

Active Housing Market Conditions

as

Home Price Leading Indicators —
Forecasting Market Inflections

September, 2010



Executive Summary

Watching active housing market statistics for clues about the future prices of homes.

Traditional housing market analysis orients on home price valuation based on “closed comps” of moderately-recent, similar transactions. In 2007, this backward-facing view of the housing market failed spectacularly.

It became obvious that to have accurate, real-time information about housing market dynamics in different geographies and price ranges, and to be able to project with the highest possible accuracy where those prices might be headed in the future was the new imperative.

Indices of home prices are aggregated, usually on a monthly or quarterly basis, from data sets of property and transaction information for sold residences as recorded at the county level. One problem for investors and traders is the necessary time lag involved in this process. Once a sale price is agreed to, it typically takes several weeks for the escrow to close and the sale to be reported to the county. For the county recorder’s office to enter the sale records into its database – and to complete the set of sales taking place across the county over a full month – introduces another time delay, sometimes measured in days or weeks and sometimes longer. After that, the data set must be analyzed to generate an index. Thus, there is an unavoidable time lag for any index based on recorded sale prices.

As an example, the Standard & Poor’s Case-Shiller Home Price Indices are released on the last Tuesday of every month with a two-month time lag. Their March 2010 indices were released on May 25, 2010. This time lag simply reflects the delays inherent in recording sale prices, assembling a complete monthly data set for a metropolitan area, and analyzing the resulting data to produce an index. But the issue of time lag is accentuated by the fact that the Case-Shiller Index is itself a moving average, so that the March 2010 indices (published in late May 2010) were themselves an average of information from January, February, and March 2010. Of course, the prices recorded in March 2010 and published in May were agreed to at the beginning of their sale process, typically in January or February of that year, reflecting another unavoidable time lag.

This paper uses the Case Shiller Index as a general proxy for traditional views of the housing market. Other Home Price Indexes (HPIs) published by various public and private sources, exhibit similar characteristics and are lagging the actual current market by similar lengths of time.

Real estate prices experience market inflection points from time to time. That is, home prices may stop rising, reach a peak, and begin to fall – or the other way round. The turns

may have short-term or long-term impact; that is, they may usher in a short or long period of rising or falling prices. Clearly, lenders, investors, traders, and anyone interested in the housing market will be affected by market turns and will desire to know as much about them as possible.

There is a clear need for real-time information about the level and direction of home prices in a market, about current supply and demand characteristics, and peculiar market dynamics, particularly when market inflection points are considered. What is happening “in the streets” in a housing market – whether that market is hot or cold, whether buyers are eager or cautious, whether prices are rising, falling, or turning – will be reflected and displayed in housing price indices for that market, but only months after the fact. A housing market at its peak is characterized not only by leveling off in upward price change, but also by a slackening in buyer demand from eagerness to promptly pay almost any price to hesitation, caution, and even exhaustion; these shifts are noticeable by realtors and others on the scene well before any index of sale prices is published.

This paper examines the power of using real-time, local dynamics as the new standard for understanding the housing market now and in the near future.

Altos Research Housing Market Statistics and Methodology

This paper references a subset of data available from Altos Research which tracks nearly 400 statistics on the current state of local housing markets, describing what is happening in real-time:

- Inventory (homes listed for sale on the market)
- Percent Price Decreased (percent of listings that have had their prices reduced)
- Median Asking Price of homes offered for sale
- Median Asking Price of New Listings (listings that have come on market in the last 7 days).
- Median Price of Listings Absorbed (listings that have gone off market in the last 7 days)
- Mean Days on Market
- Median Days on Market
- Percent of Homes Relisted
- Year-over-Year % change in Asking Price
- Year-over-Year % Inventory Change
- Year-over-Year % change in Days on Market
- Year-over-Year % change in Percent Price Decreased

The present study will show that Altos indicators function as valuable real-time intelligence of market conditions. Some Altos variables are positively correlated with price; others have negative correlations; but in general, they lead closed transaction prices and home price indices by two to eight months. This lead time provides a valuable advantage over waiting for price indices to be published.

Even more important, Altos indicators – and their rates of change or “deltas” – will be seen to serve as powerful leading indicators of market turns, being strongly correlated with the rate of change of home prices themselves, with lead times of up to several months. Therefore, knowing whether the Altos indicators are rising, falling, flat, or turning will provide valuable information, months in advance about whether home prices will be rising,

falling, flat, or turning. This particularly valuable characteristic of the Altos variables will be an essential finding of this paper.

Further Information and Data

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Table of Contents

Executive Summary	1
Watching active housing market statistics for clues about the future prices of homes.....	1
Altos Research Housing Market Statistics and Methodology.....	2
Further Information and Data.....	3
Table of Contents	4
Los Angeles, California: A Case Study	5
Home Prices and Inventory	6
Home Prices and Percent Price Decreased	6
Home Prices and Listing Prices.....	7
Home Prices and Days on Market	9
Changes in Home Prices and the Altos Leading Indicators	11
Changes in Home Prices and Inventory	12
Changes in Home Prices and Changes in Inventory.....	17
Changes in Home Prices and Percent of Listings with Price Decreased.....	20
Changes in Home Prices and Changes in Percent of Listings with Price Decreased	24
Changes in Home Prices and Changes in Median Asking Prices.....	28
Changes in Home Prices and Changes in the Prices of New Listings	32
Changes in Home Prices and Percent Relisted	36
SUMMARY: Consensus, Currency, and Competitive Advantage	40
Table of Figures	41
Data Series and Endnotes.....	43

Los Angeles, California: A Case Study

The Los Angeles, California metropolitan area is one of the most important housing markets in the country. It includes millions of residents ranging in economic status from very rich to very poor. This study will examine the use of Altos variables and their rates of change in forecasting home prices, with particular emphasis on market turns. Because of limitations on time and space, this paper will not look at other major metropolitan markets. However, there is compelling evidence that the same methodology will work well in other major metropolitan areas across the country, with the possibility of shorter or longer lead times in different markets. The Case-Shiller Home Price Index will be analyzed in relation to the Altos indicators.

In investigating market turns, this study will look at three-month and six-month changes in home prices as measured by the Case-Shiller Index, as correlated and compared with the Altos indicators and particularly with three-month and six-month changes in those indicators. Since the rate-of-change or “delta” analysis is so important, we will also look at the six-month changes in another index, the CoreLogic monthly Single Family Combined index.

These three-month and six-month deltas in home price indices represent the rate of change or velocity in home prices, expressing whether a market is rising, falling, or flat. In addition, the rates of change of the deltas themselves will hint at the convexity or concavity of home prices, whether home prices are rising but slowing down in their ascent, or bottoming out as they near the end of a bear phase – points of inflection in a market. It will be shown that the Altos variables and particularly their own changes or deltas serve as leading indicators – months in advance – of the rising and falling of home prices, and particularly of market turns and points of inflection. As such, these variables make up a powerful and valuable suite of on-the-ground leading indicators useful to anyone interested in the level and direction of home prices.

The advantage of lead-time intelligence will be first observed by graphing the Altos variables themselves against the Case-Shiller Home Price Index. Later in the study the mathematical analysis will become more intense as we look at the relationship between rates of change of the different indicators with the application of forecasting market turns.

Home Prices and Inventory

Figure 1 below shows the active housing inventoryⁱ graphed against the Case-Shiller indexⁱⁱ, both actual and reported. There is a two-month difference between the actual and reported Case-Shiller indices; for instance, the March 2010 index was actually reported on May 25, 2010.

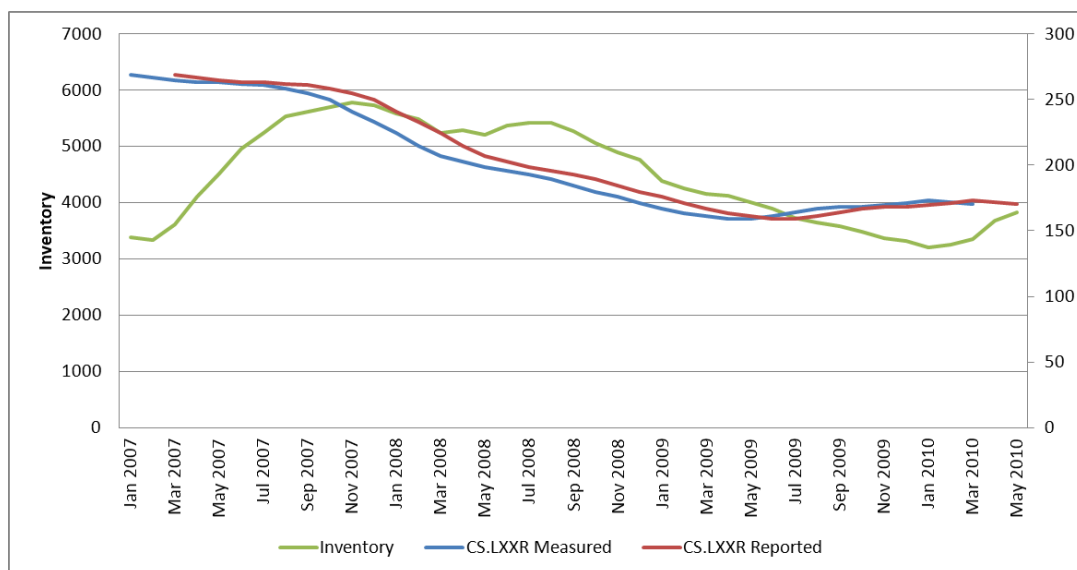


Figure 1: Case-Shiller Index vs. Inventory

Inventory is negatively correlated with the strength or weakness of a market. A high inventory is characteristic of a weak or weakening market, while a low inventory provides strength and support to the market. In Figure 1, for example, we may compare peaks in inventory with bottoms in price.

There was a peak in inventory in the summer of 2008, which led by several months the corresponding bottom in home prices in the spring of 2009. The low inventory in the winter of 2009-2010 corresponds to a firmer period of home prices.

There is evidence for a correlative relationship here, even a leading relationship. However, the most powerful mathematical results will be seen later, in examining rates of change. The present graph is simply an introduction.

Home Prices and Percent Price Decreased

The percentage of listings having price reductions is negatively related to the level of home prices. A high level of price reductions is indicative of a weak or falling market, while a low level of price reductions suggests a strong or rising market. Figure 2 shows the unique Altos indicator Percent Price Reductionsⁱⁱⁱ in comparison to the Case-Shiller index.

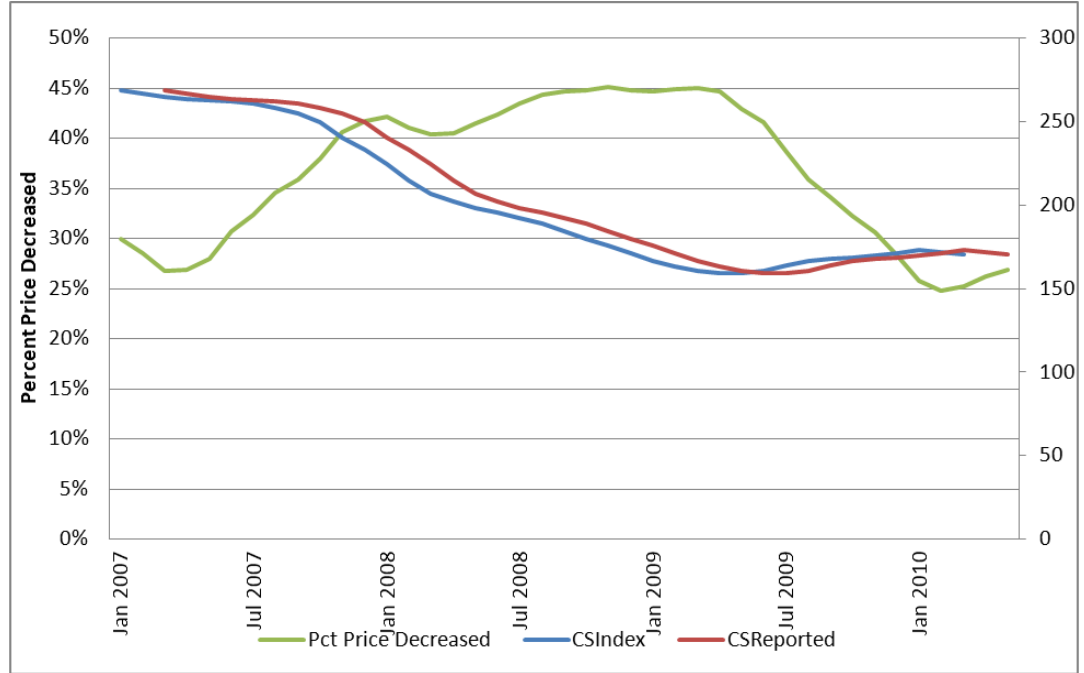


Figure 2: Case-Shiller Index vs. Percent of Homes with Price Reduction. Single Family Homes, 90-day rolling average

The inverse relationship is clear. A peak in Percent Price Decreased in the summer of 2009 is associated with a price bottom at the same time or shortly afterward. A bottom in Percent Price Decreased in early 2010 seems to be associated with a firming and a top in prices in the spring of that year.

As in the case of inventory, the strongest mathematical results will become apparent in the analysis of rates of change.

Home Prices and Listing Prices

Figure 3 displays the relationship between the Case-Shiller index and median listing prices, median price of new listings, and median price of listings absorbed. The listing-price variables are positively correlated with actual sale prices, as would be expected.

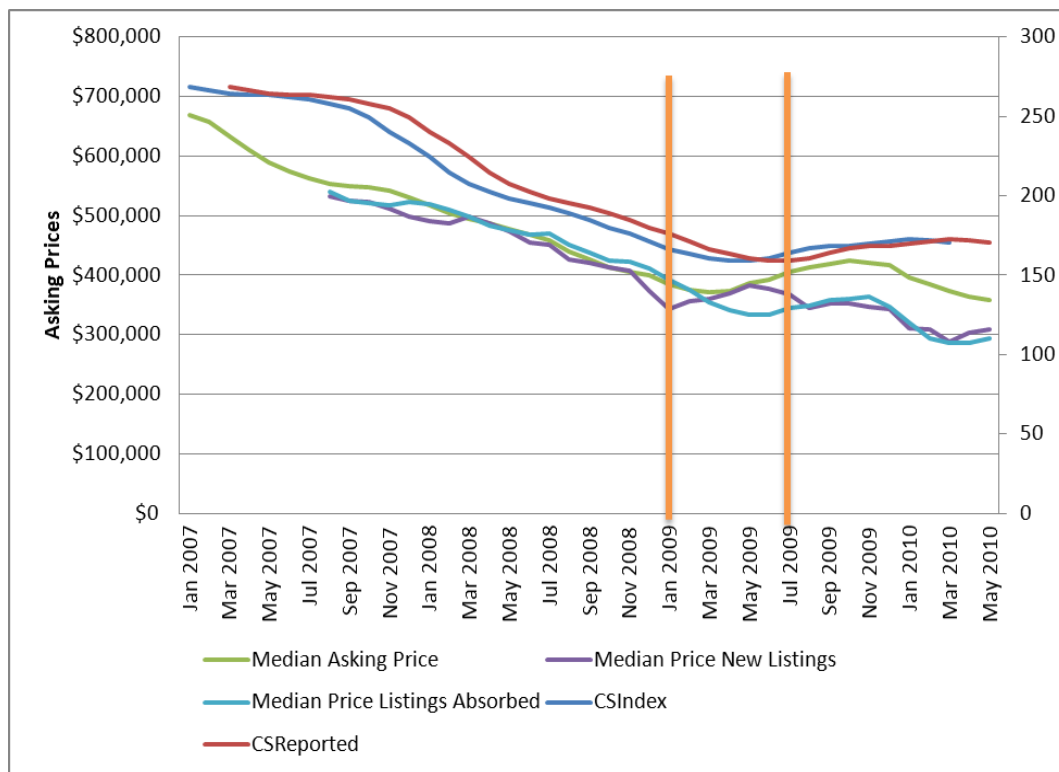


Figure 3: Case-Shiller Index and Asking Prices. Vertical bars indicate inflection points of active market new listings and, later, for the reported data of the Case-Shiller Index

The most interesting feature is that of lead time: the median asking price and the median price of new listings lead the index of home sale prices by a month or more, thus providing three or four months of lead time over the Case-Shiller home price index (delays by 2 months). For instance, the median asking price experienced a bottom in March 2009 while the Case-Shiller price index itself had a corresponding bottom two months later in May, which was not reported until late in July of that year. This lag time is illustrated by the vertical bars in Figure 3. The median price of new listings had already bottomed in January 2009, while the bottom in the median price of listings absorbed came later, concurrently with the bottom in home prices themselves – which makes sense.

