

Department of Economics

ISSN number 1441-5429

Discussion number 12/18

The Calculation of Spatial Prices in the Absence of Unit Values: Alternative Methodologies with Empirical Evidence from India

Amita Majumder¹, Ranjan Ray² and Sattwick Santra³**Abstract:**

The calculation of spatial price indices in a country commonly referred to as ‘Regional Purchasing Power Parity’ (RPP), is important in case of large countries with heterogeneous preferences and prices between regions. While spatial price differences between countries have featured prominently in the International Comparison Project (ICP) of the United Nations that periodically calculates the ‘Purchasing Power Parity’ (PPP) of a country’s currency, spatial price differences within a country has received much less attention. This is largely due to the absence on price information on the same group of items from different regions in the country.

This paper proposes alternative procedures for estimating spatial prices that either require no spatial price information or require only limited information in the form of temporal price indices at an aggregated level of items that varies between regions. The alternative procedures differ in that while one is based on the idea of a ‘true cost of living index’ (TCLI) that is based on consumer preferences and requires demand estimation, the other is based on the Barten (1964) notion that demographic variation between households can be viewed as ‘quasi-price’. The former has the advantage in not requiring the hypothesis of ‘quasi-price’ demographic effects that has been rejected by Muellbauer (1977) on UK data.

The present evidence on spatial price differences in India, which is the most comprehensive to date since it goes down to district level, shows that both the proposed procedures have considerable potential in future applications on other data sets with limited price information. Since the procedures allowed the study to be conducted on the full basket of items, and not just the food items, the RPPs presented in this paper are more useful than the earlier RPPs for India. The sensitivity of the demand elasticities and expenditure inequalities to the use of spatial price deflators establishes the importance of the RPPs in policy applications. For example, the TCLI based spatial price deflators of nominal household expenditures show that the omission of spatial prices will lead to an overstatement of expenditure inequality since the more affluent states/districts are also the ones with higher cost of living.

Keywords: Regional Purchasing Power Parity, Quasi-price demographic variation, Generalised Entropy Inequality Index, True Cost of Living Index.

JEL Codes: C21, D63, E41, I31

¹ Professor, Economic Research Unit, Indian Statistical Institute, Kolkata, India. amita@isical.ac.in

² Professor, Department of Economics, Monash University, Melbourne, Australia. ranjan.ray@monash.edu (corresponding author)

³ Assistant Professor of Economics, Centre for Studies in Social Sciences, Calcutta. sattwiks@gmail.com

This page has been left blank intentionally.

The Calculation of Spatial Prices in the Absence of Unit Values: Alternative Methodologies with Empirical Evidence from India

1. Introduction

Prices are required in a host of comparisons that range from tracking a country's Gross Domestic Product (GDP) over time to ranking countries at a point in time based on their GDP at Purchasing Power Parity (PPP). In both cases, price indices are required for adjusting the monetary aggregates for price changes- temporal price movements in case of the former and spatial price differences between countries in case of the latter. The latter, i.e., cross-country differences in prices form the basis of the exercise in calculating Purchasing Power Parity (PPP) between different countries' currencies that is periodically undertaken by the International Comparison Project. (ICP)⁴.

At the level of the individual as well, prices are required to examine how living standards in a country have changed over time, by calculating per capita income or expenditure at constant prices in each time period, or in comparing living standards between different regions in a country, by calculating per capita income or expenditure in each province corrected for price differences between the provinces. As with the country level comparisons, while the former requires information on temporal changes in prices, the latter requires information on spatial differences in prices between provinces, or what has been referred to as 'regional price parities' (RPP). In the literature on real income comparisons at the individual level, the former has generally dominated the latter, namely, studies comparing real income or expenditure over time rather than between regions. One reason for that is the greater availability of information on movement in prices over time than across regions in the same time period. While the information on temporal changes in prices is, in case of most countries, is available by items in fine detail, this is not so in case of regional differences in prices at the same point in time. In most countries, there is no information on prices across regions and, when there is, the information is limited to, spatially differentiated, temporal changes in prices at the aggregate country level, from which we can work out spatial prices indices at the level of all items, but not at the level of individual items. At the cross-country level, the ICP does not publish within country price information, and this makes the estimated PPP of a country's currency difficult

⁴ World Bank (2015)

to interpret in the context of a heterogeneous country where the purchasing power of the currency unit is likely to vary sharply between provinces.

India, which is the subject of this study, is a rare exception (see Government of India (2010)) where the temporal price indices at item level are differentiated between states⁵, allowing calculation of item wise spatial price indices but such information is limited to only 5 highly aggregated item groups making them of limited use in welfare comparisons. This provides a serious bottleneck in a country of India's size and diversity, where both preferences and prices vary a great deal between the constituent states of the Indian union. Several of the states in India have a population size that is larger than, say, most of the countries in the European Union. In fact, each state in India comprises districts, several of whom are more populated than many of the smaller countries, and intra state differences in preferences between districts can be quite large in case of many of the Northern Indian states. For example, in a state such as Bihar, which borders West Bengal in the east and Uttar Pradesh in the west, there are likely to be significant differences in preferences and prices between the eastern and western districts of Bihar that are no less than that between the smaller states of the Indian union.

Evidence on spatial prices differences in large countries, though restricted to prices of food items, is contained in, for example, Coondoo, Majumder and Ray (2004), Coondoo, Majumder and Chattopadhyay (2011), Majumder, Ray and Sinha (2012, 2015a) for India, Deaton and Dupriez (2011) for India and Brazil, Aten and Menezes (2002) for Brazil, and Gibson, Le and Kim (2017) for Vietnam. Majumder, Ray and Sinha (2015b) have explored the implication of allowing spatial price differences within countries for the calculation of PPP between countries in the bilateral country context of India and Vietnam. These studies are part of a recent tradition that seeks to overcome the absence of detailed item wise information on prices by using unit values by dividing expenditures by quantities at household level obtained from the unit records in the household expenditure surveys. Other examples of use of unit values include Cox and Wohlgenant (1986), Deaton (1988), Kedir (2005) and McKelvey (2011). This tradition, however, has the significant limitation of being restricted to food items since the required expenditure and quantity information is only available for such items. Note, also, that India is a rare example of a country providing both expenditure and quantity information at household level in its budget surveys, albeit on food items only, that even many developed countries do not. Moreover, unit values are unsatisfactory proxies for prices, as they are not exogenously

⁵ See <https://data.gov.in/resources/state-level-consumer-price-index-ruralurban-upto-april-2018>.

given and can reflect consumer choice. This may lead to inconsistencies in the estimated price effects due to the omission of quality effects and that of household characteristics on the unit values. Also, for a number of commodities like the services, for example, unit values may be difficult to tabulate. Yet, for reasons explained above spatial price indices within countries are required for both cross country and intra country comparisons.

This paper addresses the above issue by proposing and implementing alternative procedures that allow calculation of spatial price indices within a country (India in the present case), without requiring any price information either in the form of item wise prices across states (that are rarely available) or unit values (restricted to food items, if available). The alternative procedures only require published item wise Consumer Price Indices (CPIs) and disaggregated household level information on expenditure by items and household characteristics that are available in the unit records of household surveys. The informational requirements for the proposed procedures are, therefore, quite minimal and are easily satisfied in case of a large number of countries, both developed and developing countries. While the empirical implementation of the proposed procedures in this study is restricted to India, the positive experience reported later suggests considerable potential for application in any country that has household level expenditure information on items and household characteristics. The more disaggregated the breakdown of expenditures on items the better will be the implementation of the proposed procedures.

In the Indian context, this is the first study that reports spatial price indices not only at the level of the states with respect to all India, split between rural and urban areas, but also goes down to the district level in each state. To our knowledge, such an exercise has not been attempted before.⁶ The usefulness of the procedures is illustrated by reporting two applications of the spatial price indices. One is the calculation of price and expenditure elasticities from demand systems estimation that incorporates spatial price variation down to the district level and the other is the calculation of spatial price deflated expenditure inequality for India that is decomposed into inequalities between and within states for variation in prices both at the state and district level. In case of each application, the study provides evidence in support of RPP

⁶ In a recent paper, Gómez- Tello et al. (2018) used information from bulletins published by the *Instituto de Reformas Sociales* between 1910 and 1920 for 22 items, and estimated provincial price levels in Spain for the whole period with a time-adjusted Country product Dummy (CPD) model.

by showing that the results are quite different between the nominal expenditure values and those deflated by the spatial prices.

The rest of the paper is organised as follows. The procedures are briefly described in Section 2. The data is described in Section 3. The estimated spatial prices are reported and discussed in Section 4. The two applications are reported in Section 5, which is divided into two subsections. Section 5A reports the estimated price and expenditure elasticities and compares them between those obtained using the nominal expenditure values with those obtained from the alternative procedures for estimating spatial prices. Section 5B presents the results on expenditure inequalities and their decompositions. The paper concludes with Section 6.

2. The Alternative Procedures for Estimating Spatial Prices

2.1 Spatial Price Index as a True Cost of Living Index

The first of the procedures for estimating spatial prices that do not require unit values was proposed by Coondoo, Majumder and Chattopadhyay (CMC) (2011) and can be briefly described as follows.

The methodology is based on the fact that a spatial price index can be viewed as a True Cost of Living Index that is defined below. The general cost function underlying the Rank 3 Quadratic Logarithmic (QL) systems, (e.g., the Quadratic Almost Ideal Demand System (QAIDS) of Banks, Blundell and Lewbel(1997) and the Generalized Almost Ideal Demand System (GAIDS) of Lancaster and Ray(1998)) is of the form:

$$C(u, p) = a(p) \cdot \exp\left(\frac{b(p)}{(1/\ln u) - \lambda(p)}\right), \quad (2.1)$$

where p is the price vector, $a(p)$ is a homogeneous function of degree one in prices, $b(p)$ and $\lambda(p)$ are homogeneous functions of degree zero in prices, and u denotes the level of utility. The budget share functions corresponding to the cost function (2.1) are of the form

$$w_i = a_i(p) + b_i(p) \ln\left(\frac{x}{a(p)}\right) + \frac{\lambda_i(p)}{b(p)} \left(\ln\frac{x}{a(p)}\right)^2, \quad (2.2)$$

where x denotes nominal per capita expenditure and i denotes item of expenditure.

The corresponding True Cost of Living Index (TCLI) in logarithmic form comparing price situation p^1 with price situation p^0 is given by

$$\ln P(p^1, p^0, u^*) = [\ln a(p^1) - \ln a(p^0)] + \left[\frac{b(p^1)}{\frac{1}{\ln u^*} - \lambda(p^1)} - \frac{b(p^0)}{\frac{1}{\ln u^*} - \lambda(p^0)} \right], \quad (2.3)$$

where u^* is the reference utility level. Note that while “price situation” refers to the prices in a given year in temporal comparisons of prices and welfare, and in the spatial context of this study, it refers to the prices prevailing in a particular region, i.e., state/ province. The first term of the R.H.S. of (2.3) is the logarithm of the basic index (measuring the cost of living index at some minimum benchmark utility level) and the second term is the logarithm of the marginal index. Note that for $p^1 = \theta p^0, \theta > 0$, $a(p^1) = \theta a(p^0)$, so that the basic index takes a value θ and hence, may be interpreted as that component of TCLI that captures the effect of uniform or average inflation on the cost of living. On the other hand, for $p^1 = \theta p^0, \theta > 0$, $b(p^1) = b(p^0)$ and $\lambda(p^1) = \lambda(p^0)$, the marginal index takes a value of unity. Hence, the marginal index may be interpreted as the other component of TCLI that captures the effect of changes in the relative price structure.

The CMC Procedure in detail

The procedure for estimating TCLI's (spatial prices) for R regions⁷, taking region 0 as base⁸, involves three stages.

In the first stage, a set of item-specific Engel curves relating budget shares to the logarithm of income are estimated for each region $r = 0, 1, 2 \dots R$ as follows.

$$w_{ij}^r = a_i^r + b_i^r \ln x_j^r + c_i^r (\ln x_j^r)^2 + \varepsilon_{ij}^r, \quad (2.4)$$

i denotes item, j denotes household, ε_{ij}^r is a random disturbance term and a_i^r, b_i^r, c_i^r are parameters that contain the price information on item i in region r .

In the second stage $a(p^r), r = 0, 1, 2 \dots, R$ is estimated from the following equation obtained by equating equations (2.2) and (2.4):

$$\hat{b}_i^r - \hat{b}_i^0 = \ln a(p^0)(2\hat{c}_i^0) - \ln a(p^r)(2\hat{c}_i^r) + e_i^r; \quad r = 1, 2, \dots, R \quad (2.5)$$

Here e_i^r is a composite error term, which is a linear combination of the individual errors of estimation of the parameters a_i^r, b_i^r, c_i^r and p^0 denotes the price vector of the base region.

⁷ The ‘region’ can be a State or a District.

⁸ In the calculations reported later, we take All-India as the base region, 0.

In the third stage $b(p^r)$ and $\lambda(p^r)$, $r = 1, 2, \dots, R$ are estimated, using the normalization $b(p^0) = \lambda(p^0) = 1$ for the base region, from the following regression equation⁹:

$$\frac{1}{\ln\left(\frac{x_j^r}{a(p^r)}\right)} = \frac{1}{b(p^r)} \left(\frac{1}{\ln\frac{x_j^0}{a(p^0)}} + 1 \right) - \frac{\lambda(p^r)}{b(p^r)} + \text{error}. \quad (2.6)$$

The money metric utility u_j^0 of a household of the base region that has nominal per capita income x_j^0 ($= C(u_j^0, p^0)$) is given by:

$$\frac{1}{\ln u_j^0} = \frac{1}{\ln\frac{x_j^0}{a(p^0)}} + 1. \quad (2.7)$$

Using these, the TCLI's are estimated for a given reference level of utility of the base region. It may be emphasized that $a(p^r)$, $b(p^r)$ and $\lambda(p^r)$ are estimated as composite variables and no explicit algebraic forms for these functions are assumed. However, as already noted, being based on single equation Engel curves, the issue of price induced substitution effect among commodities is ignored. To incorporate such substitution among the items in the calculation of spatial prices, we need to estimate complete demand systems that require specification of functional forms for $a(p^r)$, $b(p^r)$ and $\lambda(p^r)$ which in turn require prices for estimation.

2.2 Pseudo Unit Values

The alternative procedure for estimating spatial prices in the absence of unit values or price information at the item level is due to Lewbel (1989). Unlike Coondoo, Majumder and Chattopadhyay (CMC) (2011), the Lewbel procedure is not based on the 'True Cost of Living Index' and does not require any explicit specification of consumer preferences, but like CMC it does not require price information nor the use of unit values. As described below, the Lewbel procedure is based on the concept of generalised Barten (1964) equivalence scales, where the generalisation allows the scales to depend on the exact mix of goods that comprise each group of items, as well as on demographic variables. The Lewbel procedure exploits the variation in household size and composition in a single household expenditure survey data to construct what Atella, Menon and Perali (2004) call pseudo unit values (PUVs) that can be used as proxy for the missing prices. One of the contributions of our study is to extend the Lewbel procedure

⁹The regression set up arises because $\widehat{a(p^r)}$ and $\widehat{a(p^0)}$ are estimated values.

by showing how the PUVs can be used to calculate spatial price indices in the context of a large heterogeneous country such as India.

The Lewbel procedure has been applied in the Italian context by Atella, Menon and Perali (2004) (APM). They use the Lewbel method to derive the PUVs, \hat{P} , and then show how \hat{P} can be combined with the regional price index, P_R to obtain the regional PUVs, \widehat{P}_R . APM illustrate the usefulness of the Lewbel procedure by demonstrating that the PUVs are reasonably close proxies of the true price information. We explain below how the regional PUVs can form the basis of the spatial price index.

