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VALUING DWELLINGS AND LAND AS AN INPUT INTO HOUSEHOLD WEALTH AND HOUSEHOLD BALANCE

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VALUING DWELLINGS AND LAND AS AN INPUT INTO HOUSEHOLD WEALTH AND HOUSEHOLD BALANCE

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Abstract

This paper outlines a new methodology for measuring the value of dwellings and land in Australia, as well as some outstanding measurement issues.

The Australian Bureau of Statistics (ABS) currently derives the value of dwellings and land from data published by the central bank (which is itself based on data supplied by a third party provider). This data then flows into the dwellings and land non-financial asset component of the household balance sheets (in which together they represents the largest item). This series has exhibited some volatility recently, as it is susceptible to changes in the composition of properties sold.

In order to support the compilation of quarterly balance sheets the ABS has devised a new methodology for valuing dwellings and land. The new method uses stratification based on geography and dwelling type in order to reduce compositional effects in the data. Further, the new method makes use of the ABS's Residential Property Price Index to account for lags in the provision of data, thereby improving timeliness and reducing revisions.

Introduction

1. The Australian Bureau of Statistics (ABS) has been working to improve its estimates of the total value of the dwelling stock to enhance the availability and quality of data on residential property. This paper outlines changes being made to the measure of the value of dwellings and land used in the household balance sheets in the Australian National Accounts.

Background

2. The Australian National Accounts provide a complete and integrated set of macroeconomic accounts of the Australian Economy. A key component of these accounts are the balance sheets which provide an overview of the assets, liabilities and net worth of sectors of the Australian economy. The largest contributor to Australia's net worth is the household sector, which accounts for over 75% of Australia's net worth.

3. Changes in balance sheet aggregates and net worth positions are of key interest to users, particularly because of the potential size of holding gains relative to transactions in driving changes in net worth.

4. In turn, these changes in wealth can have a significant impact on economic behaviour including both consumption and saving. For example, during and immediately after the Global Financial Crisis, sharp declines in household wealth were observed which coincided with falls in household consumption and increases in saving behaviour.

5. Currently the ABS produces household balance sheets on an annual basis. Consequently, analysis of short-term changes in household wealth is difficult. A barrier to timely, quarterly balance sheets has been the lack of high quality quarterly estimates of non-financial assets owned by households, which are approximately two-thirds larger than financial assets owned by households (for which quarterly data is available in the Financial Accounts produced by the ABS).

6. The largest non-financial asset in the balance sheets is the combined value of dwellings and land. The Australian Bureau of Statistics (ABS) has been working to improve these estimates as the current method has been subject to some volatility and higher than expected revisions, especially during the period of the GFC.

7. The new method builds on improvements made to the measurement of the dwelling stock implemented in the household accounts in 2004-5, and will support the introduction of quarterly balance sheets beginning September quarter 2013. The project will also contribute towards populating some of the data gaps highlighted under recommendation 15 of the IMF G20 Data Gaps Initiative and the new quarterly OECD institutional sector account questionnaire.

Existing Method to measure the value of dwellings and land in the household balance sheets

8. The existing method, incorporated into the balance sheets in 2004-05, uses a measure of the value of the dwelling stock compiled by the Reserve Bank of Australia (RBA). It is compiled by applying sales data (a mean value of sales supplied by a private sector contractor) to an estimate of the number of dwellings. Whilst superior to the method it replaced, the existing measure can exhibit some volatility when there are changes in the composition of buyers and sellers in the market. This is because the measure is calculated directly at the aggregate (Australia) level, so each sale has an effectively equal weight, which may not reflect the actual composition of the stock.

9. Recent development of new price indexes covering all residential property in the capital cities, as well as improvements in the scope of data available to the ABS have meant that a more comprehensive measure of the total value of the dwelling stock has been able to be developed to overcome some of these issues.

Data sources supporting the new method

10. Valuing the dwelling stock owned by households requires information on three things: the average value of the dwellings, the number of dwellings in the stock and information on who owns the dwellings.

11. Information on the value of dwellings can be collected through administrative by-product data. In Australia, each of the eight States and Territories has a Land-Titles Office or Valuer General's office (collectively referred to as VG's for the rest of this paper) that records the transfer of ownership of dwellings and land. Whenever a property is sold information is available from the VG's about the timing of the sale (either date of exchange of contracts, date of settlement or both), the property sold (this ranges

from information just about the address to information about the building material of the roof depending on which state the sale occurred in) and the price paid. Since 2003, the ABS has been collecting data from each of the VG's on all residential properties bought and sold.

