

Optionality In The Dow Industrials-S&P 500 Spread

It has happened to us all. The day ends, you walk away from the screen, head to someplace less stressful and the question arises, "What did the market do today?" You know they expect the question to be answered in terms of the Dow Jones Industrial Average (DJIA), and you oblige accordingly. Even when you know the answer may be misleading, it is still one of those no harm, no foul situations.

Every now and then, the DJIA and the S&P 500 (SPX) diverge dramatically, and many of us remember the tech boom days of 1999-2000 when these two indices and either major representation of the NASDAQ, the Composite or the NASDAQ 100, diverged wildly. We are at another moment of divergence produced by the different weighting schemes of the DJIA and SPX.

The good news is we can use the divergent composition and volatility of the two indices to create an option spread.

Weighting Schemes

The DJIA is price-weighted. The average is the sum of all 30 stocks' prices, divided by a divisor, now .12555271.

$$DJIA = \sum_{i=1}^{30} P_i / .12555271$$

The SPX is capitalization-weighted. The average is ten times the sum of each stock's price multiplied by its shares outstanding and its weight in the index, divided by the 1941-1943 baseline value.

$$SPX = 10 * \sum_{i=1}^{500} N_{i,t} * P_{i,t} / Base$$

The result is a move in any one of the DJIA's low-priced stocks will have a disproportionately small impact on the DJIA relative to its impact on the SPX. Let's use the data from Friday, February 6, 2009 to demonstrate the impact of a 1% change in each of the DJIA's members on both the DJIA and the SPX in terms of index points.

Impact Of 1% Price Change

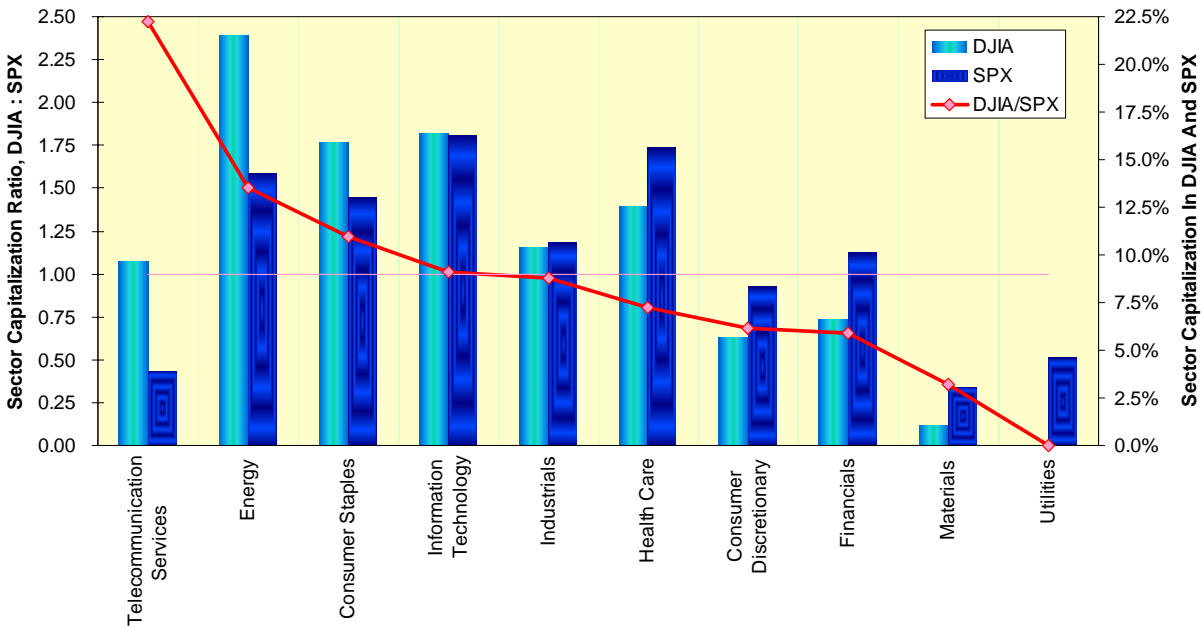
	Price	DJIA "Weight"	DJIA Points	SPX Weight	SPX Points
IBM	\$ 96.14	9.25%	7.66	1.71%	0.15
XOM	\$ 80.34	7.73%	6.40	5.40%	0.47
CVX	\$ 74.90	7.20%	5.97	2.01%	0.17
JNJ	\$ 58.51	5.63%	4.66	2.15%	0.19
MCD	\$ 58.46	5.62%	4.66	0.86%	0.07
PG	\$ 54.00	5.19%	4.30	2.13%	0.19
MMM	\$ 52.39	2.04%	4.17	0.48%	0.04
WMT	\$ 49.63	4.77%	3.95	1.47%	0.13
UTX	\$ 49.03	4.72%	3.91	0.62%	0.05
KO	\$ 43.55	4.19%	3.47	1.15%	0.10
BA	\$ 42.92	4.13%	3.42	0.42%	0.04
HPQ	\$ 36.85	3.54%	2.94	1.19%	0.10
CAT	\$ 33.28	3.20%	2.65	0.27%	0.02
VZ	\$ 31.72	3.05%	2.53	1.19%	0.10
MRK	\$ 30.77	2.96%	2.45	0.86%	0.07
JPM	\$ 27.63	2.66%	2.20	1.36%	0.12
KFT	\$ 26.34	2.53%	2.10	0.51%	0.04
T	\$ 26.08	2.51%	2.08	2.03%	0.18
DD	\$ 24.57	2.36%	1.96	0.29%	0.03
HD	\$ 23.53	2.26%	1.87	0.53%	0.05
MSFT	\$ 19.66	1.89%	1.57	1.99%	0.17
DIS	\$ 19.45	1.87%	1.55	0.48%	0.04
AXP	\$ 17.93	1.72%	1.43	0.27%	0.02
PFE	\$ 14.84	1.43%	1.18	1.32%	0.11
INTC	\$ 14.73	1.42%	1.17	1.08%	0.09
GE	\$ 11.10	1.07%	0.88	1.54%	0.13
AA	\$ 8.40	0.81%	0.67	0.09%	0.01
BAC	\$ 6.13	0.59%	0.49	0.52%	0.05
C	\$ 3.91	0.38%	0.31	0.28%	0.02
GM	\$ 2.84	0.28%	0.23	0.02%	0.00

