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.

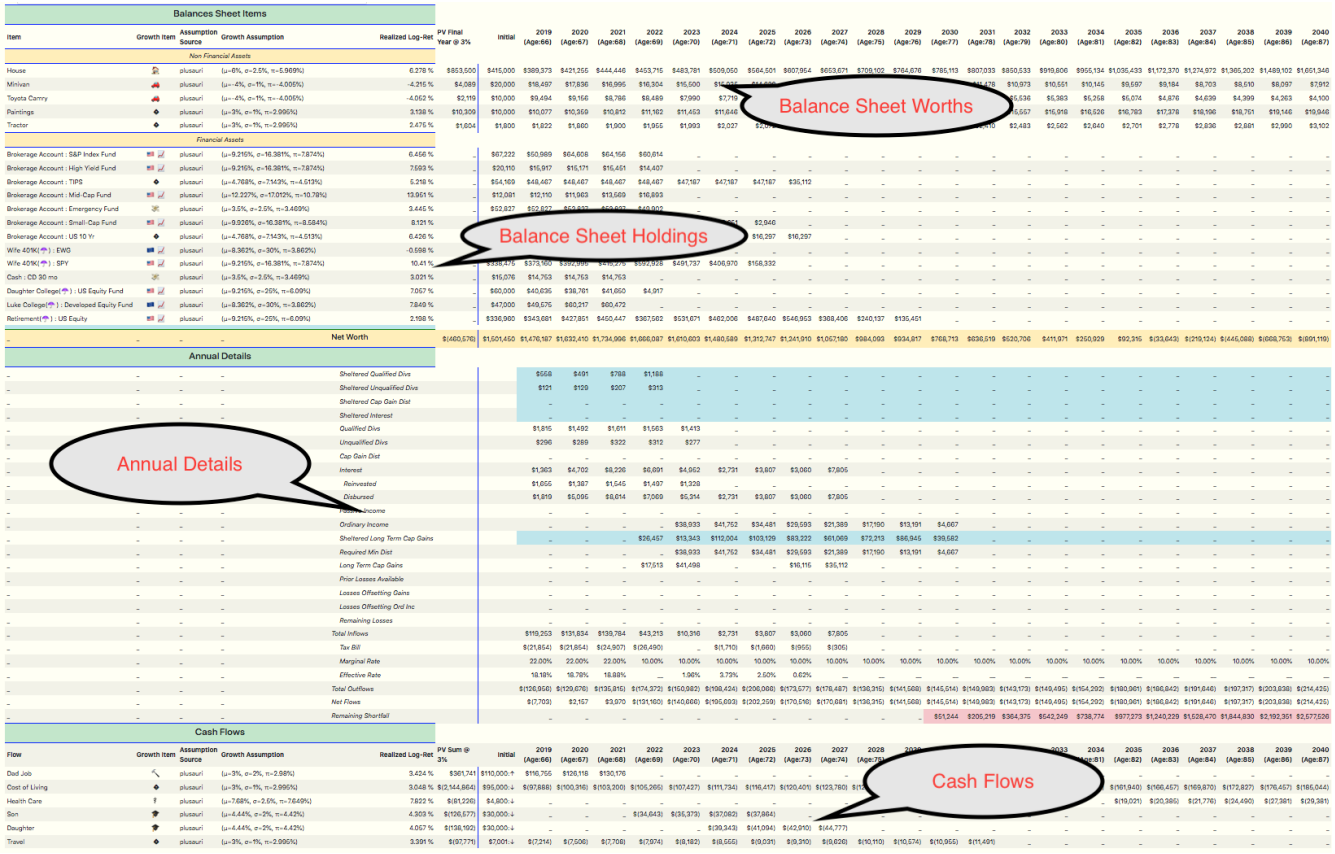

Figure 1. Screenshot of Sample Forecast (Run out of Money)

