

Composite Indicator Using Momentum and Trend Following Components, Provides Early Identification of Turning Points in S & P 500

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Introduction

In the following paper I will show that the composition of two indicators superimposed and scaled to each other at the center of the chart can provide early identification of turning points.

As a proxy to other markets we will use the S&P 500 Index on the premise that, if it works on the S&P 500, it may have application on other investment items. The two indicators used are: the Relative Strength Index (RSI) by Welles Wilder Jr. and a Difference of Two Weighted Moving Averages (DOTA-W). The use of a weighted moving average of the DOTA is also included. The combined RSI and DOTA-W is called the **JEY Indicator**.

The indicator had its origin when I was just learning about Technical Analysis. I observed that when the RSI and a simple moving average of a Difference of Two Averages (DOTA-S) were superimposed on a chart they seemed to identify turning points. The upper window of Chart 1 shows the JEY Indicator in Equis International's Technician Charting package. The signals generated by the DOTA-S crossing the RSI can provide entry and exit points. As displayed in the "Technician" it can be seen that the signals are delayed. It will be shown that, by choosing a different weighting method and by scaling them to a common reference point, more timely signals may be generated.

Formulae

The formula used for the RSI is the same as that proposed by its inventor J. Welles Wilder, Jr. and for the record is shown below:

$$RSI = 100 - \left(\frac{100}{(1 + RS)} \right)$$

Where:

$$RS = \frac{\text{Sum of 14 up closing price changes}}{\text{Sum of 14 down closing price changes}}$$

The formula for the DOTA is similar to Gerald Appel's Moving Average Convergent Divergent formula, but uses weighted moving averages rather than exponential moving averages and is shown below:

$$DOTA-W = \left(\frac{\sum_{j=1}^{12} WC_j}{\sum W} \right) - \left(\frac{\sum_{j=1}^{26} WC_j}{\sum W} \right)$$

Where: W, equals the weighting on day j
C, equals the closing price on day j

The calculation of a moving average of the DOTA is done using the following formula:

$$DOTA-W MA = \left(\frac{\sum_{j=1}^9 W_j DOTA_j}{\sum W_j} \right)$$

Where: W, equals the weighting on day j
DOTA, from formula 2 for day j

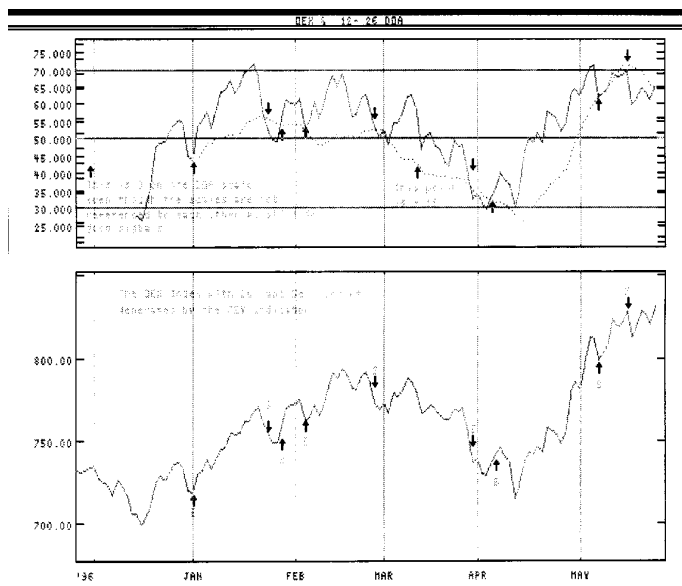


Chart 1 The JEY Indicator as constructed in the Technician. The DOTA-S (dotted line), using a simple moving average versus the RSI with potential Buy and Sell signals.

Background

Comparing Indicator weighting methods.

The chart of the S&P 500 in Chart 2 shows the three weightings, DOTA-W weighted, DOTA-S simple and The MACD Exponential of the Oscillator. We can see that many of the signals produced by the DOTA-W and MACD are the same, while those produced by the DOTA-S are consistently late. The following tables summarize the early late relationships of the three oscillators. As noted in Table 1 there are signals produced by both the DOTA-W and the DOTA-S that do not occur on the MACD. Table 2 summarizes the point gain/loss of the three oscillators.

Of the fifteen signals produced by the DOTA-W, six are the same as those produced by the MACD, three are early, and three are late. For the DOTA-S versus the MACD, two are early, eight are late, and two had no comparable signal.

