Three Soldiers Patterns

An Empirical Approach for Swing Traders.

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1   Introduction

Swing Trading is a style of trading that attempts to capture gains in a stock within one to four days. Swing traders use technical analysis to look for stocks with short-term price momentum. These traders aren't interested in the fundamental or intrinsic value of stocks, but rather in their price trends and patterns. In order to analyze the stock market, we used candlestick charts. The Japanese have been using candlestick charts since the 17th century to analyze rice prices. Candlesticks contain the same data as a normal bar chart but highlight the relationship between opening and closing prices. The narrow stick represents the range of prices traded during the period (high to low) while the broad mid-section represents the opening and closing prices for the period.
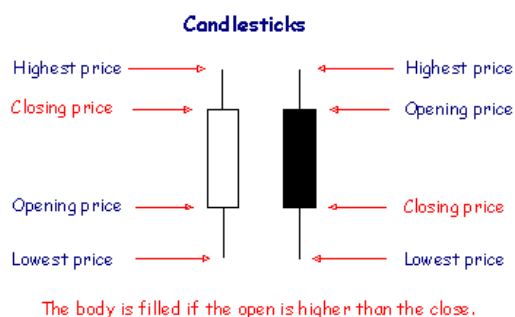

Figure 1: Candlesticks

- If the close is higher than the open - the candlestick mid-section is hollow or shaded blue/green/white.
- If the open is higher than the close - the candlestick mid-section is filled in or shaded red/black.

For our analysis we used the "Three Soldier Pattern" for the interval of four, five, seven and ten days. We examined 50 commonly traded markets. The way we enter and exit the market depends on the conformation of the following three soldiers patterns.

Three Black Crows: a bearish reversal pattern consisting of three consecutive long black bodies where each day closes at or near its low and opens within the body of the previous day. **Bearish:** expects or characterizes stock exchange by fall in prices.

Three White Soldiers: a bullish reversal pattern consisting of three consecutive long white bodies. Each should open within the previous body and the close should be near the high of the day. **Bullish:** expects or characterizes the stock market by rise in prices.
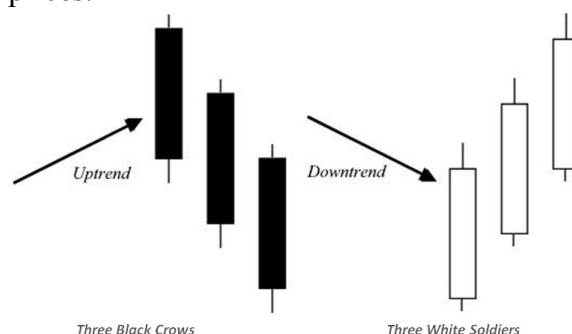

Figure 2: Representation of "Three Soldiers"

2   METHODOLOGY

The steps used to run the program are as follows:

First we downloaded the stock market data from Yahoo Finance and saved them in excel

spreadsheet (CSV format). We analyzed the data for over 30 years that includes the open, the low, the high, and the close per day.

Open: the opening price of the day.
Low: the lowest trade price during the day.
High: the highest trade price during the day.
Close: the closing price of the day.

After reading and accessing the data from the excel file, we calculated the simple moving average. Next we divided candlesticks into two categories, one that falls under the three soldiers pattern and the other that does not. For that purpose, we used if else statements to identify the Bullish or Bearish candle.
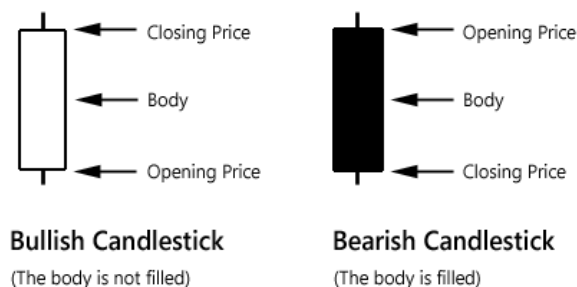

Figure 3: Representation of Bullish and Bearish Candlesticks

If the opening price is greater than closing price for a day, it is a black candle, which means loss. Then, we check if the candle is bearish or not. Or if opening price is less than closing price for a day, it is a white candle, which means gain. Then, we check if the candle is bullish or not.

After identifying the candle for each one of the days, then we start looking for the three soldier patter which is three consecutive bullish or three consecutive bearish candles. Once the pattern has been identified, we do a check for the trend of the stock before the pattern.