Similarly, asking prices and median price of new listings peaked in October 2009, leading the January 2010 peak in sale prices by three months; the median price of listings absorbed reached its peak in November 2009.

This leading characteristic is clearly based on the fundamental structure of the market: listed homes are sold several weeks or months later, and what is happening in listing prices will be reflected in sale prices after an appropriate time; and conversely newly listed homes are priced to reflect the current market conditions, while asking prices are often reduced if the market is weak.

We shall look at this relationship again, in connection with the study of rates of change.

Home Prices and Days on Market

Figure 4 shows mean and median days on market vs. the Case-Shiller price index. In general the relationship is inverse. If homes take a long time to sell, their prices are likely to be reduced, and such conditions are characteristic of a weak market. On the other hand, in a strong market, homes sell quickly – sometimes very quickly – after they are listed.

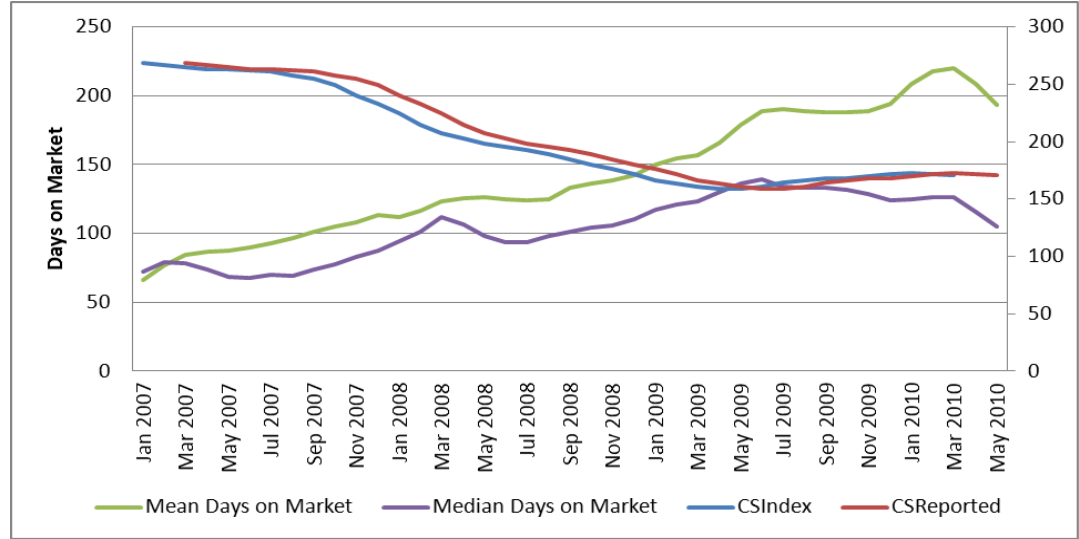


Figure 4: Case-Shiller Index and Days on Market

The mean days on market (mean DOM) is a better indicator than median days on market. Mathematically, if a house sells in 100 days then we could model that 1/100 of that house is sold per day – and this characteristic of rate-of-sale understanding lends itself to arithmetic and mathematics in a way that cannot be done by working with medians.

In general, the mean days on market has been increasing, corresponding to a more or less weak housing market. The relationship is quite strong, as we see in the scatterplot of Figure 5 below. Mean days on market is strongly correlated with the Case-Shiller Index, with no time lag used in plotting either variable (though we must remember that the Case-Shiller Index itself is reported two months late).

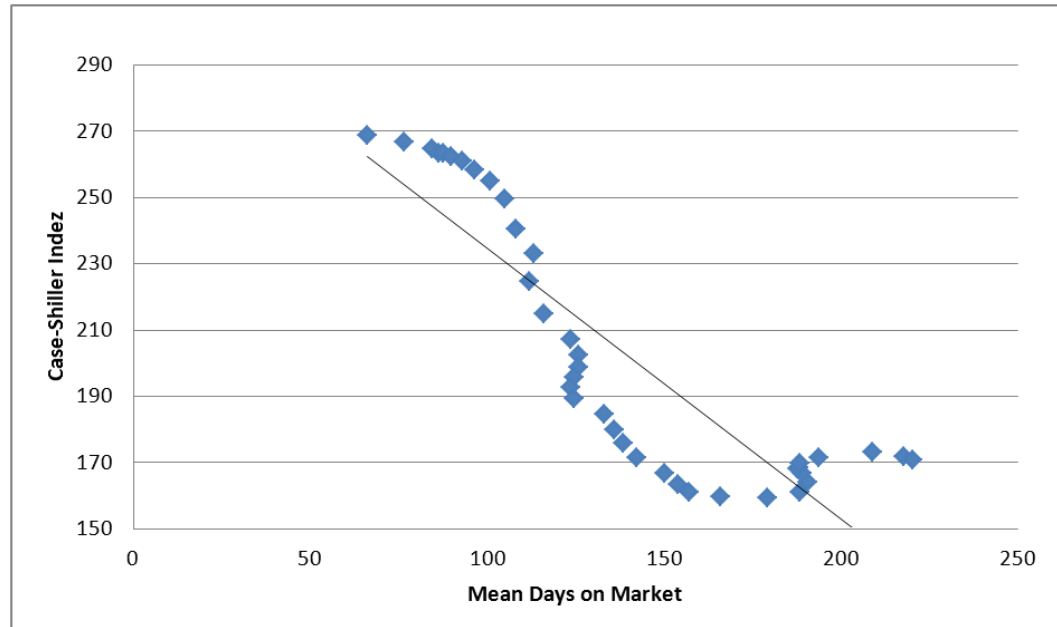


Figure 5: Case-Shiller Index and Mean Days on Market

The correlation coefficient is a very powerful $r = -0.875$, with a level of significance of $3.4 \text{ E-}13$ (that is, 3.4 times 10 to the minus 13th power). The relationship is extremely strong.

Even more interesting is that the correlation using the mean days on market lagged three months only weakens to $r = -0.849$ with significance at $6.0 \text{ E-}11$ (still incredibly strong!). This shift has gained three months of lead time at a very small cost in significance. It is more than fair to say that mean days on market is a useful three-month leading indicator of sale prices. Remembering that the Case-Shiller index is reported two months late, we could say that mean days on market is a useful five-month leading indicator in terms of actually predicting changes in sales price.

In future analysis we will see similar results: in many cases it will be possible to lengthen lead times at an acceptable cost in terms of correlation and significance, again illustrating the usefulness of the Altos variables in forecasting home price trends.

Changes in Home Prices and the Altos Leading Indicators

The most powerful results of this paper, which provide the strongest evidence and support for the Altos variables as leading indicators for market trends – and particularly market turns – will appear when we look at the rates of change or “deltas” of home prices and of the Altos indicators.

To approximate the rate of change or velocity of home prices, we will use 3-month and 6-month changes in the Case-Shiller index, and also look at the 6-month changes in the CoreLogic index. These shorter-term deltas are better measures of the rates of price change than a year-over-year, 12-month change.

Correspondingly, we will look at 3-month and 6-month deltas in the Altos variables. While 12-month deltas are also available and easy to compute, these are less responsive in measuring the current rate of change of their underlying variables.

All deltas are computed by simple arithmetic and are not annualized. For instance, if a variable changes over three months from 100 to 105, this is reported as a delta of 0.05 or 5%, rather than being annualized into a yearly rate of 0.20 or 20%. Deltas are reported in a trailing fashion, so that a change of 5% from January to April is associated with the month of April.

The following pages will provide many examples of this comparison of deltas, showing the effectiveness of the Altos indicators in monitoring and leading home price changes, with particular emphasis on market turns.

Changes in Home Prices and Inventory

A decreasing inventory of homes offered for sale is associated with a tightening housing market, as these homes sell quickly and for high prices, while an increasing inventory is associated with a weakening market. This relationship is particularly evident when inventory is studied in connection with the rate of change or deltas in home prices.

Figure 6 shows the course of inventory graphed together with the *six-month change* (not annualized) in the Case-Shiller index. To recognize the two-months lag in the reporting of the index, Figure 6 displays both the actual value of the delta of the Case-Shiller index and then, lagged by two months, the actual reporting time of the information.

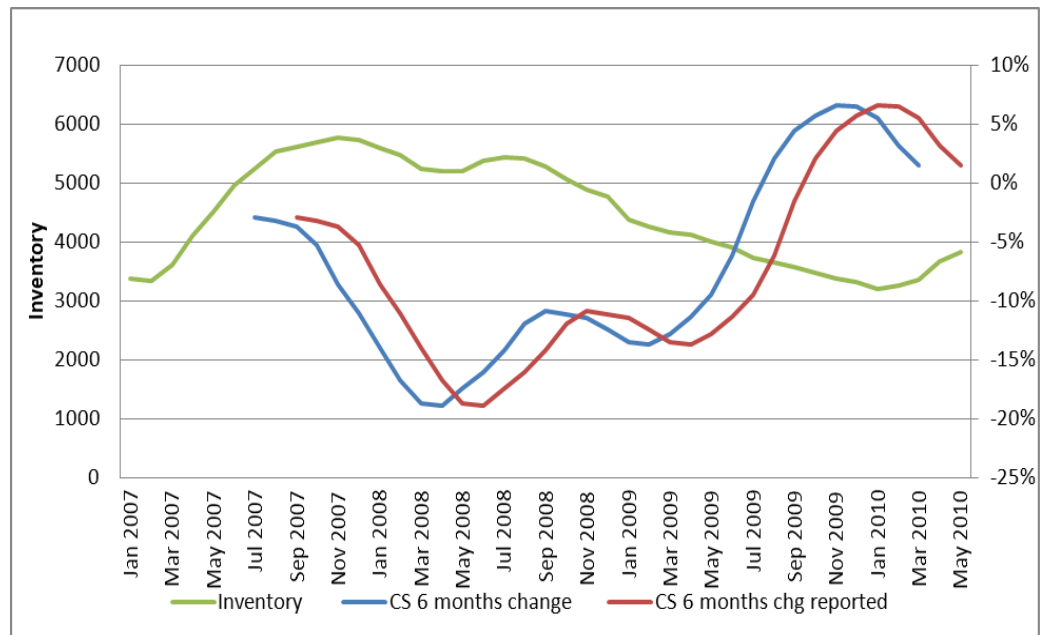


Figure 6: Six month change in Case-Shiller Index and Available Inventory

The relationship between inventory and the rate of price changes is clearly inverse – and clearly strong. A peak in inventory in November 2007 foreshadowed a bottom in the velocity of home prices in April 2008, reported in June 2008. It must be remembered that a bottom in this velocity (lowest negative value) does not mean a bottom in prices themselves but rather a time of *fastest descent* in prices (prices falling the fastest), which itself is useful information. This represents a *point of inflection* in home prices; before April 2008 the bear market was accelerating, while after April 2008 the decline was slowing down; hence we have insight into the second derivative (acceleration or deceleration) in home prices.

Similarly, a second peak in inventory in July 2008 came in advance of a corresponding second bottom in the velocity of prices in February 2009.

Inventory declined from February 2009 until January 2010, roughly corresponding to an increase in the rate of change of home prices. Home prices had been declining at a 6-month rate of 10% or so in the spring and summer of 2009, stopped declining by August 2009 (the rate of change crossed the zero line and moved from negative to positive between July and

August 2009), and then entered positive territory (home prices rising, a rate of change above zero).

Of course, a zero level of home price change corresponds to the flat characteristic of a peak or bottom in home prices – in other words, to a market turn from bear to bull or from bull to bear. Thus we see that inventory is a useful leading indicator in relation to market turns.

Looking more deeply, a bottom in the rate of change of prices corresponds to an inflection point from accelerating decline towards decelerating decline and market firming, while a peak in the rate of change of prices corresponds to an inflection point from accelerating price growth towards a time of slowing – another type of market shift. Again we see that inventory is a useful leading indicator in suggesting future changes in the tenor and character of a housing market. Those using inventory as a leading indicator in real time will know months in advance how a market is likely to perform, rather than having to wait six (or eight!) months for the actual numbers to be reported.

The correlation between the rate of change in home prices and inventory is statistically very powerful, underlining the usefulness of this variable as a leading indicator. Figure 7 is a scatter plot of the six-month change in the Case-Shiller index against inventory lagged by 5 months.

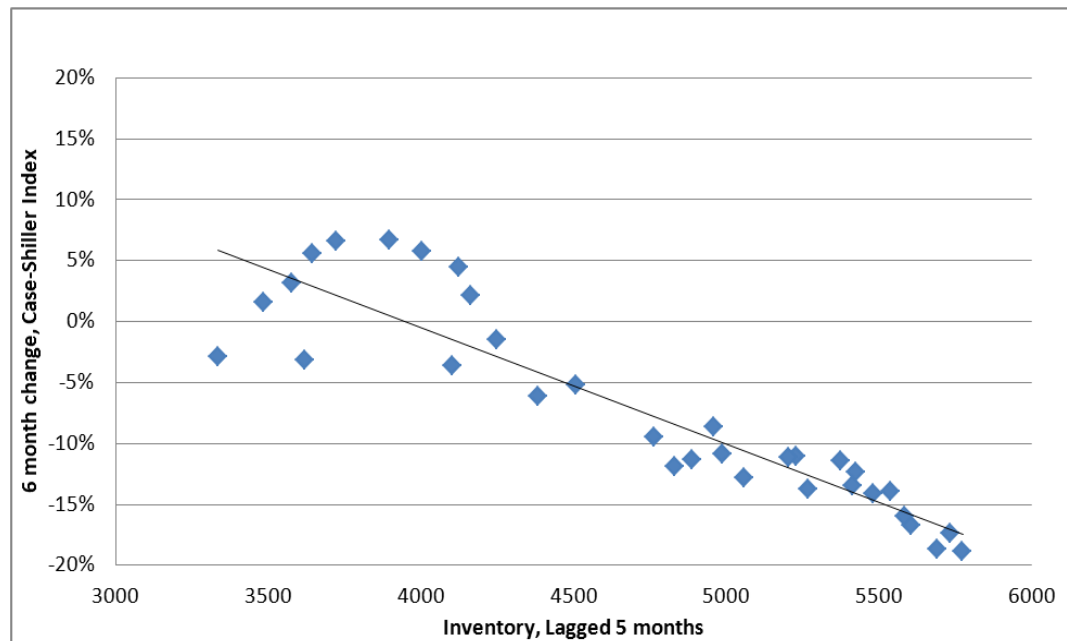


Figure 7: Case-Shiller Index, six month change and Inventory, lagged five months

The relationship, clearly inversely correlated, is statistically very powerful:

Correlation $r = -0.914$

Significance = $1.0 \text{ E-}13$ (1.0 times 10 to the -13th power)

This high degree of correlation is operative five months in advance, since the inventory time series was lagged by five months. Inventory, therefore, functions as an extremely strong indicator of change in home prices, with a lead time of five months (seven months in

relation to the reporting of the price index and thus to the availability of knowledge about its deltas).

Increasing the lead time to seven months (that is, lagging the inventory data series by seven months) weakens the correlation only slightly:

Correlation $r = -0.873$

Significance = 3.3 E-11 (3.3 times 10 to the -11th power)

Here the analysis gains an additional two months of lead time, while weakening the correlative relationship only slightly, as the correlation still possesses an overwhelming statistical significance.

The relationship between inventory and price velocity is also apparent in looking closer to current time, studying the *three-month* change in the Case-Shiller index rather than the *six-month* change. Please refer to Figure 8 below.