Table 1
Early-Late Signal Summary

Trade No.	Action	Trade MACD	Date DOTA-S	# Weeks DOTA-S Early/Late	Date DOTA-W	# Weeks DOTA-W Early/Late
1	S	19-Oct-79	02-Nov-79	3	12-Oct-79	-2
2	B	14-Dec-79	18-Jan-80	6	14-Dec-79	0
3	S	07-Mar-80	03-Apr-80	8	07-Mar-80	0
4	B	23-May-80	13-Jun-81	4	23-May-80	0
5	S	07-Nov-80	10-Oct-80	-5	05-Sep-80	-10
6	B	14-Nov-80	12-Dec-80	5	21-Nov-80	1
7	S	12-Dec-80	10-Oct-80	-10	12-Dec-80	0
		No Signal			27-Mar-81	
	B	No Signal	08-May-81		29-May-81	
		No Signal	02-Jul-81		14-Aug-81	
8	B	06-Nov-81	04-Dec-81	5	30-Oct-81	-2
9	S	15-Jan-82	26-Feb-82	7	15-Jan-82	0
10	B	08-Apr-82	07-May-82	5	08-Apr-82	0
11	S	11-Jun-82	16-Jul-82	6	18-Jun-82	2
12	B	20-Aug-82	10-Sep-82	4	27-Aug-82	1

A -ve value indicates the signal date is earlier than for the MACD

Table 2

Win - Loss Summary
Trading Summary Reports

	Amount	Signals	Average	Ratio
DOTA-W				
Wins	46.66	5	9.332	0.33
Loss	-66.1	10	-6.61	0.67
Total	-19.44	15	-1.296	-0.71
Largest Win	21.58		Largest Loss	-14.23
DOTA-S				
Wins	44.72	3	14.91	0.25
Loss	-102.1	9	-11.34	0.75
Total	-57.33	12	-4.78	-0.44
Largest Win	34.98		Largest Loss	-31.35
MACD				
Wins	50.95	5	10.19	0.42
Loss	-34.11	7	-4.87	0.58
Total	16.84	12	1.40	-1.49
Largest Win	25.67		Largest Loss	-7.97

The Win-Loss Summary Table 2 shows that using just pure cross-overs the MACD was the only one that was profitable. The DOTA-W was next with the smallest loss of 19.44 points.

We will show that by including the Relative Strength Index (RSI) we can obtain signals that improve our entry and exit points.

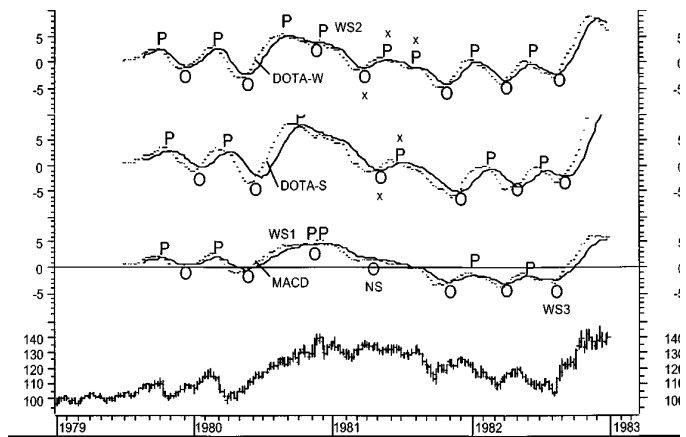


Chart 2 The S&P 500 Index comparing the timing of Buy/Sell signals. The arrows with x's identify signals that do not occur in the MACD.

Scaling Requirements

Chart 3 shows the DOTA-W and the RSI in the upper window using default scaling of both items. The middle window shows the same two indicators with the RSI scale set to 0-100 and the DOTA-W scaling set to place the zero line on the same plane as the 50 line of the RSI indicated by the dashed line at 0-50. Setting the zero of the DOTA-W axis equal to the 50 of the RSI is essential as we need to have a constant reference point. This reference point allows the two indicators to oscillate around the center of the chart.

The values chosen for the DOTA-W will vary depending on the underlying and has been found to be the maximum positive or negative value rounded to the nearest number divisible by 5. When the DOTA-W reaches the current scale maximum, I increase the scale level in increments of 5 to compress the DOTA-W e.g., in Apr-86, on Chart 6, the scale would be set to ± 15 .

The benefit of scaling is that it helps position the DOTA-W line relative to the RSI at the 30-70 level which are deemed to be the O/B and O/S levels. This can be seen by comparing the two upper charts in Chart 3.

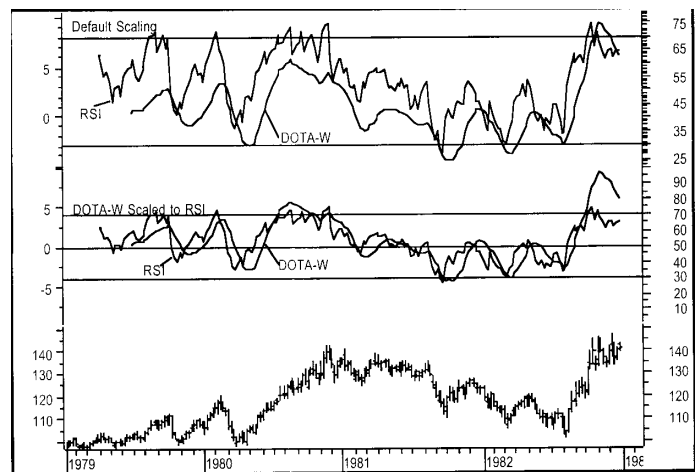


Chart 3 Scaling of the DOTA-W zero axis to the 50 of the RSI versus default scaling.

