

Inter-Market Stock Index Spreads

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Stock index futures are useful trading tools because they provide a proxy for taking on a position in a particular national stock market or stock market sector. Placing an inter-market spread between two stock index futures representing different national stock markets or sectors is an effective and facile way of expressing an opinion regarding the prospective relative performance of those two markets.

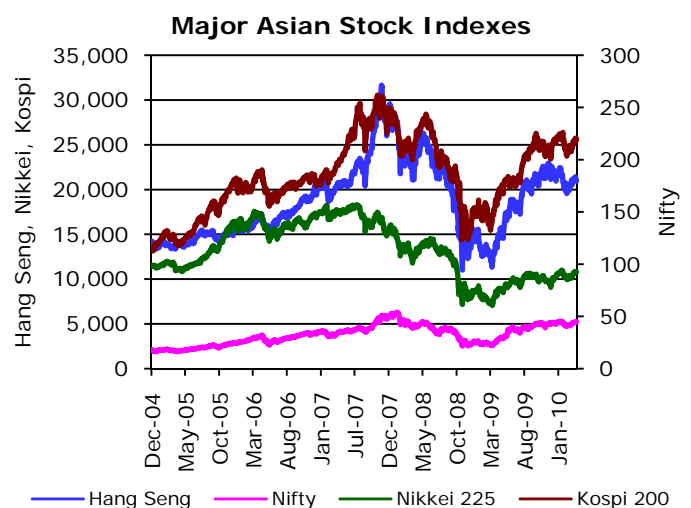
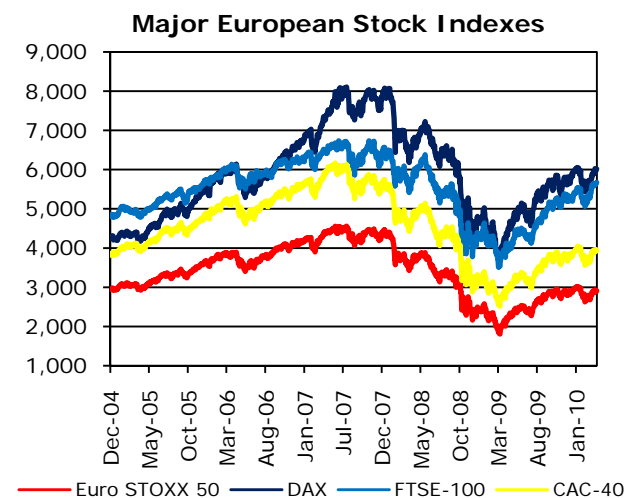
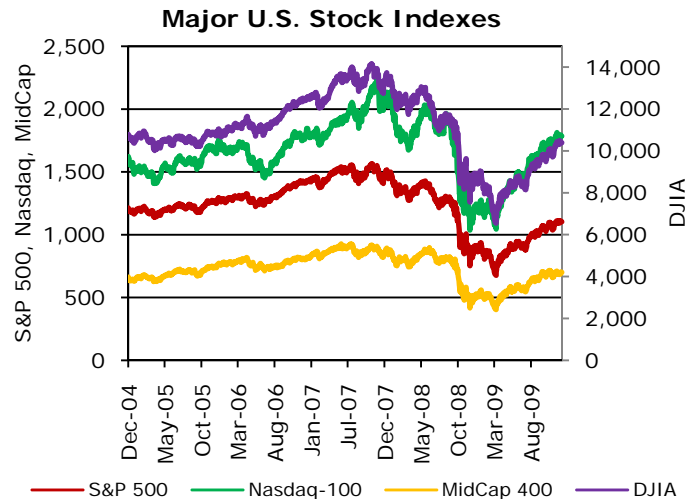
For example, if one believed that the high-tech sector of the U.S. stock market might outperform the market in general, one might place an inter-market spread by buying Nasdaq-100 futures and selling S&P 500 futures. Or, if one believed that the Korean economy and by implication stock market would outperform the U.S. economy and stock market, one might buy Kospi-200 futures and sell S&P 500 futures. This is facilitated by today's modern electronic trading systems that allow market participants to operate virtually around the clock, taking positions in American, Asian or European markets with ease.

The purpose of this piece is to review the process and practice of inter-market stock index spreading. Accordingly, we will review some useful strategies and indicators of possible opportunity in the U.S., Asian and European stock index markets.

Stock Index Futures - CME Group offers active futures contracts on a number of macro U.S. indexes including the S&P 500, Nasdaq-100, the Dow Jones Industrial Average (DJIA), and the S&P MidCap 400.

Of course, liquid stock index futures are available around the globe in Europe where EUREX lists futures on the pan-European Euro STOXX 50 and the DAX Index, representing the German equity market. NYSE Euronext lists futures on the FTSE 100 and CAC-40, represent the UK and French national stock markets respectively.

Benchmark Asian stock index futures include the Hang Seng Index offered on the Hong Kong Exchange (HKEx); KOSPI 200 futures and options available on the Korean Exchange (KRX); S&P CNX Nifty futures on the National Stock Exchange of India (NSE); and, the Nikkei 225 listed on the Osaka Securities Exchange (OSE) and on CME in both US dollar (USD) and Japanese yen (JPY) denominated versions. CME Group further will offer USD denominated versions of the S&P CNX Nifty beginning in the 3rd quarter 2010.



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The characteristics of these futures contracts are summarized in the appendix below. The availability of these contracts makes it possible to execute and carry inter-market spreads within or between continents. The profit potential and risk of these spreads will generally be a function of stock market volatility coupled with the correlation between the two indexes that are the subject of the inter-market spread. As a rule, of course, more volatility and reduced correlation produces greater risk exposure.

Comparing Volatility – Volatility is calculated as the annualized standard deviation of logged daily price movements in a market. Characteristic volatility levels vary across markets but the patterns are remarkably similar.

Stock Index Volatility

	2007	2008	2009	2005-09
S&P 500	15.99%	41.10%	27.27%	29.95%
Nasdaq-100	18.66%	42.35%	26.46%	30.85%
DJIA	14.54%	37.87%	24.19%	27.28%
Midcap 400	16.20%	43.32%	32.38%	32.62%
Euro STOXX 50	15.90%	39.44%	28.08%	29.46%
DAX	15.52%	37.93%	28.43%	28.83%
FTSE-100	17.50%	37.59%	23.48%	27.51%
CAC-40	17.09%	40.67%	26.69%	29.80%
Hang Seng	25.99%	50.61%	32.44%	37.89%
KOSPI 200	23.12%	39.15%	25.77%	30.24%
S&P CNX Nifty	25.27%	44.06%	33.41%	35.24%
Nikkei 225	18.26%	45.85%	27.37%	32.59%

Volatility rose to new heights in 2008 corresponding to the peak of the so-called sub-prime mortgage crisis but has since declined across all markets. Asian indexes have generally been more volatile while European indexes have been a bit more stable than their U.S. counterparts.

Correlations – There are generally high positive correlations between movements of major world stock indexes. As shown in our appendix, correlations amongst the U.S. indexes are quite high ranging from 0.9778 between the S&P 500 down to 0.8812 between the Nasdaq-100 and DJIA. This suggests that the S&P 500 and DJIA are reasonable proxies for each other while the traditional blue-chips included in the DJIA depart in character from the high-tech stocks that tend to dominate the Nasdaq-100.

