

From Competitive Federalism to Competitive Sub-Federalism: Cities as Dynamos

14 CHAPTER

All through organized history, if you wanted prosperity you had to have cities. Cities are places that attract new people with new ideas.

– Jane Jacobs, author of “Cities and the Wealth of Nations”

Everyone wants decentralisation, but only until his level.

– Quote attributed to Professor Raja Chelliah

New analysis of recent data for 21 Indian cities suggests a strong correlation between the capacities—resource and people—of urban local bodies (ULBs) and their service delivery. ULBs could clearly raise more resources even allowing for constraints that straitjacket them. Technology, especially satellite imagery, can play an important role. Empowering cities will be critical but the political economy challenges from state governments are considerable, raising interesting questions for Finance Commissions. It may well be that a few successful models will provide the impetus for wider change. Cities, like states, must compete with each other to unleash dynamism. To competitive federalism India must add competitive sub-federalism.

I. INTRODUCTION

14.1 The great and perceptive documenter of cities, Jane Jacobs, argued that cities are complex, organic, humming entities that tend to defy the attempts of planners and architects to impose order. But that should not lead to fatalistic inaction because for India, urbanisation is rapidly on the rise. As recently as 1991, there were only 220 million Indians living in cities, equivalent to about one-quarter of the population. By 2011, there were no less than 380 million, living in around 8,000 cities/towns¹, at least 53 of which were home to over 1 million people. Urban Indians now form about one-third

of the population – and they produce more than three-fifths of the country’s GDP.

14.2 By all accounts, urbanisation will define the trajectory of Indian development. The exodus of rural Indians into the cities over the coming decades will pose tremendous challenges for government, particularly the municipalities who will be primarily responsible for providing the services that the new migrants – and established residents – will need. Success in overcoming these challenges will be vital if the nation is to seize the opportunities that migration to the centres of economic activity can create. But how have Indian Urban Local Bodies (ULBs)

¹ Includes 4041 statutory towns and 3892 census towns.

performed and what are the tools needed for them to succeed? This chapter attempts a preliminary assessment.

14.3 What is clear is this: just as with competition between states is becoming a powerful dynamic of change and progress, that dynamic must extend to competition between states and cities, and between cities. Cities that are entrusted with responsibilities, empowered with resources, and encumbered by accountability can become effective vehicles for unleashing dynamism so that to competitive federalism India can add, and rely on, competitive sub-federalism.

II. BACKGROUND

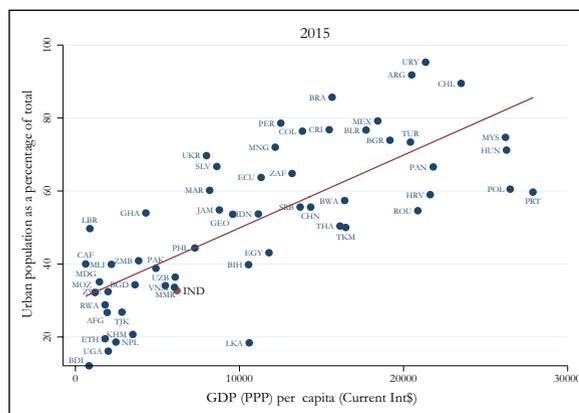
14.4 Contrary to perception, India's urbanisation rate appears to have been similar to that in other countries. Figure 1 plots the latest urbanisation rate against per capita GDP for a group of emerging and developing countries. India is not far away from the average positive relationship. Similarly the evolution of the urbanisation rate for India is also not unusual. Figure 2 plots the urbanisation rate for three countries at different levels of per capita GDP. It can be seen that countries have followed a pattern of urbanisation where the level of

urbanisation has increased with the per capita GDP. Therefore a large part of the difference in the levels of urbanisation seen between India and China can be mainly attributed to the different levels of development of each country. Contrary to perception, India and China have had very similar trends of urbanisation.

14.5 If the magnitude of Indian urbanisation is not special, the patterns of urban size seem to be, in the sense of not adhering to Zipf's Law. The law claims that the city with the largest population in any country is generally twice as large as the next-biggest; three times the size of the third biggest, and so on. In other words, the n^{th} ranked city would be $1/n^{\text{th}}$ the size of the largest city. This has been shown to hold true for many countries but not so for India.

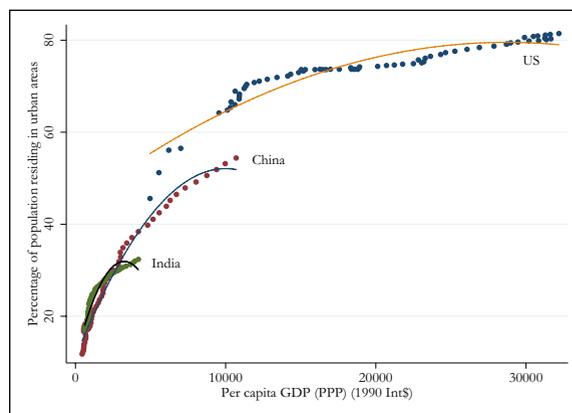
14.6 A plot between the logarithms of city rank and city population illustrates the point. Figures 3a to 3c present plots for the United States, Brazil and India, along the lines set out by Chauvin et. al. (2016). For countries where Zipf's Law holds, the plot should be a straight line with a slope coefficient of -1. The results for the US and Brazil are indeed close to this Law, as their coefficients are -1.4 and -1.28, respectively, with an R^2 around

Figure 1. Per capita GDP and Urbanisation (2015)



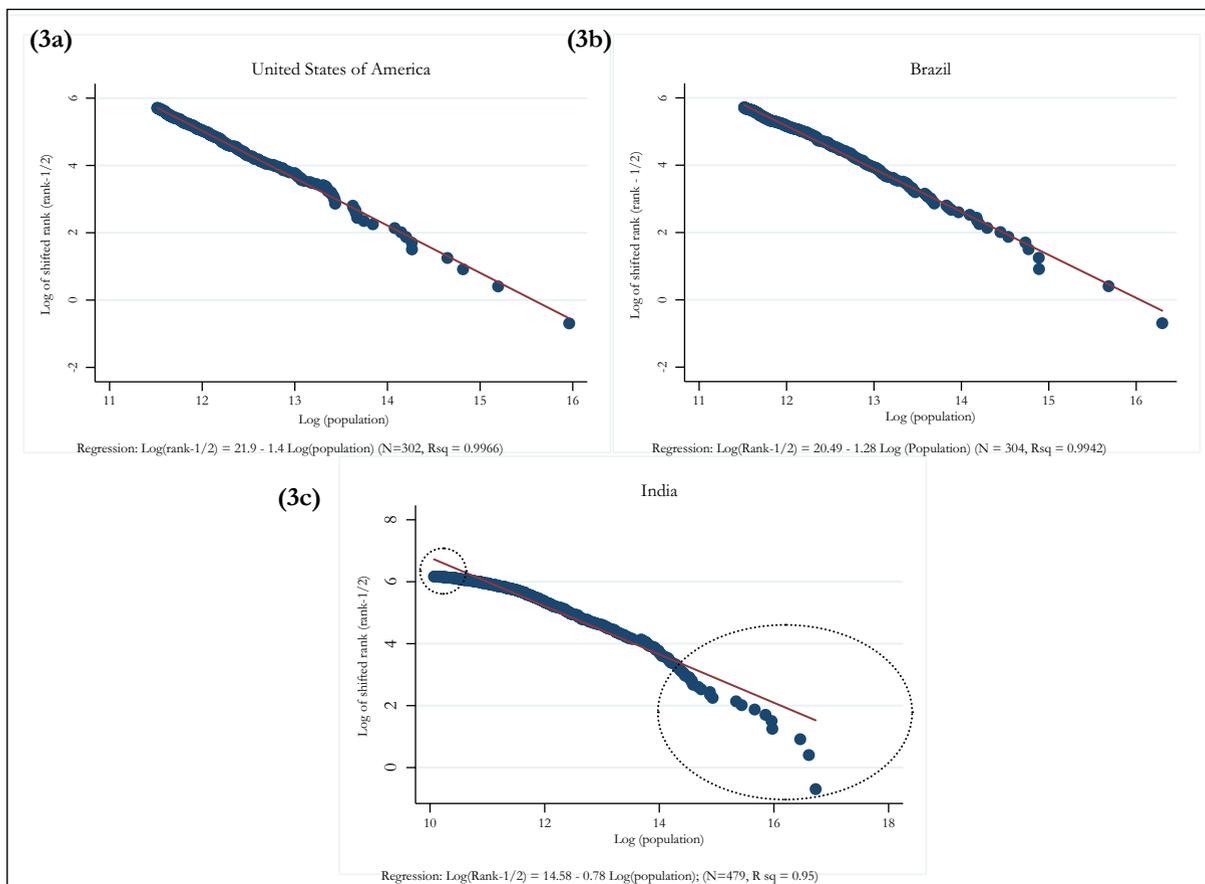
Source: World Development Indicators and United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanisation Prospects: The 2014 Revision.

Figure 2. Per capita GDP and Urbanisation



Source: Maddison Project database, Penn World Tables and United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanisation Prospects: The 2014 Revision.