The Lewbel procedure in detail¹⁰

Lewbel's (1989) proposed method exploits the demographic information included in generalized "within-group" equivalence scales. These are defined as the ratio of the group sub-utility function of a reference household, estimated without price variation, in place of "between-group" price variation. The method relies on the assumption that the original utility function is homothetically separable and "within group" sub-utility functions are Cobb-Douglas.

Consider a separable utility function $U(u_1(q_1, d), \dots, u_n(q_n, d))$, where $U(u_1, \dots, u_n)$ is the "between-group" utility function and $u_i(q_i, d)$ is the "within-group" sub-utility function, and d denotes the vector of household characteristics. The index $i=1, \dots, n$ denotes the aggregate commodity groups, while n_i is the total number of goods q comprising group i . The vector of demographic characteristics, d , affects $U(\cdot)$ through the direct effects on the within-group sub-utility function. Let us define the group equivalence scale $M_i(q, d)$ as

$$M_i(q, d) = \frac{u_i(q_i, d)}{u_i(q_i, d^h)} \quad (2.8)$$

where d^h describes the demographic profile of a reference household. Define a quantity index for group i as $Q_i(u_i, d^h)$ and rewrite the between-group utility function as:

$$U(u_1, \dots, u_n) = U\left(\frac{Q_1}{M_1}, \dots, \frac{Q_n}{M_n}\right). \quad (2.9)$$

(2.9) is formally analogous to Barten's (1964) procedure for introducing demographic variables into the utility function. Defining the price index for item group i as $P_i = Y_i^h / Q$ where Y_i^h is

¹⁰ The description of the Lewbel procedure follows closely Section 2.2 in Atella, Menon and Perali (2004).

expenditure on item group i by the reference household. Barten's utility function implies the following share demands for each household:

$$W_i = H_i (P_1 M_1, \dots, P_n M_n, Y) \quad (2.10)$$

This takes the form of $W_i^h = H_i (P_1, \dots, P_n, Y^h)$ for the reference household h , with the equivalence scales $M_i = 1$. The further assumption of homothetic separability admits two-stage budgeting and implies the existence of indirect sub-utility functions V_i such that $P_i = V_i (p_i, d^h)$. By analogy with the definition of group equivalence scales in utility space, it follows that:

$$M_i = \frac{V_i (p_i, d)}{V_i (p_i, d^h)} \quad (2.11)$$

and $V_i = M_i P_i$. Therefore, when demands are homothetically separable, each item group scale depends only on relative prices within group i and on d , given that homothetic separability implies strong separability.

Maximisation of $u_i(q_i, d)$ subject to the expenditure $p_i q_i = Y_i$ gives the budget share of an individual good $w_{ij} = h_{ij} (p_i, d, Y_i)$. For homothetically separable demands, the budget shares do not depend on expenditure and integrate back in a simple fashion to $V_i = M_i P_i$. This information can be used at the between-group level in place of price data to estimate $W_i = H_i(V_1, \dots, V_n, Y)$.

Under the assumption that the sub-group utility functions can be represented in a Cobb-Douglas form, with parameters specified as functions of demographic variables alone as follows:

$$F_i (q_i, d) = k_i \prod_{j=1}^{n_i} q_{ij}^{m_{ij}(d)} , \quad (2.12)$$

Then, the budget shares correspond to the demographic demand functions

$$w_{ij} = h_{ij} (p_i, d) = m_{ij} (d) \quad (2.13)$$

with

$$\sum_{j=1}^n w_{ij} (d) = \sum_{j=1}^n m_{ij} (d) = 1. \quad (2.14)$$

The implied indirect utility function is:

$$V_i(p_i, d) = M_i P_i = \frac{1}{k_i} \prod_{j=1}^{n_i} \left(\frac{p_{ij}}{m_{ij}}\right)^{m_{ij}(d)} \quad (2.15)$$

with

$$k_i(d) = \prod_{j=1}^{n_i} m_{ij}(d^h)^{-m_{ij}(d^h)} \quad (2.16)$$

$k_i(d)$ is a scaling function depending only on the choice of the reference demographic levels.

These results a simple procedure to estimate price variation in survey data without quantity information. Jointly estimate the m_{ij} equations and the fitted shares using the stochastic specification, $\widehat{w}_{ij} = \widehat{h}_{ij} = m_{ij}(d) + \varepsilon_{ij}$ where ε is a spherical error term for the within-group budget shares. Then, further assuming with no loss of information that $p_{ij} = P_i = 1$ for all i and j , price information can be obtained from demographic information alone by using (2.13) and (2.14):

$$M_i P_i = M_i = \frac{1}{\widehat{k}_i} \prod_{j=1}^{n_i} \left(\frac{1}{\widehat{m}_{ij}} \right)^{\widehat{m}_{ij}(d)} = \frac{1}{\widehat{k}_i} \prod_{j=1}^{n_i} m_{ij}^{-m_{ij}} \quad (2.17)$$

$$\widehat{k}_i(d) = \prod_{j=1}^{n_i} m_{ij}(\widehat{d}^h)^{m_{ij}(\widehat{d}^h)} \quad (2.18)$$

by treating M_i as price data.

Atella, Menon and Perali (2004) now formally define the PUV s as:

$$\widehat{P}_i = M_i P_i = M_i = \frac{1}{\widehat{k}_i} \prod_{j=1}^{n_i} w_{ij}^{-w_{ij}}, \quad (2.19)$$

where \widehat{k}_i is the average of the subgroup expenditure for the i th group's budget share.

The PUV is an index that can be compared to actual unit values after normalization of the actual unit values, choosing the value of a specific household as a numeraire. The index \widehat{P}_i summarises the cross section variability of prices that can be added to spatially varying price indexes to resemble unit values expressed in index form. For PUVs to look like the actual unit values, the PUV index has to be transformed into levels.

From the item wise PUVs for each household that one obtains on application of the Lewbel procedure as explained above, one can proceed to calculate the spatial price index for each region treating the PUVs as proxy for the item wise prices or unit values. There are two alternative procedures to calculate the spatial price index of region r , with respect to all India treated as numeraire, from the PUVs. The first is the Household Regional Product Dummy (HRPD) model which was introduced in Coondoo, Majumder and Ray (2004) and has been extended recently in Majumder and Ray (2017). The second is the application of the Fisher price index to the PUVs to obtain the RPPs. Both the alternative procedures that convert the Lewbel based PUVs to RPP h implemented in this study.

The HRPD¹¹ model is given as follows:

The basic premise of the approach is the concept of quality equation due to Prais and Houthakker (1971) in which the price/unit value for a commodity paid by a household is taken to measure the quality of the commodity group consumed and hence the price/unit value is postulated to be an increasing function of the level of living of the household.

A direct extension of the Country Product Dummy (CPD) model due to Summers (1973) to incorporate this would be

$$p_{jrht} = \alpha_j + \beta_r + \delta_t + \theta y_{rht} + \varepsilon_{jrht}. \quad (2.20)$$

Here p_{jrht} denotes the natural logarithm of the nominal price/unit value for the j -th commodity ($j=1,2,\dots,N$) paid by the h -th sample household of region r ($r=0,1,2,\dots,R$) at time t ($t=1,2,\dots,T$). y_{rht} denotes the natural logarithm of the nominal per capita income/ per capita expenditure (PCE) of the h -th sample household in region r , at time t , α_j, β_r and δ_t capture the commodity effect, region effect and time effect, respectively. However, in so far as a broad measure of a household's level of living, *ceteris paribus*, is the effective per capita income/PCE, PCE and household demographics should be the basic explanatory variables of the price equation to be estimated on the basis of household level data. Majumder and Ray (2017), therefore, extend this model by introducing household demographics. Further, all the parameters are made time varying and the regional effect is incorporated through a formulation of both the price/unit value of individual commodities and PCE in real terms.

The model is given by

$$p_{jrht} = \alpha_{jt}^* + \phi_{jrt} + \sum_{i=1}^4 \delta_{jit}^* n_{irht} + (\lambda_{jt}^* + \eta_{jrt}^*) y_{rht} + \varepsilon_{jrht}. \quad (2.21)$$

α_{jt}^* captures the pure commodity-time effect, which is the intercept in the numeraire region for item j at time t , ϕ_{jrt} captures the interaction between time and region and hence $\alpha_{jt}^* + \phi_{jrt}$ is the region specific intercept at time t . Thus, $\exp(\phi_{jrt})$ is the price relative of commodity j for region r ($\neq 0$) with the numeraire region taken as the base. δ_{jit}^* 's are the slopes with respect to demographic variables (same for all regions), λ_{jt}^* is the overall income slope (slope in the numeraire region) at time t , η_{jrt}^* captures the differential slope component of each region and

¹¹ The reader is referred to Majumder and Ray (2017) for more details.

hence $\lambda_{jt}^* + \eta_{jrt}^*$ is the region specific income slope at time t . Note that this model (i.e., equation (2.2)) reduces to the basic CPD model for time t when $\phi_{jrt} = \phi_{jt}$ for all j, t ; $\eta_{jrt}^* = 0$ for all j, r and t , and $\lambda_{jt}^* = 0$ for all j, t . Here n_{irht} denotes the number of household members of the i -th age-sex category present in the h -th sample household in region r , at time t , $i=1,2,3,4$ denote adult male, adult female, male child and female child categories, respectively, and ε_{jrht} denotes the random equation disturbance term. Also, note that the term involving the demographic variables does not affect the basic structure of the CPD model.

An alternative way of interpreting the model is as follows. The same equation can be written in the form of Coondoo et al. (2004) formulation, as

$$p_{jrht} - \pi_{rt} = \alpha_{jt} + \sum_{i=1}^4 \delta_{ijt} n_{irht} + (\lambda_{jt} + \eta_{jrt})(y_{rht} - \pi_{rt}) + \varepsilon_{jrht}. \quad (2.22)$$

α_{jt} , δ_{ijt} , λ_{jt} , η_{jrt} and π_{rt} are the parameters of the model. In principle π_{rt} 's may be interpreted as *the natural logarithm of the value of a reference basket of commodities purchased at the prices of region r in time t* . The left hand side of eq. (2.22) thus measures the logarithm of the price/unit value paid in real terms and $(y_{rht} - \pi_{rt})$ on the right hand side of (2.22) measures the logarithm of real PCE. The parameters $(\pi_{rt} - \pi_{0t})$, $r = 1, 2, \dots, R$; $t = 1, 2, \dots, T$, thus denote a set of logarithmic price index numbers for individual regions measuring the regional price level relative to that of the reference *numeraire* region ($r = 0$) at time t and the spatial price index is given by the formula $\exp(\pi_{rt} - \pi_{0t})$. In the estimations reported below, we use the PUVs as prices in equations (2.20) - (2.22) and the spatial price in region r is estimated directly from equation (2.22). Note, however, that Coondoo, Majumder and Ray (2004) estimated π_{rt} s in two stages as follows.

Equating (2.21) and (2.22) yields

$$\delta_{jit}^* = \delta_{ijt}, \quad \lambda_{jt}^* = \lambda_{jt}, \quad \eta_{jrt}^* = \eta_{jrt} \quad (2.23)$$

and

$$\begin{aligned} \phi_{jrt} &= \alpha_{jt} - \alpha_{jt}^* + (1 - \lambda_{jt} - \eta_{jrt})\pi_{rt} \\ \text{Or, } \phi_{jrt} &= (1 - \lambda_{jt} - \eta_{jrt})\pi_{rt} - (1 - \lambda_{jt})\pi_{0t}. \end{aligned} \quad (2.24)$$

Equation (2.21) constituted the first stage and equation and equation (2.24) constituted the second stage equation.

It may be noted that the 2nd stage equation (2.24) can be written as (Majumder and Ray, 2017)

$$\sqrt{w_{jt}} \log(p_{jrt}^*) = \sum_{r=1}^R \sqrt{w_{jt}} \pi_{rt} I_r + \sqrt{w_{jt}} \pi_{0t} + u_{jrt}, \quad (2.25)$$

where I_r is the region dummy, $p_{jrt}^* = (e^{\phi_{jrt}})^{\frac{1}{(\lambda_{jt}-1)}}$ and $w_{jt} = \frac{(\lambda_{jt}-1)^2}{\sum_j (\lambda_{jt}-1)^2}$.

This is of the form of the weighted CPD model, application of which yields purchasing power parities and international prices that are equivalent to those arising out of the Rao-system for multilateral comparisons (Rao, 2005).

It may be mentioned here that, as this study is based on a single time period, the time subscript t is suppressed in the following discussions.

As mentioned above, in this paper, we estimate equation (2.22) in one step using non-linear least squares method. Since our data set is very large, we have aggregated the data on all states combined into percentile groups to produce "All-India" data, which we denote as region 0 and add "all India" as a region. Then, we obtain $(\hat{\pi}_r, r = 0, 1, 2, \dots, R)$ as parameter estimates and use the expression $exp(\pi_r - \pi_0)$ to get the spatial price of region r with All-India as the numeraire. The resulting spatial price estimates have been referred to as HRPD (Lewbel) in the tables below.

This study has been conducted both at the level of states and at the level of districts. Since there are too many districts in India, the application of the HRPD model proved computationally quite complex at the district level. The alternative that has been followed at the district level is the application of the Fisher price index to the PUVs with the numeraire region, 0, All-India, treated analogously to the base year, and the comparison district, r , treated as the given year in the conventional use of the Fisher price index. The resulting spatial prices are referred to as Fisher (Lewbel) index in the tables below.

3. Data Description

In this study we use data from two sources, viz., (i) Consumption expenditure for detailed 278 items and demographic information¹², contained in the household level records of the 66th (July, 2009 - June, 2010) and 68th (July, 2011- June, 2012) rounds of India's National Sample Surveys (NSS), for all states and Union Territories of India (rural and urban), and (ii) State-sector wise

¹² The demographic information used in this study is the number of adults and number of children in the household.

Consumer Price Indices (CPI) for 5 broad item groups for 2011-12 with respect to the base period ($t_0 = 2010$), published by the Ministry of Statistics and Programme Implementation, Government of India (2010). The detailed 278 items provided in NSS data have been aggregated into the following five item groups to match the groups of available CPIs: (i) Food and Beverage, (ii) Clothing and Footwear, (iii) Housing and Rent, (iv) Fuel and Light and (v) Miscellaneous. The CMC procedure based on the TCLI was also applied to a more disaggregated 32 item classification of household expenditure but the results were very close to those reported later.

The state/district level TCLIs have been computed using the methodology described in section 2.2. To obtain the item wise TCLI based spatial price indices with All-India as base for the 68th round, the item wise CPIs corresponding to the 68th round (with 66th round as base) have been multiplied by the state/district level TCLIs (All-India=1) and the expenditure level of the 66th Round. For the Lewbel procedure, the item wise PUVs have been computed as per the procedure described in section 2.2. While the state level indices are computed using both the HRPD framework and Fisher's formula, the district level indices are Fisher indices computed from the item wise PUVs.¹³

4. Estimates of Spatial Prices

The estimates of spatial prices for all the major states¹⁴ (with respect to All-India =1.0) have been presented in Table 1 with the three left hand columns reporting the estimates in the rural areas and the three right hand columns reporting the corresponding estimates in the urban areas. The corresponding spatial prices for the 'Other States/ Union Territories' are presented in Table 1A. A comparison between the columns provides evidence of the sensitivity of the spatial price estimate to the procedure used to calculate it. The estimates of spatial prices obtained using the TCLI based methodology of Coondoo et al. (2011) provide evidence of considerable heterogeneity in prices across the major states of India, but the evidence is less overwhelming in case of the alternative Lewbel variants. The spread on either side of 1.0 is much larger in case of the TCLI based procedure than under the Lewbel procedure. This could possibly be

¹³ It may be mentioned that CPI for "Housing and Rent" is not available in the rural sector.

