CME Group

Stock Index Futures Spread Trading

S&P 500 vs. Ibovespa

November 2009

Contents[1]

[1] Written by Charles Farra, CME Group - charles.farra@cmegroup.com
Also see a separate paper on this subject matter - *"Spread Trading US and Brazilian Stock Index Futures"* by Richard Co of CME Group – richard.co@cmegroup.com
To contact CME Group regarding our Latin American business – cmelateam@cmegroup.com

Stock Index Futures Spread Trading

Introduction

About CME Group and Stock Index Futures

As the world's leading and most diverse derivatives marketplace, CME Group is where the world comes to manage risk. CME Group exchanges -- which include Chicago Mercantile Exchange (CME), the Chicago Board of Trade (CBOT) and the New York Mercantile Exchange (NYMEX) – offer the widest range of global benchmark products across all major asset classes. We also provide the premier marketplace for trading stock index futures.

The first successful stock index futures contract, the S&P 500 contract, began trading at CME in 1982. Since then, our product line has grown to include a comprehensive range of benchmark indexes on U.S. and international stocks. In 2008, our equity index product line had an average daily volume (ADV) of over 3.7 million contracts, with an average daily notional value traded in excess of $200 billion.

CME Group exchanges also offer trading on stock index futures virtually 24 hours per day, with the E-mini products available electronically only on the state-of-the-art CME Globex electronic trading platform. The markets are liquid around the clock, even during non-U.S. hours, and especially in the European morning hours leading into the U.S. daytime open for the stock market.

About This Guide

This spread trading guide introduces and studies the spread relationship between the S&P 500 and the Ibovespa indexes, two leading benchmarks for the U.S and Brazil equity markets. If you are interested in trading this spread relationship, this guide is designed to help you get started.

S&P 500 vs. the Ibovespa

The S&P 500 Index is the leading large-cap benchmark for the U.S. stock market and is the main barometer for institutional and professional investors. The Ibovespa is the leading benchmark for Brazilian stocks. In addition:

- The S&P 500 index contains 500 stocks, while the Ibovespa has 63 stocks.
- The S&P 500 is a capitalization-weighted, float-adjusted index. The Ibovespa is a total return index weighted by traded volume.
- ADV for the E-mini S&P 500 index futures was 2,505,492 contracts in 2008, and is above 2,321,004 contracts in 2009 YTD through September, which represents a daily notional value traded in excess of US $100 billion.
- ADV for the BM&FBovespa Ibovespa index futures was over 80,000 contracts in 2008, and is above 60,000 contracts in 2009 YTD through September, which represents a daily notional value traded in excess of BRL 4 billion.

Index Spread Trading

The purpose of this spread trading guide is to introduce and study the spread between the S&P 500 and the Ibovespa indices. While these two indices are composed of different companies with their own unique fundamental characteristics, they may at times exhibit high degrees of correlation, especially when viewing prices during the time window when both underlying markets are actually open.

Traders who are potentially interested in trading the spread between the S&P 500 and the Ibovespa may find the material in this study guide can help them get started.

Trading Hours

The E-mini S&P 500 futures trade for over 23 hours per day, while the Ibovespa futures trade for slightly over 8 hours per day. For purposes of analyzing the spread, intra-day data will be used during the period of 8:30 a.m. through 3:00 p.m. Chicago time.

Foreign Exchange Risk

The Ibovespa futures contract is denominated in Brazilian Real. When calculating the appropriate spread ratio, the foreign exchange rate needs be applied in order to make the spread dollar neutral.

Correlations

Long-term correlations based on the underlying cash indexes for these markets are moderate for several reasons:

- Completely different index composition
- Different countries and economies
- Different currencies – U.S. Dollar (USD) vs. Brazilian Real (BRL)

Index Methodology and Sector Weightings

Background of the S&P 500 and Ibovespa

S&P 500 Index

The S&P 500 Index, although dating back to 1923, was expanded to include 500 stocks in 1957. Constituents in the index represent approximately 75 percent of the market capitalization of the entire U.S. stock market universe. The S&P 500 Index is calculated from a base date of 1941 ~ 1943 with an original value of 10 points. The S&P 500 Index is maintained by S&P Index Committee, whose stated goal is to ensure that the index remains a leading indicator of U.S. equities. The S&P 500 Index is not simply the 500 largest companies in the U.S. equity market. A few selected criteria for any stock to be considered in the S&P 500 Index are as follows.

- The minimum market capitalization for stocks in the S&P 500 Index is $4 billion.
- Minimum public float of at least 50 percent of outstanding shares.
- The company's addition to the index will maintain a sector balance that is in line with sector composition of the universe of eligible companies with a market cap in excess of $4 billion.

For further detailed information on the S&P 500 and other S&P Indexes, please visit the Standard and Poor's website at www.standardandpoors.com.

Ibovespa

Source: BM&FBovespa
http://www.bovespa.com.br/indexi.asp

The ***Bovespa Index ("Ibovespa")*** is a leading indicator of the Brazilian stock market's average performance. Ibovespa's relevance comes from two facts: it reflects the variation of Bovespa's most traded stocks and it has tradition, having maintained the integrity of its historical series without any methodological change since its inception in 1968. BOVESPA is responsible for Ibovespa's management, calculation, disclosure and maintenance.

What is the Bovespa Index?

It is the current value, in Brazilian currency, of a theoretical stock portfolio constituted in 02/01/1968 (base value: 100 points), by a hypothetical investment. No additional investment has been made since this date, apart from the reinvestment of the distributed benefits (such as dividends, subscription rights and stocks bonuses). In that way, the index reflects not only the variation of the stock prices but also the impact of the distribution of benefits, and is considered an indicator that evaluates the total return of its components stocks.

Considered by some in the industry to be extremely reliable and with a methodology easily understandable by the market, the Bovespa Index may faithfully represent the average performance of the main traded stocks and the profile of the cash market operations carried out on BOVESPA.

Objective

Ibovespa's stated objective is to be an average indicator of the market performance. For that purpose, its composition aims at reflecting as close as possible the real configuration of the cash market operations (round lot) on BOVESPA.

Ibovespa's Representativity

a. In terms of Liquidity: The stocks that integrate Ibovespa's theoretical portfolio represent more than 80 percent of the number of trades and the financial value registered on BOVESPA's cash market (round lot).

b. In terms of market capitalization: The issuing companies of the stocks that compose the Bovespa Index theoretical portfolio are responsible, in average, for approximately 70 percent of the sum of all BOVESPA's companies' capitalization.

Factors Affecting the Spread

What Factors Affect the S&P 500 vs. Ibovespa Spread?

Although the spread between the S&P 500 and Ibovespa may be affected by potentially many factors, there are a few main factors which may account for the majority of changes in the spread: Sector Weightings, Currency Exchange Rate and Index Methodology. We will address each of these main factors in this paper.

SECTOR WEIGHTINGS

The various index providers use industry classification standards to calculate the many sectors, subsectors, and so on for the primary indexes. For example, Standard and Poor's and BM&F Bovespa each use a different classification standard. We simply use the sector analysis for purposes of studying the S&P 500 vs. Ibovespa spread, and specifically how it behaves as different sectors have significant moves. *Detailed examples will follow in this paper.*

Industry Classification Standards

Global Industry Classification Standard (GICS) – GICS is developed and maintained by Standard and Poor's and MSCI Barra. The GICS is used by Standard and Poor's to classify the sectors for all its indexes including the S&P 500 Index. The GICS structure consists of 10 sectors, 24 industry groups, 68 industries and 154 sub-industries.

Link to GICS
http://www.mscibarra.com/products/gics/index.jsp

Industry Classification Structure of BOVESPA Listed Companies and Funds – Used by BM&F Bovespa. Structure consists of 10 sectors, and further subdivided into subsectors and segments.

Link to BM&F Bovespa Industry Classifications
http://www.bmfbovespa.com.br/cias-listadas/empresas-listadas/BuscaEmpresaListada.aspx?Opcao=1&Idioma=en-us

CURRENCY EXCHANGE RATE

Clearly, trading a spread between indices of two different countries with different currencies adds a degree of complexity to the trade, especially for longer duration or larger position trades. Observations indicate that there may be a tendency for the Ibovespa and the Brazilian Real to move in the same direction approximately 70 percent of the time.

Please see the ***Risk Considerations*** section in this paper for further discussion on the currency rate and how it impacts the spread trade.

INDEX METHODOLOGY

STANDARD AND POOR'S 500 INDEX (S&P 500 Index)

The S&P 500 Index is a capitalization-weighted, float-adjusted index. The S&P 500 Index is calculated as the sum of the constituent's float-adjusted market capitalization divided by the S&P 500 Divisor.

A capitalization-weighted index measures the market capitalization of all the stocks in the index, rather than just the stock prices. The market capitalization of a stock refers to the value of the stock price multiplied by the number of shares outstanding.

"Float-adjusted" refers to shares. When calculating a capitalization-weighted, float-adjusted index, only those shares available to investors are counted. This will be less than a company's total outstanding shares. Shares held by government agencies, closely held groups and others are not counted.

BOVESPA INDEX (IBOVESPA)

The Bovespa Index, or Ibovespa, is a total return index weighted by traded volume and is comprised of the most liquid stocks traded on the BM&F,Bovespa. The Ibovespa reflects not only the variation of the stock prices but also the impact of the distribution of benefits, and is considered an indicator that evaluates the total return of its components stocks.

Spread Methodology

Introduction on Spread Trading

The term "spread trading" is often applied broadly and can encompass a wide array of different relationship trades, from true arbitrage trades to spreading of different asset classes. It may be helpful to illustrate where the S&P 500 vs. Ibovespa index spread would be in this spectrum.

Arbitrage - The simultaneous buying and selling of a security at two different prices in two different markets, resulting in profits. Perfectly efficient markets present no arbitrage opportunities. Perfectly efficient markets seldom exist, but arbitrage opportunities are often precluded because of transactions costs. (*Source: Bloomberg*). An example could be buying and selling a security on two different ECN networks, or foreign exchange arbitrage between different banks. Arbitrage can also include stock index arbitrage, which is the specific trading of a stock index futures contracts against a basket of the underlying stocks in that same index. Another variant of index arbitrage is the spreading of stock index futures against the exchange traded fund (ETF) based on the same underlying index.

Single Component Spreads – Examples can be divided into two basic types, similar or non-similar. *Similar single component spreads* can be stocks of integrated oil majors for example, such as trading the spread between two oil companies. While they may be two different companies but they are in the same specific subset of the energy sector. Another example could be spreading between different classes of wheat in the futures markets. Examples of *non-similar single component spreads* could be the spreads between gold vs. platinum, gold vs. silver, ethanol vs. gasoline, and so on.

Multiple Components - Index Spreads – Trading the spread between two different indexes is another type of spread trading. Depending on the nature of the indexes, the spread could be more or less complicated than trading single component spreads. For stock index markets, the spread between the S&P 500 and Ibovespa indices is an example of a spread with moderate correlations. However, there are still risks involved in spread trading, and it is possible for a spread to have higher risk than the outright components for brief periods of time. Even for the S&P 500 vs Ibovespa spread, as viewed in the historical rolling correlation charts in the latter part of this paper, there are certainly moments when the markets have very low correlations. So, even though the S&P 500 and Ibovespa may show a correlation above 70 percent from time to time, traders must acknowledge and manage the potential risks in this spread.

Pricing the Spread as a Ratio[2]

With many traditional spreads, the "spread price" or "spread value" would simply be equal to A minus B. For example, consider a spread involving two stocks between Company A and Company B. On December 5, 2008, Company A closed at 76.60 and Company B closed at 74.42, with the resultant spread being $2.18. Another example would be the spread between Chicago Wheat futures vs. Kansas City Wheat futures. On December 5, 2008, their closing prices (for March 2009 futures) were $4.755 and $5.0325 respectively, so KC was trading at a premium of $0.2775 to Chicago. Trying to use this convention for the E-mini S&P 500 futures vs. Ibovespa futures spread would be impractical.

A trader could also try taking the difference between the notional values but this would result in a "spread price" that would vary significantly and could be awkward to view. For example, using the notional values for September 22, 2009, the spread price would be $18,936. During the period from January 2006 through September 2009, the range of the spread price was $51,680 to $16,900. *Note we are using FX adjusted notional values in order to have a true notional ratio.*

However, using a ratio (E-mini S&P 500 futures notional value / (Ibovespa futures notional value / BRL)) of the respective notional dollar values of the futures contracts results in a more stable looking "spread price" for traders to analyze and view – i.e., a "Spread Ratio." For example, using the notional values for October 6, 2009, the spread price would be 1.4689. During the period from January 2006 through September 2009, the range of the spread price was 4.3570 to 1.4933.

The S&P 500 and Ibovespa indexes are not only calculated using different methodologies; they are also at very different price levels. For example, on October 6, 2009, the December 2009 E-mini S&P 500 futures settled at 1048.50 while the October 2009 Ibovespa futures settled at 62800. They also have different futures "multipliers," resulting in different dollar notional values. And finally, they are traded in different currencies, which is a very important topic we shall address. While there is no single method to price a spread, we will use a convention based on the ratio of dollar notional value for both pricing a spread and also helping to determine the optimal ratio of contracts to buy and sell (depending on a trader's risk profile).

Calculating the Spread Price for October 6, 2009:

(E-mini S&P 500 futures price * $50) / ((Ibovespa futures * R$1)/R$ exchange rate)
Using the closing values of October 6, 2009, the E-mini S&P 500 futures had a notional value of $52,425 (1048.50 x $50) and the Ibovespa futures had a notional value of $35,690 ((62,800 x R$1)/1.7596.

FX Adjusted Ratio = $52,425 / $35,690 = 1.4689

Calculating the Spread Ratio

Note: Examples in this guide use the S&P 500 and Ibovespa indexes. Buying the spread means buying the E-mini S&P 500 futures contract and selling the Ibovespa futures contract, and selling the spread means selling the E-mini S&P 500 contract and buying the Ibovespa.

For example, if a trader expects the S&P 500 to outperform the Ibovespa (either up or down regardless of time frame), the trader may "buy the spread" – buy the E-mini S&P 500 contract and sell the Ibovespa contract. If the spread ratio was at 1.4980, the trader who bought the spread would be looking to sell it for a ratio above 1.4980.

[2] Obviously there are as many ways to look at spreads as there are traders. Some traders may prefer a convention using the ratio, while others prefer the simple difference in notional values. See the following pages on monitoring the spread.

When trading the spread between the E-mini S&P 500 and the Ibovespa futures, the different index levels, their respective multipliers and the BRL exchange rate need to be taken into account. Ideally, a spread ratio which closely balances the USD notional values of the contracts should be used, so that the net effect of market movements is captured more precisely. This can be called a “dollar neutral” spread when it is initiated.

Note: When trading the Ibovespa futures contract, the minimum trading quantity is 5 contracts.

Historical Year End Ratios

S&P 500 vs. Ibovespa Spread Ratio Year-End Calculations

	A	B	C	D	E	F	G	H
Year End	S&P 500	E-mini S&P 500 futures - $notional	Ibovespa	Ibovespa futures - Notional - nonFX	Spread Ratio - Raw	BRL FX rate	Ibovespa futures- Notional - FX ADJ	Spread Ratio - FX Adj
		= A x $50		= C x BRL1	= B / D		= C / F	= B / G
1999	1469.25	$73,463	17091.60	BRL 17,092	4.29816	1.79900	$9,501	7.73240
2000	1320.28	$66,014	15259.29	BRL 15,259	4.32615	1.95000	$7,825	8.43600
2001	1148.08	$57,404	13577.57	BRL 13,578	4.22786	2.31050	$5,876	9.76846
2002	879.82	$43,991	11268.47	BRL 11,268	3.90390	3.54000	$3,183	13.81981
2003	1111.92	$55,596	22236.39	BRL 22,236	2.50023	2.89150	$7,690	7.22940
2004	1213.75	$60,688	26196.25	BRL 26,196	2.31665	2.65600	$9,863	6.15302
2005	1248.29	$62,415	33455.94	BRL 33,456	1.86557	2.33550	$14,325	4.35705
2006	1418.30	$70,915	44473.71	BRL 44,474	1.59454	2.13640	$20,817	3.40657
2007	1468.36	$73,418	63886.10	BRL 63,886	1.14920	1.78000	$35,891	2.04558
2008	903.25	$45,163	37550.31	BRL 37,550	1.20272	2.31450	$16,224	2.78369
30-Sep-09	1057.08	$52,854	61517.89	BRL 61,518	0.85916	1.76700	$34,815	1.51814

Trading the Spread as a Ratio*

Additionally, traders must also decide on the “quantity ratio” when actually trading the spread. How many contracts of the respective index futures do you buy and sell? Using the ratio of 1.50 as an example, since the notional value of the E-mini S&P 500 is 1.50 times larger than the FX adjusted notional of the Ibovespa, you would need to trade 1.50 Ibovespa contracts for every one E-mini S&P 500 futures contract. Note that since the minimum order size for Ibovespa futures is 5 contracts, this would lead to trading 7.5 Ibovespa to 5 E-mini S&P 500 contracts, or to make it whole, the order should be 15 to 10.

“Buying the spread”
10 x 15 ratio = Buy 10 contracts E-mini S&P 500 – Sell 15 contracts Ibovespa

“Selling the spread”
10 x 15 ratio = Sell 10 contracts E-mini S&P 500 – Buy 15 contracts Ibovespa

**** See Risk Considerations concerning currency and volatility adjustments***

Spread Ratio – Trading "Dollar Neutral"

Note: This is a critical point - even for short-term traders – Given the market's extreme volatility during the last four months of 2008, during that period of time daily net percentage moves in excess of 5 percent were not uncommon. So, even though a trader may be correct in their assessment of the spread's direction, if they were not "dollar neutral" when the trade was initiated, the spread trade could easily show a loss. The objective is to trade a spread in a dollar neutral ratio at initiation – the trader will either make or lose money based on net percentage moves that differ between the S&P 500 and the Ibovespa (along with the currency). If both these indexes have exactly the same percentage move, and the currency is unchanged, and the spread trade was done in a dollar neutral ratio, then regardless of the extent of the percentage move that day, the spread trade should show little or no profit/loss. [3]

Monitoring the Spread and Trade Execution

There are two further hurdles that need to be addressed before a trader can start actively trading the S&P 500 vs. Ibovespa spread: Namely, how to monitor the spread, and then how to execute the trade.

Monitoring the Spread

A dynamic link into Excel allows a trader to set up the spread quote and monitor it on a real time basis along with the underlying index futures. Because this is a calculated spread, a trader must set up a user defined quote, either in a software front end system or in a program such as Excel that allows for a dynamic data link. It is extremely difficult, if not impossible, to monitor the spread by simply looking at the movements of the underlying futures contracts.

