

Is Your Tank Half Full?

S&P Fuel Gauge: An Introduction

Ever thought about how much energy a rally in the S&P 500 has? Here's a technique that could help measure that energy and may even give you the edge you're looking for.

by Chris Evans



The performance of the S&P 500 can tell you a lot about global asset returns. If it goes up materially, then bonds usually fall, and if it goes down, bonds usually rise. If it goes up, traders prefer currencies like the Australian dollar over, say, the Japanese yen. If you start your trading day with an advantage or appropriate bias, then you would know how to

hedge or add to your positions. If you knew there was no skew in likely returns in the S&P, then you could take the day off and go to the gym or, even better, a trip to Bermuda.

HERE'S THE REALITY

Your challenge is to measure the potential energy available to make the market rally. It has little to do with recent momentum or the consensus view you hear and read about. In fact, if you go with what you hear in the media, you may end up buying after a bout of weakness. If you buy into a trend, you can only do it if the conditions are right. Here's how I look for the right conditions.

To measure energy, I have to be confident that I know all

TRADING STRATEGY

the forces that matter in the short term that lead to rallies. I must then prove that there is forecasting value in the index. I use a daily timeframe and to the extent that a high index level persists, I may be able to hold onto a long position for one to 10 days. It can augment a shorter-term trading method, but it may not help if you have a monthly perspective.

WHERE'S THE ENERGY?

There are three parts to the index:

1. fear
2. time since the last period of weakness
3. interest rates.

It is simply axiomatic that when investors are afraid, we want to be buying. When everyone is happy or complacent, we can wait to enter. If the market got hit and many investors were forced out of the market, a special window, which I refer to as a “trauma window,” opens. When this window opens, you can buy it ahead of those people before they get back in, which ultimately they will all do. Finally, it is generally true that lower interest rates help equity valuations and force people out of lower-yielding bonds and into stocks.

HOW IS IT BEHAVING?

The energy index ranges between zero and 100 with a mean of 52 and a median of 50. I break it up into two components—bonds and fear. I adjust both for volatility and where the index stands in the trauma window. It is not normally distributed, which means it doesn't cling to a mean with comparatively few readings at the extremes. It is also not particularly sticky. If you get a huge short-term rally or if bonds fall precipitously due to some central bank announcement, this index can swing quickly from bullish levels to bearish ones. If you have just come out of a period of severe weakness, the index will persistently stay in bullish territory. The distribution looks similar to what you see in Figure 1.

Next, I'll look at the parts separately to see their independence and volatility (Figure 2). You can see that bonds and fear are not connected or correlated. Bonds as a factor are more volatile than the fear factor. Since I am able to see the daily levels of both, I will be able to run scenario tests to see prospective gains when the two parts are opposing one another. And when both factors are at attractive levels, I may also prefer to take long positions.

The chart in Figure 3 displays the index. It's easy to see how the sum of the two parts creates the aggregate—there is no special weighting system. I allow each component to rise slightly above 100 to make it possible to get a total that is greater than 100 for the index. In such cases, I set the index to its maximum of 100. That's why the distribution has an abnormal number of readings equal to 100.

FILTER IT

The next step is to look at performance to see if the index is helping to avoid lousy returns from your long positions and

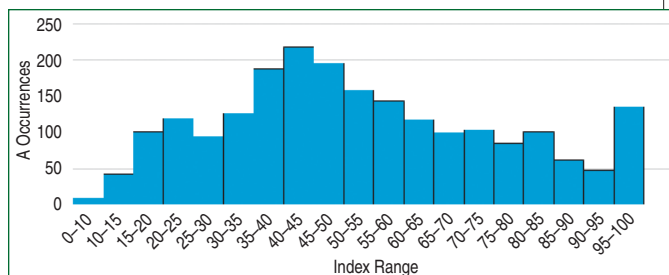


FIGURE 1: AN S&P FUEL GAUGE. The energy index ranges between zero and 100 with a mean of 52 and a median of 50. The distribution looks similar to what you see here.



FIGURE 2: BONDS VS. FEAR. The two are not correlated and neither are they connected. Bonds, as a factor, are more volatile than the fear factor.

