The spread between March 2012 and June 2012 E-mini Standard & Poor's 500 (S&P 500) futures during the "roll" period, as we approached expiration of the March contract, may be characterized as "typical." But typical represents a departure from the pricing anomalies witnessed in the prior several roll periods.

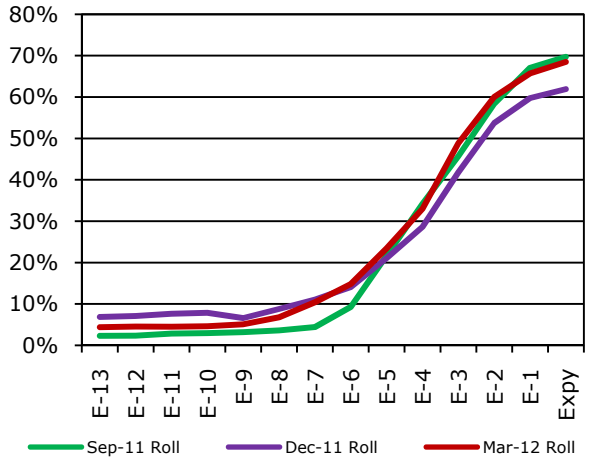
Specifically, the financing rates implicit in the March 2012/June 2012 spread converged reasonably closely to prevailing LIBOR rates. This is in contrast to the last several roll periods where implied financing rates fell sharply below prevailing LIBOR as expiration approached.

This article is intended to review this situation and discuss how one may monitor it using CME Group's Equity Quarterly Roll analyzer. [1]

Most Recent Roll – Asset managers notably including portable alpha managers follow the value and pace of the roll closely. They do so because a passive long strategy requires that they execute a roll transaction on a regular quarterly basis.

Thus, it is often interesting to monitor how much open interest has rolled or transferred from the expiring or nearby contract month to the deferred month. CME Group's Equity Quarterly Roll Analyzer provides this information in graphic and tabular form beginning approximately one month prior to the expiration of a quarterly futures contract. (See graphic below and Table 1 for the pace of roll in recent months.)

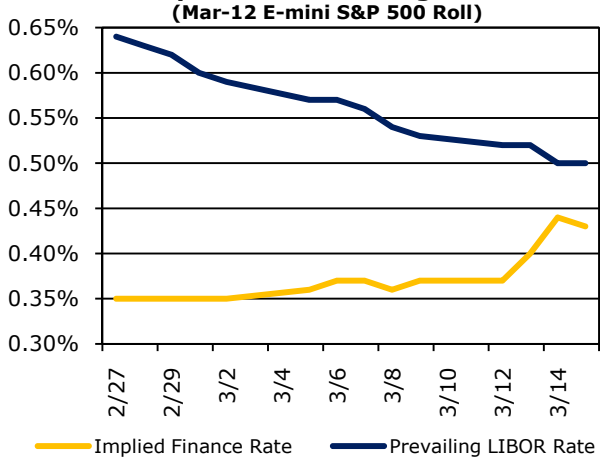
Pace of E-mini S&P 500 Roll



Our graphic depicts how the roll progressed relative to historic averages during recent roll periods in the thirteen (13) days before futures contract expiration. We depict the percentage of aggregate open interest held in the expiring and first deferred quarterly contracts that has rolled.

The Quarterly Roll Analyzer further provides information regarding the implicit financing rate and compares it to prevailing LIBOR rates – see Table 2 below for details. During the March 2012 roll period, as open interest transferred from nearby March 2012 to the deferred June 2012 futures contract, we note that implicit financing rates converged in large part to prevailing LIBOR rates. This convergence may be attributed to some slight advances in the implied financing rate coupled with some slightly larger declines in LIBOR rates.

Implied vs. Prevailing Rates
(Mar-12 E-mini S&P 500 Roll)

