Financial Planning Tool

Sample Forecasts

Here are a couple of sample forecasts for a particular *dossier*. All growth assumptions are shown in the data. The image is zoomed out to highlight the three primary sections, which can roughly be thought similar to *Balance Sheet* (**Balance Sheet Items**), *Statement Of Cash Flow* (**Annual Details**), and *Income Statement* (**Cash Flows**). With any forecast there are a **tremendous** number of calculations, assumptions and details and this view contains some of that data important to understanding the forecast. This view is **not** intended to be the primary dashboard since there is too much information. But it is the place to see visually what is going on each year in the forecast. For this introduction it is not necessary to drill down into the details much, but if the viewing application supports zoom, zooming in can be useful.

item	Growth Item	Source	Growth Assumption	Realized Log-Ret	PV Final Year @ 3%	Initial	2019 (Age:66)	2020 (Age:67)	2021 (Age:68)	2022 (Age:69)	2023 (Age:70)	2024 (Age:71)	2025 (Age:72)	2026 (Age:73)	2027 (Age:74)	2028 (Age:75)	2029 (Age:76)	2030 (Age:77)	2031 (Age:78)	2032 (Age:79)	2033 (Age:80)	2034 (Age:81)	2035 (Age:82)	2036 (Age:83)	2037 (Age:84)	2038 (Age:85)	2039 (Age:86)	2040 (Age:87)
		Non Fin	encial Assets																									
House	2	plusauri	(μ=8%, σ=2.5%, π=5.989%)	6.278 %	\$853,500	\$415,000	\$389,373	\$421,255	\$444,446	\$453,715	\$483,781	\$509,050	\$564,501	\$807,954	\$653,671	\$709,102	\$764,676	\$785,113	\$807,033	\$850,533	\$919,806	\$955,134	\$1,035,433	\$1,172,370	1,274,972	\$1,385,202	\$1,489,102	31,661,346
Minivan		plusauri	(μ=-4%, σ=1%, π=-4.005%)	-4.215 %	\$4,089	\$20,000	\$18,497	\$17,836	\$16,995	\$16,304	\$15,500	\$15,035	ALL 000-						441.478	\$10,973	\$10,551	\$10,145	\$9,597	\$9,184	\$8,703	\$8,510	\$8,097	\$7,912
Toyota Carrry		plusauri	$(\mu = -4\%, \sigma = 1\%, \pi = -4.005\%)$	-4.062 %	\$2,119	\$10,000	\$9,494	\$9,166	\$8,786	\$8,489	\$7,990	\$7,719	>	Polo	-	Cho	at 14	lath		\$6,536	\$5,383	\$5,258	\$5,074	\$4,976	\$4,639	\$4,399	\$4,263	\$4,100
Paintings	٠	plusauri	(μ=3%, σ=1%, π=2.995%)	3.138 %	\$10,309	\$10,000	\$10,077	\$10,359	\$10,812	\$11,162	\$11,453	\$11,646		Dala	ince	Sile	etv	orun	5	16,667	\$16,918	\$16,526	\$16,793	\$17,378	\$18,196	\$18,751	\$19,146	\$19,946
Tractor	٠	plusauri	(μ=3%, σ=1%, π=2.995%)	2.475 %	\$1,604	\$1,800	\$1,822	\$1,860	\$1,900	\$1,955	\$1,993	\$2,027	\$2,099	-				_	4,410	\$2,483	\$2,562	\$2,840	\$2,701	\$2,778	\$2,836	\$2,881	\$2,990	\$3,102
		Finan	sial Assets																									
Brokerage Account : S&P Index Fund	# 2	plusauri	(μ=9.215%, σ=16.381%, π=7.874%)	6.456 %		\$67,222	\$50,989	\$64,608	\$64,156	\$60,614	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brokerage Account : High Yield Fund	=	plusauri	(μ=9.216%, σ=16.381%, π=7.874%)	7.693 %		\$20,110	\$15,917	\$15,171	\$16,461	\$14,407	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brokerage Account : TIPS	٠	plusouri	$\{\mu{=}4.768\%,\sigma{=}7.543\%,\pi{=}4.513\%\}$	5.218 %		\$54,169	\$48,467	\$48,467	\$48,467	\$48,467	\$47,187	\$47,187	\$47,187	\$35,112	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brokerage Account : Mid-Cap Fund	= 2	plusauri	(μ=12.227%, σ=17.012%, π=10.78%)	13.951 %		\$12,081	\$12,110	\$11,963	\$13,569	\$16,893	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brokerage Account : Emergency Fund	36	plusouri	(μ=3.5%, σ=2.5%, π=3.469%)	3.445 %		\$52,827	\$52,827	eco.007	050.007	e49.902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brokerage Account : Small-Cap Fund	=	plusauri	(μ=9.926%, σ=16.381%, π=8.584%)	8.121 %								-	\$2,946	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brokerage Account : US 10 Yr	٠	plusauri	$\{\mu{=}4.768\%,\sigma{=}7.143\%,\pi{=}4.513\%\}$	6.426 %	C	Ba	alanc	e St	neet	Hold	lings		\$16,297	\$16,297	-	-	-		-	-	-	-	-	-	-	-	-	-