12. Information on the number of dwellings in the stock can be derived from a combination of Census of Population and Housing data as a starting point and adding in net additions. Information on gross additions to the dwelling stock is available through the quarterly Building Activity Survey, which estimates the number of completions and conversions that occur every quarter.

13. Information on ownership can also be derived from Census data. The Census (which is run in Australia every 5 years, with the latest one in August 2011) collects information on landlord and tenant type (which can be used as a proxy for ownership).

14. In addition to the sources above, the ABS will produce (from December quarter 2013) a Residential Property Price Index quarterly for the eight capital cities (which covers approximately 70% of the residential property market), to support the compilation of estimates of the value of dwellings and land.

Constructing mean values for areas

Stratification Approach

15. One of the challenges in estimating the value of the dwelling stock is that often the only information that is available is information on properties sold. Price information from properties sold is then used to infer the value of all the properties not sold during the period.

16. The assumption that properties sold are representative of properties not sold may not be true. For example, housing finance data shows that, on average, first home buyers take out smaller loans than non-first home buyers (suggesting they tend to buy smaller, more affordable dwellings). As such changes in the number of first home buyers in the market can influence the average price of properties sold, when in practice the characteristics of the dwellings in the stock hasn't changed at all.

17. To overcome this challenge it is desirable for sales data to only be used to infer the value of similar properties. For example, the mean value of sales of 3 bedroom houses in Gladesville (a suburb in Sydney) is likely a very good proxy for the value of all 3 bedroom houses in Gladesville.

18. By stratifying the stock (and having sales data used as a proxy for value), compositional effects can be reduced. The finer the stratification, the more representative and less compositionally affected the data becomes. It should be noted however that in Australia, there is a lack of variables with high quality data on which to stratify.

19. The new method stratifies sales into geography and dwelling type. This stratification is based on the assumption that the major price determining characteristics of a dwelling are location and dwelling characteristics (represented by property type).

20. This method ensures that sales in any region are only used to infer the value of other properties in the same region and of the same type, thereby reducing compositional effects and improving data quality. Contrast this approach to the existing method where effectively the value of all sales is used as a proxy for the mean value of all properties.

Geography

21. The ABS recently adopted a new Geography standard, the Australian Statistical Geography Standard (ASGS). The new standard is designed primarily with statistical output in mind but also has a focus on defining meaningful regions. The ABS has chosen to use Statistical Area Level 2 (SA2's) for stratifying sales geographically.

22. This is for several reasons, firstly their stated aim to “to represent a community that interacts together socially and economically” in conjunction with aligning to gazetted localities mean they represent areas which would be recognisable to non-statisticians as meaningful areas therefore different SA2's will likely represent different (price determining) locations to property purchases and sellers.

23. Secondly, SA2's will be stable between Censuses, and are the lowest level under which Estimated Resident Population and Dwelling Approvals data are released.

24. Thirdly, they cover the entirety of Australia, and aggregate up to any larger ABS defined geographic areas in the ASGS (see Appendix 1 for a diagram).

25. Finally, they represent areas that are large enough to have a sufficient number of quarterly sales to form robust price data (SA2's have on average 4000 dwellings, and there an average of approximately 50 sales per quarter, which is well above the 30 sales the ABS considers robust).

Dwelling characteristics

26. Whilst the ABS has a comprehensive dwelling structure classification for use in statistical outputs, each of the eight VG's have different dwelling classifications. As such, for stratification purposes the ABS has chosen a binary classification of separate house and attached dwellings (which includes semi-detached, row and terrace houses and flats, units and apartments), as this allows for the most coherence between the classifications.

Calculation

27. By stratifying in this way, the ABS is able to calculate each quarter, a mean dwelling value by SA2 by Dwelling Type based on the mean value of sales in that stratum (if there are zero sales, the mean price is imputed from the mean value of the parent Statistical Area 3, which are an aggregation of SA2's).

$$\bar{x}_{SA2,j} = \frac{\sum x_{SA2,j}}{n_{SA2,j}} \quad \text{where } j = \text{House or Attached Dwelling and } n = \text{number of sales}$$

Estimating the number of dwellings in the stock

Inputs

28. The Census of Population and Housing, conducted every 5 years, provides the best measure of the number (and type) of dwellings in the stock at a very fine geographic level. Between Censuses however, high quality information is only available on additions to the dwelling stock. Information on deductions from the stock, for example from natural disasters and demolitions, are not readily available in Australia. The result of this is that the net additions to the stock must be estimated from information on gross additions to the stock (building completions data). The model the ABS has chosen is based on the model used by the Reserve Bank of Australia (RBA) with some modification.

