REVERSE
DOLLAR COST AVERAGING

By Henry K. Hebeler
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Savers making regular investments benefit from dollar cost averaging. Volatility is a boon to these regular investors because they periodically invest at a low point in a market cycle. In general, the advantage of buying more shares at a lower price more than offsets the disadvantage or buying fewer shares at a correspondingly higher price over time. Frequently, these occurrences are enough to provide long-term returns that are *higher* than the simple returns generated by the underlying investments.

On the other hand retirees who are withdrawing money from a portfolio experience the exact opposite, or negative effect of this phenomenon. This is the principle of *reverse dollar cost averaging*. The long term effect is that retirees get less out of their investments than historical rates might suggest, because they take money out on a regular basis, and the periodic withdrawals in a low market leaves permanent damage.

The message is loud and clear. The returns for retirement planning are far too high for a retiree who wants a fair chance of financial survival.

In order to keep the evaluation of investments simple, the standard way to report a return over a period of years is to start with $1 and let it grow assuming all dividends and interest are reinvested each year. At the end of a period of 5, 10, or whatever years, there is an ending balance. Analysts, using financial calculators or compound growth tables, then determine the growth rate to give the same ending balance. Analysts cite that compound growth rate as the long-term return.

For those who are not interested in following the math demonstration that follows, let's try using a little logic to explain ***reverse*** dollar cost averaging. To keep it simple, consider stocks that pay no dividend. For every buyer of stock, there must be a seller. The buyer is the saver and the seller is the person who is withdrawing money. Each trade has a unique price agreed upon between the buyer and the seller. In the absence of any dividends, the ratio of the price at the end of a period to the price at the beginning of the period solely determines the return. Now if a regular buyer of stock gets a higher than average return using dollar cost averaging, then the person on the other side of the transaction, who is selling the stock on a regular basis, must be getting a lower than average return. That's because the return of all traders must be someplace in between. If that were not so, everyone would be doing better than average. This is a zero sum game. For every winner, there must be a loser. The loser is the retiree who is regularly selling securities and withdrawing money for living expenses. The retiree suffers from reverse dollar cost averaging.

Well let's see if dollar cost averaging really works, what its gain main be, and if there is a corresponding lower return for the person who is regularly withdrawing money. We'll look at an example portfolio that is continually rebalanced so that it always has 50% large company stocks (like the S&P 500), 40% bonds (like long-term corporate bonds), and 10% money markets (like short-term Treasury bills). We'll use data going back to 1926 for these securities from Global Financial Data on www.globalfindata.com. All dividends and interest are reinvested.

To add a touch of realism, we'll account for investment costs of 1.5% for the stocks, 0.5% for the bonds, and 0.3% for the Treasury bills. To add a lot of realism, we'll also account for inflation in each year so that we'll look at inflation adjusted returns otherwise known as real returns. We'll compute real returns over rolling 20 year periods using 1927 as the beginning point of the first 20 year period. We'll look at 50 such 20 year periods so the last period will begin in 1976 and end in 1995. For each period we're going to calculate three real returns:

1. A real return based on compound growth of $1 deposited at the beginning of the first year. This is the basis used by mutual fund companies and analysts to report securities performance.
2. A real return based on depositing $1 each year, but that $1 will continually be adjusted for inflation so that we are depositing $1 of real value each year. This is the assumption that is used in most savings calculations for retirement planning.
3. A real return based on withdrawing $1 each year, but that $1 also will be adjusted for inflation so that we are withdrawing $1 of real value each year. This is the basic assumption used in almost all retirement planning programs.

Figure 1 shows the results of those calculations. The first column is the year in which each 20 year period begins. The next three columns show the returns for each of the three cases above. But wait, look at the 1927 result. The return for deposits is less than the long-term return, and the return for withdrawals is more. Isn't this exactly the opposite of what was supposed to happen? The answer is yes, but that's not what happens in the average case. In fact, the majority of the cases show that dollar cost averaging helps and reverse dollar cost averaging hurts. In fact, the average of all of those 50 periods shows real returns of 2.9% long-term, 3.2% for deposits, and 2.6% for withdrawals, thus proving both reverse and ordinary dollar cost averaging principles.

The final perspective we'd like to illustrate is in Figure 2. There we sort the return columns from Figure 1 so that the lowest return is at the top. The median, or 50 percentile returns for the three cases are 3.3%, 4.1%, and 2.4% respectively. In half of the past 20 year periods, retirees fared a lot worse than savers. Retirees need more than a 50% chance that their money will last, so let's look at the 80th percentile for a possible value to use in planning for a retiree. There we find 0.3% for a retiree's withdrawals. The retiree has virtually no return. Yet most planning programs would have you use about 4% real return for this situation. That's dangerous by historical standards!!!

