# Home Price Index Methodology & FAQs

## About

The PropTrack Home Price Index (HPI) is a newly developed and sophisticated method of measuring monthly changes in home values across Australia. It aims to provide an up-to-date view on market performance and trends.

The Index is released on the first day of each month and is published at a national, state and regional level using Australian Bureau of Statistics (ABS) Greater Capital City Statistical Areas (GCCSA) and Statistical Area Level 4 (SA4) geographies.

## Methodology

The PropTrack HPI model uses a unique hybrid methodology that combines aspects of repeat sales and hedonic regression to control for the effect of observed property characteristics on prices. Both of these methodologies are commonly used to measure housing price movements in Australia and overseas.

Measuring price movements can be challenging because the size and quality of properties that transact change over time and are not representative of the broader stock of dwellings. The methodology used by the PropTrack HPI is specifically designed to estimate the change in typical home values using the small sample of homes that transact in a given period.

The PropTrack HPI hybrid methodology starts with a repeat sales regression. A standard repeat sales regression matches transactions of identical properties over time. This is based on the observation that the change in value of a specific property over time should only reflect changes in market prices, assuming no significant alteration or renovation was undertaken between sales.

The PropTrack HPI hybrid methodology extends the repeat sales regression by allowing transactions for non-identical but closely located properties of the same type (house or unit) to be matched together. This extends the repeat sales regression by acknowledging that nearby properties are generally similar. Sales of properties of the same type in the same ABS Statistical Area Level 1 (SA1) are matched together. There are over 57,000 spatial SA1 regions across Australia, with a population generally between 200 and 800 people.

The hedonic regression component of the PropTrack HPI hybrid methodology corrects for observed differences between properties that are matched together. A hedonic regression separates the value of homes into observable attributes to account for differences in sold properties over time. In the PropTrack HPI, hedonic regression is used to account for differences in the number of bedrooms in properties matched together.

The hybrid methodology augments the repeat sales methodology so that home price growth can be more robustly estimated in regions where there might not be a sufficient volume of repeated sales.

The PropTrack HPI is a revisionary index, with updates to the back-history recalculated each month. This means that as more data on sales becomes available over time, it is incorporated into the index to provide the most complete, accurate and up-to-date estimate of market trends. This is an important feature due to the delay in receiving the full official records of housing transactions after they settle. The revisionary nature of the PropTrack HPI allows for the model to adjust as soon as the transactional data is received in real-time and ensures that there is a high degree of accuracy in each update of the Index. The revisionary Index therefore avoids large changes when data is added or the Index is rebased.

The PropTrack HPI is the only revisionary hybrid repeat sales and hedonic methodology available in Australia. Its robust methodology ensures the Index reflects the current market by using official sales data and information about home sales derived from realestate.com.au.

## Frequently asked questions

## What is an index and why is it used for home prices?

An index number is an economic figure displayed relative to a base value. The base value is defined in an arbitrary way and usually assigned a value of 100 as a convention.

The PropTrack HPI displays the level of prices relative to the base period, allowing comparisons of price movements between time periods and geographical regions. It offers a benchmark to track how home values are fluctuating over time. For example, an index change from 100 to 102 from one month to the next represents a change in average home values of 2% relative to the previous month.

The PropTrack HPI uses a base period in January 2010, with all indices set to 100 for that month.

## When is the PropTrack HPI available?

The PropTrack HPI is released on the first day of each month, with data on the previous month and revisions for all previous months included.

## What is a hedonic index?

Hedonic refers to a method of regression analysis that models the relationship between sale prices and the attributes of properties that sold, such as bedrooms, bathrooms and land size. Hedonic regression therefore can estimate average price changes from differences in the observed attributes of sold properties over time.

For example, if more large homes transact in a given month, a hedonic model will attribute higher average sale prices to their higher bedroom counts, rather than market prices increasing.

## Why are home prices difficult to measure?

Home sales information is not publicly available in a timely manner, which makes it difficult to monitor price movements in real-time. To ensure we have a current view of the market, the PropTrack HPI uses information about home sales derived from realestate.com.au, in addition to official government data, to provide an up-to-date sample of property prices. This index is also revised, which means that as more data on sales becomes available over time it is incorporated into the index for the most up-to-date estimate of market trends.

It is also difficult to measure home prices as the small share of properties that transact in any given time change in composition. For example, the homes sold in a particular month can vary in their number of bedrooms, land size and other property features, and are not representative of the broader dwelling stock. Value movements must therefore be inferred from the small share of properties that transact (typically less than half a per cent of the dwelling stock each month). This requires methodological adjustments to acquire estimates of the change in the value of the typical home over time.

## How does the PropTrack HPI methodology differ to others available for the Australian market?

Housing price methodologies aim to estimate changes in the value of a typical home. One challenge faced in estimating value changes, is that only a small fraction of homes transact each month.

