Approved by the order of the Acting Chairman of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan

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**Methodology for constructing a price index in the housing market**

**Chapter 1. General provisions**

1. This Methodology for constructing the housing price index
(hereinafter – the Methodology) refers to a statistical methodology formed in accordance with international standards and approved in accordance with the Law of the Republic of Kazakhstan dated March 19, 2010 "On State Statistics".

2. The methodology defines the main aspects of nationwide statistical monitoring of the level of housing prices, the selection of types of housing for monitoring, the formation of weight components, formulas and stages for calculating price indices.

3. This Methodology is applied by the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (hereinafter – the Bureau) and its territorial divisions when conducting nationwide statistical monitoring of housing prices and building price indices.

“Guidelines on Residential Property Price Indices” (2013), prepared by the International Labor Organization, the International Monetary Fund, the Organization for Economic Cooperation and Development, Eurostat, the European Economic Commission of the United Nations, World Bank.

5. The Methodology outlines the existing methods for constructing a housing price index, features of data sources for obtaining price information, and determines the procedure for calculating this indicator in the republic.

6. Price indices in the housing market characterize the change in the sale and rental prices of residential real estate.

The information flows for constructing average prices and price indices for sale and rental of housing by region and in the whole country are the data of an administrative source and materials of nationwide statistical monitoring of prices in the housing market.

Depending on the source of data, the sale prices of housing in the primary or secondary market are observed. urban settlements and housing rental prices.

The primary market is the market for newly commissioned housing. The housing market is considered secondary, where the object of purchase and sale is housing that has been functioning for some time and has a certain degree of wear and tear as a result of operation.

7. Average prices and house price indices are used to evaluate housing, determine the amount of various cash payments, monitor the implementation of programs and projects, and conduct international comparisons. The dynamics of these indicators is used in calculating the gross domestic product, conducting analysis, forecasting and scientific research, measuring the well–being of the population of the republic and regions, making decisions on the purchase and construction of housing by individuals and construction organizations.

8. The housing market has specific features that lead to certain problems in the construction of housing price indices:

1. heterogeneity of housing. The formation of price indices is based on the ratio of prices of identical objects with time changes. Unlike consumer goods, housing is characterized by its uniqueness. No two houses or apartments are exactly the same, each dwelling has a uniquely defined location and a set of structural characteristics. For this reason, constructing a house price index is more complex than constructing any price index based on the traditional comparable model methodology;
2. the difference between the initial offer price and the final transaction price for the sale of housing. During the conclusion of a transaction for the purchase and sale of housing between the seller and the buyer, there is a possibility of a bargaining, leading to a decrease in the original price. The offer price is not a fixed value and differs significantly from the final price. Taking into account the prices of completed transactions when forming the housing price index provides a reflection of changes in actual prices.

9. This Methodology uses the concepts defined in the Laws of the Republic of Kazakhstan "On housing relations", "On valuation activities in the Republic of Kazakhstan ".

Chapter 2 Data sources and method for constructing house price indices

**Paragraph 1. Sources of data**

10. The housing price index depends on the quality of the information contained in the data source used to compile it. The choice of an acceptable data source is an important task in compiling a housing price index. The source selection criteria are:

1. the data source used is consistent with the purpose of constructing the housing price index;
2. ensures the construction of a price index in the housing market at the national and regional levels;
3. the information provided by the source is accurate and complete;
4. price data is up–to–date and provided within predetermined time frames;
5. provides the amount of information necessary to take into account the qualitative changes in residential facilities;
6. does not contradict the sources used by international organizations in terms of definitions, scope, frequency and other characteristics.

11. Common sources of data for the calculation of housing price indices are administrative sources, real estate agencies, construction companies, banks and other financial institutions involved in lending for the purchase of housing.

They differ in the nature of the information contained in them, its quality and efficiency, coverage and frequency, units of observation, concepts and their definitions.