Wife 401K(+) : EWG	•• 📈	plusauri	(μ=8.362%, σ=30%, π=3.862%)	-0.598 %							0	<u> </u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wife 401K(=	plusauri	(μ=9.215%, σ=16.381%, π=7.874%)	10.41 %		\$338,475	\$373,160	\$395,999	\$415,275	\$592,928	\$491,737	\$406,970	\$158,332	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash : CD 30 mo	35	plusauri	(μ=3.5%, σ=2.5%, π=3.469%)	3.021 %		\$16,076	\$14,753	\$14,763	\$14,753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Doughter College(+) : US Equity Fund	=	plusauri	(μ=9.216%, σ=26%, π=6.09%)	7.067 %		\$60,000	\$40,635	\$38,761	\$41,650	\$4,917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Luke College(?) : Developed Equity Fund	a Z	plusauri	(μ=8.362%, σ=30%, π=3.862%)	7.840 %	-	\$47,000	\$49,575	\$80,217	\$60,472	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Retirement(+) : US Equity	=	plusauri	(μ=9.215%, σ=25%, π=6.09%)	2.198 %	-	\$336,900	\$343,681	\$427,851	\$450,447	\$367,562	\$531,671	\$462,006	\$487,640	\$546,953	\$388,406	\$240,137	\$135,451	-	-	-	-	-	-	-	-	-	-	-
				Net Worth	\$1400 570	\$1501450	61 476 197	e1 632 410	t1 734 000 (1 866 097	e1 610 602 ·	003 004 10	et 312 747	e1 241 010	\$1057190	6084.002	0024 017	\$768 713	0038 510	\$520,706	6411 071	\$250.020	602 315	(22.0.42)	12101241 1	1445.0991	1000 75 20	e(001 110)
-	-	-	-		3(100,070)	\$1,001,400	81,470,187	a 1,0 a 2,4 10	art, rait, and a	\$1,000,087	a (ano, ao a	a),480,283	a1,312,747	81,241,910	81,000,180	****,093	1034,017	8706,718	\$030,319	3020,700	4411,471	\$200,920	692,810	ataa,044a)	F(210,120) 1	feed/ceep.	Construction -	#(001,110)
		Annu	al Details																									
-	-	-	-	Sheltered Qualified Divs			\$558	\$491	\$788	\$1,188	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Sheltered Unqualified Diva			\$121	\$129	\$207	\$313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Sheltered Cap Gain Dist			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Sheltered Interest			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-				Qualified Divs			\$1,815	\$1,492	\$1,611	\$1,563	\$1,413	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Unqualified Divs			\$296	\$289	\$322	\$312	\$277	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- (^	nnun			Cap Gain Dist			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
. (A	nnua	Dei	alis	Interest			\$1,363	\$4,702	\$8,226	\$6,691	\$4,952	\$2,731	\$3,807	\$3,060	\$7,805	-	-	-	-	-	-	-	-	-	-	-	-	-
				Reinvested			\$1,055	\$1,387	\$1,545	\$1,497	\$1,328	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-				Disbursed			\$1,819	\$5,095	\$8,614	\$7,069	\$5,314	\$2,731	\$3,807	\$3,060	\$7,805	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Passive Income			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Ordinary Income							\$38,933	\$41,752	\$34,481	\$29,593	\$21,389	\$17,190	\$13,191	\$4,667										
