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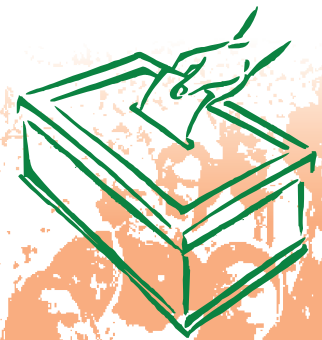

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Aims and Scope

Journal of Governance & Public Policy is a bi-annual refereed journal published by the Institute of Public Enterprise to provide a forum for discussion and exchange of ideas on Governance (local to global) and Public Policy (including foreign policy and international relations) by policy makers, practitioners and academicians.

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From the Editors' Desk

Public governance is facing its biggest challenge in many decades. Governments, big or small are all striving to keep their focus on the policies and programmes with an aim to support the well-being of their citizens during this hour of need.

The dynamic changes witnessed in the environment and the ongoing health emergency are leaving behind a huge impact on the established system of governance and creating a huge void in the lives of the people. Fine-tuning of existing policies and reallocation of available resources to fight the pandemic have become the new norms. The focus has shifted to adopting of prudent financial management practices so as to ensure equitable distribution of available resources and ensure continued protection to the needs of the vulnerable groups and individuals.

Governments are adopting various methods to get a control over the pandemic situation. eGovernance has been specifically looked at as looked at as an effective method and using digital technology innovations are known to present the possibility of improving the efficacy of the health system response to this epidemic. Nations have seen the utility of mobile health applications in improving access to testing, contact tracing, supporting frontline healthcare workers, and raising public awareness.

The Government of India developed a mobile application, called the Aarogya Setu, which is primarily meant to serve as a tool in the hands of its citizens to basically function as a digital service meant to reach out to the Indian citizens to provide information about COVID-19 pandemic. The Aarogya Setu app is a Health Bridge and a tool in the hands of the community and works as a social accountability digital tool to enable the community to keep a strict vigil through proper contact tracing.

There are two ways in which it works - helps the authorities to use the information and contain the COVID-19 pandemic and at the same time empowers the community with required information to protect themselves from the pandemic. The app provides information to the Government to prepare strategies and plan the fight against COVID by informing the people about the safety measures that need to be taken by people to protect themselves as well as the initiatives to be taken by local government institutions to ensure that the potential risk of COVID-19 infection is minimized.

The current issue of the Journal of Governance and Public Policy throws up issues which bear a huge impact on governance and wellbeing of citizenry in the country.

Geeta Potaraju
A Sridhar Raj

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Journey Towards A Citizen-Centric Public Service Delivery System: Antyodaya Saral, A Case Study from Haryana

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Abstract

The public service delivery system across India has evolved from traditional physical, bureaucratic touch-points to paperless and technology-enabled systems. It has also moved focus to citizen experience through legislative measures such as the right to service legislation (currently enacted in 23 Indian states) to structurally ensure that citizens receive public services / schemes that they have applied for, within established timelines. The Haryana Government launched Antyodaya Saral in 2017 – a web-based service delivery platform providing access to 435+ Government schemes and services of 39 Departments through a single online platform. The AS platform bases its performance on the timelines established by the Right to Service Act, Haryana (2014). It has built in tools to ensure that citizens are able to track their applications, receive the service / scheme and file grievances, all on the same platform. It complements the online platform with physical centres wherein data operators assist citizens with their applications. This paper attempts to understand citizens' experience of the public delivery system in Haryana. The paper dissects the features and facilities that citizens typically desire of the public service delivery system and how far Antyodaya Saral as a platform incorporates the same. The paper tries to understand how citizens make the choice between different public service delivery modes – online platform / physical government touchpoint / through an agent. The primary survey used for this paper, has

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been conducted in 3 districts of Haryana – Gurugram, Hisar and Karnal, through mixed methods including semi-structured interviews and an online questionnaire. The survey reveals that citizens primarily consider two factors when choosing a mode of public service delivery:

- process difficulty (how easy the process of application is, how many steps it entails, how many documents it requires)
- availability of information(how accessible is the information regarding the process itself as well as service fees, other charges etc)

Antyodaya Saral has successfully moved towards greater transparency and ease of process, through both the platform and the Saral *kendras*. However, as the platform continues to evolve and include more services and schemes, this paper suggests next steps to make the system more citizen-centric.