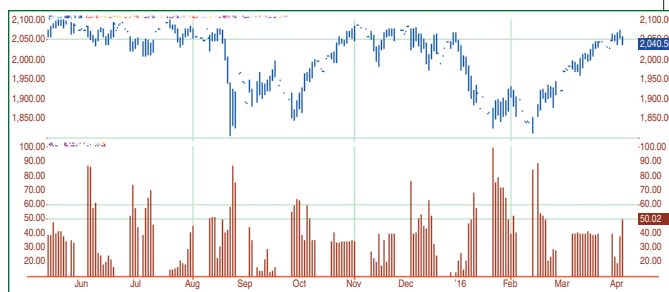


FIGURE 3: A LOOK AT THE DAILY CHART.

good returns from your short positions. I'll start by looking at the long positions.

From the table in Figure 4, you can see that if you buy S&P futures at ever-higher index levels, your average daily returns rise and the numbers of instances fall. The relationship is not perfect since there are some extreme cases of volatility in this 10-year history. I don't expect a perfectly smooth beta in this regression.

You can also see that if you wait for higher index readings to

**Keep one eye on the road
and the other on the S&P
500 fuel gauge, and you
can work yourself up to
lead the pack.**



Filter	Total Ret	# Instances	Avg Ret
>90	277.00	183	1.514
>85	529.25	244	2.169
>80	506.50	345	1.468
>75	905.00	430	2.105
>70	769.00	533	1.443
>65	1028.25	633	1.624
>60	1023.70	751	1.363
>55	1061.25	894	1.187
>50	949.50	1053	0.902
>45	947.95	1249	0.759
>40	1168.45	1467	0.796
>35	1235.20	1655	0.746
>30	1123.45	1781	0.631
>25	1099.50	1876	0.586
>20	992.25	1996	0.497
>15	687.75	2097	0.328
>10	542.50	2139	0.254
>5	508.25	2148	0.237

FIGURE 4: BUY POSITIONS. If you buy S&P futures at ever higher index levels you see your average daily return rise and the number of instances fall. You can also see that if you wait for higher index readings to buy you lose opportunity and it is quite possible that you may not get such an attractive level in your desired time frame.

Filter	Total Return	# Instances	Avg Return
<50	-459.00	1077	-0.426
<45	-406.45	877	-0.463
<40	-566.20	661	-0.857
<35	-746.20	476	-1.568
<30	-503.70	361	-1.395
<25	-460.25	262	-1.757
<20	-433.75	138	-3.143
<15	-94.75	40	-2.369
<10	-5.25	8	-0.656

FIGURE 5: IS IT TIME FOR THAT ROAD TRIP? Low readings in the index almost guarantee a mediocre return. This data set includes a 50% rally in the market overall with a 50% loss from its starting point.

	>40	>45	>50	>55	>60	>65	>70
2007	94	89	87	83	79	75	71
2008	174	151	129	110	94	83	75
2009	160	127	95	84	70	54	40
2010	207	161	129	107	88	72	59
2011	171	158	135	109	81	66	56
2012	181	155	138	123	106	94	82
2013	220	193	167	145	126	105	84
2014	144	122	98	77	69	56	44
2015	95	74	60	43	27	17	14
2016	39	29	23	19	17	17	13

FIGURE 6: HOW OFTEN DO YOU GET HIGH READINGS? This is a good metric to know just so you can have an idea of how often you need to be long to get sufficient returns.

buy your positions, you lose opportunity and it is possible that you may not get such an attractive level within your desired timeframe. Everyone must pick their own threshold.

The table in Figure 5 shows that low readings in the index almost guarantee a mediocre return. This dataset includes a 50% rally in the market overall with a 50% loss from its starting point. There are lots of high- and low-volatility periods to study. Even with the rally, it's clear that you need to wait till index levels are low before you buy.

It is certainly true that even in raging bull markets, if the index is low, high positive returns are rare and you are more likely to earn meager returns.

MAKE IT CLEANER

If the market is rallying up and you are not long, you may worry that you will not be able to reap the returns others are seeing. You want to jump in even though the price level (and the index) seems high.