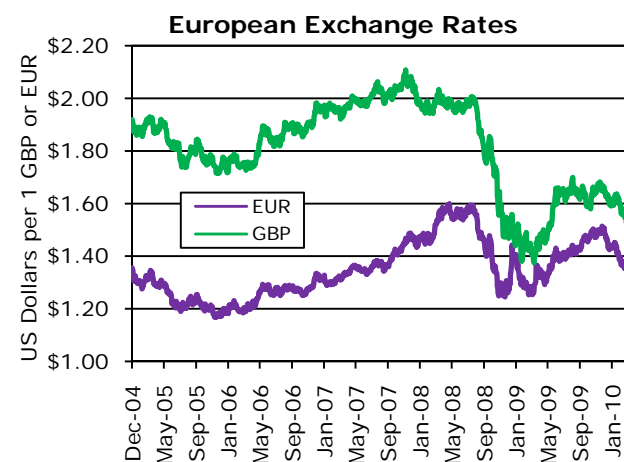
(Correlations were calculated using week-to-week changes in the spot index values from 2005 into early late March 2010. Note that closing times of U.S., European and Asian markets are not entirely synchronized, which may have the effect of reducing

correlations. We focus on correlations between the S&P 500 and other indexes to the extent that E-mini S&P 500 futures represent the most popular and liquid of CME Group stock index products.)

Correlations fall when comparing U.S. indexes to European stock indexes and fall even further when compared to Asian stock indexes. For example, correlation between the S&P 500 and the Euro STOXX 50 was pegged at 0.8698; correlation between the S&P 500 and the Nikkei 225 was down to 0.7146; while correlation between the S&P 500 and the S&P CNX Nifty was lower still at 0.5386.

Perhaps this may be explained by observing that the economies of the U.S., European Union and Japan tend to be large and well established while economies of Korea, Hong Kong and India tend to be much more dynamic.

The relationship between an investment in U.S. stocks and an investment in European or Asian stock markets is also affected by exchange rates. Thus, we translated stock index values into U.S. dollars (USD) as a common denomination and ran our correlations again as shown in the appendix. These correlations do not change considerably from correlations derived using only spot index values with some exceptions.



The exchange rates of the Euro (EUR), British pound (GBP), Korean won (KRW), Indian rupee (INR) vs. USD, as shown in our graphic, suggest a high correlation with equity market values. *I.e.*, the EUR, GBP, KRW and INR rallied along with stock market values until 2008 when the financial crisis was experienced. (We quote these Euro currencies in USD per 1 unit of EUR and GBP. We quote the won

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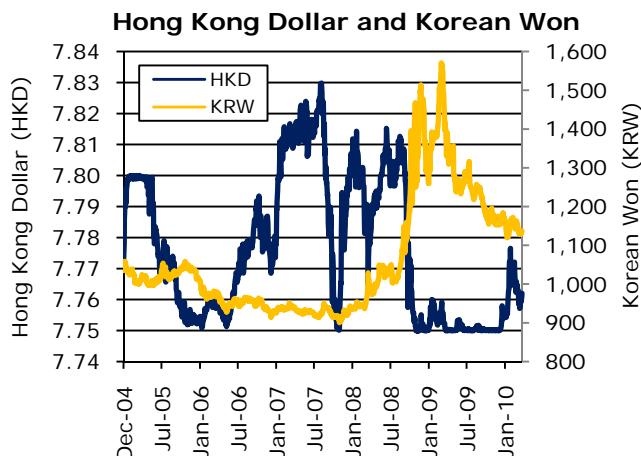
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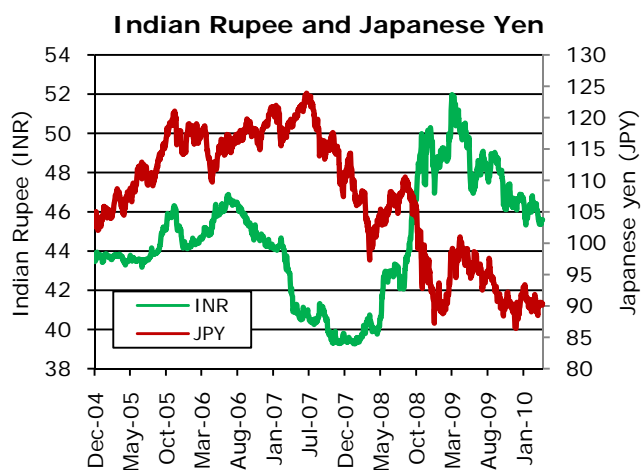


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and rupee as KRW or INR per USD by conventional interbank FX market practices.)



Almost paradoxically, considering the fact that the financial crisis began in the U.S., USD denominated investments were considered a "safe haven" of sorts and the dollar generally strengthened during the height of the crisis. But as the crisis subsided, the EUR, GBP, KRW and INR recommenced their rise vs. USD. In more recent months, the European currencies have weakened due to fiscal difficulties in European union countries including Greece, Spain and Portugal.



Thus, the national stock markets in Europe, Great Britain, Korea and India tend to be positively correlated with exchange rate movements. I.e., these exchange rates rally on the strength and break on the weakness of the equity markets. The Hong Kong dollar (HKD) is, of course, pegged to the USD and trades within a narrow range and,

therefore, exchange rates do not significantly affect the correlations.

However, the correlation between the S&P 500 and the Nikkei 225 drops from 0.7146 to 0.6220 when translating the indexes into a common currency. That might be explained by the negative correlation between movements in the Nikkei 225 and the JPY/USD exchange rate. Both series tend to rally and fall in reasonably close lockstep.

This might be explained by the fact that the Japanese economy has historically been driven by export power. A strong yen translates into a weaker economy and vice versa. Note that we quote in terms of JPY per 1 USD. Thus, the yen is strengthening (weakening) when the quote declines (advances).

Spread Ratio and Performance – In order to place an inter-market spread, it is necessary to derive the so-called "spread ratio." The spread ratio is an indication of the ratio or number of stock index futures that must be held in the two markets to equalize the monetary value of the positions held on both legs of the spread. The following formula may be used for this purpose where Value₁ and Value₂ represent the monetary value (in a common currency as necessary) of the two stock index futures contracts that are the subject of the spread.

$$\text{Spread Ratio} = \text{Value}_1 \div \text{Value}_2$$

For purposes of establishing the value of the futures contract, we use the spot index value and not the quoted futures price as a rule. This practice serves to eliminate carry considerations from the calculation.