Keywords: Citizen, Digital, Government, Public Service

Introduction

In a lot of modern democratic systems, a 'citizen' can end up being a passive figure. Someone who participates in the political process through a single vote (in most cases) and then takes a backseat for the entire policymaking process, allowing the representatives they have elected to make decisions on their behalf. However, as the size and complexity of democracies continue to grow, this simple process has acquired more nuance and more efficient systems have risen to capture the many interests and incentives of the citizens. Several scholars have debated the role of the citizen, in relation to the state (Thomas 2013:786) summarises this debate by broadly categorizing the different ways in which a citizen interacts with their government. The three categories outlined in his paper are citizen, customer and partner. This choice of each of these terms accurately reflect the nature of interaction between the state and the individual. A citizen may potentially interact with the state in the following ways: The first, as mentioned, is through the act of voting. The second is through civil society action or organised activism to make certain demands of the state or to work with the state in achieving certain outcomes. Lastly and perhaps the most frequent of these interactions is the provision and receipt of public services and schemes or what are called G2C (Government to Citizen) services.

This paper examines the interaction between citizens and the state, in the context of this third kind of interaction, against the backdrop of a technological overhaul of the public service delivery system in India.

It attempts to identify the inefficiencies that have plagued this system in the past 6 decades, specifically from a citizen's point of view, and how technological and other kinds of interventions in the form of single window, online platforms, grievance redressal cells and legislation such as the Right to Service Act have tried to centre the citizens' experience. It must be noted here that the paper focuses on the mode of delivery of these services and does not delve into the questions of institutional structures of the services themselves. The idea is to explore how citizens envision their ideal public service delivery system and how their insights can be applied to simplify this mammoth task. The paper has focused on the case study of Antyodaya Saral (AS) in the state of Haryana, an online platform launched in 2017 which has accumulated the service provision of 39 departments into one single platform. The paper has been written with the assistance of insights from the Chief Minister's Good Governance Associates in the districts of Gurugram, Hisar and Karnal.

The paper will begin by examining the relationship between a citizen and the state, specifically the interaction of the citizen with the state through Government to citizen (G2C) services. It will demonstrate the kind of incentives that such a relationship sets up for both parties and as a consequence, why it is important for the state to ensure that it institutes systems of transparency and accountability. It will briefly discuss the existence and need for citizen charters across the world as well as global landmark attempts in reforming the public service delivery system (including examples of Australia and Singapore). The paper will then discuss the evolution of India's public service delivery system as well as outline the issues that it most commonly has produced. The paper will then introduce Antyodaya Saral, its functions and the various departments enlisted with it. The next section will outline the methodology used to collect primary and secondary data for this paper. The fifth section will examine the responses collected during the study. It will demonstrate the parameters on the basis of which citizens choose a public service delivery system and what exactly shifts their preferences. The final section will conclude with the next step that AS can take to more prominently capture the citizens' needs and preferences vis-a-vis the public service delivery system.

Background

Right to Service Legislation and Existing Digital Infrastructure

What is unique about the nature of citizen-state interaction in the public service domain is that the citizen is engaging in a transaction with the state, wherein the citizen is accruing a personal benefit, often in exchange of a small fee (either a direct service fee or indirectly through the payment

