

**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 Inflation-Adjusted 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 buying power 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 The Maximum Sustainable Withdrawal Rate (MSR) is the percentage of total account value withdrawn the first year.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 1.03% 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 1.03% 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 \$10,300 the first year, then maintain buying power for the next 19 years, ending with an account value equal to the inflation-adjusted value of your original corpus.

Continuing the example, of the thousands of portfolios examined, the portfolio composed of 75% Large Cap Stocks and 25% US T-Bills is the best performer. This portfolio achieves the goal of ending with an amount equal or greater than the inflation-adjusted 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.

## Interpreting Some of the Results

There are two matters to discuss about the MSRs. First, the shorter horizons for the 85% through 100% success rates are negative. For example, the 10-year horizon with 100% historical success shows a MSR of  $-0.87\%$ . What this means is that there is no portfolio that, historically, was worth the same amount (adjusted for inflation) at the end of the 10 years as it was worth at the start of the 10 years, at any withdrawal rate. In fact, to have 100% historical success of achieving this ending value goal, you would have needed to contribute to the account each year rather than withdraw from it.

The other issue with the data has to do with the longer horizons. Longer horizons sometimes show significantly 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 3.57%. In the 35-year horizon, however, the maximum sustainable withdrawal rate is 3.34%.

This seems counter-intuitive. If my withdrawal schedule is sustainable for 35 years at 3.34% initial withdrawal, and that's the best that I can do, how is it that a 36-year horizon is sustainable at 3.57%? 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 buying power of the account, that is, to end with at least as much money as you started, adjusting for inflation. It is possible that the 35-year observations that fail at 3.57% (there are one or more of these observations) may have a remarkably good market return for the 36<sup>th</sup> year, allowing the value

of the account to climb back above the value of the inflation-adjusted corpus, thus making the 35-year observation a failure and the 36-year observation a success.

We suggest caution in interpreting some of the higher MSR's in the longer horizons, say, beyond 30 years. If a 35-year horizon has MSR of, say, 3.34%, and longer horizons have significantly higher MSR's, like 3.57%, consider the 3.34% a limiting factor. In other words, any MSR for the 36-year and longer horizons above 3.34% should be considered 3.34%, 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, it was impossible to withdraw any amount of money from an account and still achieve the goal of ending the horizon with as much buying power as you started, in terms of account value. For the 85% through 100% success rates, the MSR's for the 10-year and shorter horizons are mostly negative, indicating you would actually need to contribute to the account to reach the ending value goal of the inflation-adjusted corpus.

Moving to lower historical success rates, it appears you can withdraw from an account and maintain the inflation-adjusted corpus. At the extreme case, there is at least one portfolio (90.2% Large Cap Stocks, 9.8% Corporate Bonds) that was able to sustain a withdrawal rate 7.97% for 10 years and still have an ending value equal to the starting account value, adjusted for inflation, with a 50% success rate. What's not shown in Table 1, though, but is very important, is the magnitude by which you might have missed the goal in the 50% of the cases when you didn't meet the goal. In the worst case with this portfolio and spending policy, not only would you have not maintained the inflation-adjusted value of the account, but you would have actually run out of money. This occurred in the 10-year period from 1973-1982.

In the example just cited, the two down markets in 1973 and 1974 so adversely affected the value of the account that it was unable to survive. The point to be made here is that the larger the value of the account the more impact a very good or very bad return will have on the account. In withdrawal scenarios like this, a few bad years early in the cycle may have disastrous effects for the long-term.

Looking at the longer horizons it appears that withdrawal rates of 3% are very reasonable, particularly in the 30-year and longer horizons. More aggressive investors who can accept lower historical success rates might be able to withdraw as much as 4% or even 4.5%, provided they choose an appropriate asset allocation, and provided they are comfortable with the lower probability for future success.