-		-		Sheltered Long Term Cap Gains			-	-	-	\$26,457	\$13,343	\$112,004	\$103,129	\$83,222	\$61,069	\$72,213	\$86,945	\$39,582	-	-	-	-	-		-	-	-	-
-	-	-	-	Required Min Dist			-	-	-	-	\$38,933	\$41,752	\$34,481	\$29,693	\$21,389	\$17,190	\$13,191	\$4,667	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Long Term Cap Gains			-	-	-	\$17,613	\$41,498	-	-	\$16,115	\$35,112	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Prior Losses Available			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Losses Offsetting Gains			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Losses Offsetting Ord Inc			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Remaining Losses			-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
-	-	-	-	Total Inflows			\$119,253	\$131,834	\$139,784	\$43,213	\$10,316	\$2,731	\$3,807	\$3,060	\$7,805	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-		Tax Bill			\$(21,854)	\$(21,854)	\$(24,907)	\$(28,490)	-	\$(1,710)	\$(1,660)	\$(955)	\$(305)	-	-		-	-	-	-	-	-	-	-	-	-
-	-	-	-	Marginal Rate			22.00%	22.00%	22.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
-	-	-	-	Effective Rate			19.19%	18.78%	18.88%	-	1.96%	3.73%	2.50%	0.62%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	Total Outflows			\$(126,956)	\$(120,676)	\$(135,815)	\$(174,372)	\$(150,982)	\$(108,424)	\$(206,088)	\$(173,677) 1	\$(178,487)	\$(136,315)	\$(141,568)	\$(145,514) \$	(149,983)	\$(143,173)	\$(149,495) :	\$(154,202)	\$(180,961) \$	(186,842) 1	(191,646)	\$(107,317)	(203,838) 5	4(214,425)
-	-	-	-	Net Flows			\$(7,703)	\$2,167	\$3,970	\$(131,160)	\$(140,888)	\$(105,603)	\$(202,259)	\$(170,516)	\$(170,681)	\$(136,315)	\$(141,568)	\$(145,514) \$	(140,083)	\$(143,173)	\$(149,495)	\$(154,202)	\$(180,961) \$	186,842)	(191,646)	\$(107,317)	(203,638)	J(214,425)
-	-	-		Remaining Shortfall			-	-	-	-	-	-	-	-	-	-	-	\$51,244	\$205,219	\$364,375	\$542,249	\$738,774	\$977,273 \$	\$1,240,229 \$	1,528,470	81,844,830	\$2,192,351 \$	2,577,528
		Cas	n Flows																									
Flow	Growth Item	Assumptio	Growth Assumption	Realized Log-Ret	PV Sum @ 3%	Initial	2019 (Age:66)	2020 (Age:67)	2021 (Age:68)	2022 (Age:69)	2023 (Age:70)	2024 (Age:71)	2025 (Age:72)	2026 (Age:73)	2027 (Age:74)	2028 (Age:75)	2020				2033	2034	2035 (Age:82)	2036 (Age:83)	2037 (Age:84)	2038 (Age:85)	2039 (Age:86)	2040 (Age:87)
Ded Job	~	plusauri	(μ=3%, σ=2%, π=2.98%)	3.424 %	\$361,741	\$110,000.+	\$116,755	\$126,118	\$130,176	-	-	-		-	-	1		Car		-		1	-	-	-	-	-	
Cost of Living	٠	plusauri	(μ=3%, σ=1%, π=2.995%)	3.048 %	\$(2,144,864)	\$95,000:4	\$(97,888)	\$(100,316)	\$(103,200)	\$(105,265)	\$(107,427)	\$(111,734)	\$(116,417)	\$(120,401)	\$(123,780)	5(12		Cas	n FI	ows			\$(161,940) \$	s(166,457) s	(169,870)	\$(172,827)	\$(176,457) \$	3(185,044)
Health Core	8	plusauri	(μ=7.68%, σ=2.6%, π=7.649%)	7.822 %	\$(81,226)	\$4,800:4	-	-	-	-	-	-	-	-	-	>						1.	\$(19,021)	\$(20,385)	\$(21,776)	\$(24,490)	\$(27,381)	\$(29,381)
Son	*	plusauri	(μ=4.44%, σ=2%, π=4.42%)	4.303 %	\$(120,677)	\$30,000:4	-	-	-	\$(34,643)	\$(35,373)	\$(37,082)	\$(37,864)	-	-	-	-			-	-	-	-	-	-	-	-	-
Doughter	*	plusouri	(μ=4.44%, σ=2%, π=4.42%)	4.067 %	\$(138,192)	\$30,000:4	-	-	-	-	-	\$(30,343)	\$(41,094)	\$(42,910)	\$(44,777)	-	-	-	-	-	-	-	-	-	-	-	-	
Travel	٠	plusauri	(μ=3%, σ=1%, π=2.995%)	3.301 %	\$(97,771)	\$7,001:4	\$(7,214)	\$(7,506)	\$(7,708)	\$(7,974)	\$(8,182)	\$(8,666)	\$(0,031)	\$(9,310)	\$(9,626)	\$(10,110)	\$(10,674)	\$(10,955)	\$(11,491)	-	-	-	-	-	-	-	-	-