of taxes) (Thomas 2013:788). This likens the citizen to a customer or a client of a private firm and this analogy has been studied in depth in the field of New Public Management (NPM). NPM views the government as a more adaptive, entrepreneurial body and applies the same principles to its functioning as would apply to any privately managed service (Osborne and Gaebler 1992:2). This implies that the government is responsible for providing a certain quality of service, within a certain time frame as clearly specified beforehand. This sort of a relationship encourages symmetry of information as well as places the citizen on a more equal footing with their administration. However, a certain number of instruments are required to make such a relationship work. A major distinction between a private transaction and a transaction with the government is that with the former, a consumer usually has choice. If they are unsatisfied with a good / service from a certain provider, they have the option to switch to an alternative. This choice acts as an incentive for the provider to ensure quality of service. Further, in most countries, consumers usually have a set of consumer rights to legally protect themselves should there be a breach of contract with the producer / provider. An important constraint that remains in case of most public services is that the government has a monopoly on provision of the service. This means that the citizen cannot really exercise the choice of moving to an alternative if they are dissatisfied with the service. This puts more of an onus on the service provider to incorporate systems such as a citizen charter and public dashboards, that capture the citizens' feedback and grievances as well as promote transparency and accountability on part of the administrator.

There are various versions of such citizen charters being enforced by different countries across the globe. The Citizens' Charter, UK is one such prominent example which was launched in 1991. (House of Commons Public Administration Select Committee Twelfth Report 2007-2008). This charter recognised citizens as "customers" of public services who were owed a certain, minimum standard of quality of service and professionalism of delivery. The Citizens' Charter program espoused the following principles of public service:

- Standards: Explicit standards, published and prominently displayed at the point of delivery.
- Openness: There should be no secrecy about how public services are run, how much they cost, who is in charge, and whether or not they are meeting their standards.
- Information: Full, accurate information should be readily available, in plain language, about what services are being provided. Targets should be published, together with full and audited information about the results achieved.

- Choice: The public sector should provide choice wherever practicable.
- Non-discrimination: Services should be available regardless of race or sex. Leaflets are being printed in minority languages where there is a need.
- Accessibility: Services should be run to suit the convenience of customers, not staff. This means flexible opening hours, and telephone inquiry points that direct callers quickly to someone who can help them.
- Redressal: There should be a well-publicised and readily available complaints procedure. (House of Commons, Twelfth Report 2007-2008)

The Citizens' Charter evolved through different forms to eventually formalise into what is now known as the Public Services Guarantee. However, the core principles remain unchanged and are aimed at centering the user experience and satisfaction, using tools such as the Charter Mark Award (an award for departments that were able to achieve certain specified standards of user satisfaction - Cabinet office, 2004) and the Performance dashboard.

The Citizens' Charter inspired similar programs in other countries such as Australia which launched its Service Charter Program in 1997 and now uses Centrelink (https://www.servicesaustralia.gov.au/individuals/centrelink), a single platform delivery system that has aggregated all of the services provided by the Australian government. Another example is Singapore's Government Technology Agency (https://www.tech.gov.sg), which through its platform, 'Govtech Singapore' provides a wide range of services which are divided according to user i.e. into the categories of 'Citizens', 'Businesses' and ' Government'. What is common between Centrelink and Govtech is that both have a feature wherein services are organised around different stages in a citizens' life such as birth, marriage etc. Each such stage has unique needs and requires the citizen to interact with various departments of the government and this form of organisation makes it extremely easy for a citizen to navigate such a platform.

The UK Citizen's Charter also inspired India's first attempt at a similar legislative framework (Department of Administrative Reforms and Public Grievances 2002:1). The Indian government is notoriously mammoth sized with various public sector undertakings. It has consistently set low expectations, through its performance, for the quality of delivery of public services and schemes as well as the efficiency of the bureaucracy that is responsible for delivering the same. Service delivery is usually constrained by the absence of transparency and accountability on part of the bureaucrat which results in inertia and corruption. For instance, India has continued to slip steadily in the rankings of the Corruption Perception Index (Transparency International) between 2011 and 2019 and is currently ranked 80th out of 1988 countries.

