"Professor's Comments"

(For the September 2009 Moody's/REAL Index returns.)

This is a periodic commentary which will generally be posted monthly on the "RealIndices" web site, offering the perspective on the indexes of Professor David Geltner (or occasional guest commentators). Geltner was a leader of the team at MIT that developed the methodology for the Moody's/REAL Indexes.

Overview: Continued decline…

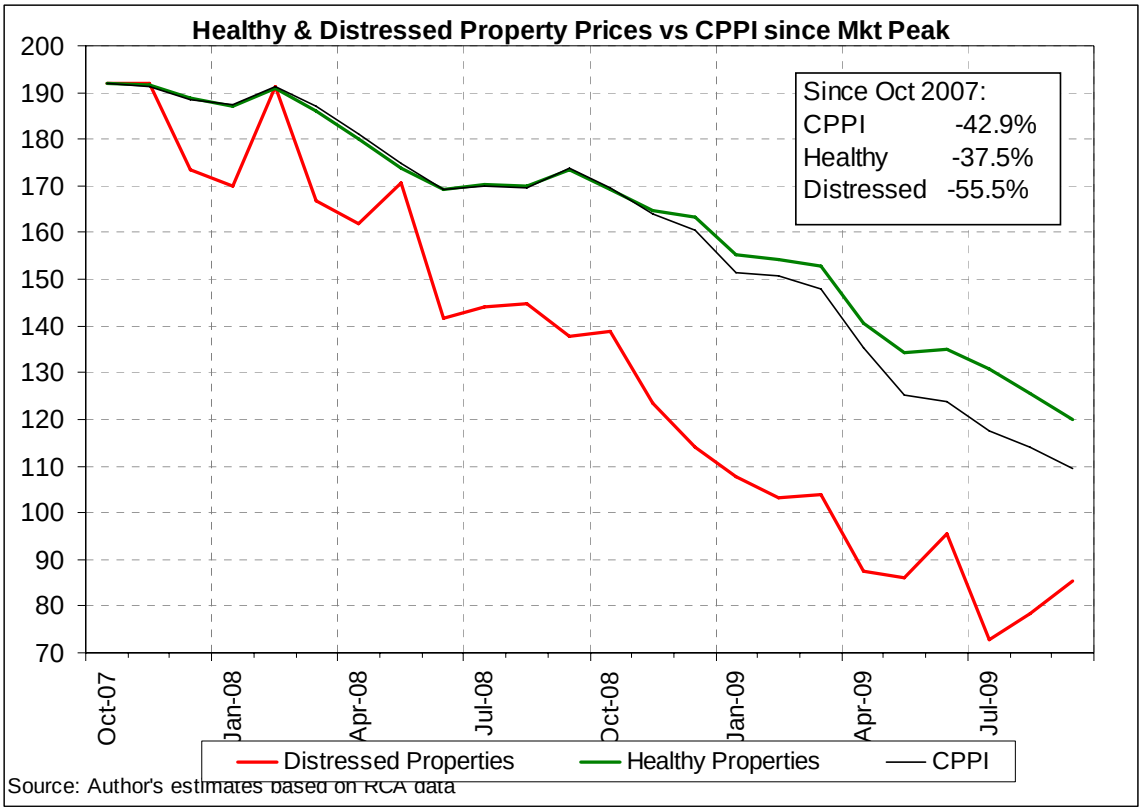
The All-Property CPPI has posted yet another monthly decline in September, its 12th in a row. I had held out some small hope that we might indicate at least a pause or leveling off of the price decline, given other relevant evidence. For example, the other transactions price based index I am involved with, the so-called "TBI" published by the MIT Center for Real Estate, recorded an uptick for the third quarter, echoing the first positive GDP quarter since the recession began. And the housing indices are have largely bottomed or turned slightly up since last spring. But the CPPI is still falling quite definitively, down 3.9% in September, now to a value just below 110 (compared to its October 2007 peak of 192). The nominal decline is now 42.9%, and the real (inflation-adjusted) decline is 44.8% (since the August 2007 real peak). In the only good news, volume was up, but only slightly, and remains at historically low levels. Furthermore, most of the increase in volume was sales of distressed assets. And this begs that we look at some of our analytics that we have introduced in previous months, to explore behind the headline numbers and gain some insight about the big picture of the CRE pricing situation…

Distressed versus "healthy" properties & the long view…

The charts on the following pages update an analytical view I have introduced in previous monthly commentaries. The first chart traces separate price movements for so-called "healthy" properties versus those falling into "distress" (as indicated by the RCA "troubled asset" designation) within the CPPI since the beginning of the downturn in October 2007.* While one should not place too much store in the returns to any one month, there continues to be a suggestion in the chart that the valuations of distressed properties *per se* may not be declining further at present. That is, properties already in distress may not have fallen further in value during September, and indeed possibly not since July. They remain around 55% below the October 2007 peak before they fell into distress.