Figure 1. Screenshot of Sample Forecast (Run out of Money)

The Balance Sheet Section

	I	Balances	Sheet Items										
Item	Growth Item	Assumption Source	Growth Assumption	Realized Log-Re	PV Final Year @ 3%	Initial	2019 (Age:66)	2020 (Age:67)	2021 (Age:68)	2022 (Age:69)	2023 (Age:70)	2024 (Age:71)	2025 (Age:72)
		Non Final	ncial Assets										
House		plusauri	(μ=6%, σ=2.5%, π=5.969%)	6.278 %	\$853,500	PV of F	inal Value	21,255	\$444,446	\$453,715	\$483,781	\$509,050	\$564,501
Minivan	<i></i>	plusauri	(μ=-4%, σ=1%, π=-4.005%)	-4.215 %	\$4,089	200	\$18,497	\$17,836	\$16.00	Appual Bala	200	\$15,035	\$14,626
Toyota Camry Whose Assumption	otions?	plusauri	(μ=-4%, σ=1%, π=-4.005%)	-4.052 %	\$2,119	\$10,000	\$9,494	\$9,156	\$	Annual Bala	nces	\$7,719	\$7,313
Paintings	~	plusauri	(μ=3%, σ=1%, π=2.995%)	with Assumptions 3.138 %	\$10,309	\$10,000	\$10,077	\$10,359	\$10,812	\$11,162	\$11,453	\$11,646	\$11,832
Tractor	٠	plusauri	(μ=3%, σ=1%, π=2.995%)	2.475 %	\$1,604	\$1,800	\$1,822	\$1,860	\$1,900	\$1,955	\$1,993	\$2,027	\$2,072
		Financi	al Assets										
Brokerage Account : S&P Index Fund	=	plusauri	(μ=9.215%, σ=16.381%, π=7.874%)	6.456 %		\$67,222	\$50,989	\$64,608	\$64,156	\$60,614	-	-	-
Brokerage Account : High Yield Fund	= 📈	plusauri	(μ=9.215%, σ=16.381%, π=7.874%)	7.593 %		\$20,110	\$15,917	\$15,171	\$15,451	\$14,407	-	-	-
Brokerage Account : TIPS	٠	plusauri	(µ=4.768%, σ =7.143%, π =4.513%)	5.218 %		\$54,169	\$48,467	\$48,467	\$48,467	\$48,467	\$47,187	\$47,187	\$47,187
Brokerage Account : Mid-Cap Fund	💷 📈	plusauri	(μ=12.227%, σ=17.012%, π=10.78	Growth Assumptions 61%		\$12,081	\$12,110	\$11,963	\$13,569	\$16,893	-	-	-
Brokerage Account : Emergency Fund	*	plusauri	(μ=3.5%, σ=2.5%, π=3.469%)	3.445 %		\$52,827	\$52,827	\$52,827	\$52,827	\$49,902	-	-	-
Brokerage Account	red Z	plusauri	(µ=9.926%, σ =16.381%, π =8.584%)	8.121 %		\$2,143	\$2,984	\$2,477	\$2,330	\$2,476	\$2,993	\$2,651	\$2,946
Brokerage Accourt		plusauri	(μ=4.768%, σ=7.143%, π=4.513%)	6.426 %	-	\$16,297	\$16,297	\$16,297	\$16,297	\$16,297	\$16,297	\$16,297	\$16,297
Wife 401K(T) : EWG	a 7	plusauri	(μ=8.362%, σ=30%, π=3.862%)	-0.598 %	Bo	alized log ret	526	\$25,555	\$56,361	-	-	-	-
Wife 401K(T) : SPY	🛤 📈	plusauri	(μ=9.215%, σ=16.381%, π=7.874%)	10.41 %		alizeu log-ret	unis 9,160	\$392,995	\$415,275	\$592,928	\$491,737	\$406,970	\$158,332
Cash : CD 30 mo	*	plusauri	(μ=3.5%, σ=2.5%, π=3.469%)	3.021 %	-	\$15,076	\$14,753	\$14,753	\$14,753	-	-	-	-
Daughter College(个) : US Equity Fund	=	plusauri	(μ=9.215%, σ=25%, π=6.09%)	7.057 %		\$60,000	\$40,635	\$38,761	\$41,650	\$4,917	-	-	-
Luke College(): Developed Equity Fund	a 7	plusauri	(μ=8.362%, σ=30%, π=3.862%)	7.849 %		\$47,000	\$49,575	\$60,217	\$60,472	1	Appual	Not Worth	-
Retirement(T) : US Equity	s	plusauri	(μ=9.215%, σ=25%, π=6.09%)	2.198 %		\$336,960	\$343,681	\$427,851	\$450,447	\$367,562		Wet WOrth	\$487,640
				Net Worth	\$(460.576)	\$1501450	\$1 / 76 187	\$1632.410	\$1 734 996	\$1666.087	\$1 610 603	\$1 / 80 589	\$1 312 747

