earnings for 2009 in today's dollars 35000 Apply

4. Repeat step 2 or grow earnings in real terms from selected year at rate % 0 Grow

Annual Employee Wages for Sally				
Year	Age	Today's Dollars	Dollars	
2005	30	37,132	39,393	
2006	31	38,245	41,792	
2007	32	39,393	44,337	
2008	33	40,575	47,037	
2009	34	41,792	49,902	
2010	35	41,792	51,399	
2011	36	41,792	52,941	
2012	37	41,792	54,529	
2013	38	41,792	56,165	

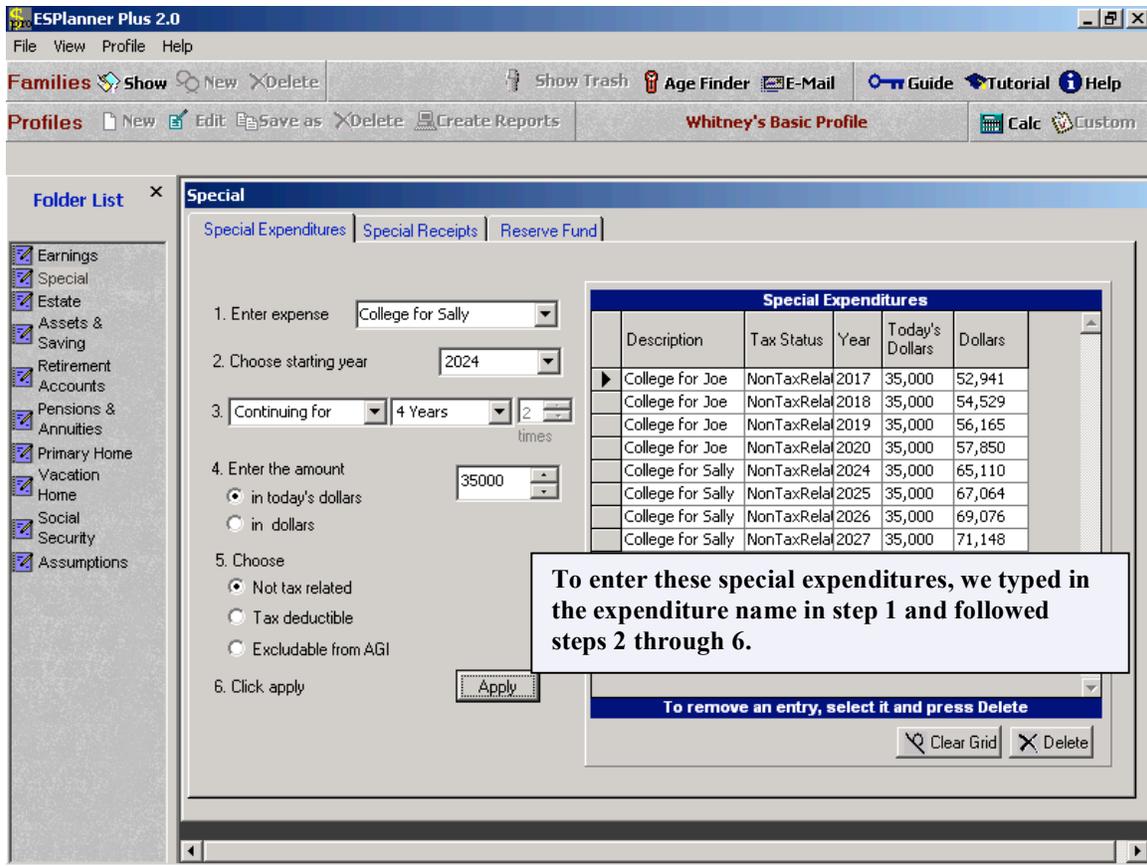
Clear Grid

Entering the Whitneys' Special Expenses

Joe and Sally want to send both of their children to their alma mater, NotforDummies U. The cost in 2003 of a NDU education was \$35,000, and worth every penny. Joe and Sally expect to pay that amount in today's dollars when their children reach age 19, which occurs in 2017 for Joe Jr. and 2024 for Sally Jr.

To enter these special expenses, we clicked *Special* on the *Folder List*. The program opened the *Special Expenditures* screen. We then typed in *College for Joe Jr.* in the field in step 1, selected 2017 for step 2, indicated in step 3 that the expense would continue for 4 years, specified in step 4 that the expense was in today's dollars, entered the amount, specified in step 5 that the expense was *Not Tax-Related*, and then clicked *Apply*. We then repeated these steps for Sally Junior's college tuition, except we specified that the expense would begin in 2024. The next screen shot shows the *Special Expenditures* screen after these inputs have been entered.

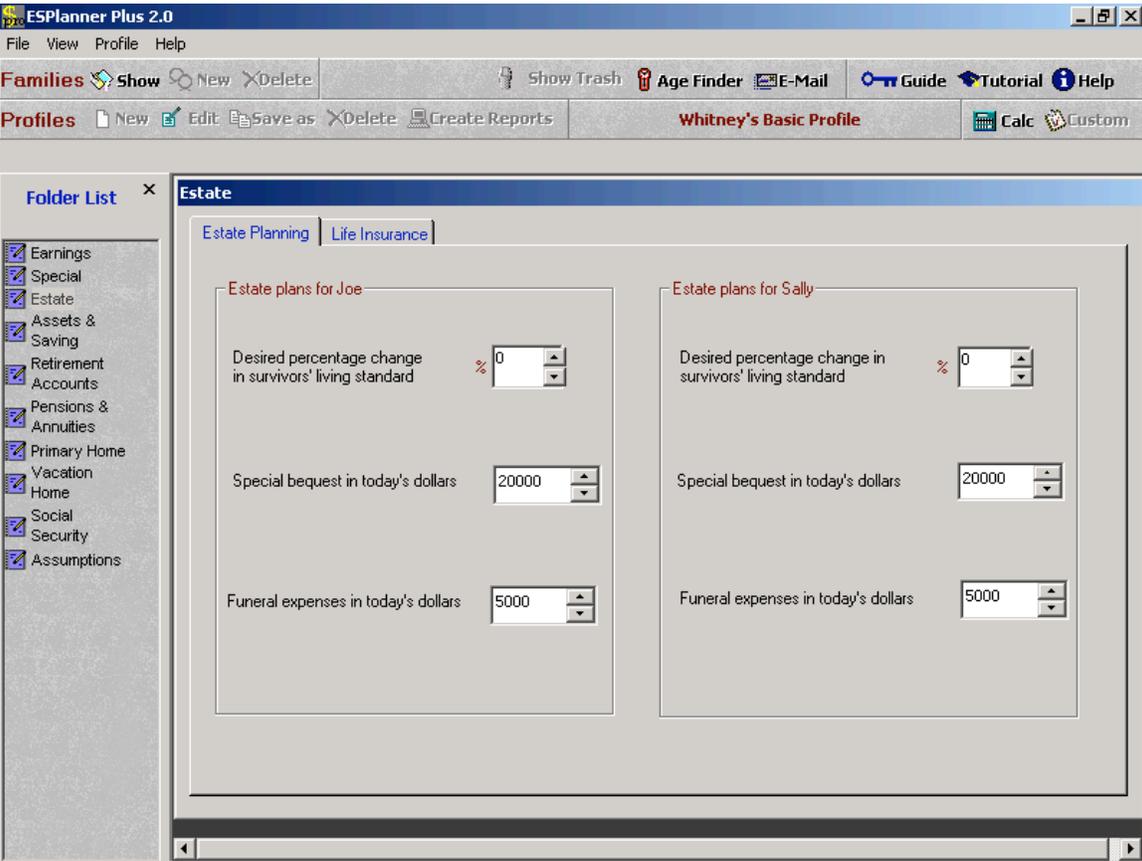
Entering College Tuition for Joe Jr. and Sally Jr.



Entering Estate Plans and Current Life Insurance Holdings

We accessed the next two screens by clicking on *Estate Plans* in the Folder List. As the first of these screens indicates, we assumed that both Joe and Sally seek to spend \$5000 on their funerals and to leave \$20,000 in bequests regardless of when they die. The second screen shows that we assume that Joe currently holds a term life insurance policy with a face value of \$250,000. Sally also has a term policy provided by her employers. But its face value is only \$100,000. The actual current life insurance holdings are used by the program only to compare with the program's recommended life insurance holdings for the current year.

Entering the Whitneys' Estate Plans



Entering the Whitneys' Current Life Insurance Holdings

The screenshot shows the ESPlanner Plus 2.0 software interface. The main window is titled 'Estate' and has a sub-tab for 'Life Insurance'. On the left, a 'Folder List' is visible with various categories like Earnings, Special, Estate, Assets & Saving, Retirement Accounts, Pensions & Annuities, Primary Home, Vacation Home, Social Security, and Assumptions. The main workspace contains a form with the following steps:

- Select: Radio buttons for 'Joe' and 'Sally' (selected).
- Enter policy name: Text box containing 'Employer Policy'.
- Enter face value: Spin box containing '250000'.
- Enter cash value: Spin box containing '0'.
- Click apply: 'Apply' button.

To the right of the form is a table titled 'Private and Employer-provided Life Insurance':

Name	Policy Name	Face Value	Cash Value
Sally	John Hancock	250,000	0
Sally	Employer Policy	100,000	0
Joe	Employer Policy	250,000	0

Below the table is a summary table:

	Joe	Sally	Total
Total face value	250,000	350,000	600,000
Total cash value	0	0	0
Total term value	250,000	350,000	600,000

Entering Regular Assets

For the moment, we assume that the Whitney's have no retirement account assets – just regular assets. These comprise \$100,000 in savings and checking accounts and mutual funds. We entered these assets by clicking *Assets and Saving* in the folder list.

Entering the Whitney's Regular Assets

The screenshot shows the 'Assets and Saving' screen in ESPlanner Plus 2.0. A callout box indicates that regular (non-retirement account) assets have been entered. The screen displays the following asset categories and values:

Asset Category	Value
Savings and checking accounts	15000
Bonds and CD's	0
Money market accounts	0
Other assets (exclude homes and business assets)	0
Mutual funds	85000
Cash value of life insurance	0
Stocks	0
Total	100,000

Entering the Whitneys' Actual Current Saving

ESPlanner recommends how much your family should save this year and in every future year. But to compare the program's recommended level of saving for the current year with what the family is actually saving, the program needs to solicit actual saving from the family. This is done on the second screen of the *Assets and Saving* folder. As indicated below, we assumed the Whitneys are contributing \$2,000 in the current year to a money market account. In addition, the real (inflation-adjusted) capital income they earn on their existing regular assets is \$3,000. Since we aren't specifying on the Saving screen that the Whitney's are withdrawing this capital income, it's building up in their saving and checking and mutual fund accounts and represents an additional form of saving.

The \$3,000 figure is calculated automatically as the amount of regular assets -- \$100,000 -- multiplied by the *real interest rate* -- the difference between the rate of return (which economists call the *nominal rate of*

interest) and the inflation rate, both of whose values are specified in the Assumptions folder. In this case, the rate of return on regular assets is assumed to equal 6 percent and the inflation rate is assumed to equal 3 percent. Hence the real interest rate is 3 percent. If we multiply .03 times \$100,000 we arrive at the \$3,000 in real asset income. Adding this amount of money that the Whitneys are indirectly saving to the \$2,000 they are directly saving produces their total actual saving for the current year of \$5,000.

Entering the Whitneys' Actual Current Saving

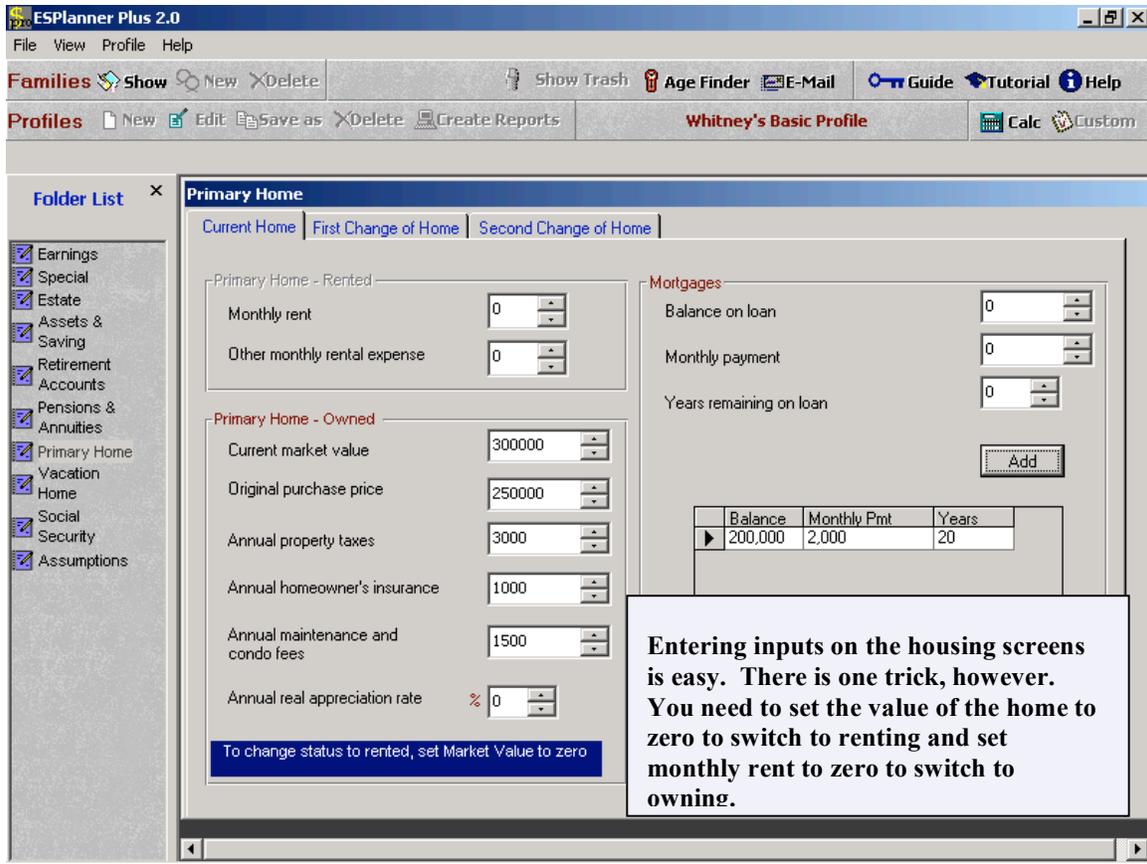
The screenshot shows the ESPlanner Plus 2.0 interface. The 'Folder List' on the left includes categories like Earnings, Special, Estate, Assets & Saving, Retirement Accounts, Pensions & Annuities, Primary Home, Vacation Home, Social Security, and Assumptions. The main window is titled 'Assets and Saving' and has two tabs: 'Regular Assets' and 'Current Saving'. The 'Current Saving' tab is selected, and the instruction reads: 'Enter the amounts you'll save or dissave over the coming year in each category'. The form contains the following entries:

Net contributions to saving, checking, money market, and other non-retirement accounts	2000
Net purchase of assets outside of retirement accounts, housing, and business assets	0
Loan payments apart from mortgage payments and prepayment of mortgage principal	0
Real asset income (dividends, interest, and other income earned on regular assets)....	3,000
Less amount of asset income not reinvested	0
Less new borrowing apart from new mortgages	0
Equals current saving	5,000

Entering Housing

Joe and Sally own a home, which we entered by clicking on *Primary Home* in the folder list. As the screen below indicates, we assumed that the couple have \$300,000 house, a \$200,000 20-year mortgage, a monthly mortgage payment of \$2,000, annual property taxes of \$3,000, a \$1,000 homeowners policy, and annual maintenance expenses of \$1,500. We also assumed that the market value of their house would stay even with inflation, so we left the real appreciation variable at its default value of zero. Finally, we assumed that the original purchase price of the home was \$250,000. Note that ESPlanner calculates capital gains on the sale of homes to the extent such gains exceed lifetime exemption levels.

Entering Housing Data



Entering Social Security Benefit Collection Dates and Covered Earnings

We have two more input folders to complete prior to computing our first case. The first is Social Security benefits, which we access by clicking the *Social Security* folder. This folder has three screens. The first solicits future Social Security benefit collection dates for those not collecting and for those already collecting benefits, it solicits the monthly benefit amount and the date benefits were first received. (We need this info to correctly calculate spousal survivor benefits.) As indicated below, we assume that both Joe and Sally begin receiving their Social Security benefits at age 65.

Entering Joe's and Sally's Social Security Benefit Collection Dates

The screenshot shows the ESPlanner Plus 2.0 interface. The main window is titled "Social Security" and has three tabs: "Benefit Collection", "Future Covered Earnings", and "Past Covered Earnings". The "Benefit Collection" tab is selected. The screen displays two questions regarding Social Security retirement benefits for Joe and Sally. For Joe, the "No" radio button is selected, the current monthly benefit is 0, and the retirement benefit collection date is 1/1/2035 at Age 65. For Sally, the "No" radio button is selected, the current monthly benefit is 0, and the retirement benefit collection date is 1/1/2040 at Age 65. A "Folder List" is visible on the left side of the window.

The next Social Security input screen asks about future Social Security-covered earnings. Since both Joe and Sally are in covered employment, we clicked the *Copy* button to copy their wage earnings into the relevant grids. Since self-employment earnings are automatically covered by Social Security, the program already knows to include Joe's self-employment earnings in assessing FICA taxes and determining Social Security covered earnings for purposes of determining Social Security benefits.

The last Social Security screen solicits past covered earnings, whether from employee wages or self-employment earnings. Here we simply entered values for both Joe and Sue.

Entering Joe's and Sally's Future Covered Earnings

ESPlanner Plus 2.0

File View Profile Help

Families Show New Delete Show Trash Age Finder E-Mail Guide Tutorial Help

Profiles New Edit Save as Delete Create Reports Whit

Social Security has been copied for contingent planning as well

Folder List x

- Earnings
- Special
- Estate
- Assets & Saving
- Retirement Accounts
- Pensions & Annuities
- Primary Home
- Vacation Home
- Social Security
- Assumptions

Social Security

Benefit Collection Future Covered Earnings Past Covered Earnings

1. Choose

Joe

Sally

2. If all employee wages entered in earnings folder are covered by Social Security, click copy

3. Enter earnings for 2003 in today's dollars Apply

And click on another year in the grid and enter earnings, or

4. Click another year in the grid and enter earnings or grow earnings in real terms at rate Grow

Annual Employee Wages

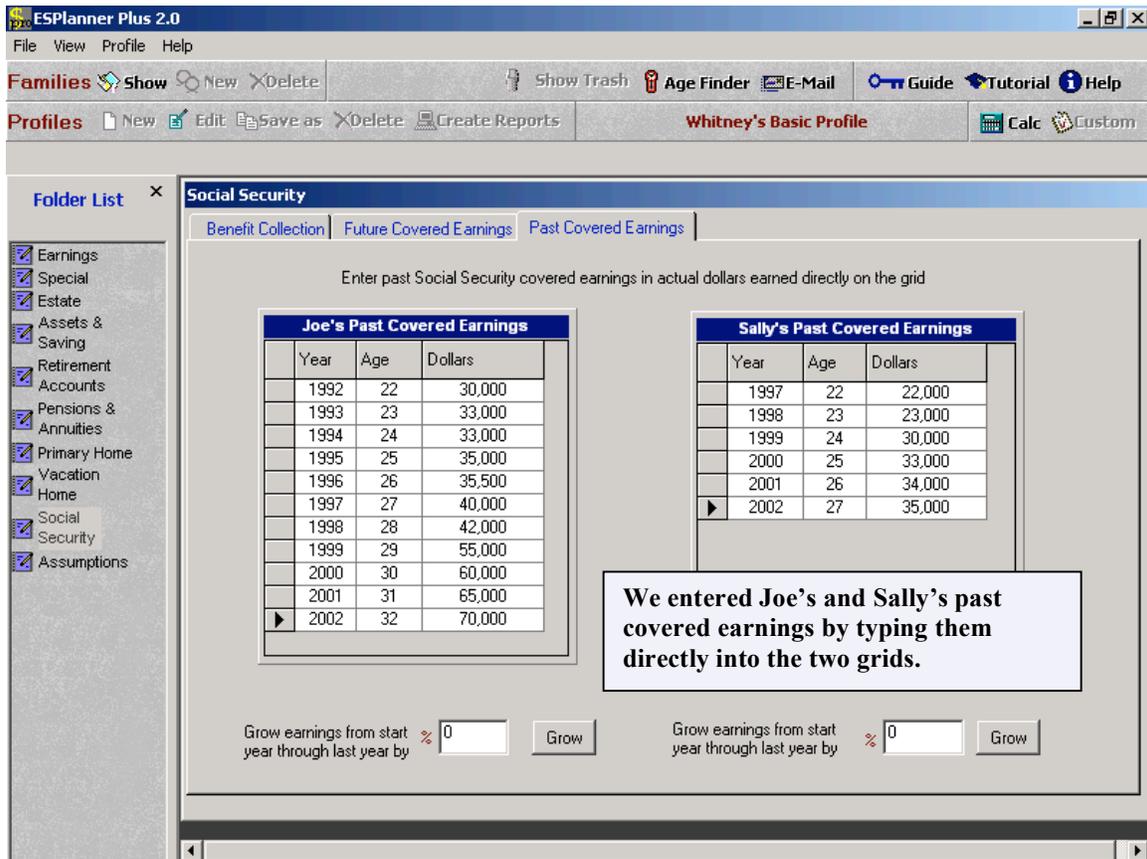
Year	Age	Today's Dollars	Dollars
2003	33	75,000	75,000
2004	34	75,000	77,250
2005	35	75,000	79,568
2006	36	75,000	81,955
2007	37	75,000	84,413
2008	38	75,000	86,946
2009	39	75,000	89,554
2010	40	75,000	92,241
2011	41	75,000	95,008
2012	42	75,000	97,858

To change the year, select that row

Clear Grid

Since Joe's and Sally's wage earnings are covered by Social Security, we entered their future covered wages simply by clicking *Copy*.

Entering Joe's and Sally's Past Covered Earnings



Entering Demographic, Economic, and Tax/Benefit Assumptions

The final set of inputs we need to consider prior to running the program are Joe's and Sally's demographic, economic, and tax/benefit assumptions. We set these assumptions by clicking *Assumptions* in the Folder List. The initial tab that appears is entitled *Economic Variables*. Here we accepted the default values for maximum ages of life, rates of return, inflation, maximum indebtedness, economies in shared living, etc.

Note that maximum age of life refers not to life expectancy, which is the average age at which a person will die, but rather the oldest age to which a person can possibly live. In contrast to many financial planning programs, which assume that people will die when they are expect to, *ESPlanner* realizes that people may live longer than they expect and that one needs to plan for that possibility. Consequently, in formulating its lifetime consumption smoothing, the program makes sure there are enough resources to maintain the household's living standard through the members' maximum ages of life.

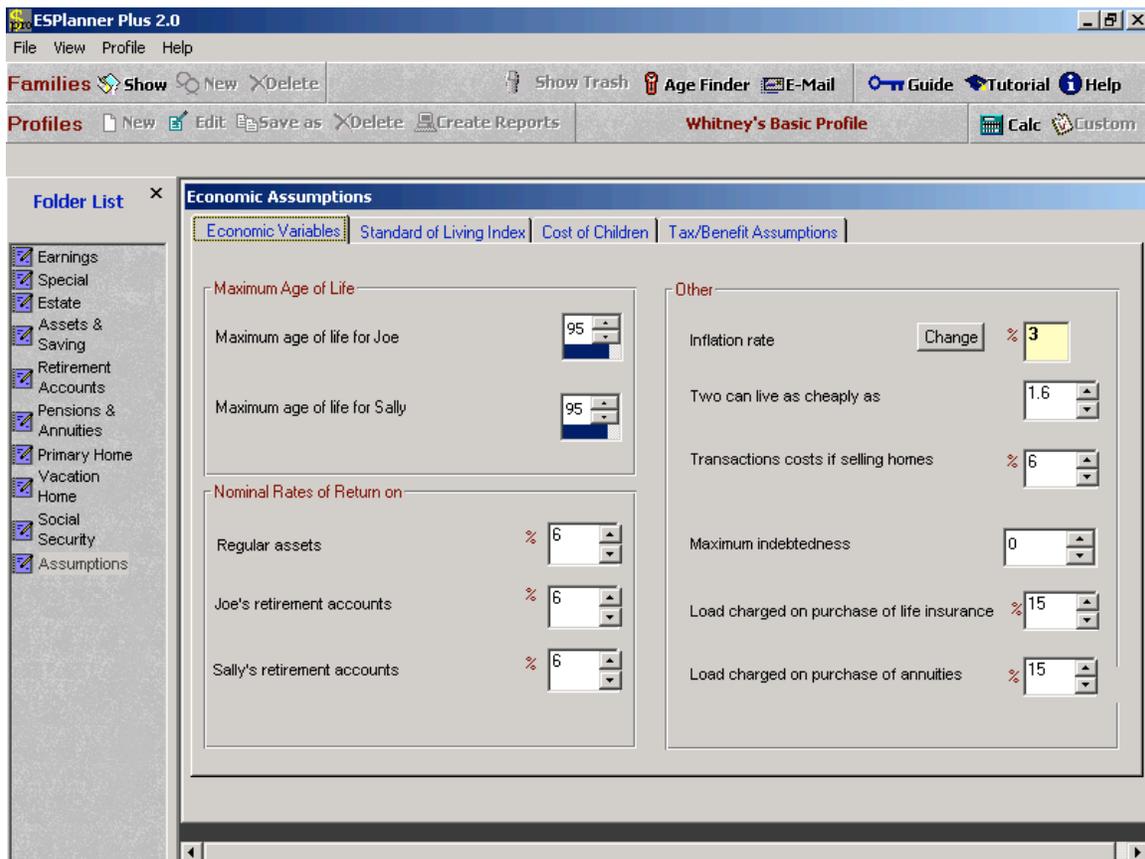
The "Two can live as cheaply as" captures economies in shared living – the fact that lots of household consumption items, like heat, TVs, the fridge, can be shared. Our default value for this variable is 1.6. The minimum value for this variable is 1, in which case, adding an extra person is completely free in terms

of giving that person the same living standard. The maximum value is 2, in which case, there are no economies in shared living.

Maximum indebtedness indicates how much your family is willing and able to borrow to smooth its living standard. *Nominal rates of return* refer to the returns your family can expect to earn on its regular assets and retirement accounts before inflation. Note that when you activate Monte Carlo, these rates of return fields are grayed out because expected rates of return are determined automatically based on the current and future portfolios specified in the Monte Carlo input folder.

The remaining non-obvious variables included on this screen are the loads for life insurance and annuities. As you'll see shortly, *ESPlanner* not only recommends life insurance holdings to maintain the living standard of survivors, it indicates the insurance premium payments needed to purchase the recommended policies. The program's internal insurance premiums are based on TIAA rates, which may be higher or lower than those your family faces. If you feel the program is generating life insurance premiums that are too low (high), you can increase (reduce) the life insurance load factor on this screen above (below) the 15 percent default value. The same holds true of premiums for annuities your family wishes to purchase.