The DJIA, to a large extent has become the playground of the two integrated oil giants ExxonMobil and Chevron, IBM, Johnson & Johnson, McDonald's and Procter & Gamble. They account for 40.61% of the DJIA, but for only 14.26% of the SPX. This is a very narrow concentration of effect in an already narrow index.

Sector Composition And Return

Now let's look at the exposure of each index to S&P's ten economic sectors. The DJIA has a much greater weight in the telecommunications services, energy services and consumer staples sectors, and a much lower weight in the basic materials and utilities sectors. The DJIA is relatively underweighted as well in the consumer discretionary and financial sectors. The financial basket cases of the DJIA, Citigroup and Bank of America are, in essence, already dead: If they go to \$0 from last Friday's close, the net impact on the index will be slightly less than 80 index points.

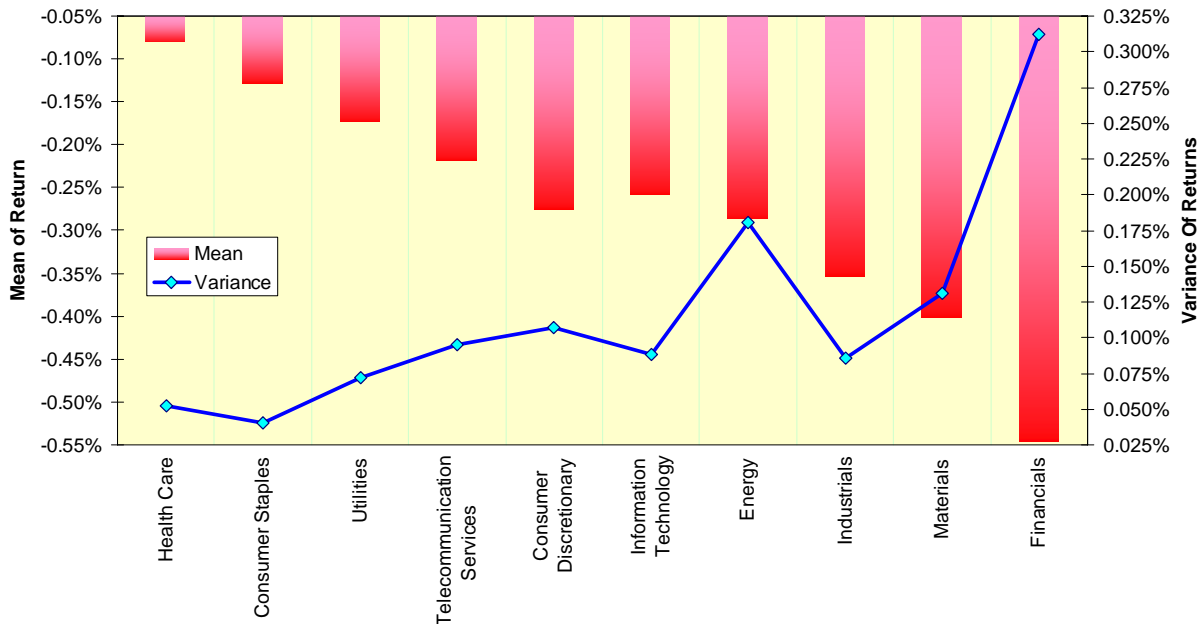
Economic Sector Capitalization Differs Between DJIA And SPX



These different exposures should create different responses to various economic factors. All else held equal, the DJIA should be more exposed to crude oil and natural gas prices than the SPX, while the SPX should be affected more by the prices of industrial commodities and demand for utilities. The SPX also should be affected more by the economic downturn by virtue of its greater exposure to the financial and consumer discretionary sectors.

The question whether each of these economic sectors performs differently over time can be answered definitively over almost any market regime. If we mark the present bear phase from last May's reaction high following the Bear Stearns rescue, we see how the mean and variance of daily returns not only differ significantly, but how realized variance of these returns increases as returns become more negative.