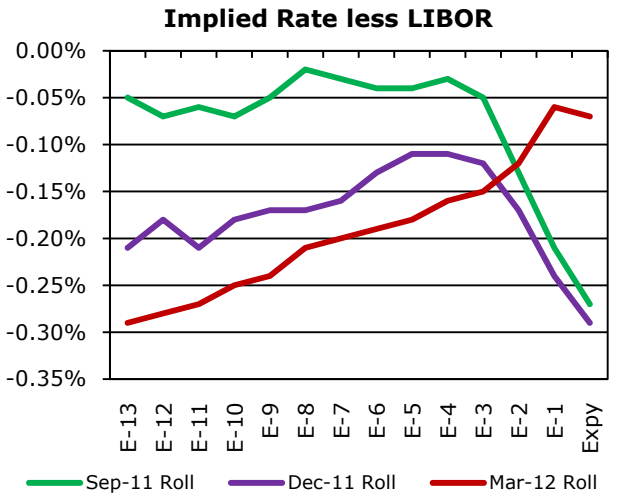


The roll period began with a large gap of 29 basis points between the two rates. This suggests that the roll was "cheap" – as opposed to "rich" in the vernacular - thereby presenting opportunity to buy the roll (buy deferred and sell nearby futures) at favorable values. Subsequently, the implicit financing rate advanced while LIBOR fell, the two rates nonetheless concluded the roll period some 7 basis points apart.

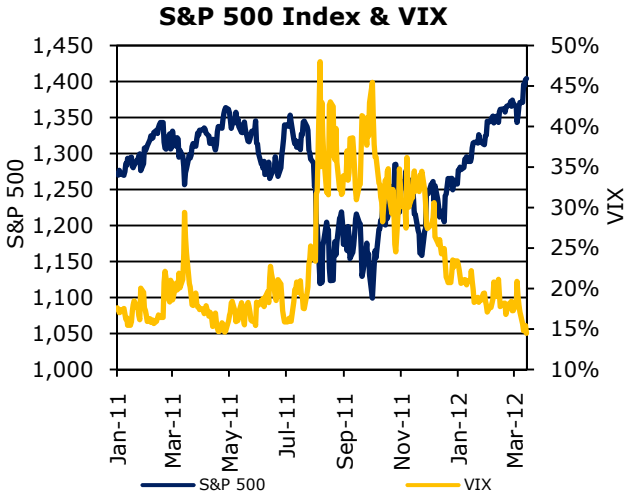
The convergence witnessed as the March 2012 roll period drew to a conclusion was in sharp contrast to the pattern that played out in the prior two roll periods in December 2011 and September 2011. In the prior periods, the gap between implied financing and LIBOR rates was initially relatively small but grew quite large as the roll periods came to an end. How can we explain these curious circumstances?

[1] CME Group Equity Quarterly Roll Analyzer may be accessed at www.cmegroup.com/trading/equity-index/paceofroll/main.htmlindex/paceofroll/main.html

Explaining the Spread - Domestic equity markets during the second half of 2011 were very sensitive as the global economy continued to be rattled by the ongoing fallout from the subprime mortgage crisis, the European sovereign debt crisis and signs of weakness in previously stalwart emerging market economies.



In particular, the sovereign debt situation in Greece was quite worrisome and, as a result, investors bailed on U.S. equities in a major way in July and August of 2011. This exerted pressure on the value of nearby stock index futures relative to the deferred months, resulting in sizable discounts of nearby to deferred futures as expirations approached.

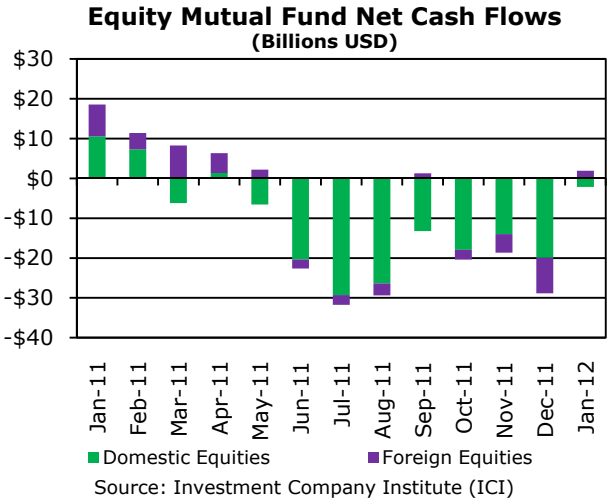


However, the situation seemed to stabilize in Europe while domestic economic numbers strengthened as we entered 2012. Equities rallied back nicely while volatility, as measured by the S&P 500 Volatility Index (or "VIX") declined.

Note that there seems to be a consistent inverse relationship between equity values and the VIX. This may be explained by the observation that equities often break swiftly and suddenly as investors seek to liquidate positions quickly in response to troublesome economic news. Thus, volatilities tend to advance in bear markets.

On the other hand, equities tend to rally slowly and steadily. The steady influx of funds into the equity markets as a result of retirement programs, implemented with automated payroll contributions, such as 401 Ks contributes to this effect. Thus, equity markets tend to exhibit declining volatilities in bull markets.