The simplest methodology for inferring the change in home prices is to look at median or mean transaction prices. However, the quality and composition of the small proportion of homes that are transacted are quite different to the broader stock of dwellings (which have no observed price). As a result, changes in the mix of properties sold over time can significantly influence these measures of price changes.

For example, even when there are no price changes within a city in a particular period, if there is an increase in the proportion of sales that are larger homes, the measured city-wide median price will increase, but does not reflect the actual movement in typical home prices.

Mix-adjusted or stratified measures group transactions of similar properties together. Properties may be grouped by a combination of characteristics, including location, price, property type or other metrics. Price changes are averaged across these groupings. By grouping similar properties, these methods control for the composition of sales between the groups. The ABS currently uses this style of methodology for their home price measurement.

Repeat sales methodologies are a simple regression approach that use changes in the price of properties sold more than once. It relies on the concept that average changes in the price of the same homes over time should reflect changes in market prices. A limitation of this approach is that it only uses data from properties sold multiple times, so is unable to use a significant amount of data. Changes in the characteristics and quality of properties, such as renovations, can also bias the results.

The PropTrack HPI is part of a class of hedonic regression methodologies that are more sophisticated and therefore require additional information about the attributes of sold properties. These models separate the price of each transaction into a range of property attributes, such as the location, type and size of a property, as well as the period in which it was sold. The index of home prices that results can be thought of as the average price level of the transactions that occurred in each period, after controlling for the observable attributes of the properties that were sold.

In addition, the PropTrack Index is revisionary. It is the only revisionary hedonic methodology available in Australia. This means all index values – both recent and historic – are updated as new data becomes available. This is an important feature due to the delay in reporting of the official records of sales. Many transactions that may influence the measure of prices in the past can therefore be incorporated into the model to best reflect the available data on Australian home prices over time.

## What sales data is used to build the PropTrack HPI?

The PropTrack HPI uses sales data from many sources. The primary data source is State and Territory Valuer Generals (VG). VG data covers all property sales, but is not available in a timely manner.

Due to the delay in the availability of VG data, the PropTrack HPI is supplemented with recent sales price data to get a timely read on price changes. PropTrack augments this data with sales reported to realestate.com.au directly by agents. This covers a significant share of sales across the country which gives an up-to-date view on the market.

## What does revisionary mean?

The PropTrack HPI is a revisionary index. This means that the entire index is recalculated each month, allowing new data and updated parameters to be incorporated to update index values and estimates of home value growth. These updates are provided for the current month, as well as all previous months.

This allows the PropTrack HPI to reflect the most up-to-date data on home transactions as it is not uncommon for sales to be reported more than a month after the transaction date. A revisionary index is able to include these transactions to provide a more accurate measure of how home prices have changed.

Revisions are common for almost all economic indicators including labour market and GDP statistics.

## Why is revisionary data useful?

Index revisions are important to best reflect up-to-date data on housing market transactions. Due to the lag in receiving data from State and Territory VG offices across the country, not all transactions will be incorporated into the index at the end of the month when the PropTrack HPI is calculated. If these additional transactions affect the index when it is subsequently recalculated each month, these changes will be included in the next monthly version of the index.

Revisions will mostly affect index values over the previous few months, as this is when transactions that were not initially available for index calculation are added.

A revisionary index is a more transparent and accurate way of reporting housing market trends based on the most up-to-date available data.

## Is the HPI seasonally adjusted?

The PropTrack HPI is not seasonally adjusted. It provides an up-to-date, compositionally adjusted measure of typical home price movements, which includes seasonal patterns in price movements.

## What property types are covered in the PropTrack HPI and how are they defined?

The PropTrack HPI is calculated separately for houses and units, and aggregated together for an 'all dwellings' measure of prices over time.

Properties are categorised as 'houses' if they have a Torrens title, with Strata and other title properties grouped in 'units'.

Other property types, such as land, acreage, serviced apartments, retirement villages and rural properties are excluded from the calculation of the PropTrack HPI.

## What geographical regions are covered?

The Index is calculated for each spatial ABS Statistical Area Level 4 across Australia (excluding Other Territories) – a total of 88 regions. It is calculated for each property type (houses, units and all dwellings). However, unit indices are not able to be produced

in regions where there are insufficient properties. This includes regional South Australia and Northern Territory.

The Index is aggregated to ABS Greater Capital City Statistical Areas, which cover the capital and rest of state regions within each state and territory.

Each month, an aggregate indices for Capital Cities (which includes all eight capital cities), Regional Areas and a National index are produced.

## What outliers are removed and why?

Transactions that do not appear to reflect general market conditions, such as sales between family members or multiple properties sold at once are removed so the PropTrack HPI best represents genuine changes in market conditions.

Statistical methods are employed to detect sales transactions that are outliers by property type, time of sale and geographic region groupings.

## Is the Index expressed in nominal or real terms?

All indices are presented in nominal terms, with no adjustment for general price inflation. The indices can therefore be interpreted as the typical change in the actual prices paid for homes across Australia in current dollar terms.