Trade Execution

Trading tactics for entering and exiting a spread trade need to be considered and planned out ahead of time:

- The spread between the E-mini S&P 500 futures and the Ibovespa futures is not a "pre-defined" spread on the CME Globex trading platform. That means traders need to trade each leg of the spread separately instead of in just one transaction. Trading a spread by "legging" the two sides can entail some execution risk. Even though the individual sides of this spread are extremely liquid, and during the vast majority of time the individual bids and offers are at just one tick, traders need to take into account the potential risk of having to "chase" one of the sides of the spread. Again, given the normal levels of liquidity and volume, even if a trader had to "give up both edges," i.e., selling the bid side and buying the offer side, this may be preferable given the risks of trying to buy the bid or sell the offer, which for stock index futures is an extremely difficult, if not impossible task.

- Another option that a trader can consider is using a so-called "auto spreader," which is a built-in function provided by many software firms offering trading systems. The auto spreader can be used to have the computer automatically enter the order to trade both sides of the spread simultaneously once a predetermined spread level is reached.

The following information is from the CME Group website, www.cmegroup.com/globex, and provides further details for traders interested in learning more about electronic trading on the CME Globex platform:

[3] Traders can expect to see some residual P+L even if they are trading a dollar neutral ratio and both the S&P 500 and Ibovespa move by the exact same percentage amount, since the true ratio is likely a fraction and futures are traded in full contracts.

The CME Globex platform is designed with an open architecture that accommodates a wide variety of trading and market data interfaces. If you need a front-end trading system, you can:

- Develop your own
- Purchase one from an independent software vendor (ISV)
- Use an application provided by a broker, data center, proprietary trading group, trading arcade or clearing firm

The CME Globex Access Directory (PDF)[4] lists all the companies that provide trading and market data applications that are certified for compliance with CME Globex. These companies also are committed to keeping current with platform enhancements and changes to CME interfaces and functionality. Many also offer network access in addition to front-end trading applications.

Sector Weightings Analysis

Industry Classifications

S&P 500

Standard and Poor's uses the Global Industry Classifications Standard (GICS)

Ibovespa

Source: BM&FBovespa

Industry Classification Structure of BOVESPA Listed Companies and Funds
The new structure was created considering mainly the use and kind of products or services developed by companies for the purposes below:

- Provide a clear identification of the companies sectors from the first level of the structure;
- Permit an overview of the companies that, even though performing different activities, belong to the same production chain or produce related products/services and show similar responses to economic conditions;
- Facilitate the localization of listed companies´ activity sectors; and
- Approximate the new classification to the criteria adopted by several institutions in domestic and international financial markets.

For companies classification we have examined the contribution of the products or services for the constitution of the revenue, considering the subsidiaries revenue too. For Holding Companies we considered the contribution of each sector in the consolidated revenue, as follows:

- if one sector represents 2/3 or more of the total revenue, the company is registered in that sector;
- if no sector has a significant participation in the revenue, the company is classified as a diversified holding.

The industry classification structure and the companies´ classification will be revised regularly. In case of change in the revenue composition, it will be analyzed if the change is a trend before making the reclassification. The link is:

http://www.bmfbovespa.com.br/cias-listadas/empresas-listadas/BuscaEmpresaListada.aspx?Opcao=1&Idioma=en-us

[4] The CME Group Globex Access Directory can also be found on the following direct link - http://www.cmegroup.com/globex/files/GAD.pdf

Sector Comparisons

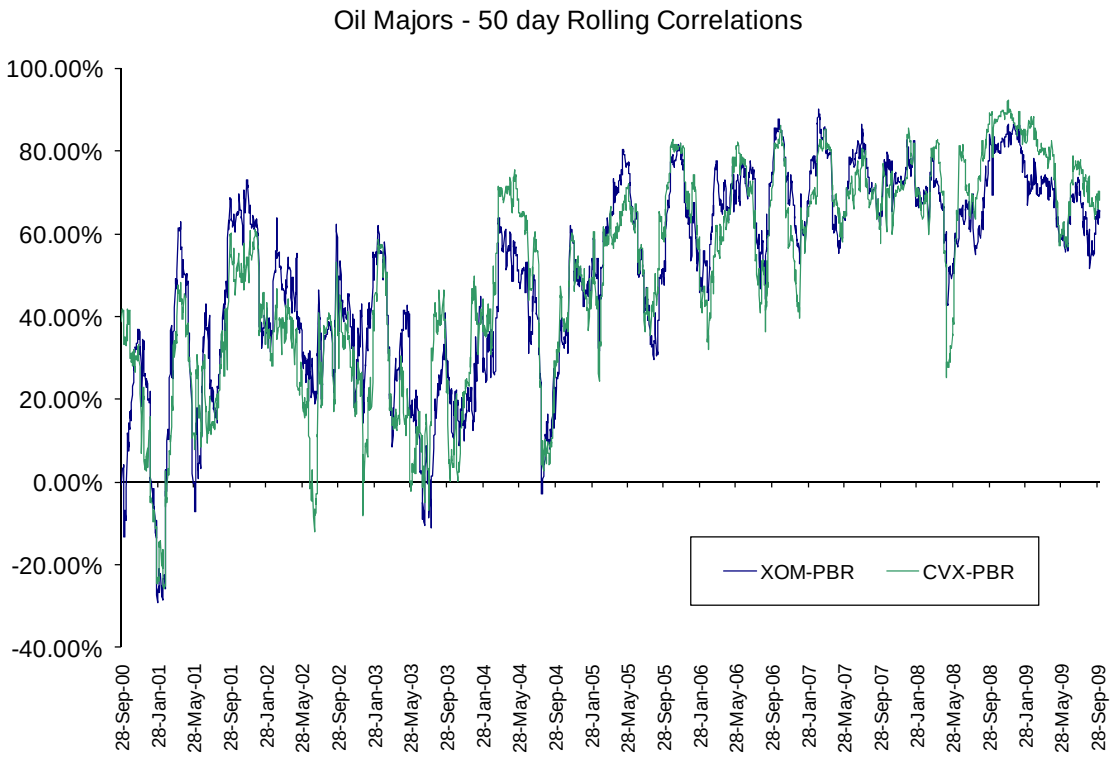
Sector Comparison: S&P 500 vs. Ibovespa

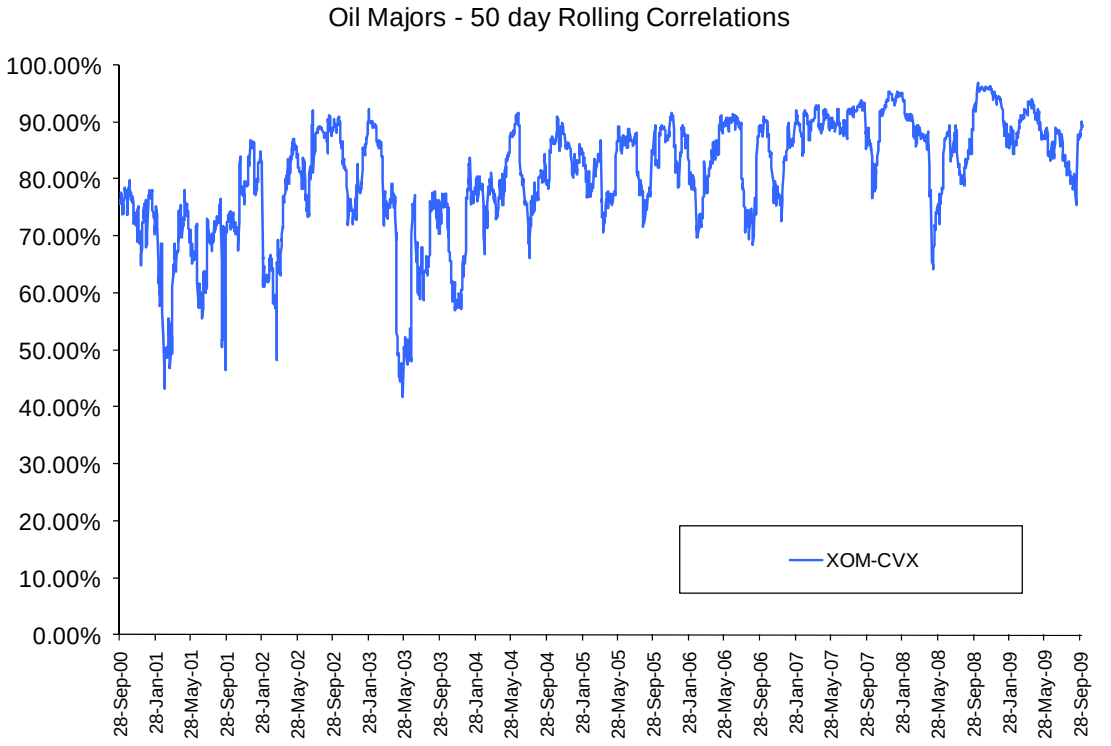
Main Ibovespa Sectors*		Main S&P 500 Sectors**	
Oil & Gas	19.27%	Energy	12.40%
Basic Materials	31.02%	Basic Materials	3.20%
Financial	21.97%	Financial	13.60%
Construction & Transportation	6.03%	Industrials	9.90%
Consumer Non Cyclical	6.34%	Consumer Discretionary	9.00%
Consumer Cyclical	3.22%	Consumer Staples	12.00%
Information Technology	0.00%	Information Technology	18.30%
Telecommunications	4.32%	Telecommunications	3.50%
Utilities	7.16%	Utilities	4.10%
Capital Goods and Services	0.67%	Health Care	14.00%
	100.00%		**100.00%**

**Industry Classifications: Bovespa* ***GICS*

As the table illustrates, there is a significant variance in the sector breakdown between the Ibovespa and S&P 500 indices. Energy and basic materials account for 50.29 percent of the Ibovespa, compared to 29.20 percent for the S&P 500 Index. Information technology and health care account for 32.30 percent of the S&P 500 but have zero representation in the Ibovespa. On trading days where we see a significant move in some of these sectors vis-à-vis the overall market, we can expect to see exaggerated divergence.

The following charts show the rolling 50-day correlations among the major energy stocks in both indexes. With energy playing a significant role in each (PBR is the largest stock by weight in the Ibovespa), it is interesting to see the increasing correlation during the past 5 years between PBR and both XOM and CVX.


Oil Majors - 50 day Rolling Correlations
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
-20.00%
-40.00%
XOM-PBR
CVX-PBR
28-Sep-00
28-Jan-01
28-May-01
28-Sep-01
28-Jan-02
28-May-02
28-Sep-02
28-Jan-03
28-May-03
28-Sep-03
28-Jan-04
28-May-04
28-Sep-04
28-Jan-05
28-May-05
28-Sep-05
28-Jan-06
28-May-06
28-Sep-06
28-Jan-07
28-May-07
28-Sep-07
28-Jan-08
28-May-08
28-Sep-08
28-Jan-09
28-May-09
28-Sep-09


Oil Majors - 50 day Rolling Correlations
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
XOM-CVX
28-Sep-00
28-Jan-01
28-May-01
28-Sep-01
28-Jan-02
28-May-02
28-Sep-02
28-Jan-03
28-May-03
28-Sep-03
28-Jan-04
28-May-04
28-Sep-04
28-Jan-05
28-May-05
28-Sep-05
28-Jan-06
28-May-06
28-Sep-06
28-Jan-07
28-May-07
28-Sep-07
28-Jan-08
28-May-08
28-Sep-08
28-Jan-09
28-May-09
28-Sep-09

Risk Considerations

Currency Risk

Daily data is examined from January 2000 through September 2009, with a total of 2,477 observations. During 68.5 percent of days, IBOV and BRL (BRL/USD for comparison purposes) moved in the same direction (70.01 percent of up days and 66.84 percent of down days).

For very short term trades and those of small quantity this may not be of concern; for larger positions and for longer duration trades, however, especially for position trades over one day, this certainly can be a serious issue. Traders must take this risk into account.

For example, a position of long 15 Ibovespa futures and short 10 E-mini S&P 500 futures – if both markets are up, along with BRL/USD higher (i.e., USD/BRL is weaker) – in this scenario, the positive long open position in Ibovespa would have the extra benefit of the USD getting weaker. The opposite would be true for both indexes going down and the USD rising higher. Therefore, for longer term trading positions, a trader must be ready to hedge the foreign exchange risk imbedded in the open trade equity.

Potential for Compounded Risk with Currency Move

Total Observations: Jan. 2000 ~ Sept. 2009 = **2477**

I+B Up Days = (IBOV and BRL/USD up)		**I+B Down Days** = (IBOV and BRL/USD down)	
Ibov Up days	1337	Ibov Down days	1140
BRL/USD Up days	1314	BRL/USD Down days	1163
SPX Up Days	1328	SPX Down Days	1149
I+B Up Days	936	**I+B Down Days**	762
Percent I+B Up vs Ibov Up	**70.01%**	*Percent I+B Down vs Ibov Down*	**66.84%**
Up Moves Results		*Down Moves Results*	
IBOV average up move	1.43%	IBOV average down move	-1.52%
BRL/USD average up move	0.72%	BRL/USD average down move	-0.80%
SPX average up move	0.85%	SPX average down move	-1.00%

Volatility Risk

Another issue is the underlying volatility of the indexes. The Ibovespa has an average 20 day historical volatility which is approximately 1.5 times greater than the S&P 500. The "up" days are higher and the "down" days are lower for Ibovespa.

Potential for Compounded Risk with Volatility

Average 20 day Historical Volatility

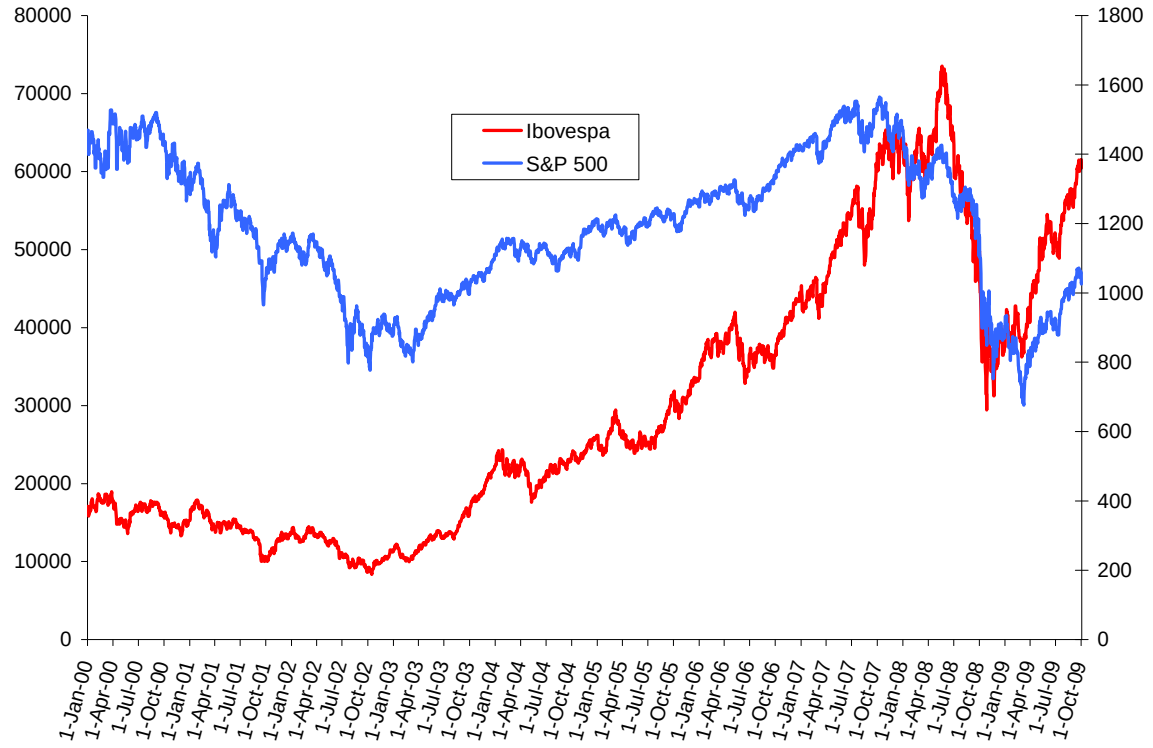
	S&P 500	Ibovespa	Ibov / SPX
2000-2009	18.79%	29.60%	1.58
2006-2009	21.35%	31.48%	1.47

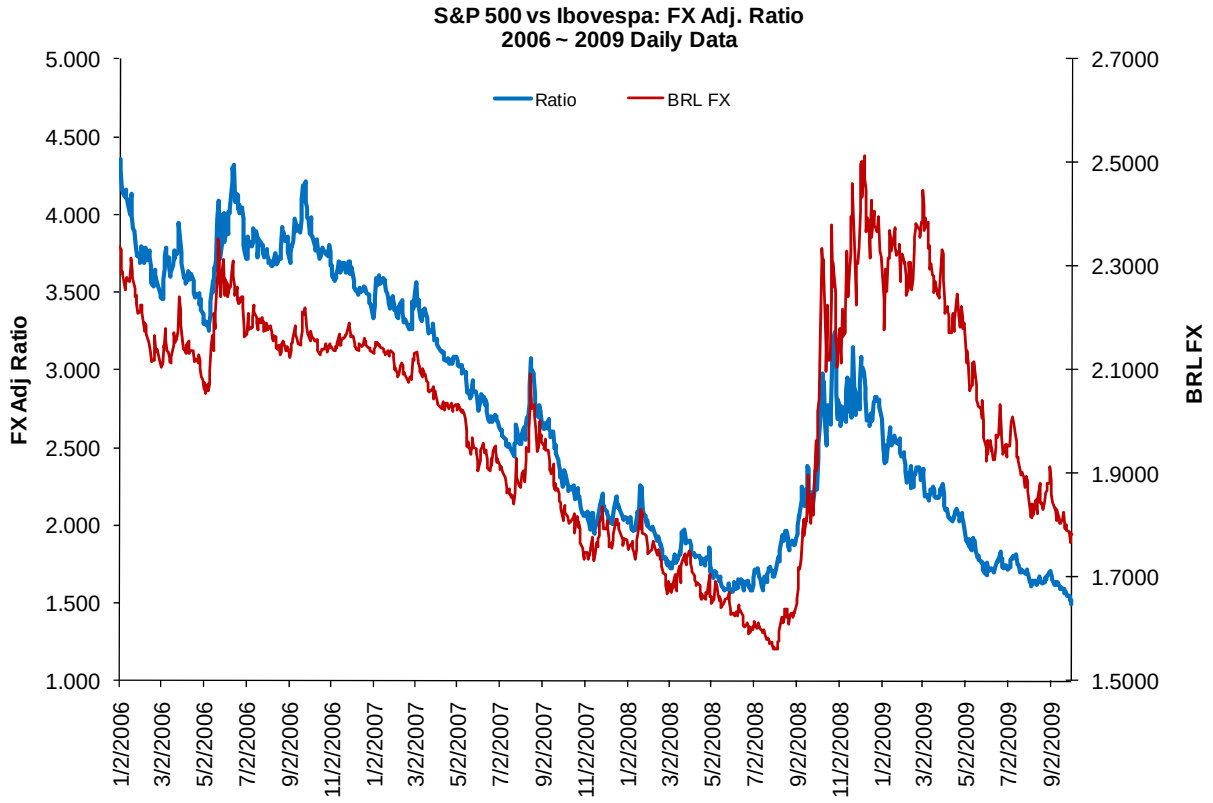
NOTE*: Given both the currency and volatility risks described above – i.e., a trade of long Ibovespa and short E-mini S&P 500 benefits by **both** the weakening USD and the higher average volatility – while a trade of short Ibovespa and long E-mini S&P 500 benefits by the strengthening USD but is hurt by the higher average volatility.