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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	# Obs	Historical Success Rate							
		100%	95%	90%	85%	80%	75%	66%	50%
2	54	-12.71	-3.55	-1.42	-0.53	1.00	2.12	4.35	8.35
3	53	-8.12	-2.07	-0.24	0.36	3.20	3.59	5.63	8.63
4	52	-3.96	-1.64	0.01	0.28	1.25	4.76	6.11	8.08
5	51	-2.56	-1.53	-0.80	-0.13	2.49	3.74	6.45	8.93
6	50	-2.42	-1.55	-0.41	0.93	1.31	3.93	6.70	8.38
7	49	-2.03	-1.36	-0.72	1.27	2.37	3.18	5.75	8.48
8	48	-1.44	-0.98	-0.63	-0.05	2.71	3.68	6.28	8.37
9	47	-1.04	-0.92	-0.54	-0.01	0.81	4.30	6.33	8.44
10	46	-0.87	-0.69	-0.49	-0.17	1.80	3.73	5.66	7.97
11	45	-0.91	-0.29	-0.05	0.10	0.43	4.00	5.86	7.73
12	44	-0.75	-0.27	-0.18	0.61	0.62	2.44	5.17	8.07
13	43	-0.47	-0.23	0.07	0.54	1.43	1.46	5.64	7.36
14	42	-0.41	-0.06	0.62	1.04	1.29	1.93	3.99	7.64
15	41	-0.08	0.20	0.44	1.08	1.81	1.89	2.72	7.23
16	40	-0.07	0.53	0.82	1.03	1.57	2.28	2.94	7.51
17	39	0.19	0.45	0.95	1.46	1.71	2.65	3.02	6.26
18	38	0.70	0.76	0.95	1.64	2.29	2.38	2.85	5.93
19	37	1.06	1.29	1.65	1.83	2.04	2.42	2.87	6.00
20	36	1.03	1.36	1.90	2.04	2.34	2.80	3.29	5.08
21	35	1.60	1.91	2.02	2.32	2.69	2.75	2.93	4.47
22	34	1.99	2.10	2.25	2.59	2.60	2.86	3.23	4.64
23	33	2.13	2.18	2.39	2.59	2.63	3.21	3.35	3.74
24	32	2.50	2.56	2.73	2.74	3.06	3.10	3.37	4.03
25	31	2.36	2.72	2.86	3.01	3.05	3.42	3.46	3.99
26	30	2.64	2.66	2.82	2.97	3.43	3.45	3.71	4.07
27	29	2.71	2.77	2.95	3.12	3.17	3.77	3.81	4.14
28	28	2.76	2.99	3.06	3.41	3.43	3.69	3.93	4.13
29	27	2.71	3.03	3.19	3.25	3.46	3.70	4.07	4.39
30	26	2.98	2.98	3.35	3.36	3.50	3.81	4.16	4.43
31	25	3.09	3.24	3.42	3.45	3.50	3.94	4.13	4.60
32	24	3.24	3.35	3.35	3.51	3.54	4.06	4.17	4.70
33	23	3.34	3.44	3.49	3.49	3.79	4.11	4.39	4.90
34	22	3.39	3.58	3.70	3.92	4.05	4.19	4.44	5.98
35	21	3.34	3.63	3.79	4.01	4.14	4.46	4.60	6.14
36	20	3.57	3.91	4.05	4.33	4.41	4.68	4.68	6.09
37	19	3.99	3.99	4.00	4.40	4.59	4.71	4.84	6.15
38	18	4.03	4.03	4.51	4.66	4.66	4.85	4.89	6.26
39	17	3.98	3.98	4.58	4.76	4.81	4.90	5.04	6.32
40	16	4.61	4.61	4.82	4.85	4.95	5.10	6.09	7.96