¹⁴ The corresponding spatial price estimates for districts have been presented in Appendix Tables A1 (based on the TCLI procedure) and A2 (based on the Lewbel (Fisher) procedure).

due to the greater role played by preferences in case of TCLI than under Lewbel. In a country of India's size and diversity in preferences between the states, this could explain the greater spread in the spatial prices from applying the Coondoo et al. (2011) procedure than under Lewbel (1989). There is no clear regional pattern in the nature of spatial heterogeneity in prices. Note, however, that the spatial price estimates obtained using the Coondoo et al. (2011) procedure are quite similar between the rural and urban areas. Note, also, that the Lewbel variants yield spatial prices that are much closer to one another than those using the TCLI based procedure. This can be explained by the fact that both the Lewbel variants, namely, the Fisher (Lewbel) index and the HRPD (Lewbel) index are based on the same set of PUVs used as proxy for prices.

To test for uniformity of spatial variation in prices across price indices computed using different methods, a nonparametric Levene's test was performed pairwise between the three indices. Table 2 presents the results. With the exception of the urban sector, where the Fisher and the HRPD index are in agreement with each other, the hypothesis of identical ranking of states between the alternative indices is rejected in all the other cases. Note, however, that as observed above, the magnitude of the Levene's test statistic confirms that HRPD and Fisher based rankings are closer to one another than that based on the TCLI.

Further evidence on the sensitivity of the state rankings to the incorporation of regional price differentials via the use of spatial price deflators in the real expenditure comparisons, and to the spatial price used in the comparison, is provided in Table 3, which reports the Spearman rank correlations between the state rankings in the 68th NSS round under alternative spatial price deflators used to capture movements in spatial prices. These also include the case where no deflator is used, namely, what has been referred to as "nominal" in the table. The off-diagonal elements in the first row and the first column show the sensitivity of the state rankings to the incorporation of spatial prices in comparison with nominal expenditure based ranking. Consistent with our earlier discussion, the use of the TCLI based Coondoo et al. (2011) spatial price deflators makes a significant difference to the state rankings on per capita real (i.e. spatial price deflated) expenditure compared to that under nominal per capita expenditure. This result holds in both rural and urban sectors. In contrast, neither the Fisher (Lewbel) index nor the HRPD (Lewbel) index makes a significant change to the state rankings based on nominal expenditures with the pairwise Spearman correlation coefficients quite close to 1.0.

While the spatial prices at district level have been presented in the Appendix (Tables A1 and A2), the Levene's test statistics and Spearman's correlation coefficient estimates at the district level have been presented in Tables 4 and 5, respectively. As found for state level prices, Levene's test of hypothesis of uniformity of spatial variation in district level prices between the TCLI based and Fisher price indices (Table 4) is rejected in both rural and urban sectors. In Table 5, in the urban sector, the results are similar to the results reported in Table 3, that is, the use of the TCLI based Coondoo et al. (2011) spatial price deflators make a significant difference to the state rankings on per capita real (i.e. spatial price deflated) expenditure compared to that under nominal per capita expenditure, but the Fisher (Lewbel) index does not make any significant change to the state rankings based on nominal expenditures. In the rural sector, on the other hand, the TCLI based Coondoo et al. (2011) ranking shows some conformity with the other two.

Figures 1(a) - 1(b) provide the map of India with the states coloured according to the class interval in the spatial prices that the state belongs to, based on the Coondoo et al (2011) and Lewbel (Fisher) procedures. While Figure 1(a) refers to the rural areas, Figure 1(b) refers to the urban areas. The colour distribution seems near identical between the rural and urban sector in case of the Coondoo et al. (2011) procedure, but this is not so in case of the Fisher price index.

The corresponding maps at district level have been presented in Figures 2(a) and 2(b). The near identical picture between the rural and urban India in case of the Coondoo et al (2011) procedure changes somewhat once prices are allowed to vary between districts. The Northwest, for example, changes colour between the rural and urban areas once district level heterogeneity in spatial prices is allowed. The evidence on rural urban heterogeneity is stronger in case of the Fisher index. Figures 2(a) and 2(b) also show that there is lot more heterogeneity between the districts than is evident at the level of states. In case of several of the states, there is heterogeneity in spatial prices between districts within a state as seen from the change in colour within a state.

5. Applications of the Spatial Prices

5A Demand Elasticities in the presence of spatially varying prices

Table 6 presents the QAIDS budget share based expenditure elasticities of the five item groups for four major states (rural and urban), viz., Uttar Pradesh, West Bengal, Maharashtra and Tamil

Nadu¹⁵ under 3 scenarios: (i) no price variation (nominal level), (ii) with district level spatial price variation based on Fisher index and (iii) with district level spatial price variation based on Coondoo et al. TCLIs.¹⁶ While the spatially price independent elasticities (i.e. based on nominal expenditures) are different from the other two which use spatially price deflated expenditures,, there is complete agreement in terms of classification of items into ‘necessary’ and ‘luxury’ items in both sectors. In each of the 4 major states, the use of RPP as a price deflator increases the magnitude of the expenditure elasticity of the ‘Food & Beverage’ item over that based on nominal expenditures. Table 6 presents an overall picture of sensitivity of the expenditure elasticities to the use of RPPs, though the estimates are quite robust between the alternative RPP procedures. .

Table 7 presents the own price elasticities corresponding to (ii) and (iii) above. All the elasticities are negative and generally comparable between the two types of price variation across item groups. In contrast to the expenditure elasticities, the price elasticities are quite robust to the use of the RPP s.

5B Inequality and Spatial Prices

Table 8 presents the expenditure inequalities in India corresponding to nominal expenditures and expenditures deflated by both state and district level TCLI based and Fisher (Lewbel) based spatial price indices. The subgroup decomposable Generalized Entropy (GE) index (Theil, 1967; Shorrocks, 1984) (given below) has been used for this purpose.

The GE index is given by

$$GE(\alpha) = \begin{cases} \frac{1}{N\alpha(\alpha-1)} \sum_{i=1}^N \left[\left(\frac{x_i}{\bar{x}} \right)^\alpha - 1 \right], & \alpha \neq 0,1 \\ \frac{1}{N} \sum_{i=1}^N \frac{x_i}{\bar{x}} \ln \left(\frac{x_i}{\bar{x}} \right), & \alpha = 1 \\ -\frac{1}{N} \sum_{i=1}^N \ln \left(\frac{x_i}{\bar{x}} \right), & \alpha = 0. \end{cases} \quad (5.1)$$

¹⁵ These states have been chosen to represent the Northern, Eastern, Western and Southern regions of India, respectively.

¹⁶ The elasticities in (ii) and (iii) are based on demographic vector augmented complete system estimation of QAIDS.

Here N is the total number of households, x_i is the per capita total expenditure of the i th household and α is the weight given to distances between expenditures at different parts of the expenditure distribution. For lower values of α , GE is more sensitive to changes in the lower tail of the distribution, and for higher values GE is more sensitive to changes that affect the upper tail.

Along with the overall index, the ‘between state’ and ‘within state’ inequality components have also been presented in the table for nominal as well as spatial price deflated expenditures.

The main features that emerge from the table are:

- (i) In all cases the ‘within state’ component is the major contributor to the overall inequality. There is not much variation across states.
- (ii) Urban inequality is higher than the rural inequality everywhere.
- (iii) In the rural sector, compared to the nominal values, the TCLI deflated values show a reduction in inequality as a result of a sharp reduction in ‘between state’ inequality. In contrast, the Fisher Index deflated values show an increase in inequality because of an increase in both ‘between state’ and ‘within state’ values. While this feature is observed for both state level and district level price variation, the TCLI deflated values are less sensitive to the level of price variation compared to the Fisher Index deflated values.
- (iv) In the urban sector, as in the rural sector, compared to the nominal values, the TCLI deflated values show a reduction in inequality. But here this is a result of a reduction in both ‘between state’ and ‘within state’ values for both state level and district level price variation. For the Fisher index deflated values, at the state level spatial price variation there is no impact of price deflation, but at the district level variation, as in case of the rural sector, the values show an increase in inequality because of an increase in both ‘between state’ and ‘within state’ values.

To explore the reason for the asymmetric result between the TCLI and the Lewbel (Fisher) procedures on the qualitative effect on inequality of incorporating the spatial prices as expenditure deflators, we examine the relation between spatial prices in a state/district and its median level per capita household expenditure, which represents the affluence level of the state/district. Table 9 presents the correlations between the median expenditure and the three indices, namely, the TCLI, Fisher and HRPD indices at state level. Table 10 presents the corresponding correlations for TCLI and Fisher index using district level data in each of 19

major states.¹⁷ The reason for the asymmetric result comes out clearly from these tables. While the preference based TCLI reports a strong and plausible correlation suggesting that the more affluent the state/district, the higher the cost of living, the Lewbel based Fisher and HRPD indices fail to find any meaningful or statistically significant association between the two. The TCLI based result of strong correlation between affluence and prices is the intra-country analogue of the widely accepted Balassa-Samuelson effect in the cross country context, namely, that consumer prices tend to be systematically higher in the developed countries than in the less developed countries. The failure to find evidence in favour of such an effect brings out a drawback of the Lewbel procedure underlying the Fisher and HRPD indices, namely, its dependence on the Barten (1964) hypothesis of ‘quasi- price’ demographic effects. Such a hypothesis has been convincingly rejected by Muellbauer (1977) on pooled UK household expenditure survey data containing both demographic variation across households and price variation over time.

6. Conclusion

The calculation of spatial price indices in a country, commonly referred to as ‘Regional Purchasing Power Parity’ (RPP) or ‘subnational PPP’, is important in case of large countries with heterogeneous preferences and prices that vary between the geographical regions in the country. RPPs are required in a host of policy applications such as real expenditure based welfare comparisons, assessment of cost of living differences, inequality, and poverty comparisons between the different regions in the country. While spatial price differences between countries have featured prominently in the International Comparison Project (ICP) of the United Nations that periodically calculates the ‘Purchasing Power Parity’ (PPP) of a country’s currency, the topic of RPP has received much less attention. Yet, the latter has implications for the former since for the cross country PPP exercise to be meaningful, it has to be integrated with the calculation of intra-country RPP. The evidence on RPP provided in the ICP exercise has been largely limited to rural urban price differences. There is now increasing realisation that in case of most countries, especially the large countries such as Brazil, India and the USA, the concept of a single PPP for the whole country is of limited significance since the purchasing power of the country’s currency varies sharply within the country. The ICP has therefore signalled its intention to focus more on subnational PPPs in its future rounds. The

¹⁷ Note that HRPD index was not computed at the district level.

need to focus on subnational PPPs has become imperative with countries such as India and China joining the ICP.

The limited evidence on RPP is largely due to the absence on price information on the same group of items from different regions in the country. Whatever evidence on spatial price differences within a country that does exist is based on unit values of items calculated by dividing household expenditures by quantities obtained from the unit records of the household expenditure surveys. Since such information, where available, is limited to food items, the evidence on the spatial price differences in the form of RPP is of limited use in the context of the complete basket of items consumed. India is a rare example of a country, which provides both expenditure and quantity information on food items in its surveys and, consequently, much of the literature on RPP of food items is on India. Moreover, unit values are unsatisfactory proxies of prices since they reflect consumer choice, and suffer from quality heterogeneity in the same item between households that severely biases the estimated RPP as a measure of spatial price differences.

The motivation of the present study is both methodological and empirical. It proposes alternative procedures for estimating spatial prices or RPP that either require no spatial price information at all or require only limited information in the form of temporal price indices at an aggregated level of items that varies between regions. The latter is available in most countries, including India, which is the subject of the empirical application of the alternative procedures. The alternative procedures differ in that while one is based on the idea of a ‘true cost of living index’ (TCLI) that is based on consumer preferences and requires demand estimation, the other is based on demographic variation between households and the notion that such variation can be viewed as ‘quasi-price’ following Barten (1964). The results suggest that, between the two, the TCLI based procedure is the preferred one since it does not rely on the strong behavioural assumption of ‘quasi-price’ demographic effects that has been rejected by Muellbauer (1977).

The empirical evidence on India provided in this paper is significant for, principally, the following reasons. First, the evidence on spatial price differences in India shows that both the proposed procedures have considerable potential in future applications on other data sets. The limited information required by the procedures makes their wide application a realistic and attractive possibility. Second, since the procedures allow the study to be conducted on the full

basket of items for which the expenditure information at household level is available, and not just the food items, the RPPs presented in this paper are of greater use in policy applications than the earlier RPPs for India. Third, the selected applications of the estimated spatial prices, one in estimating demand elasticities and the other in calculating expenditure inequalities, show the importance of spatial prices by confirming the sensitivity of the elasticity and inequality estimates to the inclusion or omission of spatial price differences between regions. Fourth, this is the most comprehensive exercise to date of estimating spatial prices in the context of India by providing evidence not only at the state level but also even down to the district level. An interesting result in this context is that spatial price differences between different districts in a state are often larger than that between the states of the Indian union. Fifth, the use of a decomposable inequality measure helped in establishing the result that much of the expenditure inequality between households is within a state than between states. This result is robust between the alternative spatial price procedures, and adds to the importance of calculating spatial prices down to the district level. Finally, the estimated spatial prices extend the Balassa-Samuelson effect in the international context to the subnational context of Indian states and districts by confirming that the more affluent a state or district, the higher is its cost of living. .

Notwithstanding the considerable potential of the proposed procedures in future estimations of RPPs that this study demonstrates, they cannot take the place of real price information from different regions in the country. The central message of this study is two-fold: (a) statistical agencies should embark on a country wide program of collecting regional price information on a wide variety of items at a disaggregated level, and (b) until such information becomes publicly available the proposed procedures can be used to estimate spatial prices covering a larger group of items than just food items. In case of most countries, the collection of regional prices can be coordinated with the ICP exercise on a global scale. The subject of spatial prices within a country, or RPP, needs much greater attention than it has received to date. The present study provides a strong case for further research into RPP.

References

Atella, V, Menon, M and Perali, F. (2004), 'Estimation of Unit Values in Cross Sections without Quantity Information and Implications for Demand and Welfare Analysis', in C. Dagum and G. Ferrari (eds.), *Household Behaviour, Equivalence Scales, Welfare and Poverty*, Physica-Verlag, Heidelberg, 195-220.

Aten, B. and Menezes, T. (2002), 'Poverty Price Levels: An Application to Brazilian Metropolitan Areas', Conference on the International Comparison Program, March 11–15, 2002, World Bank, Washington, D.C.

Banks, J., Blundell, R. and Lewbel, A. (1997), 'Quadratic Engel Curves and Consumer Demand', *Review of Economics and Statistics*, 79, 527–539.

Barten, A. P. (1964), 'Family Composition, Prices and Expenditure Patterns'. In: P. E. Hart, G. Mills and J. K. Whitaker, (eds.) *Econometric Analysis for National Economic Planning*. London: Butterworths, 277–92.

Coondoo, D., Majumder, A. and Chattopdhyay, S. (2011), 'Estimating Spatial Consumer Price Indices through Engel Curve Analysis', *Review of Income and Wealth*, 57(1), 138–155.

Coondoo, D., Majumder, A. and Ray, R. (2004), 'A method of calculating regional consumer price differentials with illustrative evidence from India', *Review of Income and Wealth*, 50(1), 51–68.

Cox, T. L. and Wohlgenant, M. K. (1986), 'Prices and Quality Effects in Cross-Sectional Demand Analysis', *American Journal of Agricultural Economics*, 68(4), 908–19.

Deaton, A. S. (1988), 'Quality, Quantity and Spatial Variation of Price', *American Economic Review*, 78, 418–430.

Deaton, A. and Dupriez, O. (2011), 'Spatial Price Differences within Large Countries', Working Paper 1321, Woodrow Wilson School of Public and International Affairs, Princeton University

Gibson, J., Le, T and Kim, B. (2017), 'Prices, Engel Curves, and Time-Space Deflation: Impacts on Poverty and Inequality in Vietnam', *World Bank Economic Review*, 31, 504-530.