Figure 3 . Zipf's Law: City/UA population and city/UA population ranks



Source: (Figure 3a to 3c): Urban Agglomeration (UA) population for India from Census 2011, City population for US and Brazil from United Nations Statistics Division, Demographic Yearbook 2015.

0.99 in both cases. But the plot for India is concave, with a slope coefficient of -0.78 and an R^2 of 0.95 . This implies that many of the smaller cities are unusually small (they lie below the line of best fit in Figure 3c). And contrary to what one might think, so are the bigger ones.

14.7 There are many reasons why the large cities are unusually small. One explanation might be that their infrastructure is overburdened. Another is that India is land-scarce relative to most countries, discouraging migration particularly because distorted land markets render rents unaffordable. By 2050, its land-to-population ratio will have declined fourfold relative to 1960, and India will be amongst the most land-scarce countries in the world (Kapoor et. al., 2014). Further mobility in India is limited by strong place-

based preferences embedded in deep social networks in India (Chauvin et. al., 2016).

14.8 In the coming years, these anomalies are likely to be rectified. That is, India's urbanisation rate should begin to converge with those in similar emerging markets, rising to 40 per cent by 2030. And much of this urban growth is likely to take place in the bigger cities, possibly bringing the country in line with Zipf's Law. This will create opportunities – and risks.

III. KEY CHALLENGES

14.9 The primary responsibility for development of urban areas lies with the state governments and the municipal corporations, municipalities and *nagar panchayats*, commonly known as urban local bodies (ULBs). These levels of government face

major and inextricably linked problems: poor governance capacities, large infrastructure deficits and inadequate finances.

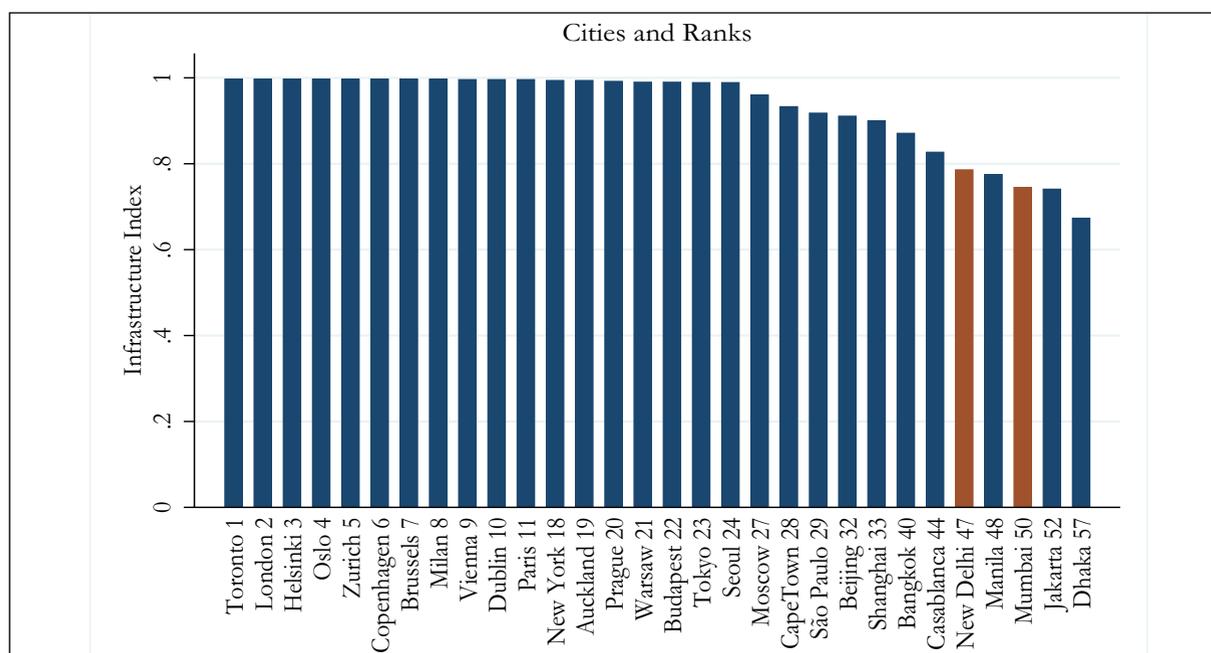
14.10 ULBs face a governance challenge. Cities do not have a single city government or a local self-government, leading to functional overlap. There is a significant fragmentation of responsibilities and service delivery across a gamut of institutions: the municipality, state departments (Police, PWD, Health, Education, Housing), and parastatal agencies or civic agencies reporting directly to the state government. There are also transparency/accountability issues, as even the most basic information on ULBs finances and quality of basic services is lacking in many cities, in part because implementation of the e-Governance initiative has also not been uniform.

14.11 The second challenge is the infrastructure deficit. Productive and healthy urbanisation requires efficient public services delivery. But every Indian city faces serious challenges related to water and power supply, waste management, public

transport, education, healthcare, safety, and pollution. To take just one example, the report based on the WHO/UNICEF Joint Monitoring Programme (2015 report and MDG Assessment) on access to sanitation shows that as against the Millennium Development Goal (MDG) target of 77 per cent, India has managed to provide access to only 63 per cent of the population by 2015. As per the ranking of global cities based on urban infrastructure (State of World Cities 2012/13), New Delhi and Mumbai are placed at 47th and 50th positions, respectively (Figure 4), showing comparatively lower levels of infrastructure in these cities.

14.12 According to the High Powered Expert Committee (HPEC) appointed by the Ministry of Urban Development (MoUD), about ₹ 39 lakh crore (at 2009-10 prices) was required for creation of urban infrastructure over the next 20 years. Out of this total, about ₹ 17 lakh crore (44 per cent) was needed for roads and ₹ 8 lakh crore (20 per cent) for services such as water supply, sewerage, solid waste management and storm water

Figure 4. Ranking of select cities as per Infrastructure Index



Source: State of the World's Cities 2012/13 - Prosperity of Cities, UN-Habitat.

drains. In addition to these investments, the requirement for operation and maintenance (O&M) was separately estimated to be ₹ 20 lakh crore.

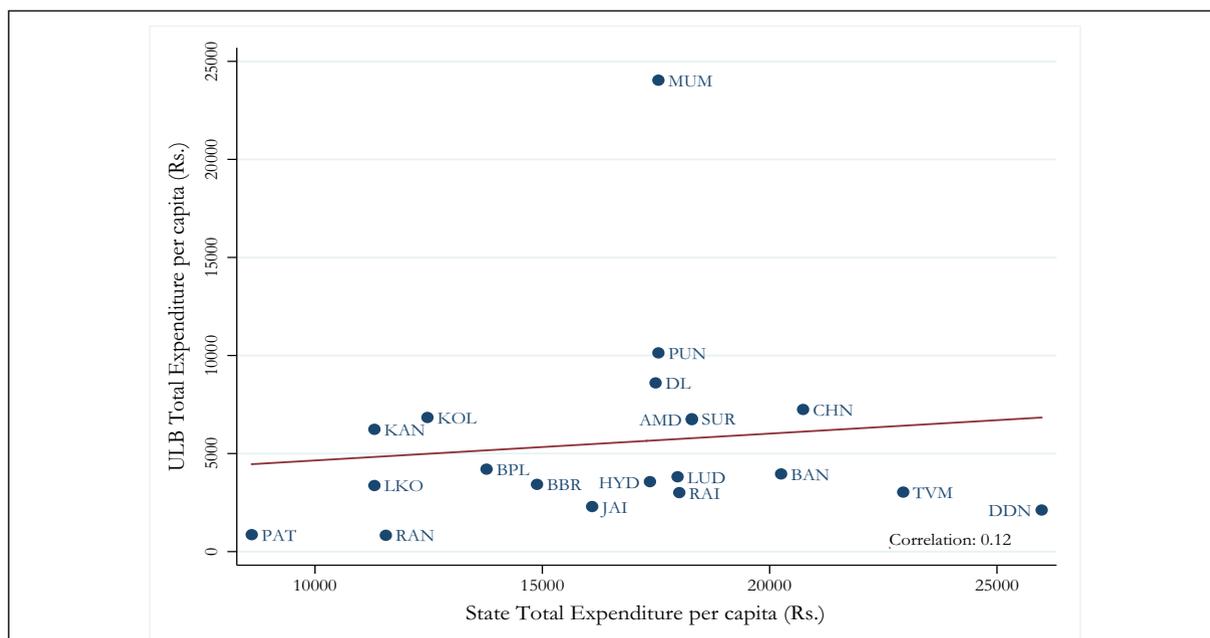
14.13 Addressing this infrastructure deficit will require resources, some of which could come from the Centre and the states. The Fourteenth Finance Commission (FFC) has recommended a grant of around ₹ 87,000 crore to the municipalities for the period 2015-20, constituting assistance of around ₹ 500 per capita per annum on average.

