

While the goal of most investors is to “buy low and sell high,” some of us have the uncanny knack of doing just the opposite—buying at the very peak and selling at the very bottom. The market moves up and down, and very few investors have demonstrated the ability to consistently predict where it is headed over a long period of time. For someone looking to commit a large amount of money to the market, the specter of another market correction can be a disturbing thought. However, history has shown that sitting on the sidelines can be even more destructive, as we miss out on the superior long-term returns of the stock market.

One way to counteract the fluctuations of the market, thereby reducing timing risk, is to follow a “formula strategy” that “mechanically” guides your investing. Perhaps the best-known formula plan is dollar cost averaging, whereby you invest a fixed dollar amount in an asset at equal intervals over a long period. As a result, more shares of a stock or mutual fund are purchased when prices are relatively low, while fewer shares are purchased when prices are relatively high. Over time, this strategy can lead to a lower average per-share cost, which, in turn, increases the rate of return.

In the August 1988 *AAIL Journal*, Michael Edleson introduced an alternate concept to dollar cost averaging called value averaging. Instead of investing a fixed dollar amount each period, you set the value of your investment holding to increase by a fixed amount or percentage each period. If share price increases alone cause the total value of your investment to increase above the planned periodic fixed increase amount, you must sell shares instead of adding to the investment. This investment accumulation strategy, which Edleson expands upon in his book “Value Averaging: The Safe and Easy Strategy

for Higher Investment Returns” (John Wiley & Sons, 2006), is more flexible than dollar cost averaging, has a lower per-share purchase cost, and tends to have a higher rate of return.

In this installment of Spreadsheet Corner, we revisit a value averaging spreadsheet developed in the July/August 2001 issue of *CI* by John Markese, former AAIL president, and John Bajkowski, AAIL president and former editor of *Computerized Investing*.

Dollar Cost Averaging Versus Value Averaging

Compared to dollar cost averaging, value averaging is a more aggressive approach because it forces you to invest more money when the market is falling and the total value of your holdings is decreasing.

When the value of your holdings goes up, you invest less money buying the higher-priced shares, and there is the potential that you may need to sell shares.

Choosing an appropriate long-term time horizon is key to successfully implementing an averaging strategy. Choosing a longer horizon will help you avoid the potential disaster of investing a substantial portion of your portfolio in the market at its high point. At a minimum, take two years—investing monthly or quarterly—to complete your move into the market. More patient investors may choose a longer period, perhaps as long as five years.

Investors who do not already have a significant pool of cash but do have cash periodically available are spared the temptation of rushing into the market all at once. While such investors are perfectly positioned for an averaging strategy, they may never start an investment program without a system such as this.

Lastly, the frequency of your investments must be taken into consideration. Investing often enough over a uniform time interval is important.

Quarterly or monthly investments are reasonable. Investing more frequently, such as weekly, is probably overkill, while investing less often is too infrequent and possibly defeats the benefits of diversifying over time in an ever-changing market.

Comparing the Strategies

Table 1 compares dollar cost averaging to value averaging, illustrating the structure of each investment plan and highlighting their differences. We used the PowerShares QQQ exchange-traded fund (QQQ), which tracks the NASDAQ-100 index, a listing of the 100 largest non-financial stocks listed on the NASDAQ Stock Market. The time period covered is the last 24 months, March 2, 2009, through March 1, 2011; the investment frequency is monthly. Keep in mind that these averaging techniques can be used to invest in individual stocks and closed-end mutual funds as well.

We ignored dividend and capital gains distributions to simplify the presentation, but for investors the reinvestment of all dividends and distributions should be part of any investment plan.

Table 1 uses a \$1,000 initial investment coupled with a \$500 monthly contribution for the dollar cost averaging approach: \$500 is invested on the first trading day of each month at the prevailing price of the exchange-traded fund (ETF).

