Recent developments in Australian Residential Property Price Indexes

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Acknowledgements:

Introduction

1. Residential property prices continue to be of significant interest to the Australian community. The Australia Bureau of Statistics (ABS) publishes a quarterly house price index (HPI) to inform policy makers and the community generally about house price movements. This article outlines recent work by the ABS to improve the current suite of house price indexes; and summarises the results of research into a range of new ABS residential property price indexes. This article concludes by noting a recent development by a private producer of residential property price indexes in Australia.

Background

2. Residential property ownership is embedded in Australia's culture. It's often referred to as "the great Australian dream" to be an owner occupier of residential property. It is commonly believed that residential property ownership brings security and a better Australian life. For these reasons a relatively high proportion of Australians live in owner occupied households. Home ownership rates have been fairly stable at around 70% for many decades. As measured in the ABS Census of Population and Housing, in 1971 the home ownership rate was 69% and in 2006 it was 70%, with small fluctuations around 70% in the intervening Censuses[1].

3. For most Australians the purchase of residential property is their single largest financial investment. It's therefore logical that residential property prices will be closely monitored by individual property owners. In addition, policy makers, market analysts and researchers closely monitor residential property prices for a range of economic and social reasons.

4. Traditionally residential property ownership in Australia meant owning a detached house on a quarter acre plot of land. However, the composition of the Australian residential housing stock continues to evolve with other types of housing, including town houses and apartments, becoming more prevalent.

5. The ABS currently produces a quarterly price index for detached houses only. The ABS has recently embarked on a range of research projects to both improve the current suite of detached houses price indexes as well as develop a range of new price indexes that allow price movements of most types[2] of Australian residential housing to be monitored over time.

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[1] Measures of Australia's Progress , ABS Cat. No. 1370.0, released 15/09/2010.

[2] The definition of structure type for the purpose of the HPI is consistent with ABS classifications: the Functional Classification of Building, 1999 (cat. no. 1268.0.55.001), which is used in building activity statistics; and the Dwelling Structure Classification (STRD) which is used in the Census of Population and Housing (refer to Census Dictionary, 2011 (cat. no. 2901.0)).

Improving the current suite of ABS HPIs

6.   The ABS HPI is published in *House Price Indexes: Eight Capital cities* (ABS Cat. No. 6416.0)*.* The ABS HPI covers transactions in detached residential dwellings in each of Australia's State and Territory capital cities on their own block of land regardless of age (i.e. including new houses sold as a house/land package as well as second-hand houses). Price changes therefore relate to changes in the total price of dwelling and land. The Census Dwelling Structure Classification (STRD) is used to categorise dwellings and is as follows:

Separate house
    11 Separate house

Semi-detached, row or terrace house, townhouse etc. with:
    21 One storey
    22 Two or more storeys

Flat, unit or apartment
    31 In a one or two storey block
    32 In a three storey block
    33 In a four or more storey block
    34 Attached to a house

Other dwelling
    91 Caravan, cabin, houseboat
    93 Improvised home, tent, sleepers out
    94 House or flat attached to a shop, office, etc.

7.   The ABS HPI currently covers only dwellings which would be classified as a "Separate house". This coverage represents approximately 54% of the value of the national dwelling stock and 75% of the value of the dwelling stock in the capital cities[3].

8.   The ABS HPI uses a stratification approach to control for compositional change in the sample of houses used to compile the indexes each quarter. This approach stratifies (clusters) houses according to two characteristics: the long-term level of prices for the suburb in which the house is located, and the neighbourhood characteristics of the suburb, as represented by the ABS Socio-Economic Indexes for Areas (SEIFA)[4].

9.   Each cluster of houses in a capital city contributes a proportion of the total value of the housing stock in that capital city. The proportion of the total value is referred to as the cluster's weight. Some clusters have a large weight; some have a small weight. The series for detached houses is derived by weighting together the indexes for each of the eight capital

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[3] As at the 2006 ABS Census
[4] ABS Cat. No. 2033.0.55.001 - Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia

cities according to the relative value of housing stock in each capital city. From the June quarter 2008 onwards, the values were obtained by combining 2006 Population Census house counts with March quarter 2008 mean prices.

