

Discussion paper on the proposed changes in the Housing index compilation methodology in the new CPI series

Importance of Housing in Indian CPI

The Consumer Price Index (CPI) is a key macro-economic indicator for measuring price changes of goods and services consumed by the households over time. Inflation based on CPI is the year on year change in the CPI. The Housing is a crucial indicator of the overall well-being of the households not only in India but across the world as a significant amount of their income is spent either on house rent or maintaining an owned house. It is considered an important factor for the economy as it affects household budgets and influences the construction and real estate sectors. High house rents can strain household finances which may in turn reduce the spending on other requisite goods and services. Therefore, inflation based on house rent index is an important tool not only for the policy and decision makers but also for the households.

In India, one of the key components of the existing CPI series is housing as it has 21.67% expenditure share for urban areas and 10.07% expenditure share at All India level in the existing CPI series. Currently, the housing index is not compiled in the rural sector mainly because Household Consumption Expenditure Survey (HCES) 2011-12 did not provide the estimates of the imputed rent for owner occupied houses for this sector. Further, as per HCES (2011-12), the actual house rent expenditure accounted for only 0.44% of the total rural consumption expenditure. Further, the rental equivalent approach also could not be adopted due to non-availability of rent market.

2.Housing Index compilation Methodology for the existing CPI series

2.1 In the existing series of CPI, the owner-occupied dwellings are also taken into account in the computation of housing index besides rented dwellings. The “Rental Equivalent Approach” was adopted to impute the rent of owner-occupied houses. The rent data are collected from the sample rented dwellings in each of the selected towns. For each quotation, twelve rented dwelling units were selected. These were selected in such a way that they represented various categories of dwellings with different number of living rooms. Dwellings are visited once in six months for canvassing house rent schedule which means the dwellings covered in the month of January for collection of information are visited in the month of July again. Similarly, dwellings covered in

February are covered again in August and so on. This arrangement was made to reduce the workload of enumerators in collection of information. Moreover, rent does not change very frequently like prices of cereals, vegetables, fruits etc. In case of concessional or subsidized dwellings like dwellings provided by the employer, the rent actually paid by the family for the dwelling along with any allowance foregone in lieu of the accommodation given to the owner is taken as rent payable per month. The selected dwellings are substituted during the course of the series. Substitution generally occurs when a dwelling is no longer available for rent, its category changes due to reconstruction or other structural modifications and in a few cases due to non-cooperation of the respondents. 7%-10% of dwellings are substituted in a year.

2.2 For compilation of housing index, rent data for six months' period were required as each sample dwelling was visited once in six months for data collection. Therefore, for the period January 2013 to May 2013, housing indices were kept at 100. First Housing Index on Base 2012=100 was compiled for the month of June 2013, for which, house rent data from January 2013 to June 2013 was used. February 2013 to July 2013-house rent data was used for July 2013 house rent index and so on. For computing House Rent Index, Rent Relatives were calculated as (current month rent)/ (Base rent) and then GM of the Rent Relatives was worked out by classifying the dwellings by number of living rooms (i.e. one room, two rooms, three rooms and four or more rooms). Weighted geometric mean (GM) of the aforementioned average rent relatives was taken to get the Housing Index. Here weights for each category of dwellings was obtained from the NSS 69th round survey on Housing Conditions (July-December 2012). This fixed base method was Continued up to November 2013. Subsequently, the Housing Indices were computed using Chain Base Method where Rent Relatives (RR) were computed as (current month rent)/ (rent six months ago) and then GM of Rent Relatives was worked out by classifying the dwellings by number of living rooms (one room, two rooms, three rooms and four or more rooms). Weighted GM of the aforementioned average rent relatives was taken to get a combined rent relative. Housing index was obtained by multiplying the combined rent relative with the corresponding House Rent Index six months ago.

2.3 Base Rent computation for the existing CPI series

Let $x_1, x_2, \dots, \text{ and } x_6$ were the rent collected for dwellings allocated to January to June of the Base year and $x_7, \dots, \text{ and } x_{12}$ represented the rent collected for July to December during a

second visit. So the Base rent were computed as $(x_1 + x_7)/2$, $(x_2 + x_8)/2$, ... and $(x_6 + x_{12})/2$ for January, Februaryand June respectively.

2.4 Index Compilation -Current Year (2013 onwards)

It may be noted that the complete set of rent values was unavailable until May of the initial year, as rent was collected for only **1/6th** of the total dwellings each month. Therefore, a full set of **Current Year Rent** was available for compilation after June of the initial year.