Entering Economic Variables



The next Assumptions input screen is called *Standard of Living Index*. This screen allows you to override the program's default assumption, namely that your family wants to have the same living standard each period. This default assumption is imposed by initially setting all values of the standard of living index to 100. The value of the index for the current year, in this case 2030, is set at 100 and can't be changed. By altering values of the index in years after the current year, you can tell the program how you want your family's living standard to change in future years *relative* to the current year.

In Joe's and Sally's case, we assumed the couple wishes to have a 10 percent higher living standard when Joe hits age 70 and Sally reaches age 65, which occurs in 2040. To tell the program this, we selected 2040, enter 110 in step 2, clicked apply, and then grew 110 at a growth rate of zero. This filled in values of 110 from 2040 onward and told the program to make the living standard 10 percent higher in each year after Sally retires than it was before she retires.

Entering the Whitneys' Preferences about Changes in their Living Standard

The screenshot shows the 'Economic Assumptions' window in ESPlanner Plus 2.0, specifically the 'Standard of Living Index' tab. The window contains the following elements:

- Folder List (Left):** A tree view showing categories like Earnings, Special, Estate, Assets & Saving, Retirement Accounts, Pensions & Annuities, Primary Home, Vacation Home, Social Security, and Assumptions.
- Instructions (Left):**
 - Select a year by clicking on the grid, then proceed to step 2 or step 4
 - Enter index value:
 - Click apply:
 - Specify the growth rate: %
 - Click grow:
- Grid (Right):** A table titled 'Living Standard for *year* is fixed at 100.' with columns for Year, Age, Age, and Living Standard Index.

Year	Age	Age	Living Standard Index
2033	63	58	100.0
2034	64	59	100.0
2035	65	60	100.0
2036	66	61	100.0
2037	67	62	100.0
2038	68	63	100.0
2039	69	64	100.0
2040	70	65	110.0
2041	71	66	110.0
2042	72	67	110.0
2043	73	68	110.0
2044	74	69	110.0
2045	75	70	110.0
2046	76	71	110.0
- Callout Box (Bottom Right):** A text box stating: "To make the Whitneys' living standard 10 percent higher after 2039, we selected 2040, entered 110, and then grew 110 at a zero growth rate."

Note that the program automatically adjusts its consumption recommendations to take into account how many mouths there are to feed in a given year in the household, the fact that two can live more cheaply than

one, and that children are not necessarily as expensive as adults with respect to generating a given living standard. Hence, don't use the standard of living index to try to adjust recommended consumption for changes over time in the household's composition. The program does that on its own by assuming that children leave the household at age 19, leaving fewer child mouths to feed, and that when a spouse or partner dies, there is one fewer adult mouth to feed.

The next Assumptions screen concerns the relative cost of children. The default assumption is that to provide a child with the same living standard as an adult requires only 70 percent of the consumption expenditure enjoyed by the adult. The program's default values are 70 percent, but we assumed that the Whitney's children have a relative cost of 80 percent once they hit age 13.

Entering the Relative Cost of Children

The screenshot shows the 'Economic Assumptions' window in ESPlanner Plus 2.0. The 'Cost of Children' tab is selected. The 'Child-Adult Equivalency Factor' section includes instructions and input fields. A grid shows the factor for each age from 0 to 18. A text box provides a summary of the configuration: 'To set the relative cost of children at 80 percent from age 13 onward, we selected age 13, entered 80 in step 2, left the growth rate at zero, and clicked Grow.'

Age	Factor
0	70.0
1	70.0
2	70.0
3	70.0
4	70.0
5	70.0
6	70.0
7	70.0
8	70.0
9	70.0
10	70.0
11	70.0
12	70.0
13	80.0
14	80.0
15	80.0
16	80.0
17	80.0
18	80.0

The final Assumptions screen is *Tax/Benefit Assumptions*. This screen permits you to specify future changes in Social Security benefits, federal income taxes, state income taxes, and payroll taxes. It also lets you input the share of regular capital income (capital income not earned in retirement accounts) that your family is likely to receive in the form of capital gains or dividends, which are taxed at a lower rate than other capital income. Finally, it allows you to enter unrealized capital gains on financial assets. The

program assumes that such gains are realized smoothly through time. This is a fairly conservative assumption.

For this case, we assumed a 20 percent cut in Social Security benefits starting in 2015, and 15 percent increases in federal income taxes and payroll taxes, also starting in 2015. We also specified that a quarter of capital income comes in the form of capital gains or dividends.

Entering Tax/Benefit Assumptions

The screenshot shows the ESPlanner Plus 2.0 interface. The main window is titled "Economic Assumptions" and has several tabs: "Economic Variables", "Standard of Living Index", "Cost of Children", and "Tax/Benefit Assumptions". The "Tax/Benefit Assumptions" tab is active. On the left, a "Folder List" shows various categories like Earnings, Special, Estate, Assets & Saving, Retirement Accounts, Pensions & Annuities, Primary Home, Vacation Home, Social Security, and Assumptions. The "Assumptions" folder is expanded. The main content area is divided into three sections:

- Predictions:**
 - Will Social Security benefits be Changed? Yes
 - Year change occurs: 2015
 - Percentage change in benefits %: -20
 - Will Federal Income Taxes be Changed? Yes
 - Year change occurs: 2015
 - Percentage change in taxes %: 15
 - Will Payroll (FICA) taxes be Changed? Yes
 - Year change occurs: 2015
 - Percentage change in taxes (negative or positive changes allowed) %: 15
- Predictions (Continued):**
 - Will State Income Taxes be Changed? Yes
 - Year change occurs: 2003
 - Percentage change in taxes %: 0
- Dividends and Capital Gains:**
 - Share of regular capital income received in the form of long-term capital gains or dividends %: 25
 - Unrealized capital gains/losses on existing financial assets: 0

Calculating the Whitneys' Plan

To process the Whitney's plan click *Show* on the Family List, click on the Whitney's input file that you wish to process, which in this case is called *Basic Plan*, and then click *Create Reports* on the Profiles Tool Bar.

The Report Menu will display permitting you to specify the particular reports you'd like to run. The *Main Reports* is always generated. But you have the option of also selecting *Detailed Reports*, which provides supplementary information about the Main Report, and, in the case of married or partnered families, *Survivor Reports*, which show how a spouse or partner will fare if his/her counterpart dies at the age you specify on the Report Selection screen. All of these reports appear in Excel files. The reports are generated one at a time (so please be patient). They will appear at the bottom of your screen as files that you can open. The Main Report will be displayed. If Monte Carlo is activated, the Report Menu also gives you the option to generate Monte Carlo reports.

Once you have selected the reports you wish to generate, make sure you've closed any open excel reports previously generated for this input file and then click *Execute*.

Selecting Reports for *ESPlanner* to Generate

These ages are used to generate survivor reports. For example, selecting age 33 as the age of death for Joe means the program will generate survivor reports for Sally assuming that Joe dies at age 33 having purchased the amount of recommended life insurance and saved the recommended amounts.

The Whitney's Current-Year Recommendations

The first worksheet you'll see in the Main Reports provides a set of charts that summarize the program's recommendations. Subsequent worksheets present the results in tabular form. The Current Recommendations report, copied below, is an example. It shows how much the Whitney's should save, consume, and insure in the current year. As indicated in the screen shot presented below, the Whitney's are consuming too much. The program recommends they spend \$50,120 on consumption and save \$19,837 in the current year. Given the couple's actual current consumption and saving, the program recommends they reduce their consumption expenditures by \$15,142 and spend \$306 more on life insurance premiums. The net recommended reduction in expenditures is thus \$14,837, which, up to a dollar, is the program's recommended increase in saving.

How does the program determine that the amount the Whitney's are currently consuming is \$65,262? It does so by starting with the Whitney's total current income and subtracting all its non-consumption expenditures, including its actual current saving. To be precise, the program subtracts from total current income the sum of actual saving, any current special expenditures, current contributions to the reserve fund, current housing expenditures, current actual life insurance premium payments, current non-employer contributions to retirement accounts, and current taxes.

The program also indicates that Joe's life is underinsured to the tune of \$484,264 and that Sally's life is over insured by \$100,000. The additional life insurance on Joe's life is needed, in the event Joe dies in the current year, to maintain Sally's living standard and that of the children at the same level through time as they would otherwise have enjoyed. The program recommends no life insurance on Sally's life because were Sally to die with no life insurance, Joe and the children would enjoy a *higher* living standard than would otherwise be the case.

The Whitney's Current-Year Recommendations

2003 Recommendations			
Decision	Recommended Amount	Current Amount	Recommended Change
Consumption	50,120	65,262	(15,142)
Saving	19,837	5,000	14,837
Joe's Life Insurance	713,483	250,000	463,483
Sally's Life Insurance	0	100,000	(100,000)
Household Life Insurance Premiums	563	257	306

The Whitneys' Annual Recommendations

The second screen in the Main Reports shows the program's annual recommendations as well as the couple's living standard per adult. All amounts for future years in this and other reports are presented in *today's dollars*, meaning in the dollars of the current year. Let's look first at the annual consumption recommendations. In considering them, bear in mind that consumption refers to all expenditures apart from housing expenses, special expenditures, bequests and funeral expenses, taxes, life insurance premium payments, and individual contributions to retirement accounts.

In the first screen shot presented below, recommended consumption is, as indicated, initially \$50,120. This value rises to \$58,600 in 2005 when the Whitneys' second child, Sally Jr., is born. It remains at this level until 2011, when Joe Jr. reaches age 13, which is the age, according to the assumptions we made in our Cost of Children screen, that children become more expensive. In 2011, recommended consumption is \$59,763. Recommended consumption remains at \$59,763 until 2017 when Joe Jr. reaches age 19, leaves the household, and leaves fewer mouths to feed. At this point, recommended consumption drops to \$50,120 again. It stays at this value until the next year, when Sally Jr. reaches age 13 and becomes more expensive. At this point, recommended consumption is \$51,371.

As the second next screen shot shows, recommended consumption drops again in 2024 when Sally Jr. leaves home. It remains at the 2024 value of \$40,892 until 2040, when Joe reaches age 70. Recall that we used the Standard of Living Index to tell the program to raise the household's living standard by 10 percent starting in 2040. In that year recommended consumption is \$44,981, which is precisely 10 percent higher than \$40,892. The \$44,981 recommendation is maintained through 2065, the year Joe, assuming he survives until then, reaches 95 -- his maximum age of life. From 2066 through 2070, Sally's last possible year of life, recommended consumption is \$28,113. Note that \$44,981 is 1.6 times larger than \$28,113. This is consistent with our assumption in the Assumptions folder that two can live as cheaply as 1.6.

(There is one other reason recommended consumption can change, which we'll discuss in more detail below. That's when the household is unable to have the same living standard when young as when old without going into debt or going deeper into debt than the household is willing to accept.)

In regarding the program's recommended changes over time in consumption expenditure, it's important to bear in mind that individual household members enjoy the same living standard year in and year out prior to 2040 and a 10 percent higher living standard after 2040. Stated differently, the program adjusts consumption recommendations in accordance with changes over time in the household's demographic composition, the relative cost of children, economies in shared living, and standard of living preferences.¹ But each of these adjustments, except those involving desired future changes in living standard, are made in order to preserve the living standards of individual household members.

¹ If C stands for a household's total recommended consumption expenditure and S stands for the living standard per adult, the formula relating the two variables is given by $T = S x M^e$, where M stands for the the number of adults plus the sum of each child's cost weight. If, for example, a family has two adults and two children and the equivalent cost of supporting the younger child is 70 percent of an adult and the cost of supporting the older child is 80 percent of an adult, the cost weights are .7 and .8, and the value for M is $2 + 1.5 = 3.5$. The exponent e equals the natural log of z divided by the natural log of 2, where x is the value of the economies of shared living entered in the Assumptions folder. In the current example, we assume that 2 can live as cheaply as 1.6, so z equals 1.6.

Annual Recommendations for the Whitneys

Year	Joe's Age	Sally's Age	Annual Recommendations				Living Standard Per Adult
			Consumption	Saving	Joe's Life Insurance	Sally's Life Insurance	
2003	33	28	50,120	19,837	713,483	0	25,557
2004	34	29	50,120	21,141	671,820	0	25,557
2005	35	30	58,600	13,838	850,473	0	25,557
2006	36	31	58,600	15,059	617,888	0	25,557
2007	37	32	58,600	16,239	587,131	0	25,557
2008	38	33	58,600	17,387	558,373	0	25,557
2009	39	34	58,600	18,491	531,169	0	25,557
2010	40	35	58,600	18,923	505,697	0	25,557
2011	41	36	59,763	18,122	481,519	0	25,557
2012	42	37	59,763	18,396	458,687	0	25,557
2013	43	38	59,763	18,680	436,813	0	25,557
2014	44	39	59,763	18,883	417,067	0	25,557
2015	45	40	59,763	12,910	391,945	0	25,557
2016	46	41	59,763	12,894	367,697	0	25,557
2017	47	42	50,120	(13,569)	340,347	0	25,557
2018	48	43	51,371	(15,098)	313,464	0	25,557
2019	49	44	51,371	(15,445)	287,149	0	25,557
2020	50	45	51,371	(26,784)	272,326	0	25,557
2021	51	46	51,371	8,452	258,317	0	25,557

This can be verified by examining the last column in this table. It shows the living standard per adult, which is calculated as the amount of consumption expenditure that a single adult living by herself/himself would need to make to achieve the living standard enjoyed by the household members in the year in question. As the screen shots show, this figure is a constant \$25,557 until 2040, when it rises by 10 percent to \$28,113, which, while it's not shown, is precisely what Sally is told to consume after Joe passes away. Stated differently, the variations over time in recommended total consumption expenditure are precisely those needed to maintain the Whitney's living standard at the same level year after year until it rises by the desired 10 percent when Joe hits age 70.