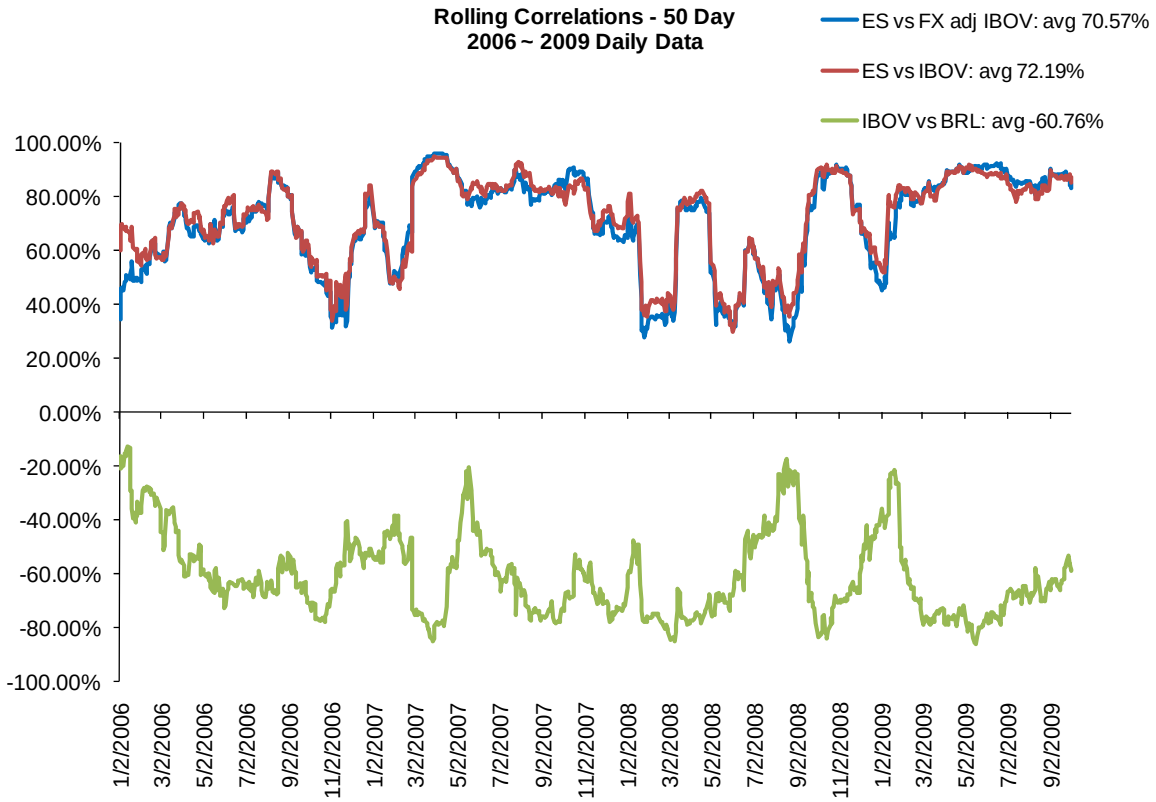
** For a more detailed examination of the complexities of the currency and volatility impact, please refer to the separate paper entitled "Spread Trading US and Brazilian Stock Index Futures" by Richard Co of CME Group. Richard can be contacted at richard.co@cmegroup.com .*

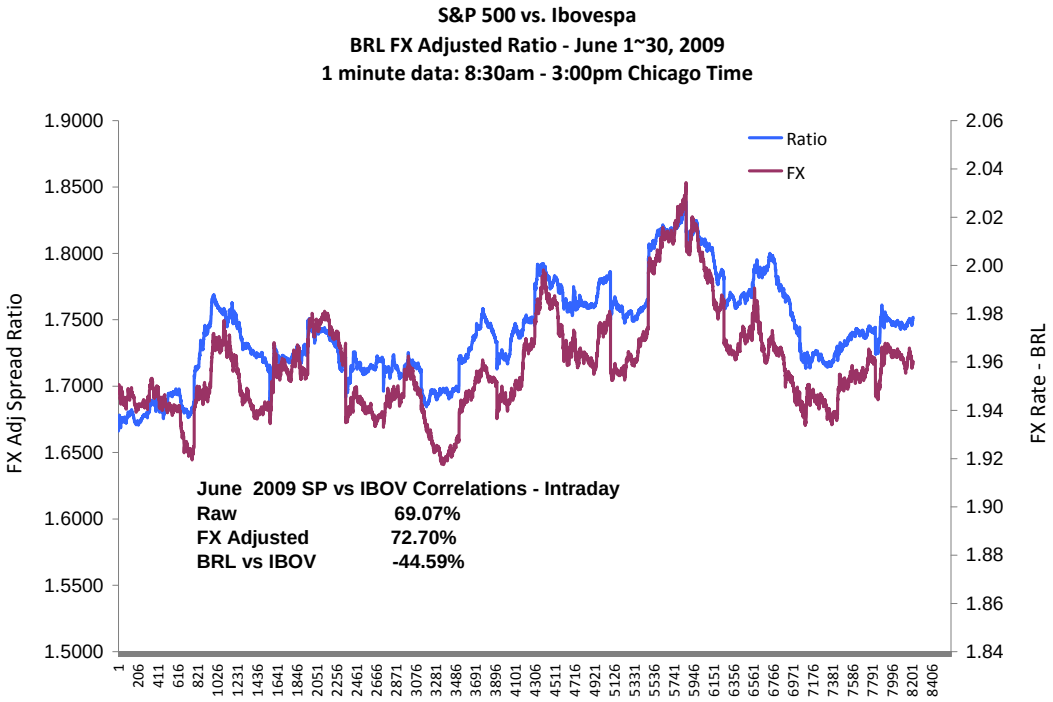
Spread Analysis

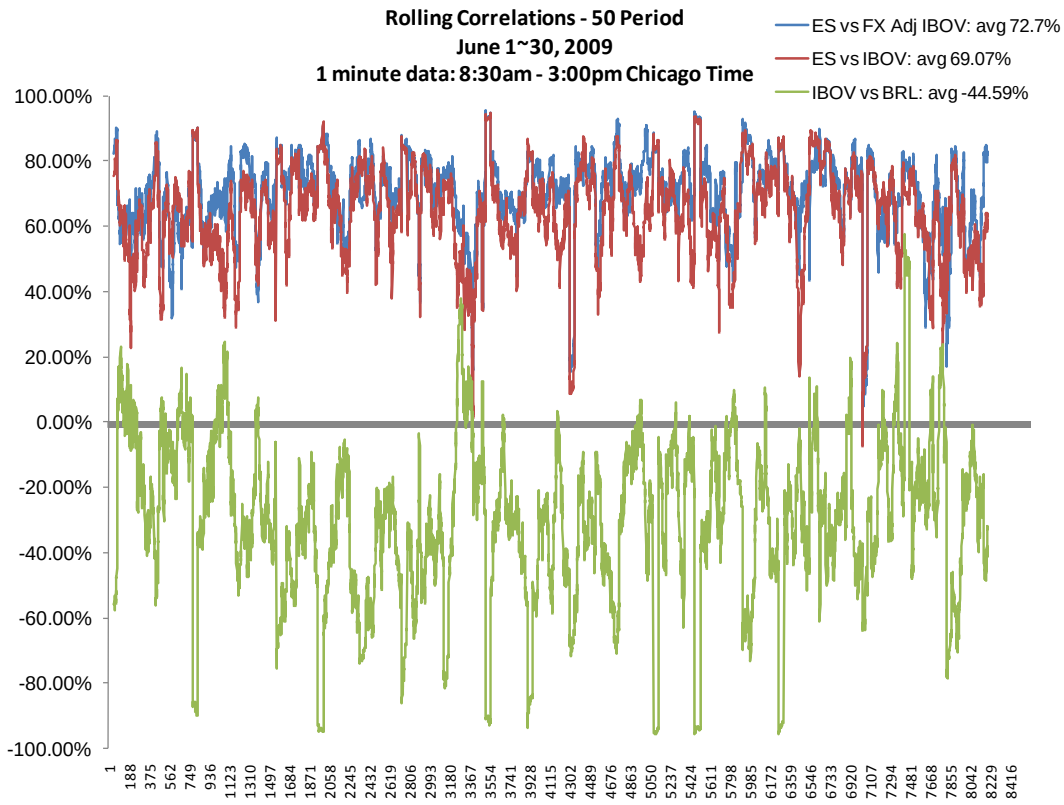
The Spread Analysis section that follows over the next several pages will review the spread over various time periods. The chart below helps to illustrate the magnitude of price ranges for the underlying indexes since January 2000. The following pages illustrate the spread relationships on a daily basis since 2006, and then into further detail using one-minute data during four monthly periods from June 2009 through September 2009, and finally a few individual trading day details for September 2009.

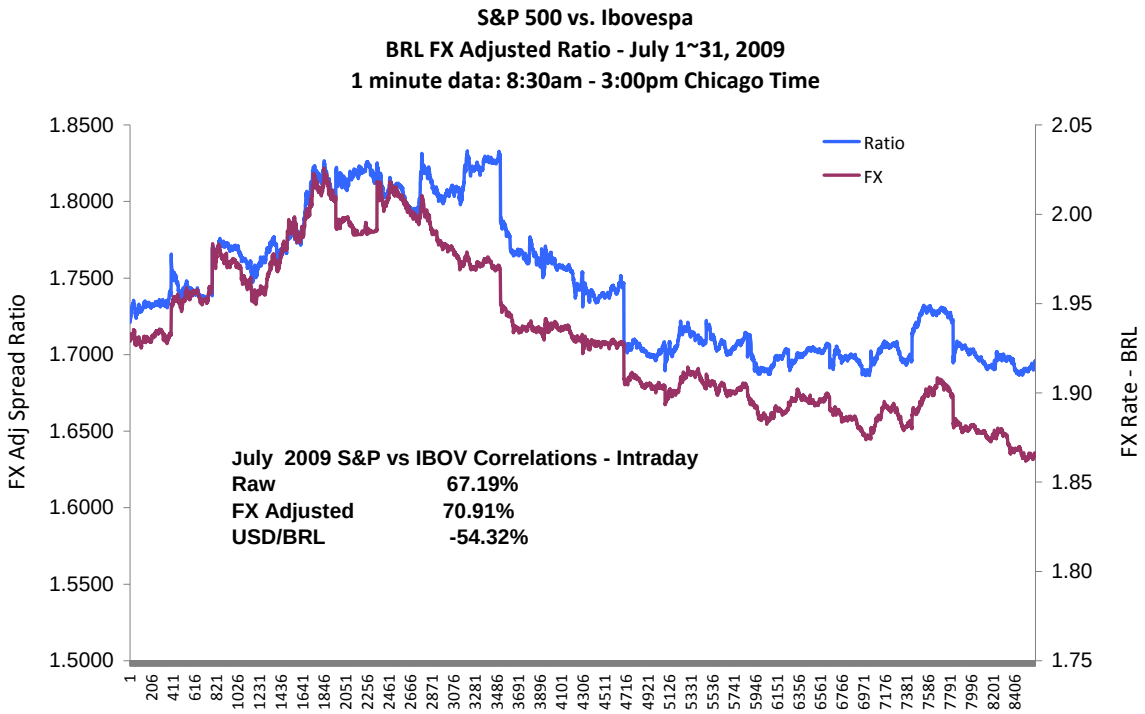


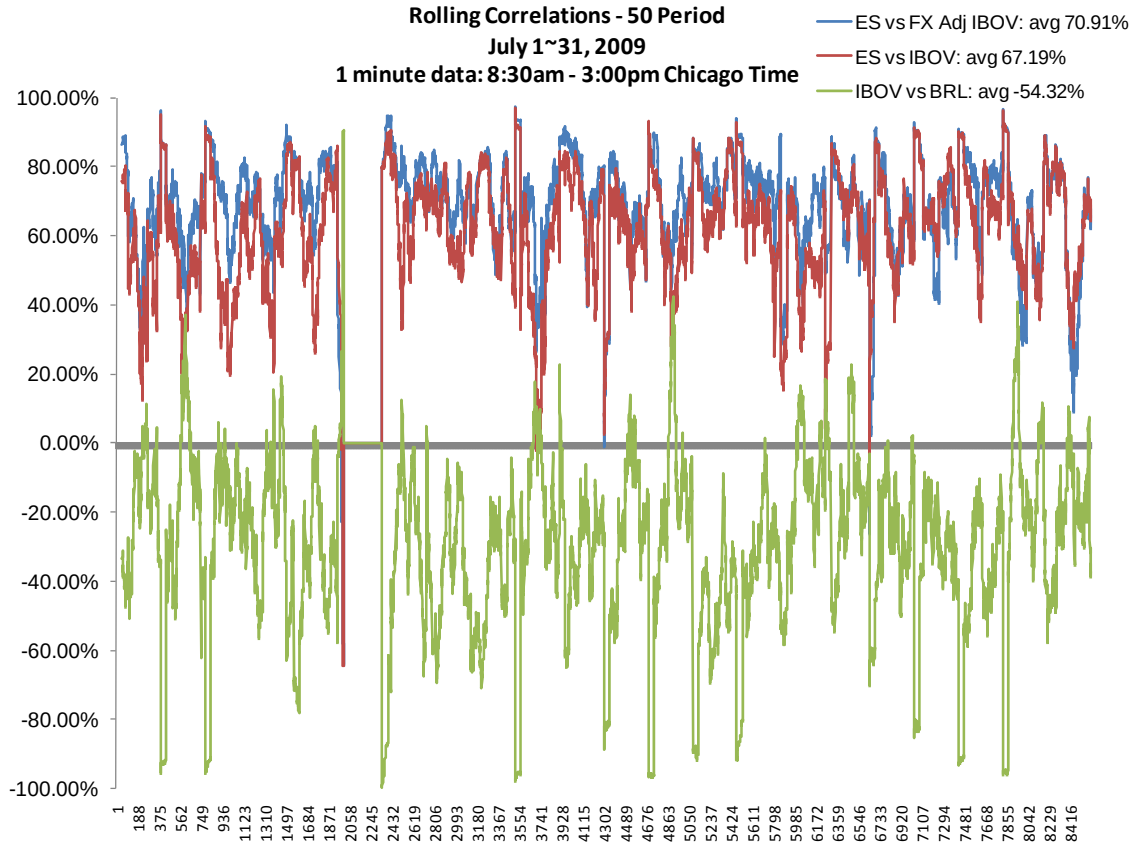

S&P 500 vs Ibovespa: FX Adj. Ratio
2006 ~ 2009 Daily Data
Ratio
BRL FX
FX Adj Ratio
BRL FX
5.000
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
2.7000
2.5000
2.3000
2.1000
1.9000
1.7000
1.5000
1/2/2006
3/2/2006
5/2/2006
7/2/2006
9/2/2006
11/2/2006
1/2/2007
3/2/2007
5/2/2007
7/2/2007
9/2/2007
11/2/2007
1/2/2008
3/2/2008
5/2/2008
7/2/2008
9/2/2008
11/2/2008
1/2/2009
3/2/2009
5/2/2009
7/2/2009
9/2/2009

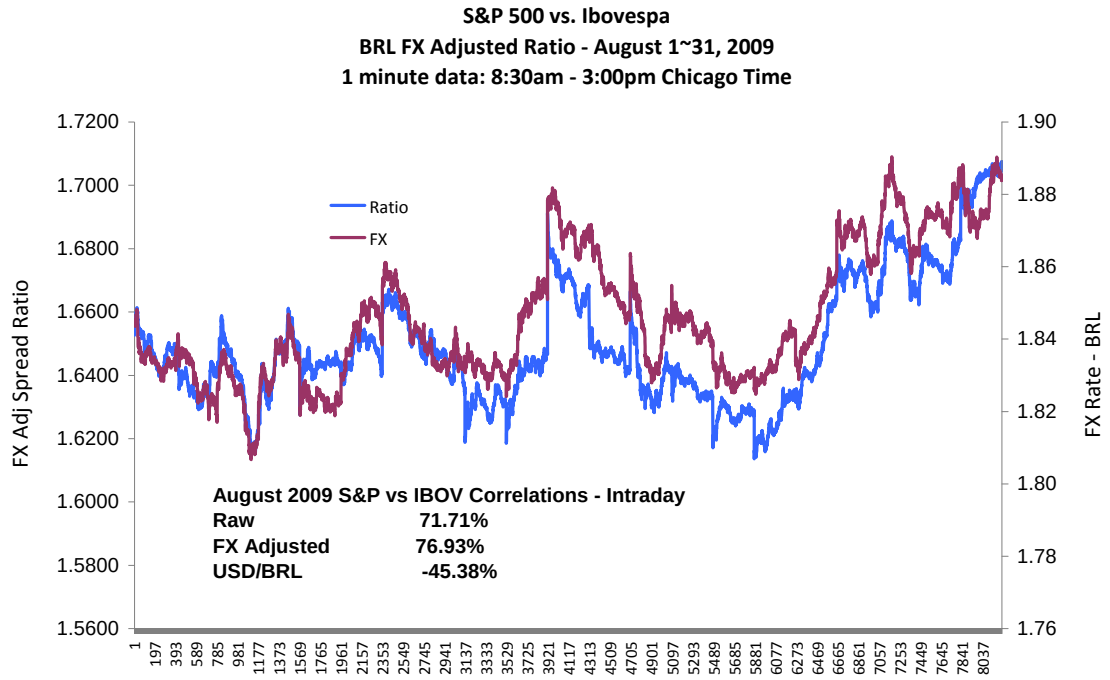

Rolling Correlations - 50 Day
2006 ~ 2009 Daily Data
ES vs FX adj IBOV: avg 70.57%
ES vs IBOV: avg 72.19%
IBOV vs BRL: avg -60.76%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
-20.00%
-40.00%
-60.00%
-80.00%
-100.00%
1/2/2006
3/2/2006
5/2/2006
7/2/2006
9/2/2006
11/2/2006
1/2/2007
3/2/2007
5/2/2007
7/2/2007
9/2/2007
11/2/2007
1/2/2008
3/2/2008
5/2/2008
7/2/2008
9/2/2008
11/2/2008
1/2/2009
3/2/2009
5/2/2009
7/2/2009
9/2/2009

