

RRG WEIGHTS

WHITEPAPER

AUTHOR

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Since I was introduced to Relative Rotation Graphs, I have been constantly playing with them and trying to see how they can give me insights into what is happening in the market. I love looking at different Asset Classes, Currencies and Portfolios. My favourite group however will always be the SP500 GICS Level 1 sectors with the SP500 as the benchmark, because I know that the total of the ten sectors must be fully encompassed by the benchmark. The ten sectors embody all the elements that can contribute to the SP500 itself. When I look at the RRG, which measures trends in relative performance of each Sector against the Index, there has to be balance in each of the axis.

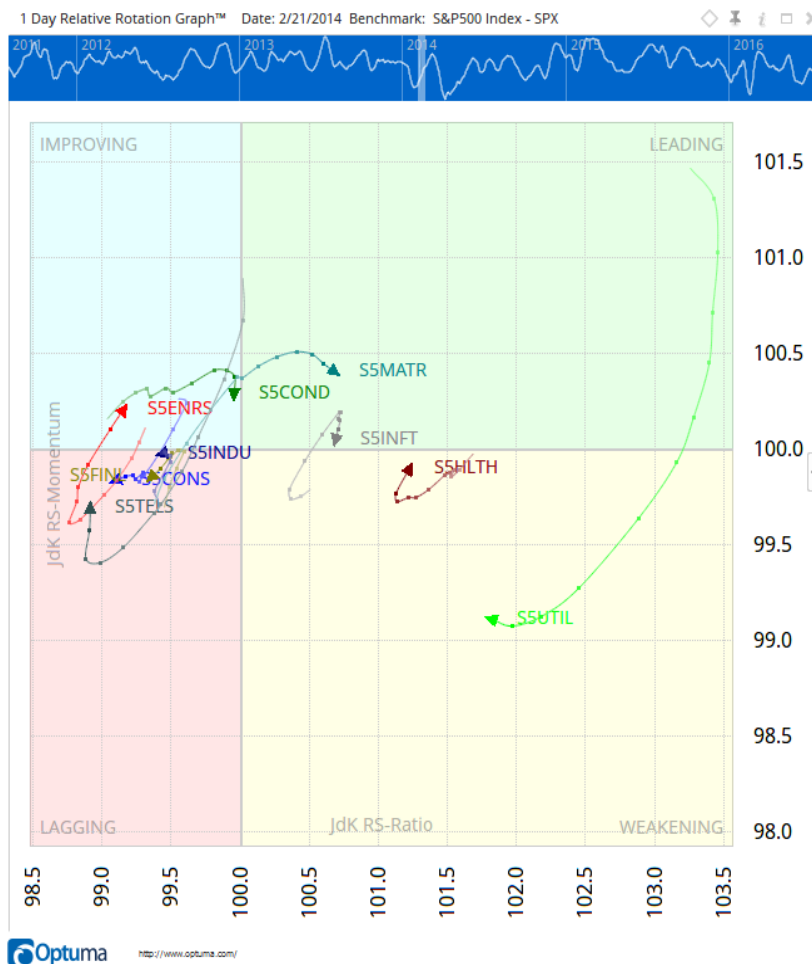


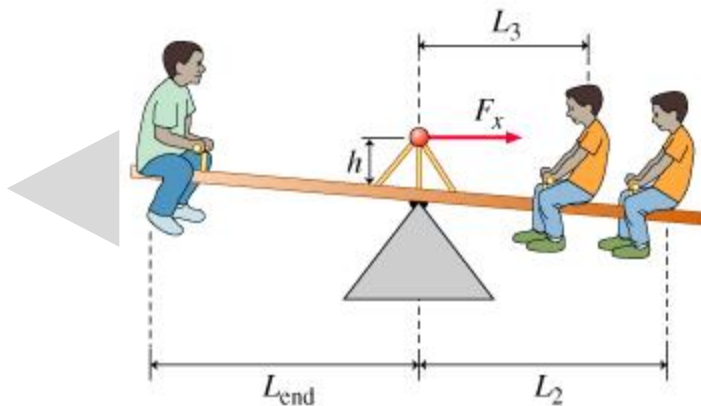
Figure 1
SP500 GICS Level 1
Sectors versus SP500 -
Data from Bloomberg

Consider Figure 1; we can see the ten sectors based on their relative strength against the SP500. An immediate stand out is the Utilities (S5UTIL) way out on its own on the right (the tail shows us where it has been) while there is a group of

sectors clustering on the left. Based on what I was saying before, if these ten embody all that contributes to the Index, and we consider the Index to be the very centre of the chart, we can theorise that all the sectors have to be balanced around that point. If that is true, it has to follow mathematical rules as we are dealing with what can only be described as a closed universe (no other stocks are contributing to the index).