29. By comparing gross additions to the stock with changes in the stock between Censuses, it is possible to calculate a realisation rate for completions, for example, if the realisation rate is 0.80, for every 100 completions there is a net addition of 80 dwellings to the stock (and consequently 20 demolitions). To calculate net additions to the stock in an ongoing way, a realisation rate has been calculated at the State/Territory level for each of the last four Censuses and averaged out. The choice to calculate this rate separately for each State/Territory reflects the different supply and demand factors they experience for construction of new dwellings.

Calculation

30. Once the rate has been calculated, the estimated number of dwellings in the stock is simply:

$$\hat{q}_t = q_0 + (r \times \sum_0^t c) \text{ where } r = \text{realisation rate and } c = \text{completions}$$

31. The total figure in each state is then apportioned to each SA2 (based on the number of dwellings of each type they had at the last Census) so that there is a quarterly estimate of the number of dwellings in the stock (by dwelling type).

$$\hat{q}_{SA2,j,t} = \hat{q}_{STATE,t} \times \frac{q_{SA2,j,0}}{\hat{q}_{STATE,0}} \text{ where } j = \text{House or Attached Dwelling}$$

32. By combining dwelling stock counts with the mean values described previously, it is possible to create dwelling stock values for each SA2 in Australia (excluding off-shore, shipping, migratory SA2's and the Other Territories for which VG information isn't available).

$$V_{SA2} = (\bar{x}_{SA2,Houses} \cdot \hat{q}_{SA2,Houses}) + (\bar{x}_{SA2,Attached} \cdot \hat{q}_{SA2,Attached})$$

33. These stock values can then be used to create mean dwelling values for most geographic regions in Australia.

Accounting for lags in VG's data

34. There are two important dates that occur with the transfer of property, first there is the exchange (or contract) date, the date at which the contract for the sale of the property is signed, and the settlement date, the date on which the property changes hands. Whilst the property may not legally change hands until the settlement date, the date on which the price of the property is determined is usually the exchange date.

35. Because of this, the ABS calculates property values based on properties that have an exchange date within the reference period. This creates a lag between when the property is valued and when data is received from the VGs, as the VG cannot send through the data until after settlement (which can occur anywhere from days to years after exchange, but is usually around 30 days).

36. Based on historical trends, the ABS estimates that it is not until the second quarter after the reference quarter in which the majority of records from the VG's are received. For example, for the March quarter of any year, it is not until after the September quarter that all the data will have been received from the VG's. It is known that the lag between exchange and settlement is not evenly distributed across property prices, longer lags tend to be associated with more expensive properties. Because of this, using a mean value during the latest two quarters would bias the results.

37. Given the close relationship between the total value and the ABS suite of dwelling price indexes, these indexes represent a good proxy for movement in the stock values. To test this assumption, ABS compared results from the aggregate RPPI to modelled historical results, and they showed a very strong correlation.

38. To allow the timely publication of data on the value of the dwelling stock, the movements of the ABS's RPPI (at the capital city level) are used as a proxy for movements in the mean value (at the state level) from the latest period for which data is complete (i.e. for the two most recent quarters).

39. In general:

$$\bar{x}_{t-1} = \bar{x}_{t-2} \cdot \frac{I_{t-1}}{I_{t-2}} ; \bar{x}_t = \bar{x}_{t-1} \cdot \frac{I_t}{I_{t-1}}$$

40. For example, the mean price of an SA2 in the March quarter was \$500,000 (as calculated from VGs data) and the RPPI had moved 1% in the June quarter, and a further 2% in the September quarter, the SA2 mean value for June would be \$505,000 and for September it would be \$515,100.

41. Apart from the most recent quarter, underlying stock figures are calculated in the same way as previously described in this paper.

42. Due to a lag in completions data, the latest quarter uses a projected dwelling stock figure, rather than an estimate. The previous quarters estimated dwelling stock figure is moved forward by the long term (5 yearly) average quarterly growth in dwellings.

