Prediction of Closing Stock Prices

By Garth Garner
Five Prediction Indicators Chosen based on “How Technical Analysis Works” by Bruce M. Kamich

♦ On Balance Volume (OBV)
♦ Price Momentum Oscillator (PMO)
♦ Relative Strength Index (RSI)
♦ Stochastic (%K)
♦ Moving Average (MA)
Goal of experiment

♦ Determine if these indicators can predict an increase or decrease in tomorrow’s closing price better than chance (50%) at the 0.05 level of significance

♦ If possible, determine which are the best indicators
Algorithm

- If all 5 indicators predict increase, then algorithm will predict an increase in tomorrow’s closing price.
- If all 5 indicators predict decrease, then algorithm will predict a decrease in tomorrow’s closing price.
On Balance Volume (OBV)

If (today’s close < yesterday’s close)
   \[ OBV = OBV - \text{today’s Volume} \]

If (today’s close > yesterday’s close)
   \[ OBV = OBV + \text{today’s Volume}; \]

If (Today’s OBV > Yesterday’s OBV)
   Predict increase in tomorrow’s closing price

If (Today’s OBV < Yesterday’s OBV)
   Predict decrease in tomorrow’s closing price
Price Momentum Oscillator (PMO)

PMO = today’s close – close ten days ago

If (PMO > 0)
    Predict increase in tomorrow’s closing price
Else
    Predict decrease in tomorrow’s closing price
Relative Strength Index (RSI)

RSI = 100 – 100/(1 + RS)
RS = 9 day ave up close/ 9 day ave down close

If (RSI > 50)
    Predict increase in tomorrow’s closing price
Else
    Predict decrease in tomorrow’s closing price
Stochastic (%K)

\[
\%K = \frac{TC - LN}{HN - LN} \times 100
\]

TC = today’s close price
LN = lowest low for 5 days
HN = highest high for 5 days

If (\%K > 80)
    Predict increase in tomorrow’s closing price
If (\%K < 20)
    Predict decrease in tomorrow’s closing price
10 Day Moving Average (MA)

If ( Today’s MA > Yesterday’s MA )
    Predict increase in tomorrow’s closing price
Else
    Predict decrease in tomorrow’s closing price
Hypothesis Test

- Ho = The Predictions will be correct 50% or less
- Test Statistic = Number of Correct Predictions
- Used the Binomial distribution to test the level of significance
- Broke up results into correct predictions for increase and decrease
- Tested on the following 5 Stocks chosen randomly
  - AAABB, AACB, AATK, ABLE, ACAR
Results (AAABB) – Using OBV, PMO, RSI, %K and MA

Failed to reject Ho for down predictions
Reject Ho at the 0.05 level of significance for up predictions
Results (AACB) – Using OBV, PMO, RSI, %K and MA

Reject Ho at the 0.05 level of significance for down predictions
Results (AACB) – Using OBV, PMO, RSI, %K and MA

Reject Ho at the 0.05 level of significance for up predictions
Results (AATK) – Using OBV, PMO, RSI, %K and MA

Reject Ho at the 0.05 level of significance for down predictions
Results (AATK) – Using OBV, PMO, RSI, %K and MA

Reject Ho at the 0.05 level of significance for up predictions
Results (ABLE) – Using OBV, PMO, RSI, %K and MA

Failed to reject Ho for down predictions
Results (ABLE) – Using OBV, PMO, RSI, %K and MA

Reject Ho at the 0.05 level of significance for up predictions
Results (ACAR) – Using OBV, PMO, RSI, %K and MA

Reject Ho at the 0.05 level of significance for down predictions
Results (ACAR) – Using OBV, PMO, RSI, %K and MA

Reject Ho at the 0.05 level of significance for up predictions
Conclusion

♦ The results of all 5 stocks were combined. By taking the total number of correct predictions including both increase and decrease price predictions we can conclude:

♦ The 5 prediction indicators can predict if tomorrow’s closing price will increase or decrease better than chance at the 0.05 level of significance

♦ Technical Analysis may be a useful tool in aiding investment decisions.
Further Conclusions

- Different combinations of the 5 indicators were attempted.
- Top 3 indicators were Moving Average (MA), On Balance Volume (OBV) and Stochastic (%K)
- %K was most useful
- Results were biased