Gómez- Tello, A., Díez- Minguela, A., Martínez- Galarraga, J. and Tirado, D. A. (2018), 'Regional Prices in Early Twentieth- Century Spain: A Country Product Dummy Approach', *Cliometrica*, <https://doi.org/10.1007/s11698-018-0175-3>

Government of India (2010), *Manual on Consumer Price Index 2010*, Ministry of Statistics and Programme Implementation, Central Statistics Office, New Delhi.

Kedir, A. M. (2005), 'Estimation of Own and Cross Price Elasticities using Unit Values: Econometric Issues and Evidence from Urban Ethiopia', *Journal of African Economies*, 14(1), 1–20.

Lancaster, G. and Ray, R. (1998), 'Comparison of Alternative Models of Household Equivalence Scales: The Australian Evidence on Unit Record Data', *Economic Record*, 74, 1–14.

Lewbel, A. (1989), 'Identification and Estimation of Equivalence Scales under Weak Separability', *Review of Economic Studies*, 56, 311-316.

Majumder, A. and Ray, R. (2017), 'Estimates of Spatial Prices in India and Their Sensitivity to Alternative Estimation Methods and Choice of Commodities', *Social Indicators Research*, 131, 145-167.

Majumder, A., Ray, R. and Sinha, K. (2012), 'The Calculation of Rural–Urban Food Price Differentials From Unit Values in Household Expenditure Surveys: A New Procedure and Comparison with Existing Methods', *American Journal of Agricultural Economics*, 94(5), 1218–1235.

Majumder, A., Ray, R. and Sinha, K. (2015a), 'Spatial Comparisons of Prices and Expenditure in a Heterogeneous Country: Methodology with Application to India', *Macroeconomic Dynamics*, 19, 931-989.

Majumder, A., Ray, R. and Sinha, K. (2015b), 'Estimating Purchasing Power Parities From Household Expenditure Data Using Complete Demand Systems with Application to Living Standards Comparison: India and Vietnam', *Review of Income and Wealth*, 61, 302-328.

McKelvey, C. (2011), 'Price, Unit Value and Quantity Demanded', *Journal of Development Economics*, 95, 157–69.

Muellbauer, J. (1977), 'Testing the Barten Model of Household Composition Effects and the Cost of Children', *Economic Journal*, 87, 460-487.

Prais, S. J. and Houthakker, H. S. (1971), *The Analysis of Family Budgets*, 2nd edition, Cambridge University Press, Cambridge.

Rao, D. S. P. (2005), 'On the Equivalence of Weighted Country-Product-Dummy (CPD) Method and the Rao-System for Multilateral Comparisons', *Review of Income and Wealth*, 51 (4), 571-580.

Shorrocks, A.F. (1984), 'Inequality Decomposition by Population Subgroups', *Econometrica*, 52, 1369-1385.

Summers, R. (1973), 'International Price Comparisons Based upon Incomplete Data', *Review of Income and Wealth*, 19(1), 1-16.

Theil, H. (1967), *Economics and Information Theory* (North-Holland, Amsterdam).

World Bank. (2015), *Purchasing Power Parities and the Real Size of World Economies: A Comprehensive Report of the 2011 International Comparison Program*. Washington, DC: World Bank.

Table 1: Spatial Price Indices for 19 Major States (All-India =1): NSS 68th Round

Major States	Rural			Urban		
	Coondoo et al. (2011)	Fisher (Lewbel)	HRPD (Lewbel)	Coondoo et al. (2011)	Fisher (Lewbel)	HRPD (Lewbel)
Andhra Pradesh	1.199	1.097	0.958	1.039	1.052	0.992
Assam	0.856	1.120	1.092	0.799	1.025	1.018
Bihar	0.803	1.136	1.241	0.653	1.005	0.958
Chattisgarh	0.694	1.259	1.337	0.655	0.894	0.907
Gujarat	1.106	1.154	0.998	1.043	0.995	0.973
Haryana	1.607	1.174	1.053	1.378	1.030	0.999
Himachal Pradesh	1.433	1.087	0.924	1.417	0.984	1.028
Jharkhand	0.731	1.073	1.099	0.805	0.964	0.995
Karnataka	1.093	1.107	0.980	1.120	1.167	1.053
Kerala	1.655	0.997	0.898	1.148	1.038	0.994
Madhya Pradesh	0.798	1.063	1.049	0.770	0.970	0.917
Maharashtra	1.108	1.075	0.956	1.193	1.093	1.002
Orissa	0.712	1.116	1.223	0.721	1.025	1.038
Punjab	1.638	1.078	0.926	1.135	1.001	1.011
Rajasthan	1.173	1.130	0.986	1.038	0.984	0.951
Tamil Nadu	1.145	1.104	0.957	0.946	1.036	0.961
Uttar Pradesh	0.846	1.042	0.996	0.747	1.004	0.965
Uttaranchal	1.288	1.070	0.926	1.005	0.980	1.003
West Bengal	0.914	1.091	1.105	0.947	1.029	0.994

**Table 1A: Spatial Price Indices for Other States/ Union Territories (All-India =1):
NSS 68th Round**

Other States/ Union Territories	Rural			Urban		
	Coondoo et al. (2011)	Fisher (Lewbel)	HRPD (Lewbel)	Coondoo et al. (2011)	Fisher (Lewbel)	HRPD (Lewbel)
A & N Islands	2.111	1.159	1.034	1.823	1.089	1.035
Arunachal Pradesh	1.136	0.960	0.920	0.934	0.961	1.007
Chandigarh	2.159	1.109	1.053	1.246	1.039	0.997
D & N Haveli	0.823	0.957	1.213	1.203	1.236	1.117
Daman & Diu	2.172	1.232	1.107	0.939	1.175	1.113
Delhi	2.028	1.348	1.081	1.478	1.176	1.080
Goa	1.851	1.123	0.935	1.233	1.025	0.986
Jammu & Kashmir	1.298	1.122	0.957	0.963	0.929	0.940
Lakshadweep	2.174	1.294	1.043	1.171	1.027	1.085
Manipur	1.134	0.998	0.915	0.637	0.954	0.928
Meghalaya	1.105	1.312	1.160	1.066	1.187	1.102
Mizoram	1.068	1.205	1.006	0.947	1.119	1.028
Nagaland	1.538	1.101	0.983	0.966	0.975	1.039
Pondicherry	1.749	1.313	1.018	1.180	1.096	1.022
Sikkim	1.184	1.113	1.104	1.086	1.090	1.032
Tripura	0.926	1.213	0.996	0.823	1.073	1.182

**Table 2: Testing for spatial homogeneity (State level price indices):
Pairwise nonparametric Levene's test for Major States: NSS 68th round**

Levene's test between	F-statistic (d.f: 1,36)	
	Rural	Urban
Coondoo et al. (2011) index and Fisher Index	25.603* (0.000)	23.747* (0.000)
Fisher Index and HRPD Index	9.257* (0.004)	0.745 (0.394)
Coondoo et al. (2011) index and HRPD	12.566* (0.001)	28.438* (0.000)

Note: Figures in parentheses are p-values. *: $p < 0.005$

Table 3: Rank Correlation Coefficient (Spearman’s Rho) among Nominal and Spatial Price deflated (State level) Real Incomes of Major States: NSS 68th Round: Rural and Urban

Rural \ Urban	Nominal	Deflated by Coondoo et al. (2011) index	Deflated by Fisher Index	Deflated by HRPD Index
Nominal		-0.095 (0.700)	0.919* (0.000)	0.946* (0.000)
Deflated by Coondoo et al. (2011) index	0.242 (0.318)		0.095 (0.700)	0.109 (0.658)
Deflated by Fisher Index	0.984* (0.000)	0.149 (0.542)		0.958* (0.000)
Deflated by HRPD Index	0.989* (0.000)	0.174 (0.477)	0.996* (0.000)	

Note: Figures in parentheses are p-values. *: p < 0.005

Table 4: Testing for Spatial Homogeneity (District level price indices): Pairwise nonparametric Levene’s test for Major States: NSS 68th round

Levene’s test between	F-statistic	
	Rural (d.f: 1,1050)	Urban (d.f: 1,1042)
Coondoo et al. (2011) index and Fisher Index	326.491* (0.000)	151.267* (0.000)

Note: Figures in parentheses are p-values. *: p < 0.005

Table 5: Rank Correlation Coefficient (Spearman’s Rho) among Nominal and Spatial Price deflated (District level) Real Incomes of Major States: NSS 68th Round: Rural and Urban

Rural \ Urban	Nominal	Deflated by Coondoo et al. (2011) index	Deflated by Fisher Index
Nominal		0.000 (0.997)	0.918* (0.000)
Deflated by Coondoo et al. (2011) index	0.244* (0.000)		0.052 (0.238)
Deflated by Fisher Index	0.947* (0.000)	0.260* (0.000)	

Note: Figures in parentheses are p-values. *: p < 0.005

Table 6: Expenditure Elasticities for Four Major States using District level Price Indices: NSS 68th Round: Rural and Urban

Uttar Pradesh						
Item groups	Rural			Urban		
	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices
Food & Beverage	0.581	0.930	0.893	0.557	0.818	0.828
Clothing & Footwear	0.437	0.573	0.515	0.711	0.616	0.629
Housing & Rent	1.525			2.207	1.385	1.162
Fuel & Light	0.797	0.825	0.834	0.844	0.957	0.993
Miscellaneous	2.156	1.425	1.541	1.416	1.431	1.442

West Bengal						
Item groups	Rural			Urban		
	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices
Food & Beverage	0.528	0.874	0.867	0.657	0.808	0.779
Clothing & Footwear	0.672	0.668	0.619	0.508	0.572	0.567
Housing & Rent	4.185	NA	NA	1.246	1.337	1.369
Fuel & Light	0.522	0.919	0.877	0.671	0.895	0.949
Miscellaneous	1.685	1.591	1.652	1.567	1.381	1.413

Maharashtra						
Item groups	Rural			Urban		
	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo (2011) et al. prices
Food & Beverage	0.699	0.887	0.882	0.775	0.767	0.774
Clothing & Footwear	0.446	0.648	0.667	0.662	0.565	0.589
Housing & Rent	3.080	NA	NA	1.462	1.352	1.269
Fuel & Light	0.554	0.801	0.809	0.931	0.781	0.886
Miscellaneous	1.715	1.415	1.416	1.212	1.430	1.414

Tamil Nadu						
Itemgroups	Rural			Urban		
	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	Engel	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices
Food & Beverage	0.586	0.875	0.831	0.514	0.828	0.816
Clothing & Footwear	0.207	0.567	0.508	0.425	0.635	0.556
Housing & Rent	1.765	NA	NA	1.139	1.181	1.152
Fuel & Light	0.746	0.859	0.828	0.832	0.861	0.838
Miscellaneous	1.738	1.347	1.442	1.616	1.305	1.354

**Table 7: Own-price Elasticities for Four Major States using District level Price Indices:
NSS 68th Round: Rural and Urban**

Uttar Pradesh				
Item groups	Rural		Urban	
	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices
Food & Beverage	-1.006	-1.045	-0.869	-0.990
Clothing & Footwear	-0.989	-1.170	-0.974	-1.218
Housing & Rent	NA	NA	-1.265	-1.374
Fuel & Light	-1.170	-1.363	-1.178	-1.288
Miscellaneous	-1.048	-1.118	-0.988	-1.117

West Bengal				
Item groups	Rural		Urban	
	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices
Food & Beverage	-0.885	-1.070	-0.972	-0.919
Clothing & Footwear	-1.094	-1.374	-0.735	-1.003
Housing & Rent	NA	NA	-0.993	-1.041
Fuel & Light	-1.246	-1.518	-1.101	-1.268
Miscellaneous	-0.921	-1.029	-1.178	-1.108

Maharashtra				
Item groups	Rural		Urban	
	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices
Food & Beverage	-0.918	-1.017	-0.877	-0.904
Clothing & Footwear	-0.980	-1.160	-0.572	-0.948
Housing & Rent	NA	NA	-1.169	-1.221
Fuel & Light	-1.002	-1.589	-0.998	-1.578
Miscellaneous	-1.105	-1.050	-0.933	-0.913

Tamil Nadu				
Item groups	Rural		Urban	
	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices	QAIDS with Lewbel Prices	QAIDS with Coondoo et al. (2011) prices
Food & Beverage	-0.971	-1.050	-0.921	-0.993
Clothing & Footwear	-1.100	-1.429	-0.989	-1.330
Housing & Rent	NA	NA	-1.028	-1.082
Fuel & Light	-1.235	-1.327	-0.971	-1.430
Miscellaneous	-1.007	-1.120	-1.081	-1.082

Table 8: Generalized Entropy Index and its Decomposition using State and District level Spatial Price Variation: NSS 68th Round: Rural and Urban

Inequality Based on		Rural				Urban			
		$\alpha = -1$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = -1$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Nominal Expenditure	Overall	0.190	0.175	0.217	0.529	0.323	0.266	0.302	0.513
	Between State	0.036	0.036	0.038	0.041	0.018	0.018	0.017	0.018
	Within State	0.154	0.139	0.179	0.487	0.305	0.249	0.284	0.496
State Level Spatial Price Variation									
TCLI Deflated Real Expenditure	Overall	0.155	0.143	0.174	0.358	0.301	0.255	0.292	0.492
	Between State	0.004	0.004	0.005	0.005	0.006	0.006	0.006	0.006
	Within State	0.151	0.139	0.170	0.354	0.295	0.249	0.286	0.486
Fisher Index Deflated Real Expenditure	Overall	0.231	0.208	0.260	0.712	0.326	0.268	0.304	0.520
	Between State	0.071	0.070	0.073	0.081	0.020	0.019	0.019	0.019
	Within State	0.160	0.139	0.187	0.631	0.306	0.249	0.285	0.501
District Level Spatial Price Variation									
TCLI Deflated Real Expenditure	Overall	0.155	0.146	0.177	0.387	0.273	0.233	0.265	0.437
	Between State	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005
	Within State	0.151	0.141	0.173	0.383	0.267	0.228	0.260	0.432
Fisher Index Deflated Real Expenditure	Overall	0.301	0.251	0.298	0.797	0.406	0.306	0.342	0.605
	Between State	0.068	0.067	0.069	0.077	0.023	0.023	0.023	0.023
	Within State	0.233	0.184	0.229	0.720	0.382	0.284	0.319	0.581

Table 9: Overall Correlation Coefficient between State Level Median Per Capita Total Expenditure and Spatial Price Indices: NSS 68th Round: Rural and Urban

Price Variation at	Spatial Price Index					
	TCLI		Fisher Index		HRPD Index	
	Rural	Urban	Rural	Urban	Rural	Urban
State Level	0.9962***	0.9788***	-0.0669	0.1390	-0.3384**	0.3263
District Level	0.9823***	0.9675***	-0.2637***	-0.0678	NA	NA

, * indicate levels of significance at 5% and 1% respectively.

