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Measuring a boom and bust: The Sydney housing market 2001–2006 ☆

Robert J. Hill [a,b,*], Daniel Melser [c], Iqbal Syed [b]

[a] Department of Economics, University of Graz, Universitätsstrasse 15/F4, 8010 Graz, Austria.
[b] School of Economics, University of New South Wales, Sydney 2052, Australia
[c] Moody's Economy.Com, Level 10, 1 O'Connell Street, Sydney, NSW 2000, Australia

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ABSTRACT

The Sydney housing market peaked in 2003. The period 2001–2006 is, therefore, of particular interest since it captures a boom and bust in the housing market. We compute hedonic, repeat-sales and median price indexes for five regions in Sydney over this period. While the three approaches are in broad agreement regarding the timing of the turning point in the housing market, some important differences also emerge. In particular, we find evidence of sample selection bias in our hedonic and repeat-sales data sets (with the former focusing more on better quality dwellings and the latter more on lower quality dwellings). These sample selection biases could in turn cause bias (in opposite directions) in our hedonic and repeat-sales indexes. Median indexes may likewise be biased as a result of an apparent decline in the average quality of dwellings sold in the latter part of the sample. We also find evidence of convergence in prices across regions during the boom and divergence in the subsequent bust.

1. Introduction

> Housing is the biggest asset in the country. Certainly for the household sector it is about 60–70 percent of their total wealth. It is an extremely important asset class for most people, yet the information we have on prices is hopeless compared with the information we have on share prices, bond prices, and foreign exchange rates, and even the information we have on commodity prices, export prices, import prices and consumer prices. It really is probably the weakest link in all the price data in the country so I think it is something that I would like to see resources put into. (Ian Macfarlane, Governor of the Reserve Bank of Australia, 4 June 2004).

The importance of the housing market to the broader economy has been clearly demonstrated by recent events, where a collapse in the US housing market has triggered a global financial crisis. This sequence of boom followed by bust, and the way it impacts on the rest of the economy, has acted to raise the profile of house price indexes and the level of scrutiny they receive (as is illustrated by the Macfarlane quotation above). The development of reliable house price indexes, however, has been hampered by a combination of a lack of suitable data sets and the fact that every house is different both in terms of its physical characteristics and its location.

House price indexes can be based on actual market data or expert surveys or even a combination of the two (for an example of the latter see de Vries et al., 2009). Here we

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* Corresponding author. Address: Department of Economics, University of Graz, Universitätsstrasse 15/F4, 8010 Graz, Austria
E-mail addresses: robert.hill@uni-graz.at (R.J. Hill), DMelser@economy.com (D. Melser), i.syed@unsw.edu.au (I. Syed).

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focus exclusively on the former. Such indexes come in three main varieties.[1] The simplest are median indexes that track the change in the price of the median dwelling from one period to the next. Examples include the National Association of Realtors (NAR) index in the US, and the Real Estate Institute of Australia (REIA) and LJ Hooker/BIS Shrapnel indexes in Australia. Median indexes, however, confound changes in prices with quality differences. This is because the median dwelling sold say in 2007 will tend to be of higher or lower quality than the median dwelling sold in 2008. These quality differences will tend to introduce noise into the index. Some median index providers try to address this problem by computing stratified (or mix adjusted) medians (see for example the Established Homes Price Index published by the Australian Bureau of Statistics, 2006).[2]

The other two varieties yield quality-adjusted indexes. A repeat-sales index is computed from repeat-sales data. Restricting the comparison to repeat sales ensures that each price relative compares like with like. One problem with this reasoning, however, is that the same dwelling at two different points in time is not necessarily the same. The best known repeat-sales indexes are the Standard and Poor's/Case–Shiller (SPCS) Home Price Indexes in the US. These are computed for 20 cities (see Standard and Poor's, 2008). The Office of Federal Housing Oversight (OFHEO) also computes repeat sales indexes in the US (see Calhoun, 1996). RPData-Rismark and Residex compute repeat-sales indexes for Australian cities, while the UK and Dutch Land Registries compute repeat-sales indexes for the UK and The Netherlands, respectively.