Example: On December 31, 2009, the E-mini (\$5) DJIA futures contract was valued at \$52,140 (= \$5 x 10,428.05) while the E-mini S&P 500 futures contract was at \$55,755 (= \$50 x 1,115.10). The spread ratio may be calculated at 1.069 suggesting that one might spread 10 E-mini S&P 500 futures vs. 11 E-mini (\$5) DJIA futures.

$$\begin{aligned} \text{Spread Ratio} &= \text{Value}_{\text{S\&P 500}} \div \text{Value}_{\text{DJIA}} \\ &= \$55,755 \div \$52,140 \\ &= 1.069 \\ &= 10 \text{ S\&P 500:11 DJIA futures} \end{aligned}$$

Example: On December 31, 2008, the E-mini S&P MidCap 400 futures contract was valued at \$53,828 (= \$100 x 538.28) while the E-mini S&P 500 futures contract was at \$45,163 (= \$50 x 903.25). The

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spread ratio may be calculated at 0.839 suggesting that one might spread 10 E-mini S&P 500 futures vs. 8 E-mini S&P MidCap 400 futures.

$$\begin{aligned}\text{Spread Ratio} &= \text{Value}_{\text{S\&P 500}} \div \text{Value}_{\text{MidCap}} \\ &= \$45,163 \div \$53,828 \\ &= 0.839 \\ &= 10 \text{ S\&P 500}:8 \text{ MidCap futures}\end{aligned}$$

Example: On December 31, 2009, the Euro STOXX 50 index was quoted at 2,964.96 with the Euro rate at 1.4321 U.S. dollars per Euro. Thus, the Euro STOXX 50 futures contract was valued at \$42,461 [= (€10 x 2,964.96) x 1.4321]. The E-mini S&P 500 futures contract was at \$55,755 (= \$50 x 1,115.10). The spread ratio is calculated at 0.662 suggesting that one might balance 7 Hang Seng futures with 10 S&P 500 futures.

$$\begin{aligned}\text{Spread Ratio} &= \text{Value}_{\text{S\&P 500}} \div \text{Value}_{\text{Euro STOXX 50}} \\ &= \$55,755 \div \$42,461 \\ &= 1.313 \\ &= 10 \text{ S\&P 500}:13 \text{ Euro STOXX 50}\end{aligned}$$

Example: On December 31, 2004, the Hang Seng index was quoted at 14,230.14 with the HKD/USD rate at 7.7726 Hong Kong dollars per U.S. dollar. Thus, the Hang Seng futures contract was valued at \$91,540 [= (HKD 50 x 14,230.14) ÷ 7.7726]. The S&P 500 index was quoted at 1,211.92 and E-mini S&P 500 futures were valued at \$60,596 (= \$50 x 1,211.92). The spread ratio is calculated at 0.662 suggesting that one might balance 7 Hang Seng futures with 10 S&P 500 futures.

$$\begin{aligned}\text{Spread Ratio} &= \text{Value}_{\text{S\&P 500}} \div \text{Value}_{\text{Hang Seng}} \\ &= \$60,596 \div \$91,540 \\ &= 0.662 \\ &= 10 \text{ S\&P 500}:7 \text{ Hang Seng}\end{aligned}$$

These examples focus on spreads vs. E-mini S&P 500 futures. We use the expression “buy the spread” to refer to a strategy where one buys E-mini S&P 500 futures and sells the other futures contract. The expression “sell the spread” refers to a strategy where one sells E-mini S&P 500 futures and buys the other futures contract.

“BUY the Spread” → BUY S&P 500 futures
& SELL other futures

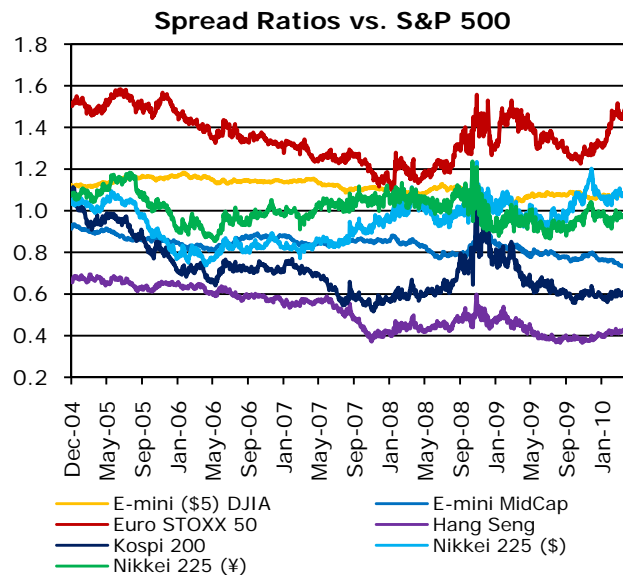
“SELL the Spread” → SELL S&P 500 futures
& BUY other futures

We have rounded these ratios using the convention of trading 10 S&P 500 futures vs. an appropriate number of the other futures contract. For example,

we have calculated a spread ratio of 10 S&P 500 futures to 11 DJIA futures. But it is perfectly appropriate to reduce these ratios to simplify the spread. Thus, traders have been known to trade the S&P:DJIA spread in ratios of 1:1, 5:6 as well as 10:11.

Because these spreads entail reduced risk relative to outright positions in a stock index futures contract, the CME Clearing House offers reduced performance bond or margin requirements of as much as 90% of the outright requirements on many of these spreads when placed in an appropriate ratio. These rates vary from time to time and may be referenced on the www.cmegroup.com website. Note that these performance bond reductions can only apply when spreading between CME Group products.

Fluctuating Spread Ratios – Spread ratios provide an indication of the appropriate way to construct an inter-market spread. Because they are dynamic, one must be aware of the current spread ratio when placing a trade. Spread ratios are also useful as a general indication of spread performance in terms of both volatility and direction.



We calculated these spread ratios to represent the ratio of E-mini S&P 500 futures relative to the other futures contract. Thus, when these ratios increase, it represents a sign of strength in the S&P 500 relative to the other index. When the ratios decline, it represents relative weakness in the S&P 500.

Note that Asian indexes led by the Kospi 200 and Hang Seng have outperformed the S&P 500 by a

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wide margin in recent years. The S&P 500:Kospi 200 ratio fell from 1.09 to 0.59 (-46%) while the S&P 500:Hang Seng ratio declined 39% during the period December 2004 to December 2009. Similarly, the DJIA (-4%), MidCap (-15%) and Euro STOXX (-13%) indexes have outperformed the S&P 500 from December 2004 to December 2009 as indicated by the ratios.

Fluctuating Spread Ratios vs. S&P 500

	S&P 500 vs. DJIA	S&P 500 vs. Mid-Cap	S&P 500 vs. Euro STOXX	S&P 500 vs. Hang Seng	S&P 500 vs. Kospi 200
12/31/04	1.12	0.91	1.51	0.66	1.09
12/30/05	1.16	0.85	1.47	0.65	0.71
12/29/06	1.14	0.88	1.30	0.55	0.71
12/28/07	1.11	0.86	1.14	0.41	0.57
12/26/08	1.03	0.84	1.32	0.49	0.78
12/31/09	1.07	0.77	1.31	0.40	0.59

However, these trends have been very uneven over the years and there have been many opportunities to either buy or sell these spreads to good effect. Let us consider some of the fundamental drivers of inter-market spreads and useful indicators that a spread trader may wish to track.

Index Sector Weightings (3/25/10)

	S&P 500	DJIA
Consumer Discretionary	10.05%	13.26%
Consumer Staples	11.29%	10.40%
Energy	10.99%	9.76%
Financials	16.32%	11.02%
Health Care	12.27%	8.34%
Industrials	10.42%	21.40%
Information Technology	18.90%	18.22%
Basic Materials	3.46%	3.62%
Telecom	2.81%	3.93%
Utilities	3.49%	0.00%

Index Constitution by Sector – During the period December 31, 2004 and March 23, 2010, the weekly changes of the S&P 500 and DJIA exhibited a very high correlation of 0.9778. This was, in fact, the highest correlation we recorded amongst the various U.S., European and Asian stock indexes under study.

