

## What can we learn from housing futures?

**By Jonathan Reiss, Analytical Synthesis, LLC  
June 24, 2008**

Futures on the S&P/Case-Shiller home price indices have traded for two years. Liquidity has been disappointing, at best. However, there are many things we can learn from the futures trading to date. We can get insights helpful both for understanding the housing futures market in particular and for insights into the housing market over all – a topic of great importance to the economy and financial markets today. We can also assess whether there is opportunity in the market today.

### **Buying housing futures may be attractive today**

Home prices are likely to continue to drop for at least a year. Even so, now may be an excellent time to buy housing futures. The reason is that futures prices incorporate market expectations and so are substantially lower than current home price index levels.

To understand how this can be true, it is helpful to understand how housing futures are similar to direct investments in housing and how they are different. Like a direct investment in housing, home price futures will benefit from unexpected increases in home prices and will be hurt by unanticipated declines. However, unlike housing, the prices of housing futures reflect market expectations<sup>1</sup>. So if the market anticipates a decline, home price futures will trade below the index value. Therefore, the futures return will be higher than that of the index. Consider the experience from the first year of home price futures trading.

### **The first year of futures trading.**

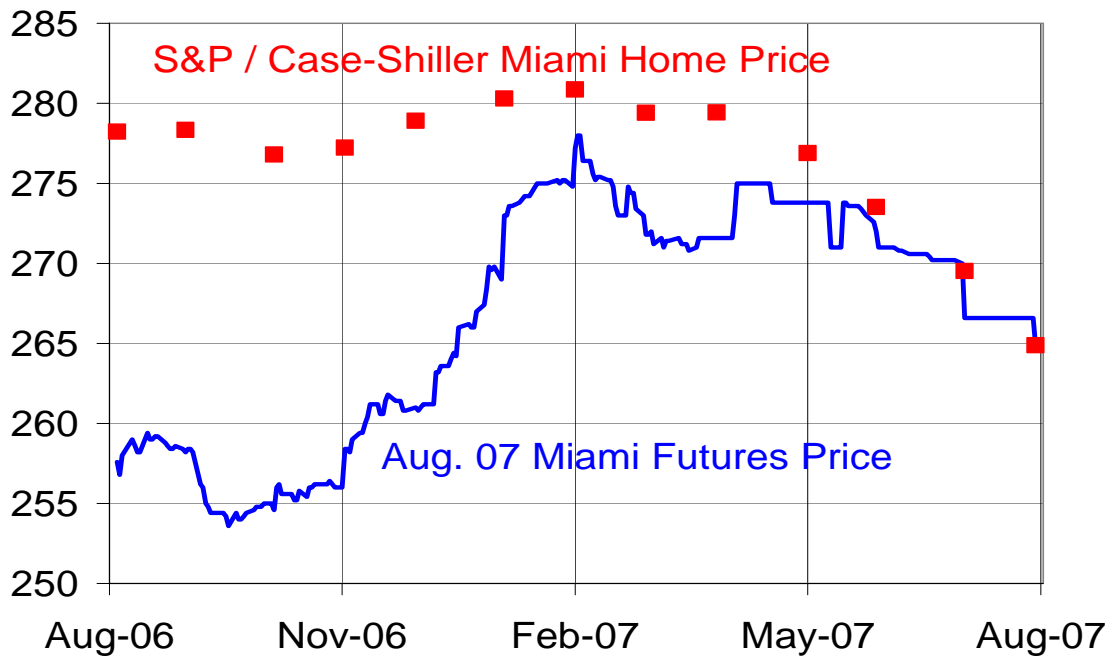
Figure 1 graphs the prices of the S&P/Case-Shiller Miami Home Price index and the future on that index. The dots represent the values of the index<sup>2</sup> while the line shows the price of the August 2007 Miami future. When the future began trading (left-hand side of the chart), the latest value for the index was 278.22 but the future was traded at 258.2, 7.2% below the index. Over the next 12 months, the index dropped 4.8% to 264.89. The futures price converged to the index value of 264.89, as is assured by the futures settlement mechanism. But the futures had a positive return of 2.6% because of the initial price discount. Including the return on the collateral, an unlevered futures investment would have returned +7.6%, very good for a housing-related investment in a period when home prices were dropping as were many related investments.

---

<sup>1</sup> Other more practical differences are that direct investments in housing entail brokerage and other transaction costs. Owners of houses, of course, have a place to live or rent out and incur property taxes, maintenance and other costs. Futures can be sold short while houses cannot.

