

Futures Contract Spread Opportunities

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Background & fundamentals

Spread Trading

In futures trading the simultaneous buying and selling of two contracts against each other is known as a “spread” or a spread trade.

The individual contracts could be from the same commodity but different months. E.g. a calendar spread.

Different commodities but similar products, e.g. wheat versus corn.

Similar contracts within a complex, e.g. TUU1 versus USU1 to trade the US Treasury curve.

MexDer 10-Year / CME 10-Year Spread

Valuation of Treasury Futures

Compare apples to apples

When spreading two contracts against each other it is important that they be evaluated in common terms.

With Treasury contracts the common denominator is the contract's cheapest-to-deliver (CTD) value of a basis point (VBP) divided by its conversion factor (CF).

Note: The conversion factors are fixed for each contract month but the VBP of the underlying cash note changes with price/yield.

Therefore the implied VBP of the contract will change with significant moves in price and yield.

Valuation of Treasury Futures

Compare apples to apples

Each Treasury futures contract that is settled by physical delivery normally has a, “basket,” or several Treasury bonds and notes that can be delivered into the contract.

The one that is most efficient to deliver is known as the cheapest-to-deliver, or CTD issue.

Treasury futures tend to price off the price behavior of the contract’s CTD.

Spread analysis begins with calculating the conversion factor adjusted VBP of the futures contract.

Valuation of Treasury Futures

Compare apples to apples

For September delivery:

The MX 10-Year Note tracks the Mexican 8% 6/11/2020 as its CTD

The US 10-Year Note tracks the UST 3.875% 5/15/2018 as its CTD

Notice the difference in maturities. The slope and level of the yield curve determines which issue/s is most efficient.

Currently in the US the issues with the shortest maturities are CTD.

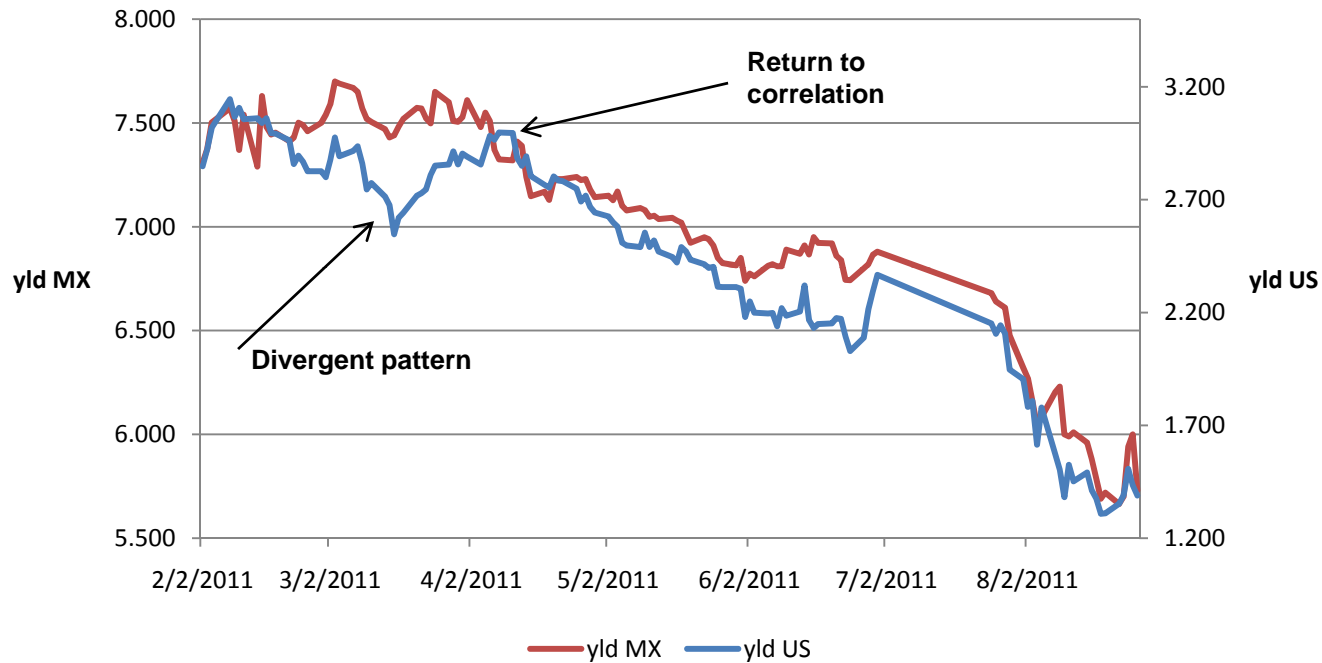
It is important to understand that even though the contracts may be labeled or implied to be 10-years their underlying asset may not be.