Figure 2. Screenshot of Balance Sheet

The balance sheet contains the *non-financial assets*, which are called worths in the system, and the *financial assets* which are called **holdings**.

This display includes:

- One row for each worth (i.e. non-financial asset) and each holding (i.e. financial asset).
- A display of the growth used for each *balance sheet item* (See *Growth Assumptions* column)
- The realized *log-return* for the *balance sheet items*. For a variable forecast this number is useful for understanding how *typical* or *atypical* the forecast is, with respect to the *balance sheet item*. For example, an equity holding modeled with a mean of 8% and standard deviation of 30% might have a realized return of -5% over the entire forecast. Or it might have a realized *log-return* of 25% over the entire forecast. That variability is inherent to investing in the real world and in forecasting (when modeled with non-zero standard deviations).
- Present value of any holdings with value remaining at the end of the forecast (i.e. those that were not sold to cover costs).
- The annual end balance for each balance sheet item
- The annual Net Worth

The Cash Flows Section



Figure 3. Screenshot of Cash Flows

The *Cash Flows* section shows all modeled cash flow streams from start of forecast to the end. These include modeled expense items like *cost of living, college costs,* and *health care costs* as well as modeled income items like *earned income, pension income, Social Security Income,* etc.

Growth Of Flows

Growth of modeled flows is independent from whether the flow applies in a given year. For example, a couple might model current college costs, (i.e. what they are willing/intend to pay) at \$30,000 per year with a growth rate of 4%, which is above inflation. Growth of the expense occurs as modeled even though the payments may only span a four year period some time in the future.

Sample Model for College Expenses (Growth assumed by system)

```
- id: Son
growing_flow_spec:
    growth:
    growth_item: college_expense
    year_range:
        start: 2022
    end: 2026
    initial_value:
        year: 2018
        value: 30000
```

Total Present Value of Incomes/Expenses

For a better understanding of where the money is going over the life of the forecast, the present value of the sum of each flow category is provided.

Who's Growth Assumptions

A fundamental goal of the system is to make swapping out assumption sets simple. Planners can store their own growth assumptions for all worth, holding and flow categories, which can be referenced by the forecast. For example, one can use the system settings (i.e. *plusauri*) or another's settings (e.g. Planning expert).