An attempt was made to rectify this in 1997 with the decision to formulate Citizens' Charters, across sectors and states (Department of Administrative Reforms and Public Grievances 2002:2). This effort, adapted from the UK model itself, was led by the Department of Administrative Reforms and Public Grievances, but ultimately could not be realised. This Citizens' Charter, however, set the ball rolling for individual states to explore the idea of institutionalising transparency and accountability in public services. The Right of Citizens for Time Bound Delivery of Goods and Services and Redressal of Grievances Bill, introduced in the Lok Sabha in 2011, was an effort to legally enshrine the right of each citizen to service delivery within a specified time frame. While this Bill did not pass through the Lok Sabha, several Indian states have passed similar Bills. The most prominent features of these Acts is that they centre the citizen by implying that every citizen is owed service delivery within a certain period of time. However, merely enacting such an Act is not enough. The legal demand of the Act puts in place a basic incentive (or disincentive, due to the application of penalties), for the administration to deliver services on time. The administration requires tools to deliver on these promises and the design and operation of these tools are equally significant.

In 2006, the central government launched the National e-Governance Plan (NeGP) as an umbrella initiative which consists of 8 core and support infrastructure components and 27 Mission Mode Projects (in 2011, 4 more Mission Mode Projects were included – Health, PDS, Posts and Education). The purpose of NeGP was to facilitate not just the digitisation of central and state government services but also shape the long term e-governance strategy for the country. The NeGP is structured in the following manner:

- Common Service Centre (CSC): The Common Service Centre (CSC) was established in 2006. The aim of these front-end delivery centres was two-fold – to enable access to those services / schemes that had been digitised as well as to encourage rural entrepreneurship. The latter was implemented through a model wherein Village Level Entrepreneurs (VLE) with the required minimum capital and infrastructure, could establish and operate a CSC. There are at present, 3,00,774 registered CSCs in India of which more than 10,000 are registered across Haryana (although all may not be active / operational).
- State Wide Area Network (SWAN): This scheme assists states and Union territories in establishing SWANS within their respective jurisdictions, down to the Block level. The SWANs have been envisaged as the "converged backbone network for data, voice and video throughout a state / union territory (UT)".
- Mission Mode Project (MMP): The aim of each MMP is to facilitate

the transition of a specific citizen service onto an online platform. It is referred to as a mission mode project as each of these transitions have set timelines as well as a standard operating procedure. The ownership and direction of the MMP's vary depending on the ministry each service falls under as well as whether that ministry is in the Central, State or Concurrent lists.

- Service Delivery Gateway: The service delivery gateways provide a standardised interfacing, messaging and routing switch whose aim is to increase interoperability between multiple central, state and district level online administrative entities. These are further categorized into the following:
  - National e-Governance Service Delivery Gateway
  - State Service Delivery Gateway
  - Mobile e-Governance Delivery Gateway

A lot of states also have unique e-governance initiatives to be able to better achieve their public service delivery goals. Given below is a list of all Indian states that have enacted some form of the Right to Public Service Delivery Act as well as their respective online and offline service delivery platforms.

Table-1: State-Wise Breakdown of Public Service Delivery Legislation, Corresponding Online and Physical Platforms for Enforcement

State	Act	Online Platform (for Implementation)	Physical Touchpoint
Madhya Pradesh	Public Services Guarantee Act(2010)	MP E-district	Lok Seva Kendras / CSCs
Bihar	Right to Public Services Act (2011) Right to Grievance Redressal Act(2015)*	Lok Sewaon Ka Adhikaar	CSCs
Delhi	Right of Citizen to Time-bound Delivery of Services(2011)	District Delhi	Suvidha Kendra / CSC / Doorstep Delivery(of notified services)
Punjab	Right to Service Act(2011)	e-District Sewa	CSCs / Sewa Kendra
Uttarakhand	Right to Service Act(2011)	e-District Uttarakhand	CSCs
Rajasthan	Guaranteed Delivery of Public Services Act(2011)	State Service Delivery Gateway	Rajiv Gandhi Seva Kendra / CSC
Uttar Pradesh	Janhit Guarantee Adhiniyam(2011)	e-Nagarsewa (only for schemes / services provided by ULBs)	Jan Sewa Kendra / CSCs
Chattisgarh	Lok Sewa Guarantee Act(2011)	Chhattisgarh e-District	Lok Sewa Kendra / CSCS
Jammu and Kashmir	Public Service Guarantee Act(2011)	No common portal	CSCs (Khidmat Centre)

