

Volume-adjusted moving averages

by Richard W. Arms Jr.



A moving average line is just that. It smoothes price over time, reducing erratic, shorter-term swings to a smoother, more comprehensible line. Any changes in the parameters of the moving average line, such as the time involved, the weighting, the offsetting of the print and so forth, are only attempts to make the smoothing more informative. However, there has been no real change in that the analysis is still dependent on only two factors: the price of the stock, commodity or average being studied, and the time period.

This is not to say the information is without value. Indeed, moving average lines are extremely informative. Through them, basic trends can be seen more clearly, uninfluenced by short-term fluctuations. When different moving averages are combined, the crossovers often can be very profitable signals.

However, time-based moving averages make the assumption that all days are equal. Whether the stock is quiet and inactive or swinging wildly and generating huge volume, the day's contribution to the moving average is the same: one price entry in the moving average.

But all days are *not* the same. A stock long dormant that has a sharp increase in volume is signaling a change in character, which can lead to profits if it is recognized and acted on. A moving average, regardless of its other parameters, should be responsive to such changes. Important trading days should have a heavier weighting in the moving average than less important ones.

Equivolume charting

Equivolume charting (Figure 1) makes such weighting possible because each posting reflects volume as well as price so that heavier-volume days emphasize, unequivocally, the significance of the trading day. (See "Trading T-bonds with Equivolume," *Stocks & Commodities*, September 1989.)

Equivolume is a charting method in which price and volume are made equal partners, rather than relegating volume information to the bottom margin of the chart. As in Figure 1, each day of trading is represented by a box. The vertical scale is price so that the top of the box is the high for the day and the bottom of the box is the low for the day. Where an Equivolume chart differs from a typical bar chart is in its horizontal dimension. The width of the box represents the trading volume for the day. Thus, the x-axis on the chart becomes volume rather than time, and equal distances along this dimension represent similar amounts of stock changing hands rather than similar amounts of time.

Volume-adjusted moving average

Creating a volume-adjusted moving average for the price of a stock or commodity starts by selecting a minimum volume increment for the x-axis that will produce a legible chart. Computer-drawn charts continually readjust the volume scale, but not beyond a minimum width. (See "What volume is it?," *Stocks & Commodities*, December 1989.)

Then, as the first step in calculating the moving average, ascertain the mean price for the day (high plus low divided by two). Post that price one or more times, depending on the width of the box (Figure 2, "Price midpoint" column). A low-volume day may produce a box only one increment wide, while a heavy-volume day may produce a box four or five increments wide. Post the midpoint price as many times as necessary to reflect the width of the box.

The next step is averaging prices over a certain number of volume increments rather than time so that, instead of talking about a 10-day moving average, we may be talking about a 20-volume or 55-volume moving average. We do this by averaging the price over the last x volumes rather than the last x days or weeks. There is no direct correlation between time and volume.

Figure 2 represents a hypothetical calculation. I have posted each day's data one or more times, depending on the volume. I used a volume increment of 100,000 shares, so I post once for each 100,000 shares or any part thereof. Because the trading volume on January 2 is 97,500 shares, I entered the mean price only once in the "Price midpoint" column. On January 3, volume is more than 100,000 but under 200,000, so I post the data twice. January 4 is again less than the minimum volume requirement, so it is posted only once. However, heavy volume on January 5 of 454,300 shares merits being posted five times. This very active day will, rightfully, have a significant influence on the moving average.

The first entry in the "5-volume moving average" column is an average of the prior five entries in the "Price midpoint" column. This takes in data from less than four full days of trading. All calculations are done in the same manner, averaging desired number of entries, regardless of the time involved.