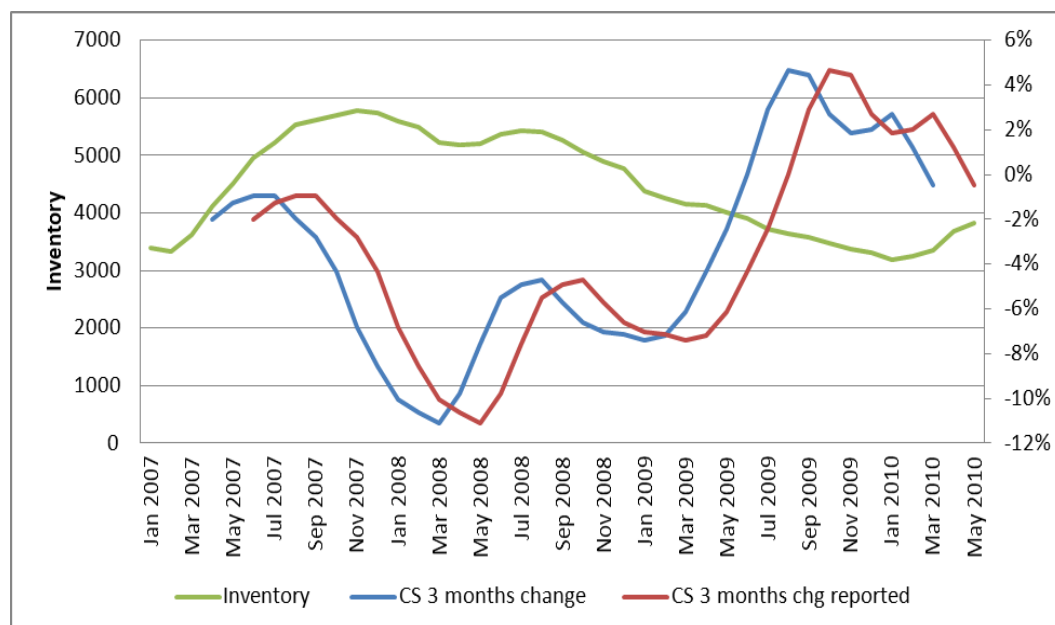


Figure 8: Three-month change in Case-Shiller Index and Inventory

Although the three-month rate of change is more volatile (and more current) than its six-month counterpart, the same features of tops and bottoms, leads and lags are seen in Figure 8 as previously appeared in Figure 6. Figure 9 displays the scatter plot of the three-month change in prices with respect to inventory, lagged four months (the lag is shorter with the time span in home price changes being shorter).

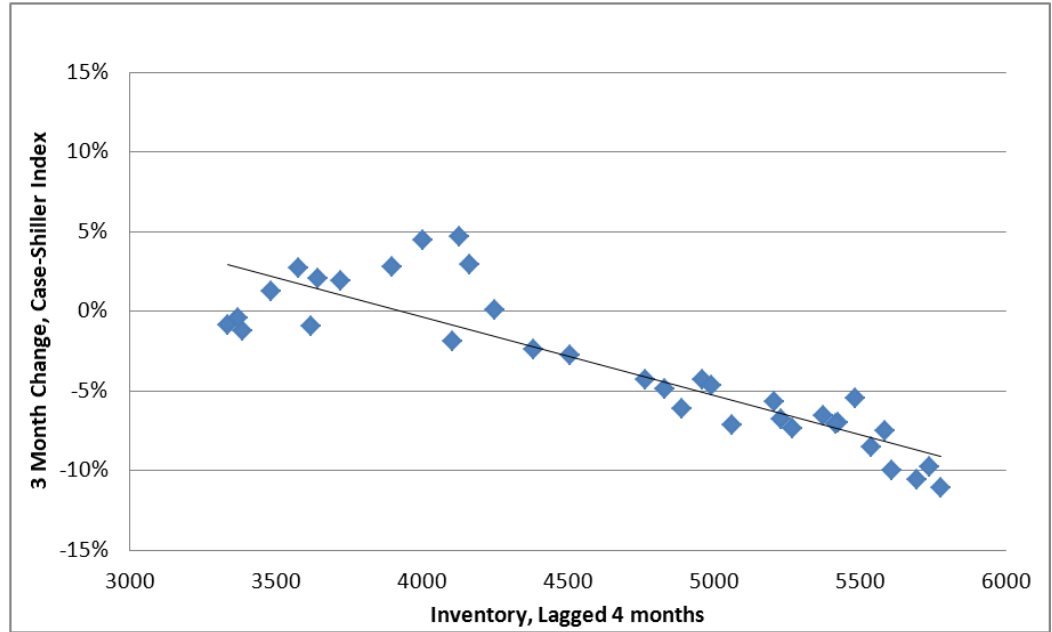


Figure 9: Case-Shiller Index, three month change and Inventory, lagged 4 months

Again the relationship is inverse and statistically very significant. The results are:

Correlation $r = -0.882$ (only minor damage due to the volatility of 3 month changes)
Significance = $2.5 \text{ E-}12$.

In this case inventory functions as a four-month leading indicator relative to the Case-Shiller price index and as a six-month leading indicator relative to the actual reporting of that index.

Adding an extra two months of lead time (using inventory lagged by six months) is gained at only a very small cost in statistical significance:

Correlation $r = -0.755$
Significance = $6.8 \text{ E-}7$.

The usefulness of inventory is not limited to the Case-Shiller index. Figure 10 shows the level of inventory in relation to the six-month change in the CoreLogic home price index.

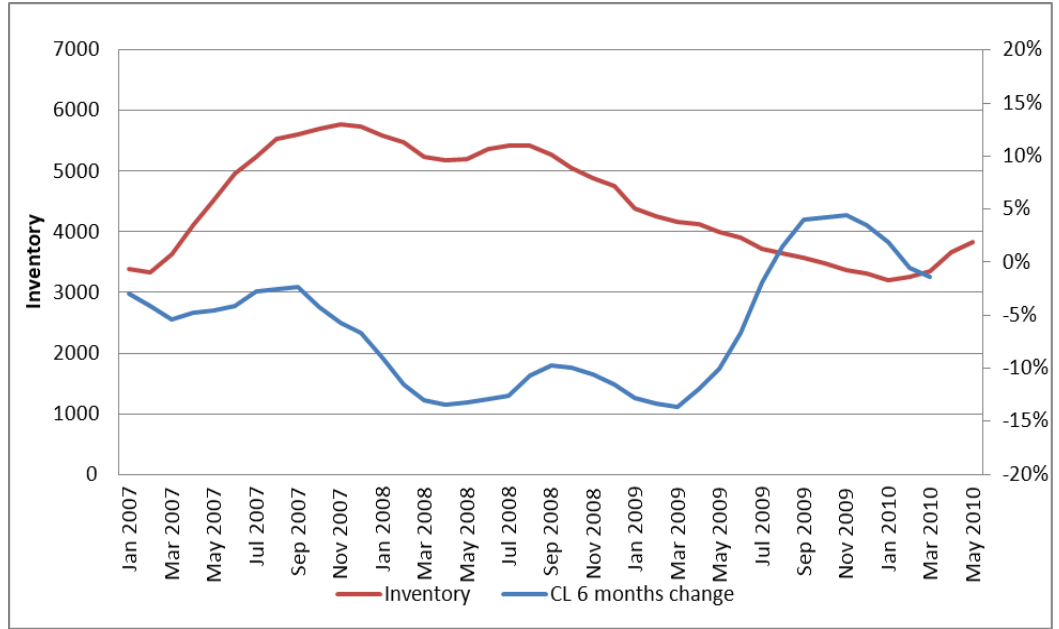


Figure 10: Six-month Change in CoreLogic Index and Inventory

Just as with the Case-Shiller index, peaks in inventory generally come before bottoms in the six-month rate of change in the CoreLogic index. Figure 11 is the corresponding scatter plot.

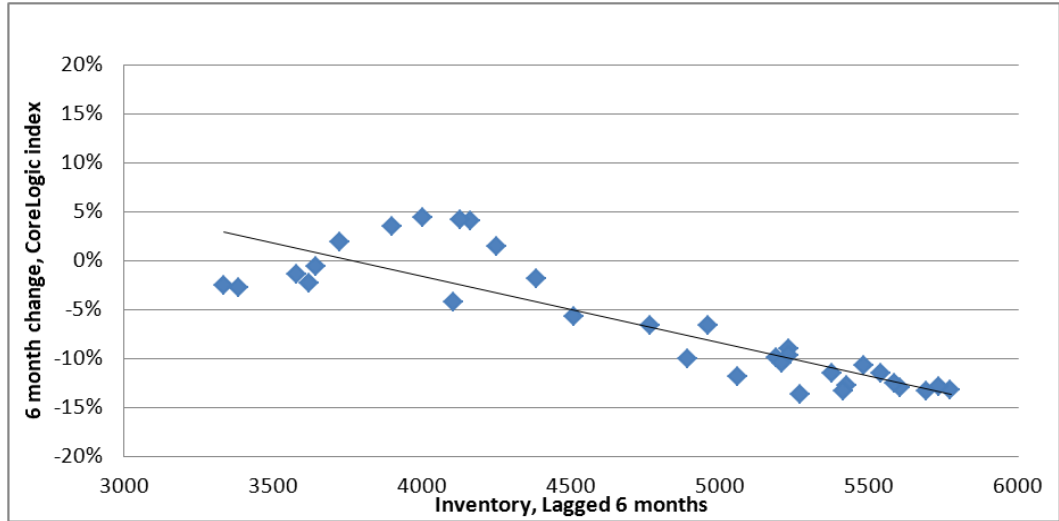


Figure 11: CoreLogic Index, six-month change and Inventory, lagged six months

Using inventory as a six-month leading indicator (lagged 6 months) yields $r = -0.864$ and a significance of $9 \text{ E-}11$. Adding an additional two months of lead time for a total of eight months produces a correlation of $r = -0.726$ and a significance of $3.8 \text{ E-}6$ (that is, 0.0000038).

Changes in Home Prices and Changes in Inventory

While inventory itself serves as a useful leading indicator of the rate of change of home prices, the same is also true of the velocity or rate of change in inventory. This rate of change reflects both how fast new listings are entering the market and how fast homes are being removed from the market (new listings increase the inventory while sold homes reduce it). In this section we will study the rate of change in home prices in relation to the rate of change in inventory as measured over a corresponding time span.

Figure 12 displays the six-month change in the Case-Shiller index and the six-month change in inventory. Since the change or delta in any variable is more volatile than the variable itself, it is not surprising that the change in inventory is somewhat jagged. However, a similar lead-lag relationship is generally observed.

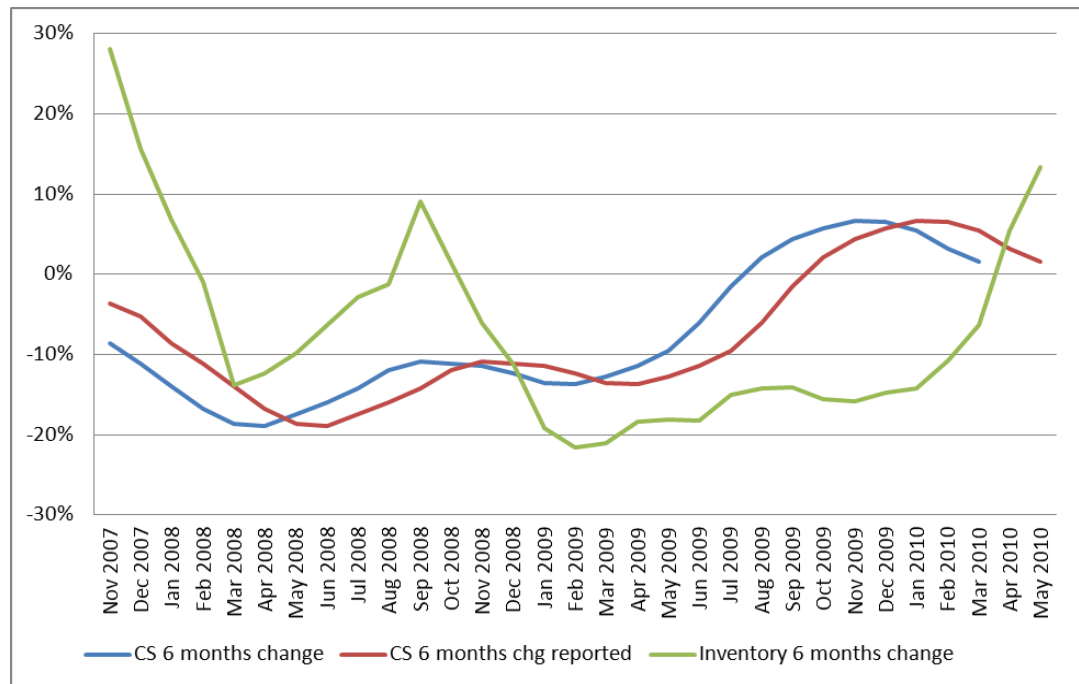


Figure 12: Six-month change in Case-Shiller Index and six-month change in inventory

The relationship is better illustrated in the scatter plot of Figure 13 below.

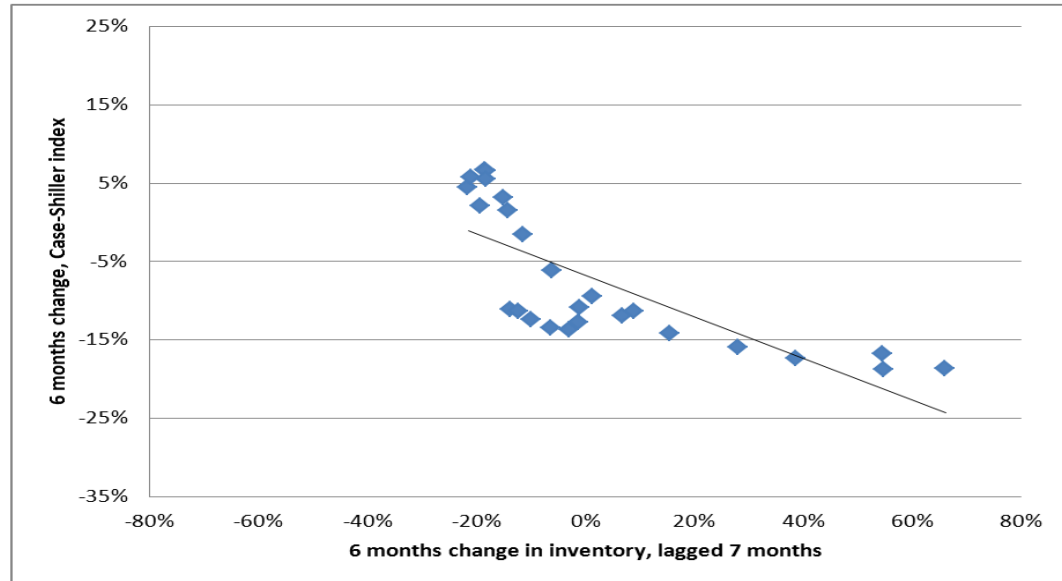


Figure 13: CSI six-month change and Inventory 6 month change, lagged seven months

The relationship is not perfectly linear but is definitely apparent. The six-month change in inventory leads the six-month change in the price index by seven months (by nine months when compared to the index being actually reported). The statistical results are:

Correlation $r = -0.760$

Significance $6.8 \text{ E-}6$ (that is, 0.0000068).

The delta-to-delta correlation is particularly useful in forecasting *market turns*. If the rate of change of inventory crosses the zero line (moving from positive to negative or the other way round), this could serve as a seven-month leading indicator of a change in the direction of home prices.

Some of the correlation is related to the common effect of seasonality. In the Los Angeles area the most popular buying time is in the late winter, spring, and early summer. The housing market is slower in the fall and early winter. But the correlative relationship is still clear and useful in its own right, even recognizing that some of the motion in both variables actually reflects the underlying common factor of seasonality.

The lead and lag times in this study are not to be considered as absolute. In a slow-moving market where homes may take a year or more to sell, longer lead and lag times are to be expected. On the other hand, in a fast-moving market with low inventory and properties selling rapidly, the situation would be much more sensitive, and shorter lead times would likely be observed.

The same relationships, though not so precise, appear in studying the six-month changes in the CoreLogic index rather than the Case-Shiller index. Please refer to Figures 14 and 15 below.

