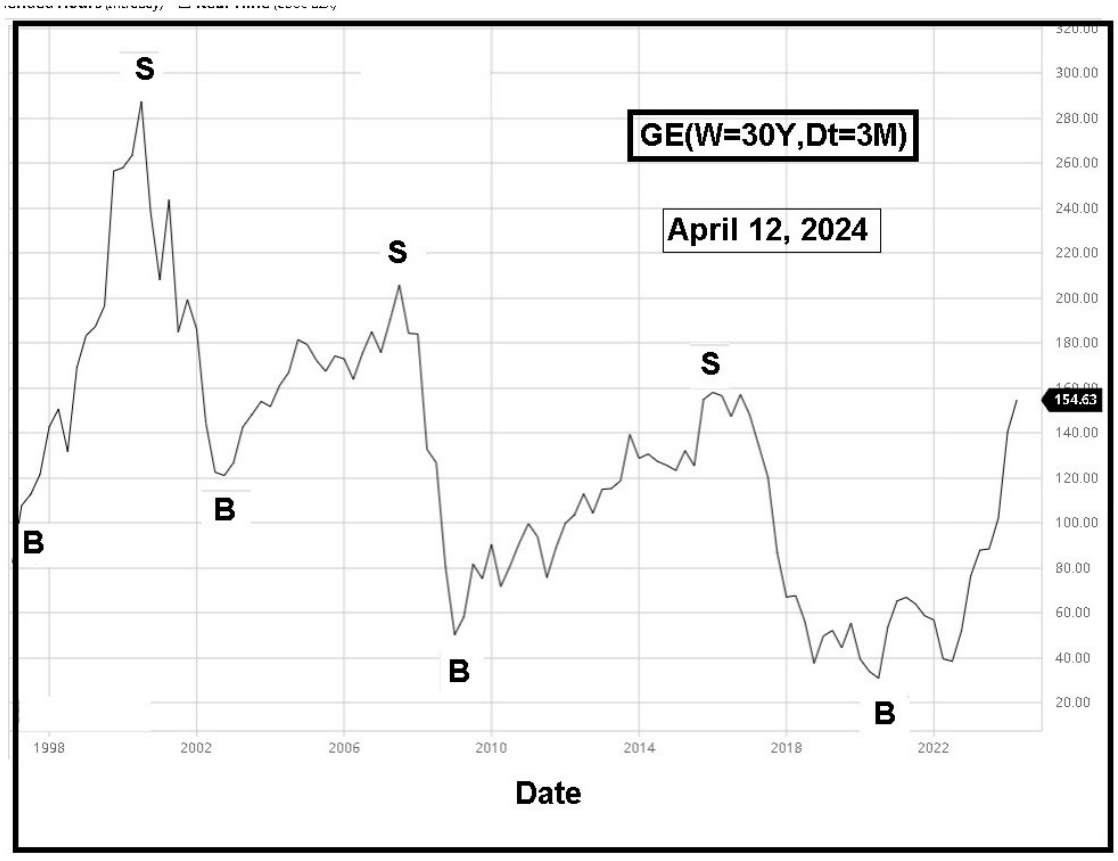
## PREDICTING FUTURE PRICES USING PAST PRICE WINDOWS

When looking at long term historical prices for any stock, commodity, or ETF, one notices that the prices typically have a local maxima followed by local minima and so on. The resultant price behavior between these extrema resembles a wave of time dependent amplitude and time dependent wavelength, difficult to predict with any high degree of accuracy but obvious once things have occurred. Here is an example of a thirty year price window(W=30Y) for GE recorded every three month(Dt=3M) going back all the way to 1994-