For the value averaging approach, the same \$1,000 initial investment is used along with a \$500 monthly increase in value: The amount actually invested each month varies such that the total value of our investment increases by \$500 each month; if the share price increases enough to cause the total value of our holdings to increase by more than \$500 during the month, we would sell shares to hold the increase in value to \$500 for the period. For example, in July 2010 QQQQ shares jumped in price

Table 1. Dollar Cost Averaging Versus Value Averaging

PowerShares QQQ ETF (QQQQ)											
Date	NAV (\$)	Dollar Cost Averaging (\$1,000 initial investment, \$500 invested each month)					Value Averaging (\$1,000 initial investment, \$500 increase each month)				
		Amount Invested (\$)	No. of Shares Bought (#)	Total No. of Shares Owned (#)	Total Invested (\$)	Total Value (\$)	Amount Invested (\$)	No. of Shares Bought (#)	Total No. of Shares Owned (#)	Total Invested (\$)	Total Value (\$)
3/2/2009	26.94	(1,000)	37.120	37.12	(1,000)	1,000	(1,000)	37.120	37.12	(1,000)	1,000
4/1/2009	30.35	(500)	16.474	53.59	(1,500)	1,627	(373)	12.304	49.42	(1,373)	1,500
5/1/2009	34.30	(500)	14.577	68.17	(2,000)	2,338	(305)	8.886	58.31	(1,678)	2,000
6/1/2009	36.06	(500)	13.866	82.04	(2,500)	2,958	(397)	11.020	69.33	(2,076)	2,500
7/1/2009	36.54	(500)	13.684	95.72	(3,000)	3,498	(467)	12.773	82.10	(2,542)	3,000
8/3/2009	39.90	(500)	12.531	108.25	(3,500)	4,319	(224)	5.617	87.72	(2,766)	3,500
9/1/2009	39.73	(500)	12.585	120.84	(4,000)	4,801	(515)	12.960	100.68	(3,281)	4,000
10/1/2009	41.56	(500)	12.031	132.87	(4,500)	5,522	(316)	7.598	108.28	(3,597)	4,500
11/2/2009	41.09	(500)	12.168	145.04	(5,000)	5,960	(551)	13.407	121.68	(4,148)	5,000
12/1/2009	44.02	(500)	11.358	156.39	(5,500)	6,884	(143)	3.259	124.94	(4,291)	5,500
1/4/2010	46.37	(500)	10.783	167.18	(6,000)	7,752	(206)	4.451	129.39	(4,498)	6,000
2/1/2010	43.08	(500)	11.606	178.78	(6,500)	7,702	(926)	21.488	150.88	(5,424)	6,500
3/1/2010	45.20	(500)	11.062	189.85	(7,000)	8,581	(180)	3.985	154.87	(5,604)	7,000
4/5/2010	48.43	(500)	10.324	200.17	(7,500)	9,694	0	(0.005)	154.86	(5,603)	7,500
5/3/2010	49.74	(500)	10.052	210.22	(8,000)	10,456	(297)	5.974	160.84	(5,901)	8,000
6/1/2010	45.50	(500)	10.989	221.21	(8,500)	10,065	(1,182)	25.977	186.81	(7,083)	8,500
7/1/2010	42.54	(500)	11.754	232.96	(9,000)	9,910	(1,053)	24.752	211.57	(8,136)	9,000
8/2/2010	46.51	(500)	10.750	243.72	(9,500)	11,335	340	(7.308)	204.26	(7,796)	9,500
9/1/2010	44.46	(500)	11.246	254.96	(10,000)	11,336	(919)	20.664	224.92	(8,714)	10,000
10/1/2010	49.20	(500)	10.163	265.12	(10,500)	13,044	566	(11.507)	213.41	(8,148)	10,500
11/1/2010	52.33	(500)	9.555	274.68	(11,000)	14,374	168	(3.210)	210.20	(7,980)	11,000
12/1/2010	53.09	(500)	9.418	284.10	(11,500)	15,083	(340)	6.409	216.61	(8,320)	11,500
1/3/2011	55.23	(500)	9.053	293.15	(12,000)	16,191	(36)	0.660	217.27	(8,357)	12,000
2/1/2011	56.75	(500)	8.811	301.96	(12,500)	17,136	(170)	2.991	220.26	(8,527)	12,500
3/1/2011	57.39										
Average	43.71										