10. Each quarter, the clusters are re-valued by applying a price relative which is derived by comparing the current median price of the cluster to the previous median price of the cluster. The current period values of each cluster are then summed to derive the current value of the total housing stock in the capital city. Index numbers are subsequently derived from the total values.

11. Thus the movement of a particular index is determined by both the movements of the median prices of the clusters and the weights of the clusters in the index structure.

Weighting and clustering review

12. As noted above, the design of the clusters that underpins the ABS HPI and the cluster weights are based on the Population and Housing census data that are released every five years. The most recent Australian Population and Housing census was conducted in August 2011. Census data are therefore expected to be released from October 2012. These data will enable a design review of the current clusters as well as the implementation of new weights. It is expected that the results of these activities will be incorporated in the ABS HPI by early 2014.

13. The use of the Population and Housing census data means weights are only available at five yearly intervals. However, in a period of five years there can be considerable changes to the housing stock which may impact the quality of the ABS HPI measure. It would be desirable to be able to update the weights more frequently.

14. An ABS project is currently underway to examine methods that allow more frequent reweighting of ABS HPI. The key challenge is moving census dwelling counts (or benchmarks) forward between Population censuses by estimating with net additions (additions and subtractions) to the housing stock.

Seasonal adjustment of the ABS HPI

15. The ABS currently publishes an original HPI series only. As noted in the Residential Property Price Index (RPPI) Handbook[5] "Although the situation may differ somewhat across countries, in general there are substantial seasonal fluctuations in the *quantities* of properties traded over the year. For the construction of a RPPI, the question is whether seasonality in quantities leads to seasonality in *prices*. The empirical evidence is somewhat mixed. Meese and Wallace (1991) find limited seasonality in prices in their econometric study. Prasad and Richards (2008) report that median prices in Australian cities are seasonal, but this seasonality vanishes after controlling for compositional change through stratification."[6]

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[5]http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/methodology/owner_occupied_housing_hpi/rppi_handbook

[6] RPPI Handbook Chapter 3, para 3.36

16. Recent research by the ABS has found that all series of the ABS HPI, excluding the Western Australian capital city of Perth, have some evidence of seasonal patterns. Despite the evidence of seasonality, it is not clear at the present whether benefits of the seasonal adjustment of HPI would outweigh the costs. The impact of seasonal adjustment on the index is fairly minor, while to incorporate this new process would entail an overhaul of production and dissemination processes thus delaying the release of data or reducing the time available for editing.

17. Of the private providers of house price indexes in Australia only one of these releases seasonally adjusted house price indexes to the public.

18. At this moment the ABS is not planning to compile and publish seasonally adjusted HPIs due to the minimal impact of seasonal factors on the price movements. This decision will be reviewed periodically.

New ABS residential property price indexes

19. The scope of the ABS HPI currently includes detached houses in Australia's eight capital cities. Research projects are well underway to extend this: first to O*ther Dwellings*[7] in the capital cities; then to all dwellings in the rest of each state and territory. These developments are aimed to enhance the fitness for purpose of the ABS HPI.

Other Dwellings price indexes

20. The composition of the Australian residential housing stock is constantly changing. Currently the ABS HPI index covers approximately 54% of the national value of the dwelling stock (and just over 40% of the number of dwelling transfers each year). An opportunity exists therefore to expand the current suite of ABS HPIs to include dwellings other than detached houses.

21. The ABS HPI is compiled from data on property transfers and house purchase collected from State and Territory Land Titles Office or Valuer-General (VG) Office, and banks. These data contain the following essential information on the property transacted: price; address; type of property; and transaction date. All providers provide information on property type which can be used to distinguish houses from other dwellings.

22. Like the ABS HPI, the objective of the Other Dwellings index is to inform the community, policy makers and other users about price change of dwellings in Australia. This is achieved by producing an accurate and timely measure of the contemporary rate of change in the prices of the stock of dwellings other than detached houses.

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[7] Other Dwellings for this purpose is defined in accordance with the ABS Census Dwelling Structure Classification (STRD) and includes Semi-detached, row or terrace house, townhouse; and Flat, unit or apartments.