Still, there are opportunities to spread the S&P 500 and the DJIA despite this extremely high correlation. In particular, traders must focus on discrepancies between the constitution of the two indexes in order to gain insight into possibly discrepant price movements.

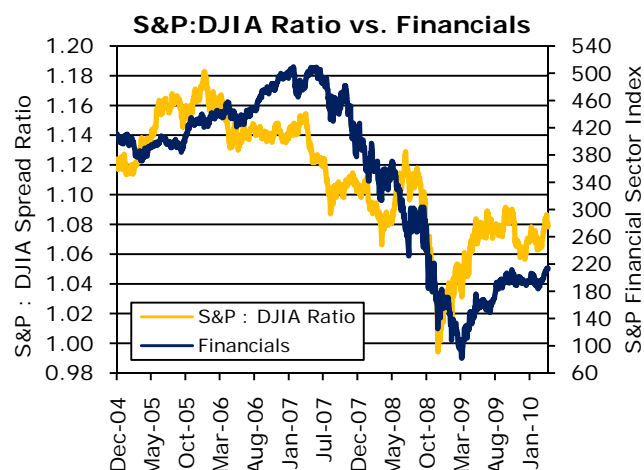
Referencing the Global Industry Classification Standard (GICS), we may categorize each index

constituent and compare the results. These proportions vary over time. But as an historical matter and as of March 25, 2010, the S&P 500 was over-weighted with financial stocks.

US Stock Performance by Sector

	2005	2006	2007	2008	2009
S&P 500	4.83%	15.61%	5.48%	-36.55%	25.93%
DJIA	1.66%	18.79%	8.83%	-31.46%	22.01%
Cons Disc	-6.36%	18.50%	-13.10%	-33.20%	40.77%
Cons Staples	3.55%	14.39%	14.16%	-15.22%	14.43%
Energy	31.18%	24.05%	34.07%	-34.53%	13.61%
Financials	6.30%	18.92%	-18.14%	-54.23%	16.69%
Health Care	6.40%	7.43%	7.28%	-22.60%	19.32%
Industrials	2.24%	13.16%	11.99%	-39.40%	20.19%
Info Tech	0.97%	8.36%	16.25%	-42.95%	61.30%
Materials	4.53%	18.69%	22.37%	-44.95%	47.85%
Telecomm	-5.33%	35.98%	11.83%	-30.03%	8.21%
Utilities	16.65%	20.53%	19.12%	-28.48%	11.30%

This is significant because the recent financial crisis exerted a particularly deleterious impact upon the financial sector of the economy which exhibited a decline of 54.23% in 2008. Thus, 2008 was an opportune time to be short the S&P/DJIA spread.



Example: As the financial crisis subsided and in anticipation of a financial sector bounce off the bottom, one might have bought the S&P 500:DJIA spread. Assume you buy the S&P 500:DJIA spread (buy S&P 500 and sell DJIA futures) on February 4, 2009 when the spread ratio was at 1.046.

This implies that one might weight the spread with 20 E-mini S&P 500 futures vs. 21 E-mini (\$5) DJIA futures. By May 11, 2009, the spread ratio had advanced to 1.080 and the long spread might have been unwound for a tidy profit.

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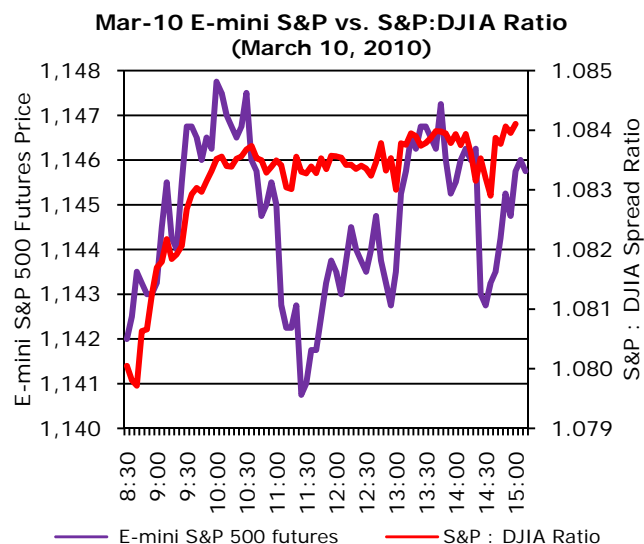
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	Mar-10 E-mini S&P 500 futures	Mar-10 E-mini DJIA Futures
2/4/09	Buy 20 @ 826.50 = \$826,500	Sell 21 @ 7,884 = \$827,820
5/11/09	Sell 20 @ 909.00 = \$909,000	Buy 21 @ 8,402 = \$882,210
	Profit of \$82,500	Loss of \$54,390
	Net Profit of \$28,110	

Intra-Day Spreading – The comparative constitution of two indexes impact spreads on a long-term or strategic basis but can also impact a spread on an intra-day or tactical basis. One might pay close attention to significant market-moving events that impact particular stocks included in the indexes.

Clearly indexes that are more heavily weighted by those particular stocks will be more heavily impacted. Note that all 30 DJIA constituents are also represented in the S&P 500. But because the DJIA only references 30 stocks, each of those stocks exerts a much greater impact upon the DJIA than the S&P 500. Of course, the reverse is not true – the S&P 500 includes 470 stocks not represented in the DJIA. This can be used as the basis for an intra-day spreading strategy.

Example: On March 10, 2010, the US equity markets were up slightly on see-saw action. The DJIA closed at 10,567 up 3 points (+0.03%) while the S&P 500 closed at 1,145.61, up 5 (+0.5%).



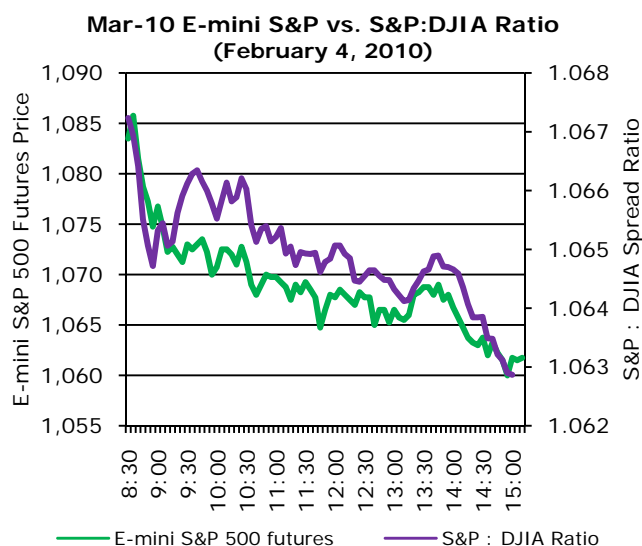
Banking analyst Dick Bove's comments that Citigroup (NYSE: C) is likely to continue rallying sent shares up +3.5% and generally lifted the financial sector early in the day. Bove expressed confidence

in the banking sector and suggested that dividend payout ratios in banks are going up to 40% in 2-3 years. Bank of America (NYSE: BAC) and JP Morgan (NYSE: JPM) were among the leading gainers on the Dow. AIG (NYSE: AIG) in September 2008, surged more than 10% on recent strong sales.

