Defined Risk Asset Allocation

CEMIL OTAR

I have known Chuck[1] since he was 17. He is now 28. He is a prudent saver. His portfolio consist of 70% equities and 30% fixed income investments. He called me up the other day. He sounded very worried about the roller coaster ride of the markets during the month of October.

-"Jim (my friends call me Jim), I am worried about the markets. I don't mind taking some risk for long-term gain. But, **I never want to see my portfolio value go below what it was four years ago**. Can you design an asset allocation for me?"

-"Chuck, we need to make a few assumptions: Would you agree that stocks might lose 40% of their value in the worst case scenario?"

-"Jim, I think this is a fair assumption".

-"Would you agree that your bond and mortgage funds might lose 25% of their value in the worst case scenario?"

-"I agree".

Table 1: Risk Based Asset Allocation

Growth Ratio	Cash	Fixed Income	Equity
1.70	0%	0%	100%
1.65	0%	4%	96%
1.60	0%	17%	83%
1.55	0%	30%	70%
1.50	0%	44%	56%
1.45	5%	48%	47%
1.40	10%	50%	40%
1.35	15%	50%	35%
1.30	24%	50%	26%
1.25	32%	50%	18%
1.20	41%	45%	14%
1.15	55%	35%	10%
1.10	65%	30%	5%
1.05	80%	20%	0%
1.00	100%	0%	0%

[1] Names and events have been changed to protect Chuck's privacy.

-"Murphy's Law may be also in effect. May I suggest for calculation purposes, that both of these events may happen at the same time?"

-"O.K."

-"Chuck, let me work on it. I will call you back with the answer as soon as I can".

Chuck defined how much risk he can take. He also asked me to provide him with an "Asset Allocation". Hence, this is a problem of **"Defined Risk Asset Allocation**".

The known variables and assumptions are:

- Current portfolio value
- Portfolio value of 4 years ago,
- That equity portion might lose 40% of its value
- That fixed income portion might lose 25% of its value
- That cash portion keeps its value, no matter what
- That the loss of value can occur simultaneously during the same month (I provide him with monthly statements)

We want to calculate three unknowns: the percentage of Cash, Fixed Income and Equity investments in Chuck's portfolio.

The derivation of equations are beyond the scope of this article. However, based on Chuck's requirements, I developed a simple table. If you want to follow Chuck's logic of risk tolerance, here is how you can use this table:

- Read the current portfolio value from your statement. Call it "V_n".
- Read the portfolio value on your statement of four years ago. Call it "V_o".
- Divide "V_n" by "V_o". Let's call the result the "Growth Ratio".
- Go to Table 1. Locate the calculated Growth Ratio in the first column. You may have to interpolate if the calculated Growth Ratio falls between two lines. Read the corresponding asset allocation.

This asset allocation meets Chuck's risk tolerance. Let's walk through his investment projection, as presented on Table 2:

He started investing at the age of 21 with an initial investment of $4,000. He is planning to increase his annual contributions each year by 3%. Assuming a 10% per year growth until age 65, Table 2 depicts the projected asset allocation, based on his risk definition.

It is interesting to note that until Chuck is 38 years old, 100% of his portfolio is in equities. During these asset accumulation years, his portfolio will have a better chance of growing faster.

Close to his retirement, Chuck may choose to become even more conservative with his investments. When he reaches age 60, he might decide to risk only three years of growth instead of four. In his (projected) case, he would calculate his Growth Ratio as $2,399,841 (portfolio value at the age of 60) divided by $1,772,498 (portfolio value at the age of 57), which equals to 1.35. We read from Table 1 his asset allocation: 15% Cash, 50% Fixed Income and 35% Equity.

I called up Chuck and told him about my findings. He was very happy:

-"Jim, I will use this table for my uncle's RRIF as well!" he shouted.

-"Hold your horses Chuck. Table 1 is only good for portfolios that are of growing nature, such as an RRSP. It is not applicable to a shrinking portfolio, such as a RRIF. That would be a different calculation".

-"Jim, one last question. I have a friend who has never invested in anything other than GIC. His Growth Ratio would be no more than 1.30 over four years. Can he use this system?"

-"Yes. Reading from Table 1, his asset allocation would be 24% Cash, 50% Fixed Income and 26% in Equities. Of course, whether he can meet his retirement objective should be addressed as well."

A proper asset allocation limits your "Risk of Ruin". Investor should avoid taking more risk than necessary and tolerable.

As always, statements in this article are based on assumptions and historic data that may not hold true in the future. The calculations and tables are of pure mathematical nature and may not be applicable to your individual situation.

Cemil Otar, P. Eng., author of "Commission Free Investing: Handbook of Canadian DRIPs and SPPs", is an independent financial advisor with W. H. Stuart & Associates, Phone (905) 889-7170.

Table 2: Chuck's projected Defined Risk Asset Allocation

Chuck's Age	Annual Investment $	Portfolio Value $	Growth Ratio	ASSET ALLOCATION Cash %	Fixed Income %	Equity %
21	4,000	4,000		0	0	100
22	4,120	8,520		0	0	100
23	4,244	13,616		0	0	100
24	4,371	19,348		0	0	100
25	4,502	25,785	6.45	0	0	100
26	4,637	33,000	3.87	0	0	100
27	4,776	41,077	3.02	0	0	100
28	4,919	50,104	2.59	0	0	100
29	5,067	60,181	2.33	0	0	100
30	5,219	71,419	2.16	0	0	100
31	5,376	83,936	2.04	0	0	100
32	5,537	97,867	1.95	0	0	100
33	5,703	113,356	1.88	0	0	100
34	5,874	130,566	1.83	0	0	100
35	6,050	149,673	1.78	0	0	100
36	6,232	170,872	1.75	0	0	100
37	6,419	194,378	1.71	0	0	100
38	6,611	220,428	1.69	0	1	99
39	6,810	249,280	1.67	0	2	98
40	7,014	281,222	1.65	0	4	96
41	7,224	316,569	1.63	0	8	92
42	7,441	355,667	1.61	0	13	87
43	7,664	398,898	1.60	0	17	83
44	7,894	446,682	1.59	0	20	80
45	8,131	499,482	1.58	0	22	78
46	8,375	557,805	1.57	0	25	75
47	8,626	622,212	1.56	0	27	73
48	8,885	693,318	1.55	0	30	70
49	9,152	771,802	1.55	0	30	70
50	9,426	858,408	1.54	0	33	67
51	9,709	953,958	1.53	0	35	65
52	10,000	1,059,354	1.53	0	35	65
53	10,300	1,175,590	1.52	0	37	63
54	10,609	1,303,758	1.52	0	37	63
55	10,928	1,445,061	1.51	0	41	59
56	11,255	1,600,823	1.51	0	41	59
57	11,593	1,772,498	1.51	0	41	59
58	11,941	1,961,689	1.50	0	44	56
59	12,299	2,170,157	1.50	0	44	56
60	12,668	2,399,841	1.50	0	44	56
61	13,048	2,652,873	1.50	0	44	56
62	13,440	2,931,600	1.49	1	45	54
63	13,843	3,238,603	1.49	1	45	54
64	14,258	3,576,721	1.49	1	45	54
65	14,686	3,949,079	1.49	1	45	54