State	Act	Online Platform (for Implementation)	Physical Touchpoint
Kerala	Right to Service Act(2012)	Akshaya	Akshaya Citizen Service Centre / CSCs
Karnataka	Guarantee of Services to Citizens Act(2012)	SAKALA	Jan Sevaka home delivery model / Atal Janasnehi Kendra(Nadakacheri) / CSCs(Nemmadi Kendra)
Odisha	Right to Service Act(2012)	e-District Odisha	Janseva Kendra / CSCs
Assam	Right to Public Service Act(2012)	State Service Delivery Gateway/ Assam e-District	CSCs(Arunodaya) / Public Facilitation Centre
Gujarat	Right of Citizens to Public Services Act(2013)	Digital Gujarat	Jan Seva Kendra / CSCs
West Bengal	Right to Public Services Act(2013)	State Service Delivery Gateway	CSCs / Sahaj Tathya Mitra Kendra
Goa	Right of Citizens to Time-bound Delivery of Public Services Act(2013)	Goa Online	CSCs
Haryana	Right to Service Act (2014)	Antyodaya Saral	Saral Kendra / Antyodaya Bhawan / Antyodaya Saral Kendra / CSCs
Maharashtra	Right to Public Service Act(2015)	Aaple Sarkar	Aaple Sarkar Seva Kendra / CSC's
Mizoram	Right to Public Services Act(2015)	e-District	CSCs
Arunachal Pradesh	Public Service Act(2016)	Arunachal e-Services	CSCs
Andhra Pradesh	Public Services Delivery Guarantee Act(2017)	MeeSeva	MeeSeva Centre / CSCs
Meghalaya	Community Participation and Public Services Social Audit Act(2017)	e-District Meghalaya	CSCs / Public Faciliation Centre
Manipur	Public Services Delivery Guarantee Bill(2019)	e-District Manipur	CSCs

*Act, online platform and physical touchpoints sourced from each state's official website

While each of the above states have an online portal as well as physical touchpoints, the ownership of these platforms as well as the services they offer vary widely. A lot of the states (including all the ones using the e-District platform) use the State Service Delivery Gateway (SSDG). In most of the above states, the online platforms accumulate the application and tracking processes of various services or simply redirect the user to the website of the concerned department. Unlike the Performance Dashboard (UK) or Govtech (Singapore), they do not capture daily statistics of applications or any numbers that would make the whole process more transparent for citizen users. In this paper, we will take the case study of AS, the online platform used by the Haryana government which has set

up a unique system of capturing the performance of various departments, under the Right to Service Act as well as added certain other parameters. We will dissect how far this system is able to center and optimise the user experience.

The Evolution of India's Public Service Delivery System

Post independence, India adopted the Industrial Policy Resolution in 1948, which laid the foundations for a Soviet-style, all encompassing public sector. The central government would retain exclusive control over the production, regulation and supply of arms and ammunition, atomic energy and railways (Department of Industrial Policy and Promotion[1] 1992:1). Additionally, it demarcated three categories for all industrial undertakings as follows:

- Schedule A: The development of industries in this category would be the sole responsibility of the state and includes the likes of coal, minerals, iron and steel.
- Schedule B: The State would lead the initiative for industries in this category. However, the private sector would be expected to supplement the state's efforts as and when required.
- Schedule C: Industries in this category could be developed through private initiative but all such activities would take place in accordance with the Five Year plans and be heavily regulated under the Industries (Development and Regulation) Act (Department of Industrial Policy and Promotion 1992:2).

This essentially meant that the supply of almost all commodities and services were determined by the state and their delivery was restricted as a consequence of the same. The delivery of all modern day consumer items such as cars, despite private manufacturing, were subject to ration-shop like queues and a token system.