Fig. 1. Real Returns for 20 Year Rolling Periods

Year	Growth	Deposits	Draws
1927	3.7%	1.8%	6.3%
1928	2.3%	0.8%	4.2%
1929	1.2%	0.6%	1.9%
1930	2.0%	1.5%	2.4%
1931	2.6%	2.1%	3.3%
1932	3.7%	2.2%	5.8%
1933	3.6%	2.6%	4.9%
1934	2.3%	2.2%	2.4%
1935	3.6%	4.2%	2.8%
1936	3.3%	5.3%	1.0%
1937	2.5%	5.0%	-0.3%
1938	3.3%	4.1%	2.3%
1939	3.2%	5.4%	0.6%
1940	3.4%	5.6%	0.8%
1941	3.7%	5.4%	1.7%
1942	5.2%	6.2%	3.9%
1943	4.9%	5.4%	4.3%
1944	5.0%	5.9%	3.8%
1945	5.0%	6.2%	3.4%
1946	4.4%	6.2%	2.2%
1947	5.0%	5.0%	5.2%
1948	5.8%	5.2%	6.8%
1949	5.9%	4.8%	7.6%
1950	4.7%	3.1%	6.9%
1951	4.3%	2.7%	6.5%
1952	4.4%	2.9%	6.5%
1953	4.4%	3.2%	6.1%
1954	3.6%	1.2%	6.9%
1955	1.1%	-1.7%	4.1%
1956	1.0%	-0.4%	2.6%
1957	1.6%	0.6%	2.9%
1958	1.6%	-0.5%	4.0%
1959	0.4%	-1.1%	2.1%
1960	0.0%	-1.6%	1.7%
1961	0.1%	-1.4%	1.6%
1962	-0.9%	-2.1%	0.3%
1963	0.2%	-0.2%	0.6%
1964	0.2%	0.8%	-0.3%
1965	0.1%	1.3%	-1.1%
1966	0.9%	3.2%	-1.4%
1967	2.1%	4.5%	-0.4%
1968	1.6%	4.1%	-1.0%
1969	1.9%	4.7%	-1.1%
1970	3.3%	5.9%	0.3%
1971	3.1%	5.3%	0.5%
1972	3.6%	6.5%	0.0%
1973	3.4%	6.7%	-0.5%
1974	4.5%	7.1%	1.3%
1975	5.7%	6.4%	4.8%
1976	5.2%	6.3%	3.7%
Average	2.9%	3.2%	2.6%

Fig. 2. Real Returns in Ascending Order

Percentile	Growth	Deposits	Draws
100	-0.9%	-2.1%	-1.4%
98	0.0%	-1.7%	-1.1%
96	0.1%	-1.6%	-1.1%
94	0.1%	-1.4%	-1.0%
92	0.2%	-1.1%	-0.5%
90	0.2%	-0.5%	-0.4%
88	0.4%	-0.4%	-0.3%
86	0.9%	-0.2%	-0.3%
84	1.0%	0.6%	0.0%
82	1.1%	0.6%	0.3%
80	1.2%	0.8%	0.3%
78	1.6%	0.8%	0.5%
76	1.6%	1.2%	0.6%
74	1.6%	1.3%	0.6%
72	1.9%	1.5%	0.8%
70	2.0%	1.8%	1.0%
68	2.1%	2.1%	1.3%
66	2.3%	2.2%	1.6%
64	2.3%	2.2%	1.7%
62	2.5%	2.6%	1.7%
60	2.6%	2.7%	1.9%
58	3.1%	2.9%	2.1%
56	3.2%	3.1%	2.2%
54	3.3%	3.2%	2.3%
52	3.3%	3.2%	2.4%
50	3.3%	4.1%	2.4%
48	3.4%	4.1%	2.6%
46	3.4%	4.2%	2.8%
44	3.6%	4.5%	2.9%
42	3.6%	4.7%	2.9%
40	3.6%	4.8%	3.3%
38	3.6%	5.0%	3.4%
36	3.7%	5.0%	3.7%
34	3.7%	5.2%	3.8%
32	3.7%	5.3%	3.9%
30	4.3%	5.3%	4.0%
28	4.4%	5.4%	4.1%
26	4.4%	5.4%	4.2%
24	4.4%	5.4%	4.3%
22	4.5%	5.6%	4.8%
20	4.7%	5.9%	4.9%
18	4.8%	5.9%	5.2%
16	4.9%	6.2%	5.8%
14	5.0%	6.2%	6.1%
12	5.0%	6.2%	6.3%
10	5.0%	6.2%	6.5%
8	5.2%	6.3%	6.5%
6	5.2%	6.4%	6.8%
4	5.7%	6.5%	6.9%
2	5.8%	6.7%	6.9%