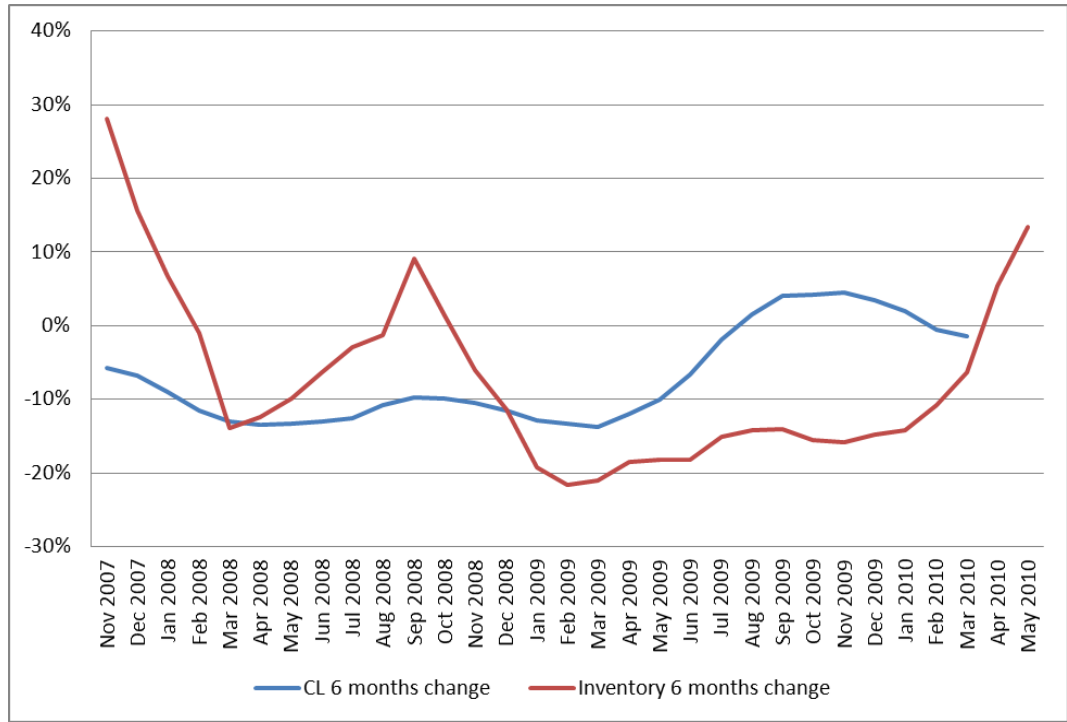


Figure 14: Six-month change in CoreLogic HPI and six-month change in Inventory

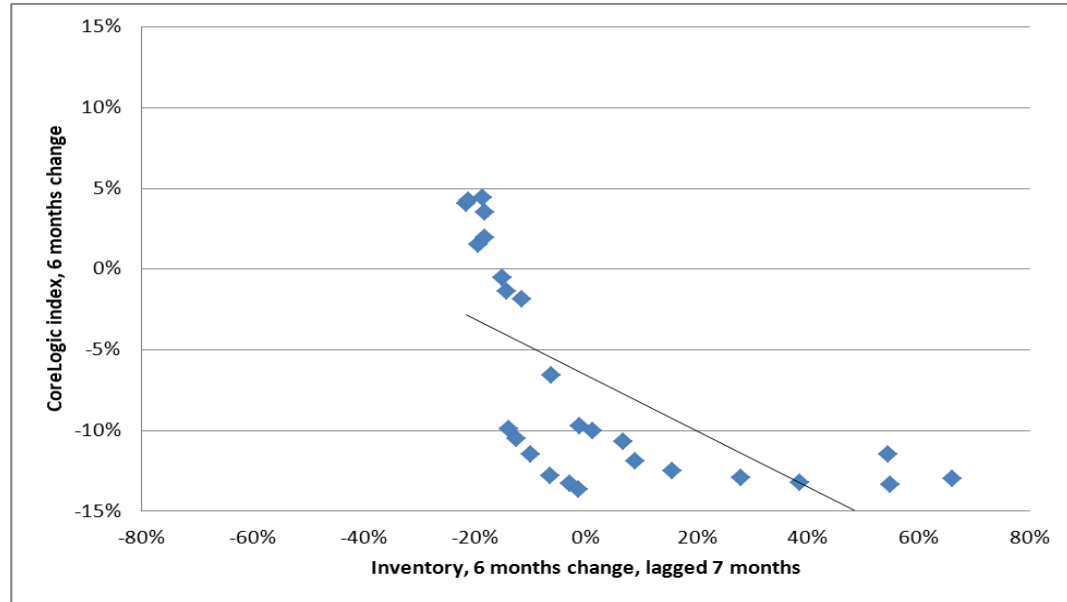


Figure 15: Six-month change in CoreLogic HPI and six-month change in Inventory, lagged seven months

Again the relationship is not quite linear but is still useful, with $r = -0.648$ and significance of $3.4 \text{ E-}4$ (that is, 0.00034) using a seven-month lead/lag time.

Changes in Home Prices and Percent of Listings with Price Decreased

There is an inverse relationship between the rate of change in home prices and the percent of listings with price reductions. A high level of price reductions suggests a weak market, while a low level of reductions is associated with a strong market. Figure 16 graphs the six-month change in the Case-Shiller index and the percent of listings with price decreased.

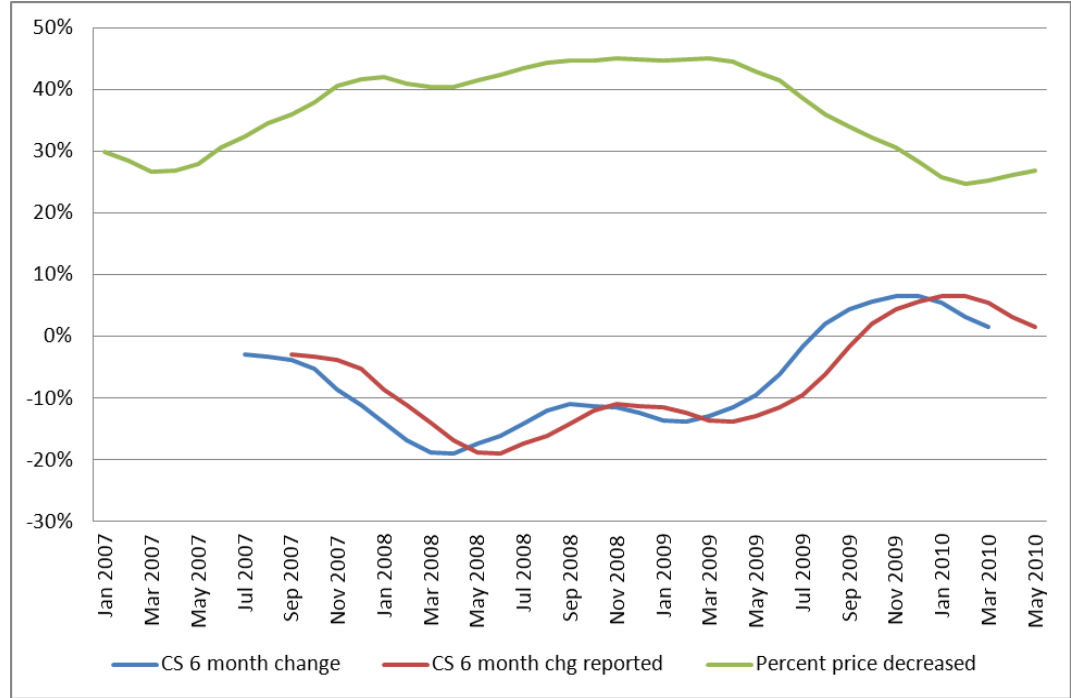


Figure 16: Six-month change CSI and Percent of Homes with Price Reduction

The peak in Percent Price Decreased in January 2008 led the April 2008 bottom in the rate of change of the Case-Shiller index by three months. The February-March 2009 peak in Percent Price Decreased and its subsequent dip did not lead the corresponding bottom in the velocity of the price index but were instead concurrent with it.

The scatter plot of Figure 17 below uses a two-month lag in Percent Price Decreased, giving Percent Price Decreased a two-month lead over the six-month rate of change of the price index (and a four-month lead over when the information is available).

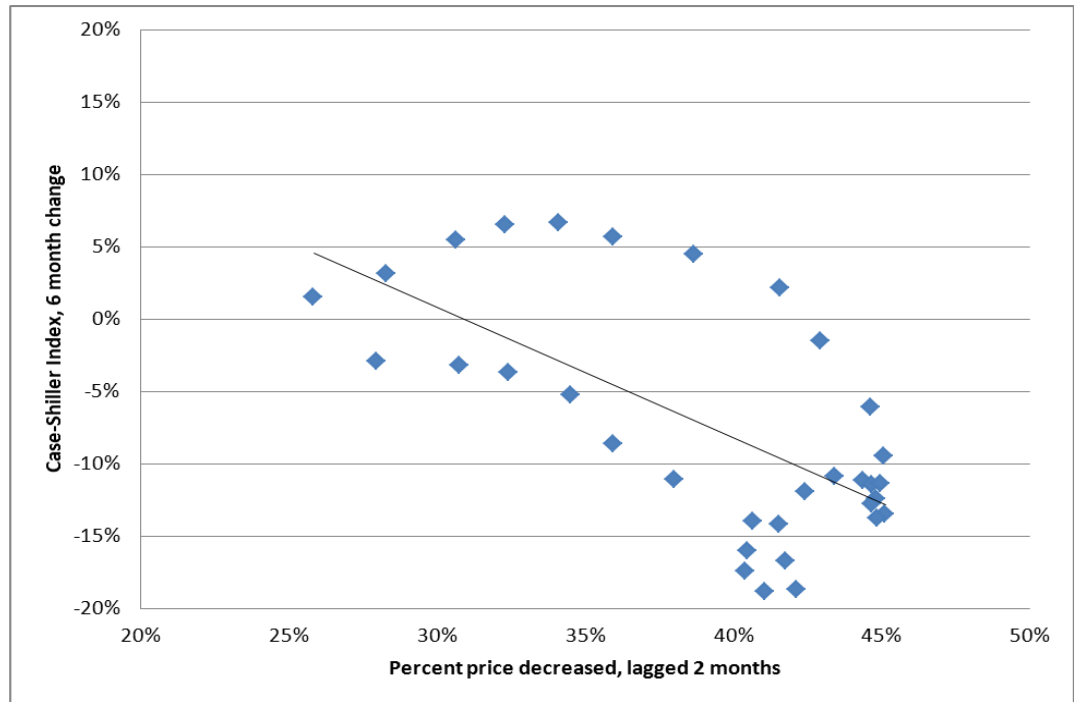


Figure 17: Case-Shiller Index, 6 months change, and Percent Price Decreased, lagged 2 months

The relationship, although not exact, is statistically significant, with a correlation of $r = -0.653$ and significance = $3.8 \text{ E-}5$ (that is, 0.000038).

An improvement in significance is gained at the sacrifice of lead time. If Percent Price Decreased is not lagged at all, the correlation strengthens to $r = -0.835$ and significance = $1.5 \text{ E-}9$.

Percent Price Decreased is not absolute and compelling as a leading indicator, but it certainly helps to suggest the direction in which prices are likely to move. Percent Price Decreased, in conjunction with the other Altos variables, is part of a powerful consensus pointing the way to the direction and turning of home prices.

Figure 18 below looks at the shorter-term, more nearly current, three-month change in the Case-Shiller index together with Percent Price Decreased.

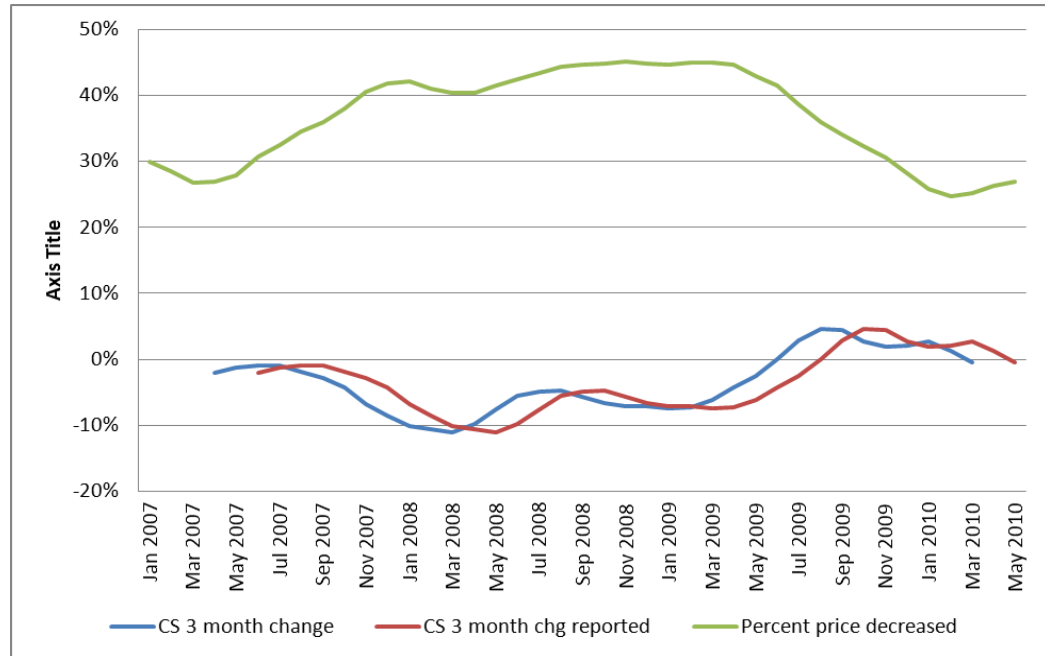


Figure 18: Case-Shiller Index, 3 months change, and Percent Price Decreased

The scatter plot of Figure 19 is built with no lag at all in Percent Price Decreased.

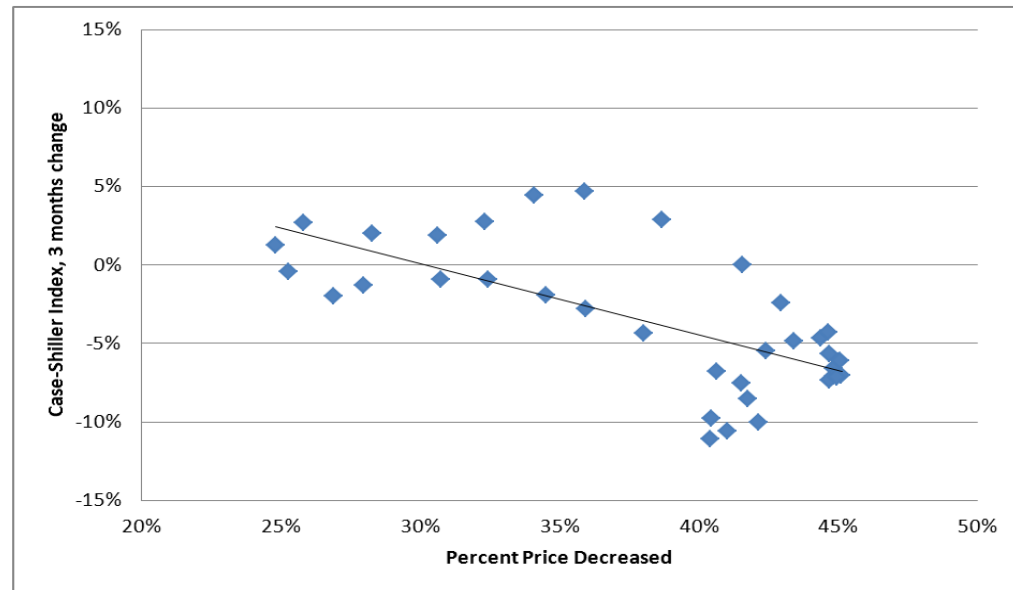


Figure 19: Case-Shiller Index, 3 months change, and Percent of Homes with Price Reduction

The relationship, while not perfectly linear, is certainly useful. The correlation is $r = -0.682$ with significance = $4.6 \text{ E-}6$. Adding two months of lead time weakens the correlation to $r = -0.465$ with significance = 0.004 (still highly significant in any statistical analysis); and this variable is actually four months ahead of the reportage of the Case-Shiller price index and thus also of the knowledge about its rate of change.