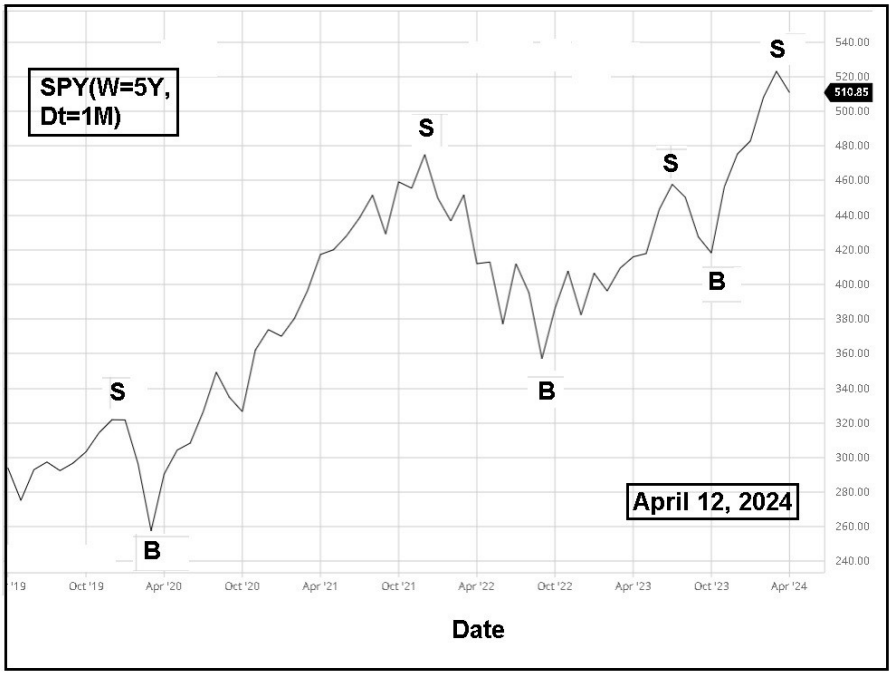


The B points represent the local price minima at which GE should have been bought and the local S points where shorts should have been set. This buy-hold strategy follows the Rothshild basic economic rule to buy low and sell high.

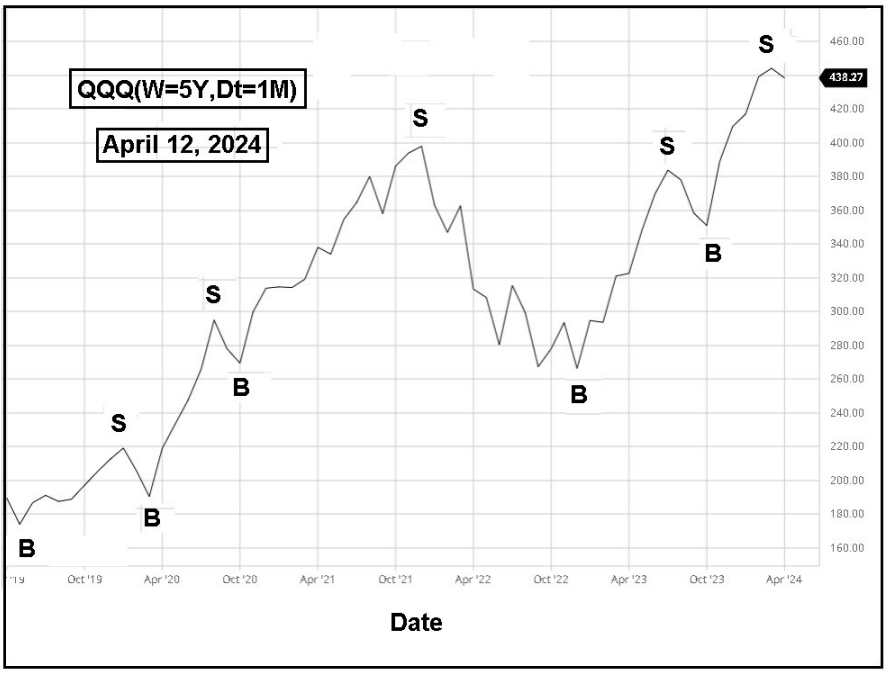
Unlike the belief of many stock investors that price history follows a random walk, it is now generally acknowledged by many stock specialists such as successful hedge-fund managers like Jim Simons, that stocks, bonds and ETFs exhibit both longer term uptrends(B>S)and downtrends(S>B) which can be taken advantage of. In the GE case we are now near the end of an uptrend and a price reversal can be expected when the next S appears. This procedure, based on a longer term (1 to 30 year) price windows, is a generalization of a Markov process but superior to it by including more information from the past, not just the latest known price. It is our purpose here to show how one can make use of past price behavior with specified price windows to predict the near term price future of equities.

