

The Data: Coverage, Periodicity, and Timeliness

Coverage characteristics

Purpose of the study: The House Price Index which covers the whole country is constructed for the purpose of monitoring price movements in the Turkish housing market.

Data description: Price indices are those constructed to monitor price movements in the Turkish housing market. Price data related to all houses subject to sale, regardless of the construction year are used to develop the house price indices. In the housing market, as the prices of properties become available when they are actually sold, house prices indicated in valuation reports prepared at the time of approval of individual housing loans are used as a proxy for price. Valuation reports which form a basis for housing loans are prepared by real estate appraisal companies. The actual sale of the property and utilization of the loan is not required and all houses appraised are included in the scope.

Statistical concepts and definitions:

House Price Index (HPI): House price index constructed by using the stratified median price method for all the houses covering the whole country.

New Housing Price Index (NHPI): Price index constructed by using the stratified median price for houses built in the current and the previous years covering the whole country.

Existing Housing Price Index (EHPI): Price index constructed by using the stratified median price method for the houses built before the current and the previous years covering the whole country.

Hedonic House Price Index (HHPI): House price index for the whole country constructed by hedonic regression method in which prices are adjusted for quality changes related to observed housing characteristics.^{1 2}

Nomenclature of Territorial Units for Statistics (NUTS): Regional unit classification designed for the whole country in compliance with the European Union Regional Statistics System to develop a comparable statistical database.

Level: Regional units formed according to NUTS.

- **NUTS Level 3:** 81 regional levels corresponding to cities.
- **NUTS-Level 2:** 26 regional levels formed by combining NUTS-Level 3 units (Annex 1).

Unit Price: Price calculated by dividing the value of a property by its gross area of use.

Median Unit Price: Median price calculated from the dataset comprising the m2 unit values in valuation reports related to both the reference month and to preceding and succeeding months, by excluding the extreme values in each stratum.

Stratum: The smallest unit in which houses with similar characteristics are grouped together and which provides a sufficient number of observations to calculate a reliable median unit price.

Stratified Median Price Method: A method where relatively homogeneous strata are established by grouping similar houses and where a general price index is computed by weighting the median unit price calculated for each stratum.

Chain Laspeyres Index Method: A method whereby the index calculated with the Laspeyres formula for each period is linked to the period before the weights are changed.

Classification system: Nomenclature of Territorial Units for Statistics (NUTS) is used for aggregating the data. The data are aggregated at the 3rd and 2nd levels of NUTS respectively and the overall indices for Turkey are constructed by using the data aggregated at the 2nd level.

Statistical population: Houses in Turkey.

Reference area: The HPI, HHPI and EHPI which is constructed to represent the whole country, covers data pertaining to all appraised houses in 76 cities. Cities of Bayburt, Bingöl, Gümüşhane, Şırnak and Tunceli are excluded from the scope due to insufficient number of observations. While constructing the NHPI, which also

¹ For detailed information, see Hülal T., Kızılkaya E., Özbekler A.G., ve Tunar P. (2016). A Hedonic House Price Index for Turkey. Working Paper No. 16/03.

<http://www.tcmb.gov.tr/wps/wcm/connect/TCMB+EN/TCMB+EN/Main+Menu/PUBLICATIONS/Research/Working+Papers>

² Eurostat (2011), Handbook on Residential Property Prices Indices.

<http://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-RA-12-022>

represents the whole country, data pertaining to the valuations of new houses in 51 cities where there are sufficient number of observations are used (Annex 2).

Geographical level: HPI and HHPI are computed for the whole country and on the basis of NUTS Level, whereas NHPI and EHPI are computed for the whole country and for the three major cities.

Sector coverage: None.

Time coverage: HPI statistics are available starting from 2010.

Coverage, n.e.s.: None.

Exceptional circumstances on coverage: The strata which have insufficient number of observations are excluded from the scope.

Statistical unit: Houses in Turkey.

Base period: 2010

Reference period: Two months previous.

Unit of measure:

Variable/Indicator	Unit of measure
HPI	Index
HHPI	Index
NHPI	Index
EHPI	Index
Unit Price	TL/m ²

Periodicity

Frequency of data collection: Monthly.

Frequency of dissemination: Monthly.

Timeliness

Average production time for each release of data: Approximately 60 days

Time lag - first results (days): Approximately 60 days.

Time lag - final results (days): Approximately 90 days.