Figures 20 and 21 display the corresponding results for the six-month change in the CoreLogic price index.

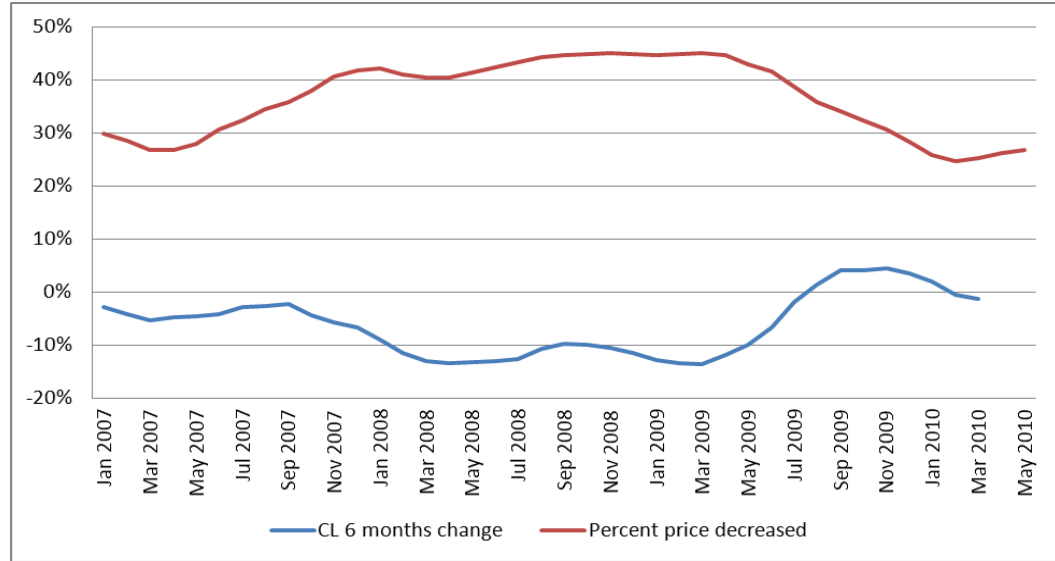


Figure 20: CoreLogic HPI, 6 months change, and Percent of Homes with Price Reductions

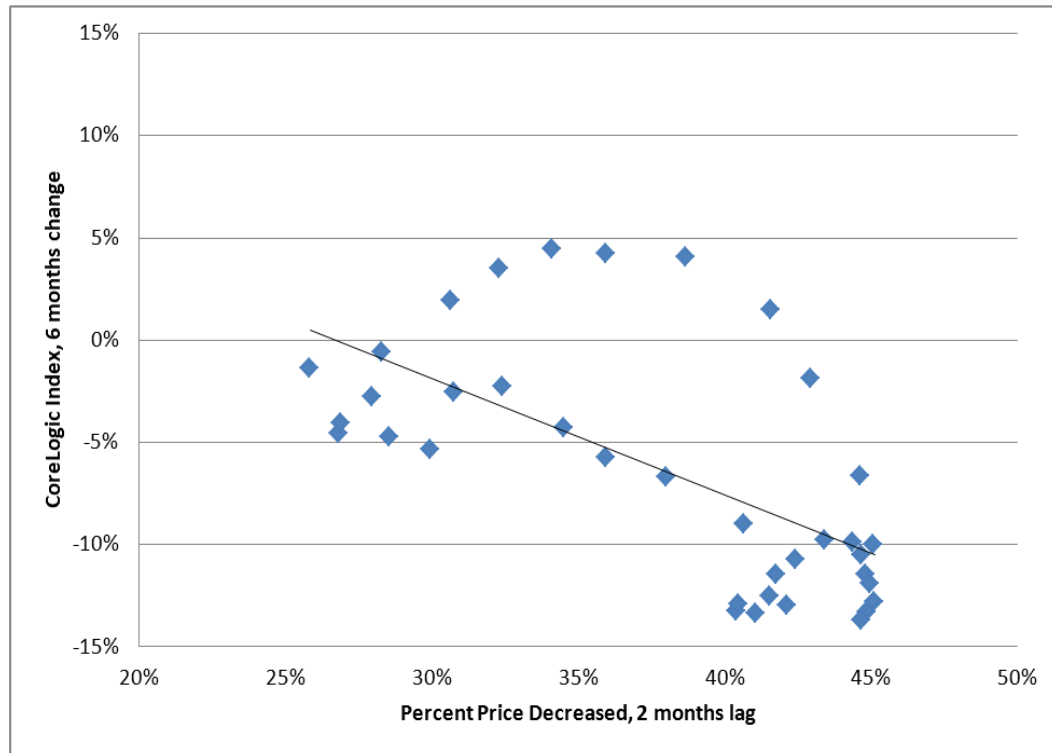


Figure 21: CoreLogic HPI, 6 months change, and Percent of Homes with Price Reductions, lagged 2 months

Again the relationship is useful although not absolutely linear. The correlation is $r = -0.631$ and the significance is $2.8 \text{ E-}5$. Giving up the two months of lead time (thus using no lag) strengthens the correlation to $r = -0.768$ and the significance to $1.2 \text{ E-}8$.

Changes in Home Prices and Changes in Percent of Listings with Price Decreased

The inverse relationship between home prices and reductions in listing prices is most clearly seen by looking at the deltas of *both* of these variables. Figure 22 graphs the six-month change in the Case-Shiller index with the six-month changes in Percent Price Decreased.

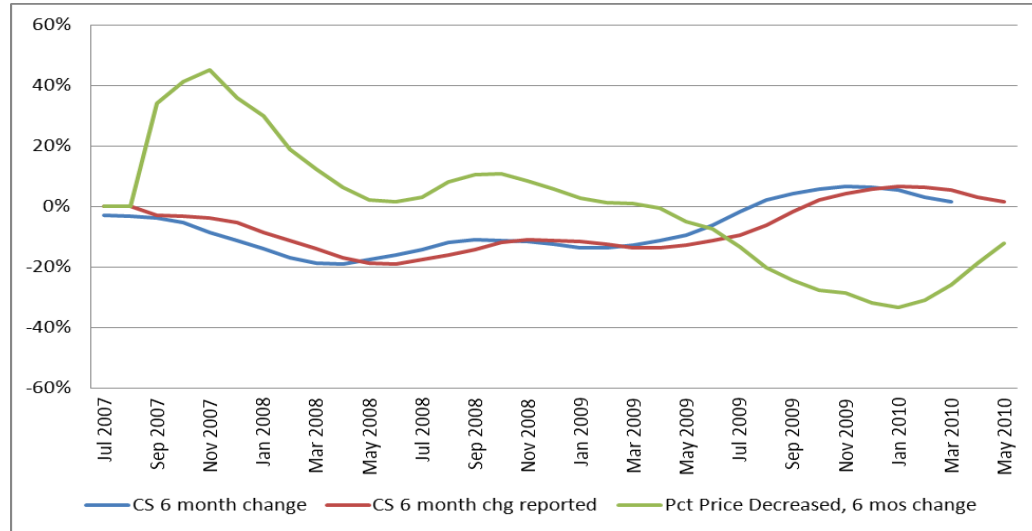


Figure 22: Case-Shiller Index, 6 months change, and Percent of Homes with Price Reductions, 6 months change

Figure 23 is the corresponding scatter plot, with the six-month changes in Percent Price Decreased being lagged by four months.

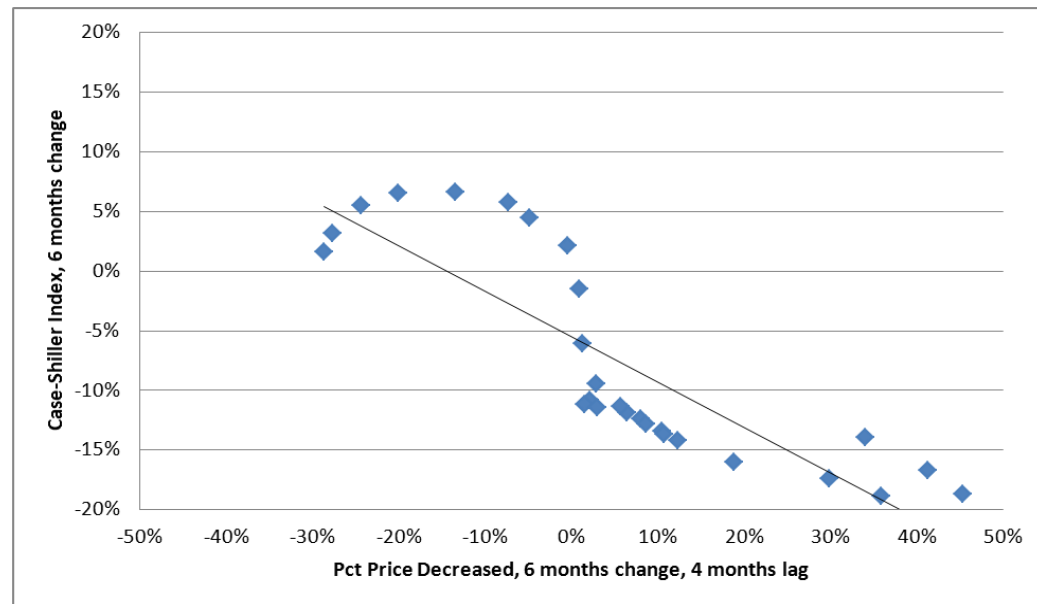


Figure 23: Case-Shiller Index, 6 months change, and Percent of Homes with Price Reductions, 6 months change, lagged 4 months

Although the relationship is not absolutely linear it is certainly strong, with correlation $r = -0.850$ and significance = $5.3 \text{ E-}9$. The change in Percent Price Decreased has a four-months lead on the change in the price index (six months lead over the actual knowledge of that change).

This correlative relationship between two rates of change is particularly useful in forecasting market turns before they actually happen. A shift in the velocity of Percent Price Decreased from positive to negative may signal an (inverse) change in the direction of prices from negative to positive, with a lead time of four (functionally six) months. Interpreting this in terms of prices instead of rates of change, if fewer listings have their prices reduced, this is likely to suggest a market of rising prices. Knowing – or even seriously surmising – that a market turn or point of inflection is in the offing is extremely valuable to anyone interested in the housing market.

Looking from a shorter-term, more nearly current perspective, Figure 24 graphs the three-month change in the Case-Shiller index and the three-month change in Percent Price Decreased.

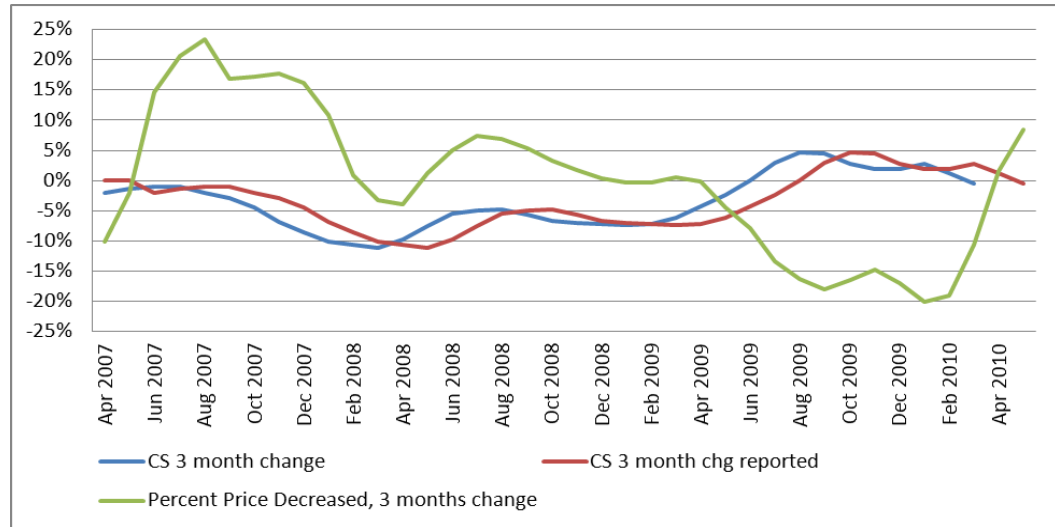


Figure 24: Case-Shiller Index, 3 months change, and Percent of Homes with Price Reductions, 3 months change

The relationship is again inverse, though more volatile than in the case of a six-month time lapse.

Figure 25 below shows the corresponding scatter plot, again with a four-month lag applied to the three-month change in Percent Price Decreased.

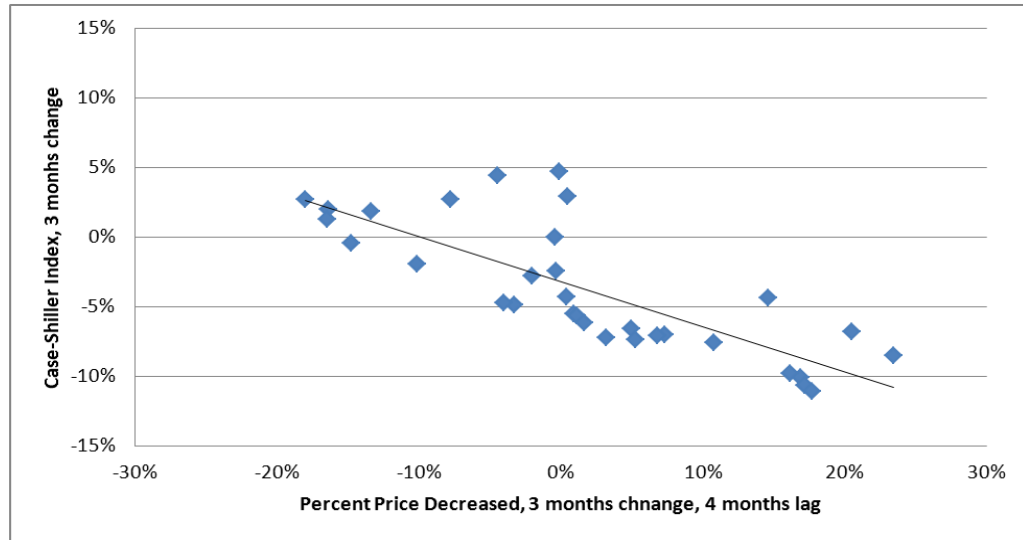


Figure 25: Case-Shiller Index, 3 months change, and Percent of Homes with Price Reductions, 3 months change, lagged 4 months

Again the relationship is strong enough to provide useful market intelligence with a four-months time lead (six months on the reported index), particularly if it appears in consensus with other Altos indicators. The correlation is $r = -0.784$ and the significance is $1.1 \text{ E-}7$. If the rate of change in Percent Price Decreased moves from positive to negative (fewer properties having their prices reduced), a firming or strengthening of market prices is likely to come within a few months; and on the other hand, if the velocity of Percent Price Decreased moves from negative to positive (more properties having their prices reduced), this is likely to suggest a subsequent weakening of the housing market.

A similar relationship is seen in reference to the six-month change in the CoreLogic index. Please refer to Figures 26 and 27 below.