Sector of ownership

43. The methodology outlined so far estimates the total value of the residential dwelling stock, however not all residential dwellings are owned by individuals. Some (for example public housing) are owned by government, or by corporations (for example housing owned by mining companies).

Figure 1 Ownership by Dwelling type, Australia, 2011

	% of dwellings owned by the household sector
Detached Houses	96.1
Attached Dwellings (a)	89.1
All Dwellings	94.4

(a) Includes flats/units/apartments and semi-detached/row/terrace houses.

44. Information on ownership of dwellings cannot be observed directly in the population, nor is it easily obtainable on every transfer that occurs. To overcome this, information on landlord and tenure type from the 2011 Census of Population and Housing is used as a proxy for ownership.

Figure 3 Sectoral allocation by landlord/tenure type

Tenure Type x Land Lord Type (a)	Sector
Owned outright	Household
Owned with a mortgage	Household
Being purchased under a rent/buy scheme	Household
Rented	
Real estate agent	Household
State or territory housing authority	Non-Household
Person not in the same household-parent/other relative	Household
Person not in the same household-other person	Household
Residential park (includes caravan parks and marinas)	Non-Household
Employer-Government (includes Defence Housing Authority)	Non-Household
Employer-other employer	Non-Household
Housing co-operative/community/church group	Household
Being occupied rent-free	
Real estate agent	Household
State or territory housing authority	Non-Household
Person not in the same household-parent/other relative	Household
Person not in the same household-other person	Household
Residential park (includes caravan parks and marinas)	Non-Household
Employer-Government (includes Defence Housing Authority)	Non-Household
Employer-other employer	Non-Household
Housing co-operative/community/church group	Household
Being occupied under a life tenure scheme	(b)
Other tenure type	(b)
Not stated total	(b)
Not applicable total	(b)

(a) Null cells have been collapsed
(b) Cells excluded from calculations
Note: figures were calculated using occupied private dwellings

45. The proportion of properties owned by sector by Capital City/Balance of State by dwelling type from the last Census is used to apportion the total value into sectors. Calculating these figures in a more disaggregated way reflects the different markets in which non-household ownership is more prevalent. For example, for detached houses household sector ownership is much higher.

Outstanding measurement issues

46. Whilst the method outlined above improves on the existing method, there are still some outstanding measurement issues, which would further enhance data quality.

Vacant Land

47. Conceptually, any vacant land, which is zoned for residential use, should be included in the total value of the stock. Currently there is no sufficiently robust data available on either the value or quantity of vacant residential land and as such, it is excluded from the values. The ABS will continue to look for data sources to allow for the measurement of vacant land for inclusion in the measure in the future.

Separating dwellings and land

48. The method as described is based around the concept of dwellings and land as a single unit. However, in the balance sheets, dwellings and land are separate items.

49. In the Australian System of National Accounts, the Land component of the total value of the stock is the residual component after the capital value of the structures is removed. The value of the structures is calculated using the Perpetual Inventory Method (PIM).

50. Being able to decompose the total value into dwellings and land using more sophisticated methods would further enhance the measures, improve the quality of the household balance sheets and provide useful information in its own right.

Representativeness

51. Whilst the stratification method does broadly control for changes in the composition of buyers and sellers in the market, the low rates of turnover in sales still means that it is subject to some compositional effects. This is especially the case if there is no activity in particular market segments that differ significantly from the stock traded in the period.

52. As noted in the method portion of this paper, any additional variables in which to further stratify the stock would further reduce these compositional effects (although this must be balanced against the requirement for having sufficient sales data in each stratum to derive mean values).

53. ABS will continue to look for ways to ensure compositional effects on the data are minimal.

Conclusion

54. The improvements outlined in this paper will enable the timely analysis of household wealth by supporting the compilation of quarterly household balance sheets.

55. Beyond the household balance sheets, derived data items from the values (such as the mean value of property) will allow users to calculate additional data items of interest for analysis (such as average loan to value ratios and information on relative household debt) which could previously only be derived from the biennial Survey of Income and Housing.

56. The ABS believes that the new measure will contribute to a marked improvement in the quality and breadth of statistics available on residential dwellings and household wealth in Australia.

References and further reading

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¹ Due for release on 24 September, 2013.

² To be renamed *Residential Property Price Indexes: Eight Capital Cities* from 4 February 2014 onwards.

Appendix 1: The Australian Statistical Geography Standard, Main Structure

