



# City size, deprivation and other indicators of development: Evidence from India

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## ABSTRACT

In this paper extending the size-productivity framework we examine the nature of relationship between city size and the deprivation index developed at a highly disaggregate level of urban centres (city/town) on the basis of dwelling conditions, basic amenities and assets in possession. Further, the demographic and economic characteristics in relation to the deprivation index and city size are analysed in detail. Very large cities are endowed with better living conditions and infrastructural facilities, displaying lower magnitude of the index though this relationship is not very strong, suggesting the importance of other variables such as income, location and the overall level of urbanisation, impacting on the index value. Large cities experience agglomeration economies but they do not benefit all sections of the population equally, which in turn does not necessarily bring in proportionate decline in the deprivation index with a rise in city size. Further, other demographic and economic variables are examined in relation to the deprivation index and city size. Findings show Further, there is no marked improvement in these other indicators of development with increase in as city size increases. Greater intervention is called for to provide support in terms of housing, sanitation and water, and for other indicators of development to improve.

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## 1. Introduction

Why large cities can offer better living amenities and lower levels of deprivation is a less researched question. Possibly for the first time an explicit mention of cities with greater amenities being large in size is made in the study by [Combes, Duranton, Gobillon, Puga, and Roux \(2012\)](#), which is reinforced by [Glaeser, Ponzetto, and Zou \(2016\)](#), arguing that megacities can prevail due to amenities as scale overwhelm the costs of density. Why large cities are more productive has, however, been researched extensively, both in theoretical and empirical terms. And interestingly enough, this framework based on agglomeration economies can supply a rationalization, indirectly though, to the negative relationship envisaged between city size and deprivation. Defining deprivation in terms of amenities, assets and dwelling conditions (materials used for housing) this paper develops an index for each of the urban settlements in India and examines its relationship with city size. Secondly, whether improved living conditions are

also associated with better demographic and economic indicators is the other key question which this paper focuses on in detail.

Two sets of data from the population census 2011 (government of India) are considered: (a) data specific to amenities, housing quality and assets and (b) the demographic and economic data. The second set is quite limited in terms of the number of variables. Nevertheless it provides a basis to focus on some of the issues related to urban development. These two sets of data are given separately by the census authorities. Under the head housing statistics the information on households with different types of houses (materials used for construction), various living amenities and assets are reported by the office of the Registrar General (population census). On the other hand, the second set on demographic data includes sex composition, age distribution, caste composition, working persons and their classification across broad economic activities.<sup>1</sup>

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<sup>1</sup> Though the soft version of these data files is available with the census office, the variables were not reported at the level of cities/towns. For a given city/town data are reported at a disaggregated level of spatial units which had to be combined to arrive at the city specific figures.

The methodology of the study is as follows. First, based on certain attributes such as quality of housing, basic amenities and assets of the households the deprivation index at the level of cities and towns is developed. The method of factor analysis is used for developing a combined index. The details of the variables are listed in the next section. Since there are a number of indicators representing the quality of housing, access to sanitation and different types of assets, it is important to first examine the nature of association among these variables. If the results are not counter-intuitive then only the index formation is sensible and the low and high values are unambiguously interpretable. Otherwise, any increase or decrease in the index value may not represent an unequivocal change in the deprivation or wellbeing level. The lower values of the index are supposed to indicate lower levels of deprivation (or better wellbeing) while the higher values reflect a higher percentage of households without adequate amenities, assets and proper dwelling conditions, provided the variables are associated coherently. For example, if all the variables representing the poor quality of housing are inter-related positively and also bear a positive association with variables representing poor amenities and asset base of the households, it will then make sense to draw inference from the magnitude of the index.

Second, given the theoretical underpinnings that large cities are in possession of agglomeration economies we try to examine if city size can explain much of the variations in deprivation index. Our hypothesis is that city size reduces deprivation index. On the other hand, if agglomeration benefits accrue inequitably then city size and deprivation index may not unfold a strong association. The association between size and deprivation is captured through regression framework. However, other relevant variables such as per capita income, location specific characteristics and the spread of the urban areas measured on the basis of the overall level of urbanisation of the regions to which cities belong, also need to be controlled for because across space different factors other than size may be impinging on deprivation. Similarly, across low and high income regions the nature and extent of association between size and deprivation may be different which may be captured through dummies, representing unknown variables.

