

Research & Product Development

March 31, 2008

E-mini S&P SmallCap 600 Index Futures vs. E-mini Russell 2000 Index Futures

Following the September 2008 expiration, Russell 2000 Index futures at the CME Group will cease to exist. For the market participants who would like to maintain exposure to the US Small Cap segment using CME Group products, the natural choice could be the E-mini S&P SmallCap 600 Index futures. In this article, we intend to highlight several salient features of the product to ease the transition.

Index Construction Differences – The two indexes follow distinct construction methodologies. If we were to summarize the highlights¹ in one paragraph each, they would read like the following:

- *Russell 2000* – excluding illiquid stocks, closed-end funds, limited partnerships, royalty trusts, non-US stocks, and stock priced below \$1, the index is a market capitalization weighted index comprising of stocks of rank 1,001 – 3,000 in the US at the time of the index rebalancing, typically in late June every year. Stocks dropped from the index between rebalancing are not replaced;
- *S&P SmallCap 600* – a market cap weighted index with stocks of capitalization of \$300 million - \$2 billion are eligible for inclusion of the index, regardless of the rank order of the market cap in relation to other US stocks. These stocks are subject to liquidity, domicile, financial viability screens. Further, the components of the index are picked to ensure a balanced portfolio in terms of sector representation. Reconstitution of the index is performed as necessary, as opposed to an annual or periodic schedule.

Despite the differences in methodology, it is the actual behavior of the indexes that counts. Exhibit 1 shows the rolling 50-day correlation between the daily performances of the two indexes, stretching back to the beginning of the millennium. For the past 5 years, the correlation has been hovering around 0.98 - 0.99. Exhibit 2 shows the correlations with other indexes. Both pieces of evidence show that the two indexes are, indeed, measuring the same segment of the market.

Exhibit 1

Rolling 50-Day Correlation Coefficient between Russell 2000 and S&P SmallCap 600 Indexes since January 2000.

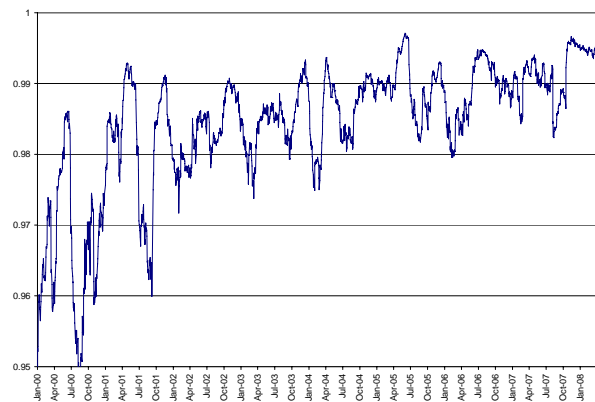


Exhibit 2

Correlation Coefficient between the daily return of Russell 2000 / S&P SmallCap 600 Indexes and other Indexes for the last 5 years

Correlation Matrix	S&P SmallCap 600	S&P 500	S&P MidCap 400	Russell 1000
Russell 2000	0.989	0.893	0.958	0.906
S&P SmallCap 600		0.894	0.960	0.907

¹ For details of the index methodologies, please consult the methodology manuals published by the respective index publishers. They are available online from the publishers' websites.

Monthly Index Performances – Notwithstanding the high correlations in the daily performances, synthetic indexers often care about the longer term performance differentials, or “tracking errors”, between the indexes.

Despite the high correlation, the performance differential measured at monthly intervals tends to exhibit some noticeable variations. The average monthly performance of S&P SmallCap 600 over those of the Russell 2000 Index was 0.25% during the period. However, the standard deviation of the differential was 1.39%. Exhibit 3 shows the distribution of such differentials since 2000. The tail of the distribution was noticeable heavy, with a kurtosis² of 2.57.

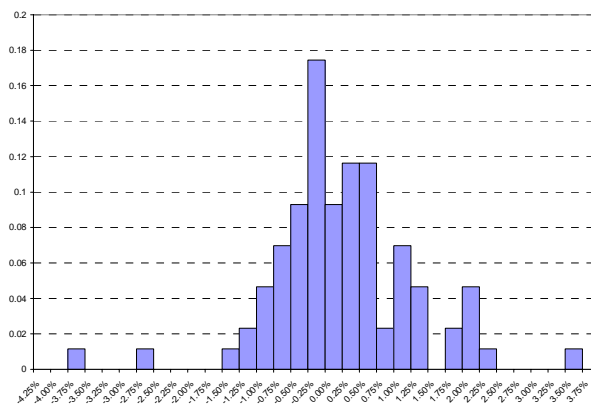
Considerations for Portable Alpha – the use of index futures as an instrument for cash equitization include additional considerations:

- *Liquidity* – as with any investment vehicles, liquidity consideration is perhaps the most important consideration after performance. While the E-mini S&P SmallCap 600 Index futures cannot compare in terms of liquidity to the E-mini Russell 2000 Index futures at the CME Group currently, it remains to be seen what kind of liquidity the Russell 2000 Index futures will generate at its new trading venue;
- *Tracking Error* – it is a well-known fact that futures trading stops 15 minutes following the conclusion of the underlying markets. Further, the costs of index arbitrage for these indexes are higher than those of the large cap indexes (e.g. S&P 500 Index) due to the inclusion of some hard-to-borrow securities. As such, the tracking error between these futures and their corresponding indexes might be higher than those of the large-cap indexes. The S&P SmallCap 600 Index futures will continue to enjoy the benefit of the month-end fair value settlement procedure, thereby containing one source of tracking error, at least insofar as monthly performance is concerned. It remains to be seen if the Russell 2000 Index futures will continue to enjoy the same benefit at its new venue.