US 10-Year Notes trade with an implied 7-year maturity.

MX 10-Year Notes trade with an implied 9-year maturity.

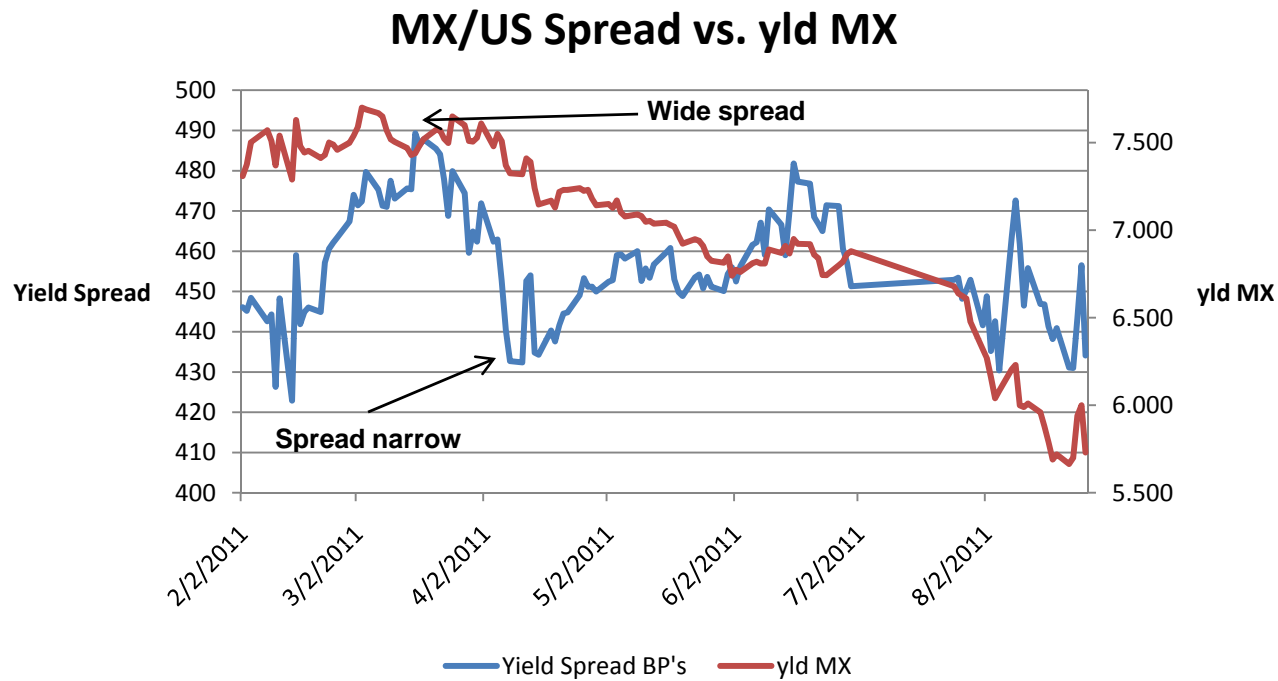
Buying MX/US Note Spread

US/MX 10-Year CTD Yields



Historically Mexican and US Government bond yields are closely correlated. In mid-March 2011 the pattern diverged from the normal pattern.

Buying MX/US Note Spread



This shows the yield spread versus the Mexican CTD issue the Mbono 8% 6/11/2020. Yields in both US and Mexican interest rate markets were trending lower. Why the swings in the spread?

Buying MX/US Note Spread

How to calculate the spread ratio?

The trading ratio for a dollar weighted spread is the same as that for a hedge ratio.

We simply take the conversion factor adjusted VBP for each contract and divide one by the other.

$$\text{VBP (ctd US)} / \text{VBP (ctd MX)} = \text{Hedge Ratio (HR)}$$

Assume on 3/16/2011 we decided, based on the level of the futures yield spreads to buy MX 10-Year and sell US 10-Year.

$$\begin{aligned}\text{VBP (ctd US)} &= \$74.92 \text{ per contract} \\ \text{VBP (ctd MX)} &= \$75.10 \text{ MXN per contract}\end{aligned}$$

Before doing the HR calculation I need to convert the USD denominated US VBP to MXN Peso equivalent.

