Weaknesses of a Hedonic Housing Price Index

- A special report from our Managing Director, Louis Christopher

There was much media last week surrounding the release of RP Data's hedonic house price index. We welcome improvements to the transparency of house price information and we pay respect to those from RP Data and Rismark who have worked hard to improve real estate information in this country.

Dr. Matthew Hardman in particular should be noted- I remember back in 2003, he and I had a good discussion about the potential to one day have a tradable house price index. And now it is upon us. Well done Matthew for sticking with the dream.

Now that the niceties are out of the way, we (SQM Research) have some genuine concerns surrounding indexes that purport to be able to measure house price movements on a daily basis. We also have concerns surrounding some of the inherent weaknesses of hedonic index models, weaknesses of which have largely no been reported on this in country.

Well, it's about time people are made aware of these limitations. Firstly we will discuss the base limitations of a hedonic index house price model and then discuss where we see issue on a daily hedonic index model.

For those that don't know, a hedonic house price index attempts to measure house price movements after taking into account quality differentials between various dwellings. Overall, it is a good theory if it can be property built into practice. Obviously, raw material house price index models can be easily skewed by quality/compositional differences in the reported sales data. E.g. a disproportionate number of affluent properties selling in a period could artificially drag the median house price upwards, yet the reality on the ground is that house prices may well still be falling.

Then there are stratified house price indexes, one which yours truly built in 2005. This is our main preference for an index due to its transparency and simplicity but even that too has its flaws.

For a hedonic index to truly work, it really needs a vast amount of data, particularly covering specific quality attributes of individual properties. By not covering the quality attributes adequately, the hedonic index itself risks providing incorrect, skewed results. The index also needs to make massive assumptions about those property attributes and what value the population will place on them, as discussed below -

Beauty is in the Eye of the Beholder

The hedonic method will only capture people's willingness to pay for perceived differences in attributes, and their direct consequences. Thus, if people aren't aware of the linkages between the attributes and benefits to them or their property, the value will not be reflected in home prices.

In other words - beauty is in the eye of the beholder, yet the hedonic index assumes we all will develop the same amount of appeal towards the same type of attributes in a property by the same magnitude. Not only does it assume a purely rational property buyer, but all buyers having exactly the same desires as each other! Straight away this is not reality. Think of swimming pools. Not everyone likes a swimming pool, yet the hedonic model assumes we will all desire one.

Watch Out if There is a New Tax

The hedonic method assumes that people have the opportunity to select the combination of features they prefer, given their income. However, the housing market may be affected by outside influences such as taxes, interest rates or other factors. So if the government of the day brought in a new tax at say - the upper end of the market, the index would not be able to immediately capture the new downturn that would take place there.

Errors Hidden in the Cracks

The method is relatively complex to implement and interpret, requiring a high degree of statistical expertise. That means errors, whether they are computational or human, can easily trick the index into giving an incorrect result. And worse, these errors may well be hidden and not easy to detect. The one thing we know with regard to data in this country is that it is full of errors, such as incorrect street addresses attributed to records. RP Data state they have a handle on this issue, but we are not so sure, especially given the significant differences between our two Stock on Market indexes (which is a subject for a newsletter at another time. See also our numbers for February Stock on Market below).

Potential Manipulation

The results depend heavily on model specification and model assumptions, of which, in the extreme could be manipulated to produce a certain desired outcome. Once again it's going back to the assumptions. What are one's assumptions for how much value to place on a view and a pool? These are assumptions that will be computed into the model, most likely as a multiple function. The problem is the value placed on the assumption is subjective and can easily be changed in order to create a desired outcome. For example, if one wanted the index to record a rise for the month, yet the raw data to date suggests there has been a fall, all one may have to do is decrease the desirability assumption of say - views and increase the desirability of bedrooms. That could then affect the index to the point where a fall in the index turns into a rise.

Now to be fair, internal manipulation is the risk for all indexes, but the additional problem is

manipulation can be more easily hidden in the hedonic index. You would need a very smart cookie who knows exactly what to look for in order to spot any discrepancies.

In all this, we are not saying that RP Data would manipulate their index. It's a very competitive market between reporting bodies, so it is unlikely they would. But the potential to do so is there and I would very much like to see in exact detail, how their auditors are monitoring the compilation of their daily index. And importantly, do their auditors have the experience and qualifications to know what to look for?

I would also like to see in detail from the ASX, how they are handling the potential "Bucket Shop" risk.

Consistency Unattainable

A hedonic index is likely to produce false readings if for example - one of the quality attributes is not consistently applied across all transactions. So if there are large holes in the data surrounding land size and number of bedrooms (as is often the case with state government supplied sold records), this can then create a massive distortion to the end result. To overcome this, more and more assumptions need to be applied and whole batches of data left out of the calculation, reducing the sample size.

The Biggest Weakness Of All

The hedonic method has to make the assumption that the characteristics which are not measured by the index, don't affect value. Now the guys at RP Data say they can take into account number of bedrooms, views, swimming pools, garages and waterfront properties, among other attributes.