Dollar Cost Averaging Method	Value Averaging Method		
Final Value (3/1/2011)	\$17,329	Final Value (3/1/2011)	\$12,641
Total Invested	(12,500)	Total Invested	(8,527)
Average Cost per Share	\$41.40	Average Cost per Share	\$38.71
Internal Rate of Return	33.6%	Internal Rate of Return	36.1%

from \$42.54 to \$46.51. To keep the increase in value for the month to \$500, the following calculations must be made: At the beginning of August, before any changes were made to the portfolio, the investor held 211.57 shares of QQQQ at a price of \$46.51 per share. Between July 1, 2010, and August 2, 2010, the price increased \$3.97 per share (\$46.51 – \$42.54) or roughly \$840, \$340 more than the planned \$500 increase for the month. Therefore, 7.308 shares (\$339.93 divided by \$46.51) need to be sold.

While dollar cost averaging is constant and unchanging, value averaging forces sales when prices rise sharply and forces larger purchases—more shares purchased—when prices fall. For example, between May 3,

2010, and June 1, 2010, QQQQ shares fell from \$49.74 to \$45.50. This resulted in the need for a \$1,182 investment under the value averaging approach.

With value averaging, when you first begin the program, the ending investment value is known, but the total investment amount isn't. In our example in Table 1, the portfolio grew to \$12,500 over 24 months, while a total of \$8,527 was invested in the PowerShares QQQ ETF. Again, note that we did not reinvest distributions in this example.

Under the dollar cost averaging approach, we knew that the total amount invested over 24 months would be \$12,500. This investment in QQQQ shares grew to \$17,136

over 24 months. When you start a dollar cost averaging program, the amount you will invest is known, but the ending investment value is not.

Remember that the goal of value averaging is to increase your portfolio by a fixed amount each period, and it may take substantial investments to do so, conceivably much more than or much less than those demanded by the dollar cost averaging total.

Which Method Works Best?

While either approach could dominate over any time period, value averaging probably has the edge because it is more aggressive. However, value averaging requires more monitoring, more transactions costs and, because it triggers sales, potentially more tax