The Balance Sheet Section

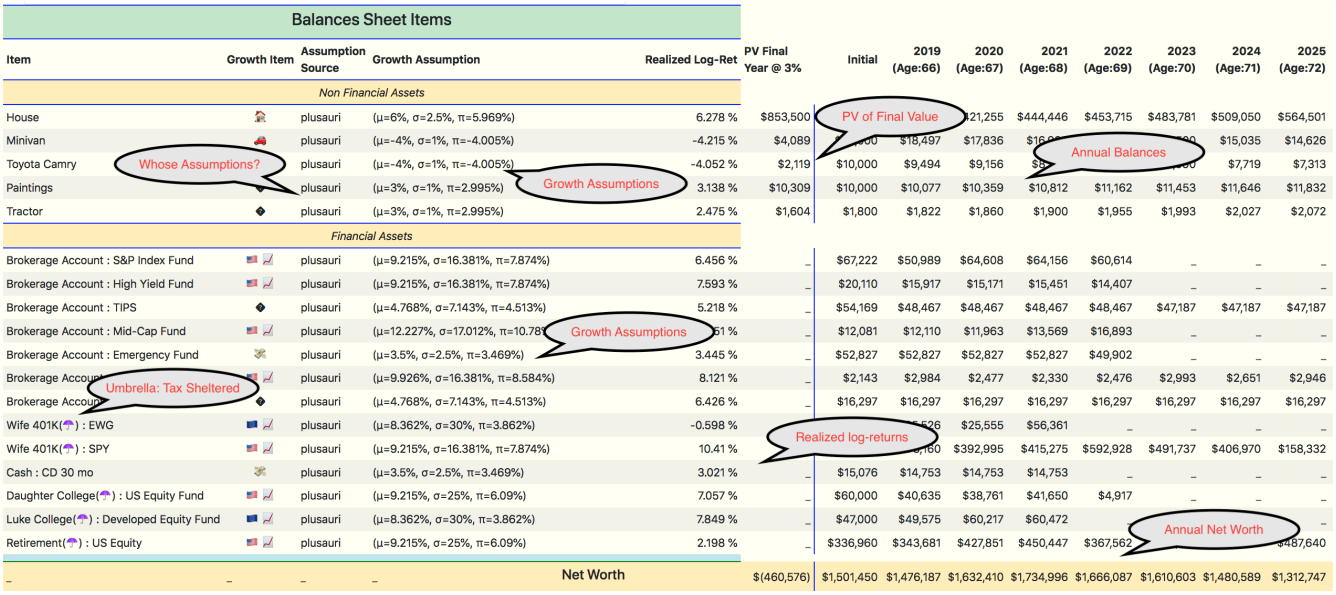

Figure 2. Screenshot of Balance Sheet

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

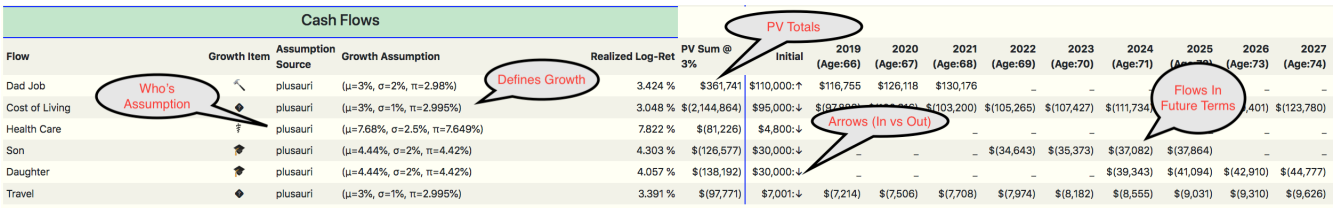

Figure 3. Screenshot of Cash Flows

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

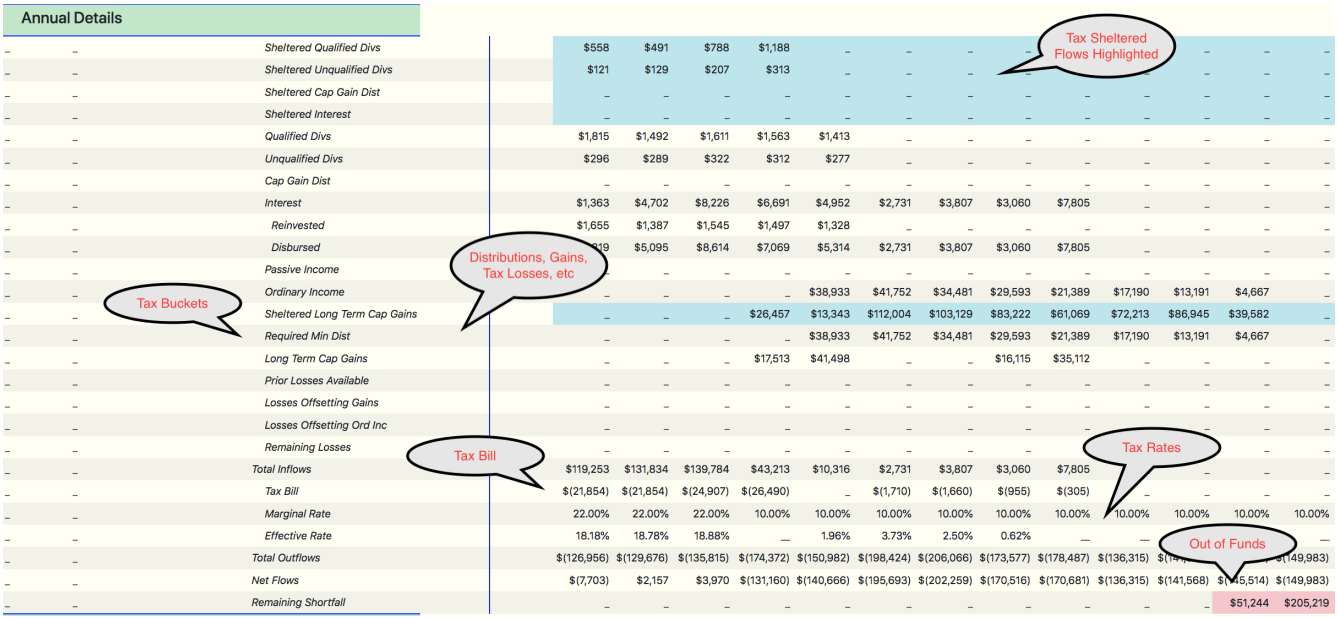