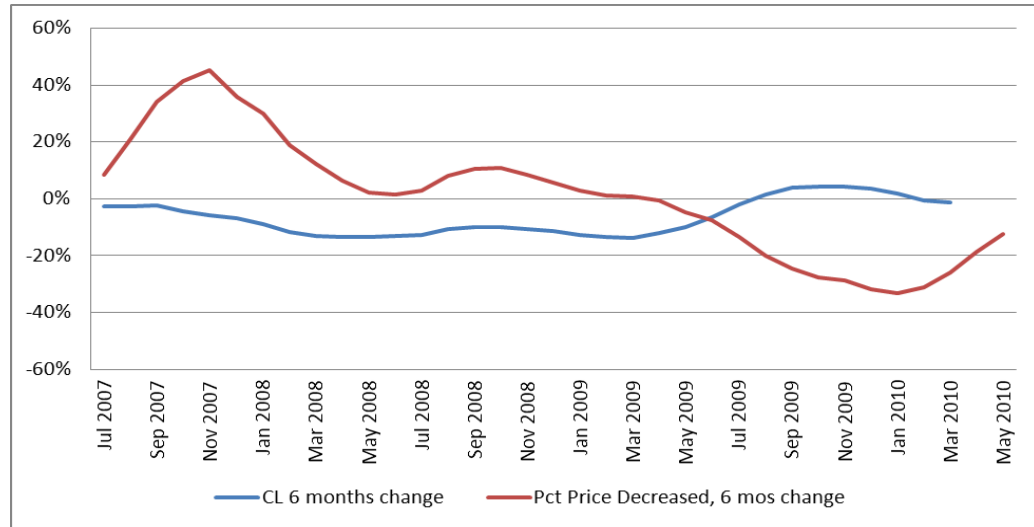


Figure 26: CoreLogic index, 6 months change, and Percent of Homes with Price Reductions, 6 months change

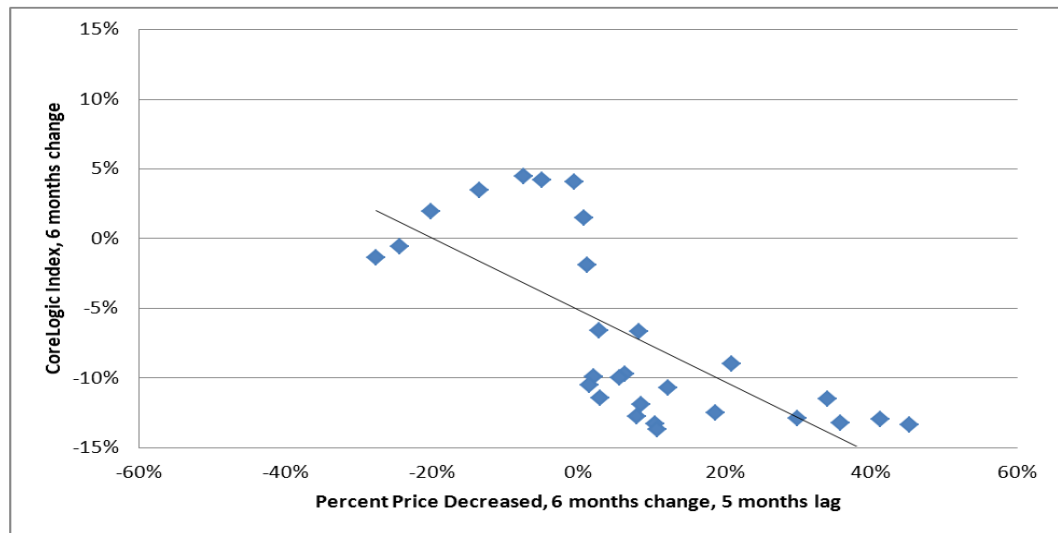


Figure 27: CoreLogic index, 6 months change, and Percent of Homes with Price Reductions, 6 months change, 5 months lag

Here the correlation is $r = -0.718$ and the significance is $1.7 \text{ E-}5$ (that is, 0.000017).

Changes in Home Prices and Changes in Median Asking Prices

There is an obvious relationship between asking prices and actual sale prices. The same is true of their deltas (changes). Figure 28 graphs the six-month change in the Case-Shiller index with the six-month change in median asking price. Figure 29 is the corresponding scatter plot with a two-month lag applied to the delta of the median asking price.

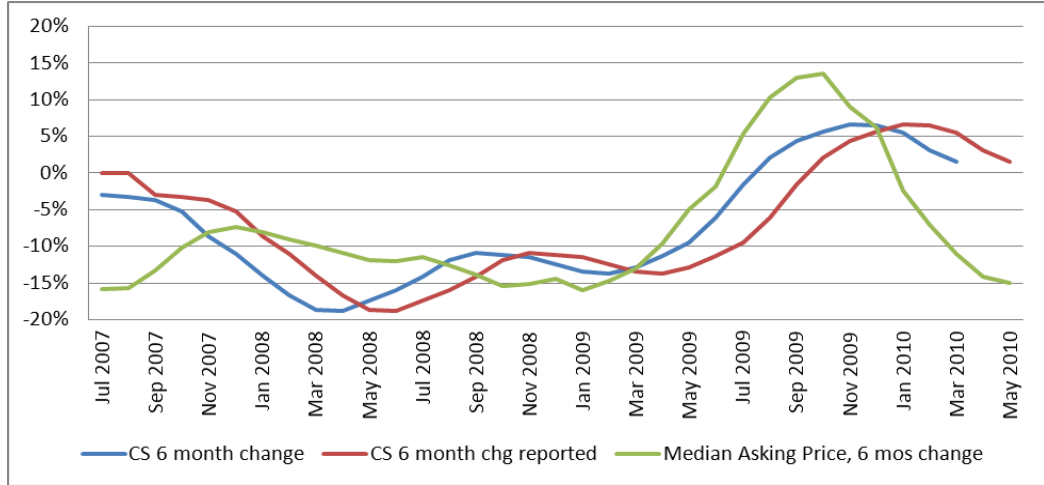


Figure 28: Case-Shiller Index, 6 months change, and Median Asking Price, 6 months change

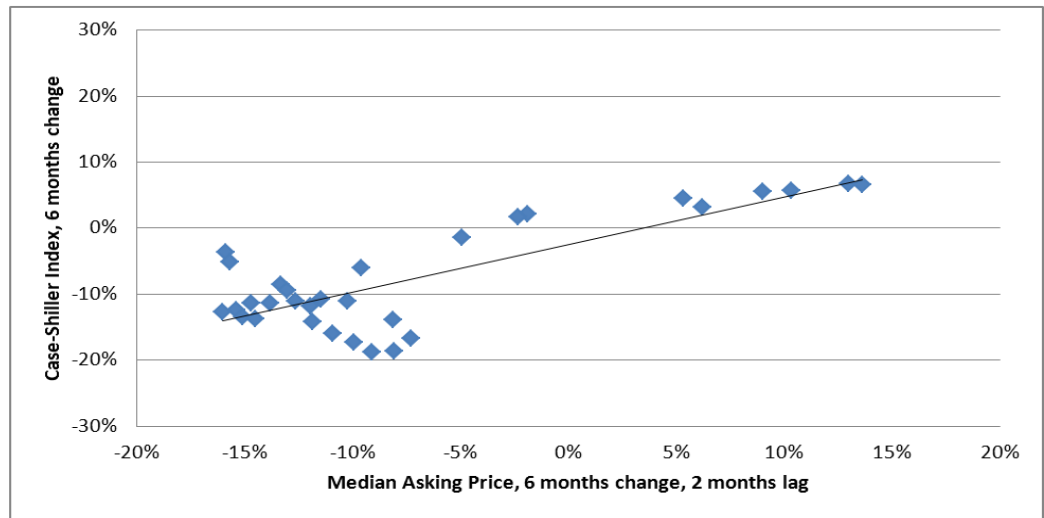


Figure 29: Case-Shiller Index, 6 months change, and Median Asking Price, 6 months change, 2 months lag

The correlation is $r = 0.799$ and the significance is $6.9 \text{ E-}8$. The lead time of two months is actually four months relative to release of the Case-Shiller index. The relationship between the two variables is not absolutely linear, but it is sufficiently strong to make the median asking price and its rate of change something well worth knowing about. If the change in median asking price crosses the zero line, shifting from negative to positive (asking prices start rising instead of falling), this is a likely signal of a corresponding positive market turn in actual sale prices.

Figure 30 gives the corresponding displays for the three-month change in the Case-Shiller index and the three-month change in median asking price.

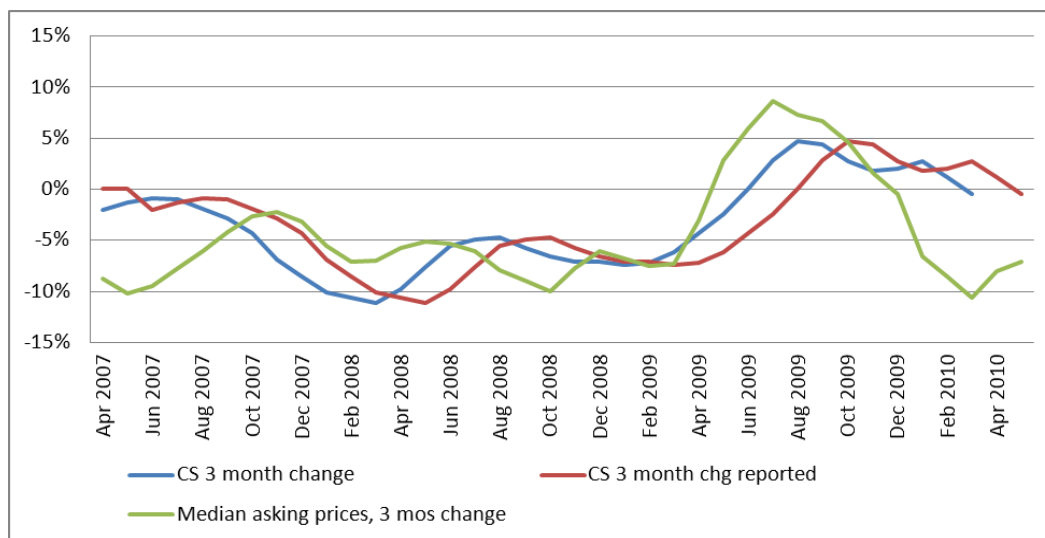


Figure 30: Case-Shiller Index, 3 months change, and Median Asking Price, 3 months change

Note that in the summer and fall of 2009 the velocity of the median asking price peaked in advance of the peak and subsequent drop in the rate of change of the Case-Shiller index itself. That is, the “heat” or “fury” of rises in asking prices (the rate of increase in asking prices) peaked in intensity (fastest rate of increase) shortly before the same thing happened with respect to actual sale prices.

The rate of change of median asking price crossed the zero line and changed from positive to negative in December 2009, as asking prices peaked and began to fall. This led by three months the transition from rising to falling in the Case-Shiller index (three-month rate of change moved from positive to negative) in March 2010, although this was not actually known until late in May of that year. It was indeed worth knowing what was happening to asking prices!

The scatter plot of Figure 31 uses a two-month time lag applied to the median asking price.

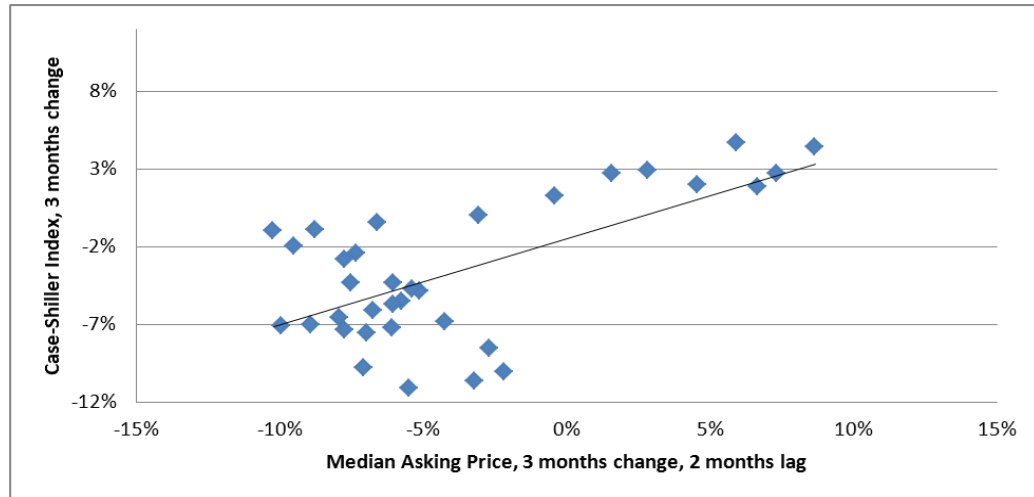


Figure 31: Case-Shiller Index, 3 months change, and Median Asking Price, 3 months change, 2 months lag

The relationship for the more volatile shorter-term deltas is weaker, with $r = 0.642$ and significance of “only” $4.3 \text{ E-}5$ (or 0.000043). As before, the relationship is not absolute but is certainly evident enough to make the change in median asking price worth knowing in current time.

Figure 32 displays the results for the six-month change in the CoreLogic index.

The rate of change of the median asking price reached a top in the fall of 2009, slightly leading the change in the CoreLogic price index. That is, the rate of increase in median asking price reached its maximum (hottest rate of increase) in October 2009, one month before the fastest rate of increase in the CoreLogic index, in November 2009. The six-month change in median asking price crossed the zero line and shifted from positive to negative (declining asking prices) in January 2010, again one month ahead of the corresponding shift in the rate of change of the CoreLogic index in February.

The six-month change in median asking price reached a bottom in January 2009, two months before the corresponding bottom in the rate of change of the CoreLogic index in March of that year.

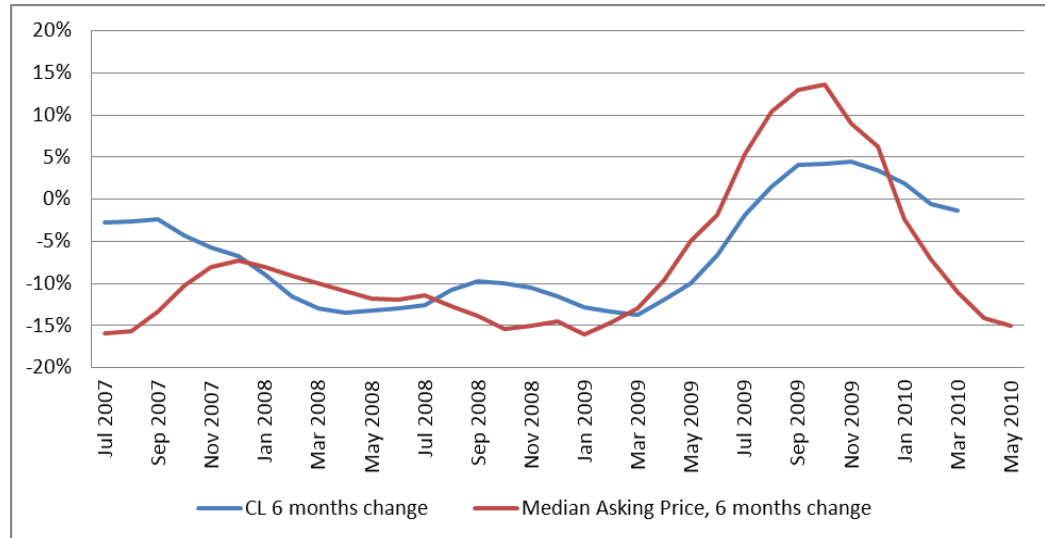


Figure 32: CoreLogic Index, 6 months change, and Median Asking Price, 6 months change

Figure 33 shows the scatter plot. A two-month lag has been applied to the change in median asking price.

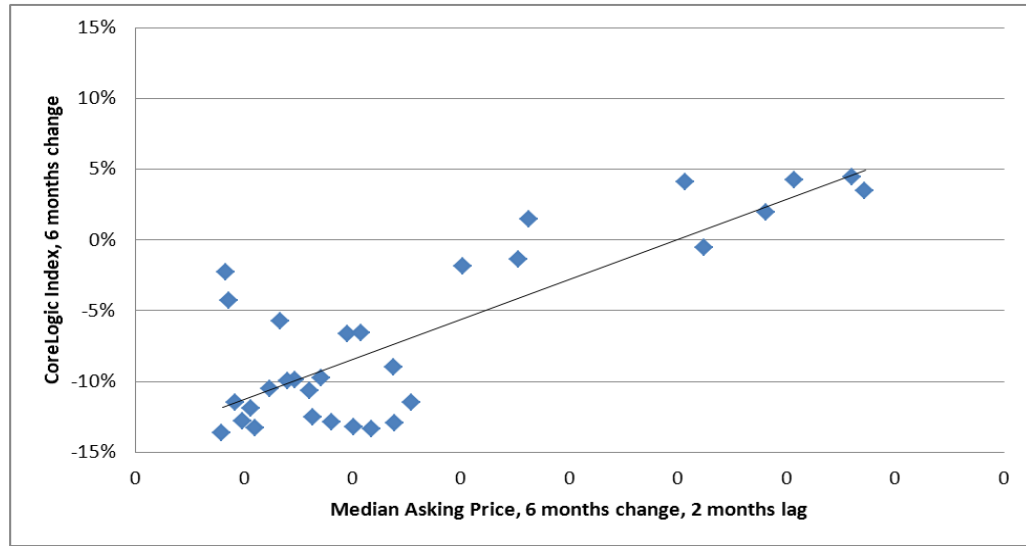


Figure 33: CoreLogic Index, 6 months change, and Median Asking Price, 6 months change, 2 months lag

The correlation of $r = 0.821$ is quite strong, with significance = $1.5 \text{ E-}8$. Again, the changes in median asking price were well worth knowing about, giving a two-months signal on what was likely to happen to the changes in home prices themselves.