This means that for January, the current year's rent will be available for **1/6th** of the total dwellings.

During February, rent data for **2/6th** of the dwellings (1/6th from January and 1/6th from February) will be available.

Similarly, by May, rent data for **5/6th** of the dwellings (1/6th from each month from January to May) will be collected.

However, only after June of the initial year, the complete set of current rent values for all dwellings will be available.

Therefore, **Index for January, February,and May** was taken as **100**.

For June, rent for 2013 for all the dwellings was available for the first time.

$$\text{Index for June} = \text{Rent June} / \text{Base rent} * 100.$$

Where rent June 2013 contained all the data from January to June (Complete set).

$$\text{Index for July} = \text{Rent July} / \text{Base rent} * 100.$$

Where rent July contains all the data from February to July.

This was followed till Nov, wherein

$$\text{Index for Nov} = \text{Rent Nov} / \text{Base rent} * 100.$$

Where rent November contains all the data from June to November.

The chain index for Housing was started from December (2013) onwards:

$$\text{Index for December} = \text{Rent December} / \text{Base rent} * 100.$$

$$= \frac{\text{Rent December}}{\text{Rent June}} * \frac{\text{Rent June}}{\text{Base rent}} * 100$$

$$= \text{Rent Relative} * \text{Index six month ago}$$

2.5 Rent relative calculation for the existing series

Let us suppose, there are five States in the country. As per current index compilation procedure, all elementary indices, including Housing index, are compiled State-wise and then aggregated to arrive at all India level index.

2.5.1 Rent data are collected from rented accommodations only. Therefore, the sample contains only rented accommodations. Dwellings, in the sample, have been divided into -four categories, using the criteria of number of living rooms:

- I - one living room set
- II - two living rooms set
- III - three living rooms set
- IV - four or more living rooms set

2.5.2. Let N_{ij} is the number of dwellings in category i of dwellings in State j in the sample. Further, assume that R^C is current rent, R^{-6} is rent six months ago and RR (Rent Relative) is ratio of R^C and R^{-6} . Then RR_{ij} represents geometric mean of the rent relatives of the rented dwellings in category i of dwellings in State j , which are depicted in the matrix below:

States	Category I	Category II	Category III	Category IV
States 1	RR_{I1}	RR_{II1}	RR_{III1}	RR_{IV1}
States 2	RR_{I2}	RR_{II2}	RR_{III2}	RR_{IV2}
States 3	RR_{I3}	RR_{II3}	RR_{III3}	RR_{IV3}
States 4	RR_{I4}	RR_{II4}	RR_{III4}	RR_{IV4}
States 5	RR_{I5}	RR_{II5}	RR_{III5}	RR_{IV5}

2.5.3 Weights/shares of these categories of dwellings within owner-occupied and rented houses (as per the results of Housing Condition Survey NSS 69th Round) were supposed as follows:

State	Rented accommodations				Owner-occupied accommodations			
	Cat- I	Cat- II	Cat- III	Cat- IV	Cat- I	Cat- II	Cat- III	Cat- IV
States 1	A_{I1}	A_{II1}	A_{III1}	A_{IV1}	B_{I1}	B_{II1}	B_{III1}	B_{IV1}
States 2	A_{I2}	A_{II2}	A_{III2}	A_{IV2}	B_{I2}	B_{II2}	B_{III2}	B_{IV2}
States 3	A_{I3}	A_{II3}	A_{III3}	A_{IV3}	B_{I3}	B_{II3}	B_{III3}	B_{IV3}
States 4	A_{I4}	A_{II4}	A_{III4}	A_{IV4}	B_{I4}	B_{II4}	B_{III4}	B_{IV4}
States 5	A_{I5}	A_{II5}	A_{III5}	A_{IV5}	B_{I5}	B_{II5}	B_{III5}	B_{IV5}

Where $\sum_{i=1}^{IV} A_{ij} = 100$ and $\sum_{i=1}^{IV} B_{ij} = 100$, for state j .

