

**Maximum Sustainable Withdrawal Rates With Varying Historical Success Rates
Using Large Cap Stocks, Corporate Bonds and US T-Bills
Ending Value Goal: Equal or Greater than Original Corpus
Data from 1946 to 2000
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A rolling period analysis of historical investment performance is used to determine the maximum sustainable withdrawal rate and a portfolio capable of achieving that rate for various investment horizons and historical success rates. Every available time frame starting with 1946 ending 2000 is tested for each horizon (2, 3, ..., 40 years). Shorter horizons and higher success rates call for more conservative portfolios; longer horizons and lower success rates allow for more aggressive ones.

Methodology

To understand the rolling period analysis, consider the 20-year horizon which has 36 observations (1946-1965, 1947-1966, ..., 1981-2000). Each of these observations is tested for each portfolio to determine historical success rate, defined as the percentage of time the portfolio is able to achieve the ending value for the account (in this case, to have at least as much money at the end of the horizon as at the beginning), given the initial withdrawal amount.

The portfolio is rebalanced at the start of each year. Withdrawals occur at the start of the year. The Maximum Sustainable Withdrawal Rate (MSR) is the percentage of total account value withdrawn the first year. Subsequent withdrawals are adjusted by prior year inflation rates, maintaining buying power at the risk of spending too much and not achieving the ending value goal.

For an example, consider the 20-year horizon from Table 2 (100% historical success rate): There are 36 observations (that is, time periods) to consider: 1946-1965, 1947-1966, ..., 1981-2000. The value for MSR of 4.03% means that there are one or more portfolios that, with 100% historical success, were able to survive 20 years of withdrawals from the account, starting with 4.03% of the value of the account the first year and adjusting each subsequent year's withdrawal by the prior year's inflation rate. Starting with one million dollars and the right asset allocation, you would have been able to withdraw \$40,300 the first year, then maintain buying power for the next 19 years, ending with at least as much money as what you started with.

Continuing the example, of the thousands of portfolios examined, the portfolio composed of 46.13% Large Cap Stocks and 53.87% US T-Bills is the best performer. This portfolio achieves the goal of ending with an amount equal or greater than the original corpus in all 36 observations.

The example given uses a historical success rate of 100%. As you lower your historical success rate (and presumably your probability for future success) you gain higher levels of sustainable spending. Tables 3 through 9 demonstrate successively lower and lower levels of historical success, with the resulting higher and higher levels of MSR.

Portfolio Optimizations

The WAT\$ Black Box program is used to find optimal portfolios. Black Box runs two processes, a systematic process and an optimization process. The systematic process creates portfolios by varying the percentage invested in each available asset by 5% at a time. So, for example, the following portfolios, as well as many others, are tested:

- 100% Large Cap Stocks
- 65% Large Cap Stocks, 35% US T-Bills
- 15% Large Cap Stocks, 45% Corporate Bonds, 40% US T-Bills

During the optimization process, the best portfolios from the systematic testing are kept and refined in an attempt to find better portfolios. This is done through a process known as simulated annealing, in which many more portfolios are tested to see if better portfolios exist. The idea of annealing comes from metallurgy: as molten metal cools the atoms gradually move less and less, eventually coming to a stable state. By repeatedly shrinking our test areas around known good portfolios we are able to gradually come to better and better portfolios.

The method of simulated annealing does not guarantee we will find the optimal portfolio, but it does find very good portfolios. If, for example, the WAT\$ Black Box program lists the optimal portfolio as being capable of a 5% withdrawal rate, it is very unlikely there exists a portfolio (using the same constraints and assets) that can achieve a 5.1% withdrawal rate.

Strange Results

There is something strange in the MSR in that longer horizons sometimes show higher MSRs than shorter horizons. For example, in the 36-year horizon there is a portfolio that achieved 100% historical success with an initial withdrawal of 3.91%. In the 35-year horizon, however, the maximum sustainable withdrawal rate is 3.71%.

This seems counter-intuitive. If my withdrawal schedule is sustainable for 35 years at 3.71% initial withdrawal, and that's the best that I can do, how is it that a 36-year horizon is sustainable at 3.91%? With its higher initial withdrawal, wouldn't my 36-year plan fail after 35 years.

