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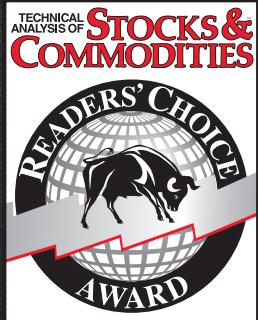
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### *Shifting Gears*

# The Volatility (Regime) Switch Indicator

Here's how you can construct a simple Excel spreadsheet for the volatility switch indicator.

by Ron McEwan



Which trading strategy should you use? This is a dilemma that most traders face, especially when the market changes its trend, which seems to be the norm these days. You may be dealing with a market that is reversing direction every

few days, and without warning, the market breaks out into a lengthy trend that catches you off-guard. By the time you can adapt to the new mode, you could have sustained a considerable drawdown.

### **REGIME SWITCHING**

Years ago, some very clever individuals came up with methods to cope with abrupt and dramatic changes. This concept was labeled "regime switching," a method for adapting a trading strategy when the market changes from a trending mode to a mean-reverting one.

Many regime switching algorithms are available today. They generally involve complex mathematical algorithms. At the heart of most of the regime switching strategies is a measure of volatility. The direction of volatility, rising or falling, as well as the level of volatility, will give a good indication of whether the market is in a trending or mean reversion mode. As a basic first step, this article will explain how to construct a simple volatility switch indicator to assist in determining whether your security of choice is trending or in a mean reversion mode.

To start, you should have at least one year's worth of data for your security. Three to five years (or more) will give you a more reliable picture of how the security reacts over time to change in volatility.

### **THE VOLATILITY SWITCH INDICATOR**

To create the 21-day volatility switch indicator for the Standard & Poor's 500:

**Step 1: Enter data.** In a blank spreadsheet, enter data for the date, open, high, low, and close of the security you are analyzing in columns A to E (Figure 1).

**Step 2: Daily change.** In column G2, enter this formula  $=((E3-E2)/((E3+E2)/2))$ . Copy this down to the end of the security data (Figure 2).

**Step 3: 21-day historical volatility.** In column H23, enter this formula

	A	B	C	D	E
1	Date	Open	High	Low	Close
463	12/30/11	1262.82	1264.12	1257.46	1257.60
464	1/3/12	1258.86	1284.62	1258.86	1277.06
465	1/4/12	1277.03	1278.73	1268.10	1277.30
466	1/5/12	1277.30	1283.05	1265.26	1281.06
467	1/6/12	1280.93	1281.84	1273.34	1277.81
468	1/9/12	1277.83	1281.99	1274.55	1280.70
469	1/10/12	1280.77	1296.46	1280.77	1292.08
470	1/11/12	1292.02	1293.80	1285.41	1292.48
471	1/12/12	1292.48	1296.82	1285.77	1295.50
472	1/13/12	1294.82	1294.82	1277.58	1289.09
473	1/17/12	1290.22	1303.00	1290.22	1293.67
474	1/18/12	1293.65	1308.11	1290.99	1308.04
475	1/19/12	1308.07	1315.49	1308.07	1314.50
476	1/20/12	1314.49	1315.38	1309.17	1315.38
477	1/23/12	1315.29	1322.28	1309.89	1316.00
478	1/24/12	1315.96	1315.96	1306.06	1314.65
479	1/25/12	1314.40	1328.30	1307.65	1326.06
480	1/26/12	1326.28	1333.47	1313.60	1318.43
481	1/27/12	1318.25	1320.06	1311.72	1316.33
482	1/30/12	1316.16	1316.16	1300.49	1313.01
483	1/31/12	1313.53	1321.41	1306.69	1312.41
484	2/1/12	1312.45	1330.52	1312.45	1324.09
485	2/2/12	1324.24	1329.19	1321.57	1325.54
486	2/3/12	1326.21	1345.34	1326.21	1344.90
487	2/6/12	1344.32	1344.36	1337.52	1344.33
488	2/7/12	1344.33	1349.24	1335.92	1347.05
489	2/8/12	1347.04	1351.00	1341.95	1349.96
490	2/9/12	1349.97	1354.32	1344.63	1351.95
491	2/10/12	1351.21	1351.21	1337.35	1342.64
492	2/13/12	1343.06	1353.35	1343.06	1351.77
493	2/14/12	1351.30	1351.30	1340.83	1350.50
494	2/15/12	1350.52	1365.87	1340.80	1343.23
495	2/16/12	1342.61	1359.02	1341.22	1358.04
496	2/17/12	1358.06	1363.40	1357.24	1361.23
497	2/21/12	1361.22	1367.76	1358.11	1362.21
498	2/22/12	1362.11	1362.70	1355.53	1357.66
499	2/23/12	1357.53	1364.24	1352.28	1363.46

MICROSOFT EXCEL

**FIGURE 1: FIRST STEP.** Enter daily data for open, high, low, and close.

=STDEV(G3:G23). Copy this down to the end of the security data (Figure 3).