14.14 The rest of the required funds would have to come from local resources. But raising sufficient resources has not proved easy. The 74th Constitutional Amendment Act of 1992 provides for the ULBs as the third tier of government and 'recommends' that state governments assign them a set of 18 functions under the Twelfth Schedule. The amendment, however, leaves it to the discretion of state legislatures to devolve finances so that ULBs can fulfil these functions. Twenty-five years on, there are glaring inter-state disparities in terms

of devolution of functional and financial powers to the ULBs. Some states have not even allowed the municipalities to levy property taxes.

14.15 Figure 5 shows the problem this has created. In principle, one would expect a clear relationship between expenditures of state governments and local bodies. If their respective roles were well-defined, both types of spending would rise together as incomes increased; if their roles were changing, spending would be inversely related, as one level of government substitutes for the other in providing services to the population. The figure shows that neither relationship really holds. There is much greater variation across states than across cities in expenditure per capita. What is most striking is the low level of ULB per capita expenditure as compared to state per capita expenditure, with a few exceptions such as Mumbai, Kanpur, and Kolkata. Either states are not devolving adequate financial resources to ULBs or ULBs are not raising these resources on their own.

Figure 5. State per capita expenditure and ULB per capita expenditure



Source: State Government Budget 2016-17 and Annual Survey of India's City-Systems 2015, Janaagraha

14.16 Moreover, even when powers have been devolved, exercising them has proved difficult. Municipal own income comes from taxes; user fees; and domestic borrowing:

- While property tax is the most important constituent of own revenues, there are problems of low coverage, low rates, low collection efficiency, and lack of

Box 1. Recent initiatives by the Government provide opportunities for urban rejuvenation

The Fourteenth Finance Commission (FFC) grant to ULBs for 2015-2020 is almost 277 per cent higher than the grant recommended by its predecessor. With the higher devolution of taxes to the states and grants to the ULBs, the overall public funds available for urban rejuvenation have increased. As a follow to the flagship programme (JNNURM) started by the Centre in 2005 across 65 cities, the Government has launched several new initiatives to rejuvenate urban areas. Some of the key schemes are - Smart Cities Mission, AMRUT, Swachh Bharat Mission (SBM), HRIDAY, Digital India, Skill development, Housing for All, Metro transport etc. The emphasis is now laid on strong convergence between area based and project-based schemes so as to exploit synergy and optimize benefits while avoiding costs overlap.

Smart Cities Mission

Smart Cities Mission (SCM) is a holistic city rejuvenation programme for 100 cities in India, The SCM initially covers five years (2015-16 to 2019-20) and may be continued thereafter based on an evaluation. Under the SCM, the core infrastructure elements in a smart city include: i) adequate water supply, ii) assured electricity supply, iii) sanitation, including solid waste management, iv) efficient urban mobility and public transport, v) affordable housing, especially for the poor, vi) robust IT connectivity and digitalization, vii) good governance, especially e-Governance and citizen participation, viii) sustainable environment, ix) safety and security of citizens, particularly women, children and the elderly, and x) health and education. The strategic components of area-based development in the SCM are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development) plus a pan-city initiative in which smart solutions are applied covering larger parts of the city.

AMRUT

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched on 25.06.2015 to improve basic urban infrastructure in 500 cities/ towns which would be known as Mission cities/ towns. The Mission is being operated for five years from financial year 2015-16 to 2019-20 and aims to cover all cities and towns with a population of over one lakh with notified Municipalities, including Cantonment Boards (civilian areas) and certain other cities like capital towns, some cities on stem of main rivers and tourist and hill destinations. The components which are to be covered under the Mission are: water supply, sewerage, septage, storm water drains, urban transport, in particular, with the focus on facilities for non-motorised transport and development of green space and parks with special provision for children-friendly components in 500 cities & towns.

HRIDAY

The Government launched the National Heritage City Development and Augmentation Yojana (HRIDAY) scheme on 21st January, 2015, with a focus on holistic development of heritage cities. The scheme aims to preserve and revitalise soul of the heritage city to reflect the city's unique character by encouraging aesthetically appealing, accessible, informative and secured environment. With a duration of 27 months (completing in March 2017) and a total outlay of ₹ 500 crore, the scheme is being implemented in 12 identified cities namely, Ajmer, Amaravati, Amritsar, Badami, Dwarka, Gaya, Kanchipuram, Mathura, Puri, Varanasi, Velankanni and Warangal. The scheme is implemented in a mission mode.

Swachh Bharat Mission

The Swachh Bharat Mission (SBM) was launched on 2nd October, 2014, with a target to make the country clean by 2nd October, 2019. All 4041 statutory towns as per census 2011 are covered under SBM. The programme includes elimination of open defecation, conversion of unsanitary toilets to pour flush toilets, eradication of manual scavenging, municipal solid waste management and bringing about a behavioural change in people regarding healthy sanitation practices. Under the solid waste management state/cities are being encouraged to come out with innovative solutions and MoUD supports them technically and financially. Some of the initiatives being taken are waste to energy, composting plants, capping of the dumpsites. All the initiatives are being supported by capacity building efforts to empower the Municipal Authorities to carry out their functions properly.

indexation of property values, making it a non-buoyant source of revenue. The study on municipal finances conducted by the FFC indicated that per capita revenue from property taxes was ₹ 1677 at most, with a low of just ₹ 42.

- ULBs by and large have not been able to levy adequate user charges to cover even the operation and maintenance costs.
- Issuing municipal bonds has been challenging owing to the poor state of ULB finances and governance.

14.17 As a result of these challenges, cities face grave difficulties in securing sufficient revenues. Own revenue as a share of total expenditure is low. Per capita expenditure is too low in most of the ULBs with few exceptions such as Mumbai and Pune which have per capita expenditure more than ₹10,000.

IV. LESSONS FROM ACROSS INDIA

14.18 The scope for learning from the experience across cities is limited, because the data on municipalities is poor and partial. Still, an attempt is made, using data provided by Janaagraha Centre for Citizenship and Democracy, Bengaluru, and the 2011 Census. Janaagraha in its Annual Survey of India's City System 2015 (ASICS-2015) has compiled data from different sources like municipal corporation budgets from 2013 to 2016, town and country planning acts, metropolitan/municipal master plans, municipal corporation acts, government reports, other acts & rules and websites of municipal corporations. Different indicators on urban resources and capacities like those on revenue generation, borrowing, expenditure, investment, budgets and auditing and indicators on transparency, accountability and participation like Public Disclosure Laws (PDL) and internal audits

were extracted from these data sources and aggregated to compute scores of "Urban Capacities and Resources" and "Transparency, Accountability and Participation". They range from 0 (poor) to 10 (good). Scores for service delivery have been constructed on the basis of data extracted from Census 2011. Data on four services were used for the analysis. These are access to treated tap water, connection to piped sewer system, accessibility to public toilets and waste water outlet connected to closed drainage. Figures show:

- Chennai, Pune, and Chandigarh score relatively well in the provision of basic services, with Bhubaneswar, Raipur and Ranchi lagging farthest behind (Figure 6).
- Hyderabad scores highly both in terms of the degree of transparency/ accountability, enacting and complying with a Public Disclosure Law (PDL) and putting in place internal audit units (Figure 7).
- Figure 8 shows that Pune, Hyderabad and Mumbai have the highest scores for own revenue as a percentage of total expenditure while Dehradun and Kanpur have a low share of own revenue in total expenditure showing their greater dependence on grants and other sources for financing their expenditures.
- In terms of capital expenditure per capita, we can see that Mumbai, Pune and Kanpur have spent relatively more than the rest of the ULBs while Patna, Ranchi and Bhubaneswar have lagged behind the rest (Figure 9).

14.19 With these indices, we can now examine the links between service delivery and fiscal strength, with the latter measured in four different ways. Greater service delivery is correlated with more:

- Staffing (Figure 10)