The table in Figure 6 shows you by year how often you get high readings. There are 250 trading days in a year, so if you get, say, 80 trading opportunities, then you are long about one third of the time, which may be sufficient.

The table in Figure 7 shows how much money you would have made each year filtered by index level. The flaw with this table is that it fails to show you what the market offered as a return during the period. You can see, for example, significant declines in early 2010 followed by gains, so that for the year, the market and index gave you a positive result. Nevertheless, you should not just blindly use the fuel index. There are a sufficient number of cases where the index was bullish, but the market was in a state of transitioning into a bear market, which was the case in 2010 and 2014.

A bear market test is needed so that if the index does break down, it needs to reset to lower levels. As you see weakness in a market that is in a strong rally, you may find yourself getting more bullish, but if it breaks down below a certain threshold, you will have to abandon hope, at least for a while.

But then again, the markets have a tendency to mean-revert, which is why it's always a good idea to use stops. Another thing you can do is wait for the index to give you an attractive

	>40	>45	>50	>55	>60	>65	>70
2007	18.50	14.50	32.00	51.25	33.25	11.75	15.25
2008	-93.25	94.25	58.50	70.75	93.25	120.50	51.00
2009	278.45	108.45	86.25	96.50	108.00	132.50	165.75
2010	77.50	-38.25	-13.50	-44.50	-78.30	-17.50	14.75
2011	120.00	45.25	-67.50	128.50	86.00	132.50	49.50
2012	131.00	64.75	72.75	134.00	191.25	213.50	172.75
2013	434.50	391.50	335.75	297.25	194.00	179.00	181.50
2014	94.75	15.75	108.25	48.75	21.00	-9.25	-27.25
2015	188.00	298.25	333.50	319.25	332.75	222.75	161.25
2016	78.75	37.75	66.00	30.25	113.25	113.25	77.50

FIGURE 7: HOW MUCH DID YOU MAKE EACH YEAR? You can see there were sufficient declines during 2010 but you can't determine how much of a return you made in a specific year.

reading and then apply a shorter-term (for example, hourly bars) trend-following system that can only buy. If it sees a breakout to the upside, then you enter a long position. If the hourly chart breaks down, you exit and wait for the next opportunity.



DON'T FORGET YOUR DAILY TUNE-UPS

You know where the index stands every day, and with that information, how can you figure out if the index is trending or not? The filters I discussed will not work since they are grouping all outcomes above or below a threshold, and that dataset may include many better or worse conditions than the current one.

What you need to do is view the performance within a narrow band around the current level of the index. The most reliable levels where all the points are significantly above zero occur when the index range midpoints are ≥ 60 (Figure 8). Each range band is 10 points and the size of each bubble is proportionate to the number of occurrences.

I shall resist the temptation here to create a simple trading system using the index. The index can be used just for risk control but allow me this indulgence. Let's say you were forced to own the S&P contract. You can never be flat but you can own the contract in proportion to the level of the index. The position quantity will be set at $\text{index}/50$ so the average position over 10 years equals close to one—1.03 to be precise. Let's compare that with the S&P 500. You can see from Figure 9 that there are still some severe pullbacks. That's because you must be long through all markets but the drawdown is 40% lower and the total number of points earned is almost three times greater.

BOOST THE OCTANE WITH BONDS

An index that helps project equity returns might also indicate when to buy or reduce bond exposure, since bonds, in the short run, are extremely negatively correlated to the S&P contract. From Figure 10 you can see that the average bond return over this 10-year period is 0.027 points per day. There has been a huge upward tilt in bond prices. Notice how as the index reaches bullish levels, the returns on bonds fall precipitously. Even if you only trade bonds, you still can use this index to manage your exposure or duration.



TOP IT UP WITH FOREX

You may not have a strong feeling for how the euro or the British pound may be affected by an S&P rally, but you know there are some reliable associations between the S&P index and the foreign exchange markets. The Japanese yen has been a place of

refuge during periods of western turmoil and the Australian dollar is a commodity producer that outperforms during good economic times or when the S&P rallies.