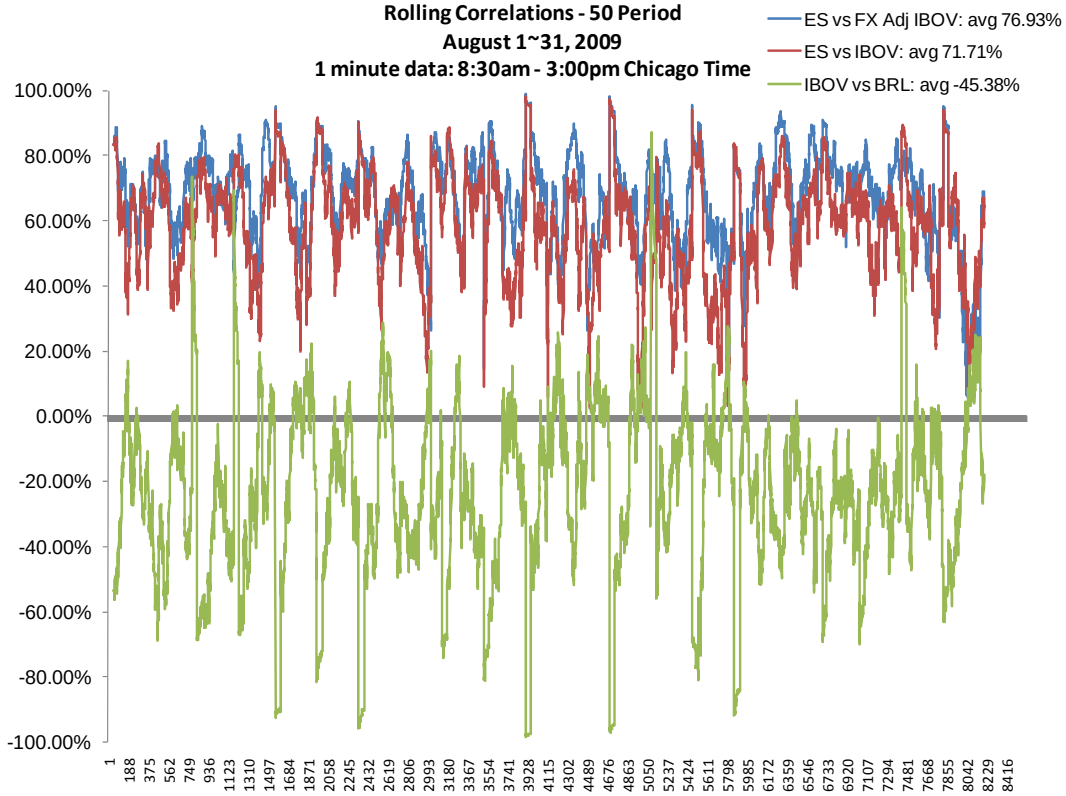

S&P 500 vs. Ibovespa
BRL FX Adjusted Ratio - June 1~30, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
Ratio
FX
FX Adj Spread Ratio
FX Rate - BRL
1.9000
1.8500
1.8000
1.7500
1.7000
1.6500
1.6000
1.5500
1.5000
2.06
2.04
2.02
2.00
1.98
1.96
1.94
1.92
1.90
1.88
1.86
1.84
June 2009 SP vs IBOV Correlations - Intraday
Raw 69.07%
FX Adjusted 72.70%
BRL vs IBOV -44.59%
1 206 411 616 821 1026 1231 1436 1641 1846 2051 2256 2461 2666 2871 3076 3281 3486 3691 3896 4101 4306 4511 4716 4921 5126 5331 5536 5741 5946 6151 6356 6561 6766 6971 7176 7381 7586 7791 7996 8201 8406

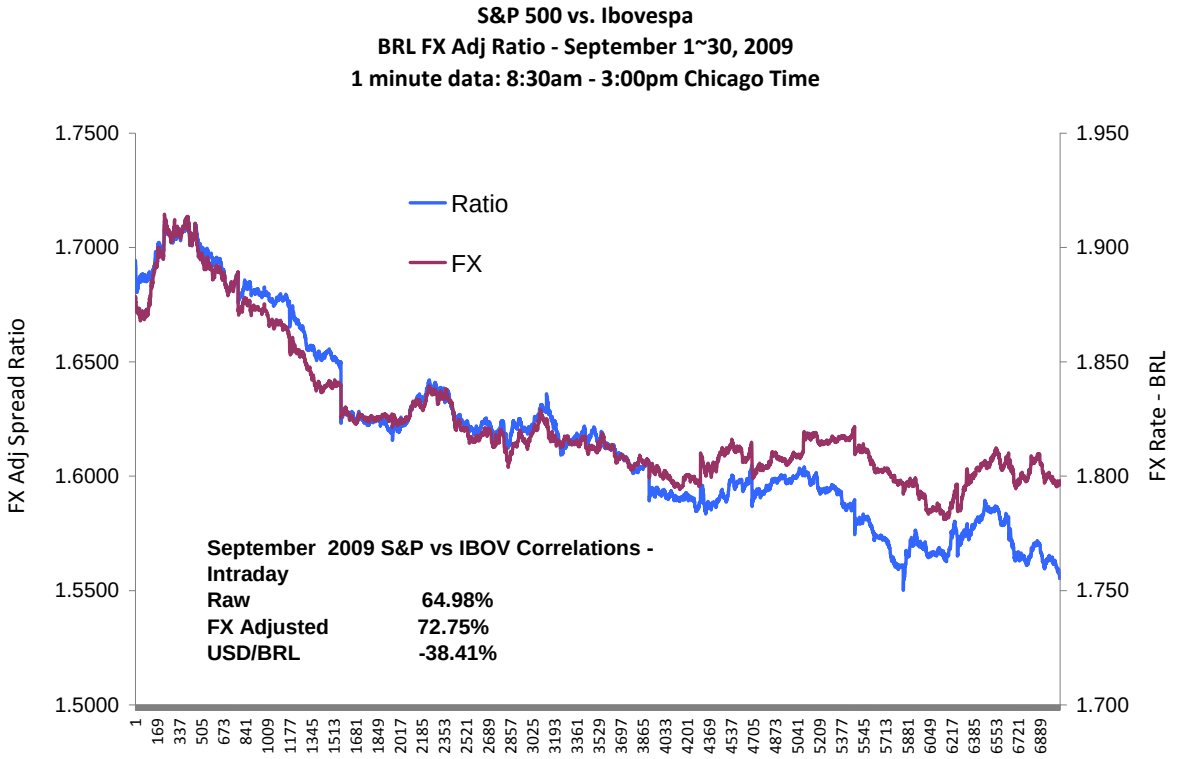

Rolling Correlations - 50 Period
June 1~30, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
ES vs FX Adj IBOV: avg 72.7%
ES vs IBOV: avg 69.07%
IBOV vs BRL: avg -44.59%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
-20.00%
-40.00%
-60.00%
-80.00%
-100.00%
1 188 375 562 749 936 1123 1310 1497 1684 1871 2058 2245 2432 2619 2806 2993 3180 3367 3554 3741 3928 4115 4302 4489 4676 4863 5050 5237 5424 5611 5798 5985 6172 6359 6546 6733 6920 7107 7294 7481 7668 7855 8042 8229 8416

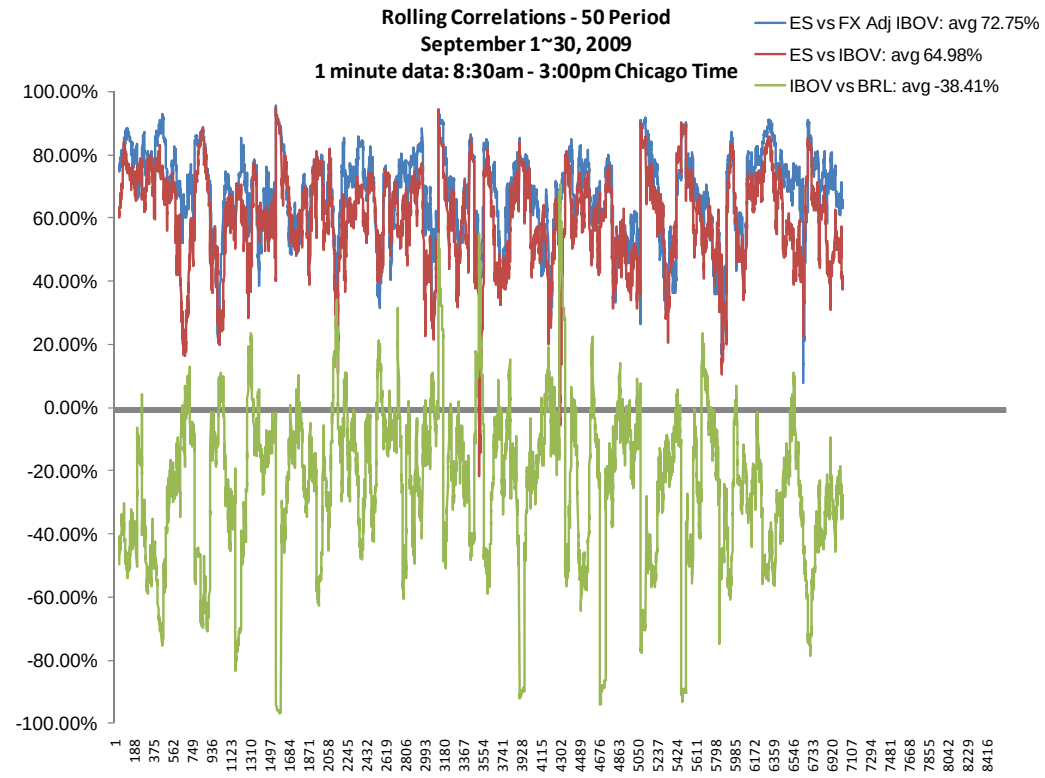

S&P 500 vs. Ibovespa
BRL FX Adjusted Ratio - July 1~31, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
Ratio
FX
FX Adj Spread Ratio
FX Rate - BRL
July 2009 S&P vs IBOV Correlations - Intraday
Raw 67.19%
FX Adjusted 70.91%
USD/BRL -54.32%

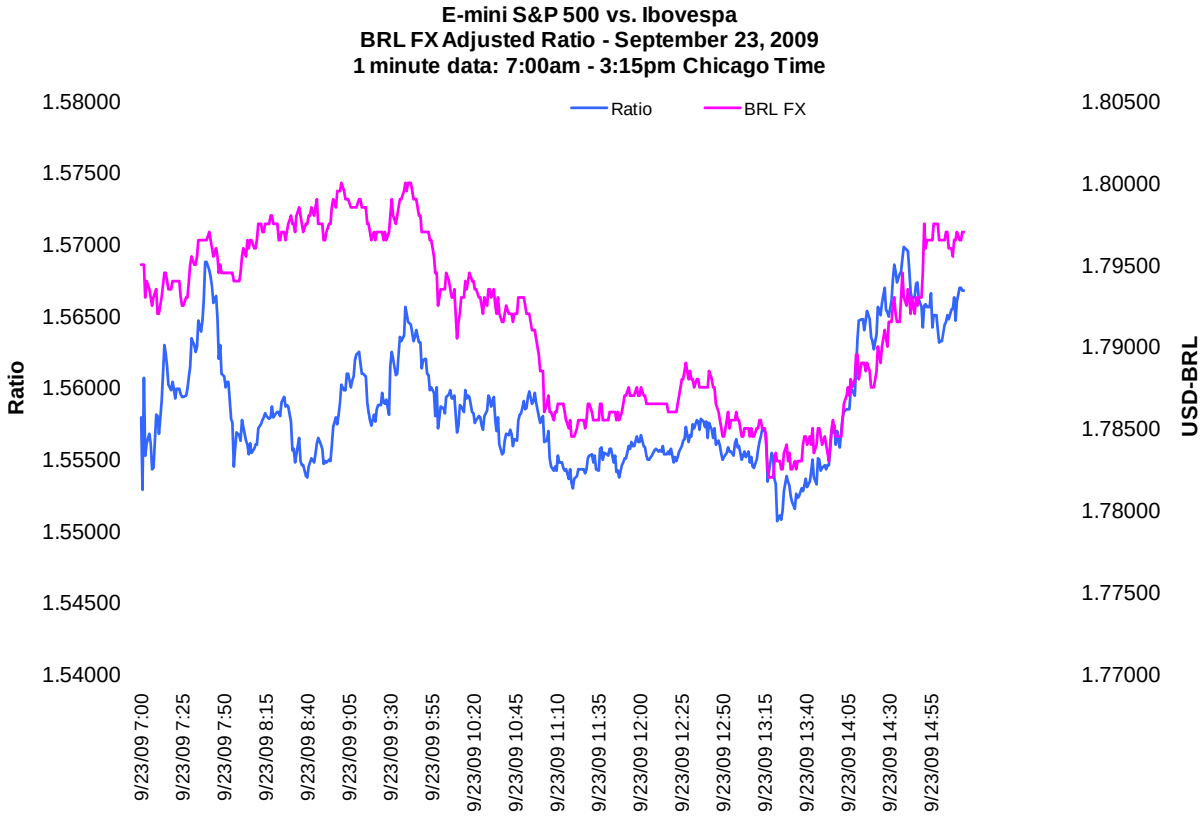

Rolling Correlations - 50 Period
July 1~31, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
ES vs FX Adj IBOV: avg 70.91%
ES vs IBOV: avg 67.19%
IBOV vs BRL: avg -54.32%

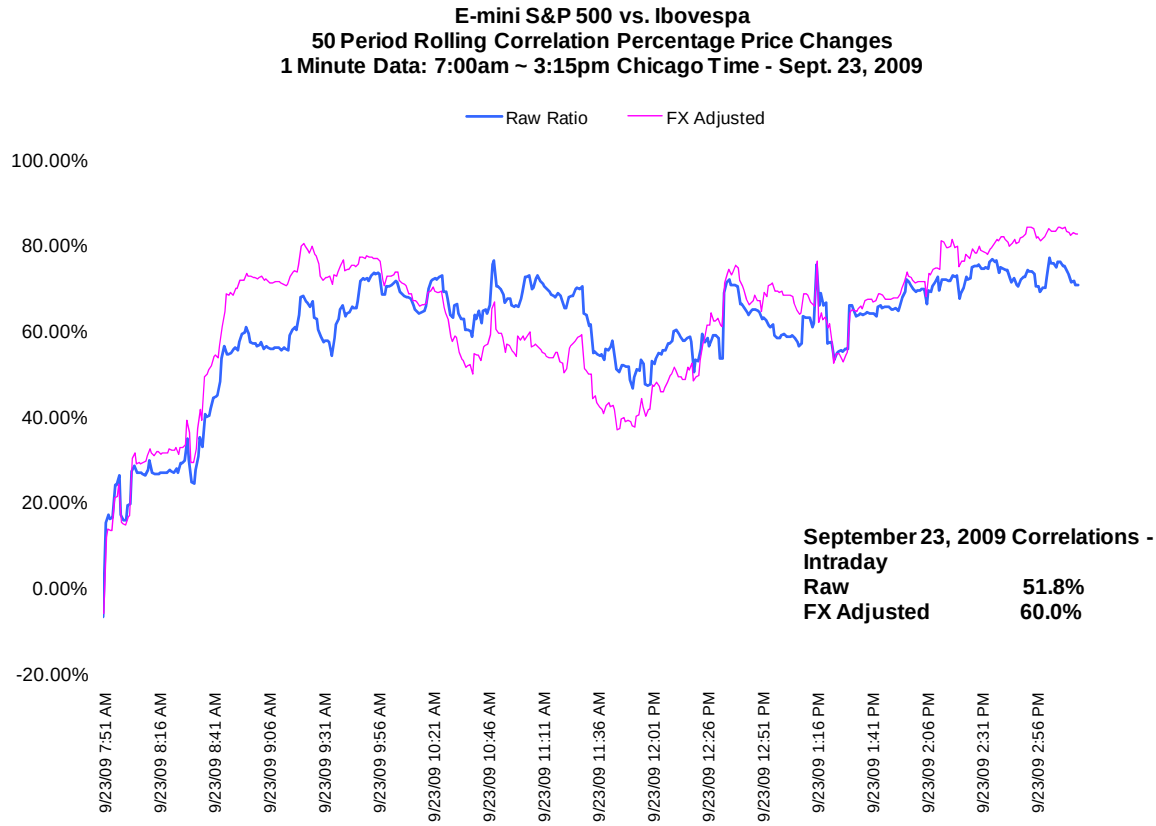

S&P 500 vs. Ibovespa
BRL FX Adjusted Ratio - August 1~31, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
FX Adj Spread Ratio
FX Rate - BRL
Ratio
FX
August 2009 S&P vs IBOV Correlations - Intraday
Raw 71.71%
FX Adjusted 76.93%
USD/BRL -45.38%