Relative Strength Characteristics

The RSI is a momentum indicator and depends solely on changes in closing prices. It always provides leading or coincident signals. The double use of ratios makes the RSI subject to greater volatility, distortion, and erratic movement. The RSI has six major Interpretive Factors. In the list below the first five were by its developer J. Welles Wilder¹ and the sixth by the research team of Colby and Myers². The number in parentheses following each factor identifies its order of significance.

Divergence between Price and the RSI (1)	Tops/Bottoms at 70/30 (1)
The Failure Swing (2)	Chart Formations (3)
Support and Resistance (4)	Reversals of the RSI at 50 (5)

In Chart 4, the top line shows the various interpretive factors of the RSI. It clearly shows that Divergence is by far the most significant factor, followed by both the level of the RSI and the Failure Swing (FS) then by Chart Formations, Two Head & Shoulders and a triple top on the RSI from Aug-81 to May-82 also acted as Divergence (D6).

Colby and Myers found the five characteristics defined by Wilder to be too complex and opted for buy and sell signals being generated by the crossing of the 50 line. What I have found to be of importance is reversals that occur within ± 5 at the 50 level. To be more specific, if the RSI was below 50 X days ago, advances to a value above 50 but below 55, and then declines to a value below 50 all within three chart units, we find this to be a sign of weakness in the price. This is shown in the top chart of D6, Chart 4. The reverse of this would show a sign of strength.

The level of the RSI as defined by the author is subject to validation by the user for each market traded. Alexander Elder³ has suggested that these upper and lower reference levels be validated every three months and set to specific levels based on the type of market being traded. The level he suggested is one, beyond which the RSI has spent less than five percent of its time. As a guidance he suggested 40-80 for Bull markets and 20-60 for Bear markets. Justification for this can be seen in Chart 4 at D6 where, from Jul-81 to Jul-82, the RSI had a range of between 52 and 26.

DOTA-W Characteristics

The center line of Chart 4 shows the DOTA-W (Bold) line and the DOTA-E. This shows the basic difference between them, which is primarily the values (levels) attained by the DOTA-W compared to the DOTA-E. One major difference is seen at X2, where the two indicators have opposing divergence to each other. I find this to be of significance as the DOTA-W was able to identify a region of divergence to price that the DOTA-E missed.

As the DOTA-W is a front weighted variation of the MACD developed by Gerald Appel⁴, the same characteristics of the MACD are considered to be applicable to the DOTA-W. The characteristics he noted include positive and negative Divergence's, Patterns, and Over/Bought and Over/Sold levels. He defined positive divergence as a rising MACD to declining prices, (X3 versus D7), while the opposite is valid for negative divergence (X2). He only defined two patterns; these being a Double Bottom on the underlying investment compared to a rising MACD, or a Double Top on the underlying investment item versus a flat bottomed MACD.

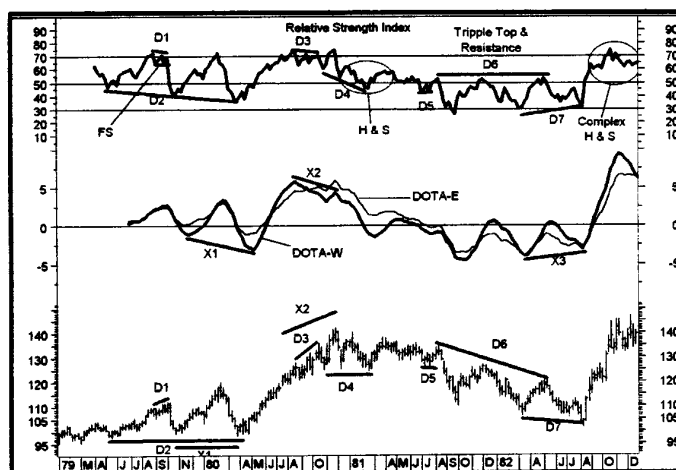


Chart 4 The Characteristics of the RSI, DOTA-W versus the DOTA-E and the SP500 for the period 1-Jan-79 to 31-Dec-82

Indicator Interpretation

There are two primary signals that can be generated by the JEY Indicator: Buy and Sell signals. A Sell signal is generated when a down-sloping RSI is crossed by the DOTA-W from below. The Buy signal, on the other hand, is generated when an up-sloping RSI is crossed by the DOTA-W from above. Signals can also be generated by the DOTA-W moving horizontally across the RSI. A secondary Buy Signal occurs when the RSI is sloping upwards and is crossed by the DOTA-W from below. The reverse is also applicable to secondary Sell Signals. Crossovers that occur at the 70 or 30 levels are significant.

All analysis is made using weekly charts. All trades are executed using the opening price of the next trading period following signal generation.

In addition to the primary crossovers, signals generated as a result of member characteristics are used as substantiation and confirmation of the trade.

No allowance was provided for commissions and slippage. Stop loss levels are a function of an individual's tolerance to risk.