The annual recommendations screen also indicates how much the Whitneys should save each year. Note that between 2017 and 2020 and between 2024 and 2027, when Joe Jr. and Sally Jr. are, respectively, in college, recommended saving is negative. (The values are in red and in parentheses.) The reason is that in those years the Whitneys are spending some of their accumulated assets to cover the tuition costs.

This is a major advantage of *ESPlanner* compared with its competition. *ESPlanner* recommends that households spend when they need to and save when they can. In contrast, conventional software sets saving on autopilot, with the household directed to save either exactly the same amount each year or

exactly the same percentage of income. Now consumption equals income net of off-the-top expenditures minus saving. So if annual saving is on autopilot, fluctuations from year to year in income or off-the-top expenditures require fluctuations in consumption. This, in turn, means fluctuating living standards over the life cycle, which is the exact opposite of what households are trying to achieve.

Finally, the annual term insurance recommendations indicate how much the Whitneys should purchase in life insurance coverage in the current year and in each future year. The program recommends no life insurance on Sally's life because Joe and the children would be able to afford a higher living standard were Sally to pass away. For Joe, the program recommends \$713,483 in life insurance initially. Joe's recommended life insurance holdings decline through time until he reaches age 60, after which recommended life insurance for Joe is also zero.

How can one tell whether these life insurance recommendations are correct? The answer is easy. The survivor reports, to which we will turn shortly, indicate that the recommended life insurance holdings are, to the dollar, the amounts needed to ensure the same living standard through time as they'd enjoy were their spouse/partner to live to his/her maximum age of live.

Annual Recommendations for the Whitneys Continued

1	Year	Joe's Age	Sally's Age	Annual Recommendations				Living Standard Per Adult
				Consumption	Saving	Joe's Life Insurance	Sally's Life Insurance	
2								
22	2022	52	47	51,371	8,064	242,268	0	25,557
23	2023	53	48	51,371	21,241	226,215	0	25,557
24	2024	54	49	40,892	(4,118)	196,227	0	25,557
25	2025	55	50	40,892	(4,037)	163,103	0	25,557
26	2026	56	51	40,892	(3,929)	129,511	0	25,557
27	2027	57	52	40,892	(3,790)	95,410	0	25,557
28	2028	58	53	40,892	31,360	64,576	0	25,557
29	2029	59	54	40,892	31,777	33,540	0	25,557
30	2030	60	55	40,892	32,248	2,128	0	25,557
31	2031	61	56	40,892	32,472	0	0	25,557
32	2032	62	57	40,892	32,675	0	0	25,557
33	2033	63	58	40,892	32,879	0	0	25,557
34	2034	64	59	40,892	33,085	0	0	25,557
35	2035	65	60	40,892	(18,093)	0	0	25,557
36	2036	66	61	40,892	(18,367)	0	0	25,557
37	2037	67	62	40,892	(18,639)	0	0	25,557
38	2038	68	63	40,892	(18,919)	0	0	25,557
39	2039	69	64	40,892	(19,208)	0	0	25,557
40	2040	70	65	44,981	(11,084)	0	0	28,113

The Whitneys' Spending Report

Next, let's examine the *Spending* Report, provided in another worksheet in the Main Reports. The spending report shows not only the annual recommended level of consumption expenditures, but also how much the Whitneys will pay for housing, special expenditures, excess bequests and funerals, insurance premiums, and retirement account contributions. Housing expenditures decline in the report as inflation erodes the real value of mortgage payments. In 2023, the mortgage is paid off and housing expenditures drop to \$5,500 per year. The column labeled "special expenditures" shows the children's college expenses occurring in the correct years.

ESPlanner is designed to use your family's home equity to cover any bequests and funeral expenses of the *last* household member to pass away. That's why the bequest and funeral expense column is labeled "excess" bequests and funeral expenses. It's the bequest and funeral expenses above and beyond the amount that can be covered by available home equity. The insurance premiums are those associated with purchasing recommended levels of life insurance coverage for Joe. And the retirement account contributions, which in the Whitney's case are zero, are those made by your family, not your family's employers. (Note that employer contributions to your family members' retirement accounts are fully included in calculating retirement account withdrawals.)

The Whitneys' Total Spending Report

Year	Joe's Age	Sally's Age	Total Spending									Total Spending
			Consumption	Special Expenditures	Net Contributions to Reserve Fund	Housing Expenditures	Joe's Retirement Account Contributions	Sally's Retirement Account Contributions	Excess Funerals and Bequests	Life Insurance Premiums		
2003	33	28	50,120	0	0	28,801	0	0	0	563	79,484	
2004	34	29	50,120	0	0	28,122	0	0	0	571	78,813	
2005	35	30	58,600	0	0	27,463	0	0	0	604	86,667	
2006	36	31	58,600	0	0	26,824	0	0	0	633	86,057	
2007	37	32	58,600	0	0	26,203	0	0	0	669	85,472	
2008	38	33	58,600	0	0	25,600	0	0	0	712	84,912	
2009	39	34	58,600	0	0	25,014	0	0	0	759	84,373	
2010	40	35	58,600	0	0	24,446	0	0	0	810	83,856	
2011	41	36	53,763	0	0	23,894	0	0	0	863	84,520	
2012	42	37	53,763	0	0	23,358	0	0	0	915	84,036	
2013	43	38	53,763	0	0	22,838	0	0	0	968	83,569	
2014	44	39	53,763	0	0	22,333	0	0	0	1,021	83,117	
2015	45	40	53,763	0	0	21,843	0	0	0	1,077	82,663	
2016	46	41	53,763	0	0	21,367	0	0	0	1,088	82,218	
2017	47	42	50,120	35,000	0	20,905	0	0	0	1,101	107,126	
2018	48	43	51,371	35,000	0	20,456	0	0	0	1,105	107,332	
2019	49	44	51,371	35,000	0	20,020	0	0	0	1,100	107,431	
2020	50	45	51,371	35,000	0	19,597	0	0	0	1,131	107,039	
2021	51	46	51,371	0	0	19,187	0	0	0	1,160	71,718	
2022	52	47	51,371	0	0	18,788	0	0	0	1,175	71,334	
2023	53	48	51,371	0	0	5,500	0	0	0	1,183	58,054	
2024	54	49	40,832	35,000	0	5,500	0	0	0	1,107	82,439	
2025	55	50	40,832	35,000	0	5,500	0	0	0	935	82,387	
2026	56	51	40,832	35,000	0	5,500	0	0	0	858	82,250	
2027	57	52	40,832	35,000	0	5,500	0	0	0	689	82,081	
2028	58	53	40,832	0	0	5,500	0	0	0	511	46,903	

The last column in the spending report shows total spending in each year. The key question with respect to this column of numbers is whether this recommended spending path is actually affordable. The answer, as we'll now see, is yes.

The Whitney's Regular Assets Report

Were the time-path of spending shown in the Spending Report not affordable, the household would end up in debt in the last period of the household's possible existence. As the Whitney's *Regular Asset Report*, parts of which are copied below, indicates, this doesn't happen. The program makes sure the Whitneys "die broke." This means that they spend all their resources (apart from housing equity not used to cover Sally's final bequest and funeral expenses), but they don't leave any bills unpaid.

The first of the Regular Assets screen shots shown below shows that the couple spends down its assets to send the two kids to college. The second screen shot shows that the couple dies broke; i.e., regular assets in 2070 when Sally reaches age 95 equal zero. The Regular Assets Report is a balance sheet. The annual change in regular assets equals that year's saving. And saving equals income minus the sum of total spending plus taxes.

The Whitneys' Regular Assets

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1	Year	Joe's Age	Sally's Age	Regular Assets				
				Total Income	Total Spending	Taxes	Saving	Regular Assets
2								
3	2003	33	28	138,000	79,484	38,679	19,837	122,837
4	2004	34	29	139,628	78,814	39,673	21,141	143,978
5	2005	35	30	141,325	86,667	40,820	13,838	157,816
6	2006	36	31	142,842	86,057	41,727	15,059	172,874
7	2007	37	32	144,428	85,472	42,717	16,239	189,114
8	2008	38	33	146,083	84,912	43,784	17,387	206,500
9	2009	39	34	147,806	84,374	44,942	18,491	224,991
10	2010	40	35	148,345	83,856	45,566	18,923	243,914
11	2011	41	36	148,896	84,520	46,255	18,122	262,036
12	2012	42	37	149,424	84,037	46,992	18,396	280,431
13	2013	43	38	149,960	83,569	47,711	18,680	299,112
14	2014	44	39	150,504	83,118	48,504	18,883	317,994
15	2015	45	40	151,054	82,663	55,481	12,910	330,904
16	2016	46	41	151,430	82,218	56,318	12,894	343,798
17	2017	47	42	151,806	107,126	58,249	(13,569)	330,229
18	2018	48	43	151,410	107,933	58,576	(15,098)	315,131
19	2019	49	44	150,971	107,492	58,924	(15,445)	299,686
20	2020	50	45	125,521	107,100	45,204	(26,784)	272,902
21	2021	51	46	124,741	71,719	44,570	8,452	281,354

AnnualRecommendations RegularAssets TotalIncome TotalSpending NetWort

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The Whitneys' Regular Assets Continued

Year	Joe's Age	Sally's Age	Regular Assets				
			Total Income	Total Spending	Taxes	Saving	Regular Assets
2052	82	77	41,590	50,481	3,891	(12,783)	273,186
2053	83	78	41,217	50,481	3,673	(12,936)	260,250
2054	84	79	40,841	50,481	3,456	(13,096)	247,154
2055	85	80	40,459	50,481	3,236	(13,257)	233,896
2056	86	81	40,073	50,481	3,014	(13,422)	220,474
2057	87	82	39,682	50,481	2,792	(13,591)	206,883
2058	88	83	39,286	50,481	2,566	(13,761)	193,122
2059	89	84	38,885	50,481	2,336	(13,932)	179,191
2060	90	85	38,480	50,481	2,104	(14,105)	165,086
2061	91	86	38,069	50,481	1,872	(14,284)	150,801
2062	92	87	37,653	50,481	1,637	(14,465)	136,336
2063	93	88	37,232	50,481	1,398	(14,647)	121,689
2064	94	89	36,805	50,481	1,154	(14,830)	106,858
2065	95	90	36,373	75,481	909	(40,017)	66,841
2066		91	21,368	33,613	1,108	(13,353)	53,488
2067		92	20,979	33,613	583	(13,217)	40,271
2068		93	20,594	33,613	61	(13,080)	27,191
2069		94	20,213	33,613	0	(13,400)	13,791
2070		95	19,822	33,613	0	(13,791)	0

The Whitneys' Total Income Report

The next report in Main Reports that we want to show you is the *Total Income Report*. This report decomposes the household's total income into four components – non-asset income, special receipts, retirement account withdrawals and annuities, and income from the household's regular assets. *Non-asset income* consists of labor earnings, social security benefits, pension benefits, and regular annuities (annuities that aren't derived from retirement accounts).

The Whitney's Net Worth Report

The remaining report in Main Reports shows the Whitney's' total net worth each year, breaking total net worth into components. These components are regular assets, retirement account balances, home equity, and the value of the couple's reserve fund.

The Whitneys' Total Income Report

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1	Year	Joe's Age	Sally's Age	Total Income						Total Income
				Joe's Non-Asset Income	Sally's Non-Asset Income	Special Receipts	Joe's Retirement Account Withdrawals &	Sally's Retirement Account Withdrawals &	Regular Asset Income	
2										
3	2003	33	28	100,000	35,000	0	0	0	3,000	138,000
4	2004	34	29	100,000	36,050	0	0	0	3,578	139,628
5	2005	35	30	100,000	37,132	0	0	0	4,194	141,326
6	2006	36	31	100,000	38,245	0	0	0	4,597	142,842
7	2007	37	32	100,000	39,393	0	0	0	5,035	144,428
8	2008	38	33	100,000	40,575	0	0	0	5,508	146,083
9	2009	39	34	100,000	41,792	0	0	0	6,015	147,807
10	2010	40	35	100,000	41,792	0	0	0	6,553	148,345
11	2011	41	36	100,000	41,792	0	0	0	7,104	148,896
12	2012	42	37	100,000	41,792	0	0	0	7,632	149,424
13	2013	43	38	100,000	41,792	0	0	0	8,168	149,960
14	2014	44	39	100,000	41,792	0	0	0	8,712	150,504
15	2015	45	40	100,000	41,792	0	0	0	9,262	151,054
16	2016	46	41	100,000	41,792	0	0	0	9,638	151,430
17	2017	47	42	100,000	41,792	0	0	0	10,014	151,806
18	2018	48	43	100,000	41,792	0	0	0	9,618	151,410
19	2019	49	44	100,000	41,792	0	0	0	9,179	150,971
20	2020	50	45	75,000	41,792	0	0	0	8,729	125,521
21	2021	51	46	75,000	41,792	0	0	0	7,949	124,741

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The Whitneys' Net Worth

Year	Joe's Age	Sally's Age	Net Worth						Net Worth
			Regular Assets	Housing Equity	Reserve Fund	Joe's Retirement Accounts	Sally's Retirement Accounts		
2003	33	28	122,837	109,096	0	0	0	231,932	
2004	34	29	143,978	118,159	0	0	0	262,137	
2005	35	30	157,816	127,207	0	0	0	285,023	
2006	36	31	172,874	136,258	0	0	0	309,133	
2007	37	32	189,114	145,331	0	0	0	334,445	
2008	38	33	206,500	154,445	0	0	0	360,946	
2009	39	34	224,991	163,621	0	0	0	388,613	
2010	40	35	243,914	172,881	0	0	0	416,795	
2011	41	36	262,036	182,246	0	0	0	444,282	
2012	42	37	280,431	191,741	0	0	0	472,172	
2013	43	38	299,112	201,390	0	0	0	500,501	
2014	44	39	317,994	211,219	0	0	0	529,213	
2015	45	40	330,904	221,256	0	0	0	552,160	
2016	46	41	343,798	231,530	0	0	0	575,328	
2017	47	42	330,229	242,072	0	0	0	572,301	
2018	48	43	315,131	252,914	0	0	0	568,045	
2019	49	44	299,686	264,090	0	0	0	563,775	
2020	50	45	272,902	275,637	0	0	0	548,539	
2021	51	46	281,354	287,593	0	0	0	568,947	

The Whitneys' Detailed Reports

ESPlanner's detailed reports spell out the components of your family members' non-asset incomes, housing expenses, taxes, Social Security benefits, reserve fund, estates, and retirement accounts. Here are three examples of such reports. The first of these three screen shots show that Joe's labor income declines at age 50 when he stops consulting. It also shows that he starts collecting Social Security retirement benefits starting at age 65.