* The method of constructing these index break-outs is described in my October commentary published last month. Please note that while the sub-indices are anchored to the frozen official CPPI, the relative movements are not frozen, but rather include backward revisions reflecting the latest data. Also be aware that the two sub-indices contain more noise than the official CPPI, particularly in the case of the distressed property index which is estimated based on far fewer transaction observations. The result is that individual monthly returns can be unreliable.

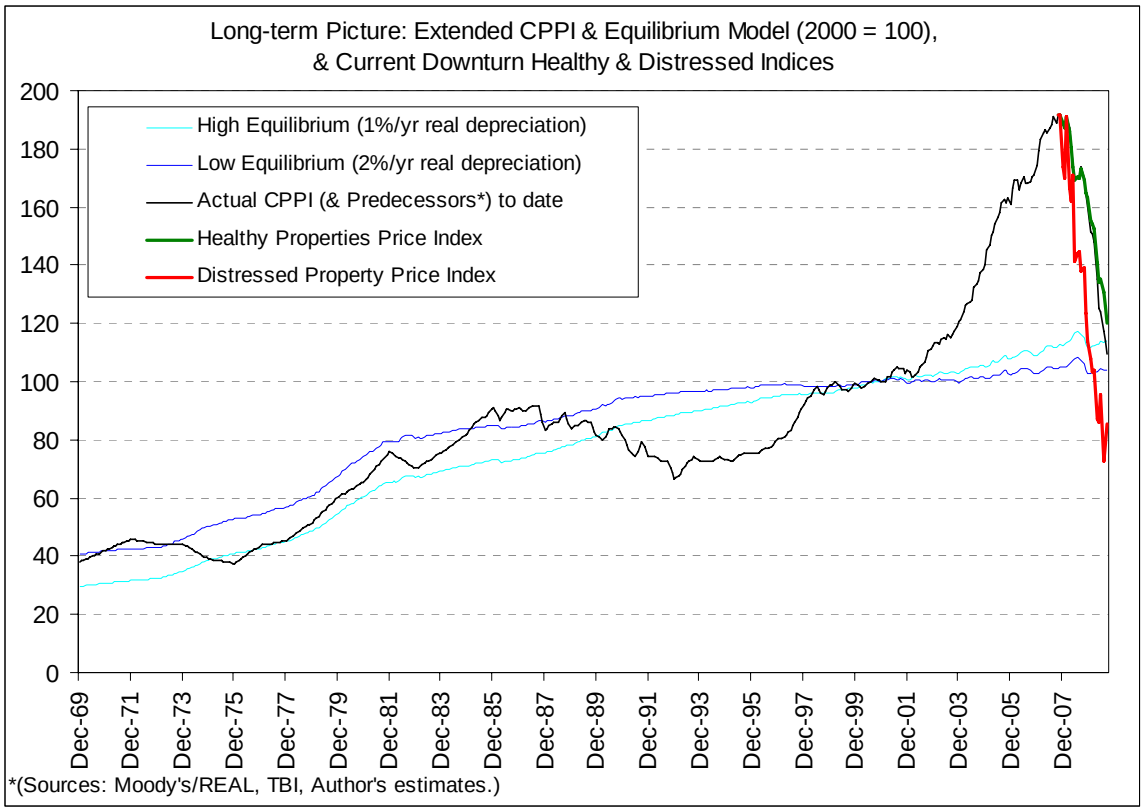
Meanwhile, “healthy” properties (those not flagged as “troubled” by RCA) may still be slipping in the prices they can command, perhaps being dragged down by competition from the growing presence of distressed properties in the market. Indeed, troubled asset sales grew to 33% of all the CPPI observations in September, a new record, up from 25% in August (which was itself a record). Interestingly, the healthy property index is now down 37.5% from its peak, which is very similar to the cumulative drop now registered (as of third quarter) in the NCREIF-based TBI price index since its peak.[*] It would not be surprising if the NCREIF member core property holdings that underlie the TBI would generally be suffering less of the distress indicated by the RCA “troubled asset” designation than the broader population of commercial properties tracked by the CPPI. Clearly, part of the drop in the CPPI during the third quarter, in contrast to the TBI, must be attributable, both directly and indirectly, to the growing proportion of distressed sales in the RCA database.