Figure 4. Screenshot of Cash Flows

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			
Forecast	Forecast 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					
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).

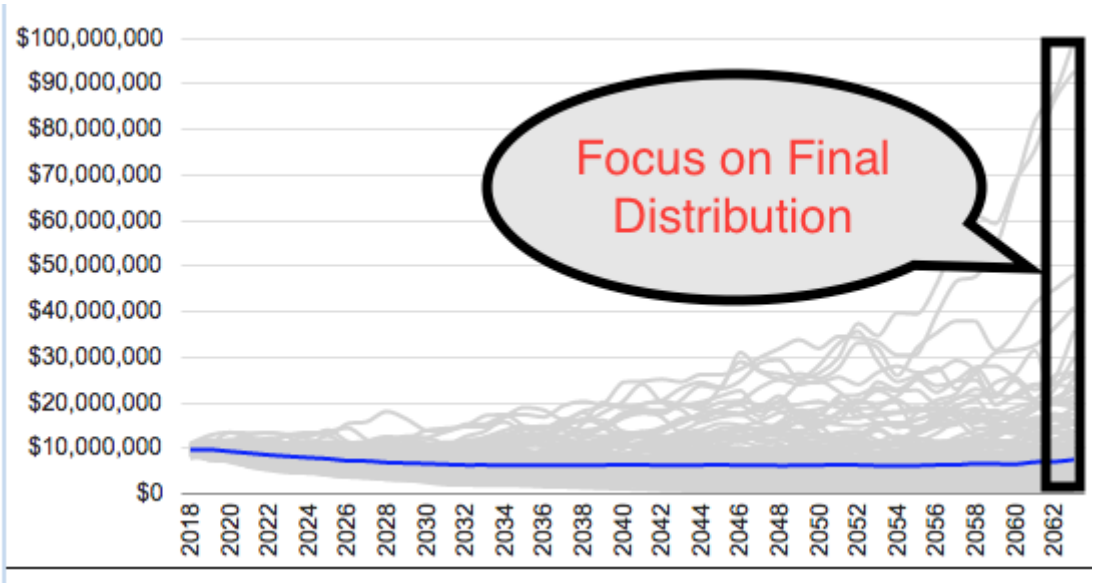

Figure 6. Screenshot of Typical View of Monte Carlo Results