<sup>2</sup> Index values are shown on their publication dates. For example, the first dot represents the June 2006 index value published on August 29, 2006.

**Figure 1: Futures price convergence to the index:**



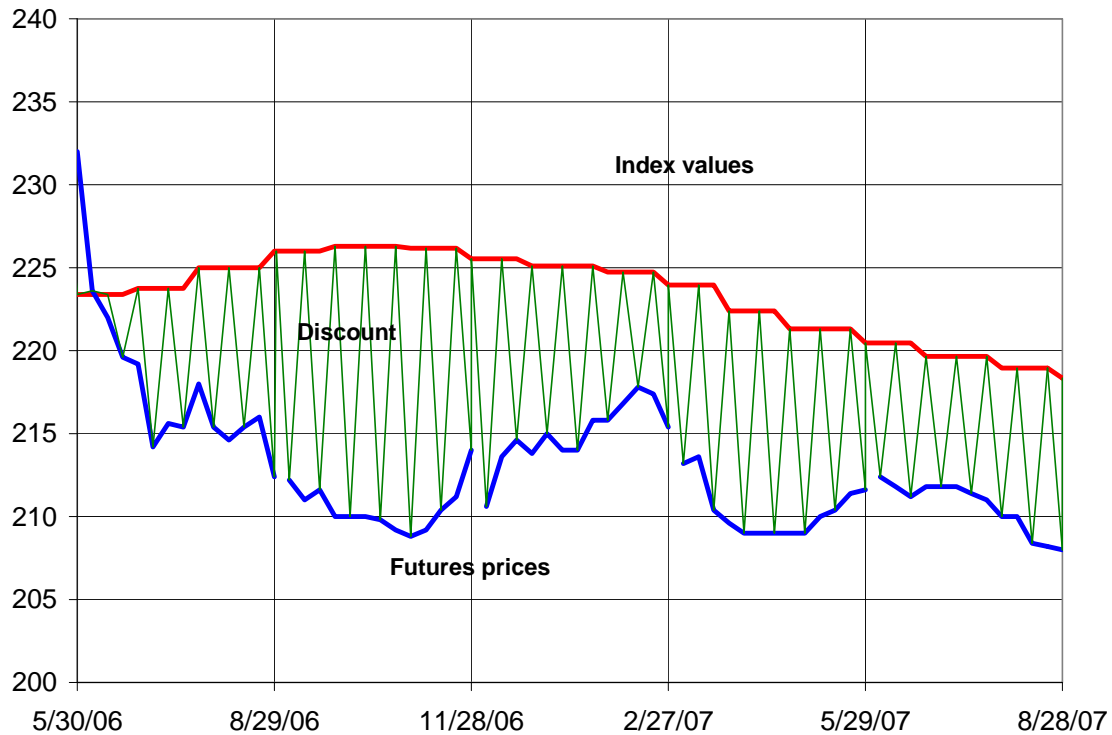
Source: S&P, Chicago Mercantile Exchange.

**Initial discount in the future results in a return premium even in a declining market.**

What we can learn from this is that the housing futures prices incorporate market expectations for home prices. The nature of the housing market has an important influence on the behavior of house price index futures. Because the underlying housing market is not easily traded, there is great latitude regarding where the future can be relative to the index when there is a meaningful amount of time to final valuation. This is very different from many financial futures such as those on the S&P 500 stock index. The divergence between the index and the future reflects the market outlook for housing as well as a return premium. As it approaches expiration, the futures price converges to the index value. So, the discount of the future relative to the index is an important measure of the market outlook and its level of risk aversion. It is also an important factor influencing the futures' subsequent return.

Figure 2 shows the relationship of the future to the index during the first year of trading. This chart shows the 10-City composite index but the basic pattern was similar for all 10 cities that traded. Unlike Figure 1, this chart rolls from one future to the next so that it is always showing a future with about one year to expiration. The breaks in the line show where the graph switches from one futures contract to the next. As you can see, the future began at a substantial premium to the index but quickly declined to below the index and has remained there. The reason for the initial premium is that the original market-maker for the home price index futures mispriced the futures. During the first month of trading, almost all trades were at the bid side of the market until it found its equilibrium at a discount to the index.