Figure 1. Value Averaging Spreadsheet With No Selling of Shares

Value Averaging Worksheet, Second Quarter 2011 Computerized Investing									
Ticker	VTI	Security		Vanguard Total Stock Market ETF					
\$1,000	Dollar Amount of Initial Investment								
\$1,000	Dollar Amount of Increase Desired Each Period								
0	<< Purchase Fractional Shares? (Enter 1 if Yes, 0 if No)								
Fractional shares WILL NOT purchased									
0	<< Do You Wish to Sell Shares to Force Portfolio to Maintain Desired Value? (Enter 1 if Yes, 0 if No)								
Shares WILL NOT be sold to force portfolio to desired level									
Date	Desired Value	Share Price or NAV	Shares Acquired Since Last Rebalancing	No. of Shares Owned Before Rebalancing	Total Value Before Rebalancing	Amount to Invest (Redeem)	No. of Shares to Buy (Sell)	No. of Shares Owned After Rebalancing	Total Invested
2/2/2009	\$1,000	40.84		0.000	\$0.00	\$1,000.00	24.000	24.000	\$1,000
3/2/2009	\$2,000	35.59		24.000	\$854.16	\$1,145.84	32.000	56.000	\$2,146
4/1/2009	\$3,000	39.73		56.000	\$2,224.88	\$775.12	20.000	76.000	\$2,921
5/1/2009	\$4,000	44.01		76.000	\$3,344.76	\$655.24	15.000	91.000	\$3,576
6/1/2009	\$5,000	47.28		91.000	\$4,302.48	\$697.52	15.000	106.000	\$4,274
7/1/2009	\$6,000	46.60		106.000	\$4,939.60	\$1,060.40	23.000	129.000	\$5,334
8/3/2009	\$7,000	50.44		129.000	\$6,506.76	\$493.24	10.000	139.000	\$5,827
9/1/2009	\$8,000	51.13		139.000	\$7,107.07	\$892.93	17.000	156.000	\$6,720
10/1/2009	\$9,000	52.78		156.000	\$8,233.68	\$766.32	15.000	171.000	\$7,487
11/2/2009	\$10,000	52.44		171.000	\$8,967.24	\$1,032.76	20.000	191.000	\$8,519
12/1/2009	\$11,000	55.78		191.000	\$10,653.98	\$346.02	6.000	197.000	\$8,865
1/4/2010	\$12,000	57.10		197.000	\$11,248.70	\$751.30	13.000	210.000	\$9,617
2/1/2010	\$13,000	54.96		210.000	\$11,541.60	\$1,458.40	27.000	237.000	\$11,075
3/1/2010	\$14,000	56.70		237.000	\$13,437.90	\$562.10	10.000	247.000	\$11,637
4/5/2010	\$15,000	60.39		247.000	\$14,816.33	\$83.67	1.000	248.000	\$11,721
5/3/2010	\$16,000	61.43		248.000	\$15,234.64	\$765.36	12.000	260.000	\$12,486
6/1/2010	\$17,000	55.38		260.000	\$14,398.80	\$2,601.20	47.000	307.000	\$15,087
7/1/2010	\$18,000	52.25		307.000	\$16,040.75	\$1,959.25	37.000	344.000	\$17,047
8/2/2010	\$19,000	57.26		344.000	\$19,697.44	\$0.00	0.000	344.000	\$17,047
9/1/2010	\$20,000	54.73		344.000	\$18,827.12	\$1,172.88	21.000	365.000	\$18,220
10/1/2010	\$21,000	58.66		365.000	\$21,410.90	\$0.00	0.000	365.000	\$18,220
11/1/2010	\$22,000	60.87		365.000	\$22,217.55	\$0.00	0.000	365.000	\$18,220
12/1/2010	\$23,000	62.16		365.000	\$22,888.40	\$311.60	5.000	370.000	\$18,531
1/3/2011	\$24,000	65.55		370.000	\$24,253.50	\$0.00	0.000	370.000	\$18,531
2/1/2011	\$25,000	67.06		370.000	\$24,812.20	\$187.80	3.000	373.000	\$18,719
3/1/2011		68.25						Final Value:	\$25,457
								Total Net Cost:	(\$18,719)
	Avg Share Price or NAV:	53.64						Average Net Cost Per Share:	50.18
								Internal Rate of Return:	28.0%

consequences. Value averaging can be modified so that no sales take place, with future value increases adjusted to compensate. Also, the loss potential is greater for value averaging because the amount required to be invested is unconstrained.

Please note that you cannot judge which approach did best in the examples simply by looking at ending portfolio values because the amounts invested and the timing of the investments differ for the two approaches. The calculation to determine performance is called an internal rate of return (IRR), which takes into consideration all the cash flows and their timing. From Table 1, we see that both dollar cost averaging and value averaging yield lower average cost per share values than the average monthly price of QQQQ shares over the test period. However, value averaging has a lower per-share cost—

\$38.71 versus \$41.40—as well as a higher internal rate of return—36.1% compared to 33.6%.

Value Averaging Spreadsheet

Since the amount of money you need to invest with a value averaging strategy will change every period depending on the price movement in the security, a spreadsheet is a useful tool for calculating the periodic investment amount.

While Edleson views the potential for forced sales as an advantage of value averaging, others view it in a negative light. Unless your investment is in a tax-sheltered account, you may be forced to pay capital gains taxes earlier than you otherwise had planned. Our value averaging spreadsheet allows you to set whether or not you wish to sell shares when

the value of your fund increases beyond the desired amount.

Figures 1 and 2 present the Value Averaging Spreadsheet. It is also available for download from the AAIL.com Download Library from both the “Files from AAIL” and “Spreadsheets” sections. We use the Vanguard Total Stock Market ETF (VTI) as an example in the spreadsheet. To use the spreadsheet, you first enter the initial investment amount in cell A5 and the dollar amount by which you want your investment to grow each period in cell A6. Allowing for two separate entries is useful since some funds require a higher initial investment than is required for subsequent purchases. The existence of two entries also allows you to apply a value averaging plan to an existing investment. To do this, you would input the current value of your holding in cell A5 and the desired periodic change amount in cell A6. If you wish to use value averaging to exit a position over time, enter a negative value in cell A6.