Access by the Public

Advance dissemination of release calendar

The release calendar is announced to the public in advance and published on the first business day of each year on the website of the CBRT.

Link to advance release calendar:

[Data Release Calendar](#)

Data release policy: The institutions and organizations which are the subscribers of the data delivery system are informed about the publication of the results just after they are made available on the website of the CBRT.

Simultaneous release to all interested parties

Simultaneous release: The House Price Index statistics are released simultaneously.

Pre-release data share with press or other specific users under special agreements: Not shared.

Integrity

Dissemination of terms and conditions under which official statistics are produced, including those relating to the confidentiality of individually identifiable information

Responsibility for collecting, processing, and disseminating statistics: The Real Sector Data Division of the Statistics Department of the CBRT is responsible for collecting, processing and disseminating the statistics.

Data sharing and coordination among data producing agencies: None.

Confidentiality of individual reporters' data: In accordance with Article 43, Paragraph 5 of CBRT Law No. 1211, as amended on April 25, 2001 by the Law No. 4651, which states that "...the Bank may not publish or disclose the statistical information having a private and personal nature nor may it submit these to any official authority or private body other than the Banking Regulation and Supervision Agency. This information shall not be used for purposes other than those of statistical nature nor as means of evidence.", the data shall be deemed as confidential and will not be exposed to third parties.

Staff, facilities, computing resources, and financing: A total of 9 people of whom 4 graduated in statistics work in the process of collecting, processing, controlling, analyzing and publishing the statistics. When any technical problem is encountered during the preparation of the statistical data, IT Department supports immediately to solve the flaws.

Monitoring user requirements: The "Statistics Users Survey" is conducted via the website of the CBRT once in a year.

Quality policy: Publishing up-to-date, reliable, timely, and transparent statistics in compliance with international standards.

Quality monitoring: There are various micro and macro level controls in order to ensure quality standards.

Impartiality of statistics: Necessary measures to produce unbiased statistics are taken.

Data sources: The data source is valuation reports prepared at the stage of approval of individual housing loans extended by banks. Valuation reports which form a basis for housing loans are prepared by real estate appraisal companies. To construct the House Price Index (HPI) representing the whole country, all valuation reports are used, to construct the New Housing Price Index (NHPI) valuation reports for the houses built in the current and previous years are used and to construct the Existing Housing Price Index (EHPI), valuation reports for the houses built before the current and the previous years are used.

Methodology: The "Stratified Median Price Method" has been implemented in constructing the HPI to develop a measure for price movements in the heterogeneous housing market. In the scope of the current HPI implementation, in which the geographical stratification approach is applied, houses with different characteristics are grouped together to form homogenous strata and the median unit price for each stratum is weighted by the number of houses sold to reach the overall price index. In calculating the NHPI, the median unit prices for each stratum are weighted by building permit statistics issued by the Turkish Statistical Institute (TURKSTAT).

Sub-cities, which have sufficient number of observations, are determined as strata. In the case of insufficient number of observations for sub-cities, cities (NUTS-Level 3) and in the case of insufficient number of observations for cities, NUTS-Level 2 regions constitute strata. The strata are reviewed each year considering the number of observations. The strata in which the number of observations is insufficient are excluded and the strata which have satisfactory number of observations are included in calculation of the index.

The HPI relies on the assumption that the median unit price of appraised houses is indicative of the median unit price of all houses sold. The median unit price denotes the median price calculated by using a quarterly dataset of unit prices including both the reference month and the preceding and succeeding months by excluding the extreme values in each stratum. However, data for only two months, January 2010 and February 2010 are used to calculate the index for January 2010, which is the first month of the series. The fact that the distribution of unit prices in the strata is positively skewed and the median value in the data series with skewed distribution is more meaningful than the mean value is the main reason for choosing the median value for unit price.

HHPI which measures quality adjusted price changes related to the observed housing characteristics is constructed by using "characteristic-prices-based" hedonic regression method and log-linear regression model.

The log-linear regression model is applied for each stratum and for each period which enables observing the price effects of quality component changes by stratum and in time.

Calculation of Extreme Values: The Tukey's Hinges method has been implemented in the analysis of extreme values in computing the median unit price used to construct the index. Unit prices that qualify the following equation:

$$m2 \text{ unit price} < Q1 - 3*(Q3 - Q1) \text{ or } m2 \text{ unit price} > Q3 + 3*(Q3 - Q1)$$

where:

Q1: Lower Quartile and **Q3:** Upper Quartile

are accepted as extreme values and excluded from the analysis.