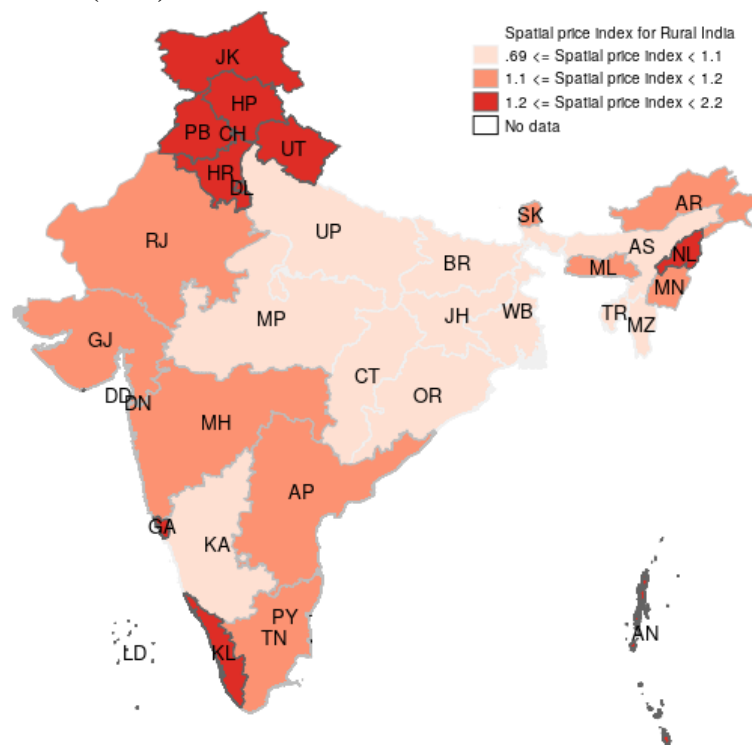
Table 10: State wise Correlation Coefficient between District Level Median Per Capita Total Expenditure and Spatial Price Indices for 19 major States: NSS 68th Round: Rural and Urban

Major States	TCLI		Fisher Index	
	Rural	Urban	Rural	Urban
Andhra Pradesh	0.978***	0.934***	-0.153	0.144
Assam	0.931***	0.918***	-0.012	-0.032
Bihar	0.934***	0.929***	-0.607***	-0.204
Chhattisgarh	0.915***	0.900***	-0.479	0.018
Gujarat	0.969***	0.974***	-0.694***	-0.224
Haryana	0.979***	0.980***	0.385	-0.357
Himachal Pradesh	0.972***	0.967***	-0.061	0.427
Jharkhand	0.897***	0.945***	-0.393	-0.121
Karnataka	0.985***	0.982***	-0.379	0.401**
Kerala	0.992***	0.956***	-0.108	0.131
Madhya Pradesh	0.961***	0.957***	-0.490***	-0.248
Maharashtra	0.907***	0.984***	-0.031	0.203
Orissa	0.952***	0.947***	-0.427**	0.243
Punjab	0.892***	0.936***	-0.185	-0.134
Rajasthan	0.965***	0.959***	-0.514***	-0.210
Tamil Nadu	0.979***	0.975***	-0.728***	-0.029
Uttar Pradesh	0.935***	0.983***	-0.459***	-0.099
Uttaranchal	0.751***	0.946***	-0.034	0.253
West Bengal	0.975***	0.970***	-0.650***	0.458**

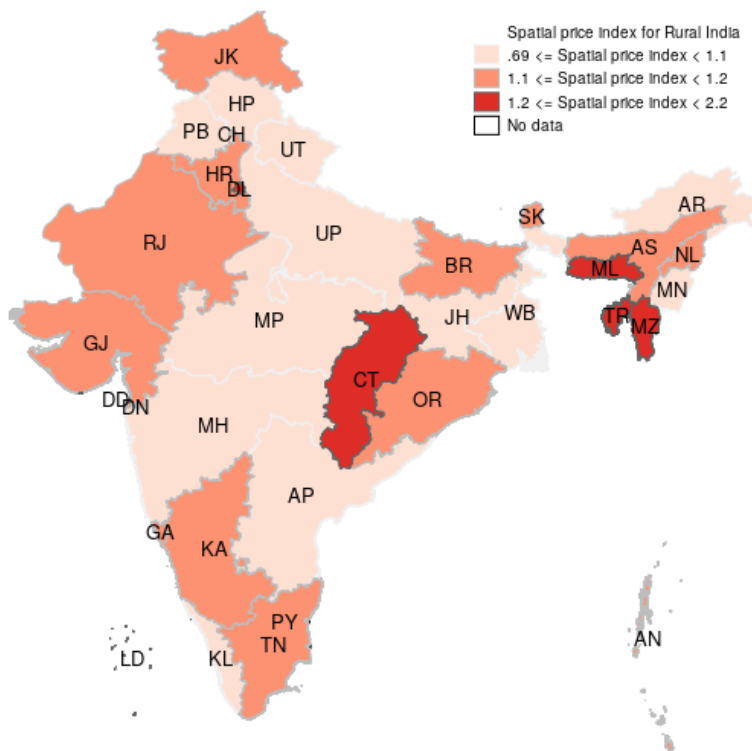
, * indicate levels of significance at 5% and 1% respectively.

Map 1(a): State level Spatial Price Indices (All-India =1): NSS 68th Round (Rural)¹⁸

Coondoo et al. (2011) Method



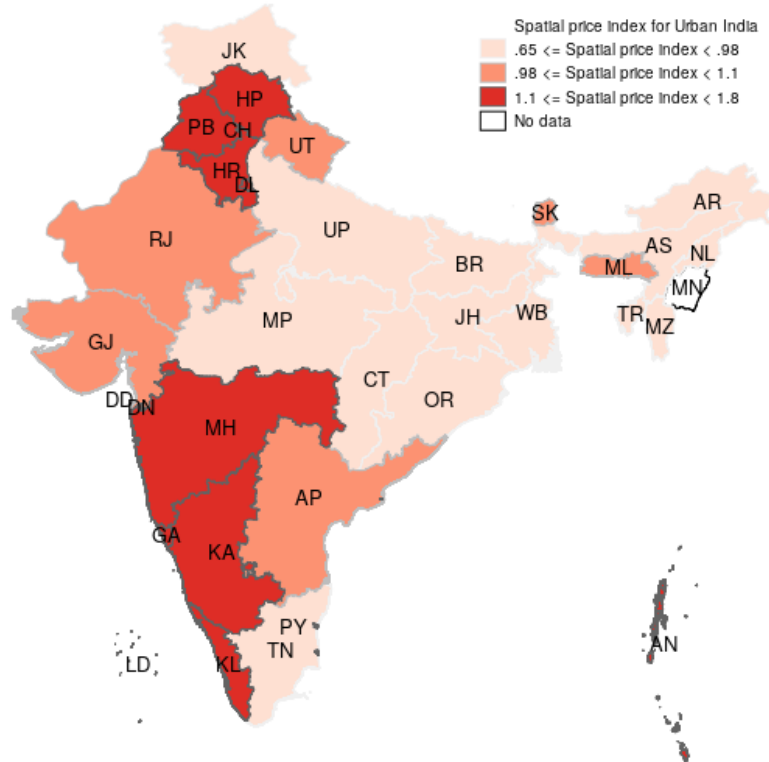
Fisher Index from Pseudo Unit Values



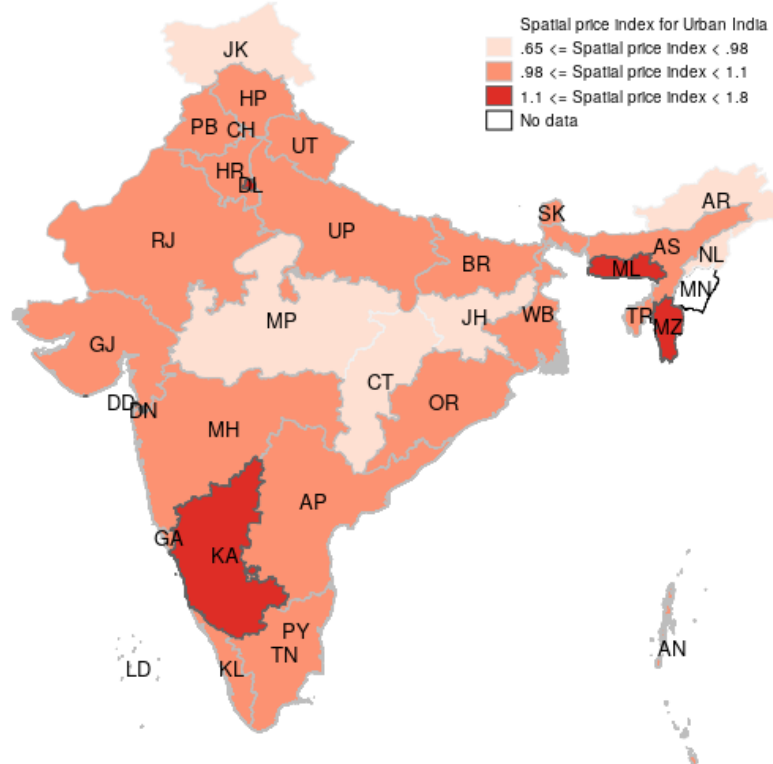
¹⁸ See Appendix Table A3 for explanation of the abbreviated names of the states.

Map 1(b): State level Spatial Price Indices (All-India =1): NSS 68th Round (Urban)¹⁹

Coondoo et al. (2011) Method



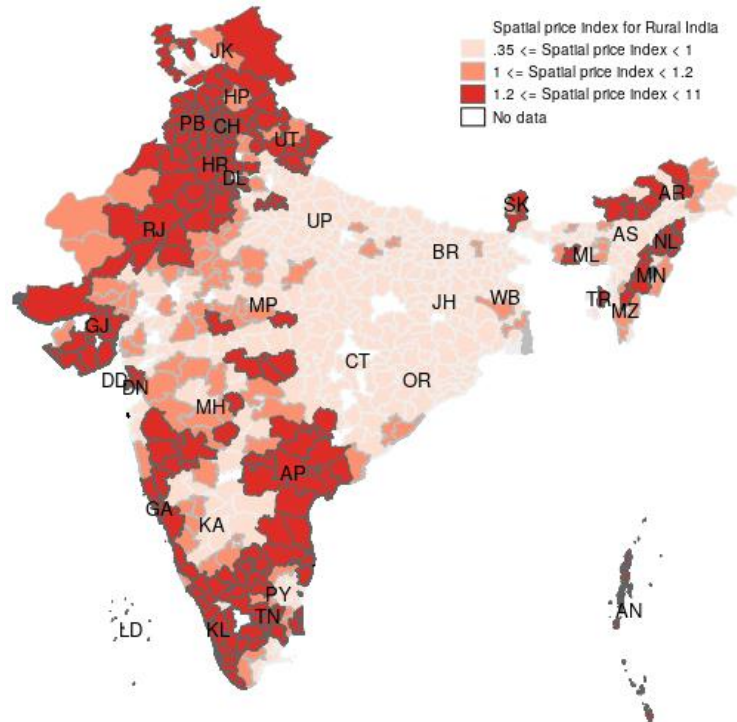
Fisher Index from Pseudo Unit Values



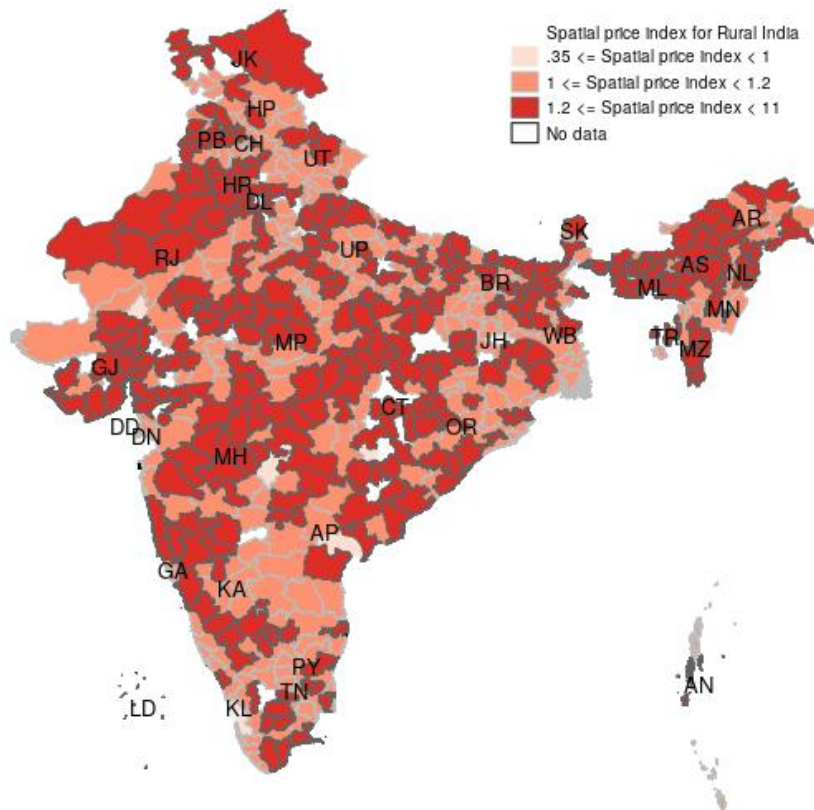
¹⁹ See Appendix Table A3 for explanation of the abbreviated names of the states.

Map 2(a): District level Spatial Price Indices (All-India =1): NSS 68th Round (Rural)²⁰

Coondoo et al. (2011) Method



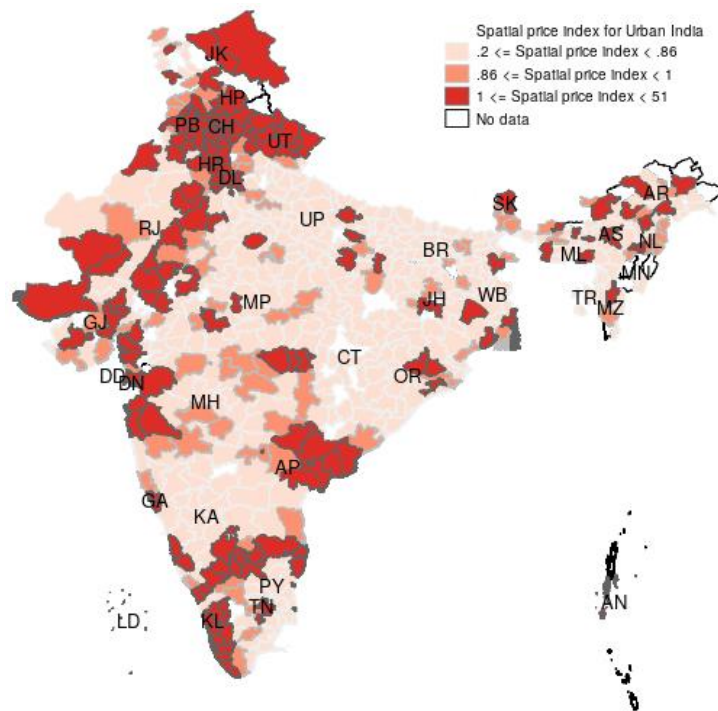
Fisher Index from Pseudo Unit Values



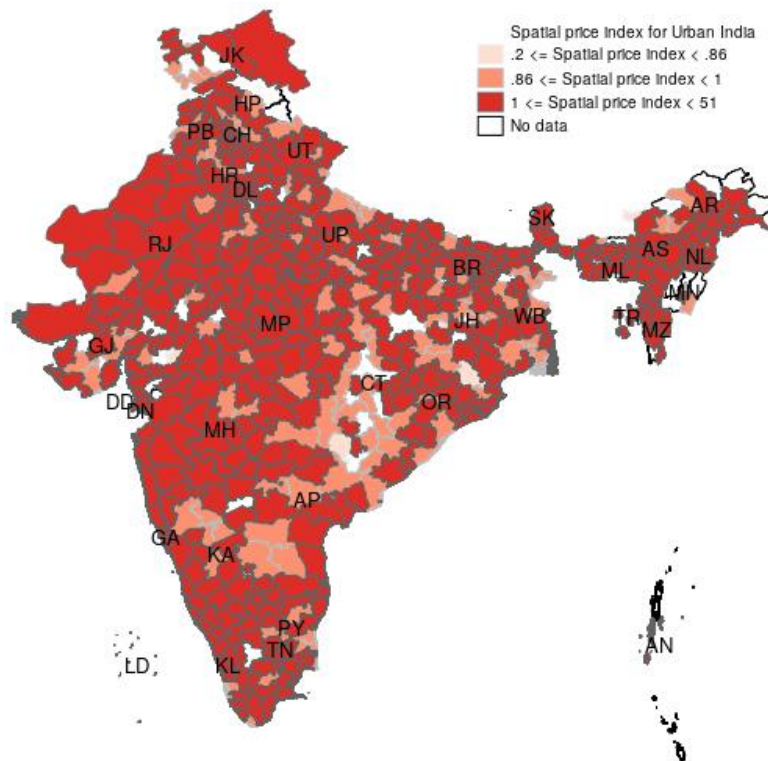
²⁰ See Appendix Table A3 for explanation of the abbreviated names of the states.