Figure 6. Ranking of ULBs on the Availability of Services

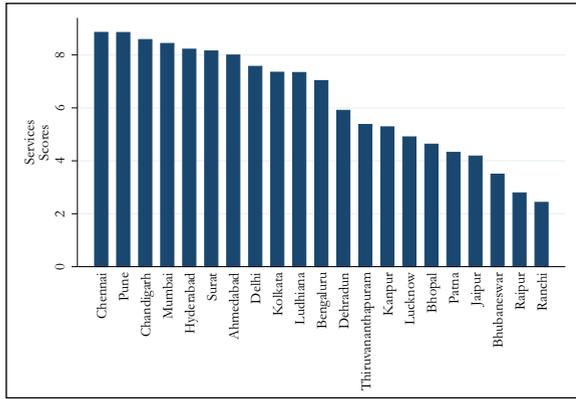


Figure 7. Ranking of ULBs on Transparency, Accountability and Participation

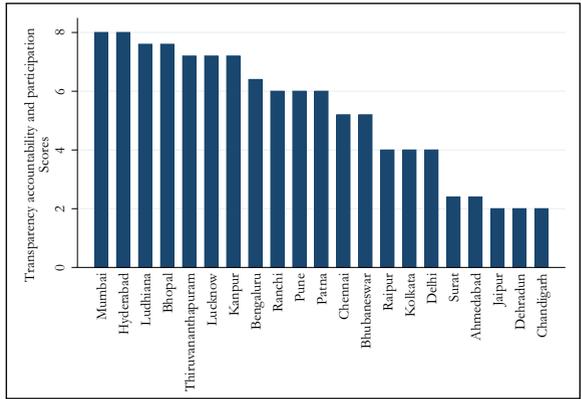


Figure 8. Ranking of ULBs on Own Revenue as a Percentage of Total Expenditure

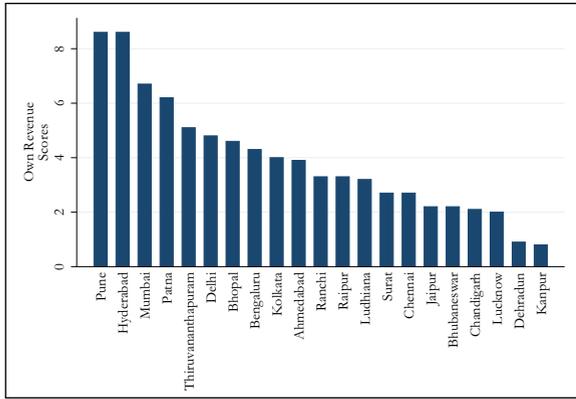
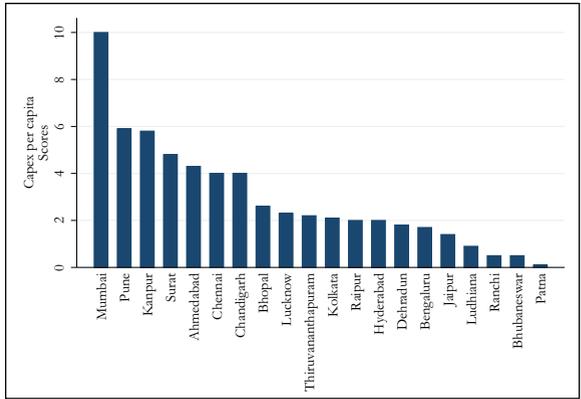


Figure 9. Ranking of ULBs on Capital Expenditure per Capita



Source (Figure 6 to Figure 9): Census 2011 and Annual Survey of India's City-Systems 2015 (ASICS-2015), Jaanaagraha.

- Capital expenditure per capita (Figure 11)
- Resources (Figure 12)
- Own revenue (Figure 13)

The correlation is especially strong with staffing and expenditures. A clear conclusion is that more resources seem to be associated with better outcomes.²

Figure 10. Adequate Staff and Services

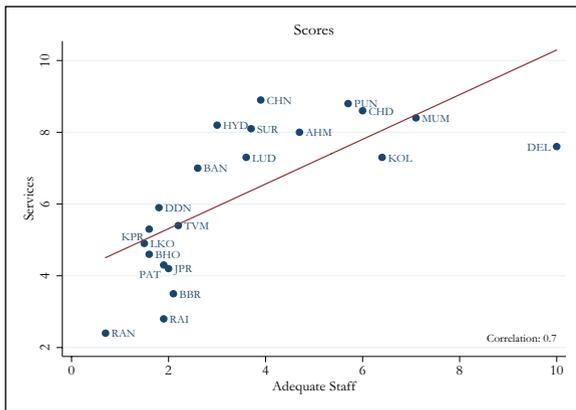
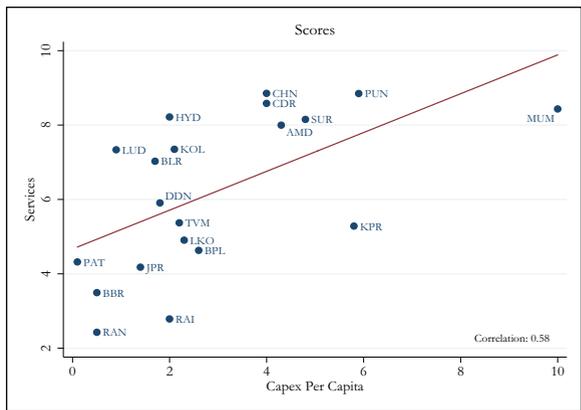


Figure 11. Capital Expenditure per capita and Services



² Though the direction of causality remains unclear; the data is too weak to investigate this further.

Figure 12. Urban Capacities & Resources and Services

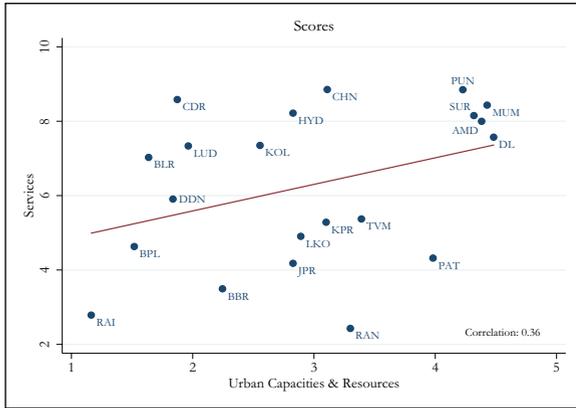
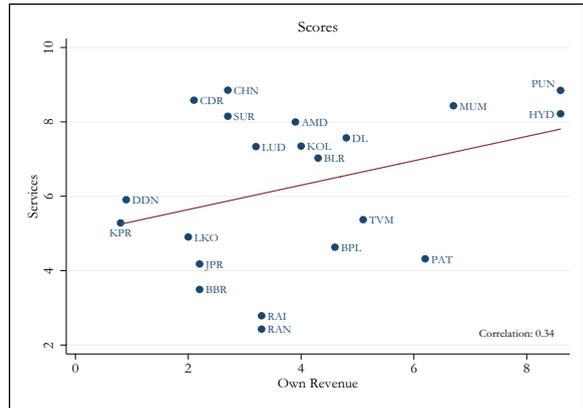


Figure 13. Own Revenue and Services

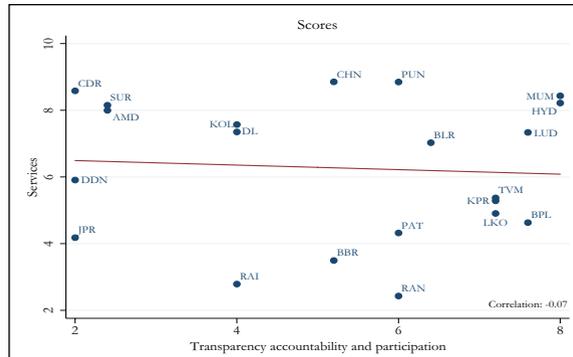


Source (Figure 10 to Figure 13): Census 2011 & ASICS-2015.

14.20 In contrast, it is difficult to find a relationship between service delivery and governance. Figure 14 shows there is no relationship at all between services and transparency/accountability. Figure 15 indicates there is actually a negative

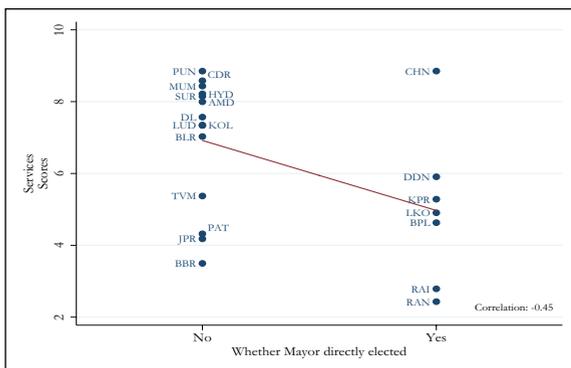
relationship between having a directly elected Mayor and the availability of services. There also does not seem to be a strong correlation between mayoral tenure and outcomes (Figure 16). One possible reason could be that a directly elected Mayor can function

Figure 14. Transparency, Accountability & Participation and Services



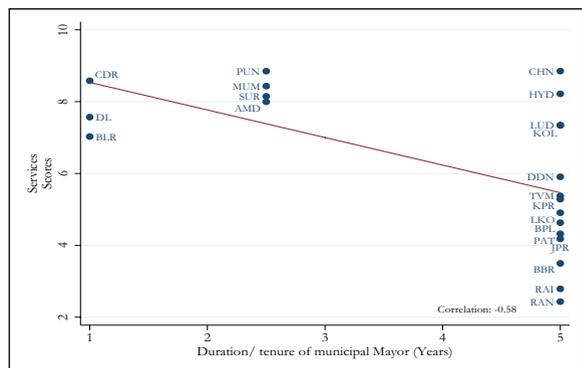
Source: Census 2011 & ASICS-2015

Figure 15. Direct Election of Mayor and Services



Source: Census 2011 & ASICS-2015

Figure 16. Mayoral Tenure and Services



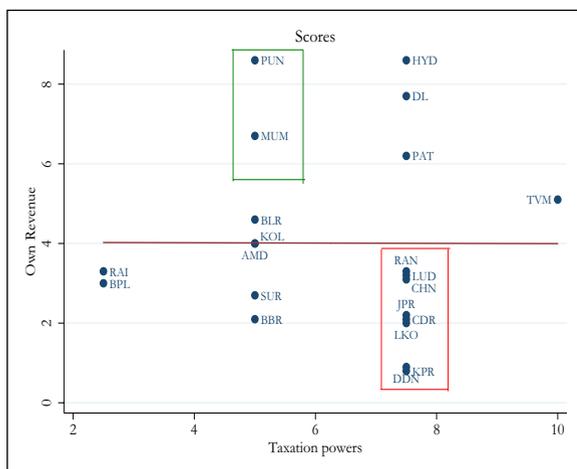
Source: Census 2011 & municipal corporations

effectively only if he/she has the support of majority members of the municipal council, which is not always the case. Considering this fact, two state governments namely, Rajasthan and Tamil Nadu, have amended their respective municipal act to provide for indirect mayoral elections.