We will begin our discussion with a couple of very active but low volatility ETF funds SPY and QQQ. These typically move in price of less than one percent per day. This low volatility compared to other equities has made them ideal for investors uncomfortable with higher risk vehicles. They have been used exclusively by us over the past few years with excellent returns, showing definite up and down trends which allow one to estimate price into the near future. Using five year

windows(W=5Y) and 1 month time increments of Dt=1M, produces the following results-

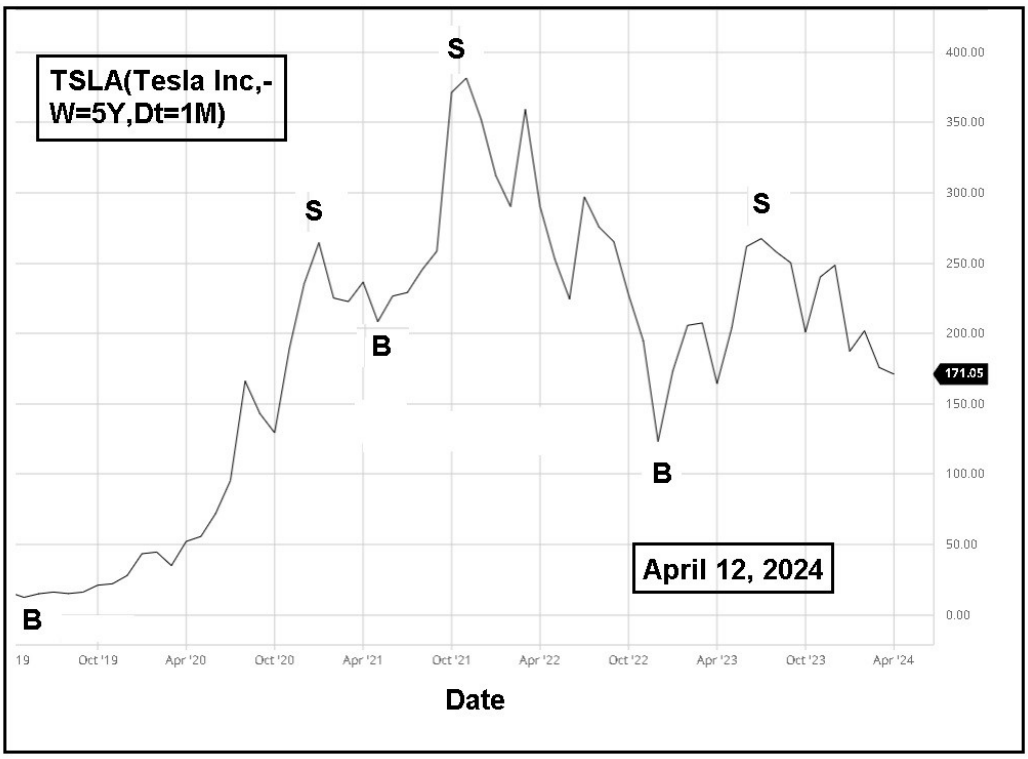



and-



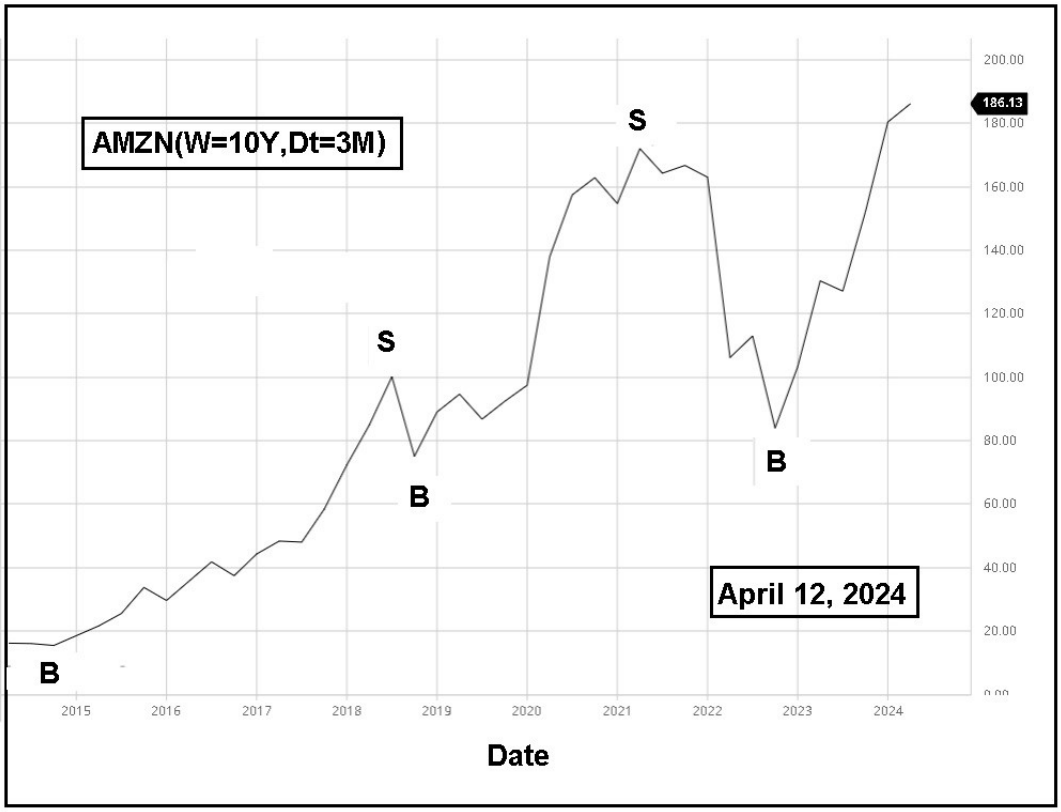
The buy and sell points corresponding to price extrema are designated by B and S. We don't use shorter time increments since we want to filter out shorter time price fluctuations which are more or less random. At the moment (April12) we are close to or at a sell point for both ETFs although I would wait a few more days for a possible B point reversal determined by bullish actions by the Federal Reserve and economic stimulus due to expanding war in the Middle East.