The third variety is hedonic indexes. These utilize information on characteristics (such as number of bedrooms, number of bathrooms, lot size, and location) to compute quality-adjusted indexes. Perhaps the oldest hedonic index is the US Census Department's constant quality index, which dates back to 1964. In the UK, the Halifax house price index and the Nationwide index both date back to the 1980s. More recently, a third UK hedonic index – the Communities and Local Government (CLG) index – was developed by the Office of National Statistics (ONS) (see Acadametrics, 2009 for a discussion of the various UK indexes). Conseil Supérieur du Notariat (CSN) and INSEE (the national statistical office of France) compute hedonic indexes for regions in France (see Gouriéroux and Laferrère, 2009). Statistics Finland also computes a hedonic index (see Saarnio, 2006), while RPData-Rismark computes hedonic indexes for cities in Australia.

In this study we use a large transactions data set on housing prices and characteristics for Australia's largest city, Sydney, over the period 2001–2006, to examine the effects of quality-adjustment using hedonic and repeat-sales methods on both temporal and spatial house price indexes. To provide a point of reference, we also compute median indexes. We split Sydney into five regions, and then compute temporal indexes for each region as well as for Sydney as a whole, and spatial indexes that compare prices across the five regions.[3]

The period 2001–2006 is particularly well suited to such comparisons since it includes both a boom and bust. We pay particular attention to the problem of sample selection bias in the hedonic and repeat-sales data sets. Both appear to be affected by sample selection bias, the former focusing more on better quality dwellings, and the latter doing the reverse. An apparent tendency for lower quality dwellings to rise faster in price than higher quality dwellings during the boom when combined with sample selection bias may be causing a downward bias in our hedonic indexes, and an upward bias (although less clearly so) in our repeat-sales indexes. Similarly, an apparent decline in the average quality of dwellings sold, particularly during the bust, may be causing a downward bias in our median indexes. We also compare the volatility of hedonic, repeat-sales and median indexes, and consider whether house prices are converging or diverging over time across regions. We find evidence of convergence during the boom and divergence since the beginning of the bust.

Our main findings are summarized in the conclusion.

2. Methodologies for constructing house price indexes

2.1. Median house price indexes

A median index tracks changes in the price of the median dwelling sold from one period to the next. The main attraction of median indexes are that they are easy to compute and easy to understand. Their main disadvantage is that they may provide very noisy estimates of the change in the cost of housing. For example, suppose there are two regions in a city denoted by A and B, and that region A is much richer and hence has more expensive houses than region B. Suppose further that the median dwelling sold in 2006 and 2008 is from region A, while the median dwelling in 2007 is from region B. It follows that the median index could record a large rise from 2006 to 2007 and then a large fall from 2007 to 2008. Such an index could be a very poor indicator of what is actually happening in the housing market.

Stratification (often alternatively referred to as mix-adjustment) is often used to try and deal with this problem. The simplest form of stratification divides a city into geographical regions and then computes a separate median for each region. The changes in the median indexes for each region are then averaged, usually by taking an arithmetic or geometric mean to obtain the overall price index for that period. While stratification should reduce the amount of noise in the index, it will not eliminate it. Within each region, it will still be the case that the median dwelling sold in one period will tend to be of either supe-

[1] Market prices can take the form of asking prices, the price on which a mortgage backed offer is based, the price at which contracts are exchanged, and the actual price that is eventually officially recorded. Index providers trade off timeliness against accuracy depending on which market price they use. See Acadametrics (2009) for a discussion of which market prices are used by index providers in the UK.

[2] Stratified medians are discussed in the next section.

[3] Repeat-sales indexes are by necessity temporal. However, median and hedonic indexes can be computed either in a spatial or temporal domain.