If this were a "Don't Go Broke" study, that would be the case—once you are out of money the game is over. The ending value goal in the present study, though, is to maintain the initial value of the account, not adjusting for inflation. It is possible that the 35-year observations that fail at 3.91% (there are one or more of these observations) may have a remarkably good market return for the 36th year, allowing the value of the account to climb back above the account's initial value, thus making the 35-year observation a failure and the 36-year observation a success.

We suggest caution in interpreting some of the higher MSRs in the longer horizons, say, beyond 30 years. If a 35-year horizon has MSR of, say, 3.71%, and longer horizons have significantly higher MSRs, like 3.91%, consider the 3.71% a limiting factor. In other words, any MSR for the 36-year and longer horizons above 3.71% should be considered 3.71%, and not the higher value listed in the table. We have highlighted the text in the tables to indicate this strangeness.

Conclusion

Table 1 summarizes the results of the study by showing the maximum sustainable withdrawal rates for all horizons (2 through 40 years) and all historical success rates (eight different ones from 50% to 100%). Tables 2 through 9 show portfolios capable of achieving the withdrawal rates shown in Table 1. Because of the mathematical complexity of the problem, and because of the algorithm employed by Black Box, the portfolios shown in Tables 2 through 9 should not be considered as absolute optimal portfolios for their particular horizon and success rate, but rather they should be considered very near optimal.

The purpose of the study is to determine how much you can spend from a pool of money over some time horizon, yet still meet some future goal for the value of the portfolio. The two primary variables in the study are horizon and historical success rate. Horizon is simply the length of time to consider for withdrawals. Historical success rate is the frequency of time you would have been successful, had you lived through any particular period of time in the past.

Historical success rate works very well as a measure of risk. The more you are willing to lower historical success rate the greater the capacity to spend from the portfolio. Associated with this lower historical success rate, however, is most likely a lower probability for future success. Various success rates were run so that investors with different levels of risk acceptance can find portfolios and withdrawal rates that fit their personal needs.

Looking at the short horizons in Table 1, there is a big difference in MSR across the various success rates, with a low of 0.38 for the 100% success rate, 2-year horizon to a high of 11.90 for the 50% success rate, 3-year horizon. These values are the lowest and highest MSRs in the table.

The MSRs at the 100% success rate get gradually higher and higher from the 2-year horizon to the 15-year horizon, reaching a peak of 4.09 for the 15-year horizon. They then taper off, dropping to 3.71 for the 35-year horizon. In terms of planning, this data suggests that for horizons of 5 years or less, it might be difficult to find a portfolio that can maintain its value while at the same time withdrawing any significant amounts. Considering longer horizons, however, of 10 years or more, it seems likely that, with the right asset allocation, the investor can withdraw at a 4% rate and still have the original corpus in tact at the end of the investment horizon.

On the other extreme, at the 50% success rate, the MSRs show a different pattern. Whereas the MSR peaks at the 15-year horizon for the 100% success rate, the MSR peaks at the 3-year horizon for the 50% success rate, with a high of 11.90. As the horizon extends the MSR gradually drops, reaching a low of 5.36 for the 28 and 29-year horizons.

It is interesting that, for the shorter horizons, the investor willing to take greater risks (as measured by historical success rate) can withdraw at significantly higher withdrawal rates and perhaps still maintain the value of the portfolio. For example, in the 5-year horizon the MSR for the 50% success rate is 11.45, nearly 3.5 times greater than the 3.31 MSR for the 100% success rate. In the longer horizons, however, the highly aggressive investor does not enjoy the same sort of advantage. In the 25-year horizon, for example, the MSR for the 50% success rate is 5.56, not quite 1.5 times higher than the 3.84 MSR for the 100% success rate.

The trend in Table 1 is clear. When considering horizons of 20 years or more, highly conservative investors seeking to maintain the value of their account (and seeking to maintain their purchasing power with subsequent year withdrawals) should not consider withdrawing more than about 4% of the value of the account the first year. Highly aggressive investors seeking the same goals can consider a 6% initial withdrawal, as long as they realize that poor market returns early in the horizon might require significant changes in spending.