If one is willing to risk greater daily price fluctuations, then stocks and commodities can also be treated by the present time-window approach. Consider for example TSLA. Its five year price window with Dt=1M looks like this-



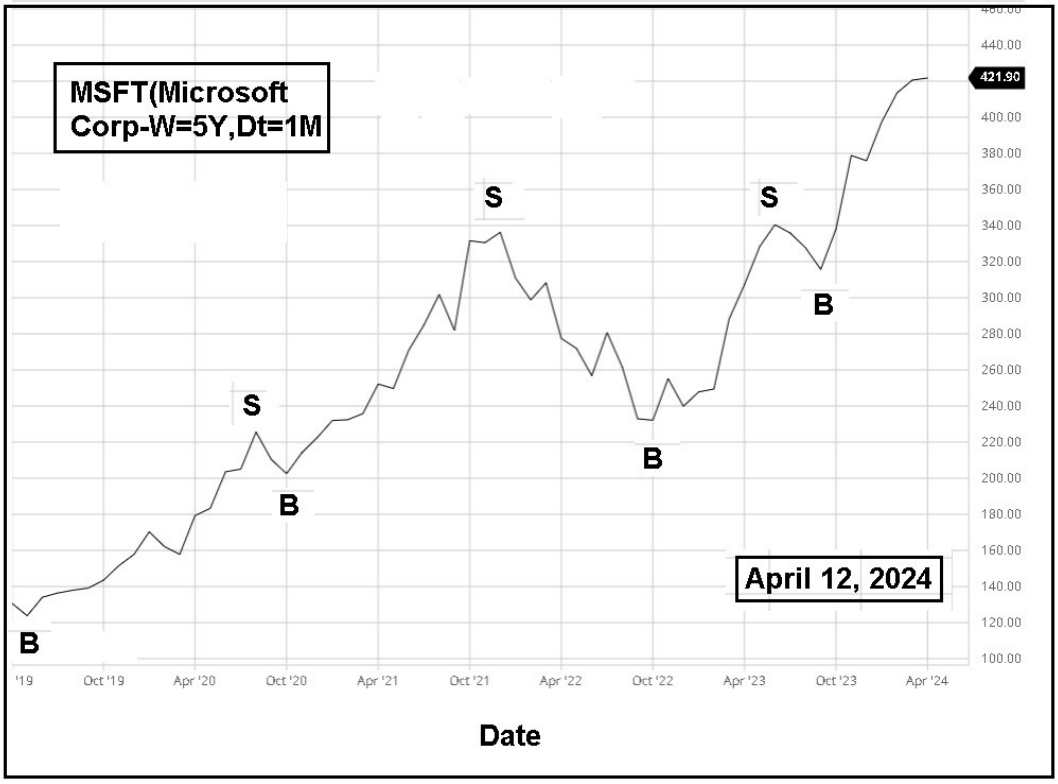
At present it is in a downtrend with a possible buy point(B) to be reached at P=$120/sh. The latest downtrend has been based on a realization by consumers that EVs will not be taking over the automobile business until well into 2050 due to their present shortcomings of limited driving range, cost of battery replacements, and cost of the vehicles themselves. Note that daily price fluctuations for TSLA are as high as ten percent and so have a much higher risk compared to ETFs.