In the next step the relationship between deprivation index and a number of demographic and economic attributes including city size is assessed. This is again pursued on the basis of factor analysis. While the correlation matrix is the basic input to the factorial analysis the latter is considered to be appropriate as it allows the assessment of the extent of co-movement of a number of variables with precision. On a priori basis large cities are expected to correspond to better indicators as largeness not only results in economic gains but also initiates social and demographic transformations. Consequently large cities are likely to display a higher literacy rate, higher work participation rate especially among females and greater presence of economic activities which are dynamic in nature. Prevalence of higher wages in large cities can be, in part, traced back to city education and industry shocks (Duranton, 2016). Similarly, inclusiveness would require greater presence of low caste population or lower incidence of poverty for which the percentage of scheduled caste and tribe population is taken as a proxy in our analysis. The sex composition of the population or the work force is also a development indicator. The fertility behaviour which is captured through child-woman ratio in this paper, also tends to decline with city size. The details of these variables are provided in Section 4. The following statistical software has been used for the quantitative analysis: STATA.

The rest of the paper is structured as follows. Section 2 displays the analytical frame based on the existing literature. Section 3 covers the estimation of deprivation index and its relationship with city size. Section 4 examines the association between deprivation

index and other demographic and economic variables and Section 5 summarises the major findings with policy implications.

## 2. Analytical frame

The agglomeration literature building on Henderson (1974) and Sveikauskas (1975) (as surveyed in many other studies, e.g., Duranton and Puga (2001), Rosenthal and Strange (2004), and Head and Mayer (2004)) argues that firms in large cities are more productive due to the advantages that large cities enjoy from a number of factors such as indivisibilities in investment, huge infrastructure base, large market size, lower labour turn-over cost, easy information-sharing and so on. The study by Combes et al. (2012) extended it by considering an entirely different reason for the higher average productivity in larger cities. It refers to stronger selection in larger cities which would mean though there are some productivity advantages for all firms from locating in denser areas, the rewards are particularly strong for those firms that are per se more productive. In the new economic geography (NEG) literature the trade-off between increasing returns and mobility costs encourages migration and population expansion in cities. Though the modern sector in the historical sense was manufacturing, in the present context the services sector falls within its scope and firms in this sector not only supply to consumers and manufacturing firms but also serve each other (Ottaviano & Thisse, 2004). In the NEG framework of industry location (Krugman, 1991), external scale economies make people and companies more productive through the following mechanisms as pointed out by Frick and Rodríguez-Pose (2017): (a) knowledge spill-overs between workers enabling learning and spur innovation; (b) forward and backward linkages between companies, suppliers and buyers making interactions between economic actors more efficient; and (c) a pooled labor market allowing for an easier matching between firms and employees. They indicate that a high share of industries, a well-developed urban infrastructure, and an adequate level of governance effectiveness allow countries to take advantage of agglomeration benefits from larger cities. Besides, the productivity impact of metropolitan governance structures is well-documented by Ahrend et al. (2014) while estimating agglomeration benefits across five OECD countries. The difference between the NEG literature and the urban economists' approach is that the former analyzes the impact of city size or agglomeration on economic growth at the national level while the latter is concerned with the impact of city size on the productivity of urban workers at the city level though the mechanisms which determine people's productivity are similar (Castells-Quintana & Royuela, 2014). Criticising the existing literature on static agglomeration economies, Camagni, Capello, and Caragliu (2016) abandons the agglomeration-growth shortcut, and unravel the role of dynamic agglomeration economies and their determinants. The quality of the activities, the quality of production factors, the density of external linkages and co-operation networks, and the characteristics of the overall urban system in which the city is located are some of the major factors which are expected to increase productivity and long-term 'structural dynamics' processes of urban transformation (Camagni et al., 2016).

The framework of higher productivity gains in larger cities can be extended further to suggest that part of the productivity gains benefits the workers in terms of higher wages (Duranton, 2016) compared to those in small towns. Higher economic growth originating from large cities is less likely to have no percolation effect even when it is accompanied by a sizeable increase in inequality. Increased earnings may result in better living standards in terms of food as well as non-food consumption and also through enhanced investment in dwelling conditions and basic amenities.

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