We can see that there is a group of six sectors on the left side of the vertical 100 line, that's like a group of children on one side of a seesaw while less are sitting on the right side. Figure 2 shows that to have balance it is only possible if the bigger group of children is closer to the apex than the lone child (L_2 is smaller than L_{end}). If we are to have balance in the RRG, then we should see something similar.

Figure 2
Balance comes from a combination of distance from the apex and the mass of each child



As an exercise to check that we have balance, we can sum up all the negative distances from the apex (100) and the positive distances and we would expect them to be equal if it is a balanced universe. I've done this in a Watchlist in Figure 3. We list the RRG Ratio and then the distance that ratio is from 100. By adding groups to the Watchlist based on the Sign of the "From 100" column, the totals we get for the left side (negative numbers) is 4.1 and on the right side (positive numbers) 4.4! Hang on, that's not balanced, we have a 7.3% discrepancy between the left and the right sides!

Watch List - No Layout

Code	Last	Change (%)	RRG Ratio	From 100
From 100 - Negative SUM: -4.1				
S5TELS	148.19	-1.39%	98.91	-1.1
S5CONS	426.31	-0.21%	99.09	-0.9
S5ENRS	629.81	-0.70%	99.14	-0.9
S5FINL	288.72	0.03%	99.35	-0.6
S5INDU	441.60	0.00%	99.43	-0.6
S5COND	516.50	0.17%	99.95	-0.1
From 100 - Positive SUM: 4.4				
S5MATR	291.53	-0.11%	100.67	0.7
S5INFT	589.90	-0.34%	100.68	0.7
S5HLTH	679.40	-0.25%	101.21	1.2
S5UTIL	205.38	0.15%	101.81	1.8

Type Code or Name to add an item to the watchlist

Figure 3
SP500 Sectors with
RRG Ratio and
distance from 100

There is another aspect to the seesaw example that I have not been considering and I believe that it is a fundamental oversight in some Intermarket Analysis theories based on sectors (I'll come back to that later on). The missing element may be obvious to you, but it took me a little bit of thinking to work out why the two sides were not matching. The issue was that I had always considered the ten sectors to be equal weighted, but obviously that is not the case.

Again in our seesaw example, have a look at Figure 2, you can see that the one child on his own is bigger than the 2, so not only do we need to factor in the distance from the apex but also the weight of each child (sector).