Map 2(b): District level Spatial Price Indices (All-India =1): NSS 68th Round (Urban)²¹

Coondoo et al. (2011) Method



Fisher Index from Pseudo Unit Values



²¹ See Appendix Table A3 for explanation of the abbreviated names of the states.

APPENDIX

**Table A1: District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Andhra Pradesh	1	Adilabad	1.172	0.814	Assam	1	Baksa	0.749	0.949
	2	Anantapur	0.983	0.860		2	Barpeta	0.860	0.593
	3	Chittoor	1.220	0.931		3	Bongaigaon	0.876	0.945
	4	Cuddapah	1.147	0.879		4	Cachar	0.754	0.936
	5	East Godavari	1.695	0.863		5	Chirag	1.055	0.663
	6	Guntur	1.201	0.973		6	Darrang	0.928	0.810
	7	Hyderabad & Rangar		0.938		7	Dhemaji	0.950	1.103
	8	Karimnagar	1.261	0.930		8	Dhubri	0.858	0.671
	9	Khammam	1.347	0.813		9	Dibrugarh	0.730	0.714
	10	Krishna	1.372	0.910		10	Goalpara	0.928	1.300
	11	Kurnool	1.107	0.873		11	Golaghat	0.810	0.795
	12	Mahbubnagar	1.125	0.908		12	Guwahati	1.111	0.971
	13	Medak	0.948	0.952		13	Hailakandi	0.701	0.722
	14	Nalgonda	1.136	1.007		14	Jorhat	0.940	0.613
	15	Nellore	1.351	0.734		15	Kamrup	0.970	1.192
	16	Nizamabad	1.410	0.943		16	Karbi Anglong	0.730	0.628
	17	Prakasam	1.371	0.942		17	Karimganj	0.686	1.025
	18	Rangareddi	1.287	0.812		18	Kokrajhar	0.812	0.569
	19	Srikakulam	1.214	0.730		19	Lakhimpur	0.907	0.639
	20	Visakhapatnam	1.261	0.863		20	Marigaon	0.810	0.460
	21	Vizianagaram	0.987	0.755		21	Nagaon	0.908	0.549
	22	Warangal	0.896	0.688		22	Nalbari	0.936	0.532
	23	West Godavari	1.238	0.703		23	North Cachar Hills	0.860	0.503
					24	Sibsagar	1.058	0.605	
					25	Sonitpur	0.751		
					26	Tinsukia	1.115	1.565	
					27	Udalguri	1.005	0.693	

**Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method**

State	Dist. Sl. No	District Name	Rural	Urban	State	Dist. Sl. No	District Name	Rural	Urban
Bihar	1	Araria	0.808	0.406	Bihar	30	Saharsa	0.800	0.391
	2	Arwal	0.835	0.580		31	Samastipur	0.827	0.580
	3	Aurangabad	0.761	0.329		32	Saran	0.751	0.618
	4	Banka	0.640	0.539		33	Sheikhpura	0.784	0.643
	5	Begusarai	0.929	0.543		34	Sheohar	0.798	0.552
	6	Bhagalpur	0.960	0.668		35	Sitamarhi	0.801	0.633
	7	Bhojpur	0.836	0.752		36	Siwan	0.755	0.654
	8	Buxar	0.830	0.636		37	Supaul	0.555	
	9	Darbhanga	0.766	0.628		38	Vaishali	0.691	
	10	Gaya	0.741	0.678					
	11	Gopalganj	1.013	0.996					
	12	Jamui	0.995	0.959	Chhattisgarh	1	Bastar	0.740	0.710
	13	Jehanabad	0.797	0.571		2	Bijapur	0.735	0.726
	14	Kaimur (Bhabua)	0.755	0.727		3	Bilaspur	0.778	0.593
	15	Katihar	0.819	0.564		4	Dantewada	0.670	0.683
	16	Khagaria	0.787	0.487		5	Dhamtari	0.615	0.539
	17	Kishanganj	0.937	0.713		6	Durg	0.736	0.570
	18	Lakhisarai	0.740	0.718		7	Janjgir - Champa	0.662	0.731
	19	Madhepura	0.885	0.817		8	Jashpur	0.697	0.657
	20	Madhubani	0.872	0.688		9	Kanker	0.686	0.305
	21	Munger	0.885	0.664		10	Kawardha	0.719	0.785
	22	Muzaffarpur	0.724	0.347		11	Korba	0.711	0.723
	23	Nalanda	0.697	0.507		12	Koriya	0.812	0.670
	24	Nawada	0.562	0.328		13	Mahasamund	0.753	0.467
	25	Pashchim Champaran	0.663	0.949		14	Narayanpur	0.559	0.847
	26	Patna	0.524	0.696		15	Raigarh	0.544	0.425
	27	Purba Champaran	0.684	0.522		16	Raipur	0.886	0.763
	28	Purnia	0.705	0.788		17	Rajnandgaon	0.352	0.591
	29	Rohtas	0.636	0.474		18	Surguja	1.714	0.207

Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Gujarat	1	Ahmadabad	1.536	1.138	Haryana	1	Ambala	1.281	1.216
	2	Amreli	1.135	0.740		2	Bhiwani	1.216	1.257
	3	Anand	1.154	0.685		3	Faridabad	1.103	1.072
	4	Banas Kantha	1.147	1.080		4	Fatehabad	1.518	1.136
	5	Bharuch	1.041	0.539		5	Gurgaon	1.423	1.068
	6	Bhavnagar	1.143	1.369		6	Hisar	1.515	1.087
	7	Dohad	1.397	1.143		7	Jhajjar	1.535	1.204
	8	Gandhinagar	1.504	0.925		8	Jind	1.869	1.286
	9	Jamnagar	1.637	1.057		9	Kaithal	1.780	1.076
	10	Junagadh	1.163	0.856		10	Karnal	1.413	0.855
	11	Kachchh	1.278	0.712		11	Kurukshetra	1.304	1.115
	12	Kheda	1.411	0.948		12	Mahendragarh	1.339	1.308
	13	Mahesana	1.261	0.757		13	Mewat	1.969	0.995
	14	Narmada	1.227	0.909		14	Panchkula	1.951	1.449
	15	Navsari	0.987	0.867		15	Panipat	1.970	1.158
	16	Panch Mahals	0.867	0.626		16	Rewari	1.748	0.933
	17	Patan	0.759	0.776		17	Rohtak	2.051	1.547
	18	Porbandar	0.671	0.884		18	Sirsa	2.592	2.721
	19	Rajkot	1.054	1.126		19	Sonipat	1.462	1.596
	20	Sabar Kantha	0.891	0.663		20	Yamunanagar	1.284	0.625
	21	Surat	1.043	1.116					
	22	Surendranagar	0.894	1.089					
	23	The Dangs	0.814	NA					
	24	Vadodara	1.366	0.986					
	25	Valsad	1.264	1.452					

**Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Himachal Pradesh	1	Bilaspur	1.225	1.135	Karnataka	1	Bagalkot	0.998	0.704
	2	Chamba	1.411	0.935		2	Bangalore	0.909	0.483
	3	Hamirpur	1.417			3	Bangalore Rural	1.009	0.695
	4	Kangra	1.173	1.105		4	Belgaum	0.900	0.594
	5	Kinnaur	1.165	1.012		5	Bellary	0.868	0.618
	6	Kullu	1.763	1.289		6	Bidar	0.967	0.745
	7	Lahul & Spiti	1.533	0.949		7	Bijapur	0.808	0.720
	8	Mandi	1.611	1.615		8	Chamarajanagar	1.058	0.629
	9	Shimla	1.564	1.623		9	Chikkaballapura	1.063	0.835
	10	Sirmaur	1.557	1.308		10	Chikmagalur	1.211	0.848
	11	Solan	1.708	1.598		11	Chitradurga	1.145	0.495
	12	Una	2.124			12	Dakshina Kannada	0.906	0.617
Jharkhand	1	Bokaro	0.784	0.475		13	Davanagere	0.998	0.601
	2	Chatra	0.751	0.845		14	Dharwad	0.998	0.619
	3	Deoghar	0.684	0.660		15	Gadag	1.004	0.702
	4	Dhanbad	0.743	0.991		16	Gulbarga	1.751	1.383
	5	Dumka	0.812	0.579		17	Hassan	0.948	0.717
	6	Garhwa	0.797	0.516		18	Haveri	1.019	1.009
	7	Giridih	0.745	0.978		19	Kodagu	1.309	1.206
	8	Godda	0.675	0.581		20	Kolar	2.123	1.786
	9	Gumla	0.662	0.575		21	Koppal	2.127	1.127
	10	Hazaribagh	0.574	0.586		22	Mandya	1.283	1.145
	11	Jamtara	0.704	0.626		23	Mysore	1.031	0.859
	12	Kodarma	0.956	0.607		24	Raichur	1.679	2.128
	13	Latehar	0.735	0.732		25	Ramanagar	2.140	0.852
	14	Lohardaga	0.723	1.058		26	Shimoga	1.244	1.186
	15	Pakaur	0.749	0.995		27	Tumkur	1.268	0.872
	16	Palamu	0.699	0.724		28	Udupi	1.348	1.025
	17	Pashchimi Singhbhum	0.644	0.667		29	Uttara Kannada	1.292	0.964
	18	Purbi Singhbhum	0.800	0.845					
	19	Ranchi	0.803	0.689					
	20	Sahibganj	0.650	0.580					
	21	Seraikela-kharsawan	0.725	0.631					
	22	Simdega	0.821	0.735					

Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Kerala	1	Alappuzha	1.034	0.762	Madhya Pradesh	19	Gwalior	0.981	1.194
	2	Ernakulam	1.500	0.875		20	Harda	0.701	0.583
	3	Idukki	1.420	1.021		21	Hoshangabad	1.087	0.814
	4	Kannur	1.471	1.038		22	Indore	1.045	0.909
	5	Kasaragod	1.378	0.860		23	Jabalpur	1.355	1.159
	6	Kollam	1.498	1.036		24	Jhabua	0.911	0.617
	7	Kottayam	1.802	1.072		25	Katni	1.059	0.582
	8	Kozhikode	1.887	1.421		26	Mandla	1.075	0.928
	9	Malappuram	1.887	1.406		27	Mandsaur	0.847	0.573
	10	Palakkad	2.027	1.486		28	Morena	0.775	0.579
	11	Pathanamthitta	1.726	1.006		29	Narsimhapur	0.752	0.574
	12	Thiruvananthapuram	2.035	1.252		30	Neemuch	0.934	0.736
	13	Thrissur	1.927	1.107		31	Panna	0.884	0.675
	14	Wayanad	2.011	1.654		32	Raisen	1.088	1.722
Madhya Pradesh	1	Alirajpur	0.567	0.701		33	Rajgarh	0.933	0.715
	2	Anuppur	0.770	0.700		34	Ratlam	1.198	0.496
	3	Ashoknagar	0.731	0.591		35	Rewa	0.527	0.815
	4	Balaghat	0.934	1.061		36	Sagar	0.956	0.450
	5	Barwani	0.899	0.624		37	Satna	0.757	0.638
	6	Betul	1.052	0.636		38	Sehore	0.728	0.962
	7	Bhind	0.875	0.793		39	Seoni	0.461	0.893
	8	Bhopal	0.998	0.644		40	Shahdol	1.272	0.883
	9	Burhanpur	1.013	0.791		41	Shajapur	0.588	0.465
	10	Chhatarpur	0.712	0.591		42	Sheopur	0.579	0.505
	11	Chhindwara	0.881	0.642		43	Shivpuri	0.578	0.598
	12	Damoh	0.994	0.594		44	Sidhi	0.632	0.496
	13	Datia	0.549	0.447		45	Singrauli	0.687	0.454
	14	Dewas	0.677	0.407		46	Tikamgarh	1.193	0.596
	15	Dhar	0.671	0.818		47	Ujjain	0.696	0.805
	16	Dindori	0.542	0.580		48	Umaria	0.841	0.601
	17	East Nimar	0.590	0.614		49	Vidisha	0.789	0.234
	18	Guna	0.798	0.827		50	West Nimar	0.644	0.695

**Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Maharashtra	1	Ahmadnagar	0.907	0.623	Orissa	1	Anugul	0.669	0.538
	2	Akola	1.058	0.799		2	Balangir	0.834	0.806
	3	Amravati	1.163	0.907		3	Baleshwar	0.809	0.754
	4	Aurangabad	1.015	0.707		4	Bargarh	0.593	0.519
	5	Bhandara	0.987	0.886		5	Baudh	0.612	0.618
	6	Bid	0.933	0.549		6	Bhadrak	0.638	0.734
	7	Buldana	1.228	0.913		7	Cuttack	0.593	0.373
	8	Chandrapur	1.402	0.913		8	Debagarh	0.748	0.968
	9	Dhule	1.205	1.131		9	Dhenkanal	0.726	0.522
	10	Gadchiroli	0.920	1.155		10	Gajapati	0.878	0.604
	11	Gondiya	0.987	1.271		11	Ganjam	0.770	0.960
	12	Hingoli	0.762	0.943		12	Jagatsinghapur	0.830	0.904
	13	Jalgaon	0.889	0.830		13	Jajapur	0.828	0.723
	14	Jalna	1.032	0.939		14	Jharsuguda	0.912	1.049
	15	Kolhapur	0.554	0.780		15	Kalahandi	0.999	1.049
	16	Latur	1.211	0.652		16	Kandhamal	0.794	0.784
	17	Mumbai (Suburban)	1.072	0.820		17	Kendrapara	0.809	1.004
	18	Nagpur	0.970	0.790		18	Kendujhar	0.719	0.530
	19	Nanded	0.969	0.854		19	Khordha	0.790	0.489
	20	Nandurbar	1.015	1.096		20	Koraput	0.535	0.653
	21	Nashik	0.834	1.259		21	Malkangiri	0.562	0.827
	22	Osmanabad		1.597		22	Mayurbhanj	0.507	0.506
	24	Parbhani	0.913	1.540		23	Nabarangapur	0.621	0.432
	25	Pune	1.816	1.417		24	Nayagarh	0.688	0.470
	26	Raigarh	1.062	0.834		25	Nuapada	0.660	0.521
	27	Ratnagiri	1.064	0.948		26	Puri	0.602	0.492
	28	Sangli	1.228	0.901		27	Rayagada	0.625	0.378
	29	Satara	1.164	0.706		28	Sambalpur	0.577	0.832
	30	Sindhudurg	1.367	0.869		29	Sonapur	0.654	0.195
	31	Solapur	1.398	0.982					
	32	Thane	1.190	0.855					
	33	Wardha	1.415	0.868					
	34	Washim	1.316	0.818					
	35	Yavatmal	1.242	0.755					

**Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Punjab	1	Amritsar	1.644	0.942	Rajasthan	6	Bharatpur	1.407	0.854
	2	Barnala	1.569	0.989		7	Bhilwara	1.001	0.617
	3	Bathinda	1.539	1.193		8	Bikaner	0.901	0.569
	4	Faridkot	1.536	1.266		9	Bundi	1.071	0.781
	5	Fatehgarh Sahib	1.781	1.013		10	Chittaurgarh	1.179	0.705
	6	Firozpur	1.444	1.084		11	Churu	1.320	1.120
	7	Gurdaspur	2.052	1.127		12	Dausa	1.351	1.444
	8	Hoshiarpur	1.781	1.170		13	Dhaulpur	1.473	1.023
	9	Jalandhar	1.642	1.106		14	Dungarpur	1.441	0.808
	10	Kapurthala	1.670	1.131		15	Ganganagar	1.208	0.911
	11	Ludhiana	1.391	1.059		16	Hanumangarh	1.059	0.805
	12	Mansa	1.370	0.808		17	Jaipur	1.088	1.052
	13	Moga	1.592	0.985		18	Jaisalmer	1.216	1.023
	14	Muktsar	1.528	1.361		19	Jalor	0.729	0.674
	15	Nawanshahr	1.933	1.139		20	Jhalawar	1.374	0.757
	16	Patiala	1.750	1.083		21	Jhunjhunun	1.562	1.213
	17	Rupnagar	1.978	1.363		22	Jodhpur	1.124	0.982
	18	SJAS Nagar (Mohali)	2.070	1.598		23	Karauli	1.140	0.828
	19	Sangrur	1.556	1.167		24	Kota	1.281	0.938
	20	Tarn Taran	1.672	0.989		25	Nagaur	1.060	1.003
				26		Pali	1.372	0.749	
				27		Rajsamand	1.058	0.983	
Rajasthan	1	Ajmer	1.459	1.011		28	Sawai Madhopur	1.134	1.310
	2	Alwar	1.344	0.681		29	Sikar	1.043	1.535
	3	Banswara	1.147	0.859		30	Sirohi	1.138	0.973
	4	Baran	1.270	0.798		31	Tonk	1.149	0.620
	5	Barmer	1.521	1.024		32	Udaipur	1.103	0.643

Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Tamil Nadu	1	Ariyalur	1.388	1.164	Uttaranchal	1	Almora	1.350	1.163
	2	Chennai	NA	1.410		2	Bageshwar	1.165	1.346
	3	Coimbatore	1.297	1.090		3	Chamoli	1.211	1.171
	4	Cuddalore	1.132	0.765		4	Champawat	1.159	1.674
	5	Dharmapuri	1.502	0.853		5	Dehradun	1.543	1.231
	6	Dindigul	0.984	0.644		6	Dehradun(Hills)	1.245	1.199
	7	Erode	0.596	0.530		7	Garhwal	1.237	1.300
	8	Kancheepuram	1.139	0.688		8	Hardwar	1.338	1.310
	9	Kanniyakumari	1.370	0.760		9	Nainital	1.219	1.224
	10	Karur	1.459	0.967		10	Nainital(Hills)	1.185	0.658
	11	Krishnagiri	0.989	0.769		11	Pithoragarh	1.415	0.917
	12	Madurai	1.329	1.269		12	Rudraprayag	1.382	0.733
	13	Nagapattinam	1.281	0.859		13	Tehri Garhwal	1.409	1.114
	14	Namakkal	1.331	0.910		14	Udham Singh Nagar	0.962	1.387
	15	Perambalur	1.234	1.023		15	Uttarkashi	1.677	1.048
	16	Pudukkottai	1.690	0.752	West Bengal	1	Bankura	1.215	0.884
	17	Ramanathapuram	1.164	0.713		2	Barddhaman	0.908	0.905
	18	Salem	0.754	0.460		3	Birbhum	0.851	0.714
	19	Sivaganga	1.271	0.783		4	Dakshin Dinajpur	0.758	0.784
	20	Thanjavur	1.290	0.741		5	Darjiling	0.817	0.907
	21	The Nilgiris	1.183	0.734		6	Haora	0.886	1.037
	22	Theni	1.329	0.746		7	Hugli	0.902	0.664
	23	Thiruvallur	0.884	0.709		8	Jalpaiguri	0.942	0.732
	24	Thiruvavur	1.250	0.963		9	Koch Bihar	1.002	0.789
	25	Thoothukkudi	1.201	0.718		10	Kolkata	NA	1.233
	26	Tiruchirappalli	1.063	0.699		11	Maldah	0.882	1.007
	27	Tirunelveli	0.982	0.792		12	Murshidabad	1.086	0.643
	28	Tiruvannamalai	0.933	0.639		13	Nadia	0.892	0.631
	29	Vellore	1.178	0.880		14	North 24 Parganas	0.936	1.049
	30	Viluppuram	1.680	1.001		15	Pashim Midnapur	0.750	0.650
	31	Virudhunagar	1.535	1.340		16	Purba Midnapur	0.874	0.817
					17	Puruliya	0.748	1.261	
					18	South 24 Parganas	0.985	0.989	
					19	Uttar Dinajpur	0.757	1.639	

**Table A1 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Coondoo et al. (2011) Method**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Uttar Pradesh	1	Agra	1.152	0.877	Uttar Pradesh	37	Jhansi	0.896	0.729
	2	Aligarh	1.102	0.918		38	Jyotiba Phule Nagar	0.768	0.733
	3	Allahabad	0.890	0.637		39	Kannauj	0.866	0.576
	4	Ambedkar Nagar	0.908	0.636		40	Kanpur Dehat	0.582	0.479
	5	Auraiya	0.899	0.477		41	Kanpur Nagar	0.799	0.337
	6	Azamgarh	0.877	0.818		42	Kashiramnagar	0.725	0.592
	7	Baghpat	1.648	0.860		43	Kaushambi	0.675	0.543
	8	Bahraich	1.613	0.961		44	Kheri	0.646	0.382
	9	Ballia	1.129	1.394		45	Kushinagar	0.802	1.308
	10	Balrampur	1.504	3.462		46	Lalitpur	0.678	0.324
	11	Banda	1.023	0.659		47	Lucknow	1.075	0.536
	12	Barabanki	0.921	0.900		48	Mahoba	0.668	0.376
	13	Bareilly	1.289	0.551		49	Mahrajganj	0.873	1.016
	14	Basti	0.941	0.607		50	Mainpuri	0.763	0.604
	15	Bijnor	0.901	0.591		51	Mathura	0.711	0.459
	16	Budaun	0.799	0.541		52	Mau	0.762	0.518
	17	Bulandshahar	1.204	0.981		53	Meerut	0.770	1.203
	18	Chandauli	0.698	0.419		54	Mirzapur	0.812	0.667
	19	Chitrakoot	0.854	0.546		55	Moradabad	0.651	0.588
	20	Deoria	0.909	0.625		56	Muzaffarnagar	0.734	0.462
	21	Etah	0.856	0.673		57	Pilibhit	0.653	0.642
	22	Etawah	0.873	0.514		58	Pratapgarh	0.789	0.842
	23	Faizabad	0.805	0.418		59	Rae Bareli	0.790	0.575
	24	Farrukhabad	0.833	0.650		60	Rampur	0.764	0.610
	25	Fatehpur	0.819	0.436		61	Saharanpur	0.789	0.744
	26	Firozabad	0.747	0.604		62	Sant Kabir Nagar	1.177	0.331
	27	Gautam Buddha Nagar	0.809	0.832		63	Sant Ravidas Nagar Bhadohi	0.969	0.512
	28	Ghaziabad	0.742	0.571		64	Shahjahanpur	1.029	0.989
	29	Ghazipur	0.844	0.509		65	Shrawasti	0.823	0.546
	30	Gonda	0.769	0.469		66	Siddharthnagar	0.818	1.137
	31	Gorakhpur	0.849	0.471		67	Sitapur	0.944	0.783
	32	Hamirpur	0.870	0.650		68	Sonbhadra	0.696	0.453
	33	Hardoi	0.915	0.640		69	Sultanpur	0.836	0.424
	34	Hathras	0.833	0.809		70	Unnao	0.778	0.880
	35	Jalaun	0.855	0.654		71	Varanasi	1.237	0.483
	36	Jaunpur	0.982	0.933					

**Table A2: District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Andhra Pradesh	1	Adilabad	1.286	0.926	Assam	1	Baksa	1.328	1.216
	2	Anantapur	1.339	1.305		2	Barpeta	1.352	1.167
	3	Chittoor	1.163	1.149		3	Bongaigaon	1.241	1.209
	4	Cuddapah	1.242	1.127		4	Cachar	1.339	1.201
	5	East Godavari	1.227	1.195		5	Chirag	1.360	1.205
	6	Guntur	1.252	0.971		6	Darrang	1.399	1.241
	7	Hyderabad & Rangar		1.350		7	Dhemaji	1.274	1.131
	8	Karimnagar	1.067	0.980		8	Dhubri	1.185	1.245
	9	Khammam	1.153	1.082		9	Dibrugarh	1.211	1.115
	10	Krishna	1.122	0.990		10	Goalpara	1.207	2.097
	11	Kurnool	1.208	0.865		11	Golaghat	1.208	1.908
	12	Mahbubnagar	1.227	1.050		12	Guwahati	1.213	1.078
	13	Medak	1.188	1.099		13	Hailakandi	1.301	1.097
	14	Nalgonda	1.201	0.942		14	Jorhat	1.196	1.103
	15	Nellore	1.347	1.008		15	Kamrup	1.050	1.046
	16	Nizamabad	1.170	1.002		16	Karbi Anglong	1.333	1.309
	17	Prakasam	1.258	1.369		17	Karimganj	1.161	1.162
	18	Rangareddi	0.989	1.015		18	Kokrajhar	1.267	1.151
	19	Srikakulam	1.329	1.415		19	Lakhimpur	1.257	1.193
	20	Visakhapatnam	1.182	0.972		20	Marigaon	1.066	1.062
	21	Vizianagaram	1.065	0.962		21	Nagaon	1.120	1.072
	22	Warangal	1.038	1.000		22	Nalbari	1.061	1.009
	23	West Godavari	1.093	1.078		23	North Cachar Hills	1.069	1.004
						24	Sibsagar	0.940	0.605
						25	Sonitpur	0.870	
						26	Tinsukia	1.005	1.249
						27	Udalguri	1.004	1.244

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No	District Name	Rural	Urban	State	Dist. Sl. No	District Name	Rural	Urban
Bihar	1	Araria	1.260	1.190	Bihar	30	Saharsa	1.260	1.067
	2	Arwal	1.165	0.935		31	Samastipur	1.353	1.131
	3	Aurangabad	1.736	1.200		32	Saran	1.107	1.319
	4	Banka	1.283	1.071		33	Sheikhpura	1.167	1.061
	5	Begusarai	1.221	1.099		34	Sheohar	1.117	0.918
	6	Bhagalpur	1.315	1.136		35	Sitamarhi	1.119	1.052
	7	Bhojpur	1.230	1.189		36	Siwan	1.287	1.096
	8	Buxar	1.306	1.019		37	Supaul	1.340	1.363
	9	Darbhanga	1.203	1.026		38	Vaishali	1.130	
	10	Gaya	1.296	0.999					
	11	Gopalganj	1.242	1.265					
	12	Jamui	1.186	1.059	Chhattisgarh	1	Bastar	1.410	1.240
	13	Jehanabad	1.118	1.172		2	Bijapur	1.396	1.061
	14	Kaimur (Bhabua)	1.235	1.112		3	Bilaspur	1.423	0.869
	15	Katihar	1.232	1.093		4	Dantewada	1.349	1.053
	16	Khagaria	1.213	1.039		5	Dhamtari	1.393	1.009
	17	Kishanganj	1.087	1.429		6	Durg	1.200	1.037
	18	Lakhisarai	1.386	1.646		7	Janjgir - Champa	1.197	0.954
	19	Madhepura	1.186	1.080		8	Jashpur	1.283	0.966
	20	Madhubani	1.432	1.128		9	Kanker	1.083	0.872
	21	Munger	1.346	1.063		10	Kawardha	1.103	1.081
	22	Muzaffarpur	1.572	0.936		11	Korba	1.464	0.964
	23	Nalanda	1.464	1.333		12	Koriya	1.589	1.010
	24	Nawada	1.396			13	Mahasamund	1.254	0.967
	25	Pashchim Champaran	1.097	1.113		14	Narayanpur	1.470	0.922
	26	Patna	2.350	0.981		15	Raigarh	1.327	0.964
	27	Purba Champaran	1.063	1.160		16	Raipur	1.205	1.169
	28	Purnia	1.097	0.967		17	Rajnandgaon	1.525	1.044
	29	Rohtas	1.154	0.606		18	Surguja	0.985	0.853

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Gujarat	1	Ahmadabad	1.502	1.030	Haryana	1	Ambala	1.694	1.239
	2	Amreli	1.160	1.248		2	Bhiwani	1.068	1.035
	3	Anand	1.397	1.066		3	Faridabad	1.227	1.023
	4	Banas Kantha	1.324	1.113		4	Fatehabad	1.369	1.718
	5	Bharuch	1.264	1.197		5	Gurgaon	2.031	1.282
	6	Bhavnagar	1.271	0.912		6	Hisar	1.310	1.040
	7	Dohad	1.247	0.936		7	Jhajjar	1.045	0.936
	8	Gandhinagar	1.339	1.106		8	Jind	1.396	1.125
	9	Jamnagar	1.367	0.990		9	Kaithal	1.266	0.960
	10	Junagadh	1.176	1.048		10	Karnal	1.258	1.291
	11	Kachchh	1.389	1.057		11	Kurukshetra	1.281	1.034
	12	Kheda	1.496	1.153		12	Mahendragarh	1.336	1.060
	13	Mahesana	1.318	0.975		13	Mewat	1.234	1.126
	14	Narmada	1.403	1.254		14	Panchkula	1.417	1.116
	15	Navsari	1.293	1.195		15	Panipat	1.328	1.083
	16	Panch Mahals	1.256	1.172		16	Rewari	1.389	1.007
	17	Patan	1.439	1.018		17	Rohtak	1.376	1.200
	18	Porbandar	1.265	1.283		18	Sirsa	1.495	1.224
	19	Rajkot	1.771	0.992		19	Sonipat	1.205	1.044
	20	Sabar Kantha	1.182	1.224		20	Yamunanagar	1.360	1.326
	21	Surat	1.385	1.135					
	22	Surendranagar	1.315	1.144					
	23	The Dangs	1.200	NA					
	24	Vadodara	1.294	1.054					
	25	Valsad	1.093	1.258					

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Himachal Pradesh	1	Bilaspur	1.249	1.149	Karnataka	1	Bagalkot	1.096	0.992
	2	Chamba	1.184	1.376		2	Bangalore	1.259	0.949
	3	Hamirpur	1.186	NA		3	Bangalore Rural	1.209	1.130
	4	Kangra	1.017	0.907		4	Belgaum	1.277	1.037
	5	Kinnaur	1.262	1.006		5	Bellary	1.135	1.149
	6	Kullu	1.128	1.054		6	Bidar	1.199	1.064
	7	Lahul & Spiti	1.176	0.937		7	Bijapur	1.169	0.995
	8	Mandi	1.173	0.929		8	Chamarajanagar	1.079	0.916
	9	Shimla	1.147	0.978		9	Chikkaballapura	1.429	1.113
	10	Sirmaur	1.159	0.928		10	Chikmagalur	1.126	1.085
	11	Solan	1.077	1.196		11	Chitradurga	1.213	1.068
	12	Una	1.169	NA		12	Dakshina Kannada	1.173	1.132
Jharkhand	1	Bokaro	1.005	1.313		13	Davanagere	0.998	0.601
	2	Chatra	1.153	1.401		14	Dharwad	1.074	0.966
	3	Deoghar	1.055	1.264		15	Gadag	1.187	1.029
	4	Dhanbad	1.025	0.929		16	Gulbarga	1.327	1.130
	5	Dumka	1.059	0.986		17	Hassan	1.112	1.257
	6	Garhwa	1.194	1.196		18	Haveri	1.306	1.650
	7	Giridih	1.143	1.057		19	Kodagu	1.217	1.140
	8	Godda	1.417	1.030		20	Kolar	1.425	1.339
	9	Gumla	1.147	1.112		21	Koppal	1.384	1.139
	10	Hazaribagh	1.324	1.109		22	Mandya	1.328	1.027
	11	Jamtara	1.187	0.992		23	Mysore	1.192	1.020
	12	Kodarma	1.231	0.951		24	Raichur	1.370	1.632
	13	Latehar	1.094	0.988		25	Ramanagar	1.126	1.079
	14	Lohardaga	0.982	1.134		26	Shimoga	1.196	1.037
	15	Pakaur	1.105	0.831		27	Tumkur	1.317	1.174
	16	Palamu	1.257	1.449		28	Udupi	1.126	1.067
	17	Pashchimi Singhbhum	1.271	1.046		29	Uttara Kannada	1.339	1.059
	18	Purbi Singhbhum	1.231	1.033					
	19	Ranchi	1.125	0.972					
	20	Sahibganj	1.472	0.947					
	21	Seraikela-kharsawan	1.190	1.070					
	22	Simdega	1.194	1.051					