The administrative sources available for statistical purposes have a high level of completeness and data quality at minimal cost. In many countries, data from administrative sources such as land registers, tax authorities, local governments, and notaries are used to form a housing price index. Relevant information is also obtained from banks and appraisal companies.

If the data from administrative sources do not meet the requirements, then the data for constructing the price index on the housing market are obtained from materials of specially organized statistical observations by registering prices from advertisements for the sale of housing in the media or on Internet resources.

Section 2. Method for constructing price indices

12. The stratification method is used in constructing house price indices. Stratification is a direct and easy–to–calculate method for constructing a house price index. The purpose of stratification is to divide the initial set of objects into groups with a smaller price spread. The division is made according to price–determining characteristics, the main of which are the area of housing (general and residential), location, year of commissioning, type, material of the outer walls of the house and other characteristics (floor, number of rooms, number of sanitary facilities, availability of an elevator, garage, etc. ).

The construction of a stratified sample is a two–stage process in which the set of elements that make up the population under study is divided into strata so that each of its elements is included in one and only one stratum.

When choosing variables for stratification, the following principles are taken into account:

1. elements of one stratum are similar to each other, and elements included in different strata are different;
2. variables are closely related to the price of housing. The closer this connection, the more accurate the resulting estimates;
3. variables are selected to ensure ease of stratification.

The choice of stratification variables depends on the availability of data on the characteristics of housing on a regular basis and the extent to which they affect the price. Determining the optimal number of strata is one of the main tasks of the stratification method.

Detailed stratification by housing characteristics ensures stratum homogeneity and reduces problems associated with changes in housing quality. When defining homogeneous strata, the average price of each group is used as the price of constant quality for a particular type of housing. With an excessive increase in the number of strata, the number of observations within the group is reduced, or it does not contain a single residential object. A practical problem of detailed segmentation is also the difficulty of obtaining data for the weight components.

With an enlarged stratification, significant compositional changes are possible in the sample of residential objects within the stratum. This entails a violation of the condition of comparability of observed housing over time, which increases the likelihood of distortion of the value of the housing price index.

Stratification is recommended by international experts as the most appropriate method for constructing a housing price index in Kazakhstan. The data sources used allow the division of housing into groups according to selected characteristics and the formation of price indices for various types of housing.

The principles of the stratification method are easy to explain to users, which ensures the transparency of the indicator's methodology.

**Chapter 3 Construction of price indices in the housing market based on the materials of the nationwide statistical observation**

13. Information source for the formation of average prices and price indexes for the sale of new housing, resale and rental housing are materials of nationwide statistical observation.

Prices are recorded by the relevant officials of the territorial divisions of state statistics responsible for collecting prices by directly interviewing employees of organizations engaged in housing sales and rentals, and are also recorded from announcements posted in the media or on Internet resources.

**Paragraph 1. New home sales price index**

14. To monitor prices for new housing, the sample is formed from the types of housing available in the primary housing markets of the regions. In all cities, with the exception of cities of republican significance and the capital, the new housing market is not very saturated, so almost all new residential properties are included in the sample. If there is no new housing built by commercial construction organizations in the city, it is allowed to include housing sold under government programs in the sample.

Registration is subject to prices for :

1. one–, two–, three–room comfortable apartments in a new high–rise building (at least 5 floors) of a certain class ( II, III, IV class according to the Construction Norms and Rules of the Republic of Kazakhstan 3.02–43–2007 Residential buildings (hereinafter – CNR RK) or economy and business class), with walls made of brick, monolith or panels, having different finishes (fine, rough, rough improved);
2. new single–family houses with a significant share of their sales in the housing market of the surveyed city.

Apartments with a fine finish are apartments with full readiness for living. Such apartments are characterized by the completion of internal finishing (facing, painting, wallpaper) works, the arrangement of clean floors, the installation of sanitary equipment and appliances, household electrical appliances, gas or electric cookers and in–house door blocks.