Buying MX/US Note Spread

Compare apples to apples

Convert VBP (ctd US) into MXN equivalent amount.

$$\$74.92 \text{ USD} \times 12.00 = \$899.04 \text{ MXN}$$

Now we can go ahead with the HR calculation:

$$\text{VBP (ctd US)} / \text{VBP (ctd MX)} = \text{Hedge Ratio (HR)}$$

$$899.04 / 75.10 = 11.97 \text{ MX 10-Years per 1 US 10-Year} \\ \text{rounded to 12:1}$$

3/16/2011 Bot 240 Sep MX 10-Years at 107.800
Sold 20 Sep US 10-Years at 119-29+

Note: MX 10-Years quoted in decimal form, US 10-Years in 1/32 form.

Buying MX / US Note Spread

How to evaluate the results?

P&L

3/16/11 Bot 240 Sep MX 10-Year at 107.800
Sold 20 Sep US 10-Year at 119-29+

4/8/11 Sold 240 Sep MX 10-Year at 109.575 = **Gain** of 1.775 points
Bot 20 US 10-Year at 116-27+ = **Gain** of 98 ticks

1.775 points MX 10-Year x 1000 MXN x 240 contracts = \$426,000 MXN **Gain**
98 ticks US 10-Year x \$31.25 x 20 contracts = \$61,250 **Gain**

converted at 12.00 = \$735,000 Peso **Gain**

Total **gain** of \$1,161,000 Pesos

IPC / S&P 500 E-mini Spread

Valuation of Equity Index futures

Compare apples to apples

When spreading two contracts against each other it is important that they be evaluated in common terms.

With Equity Index contracts the common denominator is the contract's notional, or face, value.

To calculate an equity index future's notional value is easy:

$$\text{Price of futures} \times \text{contract multiplier} = \text{Notional Value (NV)}$$

Note: The contract multiplier is fixed but the futures price is not.

Therefore the NV will change with significant moves in price.

Valuation of Equity Index futures

Compare apples to apples

$$P \text{ futures} \times \text{multiplier} = NV$$

Let's calculate the notional value for S&P E-mini futures when:

P futures = 1296.25

multiplier = \$50.00

$$1296.25 \times 50.00 = \$64,812.50 \text{ USD per contract}$$

Now will calculate the notional value of the IPC futures when:

P futures = 35137

Multiplier = \$10.00 MXN

$$35137 \times 10.00 = \$351,370 \text{ MXN per contract}$$

Valuation of Equity Index futures

Compare apples to apples

Convert S&P E-mini futures notional value to equivalent \$MXN terms.