Joe's Non-Asset Income Report

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Year	Joe's Age	Joe's Non-Asset Income					Total Non-Asset Income
		Labor Income	Pension Income	Annuity Income	Social Security Benefits		
2018	48	100,000	0	0	0	100,000	
2019	49	100,000	0	0	0	100,000	
2020	50	75,000	0	0	0	75,000	
2021	51	75,000	0	0	0	75,000	
2022	52	75,000	0	0	0	75,000	
2023	53	75,000	0	0	0	75,000	
2024	54	75,000	0	0	0	75,000	
2025	55	75,000	0	0	0	75,000	
2026	56	75,000	0	0	0	75,000	
2027	57	75,000	0	0	0	75,000	
2028	58	75,000	0	0	0	75,000	
2029	59	75,000	0	0	0	75,000	
2030	60	75,000	0	0	0	75,000	
2031	61	75,000	0	0	0	75,000	
2032	62	75,000	0	0	0	75,000	
2033	63	75,000	0	0	0	75,000	
2034	64	75,000	0	0	0	75,000	
2035	65	0	0	0	19,421	19,421	
2036	66	0	0	0	19,421	19,421	

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The Whitneys' Tax Report

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Year	Joe's Age	Sally's Age	Taxes				Total Taxes
			Federal Income Taxes	State Income Taxes	Joe's FICA Tax	Sally's FICA Tax	
2003	33	28	21,295	6,938	7,769	2,677	38,679
2004	34	29	21,939	7,112	7,864	2,758	39,673
2005	35	30	22,798	7,221	7,961	2,841	40,820
2006	36	31	23,368	7,375	8,058	2,926	41,727
2007	37	32	24,005	7,543	8,156	3,014	42,717
2008	38	33	24,712	7,713	8,255	3,104	43,784
2009	39	34	25,489	7,901	8,355	3,197	44,942
2010	40	35	25,900	8,014	8,455	3,197	45,566
2011	41	36	26,369	8,132	8,557	3,197	46,255
2012	42	37	26,882	8,253	8,659	3,197	46,992
2013	43	38	27,371	8,379	8,763	3,197	47,711
2014	44	39	27,926	8,513	8,867	3,197	48,504
2015	45	40	32,845	8,641	10,319	3,677	55,481
2016	46	41	33,435	8,765	10,441	3,677	56,318
2017	47	42	35,037	8,971	10,564	3,677	58,249
2018	48	43	35,204	9,006	10,689	3,677	58,576
2019	49	44	35,388	9,045	10,814	3,677	58,924
2020	50	45	27,418	7,511	6,598	3,677	45,204
2021	51	46	26,764	7,531	6,598	3,677	44,570

Ready

The Whitneys' Housing Report

Year	Joe's Age	Sally's Age	Housing								
			Mortgage	Property Tax	Maintenance and Condo Fees	Homeowner's Insurance	Net Home Purchases	Housing Expenditures	Mortgage Balance	Home Equity	
2003	33	28	23,301	3,000	0	2,500	0	28,801	196,631	109,096	
2004	34	29	22,622	3,000	0	2,500	0	28,122	192,915	118,159	
2005	35	30	21,963	3,000	0	2,500	0	27,463	188,815	127,207	
2006	36	31	21,324	3,000	0	2,500	0	26,824	184,293	136,258	
2007	37	32	20,703	3,000	0	2,500	0	26,203	179,304	145,331	
2008	38	33	20,100	3,000	0	2,500	0	25,600	173,800	154,445	
2009	39	34	19,514	3,000	0	2,500	0	25,014	167,729	163,621	
2010	40	35	18,946	3,000	0	2,500	0	24,446	161,031	172,881	
2011	41	36	18,394	3,000	0	2,500	0	23,894	153,642	182,246	
2012	42	37	17,858	3,000	0	2,500	0	23,358	145,491	191,741	
2013	43	38	17,338	3,000	0	2,500	0	22,838	136,499	201,390	
2014	44	39	16,833	3,000	0	2,500	0	22,333	126,580	211,219	
2015	45	40	16,343	3,000	0	2,500	0	21,843	115,638	221,256	
2016	46	41	15,867	3,000	0	2,500	0	21,367	103,567	231,530	
2017	47	42	15,405	3,000	0	2,500	0	20,905	90,250	242,072	
2018	48	43	14,956	3,000	0	2,500	0	20,456	75,560	252,914	
2019	49	44	14,520	3,000	0	2,500	0	20,020	59,354	264,090	
2020	50	45	14,097	3,000	0	2,500	0	19,597	41,477	275,637	
2021	51	46	13,687	3,000	0	2,500	0	19,187	21,756	287,593	

The Whitneys' Survivor Reports

The next screen shot shows Sally's annual recommendations as a survivor were Joe to die at the end of his 33rd year. The first thing to notice is that Sally's living standard is precisely the same \$25,527 per equivalent adult as she and other family members experience if Joe lives to a ripe old age. The next thing to notice is that Sally's recommended consumption does not rise in 2005 when Sally Jr. would otherwise have been born; i.e., the program realizes that if Joe is deceased, Sally Jr. will not be forthcoming. The third thing to notice is that Sally's recommended consumption varies over time as Joe Jr. becomes more expensive in 2011 and then leaves the household in 2017. Although it's not shown, Sally's recommended survivor consumption rises by 10 percent when she reaches age 65, to ensure that she enjoys precisely the same living standard when she's a widow as she would had Joe not died.

The next question to ask is whether Sally, as a survivor, can actually afford the same living standard. The answer is shown in her survivor Regular Assets report, part of which is shown below. As this report indicates, Sally begins life as a widow with \$811,320. As Joe's Estate

Sally's Survivor Annual Recommendations

Year	Sally's Age	Sally's Survivor Annual Recommendations			Living Standard Per Adult
		Saving	Consumption	Life Insurance	
2004	29	-3,709	36,625	0	25,557
2005	30	-2,934	36,625	0	25,557
2006	31	-2,150	36,625	0	25,557
2007	32	-1,440	36,625	0	25,557
2008	33	-750	36,625	0	25,557
2009	34	119	36,625	0	25,557
2010	35	674	36,625	0	25,557
2011	36	-383	38,072	0	25,557
2012	37	8	38,072	0	25,557
2013	38	364	38,072	0	25,557
2014	39	385	38,072	0	25,557
2015	40	-5,533	38,072	0	25,557
2016	41	-5,487	38,072	0	25,557
2017	42	-40,934	25,557	0	25,557
2018	43	-41,283	25,557	0	25,557
2019	44	-41,756	25,557	0	25,557
2020	45	-42,299	25,557	0	25,557
2021	46	-7,918	25,557	0	25,557
2022	47	-8,323	25,557	0	25,557

Sally's Survivor Regular Assets

Year	Sally's Age	Sally's Survivor Regular Assets				
		Total Income	Spending	Taxes	Saving	Regular Assets
2003	28	0	(811,320)	0	811,320	811,320
2004	29	77,375	64,747	16,337	(3,709)	807,611
2005	30	77,859	64,088	16,705	(2,934)	804,677
2006	31	78,383	63,449	17,084	(2,150)	802,526
2007	32	78,946	62,828	17,556	(1,440)	801,066
2008	33	79,548	62,225	18,073	(750)	800,336
2009	34	80,188	61,639	18,429	119	800,456
2010	35	80,245	61,071	18,500	674	801,130
2011	36	80,319	61,966	18,735	(383)	800,748
2012	37	80,362	61,431	18,924	8	800,756
2013	38	80,419	60,910	19,143	264	801,120
2014	39	80,131	60,405	19,341	385	801,505
2015	40	77,141	59,915	22,759	(5,533)	795,971
2016	41	76,380	59,439	23,028	(5,487)	790,484
2017	42	64,816	81,462	24,288	(40,934)	749,550
2018	43	63,624	81,013	23,894	(41,283)	708,266
2019	44	62,421	80,578	23,600	(41,756)	666,510
2020	45	61,205	80,155	23,349	(42,299)	624,211
2021	46	59,973	44,744	23,146	(7,918)	616,293

Report (which is one of the detailed reports) records, his net estate that he leaves to Sally if he dies at age 33 is precisely \$811,320. It consists of the \$122,837 in regular assets of the couple, plus the \$713,483 in recommended life insurance, less Joe's desired bequest and funeral expenses, which total \$25,000. This

shows that *ESPlanner's* life insurance recommendation is, to the dollar, exactly what Sally needs to maintain her living standard and that of Joe Jr.

In addition to the annual recommendations and regular asset reports, the other survivor reports provide detailed information about sources of income, taxes, Social Security benefits, housing, and spending of survivors.

Joe Retires Early

Our next goal is to show you how easy it is to use *ESPlanner* to determine implications for the Whitneys' living standard of changes in financial plans and goals. Our first example involves Joe's retiring at age 60, rather than 65. To consider this case, we return to the Family List by clicking Show on the Family Tool Bar. Next we select Basic Plan under Whitney. Finally, we click *Save As* on the Profiles Tool Bar and enter *Retire Early* as the new file name. The program automatically copies all the inputs from Basic Plan into Retire Early.

We then click on *Retire Early*, click *Inputs*, click *Earnings* on the folder list, select Joe, go to the earnings grid, selected the year that Joe reaches age 60, enter zero earning for that year, and then grow those earnings at a zero rate. This fills in earnings of zero for ages 60 and beyond. Before hitting the *Create Reports* button, we do one other thing. We go to the Future Covered Earnings screen in the Social Security folder and copy Joe's future earnings.

Compared with the Basic Plan, the program now recommends that the Whitneys consume only \$46,800 in the current year, rather than \$50,120. This entails a living standard reduction of 6.6 percent as can be double checked by comparing the living standard per adult figures across the two sets of annual recommendations. The program also recommends that the Whitneys save 17.1 percent more this year -- \$23,233 rather than \$19,837. Because Joe's future earnings are reduced, he has less future income to insure. Consequently, the program recommends that Joe reduce his current life insurance by close to \$100,000.

Joe and Sally Do Contingent Planning

We next demonstrate how to do contingent planning. Specifically, we return to the base case assumption but assume that were Joe to die, Sally would choose a more demanding career and earn \$75,000 each year measured in today's dollars. We also assume that she'd need to hire a nanny for 7 years to help take care of the children, which would cost \$15,000 per year.

To activate contingent planning, we click *Show* on the Family Tool Bar and return to the Whitney family screen. There we check off contingent planning. When we click on *Inputs* under *Basic Plan*, the input folder list appears, but with contingent planning input folders added to the list.

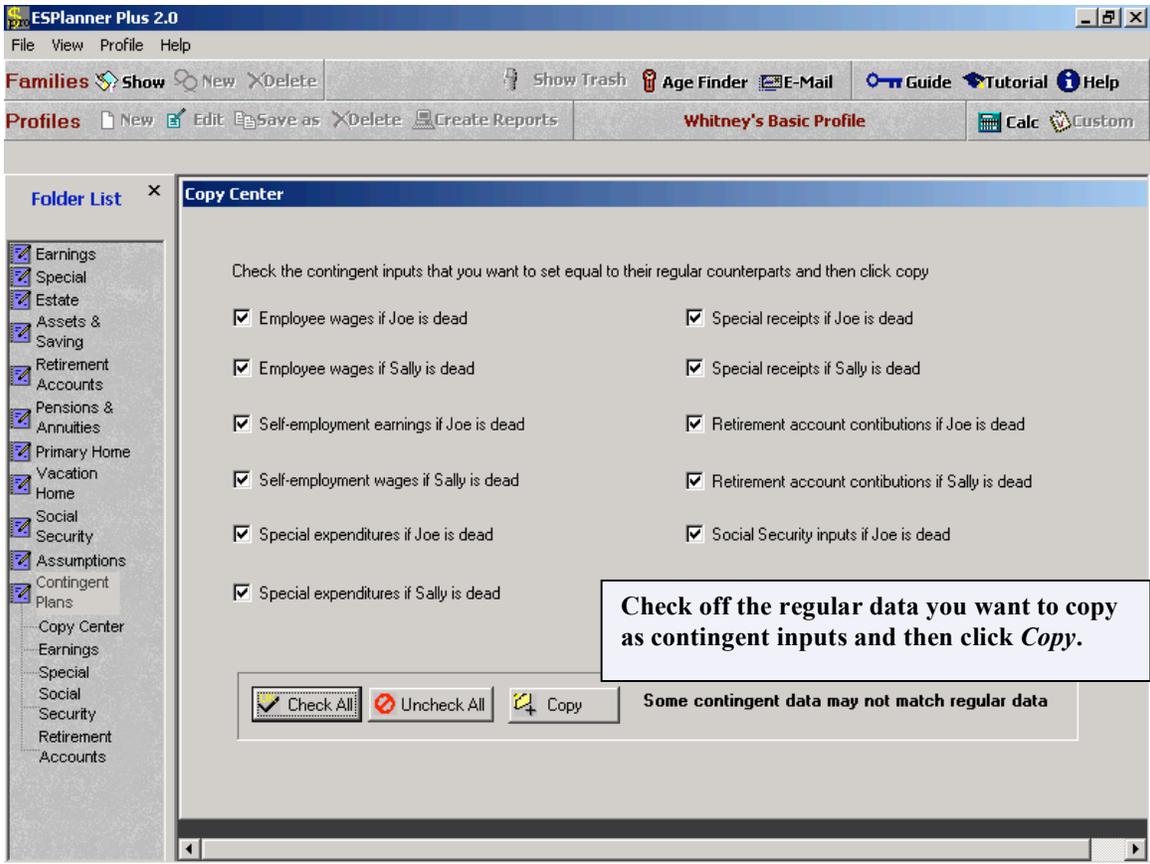
Since many of your family members' contingent plans may be the same as their regular plans, the program permits you to copy their respective regular plans into the contingent planning input fields. This can be done by opening the *Copy Center* folder, checking off what regular inputs you'd like to copy to their contingent counterparts, and then clicking *Copy*.