However, correct us if we are wrong but they can NOT take into account the slope of the land, which is a massive attribute and causation of value. Neither can they take into account the shape of the land. They can't take into account the value add of renovations. They also assume that being close to good schools and hospitals and transportation makes no difference. They say that views can be taken into account but sorry, we doubt this very much because views are very unique from property to property. And can they take into account whether a property is well maintained or not? Somehow, we don't think so. They cannot take this into account because there is very little reliable data on these attributes.

To measure how all these characteristics influence the price of a house would require a lot of information, which is simply just not collected in Australia.

And this is the last weakness as well. There just simply isn't adequate data to make this daily hedonic index 100% reliable, just yet. And more likely the reality is that the monthly and hedonic indexes are mainly giving off similar results as the other stratified indexes, due to the effective stratification that

is being applied to the hedonic index by using geographical location as its main influence of dwelling price movement.

In all this though, that is not to say they have a "bad" index. No, they do have a good index, but one that still has its flaws.

A Daily Index? Once Again, Nice in Theory

If there were daily bids and offers on a variety of properties that changed value, then it would be possible to do some type of daily dwelling price measurement. No doubt, sentiment towards real estate per say would change on a daily basis given what is happening in the economy. One such example of a change in sentiment that happened overnight was the lift in interest rates by the major banks last month. There is some evidence to show there was an immediate change in sentiment, as the very next weekend, auction clearance rates fell in Sydney (from the preceding weekend) and are still down on levels recorded last year.

So if sentiment in real estate does change daily is it possible to really measure this? We think not as there just simply isn't a big enough sample size of data that comes through covering each present day. But let's consider what the guys have built.

1400 Transactions a Day - But Are They Today's Transactions?

In short, the answer is no. The 1400 transactions RP Data quote are based on what they RECEIVE each day but it's not based on PRESENT day real estate sales. It's actually based on a wide time period of exchange dates which most likely goes back many months. Our bet is the actual transactions they get on the day -for the day, are very few indeed, baring the exception of the weekend auction results.

The Past Determines the Present?

What they do with the 1,400 transactions is update their estimated values on each property in the country. This is what predominately drives the daily index. The problem with this is that they are using the PAST to determine and estimate PRESENT day price. We have a real problem with this, in that it is just like looking at last month's daily price chart of BHP and making an estimate of what the price is today! And then worse, not adjusting that estimate based on new information that comes to hand, which brings us on to the next grievance we have with this index.

A No Revisions Index is Dangerous

This index is not being revised. That means that the authors are literally not taking into account the vast majority of sold transactions that happened on the reference day. On our estimate, they are missing out on over 90% of transactions which will never be adjusted for or taken into account in the

index. The equivalent would be the Electoral office officially determining the winner of the election with less that 10% of the votes counted and writing off the rest of the votes as irrelevant. The crazy thing is this company was putting in extensive revisions on their monthly hedonic index and yet now they see no need to revise on a daily index?

I suspect the reason why they are not revising is that ASX demands that of them if they are to provide derivative contracts surrounding the index. IN the ASX's mindset, it's no good for bet making if the index you are betting on gets revised all the time.

There will be an end result to this and that is they will likely make some big adjustments in the daily index to reflect the "new" past as records come into their office. If they don't, it is my opinion that the index could go widely off track compared to the other competitor indexes and with general reality.

Perhaps we are already witnessing this now. Does anyone really believe that Melbourne's dwelling prices rose 1.8% in January? That would make for a booming housing market with an annualised rate of growth of close to 22%. Funny that there has not been one single other measurement out there that has suggested Melbourne is in a strong recovery mode. And please do not use the seasonality argument as all the evidence there suggests house prices fall in January due to many desperate vendors failing to sell in spring and hardened buyers.

Another Solution

Needless to say there is a way where it can work which would be along the lines of an inverse futures contract here the strike dates (and strike prices) are set in the past and are traded on until nearly all data is captured on that date. It would be fluid as the price for that date can fluctuate based on progressive updates of incoming data. This could work well, and better still, if it was based on the ABS stratified index, there would be no question of bucket shop risks, which we believe this current index has. So right now you might have say- four strike dates, being say the September 2011 quarter, which would, in theory be about to be finally settled on now. Anyway, this is just food for thought and a bit late in its delivery. It's a little sad though that the ASX does not seem to have explored all options on the table nor bothered to speak to all the experts in the field.

Final Summary

In short, there isn't a perfect index out thee for property and thee isn't likely to be and that is simply because nearly every property is unique to itself. The hedonic method of calculation residential real estate price changes is a good method, but not without its own flaws that have rarely been reported until now. And as for the daily index that doesn't get revised, sorry but revision is absolutely necessary in this game. Needless to say, best of luck with your index guys.

Other Items

We note that RP Data have stated that the seasonal adjustment is no longer a part of their index as they are taking a "review" of it. Folks, that potentially is another way of saying they no longer have confidence in their seasonality - numbers quoted as gospel right throughout last year which often stated house price falls being smaller than their "raw" results". Now it seems raw results are okay? We would like to read more about this new development and what it means for the old, seasonally adjusted index.