Open Discussion

In Charts 5 through 8, the completed JEY indicator is displayed in the top portion and the S&P 500 in the lower portion. The DOTA-W is the thinner line with its scale on the left. The RSI is the thicker line with its scale on the right. The scale of the S&P 500 is shown on both sides. All charts use weekly data and the period under study is from 1-Jan-79 to 12-Dec-89. The different charts were needed to show the JEY Indicator at its scaling reference to the RSI. I have not included the use of the 9 unit MA as done in the MACD. It was found that inclusion tended to distract one from which were the valid signals. The crossing of the 9WMA to the DOTA-W or the DOTA-W to the RSI that I am presenting. Each chart contains some standard symbols to identify various observations. Divergences are identified by the letter "Dx," while Failure Swings on the RSI uses "FSx" the 'x' being a number, and each trade is numbered. Trendlines are identified by "TLx." Pertinent statistics for each signal is recorded in Annex A and a Gain/Loss summary is presented in Annex B.

Examination of Chart 5 and the Buy/Sell signals show us some interesting points. First, the concept of divergence between the RSI of the DOTA-W to price gives us a significant warning that a

change in trend is about to occur. Then, as the trend starts to change, the buy or sell signal is generated. The other point is that many of the crossovers either precede or coincide with other characteristics of both component members. This can be seen on the trade 1, where the crossover was preceded by divergence (D1), and a failure swing (FS1).

Upon close examination of the trades from 8 through 15, it can be seen that there were many whipsaws and this is also the region where we made six of the sixteen losses. This is one of the weaknesses of the DOTA-W in that it does not perform well in sideways trends. While not a specific member component, the use of TrendLine(s) cannot be forgotten as a very important component of any indicator. In hindsight, the use of a TrendLine along the highs from Nov-80 until Jun-81 and adding another trading rule that trades in the direction of the trend, take precedence over trades that are counter trend. In this way we may be able to reduce the number of whipsaws that occur. But, this runs counter to the purpose of a trading system where we are supposed to take all signals. It would then fall on money management principals to minimize the loss on these trades.

A closer look at trades 5, 24 and 8 show the case where secondary Buy and Sell signals can occur and permit adding positions. Signal 24a in Chart 5 was based on the Failure Swing at FS5 and the divergence at D6. Taking our rules for a sell signal this trade cannot be considered valid. It does, however, point out the complex situations that can arrive and the importance of following the established rules.

As Mr. Wilder pointed out in his book, *New Concepts in Technical Trading System*, divergence is certainly the most powerful use of the RSI. In Chart 5, I have identified six of the seven, which were followed immediately by major trend changes. It can be seen, in Chart 6 on Nov-82, that the Divergence D6 followed by a Failure Swing they both failed.

By following the Signals of the **JEY Indicator** on Chart 5, there were 9 consecutive profitable trades, and sixteen winners for a total gain of 145.77 points. At a value of \$500 per point in effect then, the total return would have been US \$72,885 with only a \$5,150 loss (less commissions).

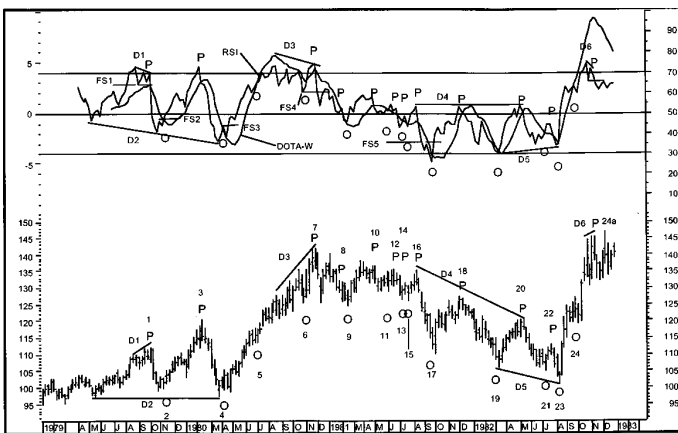


Chart 5 The completed JEY INDICATOR showing Buy and Sell on the S&P 500 for the period 01-Jan-79 to 13-Dec-82.

In Chart 6 we can see there are many signals that were generated as a result of divergence and either Symmetrical Triangle patterns on the RSI or Advancing Triangles on price. To continue the discussion from signal 24a, we can see there was major Divergence of price to the RSI in the form of a Rising Wedge and

a double bottom on price. The **JEY Indicator** also permitted us to two small trades (26, 27) at the very end of the Rising Wedge pattern. The signal at 28 which was at the beginning of divergence D7 and the resulting change of trend from up to neutral that lasted for six months. A closer examination of the RSI and divergence D7 and D8 shows the start of a major bearish trend that lasted until the end of Jul-84. It should be noted that we have our whipsaws again at signals 30, 32 and 34-37 and they seem to occur when the RSI is at or near 50. An interesting phenomena that seems to occur is that, whenever a Symmetrical Triangle starts on the RSI we get a sell signal from the **JEY Indicator**. This is seen at D8, D9 and D10. The major support provided by the Trendlines on both Price and the RSI from the Breakout in Aug 84 and the double Symmetrical and Advancing Triangles is also interesting, all three buy signals were generated at support of the RSI TL. The signal at 44 was at the top of the Head & Shoulders pattern following by a penetration of the RSI TL and was a secondary type sell signal. Signal 46 is at the bottom of the failed Head & Shoulders reversal and signal 47 was another secondary type signal that allowed us to capture additional profits. The divergence at D11 and 12 also prove to warn us of pending changes.