Apartments with a rough finish or with a rough improved finish are apartments with varying degrees of readiness for living in which it is necessary to carry out work related to finishing.

According to CNR RK residential buildings are subdivided into I, II, III and IV classes depending on such indicators as the size of living space per person, the height of residential premises from the floor to the bottom of the ceilings, the number of living rooms, the minimum area of kitchen premises, the quality of finishing of the house and apartments, and others.

Price monitoring includes class II, III and IV apartments.

I characteristics correspond to the elite type of housing, which is not sufficiently representative in the housing markets of the surveyed cities. Inclusion of class I housing in observation can lead to a significant spread of prices in the sample.

Simultaneously with the classification of CNR RK in the housing market, the division of residential buildings into economy, business and elite classes is widely used. When monitoring prices for new housing, economy and business class objects are included in the sample.

The selling price of an apartment (house) is fixed, indicating the detailed characteristics: location, material of the outer walls of the house, number of rooms, decoration, total area of housing and kitchen area, number of storeys of the house, floor of the apartment, class of housing, name of the residential complex (if any).

**Paragraph 2. Index of home resale prices**

15. The resale prices of comfortable and uncomfortable housing with specially selected characteristics (total area, location, number of rooms, floor, material of the walls of the house, year of construction) that are unchanged during the surveyed period are subject to observation. When sampling apartments, their most representative types are taken into account.

The principles of housing sampling are:

1. representativeness. The type of apartment (house) included in the observation occupies a large share in the overall structure of the housing market and reflects the dynamics of prices of the represented type;

2) relevance, regularity. The type of the selected apartment (house) is in demand and has been on the market for a long period of time.

16. To monitor the resale prices of comfortable housing, the sample includes one–, two–, and three–room apartments in multi–storey brick, monolithic, or panel houses (at least 5 floors), and for unfurnished housing, single–family (individual) houses that do not have at least one type of communal amenities ( plumbing, sewerage, central heating, hot water).

**Paragraph 3. Housing rental price index**

17. The selection of organizations for observation is carried out in compliance with the following criteria:

1. selected properties provide the greatest possible coverage of types of housing;
2. the sample includes organizations with different volumes of housing rental services;
3. price information of organizations reflects changes in housing prices in all areas of the city;

4) information is available on the attributes of housing, including its location and price.

18. To monitor rental prices for comfortable housing, the sample includes one–, two–, and three–room apartments in multi–storey brick, monolithic or panel houses (at least 5 floors), for unfurnished housing – single–family (individual) houses that do not have at least one type utilities ( water supply, sewerage, central heating, hot water supply ).

Representative types of housing are selected in each surveyed city, and their detailed description is compiled. A detailed description of the characteristics of housing provides comparability of apartments in both survey periods. The detailed description takes into account the quantitative and qualitative characteristics of the apartments, such as the number of rooms, wall material, year of commissioning, location, total area and kitchen area, number of storeys of the house, the floor of the apartment, availability of amenities, availability of furniture and household appliances.

19. The sample for each type of dwelling provides a number of price quotations to represent its average price. The number of items in the sample during the year remains constant within each of the housing types.

20. When there is a temporary lack of data on the sale, resale or rental of apartments of a certain type, price indices are imputed based on changes in prices for other types of housing or the price of the previous month is carried over.

**Chapter 4. Construction of housing price indices based on data from an administrative source**

21 Administrative data on housing resale prices in the Republic of Kazakhstan are compiled from the Statistical Register of Housing Stock (hereinafter – SRHF) of the Bureau. The source for updating SRHF data is information from the State Database "Real Estate Register" (hereinafter – SDB RRE) of the Ministry of Justice of the Republic of Kazakhstan.

Based on the information obtained through the integration interaction from the SDB RRE, the construction of a housing price index for cities of regional and republican significance is carried out.