2.5.4. Thus, weighted average of the category-wise rent relatives for rented and owner-occupied accommodations is as follows:

State	Rented	Owner-occupied
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States 1	$R_1 = \text{weighted GM of } RR_{i1}, \text{ where weight } A_{i1}$	$O_1 = \text{weighted GM of } RR_{i1}, \text{ where weight } B_{i1}$
States 2	$R_2 = \text{weighted GM of } RR_{i2}, \text{ where weight } A_{i2}$	$O_1 = \text{weighted GM of } RR_{i2}, \text{ where weight } B_{i2}$
States 3	$R_3 = \text{weighted GM of } RR_{i3}, \text{ where weight } A_{i3}$	$O_1 = \text{weighted GM of } RR_{i3}, \text{ where weight } B_{i3}$
States 4	$R_4 = \text{weighted GM of } RR_{i4}, \text{ where weight } A_{i4}$	$O_1 = \text{weighted GM of } RR_{i4}, \text{ where weight } B_{i4}$
States 5	$R_5 = \text{weighted GM of } RR_{i5}, \text{ where weight } A_{i5}$	$O_1 = \text{weighted GM of } RR_{i5}, \text{ where weight } B_{i5}$

It may be noted that the Rent Relative of rented accommodation is applied to the respective category of owner-occupied dwellings also, using rental equivalence approach, to compute weighted average of the category-wise rent relatives for owner-occupied accommodations.

2.5.6. Now the overall rent relative is computed as follows:

State	Overall Rent Relative
States 1	$Y_1 = \text{weighted GM of } R_1 \text{ \& } O_1, \text{ where weight are } w_1 \text{ \& } (1-w_1)$
States 2	$Y_2 = \text{weighted GM of } R_2 \text{ \& } O_2, \text{ where weight are } w_2 \text{ \& } (1-w_2)$
States 3	$Y_3 = \text{weighted GM of } R_3 \text{ \& } O_3, \text{ where weight are } w_3 \text{ \& } (1-w_3)$
States 4	$Y_4 = \text{weighted GM of } R_4 \text{ \& } O_4, \text{ where weight are } w_4 \text{ \& } (1-w_4)$
States 5	$Y_5 = \text{weighted GM of } R_5 \text{ \& } O_5, \text{ where weight are } w_5 \text{ \& } (1-w_5)$

where w_j was computed from the result of HCES 2011-12. Here, w_j represents the share of expenditure.

2.6. Compilation of State wise and All India Housing index

2.6.1 Using methodology mentioned above, the State-wise Housing Index (HRI) is computed, following chain base method, as follows:

State	House Rent Index
States 1	$HRI_1 = HRI^{-6}_1 \cdot Y_1$
States 2	$HRI_2 = HRI^{-6}_2 \cdot Y_2$
States 3	$HRI_3 = HRI^{-6}_3 \cdot Y_3$
States 4	$HRI_4 = HRI^{-6}_4 \cdot Y_4$
States 5	$HRI_5 = HRI^{-6}_5 \cdot Y_5$

Where HRI^{-6}_j is the Housing Index of six months ago of State j .

2.6.2 Following this procedure, State-wise House Rent Indices are compiled, which were further aggregated to arrive at all India Housing Index. For compilation of All India Housing index, the corresponding housing weights of the respective States are used.

3. Limitations identified by the users and experts in the existing housing index compilation methodology

The stakeholders and users of CPI data highlighted some anomalies in the existing Housing index compilation methodology which are as under;

3.1 There are three different methods used to calculate the index:

- From January to May 2013, the index was set to 100.
- From June to November 2013, a fixed base method was used.
- From December 2013 onwards, a chain index method was applied.

It was observed that **a sharp rise in both the index and inflation occurred following May 2013**, resulting in a **sudden upward shift**. This escalation was due to the assumption of index as 100 till May 2013.

3.2 From December 2013, the chain index was based on six months prior data which introduced an unexplainable movement in the monthly housing inflation rates.

3.3 The issue of some distortions in some months, introduced due to concessional or employer provided dwellings, was also highlighted by the users including the Reserve Bank of India. In the case of employer-provided accommodation, information is collected on House Rent Allowance (HRA) and any other license fees paid by the employee to retain the dwelling. When an employee's salary increases, the corresponding rise in HRA is reflected in the recorded house rent, thereby capturing an increase. However, when the employee vacates the accommodation and it is allotted to a junior employee with a lower HRA, it results in a lower recorded rent, which may incorrectly appear as a decline in rent or negative inflation. This, however, does not represent an actual decrease in rent prices.

3.4 During a Technical Assistance Mission on base revision of CPI with IMF Experts, it was advised that since India uses the panel survey approach for the collection of rents, when calculating price change, the price change is based on a comparison of like with like, meaning that panel 1 in M7 is compared with the prices collected in M1. This results in a six-month change. To convert the 6 months, change into a one-month change, the 6th root of the change may be calculated. This is then multiplied by the previous period index. Prices for the other panels are not imputed or used. Only the prices of the individual panels are used subject to the condition that each panel is broadly representative of the whole. Carrying forward the prices of the other panels may create a downward bias in the rent index.