Assume a USD/MXN rate of roughly \$12.00 Pesos per USD

E-mini notional value x exchange rate = E-mini MXN NV

\$64,812.50 USD x 12.00 = \$777,750 MXN NV

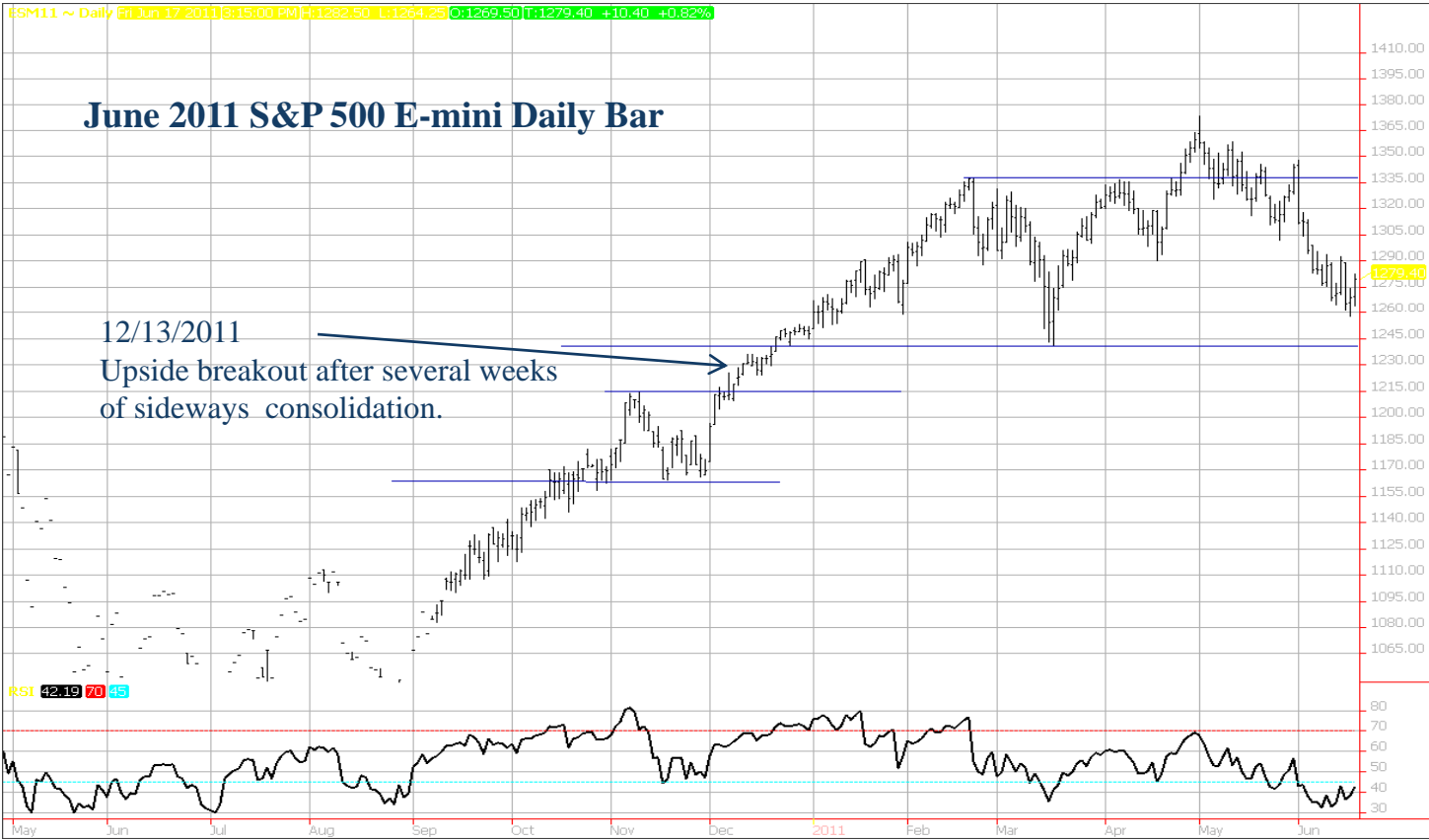
Now we can compare that to the NV of the IPC futures and calculate the proper hedge ratio - spread ratio.

Hedge Ratio = NV (E-mini) / NV (IPC)

HR = 777750 / 351370

=2.2135, or rounded to 2:1 IPC to E-mini

Selling the IPC/E-mini spread



Selling the IPC/E-mini spread

How to calculate the spread value?

Rather than use a price differential to calculate spread value use a weighted notional value differential calculation.

$$NV (IPC) \times 2 / NV (E-mini) = \text{Spread Value}$$

Assuming on 12/13/2010 we:

Sold 200 June IPC at 38475 and

Bot 100 June E-mini at 1231.25

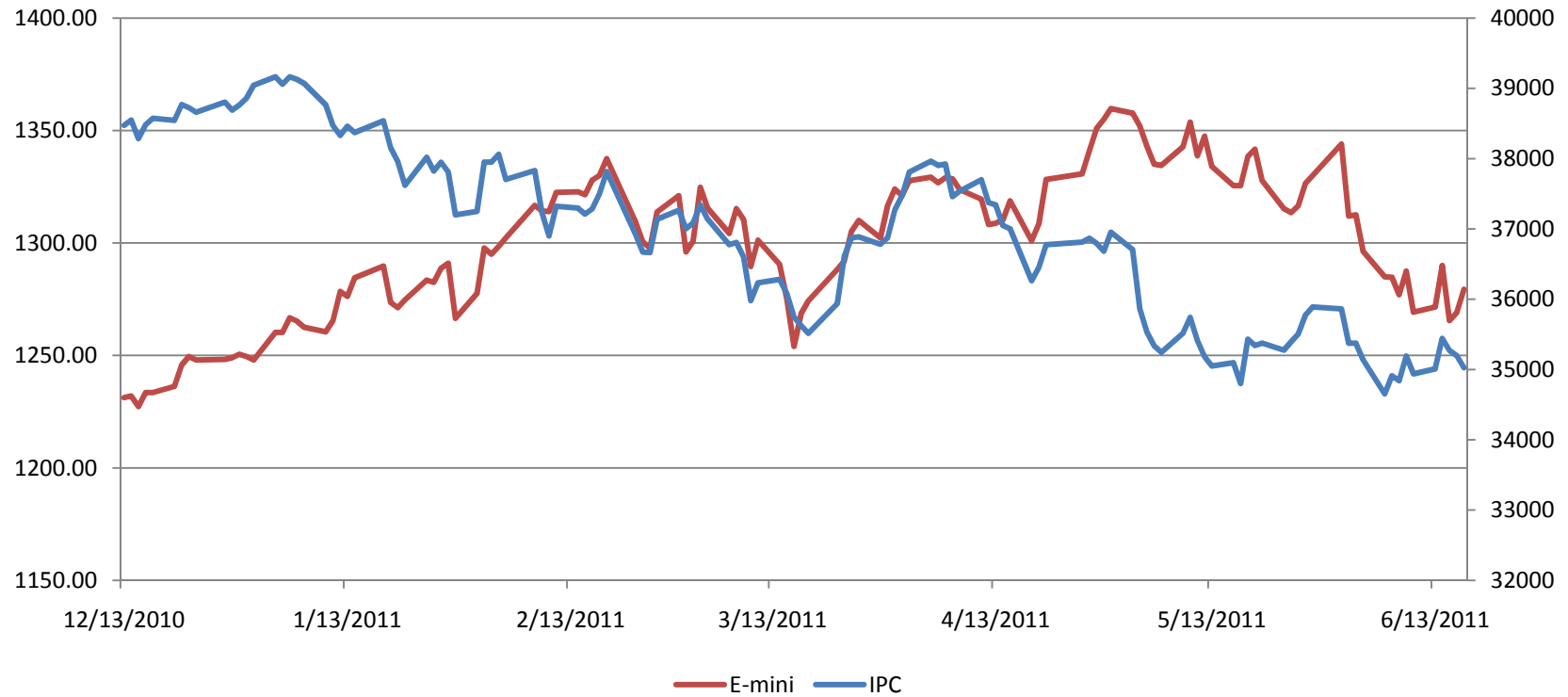
$$NV (IPC) = (38475 \times 10.00 \text{ MXN}) = 384750 \times 2 = \mathbf{769500}$$