If you are running contingent planning (have activated contingent planning), it's very important to bear in mind that most contingent entries, such as contingent future earnings, will be zero unless you enter alternative values. If, for example, you don't tell the program that Sally will have earnings if Joe dies, the program will assume she will have no earnings in that eventuality and recommend much more life insurance than is really needed.

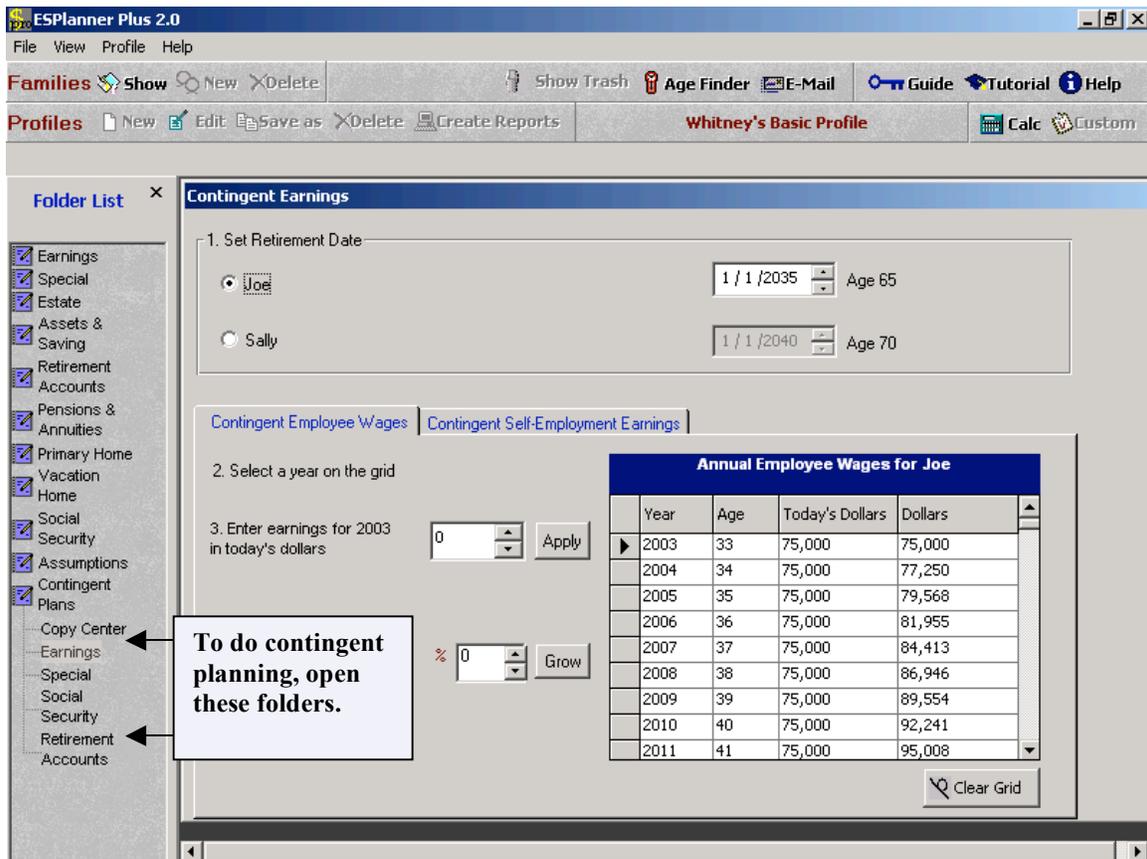
In this case, we copied all the inputs except Sally's earnings, her Social Security inputs, and her special expenditures if Joe dies. We then clicked first on *Social Security* and then on *Special* under *Contingent Planning* to enter the right covered earnings for Sally and the right nanny expenses in the event Joe dies.

The new results are a lot different from the previous results with respect to Joe's recommended life insurance holdings. The program was recommending that Joe purchase \$713,483 in life insurance. But now that it knows that Sally will double her earnings if Joe dies, it recommends that Joe purchase only \$2,133 in life insurance.

Using the Copy Center To Do Contingent Planning



Entering the Whitney's' Contingent Plans



The Whitneys Accumulate a Reserve Fund

Our next goal is to illustrate the use of the program's *Reserve Fund* option. Your family may want to hold some funds aside in case of an emergency. *ESPlanner's* Reserve Fund screen allows you to enter your family's current reserve fund as well as specify how it would like the fund to change through time. The program treats contributions to the fund like special expenditures and withdrawals from the fund like special receipts.

In the case of couples, whether married or partnered, when a spouse or partner passes away, the reserve fund is used by the surviving spouse/partner to finance her/his remaining lifetime consumption. If both spouses/partners die in the same year, the reserve fund is used to finance the bequests, funerals, and the living standards and other special expenses of surviving children. In the net worth charts in which one spouse will outlive the other (if both live to their maximum ages of life), the reserve fund ends in the year the longer-lived spouse becomes a widow or widower for sure.

To enter Reserve Fund data in the Whitneys' basic plan, we clicked *Special* on the Input Folder List, and then clicked *Reserve Fund*. In the screen shot below we assumed in step 1 that the Whitney's current reserve fund is \$10,000. In step 2 we assumed that they earn 6 percent nominal rate of return (rate of return

before inflation) on the fund. In Step 3 we specified that the Whitneys want to have a \$13,000 fund (valued in today's dollars) at the end of the current year. In step 4 we assumed that 30 percent of the funds income would be used to cover taxes. In step 5, we grew the fund by 5 percent per year. Finally, in step 6 we specified that fund income is taxable.

When we run the Whitneys' basic plan, but with these reserve fund information entered, recommended consumption in the current year falls from \$50,120 to \$47,270. The reserve fund assets now show up in the Net Worth Report, and net contributions to the reserve fund now show up in the Spending Report.

The Whitneys Have Retirement Accounts

Next let's give the Whitneys current retirement account assets and assume they contribute over time to retirement accounts. As the next four screen shots indicate, the program allows you to specify current holdings in and future contributions to employer accounts, individual deductible accounts, and Roth IRA accounts.

You can also tell the program when family members will stop contributing to these accounts, how much they will contribute each year, when they will start and stop withdrawing their retirement account assets, the fraction of their retirement account balances that will be converted to annuities at the initial date of withdrawal, the type of annuity they will choose, and the order in which non-annuitized account balances will be withdrawn.

The fifth screen shot in this section shows Joe's *Retirement Account Report*, which tracks the evolution of Joe's retirement account assets, including his and his employer's contributions to his accounts as well as his withdrawals from his accounts. Like the regular asset report, the retirement account reports zero out at the end showing you that all the funds and income earned on the accounts are used by *ESPlanner* for meeting recommended consumption and other expenditures.

You can run your family's plan with different retirement account contribution levels, different degrees of annuitization, different retirement account withdrawal dates and withdrawal orderings, different annuity designs, etc. Each time you run the program, check the resulting living standard generated by the program. Since the goal is to maximize your family's living standard, you'll quickly be able to determine how retirement accounts can help you meet that goal.

The Whitneys Accumulate a Reserve Fund

The screenshot shows the 'Special' tab in ESPlanner Plus 2.0. The 'Reserve Fund' sub-tab is active. On the left, there are input fields for:

- 1. Fund's value at end of last year: 10000
- 2. Desired fund in today's dollars at end of 2003: 13000
- 3. Fund's nominal rate of return: 6%
- 4. Click another year in the grid and enter desired fund or grow the fund in real terms at rate: 2%
- 5. Percentage share of fund income to be spent on taxes: 30%
- 6. Check if reserve fund income is taxable:

 On the right, a table titled 'Reserve Fund' displays the following data:

Year	Reserve Fund Today's Dollars	Reserve Fund Dollars	Net Contribution Today's Dollars	Net Contribution Dollars
2003	13,000	13,000	2,883	2,883
2004	13,260	13,658	109	112
2005	13,525	14,349	111	117
2006	13,796	15,075	113	123
2007	14,072	15,838	115	130
2008	14,353	16,639	117	136
2009	14,640	17,481	120	143
2010	14,933	18,366	122	150
2011	15,232	19,295	125	158
2012	15,536	20,271	127	166
2013	15,847	21,297	130	174
2014	16,164	22,375	132	183
2015	16,487	23,507	135	192
2016	16,817	24,696	138	202
2017	17,153	25,946	140	212
2018	17,496	27,259	143	223

The Whitneys' Retirement Account Assets

The screenshot shows the 'Retirement Accounts' tab in ESPlanner Plus 2.0. The 'Assets' sub-tab is active. The interface is divided into 'Individual Deductible Accounts' and 'Employer Accounts' for two individuals, Joe and Sally.

Account Type	Joe	Sally
401(k), 403(b), & Other Defined Contributions Accounts	20000	17000
Keogh and SEP Plans	0	0
IRAs	2500	3000
Supplemental Retirement Accounts	0	0
Employer Accounts	15000	10500
Roth IRAs	2000	750

The Whitneys Contribute to Retirement Accounts

Retirement Accounts Contributions

1. Choose
 Joe
 Sally

2. Joe's age at last contribution: 59
 Sally's age at last contribution: 59

3. Select
 Individual deductible contribution
 Employer's contribution
 Roth IRA contribution

4. Enter contribution for 2003 in today's dollars: 1000 [Apply]

5. Click on another year in the grid and enter contribution, or

6. Specify annual real percentage growth in contributions starting in 2003: 0 [Grow]

Year	Age	Individual	Employer	Roth IRA
2003	28	2,000	1,500	1,000
2004	29	2,000	1,500	1,000
2005	30	2,000	1,500	1,000
2006	31	2,000	1,500	1,000
2007	32	2,000	1,500	1,000
2008	33	2,000	1,500	1,000
2009	34	2,000	1,500	1,000
2010	35	2,000	1,500	1,000
2011	36	2,000	1,500	1,000
2012	37	2,000	1,500	1,000
2013	38	2,000	1,500	1,000
2014	39	2,000	1,500	1,000
2015	40	2,000	1,500	1,000
2016	41	2,000	1,500	1,000

To change the year, select that row from the grid

The Whitneys Choose How to Withdraw their Retirement Accounts Assets

Retirement Accounts Withdrawals

1. Select age at first withdrawal: Joe 60, Sally 65

2. Select age at last withdrawal: Joe 95, Sally 95

3. Specify percent of assets to be annuitized (%): Joe 50, Sally 100

4. Specify percent of non-annuitized assets to be spent * %: Joe 80, Sally 100

Joe's Withdrawal Order

- Individual Deductible Accounts
- Employer Accounts
- Roth IRA's

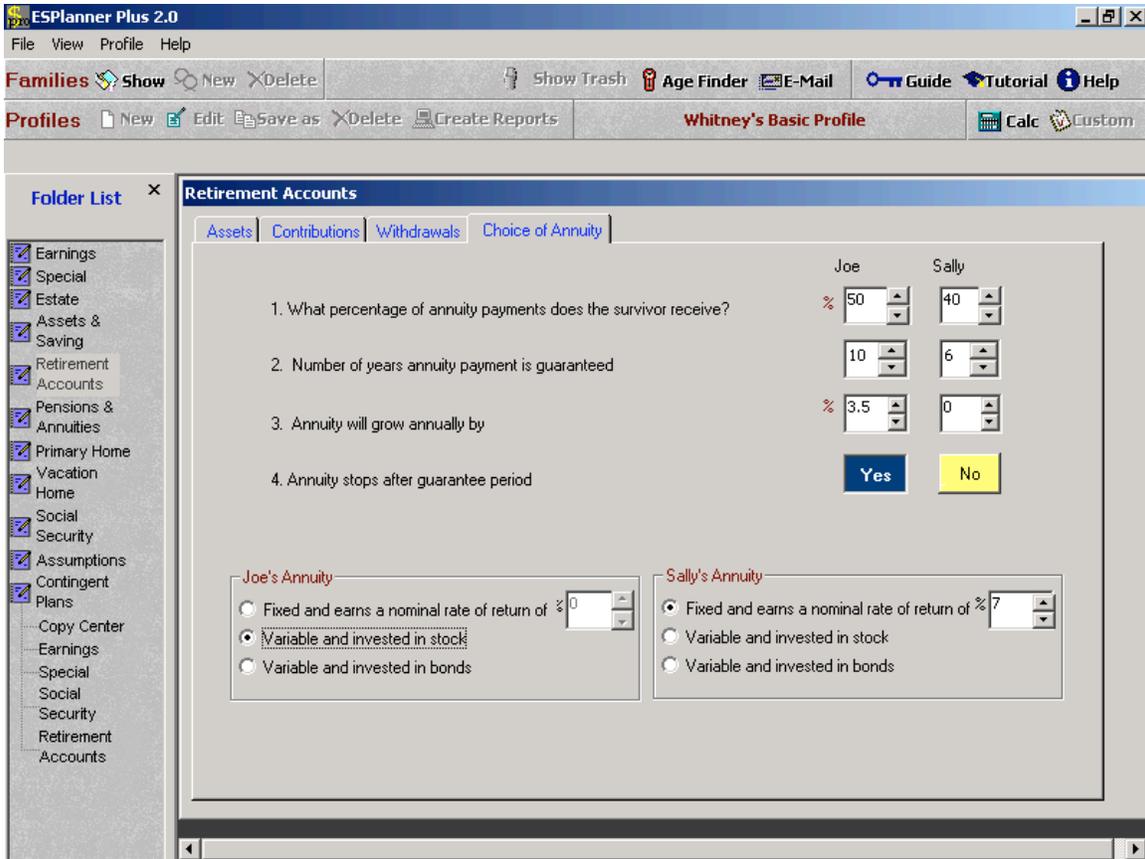
Sally's Withdrawal Order

- Individual Deductible Accounts
- Roth IRA's
- Employer Accounts

5. To change the order of withdrawal, select the item you want to move and click the UP or DOWN arrow on the corresponding list.