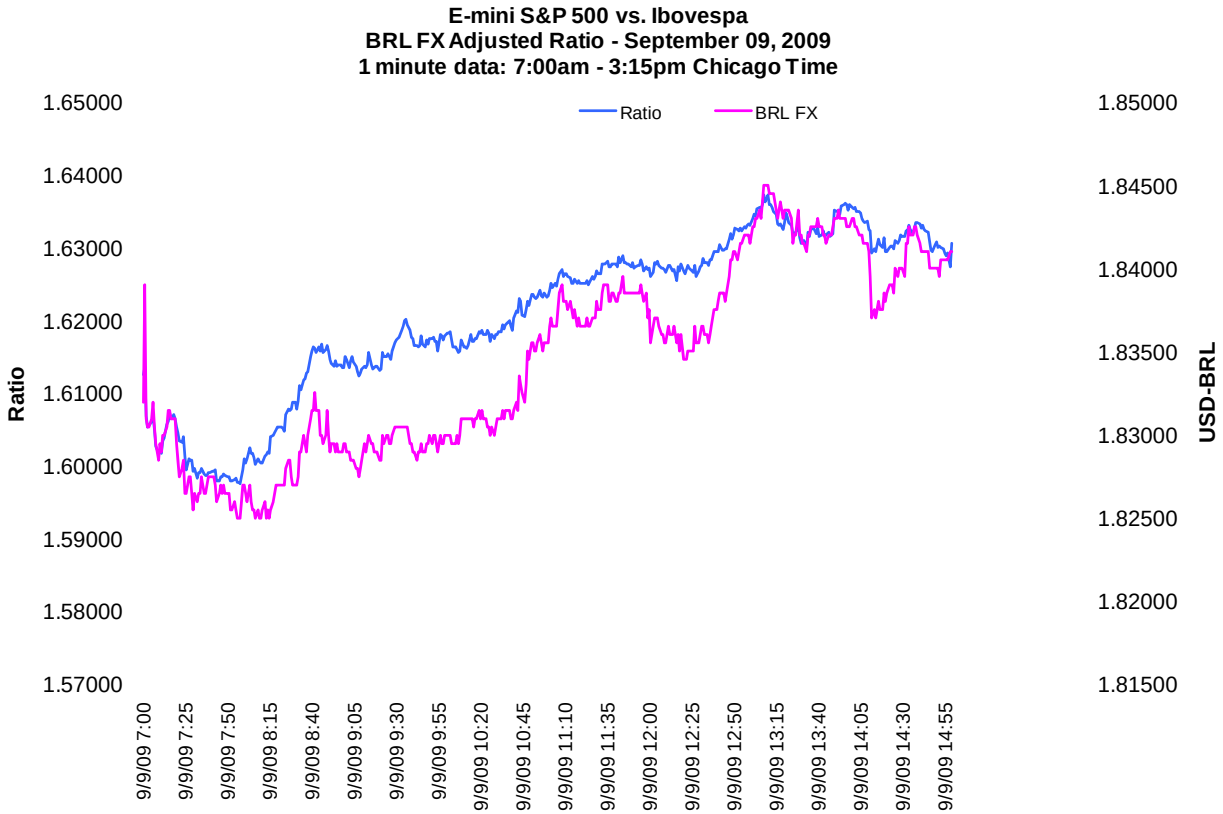

Rolling Correlations - 50 Period
August 1~31, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
ES vs FX Adj IBOV: avg 76.93%
ES vs IBOV: avg 71.71%
IBOV vs BRL: avg -45.38%

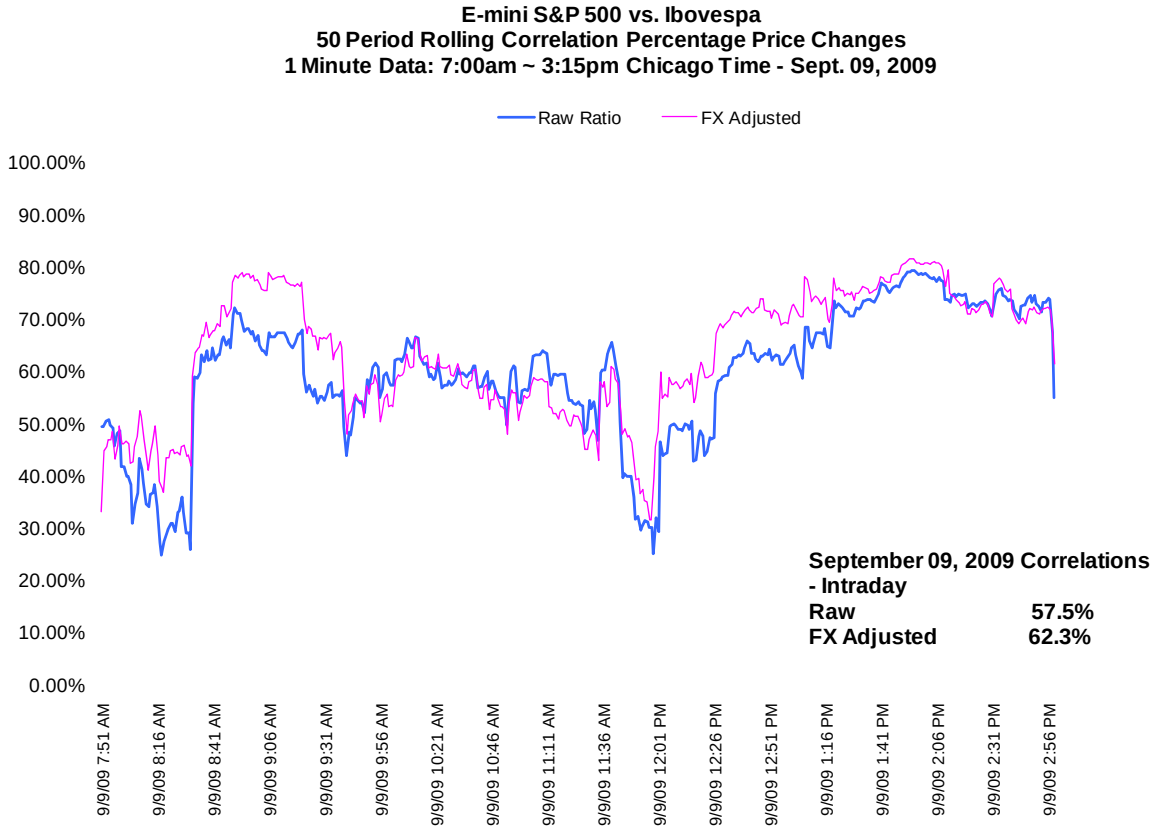

S&P 500 vs. Ibovespa
BRL FX Adj Ratio - September 1~30, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
Ratio
FX
FX Adj Spread Ratio
FX Rate - BRL
1.7500
1.7000
1.6500
1.6000
1.5500
1.5000
1.950
1.900
1.850
1.800
1.750
1.700
September 2009 S&P vs IBOV Correlations - Intraday
Raw 64.98%
FX Adjusted 72.75%
USD/BRL -38.41%
1 169 337 505 673 841 1009 1177 1345 1513 1681 1849 2017 2185 2353 2521 2689 2857 3025 3193 3361 3529 3697 3865 4033 4201 4369 4537 4705 4873 5041 5209 5377 5545 5713 5881 6049 6217 6385 6553 6721 6889


Rolling Correlations - 50 Period
September 1~30, 2009
1 minute data: 8:30am - 3:00pm Chicago Time
ES vs FX Adj IBOV: avg 72.75%
ES vs IBOV: avg 64.98%
IBOV vs BRL: avg -38.41%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
-20.00%
-40.00%
-60.00%
-80.00%
-100.00%
1 188 375 562 749 936 1123 1310 1497 1684 1871 2058 2245 2432 2619 2806 2993 3180 3367 3554 3741 3928 4115 4302 4489 4676 4863 5050 5237 5424 5611 5798 5985 6172 6359 6546 6733 6920 7107 7294 7481 7668 7855 8042 8229 8416


E-mini S&P 500 vs. Ibovespa
BRL FX Adjusted Ratio - September 23, 2009
1 minute data: 7:00am - 3:15pm Chicago Time
Ratio
BRL FX
Ratio
USD-BRL
1.58000
1.57500
1.57000
1.56500
1.56000
1.55500
1.55000
1.54500
1.54000
1.80500
1.80000
1.79500
1.79000
1.78500
1.78000
1.77500
1.77000
9/23/09 7:00
9/23/09 7:25
9/23/09 7:50
9/23/09 8:15
9/23/09 8:40
9/23/09 9:05
9/23/09 9:30
9/23/09 9:55
9/23/09 10:20
9/23/09 10:45
9/23/09 11:10
9/23/09 11:35
9/23/09 12:00
9/23/09 12:25
9/23/09 12:50
9/23/09 13:15
9/23/09 13:40
9/23/09 14:05
9/23/09 14:30
9/23/09 14:55


E-mini S&P 500 vs. Ibovespa
50 Period Rolling Correlation Percentage Price Changes
1 Minute Data: 7:00am ~ 3:15pm Chicago Time - Sept. 23, 2009
Raw Ratio
FX Adjusted
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
-20.00%
September 23, 2009 Correlations - Intraday
Raw 51.8%
FX Adjusted 60.0%
9/23/09 7:51 AM
9/23/09 8:16 AM
9/23/09 8:41 AM
9/23/09 9:06 AM
9/23/09 9:31 AM
9/23/09 9:56 AM
9/23/09 10:21 AM
9/23/09 10:46 AM
9/23/09 11:11 AM
9/23/09 11:36 AM
9/23/09 12:01 PM
9/23/09 12:26 PM
9/23/09 12:51 PM
9/23/09 1:16 PM
9/23/09 1:41 PM
9/23/09 2:06 PM
9/23/09 2:31 PM
9/23/09 2:56 PM

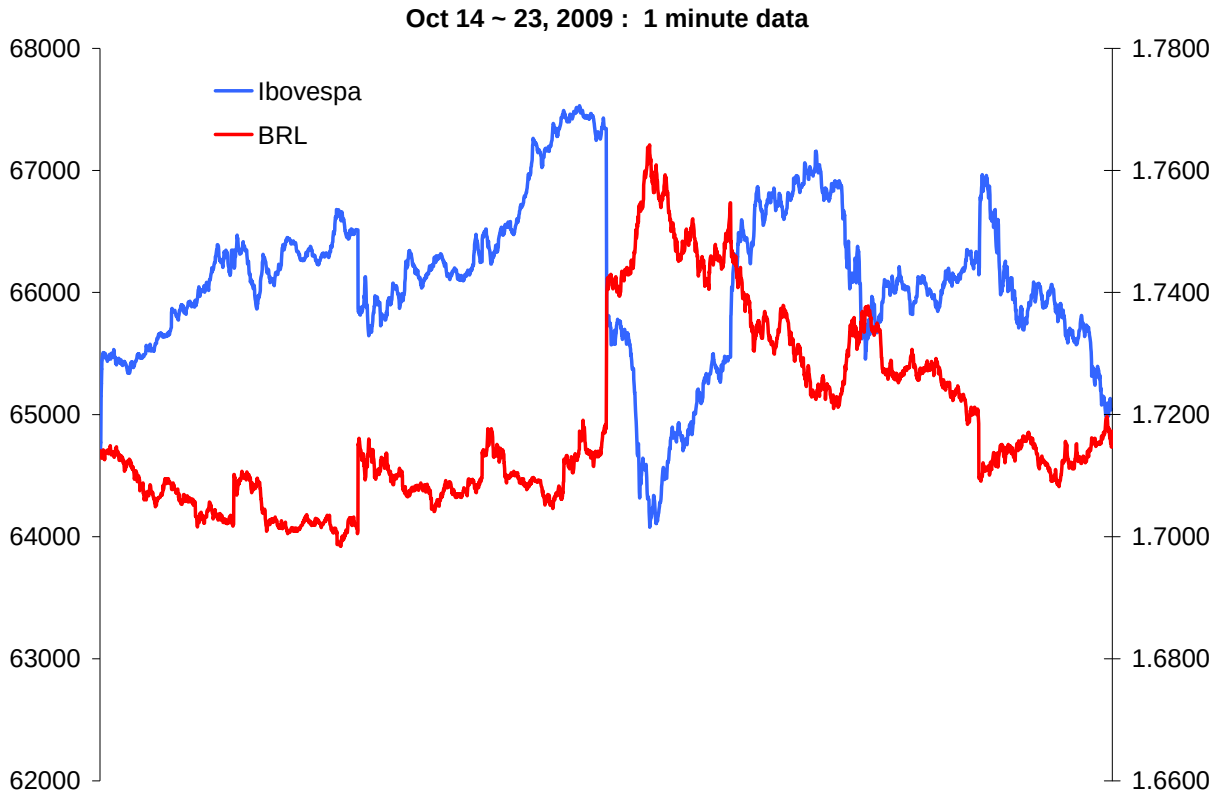

E-mini S&P 500 vs. Ibovespa
BRL FX Adjusted Ratio - September 09, 2009
1 minute data: 7:00am - 3:15pm Chicago Time
Ratio
BRL FX
Ratio
USD-BRL
1.65000
1.64000
1.63000
1.62000
1.61000
1.60000
1.59000
1.58000
1.57000
1.85000
1.84500
1.84000
1.83500
1.83000
1.82500
1.82000
1.81500
9/9/09 7:00
9/9/09 7:25
9/9/09 7:50
9/9/09 8:15
9/9/09 8:40
9/9/09 9:05
9/9/09 9:30
9/9/09 9:55
9/9/09 10:20
9/9/09 10:45
9/9/09 11:10
9/9/09 11:35
9/9/09 12:00
9/9/09 12:25
9/9/09 12:50
9/9/09 13:15
9/9/09 13:40
9/9/09 14:05
9/9/09 14:30
9/9/09 14:55


E-mini S&P 500 vs. Ibovespa
50 Period Rolling Correlation Percentage Price Changes
1 Minute Data: 7:00am ~ 3:15pm Chicago Time - Sept. 09, 2009
Raw Ratio
FX Adjusted
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
September 09, 2009 Correlations
- Intraday
Raw 57.5%
FX Adjusted 62.3%
9/9/09 7:51 AM
9/9/09 8:16 AM
9/9/09 8:41 AM
9/9/09 9:06 AM
9/9/09 9:31 AM
9/9/09 9:56 AM
9/9/09 10:21 AM
9/9/09 10:46 AM
9/9/09 11:11 AM
9/9/09 11:36 AM
9/9/09 12:01 PM
9/9/09 12:26 PM
9/9/09 12:51 PM
9/9/09 1:16 PM
9/9/09 1:41 PM
9/9/09 2:06 PM
9/9/09 2:31 PM
9/9/09 2:56 PM

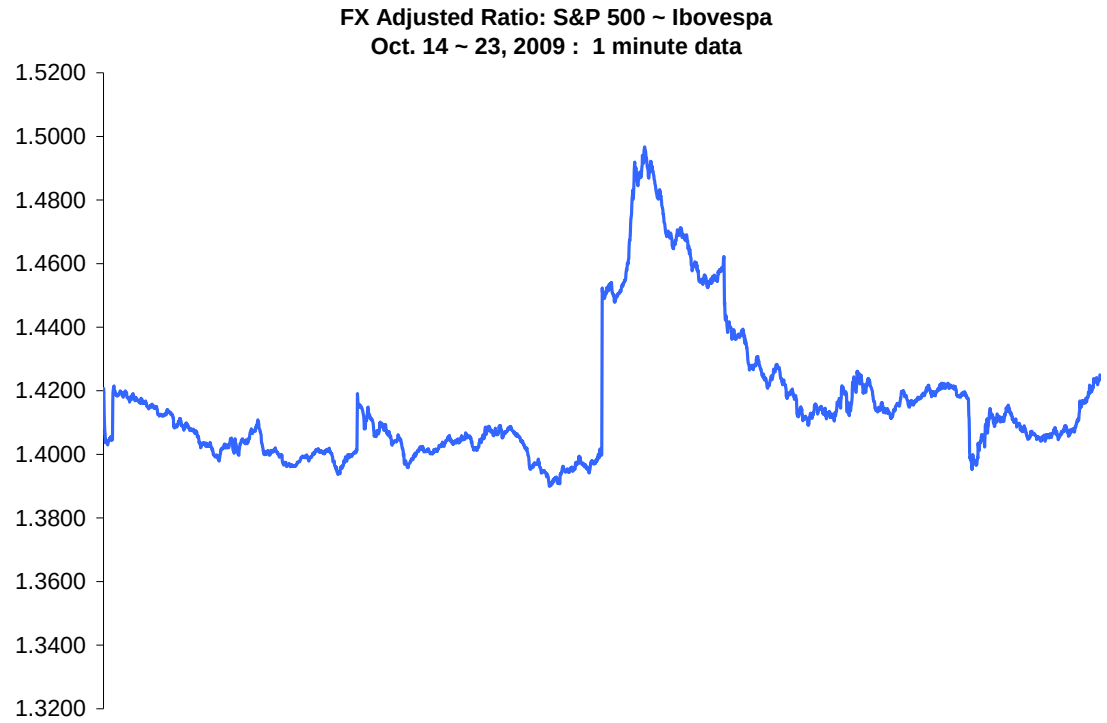
Trade Analysis – October 20, 2009 Market Impact of IOF Inflow Tax

The announcement of the Brazilian government's two percent tax on foreign investment inflows in the Brazilian financial and capital markets had a dramatic market impact on October 20, 2009. The Ibovespa index fell 2.88 percent while the USD/BRL exchnage rate rose 1.87 percent. Therefore, if a trader had been holding a short spread position (i.e., short S&P 500 and long Ibovespa) going into this news event, the rising USD (falling BRL) would have reduced the impact on the BRL open trade equity of the Ibovespa position – i.e., the loss on the Ibovespa side, measured in USD (which should be viewed as such, since the spread is against a USD postion in S&P 500), would be less than if the USD/BRL exchange rate had remained unchanged.

As the market recovered that week, the rising Ibovespa and falling USD/BRL exchange rate would have both given a positive impact to the BRL-denominated side of the open trade equity. Given that it has been observed that these markets move in tandem (Ibovespa and USD/BRL in opposite directions) close to 70 percent of the time, it is certainly part of the equation in deciding trading strategy, especially for position trades that can last over multiple days or longer.