These patterns are reflected in an inspection of flow of fund data for equity mutual funds. Note that throughout the latter half of 2011, monies had been withdrawn from equity funds. However, the situation had stabilized by January 2012, according to date from the Investment Company Institute (ICI).



Source: Investment Company Institute (ICI)

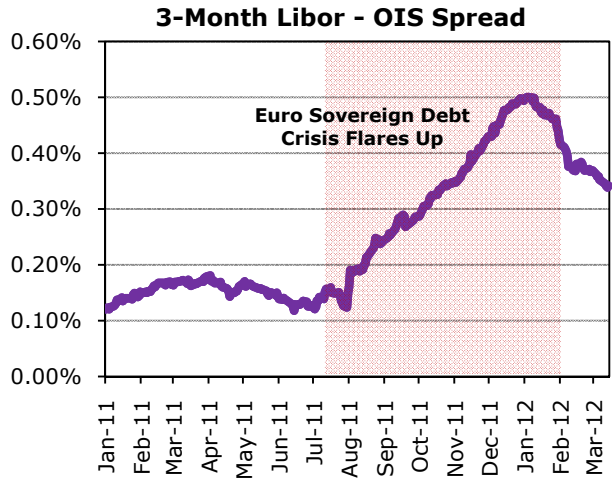
The liquidations of late 2011 weighed on stock index futures and the effects were observed in the quarterly roll. But to the extent the liquidation is stayed and even reversed in 2012, the pricing anomalies are relieved.

Interest Rate Considerations – Let us turn our attention to another explanation for the roll financing patterns in March 2012. Specifically, we believe it is interesting to follow the 3-month USD LIBOR vs. the Overnight Interest Spread (OIS) rate as a barometer of market stress. [2]

[2] OIS may be thought of as indicative of the effective Fed Funds rate taken as an average over a period of time such as a month or calendar quarter.

Note that this spread is historically observed around 10 basis points. But the LIBOR/OIS spread skyrocketed to about 350 basis points (3.5%) at the height of the subprime mortgage crisis. While the European sovereign debt crisis does not hit quite so close to home, it is interesting to observe how the spread spiked during the latter half of 2012.

But after achieving an interim peak near the conclusion of 2011, the LIBOR/OIS spread is now moving downward again. This may be interpreted as another sign of declining market stress and a return to more favorable equity investment conditions.



One may further suggest that the value of a futures contract is not only a function of market conditions, but further a function of the financing rate relevant to the particular trader. *E.g.*, if one is able to finance one's position at a more favorable rate, that implies that the futures or forward value may be reduced. In other words, the value of a futures contract might be intrinsically different depending upon your relevant financing rate.

Some would suggest that OIS has become a more relevant financing rate than LIBOR for many banks engaging in broker/dealer activities. Banks have generally deleveraged while commercial loan demand has been off in the wake of the subprime crisis. As a result, the necessity to aggressively raise funds through LIBOR financing is reduced, allowing banks to rely upon cheaper Fed Funds rate borrowing.

Thus, while we have traditionally compared the financing rate implicit in stock index futures to LIBOR, some would suggest that OIS provides a more apt comparison. But as economic conditions heat up and the LIBOR-OIS spread declines, as occurred recently, LIBOR financing becomes comparitively more attractive once again. Thus, the implied financing rate during the roll converges more closely to LIBOR.

Conclusion – Interested parties are advised to consult our website to access our Equity Quarterly Roll Analyzer at www.cmegroup.com/trading/equity-index/paceofroll/main.html. This website tool represents a valuable and popular way of monitoring activity during a critical period of market activity.

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Table 1: Pace of E-Mini S&P 500 Roll

	Mar-11 Roll	Jun-11 Roll	Sep-11 Roll	Dec-11 Roll	Mar-12 Roll
E-13	5.83%	3.27%	2.31%	6.86%	4.37%
E-12	5.89%	3.30%	2.35%	7.10%	4.53%
E-11	6.26%	3.48%	2.83%	7.65%	4.51%
E-10	7.46%	4.29%	2.94%	7.88%	4.63%
E-9	7.87%	4.60%	3.17%	6.59%	5.08%
E-8	10.73%	5.51%	3.62%	8.81%	6.79%
E-7	16.63%	7.62%	4.41%	11.08%	10.41%
E-6	20.39%	10.58%	9.30%	14.10%	14.81%
E-5	29.71%	21.69%	21.72%	21.07%	23.46%
E-4	35.70%	32.15%	34.18%	28.64%	33.00%
E-3	44.50%	42.66%	45.70%	41.82%	48.83%
E-2	50.74%	57.55%	58.40%	53.72%	60.00%
E-1	56.98%	64.38%	67.04%	59.74%	65.70%
Expiry	59.72%	66.95%	69.73%	61.92%	68.47%

