

The Data: Coverage, Periodicity, and Timeliness

Coverage characteristics

**Purpose of the study:** Commercial Property Price Index, which covers the whole country, is constructed for the purpose of monitoring price movements in the Turkish commercial property market.

**Data description:** Price indices are those constructed to monitor price movements in the Turkish commercial property market. Property prices indicated in valuation reports prepared for banks by real estate appraisal companies are used as a proxy for price.

**Statistical concepts and definitions:**

**Commercial Property Price Index (CPPI):** Index calculated by weighting the Retail Property and Office Price Indices in which prices are adjusted for quality changes related to observed property characteristics.

**Retail Property Price Index (RPI):** Index constructed using hedonic regression method in which prices are adjusted for quality changes related to observed retail property characteristics.

**Office Price Index (OPI):** Index constructed using hedonic regression method in which prices are adjusted for quality changes related to observed office characteristics.

**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.

- o **NUTS Level 3:** 81 regional levels corresponding to cities.
- o **NUTS-Level 2:** 26 regional levels formed by combining NUTS-Level 3 units
- o **NUTS-Level 1:** 12 regional levels formed by combining NUTS-Level 2 units (Annex 1).

**Stratum:** The smallest unit in which properties with similar characteristics are grouped together geographically and which provides a sufficient number of observations to make reliable calculations.

**Classification system:** Nomenclature of Territorial Units for Statistics (NUTS) is used for aggregating the RPI data. The data are aggregated at the 2<sup>nd</sup> level of NUTS for two strata; TR3 stratum in which İzmir is located and TR5 stratum in which Ankara is located, while the data are aggregated at the 1<sup>st</sup> level of NUTS for other strata. RPI for Türkiye is constructed using the data aggregated at the 1<sup>st</sup> level.

While aggregating the OPI data, indices are calculated for İstanbul, Ankara and İzmir separately in addition to a single index calculated for the rest of Türkiye. OPI for Türkiye is constructed by weighting these four indices.

**Statistical population:** Retail properties and offices in Türkiye.

**Reference area:** CPPI, RPI and OPI cover all cities in Türkiye.

**Geographical level:** CPPI, RPI and OPI are published for İstanbul, Ankara, İzmir and the whole country.

**Sector coverage:** None.

**Time coverage:** CPPI, RPI and OPI statistics are available starting from 2<sup>nd</sup> quarter of 2015.

**Coverage, n.e.s.:** None.

**Exceptional circumstances on coverage:** None.

**Statistical unit:** Retail properties and offices in Türkiye.

**Base period:** 2017

**Reference period:** Previous quarter.

	<b>Unit of measure:</b> <table border="1"> <thead> <tr> <th>Variable/Indicator</th> <th>Unit of measure</th> </tr> </thead> <tbody> <tr> <td>CPPI</td> <td>Index</td> </tr> <tr> <td>RPI</td> <td>Index</td> </tr> <tr> <td>OPI</td> <td>Index</td> </tr> </tbody> </table>	Variable/Indicator	Unit of measure	CPPI	Index	RPI	Index	OPI	Index
Variable/Indicator	Unit of measure								
CPPI	Index								
RPI	Index								
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<b>Periodicity</b>	<b>Frequency of data collection:</b> Quarterly.								
	<b>Frequency of dissemination:</b> Quarterly.								
<b>Timeliness</b>	<b>Average production time for each release of data:</b> Approximately 60 days.								
	<b>Time lag - first results (days):</b> Approximately 60 days.								
	<b>Time lag - final results (days):</b> Approximately 60 days.								

## Access by the Public

<b>Advance dissemination of release calendar</b>	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.
	<b>Link to advance release calendar:</b> <a href="#">Data Release Calendar</a>
	<b>Data release policy:</b> 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.
<b>Simultaneous release to all interested parties</b>	<b>Simultaneous release:</b> CPPI statistics are released simultaneously.
	<b>Pre-release data share with press or other specific users under special agreements:</b> Not shared.

## Integrity

<b>Dissemination of terms and conditions under which official statistics are produced, including those relating to the confidentiality of individually identifiable information</b>	<b>Responsibility for collecting, processing, and disseminating statistics:</b> The Surveys and Indices Division of the Data Governance and Statistics Department of the CBRT is responsible for collecting, processing and disseminating the statistics.
	<b>Data sharing and coordination among data producing agencies:</b> None.
	<b>Confidentiality of individual reporters' data:</b> 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.
	<b>Staff, facilities, computing resources, and financing:</b> A total of 6 people of whom 3 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.
	<b>Monitoring user requirements:</b> The "Statistics Users Survey" is conducted.
	<b>Quality policy:</b> Publishing up-to-date, reliable, timely, and transparent statistics in compliance with international standards.
	<b>Quality monitoring:</b> There are various micro and macro level controls in order to ensure quality standards.
	<b>Impartiality of statistics:</b> Necessary measures to produce unbiased statistics are taken.