The chart below (on the next page) puts the current situation in a longer-term perspective, using a backward extension of the CPPI and an “equilibrium price model” that I have introduced and described in previous commentaries. The key point is that values of the CPPI below the bounds indicated by the blue lines may be in what could be termed “negative bubble” territory, by which I mean prices that are unsustainably low because

[*] The TBI rose in 3Q09 from 39% below its 2Q07 peak at the end of the previous quarter to a level 36.5% below its peak. The TBI is available on the MIT Center for Real Estate web site, at: http://web.mit.edu/cre/research/credl/tbi.html .

they present an excessive bargain to the buyers, that is, super-normal expected returns going forward from an economic perspective. However, I have noted that this may be harder to judge for distressed properties, as they may genuinely present greater risk or excessively deteriorated cash flow fundamentals. And I have also cautioned that the "equilibrium model" I am using here is simplistic.* But with these caveats in mind, the chart below suggests that at least some distressed properties may be in the negative bubble territory, and even the healthy properties are now selling at prices that would seem very solid and sustainable by long-run historical standards.



The biggest problem in the market now may be simply that so few properties are available for sale, either healthy or distressed. This may be attributed to various forms or motivations of "loss aversion" on the part of property owners (or lenders), which may be a rational response to the current market circumstances and political environment. There is an understandable desire to avoid "fire sales" and "dumping" of properties into a down market.

* It is simply that the market was in "equilibrium" at the end of 2000 when the CPPI was initiated and pegged at a level of 100, and that over time over the long run same-property prices such as those tracked by the CPPI tend to grow at 1% to 2% per year below general inflation (reflecting real depreciation of the property).

Putting some confidence bounds around the downturn magnitude…[*]

In recent weeks several people have inquired about what might be the "statistical confidence bounds" around the magnitude of the market price downturn suggested by the fall in the CPPI since October 2007. Answering this question is more difficult technically, and even conceptually, than might at first appear, and I won't try to go into the full analysis here in this month's commentary. But I would like to provide some response to this important question.

First, to cut to the chase, given that the current index drop from the October 2007 peak through September 2009 is 42.9% (of the peak value), an approximate 95% confidence interval around the magnitude of that drop could, I believe, be reasonably quantified as between 38.4% and 47.4%, or between 33.9% and 51.9%, depending on how you want to define the range. Let me explain…

First, I should reiterate that the CPPI is not intended primarily to be a tool of statistical inference. It has not been designed to be optimized as an inference device, but rather as a practical information product and potential supporting platform for trading of commercial property risk. (For example, the index is frozen after each period's update, whereas a pure statistical product would be perennially revised as more data becomes available.)

Second, I should point out that, while the CPPI is based on regression models for which standard errors can be computed, the complete index construction procedure can involve additional steps which may render the computed standard errors incomplete. For example, the monthly all-property index is computed using a two-stage procedure that likely reduces the error below what is implied by the computed regression "standard errors". Nevertheless, the regression standard errors do tell us much useful information about the precision of the CPPI, and I have used them in computing the previously noted bounds (but in different ways).

There is an important conceptual or definitional issue in how one defines "error" in a repeat-sales regression model, which relates to how the model may be used. In general, the coefficient standard errors in a repeat-sales price regression include two components: (1) Purely random noise reflecting the dispersion in individual property transaction prices around those properties' true market values (as of any given time); and (2) Idiosyncratic drift over time in the individual properties' true market values. (In their seminal 1988 article in the *New England Economic Review* that presented the repeat-sales regression procedure which is essentially used in the CPPI, Karl Case and Robert Shiller labeled these two components: "$N_{i,t}$" and "$H_{i,t}$", respectively.) Our analysis suggests that, in the monthly all-property CPPI, each of these two components makes up about half of the computed "standard error".