$$NV (e-mini) = 1231.25 \times 50.00 = 61562.50 \times 12.00 = \mathbf{738750}$$

$$769500 / 738750 = \mathbf{1.0416 \text{ spread level}}$$

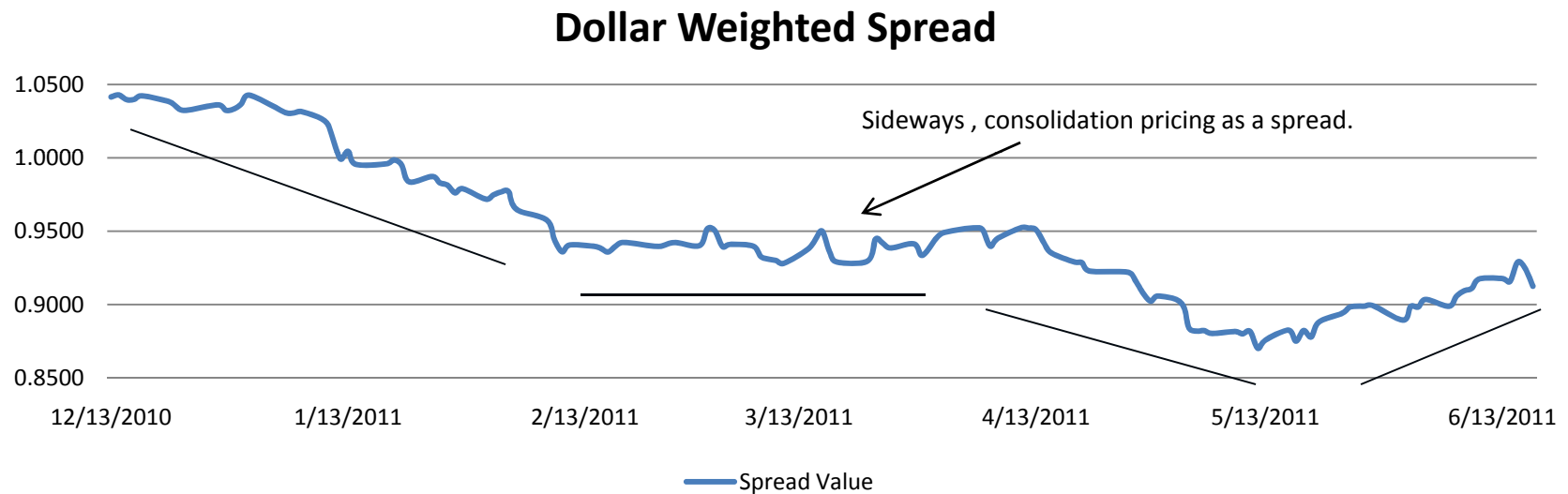
Selling the IPC/E-mini spread

June IPC / June E-mini



Valuation of Equity Index futures

When to get and out of the spread?



Selling the IPC/E-mini spread

How to evaluate the results?

P&L

12/13/10 Bot 100 E-mini at 1231.25
 Sold 200 IPC at 38475
 Dollar weighted spread = 1.0416

2/08/11 Sold 100 E-mini at 1316.75 = **Gain** of 85.50 points
 Bot 200 IPC at 37830 = **Gain** of 645 points
 Dollar weighted spread = 0.9576

645 points IPC x 10.00 MXN x 200 contracts = \$1,290,000 MXN
85.50 points E-mini x \$50.00 x 100 contracts = \$427,500 USD

converted at 12.00 = \$5,130,000 MXN

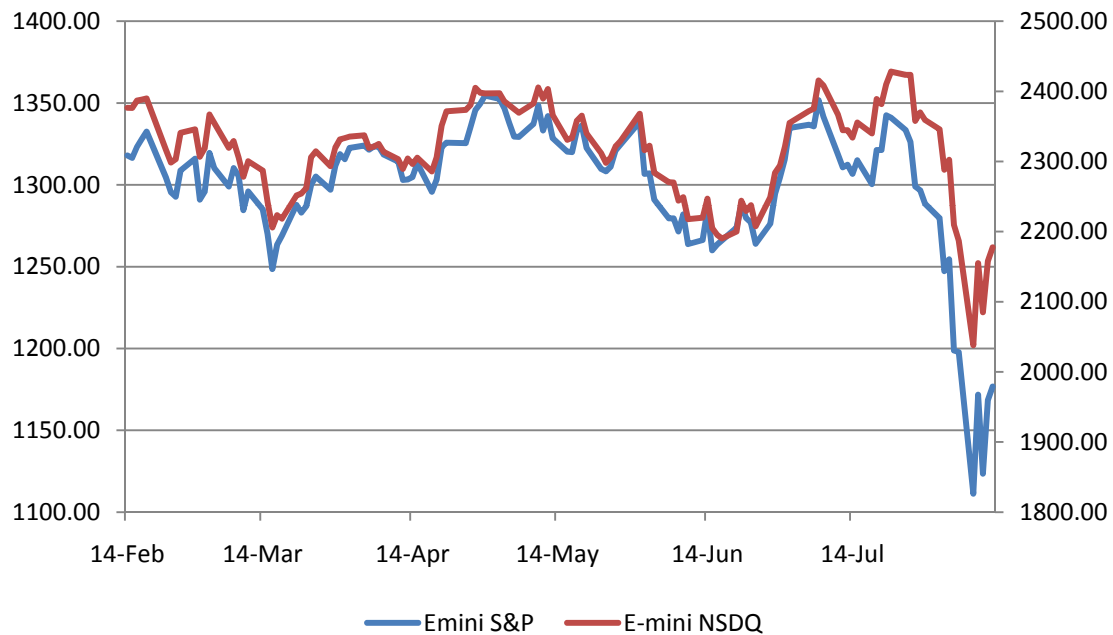
Total **gain** of \$6,420,000

S&P 500 E-mini / NASDAQ-100 E-mini Spread

Equity Index Spreads

S&P 500 versus NASDAQ-100

S&P 500 vs. NASDAQ-100



Historically closely correlated, recently divergent.

Equity Index Spreads

S&P 500 versus NASDAQ-100

Trading relationships between highly correlated indices often tend to be mean-reverting.