**Step 4: 21-day volatility switch indicator.** This formula creates the 21-day switch indicator. It normalizes the historical volatility created in step 3 to a value between zero and 1.

A rising indicator (crossing above 0.5) indicates that volatility in the market is increasing and you can expect a more choppy market with abrupt moves. A stochastic indicator is appropriate for such conditions to aid in picking short-term reversals. A declining indicator, particularly from a recent high reading near 1 and crossing below 0.5, will indicate a decrease in market volatility and a new trend in direction. A trending indicator such as the moving average convergence/divergence (MACD) can be usefully applied in these market conditions. A simple



**Which trading strategy should you use? This dilemma faces most traders, especially when the market changes its trend.**

	A	B	C	D	E	F	G
1	Date	Open	High	Low	Close		daily return
2	3/5/10	1125.12	1139.38	1125.12	1138.70		
3	3/8/10	1138.40	1141.05	1136.77	1138.50		0.000
4	3/9/10	1137.56	1145.37	1134.90	1140.45		0.002
5	3/10/10	1140.22	1148.26	1140.09	1145.61		0.005
6	3/11/10	1143.96	1150.24	1138.99	1150.24		0.004
7	3/12/10	1151.71	1153.41	1146.97	1149.99		0.000
8	3/15/10	1148.53	1150.98	1141.45	1150.51		0.000
9	3/16/10	1150.83	1160.28	1150.35	1159.46		0.008
10	3/17/10	1159.94	1169.84	1159.94	1166.21		0.006
11	3/18/10	1166.13	1167.77	1161.16	1165.83		0.000
12	3/19/10	1166.68	1169.20	1155.33	1159.90		-0.005
13	3/22/10	1157.25	1167.82	1152.88	1165.81		0.005
14	3/23/10	1166.47	1174.72	1163.83	1174.17		0.007
15	3/24/10	1172.70	1173.04	1166.01	1167.72		-0.006
16	3/25/10	1170.03	1180.69	1165.09	1165.73		-0.002
17	3/26/10	1167.58	1173.93	1161.48	1166.59		0.001
18	3/29/10	1167.71	1174.85	1167.71	1173.22		0.006
19	3/30/10	1173.75	1177.83	1168.92	1173.27		0.000
20	3/31/10	1171.75	1174.56	1165.77	1169.43		-0.003
21	4/1/10	1171.23	1181.43	1170.69	1178.10		0.007
22	4/5/10	1178.71	1187.73	1178.71	1187.44		0.008
23	4/6/10	1186.01	1191.80	1182.77	1189.44		0.002
24	4/7/10	1188.23	1189.60	1177.25	1182.45		-0.006
25	4/8/10	1181.75	1188.55	1175.12	1186.44		0.003
26	4/9/10	1187.47	1194.66	1187.15	1194.37		0.007
27	4/12/10	1194.94	1199.20	1194.71	1196.48		0.002
28	4/13/10	1195.94	1199.04	1188.82	1197.30		0.001
29	4/14/10	1198.69	1210.65	1198.69	1210.65		0.011
30	4/15/10	1210.77	1213.92	1208.50	1211.67		0.001
31	4/16/10	1210.17	1210.17	1186.77	1192.13		-0.016
32	4/19/10	1192.06	1197.87	1183.68	1197.52		0.005
33	4/20/10	1199.04	1208.58	1199.04	1207.17		0.008
34	4/21/10	1207.16	1210.99	1198.85	1205.94		-0.001
35	4/22/10	1202.52	1210.27	1190.19	1208.67		0.002
36	4/23/10	1207.87	1217.28	1205.10	1217.28		0.007
37	4/26/10	1217.07	1219.80	1211.07	1212.05		-0.004
38	4/27/10	1209.92	1211.38	1181.62	1183.71		-0.024
39	4/28/10	1191.59	1195.05	1181.81	1191.36		0.008