The S&P 500:DJIA spread ratio rallied from about 1.080 to 1.084 this day, mostly in the early morning in the immediate wake of Bove's comments. Thus, if you would have bought the spread (buy S&P 500 futures and sell DJIA futures) at 8:45 (CT) when the spread ratio was at 1.081 and sold the spread at 14:00 (CT) when the ratio was at 1.084, one might have earned a tidy profit. But you needed to react quickly to Bove's market moving comments.

	Mar-10 E-mini S&P 500 futures	Mar-10 E-mini DJIA Futures
8:45	Buy 10 @ 1,143.25 = \$571,625	Sell 11 @ 10,581 = \$581,955
14:00	Sell 10 @ 1,145.50 = \$572,750	Buy 11 @ 10,565 = \$581,075
	Profit of \$1,125	Profit of \$880
	Net Profit of \$2,005	

Example: On February 4, 2010, the US equity market experienced a massive sell-off on an unexpected advance in jobless claims and lingering concerns over European sovereign debt issues. The DJIA tanked by 268 points (-2.6%) to end the day at a 3-month low of 10,002. Weakness in financial shares sent the S&P 500 (-3.1%) to close at 1,063.11.



Many feared this was the beginning of the much-feared correction and bought Treasuries, driving

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yields on benchmark 10-year T-notes down 11 basis points to 3.59% The CBOE VIX, which we may regard as the market "fear meter" advanced to 21%. Oil prices declined to \$73.14 a barrel and gold fell to a 3-month low of \$1,062/oz.

All 10 GISC industry sectors were down in excess of 2.3% with the sensitive financial sector leading the retreat at -4.15%. As a result, the S&P 500:DJIA spread ratio declined steadily throughout the day from about 1.067 to 1.063. *I.e.*, this was a good day to be short the S&P 500:DJIA spread.

The S&P 500:DJIA spread ratio fell from about 1.067 to 1.063 on February 4, 2010. Assume you would sell the spread (sell S&P 500 futures and buy DJIA futures) at 10:30 (CT) when the ratio was at 1.066 and cover the spread at 14:30 (CT) when the ratio was at 1.064, one might have realized a nice profit.

	Mar-10 E-mini S&P 500 futures	Mar-10 E-mini DJIA Futures
10:30	Sell 20 @ 1,071.25 = \$1,071,250	Buy 21 @ 10,036 = \$1,053,780
14:30	Buy 20 @ 1,063.75 = \$1,063,750	Sell 21 @ 9,984 = \$1,048,320
	Profit of \$7,500	Loss of \$5,460
	Net Profit of \$2,040	

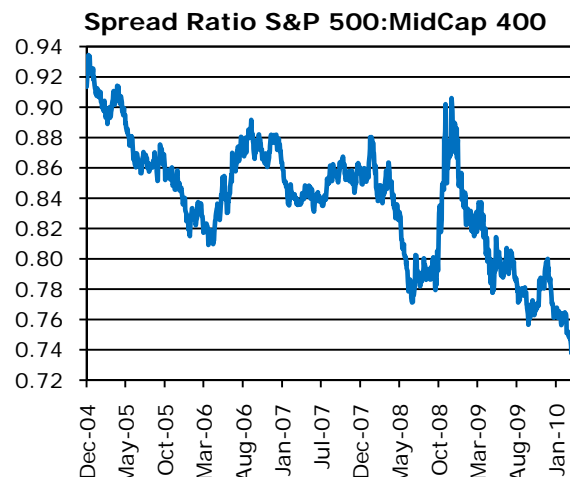
Note that we applied this S&P:DJIA spread on a ratio of 20:21 rather than 10:11 as in the previous example. The rationale is that the spread ratio was at 1.066 when you might have placed the spread on February 4th but rallied up to 1.081 on March 10th.

Credit Considerations – Inter-market stock index spreads are, of course, impacted by a variety of fundamental economic factors, not the least of which include monetary policy and credit conditions. In fact, the spread between S&P 500 and S&P MidCap 400 futures is often said to be driven by interest rates and credit conditions to a very considerable extent.

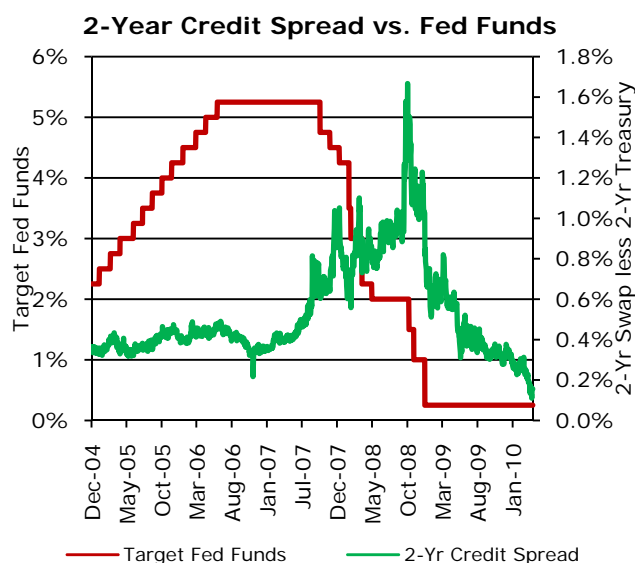
The explanation is found by examining the fund raising inclinations of larger companies such as those which comprise the S&P 500 vs. less well capitalized companies that comprise the MidCap 400. As a general rule, smaller U.S. corporations are more likely to be dependent upon debt to fund their operations than are the presumably more successful larger capitalized corporations which may have better access to equity markets.

As such, the value of mid- and small-cap stocks tend to be more sensitive to rates and credit conditions

than are large-cap stocks. However, the relationships may be rather complex.



During the period from 2004 through March 2010, the S&P 500:MidCap spread ratio generally declined. However, there were some considerable swings along the way which might be traced to credit market conditions. In particular, we might consider the level of interest rates as driven by the target Fed Funds rate as well as credit risk considerations. We may measure the latter factor by reference to a "credit spread" or the rate on a 2-year interest rate swap (private credit risks) vs. 2-year Treasuries (public credit risks). Credit conditions are generally deteriorating as this spread rises and improving as the spread declines.



The US economy was experiencing strong growth and gradually rising rates in 2005 up until about mid

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2006 when US housing values peaked. Because credit was readily available even on gradually rising rates, it was generally profitable to sell the S&P 500:MidCap 400 spread, *i.e.*, to hold credit sensitive mid-cap stocks and short larger cap issues.

But credit concerns flared by mid 2006 and the spread ratio reversed upwards as midcap stocks became less attractive.

Interestingly, midcap stocks outperformed larger cap stocks in early 2008 as the stock market tumbled precipitously. This might be explained by the fact that asset managers were rapidly liquidating investments of all sorts to raise capital. Large cap stocks tend to be more liquid and, therefore, better sources of immediate cash than midcap stocks. But midcap stocks began to seriously underperform by late 2008 as the scope of the crisis widened and the credit spread spiked to its high point in October 2008.

Throughout 2009, equity markets clawed back up and credit conditions improved. Outright interest rates declined as the Federal Reserve pushed the benchmark target Fed Funds rate to an unprecedented low of 0-0.25%. Credit spreads rapidly declined to pre-crisis levels or below. Consumer demand remains shaken but those credit sensitive midcap stocks have outperformed the large cap sector by a considerable margin during the past year and a half.