Changes in Home Prices and Changes in the Prices of New Listings

The asking prices of new listings particularly reflect the current, real-time perceptions of sellers about how prices have recently changed and are expected to change. There is a positive relationship between changes in the median price of new listings and the changes in actual sale prices, as seen in Figure 34 below.

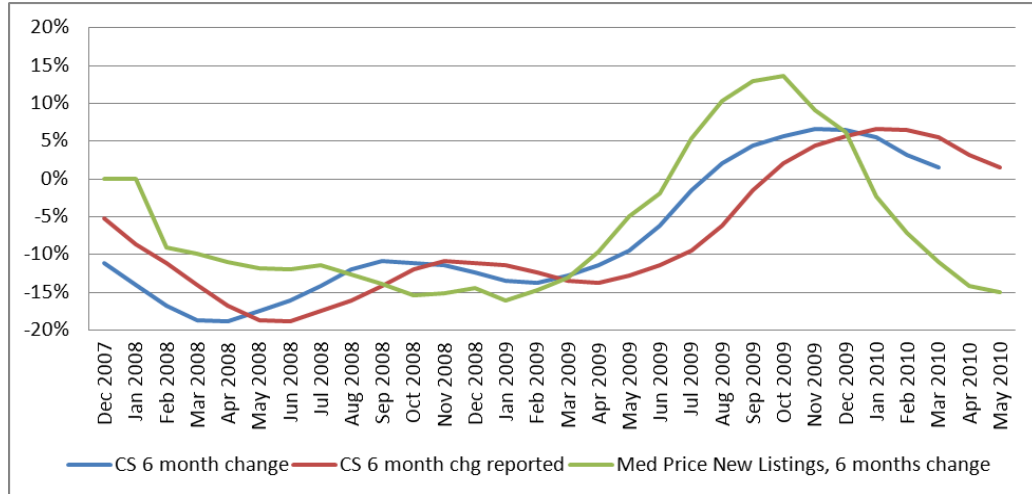


Figure 34: Case-Shiller Index, 6 months change, and Median Price of New Listings, 6 months change

The bottom in rate of change of the median price of new listings (time of fastest decrease) occurred in January 2009, one month in advance of the time of fastest decrease in the Case-Shiller index and three months before that information was actually available. In July 2009 the rate of change of median price of new listings crossed the line from negative to positive (median price of new listings stopped falling and began to rise), again one month before the corresponding event with respect to actual sale prices. The time of fastest increase in price of new listings was the strong peak of October 2009, again one month before the time of fastest sale price increases (hottest price rises) in November of that year.

Figure 35 shows the corresponding scatter plot. A lag of two months has been applied to the rate of change of median asking price.

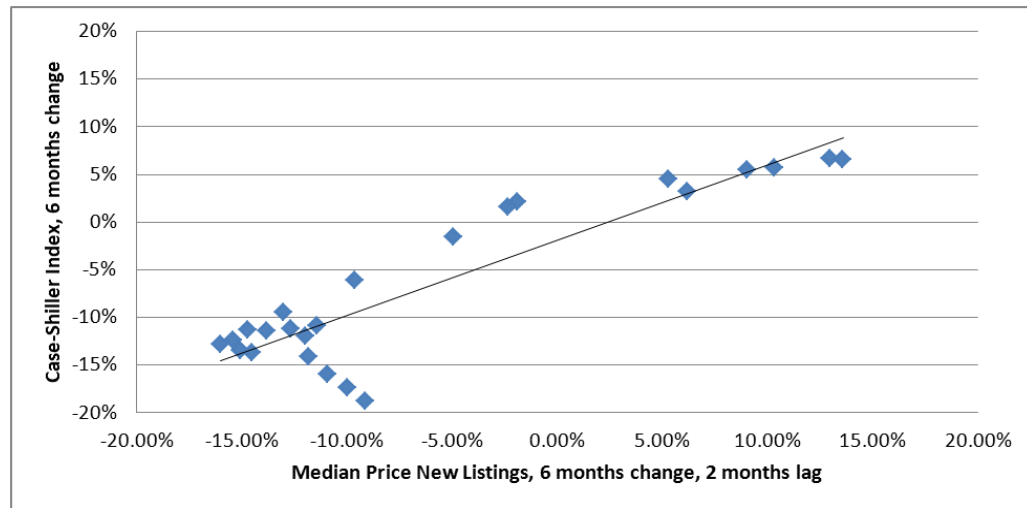


Figure 35: Case-Shiller Index, 6 months change, and Median Price of New Listings, 6 months change, 2 months lag

Although there are a few points off the trend line, the overall positive relationship is clear. The correlation is a very high $r = 0.905$ and the significance is $1.3 \text{ E}-09$, almost down to one part in a billion. What happens in the velocity of the price of new listings is very likely to

signal what will happen to the rate of change – the direction of motion – in actual sale prices. Here there is a two-month lag, but this is actually four months due to the delay in reporting.

When the time interval is shortened to a more current but less stable three months, the relationship is less obvious. Please refer to Figures 36 and 37.

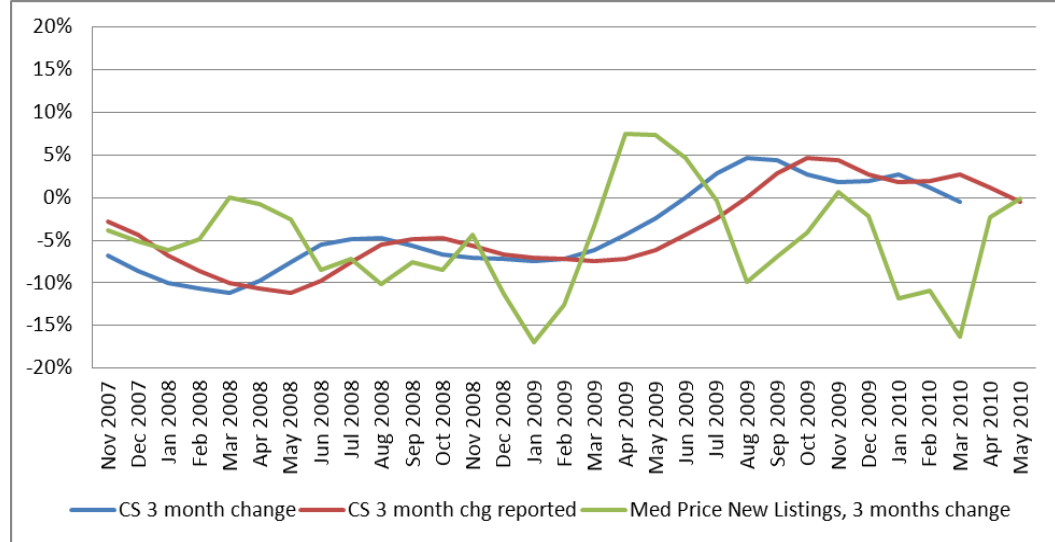


Figure 36: Case-Shiller Index, 3 months change, and Median Price of New Listings, 3 months change

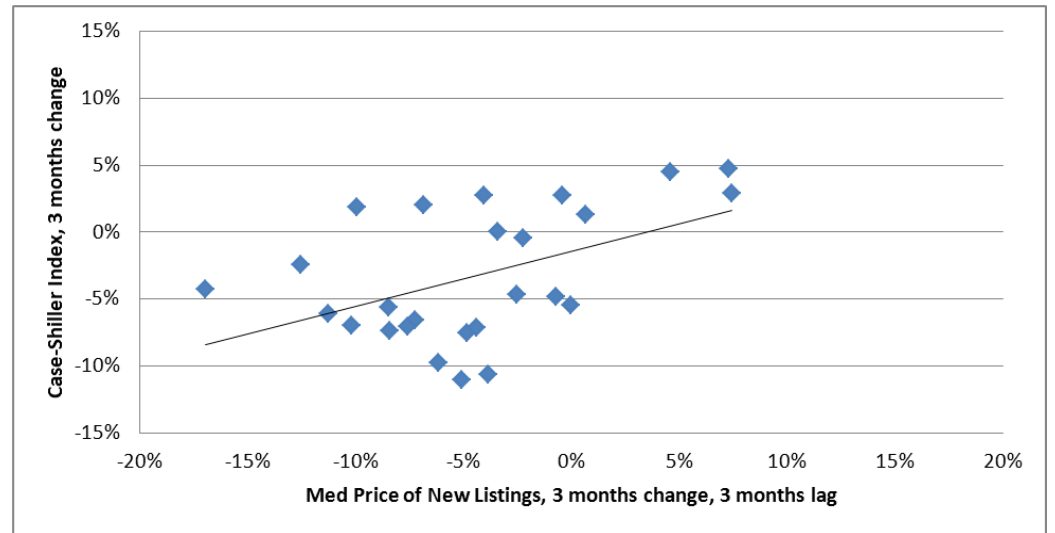


Figure 37: Case-Shiller Index, 3 months change, and Median Price of New Listings, 3 months change, 3 months lag

Even here, the relationship is still statistically strong, with $r = 0.485$ and a significance level of 0.012.

With a time interval of six months, the rate-of-change relationship is even stronger when the CoreLogic index is studied instead of the Case-Shiller index. Please see Figure 38 below.

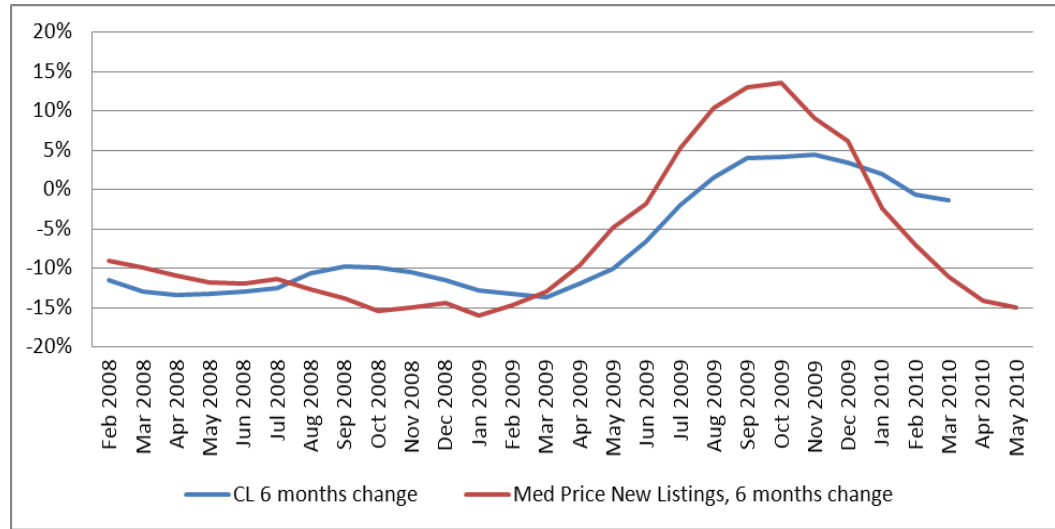


Figure 38: CoreLogic Index, 6 months change, and Median Price of New Listings, 6 months change

The six-month velocity or change in median price of new listings clearly led the six-month rate of change in the CoreLogic index at least three times – corresponding to two points of inflection and one market bottom in home prices themselves.

1. In reaching a low in January 2009 (fastest rate of decrease in new listing prices)
2. In crossing the zero line from negative to positive (moving from falling new listing prices to rising new listing prices) in July 2009 – a market bottom.
3. In reaching a top in October 2009 (fastest rate of increase in new listing prices).

Figure 39 displays the corresponding scatter plot.

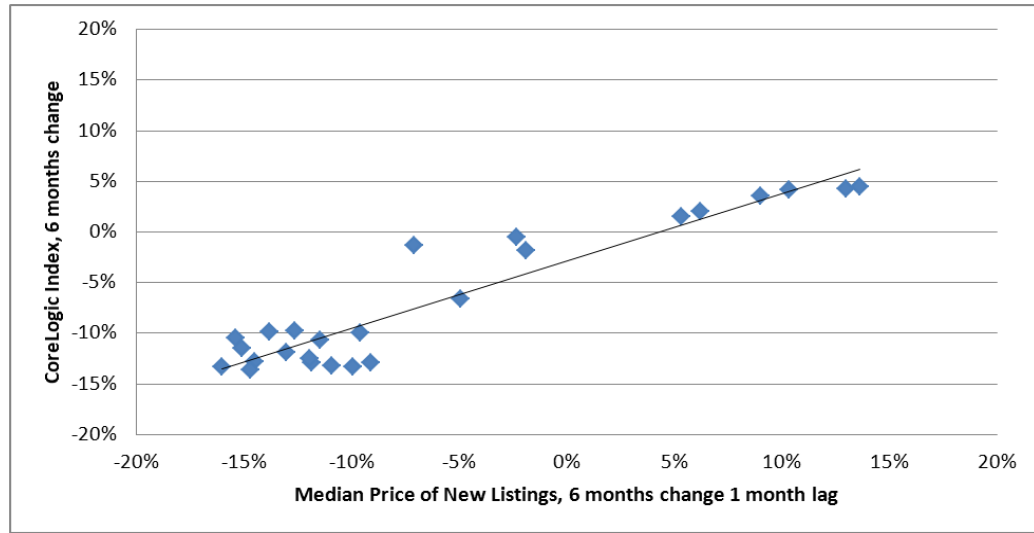


Figure 39: CoreLogic Index, 6 months change, and Median Price of New Listings, 6 months change, 1 month lag

The relationship has only a one-month lead time, but is extremely powerful with a correlation of $r = 0.940$. The significance level is $3.1 \text{ E-}12$, or about three parts in a trillion.

It is clear that what happens to the velocity of the median price of new listings will soon be reflected in the rate of change of sale prices themselves.

Changes in Home Prices and Percent Relisted

If many properties are relisted (typically at lower prices), this is indicative of a weak or declining market, while fewer properties are relisted in a strong or rising market. The relationship between the two is thus inverse.

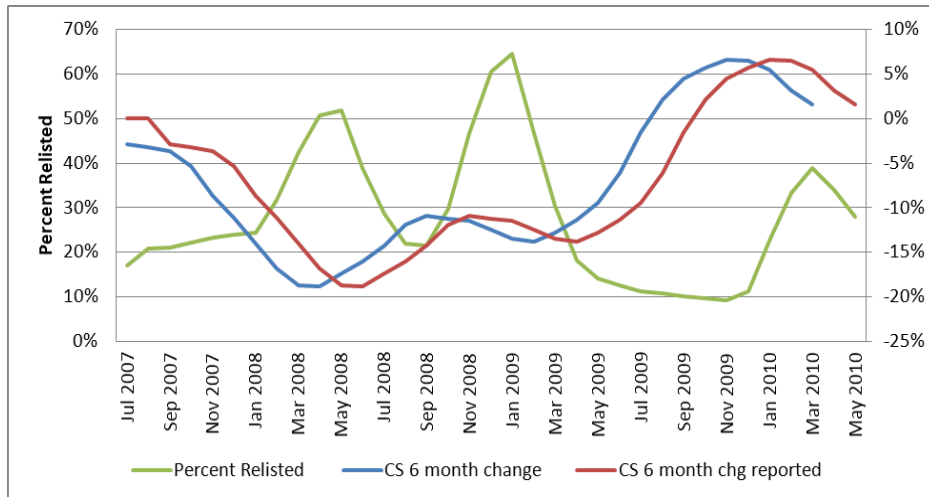


Figure 40: Case-Shiller Index, 6 months change, and Percent Relisted

Figure 40 displays the inverse nature of the relationship. It will be helpful to look at the scatter plot of Figure 41.