V. MOBILISING RESOURCES

14.21 One striking correlation (or its absence) is between formal taxation powers and actual mobilisation of resources (Figure 17). One would expect that giving greater taxation powers to ULBs should lead to greater revenue generation. ULBs like Mumbai and Pune even with low scores on taxation powers do very well in own revenue while, at the same time, ULBs like Kanpur, Dehradun etc. even with relatively higher taxation powers perform badly in terms of own revenue. At first, this may seem counter-intuitive, which, at closer inspection would reveal that it is not the case. This is because having the powers to impose a greater number of taxes do not necessarily mean greater revenues for an ULB. Many other factors are important for being able to collect greater revenues such as the size of the tax base, the efficiency in tax collection

Figure 17. Taxation Powers and Own Revenue



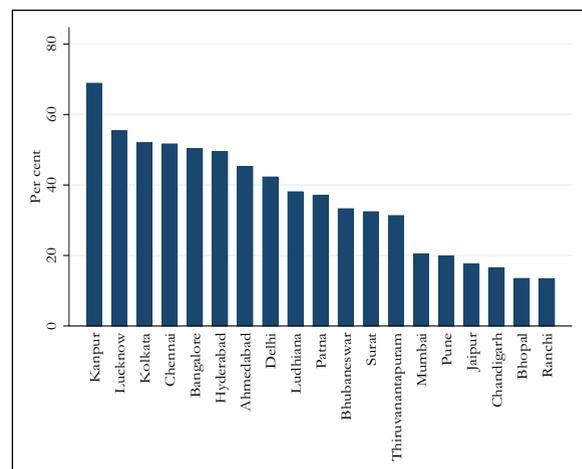
Source: ASICS-2015

and the level of economic activity in the city area.

14.22 If better service delivery requires more resources, where can they be found? Perhaps the greatest immediate scope for revenue comes from the property tax. Property tax as a share of own revenue is above 50 per cent in Kanpur and Lucknow, but it is less than 15 per cent in Bhopal and Ranchi (Figure 18). So, the problem is not necessarily that ULBs cannot raise resources because they are prevented from doing so.

14.23 The major factors contributing to poor realisation from property tax are the poor assessment rate, weak collection efficiency, flawed methods for property valuation, loss on account of exemptions, and poor enforcement. In an exercise done for the Survey an attempt has been made to assess the property tax potential of Bengaluru and Jaipur using the latest satellite-based imagery. The results estimate that currently Bengaluru and Jaipur are collecting no more than 5 to 20 per cent of the property tax potential (Box 2). Put differently, cities could increase their resources five to twenty fold. All efforts must be directed at realising potential of property taxes.

Figure 18. Property Tax of ULBs as a Percentage of Own Revenue



Source: ASICS-2015

Box 2. Estimation of Property Tax Potential from Satellite Imagery

The primary source of own revenue for urban local bodies is the property tax. Based on assessment of 36 cities, the 13th Finance Commission affirmed that by increasing the compliance to even 80-85 per cent, the current property tax (₹ 4400 crore) could be increased to as much as ₹ 22000 crore. Challenges to the property tax collection include inaccurate enumeration and likely under-valuation. Collection is also hampered by lack of adequate staff in the revenue department in many ULBs. Geographical Information System (GIS) technology based Big Data solutions can greatly help in assessing the total built-up area in a city and in estimation of the property tax potential and its valuation for each city.

Building Density from Satellite Imagery

This study has attempted to estimate the property tax potential of Bengaluru (Figure 2A) and Jaipur (Figure 2B) by using satellite imagery from LANDSAT program from joint National Aeronautics and Space Administration (NASA) and United States Geological Survey (USGS).

The satellite based raw data has been geo-processed to identify built-up area, including everything from an independent housing unit to apartments as well as urban slums. Since the built-up wavelength bandwidth picks associated noise from road surface reflectance, we develop a net built-up density measure to correct it (details described in Appendix). Using the information from net building data density, this study on Bengaluru and Jaipur extracts building agglomerations across the city to arrive at an aggregate built-up estimate for the city. The building density on the ground provides an estimate of total build-up area (in square feet/km), which when interacted with zone specific guidance value of property tax per unit area gives an aggregate sum of potential property tax to be collected. Usually, a city is classified by different guidance values zones, depending on factors such as construction material, type of roof /floor, nature of occupancy (tenanted or self-occupied), and depreciation. Consider Koramangala (one of the localities in Bengaluru) illustrated in figure 2C. It can be seen that the processed image can distinguish the built-up (commercial/residential) regions from green and barren regions.