**FIGURE 2: SECOND STEP.** Calculate the daily change of price.

	Date	Open	High	Low	Close	daily return	21d hist Volatility
2	3/5/10	1125.12	1139.38	1125.12	1138.70		
3	3/8/10	1138.40	1141.05	1136.77	1138.50		0.000
4	3/9/10	1137.56	1145.37	1134.90	1140.45		0.002
5	3/10/10	1140.22	1148.26	1140.09	1145.61		0.005
6	3/11/10	1143.96	1150.24	1138.99	1150.24		0.004
7	3/12/10	1151.71	1153.41	1146.97	1149.99		0.000
8	3/15/10	1148.53	1150.98	1141.45	1150.51		0.000
9	3/16/10	1150.83	1160.28	1150.35	1159.46		0.008
10	3/17/10	1159.94	1169.84	1159.94	1166.21		0.006
11	3/18/10	1166.13	1167.77	1161.16	1165.83		0.000
12	3/19/10	1166.68	1169.20	1155.33	1159.90		-0.005
13	3/22/10	1157.25	1167.82	1152.88	1165.81		0.005
14	3/23/10	1166.47	1174.72	1163.83	1174.17		0.007
15	3/24/10	1172.70	1173.04	1166.01	1167.72		-0.006
16	3/25/10	1170.03	1180.69	1165.09	1165.73		-0.002
17	3/26/10	1167.58	1173.93	1161.48	1166.59		0.001
18	3/29/10	1167.71	1174.85	1167.71	1173.22		0.006
19	3/30/10	1173.75	1177.83	1168.92	1173.27		0.000
20	3/31/10	1171.75	1174.56	1165.77	1169.43		-0.003
21	4/1/10	1171.23	1181.43	1170.69	1178.10		0.007
22	4/5/10	1178.71	1187.73	1178.71	1187.44		0.008
23	4/6/10	1186.01	1191.80	1182.77	1189.44		0.002
24	4/7/10	1188.23	1189.60	1177.25	1182.45		-0.006
25	4/8/10	1181.75	1188.55	1175.12	1186.44		0.003
26	4/9/10	1187.47	1194.66	1187.15	1194.37		0.007
27	4/12/10	1194.94	1199.20	1194.71	1196.48		0.002
28	4/13/10	1195.94	1199.04	1188.82	1197.30		0.001
29	4/14/10	1198.69	1210.65	1198.69	1210.65		0.011
30	4/15/10	1210.77	1213.92	1208.50	1211.67		0.005
31	4/16/10	1210.17	1210.17	1186.77	1192.13		-0.016
32	4/19/10	1192.06	1197.87	1183.68	1197.52		0.005
33	4/20/10	1199.04	1208.58	1199.04	1207.17		0.008
34	4/21/10	1207.16	1210.99	1198.85	1205.94		-0.001
35	4/22/10	1202.52	1210.27	1190.19	1208.67		0.002
36	4/23/10	1207.87	1217.28	1205.10	1217.28		0.007
37	4/26/10	1217.07	1219.80	1211.07	1212.05		-0.004
38	4/27/10	1209.92	1211.38	1181.62	1183.71		-0.024
39	4/28/10	1191.59	1195.05	1181.81	1191.36		0.008

**FIGURE 3: THIRD STEP.** Calculate the 21-day historical volatility.

	A	B	C	D	E	F	G	H	I
1	Date	Open	High	Low	Close		daily return	21d hist Volatility	Volatility Switch
39	4/28/10	1184.59	1195.05	1181.81	1191.36		0.006	0.008	
40	4/29/10	1193.30	1209.36	1193.30	1206.78		0.013	0.009	
41	4/30/10	1206.77	1207.99	1186.32	1186.69		-0.017	0.009	
42	5/3/10	1188.58	1205.13	1188.58	1202.26		0.013	0.010	
43	5/4/10	1197.50	1197.50	1168.12	1173.60		-0.024	0.011	1.0000
44	5/5/10	1169.24	1175.95	1168.15	1165.87		-0.007	0.011	1.0000
45	5/6/10	1164.38	1167.58	1065.79	1128.15		-0.033	0.013	1.0000
46	5/7/10	1127.04	1135.13	1094.15	1110.88		-0.015	0.013	1.0000
47	5/10/10	1122.27	1163.85	1122.27	1159.73		0.043	0.017	1.0000
48	5/11/10	1156.39	1170.48	1147.71	1155.79		-0.003	0.017	0.9524
49	5/12/10	1155.43	1172.87	1155.43	1171.67		0.014	0.017	1.0000
50	5/13/10	1170.04	1173.57	1156.14	1157.44		-0.012	0.017	0.9524
51	5/14/10	1157.19	1157.19	1126.14	1135.68		-0.019	0.017	1.0000
52	5/17/10	1136.52	1141.88	1114.96	1136.94		0.001	0.017	0.9524
53	5/18/10	1138.78	1148.66	1117.20	1120.80		-0.014	0.017	0.9524
54	5/19/10	1119.57	1124.27	1100.66	1115.05		-0.005	0.017	0.8095
55	5/20/10	1107.34	1107.34	1071.58	1071.59		-0.040	0.019	1.0000
56	5/21/10	1067.26	1090.16	1055.90	1087.69		0.015	0.019	1.0000
57	5/24/10	1084.78	1089.95	1072.70	1073.65		-0.013	0.019	0.9524
58	5/25/10	1067.42	1074.75	1040.78	1074.03		0.000	0.019	0.9524
59	5/26/10	1075.51	1090.75	1065.59	1067.95		-0.006	0.019	0.8095
60	5/27/10	1074.27	1103.52	1074.27	1103.06		0.032	0.020	1.0000
61	5/28/10	1102.59	1102.59	1084.78	1089.41		-0.012	0.020	0.9524
62	6/1/10	1087.30	1094.77	1069.89	1070.71		-0.017	0.020	0.9524
63	6/2/10	1073.01	1098.66	1072.03	1098.38		0.026	0.021	1.0000
64	6/3/10	1098.82	1105.67	1091.81	1102.83		0.004	0.020	0.9524
65	6/4/10	1098.43	1098.43	1060.50	1064.88		-0.035	0.021	1.0000
66	6/7/10	1065.84	1071.36	1049.86	1050.47		-0.014	0.020	0.9048
67	6/8/10	1050.81	1063.15	1042.17	1062.00		0.011	0.020	0.9048
68	6/9/10	1062.75	1077.74	1052.25	1055.69		-0.006	0.018	0.3810
69	6/10/10	1058.77	1087.85	1058.77	1086.84		0.029	0.019	0.6190
70	6/11/10	1082.65	1092.25	1077.12	1091.60		0.004	0.019	0.4286
71	6/14/10	1095.00	1105.91	1089.03	1089.63		-0.002	0.019	0.3810
72	6/15/10	1091.21	1115.59	1091.21	1115.23		0.023	0.019	0.6190
73	6/16/10	1114.02	1118.74	1107.13	1114.61		-0.001	0.019	0.5714
74	6/17/10	1115.98	1117.72	1105.87	1116.04		0.001	0.019	0.3333
75	6/18/10	1116.16	1121.01	1113.93	1117.51		0.001	0.019	0.2857