**Figure 2: Futures consistently priced at a discount to the index**



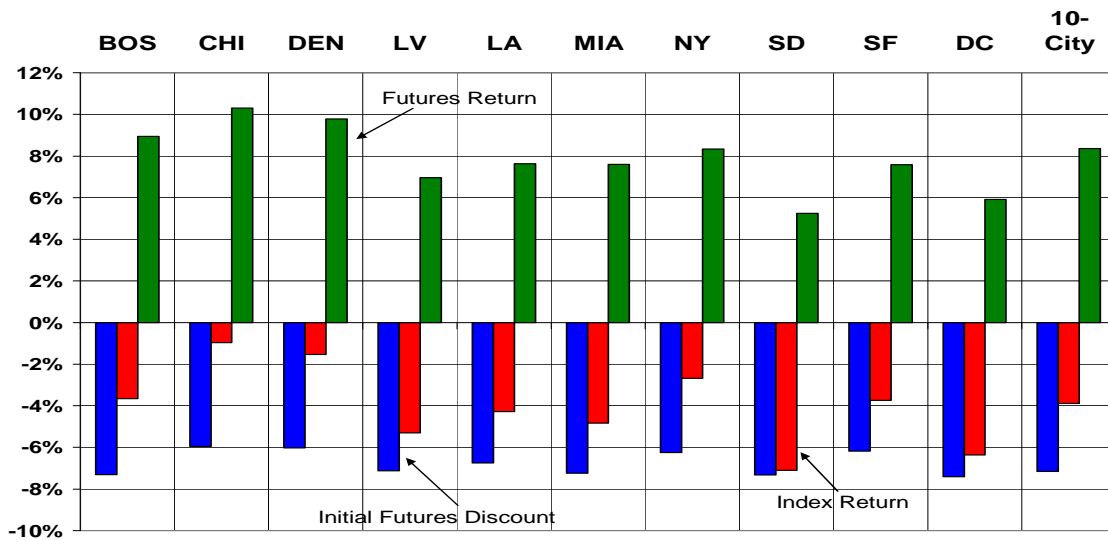
Source: S&P, Chicago Mercantile Exchange and Bloomberg

In 2006, the discounts were generally large enough to reward holders of the future for the risk that they took, as well as for the decline in the index that occurred. Figure 3 graphs the discounts of the August 2007 futures when they began trading (in blue), the home price index returns (in red) and the excess return on the future (green). Home prices declined in all ten cities. But you can also see that the futures discounts were larger than the index declines, resulting in significantly positive returns for all futures.<sup>3</sup>

These results should not be surprising. They are how futures should behave. The futures contract prices reflect the market outlook. It should also reflect a risk premium built into the futures to compensate the buyer for taking on the risk of housing. Financial theory suggests that there should be a positive expected return. But the actual premium is likely to be even larger than theory would suggest because of excess demand for hedging in this market. Hedgers are willing to pay an extra premium to offset their risk by selling futures.

<sup>3</sup> Futures returns also incorporate a return on collateral of 5%.

**Figure 3: Housing futures posted positive returns in declining housing markets** <sup>4</sup>



Source: S&P, Chicago Mercantile Exchange, Bloomberg and Analytical Synthesis estimates.