Trade Analysis – October 20, 2009 Market Impact of IOF Inflow Tax



	IBOV	SPX	USD/BRL Actual	Actual OTE with USD/BRL Changes US$value IB * 15	US$value Spx *10	OTE Sell Sprd
1-Oct-09	60459	1029.85	1.7786	$ 509,887	$ 514,925	$ (5,038)
19-Oct-09	67239	1097.91	1.7122	$ 589,058	$ 548,955	$ 40,103
20-Oct-09	65303	1091.06	1.7442	$ 561,601	$ 545,530	$ 16,071
21-Oct-09	65486	1081.40	1.7432	$ 563,498	$ 540,700	$ 22,798
22-Oct-09	66135	1092.91	1.7296	$ 573,557	$ 546,455	$ 27,102
23-Oct-09	65059	1079.60	1.7105	$ 570,526	$ 539,800	**$ 30,726**

	IBOV	SPX	USD/BRL Unchanged	USD/BRL Unchanged US$value IB * 15	US$value Spx *10	OTE Sell Sprd
1-Oct-09	60459	1029.85	1.7786	$ 509,887	$ 514,925	$ (5,038)
19-Oct-09	67239	1097.91	1.7786	$ 567,067	$ 548,955	$ 18,112
20-Oct-09	65303	1091.06	1.7786	$ 550,739	$ 545,530	$ 5,209
21-Oct-09	65486	1081.40	1.7786	$ 552,283	$ 540,700	$ 11,583
22-Oct-09	66135	1092.91	1.7786	$ 557,756	$ 546,455	$ 11,301
23-Oct-09	65059	1079.60	1.7786	$ 548,682	$ 539,800	**$ 8,882**

Spread Trade: Long 15 Ibovespa and Short 10 E-mini S&P 500
Spread Ratio declines from 1.5148 to 1.4192
Ending Open Trade Equity P+L = $30,726
Ending Open Trade Equity without BRL move = $8,882

P&L Calculations

Calculating the Spread's P+L – Day Trading Examples

P+L Examples: E-mini S&P500 vs. Ibovespa Futures

Trade Example - Buying the Spread

Day Trade - September 4, 2009

BUY 10 E-mini S&P 500 and SELL 15 Ibovespa

				US$ Notional Amount
E-mini S&P 500		**10x15**	**BRL FX**	
9:01:00 AM	Buy 10	1003.50		-$501,750
9:02:00 AM	Sell 10	1004.00		$502,000
Net		**$250.00**		**$250**
Ibovespa				
9:01:00 AM	Sell 15	55770.00	**1.8568**	$450,533
9:02:00 AM	Buy 15	55790.00	**1.8553**	-$451,059
Net (in USD - FX adjusted)		**-$525.95**		**-$526**
NET P+L		**-$275.95**		**-$275.95**
Ratio Spread Level				
9:01:00 AM	**Buy**	**1.67052**		
9:02:00 AM	**Sell**	**1.66940**		

P&L Calculations (continued)

Calculating the Spread's P+L – Day Trading Examples

P+L Examples: E-mini S&P500 vs. Ibovespa Futures

Trade Example - Selling the Spread

Day Trade - September 15, 2009

SELL 10 E-mini S&P 500 and BUY 15 Ibovespa

				US$ Notional Amount
E-mini S&P 500		**10x15**	**BRL FX**	
9:46:00 AM	Sell 10	1049.00		$524,500
12:50:00 PM	Buy 10	1052.00		-$526,000
Net		**-$1,500.00**		**-$1,500**
Ibovespa				
9:46:00 AM	Buy 15	58910.00	**1.8129**	-$487,423
12:50:00 PM	Sell 15	59200.00	**1.8030**	$492,512
Net (in USD - FX adjusted)		**$5,089.01**		**$5,089**
NET P+L		**$3,589.01**		**$3,589.01**
Ratio Spread Level				
9:46:00 AM	**Sell**	**1.61410**		
12:50:00 PM	**Buy**	**1.60199**		

Index Correlations and Historical Volatilities

Index Correlations

The correlation between the S&P 500 Index and the Ibovespa Index.

Index Correlations | 2008

	S&P 500	S&P MidCap 400	S&P SmallCap 600	DJIA	NASDAQ-100	MSCI EAFE	MSCI Emerging Markets	Brazil Ibovespa
S&P 500	100.00%							
S&P MidCap 400	96.19%	100.00%						
S&P SmallCap 600	92.97%	97.52%	100.00%					
DJIA	98.99%	93.69%	91.07%	100.00%				
NASDAQ-100	94.47%	92.32%	89.49%	92.54%	100.00%			
MSCI EAFE	42.95%	42.43%	33.04%	41.33%	35.81%	100.00%		
MSCI Emerging Markets	49.58%	50.14%	41.93%	47.54%	44.32%	84.53%	100.00%	
Brazil Ibovespa	76.97%	76.22%	69.20%	75.30%	71.73%	54.73%	70.19%	100.00%

Index Correlations | YTD January - September 2009

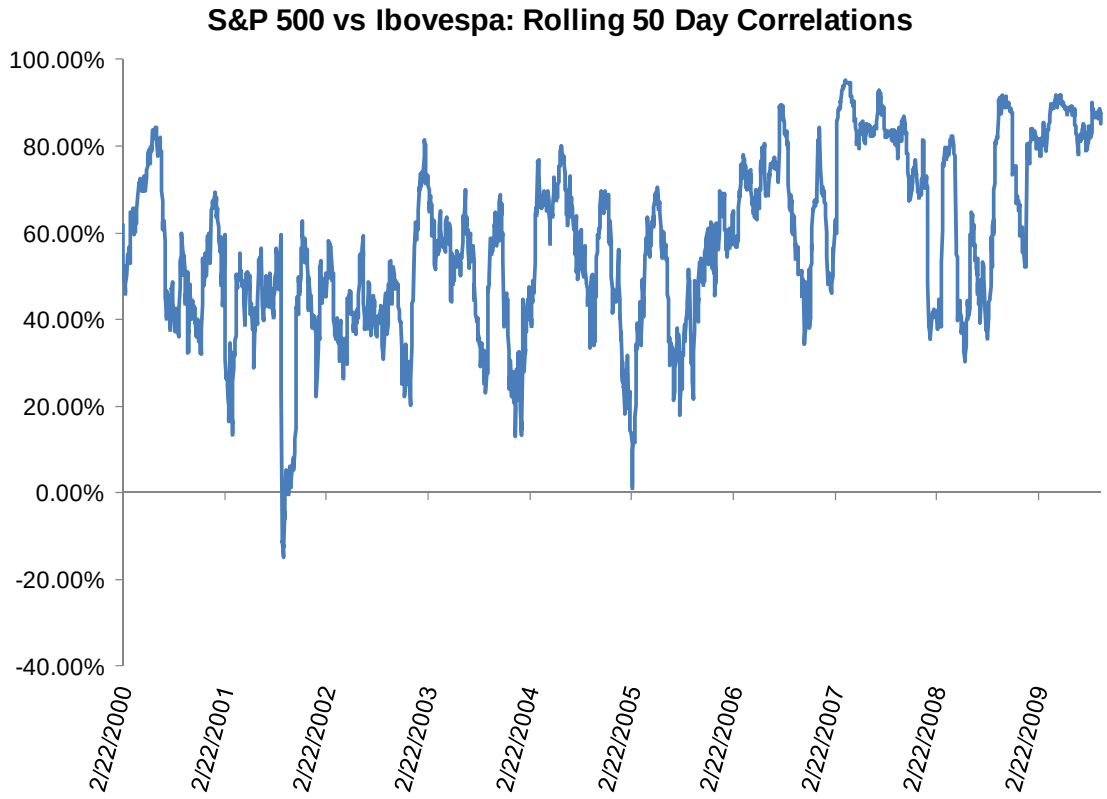
	S&P 500	S&P MidCap 400	S&P SmallCap 600	DJIA	ND100	MSCI EAFE	MSCI Emerging Markets	Brazil Ibovespa
S&P 500	100.00%							
S&P MidCap 400	97.08%	100.00%						
S&P SmallCap 600	95.26%	98.31%	100.00%					
DJIA	98.59%	94.63%	93.29%	100.00%				
NASDAQ-100	93.62%	93.94%	92.20%	91.51%	100.00%			
MSCI EAFE	55.00%	53.42%	50.31%	54.80%	50.72%	100.00%		
MSCI Emerging Markets	56.65%	55.67%	51.81%	56.30%	52.21%	83.54%	100.00%	
Brazil Ibovespa	77.35%	78.29%	74.38%	75.17%	76.73%	56.23%	67.71%	100.00%

Rolling Correlations of Percentage Price Changes

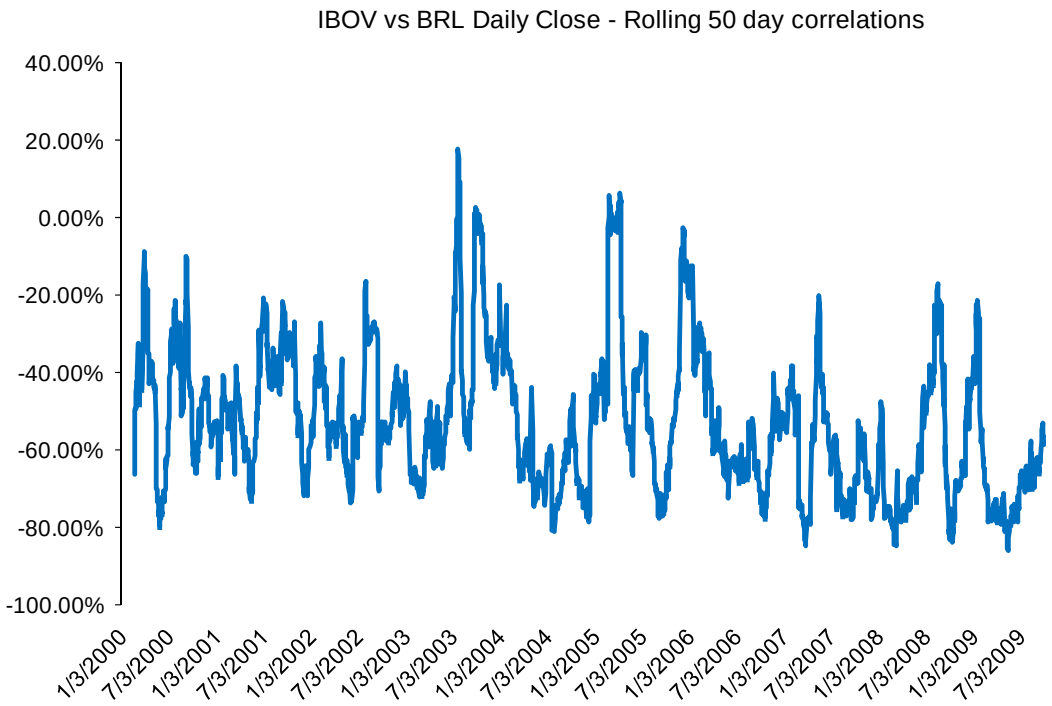
Average 50 day correlations:

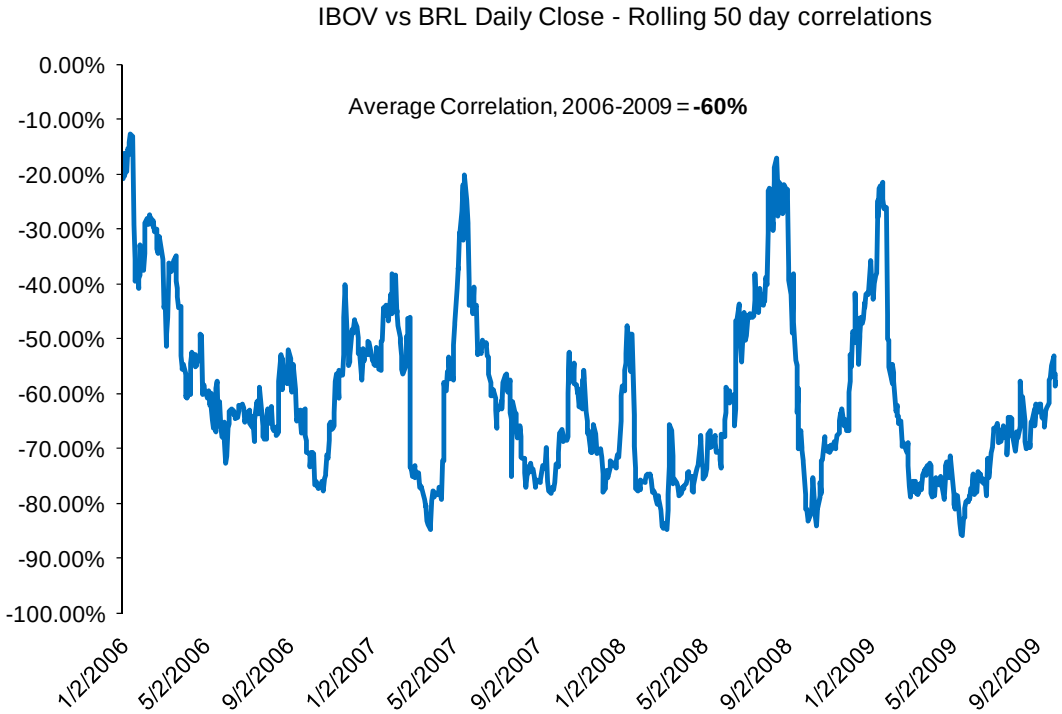
2000 to 2009 = 57.62%

2006 to 2009 = 72.19%



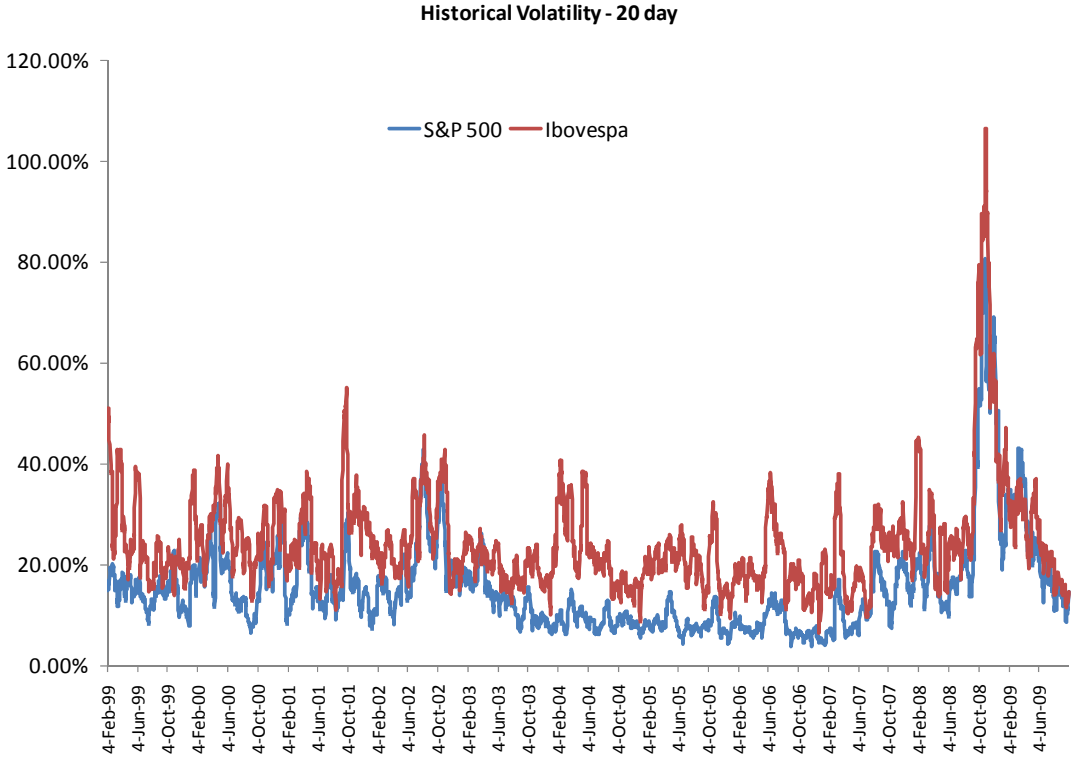
Correlation: Ibovespa vs. BRL FX rate

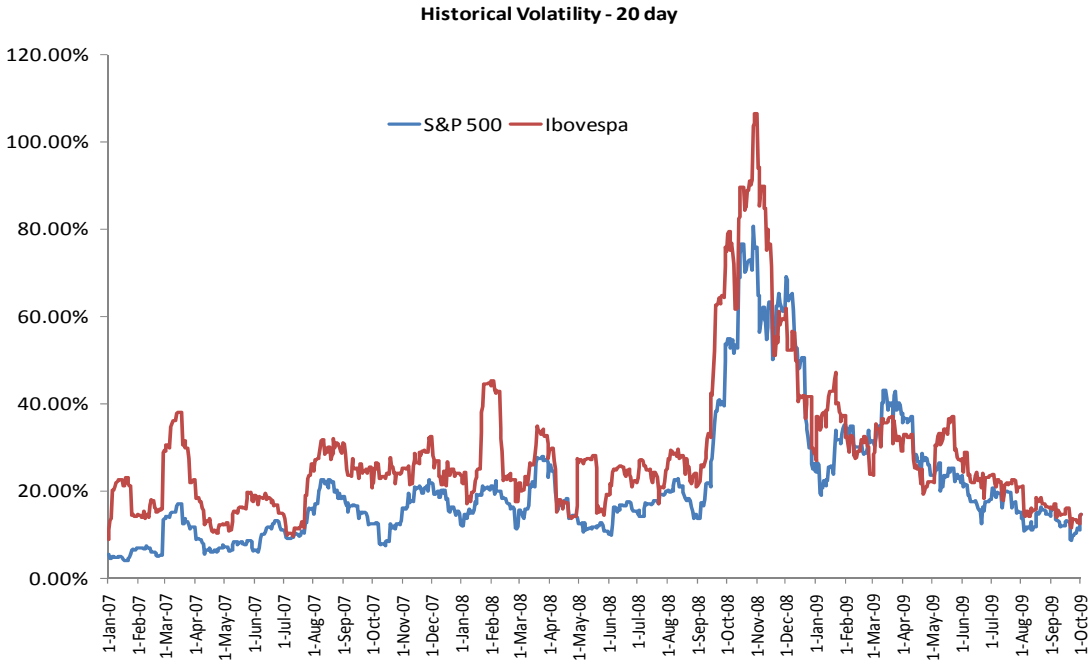




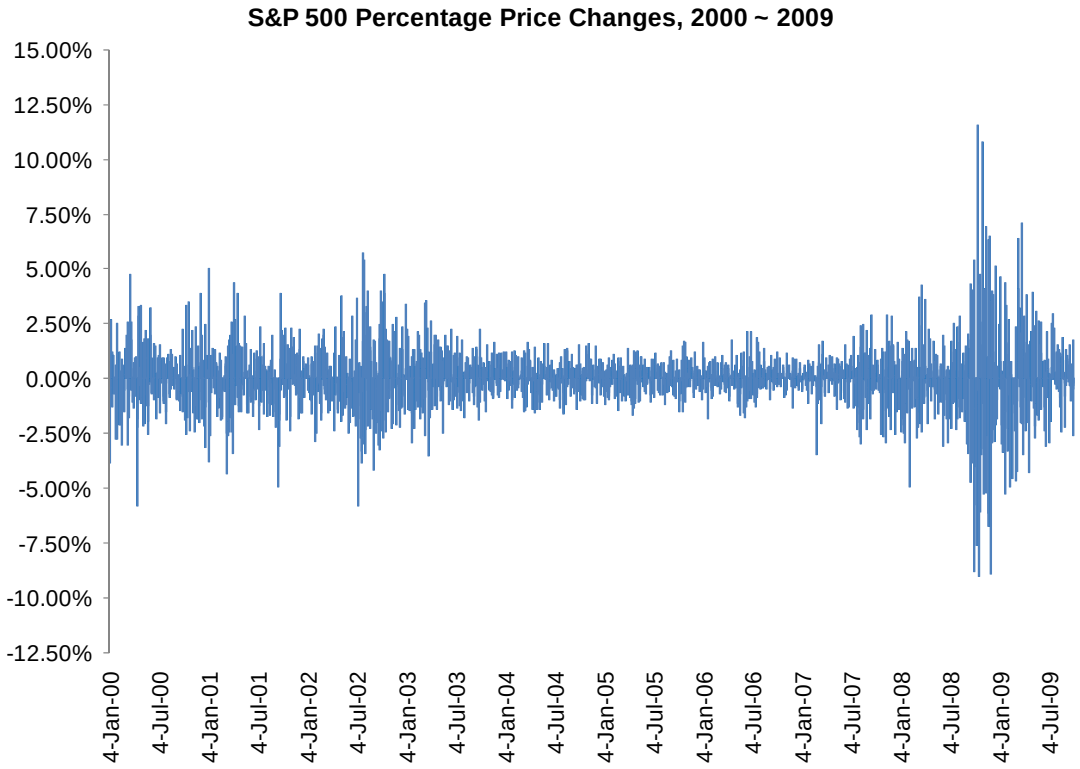
Historical Volatilities

The Historical Volatilities (HVs) of the S&P 500 and Ibovespa are similar, as can be expected because these indexes often have high degrees of correlation.