The economy was partially liberalised in 1966. However, this de-licensing project arbitrarily excluded commodities such as furnishing and toiletries with a particular government spokesperson stating that they were not "particularly a priority item, and it was thought that there was no purpose in allowing decontrol in a field in which we may not want substantial quantity to be added" (Mital 2016). While liberalization in 1991 emancipated consumer goods and certain industries from regulatory shackles, certain public services and publicly provided goods continued to only be available to the masses through the ration shop and token system. The selective and often arbitrary granting of licenses for production and

1 Department of Industrial Policy and Promotion has been renamed as Department for Promotion of Industry and Internal Trade

distribution of services by the state meant that supply was restricted and could not meet rising demand. This gap meant long queues and waiting times if a citizen were to obtain a service legally, and black markets and rent-seeking otherwise. The LPQ system unfortunately produced a slow and corrupt bureaucracy as one of its most enduring legacies. Following are the major issues that the Indian bureaucracy has been notorious for:

Corruption – Expense of Time and Money

The Prevention of Corruption Act (1947) laid out penalties for public servants whose offences could range from bribery to misappropriation of funds and abuse of office. However, this act was constrained by caveats including that no order under this act could be passed by anyone lower in rank than a Superintendent of police. The Prevention of Corruption Act 1988 significantly expanded the scope of the term 'public servant' which now included all employees of public undertakings including employees of national banks and all institutions that receive public aid. The 1988 act produced limited results. For instance, The India Corruption survey 2018 (Transparency International India 2018) demonstrated that 56% of the citizens surveyed in 2018 had paid a bribe to obtain a public service. However, an amendment to the Act in 2018 (Murthy, Pal, Prakash 2018) brought about some significant changes including introducing punishment up to 7 years in prison for those who were caught giving a bribe to a public servant (in any form, monetary or otherwise). Subsequently, the India Corruption Survey 2019 (Transparency International India 2019) recorded a slight decrease in instances of bribery by citizens, from 56% to 51%.

It is important to note here that the Corruption Perception Index measures both a citizen's perception and experience of corruption. This means that the more frequent a citizen's interaction is with corruption, the greater is the breach in trust between the citizen and the state. This also means that the average citizen ends up incurring a much higher cost of both time and money when trying to procure a public service / scheme, than is worth its value.

For instance, Citizen A wants to procure a certain service whose processing fee is Rs. 100. However, the citizen has made several visits to the department office with no luck. Each trip costs A, Rs. 50. A realises they must pay a bribe in order to file their application. A spends:

Service Fee:Rs. 100

Bribe: Rs. 500

3 trips to the department office: Rs. 150

Now let's assume, A's hourly wages can be calculated from their income and 'A' earns Rs. 150 an hour. This is the opportunity cost of one hour of A's time. Each visit to the department office takes up at least an hour.

Value of time spent: Rs. 450
Total cost incurred by A: 1200
Cost of applying for service on paper: Rs. 100

That is a Rs. 1100 deficit incurred by 'A' in procuring a single service. Now, this situation may be exacerbated if 'A' requires more than one service / scheme or 'A' is a daily wage earner who then loses a day's wage for every time they visit the department office. This is a rather simplistic explanation of a very real issue faced by millions of citizens, as is evident through Transparency International's data.

In Haryana, 44% of the citizens who participated in the 2019 survey admitted to paying a bribe. However, Haryana was also one of the 7 states which reported the lowest instances of corruption in the country (Transparency International India 2019).

Lack of Transparency

The intricacy of the bureaucracy poses a knowledge problem for the citizens. In the absence of the internet or online websites, the only official information that a citizen would have access to were through official gazettes and circulars. If one did not actively keep an eye out for the same, through news broadcasts and the like, it was very easy to miss updates and amendments. It was also difficult for a citizen to know what government schemes and subsidies they were eligible for, unless it was through state-sponsored awareness campaigns which would not always take place for all schemes. In this scenario, the onus was on the citizen to actively keep themselves informed. This task could perhaps be made easier if citizens organised themselves and pooled in their efforts. For instance, a farmers' union would have more incentive to ensure that they keep themselves informed regarding the latest farming subsidies and policies. However, for an average citizen with diverse interests and occupations, there isn't enough of an incentive to go out of their way to keep track of government programs. This lack of transparency is what encouraged the rise of intermediary agents who bridged the asymmetry of information for a fee. In most parts of the country, agents continue to play an important role for those who are academically / technologically illiterate or simply do not wish to spend their time waiting in government offices.