Economic Sector Return And Variance After May 19, 2008

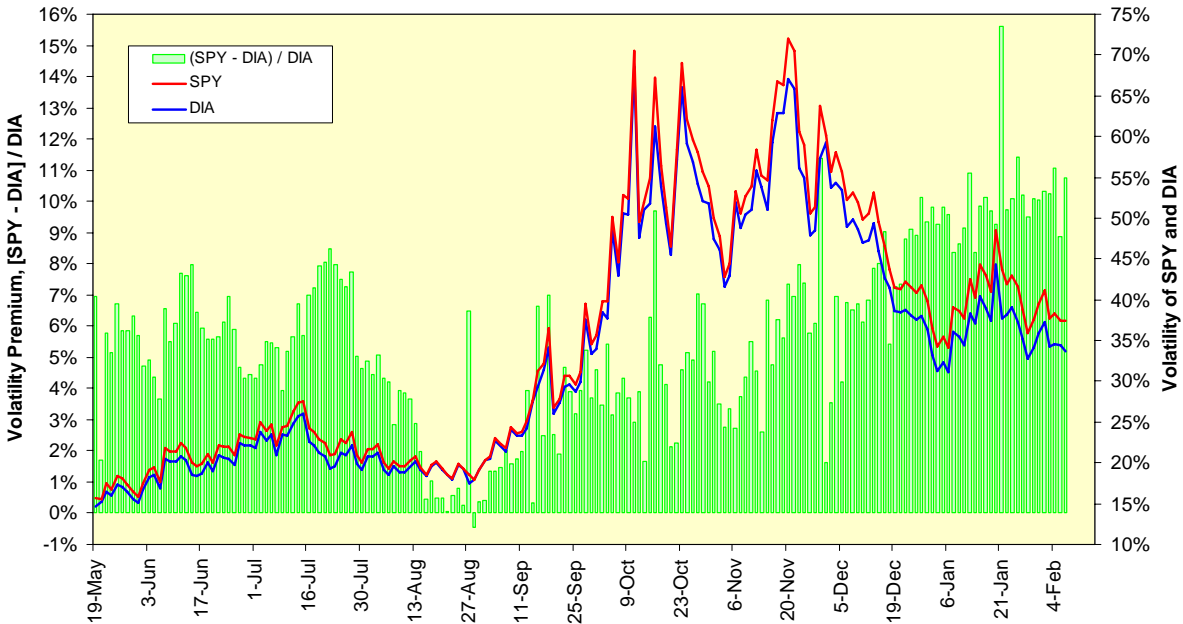


Setting Up The Trade

Different variance and sector exposure combine with the different weights to produce two indices with different long-term and short-term volatility. Using data from the CRB-Infotech CD-ROM, we can calculate that since the start of 1928, the daily variance of the DJIA's returns has been 0.38% greater than those for the SPX.

In the short-term, however, the devastation of the financial sector pushed SPX volatility over DJIA volatility. If we compare the two using their principal ETFs, the SPY and DIA, we see how the ongoing financial crisis led to a persistent volatility premium of the SPY over the DIA.

SPY Volatility High Relative To DIA Volatility

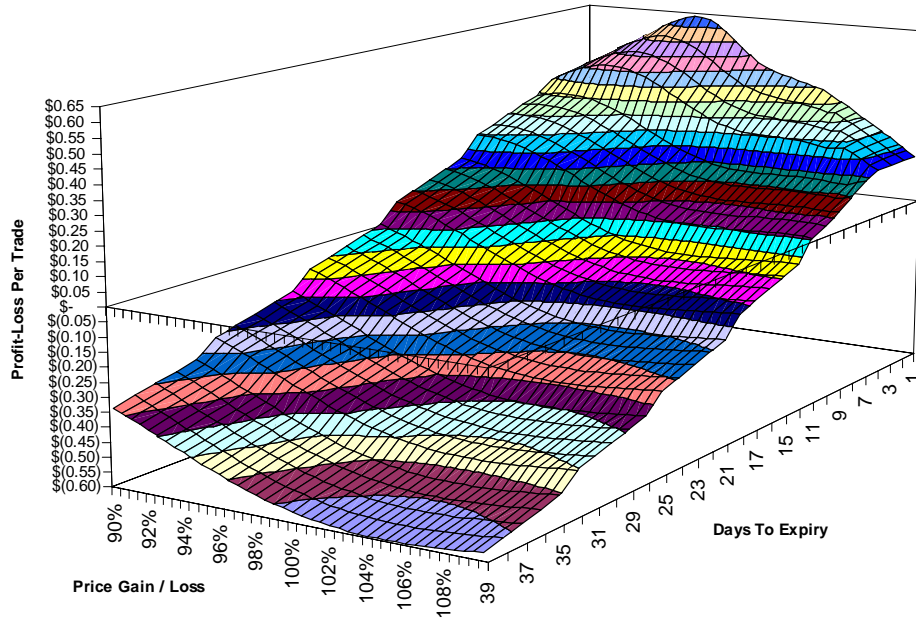


If the two indices revert to their long-term relationship, a trade of being long the DIA straddle and short the SPY straddle should offer an opportunity to capture the volatilities' convergence. We will use last Friday's data for the options expiring March 21, 2009.

SPY \$87 straddle: Sell at \$8.70
DIA \$83 straddle: Buy at \$8.00

Projecting the trade's profit-and-loss forward involves making assumptions for four different options' volatility as well as both the absolute and relative price paths of both the DIA and SPY. Let's keep volatility constant for each option and move both the SPY and DIA up and down in equal percentage increments and decrements for purposes of illustration.

Long March DIA 83 Straddle / Short SPY 87 Straddle



The key aspect of the trade to note is how its projected profitability rises as expiration approaches. The reason behind this is quite simple: The higher volatility of the short SPY straddle has to converge down to a time premium of zero by expiration, and as it was richer than that of the DIA, the gain increases with time. Most important, once the higher initial volatility is sold, you can be assured of this aspect of the trade moving in your favor.

However, and this is a huge “however,” you must remember the assumption here that both the SPY and DIA will rise and fall at the same rate. As we showed above, their different weightings and factor exposures almost assure us this will not be the case.