At any rate, it is clear from this data how important it is to periodically review the financial plan. To choose a 30-year strategy and then blindly follow the strategy for 30 years, without regard to portfolio value or spending needs, would certainly be unwise.

In this study the assets available to the portfolio are restricted to Large Cap Stocks, Corporate Bonds and US T-Bills. Other studies include Small Cap Stocks and other asset classes.

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Study conducted by Zunna, Inc. using the WAT\$ Black Box Program.

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**Table 1 - Maximum Sustainable Withdrawal Rates
With Varying Historical Success Rates
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	# Obs	Historical Success Rate							
		100%	95%	90%	85%	80%	75%	66%	50%
2	54	0.38	2.15	3.65	3.95	4.94	5.31	8.11	10.72
3	53	0.83	3.32	4.72	5.37	5.96	6.86	8.64	11.90
4	52	2.10	4.16	4.69	5.31	6.72	8.11	8.59	11.12
5	51	3.31	4.01	4.51	4.74	6.06	7.47	8.99	11.45
6	50	3.15	4.09	4.57	5.21	6.85	7.28	9.14	10.97
7	49	3.43	4.11	4.57	5.32	5.96	7.31	8.44	10.56
8	48	3.87	4.27	4.40	4.63	5.93	6.93	8.24	10.41
9	47	3.62	4.37	4.44	4.77	5.52	7.04	8.25	10.57
10	46	3.82	4.08	4.63	4.83	5.46	5.99	8.15	10.36
11	45	3.99	4.10	4.23	4.76	4.96	6.43	7.51	10.23
12	44	3.92	4.32	4.41	4.59	4.71	5.26	7.21	9.95
13	43	3.90	4.06	4.35	4.71	4.80	5.08	7.27	9.18
14	42	4.00	4.24	4.43	4.66	4.88	4.94	6.31	9.25
15	41	4.09	4.23	4.34	4.56	4.69	4.88	5.70	8.06
16	40	4.08	4.23	4.37	4.51	4.76	5.05	5.47	8.16
17	39	4.08	4.15	4.19	4.56	4.73	4.87	5.76	7.93
18	38	4.08	4.17	4.19	4.43	4.58	4.80	5.61	7.84
19	37	4.01	4.09	4.18	4.53	4.66	4.74	5.36	7.02
20	36	4.03	4.05	4.10	4.42	4.66	4.81	5.38	7.02
21	35	4.00	4.04	4.16	4.47	4.57	4.64	5.40	6.39
22	34	3.92	3.98	4.14	4.51	4.55	4.61	5.15	6.07
23	33	3.90	3.98	4.07	4.27	4.53	4.59	5.17	5.92
24	32	3.92	3.93	4.05	4.26	4.50	4.56	4.77	5.93
25	31	3.84	3.89	4.08	4.27	4.49	4.51	4.81	5.56
26	30	3.83	3.85	4.01	4.28	4.49	4.49	4.81	5.55
27	29	3.81	3.85	3.85	4.27	4.41	4.46	4.61	5.38
28	28	3.78	3.84	3.87	4.23	4.41	4.44	4.61	5.36
29	27	3.73	3.85	3.87	4.37	4.39	4.43	4.82	5.36
30	26	3.74	3.85	3.88	3.91	4.38	4.42	4.79	5.68
31	25	3.74	3.84	3.88	3.93	4.35	4.43	4.96	5.65
32	24	3.74	3.81	3.87	3.92	4.33	4.43	5.00	5.68
33	23	3.74	3.84	3.93	4.29	4.33	4.42	5.00	5.67
34	22	3.74	3.93	4.30	4.33	4.40	4.90	5.16	6.85
35	21	3.71	3.93	4.29	4.33	4.86	4.99	5.17	6.83
36	20	3.91	4.30	4.33	4.86	4.99	5.10	5.16	6.80
37	19	4.29	4.29	4.31	4.85	4.98	5.10	5.45	6.75
38	18	4.29	4.29	4.85	4.96	5.09	5.15	5.50	6.90
39	17	4.27	4.27	4.85	5.08	5.14	5.39	5.49	6.86
40	16	4.84	4.84	5.08	5.12	5.39	5.48	6.63	8.43