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

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	-12.71			100.00
3	53	-8.12	19.46	64.72	15.82
4	52	-3.96	32.41	1.07	66.51
5	51	-2.56	26.66	20.03	53.32
6	50	-2.42	23.20	0.14	76.66
7	49	-2.03	18.06		81.94
8	48	-1.44	20.85		79.15
9	47	-1.04	16.07		83.93
10	46	-0.87	14.54	3.88	81.58
11	45	-0.91	9.84	0.02	90.14
12	44	-0.75	11.81		88.19
13	43	-0.47	20.97		79.03
14	42	-0.41	22.46		77.54
15	41	-0.08	40.73		59.27
16	40	-0.07	22.63		77.37
17	39	0.19	40.00		60.00
18	38	0.70	65.00		35.00
19	37	1.06	55.00		45.00
20	36	1.03	75.00		25.00
21	35	1.60	88.47		11.53
22	34	1.99	87.83		12.17
23	33	2.13	99.45		0.55
24	32	2.50	100.00		
25	31	2.36	96.06		3.94
26	30	2.64	98.26	1.74	
27	29	2.71	100.00		
28	28	2.76	100.00		
29	27	2.71	100.00		
30	26	2.98	100.00		
31	25	3.09	100.00		
32	24	3.24	100.00		
33	23	3.34	100.00		
34	22	3.39	100.00		
35	21	3.34	100.00		
36	20	3.57	100.00		
37	19	3.99	100.00		
38	18	4.03	100.00		
39	17	3.98	100.00		
40	16	4.61	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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	-3.55	30.19		69.81
3	53	-2.07	2.44		97.56
4	52	-1.64	2.56		97.44
5	51	-1.53	13.02	0.32	86.66
6	50	-1.55	31.37	7.09	61.54
7	49	-1.36	6.81		93.18
8	48	-0.98	25.85	0.04	74.11
9	47	-0.92	21.63		78.37
10	46	-0.69	20.00		80.00
11	45	-0.29	38.31		61.69
12	44	-0.27	27.59		72.41
13	43	-0.23	60.71		39.29
14	42	-0.06	23.38		76.62
15	41	0.20	55.00		45.00
16	40	0.53	78.14		21.86
17	39	0.45	41.50		58.50
18	38	0.76	57.15		42.85
19	37	1.29	76.28		23.72
20	36	1.36	70.00		30.00
21	35	1.91	92.90		7.10
22	34	2.10	100.00		
23	33	2.18	93.64		6.36
24	32	2.56	100.00		
25	31	2.72	88.78	11.22	
26	30	2.66	100.00		
27	29	2.77	100.00		
28	28	2.99	100.00		
29	27	3.03	100.00		
30	26	2.98	100.00		
31	25	3.24	100.00		
32	24	3.35	100.00		
33	23	3.44	100.00		
34	22	3.58	100.00		
35	21	3.63	100.00		
36	20	3.91	100.00		
37	19	3.99	100.00		
38	18	4.03	100.00		
39	17	3.98	100.00		
40	16	4.61	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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	-1.42	22.52		77.48
3	53	-0.24	45.73	14.34	39.93
4	52	0.01	55.66		44.34
5	51	-0.80	33.21	1.82	64.98
6	50	-0.41	43.26		56.74
7	49	-0.72	37.76	10.81	51.43
8	48	-0.63	13.78	0.67	85.56
9	47	-0.54	2.94	15.75	81.31
10	46	-0.49	12.95	10.75	76.29
11	45	-0.05	28.58		71.41
12	44	-0.18	41.34		58.66
13	43	0.07	25.00		75.00
14	42	0.62	60.94		39.06
15	41	0.44	53.45		46.55
16	40	0.82	47.16		52.84
17	39	0.95	52.10		47.90
18	38	0.95	60.91		39.09
19	37	1.65	100.00		
20	36	1.90	97.02		2.98
21	35	2.02	88.04		11.96
22	34	2.25	85.12	8.59	6.30
23	33	2.39	98.07	0.03	1.90
24	32	2.73	100.00		
25	31	2.86	100.00		
26	30	2.82	100.00		
27	29	2.95	98.26	1.70	0.05
28	28	3.06	100.00		
29	27	3.19	100.00		
30	26	3.35	100.00		
31	25	3.42	97.60		2.39
32	24	3.35	97.34	0.98	1.68
33	23	3.49	100.00		
34	22	3.70	100.00		
35	21	3.79	100.00		
36	20	4.05	100.00		
37	19	4.00	100.00		
38	18	4.51	100.00		
39	17	4.58	100.00		
40	16	4.82	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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	-0.53	14.92	0.06	85.02
3	53	0.36	57.51	11.50	30.99
4	52	0.28	66.53		33.47
5	51	-0.13	59.48		40.52
6	50	0.93	62.83		37.17
7	49	1.27	95.00		5.00
8	48	-0.05	7.01	28.45	64.54
9	47	-0.01	25.19	30.66	44.15
10	46	-0.17	7.51		92.49
11	45	0.10	18.03		81.97
12	44	0.61	53.72		46.28
13	43	0.54	58.86		41.13
14	42	1.04	61.31		38.69
15	41	1.08	52.09		47.91
16	40	1.03	67.25		32.75
17	39	1.46	70.00		30.00
18	38	1.64	86.51		13.49
19	37	1.83	75.85	6.67	17.48
20	36	2.04	86.50	0.59	12.91
21	35	2.32	100.00		
22	34	2.59	100.00		
23	33	2.59	100.00		
24	32	2.74	100.00		
25	31	3.01	100.00		
26	30	2.97	100.00		
27	29	3.12	100.00		
28	28	3.41	100.00		
29	27	3.25	97.93	2.07	
30	26	3.36	96.80	1.14	2.06
31	25	3.45	100.00		
32	24	3.51	100.00		
33	23	3.49	100.00		
34	22	3.92	100.00		
35	21	4.01	100.00		
36	20	4.33	100.00		
37	19	4.40	100.00		
38	18	4.66	100.00		
39	17	4.76	100.00		
40	16	4.85	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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	1.00	98.56		1.44
3	53	3.20	100.00		
4	52	1.25	100.00		
5	51	2.49	100.00		
6	50	1.31	100.00		
7	49	2.37	100.00		
8	48	2.71	100.00		
9	47	0.81	40.00		60.00
10	46	1.80	88.92		11.08
11	45	0.43	35.75		64.25
12	44	0.62	45.47		54.53
13	43	1.43	71.94		28.06
14	42	1.29	80.00		20.00
15	41	1.81	96.63		3.37
16	40	1.57	76.45		23.55
17	39	1.71	100.00		
18	38	2.29	100.00		
19	37	2.04	100.00		
20	36	2.34	100.00		
21	35	2.69	100.00		
22	34	2.60	100.00		
23	33	2.63	100.00		
24	32	3.06	100.00		
25	31	3.05	100.00		
26	30	3.43	100.00		
27	29	3.17	100.00		
28	28	3.43	100.00		
29	27	3.46	100.00		
30	26	3.50	100.00		
31	25	3.50	100.00		
32	24	3.54	100.00		
33	23	3.79	100.00		
34	22	4.05	100.00		
35	21	4.14	100.00		
36	20	4.41	100.00		
37	19	4.59	100.00		
38	18	4.66	100.00		
39	17	4.81	100.00		
40	16	4.95	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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	2.12	76.88		23.12
3	53	3.59	100.00		
4	52	4.76	99.28	0.58	0.15
5	51	3.74	100.00		
6	50	3.93	100.00		
7	49	3.18	100.00		
8	48	3.68	100.00		
9	47	4.30	100.00		
10	46	3.73	100.00		
11	45	4.00	100.00		
12	44	2.44	100.00		
13	43	1.46	85.00		15.00
14	42	1.93	68.44	10.10	21.45
15	41	1.89	72.92		27.08
16	40	2.28	92.02	7.97	
17	39	2.65	90.00		10.00
18	38	2.38	91.06		8.94
19	37	2.42	100.00		
20	36	2.80	100.00		
21	35	2.75	100.00		
22	34	2.86	100.00		
23	33	3.21	96.12	3.87	
24	32	3.10	100.00		
25	31	3.42	99.28	0.71	0.01
26	30	3.45	99.99		
27	29	3.77	98.94	0.01	1.05
28	28	3.69	97.02		2.98
29	27	3.70	100.00		
30	26	3.81	100.00		
31	25	3.94	100.00		
32	24	4.06	100.00		
33	23	4.11	100.00		
34	22	4.19	100.00		
35	21	4.46	100.00		
36	20	4.68	100.00		
37	19	4.71	100.00		
38	18	4.85	100.00		
39	17	4.90	100.00		
40	16	5.10	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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	4.35	95.49	4.51	
3	53	5.63	100.00		
4	52	6.11	93.31	6.69	
5	51	6.45	100.00		
6	50	6.70	100.00		
7	49	5.75	100.00		
8	48	6.28	100.00		
9	47	6.33	100.00		
10	46	5.66	100.00		
11	45	5.86	100.00		
12	44	5.17	100.00		
13	43	5.64	100.00		
14	42	3.99	100.00		
15	41	2.72	100.00		
16	40	2.94	100.00		
17	39	3.02	100.00		
18	38	2.85	100.00		
19	37	2.87	98.59	1.41	
20	36	3.29	100.00		
21	35	2.93	85.00	15.00	
22	34	3.23	100.00		
23	33	3.35	100.00		
24	32	3.37	98.02		1.98
25	31	3.46	100.00		
26	30	3.71	96.44		3.56
27	29	3.81	100.00		
28	28	3.93	100.00		
29	27	4.07	100.00		
30	26	4.16	100.00		
31	25	4.13	95.93	4.06	
32	24	4.17	100.00		
33	23	4.39	100.00		
34	22	4.44	100.00		
35	21	4.60	100.00		
36	20	4.68	100.00		
37	19	4.84	100.00		
38	18	4.89	100.00		
39	17	5.04	100.00		
40	16	6.09	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 Inflation-Adjusted Corpus  
1946-2000**