Another stock to which the present approach can be applied is AMZN. Its ten year window W=10Y with a with a Dt=3M looks like this-



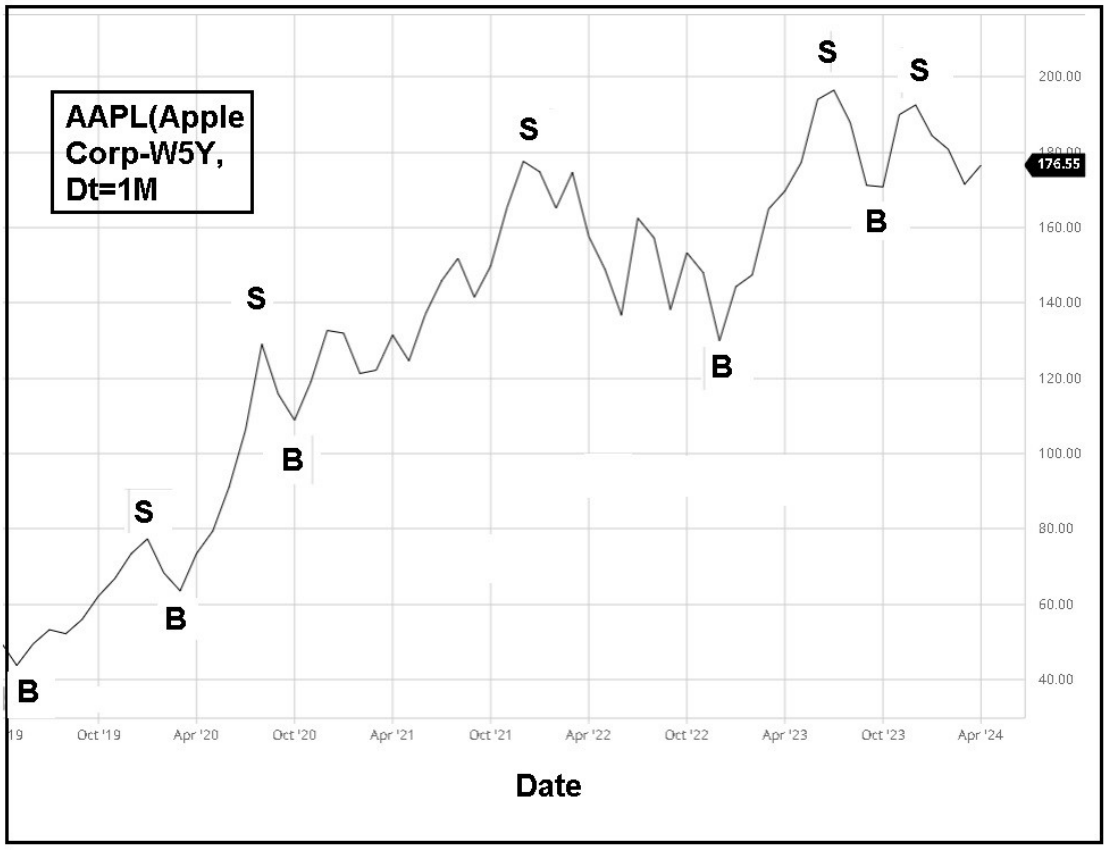
It shows three buy points and two sell points over the past ten years. At present it is in an uptrend awaiting a sell signal.

Next we consider the stock Microsoft(MSFT) using a  five year time window with a Dt of one month-




It has been in an uptrend since September of last year. We are awaiting a sell point S but this may not come yet for several more months.

As a final active stock we examine AAPL using a five year window with a Dt of one month. Here is the graph-




The chart shows that AAPLE is near a buy point in the $179/sh range.

The above examples using five to thirty year price windows into the past, allows one to make a reasonable guess as to what the equity will do in the next few month. Since such predictions can never be one hundred percent correct, therefore, if the price moves contrary to the expectation one should terminate the transaction immediately. All that is actually needed is that one be correct over half the time in one's extrapolation into the future as predicted from past price windows.

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April 12, 2024
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