* These assets will be withdrawn smoothly and the remainder will be saved to extent permitted by minimum distribution requirements.

The Whitneys Design their Retirement Account Annuities



The Evolution of Joe's Retirement Account

Joe's Retirement Accounts										
Year	Joe's Age	Retirement Account Asset Income	Employee Contributions	Employer Contributions	Contributions to ROTH IRA	Withdrawals	Retirement Account Saving	Retirement Account Assets	Retirement Account Annuity	
2047	77	3,161	0	0	0	7,518	(4,357)	104,161	3,252	
2048	78	3,034	0	0	0	7,518	(4,484)	99,677	3,283	
2049	79	2,903	0	0	0	7,518	(4,615)	95,063	3,315	
2050	80	2,769	0	0	0	7,518	(4,749)	90,314	3,347	
2051	81	2,631	0	0	0	7,518	(4,887)	85,427	3,380	
2052	82	2,488	0	0	0	7,518	(5,030)	80,398	3,413	
2053	83	2,342	0	0	0	7,518	(5,176)	75,222	3,446	
2054	84	2,191	0	0	0	7,518	(5,327)	69,895	3,479	
2055	85	2,036	0	0	0	7,518	(5,482)	64,413	3,513	
2056	86	1,876	0	0	0	7,518	(5,642)	58,772	3,547	
2057	87	1,712	0	0	0	7,518	(5,806)	52,966	3,582	
2058	88	1,543	0	0	0	7,518	(5,975)	46,991	3,616	
2059	89	1,369	0	0	0	7,518	(6,149)	40,842	3,651	
2060	90	1,190	0	0	0	7,518	(6,328)	34,514	3,687	
2061	91	1,005	0	0	0	7,518	(6,513)	28,002	3,723	
2062	92	816	0	0	0	7,518	(6,702)	21,300	3,759	
2063	93	620	0	0	0	7,518	(6,898)	14,403	3,795	
2064	94	420	0	0	0	7,518	(7,098)	7,305	3,832	
2065	95	213	0	0	0	7,518	(7,305)	0	3,869	

Joe and Sally Expect to Receive a Very Large Inheritance

Let's now assume that Joe and Sally expect to receive a very large inheritance, say \$5 million, but not for 10 years. Since they are unable to borrow against this future receipt, the couple is strapped for cash or, in the language of economists, borrowing or liquidity constrained and cannot enjoy as high a living standard in the next 10 years as they will thereafter.

ESPlanner deals with borrowing constraints by generating the smoothest living standard path for your family without putting it into debt or, if it is able to borrow, without putting it into more debt than the borrowing limit specified in the Economic Assumptions folder.

We enter Joe's and Sally's expected inheritance in the *Special Receipts* screen in the *Special* input folder. The spending report for this case is shown below. As you can see, recommended consumption jumps dramatically in 2013 when the couple receives their inheritance. Recommended saving jumps as well since the couple saves the vast majority of what it inherits in order to enjoy a higher living standard in future years as well. Note also that in the ten years prior to receiving an inheritance, the program smoothes the

couple's living standard as well. This is a key feature of *ESPlanner's* consumption smoothing. *ESPlanner* not only smoothes your family's living standard over its entire life cycle to the maximum extent possible given its borrowing limits, it also smoothes your family's living standard during each sub interval of its life cycle.

Recommended Consumption When Joe and Sally Inherit

Year	Joe's Age	Sally's Age	Total Spending								
			Consumption	Special Expenditures	Net Contributions to Reserve Fund	Housing Expenditures	Joe's Retirement Account Contributions	Sally's Retirement Account Contributions	Excess Funerals and Bequests	Life Insurance Premiums	Total Spending
2003	33	28	74,581	0	0	28,801	0	0	0	0	103,382
2004	34	29	74,581	0	0	28,122	0	0	0	0	102,703
2005	35	30	87,199	0	0	27,463	0	0	0	0	114,662
2006	36	31	87,199	0	0	26,824	0	0	0	0	114,023
2007	37	32	87,199	0	0	26,203	0	0	0	0	113,402
2008	38	33	87,199	0	0	25,600	0	0	0	0	112,799
2009	39	34	87,199	0	0	25,014	0	0	0	0	112,213
2010	40	35	87,199	0	0	24,446	0	0	5	5	111,650
2011	41	36	88,930	0	0	23,894	0	0	38	38	112,862
2012	42	37	88,930	0	0	23,358	0	0	78	78	112,366
2013	43	38	313,635	0	0	22,838	0	0	0	0	336,473
2014	44	39	313,635	0	0	22,333	0	0	0	0	335,968
2015	45	40	313,635	0	0	21,843	0	0	0	0	335,478
2016	46	41	313,635	0	0	21,367	0	0	0	0	335,002
2017	47	42	263,023	35,000	0	20,905	0	0	0	0	318,934
2018	48	43	269,596	35,000	0	20,456	0	0	0	0	325,052
2019	49	44	269,596	35,000	0	20,020	0	0	0	0	324,616
2020	50	45	269,596	35,000	0	19,597	0	0	0	0	324,193
2021	51	46	269,596	0	0	19,187	0	0	0	0	288,783

Asset Accumulation When Joe and Sally Inherit

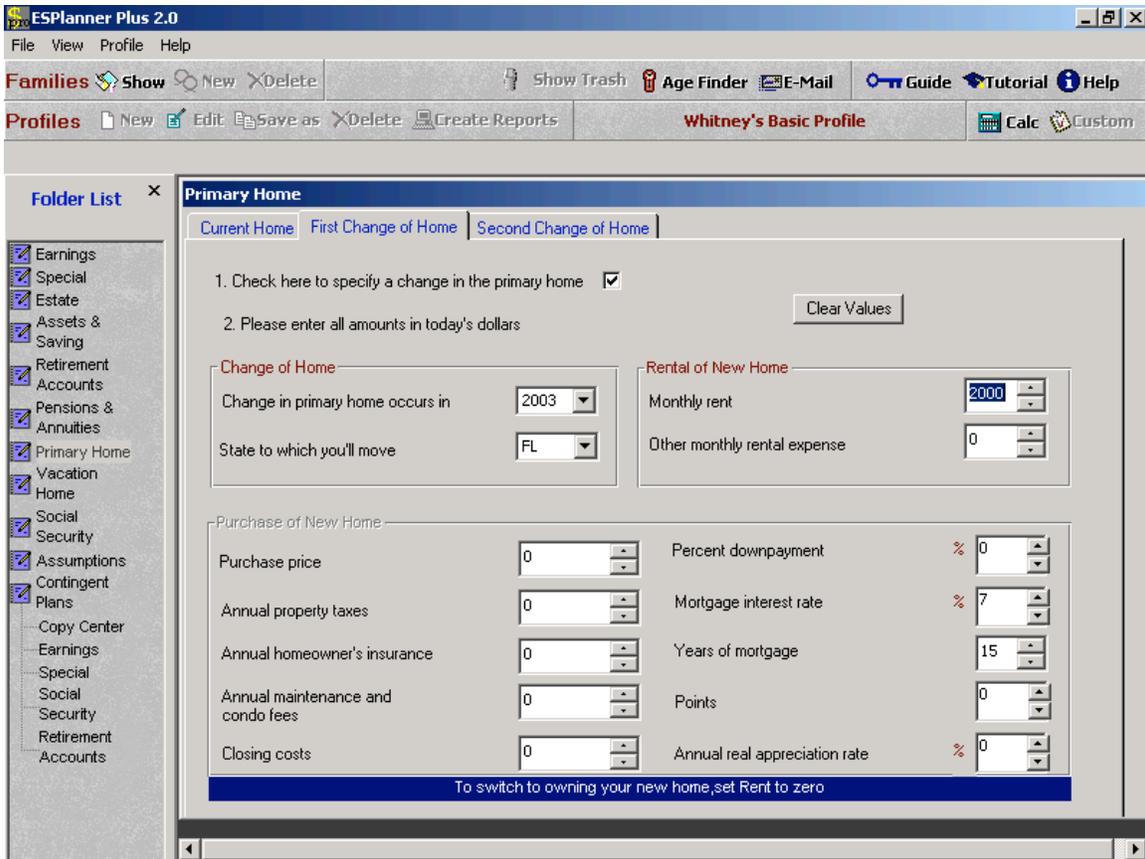
Year	Joe's Age	Sally's Age	Regular Assets				
			Total Income	Total Spending	Taxes	Saving	Regular Assets
2003	33	28	138,000	103,382	38,679	(4,061)	98,939
2004	34	29	138,932	102,703	39,217	(2,989)	95,951
2005	35	30	139,926	114,662	39,769	(14,505)	81,446
2006	36	31	140,618	114,023	40,166	(13,571)	67,875
2007	37	32	141,370	113,401	40,616	(12,648)	55,226
2008	38	33	142,183	112,799	41,151	(11,766)	43,460
2009	39	34	143,058	112,213	41,299	(10,445)	33,016
2010	40	35	142,754	111,650	41,140	(10,036)	22,979
2011	41	36	142,461	112,862	41,161	(11,562)	11,417
2012	42	37	142,125	112,366	41,176	(11,417)	0
2013	43	38	10,141,792	336,473	41,218	9,764,101	9,764,101
2014	44	39	426,183	335,968	276,138	(185,923)	9,578,178
2015	45	40	420,768	335,478	302,906	(217,616)	9,360,561
2016	46	41	414,430	335,002	297,527	(218,099)	9,142,463
2017	47	42	408,077	318,933	293,015	(203,871)	8,938,592
2018	48	43	402,139	325,052	287,918	(210,830)	8,727,762
2019	49	44	395,999	324,616	282,452	(211,070)	8,516,692
2020	50	45	364,851	324,193	261,905	(221,247)	8,295,445
2021	51	46	358,407	288,782	256,086	(186,462)	8,108,984

The next screen shot shows the couple's regular assets before and after receiving the inheritance. Note that the couple runs their regular assets down to zero prior to 2013 and then accumulates assets thereafter. This makes sense. Why save for years after 2013 when you know you'll be receiving a huge windfall.

Joe and Sally Downsize and Retire in Florida

The next screen shot shows how we tell the program that Joe and Sally intend to sell their Oklahoma home, move to Florida, and rent when Joe reaches age 65. We access this screen by clicking on the housing folder and then selecting the "First Change of Home" tab.

Joe and Sally Move to Florida



Interestingly enough, this move actually lowers Joe's and Sally's living standard. Their recommended 2003 consumption declines from \$50,120 to \$46,312. The reason is that paying \$2000 per month in rent for 35 years more than eats up the equity they pull out of their home by selling their home. So, even though Joe and Sally thought they were downsizing, they actually ended up upsizing with respect to

overall long-term housing expenditures. The housing report, copied below, shows what happens to their housing expenditures from this move.

The Impact on Joe and Sally of “Downsizing” their Home

Housing												
Year	Joe's Age	Sally's Age	Rent & Rental Expenses	Mortgage	Property Tax	Maintenance and Condo Fees	Homeowner's Insurance	Net Home Purchases	Housing Expenditures	Mortgage Balance	Home Equity	
2024	54	49	0	0	3,000	0	2,500	0	5,500	0	300,000	
2025	55	50	0	0	3,000	0	2,500	0	5,500	0	300,000	
2026	56	51	0	0	3,000	0	2,500	0	5,500	0	300,000	
2027	57	52	0	0	3,000	0	2,500	0	5,500	0	300,000	
2028	58	53	0	0	3,000	0	2,500	0	5,500	0	300,000	
2029	59	54	0	0	3,000	0	2,500	0	5,500	0	300,000	
2030	60	55	0	0	3,000	0	2,500	0	5,500	0	300,000	
2031	61	56	0	0	3,000	0	2,500	0	5,500	0	300,000	
2032	62	57	0	0	3,000	0	2,500	0	5,500	0	300,000	
2033	63	58	0	0	3,000	0	2,500	0	5,500	0	300,000	
2034	64	59	0	0	3,000	0	2,500	0	5,500	0	300,000	
2035	65	60	0	0	3,000	0	2,500	282,000	(276,500)	0	0	
2036	66	61	24,000	0	0	0	0	0	24,000	0	0	
2037	67	62	24,000	0	0	0	0	0	24,000	0	0	
2038	68	63	24,000	0	0	0	0	0	24,000	0	0	
2039	69	64	24,000	0	0	0	0	0	24,000	0	0	
2040	70	65	24,000	0	0	0	0	0	24,000	0	0	
2041	71	66	24,000	0	0	0	0	0	24,000	0	0	
2042	72	67	24,000	0	0	0	0	0	24,000	0	0	

Joe and Sally Run Monte Carlo Simulations

The next three screen shots help you understand how to run Monte Carlo simulations assuming you have a) purchased *ESPlannerPlus* and b) activated Monte Carlo on the Family Information screen.