**Table 2 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 100%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	0.38			100.00
3	53	0.83	19.52	57.58	22.90
4	52	2.10	40.21	15.63	44.17
5	51	3.31	36.53	22.07	41.39
6	50	3.15	29.31	0.04	70.65
7	49	3.43	30.95	0.07	68.98
8	48	3.87	42.58		57.41
9	47	3.62	29.02		70.98
10	46	3.82	28.80		71.20
11	45	3.99	31.89	0.05	68.07
12	44	3.92	34.94		65.06
13	43	3.90	31.07		68.92
14	42	4.00	32.73		67.27
15	41	4.09	39.09		60.91
16	40	4.08	34.34		65.66
17	39	4.08	36.89		63.11
18	38	4.08	36.45		63.55
19	37	4.01	34.95		65.05
20	36	4.03	46.13		53.87
21	35	4.00	51.58		48.42
22	34	3.92	52.85		47.15
23	33	3.90	57.70		42.30
24	32	3.92	61.67		38.33
25	31	3.84	61.76		38.24
26	30	3.83	61.14	3.07	35.79
27	29	3.81	67.99		32.01
28	28	3.78	71.03		28.96
29	27	3.73	72.77		27.23
30	26	3.74	75.00		25.00
31	25	3.74	77.08		22.92
32	24	3.74	78.45		21.55
33	23	3.74	78.82		21.18
34	22	3.74	80.00		20.00
35	21	3.71	80.58		19.42
36	20	3.91	95.00		5.00
37	19	4.29	100.00		
38	18	4.29	100.00		
39	17	4.27	100.00		
40	16	4.84	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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**Table 3 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 95%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	2.15	11.58		88.42
3	53	3.32	17.30	7.06	75.64
4	52	4.16	35.90	1.46	62.64
5	51	4.01	25.26	0.04	74.70
6	50	4.09	23.50	6.37	70.12
7	49	4.11	40.17		59.83
8	48	4.27	26.47		73.53
9	47	4.37	37.99	2.57	59.44
10	46	4.08	21.39	1.18	77.44
11	45	4.10	25.21		74.79
12	44	4.32	40.41		59.59
13	43	4.06	33.01		66.99
14	42	4.24	35.71		64.29
15	41	4.23	41.51		58.49
16	40	4.23	46.32		53.68
17	39	4.15	44.77		55.23
18	38	4.17	46.89		53.11
19	37	4.09	36.51	0.10	63.39
20	36	4.05	42.00		58.00
21	35	4.04	55.70		44.30
22	34	3.98	48.43	0.01	51.56
23	33	3.98	58.83		41.17
24	32	3.93	55.08	3.64	41.28
25	31	3.89	56.36	9.29	34.35
26	30	3.85	66.61		33.39
27	29	3.85	65.19	2.46	32.34
28	28	3.84	67.04	3.07	29.89
29	27	3.85	69.34	2.28	28.38
30	26	3.85	70.83	0.39	28.77
31	25	3.84	71.26	0.10	28.64
32	24	3.81	72.80	0.54	26.66
33	23	3.84	82.53		17.46
34	22	3.93	93.38		6.62
35	21	3.93	93.33		6.67
36	20	4.30	100.00		
37	19	4.29	100.00		
38	18	4.29	100.00		
39	17	4.27	100.00		
40	16	4.84	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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**Table 4 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 90%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	3.65	28.07	6.11	65.82
3	53	4.72	84.94		15.06
4	52	4.69	38.14	20.51	41.35
5	51	4.51	47.98	0.11	51.91
6	50	4.57	32.94		67.06
7	49	4.57	46.27	12.90	40.83
8	48	4.40	28.29	4.36	67.35
9	47	4.44	46.36		53.63
10	46	4.63	38.18	7.32	54.50
11	45	4.23	34.82		65.18
12	44	4.41	51.46		48.54
13	43	4.35	36.66		63.34
14	42	4.43	70.00		30.00
15	41	4.34	68.99		31.01
16	40	4.37	73.25		26.75
17	39	4.19	49.67		50.33
18	38	4.19	41.75		58.25
19	37	4.18	57.88		42.12
20	36	4.10	55.95		44.05
21	35	4.16	66.37		33.63