Figure 2A

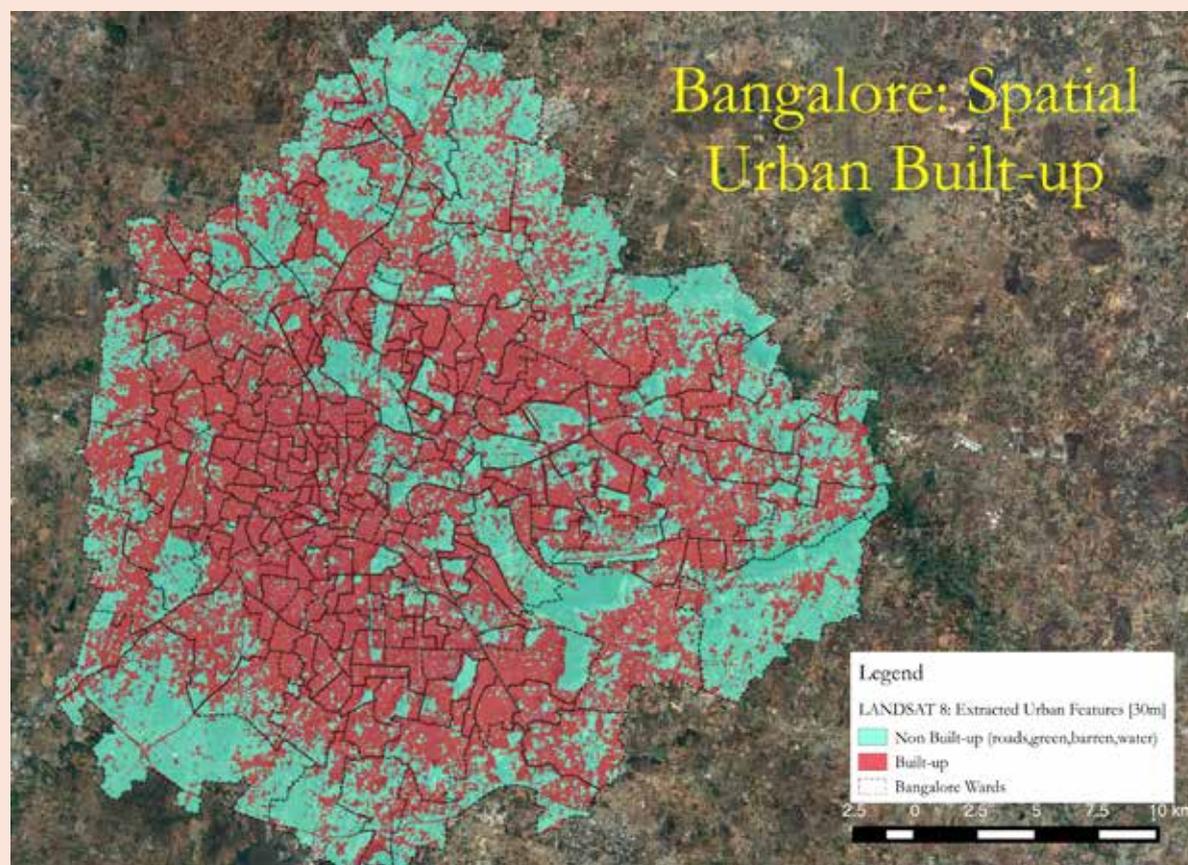


Figure 2B

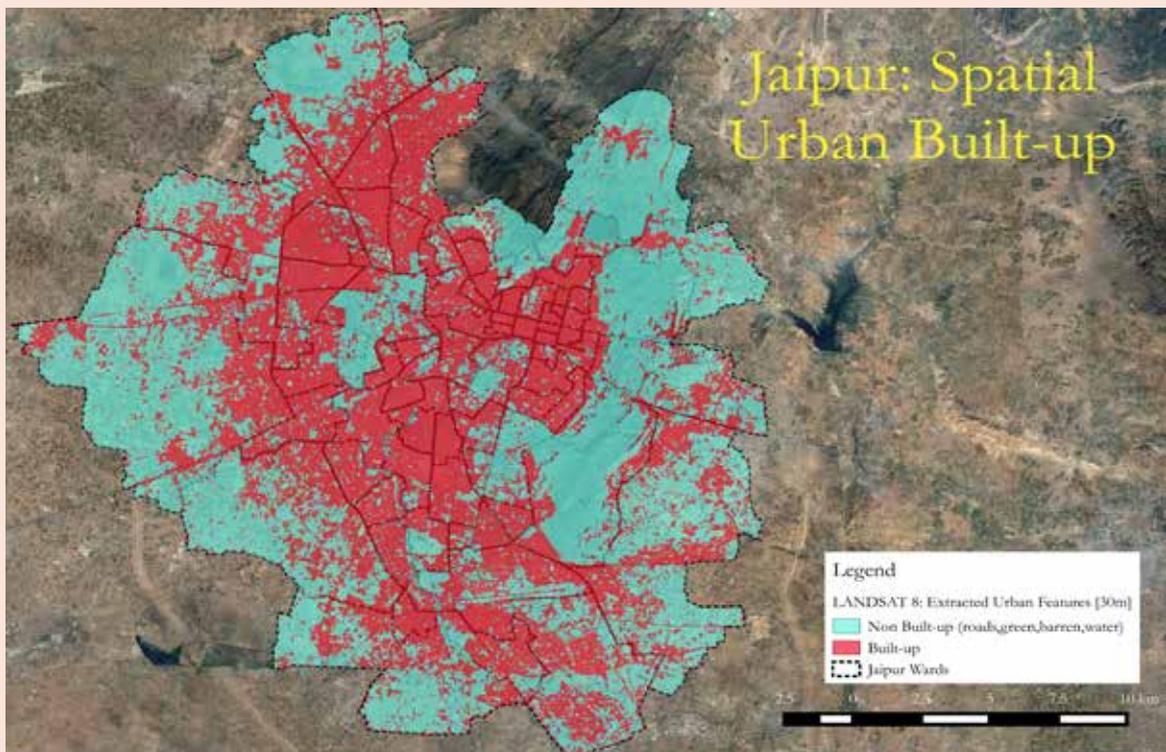
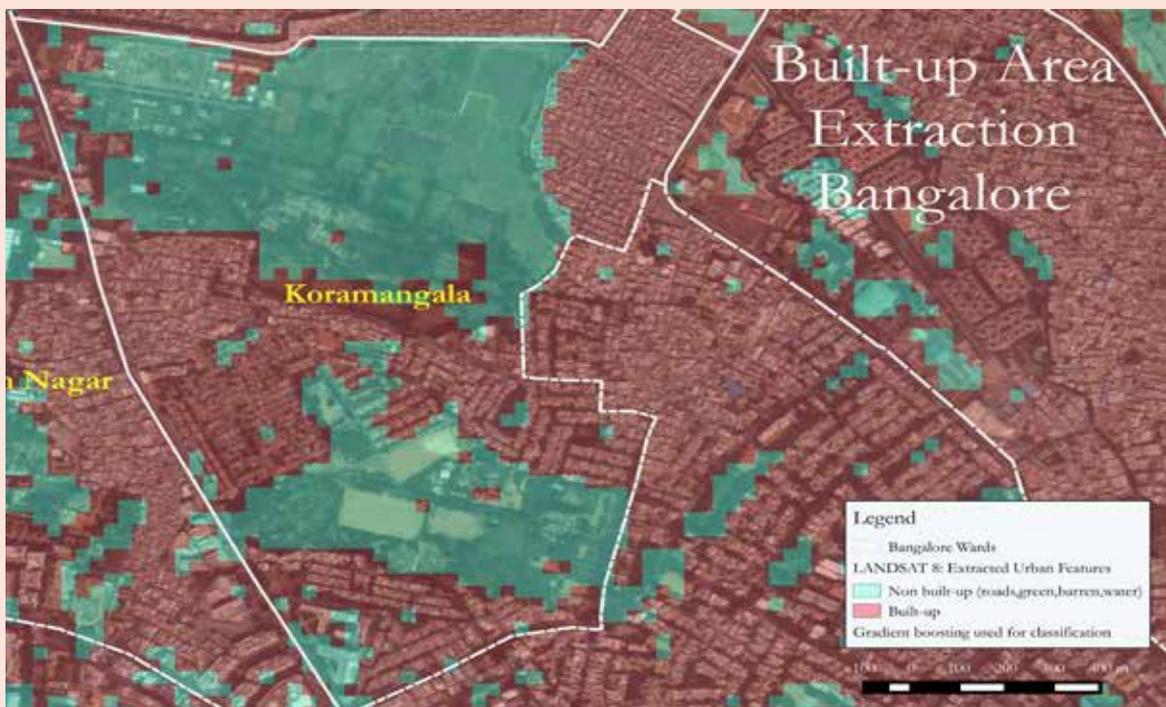


Figure 2C



Building Elevation from Floor Area Ratio | Floor Space Index

Since satellite imagery (LANDSAT) cannot help identify the height of building (other satellite based DEM elevation models only provide height from mean sea level), the prospective height of buildings has, therefore, been estimated, using unified development codes, Floor Area Ratio (FAR) and Floor Space Index (FSI). Both the ratios regulate the

permissible extent of build-up area of a building by the total size of the plot. Higher value of FSI implies dense construction, an FSI of 2.0 implies that total floor areas is twice the gross area of the plot suggesting a multiple-store building. This ratio varies according to development plans and zoning laws of individual states. For instance the Bruhat Bengaluru Mahanagara Palike (BBMP) has classified the city by 12 zones including Residential (Main), Residential (Mixed), Commercial and Industrial categories. Jaipur Development Authority's Development Plan 2025, on the other hand define broad level FSIs, ranging from 0.1 (amusement park), 0.2 (resort) to 2.25 (residential/commercial). Based on the ranges we have developed separate minimum, maximum and average value scenarios for the respective cities (calculation in appendix).

Estimation of property tax potential for Bengaluru

As seen in the image above (Figure 2A), spanning 784 square km, satellite imagery of Bengaluru indicates near 50 per cent built-up area. The potential property tax is estimated by fixing a ward as the basic unit for identifying net built-up area, property tax unit (guidance values) and FSI ratio. There are 198 wards within BBMP jurisdiction; properties in these wards have been classified in 6 zones (A to F) based on the streets they are on, which determines the guidance value. This classification determines the Unit Area Value (UAV) used for calculation of property tax. The average age of properties has been assumed to be around 10 years, based on which a depreciation rate of 10 per cent is applied in the computations. The street wise guidance values are clipped by respective wards and the net built-up density is aggregated to the ward boundary. To accurately capture FSI ratio values across establishments we have considered three scenarios (min, max and average value) based on their respective values by the 12 zones as given below (Table 2A). The estimate indicates Bengaluru has potential of collecting upto 4 to 7 times of its current property tax revenue.

FSI Scenario (Residential Commercial)	MIN[1.8 1.5] (Cr.)	MAX[3.3 3.3] (Cr.)	AVG[2.5 2.4] (Cr.)
Collected	1031.8	1031.8	1031.8
Potential	4359.5	8693.8	6526.7
Proportion	23.7%	11.9%	15.8%

Source: Budget Documents – BBMP

Estimation of property tax potential for Jaipur

In line with the steps taken to estimate the property tax potential of Bengaluru city, property tax potential has been estimated for Jaipur. The city has a total area of 484 sq km with 39% built up area. Unlike Bengaluru the guidance values for property tax in Jaipur, are constituted at colony level. Built-up density was aggregated over 2534 colonies to arrive at a guidance value per ward (Table 2B). In the absence of official FSI data for Jaipur, elevation and non-elevation scenarios are considered. The estimate indicates Jaipur has potential of collecting upto 10 to 20 times of its current property tax revenue.

FSI Scenario	No Elevation (Cr.)	Min [1.5] (Cr.)	Max [2.0] (Cr.)
Collected	41.2	41.2	41.2
Potential	380.0	599.7	799.7
Proportion	10.8%	6.8%	5.1%

Source: Budget Documents – Jaipur Nagar Nigam

Conclusion

Satellite imagery can be a useful tool for improving urban governance by facilitating better property tax compliance. The exercise has shown that Bengaluru and Jaipur are currently collecting no more than 5 to 20 per cent of the potential for property tax. Bengaluru and Jaipur can collect five to twenty times their current property tax collection. Revenue self-sufficiency can significantly enhance the ULBs capacity to invest in much needed infrastructure and services to improve the quality of life of their citizens. Adopting modern techniques, along with other measures, can enable the urban local bodies mobilize untapped potential.

Box 3. The role of private sector in urban development - lessons from Gurgaon and Jamshedpur*

Gurgaon was mainly an agricultural wasteland and not categorised as an urban area until 2001. The population of the city exploded after the Haryana government removed restrictions on the land acquisition process, empowered Haryana Urban Development Authority (HUDA) to convert the agriculture land for developing township and simultaneously granted licenses to private developers to develop townships from large parcel of contiguous land. The city did not have a municipal body responsible for urban planning and public goods till the Municipal Corporation of Gurgaon (MCG) was created in 2008 with control over limited pockets of the city. The three areas of Gurgaon, therefore, are controlled by HUDA, the MCG, and private developers, respectively.