Table 2: Detailed E-Mini S&P 500 Roll Data
(March 2012)

Days to Expiry	Date	Spread VWAP	Implied Financing	LIBOR	Spread vs. LIBOR
18	2/27/12	-5.85	0.35%	0.64%	-0.29%
17	2/28/12	-5.85	0.35%	0.63%	-0.28%
16	2/29/12	-5.85	0.35%	0.62%	-0.27%
15	3/1/12	-5.85	0.35%	0.60%	-0.25%
14	3/2/12	-5.87	0.35%	0.59%	-0.24%
11	3/5/12	-5.83	0.36%	0.57%	-0.21%
10	3/6/12	-5.80	0.37%	0.57%	-0.20%
9	3/7/12	-5.79	0.37%	0.56%	-0.19%
8	3/8/12	-5.83	0.36%	0.54%	-0.18%
7	3/9/12	-5.79	0.37%	0.53%	-0.16%
4	3/12/12	-5.78	0.37%	0.52%	-0.15%
3	3/13/12	-5.67	0.40%	0.52%	-0.12%
2	3/14/12	-5.56	0.44%	0.50%	-0.06%
1	3/15/12	-5.61	0.43%	0.50%	-0.07%

Appendix – About the Roll

Many asset managers routinely buy and hold a passive position in stock index futures. This tactic allows one to secure the returns in the underlying stock index such as the S&P 500, which is often regarded as the benchmark or bogey against which asset manager performance may be measured.

Portable alpha managers in particular follow the value and pace of the roll closely. They do so because a passive long strategy requires that they execute a roll transaction on a regular quarterly basis.

Thus, it is often interesting to monitor how much open interest has rolled or transferred from the expiring or nearby contract month to the deferred month. Further, it is interesting to watch the implied financing rate in the roll and compare it to prevailing LIBOR rates.

CME Group's Equity Quarterly Roll Analyzer provides this information beginning approximately two weeks prior to the expiration of a quarterly futures contract on the 3rd Friday of the contract month.

Maintaining a Position – "Rolling" one's long position forward from an expiring nearby to a deferred futures contract is commonplace in the context of a "portable alpha" program. This strategy is intended to secure core or "beta" returns as indicated by a "benchmark" such as Standard & Poor's 500 (S&P 500) stock market index. Further, portable alpha managers attempt to enhance overall portfolio returns by layering on an additional trading strategy in pursuit of excess or "alpha" returns.

But, unlike equities, futures are not perpetual in nature but rather expire on a periodic basis. Of course, the convention in stock index futures is to provide for a quarterly expiration on the 3rd Friday of March, June, September and December.

Thus, asset managers passively holding long positions in an expiring contract must "roll forward" their positions. This is accomplished by selling the expiring contract and reestablishing their long positions in the next contract month.

"Roll" Forward ➔ **Sell Nearby & Buy Deferred Futures**

The price at which one may roll forward is easily found in the spread between nearby and deferred futures contracts.

$$Roll = Deferred\ Futures - Nearby\ Futures$$

E.g., assume that Dec-11 E-mini S&P 500 futures are at 1,196.50 while Mar-12 E-mini S&P 500 futures are at 1,190.50. Thus, the roll may be quoted as the spread or -6.00 index points (= 1,190.50 – 1,196.50).

$$Roll = 1{,}190.50 - 1{,}196.50 = -6.00\ index\ points$$

Positive and Negative Carry – While the roll may readily be calculated, the next question is whether or not it fairly reflects prevailing market conditions. As a general rule, the "fair value" of a stock index futures contract ($FV_{futures}$) may be calculated by reference to "cost of carry" considerations. In other words, what would it cost to buy and carry until term an equity portfolio that reflects the value of the underlying index (*Spot*).