Let's look at the Australian dollar but adjust for the general direction of the US dollar by dividing by the price of

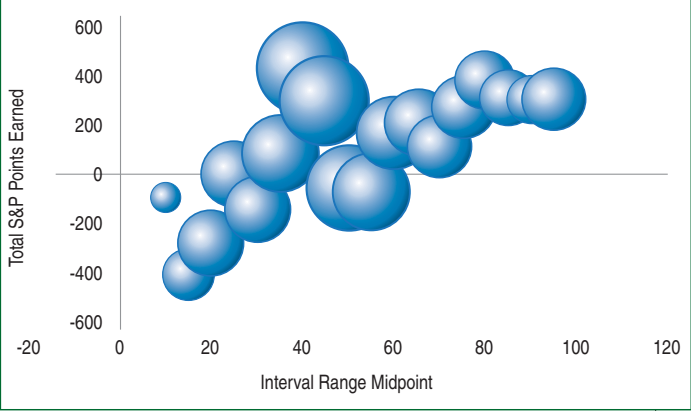


FIGURE 8: LOOKING AT A NARROWER RANGE. The size of each bubble is proportionate to the number of occurrences. Each range band is 10 points. The most reliable levels where all the points are significantly above zero occur when the index range midpoints are ≥ 60 .

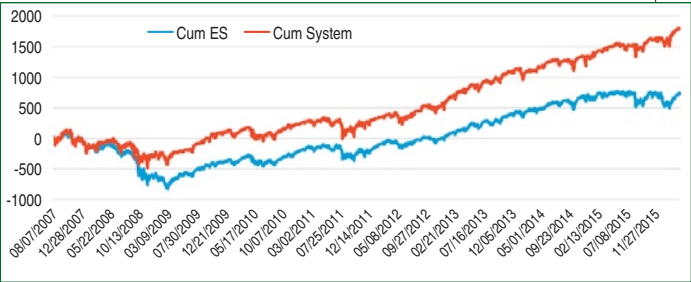


FIGURE 9: S&P 500 VS. TRADING ONE ES CONTRACT WITH VARYING POSITION SIZES. You can see there are some severe pullbacks. That's because you must be long through all markets. The nice thing is that the drawdown is 40% lower and the total number of points earned is almost three times greater.

the euro (Figure 11). I do this so I can see the underlying behavior of the Australian dollar without the macro effect. For this, I would use the following rules:

- 1. Buy the A\$/EC cross if the index is > 65
- 2. Short the A\$/EC cross if the index is < 35 .

If the index is between 65 and 35, you wouldn't take a position. Having this information gives you a tremendous advantage even

Filter	Avg Ret
>40	0.032
>50	0.019
>60	0.011
>70	0.006
>80	0.012
>90	-0.004

FIGURE 10: WHAT ABOUT BONDS? The average bond return over this 10-year period is .027 points per day. Notice how as the index reaches bullish levels the returns on bonds fall precipitously. Even if you only trade bonds, you still can use this index to manage your exposure.

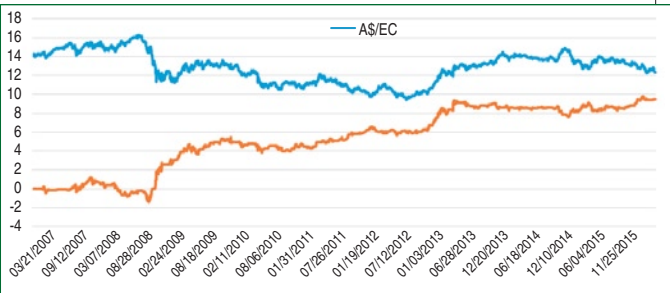


FIGURE 11: TRADING THE AUSSIE/EURO CROSS. There's a relationship between the S&P500 and just about everything, including currencies. Study those relationships and see how you can take advantage of them.

though there are many other variables that affect such currency cross rates.

AND YOU HAVE A FULL TANK

This type of trade governs many, if not all, market relationships. Face it: We are in a low-yield environment and we could see a slow-growing equity market, which could tempt us to pick stocks blindly without considering the existence of volatility in the S&P 500 index. High volatility could slice through all your gains and that could lead you to desperately hedge your positions when the S&P 500 is at poor levels. Keep an eye on that S&P gauge and when it has risen to an attractive level, put on those risk-on positions and plan your next vacation.

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