In Gurgaon, the private sector has stepped in to address many of the failings of the public sector, with mixed success. Private suppliers have responded to the failure of the public sector by creating private sewage, water, electricity, security and fire prevention. The new Rapid Metro in Gurgaon was built by DLF and Infrastructure Leasing & Financial Services Limited (IL&FS), with HUDA providing the requisite land. Within privately developed enclaves, roads are of good quality. The shortfall in transport facilities is covered by the private modes of transport. In short, private builders/firms have addressed most challenges but they have been unable to provide services beyond their own property line for want of cooperation amongst builders and the authorities. The authorities, on the other hand, have had limited success in providing the city with large scale infrastructure.

Gurgaon city's failures are well known but not put into context. The city has suffered from lack of cohesive urban plan and its explosive growth has outpaced the planning efforts like in any other Indian cities. On top of that, after development has begun, multiple layers of local and higher authorities, having greater power to extract rents, have increased the transaction costs for the private builders. Different private builders have to seek different political patronage as otherwise none would manage to function.

In theory, water, sewage, roads, and electricity could be provided at scale by private, natural monopolies – albeit at potentially high prices. But instead of natural monopolies, Gurgaon has developed a competitive system of private suppliers. Competition among private suppliers has produced two failures. First, prices of water, electricity, sewage, and so forth are close to marginal cost but average cost is far too high because of the failure to exploit economies of scale. Second, competitive suppliers have produced negative externalities such as excess pollution with diesel fumes, over used common resources by dumping sewage waste and, groundwater dissipation leading to unsustainable level of water table.

Jamshedpur is a private township and one of the best-governed cities in India. Jamshedpur Utilities and Services Company Ltd. (JUSCO), a wholly-owned subsidiary of Tata Steel, is responsible for provisioning of the basic services to the city population. Jamshedpur is widely regarded as having some of the best urban infrastructure in the country and JUSCO is considered a model provider. Jamshedpur was rated the second best in the country by ORG Marg Nielsen, the worldwide market research firm, on its quality-of-life index in 2008, and in 2010 the city was ranked seventh of 441 cities and towns in India on sanitation and cleanliness by MoUD.

The three lessons from Gurgaon and Jamshedpur experience are:

- i) A system of proprietary, competitive cities can combine the initiative and drive of private development with the planning and foresight characteristic of the best urban planning. A handful of proprietary cities built within a single region would create a competitive system of proprietary cities that build, compete, innovate, and experiment.
- ii) The private sector has to bear the burden of higher transaction costs, if the city is managed by multiple authorities, each having greater power and competing to extract rent. The transaction costs would also be higher if initial cohesive development plan for the city is not put in place. Post-growth infrastructure development costs are much higher and at times prohibitive.
- iii) The active role of civil society can prevent excessive exploitation of resources and reduce the impact negative externalities associated with rapid urbanisation. In Gurgaon, there has been a slow emergence of citizens groups, environmental groups, and resident welfare associations to monitor the commons.

* Rajagopalan, S. & Tabarrok, A. (2014). *Lessons from Gurgaon, India's private city*, in D. Anderson & Moroni, S (Ed.), *Cities and Private Planning*. Cheltenham, UK: Edward Elgar.

VI. CONCLUSION

14.24 Urbanisation will pose considerable challenges for municipalities over the coming decades. But these challenges can be – indeed, must be – overcome, and the analysis in this chapter points to some priority areas.

14.25 The first task is empowering ULBs financially.

- The analysis shows that municipalities that have generated more resources have been able to deliver more basic services. The states should, therefore, empower cities to levy all feasible taxes.
- Municipalities also need to make the most of their existing tax bases. There is a need to adopt the latest satellite based techniques to map urban properties. The Government should leverage the Indian Space Research Organization (ISRO)/ National Remote Sensing Agency (NRSA) to assist ULBs in implementing GIS mapping of all properties in the area of a ULB. Property tax potential is large and can be tapped to generate additional revenue at city level.

14.26 It is true but tiresome to repeat that ULBs need to be empowered but the political economy challenges—higher level bodies (state governments) needing to cede power and sharing resources—are daunting. The big question here is whether Finance Commissions should take cognizance of this political economy challenge identified by Professor Chelliah and allocate even more resources to ULBs or whether to respect the sovereignty of states and hope that they will themselves be forthcoming in decentralizing down – fiscally and governance-wise – commensurate with the needs of urbanisation.

14.27 Finally, data and transparency can play an important role here.

- MoUD should give greater priority to compile and publish comprehensive data on ULBs and urban sector. Perhaps, grants to ULBs should be more tightly linked to comprehensive and updated data disclosure and transparency by ULBs.
- NITI Aayog should compile comparative indices of municipalities' performance annually based on the actual accountability and administrative capacity to deliver the core public services.

14.28 Competition between states is becoming a powerful dynamic of change and progress, and that dynamic must extend to competition between states and cities and between cities. Cities that are entrusted with responsibilities, empowered with resources, and encumbered by accountability can become effective vehicles for competitive federalism and, indeed, competitive sub-federalism to be unleashed.

REFERENCES:

1. Chauvin, J. P; Glaeser, Edward; Ma, Yueran and Tobio, Kristina, 2016. What is different about urbanisation in rich and poor countries? – Cities in Brazil, China, India and the United States. NBER Working Paper No. 22002.
2. Colmer, Jonathan, 2016. Urbanisation, Growth, and Development: Evidence from India. Available at: <http://urbanisation.econ.ox.ac.uk/materials/papers/24/urbanisationindia.pdf>.
3. Jana Urban Space Foundation and Janaagraha Centre for Centre for Citizenship and Democracy, 2015. Annual Survey of India's City-Systems 2015 (ASICS-2015). Available at <http://janaagraha.org/reports/ASICS-2015.pdf>.

4. Kapur, Devesh; Somanathan, T. V.; Subramanian, Arvind, 2014. Land-Shakled-I, Business Standard, July 20, 2014.
5. Kapur, Devesh; Somanathan, T. V.; Subramanian, Arvind, 2014. Land-Shakled-II, Business Standard, July 21, 2014.
6. Report of the Fourteenth Finance Commission, 2015. Available at: <http://finmin.nic.in/14fincomm/14fceng.pdf>
7. The High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services, 2011. Report on Indian Urban Infrastructure and Services.
8. UNICEF and World Health Organization, 2015 Progress on Sanitation and Drinking Water, 2015 Update and MDG Assessment.
9. United Nations Human Settlements Programme (UN-HABITAT), 2013. State of World Cities 2012/13.

APPENDIX: BUILT-UP DENSITY EXTRACTION AND PROPERTY TAX EVALUATION METHODOLOGY

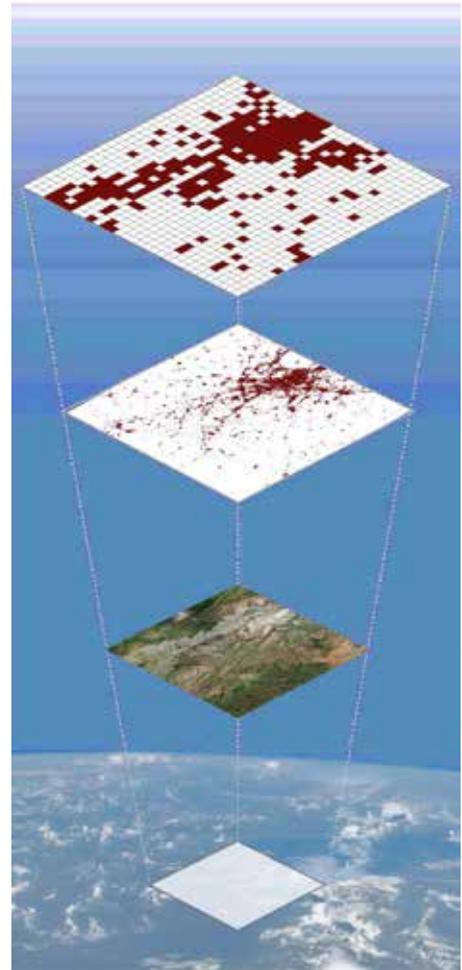
Section I: Built-up Density Extraction from Satellite Imagery

Remotely sensed satellite imagery is a powerful tool for assessing the spatial distribution as well as growth of urban built-up areas that can be used to gather strategic planning information at a very micro level. Satellite imagery data records information in an image pixel form, which is further cleaned, processed and fine-tuned with local specification of the sub-geography. Data from satellite is composed of reflected light wavelengths. Taking advantage of the unique spectral response of built-up areas and other land covers, these wavelengths can be logically trained to represent distinctive land use features, like green cover, barren regions, water bodies, roads and buildings.