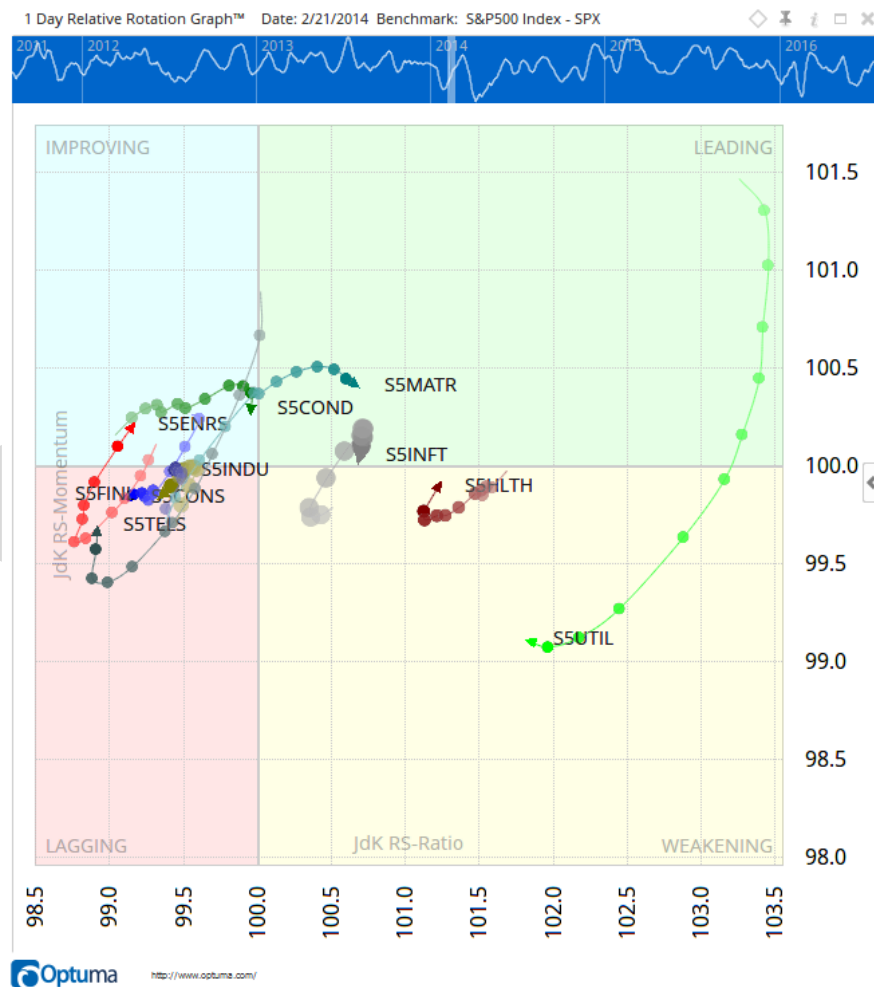
How do we do that? Fortunately, if you are using a data source like Bloomberg, we can fuse in the fundamental Market Cap of each Sector as an External Data Field and then put that into a formula to get the weight of each. Here is the formula I used to work out the sector weight as a percentage of the Sector Market Cap verses the total SP500 Market Cap.

```
MC1=DATAFIELD(FIELD=CUR_MKT_CAP);
MCBM1 = DATAFIELD(GETDATA(CODE=SPX:BLMB), FIELD=CUR_MKT_CAP);

(MC1 / MCBM1) * 100
```

Let's have a look at this on the RRG Chart by setting our script to define the size of the Bubbles on the RRG. See Figure 4, bigger bubbles means bigger weight.

Figure 4
Sp500 GICS Level 1
sectors showing
sector weight



We can see that Utilities is a featherweight, making up just 2.9% of the total index. It can get a long way from the origin since it is so light. This chart also shows that Financials (S5FINL in the cluster on the left) and Information Technology (S5INFT) are the 300 pound gorillas of the SP500.

Now we need to include the weights in all of our calculations. All we need to do is simply add up the product of the weight with the distance to get a variable that we will call "Force". Let's do that in the Watchlist.

Watch List - No Layout

	Code	Last	Change (%)	RRG Ratio	From 100	Weight	Force
From 100 - Negative					SUM: -4.1	SUM: -32.05	
<input type="checkbox"/>	S5TELS	148.19	-1.39%	98.91	-1.1	1.84	-2.01
<input type="checkbox"/>	S5CONS	426.31	-0.21%	99.09	-0.9	8.83	-8.00
<input type="checkbox"/>	S5ENRS	629.81	-0.70%	99.14	-0.9	8.57	-7.33
<input type="checkbox"/>	S5FINL	288.72	0.03%	99.35	-0.6	13.61	-8.84
<input type="checkbox"/>	S5INDU	441.60	0.00%	99.43	-0.6	9.29	-5.29
<input type="checkbox"/>	S5COND	516.50	0.17%	99.95	-0.1	10.70	-0.58
From 100 - Positive					SUM: 4.4	SUM: 32.11	
<input type="checkbox"/>	S5MATR	291.53	-0.11%	100.67	0.7	3.04	2.04
<input type="checkbox"/>	S5INFT	589.90	-0.34%	100.68	0.7	16.49	11.25
<input type="checkbox"/>	S5HLTH	679.40	-0.25%	101.21	1.2	11.66	14.16
<input type="checkbox"/>	S5UTIL	205.38	0.15%	101.81	1.8	2.57	4.67

Type Code or Name to add an item to the watchlist

Optuma <http://www.optuma.com/>

Figure 5
SP500 Sectors with
weight and force.

In Figure 5, you can see the weights of each sector. The last column in Figure 5 is Force which is the product of the Weight of the Sector with the distance of the RRG Ratio from the 100 apex. The sums for this become 32.05 on the left side and 32.11 on the right. Now that's more like it! That's a variance of 0.18% compared to 7.3% in the unweighted case.