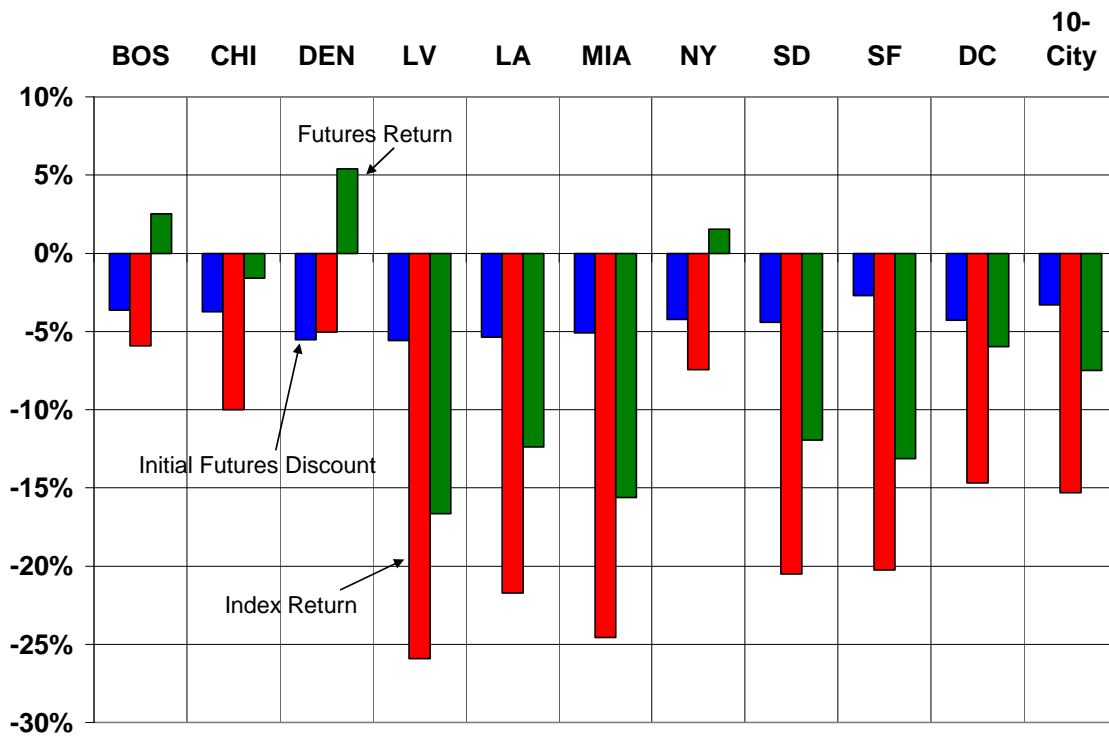
**The second year of futures trading.**

Looking back at Figure 2, you can see that at the beginning of 2007 the futures rallied even though the index itself had begun to decline. As a result, the discount narrowed. We will see shortly the unfortunate impact of this on holders of long futures positions, but first we should recognize a public benefit from the futures. Those paying attention to this market could see that the market was not as cautious about taking on housing risk. This was not unique to the housing futures market. It reflected the behavior of financial institutions generally. Many other instruments that are exposed to housing risk, such as sub-prime mortgage securities and the stocks of mortgage originators, were underestimating the house price decline that was about to occur. However, the house price futures market has the benefit of transparency. The market expectation is much more visible in the futures because, unlike other instruments, their prices directly reflect the market's forecast and the return premium offered for taking on the risk. This might have served as a warning of the potential for losses if home prices continued to drop.

As we noted, the futures price discounts in the first half of 2007 became quite modest. This meant that there was little cushion to absorb house price declines. Unfortunately, for people with long futures positions as well as many other financial market participants, the house price declines accelerated. Using the same color scheme as above, Figure 4 displays the returns on the May 2008 futures over their life. You can see that futures outperformed the underlying indices because of the initial pricing discount -- but not by nearly enough to cushion the full home price declines. The futures returns were negative in most cities because of home price declines *that the market did not anticipate*.

<sup>4</sup> Futures and index returns from 8/29/06 to 8/28/07. Futures returns include an assumed return on collateral of 5%.

**Figure 4 Futures returns were negative because the discounts were too small <sup>5</sup>**



Source: S&P, Chicago Mercantile Exchange, Bloomberg and Analytical Synthesis estimates.