Example: Assume you sell the S&P 500: MidCap spread (sell S&P 500 futures and buy MidCap futures) on June 25, 2009 with the ratio at 0.799. By September 9, 2009, you cover the spread with the ratio down at 0.770.

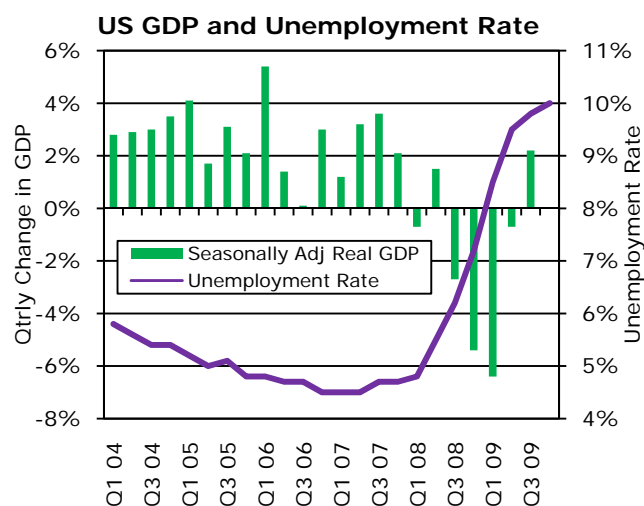
	Sep-09 E-mini S&P 500 futures	Sep-09 E-mini MidCap Futures
6/25/09	Sell 10 @ 916.50 = \$458,250	Buy 8 @ 573.00 = \$458,400
9/9/09	Buy 10 @ 1,032.50 = \$516,250 Loss of \$58,000	Sell 8 @ 669.80 = \$535,840 Profit of \$77,440
	Net Profit of \$19,440	

Economic Fundamentals – The fundamental drivers of these markets are found in basic economic conditions. Let's try to correlate U.S. economic circumstances with stock market movements over recent years.

The U.S. experienced solid growth between 2002 and 2006 when the so-called sub-prime mortgage crisis started to emerge. The U.S. housing bubble

began to burst by mid 2006 as home values plummeted with the S&P/Case-Shiller Home Price Composite Index of 10 U.S. cities down approximately 30% from its peak. Mortgage delinquencies and foreclosures rose to unprecedented levels and activity in the housing market ground down to a halt.

Mortgage investors, often involved in complex, levered and generally illiquid structures including structured investment vehicles (SIVs) and collateralized depository obligations (CDOs) saw the value of these investments decline quickly. Faced with the need to raise capital, many of these investors including levered asset managers turned to the equity markets as a source of liquidity. The result was a 37% decline in the value of the S&P 500 in 2008.



Distressed conditions on Wall Street quickly filtered onto Main Street. U.S. GDP fell 6.4% in the 1st quarter 2009. U.S. unemployment soared to 10.2% by October 2009. Since those low points, however, conditions have begun to improve with 4th quarter 2009 GDP at +5.7%. Unemployment remains high, but has backed off to 9.7%. Stock markets are often regarded as a leading indicator of economic events and have been rallying impressively since the lows of spring 2009.

US, European and Asian economies have all experienced economic reverses in recent years. GDPs in the European union and Great Britain experienced moderate declines of 2.5% and 2.6% during the 1st quarter 2009, the worst quarter of the financial crisis. They have since recovered into (barely) positive territory but are burdened by the

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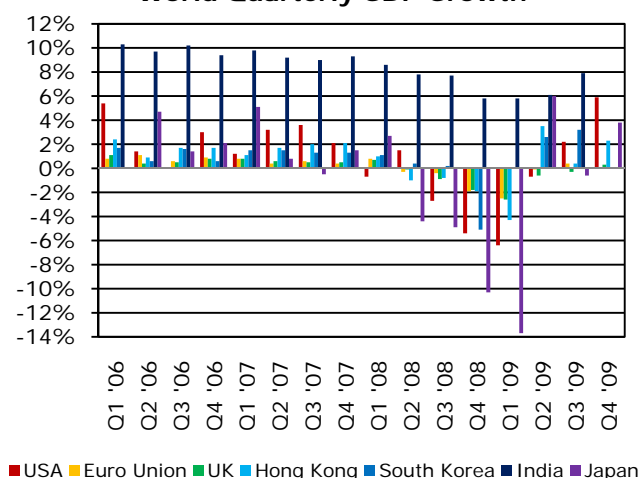


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sovereign debt issues plaguing Greece, Spain and Portugal.

Japanese GDP fared very poorly during the crisis, declining by 10.3% and 13.7% during the first two quarters of 2009. While many Asian economies depend on export activity, Japan may be more dependent than most and continues to carry a large bad debt overhang. Other Asian nations including South Korea, China and India have been much more resilient. In fact, the crisis was barely felt in booming economies such as India and China.

World Quarterly GDP Growth



Fundamentally Driven Strategy - The performance of national stock markets may be monitored by examining spread ratios. Let's compare the performance of the S&P 500 to the Euro STOXX 50, the Hang Seng, Kospi 200 and Nikkei 225 by studying the accompanying graphic.

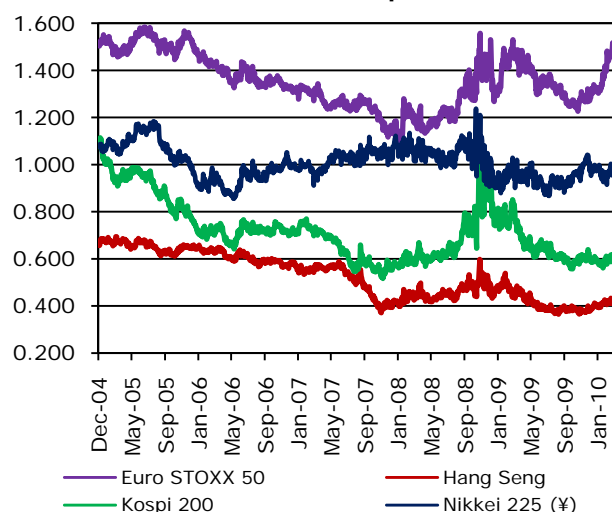
During the period from 2005 through early 2010, the S&P 500 has essentially broken even vs. the Euro STOXX 50 and the Nikkei 225. But it has underperformed the Hang Seng and Kospi 200 by a rather wide margin.

That may be explained by reference to macroeconomic conditions. Certainly most Asian economies have been much more expansive than the U.S. economy during this period. Weakness in the U.S. dollar certainly contributed to these trends. So while European growth has been slow, the Euro had been strengthening nicely from 2005 until early 2008.

Although the financial crisis originated in the U.S., USD denominated investments were regarded as a

safe haven of sorts as the crisis peaked. Thus, the USD generally advanced vs. other currencies and the S&P 500 tended to outperform other stock markets as stocks generally declined.

S&P vs. Euro & Asian Spread Ratios



Thus, one generally might buy other indexes and sell U.S. indexes during periods of sustained growth. During periods of contraction or serious economic distress, one generally might sell these other indexes and buy U.S. indexes. We reserve consideration of spreads between the US stock market as represented by the S&P 500 and European or Japanese markets for the next sections.

Example: In May 2008, the financial crisis was well underway. Thus, one might have sold Hang Seng futures and bought S&P 500 futures. The spread ratio as of May 2, 2008 was 2.38 implying that one should sell 2 Hang Seng futures and buy 5 E-mini S&P 500 futures. This strategy might have generated a \$37,502 profit as seen in our table.