22	34	4.14	71.48		28.52
23	33	4.07	72.89		27.11
24	32	4.05	75.69		24.31
25	31	4.08	80.00		20.00
26	30	4.01	80.00		20.00
27	29	3.85	72.91		27.09
28	28	3.87	75.00		25.00
29	27	3.87	76.83		23.17
30	26	3.88	78.23		21.77
31	25	3.88	80.00		20.00
32	24	3.87	80.24		19.75
33	23	3.93	92.82		7.18
34	22	4.30	100.00		
35	21	4.29	100.00		
36	20	4.33	100.00		
37	19	4.31	100.00		
38	18	4.85	100.00		
39	17	4.85	100.00		
40	16	5.08	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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**Table 5 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 85%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	3.95	36.41	0.23	63.36
3	53	5.37	83.13	15.15	1.72
4	52	5.31	72.48	27.43	0.10
5	51	4.74	66.37		33.63
6	50	5.21	60.16		39.84
7	49	5.32	100.00		
8	48	4.63	32.85		67.15
9	47	4.77	43.36		56.64
10	46	4.83	42.72		57.28
11	45	4.76	41.38		58.61
12	44	4.59	46.50		53.50
13	43	4.71	46.29		53.71
14	42	4.66	49.63		50.37
15	41	4.56	81.52		18.48
16	40	4.51	50.78		49.22
17	39	4.56	49.55		50.45
18	38	4.43	54.24		45.76
19	37	4.53	84.20		15.80
20	36	4.42	86.51		13.49
21	35	4.47	92.29		7.71
22	34	4.51	98.17		1.83
23	33	4.27	62.77		37.23
24	32	4.26	65.00		35.00
25	31	4.27	66.71		33.29
26	30	4.28	68.22		31.78
27	29	4.27	70.00		30.00
28	28	4.23	71.14		28.86
29	27	4.37	100.00		
30	26	3.91	88.72		11.28
31	25	3.93	90.00		10.00
32	24	3.92	91.22		8.78
33	23	4.29	100.00		
34	22	4.33	100.00		
35	21	4.33	100.00		
36	20	4.86	100.00		
37	19	4.85	100.00		
38	18	4.96	100.00		
39	17	5.08	100.00		
40	16	5.12	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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**Table 6 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 80%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	4.94	96.77	0.02	3.21
3	53	5.96	77.51		22.49
4	52	6.72	100.00		
5	51	6.06	93.89		6.11
6	50	6.85	90.60		9.40
7	49	5.96	94.73		5.27
8	48	5.93	100.00		
9	47	5.52	89.91	0.01	10.08
10	46	5.46	100.00		
11	45	4.96	58.33		41.66
12	44	4.71	51.49	0.01	48.49
13	43	4.80	42.50	4.22	53.29
14	42	4.88	68.21		31.79
15	41	4.69	65.29	2.22	32.49
16	40	4.76	67.11		32.88
17	39	4.73	75.51		24.48
18	38	4.58	77.76		22.24
19	37	4.66	81.93		18.07
20	36	4.66	90.69		9.31
21	35	4.57	92.15		7.85
22	34	4.55	95.99		4.01
23	33	4.53	87.13		12.87
24	32	4.50	100.00		
25	31	4.49	100.00		
26	30	4.49	100.00		
27	29	4.41	100.00		
28	28	4.41	100.00		
29	27	4.39	100.00		
30	26	4.38	100.00		
31	25	4.35	100.00		
32	24	4.33	100.00		
33	23	4.33	100.00		
34	22	4.40	100.00		
35	21	4.86	100.00		
36	20	4.99	100.00		
37	19	4.98	100.00		
38	18	5.09	100.00		
39	17	5.14	100.00		
40	16	5.39	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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**Table 7 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 75%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	5.31	72.62	27.38	
3	53	6.86	100.00		
4	52	8.11	100.00		
5	51	7.47	99.90	0.10	
6	50	7.28	100.00		
7	49	7.31	100.00		
8	48	6.93	99.02		0.98
