



ES – Spain

The *Ministerio de Fomento* produces a nationwide house price series for all types of existing dwellings, priced per square meter. The series is constructed using the mix-adjusted method. The average price-per-square meter is calculated using appraisal agency data, based on dwellings that have been sold in the open market and are more than two years old. Dwellings are grouped by provinces. Dwelling stock information from the latest ten-year census is used to calculate the weights: 2011 is the most recent publication of the census data. The house price series is reported at a quarterly frequency and begins in the first quarter of 1995.

To extend the house price index, we use two historical series: From the first quarter of 1987 to the last quarter of 1994, we use a nationwide quarterly house price series produced by the *Ministerio de Vivienda*, which measures the average price (per square meter) for all dwelling types, new and existing. From 1976 to 1986, we use the annual house price series produced by *Tecnigrama*. The *Tecnigrama* series measures average prices (per square meter) for all types of new dwellings located in Madrid. Both series are converted into Euros at the fixed conversion rate, using the irrevocable exchange rate of 166.386 pesetas per euro. We combine the annual *Tecnigrama* series from 1976 to 1986 with the annual four quarter average of the *Ministerio de Vivienda* series from 1987 until 2004. We use the full combined (annual) series from 1976 to 2004 to fit a BSTS model, then backcast an annual observation for the year 1975.²⁵ The *Tecnigrama* annual series backcasted to 1975 is then interpolated at quarterly frequency using the quadratic-match average method. We use the growth rates of the *Ministerio de Vivienda* series (from 1987 to 1994) and the growth rates of the interpolated *Tecnigrama* series (from 1975 to 1986) to extend the *Ministerio de Fomento* series to the first quarter of 1975.

The source of the historical house price series has changed. This affects the 2014 second quarter release and all subsequent updates. From the first quarter of 1975 to the last quarter of 1986, we now use the average price series based on mortgage loan data from the *Instituto Nacional de Estadística* facilitated by Paloma Taltavull de La Paz (University of Alicante). This series closely matches the *Ministerio de Fomento* data during the period in which the two sources overlap. The average mortgage loan series better reflects underlying changes in house prices nationwide in the 1970s and early 1980s than the series from *Tecnigrama*, which only includes prices for Madrid. It is calculated as the total amount of mortgage loans in euros divided by the number of loans.

The house price series are not seasonally-adjusted by the source. We seasonally-adjust the complete series using the BSTS model and then transform the series into an index with a base year 2005=100. We deflate this house price series using the Personal Consumption Expenditure (PCE) deflator. To construct the PCE deflator, we use the quarterly PCE deflator obtained from the OECD National Accounts database, which started in 1995. A change in the quarterly PCE deflator reported in the OECD National Accounts database occurred in January 2012. This affects our calculations for the February 2012 update and further updates. The change consists of a shortening of the quarterly PCE deflator series, which now starts in 2000 instead of 1995. To

²⁵ Backcasting is the process of extrapolating into the past the trends present in the current data. We rely on backcasting to complete missing series only when the missing data does not exceed one year and we could not find alternative sources to extend the series back to 1975. Prior to the third quarter of 2012 release, backcasting was computed with an AR(3) model.

extend this series we take the annual PCE deflator from the OECD Economic Outlook database, which spans from 1960 to the present, and interpolate the series to a quarterly frequency using the quadratic-match average method. We then use the resulting growth rates to extend the quarterly PCE deflator obtained from the OECD National Accounts database back to the first quarter of 1975.

We complete the Spanish data by reporting Personal disposable income (PDI) on a *per capita* basis. Before we were using the sum of private consumption expenditure, household savings and change in equity in pension fund reserves from the OECD Economic Outlook database. We also used interpolated working-age population series obtained from the OECD Economic Outlook database. The source of the PDI and working age population data has changed, affecting the PDI *per capita* series in the 2012 first quarter update and all subsequent updates. Gross disposable income and consumption of fixed capital for households is collected from Eurostat. Both series are reported at a quarterly frequency and begin in 2000. Consumption of fixed capital is subtracted from gross disposable income series to produce PDI. The series is largely influenced by seasonal factors, so we use the BSTS model in state-space form to identify and systematically extract the seasonal and excessively volatile components of the data.

To extend the PDI series to 1975 we use the net disposable income series from the OECD Outlook 70 database, which is reported at an annual frequency. We interpolate to a quarterly frequency using the quadratic-match average method. The resulting quarterly growth rates are used to extend the series. Current working age population data is now obtained from the OECD Main Economic Indicators database. It is reported at a quarterly frequency and begins in the first quarter of 1999. We use the quarterly growth rates of the discontinued working age population series from the OECD Outlook 90 database to extend the series to the first quarter of 1975. We divide the spliced PDI series by the extended working-age population series to obtain a nominal PDI *per capita* series. We use the PCE deflator to express the PDI *per capita* series in real terms. Both nominal and real PDI measures are re-based to 2005=100.

References:

“Basic Aspects of the Methodological Design of the Housing Price Index in Spain.”

Martínez Pagés and Maza (2003): “Análisis del Precio de la Vivienda en España (Analysis of House Prices in Spain).”

Taltavull de La Paz (2014): “Vivienda y Crecimiento. Una Mirada Retrospectiva a la Formación del Mercado de la Vivienda en España (Housing and Economic Growth. Looking Back to Housing Market Formation in Spain).”

Information Resources:

Bank of Spain Data

<http://www.bde.es/webbde/en/estadis/infoest/s16-nm.pdf>

Eurostat Data

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

Acknowledgements: Paloma Taltavull de La Paz from the University of Alicante and Jorge Martínez Pagés and Juan Ayuso Huertas from the Bank of Spain.