The script for the Force column is:

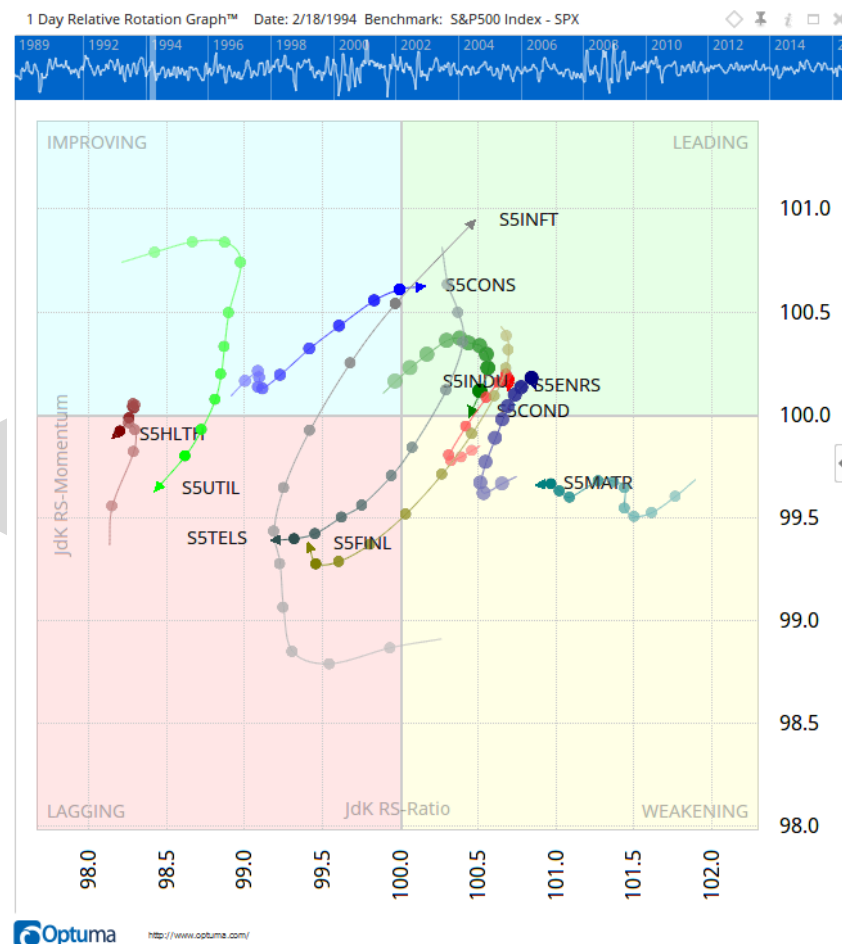
```
MC1=DATAFIELD(FIELD=CUR_MKT_CAP);
MCB1 = DATAFIELD(GETDATA(CODE=SPX:BLMB), FIELD=CUR_MKT_CAP);
RRG1 = JDKRS(INDEX=SPX:BLMB) - 100;

((MC1 / MCB1) * 100) * RRG1
```


The result of this is that we have been able to show that the GICS Level 1 sectors are balanced in a RRG but only when we consider their relative weights. Yahoo, high 5's all around! That's great from a theoretical point of view, but how can we use that information? For the most part there are a couple of key lessons that we can take away from this:

First, when we do Intermarket Analysis based on sectors, we cannot consider all the sectors to be equal because clearly they are not. The heavier sectors will exert more torque the further away from the apex they are (now that will make an interesting study). In fact, examining historical sector rotations and extrapolating to today can actually be dangerous because the environment is so different. It's like believing that you can throw your twenty-two year old son in the air because you did it when he was two! Let's look at the situation twenty years ago as an example.

Figure 6
Sp500 GICS Level 1
sectors with weights
18th Feb 1994



In Figure 6 we can see that Industrials and Consumer Discretionary are the biggest at 15% and 16% respectively. In fact, the spread between all the sectors is more evenly spread, with the smallest sector being Utilities at 6%. So at that time, with a smaller difference between Sectors, we could almost ignore the weights and treat them as equals and apply all the theories and see them hold. Today I don't think we have that luxury. Am I saying that Intermarket Analysis should be thrown out? Not at all! It is still extremely important, in particular in determining when a sector will cease to be the outperformer. I am simply suggesting that there is another dimension that needs to be considered as part of the analysis. There is more research that will need to be undertaken in this area.