The scaling of both Charts 5 and 6 was set at ± 10 and proved to be the optimal value for this period, permitting us to capture practically every turning point and only experiencing minimal losses. As volatility is starting to increase we need to change the scale of the DOTA-W to ± 15 in order to continue with the next trades on Chart 7. This scale change was done on 18-Apr-96 and permits signals 48 to 52 to materialize. Divergence D11 is a Double Top on the RSI while price continues to rise and is supported by the TrendLine that started at signal 46. Divergence D12 has the RSI declining from 80 and breaking 70 when signal 48 is activated followed by penetration of the support TL. The next four signals are all generated by crossovers but are supported by the Head & Shoulder formation, and divergence D13 on the RSI in fact, there is also a Symmetrical Triangle by D13 and TL1a from signals 51 and 53 on the RSI. This also marks the third time that we see the combination of Advancing and Symmetrical Triangles. By extending TL1a from signal 51 to 56 on the RSI it acts as both support and resistance to the RSI right up to signal 56.

We continue our commentary on Chart 8 starting at signal 53. From this point forward the scaling of the DOTA-W is set to ± 25 . The buy signal at 53, is followed quickly by the penetration of D13 by price. The **JEY Indicator** quickly penetrates the neck line of the Inverse Head & Shoulder and D13. Our next signal 54 is again at the start of a Symmetrical Triangle and divergence D14 on the RSI. Signal 55 is supported by solid TL1 which forms the second line of the Fan Principle⁵.

Signal 56 is the result of a crossover of the **JEY Indicator** and has at least four supporting technical reasons: the completion of Divergence D14 on both the RSI and the DOTA-W plus the failure of the RSI to remain above TL1a. It is also important to note that the divergence at D14 was seven weeks before the big Crash of Oct '87 which was forewarned by support TL1 and then its subsequent penetration and the breaking of the Head & Shoulder neckline. While there was no secondary sell signal when the RSI crossed TL1, it was very close and there was ample technical reasons to add positions. The rapid decent of the RSI to below 30 was followed very quickly by the DOTA-W and their combination permitted buy signal 57 to be generated the Monday following the Crash.

While price came back and tested the low made at signal 57

the RSI continued its downward fall until the test was completed in Dec-87 and divergence D15 was completed. The failure to reach the same low as at signal 57 started TL2 which was to last until Sep-89, 22 months. It is interesting to note that the trendlines on the RSI are much straighter while those on price get bent see TL1 and TL2. Also, every buy signal was supported by TL1 and every sell had resistance at TL2.

The signal at 58 was another secondary buy signal that permitted a small profit of 2.73 points. If one had not been patient here, a loss of about 30 points could have occurred to signal 59 the next buy signal. This could have been anticipated by projecting TL2 into the future. Signal 66 was marked with an x because we there were three signals in rapid succession and two of them were not taken.

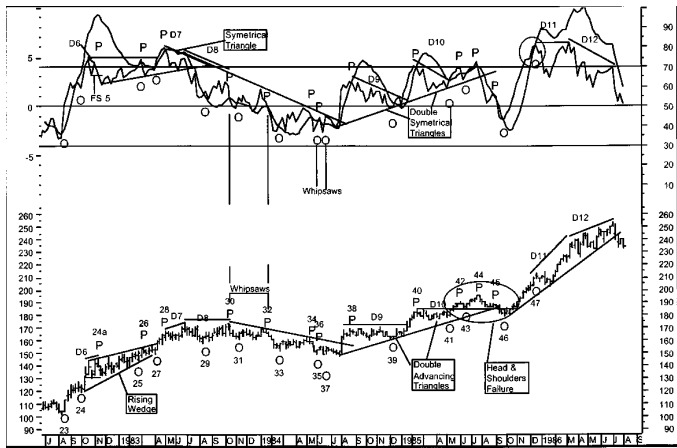


Chart 6 Signals generated on S&P 500 by JEY Indicator from 20-Aug-82 to 31-Dec-85

Problems

The DOTA-W has the standard problems of all oscillators, in that there is no maximum or minimum value. Hence it is very difficult to define an overbought or oversold level with these tools.

The value of the oscillator is directly related to the value of the underlying making it very difficult to assign a constant scaling value.

To date, because of fluctuating values of the oscillator, I have been unable to computerize the indicator. This is not an essential criteria, but would make it more flexible, simplify its use and remove the human element.

The use of component member characteristics, can be an asset as well as a hindrance. Signal 24a is a perfect example where we have no signal but, Divergence followed quickly by a Failure Swing of the RSI. Divergence being the more powerful characteristic, according to Welles Wilder would suggest that you should exit the trade. Only belief in the **JEY Indicator** and its ability to identify prominent turning points keep you in the prior two trades for a fairly good return.

Conclusions

The combined use of a trend-following indicator such as the DOTA-W and a momentum indicator (RSI) can definitely provide the trader with an advanced tool that can definitely identify turning points at the most opportune time.