The program’s Monte Carlo calculations begin with a dynamic program that determines how much the household should consume each period given all the different levels of regular and retirement account assets it could possibly have in that period. This dynamic program takes into account that higher (lower) regular and retirement account asset levels mean higher (lower) taxes (depending on the year in question).

The dynamic program assumes that households, at any point in time, will base their consumption decision on *ESPlanner’s* recommendation. Once this set of *consumption functions* (one for each future period) is generated, the program randomly selects 500 time paths of annual asset returns. Each time path of returns

is then used in conjunction with the family's portfolio choices to figure out what rate of return the household will earn each period on its regular and retirement account portfolios.

For each of the 500 time paths of portfolio returns, the Monte Carlo simulations begin by using the household's initial regular and retirement account asset levels (the initial *state variables*) to determine, based on the initial period consumption function, how much the household should consume in that period. This decision, in turn, determines how much the household saves and, given the portfolio returns, how much regular and retirement account assets the household will have at the beginning of the second period. These second-period asset levels are then inputted into the second-period consumption function to determine second-period consumption, and so on. The simulation proceeds in this manner through the last period a household member could be alive.

In the process of calculating the entire time path or *trajectory* of consumption associated with each of the 500 time paths of randomly drawn returns, we also determine the associated time paths of retirement and regular asset levels, income levels, saving levels, etc. After each of the 500 trajectories of all variables has been determined, we do two things. First, we show the percentile distribution of outcomes for the household's living standard, income, and asset levels in each future year. Second, we rank the 500 trajectories based on the present value of consumption and display the trajectories for the household's living standard, income, and asset positions associated with the fifth lowest, 25th lowest, 50th lowest, 75th lowest, and 95th lowest present values of consumption. We refer to these as lowest, low, middle, high, and highest trajectories.

In the following two screen shots we assume that Joe and Sally have a favorite stock, XYZ Corp., and show you how to enter that asset in the first, *Build Portfolio*, screen of the Monte Carlo folder. In the second of these two screen shots, we renamed Portfolio 2 as "Hot Tip," we removed the non-cash assets from the Hot Tip portfolio, and then selected XYZ Corp. from the asset grid. Next, we set the asset percentage at 50 percent, and then used the *Add* button to add XYZ Corp. to the Hot Tip portfolio. Then we selected large cap stocks and added 50 percent holdings of that asset as well to the Hot Tip portfolio.

We next renamed Portfolios 3 and 4 to "Play It Safe" and "U.S. Stocks" and then used the *Remove* and *Add* buttons to define those portfolios as consisting, respectively, of 100 percent inflation-indexed bonds and 100 percent in large cap U.S. equity. Finally, as the next screen shot shows, we told the program that through 2040 the couple wants to a) hold only its Hot Tip portfolio when it comes to its regular assets, b) hold only its Play It Safe portfolio in Joe's retirement account and c) hold its U.S. Stocks portfolio in Sally's retirement accounts for 10 years and then switch to Play It Safe. After 2040, the couple wants to hold only the Play It Safe portfolio.

The next three screen shots show examples of the Monte Carlo reports. In this run, we've given Joe and Sally \$50,000 in initial retirement account assets and assumed no future contributions. The first of the

three screen shots show the percentile distribution of the couple's living standard each year as they age. The second shows very low, low, middle, high, and very high trajectories of the couple's total income. The third shows a tabular display of the percentile distribution of the couple's regular assets.

Once you consider these results, you may want to adjust your portfolio decisions. Note that in the case we present, once Joe and Sally switch in 2040 to the Play It Safe portfolio, their income trajectories show no variability from one period to the next. This illustrates that the program can be used to deliver different degrees of income, asset, and living standard variability when young and when old.

Entering Joe's and Sally's Own Asset

The screenshot shows the ESPlanner Plus 2.0 Monte Carlo interface. A dialog box titled "Define a new asset" is open, with the following steps and inputs:

1. Enter a short name for this asset:
2. Specify expected nominal rate of return (%):
3. Specify the variance of this assets return relative to that of diversified stock:

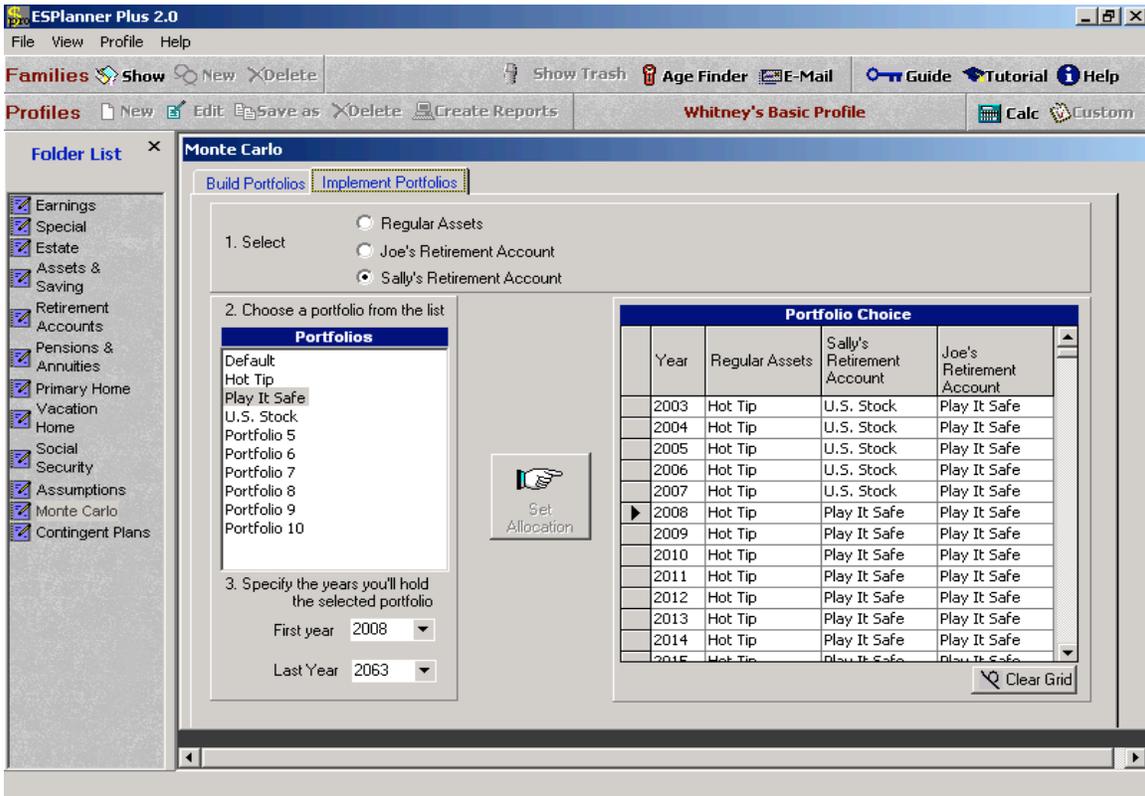
Buttons at the bottom of the dialog include "Add New Asset" and "Close". Below the dialog, a callout box points to the "New" button with the text: "To enter your own assets, click New."

Establishing a Portfolio with 100 Percent XYZ Corp.

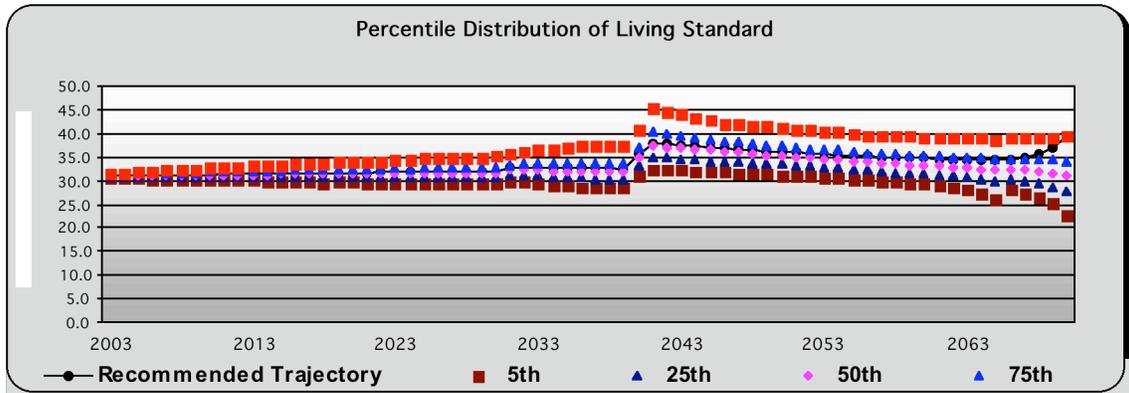
The screenshot shows the ESPlanner Plus 2.0 Monte Carlo interface. The "Default" portfolio is being configured. The "Large cap stocks" asset is selected with a share of 50%. The "XYZ Corp." asset is also selected with a share of 50%. The "Default" table shows the asset allocation:

Default			
Asset	Share	Av. R...	Risk
Cash	0%	-2.96%	4.5%
XYZ Corp.	50%	3.88%	67.0%
Large cap stocks	50%	6.95%	100.0%

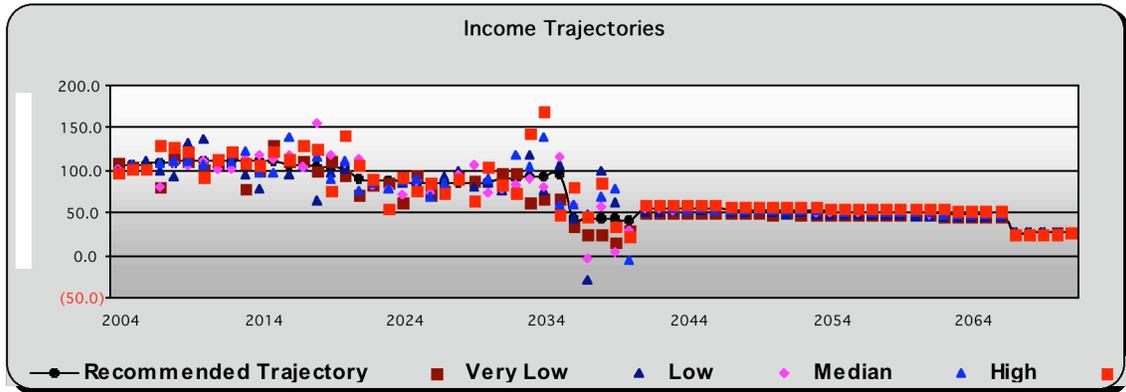
Implementing Joe's and Sally's Portfolios



The Annual Variability in Joe's and Sally's Living Standard



Illustrating Alternative Income Trajectories



The Percentile Distribution of Joe's and Sally's Regular Assets

Microsoft Excel - Whitney_Basic Profile_MonteCarlo_report2461										
File Edit View Insert Format Tools Data Window Help										
AD60 =										
1	Year	Joe's Age	Sally's Age	Recommended Trajectory	Percentile Distribution of Regular Assets					
					5th	25th	50th	75th	95th	
2										
3	2,003	33	28	118,688	104,605	111,975	116,393	122,068	129,468	
4	2,004	34	29	135,993	115,682	125,339	132,256	140,827	152,702	
5	2,005	35	30	144,477	118,907	130,623	138,808	150,375	166,773	
6	2,006	36	31	154,293	120,788	136,101	147,614	160,375	179,231	
7	2,007	37	32	165,465	123,455	145,471	157,735	171,239	199,186	
8	2,008	38	33	178,069	136,377	155,330	169,785	186,543	212,224	
9	2,009	39	34	192,120	146,597	165,757	182,473	199,992	229,247	
10	2,010	40	35	206,876	159,901	179,538	196,201	216,304	253,683	
11	2,011	41	36	220,883	169,057	191,991	209,431	233,754	274,249	
12	2,012	42	37	235,453	180,363	202,806	224,429	249,170	288,668	
13	2,013	43	38	250,564	191,699	216,504	238,361	264,734	308,208	
14	2,014	44	39	266,188	199,995	229,905	251,825	283,004	329,194	
15	2,015	45	40	276,574	203,687	235,659	260,737	297,259	347,463	
16	2,016	46	41	287,125	209,865	244,096	272,459	308,891	365,659	
17	2,017	47	42	273,680	190,501	228,355	257,484	299,489	356,526	
18	2,018	48	43	258,056	168,350	211,324	241,372	281,911	341,408	
19	2,019	49	44	241,669	149,836	191,641	226,530	267,709	339,001	
20	2,020	50	45	212,327	119,150	160,200	193,687	237,608	311,155	
21	2,021	51	46	216,933	118,385	163,090	196,914	241,354	311,807	