Weighting: Data on house sales registered by the General Directorate of Land Registry and Cadastre (LRC) are used as weights for aggregating the strata in constructing the HPI, HHPI and EHPI whereas building occupancy permit statistics issued by TURKSTAT are used for weighting in computing the NHPI.

Weights used to produce the HPI are updated each year with the weights calculated using the number of houses sold in the related stratum in the previous year. In calculating the indices for the very first years of the series, 2010 and 2011, house sales data for 2011 are used as an exception.

Building occupancy permits issued in the two consecutive years preceding the reference year are used to calculate the weights for constructing the NHPI.

Calculating the HPI: HPI (2010=100), which measures changes in the house prices compared with the base year, is calculated using the Chain Laspeyres Index method. The reason for implementing the chain index method is that the weights are updated each year.

Calculation of the Index for the Base Year:

$$I_{t0} = \frac{\sum \omega_{i0} p_{it0}}{(\sum \sum \omega_{i0} p_{ik0}) / 12 * 100}$$

I_{t0} : index for the reference month of the base year

ω_{i0} : weight for stratum i in the base year

p_{it0} : price for stratum i for the reference month in the base year

p_{ik0} : price for stratum i for the month k in the base year

Calculating the Chained Index:

$$I_{ty} = (\frac{\sum \omega_{iy} p_{ity}}{\sum \omega_{iy} p_{i12(y-1)}}) * I_{12(y-1)}$$

I_{ty} : index for the reference month,

$\sum \omega_{iy}$: weight for stratum i in the current year

p_{ity} : price for stratum i for the reference month,

$p_{i12(y-1)}$: price for stratum i for December the previous year,

$I_{12(y-1)}$: index for December the previous year.

Calculating the HHPI: HHPI (January 2012=100), which measures quality adjusted price changes is computed by using the following regression model, by estimating the regression coefficients for each period and each stratum.

$$\ln p_n^t = \beta_0^t + \sum_k \beta_k^t z_{nk}^t + \varepsilon_n^t \quad \forall n, t$$

p_n^t : price of property n in month t

z_{nk}^t : characteristic k of property n in month t

β_k^t : shadow price of the features of house n in month t

ε_n^t : error term

Laspeyres index is calculated for each stratum for computing price changes by keeping housing characteristics constant in time.

$$P_i^t = \frac{\exp(\widehat{\beta}_0^t) \exp[\sum_k \widehat{\beta}_k^t \overline{z_{nk}^0}]}{\exp(\widehat{\beta}_0^0) \exp[\sum_k \widehat{\beta}_k^0 \overline{z_{nk}^0}]}$$

P_i^t : hedonic house price index for stratum i in period t

$\widehat{\beta}_k^0$: estimated shadow price of the features in the base period

$\widehat{\beta}_k^t$: estimated shadow price of the features in period t

$\overline{z_{nk}^0}$: average housing characteristics in the base period

Modes of dissemination: The House Price Index results are published on the website of the CBRT under the menu “Statistics/Real Sector Statistics” along with a report summarizing the monthly developments. The data are also available as a time series under the menu “Statistics/Electronic Data Distribution System (EDDS)”.

Commenting on erroneous interpretation and misuse of statistics: After the data is published, media is tracked regularly in order to prevent misuse of data.

Disclosure of terms and conditions for statistical collection, processing, and dissemination: Data are submitted by the banks within the first 7 business days of each month via the Electronic Data Transfer System (EDTS) of the CBRT. The statistics produced are published in the last week of each month.

Seasonal adjustment: Seasonal adjustment is not applied.

Legal acts and other agreements on collection, processing, and dissemination of statistics:

- Article 43, CBRT Law No. 1211, as amended on April 25, 2001 by the Law No. 4651
- Turkish Statistics Law No. 5429 - Official Statistics Program

Identification of internal government access to data before release

None.

Identification of ministerial commentary on the occasion of statistical releases

Statistics are published along with a report without any interpretation.

Provision of information about revision and advance notice of major changes in methodology

Revision schedule: Only the previous month’s indices are revised.

Identification of preliminary and/or revised data: While disseminating the current month’s indices, the previous month’s indices are revised due to the late and revised submissions of valuation reports by the banks extending housing loans.

Advance notice of major changes in methodology, source data, and statistical techniques: Major changes in methodology and statistical techniques are announced on the website of the CBRT in advance.