The Annual Details Section

	Annual Details															
-	-	Sheltered Qualified Divs		\$558	\$491	\$788	\$1,188	-	-	-	-	Flows	Sheltered Hiahliahted) -	-	-
-	-	Sheltered Unqualified Divs		\$121	\$129	\$207	\$313	-	-	-	4	~		-	-	-
-	-	Sheltered Cap Gain Dist		-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	Sheltered Interest		-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	Qualified Divs		\$1,815	\$1,492	\$1,611	\$1,563	\$1,413	-	-	-	-	-	-	-	-
-	-	Unqualified Divs		\$296	\$289	\$322	\$312	\$277	-	-	-	-	-	-	-	-
-	-	Cap Gain Dist		-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	Interest		\$1,363	\$4,702	\$8,226	\$6,691	\$4,952	\$2,731	\$3,807	\$3,060	\$7,805	-	-	-	-
-	-	Reinvested		\$1,655	\$1,387	\$1,545	\$1,497	\$1,328	-	-	-	-	-	-	-	-
-	-	Disbursed	Distri	butions Gains	\$5,095	\$8,614	\$7,069	\$5,314	\$2,731	\$3,807	\$3,060	\$7,805	-	-	-	-
-	-	Passive Income	Ta	x Losses, etc	-	-	-	-	-	-	-	-	-	-	-	-
-	Tax Buckets	Ordinary Income	7	<u> </u>	-	-	-	\$38,933	\$41,752	\$34,481	\$29,593	\$21,389	\$17,190	\$13,191	\$4,667	-
-	Tax Duckets	Sheltered Long Term Cap Gains		-	-	-	\$26,457	\$13,343	\$112,004	\$103,129	\$83,222	\$61,069	\$72,213	\$86,945	\$39,582	-
-	-	Required Min Dist	-	-	-	-	-	\$38,933	\$41,752	\$34,481	\$29,593	\$21,389	\$17,190	\$13,191	\$4,667	-
-	-	Long Term Cap Gains		-	-	-	\$17,513	\$41,498	-	-	\$16,115	\$35,112	-	-	-	-
-	-	Prior Losses Available		-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	Losses Offsetting Gains		-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	Losses Offsetting Ord Inc		-	-	-	-	-	-	-	-	-			-	-
-	-	Remaining Losses	Tax Bill	-	-	-	-	-	-	-	-		Tax R	ates) -	-
-	-	Total Inflows	-	\$119,253	\$131,834	\$139,784	\$43,213	\$10,316	\$2,731	\$3,807	\$3,060	\$7,805	7/	<u> </u>	-	-
-	-	Tax Bill		\$(21,854)	\$(21,854)	\$(24,907)	\$(26,490)	-	\$(1,710)	\$(1,660)	\$(955)	\$(305)	/-	-	-	-
-	-	Marginal Rate		22.00%	22.00%	22.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
-	-	Effective Rate		18.18%	18.78%	18.88%	-	1.96%	3.73%	2.50%	0.62%	-	-	Out	of Funds	-
-	-	Total Outflows		\$(126,956)	\$(129,676)	\$(135,815)	\$(174,372)	\$(150,982)	\$(198,424)	\$(206,066)	\$(173,577)	\$(178,487)	\$(136,315)	\$(1417		(149,983)
-	-	Net Flows		\$(7,703)	\$2,157	\$3,970	\$(131,160)	\$(140,666)	\$(195,693)	\$(202,259)	\$(170,516)	\$(170,681)	\$(136,315)	\$(141,568)	\$(\$45,514) \$	\$(149,983)
-	-	Remaining Shortfall		-	-	-	-	-	-	-	-	-	-	-	\$51,244	\$205,219

Figure 4. Screenshot of Cash Flows

Of course, not all details can be provided in a single view, but this section highlights some of the most important details. The following describes the general approach of the system:

- Each year the worths, holdings and flows are grown based on their corresponding assumptions.
- Distributions (capital gains, interest, dividends) associated with the holdings are determined and bucketed for tax purposes.
- Expenses linked to specific accounts, eg college fund expenses linked to 529 accounts, are sold when required.
- A federal and state tax bill is calculated and carried forward as an expense for the following year.
- When capital losses occur in any year those losses can be carried forward to offset future gains. Additionally some of those losses may offset *ordinary income*. See rows: *Prior Losses Available*, *Losses Offsetting Gains*, *Losses Offsetting Ordinary Income*, and *Remaining Losses*.

Sample Monte Carlo Results

Below is a sample result for a *Monte Carlo Simulation*. If you squint while looking at the numbers on the left (i.e. number of entries in each bucket) you might notice this is really an ASCII display of a *log-normal distribution*.