The other big take away that impacts Portfolio Selection is that if my goal is to gain alpha over the Index, then I simply must consider the weights as part of my selections. Back to the seesaw, by virtue of his weight, to have balance the largest child cannot move too far away from the apex of the seesaw. In the same way, the largest sector (or equity in a portfolio) cannot move far from an Index (average of the portfolio) that it is contributing to. The further it moves away, the more it effects the value of the Index, dragging the Index with it. The only exception to this is when one large sector is moving in one direction and there is another large sector moving the opposite direction, maintaining the balance across the chart. That in itself presents a fantastic pairs trading opportunity, but I digress. If I want to achieve alpha, I need a base of the heaviest sectors at weight, and then layer in the lighter sectors that are improving by going overweight on them.

Since securities in the RRG tend to rotate in a clockwise fashion, when we are looking for Long-only opportunities, we are looking for securities in the chart that are moving from the negative quadrants with enough velocity to break through (watch for another Optuma Whitepaper on the Physics parallels of RRG).

Now that we are considering weight too, we can make some decisions on position sizing by going overweight on the lighter sectors since we know that they have the greatest capacity to move a long way from the index without dragging the index along. Obviously that can happen in both positive and negative directions, so they do present the greatest risk too.

On the 16th Jan 2014, Utilities (The only item showing the arrow in the RRG chart) was in one of the "perfect" RRG positions. At this point the trend of its relative performance is improving and the trajectory is showing a lot of promise. The space

between the observations (the dots) being wide shows good velocity which gives confidence that it will continue on that path. The chart on the right of Figure 7 has a vertical black line corresponding to the selected date of the RRG chart (January 16th).