Quality

Dissemination of documentation on methodology and sources used in preparing statistics

The documentation on methodology used in preparing the statistics is available under the related heading on the website of the CBRT.

Dissemination of component detail, reconciliations with related data, and statistical frameworks

Internal consistency: Consistency checks are made systematically. Statistics in the same data set are internally consistent with each other.

Temporal consistency: Comparable time series start from 2010. There is no break in the time series data with respect to methodological changes.

that support statistical cross-checks and provide assurance of reasonableness

Intersectoral and cross-domain consistency: House Price Index statistics are consistent with other data sources or statistics.

Notes

Last posted

Last certified

Last updated

21/08/2017

Annex 1: Nomenclature of Territorial Units for Statistics

Level 1	Level 2	Cities
TR A - North East Anatolia	TR 10	İstanbul
TR B - Middle East Anatolia	TR 21	Edirne, Kırklareli, Tekirdağ
TR C - South East Anatolia	TR 22	Balıkesir, Çanakkale
TR 1 - İstanbul	TR 31	İzmir
TR 2 - Western Marmara	TR 32	Aydın, Denizli, Muğla
TR 3 - Ege	TR 33	Afyonkarahisar, Kütahya, Manisa, Uşak
TR 4 - Eastern Marmara	TR 41	Bursa, Eskişehir, Bilecik
TR 5 - West Anatolia	TR 42	Bolu, Kocaeli, Sakarya, Yalova, Düzce
TR 6 -The Mediterranean	TR 51	Ankara
TR 7 - Middle Anatolia	TR 52	Konya, Karaman
TR 8 - Western Black Sea	TR 61	Antalya, Burdur, Isparta
TR 9 - Doğu Karadeniz	TR 62	Adana, Mersin
	TR 63	Hatay, Kahramanmaraş, Osmaniye
	TR 71	Nevşehir, Niğde, Aksaray, Kırıkkale, Kırşehir
	TR 72	Kayseri, Sivas, Yozgat
	TR 81	Zonguldak, Bartın, Karabük
	TR 82	Çankırı, Kastamonu, Sinop
	TR 83	Samsun, Çorum, Amasya, Tokat
	TR 90	Artvin, Giresun, Gümüşhane, Ordu, Rize, Trabzon
	TR A1	Erzurum, Erzincan, Bayburt
	TR A2	Ağrı, Ardahan, Kars, Iğdır
	TR B1	Bingöl, Elazığ, Malatya, Tunceli
	TR B2	Van, Bitlis, Hakkâri, Muş
	TR C1	Kilis, Adıyaman, Gaziantep
	TR C2	Diyarbakır, Şanlıurfa
	TR C3	Batman, Mardin, Siirt, Şırnak

Annex 2: Cities Included in Calculation of New Housing Price Index (NHPI)

Cities	
Adana	Ordu ⁽¹⁾
Ankara	Osmaniye ⁽¹⁾
Antalya	Yalova ⁽¹⁾
Aydın	Bolu ⁽²⁾
Balıkesir	Edirne ⁽²⁾
Bursa	Elazığ ⁽²⁾
Çanakkale	Erzurum ⁽²⁾
Çorum	Kırklareli ⁽²⁾
Denizli	Kütahya ⁽²⁾
Diyarbakır	Şanlıurfa ⁽²⁾
Eskişehir	Trabzon ⁽²⁾
Gaziantep	Afyonkarahisar ⁽³⁾
Hatay	Amasya ⁽³⁾
İstanbul	Bilecik ⁽³⁾
İzmir	Düzce ⁽³⁾
Kahramanmaraş	Karabük ⁽³⁾
Kayseri	Kırkkale ⁽³⁾
Kocaeli	Sivas ⁽³⁾
Konya	Tokat ⁽³⁾
Malatya	Adıyaman ⁽⁴⁾
Manisa	Kastamonu ⁽⁴⁾
Mersin	Zonguldak ⁽⁴⁾
Muğla	Aksaray ⁽⁵⁾
Sakarya	Karaman ⁽⁵⁾
Samsun	Uşak ⁽⁵⁾
Tekirdağ	

(1) Included in calculation of NHPI starting from 2013.

(2) Included in calculation of NHPI starting from 2014.

(3) Included in calculation of NHPI starting from 2015.

(4) Included in calculation of NHPI starting from 2016.

(5) Included in calculation of NHPI starting from 2017.