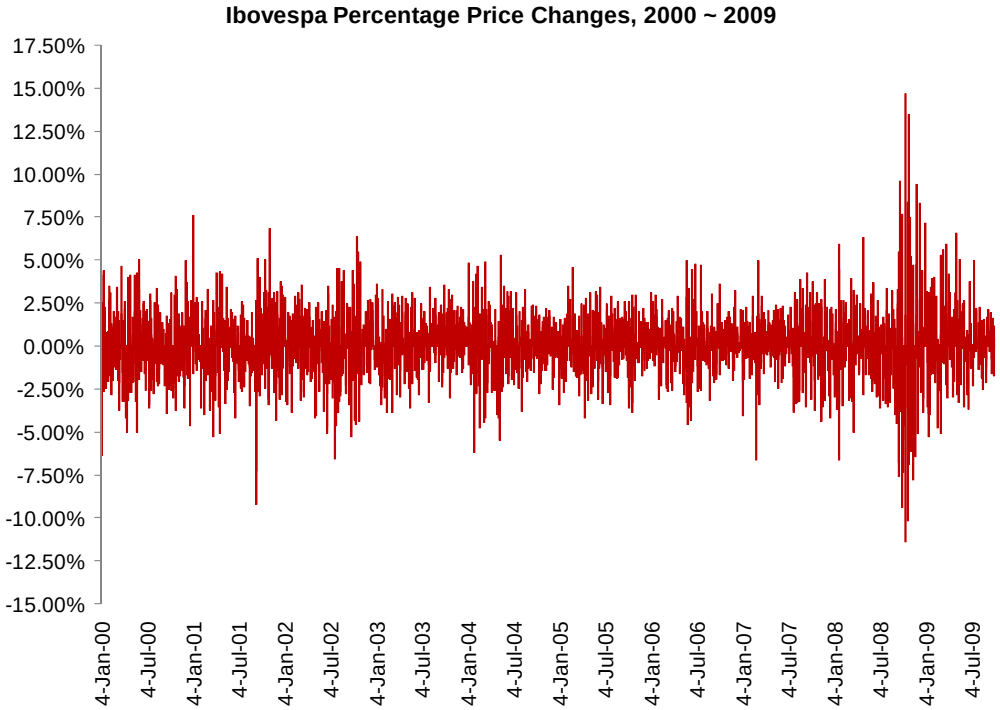


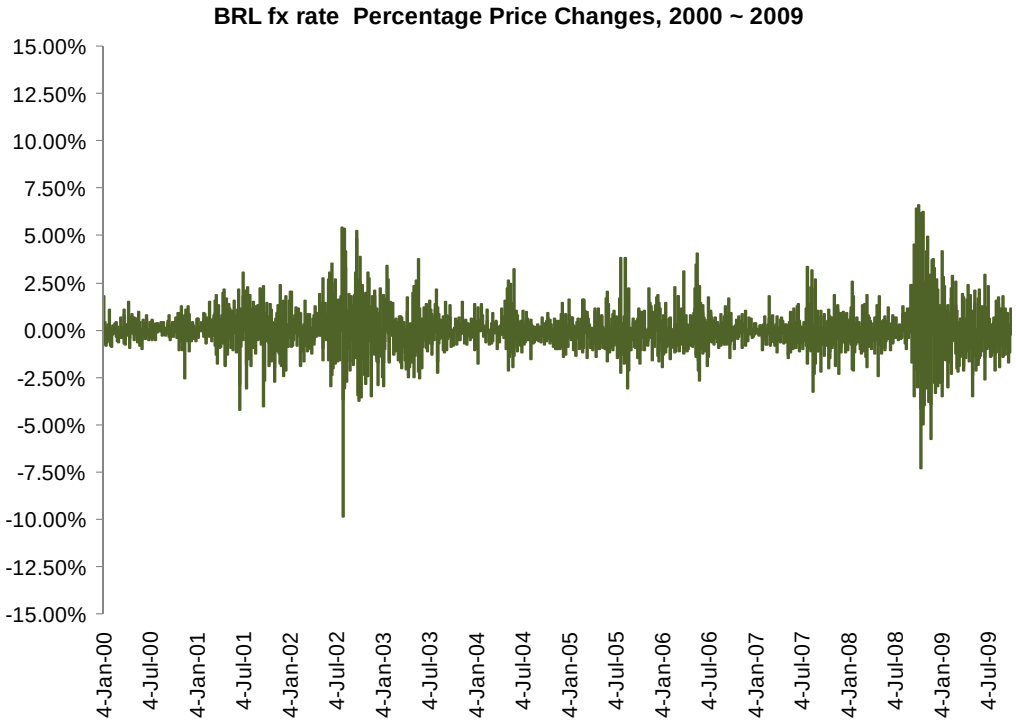
Review of Recent Volatility Periods – Daily Percentage Price Changes



The charts preceding and following show the daily percentage price changes for the S&P 500, Ibovespa and the BRL exchange rate. The S&P 500 experienced two major high volatility periods: The 2000~2002 period and the 2008-2009 period. What is noticeable, however, is the time period from 2004-2007, a roughly four-year period of relatively low volatility. Comparing the S&P 500 to the Ibovespa, both during the high extremes and the low volatility periods, the Ibovespa experienced wider market swings.

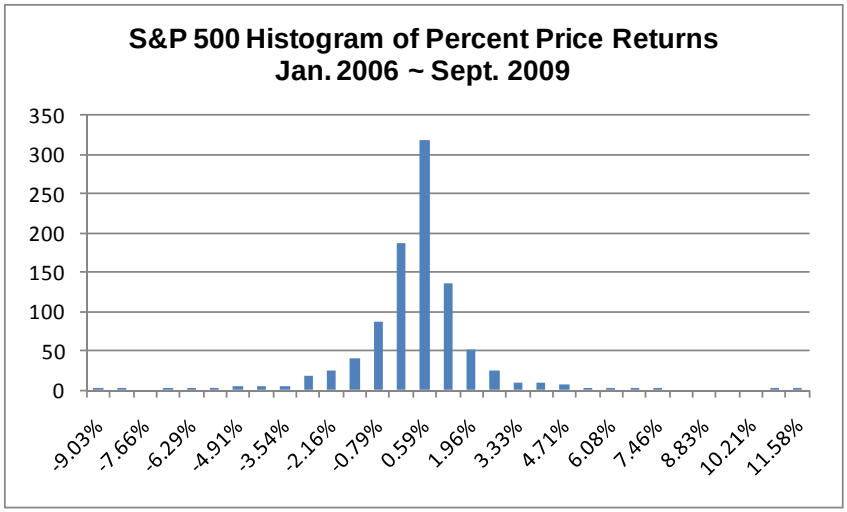
Ibovespa & BRL Percent Price Changes

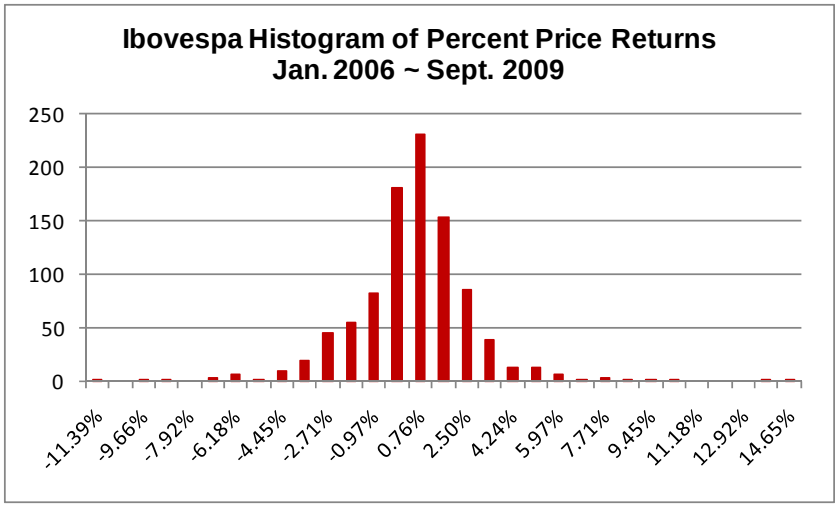




Statistical Summary of Percentage Returns

The following histogram charts and the summary table help to illustrate the different volatility characteristics of the S&P 500 and Ibovespa indexes. The Ibovespa histogram is flatter with wider tails than the S&P 500 histogram. The Ibovespa exhibits a significantly higher skew than the S&P 500 index.





Jan.2006 ~ Sept.2009	***S&P 500 PCT Return***	*Jan.2006 ~ Sept.2009*	***IBOV PCT Return***
Mean	**-0.00692%**	Mean	**0.08841%**
Standard Error	**0.05454%**	Standard Error	**0.07278%**
Median	**0.04773%**	Median	**0.10619%**
Standard Deviation	0.016854	Standard Deviation	0.022491
Sample Variance	0.000284	Sample Variance	0.000506
Kurtosis	**8.633380**	**Kurtosis**	**5.681020**
Skewness	**0.051334**	**Skewness**	**0.254733**
Minimum	**-9.035%**	Minimum	**-11.393%**
Maximum	**11.580%**	Maximum	**14.658%**
Count	955	Count	955

Appendix

Contract Details

Ibovespa Constituents

Volume & Liquidity Analysis

CME Group Website Useful Links

Contract Specification Guide

E-mini S&P 500 and Ibovespa	1.75000	Exchange rate - BRL Real	
	Ibovespa Stock Index	**Mini Ibovespa**	**E-mini S&P 500**
Underlying Asset	Ibovespa Index	Ibovespa Index	S&P 500 Index
Ticker Symbol	IND	WIN	ES
Settlement Style	Cash	Cash	Cash settlement to SOQ
Contract Currency	BRL Real	BRL Real	US Dollar
Quote Convention	Full Index points	Full Index points	Full Index points and quarter points
Quote Convention - Example	64800	64800	1072.50
Contract Size - Multiplier	1 BRL	0.20 BRL	US$ 50
Minimum Tick (tick size)	5 full index points	5 full index points	0.25
Minimum Tick in Br. Real	5	1	
Minimum Number of Contracts to Trade	5	1	1
Maximum Number of Contracts to Trade	1st-2nd contract months: 2,000 Other contract months: 1,000	500	2000
Min. Tick with Min. Contracts to Trade - USD (fyi)	$14.29	$0.57	$12.50
Trade Example - Buy	62115	62115	1070.00
Trade Example - Sell	62120	62120	1070.25
Trade Example - NET min. tick w/ Min Contracts	BRL 25	BRL 1	$12.50
Trade matching algorithm	FIFO	FIFO	FIFO
Daily price Limits	Daily Limit of 10%	Daily Limit of 10%	RTH: Successive 10%, 20%, 30% limits (downside only) ETH (overnight): 5% up or down
Trading Hours	Brazil Winter: Monday to Friday 9:00am - 5:15pm Brazil Summer: Monday to Friday 10:00am - 6:15pm	Brazil Winter: Monday to Friday 9:02am - 5:15pm Brazil Summer: Monday to Friday 10:02am - 6:15pm	Monday to Thursday 5:00pm-3:15pm (next day); Shutdown period from 4:30pm-5:00pm.
Contract months	Even months (February, April, June, August, October, December)	Even months (February, April, June, August, October, December)	March, June, September, December
Last Trading Day	Wednesday closest to the 15th calendar day of the contract month	Wednesday closest to the 15th calendar day of the contract month	Trading can occur up to 8:30 a.m. on the 3rd Friday of the contract month

E-mini S&P 500 futures are listed with and subject to the rules and regulations of CME. Ibovespa and Mini-Ibovespa futures are listed with and subject to the rules and regulations of BM&FBovespa.

CME Group – Price Banding
http://www.cmegroup.com/globex/files/PriceBanding.pdf

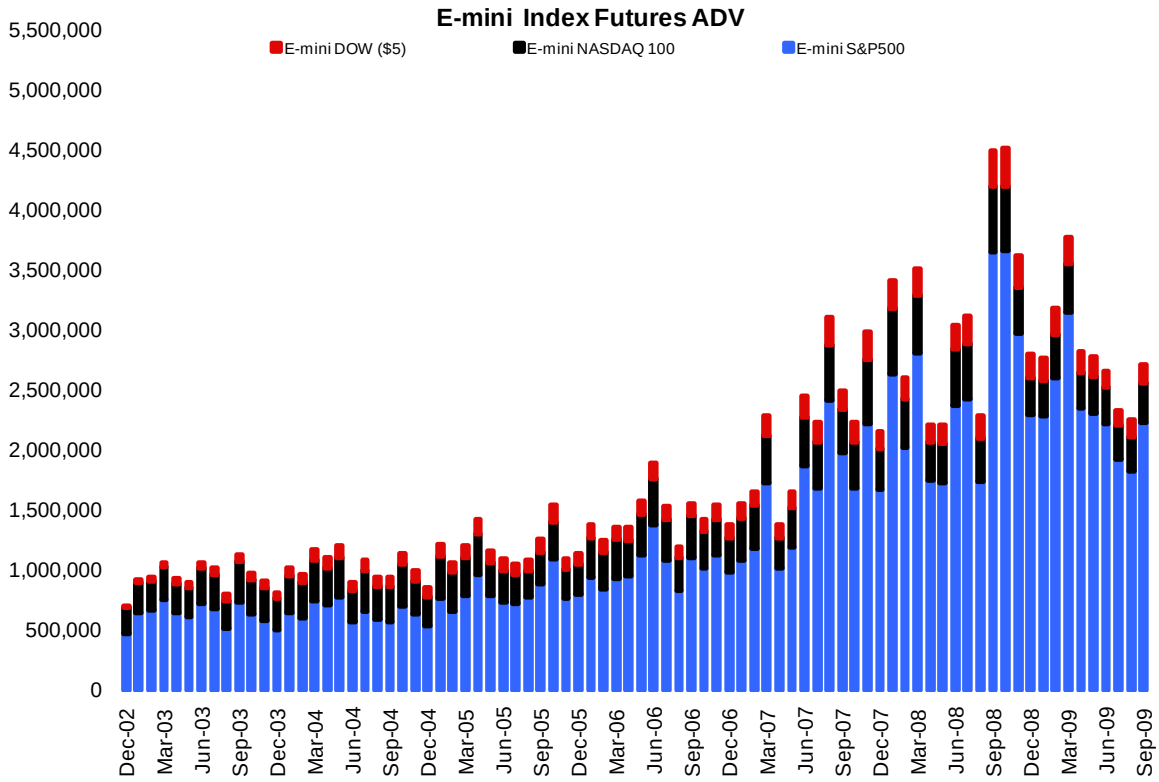
BM&F Bovespa Auction Tunnels
http://www.bmf.com.br/portal/pages/boletim2/bd_manual/Tunel_leilao.asp