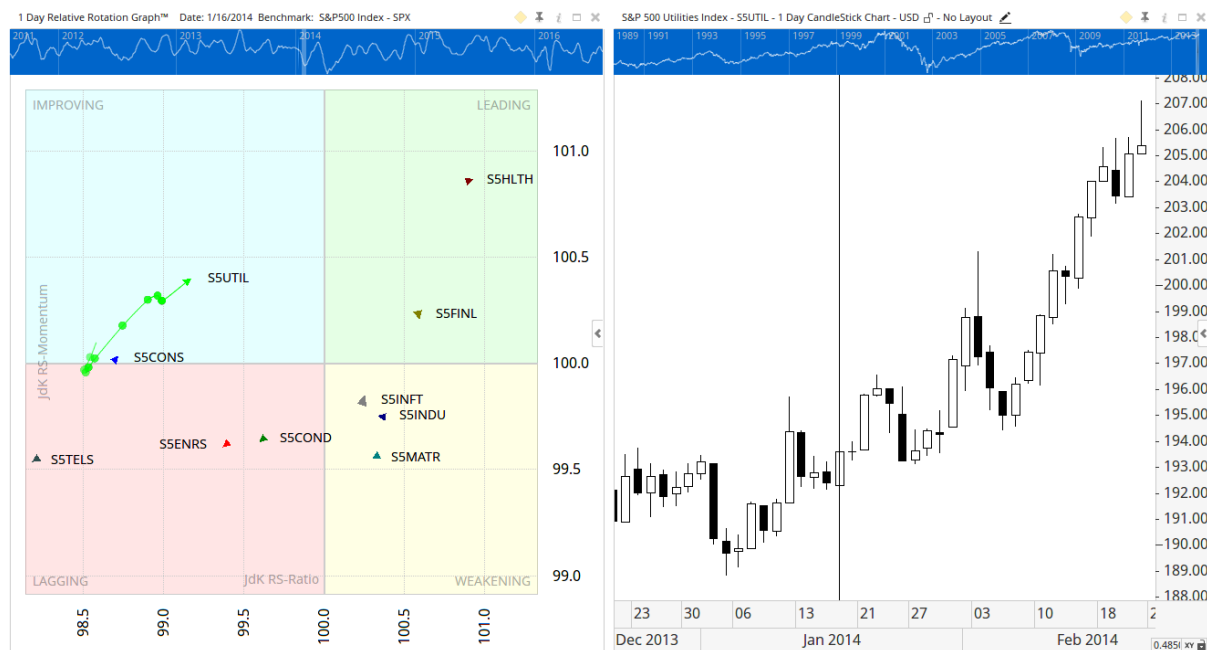


Figure 7 RRG at 16th Jan 2014 with Utilities Sector Price Chart

We have identified the sector that we are interested in, the next step is to drill into the Utilities to see what selections we can make from the sector. When we do this we need to make a choice if we are going to keep SP500 as the benchmark, or now look at each of the stocks compared to the Utilities sector Index. I prefer the latter as I am still interested in the weights of each stock as a percentage of that sector's index and to take that same selection philosophy into the Sector. By doing this I can look for low weighted stocks that have the greatest ability to give me significant gains over the index.



Figure 8 Drilling into the Sector

Figure 9 shows the results with weights of each stock compared to the weight of the Sector.

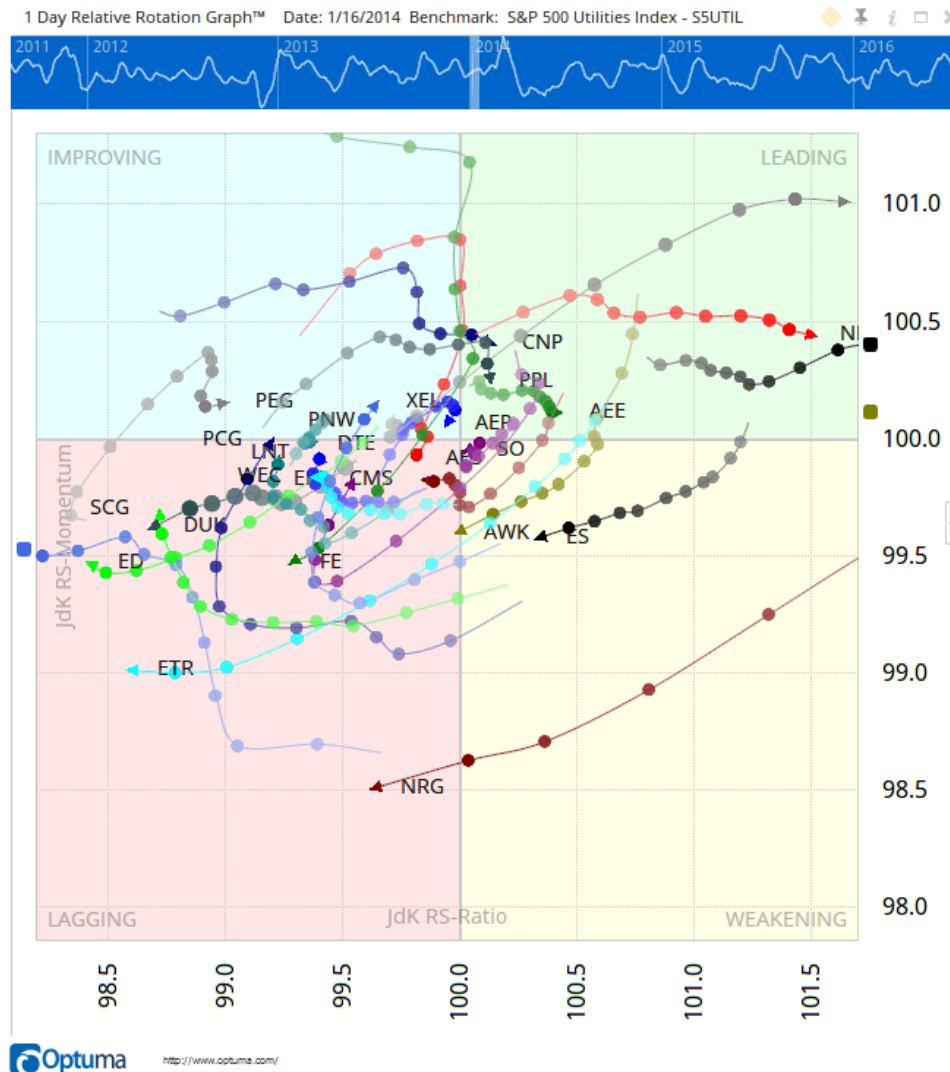


Figure 9
Utilities Sector
Members
16th Jan 2014

When I look at Figure 9, the best opportunity that I see is PEG, it is in the top left quadrant, and even though there was a bit of a wobble, it is heading in the right direction and has low weight (3.3%). It is at this point that I would be opening up the chart of PEG and confirming with my other analysis techniques if I am satisfied. Figure 10 shows the performance of the stock since the 16th (Black Line).