Expressing this view would mean buying E-mini S&P 500 Index futures and selling E-mini NASDAQ-100 futures.

$$\text{Hedge Ratio (HR)} = \text{Value}_1 \div \text{Value}_2$$

$$\text{HR} = \text{Sep E-mini S\&P (ESU1)} \div \text{Sep E-mini NSDQ-100 (NQU1)}$$

$$\text{HR} = 58,837.50 \div 43,550.00$$

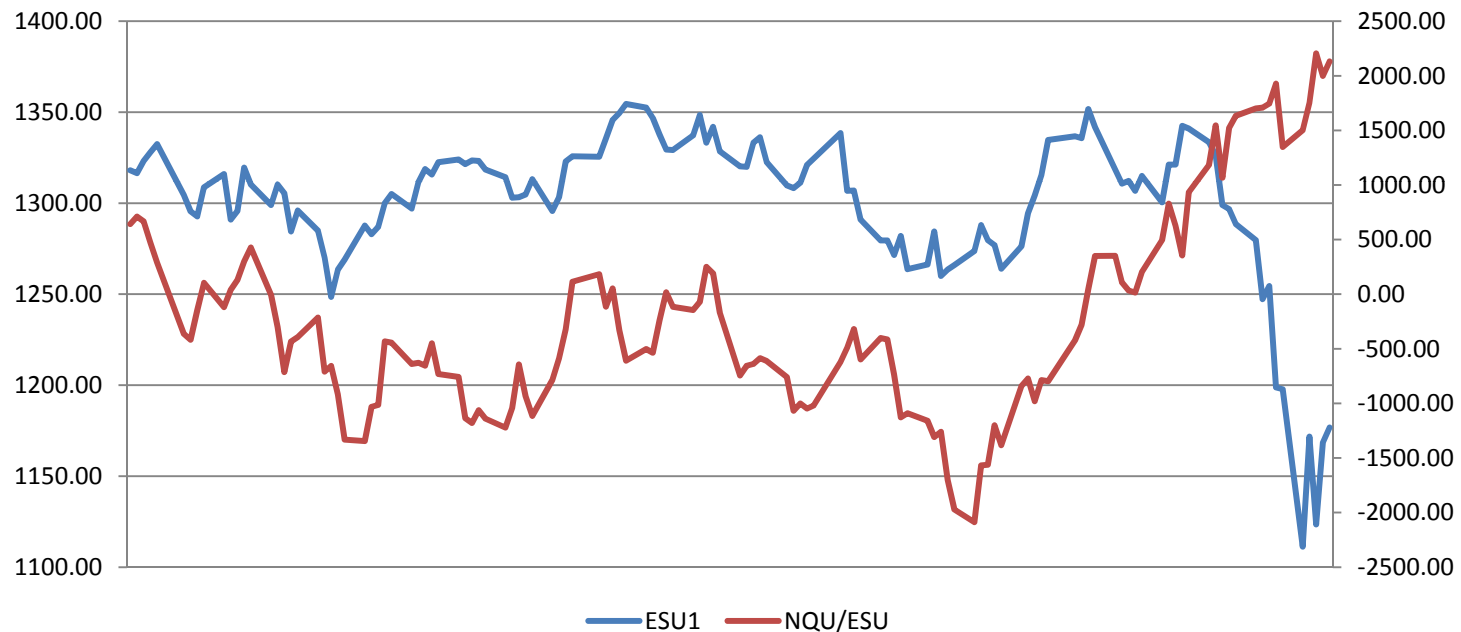
$$\text{HR} = 1.3510 \text{ E-mini NSDQ-100 (NQU1) futures per 1.0 ESU1}$$

Buy 100 ESU1 and Sell 135 NQU1 against them.

Equity Index Spreads

S&P 500 versus NASDAQ-100

Weighted Spread vs. S&P Index



Selling the NQU1 / ESU1 spread

How to evaluate the results?

P&L

08/12/11 Bot 100 Sep S&P at 1176.75
 Sold 135 Sep NSDQ at 2177.50
 Dollar weighted spread = 2132.50

9/01/11 Sold 100 Sep E-mini at 1201.25 = **Gain** of 25.50 points
 Bot 135 Sep NSDQ at 2217.25 = **Loss** of 39.75 points
 Dollar weighted spread = 2020.50

25.50 points S&P 500 x 50.00 x 100 contracts = \$127,500 **Gain**
39.75 points NSDQ x \$20.00 x 135 contracts = \$107,325 **Loss**

Net **gain** of \$20,175

For more information, please contact:

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