We assume that one finances the portfolio at prevailing short-term rates, such as LIBOR rates (R); and, benefits from the accrual of dividend income measured in index points (*Div*) over so many days (*days*) until futures maturity.

$$FV_{futures} = Spot + Financing - Dividends$$
$$= Spot\ x\left(1 + R\left(\frac{days}{360}\right)\right) - Div$$

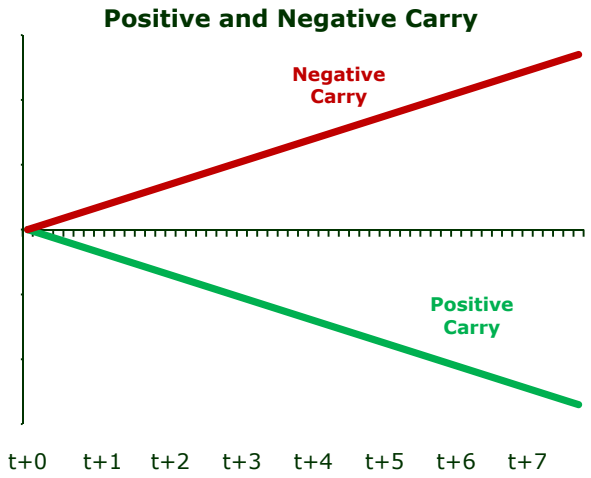
E.g., assume that the S&P 500 Index is at 1,196.80, short-term LIBOR rates are at 0.59%, there are 108 days until expiration and we expect 7.90 index points of dividend accrual until futures contract expiration. Thus, we may calculate the fair value of a futures contract at 1,191.02.

$$FV_{futures} = 1{,}196.80\ x\left(1 + 0.59\%\left(\frac{108}{360}\right)\right) - 7.90$$
$$= 1{,}191.02$$

Where the cost of financing exceeds the expected receipt of dividend income, stock index futures should trade at premium to the spot index value. As a result, deferred futures should generally trade at a premium to nearby futures and the roll is quoted as a positive number. This is a condition known as "negative carry" in futures markets because financing costs exceed dividend receipts. Negative carry is the condition normally expected in stock index futures.

But sometimes, the anticipated dividend stream exceeds financing costs. This is the case currently as short-term interest rates, driven fundamentally by Fed monetary policy, are at historically all-time lows with target Fed Funds at 0-0.25%. As such, deferred futures should trade at discount to nearby

futures and the roll is quoted as a negative number. This is a circumstance known as "positive carry" because dividend receipts exceed financing costs.



Implicit Financing – How might one determine whether the "roll" is cheap or rich? One might attempt to calculate the fair value associated with the nearby and deferred futures contracts. Or, one might get to the heart of the matter by calculating the financing rate implicit (*Imp Fin*) in the value of the roll (*Roll*).

In order to calculate this value, we also need to know the price of nearby futures ($Futures_{nearby}$); the number of days between expiration of nearby and deferred futures ($Days_{between}$). Finally, we need to estimate the dividends that will accrue between the expiration of the nearby and deferred futures ($Div_{between}$) as well as dividends that will accrue until expiration of the nearby futures contract ($Div_{to\ nearby}$).

$$Imp\ Fin = \left(\frac{36000}{days_{between}}\right)\left(\frac{Roll + Div_{between}}{Futures_{neearby} + Div_{to\ nearby}}\right)$$

E.g., the roll is at -5.75 index points, there are 108 days until expiration of the deferred futures contract, nearby futures are at 1,196.00. We estimate that there will be 7.00 index points in dividends accrued between expirations and an additional 1.15 index points in dividends accrued until expiration of nearby futures. The implicit financing rate is calculated as 0.27833% or approximate 28 basis points.

$$Imp\ Fin = \left(\frac{36000}{108}\right)\left(\frac{-6.00 + 7.00}{1{,}196.50 + 1.15}\right) = 0.28\%$$

We can compare this implied financing rate of 0.28% to prevailing financing rates to determine whether the Roll appears rich or cheap.

E.g., assume that prevailing Libor rates are at 0.59% while the implied financing rate is at 0.28% or 31 basis points below prevailing rates. This suggests that the Roll is rather low or cheap. Thus, it may be an opportunity time to "buy the roll" by buying deferred and selling nearby futures.

E.g., assume that the implied financing rate is at 0.70% while prevailing rates are at 0.59%. This would suggest that the Roll is rather high or rich. Thus, it may be more opportune to "sell the roll" buy selling deferred and buying nearby futures.

Implicit Financing < Prevailing Rate → **Roll is "Cheap"**

Implicit Financing >Prevailing Rate → **Roll is "Rich"**