² The reported kurtosis is normalized, i.e. that of a normal distribution is zero. The kurtosis of monthly returns on the S&P SmallCap 600 and Russell 2000 indexes are 0.55 and 0.21 respectively.

Exhibit 3

Distribution of Monthly Performance Differential between S&P SmallCap 600 and Russell 2000 Indexes, since January 2000.



- *Roll Cost/Implied financing rate* – the history of the S&P SmallCap 600 Index futures is much shorter than that of the Russell 2000 Index futures. However, it might still be instructive to review the latest quarterly roll cost. The roll costs of the Russell 2000 Index futures for the last 5 rolls are also shown in Exhibit 4. In this latest quarterly roll, the S&P SmallCap 600 was trading at 107 basis points below LIBOR, or 50 basis points higher than the Russell 2000 calendar spreads³.

For indexers considering a transition to S&P SmallCap 600 Index futures as a surrogate for the Russell 2000 Index, it means a balancing act between tracking errors between the indexes and their respective futures versus the tracking error between the indexes as well as the implied financing costs. The liquidity issue will likely remain undetermined until the termination of Russell 2000 Index futures at CME Group.

Exhibit 4

Average historical roll cost for Russell 2000 and S&P SmallCap 600, measured in annualized basis point spread to LIBOR.

Roll Cost	Russell 2000	S&P SmallCap 600
Mar/Jun07	-81	
Jun/Sep07	-96	
Sep/Dec07	-165	
Dec/Mar08	-162	
Mar/Jun08	-157	-107

³ One possible explanation is the inclusion of fewer hard-to-borrow stocks in the S&P SmallCap 600 Index portfolio, thereby contributing to the difference in the roll cost. For more information on this latest quarterly roll, please consult the Quarterly Roll Summary published by CME Group.

In addition to the foregoing, capital efficiency may also come into play. This is especially true for the portable alpha programs. The S&P SmallCap 600 Index futures at CME Group will enjoy the benefits of the cross margining with other index products within CME Group. While cross margining benefits between the stock indexes with other financial and commodity futures are much lower, efficiency will still accrue due to the centralized collateral treatment, not an insignificant consideration if the alpha strategy cuts across a host of different instruments.

Transitioning to S&P SmallCap 600 – the most obvious way of transitioning into the S&P SmallCap 600 Index futures is, of course, by trading out of the existing Russell 2000 Index futures and acquiring a comparable position in the S&P SmallCap 600 Index futures. Depending on the size of the position, the liquidity of both contracts might not be there to support such a move. There could be a sizeable market impact.

However, when the nearest expiration approaches, there could be a second transition strategy with less market impact, viz. via the calendar spread.

Typically, the calendar spread for any index futures is much more liquid than the outright markets. This certainly applies to the S&P SmallCap 600 Index futures. Overlaying a calendar spread between the expiring and next quarterly S&P SmallCap 600 Index futures will not introduce additional exposure to the small-cap stock segment. Since the Russell 2000 and S&P SmallCap 600 Index futures both expire as of the 3rd Friday of the expiration months, the two positions will drop out at the same time, leaving only the deferred S&P SmallCap 600 Index futures position. There is little impact to the performance bond requirements, as the calendar spread requires little additional collateral. Once the lead month contracts terminate, the collateral requirement for the net outright position will remain in place for the succeeding S&P SmallCap 600 Index futures outright position.

Given the high correlation between the two indexes, the co-existence of the two expiring legs will introduce manageable amount of discrepancy as the calendar spread will not be acquired until a few days prior to the expiration of the front leg.

In terms of the number of calendar spreads in the S&P SmallCap 600 Index futures, there is, of course, no single correct answer.


- (a) *Notional Value equivalence* – if the market user decides to maintain the same notional value exposure following the transition, matching up the notional value between the Russell 2000 and S&P SmallCap 600 Index futures will provide the answer. Given the fact that the contract multipliers are the same for E-mini Russell 2000 and E-mini S&P SmallCap 600, the “hedge ratio” is simply the ratio of the futures prices. E.g., at prices of 684.10 and 362.2 for the Russell 2000 and S&P SmallCap 600 respectively, each one Russell 2000 Index futures would require 1.89 S&P SmallCap 600 Index futures calendar spread;
- (b) *Volatility-adjusted Positions* – it is not surprising to find that the Russell 2000 Index is more volatile than the S&P SmallCap 600 Index. If one wishes to match up as much as possible to the characteristics of the Russell 2000 Index following the overlay, the position can be adjusted by the correlation and the relative volatility of the two indexes, viz. by a factor of

$$\rho \frac{\sigma_{\text{Russell 2000}}}{\sigma_{\text{S\&P SmallCap 600}}}$$

where ρ is the correlation between the Russell 2000 and S&P SmallCap 600 Indexes, and σ denoting the volatility of the index indicated in the accompanying subscript.

With a correlation of approximately 0.99, and the volatility estimates of 19.1% and 17.4% for Russell 2000 and S&P SmallCap 600 Indexes respectively, this adjustment factor is 1.087. Therefore, using the same futures prices as in (a), for each Russell 2000 Index futures, $1.89 \times 1.087 = 2.054$ S&P SmallCap 600 Index futures calendar spread are needed.

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