	Sep-08 E-mini S&P 500 futures	Sep-08 Hang Seng Futures
5/2/08	Buy 5 @ 1,417.50 = \$354,375	Sell 2 @ 26,120 = \$335,108
8/15/08	Sell 5 @ 1,299.75 = \$324,937	Buy 2 @ 20,951 = \$268,169
	Loss of \$29,437	Profit of \$66,939
	Net Profit of \$37,502	

Example: By December 2008, we were past the height of the crisis and while the U.S. stock market was still slipping, many Asian equity markets were rebounding. Thus, one might have bought 1 Mar-09 KOSPI futures contract at 133.00 and sold 1 Mar-09 E-mini S&P 500 futures at 871.50 on December 5,

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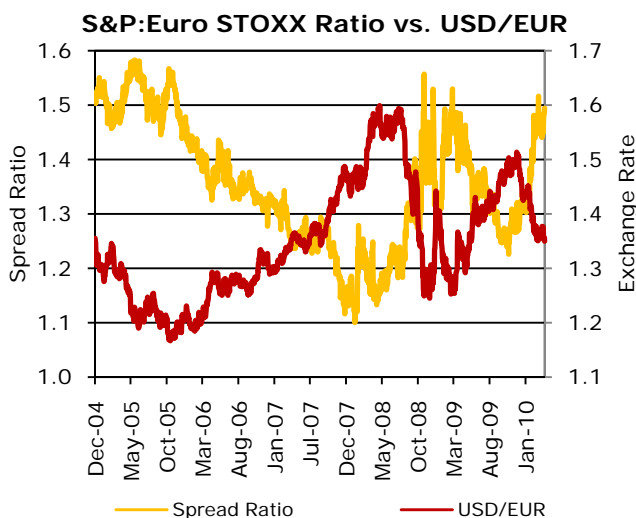


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2008. This strategy might have generated a profit on both sides of the spread for a net \$14,435 gain.

	Mar-09 E-mini S&P 500 futures	Mar-09 KOSPI 200 Futures
12/5/08	Sell 1 @ 871.50 = \$43,575	Buy 1 @ 133.00 = \$43,575
2/13/09	Buy 1 @ 820.00 = \$41,000	Sell 1 @ 155.70 = \$55,435
	Profit of \$2,575	Profit of \$11,860
	Net Profit of \$14,435	

S&P 500 vs. Euro STOXX 50 – The S&P 500:Euro STOXX 50 spread is deserving of some special consideration for several reasons. First, these contracts represent the two most liquid and active stock index futures contracts available today. Secondly, to the extent that US and European daylight trading hours overlap for some hours on a daily basis, it is possible to leg into the spread when both futures markets are trading at the height of their liquidity. Note, however, that because S&P 500 futures is a CME Group product while Euro STOXX 50 futures are a EUREX product, cross-margining breaks are unavailable.



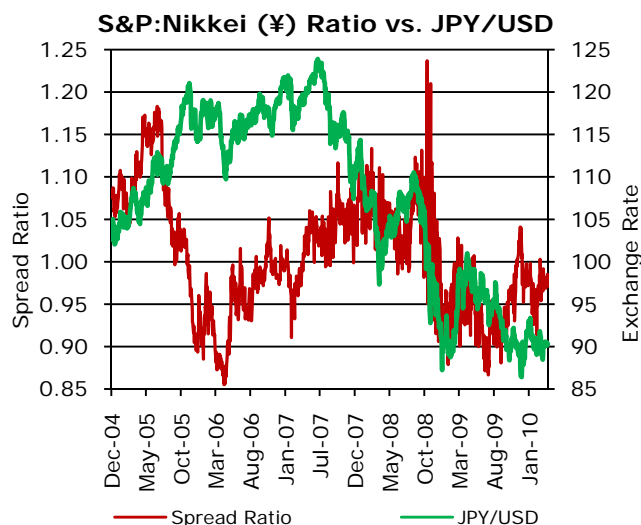
The S&P 500:Euro STOXX 50 spread ratio is highly correlated to the value of the USD/EUR exchange rate. As the Euro strengthens, the spread weakens and vice versa. Thus, the spread weakened prior to the economic crisis but advanced during the peak crisis period. The spread weakened as the crisis subsided and economic conditions improved. But the spread has most recently advanced as a European debt and monetary crisis has emerged over fiscal concerns in Greece, Spain and Portugal. Thus, it would have been profitable to buy the

spread, i.e., buy S&P 500 futures and sell Euro STOXX 50 futures in late 2009 through early 2010.

Example: On January 12, 2010, the S&P 500:Euro STOXX 50 spread ratio was at 1.317 implying an appropriate spread ratio of 10:13. The USD/EUR exchange rate was at 1.4486. By March 4, 2010, the spread ratio had rallied to 1.468 while the Euro weakened to 1.3581. One might have capitalized on these circumstances by buying the spread, i.e., buying S&P 500 futures and selling Euro STOXX 50 futures.

	Mar-10 E-mini S&P 500 futures	Mar-10 Euro STOXX 50 Futures
1/12/10	Buy 10 @ 1,134.00 = \$567,000	Buy 13 @ 2,977.00 = \$560,623
3/4/10	Sell 10 @ 1,122.25 = \$561,125	Sell 13 @ 2,817.00 = \$497,350
	Loss of \$5,875	Profit of \$63,273
	Net Profit of \$57,398	

S&P 500 vs. Nikkei 225 – Like the S&P 500:Euro STOXX spread, currency fluctuations can exert a major impact on S&P 500:Nikkei 225 spreads. From early 2005 through early 2006, the inter-market futures spread weakened on a weakening JPY value. The spread generally declined on a strengthening JPY value from early 2008 through late 2009 although the trend was interrupted briefly by the “safe haven” effect of USD denominated investments at the height of the financial crisis.



This negative relationship between the JPY values and economic strength may be counterintuitive but is understood considering the critical role that exports play in the Japanese economy. Thus, there has been a negative correlation between the

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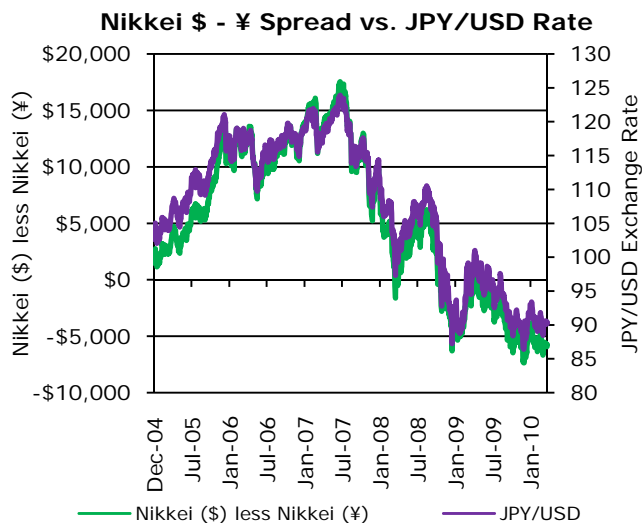


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strength of the yen and the Japanese economy as indicated by stock values. (Per interbank FX conventions, we are quoting the exchange rate in terms of yen per US dollar – the opposite of the Euro quote.)