In Figure 1, an Equivolume chart of Air Products Chemicals, I asked the computer to include two moving averages, an 8-volume and a 55-volume line. I chose these because experience has shown them to be quite helpful. The 55, alone, is what we are really watching. Strong stocks tend to hold above it and weak stocks tend to stay below it. Crossovers are helpful in recognizing turning points. The 8-volume line, which is much more volatile, serves to define the current price level, allowing us to see where the two

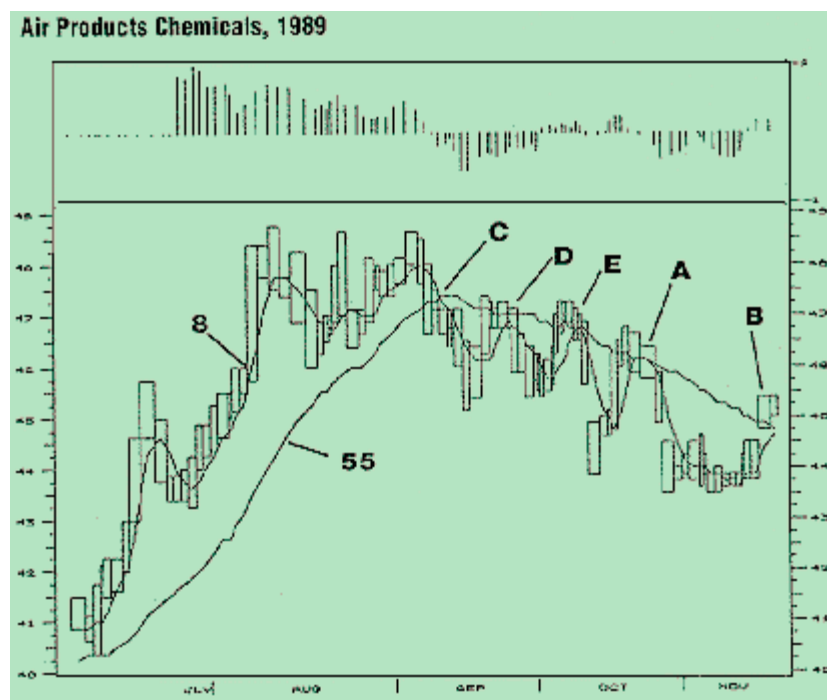


FIGURE 1: *In Equivolume charting, each day of trading is represented by a box. The vertical scale is price so that the top of the box is the high for the day and the bottom of the box is the low, and the width of the box represents the trading volume for the day.*

Sample calculation of volume-adjusted moving averages							
Date	High	Low	Volume	Price midpoint	5-volume moving av.	7-volume moving av.	12-volume moving av.
1/2/89	23.5	22.875	97,500	23.1875			
1/3/89	23.25	22.75	164,500	23			
	23.25	22.75		23			
1/4/89	24.125	23	85,000	23.5625			
1/5/89	25.75	23.875	454,300	24.8125	23.5125		
	25.75	23.875		24.8125	23.8375		
	25.75	23.875		24.8125	24.2	23.88392	
	25.75	23.875		24.8125	24.5625	24.11607	
1/8/89	25.75	23.875		24.8125	24.8125	24.375	
	25.25	24.375	387,500	24.8125	24.8125	24.63392	
	25.25	24.375		24.8125	24.8125	24.8125	
	25.25	24.375		24.8125	24.8125	24.8125	24.27083
1/9/89	25.25	24.375		24.8125	24.8125	24.8125	24.40625
	24.5	21.625	123,800	23.0625	24.4625	24.5625	24.41145
	24.5	21.625		23.0625	24.1125	24.3125	24.41666
Column 5 is the average of columns 2 and 3, the mid-point of the day's trading range							

FIGURE 2: In this sample calculation of a volume-adjusted moving average, each day's data are entered one or more times, depending on the volume. Here, a volume increment of 100,000 shares is used. The midpoint column is the number to be used in the moving average.