Legal experiments and efforts made to tackle the above issues, include the right to public service legislation outlined in the previous section as well as the Lokpal Bill and Prevention of Corruption Act. Over the past decade, Indian states have begun experimenting with ICT (Information and Communication) tools in an attempt to replace human discretion with computer algorithms. Most of these platforms currently are user-assisted rather than user-only facilities. This means that in most cases there continue

to be physical centres that a citizen can visit to have an operator assist them in using the platform. *AS* is one such attempt to transition public service departments towards cashless, paperless and eventually faceless transactions. What AS has done is not only aggregate the services of 37 departments into one single platform but also establish dashboards that continually measure the performance of these departments through certain metrics (including the Right to Service timelines) which are visible to all users. This has been a major push towards transparency and accountability.

Introduction to Antyodaya Saral

Various departments within the state of Haryana such as the Transport department have been slowly digitising their G2C service delivery over the past decade. The launch of *AS* in 2017 accelerated this process by providing a single platform for all departments of the state to host their applications through a paperless, cashless delivery model. AS provides access to 236 Government schemes, 310 Government services of 39 Departments .[2]

Saral Touchpoints

AS is a user-assisted facility. It has *kendras* (centres) with data operators at key locations across the state, in order to help citizens use the platform. It must be noted here that the platform used by citizens directly and the one used at these *kendras* is the same.

- Online Platform
  SARAL (saralharyana.gov.in), the online web platform, is a direct access point for users to apply for services and schemes of the Haryana Government. The platform enlists all schemes / services along with their respective details on charges, Right to Service timeline, documents required and other details for citizens to easily view, browse, and apply.
- Saral Kendra (or) Citizen Service Centre
  Saral Kendras are the physical touchpoint for AS, providing access to citizens who may need personal assistance in applying for the service / scheme, as well as for citizens who do not have access to / are not well versed with the intricacies of using an online platform. Saral Kendras have multiple single-window system counters with Data Entry Operators assisting in the filling out of applications.

Types of *Kendras*

Table-2: Description of Different Types of Kendras

Saral Kendra	Headquarter for service delivery in a district, often situated in the District's Mini Secretariat complex itself - SARAL Kendras provide access to all services only
Antyodaya Bhawan	Headquarter for scheme delivery, often situated in the District's Mini Secretariat complex itself - Antyodaya Bhawans provide access to all schemes only.

2 List of services and schemes attached in annexure.

AS Kendras	*Kendras* situated at Sub-Division / *Tehsil* levels in the District, often attached with the SDO / *Tehsil* complex itself - AS Kendras provide access to all services and schemes together.
Citizen Facilitation Centres	Districts, Municipal Corporations, Municipal Councils, and Municipal Committee offices are equipped with Citizen Facilitation Centres where they exclusively offer services of the Urban Local Bodies Department through Saral. For example, Birth & Death Certificate, Fire NOC, etc.
Atal Seva Kendra / Citizen Service Centre	While these exist across the country, in Haryana specifically registered CSCs are permitted to offer limited services of Saral

Data obtained from Digital Haryana Cell

Saral Portals & Interfaces

The two main interfaces of the platform are: (1) Antyodaya Saral Portal, and the (2) Antyodaya Saral Dashboard.

- Antyodaya Saral Portal

  The Antyodaya Saral portal is the primary touchpoint for users to apply for services and schemes. Note that users here may mean - (a) citizens who directly apply for a service / scheme on the website, or (b) Data Entry Operators at Saral Kendras and Citizen Service Centres (Atal Seva Kendras) who apply on behalf of the citizens visiting the physical touchpoints.