**Data sources:** The data source is valuation reports provided for banks by real estate appraisal companies.

**Methodology:** RPI and OPI which measure quality adjusted price changes related to the observed property characteristics are constructed by using “characteristics-prices-based” hedonic regression method.

In the scope of the RPI and OPI implementation, in which the geographical stratification approach is applied, the indices for each stratum of RPI and OPI are weighted by the regional gross domestic product (GDP) to reach the overall price indices. The datasets used for calculating the indices in each stratum cover the relevant quarter and are composed by excluding the extreme values.

RPI and OPI are weighted by the total value of properties to construct CPPI.

**Calculation of Extreme Values:** The Cook’s Distance method has been implemented in the analysis of extreme values in order to construct the indices. In this method, the value of  $D_i$  is calculated for each observation  $i$  by using the changes that occur when including and omitting the observation  $i$  in the model.

$$D_i = \frac{\sum_{j=1}^n (\widehat{Y}_j - \widehat{Y}_{j(i)})^2}{p\widehat{\sigma}^2} \quad \forall i$$

$D_i$  : Cook’s Distance for observation  $i$

$\widehat{Y}_j$  :  $j^{\text{th}}$  fitted response value, where the fit includes observation  $i$

$\widehat{Y}_{j(i)}$  :  $j^{\text{th}}$  fitted response value, where the fit does not include observation  $i$

$\widehat{\sigma}^2$  : mean squared error

$p$  : number of coefficients in the regression model

Observations with  $D$  value greater than the threshold value of “4/number of observations” are accepted as extreme values and excluded from the analysis.

**Weighting:** Regional GDP values, which belong to two years ago, are used as weights for aggregating the strata in constructing the RPI and OPI.

While constructing the CPPI, the total value of retail properties and offices in the previous year’s data compiled within the scope of CPPI are used as weights in aggregating the RPI and OPI. As an exception, in calculation of indices’ weights for 2015, data on total value of commercial properties for 2015 are used instead of total value for 2014.

**Calculating the Indices:** RPI, which measures quality adjusted price changes of retail properties and OPI, which measures quality adjusted price changes of offices are computed by using the “characteristic-prices-based” hedonic regression method. The regression coefficients are estimated for each period and each stratum which enables observing the price effects of quality component changes by stratum and in time.

$$\ln P_n^t = \beta_0^t + \sum_{k=1}^K \beta_k^t z_{nk}^t + \varepsilon_n^t \quad \forall n, t$$

$P_n^t$  : value of property  $n$  in quarter  $t$

$\beta_0^t$  : intercept term

$\beta_k^t$  : shadow price of the features in quarter  $t$

$z_{nk}^t$  : value of characteristic  $k$  of property  $n$  in quarter  $t$

$\varepsilon_n^t$  : error term

In order to compute price changes by keeping property characteristics constant in time, Fisher index is calculated for each stratum by taking the geometric mean of the Laspeyres and Paasche indices. Indices are produced based on the previous period. Afterwards, the whole series are computed with 2017 as the base period.

$$P_i^t = \sqrt{\frac{\exp(\widehat{\beta}_0^t) \exp[\sum_k \widehat{\beta}_k^t z_{nk}^{t-1}]}{\exp(\widehat{\beta}_0^{t-1}) \exp[\sum_k \widehat{\beta}_k^{t-1} z_{nk}^{t-1}]} * \frac{\exp(\widehat{\beta}_0^t) \exp[\sum_k \widehat{\beta}_k^t z_{nk}^t]}{\exp(\widehat{\beta}_0^{t-1}) \exp[\sum_k \widehat{\beta}_k^{t-1} z_{nk}^t]}}$$

$P_i^t$ : price index for stratum i in period t

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

$z_{nk}^t$ : average property characteristics in period t

**Modes of dissemination:** Commercial Property Price Index results are published on the website of the CBRT under the menu "Statistics/Real Sector Statistics" along with a report summarizing the quarterly developments. The data are also available as a time series under the menu "Statistics/Electronic Data Delivery System (EVDS)".

**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 20 business days of each quarter via the Electronic Data Transfer System (EDTS) of the CBRT.

**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

**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:** Indices may be subject to revision up to one year.

**Identification of preliminary and/or revised data:** While disseminating the current quarter's indices, indices may be subject to revision up to one year due to revisions in the calculations or late and revised submissions of valuation reports by the banks.

**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 that support statistical cross-checks and provide assurance of reasonableness**

**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 2<sup>nd</sup> quarter of 2015. There is no break in the time series data with respect to methodological changes.

**Intersectoral and cross-domain consistency:** CPPI statistics are consistent with other data sources or statistics.

## Notes

Last posted

Last certified

Last updated

26/02/2024

**Annex 1: Nomenclature of Territorial Units for Statistics**

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