23.   Various methods were considered by the ABS for the production of the Other Dwellings price index. Repeat sales regressions are easy to run and the price indexes are easy to construct but are exposed to sample selection bias and subject to substantial revision as the sample is updated with new sales. Despite being the easiest to construct and explain, the unstratified median price index is the only method that cannot control for the quality of property mix, and consequently the index can be quite volatile. Stratification attempts to control for compositional change, and the use of stock weights in index construction can control for sample selection bias. In addition, stratification is simple to explain to users and relatively easy to establish and maintain, as it has less onerous data requirements than hedonics. However, there is a trade-off between the level of stratification and sufficient observations: there may be insufficient observations to obtain a reliable estimate with a finer level of stratification, but if fewer stratification variables are used, there may be unit value bias (the mix of properties sold may change dramatically from one period to the next).

24.   It has been indicated in RPPI literature that one of the key determinants of the method used is data availability. Among the methods producing quality-adjusted price indexes discussed above, stratification and repeat sales are relatively less data intensive. The current state of ABS data holdings does not fully support the production of repeat sales indexes due to the problem with unique identifiers for units/apartments. In addition, a recent study of repeat sales in one of Australia's largest states, New South Wales, shows that it is the low turnover of other dwellings that make repeat sales a poor option, with only 4.7% of other dwellings sold more than once over the past 9 years. However, the construction of stratified indexes is viable with the current state of data holdings.

25.   To produce a hedonics index, other data sources would have to be investigated by the ABS to obtain the detailed housing characteristics. The richer data sets, if available, may also potentially be useful for improving the stratification method, as more variables could be tested to construct stratified indexes.

26.   Based on an assessment of the various methods available, the ABS has decided to utilise the stratification method to produce the Other Dwellings index.

27.   A feature article to present the experimental price index for Other Dwellings in the eight Australian capital cities is planned for the June quarter 2012 issue of *House Price Indexes: Eight Capital Cities* (ABS cat. no. 6416.0). The release date for this issue of the publication is 01 August 2012.

ABS 'Rest of state' price indexes

28.   The majority of Australians live in the capital cities of Australia's States and Territories. The coverage of the ABS HPI is currently limited to detached houses in these eight capital cities. In order to both satisfy user demand and maintain the relevance of the ABS HPI measure, the ABS has recognised the need to extend the coverage of the ABS HPI to 'Other Dwellings' (discussed above) and 'Rest of State' (the geographical areas outside the capital cities).

29.   The number of dwellings in the rest of state represents about 38.6%[8] of the number of dwellings in Australia. The aim is to be able to produce Rest of State indexes for houses and Other Dwellings which can be aggregated with the ABS HPI and the new capital cities Other Dwellings index. This is because the current ABS HPI cannot be assumed to be representative of dwelling price movements outside the capital cities.

30.   The data sources used to compile the current ABS HPI and the experimental 'Other Dwellings' also contains the necessary data items to produce the 'Rest of State' indexes.

31.   There are a number of methods which can be used to construct a RPPI. For the ABS HPI, the ABS uses the stratification method combined with the Laspeyres index formula and stock weights. Each method has specific and widely different data requirements, and they also differ in terms of cost and ease of maintenance, expertise required, and ability to remove compositional change/quality change from the price measurement. Suffice to say that the conclusion of ABS analysis is that the stratification approach is also applicable to Rest of State indexes, that is, the stratification approach is still the most viable approach, given the type of data available.

32.   Data used for the stratification of the Rest of State indexes stratification include 2006 Census data on the housing stock, neighbourhood information in SEIFA (Index of Advantage - Disadvantage) as well as locational information characteristics. A cluster analysis has been undertaken by the ABS. Using the same clustering approach (Wards Tree) as the capital city ABS HPI and Other Dwellings Index, with the same clustering variables of long term median price and SEIFA (Index of Advantage - Disadvantage), this work has shown that it is possible to produce a Rest of State index for detached houses and Other Dwellings in most states.

33.   Some challenges have been encountered as part of the research to produce the Rest of State indexes. A key issue is the low numbers of dwellings and sales observations for some areas outside Australia's capital cities.

34.   Low numbers of dwellings and sales observations for a locality mean that the long term median price measure, which is used as a clustering variable, is unreliable. Therefore it is difficult or risky to include these suburbs in an automated clustering process.