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Kerala	1	Alappuzha	1.192	1.057	Madhya Pradesh	19	Gwalior	1.554	1.057
	2	Ernakulam	1.162	1.111		20	Harda	1.338	1.014
	3	Idukki	1.096	1.278		21	Hoshangabad	1.172	0.985
	4	Kannur	1.117	1.017		22	Indore	1.158	1.260
	5	Kasaragod	1.245	1.391		23	Jabalpur	1.166	1.032
	6	Kollam	1.127	1.130		24	Jhabua	1.430	1.016
	7	Kottayam	1.052	1.052		25	Katni	1.235	1.011
	8	Kozhikode	0.977	1.138		26	Mandla	1.046	1.096
	9	Malappuram	0.979	1.608		27	Mandsaur	1.169	1.109
	10	Palakkad	1.116	0.971		28	Morena	1.152	1.101
	11	Pathanamthitta	0.975	0.942		29	Narsimhapur	1.356	1.143
	12	Thiruvananthapuram	1.076	1.108		30	Neemuch	1.407	1.035
	13	Thrissur	1.092	1.090		31	Panna	1.209	1.233
	14	Wayanad	1.073	1.078		32	Raisen	1.229	1.268
Madhya Pradesh	1	Alirajpur	1.250	1.106		33	Rajgarh	0.933	0.715
	2	Anuppur	1.195	1.059		34	Ratlam	1.192	1.125
	3	Ashoknagar	1.235	1.263		35	Rewa	1.141	1.074
	4	Balaghat	1.354	1.107		36	Sagar	1.076	0.948
	5	Barwani	1.115	1.109		37	Satna	1.423	1.323
	6	Betul	1.185	1.013		38	Sehore	1.152	1.486
	7	Bhind	1.236	1.085		39	Seoni	1.199	1.149
	8	Bhopal	1.274	1.140		40	Shahdol	1.571	1.051
	9	Burhanpur	1.087	1.132		41	Shajapur	1.174	1.026
	10	Chhatarpur	1.160	0.961		42	Sheopur	1.495	0.995
	11	Chhindwara	1.322	1.034		43	Shivpuri	1.408	1.034
	12	Damoh	1.285	1.081		44	Sidhi	1.231	1.064
	13	Datia	1.171	1.003		45	Singrauli	1.529	1.043
	14	Dewas	1.204	0.956		46	Tikamgarh	1.405	1.152
	15	Dhar	1.262	1.139		47	Ujjain	1.271	0.973
	16	Dindori	1.244	0.994		48	Umaria	1.384	1.103
	17	East Nimar	1.241	1.024		49	Vidisha	1.403	0.841
	18	Guna	1.095	0.990		50	West Nimar	1.094	0.983

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Maharashtra	1	Ahmadnagar	1.113	1.191	Orissa	1	Anugul	0.996	1.035
	2	Akola	1.208	1.042		2	Balangir	1.361	1.093
	3	Amravati	1.073	1.173		3	Baleshwar	1.223	1.170
	4	Aurangabad	1.224	0.965		4	Bargarh	1.067	1.127
	5	Bhandara	1.270	1.168		5	Baudh	1.079	1.026
	6	Bid	1.223	0.994		6	Bhadrak	1.211	0.972
	7	Buldana	1.177	1.075		7	Cuttack	1.143	0.842
	8	Chandrapur	1.282	1.161		8	Debagarh	1.082	1.622
	9	Dhule	1.201	0.989		9	Dhenkanal	1.115	1.076
	10	Gadchiroli	1.297	1.162		10	Gajapati	1.128	1.030
	11	Gondiya	1.164	1.035		11	Ganjam	1.217	1.116
	12	Hingoli	1.356	0.965		12	Jagatsinghapur	1.170	1.890
	13	Jalgaon	1.072	1.113		13	Jajapur	1.128	1.196
	14	Jalna	1.120	1.118		14	Jharsuguda	1.175	0.973
	15	Kolhapur	1.234	1.010		15	Kalahandi	1.208	1.255
	16	Latur	0.904	1.138		16	Kandhamal	1.187	1.149
	17	Mumbai (Suburban)	1.207	1.068		17	Kendrapara	1.124	1.144
	18	Nagpur	1.276	1.251		18	Kendujhar	1.178	1.220
	19	Nanded	1.216	1.112		19	Khordha	1.292	1.071
	20	Nandurbar	1.223	1.178		20	Koraput	1.167	0.876
	21	Nashik	1.085	1.069		21	Malkangiri	1.283	1.047
	22	Osmanabad	1.167	1.150		22	Mayurbhanj	1.240	1.255
	24	Parbhani	NA	1.288		23	Nabarangapur	1.139	0.989
	25	Pune	1.141	1.212		24	Nayagarh	1.299	1.223
	26	Raigarh	1.917	1.058		25	Nuapada	1.208	1.028
	27	Ratnagiri	1.346	1.010		26	Puri	1.422	1.136
	28	Sangli	1.285	1.085		27	Rayagada	1.233	0.969
	29	Satara	1.186	1.031		28	Sambalpur	1.061	1.707
	30	Sindhudurg	1.279	1.144		29	Sonapur	1.275	0.981
	31	Solapur	1.144	1.516					
	32	Thane	1.175	1.110					
	33	Wardha	1.203	1.118					
	34	Washim	1.324	1.144					
	35	Yavatmal	1.325	1.112					

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Punjab	1	Amritsar	1.243	1.049	Rajasthan	6	Bharatpur	1.108	1.184
	2	Barnala	1.189	1.036		7	Bhilwara	1.328	0.891
	3	Bathinda	1.169	0.982		8	Bikaner	1.149	1.118
	4	Faridkot	1.225	1.085		9	Bundi	1.149	1.119
	5	Fatehgarh Sahib	1.271	1.101		10	Chittaurgarh	1.282	1.005
	6	Firozpur	1.238	1.014		11	Churu	1.222	0.998
	7	Gurdaspur	2.106	1.065		12	Dausa	1.173	1.066
	8	Hoshiarpur	1.147	1.035		13	Dhaulpur	1.221	1.054
	9	Jalandhar	1.227	1.097		14	Dungarpur	1.299	1.039
	10	Kapurthala	1.519	1.043		15	Ganganagar	1.222	1.023
	11	Ludhiana	1.242	0.977		16	Hanumangarh	1.257	1.192
	12	Mansa	1.247	1.143		17	Jaipur	1.166	1.026
	13	Moga	1.298	1.056		18	Jaisalmer	1.151	0.980
	14	Muktsar	1.059	1.005		19	Jalor	0.969	1.525
	15	Nawanshahr	1.280	0.951		20	Jhalawar	1.184	1.330
	16	Patiala	1.080	0.916		21	Jhunjhunun	1.177	1.284
	17	Rupnagar	1.147	1.131		22	Jodhpur	1.198	1.078
	18	SJAS Nagar (Mohali)	1.141	1.079		23	Karauli	1.140	1.024
	19	Sangrur	1.164	1.158		24	Kota	1.264	1.181
	20	Tarn Taran	1.274	1.169		25	Nagaur	1.229	1.019
				26		Pali	1.372	0.749	
				27		Rajsamand	1.058	0.983	
Rajasthan	1	Ajmer	1.178	1.288		28	Sawai Madhopur	1.208	1.127
	2	Alwar	1.307	1.042		29	Sikar	1.262	1.056
	3	Banswara	1.511	1.046		30	Sirohi	1.218	1.035
	4	Baran	1.332	1.001		31	Tonk	1.282	1.168
	5	Barmer	1.358	0.940		32	Udaipur	1.292	1.050

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Tamil Nadu	1	Ariyalur	1.068	1.409	Uttaranchal	1	Almora	1.339	0.997
	2	Chennai	1.250	1.136		2	Bageshwar	1.229	1.078
	3	Coimbatore	1.155	1.285		3	Chamoli	1.419	1.085
	4	Cuddalore	1.161	1.063		4	Champawat	1.159	1.082
	5	Dharmapuri	1.147	1.051		5	Dehradun	1.046	1.029
	6	Dindigul	1.156	0.923		6	Dehradun(Hills)	1.163	1.067
	7	Erode	1.255	1.037		7	Garhwal	1.118	1.157
	8	Kancheepuram	1.108	0.983		8	Hardwar	1.152	0.955
	9	Kanniyakumari	1.171	1.022		9	Nainital	1.112	1.134
	10	Karur	1.093	1.041		10	Nainital(Hills)	1.249	0.931
	11	Krishnagiri	1.162	1.066		11	Pithoragarh	1.026	1.134
	12	Madurai	1.384	1.112		12	Rudraprayag	1.165	1.000
	13	Nagapattinam	1.305	1.289		13	Tehri Garhwal	1.106	1.009
	14	Namakkal	1.390	1.097		14	Udham Singh Nagar	1.452	1.102
	15	Perambalur	1.152	1.040		15	Uttarkashi	1.260	1.163
	16	Pudukkottai	1.274	1.145	West Bengal	1	Bankura	1.249	1.468
	17	Ramanathapuram	1.254	0.989		2	Barddhaman	1.111	1.065
	18	Salem	1.197	0.997		3	Birbhum	1.264	1.009
	19	Sivaganga	1.197	0.988		4	Dakshin Dinajpur	1.166	1.115
	20	Thanjavur	1.292	1.164		5	Darjiling	1.279	0.898
	21	The Nilgiris	1.095	1.304		6	Haora	1.154	0.903
	22	Theni	1.199	1.123		7	Hugli	1.274	0.929
	23	Thiruvallur	1.139	1.049		8	Jalpaiguri	1.125	1.066
	24	Thiruvarur	1.237	0.930		9	Koch Bihar	1.147	1.037
	25	Thoothukkudi	1.441	1.104		10	Kolkata	NA	1.006
	26	Tiruchirappalli	1.160	1.032		11	Maldah	1.094	1.068
	27	Tirunelveli	1.278	1.135		12	Murshidabad	1.149	0.940
	28	Tiruvannamalai	1.214	1.088		13	Nadia	1.142	1.996
	29	Vellore	1.239	1.257		14	North 24 Parganas	1.405	1.044
	30	Viluppuram	1.141	0.965		15	Pashim Midnapur	1.258	0.955
	31	Virudhunagar	1.095	1.099		16	Purba Midnapur	1.298	0.943
						17	Puruliya	1.166	1.055
						18	South 24 Parganas	NA	0.999
						19	Uttar Dinajpur	1.061	1.484

**Table A2 (contd.): District level Spatial Price Indices for Major States (All-India =1)
NSS 68th Round: Fisher Index**

State	Dist. Sl. No.	District Name	Rural	Urban	State	Dist. Sl. No.	District Name	Rural	Urban
Uttar Pradesh	1	Agra	1.078	1.061	Uttar Pradesh	37	Jhansi	1.208	1.048
	2	Aligarh	1.195	1.109		38	Jyotiba Phule Nagar	1.349	1.048
	3	Allahabad	1.041	1.002		39	Kannauj	1.214	1.011
	4	Ambedkar Nagar	1.130	0.982		40	Kanpur Dehat	1.115	1.195
	5	Auraiya	1.132	1.013		41	Kanpur Nagar	1.258	1.118
	6	Azamgarh	1.206	1.052		42	Kashiramnagar	1.157	0.923
	7	Baghpat	1.495	1.159		43	Kaushambi	1.231	1.063
	8	Bahraich	1.219	1.914		44	Kheri	1.108	0.993
	9	Ballia	1.231	1.283		45	Kushinagar	1.174	1.366
	10	Balrampur	1.598	1.346		46	Lalitpur	1.128	1.258
	11	Banda	1.164	1.130		47	Lucknow	1.358	1.037
	12	Barabanki	1.076	1.169		48	Mahoba	1.284	1.054
	13	Bareilly	1.180	1.268		49	Mahrajganj	1.147	1.088
	14	Basti	1.182	1.154		50	Mainpuri	1.061	0.960
	15	Bijnor	1.136	1.223		51	Mathura	1.263	0.894
	16	Budaun	1.131	1.065		52	Mau	1.363	1.075
	17	Bulandshahar	0.988	1.060		53	Meerut	1.160	1.157
	18	Chandauli	1.273	1.041		54	Mirzapur	1.071	1.265
	19	Chitrakoot	1.334	1.034		55	Moradabad	1.154	0.951
	20	Deoria	1.219	0.995		56	Muzaffarnagar	1.273	0.866
	21	Etah	1.264	1.064		57	Pilibhit	1.108	1.364
	22	Etawah	1.332	1.088		58	Pratapgarh	1.170	1.069
	23	Faizabad	1.279	0.952		59	Rae Bareli	1.294	1.160
	24	Farrukhabad	1.100	1.221		60	Rampur	1.250	1.156
	25	Fatehpur	1.119	1.188		61	Saharanpur	1.252	1.038
	26	Firozabad	1.087	1.083		62	Sant Kabir Nagar	1.123	1.677
	27	Gautam Buddha Nagar	1.246	0.979		63	Sant Ravidas Nagar Bhadohi	1.218	1.565
	28	Ghaziabad	1.244	1.117		64	Shahjahanpur	1.062	1.154
	29	Ghazipur	1.360	0.994		65	Shrawasti	1.173	1.038
	30	Gonda	1.352	1.268		66	Siddharthnagar	1.245	0.931
	31	Gorakhpur	1.465	0.977		67	Sitapur	1.165	1.024
	32	Hamirpur	1.157	1.030		68	Sonbhadra	1.205	1.008
	33	Hardoi	1.071	1.151		69	Sultanpur	1.229	1.133
	34	Hathras	1.019	1.090		70	Unnao	1.215	1.173
	35	Jalaun	1.470	1.027		71	Varanasi	1.261	1.176
	36	Jaunpur	1.109	1.084					

Table A3: Names of States and their Abbreviations

Sl. No.	Name of State	Abbreviation	Sl. No	Name of State	Abbreviation
1	Andaman and Nicobar	AN	19	Madhya Pradesh	MP
2	Andhra Pradesh	AP	20	Maharashtra	MH
3	Arunachal Pradesh	AR	21	Manipur	MN
4	Assam	AS	22	Meghalaya	ML
5	Bihar	BR	23	Mizoram	MZ
6	Chandigarh	CH	24	Nagaland	NL
7	Chhattisgarh	CT	25	NCT of Delhi	DL
8	Dadra and Nagar Haveli	DN	26	Orissa	OR
9	Daman and Diu	DD	27	Puducherry	PY
10	Goa	GA	28	Punjab	PB
11	Gujarat	GJ	29	Rajasthan	RJ
12	Haryana	HR	30	Sikkim	SK
13	Himachal Pradesh	HP	31	Tamil Nadu	TN
14	Jammu and Kashmir	JK	32	Tripura	TR
15	Jharkhand	JH	33	Uttar Pradesh	UP
16	Karnataka	KA	34	Uttarakhand	UT
17	Kerala	KL	35	West Bengal	WB
18	Lakshadweep	LD			