4. Proposed Changes and Methodology for Compilation of the House Rent Index in the New Series

In the ongoing base revision exercise, all aspects of index compilation methodology are revisited to prepare a more robust and resilient CPI series. To address issues highlighted by the users and experts as mentioned in para 3 above, the housing index compilation methodology is proposed

to be revised significantly. The methodology is reviewed under the guidance of the “Expert Group on the Base Revision of CPI”. Proposed changes in the housing index compilation methodology are as follows:

4.1 Frequency and Coverage of Rent Collection

- **Monthly Rent Collection:** Rent data will be collected **monthly**, replacing the current practice of collecting rent every six months.
- **Expanded Sample Coverage:** Instead of limiting rent collection to **one-sixth of the sample**, the new approach proposes collecting rent data from **all selected dwellings** each month. It is being proposed to address the issue of panel approach highlighted by the IMF expert at para 3.4 above, since the panel approach necessitates a larger sample size to ensure representativeness at the aggregate level, which is not feasible due to the limited availability of rented dwellings in many markets outside major urban centres

4.2 Inclusion of Rural Sector: In addition to urban expenditure on housing, the HCES 2023–24 has also captured house rent data for rural areas, including imputed rent for owner-occupied dwellings. Consequently, the new series will compile the Housing Index for both rural and urban sectors. This marks a departure from the current series, which includes only the urban sector, due to the absence of imputed rent data for rural areas in the HCES 2011–12.

4.3 Sampling Framework

- **Urban Sector:** Rent data will be collected from 12 dwellings per urban market, subject to the availability of rented units.
- **Rural Sector:** In selected villages, data will be collected from 6 dwellings, based on availability.

4.4. Exclusion of employer provided dwellings.

To eliminate distortions introduced sometimes due to concessional or employer provided dwellings as mentioned in para 3.3 above, in the proposed CPI series, government accommodations and other employer-provided dwellings will be excluded from the compilation of the Housing Index, as these do not reflect transactions in the actual rental market.

4.5. Classification and Weighting of Dwellings

As in the existing series, dwellings will be categorized by the number of living rooms:

- Category 1- Dwellings with 1 living room
- Category 2- Dwellings with 2 living rooms
- Category 3- Dwellings with 3 living rooms
- Category 4- Dwellings with 4 or more living rooms

The weights assigned to each dwelling category will be based on the proportions obtained from the Census 2011 data.

4.6 Compilation Methodology

4.6.1 In the new CPI series, it is proposed to compile the Housing Index by treating the Categories as a priced item and compile index category wise in a state * sector wise. Then compile the weighted average will be the index.

4.6.2. Let N_{ij} is the number of dwellings in category i of dwellings in State j in the sample. Further, assume that R^C is current rent, R^{-1} is rent six months ago and RR (Rent Relative) is ratio of R^C and R^{-1} . Then RR_{ij} represents geometric mean of the rent relatives of the rented dwellings in category i of dwellings in State j , which are depicted in the matrix below:

States	Category I	Category II	Category III	Category IV
States 1	RR_{I1}	RR_{II1}	RR_{III1}	RR_{IV1}
States 2	RR_{I2}	RR_{II2}	RR_{III2}	RR_{IV2}
States 3	RR_{I3}	RR_{II3}	RR_{III3}	RR_{IV3}
States 4	RR_{I4}	RR_{II4}	RR_{III4}	RR_{IV4}
States 5	RR_{I5}	RR_{II5}	RR_{III5}	RR_{IV5}

4.6.3. P_{ij} represents Priced item Index of the of the rented dwellings in category i of dwellings in State j , which is the **product of Geometric mean of rent relative and Priced item index of previous month** in category i of dwellings in State j (formula for the short term formula or Chain index).

$$\text{i.e., } P_{ij}^c = RR_{ij} * P_{ij}^{-1}$$

States	Category I	Category II	Category III	Category IV
States 1	P_{I1}	P_{II1}	P_{III1}	P_{IV1}
States 2	P_{I2}	P_{II2}	P_{III2}	P_{IV2}
States 3	P_{I3}	P_{II3}	P_{III3}	P_{IV3}
States 4	P_{I4}	P_{II4}	P_{III4}	P_{IV4}
States 5	P_{I5}	P_{II5}	P_{III5}	P_{IV5}