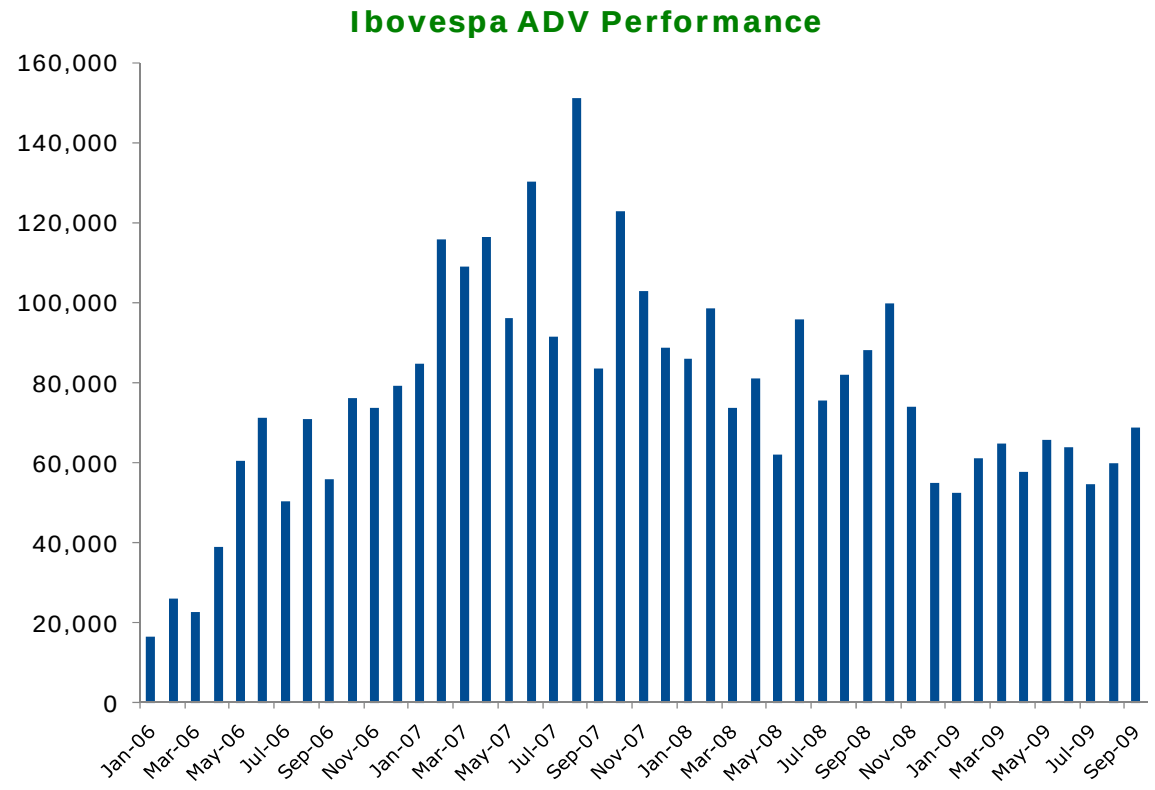
Ibovespa Constituents by Sector

Ibovespa Index by Sector Group		2-Oct-09	Price	% Weight	% Weight
Name	Industry	Bovespa SECTOR	2-Oct-09	in Index	Total
Vale SA	Diversified Minerals	Basic Materials	36.87	12.40%	
Gerdau SA	Steel-Producers	Basic Materials	24.61	3.73%	
Vale SA	Diversified Minerals	Basic Materials	41.29	3.58%	
Cia Siderurgica Nacional SA	Steel-Producers	Basic Materials	54.50	3.08%	
Usinas Siderurgicas de Minas Gerais SA	Steel-Producers	Basic Materials	46.84	3.00%	
Aracruz Celulose SA	Paper & Related Products	Basic Materials	3.93	1.28%	
MMX Mineracao e Metalicos SA	Steel-Producers	Basic Materials	11.67	0.95%	
Metalurgica Gerdau SA	Steel-Producers	Basic Materials	30.65	0.94%	
Usinas Siderurgicas de Minas Gerais SA	Steel-Producers	Basic Materials	45.29	0.65%	
Votorantim Celulose e Papel SA	Paper & Related Products	Basic Materials	29.00	0.62%	
Klabin SA	Paper&Related Products	Basic Materials	4.20	0.40%	
Duratex SA	Bldg&Construct Prod-Misc	Basic Materials	28.36	0.39%	**31.02%**
Empresa Brasileira de Aeronautica SA	Aerospace/Defense	Capital Goods and Services	10.18	0.67%	**0.67%**
All America Latina Logistica SA	Transport-Rail	Construction & Transportation	13.33	1.29%	
Cyrela Brazil Realty SA	Real Estate Oper/Develop	Construction & Transportation	23.45	1.26%	
Gafisa SA	Bldg-Residential/Commer	Construction & Transportation	26.78	1.05%	
Gol Linhas Aereas Inteligentes SA	Airlines	Construction & Transportation	18.40	0.65%	
Tam SA	Airlines	Construction & Transportation	24.28	0.60%	
Rossi Residencial SA	Real Estate Oper/Develop	Construction & Transportation	13.13	0.60%	
Cia de Concessoes Rodoviarias	Public Thoroughfares	Construction & Transportation	32.85	0.57%	**6.03%**
Lojas Americanas SA	Retail-Discount	Consumer Cyclical	11.84	0.94%	
Lojas Renner SA	Retail-Apparel/Shoe	Consumer Cyclical	31.53	0.85%	
NET Servicos de Comunicacao SA	Cable/Satellite TV	Consumer Cyclical	21.30	0.79%	
B2W Cia Global Do Varejo	E-Commerce/Products	Consumer Cyclical	50.05	0.65%	**3.22%**
BRF - Brasil Foods SA	Food-Meat Products	Consumer Non Cyclical	46.07	2.23%	
Cia de Bebidas das Americas	Brewery	Consumer Non Cyclical	151.80	1.03%	
Natura Cosmeticos SA	Cosmetics&Toiletries	Consumer Non Cyclical	32.68	0.74%	
JBS SA	Food-Meat Products	Consumer Non Cyclical	9.81	0.73%	
Cia Brasileira de Distribuicao Grupo Pao	Food-Retail	Consumer Non Cyclical	50.99	0.58%	
Souza Cruz SA	Tobacco	Consumer Non Cyclical	63.62	0.55%	
Cosan SA Industria e Comercio	Sugar	Consumer Non Cyclical	19.90	0.48%	**6.34%**
Itau Unibanco Holding SA	Commer Banks Non-US	Financial	36.35	5.79%	

Ibovespa Constituents by Sector (continued)

Ibovespa Index by Sector Group		2-Oct-09	Price	% Weight	% Weight
Name	Industry	Bovespa SECTOR	2-Oct-09	in Index	Total
BM&FBOVESPA SA	Finance-Other Services	Financial	12.98	4.55%	
Banco Bradesco SA	Commer Banks Non-US	Financial	36.14	4.17%	
Investimentos Itau SA	Diversified Operations	Financial	10.82	2.52%	
Banco do Brasil SA	Commer Banks Non-US	Financial	30.65	2.30%	
Redecard SA	Finance-Credit Card	Financial	28.00	1.58%	
Bradespar SA	Investment Companies	Financial	32.03	1.07%	**21.97%**
Petroleo Brasileiro SA	Oil Comp-Integrated	Oil & Gas	34.24	15.10%	
Petroleo Brasileiro SA	Oil Comp-Integrated	Oil & Gas	39.73	3.25%	
Ultrapar Participacoes SA	Petrochemicals	Oil & Gas	70.39	0.47%	
Braskem SA	Petrochemicals	Oil & Gas	11.20	0.44%	**19.27%**
Tele Norte Leste Participacoes SA	Telephone-Integrated	Telecommunications	32.84	0.99%	
Tim Participacoes SA	Cellular Telecom	Telecommunications	4.57	0.88%	
Vivo Participacoes SA	Cellular Telecom	Telecommunications	47.26	0.76%	
Brasil Telecom SA	Telephone-Integrated	Telecommunications	15.99	0.39%	
Brasil Telecom Participacoes SA	Telephone-Integrated	Telecommunications	19.33	0.34%	
Tele Norte Leste Participacoes SA	Telephone-Integrated	Telecommunications	39.13	0.31%	
Telemar Norte Leste SA	Telephone-Integrated	Telecommunications	59.84	0.31%	
Telecomunicacoes de Sao Paulo SA	Telephone-Integrated	Telecommunications	44.03	0.20%	
Tim Participacoes SA	Cellular Telecom	Telecommunications	6.04	0.16%	**4.32%**
Cia Energetica de Minas Gerais	Electric-Integrated	Utilities	26.88	1.51%	
Centrais Eletricas Brasileiras SA	Electric-Integrated	Utilities	27.22	0.88%	
Centrais Eletricas Brasileiras SA	Electric-Integrated	Utilities	24.49	0.86%	
Cia Energetica de Sao Paulo	Electric-Generation	Utilities	22.15	0.82%	
Eletropaulo Metropolitana Eletricidade d	Electric-Distribution	Utilities	37.15	0.70%	
Cia Paranaense de Energia	Electric-Integrated	Utilities	31.43	0.66%	
CPFL Energia SA	Electric-Integrated	Utilities	32.43	0.48%	
CTEEP	Electric-Transmission	Utilities	51.69	0.38%	
Cia de Saneamento Basico do Estado de Sa	Water	Utilities	34.93	0.38%	
Light SA	Electric-Integrated	Utilities	26.55	0.32%	
Centrais Eletricas de Santa Catarina SA	Electric-Integrated	Utilities	34.19	0.09%	
Cia de Gas de Sao Paulo	Gas-Distribution	Utilities	33.75	0.09%	**7.16%**
				100.00%	**100.00%**


E-mini Index Futures ADV
E-mini DOW ($5)
E-mini NASDAQ 100
E-mini S&P500
5,500,000
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Dec-02
Mar-03
Jun-03
Sep-03
Dec-03
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Sep-08
Dec-08
Mar-09
Jun-09
Sep-09

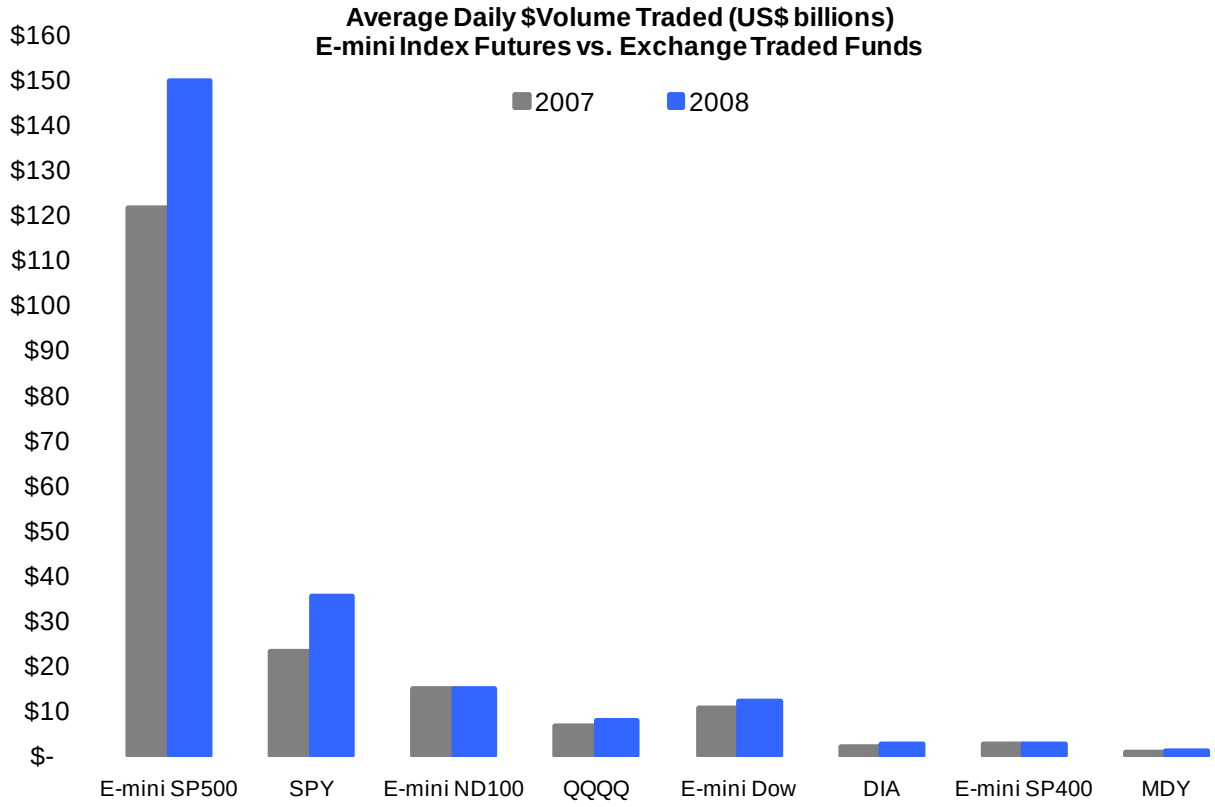

Ibovespa ADV Performance
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Jan-06
Mar-06
May-06
Jul-06
Sep-06
Nov-06
Jan-07
Mar-07
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09

Liquidity and Hourly Analysis

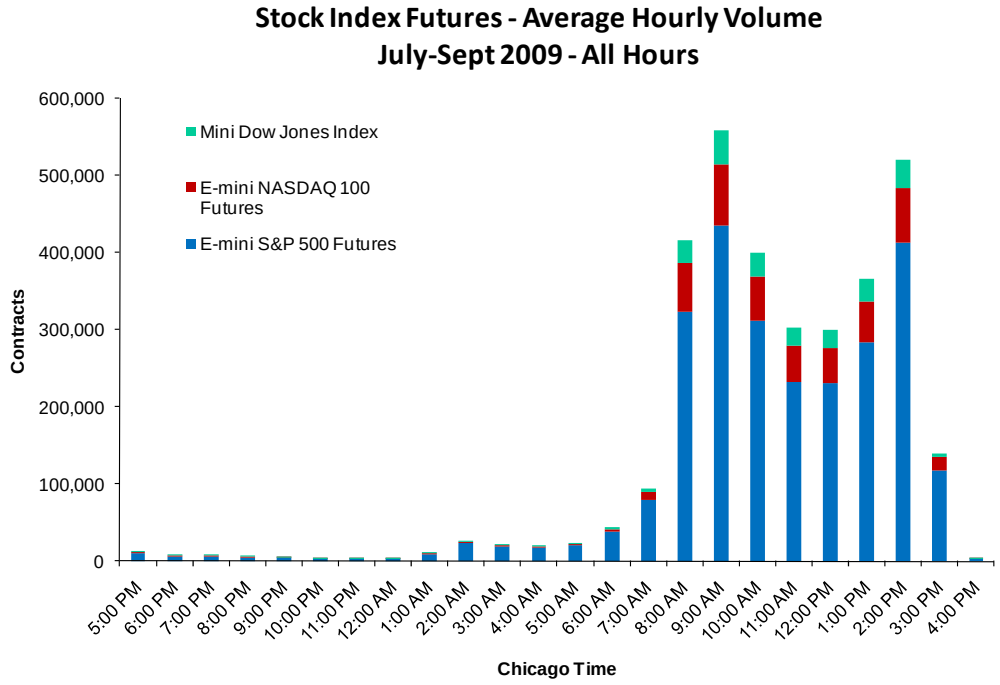
Liquidity vs. ETFs (Exchange Traded Funds)

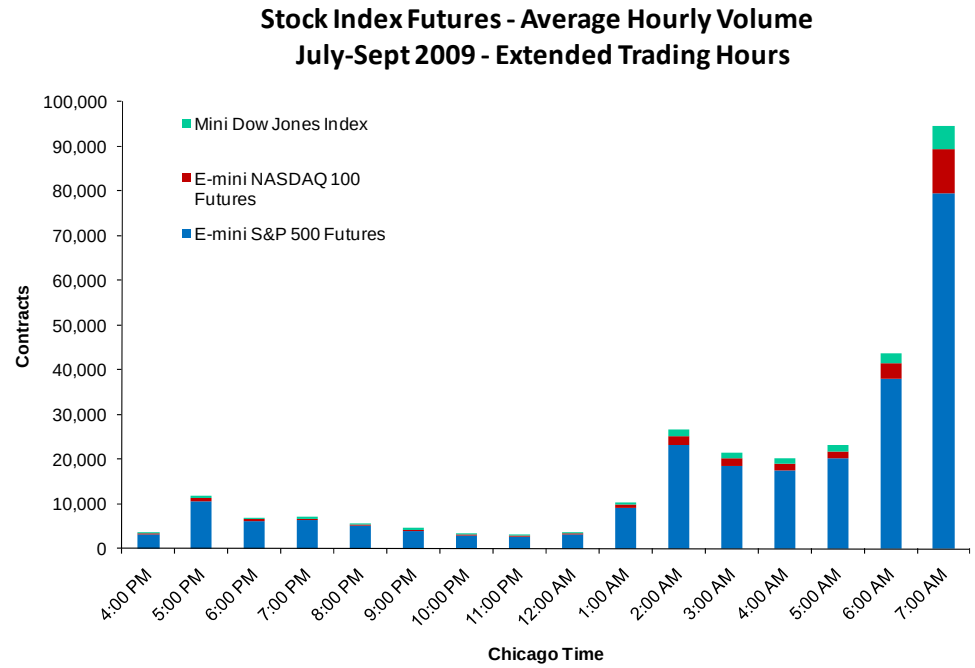
The E-mini S&P 500 Index futures (ES) has daily average notional value traded of at least five times the comparative underlying ETF. Typically, liquidity is therefore significantly better in the E-mini index futures than their ETF counterparts.

Additionally, E-mini index futures have a significant advantage vs. the ETF in terms of initial margin requirements. Current initial margins for E-mini S&P 500 index futures (ES) are $5,625 or about 10 percent of the underlying value. This compares to initial deposit requirements for ETFs of 50 percent (Reg T).



Liquidity in U.S. and Non-U.S. Trading Hours – E-mini S&P 500 and S&P 500 Futures
The E-mini S&P 500 index futures may be very liquid even during non-U.S. standard hours. All times shown in the chart below are in Central Time. Average volume per hour increases substantially once the London day session begins at approximately 2:00 a.m. Central Time (8:00 a.m. London time). The times shown below represent the one-hour period ending at that time (4:00 a.m. means the one-hour period between 3:00 a.m. and 4:00 a.m.). During the 2:00 a.m. to 7:00 a.m. periods, there may be increased spreading activity between U.S. and European stock index futures.





CME Group Website: Useful Links

CME Group Homepage
http://www.cmegroup.com

Equity Index Homepage
http://www.cmegroup.com/trading/equity-index/

Equity Index Research Center
http://www.cmegroup.com/trading/equity-index/equity-research-center.html

Disclaimer

E-mini Dow ($5) futures contracts are listed with and subject to the rules and regulations of CBOT. E-mini S&P 500 futures and E-mini NASDAQ-100 futures are listed with and subject to the rules and regulations of CME. Ibovespa futures are listed with and subject to the rules and regulations of BM&F Bovespa.

Futures trading is not suitable for all investors, and involves the risk of loss. Futures are a leveraged investment, and because only a percentage of a contract's value is required to trade, it is possible to lose more than the amount of money deposited for a futures position. Therefore, traders should only use funds that they can afford to lose without affecting their lifestyles. And only a portion of those funds should be devoted to any one trade because they cannot expect to profit on every trade.

All references to options refer to options on futures.

CME Group is a trademark of CME Group Inc. The Globe logo, CME, E-mini and Chicago Mercantile Exchange are trademarks of Chicago Mercantile Exchange Inc. Chicago Board of Trade is a trademark of the Board of Trade of the City of Chicago, Inc. NYMEX is a trademark of the New York Mercantile Exchange, Inc. These products are not sponsored, sold or endorsed by S&P, a division of The McGraw-Hill Companies, Inc., and S&P makes no representation regarding the advisability of investing in them.

NASDAQ-100® is a registered service/trademark of The Nasdaq Stock Market, Inc. ("Corporations"). The Corporations and Nasdaq Financial Products Services,Inc. make no warranty, express or implied, and bear no liability with respect to the NASDAQ-100 Index, its use or any data included therein.

"Standard & Poor's," "S&P®" and "S&P 500®" are trademarks of The McGraw-Hill Companies, Inc.

MSCI® is a trademark of MSCI, used under license.

"Dow Jones Industrial Average" is a service mark of Dow Jones & Company and have been licensed for use for certain purposes by the Board of Trade of the city of Chicago (CBOT). The CBOT's futures and futures-options based on the Dow Jones Industrial Average are not sponsored, endorsed, sold or promoted by Dow Jones, and Dow Jones makes no representation regarding the advisability of trading in such products. All other trademarks are property of their respective owners.

The information within this brochure has been compiled by CME Group for general purposes only. CME Group assumes no responsibility for any errors or omissions. Additionally, all examples in this brochure are hypothetical situations, used for explanation purposes only, and should not be considered investment advice or the results of actual market experience All matters pertaining to rules and specifications herein are made subject to and are superseded by official CME, CBOT and NYMEX rules. Current rules should be consulted in all cases concerning contract specifications.