Dossier	Family Of Four Closer To Retirement (30)
Duration	86 ms
Number Forecasts	10,000
Primary User	plusauri
Growth Outlook	standard
Evaluated Range	(2019 -> 2041] (22 Years)
Inflation	[(1900, 3.00%)]
Cost of Capital	[(1900, 7.50%)]
Percent Bust Scenarios	51.46%

Boundary	Forecasts										
Foreast	Foreast Id	End Net Worth	PV End Net Worth								
Worst Net Worth	33	\$(3,305,140)	\$(1,708,266)								
Geometric Mean Net Worth (Percentile 21.14%)	-	\$(984,711)	\$(508,949)								
Median Net Worth	9,782	\$(51,731)	\$(26,737)								
Best Net Worth	6,554	\$100,341,034	\$51,861,397								
Histogram Summary Data											

Histogram Summary Data

Num Forecasts	Opening NW	Closing NW	Bar End	Opening Forecast Id	Closing Forecast Id
5566	\$(3,305,140)	\$149,487	\$149,733	33	9521
3835	\$150,128	\$3,601,488	\$3,604,605	4246	2497
397	\$3,607,968	\$7,056,020	\$7,059,477	5299	9770
115	\$7,072,750	\$10,322,910	\$10,514,349	3943	8365
45	\$10,524,615	\$13,914,277	\$13,969,221	673	635
18	\$14,187,530	\$16,660,740	\$17,424,093	9997	8772
6	\$17,568,789	\$19,609,397	\$20,878,965	6770	8305
3	\$21,762,440	\$23,984,490	\$24,333,837	9097	7233
3	\$25,648,324	\$26,979,296	\$27,788,709	5343	9556
1	\$28,570,093	\$28,570,093	\$31,243,581	8965	8965
-	-	-	\$34,698,453	-	-
4	\$35,003,133	\$37,170,616	\$38,153,325	6090	5712
2	\$39,779,115	\$39,978,742	\$41,608,197	1348	845
1	\$45,010,859	\$45,010,859	\$45,063,069	2468	2468
-	-	-	\$48,517,941	-	-
-	-	-	\$51,972,813	-	-
-	-	-	\$55,427,685	-	-
-	-	-	\$58,882,557	-	-
-	-	-	\$62,337,429	-	-
-	-	-	\$65,792,301	-	-
-	-	-	\$69,247,173	-	-
-	-	-	\$72,702,045	-	-
-	-	-	\$76,156,917	-	-
-	-	-	\$79,611,789	-	-
1	\$81,422,469	\$81,422,469	\$83,066,661	8622	8622
-	-	-	\$86,521,533	-	-
1	\$88,587,007	\$88,587,007	\$89,976,405	6862	6862
-	-	-	\$93,431,277	-	-
-	-	-	\$96,886,149	-	-
-	-	-	\$100,341,021	-	-
1	\$100,341,034	\$100,341,034	\$103,795,893	6554	6554

Figure 5. Screenshot of Sample Forecast (Monte Carlo Results)

The purpose of *Monte Carlo Simulation* is to provide information on the likelihood of success or failure - where failure is typically defined as running out of money before the end of the forecast. The output shows the following forecasts from the simulation with 10,000 forecasts:

- *Worst*: Worst forecast in terms of smallest *net worth* at end of forecast. Other metrics for forecast comparison/sorting are available.
- *Geometric Mean Forecast:* The forecast without any volatility, where all growth assumptions are assumed to be the *geometric mean* of growth modeled.
- Median Forecast: Forecast in the middle of the distribution.
- *Best Forecast*: Best forecast in terms of largest *net worth* at end of forecast. Other metrics for forecast comparison/sorting are available.

Providing these specific forecasts is arbitrary and it is a simple change to provide other breakdowns - like quintiles. In addition to the distribution, the *number of bust* scenarios is provided. This is typically viewed as a proxy for *probability of failure*.

A good way to think about the distribution is to take the typical picture results from a *Monte Carlo Simulation* and rather than focus on all the crazy paths that the scenarios of the portfolio has taken, focus only on where the final values end up (i.e. the utmost right hand side).



Figure 6. Screenshot of Typical View of Monte Carlo Results