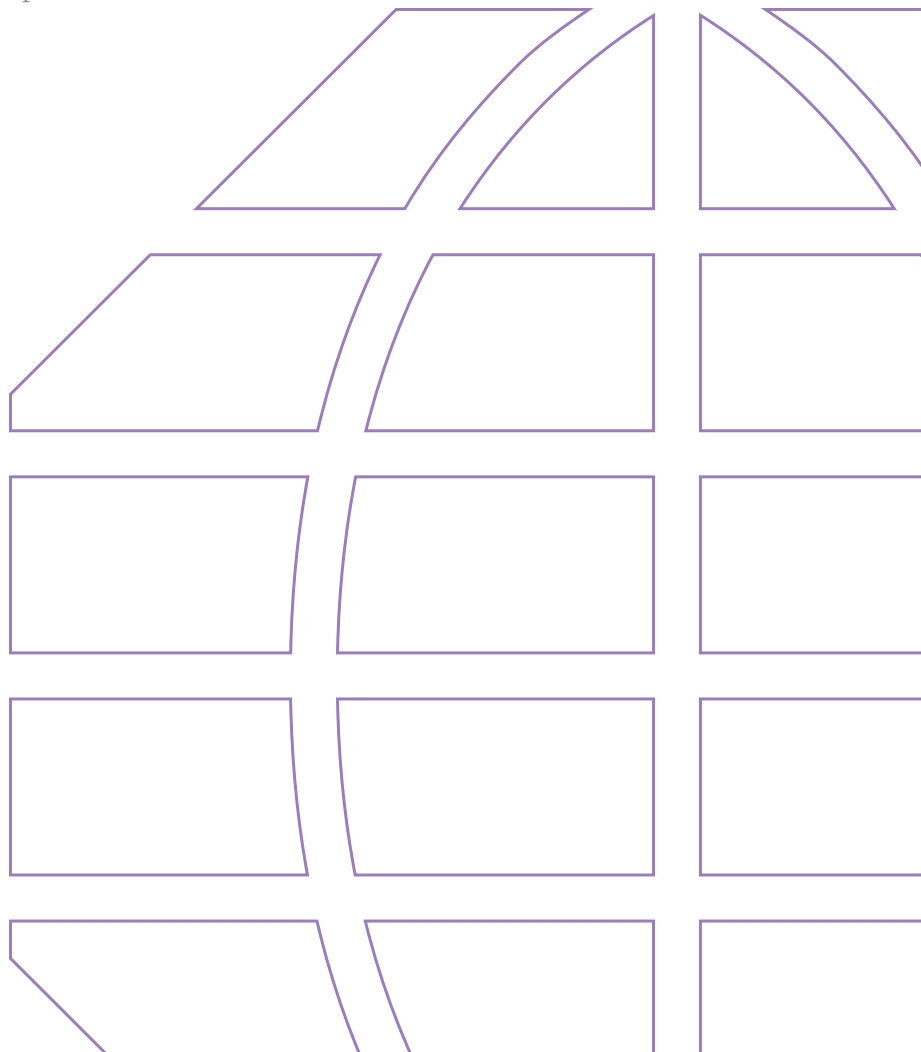


RESEARCH AND PRODUCT DEVELOPMENT

Tracking Error for E-mini MSCI Emerging Markets Futures

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This paper examines the tracking error of the E-mini MSCI Emerging Markets futures to the underlying index over its first 12 months of performance.

It has been a year since the launch of CME Group E-mini MSCI Emerging Markets futures contracts in late October 2007. Since that time, the contract has attracted significant attention from market participants, as evidenced by the strong growth in open interest. As of this writing, the open interest was over 12,000 contracts and gaining at a healthy pace. With the recent turmoil in the markets, it is time to review how the increased volatility in the market has impacted the performance of the futures contract with respect to its tracking error versus the underlying index. Methodological notes will follow the comparison.

TABLE 1:
CME Group E-mini MSCI Emerging Markets Futures tracking error since inception.