As shown in Annex B, the **JEY Indicator** has over the period of study shown a very good return. A 306% return for the **JEY Indi-**

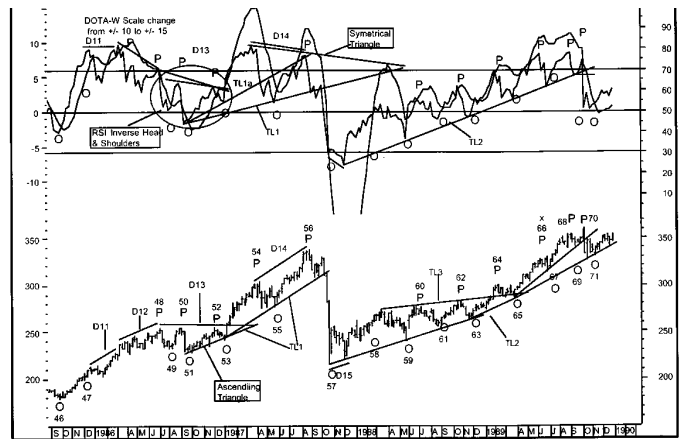


Figure 7 The final four years of the S&P 500 with Buy and Sell signals as suggested by the JEY Indicator 17-Sep-85 to 31-Dec-89. Chart Scaled to +/-15 from 4/18/86 to 1/9/87 for Signals 48 to 52

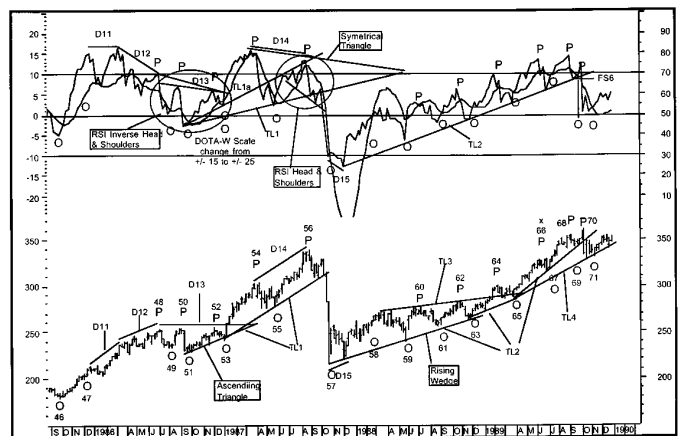


Figure 8 DOTA-W was scaled to +/- 25 from Signal 53 onwards

icator versus the Buy and Hold strategy is excellent. And, a total return of 724.55 points at \$500 per point represents \$362,275.00. It is interesting to note that there were 13 consecutive profitable signals to only three consecutive losers. The largest loss at 12.09 points is acceptable and did not affect total capital too adversely. At the time of the loss we had gained 452.61 points. The largest win of 74.05 points occurred during the Crash of '87 and was one of the 13 consecutive wins.

Combining the individual attributes of each member, and the use of trend lines on both the underlying and the indicators is essential in identifying market direction, creating greater confidence that the trade will be successful

Neither indicator, separately or combined, works well during a consolidation/distribution phase. It was during these conditions that the most of losses were suffered.

Additional research will be done to identify what additional tool(s) or methods can be used to improve the Indicator.

I am convinced that the **JEY Indicator** can provide significant advance warning that a change in direction of the underlying is pending and one should welcome its message.