SRHF has the following structure:

1. location of housing (address);
2. technical characteristics of housing (number of storeys of the house, number of rooms, total and living area, year of commissioning of the house, material of the outer walls of the house, height of the dwelling);
3. availability of amenities (heating, electricity, water supply, sewerage, gas);
4. type of house or apartment;
5. the amount of the transaction under the contract of sale;
6. transaction date.

Subparagraphs 1 ), 2), 3), 4 ) specified in the structure are further detailed by their constituent attributes.

22. The Home Resale Price Index is derived from SRHF data using a stratification method.

To construct a home resale price index, the following attributes are selected from the SRHF database:

1. city;
2. street of house;
3. number of storeys of the house;
4. apartment types;
5. types of houses;
6. number of rooms;
7. total and living area of housing;
8. year of commissioning;
9. material of external walls;
10. improvement;
11. the amount of the transaction under the contract of sale;
12. transaction date.

23. The use of the stratification method involves the selection of variables according to which the total population of dwellings is divided into strata. The pricing variables for stratification based on SRHF data are:

1. type of house (single–family, multi–apartment);
2. number of rooms (one, two, three or more).

Variables for housing stratification are chosen to ensure that there are sufficient observations within the same stratum and that prices for comparable housing types can be compared.

24. Information on transactions for the purchase and sale of housing is distributed by strata:

1. resale of housing (single–family houses);
2. resale of housing (apartments in apartment buildings), one–room;
3. resale of housing (apartments in apartment buildings), two–room apartments;
4. resale of housing (apartments in apartment buildings), three or more rooms.

25. Each quarter, the number of apartments (houses) and their structure in the stratum changes, as data on actually registered housing purchase and sale transactions for the period are used. The average resale price of housing in the reporting period in a particular city is significantly lower or higher than in the previous period.

For the accuracy of the calculation of indicators, various types of information control are provided. Transactions are not included in the calculation. with zero and extreme prices, transactions for the sale of housing with the area and number of rooms that go beyond the limits of the established limit values.

If the number of transactions in a stratum is small or equal to zero, to calculate the average price and price index for this stratum, they are imputed based on the average price change for the rest of the strata of the city or for similar strata of other cities.

**Chapter 5 Formation of the weighing scheme**

26. To form average prices and price indices for regions and the republic, a weighting scheme is drawn up.

The weighing scheme is a set of weights of specific typeshousing defined by all degrees of aggregation according to the standard classification. It aggregates indicators from the lowest level to the highest.

Weight components reflect the significance of each surveyed type of housing and the impact of changes in its price on the overall value of the index.

27. Sources for the formation of weights:

1) for the sale of new housing, data on the commissioning of housing are used;

2) for the resale of housing, information on the housing fund of the republic is used.

**Chapter 6 Indicators of house price statistics**

28. On the basis of nationwide statistical monitoring of the level of housing prices, average prices and price indices are formed for the following types:

1. sale of new housing (apartments in apartment buildings);
2. resale of comfortable housing (apartments in apartment buildings);
3. resale of unfurnished housing;
4. rent of comfortable housing;
5. rental of unfurnished housing.

**Chapter 7 Calculation of average prices and price indices**

30. The average price of one square meter of the total area of housing type  in the region is calculated as a geometric mean of the observed prices for residential properties of this type:



where:

 – the average price of housing of the type in the period ;

 – the product of housing prices of the type in the period ;

 – the number of prices in the sample (stratum) of housing of the type during the period .

31. Calculation of the price of one square meter of the total area of housing type on average in the republic is carried out on the basis of the average prices of the surveyed cities and their weight components according to the formula:



where:

 – the average price in the republic for housing of the type in the period ;

** – the average price of the city for housing of the type ;

** – the weight of the city .

The weights of cities for the sale of new housing are the shares of regions in the total area of commissioned housing, the resale of housing is the share of regions in the total housing stock.

A similar formula is applied to aggregate average housing prices from the elementary level to higher levels. In this case **, is the weight of the dwelling of the species .