Note that there are several Nikkei 225 futures contracts available. The OSE lists a contract valued at ¥1,000 x Index. CME Group lists both JPY and USD denominated contracts valued at ¥500 and \$5 x Index, respectively. The two CME Nikkei contracts turn in very similar performance but may diverge as discussed in the next section. We used the CME Nikkei 225 (¥) contract in our graphic illustration.

“Correlation Trade” – The availability of both USD and JPY denominated Nikkei 225 futures at CME Group provides a unique spreading opportunity. This spread has become so popular that these two CME Group products often post nearly identical daily volumes. This is called a “correlation trade” in reference to the strong negative correlation between the Nikkei 225 index and the JPY/USD exchange rate. In our illustration, we quote the spread as the USD value of the Nikkei 225 (\$) contract less the USD value of the Nikkei 225 (¥) contract.



JPY weakens as the quoted JPY/USD rate increases; and, strengthens as the quoted rate decreases. Or, one may say that there is a positive correlation with the USD/JPY exchange rate and the Nikkei (\$) less Nikkei (¥) spread. Again, we explain this correlation by observing that as the USD advances vs. JPY, U.S. consumer purchasing power for JPY denominated goods and services increases.

This bolsters the export driven Japanese economy and the Nikkei 225 may advance. If the USD should decline vs. the JPY, U.S. consumer purchasing power for Japanese products decreases, thus detracting from Japanese economic strength and the Nikkei 225 index may decline.

Because of the more dynamic nature of the USD version of the contract, there is often a premium of up to 100 index points in the value of the Nikkei 225 (\$) vs. Nikkei 225 (¥) futures. Professional trading groups including hedge funds follow this relationship closely as part of their short-term correlation trading activities. This spread offers significant cross-margining efficiencies currently in the vicinity of 85%.

Conclusion – In today's electronically interlocked world economy, investors frequently rotate investment between market sector or even between national economies. Inter-market spreads between stock index futures facilitate these rotational strategies nicely.

These inter-market spreads may be pursued based upon a number of different analytical techniques. For example, one may pursue spreads between the S&P 500 and DJIA by analyzing the constituencies of the two indexes. Spreads between large cap stocks represents in the S&P 500 vs. mid-cap stocks as represented in the S&P MidCap 400 may be motivated by credit conditions.

Spreads between different national economies such as an S&P 500 vs. Euro STOXX 50 spread may be motivated by fundamental international economic conditions. These international spreads may be further impacted by the effect of exchange rates. Finally, we have reviewed a “correlation trade” between USD and JPY denominated Nikkei 225 futures contracts as offered at CME Group.

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Appendix of Miscellaneous Data

Comparing Stock Index Futures (As of 3/23/10)

Futures Contract	Exchange	Contract Multiplier	Index	Currency	Currency Value	Contract Value (USD)
E-mini S&P 500	CME Group	\$50	1,174.17	USD	1.00	\$58,709
E-mini Nasdaq-100	CME Group	\$20	1,963.20	USD	1.00	\$39,264
E-mini (\$5) DJIA	CME Group	\$5	10,888.83	USD	1.00	\$54,444
E-mini S&P MidCap 400	CME Group	\$100	799.95	USD	1.00	\$79,995
Euro STOXX 50	EUREX	€10	2,910.52	EUR	1.3499	\$39,289
DAX	EUREX	€25	6,017.27	EUR	1.3499	\$203,068
FTSE 100	NYSE Euronext	£10	5,673.63	GBP	1.5048	\$85,377
CAC 40	NYSE Euronext	€10	3,952.55	EUR	1.3499	\$53,355
Hang Seng	HKEx	HKD 50	20,987.78	HKD	7.7620	\$135,196
KOSPI 200	KRX	KRW 500,000	220.09	KRW	1,136.90	\$96,794
S&P CNX Nifty	NSE	INR 50	5,225.30	INR	45.5950	\$5,730
E-mini S&P CNX Nifty *	CME Group	\$10	5,225.30	USD	1.00	\$52,253
E-micro S&P CNX Nifty *	CME Group	\$2	5,225.30	USD	1.00	\$10,451
Nikkei 225	TSE	¥1,000	10,774.15	JPY	90.40	\$119,183
Nikkei 225	CME Group	¥500	10,774.15	JPY	90.40	\$59,592
Nikkei 225	CME Group	\$5	10,774.15	USD	1.00	\$53,871

* Contract to be listed at CME Group on a to-be-determined date during 3rd quarter 2010

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Correlations between Spot Index Values (Sampled Weekly from 12/31/04-3/23/10)

	S&P 500	Nasdaq-100	DJIA	Midcap 400	Euro STOXX 50	DAX	FTSE-100	CAC-40	Hang Seng	KOSPI 200	S&P CNX Nifty	Nikkei 225
S&P 500	-											
Nasdaq-100	0.9067	-										
DJIA	0.9778	0.8812	-									
Midcap 400	0.9560	0.9040	0.9104	-								
Euro STOXX 50	0.8698	0.7805	0.8542	0.8370	-							
DAX	0.8717	0.7977	0.8549	0.8475	0.9719	-						
FTSE-100	0.8695	0.7651	0.8538	0.8414	0.9423	0.9159	-					
CAC-40	0.8614	0.7758	0.8439	0.8295	0.9828	0.9506	0.9501	-				
Hang Seng	0.6416	0.6174	0.6089	0.6564	0.6754	0.6621	0.6730	0.6612	-			
KOSPI 200	0.5919	0.6201	0.5678	0.6428	0.6306	0.6523	0.5993	0.6057	0.7012	-		
S&P CNX Nifty	0.5366	0.5386	0.5277	0.5526	0.6095	0.6074	0.5606	0.5844	0.6619	0.6022	-	
Nikkei 225	0.7146	0.6661	0.7039	0.7084	0.7554	0.7454	0.7306	0.7507	0.7311	0.7296	0.5699	-

Correlations between Spot Index Values Translated from Native Currency to USD (Sampled Weekly from 12/31/04-3/23/10)

	S&P 500	Nasdaq-100	DJIA	Midcap 400	Euro STOXX 50	DAX	FTSE-100	CAC-40	Hang Seng	KOSPI	S&P CNX Nifty	Nikkei 225
S&P 500	-											
Nasdaq-100	0.9067	-										
DJIA	0.9778	0.8812	-									
Midcap 400	0.9560	0.9040	0.9104	-								
Euro STOXX 50	0.8496	0.7694	0.8210	0.8334	-							
DAX	0.8484	0.7813	0.8192	0.8391	0.9719	-						
FTSE-100	0.8309	0.7385	0.8077	0.8153	0.9284	0.9060	-					
CAC-40	0.8441	0.7670	0.8139	0.8286	0.9828	0.9506	0.9324	-				
Hang Seng	0.6418	0.6178	0.6090	0.6567	0.7164	0.7011	0.7167	0.7060	-			
KOSPI	0.6309	0.6424	0.6008	0.6800	0.7017	0.7160	0.6816	0.6751	0.7317	-		
S&P CNX Nifty	0.5492	0.5468	0.5342	0.5646	0.6591	0.6518	0.5995	0.6381	0.6807	0.6408	-	
Nikkei 225	0.6220	0.5610	0.6061	0.6170	0.7034	0.6877	0.6832	0.7047	0.6804	0.6822	0.5175	-

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