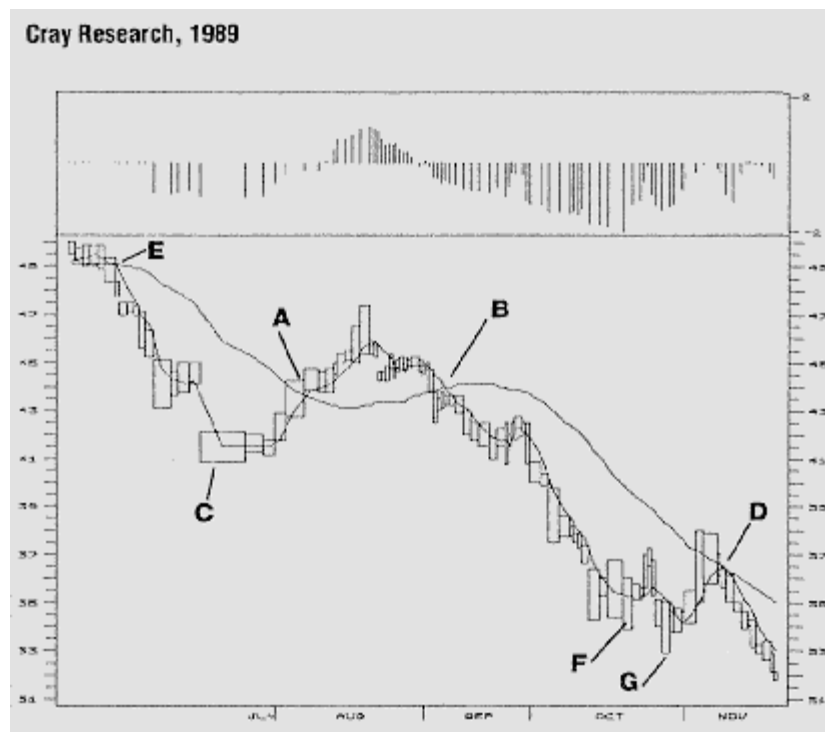


FIGURE 3: A crossover of the 8-volume and 55-volume moving averages (point A) suggests this stock is ready to turn higher and that it is time to buy.

lines cross.

Note how the heavier trading at point A moves the faster line sideways, thereby preventing a decisive penetration of the slower line. At point B the heavy volume on the upside is pulling the 8-volume line rapidly upward, so a penetration appears imminent. Had all days been equally valued, the change in direction would have been less obvious. At points D and E, the 55-volume line continues to contain the price, suggesting the decline is not over. Point C is the crossover from strength to weakness.

Of equal importance is that the stock has moved sideways on shrinking volume, that it seems to have formed a wedge, that it has made three successive tops, with the third indicating a reluctance to move higher, and that the ease of movement oscillator across the top of the chart has dropped into negative territory. In addition, the move downward appears to be decisive, in that volume and spread have both expanded. There are many clues that the stock is likely to decline, with the volume-adjusted moving average lines just one article of information. It should be noted that these moving average lines are an additional tool for trading purposes, not an instant road to riches. The examples illustrate certain points, but there is still no substitute for solid technical analysis.

Figure 3 illustrates nearly 100 days of trading in Cray Research, again using the 8-volume and 55-volume moving averages. Point C is a heavy-volume day, which produces an oversquare entry, a box that is wider than it is tall, due to a fairly narrow spread. The stock appears ready to turn higher. The crossover at point A indicates it is time to buy. The trade is profitable if it is followed by a close stop, but it could be a break-even or even a loss if one waits for the next crossover. This is often the case, so I use moving average lines to aid in entering positions, while being less patient in closing out.

It helps to watch the spread between the moving averages and close out when there is a wide divergence. Points E and B are very profitable signals on the short side. A closeout at point C would be likely, due to the oversquare day. However, one might be likely to close the other position when the stock rallied to point D. By waiting for the crossover the position would be held, but the more logical closeout would have been at point F or G when the two moving average lines were very far apart, even though the move later went lower.

Other technicians may find values they prefer to the two particular moving average lines used here as examples. In addition, different values are more effective if a longer-term chart is being used. Each trader should experiment with many different lines and timeframes, arriving at those that suit his or her objectives and temperament. Volume-adjusted moving average lines are a very effective timing tool and provide an approach that properly values the differing importance of each trading day.

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