	Monthly Performance			Monthly Tracking Error	
	Index/Gross	Index/Net	Futures	vs. Gross	vs. Net
Nov-07	-7.08%	-7.09%	-8.46%	-1.37%	-1.37%
Dec-07	0.56%	0.56%	-0.89%	-1.45%	-1.45%
Jan-08	-12.53%	-12.53%	-9.50%	3.02%	3.03%
Feb-08	7.30%	7.30%	3.00%	-4.30%	-4.30%
Mar-08	-5.17%	-5.17%	-2.11%	3.06%	3.06%
Apr-08	8.07%	8.06%	8.52%	0.45%	0.46%
May-08	1.86%	1.85%	2.05%	0.19%	0.20%
Jun-08	-10.01%	-10.01%	-10.44%	-0.43%	-0.43%
Jul-08	-3.75%	-3.75%	-6.50%	-2.75%	-2.75%
Aug-08	-8.04%	-8.04%	-6.32%	1.72%	1.72%
Sep-08	-17.52%	-17.53%	-15.69%	1.84%	1.84%
Oct-08	-27.38%	-27.39%	-28.34%	-0.96%	-0.96%
			Average	-0.0789%	-0.0831%
			Std Dev	2.26%	2.26%

Monthly Performance Comparison.

Table 1 compares/contrasts the performance of the index with gross and net dividends, as well as with that achieved from a strategy of using futures to replicate the index. With November 2007 being the first full calendar month of the contract, we can show the performance of the last 12 full months. Table 1 shows the monthly performance of the futures in relation to the underlying index.

Some Observations:

- The long-term performance of the futures is actually quite attractive. The monthly tracking error averaged to be a few basis points (bps) during the first 12 months of the product.
- The monthly performance does show considerable volatility. The estimated standard deviation of 226 bps was a result of the recent heightened variability. But there is a distinct pattern to the fluctuation, in which a large deviation one month tends to have an offsetting deviation in the following month. We have noticed the same pattern for most of the non-U.S. index futures, including those based on the Nikkei 225 Stock Average and the MSCI EAFE Index.

The pattern behavior can be explained by the asynchronous closing time between the futures and the underlying cash market: The 800 securities from 25 emerging markets countries (see Table 2 for country weightings) are traded in 11 different time zones. The monthly performance of the futures contract is measured against the closing price of the futures at 3:15 p.m. Central Time (CT) at the end of each calendar month. Asian markets, which represent almost 45 percent in the index, would have closed some 13 hours prior to that time.

Information flow during American time zones will impact both futures and the underlying stocks, but the effect on the latter would not show up until the following business day. As such, the same-day cash index would not have reflected the latest market movement. Since the underlying index trails the futures in this sense, the unaccounted-for market movement will be reflected in the performance of the underlying index the next calendar month, causing the tracking error to reverse.

TABLE 2:
MSCI Emerging Markets Country Weight as of November 1, 2008.

MSCI Emerging Markets Index			
Country	Weight	Country	Weight
China	15.45%	Chile	1.36%
Brazil	14.20%	Thailand	1.31%
Korea	13.51%	Czech Republic	0.92%
Taiwan	11.66%	Egypt	0.67%
Russia	7.51%	Hungary	0.65%
South Africa	7.23%	Colombia	0.55%
India	6.64%	Peru	0.55%
Mexico	5.18%	Morocco	0.52%
Israel	3.26%	Philippines	0.51%
Malaysia	2.93%	Argentina	0.44%
Poland	1.71%	Pakistan	0.18%
Turkey	1.59%	Jordan	0.11%
Indonesia	1.37%	Total	100.00%

Source: MSCI Barra.

Performance Calculation Methodology

The performance of the cash index is calculated by the closing price of the index plus the monthly gross or net dividend accrued throughout that month. However, the performance of the futures cannot be simply taken as the percentage change between two futures prices.

- Futures contracts are “unfunded” instruments. One does not pay the price of the futures contract in cash. The money is actually sitting in interest-accruing instruments and serves as collateral. Thus, if one commits 100 percent of the cash index, no leverage will be involved, thus making the performance comparison an “apples-to-apples” one.
- We used the one-month LIBOR as the instrument for the interest-accruing calculation. Note that in the months when there are sizeable changes in the interest rates – e.g., January 2008, in which the Federal Reserve cut its target rate by 125 bps – this methodology may result in a significant difference in futures performance for participants holding the cash assets in, for example, overnight rate instruments.
- Thus, the performance calculation for the futures strategy is the futures price change for the month divided by the cash index value, plus the interest accrual for the month. Before the expiration of the lead month futures contracts, the position is assumed to “roll over” to the next available quarterly contract at the settlement prices of the day. This rollover is assumed to be consummated on the Monday prior to the expiration Friday.

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