The study uses 30m resolution LANDSAT-8 Operational Land Imager (OLI) raw imagery from NASA with 0% cloud cover, where each pixel records wavelengths of visible, infra-red and thermal radiations by 11 bands (Figure A). Built-up areas are conventionally mapped through arithmetic manipulation of re-coded Modified Normalized Difference Water Index (MNDWI), Normalized Difference Built-up Index (NDBI) and Soil Adjusted Vegetation Index (SAVI) derived from OLI imagery. But often they are fraught with noise from the other bands.

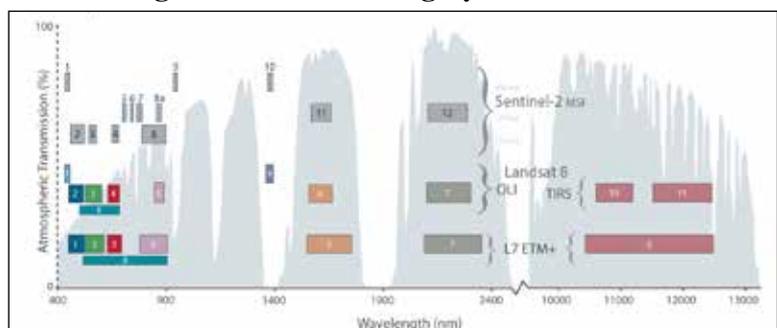
To ensure optimal accuracy of built-up density detection and considering non-gaussian distribution of wavelengths and components, the analysis attempts a novel methodology framework by applying Principal Component Analysis (PCA) in conjugation with an ensemble of machine learning based Gradient Boosting Model (GBM) algorithm and multinomial classification regression.

The raw wavelength bands are first classified into specified MNDWI, NDBI and SAVI indices. Since the Landsat TM/ETM+/OLI images are highly correlated between the adjacent spectral bands, PCA is applied to transform highly correlated bands into an orthogonal subset. After performing PCA, the original correlated bands are transformed into independent components by unique land use types.



Source: The Atlas of the Human Planet GHSL

Figure A. Satellite Imagery Band Variation



Source: NASA

This is followed by a subjective pixel level study of the components to identify optimal thresholds for the geography in question (Bengaluru and Jaipur). Since the variation of wavelengths (and of the components) confirming to a specified land use class differs for each sub-geography, a customized supervised classification algorithm is developed with an ensemble of decision trees, GBM (using Greg Ridgeway’s R package) with multinomial classification. The final classification performs reasonably well when validated with specified land use polygons, aerial imagery mapping and ground level checking for sample built up units.

Section II: Estimation of potential property tax from extracted built-up units

Bengaluru

- i. **Classification in Zones:** There are 198 wards within Bruhat Bengaluru Mahanagara Palike (BBMP) jurisdiction; properties in these wards have been classified in 6 zones (A to F) based on the streets they are on, which determines the guidance value as per the notification dated 9th March, 2016, by the BBMP. This classification determines the Unit Area Value¹ (UAV) used for calculation of property tax. The buildings that fall into these zones have been assigned a UAV based on criteria such as construction material, nature of roof, flooring, whether self-occupied or Tenanted, etc.
- ii. **Unit Area Value:** In order to arrive at a hybrid UAV to cover all properties within a zone, the following assumptions have been made:
 - (i) Under Residential category:
 - 100 % of properties were assumed to be falling under *RCC or Madras terrace Buildings*.
 - 70 % of properties were assumed to self-occupied and 30 % tenanted.²
 - (ii) Under Non-Residential category
 - 100 % of properties were assumed to fall under category V (highest) since the UAV did not vary significantly across categories.
 - 75 % of properties were assumed to be tenanted.
 - 25 % of properties were assumed to be self-occupied.
 - (iii) Keeping in mind (i) and (ii), a weighted average hybrid (WAH) UAV was arrived at as below:

Zone	Residential								Non residential						
	A	B	C	D	E	F	Mix		Mix	A	B	C	D	E	F
UAV	6	4.8	4.3	3.8	3	2.4	30%	Tenanted	75%	25	18	13	10	7.5	3.8
UAV	3	2.4	2.2	1.9	1.5	1.2	70%	Self-occupied	25%	13	8.8	6.3	5	3.8	1.9
Weighted Average Hybrid Rate	3.9	3.1	2.8	2.5	2.0	1.6				21.9	15.3	10.9	8.8	6.6	3.3

¹ The Unit Area Value system is another variant of the earlier Annual Rateable Value (ARV) system. While the ARV was based on the expected rent from the property, the Unit Area Value is based on the expected returns from the property depending on the location and usage of the property. Since the unit of calculation is based on per square foot per month (UNIT) and for a particular location, street, (AREA) and multiplied by a rate (VALUE), this method of assessment of property is called “Unit Area Value” method.

² <http://www.livemint.com/Opinion/a5jnMOHQsHEk47Rr9mUWPI/Five-charts-on-the-state-of-Indias-housing-sector.html>

iii. **Property tax computation:** As per the Property Tax Handbook by BBMP, property tax is to be calculated as below:

For residential properties:³

Built up area x UAV x 10 months = Total₁ (T₁)

T₁ - Applicable Depreciation = T₂ (Taxable Annual Value)

T₂ x 20% = T₃ (Property tax)

T₃ x 24 % = T₄ (Cess)

T₃ + T₄ = T₅ (Gross Property payable)

T₅ x 5% = T₆ (Rebate for early payment)

T₅-T₆= Net property tax payable,

Which is: $\{[(\text{Sqft} * \text{UAV} * 10 \text{ months}) - \text{depreciation}] * 20\%\} * 1.248$

For Non-residential properties:⁴

Built up area x UAV x 10 months = T₁

T₁ – Applicable Depreciation = T₂

T₂ x 25 % = T₃ (Property tax)

T₃ x 24% = T₄ (cess)

T₃+T₄= Tax payable

Which is: $\{[(\text{Sqft} * \text{UAV} * 10 \text{ months}) - \text{depreciation}] * 25\%\} * 1.31$

Depreciation for the purpose of property tax calculation is based on the age of the building.⁵ We have an average age of 10 years for all properties in Bengaluru, and a rate of 10% has been used in the calculations.

iv **Factor for computing Property tax value:** Based on the above, the factors for each zone under residential and non-residential have been calculated as below:

Residential:

A	B	C	D	E	F
8.7	6.9	6.2	5.5	4.4	3.5

Non-residential:

A	B	C	D	E	F
61.0	42.7	30.5	24.4	18.3	9.3

Other key Assumptions

- (i) All streets assumed to have the same number of properties.
- (ii) The split between residential and non-residential has been assumed as 80:20 based on the land use for Bengaluru Metropolitan Area 2015⁶ .

³ http://218.248.45.169/download/ptax/annexure_I.pdf

⁴ http://218.248.45.169/download/ptax/annexure_II.pdf

⁵ http://218.248.45.169/download/ptax/annexure_III.pdf

⁶ <https://www.scribd.com/document/4993129/Report-of-The-Advisory-Committee;> <https://www.scribd.com/document/4993118/Cabinet-Note>

Jaipur:

- I. The land and building tax (popularly known as house tax) has a chequered history in Rajasthan. Land and Building Tax was abolished by the State Government vide its Notification dated 24.2.2007. Even prior to its abolition, this tax was not levied and recovered by as many as 60 urban local bodies. The situation even prior to abolition of house tax was not at all satisfactory in Rajasthan. The urban local bodies either did not recover house tax or recovered it with great reluctance. As a result the recovery even against assessed tax did not go beyond 40 percent. Having remained abolished from 24.2.2007 to 28.8.2007, this tax was re-imposed under the nomenclature of urban development tax with effect from 29.8.2007 with reduced revenue potential.
a. (http://www.sfc.rajasthan.gov.in/includes/study_report_24009013.pdf)
- II. Even at present, only institutional/commercial buildings above 100 square yards and residential buildings above 300 square yards are subject to this tax.
- III. During the course of eight years, from 2007 to 2015, the number of properties billed for tax has increased by a mere 2% (1,19,680 properties in 2007 to 1,21,498 properties in 2015).
- IV. Jaipur at present does not have an online portal for property tax payment by its citizens.
- V. For the purpose of property tax computation, Jaipur follows rates prescribed by the District Level Committee (DLC), which can be accessed here:
a. <http://epanjyan.nic.in/FindDlcRate.aspx>
- VI. Property tax is calculated by multiplying the area of the property (in square yards) to the prevalent DLC rates for the area, and the product obtained divided by 2000.
- VII. DLC rates can be viewed colony/ zone/ SRO wise and are classified based on:
 - (a) the location of the area - (i) interior or (ii) exterior
 - (b) the type of property - (i) residential (ii) commercial (iii) agricultural (iv) industrial
- VIII. For the above calculation, a few assumptions were made as below:
 - (i) For location of property, an average of interior and exterior rates was taken per colony.
 - (ii) For type of property, agricultural and industrial properties were not considered.
 - (iii) A simple average was arrived at considering the interior and exterior rates.
 - (iv) It was observed that the simple average rates were repeated in some colonies, and the repeating rates were multiplied by the number of colonies per rate.

The above calculation was then aggregated under residential and commercial properties and divided by the total number of colonies in that zone, to arrive at a weighted average rate per zone for residential and commercial properties.