If we match an uptrend (stock price getting higher) with the three black crows, we predict that the stock prices will fall and we recommend selling the stock. In the other hand, if we match a downtrend (stock prices falling) with the three white soldiers, we predict the stock price will rise and thus recommending to buy stock.

For each prediction, we looked at the results for staying in the trade for 4, 5, 7 & 10 days.

The code was modified multiple time in order to obtain best results, we divided the results into two categories with multiple subcategories.

Category I: Strict rules, meant that the classification of the bullish or bearish candles could not have more than 10% wick and the opening on the next day is within the body of the previous day.

Category II: Loose rules, we allowed the wick to be up to 25%, and we just looked for three consecutive bullish or bearish candles.

The subcategories applied to both categories were the simple moving average calculated over 60, 50, 40, 30, 15 & 5 days, and a trend check going back 15, 10 & 5 days.

We ran 50 different stocks through the program and found out that the best results came from having strict rules with a 30 day SMA and 10 day back trend check. For the loose rules, the best results came from 40 day SMA and 10 day back trend check. Overall the best results were obtained when staying in the trade for 10 days.

The program was designed to output multiple files. A file for each stock market, then the average results per market into a spreadsheet, and finally and overall tally into another spreadsheet.

Total Averages and Percentage.

	4 Day Corr	Gain%	4 Day Wro	Loss%	Win %	5 Day Corr	Gain%	5 Day Wro	Loss%	Win %	7 Day Corr	Gain%	7 Day Wro	Loss%	Win %	10 Day Co	Gain%	10 Day Wr	Loss%	Win %
Totals:	197	562.8529	194	-524.573	50	194	593.7023	195	-602.579	50	192	760.5586	197	-737.511	49	214	948.2037	177	-805.646	5
Totals:	11	13.63339	10	-28.324	52	8	14.13458	13	-31.253	38	8	24.34141	12	-30.3663	40	13	38.89671	8	-30.6663	6

Results.