Cell A7 is where you indicate whether you can purchase or sell fractional shares. Sales or purchases are normally done in whole increments for stock transactions, while mutual funds can usually be purchased or sold using fractional shares. Enter a “1” in cell A7 if you wish to deal with fractional shares, or a “0” if you do not. The message in cell B8 confirms your selection.

Cell A9 is where you indicate if you wish to sell shares when your portfolio increases beyond the desired amount in a period. Enter “1” in cell A9 if you wish to sell shares; enter “0” if you do not wish to sell on those occasions. As confirmation, a formula in cell B10 will report how the spreadsheet calculates the reinvestment amount.

Column A lists the date of each rebalancing. You can use any time period you want—simply input the dates in column A. Column B automatically calculates the desired value of your holdings for each time period based on the values you enter in cells

A5 and A6. Column C is where you input the net asset value or share price of the security.

Column D allows you to enter any share amounts that you may have acquired, or sold, since the last time you rebalanced your portfolio. You would use this column to input any shares acquired through dividend reinvestment. Column D is also where you can adjust for any difference between the number of shares you instructed your fund or broker to buy or sell and the quantity actually transacted. Small differences are not uncommon because of the time lag.

Column E sums the total number of shares from the last rebalancing and accounts for any differences entered in column D. Column F computes the total value of your holdings before the current rebalancing—multiplying the total number of shares reported in column E by the net asset value or share price in column C. Column G compares the current value of your holdings to the desired value and calculates how much money you need to invest or withdraw for the period. If you specified in cell A9 that you do not wish to sell any shares, a zero will appear in column G when your holdings go above the desired amount. Column H calculates the number of shares you need to buy or sell to rebalance, and column I estimates the number of shares you own after rebalancing. Column J keeps a running total of the amount you have invested in the security.

Looking at Figures 1 and 2, we see that the average share price of VTI over the 25-month period is \$53.64 (Cell C44). By comparison, the average share cost when we did not sell shares for rebalancing is \$50.18 (Figure 1, cell J44) and \$50.24 when we were selling shares for rebalancing (Figure 2, cell J44). Row 42 in both Figures 1 and 2 shows the share price of VTI one month after our