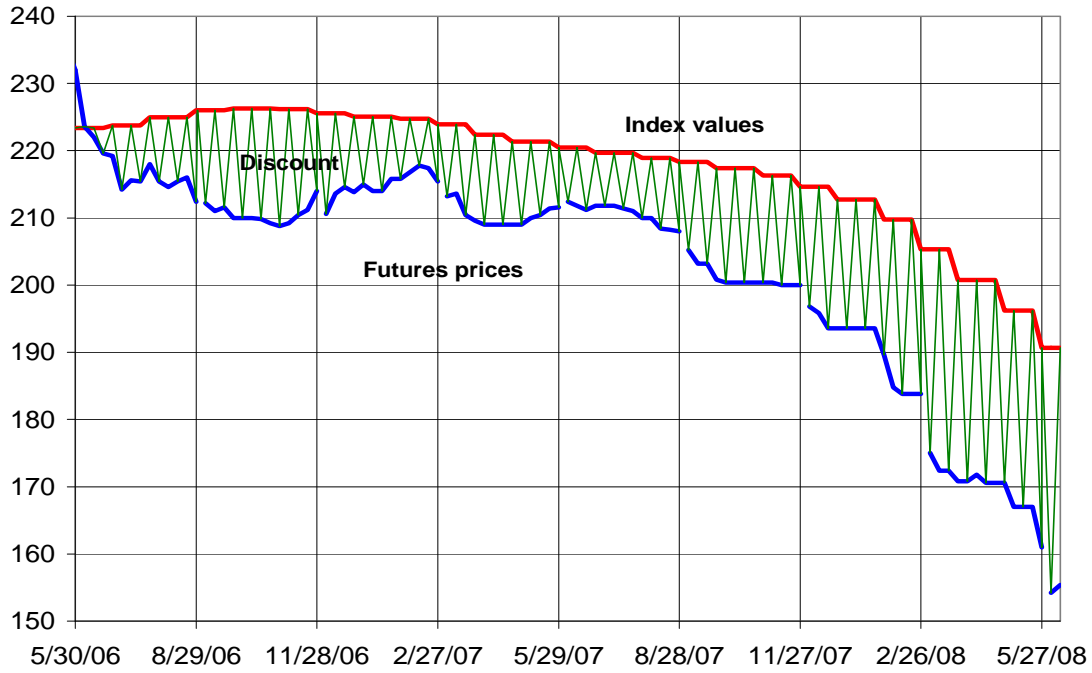
**Looking Forward**

Figure 5 brings Figure 2 up-to-date. You can see that while house price declines have accelerated, the futures have dropped even faster. This has opened up a substantial discount. Figure 6 gives a fuller picture of this. It displays the futures discounts for a variety of horizons and cities. You can see that the market is pricing a further 20% decline in home prices for the 10-city index. The question of how far home prices will decline and when the decline will end is of great concern to many people. It has implications for the economy and the financial markets. The futures market gives a daily indication of the market forecast.

The outlook is even more negative for Los Angeles and Miami. Subprime lending was especially prevalent in Los Angeles. Miami experienced an enormous home construction boom. Both cities have experienced substantial foreclosures. So there are certainly reasons to be particularly pessimistic about those cities. Chicago and New York have stronger fundamentals and home prices in those cities did not rise as sharply from 2000 to 2005. Even in those cities, the futures are pricing discounts of more than 10%.

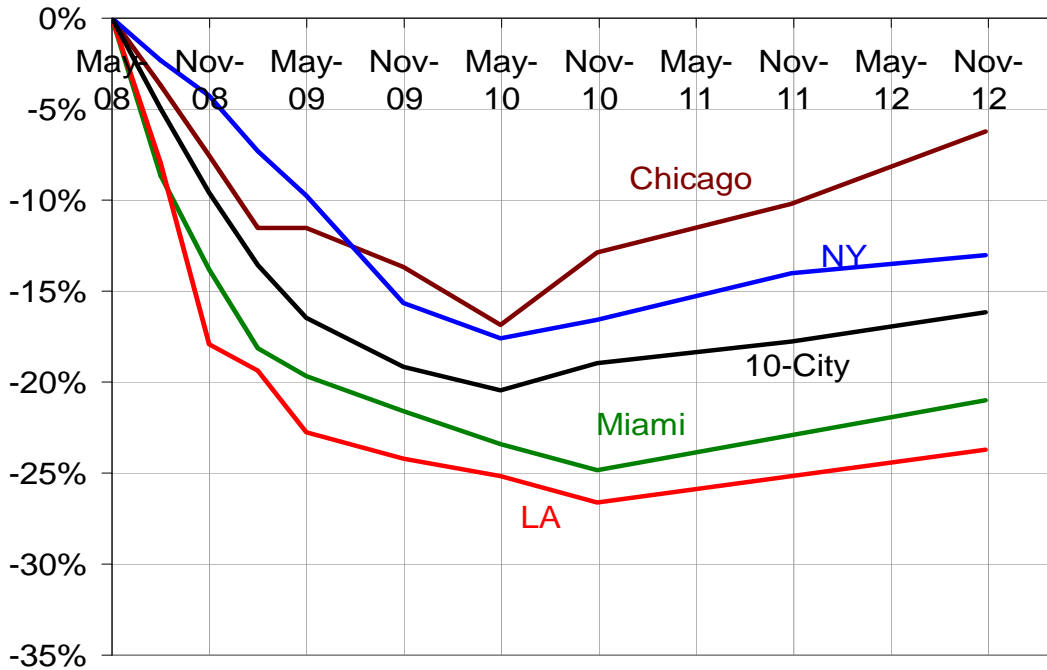
<sup>5</sup> Futures and index returns from 5/29/07 to 5/27/08. Futures returns include an assumed return on collateral of 4.9%.

**Figure 5: Discount has increased while home prices have fallen**



Source: S&P, Chicago Mercantile Exchange and Bloomberg

**Figure 6: Futures market is pricing in large declines over the next two years.**



Source: S&P, Chicago Mercantile Exchange, Bloomberg and Analytical Synthesis estimates.