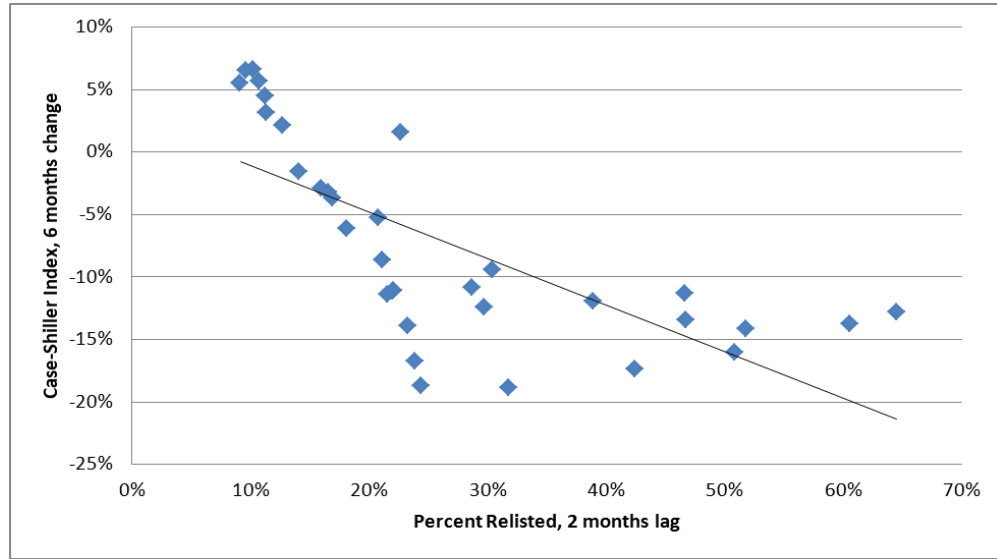


Figure 41: Case-Shiller Index, 6 months change, and Percent Relisted, lag 2 months

The relationship between Percent Relisted and the six-month delta in the Case-Shiller price index (with a two months lead over the actual index and a four months lead over the reported index) may not look powerful but it is statistically real, with $r = -0.707$ and significance = $4.2 \text{ E-}6$. We can get an extra two months of lead time by lagging Percent Relisted by four months, at the bearable cost of reducing r to -0.632 and significance to “only” $8.0 \text{ E-}5$ (or 0.00008).

When the time span is shortened to three months the relationship is more volatile, as seen in Figures 42 and 43.

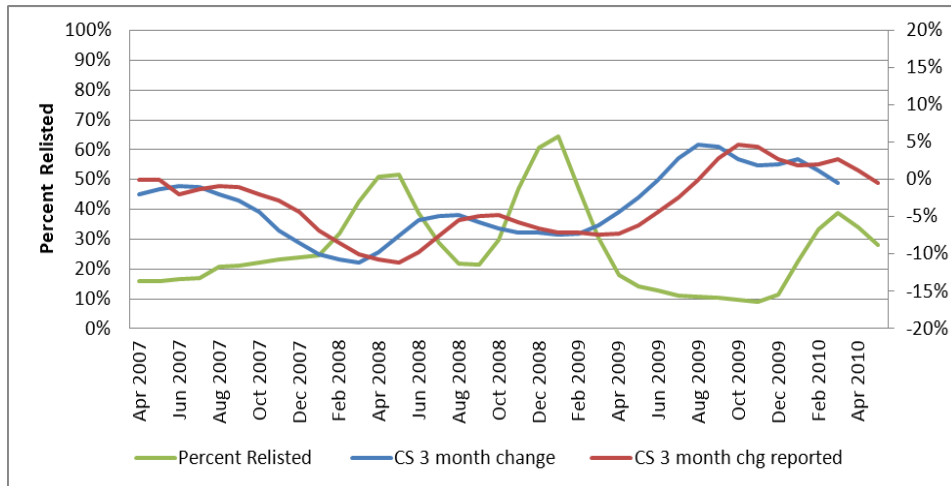


Figure 42: Case-Shiller Index, 3 months change, and Percent Relisted

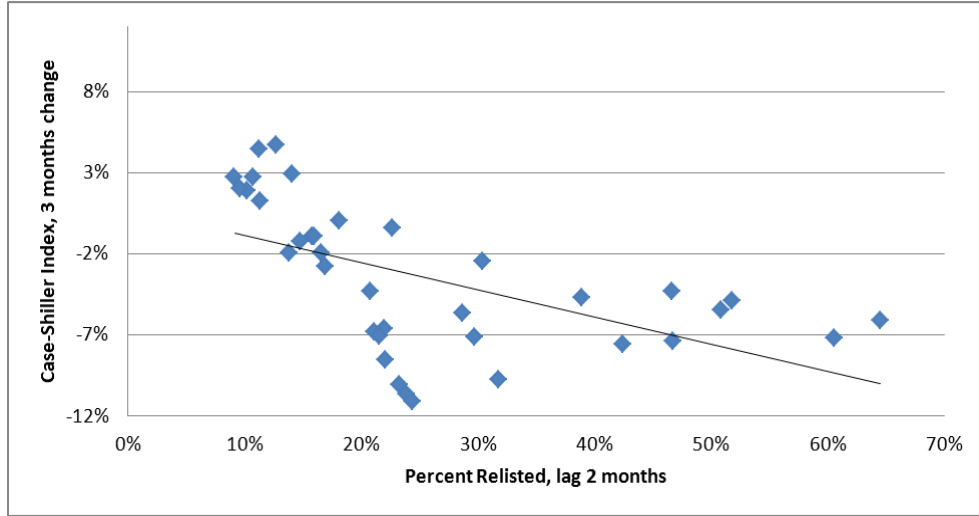


Figure 43: Case-Shiller Index, 3 months change, and Percent Relisted, lag 2 months

In this case the correlation is still a powerful $r = -0.563$ and the significance is $3.5 \text{ E-}4$ (or 0.00035), still a strong relationship.

Figure 44 looks at the six-month change in the CoreLogic index in relation to Percent Relisted.

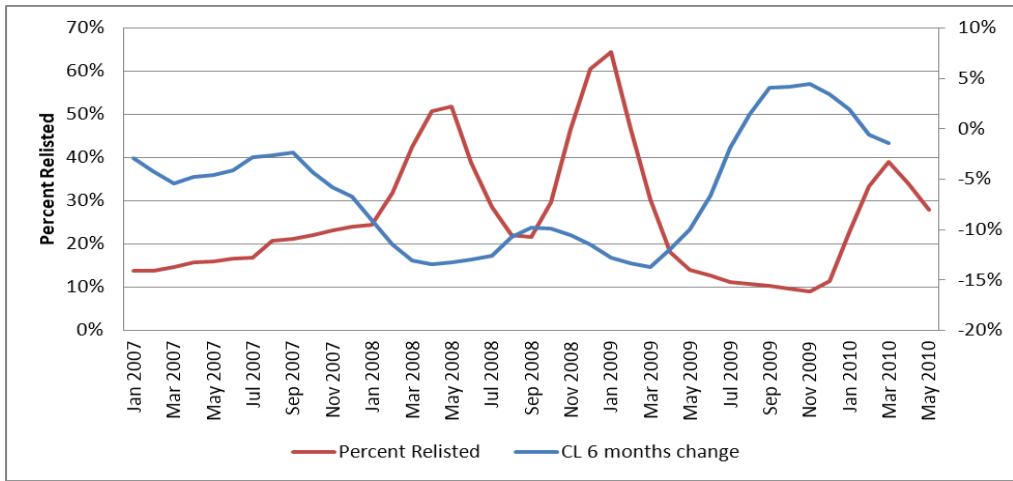


Figure 44: CoreLogic Index, 6 months change, and Percent Relisted

Again the relationship is clearly inverse.

Figure 45 is the corresponding scatter plot, with a two month lag applied to Percent Relisted.

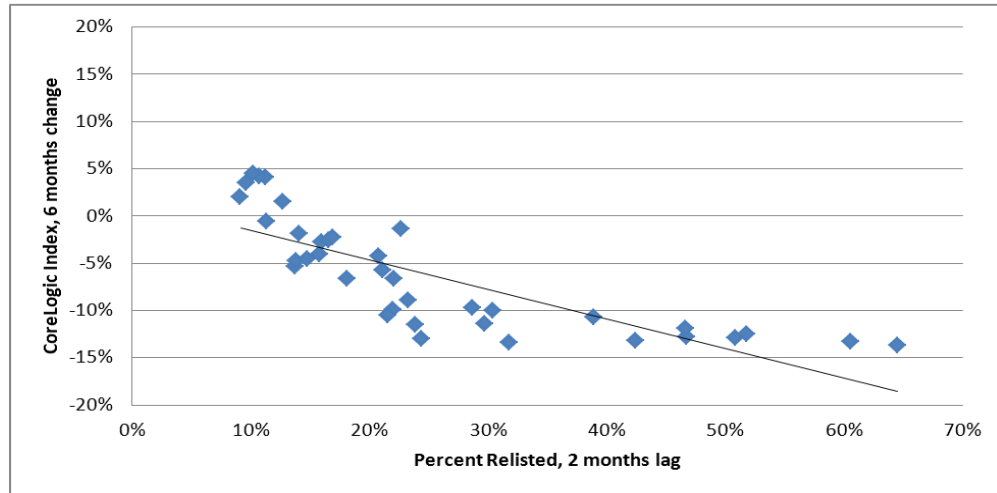


Figure 45: CoreLogic Index, 6 months change, and Percent Relisted, 2 months lag

The correlation is a strong -0.800 and the level of significance is 2.9 E-9, around three parts in a billion.

SUMMARY: Consensus, Currency, and Competitive Advantage

We have seen that the Altos variables and their deltas have powerful leading relationships with home prices and with the changes in those prices, with particular reference to forecasting market turns such as tops, bottoms, and points of inflection. Each relationship exhibited in this paper is statistically significant. While no correlation is absolute, the total set of Altos tools, taken together, provide a powerful community of *consensus* about what is happening and what is likely to happen.

The present study illustrates the importance of *currency* in knowledge. While home price indices by their very nature are only known well after the actual sales prices are agreed upon, the Altos variables provide real-time information, in advance of sales, about current market conditions. Indicators related to inventory, new listings, and asking prices stand logically – and chronologically – in advance of the closing of escrows, in advance of the recording of sale prices, and even farther in advance of the collection and reporting of home price data in the form of an index. This advantage in time is particularly important in relation to peaks or troughs in prices, and in relation to points of inflection when the pace of price rises or declines picks up or slows down.

Currency of information – real-time knowledge – can be valuable to lenders, investors, traders, builders, realtors, and everyone involved in the housing market. It would have been very helpful in 2007 to have leading information about the price peak of that year, and it would have been very helpful in 2008 to know in advance – even if only in the form of a suggestion – something about the power of that year’s housing crash. In any year, it is helpful to know about price dips, peaks, rises and declines.

The value of current and leading information is all the greater in the context of *competitive advantage*. Investors, traders, and all market participants will gain an advantage in having superior market intelligence – particularly current and leading intelligence – that their competitors lack. On the other hand, investors, traders and market participants that base their portfolio decisions on lagging market information– will be significantly disadvantaged in an environment where their competitors have real-time knowledge.

Knowledge is power. Knowledge is money. The Altos indicators are an aid to knowledge.

Table of Figures

Figure 1: Case-Shiller Index vs. Inventory.....	6
Figure 2: Case-Shiller Index vs. Percent of Homes with Price Reduction.	7
Figure 3: Case-Shiller Index and Asking Prices. Vertical bars indicate inflection points of active market new listings and, later, for the reported data of the Case-Shiller Index	8
Figure 4: Case-Shiller Index and Days on Market.....	9
Figure 5: Case-Shiller Index and Mean Days on Market.....	10
Figure 6: Six month change in Case-Shiller Index and Available Inventory.....	12
Figure 7: Case-Shiller Index, six month change and Inventory, lagged five months.....	13
Figure 8: Three-month change in Case-Shiller Index and Inventory.....	14
Figure 9: Case-Shiller Index, three month change and Inventory, lagged 4 months.....	15
Figure 10: Six-month Change in CoreLogic Index and Inventory.....	16
Figure 11: CoreLogic Index, six-month change and Inventory, lagged six months.....	16
Figure 12: Six-month change in Case-Shiller Index and six-month change in inventory.....	17
Figure 13: CSI six-month change and Inventory 6 month change, lagged seven months.....	18
Figure 14: Six-month change in CoreLogic HPI and six-month change in Inventory.....	19
Figure 15: Six-month change in CoreLogic HPI and six-month change in Inventory, lagged seven months.....	19
Figure 16: Six-month change CSI and Percent of Homes with Price Reduction.....	20
Figure 17: Case-Shiller Index, 6 months change, and Percent Price Decreased, lagged 2 months.....	21
Figure 18: Case-Shiller Index, 3 months change, and Percent Price Decreased.....	22
Figure 19: Case-Shiller Index, 3 months change, and Percent of Homes with Price Reduction.....	22
Figure 20: CoreLogic HPI, 6 months change, and Percent of Homes with Price Reductions.....	23
Figure 21: CoreLogic HPI, 6 months change, and Percent of Homes with Price Reductions, lagged 2 months.....	23
Figure 22: Case-Shiller Index, 6 months change, and Percent of Homes with Price Reductions, 6 months change.....	24
Figure 23: Case-Shiller Index, 6 months change, and Percent of Homes with Price Reductions, 6 months change, lagged 4 months.....	24
Figure 24: Case-Shiller Index, 3 months change, and Percent of Homes with Price Reductions, 3 months change.....	25
Figure 25: Case-Shiller Index, 3 months change, and Percent of Homes with Price Reductions, 3 months change, lagged 4 months.....	26
Figure 26: CoreLogic index, 6 months change, and Percent of Homes with Price Reductions, 6 months change.....	27
Figure 27: CoreLogic index, 6 months change, and Percent of Homes with Price Reductions, 6 months change, 5 months lag.....	27
Figure 28: Case-Shiller Index, 6 months change, and Median Asking Price, 6 months change.....	28
Figure 29: Case-Shiller Index, 6 months change, and Median Asking Price, 6 months change, 2 months lag.....	28
Figure 30: Case-Shiller Index, 3 months change, and Median Asking Price, 3 months change.....	29

Figure 31: Case-Shiller Index, 3 months change, and Median Asking Price, 3 months change, 2 months lag.....	30
Figure 32: CoreLogic Index, 6 months change, and Median Asking Price, 6 months change	31
Figure 33: CoreLogic Index, 6 months change, and Median Asking Price, 6 months change, 2 months lag.....	32
Figure 34: Case-Shiller Index, 6 months change, and Median Price of New Listings, 6 months change	33
Figure 35: Case-Shiller Index, 6 months change, and Median Price of New Listings, 6 months change, 2 months lag	33
Figure 36: Case-Shiller Index, 3 months change, and Median Price of New Listings, 3 months change	34
Figure 37: Case-Shiller Index, 3 months change, and Median Price of New Listings, 3 months change, 3 months lag	34
Figure 38: CoreLogic Index, 6 months change, and Median Price of New Listings, 6 months change	35
Figure 39: CoreLogic Index, 6 months change, and Median Price of New Listings, 6 months change, 1 month lag.....	36
Figure 40: Case-Shiller Index, 6 months change, and Percent Relisted	36
Figure 41: Case-Shiller Index, 6 months change, and Percent Relisted, lag 2 months	37
Figure 42: Case-Shiller Index, 3 months change, and Percent Relisted	37
Figure 43: Case-Shiller Index, 3 months change, and Percent Relisted, lag 2 months	38
Figure 44: CoreLogic Index, 6 months change, and Percent Relisted	38
Figure 45: CoreLogic Index, 6 months change, and Percent Relisted, 2 months lag	39

Data Series and Endnotes

ⁱ Inventory: total homes listed for sale in Los Angeles Metropolitan Statistical Area, 90-day rolling average, single family homes. *Altos Research time-series data product number: ZR.ZRINV.90.SF.A-Los Angeles-Long Beach-Santa Ana*

ⁱⁱ Case-Shiller Index: Los Angeles S&P Case Shiller Index CSX.LA

ⁱⁱⁱ Percent Price Reductions: Percent of homes currently on the market that have had price reductions. *Time-series data product number: ZR.PPD.90.SF.A- Los Angeles-Long Beach-Santa Ana*