General Information About Price Indexes

We are frequently asked why we publish two different index types for the price of new home sold or being constructed. The answer is that we have been requested to publish these indexes because they have different strengths and weaknesses. It depends on your purpose to determine which index is appropriate. To further confuse things, we must explain that there are actually three different kinds of residential construction price indexes computed. These are:

Laspeyres (Constant Quality type);

Paasche (Output Deflator); and

Fisher Ideal Index (Price Deflator)

Below is a brief description of each type of index and its appropriate use.

Laspeyres Price Index (Constant Quality)

This index answers the question, "How much is the sales price today for the same quality house as in the base year?" The base year we are now using is 2005; its index value is set to 100.0. Quality includes not only the physical size and amenities of the house, but also its geographic location. A hypothetical calculation is made in which the base year kind of house is held constant over time while its selling price is calculated in current dollars.

Uses of This Index

In theory, this index may be used to determine how much of a total price increase is due to an increase in quality - changes in size, amenities, and location - and how much is due to inflation. This index keeps housing quality constant. It has been used to inflate previous years' house prices to determine housing insurance replacement costs, to update local government real estate tax abatement levels, and to update price levels in housing programs for inflation where such updates are required by law or custom. Construction contracts might have a price escalation clause tied to this index. The assumption is that inflation in existing housing or construction can be approximated by inflation in the sales prices of new one-family houses sold.

Weaknesses of This Index

Its greatest strength, constant quality, contributes to its greatest weakness - a bias towards over-stating inflation. This index does not allow for effects of substitution in housing. If some feature in a house becomes increasingly expensive, the buyer may substitute some other item. Or, the buyer may agree to a smaller house with fewer rooms so that the

house can be purchased at an affordable price. This index does not allow for such adjustments. Furthermore, this index assumes that the base year percent distribution of new home sales by geographic area will not change. In reality, these proportions do change, reflecting the fact that markets are not all relatively strong or weak at the same time. This index has a problem of weighting higher priced markets at their base year levels even when new home sales proportions have significantly changed. For example, in the West region sales activity had transferred to lower priced markets resulting in an overstated price index. This happened in the late 1980's when California and Hawaii accounted for nearly 60 percent of all houses sold in the West region. By the early 1990's sales activity in these two high priced states had diminished to about 40 percent of the West's activity, with a corresponding increase in more moderately priced parts of the region.

Paasche Index (Output Deflator)

This index answers the question, "What is the difference in price in today's house in today's dollars versus the price for the same house in base year dollars?" Since "today" is defined as any time period in question, the quality of the house defined above is not held constant. It is newly calculated at each time period. A hypothetical calculation is made in which the numerator of the calculation is the current house priced in current dollars. The denominator is the current house priced in base year dollars. In the numerator, for each time period the size, characteristics, and geographic mixture of the houses sold reflect the activity of that time period and the prices paid. Base year prices for the same characteristics are held constant in the denominator.

Uses of This Index

Since we are not concerned with new home sales or under construction as an output, we do not publish this index. Our use for this index is to calculate the Fisher Ideal Index as defined below. Data users who are concerned with measuring the value of today's output or production using a constant set of dollars will find this kind of index useful. By dividing today's output or value of production by this index, one can convert or deflate back to a fixed or standard set of dollars associated with the base year. This enables the data user to determine what the real value of output is for each time period.

Weaknesses of This Index

Given that buyers of new homes can satisfy their housing needs through a variety of means, preferences in housing choices can change at each time period. If, in effect, the real costs of housing are rising relative to income, the Paasche index will allow the substitution of a smaller house with fewer amenities over the larger house with more amenities in order to increase affordability, because there is no fixed standard quality. By doing this, the Paasche index understates inflation because it allows cheaper options to replace more expensive ones. If certain housing markets become over priced, and housing

sales reflect a shift to lower priced markets, a Paasche index will not factor out these changes. All things being equal, this will result in a lower calculated rate of inflation.

Paasche can be derived by the following formula:

$$\text{Paasche} = (\text{Fisher}^2) / \text{Laspeyres}$$

Fisher Ideal Index (Price Deflator)

This index helps answers the question, "What is the (unbiased) value of today's homes being constructed in constant dollars?" In doing this it attempts to eliminate two kinds of problems associated with the previous two indexes:

- the tendency to overstate inflation (Laspeyres); and
- the tendency to understate inflation (Paasche);

The Fisher Ideal index is the geometric average of a Laspeyres and Paasche indexes for the same time period. The geometric average is calculated by multiplying the Laspeyres index by the Paasche index and then taking the square root of the result. The biases associated with each component index are minimized by calculating the geometric average.

Uses of This Index

This index can be used as a price deflator in determining the constant dollar value of today's output of houses under construction, which is included in the Gross Domestic Product. It does eliminate the problems of either understating or overstating inflation given substitutions made in the marketplace, while at the same time allowing for some change in base characteristics to reflect the variation in size, amenities and geographic location of houses. The geometric average technique has the effect of halving the yearly quality change taking place.

Weaknesses of the index

This index cannot be used to precisely determine how much of a total price change is associated with inflation and how much is attributed to changing quality since there is no fixed quality associated with the base year. A further weakness of this index is its complexity. It relies on the production of the two component indexes, while producing a result similar to either the Laspeyres or the Paasche indexes.