Figure 2. Value Averaging Spreadsheet With Selling of Shares


	A	B	C	D	E	F	G	H	I	J
1	Value Averaging Worksheet, Second Quarter 2011 Computerized Investing									
2										
3	Ticker	VTI		Security	Vanguard Total	Stock Market	ETF			
4										
5	\$1,000	Dollar Amount of Initial Investment								
6	\$1,000	Dollar Amount of Increase Desired Each Period								
7	0	<< Purchase Fractional Shares? (Enter 1 if Yes, 0 if No)								
8		Fractional shares WILL NOT purchased								
9	1	<< Do You Wish to Sell Shares to Force Portfolio to Maintain Desired Value? (Enter 1 if Yes, 0 if No)								
10		Shares WILL be sold to keep portfolio at desired level								
11										
12					No. of					
13			Share	Shares	Shares	Total	Amount	No. of	No. of	
14			Price	Acquired	Owned	Value	to	Shares	Shares	
15			or	Since Last	Before	Before	Invest	to Buy	Owned	Total
16	Date	Desired	NAV	Rebalancing	Rebalancing	Rebalancing	(Redeem)	(Sell)	Rebalancing	Invested
17	2/2/2009	\$1,000	40.84		0.000	\$0.00	\$1,000.00	24.000	24.000	\$1,000
18	3/2/2009	\$2,000	35.59		24.000	\$854.16	\$1,145.84	32.000	56.000	\$2,146
19	4/1/2009	\$3,000	39.73		56.000	\$2,224.88	\$775.12	20.000	76.000	\$2,921
20	5/1/2009	\$4,000	44.01		76.000	\$3,344.76	\$655.24	15.000	91.000	\$3,576
21	6/1/2009	\$5,000	47.28		91.000	\$4,302.48	\$697.52	15.000	106.000	\$4,274
22	7/1/2009	\$6,000	46.60		106.000	\$4,939.60	\$1,060.40	23.000	129.000	\$5,334
23	8/3/2009	\$7,000	50.44		129.000	\$6,506.76	\$493.24	10.000	139.000	\$5,827
24	9/1/2009	\$8,000	51.13		139.000	\$7,107.07	\$892.93	17.000	156.000	\$6,720
25	10/1/2009	\$9,000	52.78		156.000	\$8,233.68	\$766.32	15.000	171.000	\$7,487
26	11/2/2009	\$10,000	52.44		171.000	\$8,967.24	\$1,032.76	20.000	191.000	\$8,519
27	12/1/2009	\$11,000	55.78		191.000	\$10,653.98	\$346.02	6.000	197.000	\$8,865
28	1/4/2010	\$12,000	57.10		197.000	\$11,248.70	\$751.30	13.000	210.000	\$9,617
29	2/1/2010	\$13,000	54.96		210.000	\$11,541.60	\$1,458.40	27.000	237.000	\$11,075
30	3/1/2010	\$14,000	56.70		237.000	\$13,437.90	\$562.10	10.000	247.000	\$11,637
31	4/5/2010	\$15,000	60.39		247.000	\$14,916.33	\$83.67	1.000	248.000	\$11,721
32	5/3/2010	\$16,000	61.43		248.000	\$15,234.64	\$765.36	12.000	260.000	\$12,486
33	6/1/2010	\$17,000	55.38		260.000	\$14,398.80	\$2,601.20	47.000	307.000	\$15,087
34	7/1/2010	\$18,000	52.25		307.000	\$16,040.75	\$1,959.25	37.000	344.000	\$17,047
35	8/2/2010	\$19,000	57.26		344.000	\$19,697.44	(\$697.44)	(12,000)	332.000	\$16,349
36	9/1/2010	\$20,000	54.73		332.000	\$18,170.36	\$1,829.64	33.000	365.000	\$18,179
37	10/1/2010	\$21,000	58.66		365.000	\$21,410.90	(\$410.90)	(7,000)	358.000	\$17,768
38	11/1/2010	\$22,000	60.87		358.000	\$21,791.46	\$208.54	3.000	361.000	\$17,977
39	12/1/2010	\$23,000	62.16		361.000	\$22,439.76	\$560.24	9.000	370.000	\$18,537
40	1/3/2011	\$24,000	65.55		370.000	\$24,253.50	(\$253.50)	(4,000)	366.000	\$18,283
41	2/1/2011	\$25,000	67.06		366.000	\$24,543.96	\$456.04	7.000	373.000	\$18,739
42	3/1/2011		68.25							Final Value: \$25,457
43										Total Net Cost: (\$18,739)
44		Avg Share Price or NAV:	53.64							Average Net Cost Per Share: 50.24
45										Internal Rate of Return: 28.1%


final rebalancing (cell C42), along with the final portfolio value of \$25,457 (cell J42). This value is used to calculate the internal rate of return in cell J45 using the XIRR function in Excel. The internal rate of return on an investment is defined as the “annualized effective compounded return rate.” Specifically, the IRR of an investment is the interest rate at which the net present value of costs (negative cash flows) of the investment equals the net present value of the benefits (positive cash flows) of the investment. This calculation uses the periodic cash flows over the 25-month investment period as well as the final portfolio value (which is viewed as a cash inflow at the end of the averaging period) along with

the dates of these cash flows from Column A. It is important that the values in Column A are formatted as dates and not text, otherwise the XIRR function will not work.

For a full listing of the underlying formulas used in this value averaging spreadsheet, you can refer to the on-line version of this article at ComputerizedInvesting.com or download the Value Averaging Spreadsheet from the AAIL Download Library.

Conclusion

Dollar cost averaging and value averaging provide investors with a clearly defined investment plan. Having the path laid out before you should make the first steps much easier. Both averaging strategies attempt to reduce one of the biggest fears faced by investors—investing a large sum of money into the market prior to a severe market downturn. 

 **John Markese**, former president of AAIL, **John Bajkowski**, president of AAIL, and **Wayne A. Thorp, CFA**, editor of *Computerized Investing*, contributed to this article.