9	47	7.04	100.00		
10	46	5.99	100.00		
11	45	6.43	100.00		
12	44	5.26	100.00		
13	43	5.08	63.45		36.55
14	42	4.94	71.91		28.09
15	41	4.88	60.00		40.00
16	40	5.05	93.44		6.56
17	39	4.87	76.09	20.16	3.75
18	38	4.80	71.60		28.40
19	37	4.74	78.27	20.00	1.73
20	36	4.81	77.98	22.02	
21	35	4.64	78.63	5.76	15.61
22	34	4.61	81.11		18.89
23	33	4.59	92.58	0.26	7.15
24	32	4.56	86.51	2.27	11.22
25	31	4.51	95.21	2.52	2.26
26	30	4.49	100.00		
27	29	4.46	100.00		
28	28	4.44	100.00		
29	27	4.43	100.00		
30	26	4.42	100.00		
31	25	4.43	100.00		
32	24	4.43	100.00		
33	23	4.42	100.00		
34	22	4.90	100.00		
35	21	4.99	100.00		
36	20	5.10	100.00		
37	19	5.10	100.00		
38	18	5.15	100.00		
39	17	5.39	100.00		
40	16	5.48	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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**Table 8 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 66%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	8.11	76.04	19.08	4.88
3	53	8.64	100.00		
4	52	8.59	96.41	3.59	
5	51	8.99	100.00		
6	50	9.14	100.00		
7	49	8.44	100.00		
8	48	8.24	100.00		
9	47	8.25	100.00		
10	46	8.15	100.00		
11	45	7.51	100.00		
12	44	7.21	100.00		
13	43	7.27	100.00		
14	42	6.31	100.00		
15	41	5.70	89.39		10.61
16	40	5.47	100.00		
17	39	5.76	100.00		
18	38	5.61	100.00		
19	37	5.36	100.00		
20	36	5.38	100.00		
21	35	5.40	100.00		
22	34	5.15	100.00		
23	33	5.17	100.00		
24	32	4.77	98.71		1.29
25	31	4.81	100.00		
26	30	4.81	100.00		
27	29	4.61	74.27	25.73	
28	28	4.61	77.48	22.52	
29	27	4.82	100.00		
30	26	4.79	100.00		
31	25	4.96	100.00		
32	24	5.00	100.00		
33	23	5.00	100.00		
34	22	5.16	100.00		
35	21	5.17	100.00		
36	20	5.16	100.00		
37	19	5.45	100.00		
38	18	5.50	100.00		
39	17	5.49	100.00		
40	16	6.63	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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**Table 9 - Maximum Sustainable Withdrawal Rates
With Historical Success Rate of 50%
Ending Value Goal: Equal or Greater than Original Corpus
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	10.72	100.00		
3	53	11.90	100.00		
4	52	11.12	100.00		
5	51	11.45	100.00		
6	50	10.97	100.00		
7	49	10.56	100.00		
8	48	10.41	100.00		
9	47	10.57	99.82	0.18	
10	46	10.36	100.00		
11	45	10.23	94.58	5.42	
12	44	9.95	99.43	0.57	
13	43	9.18	100.00		
14	42	9.25	100.00		
15	41	8.06	100.00		
16	40	8.16	100.00		
17	39	7.93	100.00		
18	38	7.84	100.00		
19	37	7.02	100.00		
20	36	7.02	100.00		
21	35	6.39	100.00		
22	34	6.07	100.00		
23	33	5.92	100.00		
24	32	5.93	100.00		
25	31	5.56	100.00		
26	30	5.55	100.00		
27	29	5.38	100.00		
28	28	5.36	100.00		
29	27	5.36	100.00		
30	26	5.68	100.00		
31	25	5.65	100.00		
32	24	5.68	100.00		
33	23	5.67	100.00		
34	22	6.85	100.00		
35	21	6.83	100.00		
36	20	6.80	100.00		
37	19	6.75	100.00		
38	18	6.90	100.00		
39	17	6.86	100.00		
40	16	8.43	100.00		

Assets Available to the Portfolio: Large Cap Stocks (L), Corporate Bonds (CB) and US T-Bills (T)
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