32. Average house prices are the basis for calculating individual price indices. And the individual (elementary) price index reflects the change in prices of one element of the studied population (a particular type of housing).

The individual price index for each type of housing is determined by the Jevons formula as a simple relative value for comparing geometric average prices for this type of housing in the reporting and base periods:

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where:

**** – housing price index of the type in the reporting period compared to the previous one;

**** – average housing prices of the type in the periods and ;

 – the size of the sample (stratum) of the housing species in the periods and . For the resale of housing, their values either coincide or differ depending on the number of completed purchase and sale transactions for this type of housing. For the construction of price indices for the sale of new housing and rental housing, the sample size is kept constant during the reporting year .

33. Individual price indices are aggregated. The aggregate index is a relative indicator that characterizes the average change in a socio–economic phenomenon, consisting of incommensurable elements.

The aggregate price index is defined as the weighted average of individual price indices by type of housing. For the calculation, the Laspeyres formula is used:



where:

** – housing price index for the period compared to the previous period ;

 – housing prices in periods and , respectively ;

 – the total area of housing put into operation or the total area of housing in the housing stock (depending on the calculated index), taken as weights for aggregation.

34. Price indices are calculated for different comparison periods :

1) the price index of the reporting month by December of the previous year is found by multiplying the price index in the reporting month by the previous month and the price index of the previous month by December of the previous year:



where:

 – price index of the reporting month against December of the previous year;

 – price index of the reporting month to the previous one;

 – price index of the previous month to December of the previous year.

2) the price index of the reporting month by December of the base year is calculated as the product of the price index in the reporting month by the previous month and the price index of the previous month by December of the base year:



where:

 – price index of the reporting month to December of the base year;

 – price index of the previous month to December of the base year.

3) the price index of the reporting month to the corresponding month of the previous year is calculated by dividing the price index of the reporting month to December of the base year by the price index of the corresponding month of the previous year to December of the base year:



where:

 – price index of the reporting month to the corresponding month of the previous year;

 – price index of the reporting month to December of the base year;

 – price index of the corresponding month of the previous year to December of the base year.

4) the price index of the reporting period to the corresponding period of the previous year is calculated by dividing the sum of the price indices of the months of the reporting period to December of the base year by the sum of the price indices of the months of the corresponding period of the previous year to December of the base year:



where:

 – price index of the reporting period to the corresponding period of the previous year;

 – price indices of the months of the reporting period to December of the base year;

– price index of the months of the corresponding period of the previous year to December of the base year.

5) the price index of the reporting quarter to the previous quarter is calculated by the ratio of the sum of price indices to December of the base year for the months included in the reporting quarter to the sum of similar price indices for the months of the previous quarter:



where:

 – price index of the reporting quarter to the previous quarter;

 – price indices of the months of the reporting quarter to December of the base year;

 – price indices of the months of the previous quarter to December of the base year.

6) price index of the reporting quarter to the corresponding quarter of the previous year:



where:

 – price index of the reporting quarter to the corresponding quarter;

 – price indices of the months of the reporting quarter to December of the base year;

 – price indices of the months of the corresponding quarter of the previous year to December of the base year.

7) price index for the quarter:



where:

 – price index for the quarter;

 – price index of the last month of the reporting quarter to December of the base year;

 – price index of the last month of the previous quarter to December of the base year.

At the same time, the price index for the first quarter will coincide with the price index of March by December of the previous year.

8) price index of the reporting quarter to the base year:

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where:

**– average price in the reporting quarter;

**– the average annual price of the base year.

To form the price index of the reporting quarter to the base year, the average annual price of the base year is calculated using the arithmetic mean formula from the prices of quarters of the base year. Average annual price of the base year:

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where:

**– average prices for the 1st, 2nd, 3rd, 4th quarter of the base year, respectively.

9) price index of the reporting quarter to the corresponding quarter of the previous year:

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where:

**– price indices to the base year in the reporting quarter and the corresponding quarter of the previous year, respectively.