Annex A
Summary of Signals Using JEY Indicator

Signal No.	Action	Signal Date	Entry Date	Entry Price	Exit Date	Exit Price	Gain Loss	Net G/L	Remarks
1	S	10/05/79	10/12/79	109.88	11/16/79	103.50	6.38	6.38	X'ovr
2	B	11/09/79	11/16/79	103.50	02/29/80	113.33	9.83	16.21	Convergence to RSI, Failure Swing FS2 and X'ovr
3	S	02/22/80	02/29/80	113.33	04/25/80	99.80	13.53	29.74	X'ovr
4	B	04/18/80	04/25/80	99.80	12/05/80	137.21	37.41	67.15	Divergence D2, X'ovr, Failure Swing as Confirmation
5	B	07/11/80	07/18/80	120.36	12/05/80	137.21	16.85	84.00	X'ovr
6	B	11/07/80	11/14/80	129.47	12/05/80	137.21	7.74	91.74	X'ovr
7	S	11/28/80	12/05/80	137.21	02/13/81	129.27	7.94	99.68	X'ovr, Cross < 70, Failure Swing FS3 as Confirmation
8	S	02/06/81	02/13/81	129.27	02/27/81	127.35	1.92	101.60	X'ovr
9	B	02/20/81	02/27/81	127.35	05/15/81	129.71	2.36	103.96	X'ovr
10	S	05/08/81	05/15/81	129.71	06/05/81	132.41	-2.7	101.26	X'ovr
11	B	05/29/81	06/05/81	132.41	07/02/81	131.88	-0.53	100.73	X'ovr
12	S	06/26/81	07/02/81	131.88	07/17/81	129.63	2.25	102.98	X'ovr
13	B	07/10/81	07/17/81	129.63	07/24/81	128.72	-0.91	102.07	X'ovr
14	S	07/17/81	07/24/81	128.72	07/31/81	129.89	-1.17	100.90	X'ovr
15	B	07/24/81	07/31/81	129.89	08/28/81	125.50	-4.39	96.51	X'ovr
16	S	08/21/81	08/28/81	125.50	10/02/81	115.52	9.98	106.49	Rev. at 50, X'ovr
17	B	09/25/81	10/02/81	115.52	12/18/81	122.77	7.25	113.74	X'ovr, Level < 30, Confirmation by Failure Swing
18	S	12/11/81	12/18/81	122.77	03/19/82	109.44	13.33	127.07	Divergence D3, RSI Double. Top, Rev at 50, X'ovr
19	B	03/12/82	03/19/82	109.44	05/21/82	116.71	7.27	134.34	X'ovr
20	S	05/14/82	05/21/82	116.71	07/16/82	109.57	7.14	141.48	Divergence D3, Triple Top RSI, X'ovr,
21	B	07/09/82	07/16/82	109.57	08/06/82	108.97	-0.6	140.88	X'ovr
22	S	07/30/82	08/06/82	108.97	08/20/82	104.08	4.89	145.77	X'ovr
23	B	08/13/82	08/20/82	104.08	11/04/83	163.55	59.47	205.24	Divergence D4, X'ovr
24	B	09/24/82	10/01/82	123.61	11/04/83	163.55	39.94	245.18	X'ovr
24a	S	11/12/82	11/19/82	137.02	11/19/82	137.02	0	245.18	Divergence D5, Failure Swing no X'ovr Not Taken
25	B	02/25/83	03/04/83	148.05	11/04/83	163.55	15.5	260.68	Secondary Buy Signal X'ovr
26	S	11/03/83	11/04/83	163.55	04/22/83	159.74	3.81	264.49	X'ovr
27	B	04/15/83	04/22/83	159.74	05/13/83	165.80	6.06	270.55	X'ovr
28	S	05/06/83	05/13/83	165.80	08/26/83	164.33	1.47	272.02	X'ovr, Note B/O on Sym. Tria. at end of D7 on RSI
29	B	08/19/83	08/26/83	164.33	10/28/83	165.99	1.66	273.68	X'ovr
30	S	10/21/83	10/28/83	165.99	11/18/83	166.58	-0.59	273.09	X'ovr Double Top, completion of D8
31	B	11/11/83	11/18/83	166.58	02/03/84	162.86	-3.72	269.37	X'ovr RSI declining rapidly, Reversal at 50 on RSI.
32	S	01/27/84	02/03/84	162.86	03/02/84	159.30	3.56	272.93	x'ovr RSI has solid cross below 50
33	B	02/24/84	03/02/84	159.30	05/25/84	155.52	-3.78	269.15	X'ovr
34	S	05/18/84	05/25/84	155.52	06/08/84	154.33	1.19	270.34	X'ovr
35	B	06/01/84	06/08/84	154.33	06/15/84	153.05	-1.28	269.06	X'ovr
36	S	06/08/84	06/15/84	153.05	06/29/84	153.97	-0.92	268.14	X'ovr
37	B	06/22/84	06/29/84	153.97	09/07/84	164.88	10.91	279.05	X'ovr, Note Major B/O above TL starting at Signal 30.
38	S	08/31/84	09/07/84	164.88	12/21/84	163.61	1.27	280.32	X'ovr
39	B	12/14/84	12/21/84	163.61	02/22/85	181.33	17.72	298.04	X'ovr RSI Sym. Tria. F/B B/O above D9 and Adv. Tria.

Summary of Signals Using JEY Indicator (continued)