**FIGURE 4: FOURTH STEP.** Calculate the 21-day volatility switch indicator. A cell value greater than 0.5 is red, whereas a cell value less than 0.5 is green.

moving average crossover is also suitable for keeping you long (or short, as the case may be) in a trending market.

In column I43, enter this formula:

```
=COUNTIF(H23:H43,"<=" & VALUE(H43))/COUNT(H23:H43)
```

Copy this down to the end of the security data (Figure 4).

time to apply your favorite trend-following indicator, such as the moving average crossover or moving average convergence/divergence (MACD).

The key here is that rising volatility leads to increasing uncertainty and a choppy market. Falling volatility leads to less anxiety and increased certainty in market direction. Finally, I should mention that the 21-day time period is not optimized; finding the optimal lookback period is beyond the scope of this article. It should, however, represent a good starting point. I leave it to you to determine what gives the best results.

While this article presents an oversimplified example of using volatility in a regime switching strategy, it will help those not familiar with this concept to start implementing it along



**FIGURE 5: MEAN REVERTING MARKET.** Red cell value indicates the market is either in a mean reverting mode or is entering it soon.

Format column I43 with conditional formatting to make the value appear in red if the cell value is greater than 0.5 and appear as green if the cell value is less than 0.5. The spreadsheet can be seen at the STOCKS & COMMODITIES website at [http://www.traders.com/Documentation/FEEDbk\\_docs/2013/02/volt-switch.xls](http://www.traders.com/Documentation/FEEDbk_docs/2013/02/volt-switch.xls).

## MEAN REVERSION OR TRADING MARKET

Red indicates the 21-day volatility indicator is rising and the market is either in a mean-reverting mode or will be entering it soon (Figure 5). Now is the time to use your favorite indicator for a trading range market such as the relative strength index (RSI) or stochastic oscillator.

## TRENDING MARKET

Green indicates the 21-day volatility indicator is falling and the market is either in a trending mode or will be entering it soon (Figure 6). Now is the

**Rising volatility leads to increasing uncertainty; falling volatility leads to increased certainty.**



**TRADING SYSTEMS**

with their other trading tools.

*Ron McEwan is an independent trader and market technician. He may be reached at rmac@juno.com.*

**SUGGESTED READING**

- Quantum Financier. “Regime Switching System Using Volatility Forecast.” <https://quantumfinancier.wordpress.com/2010/08/27/regime-switching-system-using-volatility-forecast/>
- Systematic Investor. “Trading Using Garch Volatility Forecast.” <https://systematicinvestor.wordpress.com/>

‡Microsoft Excel

See Traders’ Tips section beginning on page 66 for commentary and implementation of Ron McEwan’s technique in various technical analysis programs. Accompanying program code can be found in the Traders’ Tips area of Traders.com.



**FIGURE 6: TRENDING MARKET.** Green cell value indicates the market is either in a trending mode or will enter it soon.

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