	4 Day Corr	4 Day Wro	Win %	5 Day Corr	5 Day Wro	Win %	7 Day Corr	7 Day Wro	Win %	10 Day Co	10 Day Wr	Win %	
Totals:	10	10	50	8	12	40	8	12	40	12	8	60	Strict rules, 60 day sma, 5 day trend check
Totals:	9	8	53	6	11	35	5	12	29	9	8	53	Strict rules, 60 day sma, 10 day trend check
Totals:	9	8	53	6	11	35	5	12	29	9	8	53	Strict rules, 60 day sma, 15 day trend check
Totals:	10	10	50	7	13	35	7	12	37	11	9	55	Strict rules, 50 day sma, 5 day trend check
Totals:	11	10	52	8	13	38	8	12	40	12	9	57	Strict rules, 50 day sma, 10 day trend check
Totals:	10	10	50	7	13	35	7	12	37	11	9	55	Strict rules, 50 day sma, 15 day trend check
Totals:	11	9	55	7	13	35	7	12	37	11	9	55	Strict rules, 40 day sma, 5 day trend check
Totals:	11	10	52	7	14	33	7	13	35	12	9	57	Strict rules, 40 day sma, 10 day trend check
Totals:	11	9	55	7	13	35	7	12	37	11	9	55	Strict rules, 40 day sma, 15 day trend check
Totals:	11	10	52	8	13	38	8	12	40	12	9	57	Strict rules, 30 day sma, 5 day trend check
Totals:	11	10	52	8	13	38	8	12	40	13	8	62	Strict rules, 30 day sma, 10 day trend check
Totals:	11	9	55	7	13	35	7	12	37	11	9	55	Strict rules, 30 day sma, 15 day trend check
Totals:	12	12	50	10	14	42	10	14	42	14	10	58	Strict rules, 15 day sma, 5 day trend check
Totals:	14	11	56	11	14	44	11	13	46	13	12	52	Strict rules, 15 day sma, 10 day trend check
Totals:	10	10	50	7	13	35	6	13	32	9	11	45	Strict rules, 15 day sma, 15 day trend check
Totals:	10	10	50	9	11	45	11	9	55	11	9	55	Strict rules, 5 day sma, 5 day trend check
Totals:	11	13	46	9	15	38	11	13	46	13	11	54	Strict rules, 5 day sma, 10 day trend check
Totals:	12	12	50	10	14	42	10	14	42	14	10	58	Strict rules, 5 day sma, 15 day trend check
Totals:	197	192	51	193	197	49	185	205	47	206	185	53	Loose rules, 60 day sma, 5 day trend check
Totals:	193	190	50	194	190	51	184	200	48	204	181	53	Loose rules, 60 day sma, 10 day trend check
Totals:	186	192	49	186	193	49	177	204	46	196	184	52	Loose rules, 60 day sma, 15 day trend check
Totals:	184	193	49	183	193	49	178	198	47	193	185	51	Loose rules, 50 day sma, 5 day trend check
Totals:	188	193	49	188	193	49	183	197	48	204	178	53	Loose rules, 50 day sma, 10 day trend check
Totals:	194	196	50	194	196	50	185	204	48	207	185	53	Loose rules, 50 day sma, 15 day trend check
Totals:	205	191	52	196	198	50	192	201	49	214	180	54	Loose rules, 40 day sma, 5 day trend check
Totals:	201	199	50	194	203	49	194	203	49	215	183	54	Loose rules, 40 day sma, 10 day trend check
Totals:	197	194	50	194	195	50	192	197	49	214	177	55	Loose rules, 40 day sma, 15 day trend check
Totals:	218	194	53	218	194	53	211	199	51	221	191	54	Loose rules, 30 day sma, 5 day trend check
Totals:	214	203	51	209	207	50	203	212	49	215	202	52	Loose rules, 30 day sma, 10 day trend check
Totals:	209	203	51	204	205	50	203	207	50	217	194	53	Loose rules, 30 day sma, 15 day trend check
Totals:	234	200	54	233	200	54	220	214	51	232	202	53	Loose rules, 15 day sma, 5 day trend check
Totals:	216	195	53	218	193	53	206	204	50	219	191	53	Loose rules, 15 day sma, 10 day trend check
Totals:	207	198	51	209	196	52	198	206	49	211	193	52	Loose rules, 15 day sma, 15 day trend check
Totals:	232	218	52	230	217	51	228	223	51	228	221	51	Loose rules, 5 day sma, 5 day trend check
Totals:	227	208	52	229	206	53	211	224	49	224	211	51	Loose rules, 5 day sma, 10 day trend check
Totals:	234	200	54	233	200	54	220	214	51	232	202	53	Loose rules, 5 day sma, 15 day trend check
Totals:	448	453	50	443	456	49	438	465	49	463	441	51	Loose rules, 5 day sma, no trend
Totals:	448	453	50	443	456	49	438	465	49	463	441	51	Loose rules, 15 day sma, no trend
Totals:	448	453	50	443	456	49	438	465	49	463	441	51	Loose rules, 30 day sma, no trend
Totals:	448	453	50	443	456	49	438	465	49	463	441	51	Loose rules, 40 day sma, no trend
Totals:	448	453	50	443	456	49	438	465	49	463	441	51	Loose rules, 50 day sma, no trend
Totals:	448	453	50	443	456	49	438	465	49	463	441	51	Loose rules, 60 day sma, no trend
Totals:	21	17	55	17	21	45	18	19	49	19	19	50	Strict rules, 5 day sma, no trend
Totals:	21	17	55	17	21	45	18	19	49	19	19	50	Strict rules, 15 day sma, no trend
Totals:	21	17	55	17	21	45	18	19	49	19	19	50	Strict rules, 30 day sma, no trend
Totals:	21	17	55	17	21	45	18	19	49	19	19	50	
Totals:	10	11	48	9	12	43	9	11	45	12	9	57	
Totals:	11	11	50	8	14	36	8	13	38	12	10	55	
Totals:	10	11	48	8	13	38	7	13	35	10	11	48	20 sma 10 day track
Totals:	10	11	48	8	13	38	7	13	35	10	11	48	10 sma 20 day track
Totals:	10	11	48	8	13	38	7	13	35	10	11	48	
Totals:	11	9	55	7	13	35	7	12	37	11	9	55	
Totals:	11	10	52	8	13	38	8	12	40	13	8	62	

Loose Rules, 40 day sma, 15 day back trend.