Of these two components of the standard error, the second, idiosyncratic asset price drift, is not "error", in the sense that it reflects true market value evolution. It is a type of

[*] Note, this section has been revised since its original publication in November 2009. The earlier section of this commentary remains as it was originally published.

dispersion that also exists in stock market indices and indeed in any portfolio of assets over time. Arguably we might not include it in a measure of how accurately or precisely the CPPI is tracking its underlying property population, if we define that population as those properties owned by investors who have experienced the round-trip same-property price changes observed in the transactions used to compute the index. For example, the S&P500 stock index reflects the idiosyncratic drift of the 500 individual stocks that compose that index, yet no one asks for "confidence bounds" around the S&P500 Index returns. Extending this reasoning slightly, one could argue that the idiosyncratic price drift that is included in the CPPI is not relevant for users who might want to trade the CPPI as a method to synthetically invest in commercial property (namely, to invest "round-trip" in those properties whose transactions are used to compute the index).

On the other hand, both components of the standard error may be relevant for someone who would be looking to the CPPI to hedge a particular portfolio of specific real properties. Those properties in the subject portfolio will be different from the specific properties whose transactions will be used to compute the CPPI, and therefore the idiosyncratic drift in the CPPI properties (as well as in the subject portfolio's properties) will be a component of "basis risk" in any such hedge.

At the time of the CPPI peak in October 2007 transaction volume was high and the average all-property monthly index coefficient standard error was around 1.5%. Recently, with the dearth of transaction observations the CPPI monthly standard errors have shot up to around 4.5%, higher than they have ever been in the history of the index.[*] Recognizing that this error is attributable to both random noise and idiosyncratic drift, we can apply the more recent standard error to the overall drop in the index since its peak, to obtain bounds around that overall drop. Given that the total drop in the index so far from October 2007 through September 2009 is: 109.61/191.87 – 1 = -42.9%, a two standard error confidence bound around that using the entire current 4.5% coefficient standard error would be +/- 9% or an overall drop of between -33.9% and -51.9%, encompassing the total dispersion including the idiosyncratic drift. Assuming that random pricing noise accounts for only half of that, we would have half the range: between -38.4% and -47.4%. If we use the average coefficient standard error between the 1.5% of the peak period and the 4.5% of the current period (i.e., 3% instead of 4.5% standard error), then the confidence range becomes 36.9%/48.9% (or 39.9%/45.9% ignoring idiosyncratic drift). [†]

[*] This raises an interesting technical point. The precision of the return estimate in a repeat-sales index for any given period in the history of the index is a function of the overall average data frequency in the entire historical index database. Thus, if data becomes scarcer in recent times, this can reduce the precision of the estimates of ***all*** of the historical index returns, not just the current return. Counter-intuitively, this can cause a fully-adjusted (revised) index that is updated to reflect all the current data to actually give a ***less accurate*** estimate of earlier historical returns than those that were estimated when data was more plentiful, earlier returns that were incorporated permanently into a frozen index such as the CPPI. In other words, the lower coefficient standard errors of the peak period still apply to the CPPI during the peak period because it is frozen.

[†] A couple of further technical notes may be of interest in continuing to clarify the subtleties of repeat-sales indexes. First, it is not necessary to accumulate the coefficient errors over time even though the index returns do accumulate in the index level, because unlike a stock market index where the individual stocks remain in the index and accumulate idiosyncratic drift, the individual property "round-trips" (same-

-David Geltner, November 2009.

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property sale pairs) that form the basis of the repeat-sales index do not remain in the index (or if they do they are treated as new separate observations). Thus, the index error only reflects (always) the average accumulation of idiosyncratic drift between the two paired sales of the average property transacting in the index. (And of course the purely random property price dispersion component of the error does not accumulate over time even at the underlying individual property level.)

Second, it is appropriate to use the coefficient standard error to measure error in index changes over any span of time even though the coefficient error actually applies to the index ***return*** (not the index level). This is because index returns are differences between two levels, and the regression’s coefficients’ standard errors naturally apply to the errors in those returns estimates, which are therefore already differences between two index levels. Hence, the coefficients’ standard errors are directly relevant to measure the error in the difference between any two index levels even between non-adjacent points in time. For non-adjacent periods differences one should use the coefficient standard error of the most recent period (the endpoint of the difference period), as the first period error is common to the index levels at both points in time (as the index levels just accumulate with the index returns from one period to the next), and therefore the first period’s error in levels cancels out of the comparison. (In fact, in a regression-based index, any index value level is actually already a difference between two levels, as the starting value of the index is arbitrary, that is, effectively also estimated by the regression.) However, particularly in a frozen index like the CPPI, one could make the argument that one should use the average coefficient standard error between the two points in time rather than just the most recent standard error. (Both ways have been demonstrated here.)