35.   One way of dealing with this situation would be to exclude these localities completely from the cluster design and index compilation. The exploratory cluster analysis has excluded localities with less than a pre-determined number of observations. While the number of excluded localities would be large, their combined share of the value of the rest of state dwelling stock would be relatively minor. In index compilation, this value could be distributed over the value of the other clusters.

36.   Another option would be to use postcodes as the building blocks of clusters, rather than localities. This would be possible as sales data are coded with postcode information, and

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[8] ABS 2006 Census data

SEIFA is also available by postcode. There are far fewer postcodes that localities (for example in New South Wales 'Rest of State' there are approximately 350 postcodes as opposed to over 3000 localities). This approach may have some advantages in terms of clerical effort required for cluster design, however it has yet to be fully assessed.

37.   At a more aggregate level, low numbers of dwellings and sales observations have implications for index quality. In determining the optimum number of clusters, the aim has been to strike a balance between the number of clusters and the number of price observations in the clusters (clusters with fewer localities are thought to be more homogenous in terms of housing characteristics, but with fewer observations median prices can be more volatile). In larger States, it is possible to have a cluster solution where most clusters have a sufficient number of observations and few poorly performing clusters. On the other hand, and like the detached house price index in capital cities, the smaller states stretch the limitations of the stratification method due to their small number of observations: poor clusters have a greater weight and indexes can be less robust.

38.   Clusters with more observations could be achieved by not seeking to separate houses from other dwellings. As it is fairly clear that dwelling type is a price determining characteristic, this option is not ideal.

39.   This research work is still in progress with a focus on the final design of clusters. Preliminary results suggest that while it may be possible to produce potentially publishable indexes for some components of the rest of state, other components may not be publishable. However, it should be noted that while lower level aggregates may not be publishable, it may still be possible to produce robust indexes for their parent components. A feature article to present the experimental price index for Rest of State will occur in *House Price Indexes: Eight Capital Cities* (ABS cat. no. 6416.0) when the various issues have been resolved and indexes compiled.

Other residential property prices indexes

40.   There are numerous residential property price indexes available measuring varying aspects of the Australian housing market. The main residential price measurements are:

- The Australian Bureau of Statistics (ABS) House Price Index (HPI);
- The Australian Property Monitors (APM) Composition Adjusted Housing Price Series;
- The RP Data - Rismark "Hedonic" Property Price Index;
- Residex "Repeat-Sales" Indexes; and
- Real Estate Institute of Australia median house prices for each State and Territory

41.   These price indexes use different methodologies and data sources, and have varying scopes. The Residential Property Price Indexes International Handbook covers in detail the pros and cons of these various methods.

42.   An interesting recent development is the RP Data-Rismark Daily Home Value Index which is part of the suite of housing market indexes produced by RP Data and Rismark International.

43.   "The RP Data-Rismark Daily Home Value Index aims to measure daily movements in the value of Australian housing markets. Rather than relying solely on transacted sale prices to provide a measure of housing market conditions, the RP Data-Rismark Daily Home Value Index is based on a 'hedonic' methodology which includes the attributes of properties that are transacting as part of the analysis. Understanding factors such as the number of bedrooms and bathrooms, the land area and the geographic context of the property allows for a much more accurate analysis of the true value of movements across specific housing markets. This method also allows for compositional change in consumer buying patterns when measuring capital gains.

44.   The RP Data-Rismark Daily Home Value Index provides daily capital growth measurements across three broad housing types: houses, units and a "combined dwellings" index that includes both houses and units. The index results are released daily for Sydney, Melbourne, Brisbane (including Gold Coast), Adelaide, Perth and the combined capitals, which is a composite of these cities. Historical back series are available on a subscription basis".[9]

Conclusion

45.   The ABS is currently undertaking a significant research program to review and improve the current suite of residential property price indexes as well as produce a range of new price indexes. Developments in Australian residential property price indexes are not limited to the National Statistical office, with the RP Data Daily Home Value Index a clear example. In an environment of various RPPIs in Australia, it continues to be important for the ABS to maintain its relevance and clearly and transparently communicate its methods of index construction and ensure that the data are available for all Australians to use.

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[9] See http://www.rpdata.com/research/daily_indices.html