Figure 10
PEG showing
performance since
16th Jan 2014



If we fast forward to today (21st Feb 2014) and then remove all the other securities from the RRG, let's have a look at PEG in Figure 11. I have also increased the tail length of PEG so I can see the path that it took through the RRG.

PEG out-performed as expected and even though the trend is starting to weaken, it is still very positive compared to S5UTIL Index. The little hook tells me that there may be more in store. The RRG successfully assisted me in finding a great trade. It is always interesting to bring this back to the SP500 and see how the performance has been against the Index (particularly if the SP500 is my Benchmark). Remember in Figure 1 that Utilities was out on its own? Let's contrast that to PEG by adding PEG to that same RRG in Figure 12.

We can see that PEG outperformed the SP500 by more than the Utilities Sector but it has the same general shape as the Utilities. This makes sense since PEG was the best relative trending stock in the best relative trending Sector. The ability to drill in and make these selections is a powerful advantage for anyone who needs to make selections like these. We need to see how this performed on an absolute basis, so let's open the three (SPX, S5UTIL & PEG) in a Relative Comparison Chart (see Figure 13).

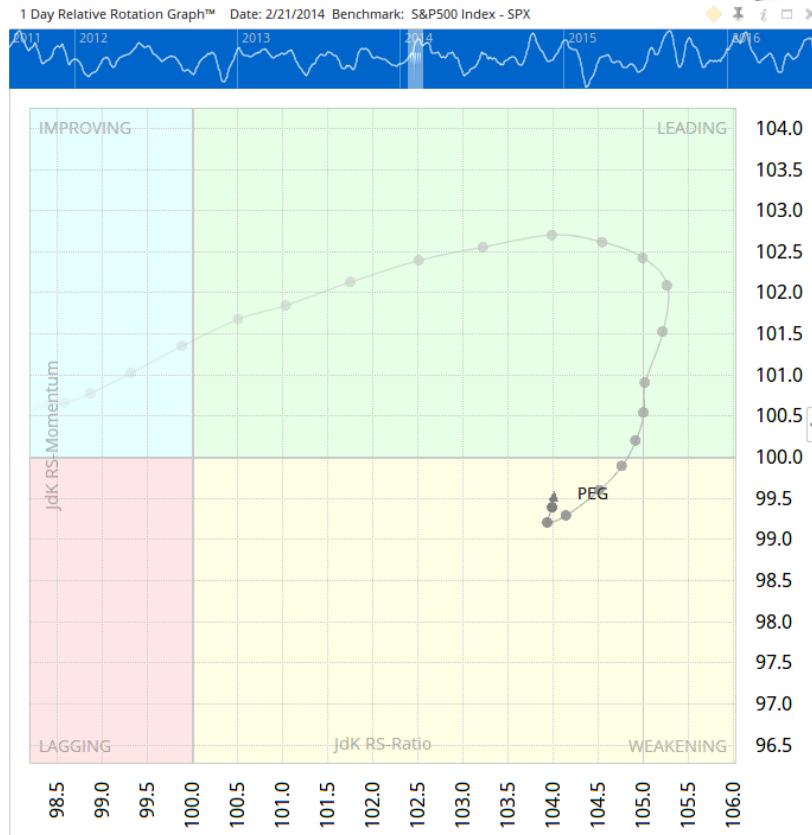


Figure 11
Last 30 days of PEG
against S5UTIL

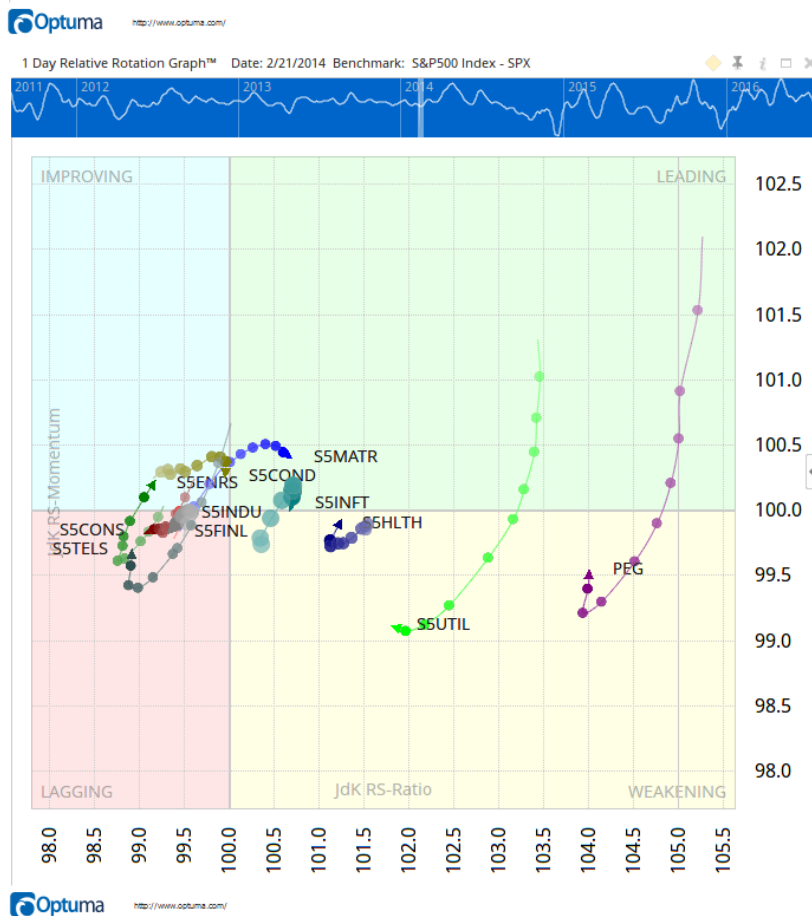
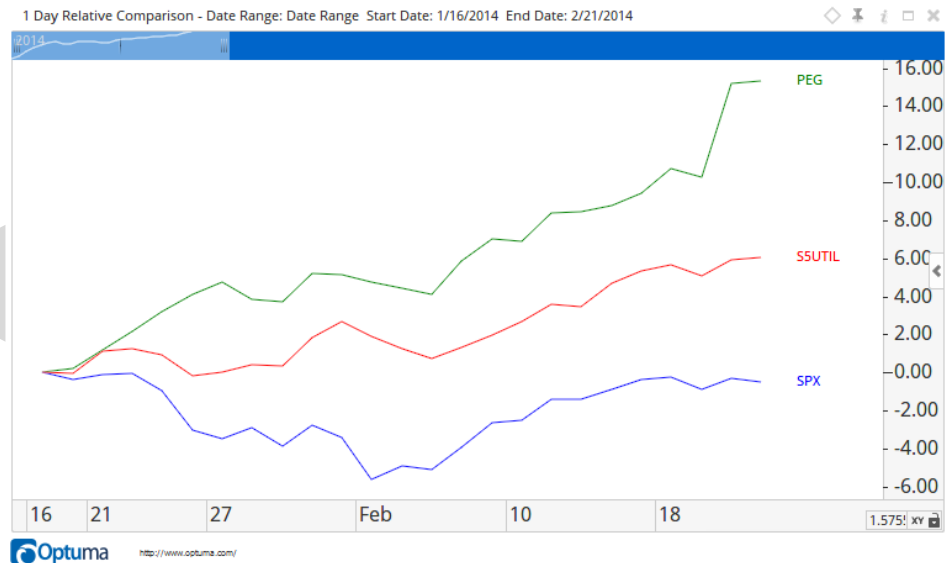


Figure 12
SP500 GICS Level 1
Sectors with PEG added

Figure 13
Absolute performance of
SPX, S5UTIL and PEG
From 16th Jan 2014



We can see in absolute terms that PEG out performed S5UTIL which in turn out performed the SPX. All of this was anticipated by finding the sector with the highest probability of outperforming and then within that sector finding the stock that has the highest probability of outperforming.

As with all strategies in the market, you need to test these for yourself to have confidence in them. No technique is a guarantee of success and standard trade management rules must be employed. This paper is merely presenting that RRG coupled with weights can give a different perspective in understanding both Intermarket Analysis and Portfolio Selection. If you do not have access to these charts and would like to try them for yourself, contact one of our Optuma offices and we'd be happy to help you set up a trial account so you can experiment with these charts.

About Optuma

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