Signal No.	Action	Signal Date	Entry Date	Entry Price	Exit Date	Exit Price	Gain Loss	Net G/L	Remarks
40	S	02/15/85	02/22/85	181.33	05/10/85	179.99	1.34	299.38	X'ovr
41	B	05/03/85	05/10/85	179.99	06/14/85	189.50	9.51	308.89	X'ovr, RSI Sym Tria. B/O & Adv. above Adv. Tria. & D10
42	S	06/07/85	06/14/85	189.50	06/28/85	189.14	0.36	309.25	X'ovr
43	B	06/21/85	06/28/85	189.14	08/02/85	189.60	0.46	309.71	X'ovr, Support by D10 TL
44	S	07/26/85	08/02/85	189.60	10/04/85	182.08	7.52	317.23	X'ovr Confirmed. By RSI TL Brk
45	S	09/06/85	09/13/85	188.25	10/04/85	182.08	6.17	323.40	X'ovr, Secondary Sell Signal F/B TL B/O
46	B	09/27/85	10/04/85	182.08	07/03/86	250.80	68.72	392.12	X'ovr, Head & Shoulders Failure
47	B	12/13/85	12/20/85	212.02	07/03/86	250.80	38.78	430.90	X'ovr Secondary Buy Signal.
48	S	07/03/86	07/03/86	250.80	08/15/86	240.68	10.12	441.02	DOTA-W scale change end D12
49	B	08/08/86	08/15/86	240.68	09/19/86	231.94	-8.74	432.28	X'ovr
50	S	09/12/86	09/19/86	231.94	10/03/86	229.91	2.03	434.31	X'ovr
51	B	09/26/86	10/03/86	229.91	12/19/86	248.21	18.3	452.61	X'ovr
52	S	12/12/86	12/19/86	248.21	01/16/87	260.30	-12.1	440.52	X'ovr
53	B	01/09/87	01/16/87	260.30	04/10/87	301.95	41.65	482.17	DOTA-W scale change end D13, RSI Inverse H&S NeckLine, and Cross above D13 TL.
54	S	04/03/87	04/10/87	301.95	05/29/87	289.11	12.84	495.01	X'ovr
55	B	05/22/87	05/29/87	289.11	09/04/87	329.80	40.69	535.70	X'ovr RSI Dbl. Btm at Sigbal 53, Break above D13a, & PriceTriple Btm
56	S	08/28/87	09/04/87	329.80	11/06/87	255.75	74.05	609.75	X'ovr at end D14 of both RSI & DOTA-W, See text for additional comments
57	B	10/30/87	11/06/87	255.75	07/15/88	270.55	14.8	624.55	X'ovr, Note D15 & start of TL end Nov -87
58	B	02/26/88	03/04/88	267.82	07/15/88	270.55	2.73	627.28	X'ovr, Secondary Buy Signal.
59	B	05/27/88	06/03/88	262.16	07/15/88	270.55	8.39	635.67	X'ovr, Note Sup of TL2 on both RSI and Price
60	S	07/08/88	07/15/88	270.55	09/16/88	266.47	4.08	639.75	X'ovr Note Break down from Resistance at TL3.
61	B	09/09/88	09/16/88	266.47	11/04/88	278.97	12.5	652.25	X'ovr Supported by TL2.
62	S	10/28/88	11/04/88	278.97	12/09/88	274.93	4.04	656.29	X'ovr Resistance at TL3
63	B	12/02/88	12/09/88	274.93	02/10/89	299.63	24.7	680.99	X'ovr Sup of TL2 followed by break of TL3
64	S	02/03/89	02/10/89	299.63	04/07/89	296.39	3.24	684.23	X'ovr, followed by Sup of TL3
65	B	03/31/89	04/07/89	296.39	06/23/89	321.89	25.5	709.73	X'ovr Support of TL2 & break above TL3
66	S	06/16/89	06/23/89	321.89	07/28/89	333.67	-11.8	697.95	X'ovr See text about whipsaws this location
67	B	07/21/89	07/28/89	333.67	09/15/89	347.66	13.99	711.94	X'ovr Support of TL2
68	S	09/08/89	09/15/89	347.66	09/29/89	344.23	3.43	715.37	X'ovr
69	B	09/22/89	09/29/89	344.23	10/20/89	342.85	-1.38	713.99	X'ovr & TL2 Support
70	S	10/13/89	10/20/89	342.85	11/17/89	339.55	3.3	717.29	X'ovr Break below of TL2 and FS6
71	B	11/10/89	11/17/89	339.55	12/29/89	346.81	7.26	724.55	X'ovr TL4 support
72	C	12/29/89	12/29/89	346.81					System closed at open on 12-29-89

Definitions used in table:

- X'ovr** = Crossover
- Sym** = Symmetrical
- Tria** = Triangle
- F/B** = Followed by
- B/O** = Break Out

Annex B

Summary of Net Gains/Losses

Signals from 1979 to Feb-1983

From Trade: 1	To End of Trade: 22			
	Points	Signals	Average	Ratio
Wins	156.07	16	9.75	0.73
Loss	-10.30	6	-1.72	0.27
Total	145.77	22	6.63	15.15
Largest Win	37.41	Largest Loss		4.39

Signals from Feb-1983 to Feb-1986

From Trade: 23	To End of Trade: 45			
	Points	Signals	Average	Ratio
Wins	187.92	18	10.44	0.78
Loss	-10.29	5	-2.06	0.22
Total	177.63	23	7.72	18.26
Largest Win	59.47	Largest Loss		3.78

Signals from Feb-1986 to Dec-1989

From Trade: 46	To End of Trade: 71			
	Points	Signals	Average	Ratio
Wins	435.14	22	19.78	0.85
Loss	-33.99	4	-8.50	0.15
Total	401.15	26	15.43	12.80
Largest Win	74.05	Largest Loss		12.09

Signals from Jan-1979 to Dec-1989

From Trade: 1	To End of Trade: 71			
	Points	Signals	Average	Ratio
Wins	779.13	56	13.91	0.79
Loss	-54.58	15	-3.64	0.18
Total	724.55	71	10.02	14.28
Largest Win	74.05	Largest Loss		12.09

Buy and Hold Strategy Jan-1979 to Dec-1989

Buy		Sell		Net
10/12/79	109.88	12/29/89	346.81	236.93
% Gain/Loss JEY Indicator Vs Buy/Hold				306%

Definitions:

Wins = Sum of Winning Points

Loss = Sum of Losing Points

Win Signals = Number of Winning Signals

Loss Signals = Number of Losing Signals

Average = Points divided by number of Signals

Wins Ratio = Number of Winning Signals divided by total number of Signals.

Loss Ratio = Number of Losing Signals divided by total number of Signals.

Total ratio = Win Points divided by Loss Points.

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