4.6.4. Let us suppose weights/shares of these categories of dwellings within owner-occupied and rented houses (as per the Census 2011 data) are as follows:

State	Rented accommodations				Owner-occupied accommodations			
	Cat- I	Cat- II	Cat- III	Cat- IV	Cat- I	Cat- II	Cat- III	Cat- IV
States 1	A_{I1}	A_{II1}	A_{III1}	A_{IV1}	B_{I1}	B_{II1}	B_{III1}	B_{IV1}
States 2	A_{I2}	A_{II2}	A_{III2}	A_{IV2}	B_{I2}	B_{II2}	B_{III2}	B_{IV2}
States 3	A_{I3}	A_{II3}	A_{III3}	A_{IV3}	B_{I3}	B_{II3}	B_{III3}	B_{IV3}
States 4	A_{I4}	A_{II4}	A_{III4}	A_{IV4}	B_{I4}	B_{II4}	B_{III4}	B_{IV4}
States 5	A_{I5}	A_{II5}	A_{III5}	A_{IV5}	B_{I5}	B_{II5}	B_{III5}	B_{IV5}

Where $\sum_{i=1}^{IV} A_{ij} = 100$ and $\sum_{i=1}^{IV} B_{ij} = 100$, for state j.

4.6.5. Thus, the Index for Rented dwellings and Owner-occupied dwellings are the weighted average of the category-wise priced index for rented and owner-occupied accommodations which is as follows:

State	Rented	Owner-occupied
States 1	R ₁ = weighted AM of P _{i1} , where weight A _{i1}	O ₁ = weighted AM of P _{i1} , where weight B _{i1}
States 2	R ₂ = weighted AM of P _{i2} , where weight A _{i2}	O ₂ = weighted AM of P _{i2} , where weight B _{i2}
States 3	R ₃ = weighted AM of P _{i3} , where weight A _{i3}	O ₃ = weighted AM of P _{i3} , where weight B _{i3}
States 4	R ₄ = weighted AM of P _{i4} , where weight A _{i4}	O ₄ = weighted AM of P _{i4} , where weight B _{i4}
States 5	R ₅ = weighted AM of P _{i5} , where weight A _{i5}	O ₅ = weighted AM of P _{i5} , where weight B _{i5}

Note: Price index of rented accommodation (P_{ij}) is applied respective category of owner-occupied dwellings also, using rental equivalence approach, to compute weighted average of the category-wise rent relatives for owner-occupied accommodations. It may be noted that Rent or rates are not collected independently from households that occupy their own dwellings.

4.6.7. Now the overall House rent Index for the state is computed as follows:

State	Overall House rent
States 1	HR ₁ = weighted AM of R ₁ & O ₁ , where weight are w ₁ & w ₁ *
States 2	HR ₂ = weighted AM of R ₂ & O ₂ , where weight are w ₂ & w ₂ *
States 3	HR ₃ = weighted AM of R ₃ & O ₃ , where weight are w ₃ & w ₃ *
States 4	HR ₄ = weighted AM of R ₄ & O ₄ , where weight are w ₄ & w ₄ *
States 5	HR ₅ = weighted AM of R ₅ & O ₅ , where weight are w ₅ & w ₅ *

where w_j has been computed from the result of HCES round. Here, w_j and w_j* represents the share of expenditure for rented dwelling and owner-occupied dwellings respectively for state j.

5. Following is the summary of changes proposed in the housing index compilation in the new CPI series;

Parameters	Existing series	Proposed in the new series
Coverage	Only urban areas	Urban & rural both

	12 dwellings per market (as per availability)	Urban – 12 dwellings per market(as per availability) Rural - 6 dwellings per market (as per availability)
	Panel approach for capturing rents from all dwellings in 6 months	Rent data will be captured from all dwellings for every month
	Employer provided accommodation included	Employer provided accommodation not included
Methodology	3 methods are used to compile the index for different different periods.	Only one method will be used from the beginning as done for other items in the basket, which is short index or chain index method
Higher level indices	Weighted Geometric mean of elementary indices	Weighted Arithmetic mean of elementary indices (in line with other items in CPI)
Source for dwelling type weights	Housing Condition Survey -NSS 69 th round	Census 2011
Release of Housing index	All India and urban	All India, urban and rural

The proposed changes in the methodology are being done with the objective of making housing index more robust and representative. **Feedback/comments are invited** on the proposed changes in housing index compilation methodology. Comments and suggestions may be sent to **psd-nso2020@mospi.gov.in** by **20th November, 2025**