	4 Day %	Gain%	Loss%	5 Day %	Gain%	Loss%	7 Day %	Gain%	Loss%	10 Day %	Gain%	Loss%
AET	10	3.98773	-37.1585	0	0	-31.8382	11.11111	2.300613	-38.5242	10	4.831288	-34.4965
AIG	50	5.124733	-22.3106	50	1.031357	-22.4162	0	0	-25.3101	50	5.417226	-23.2137
AKS	30	15.35905	-40.3631	22.22222	8.781006	-39.0353	33.33333	15.53664	-48.6257	30	10.4293	-43.6959
APPL	62.5	15.13646	-12.3176	62.5	20.79197	-17.6108	50	27.44481	-27.3695	50	34.5467	-36.0909
BA_boeing	33.33333	0.648219	-3.86614	33.33333	2.724181	-5.57839	16.66667	3.503397	-17.9034	16.66667	5.994405	-22.9267
BAC	61.53846	11.46868	-8.26131	69.23077	13.29342	-6.69737	75	31.6055	-6.448	66.66667	32.9439	-6.15293
C	33.33333	1.365338	-2.83802	33.33333	1.959921	-2.25727	66.66667	3.383743	-4.47043	66.66667	4.723701	-3.82852
CI	66.66667	5.172622	-3.17037	66.66667	7.895109	-4.6963	66.66667	10.10103	-6.57778	66.66667	5.492381	-3.97037
COG	61.53846	26.81612	-11.3607	69.23077	31.21728	-11.0865	53.84615	23.69167	-16.1101	61.53846	74.02031	-16.5843
CSCO	40	2.944801	-14.6551	60	3.790914	-9.07028	60	3.852969	-8.70657	60	8.352472	-3.94966
DBA	40	1.653077	-4.23267	20	0.401123	-3.44224	40	0.464781	-6.14123	40	1.386213	-5.6364
DIA	40	2.880818	-9.42252	60	4.394668	-10.8042	50	7.027848	-10.4918	60	7.469224	-9.74423
DOW	40	8.83481	-3.57767	40	11.53108	-9.82687	40	16.60099	-14.0076	60	17.20628	-9.01907
EEM	41.66667	8.17443	-16.2825	50	14.34148	-18.559	50	30.58289	-25.1589	58.33333	31.42142	-25.6448
EWA	66.66667	1.777521	-2.56917	50	3.205986	-3.67488	50	4.129846	-2.23016	50	6.716263	-2.18516
EWG	100	5.206083	0	66.66667	3.571186	-1.96491	33.33333	2.751572	-3.98176	66.66667	4.88613	-3.49586
EWZ	83.33333	12.43695	-0.2099	50	10.18237	-4.1343	50	23.75622	-2.57552	83.33333	38.63675	-3.3759
GG	44.44444	5.754169	-26.0607	33.33333	4.932713	-31.3327	44.44444	18.47355	-33.6035	50	22.09229	-49.7902
GLD	25	0.68364	-2.09659	50	2.357312	-2.41114	50	2.667313	-2.60172	25	2.074493	-2.22969
GOOGL	25	0.692555	-13.0582	0	0	-26.7802	50	1.186354	-19.8728	25	0.390575	-16.5758
GPS	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
HPQ	54.54545	95.02418	-46.1332	55.81395	96.35506	-59.9306	47.61905	85.01456	-77.8316	50	99.66201	-76.8489
I_B_M	45	36.80047	-37.6466	46.15385	33.49411	-42.9034	40	38.4496	-60.6035	51.28205	58.40403	-72.2578
IYM	52.94118	23.43659	-12.51	41.17647	28.94021	-13.8244	41.17647	24.58632	-18.7131	58.82353	21.98069	-32.5075
JCP	57.14286	42.46222	-28.2284	57.14286	36.53142	-31.0222	57.14286	42.95501	-26.6951	57.14286	34.08901	-27.6486
JNJ	83.33333	10.91516	-0.90051	66.66667	13.09043	-1.29131	66.66667	12.0469	-4.84663	66.66667	8.790631	-6.03803
JPM	37.5	5.143712	-2.28436	28.57143	2.0454	-4.13889	25	4.822552	-13.2646	37.5	18.62627	-23.3042
KO	33.33333	3.551233	-7.26801	42.85714	2.633862	-9.53093	42.85714	4.863564	-8.17894	28.57143	3.007046	-13.6556
M	50	11.23853	-10.817	45.45455	14.49063	-18.3729	45.45455	22.02367	-19.3148	36.36364	25.45039	-25.1128
MO	100	24.33025	0	87.5	42.34125	-0.99715	87.5	49.31017	-0.42735	87.5	62.43261	-0.92593
MRK	66.66667	12.07812	-8.98692	55.55556	13.38324	-16.1134	44.44444	15.10401	-23.0727	55.55556	19.82027	-25.2547
MS	14.28571	2.01909	-19.3394	28.57143	1.543778	-25.5029	42.85714	6.41913	-29.4278	57.14286	5.960799	-36.721
MSFT	50	10.29422	-4.42943	87.5	12.16988	-1.97874	100	21.05237	0	100	30.41831	0
ORCL	25	11.61996	-13.4757	25	11.82502	-14.1941	75	29.16986	-3.28947	75	34.39321	-6.99013
PFE	33.33333	4.882045	-5.14249	33.33333	4.030144	-3.84282	66.66667	4.969776	-1.82825	66.66667	7.910002	-4.15512
PG	75	7.091147	-0.63563	100	5.49298	0	100	5.499439	0	100	7.838472	0
QQQ	42.85714	4.522	-10.0316	42.85714	7.580431	-8.41546	57.14286	15.42635	-9.79025	71.42857	19.30745	-9.29807
RF	55.55556	39.51821	-17.8119	44.44444	27.48243	-24.3669	33.33333	21.83958	-29.812	55.55556	36.06463	-26.1958
SLV	66.66667	7.681936	-2.70523	33.33333	7.069219	-3.13264	33.33333	9.057437	-11.0994	33.33333	4.197349	-14.2139
SLX	50	1.322981	-4.00886	50	2.524773	-5.10479	25	1.195392	-9.10213	50	4.056423	-7.54846
SPY	50	6.603459	-7.63658	50	7.697336	-4.83277	62.5	9.31591	-4.43032	87.5	13.5073	-1.88055
SUNE	70	7.267652	-13.6017	60	16.0352	-9.35709	60	22.40432	-22.4979	40	19.34718	-29.2998
T	50	31.79304	-11.8907	40	32.31528	-9.40898	60	33.64216	-3.89753	70	40.41734	-2.42747
TIF	75	14.71317	-2.41299	87.5	15.30394	-9.55056	62.5	21.72439	-20.9458	62.5	30.41227	-13.9782
UNG	50	12.42571	-7.62569	75	12.9232	-4.94382	75	22.596	-2.69663	75	11.48782	-14.5506
USD	0	0	-15.2388	0	0	-16.6049	25	8.00843	-15.0338	50	11.5909	-12.2257