I began this essay by noting that it may be the time to buy home price futures. The market is currently pricing in quite substantial discounts. It is certainly possible for declines of this size, or worse, to occur. However, if the market is operating as it should, the futures prices should be downward biased forecasts of home prices. That is, the expected decline should be smaller than the levels indicated in the futures so that buyers will have positive expected returns for taking on housing risk. Of course, each of us must make his own judgment. And, differences of opinions are what make markets.

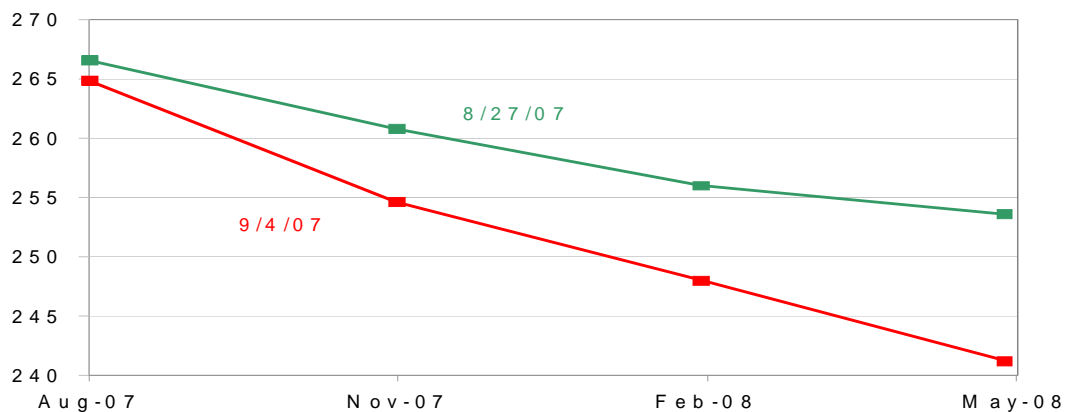
This market has the potential to provide value to many constituencies. It could allow builders, mortgage servicers, investors and banks to hedge their exposure to home prices. It could enable endowments, pension plans and global investors to expand their investments into a diversifying asset class. And it could facilitate the creation of retail products that would help individuals manage the financial risks related to the value of their homes. Liquidity was building well for the first year that the contract traded but has declined substantially since then. The Chicago Mercantile Exchange has addressed a major shortcoming of the market by extending the contract listings to five years late in 2007 and is making efforts to bring participants into this market. Standard & Poor's has recently purchased full licensing rights and is improving the availability of information on the indices. There are many institutions interested in seeing this market develop. More education and coordination of these efforts should help the market to reach its potential.

*Jonathan Reiss is Founder and Managing Director of Analytical Synthesis. Analytical Synthesis is market-maker in futures on the S&P / Case-Shiller indices and consults on applications of these instruments and other housing-related products. The views expressed in this article reflect those of the author, and not necessarily those of Standard and Poor's or Fiserv.*

### **Appendix: Additional insights into the behavior of futures pricing**

One other notable aspect of house price futures is the way that the curve responds to news. Figure 7 shows the Miami home price curve before and after the August 2007 index release. The index was down about 1% more than anticipated. But, as you can see, the May 2008 future dropped about 5%. This is because market participants know that home price movements are very persistent. When they drop, they typically drop for a number of months or even years. So, when the price decline accelerated, the market anticipated that this would continue. So, futures market participants priced further declines into the longer-term contracts.

**Figure 7: Longer-term futures react more because of index momentum**



This has a number of implications. The first is that hedges need to match the appropriate horizon. This is why it was a big step forward when futures contracts with terms as long as five years began trading in Sept. 2007. Second, it means that longer contracts are more volatile. The volatility of the fourth contract has been nearly twice that of the nearest one (6.7% v 3.4% for the 10-city).

Third, because the market understands the momentum of the indices, and so incorporates full impact of news in the longer-term contracts, the futures are more efficiently priced than the underlying housing market. One indication of this is a measure proposed by Professor Paul Samuelson. He noted that efficient markets should not be predictable -- in particular, that their prices should not exhibit pronounced trends. Autocorrelation, is a measure of this, ranges from -1 to 1. If the market is efficiently priced, the autocorrelation should be close to zero. As Professors Case and Shiller have noted, home prices are very highly autocorrelated. The autocorrelation of the 10-city index is 0.92. The autocorrelation of the fourth futures contract has been -0.02 indicating that, even though they are not yet liquid, the futures market is more efficient than the underlying homes themselves.