Horizon Years	#Obs	MSR	Portfolio		
			L	CB	T
2	54	8.35	100.00		
3	53	8.63	100.00		
4	52	8.08	100.00		
5	51	8.93	100.00		
6	50	8.38	100.00		
7	49	8.48	100.00		
8	48	8.37	100.00		
9	47	8.44	100.00		
10	46	7.97	90.22	9.78	
11	45	7.73	100.00		
12	44	8.07	100.00		
13	43	7.36	100.00		
14	42	7.64	100.00		
15	41	7.23	100.00		
16	40	7.51	100.00		
17	39	6.26	100.00		
18	38	5.93	100.00		
19	37	6.00	100.00		
20	36	5.08	100.00		
21	35	4.47	100.00		
22	34	4.64	100.00		
23	33	3.74	100.00		
24	32	4.03	100.00		
25	31	3.99	100.00		
26	30	4.07	100.00		
27	29	4.14	100.00		
28	28	4.13	100.00		
29	27	4.39	100.00		
30	26	4.43	100.00		
31	25	4.60	100.00		
32	24	4.70	100.00		
33	23	4.90	100.00		
34	22	5.98	100.00		
35	21	6.14	100.00		
36	20	6.09	100.00		
37	19	6.15	100.00		
38	18	6.26	100.00		
39	17	6.32	100.00		
40	16	7.96	100.00		

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