Strict Rules, 30 day sma, 10 day back trend

AET	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
AIG	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
AKS	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
APPL	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
BA_boeing	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
BAC	100	2.551392	0	0	0	-1.00598	100	1.545415	0	100	0.889342	0
C	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
CI	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
COG	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
CSCO	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
DBA	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
DIA	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
DOW	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
EEM	100	1.595785	0	100	3.098097	0	100	10.8517	0	100	10.04835	0
EWA	0	0	-2.56917	0	0	-3.16206	0	0	-0.6917	0	0	-1.87747
EWG	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
EWZ	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
GG	50	0.425532	-8.8748	50	0.567376	-6.81458	50	4.184397	-0.95087	50	7.446809	-6.81458
GLD	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
GOOGL	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
GPS	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
HPQ	60	5.575307	-6.3027	20	3.695067	-10.8115	0	0	-6.51205	60	3.139026	-3.95109
I_B_M	20	1.306076	-5.35679	20	1.192504	-6.85784	20	1.873935	-11.8343	40	5.04475	-12.2092
IYM	50	0.33705	-1.89626	50	1.952036	-0.62225	50	2.900167	-0.05185	100	8.978041	0
JCP	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
JNJ	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
JPM	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
KO	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
M	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
MO	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
MRK	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
MS	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
MSFT	0	0	-3.32429	0	0	-1.97874	100	1.628223	0	100	1.83175	0
ORCL	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
PFE	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
PG	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
QQQ	100	1.702715	0	100	2.02485	0	100	1.35757	0	100	1.518638	0
RF	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
SLV	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
SLX	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
SPY	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
SUNE	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
T	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
TIF	100	0.139535	0	100	1.604651	0	0	0	-10.3256	0	0	-5.81395
UNG	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0
USD	NaN	0	0	NaN	0	0	NaN	0	0	NaN	0	0

Citation

O. Ait Hellal, G. Meyer. The Engulfing Pattern.
An Empirical Approach for Swing
Traders.Stockcharts.com. Candlestick Pattern
Dictionary.

Stocks used in the program:

AET, AIG, AKS,APPL,BA,BAC,C,CI,
COG,CSCO,DBA,DIA,DOW,EEM,EWA,EWG,EW
Z,GG,GLD,GOOGL,GPS,HPQ,IBM,IYM,JCP,JNJ,J
PM,KO,M,MO,MRK,MS,MSFT,ORCL,PFE,PG,QQ
Q,RF,SLV,SLX,SPY,SUNE,T,TIF,UNG,USO,USD,
VZ,WFC,XOM.