  The portal provides the ability to avail all enlisted services / schemes at any time, with distinctive features such as:

  - Remote application: Citizens may apply for services remotely, without the need to visit a physical touchpoint.[3]
  - Application tracking: Saral offers the ability to trace the status of the application through a unique application ID (Saral ID) which is received on one's registered mobile number once the application is submitted. Furthermore, dynamic status updates are provided on the progress of the user's application at every stage.
  - Timely delivery of services: The Knowledge Management System (KMS) which is part of the Saral Portal provides information on all the schemes and services - and their respective Right to Service (RTS) timelines. This helps to keep the user aware of the timeline within which one is entitled to receive the application by Government standards.
  - Transparency in charges: The KMS portal further details the Government charges & Saral service charges of each service / scheme as is defined by official Government orders. This helps to keep the

3 For certain services that would require a physical interface, for example, issue of Driver's Licenses, citizens are provided with the option to apply for a token number and time with which they may solicit an appointment to visit the Saral Kendra.

user informed about the charges one is obligated to pay for the service / scheme.

- Grievance Redressal[4]: Saral provides a helpline number and also allows for dissatisfied users to raise e-Tickets (grievance tickets) in case of any issue found in the service / scheme delivered i.e. spelling errors, erroneous applications, etc. Unlike Bihar, Haryana does not have a separate Right to Grievance Redressal legislation nor does the RTS Act mandate a timeline for response to grievances. However, AS does calculate a ticketing score i.e., the pace at which a grievance ticket is resolved and closed. While this may encourage faster resolution of grievances, it could also create a perverse incentive of closing a particular grievance as quickly as possible without adequate resolution. Of course, a user has the option to reopen the ticket but the time taken to resolve a reopened ticket is not captured. The state administration also offers alternative platforms for grievance resolution such as the CM Window.

• Antyodaya Saral Dashboard

The Antyodaya Saral Dashboard refers to the service delivery accountability portal for Departments, and as a consequence, of Districts as well. There are three kinds of dashboards – Department, the Deputy Commissioner's dashboard (which provide detailed reports on the districts' performance) and the State level / CM's dashboard (which provide a bird's eye view of the performance of all districts). The primary purpose of these dashboards is to improve accountability and transparency across ranks of officials, who are separated by geography and departments.[3]

Methodology

The study was conducted in three districts of Haryana- Karnal, Gurugram and Hisar. These three districts were chosen for their comparable population sizes, literacy rates and rural-urban population break-up.

Table-3: Demographic Breakdown of Three Districts

District	Karnal	Gurugram	Hisar
Population	15,05,324	15,14,432	17,43,931
Population_Urban	4,54,810	10,42,253	5,53,488
Population_Rural	10,50,514	4,72,179	11,90,443
SC Population (Percentage)	22.56	13.07	23.44
ST Population (Percentage)	0.00	0.00	0.00
Number of households	29,09,674	5,23,691	3,33,516
Sex Ratio	887	879	872
Literacy percentage	74.73	84.7	72.89

*Data from Haryana District Census Handbook, Census of India 2011

4 An example of each, of the three kinds of dashboards is attached in the annexure.

The primary data for this study was sourced via a combination of in-person interviews, user feedback forms and an online questionnaire. The sampling method used for the survey was non-probability purposive sampling. Semi-structured interviews were conducted with respondents, chosen from the pool of visitors at Kendras in the three districts and 20 responses were collected. The user feedback forms, handed to visitors at *kendra*s, recorded 220 responses. Both these methods had to be suspended far ahead of schedule due to the imposition of the pan-India lockdown. Post this, an online questionnaire was circulated amongst users of AS across the three districts wherein 300 responses were recorded and analyzed.

The interviews were qualitatively analyzed in order to gain an understanding of citizens' use of AS as well as their perception and expectations of the public service delivery system. Citizens were able to comment on their satisfaction with the service received but this could not be standardized owing to diversity of services and the various levels of application that different respondents were at. In order to fill this gap, a second questionnaire was floated with the aim of reaching 300 respondents (100 per district). The online questionnaire received 376 responses and achieved a response rate of 79.7%. The four most frequently and commonly used services were identified and used as the foundation for this questionnaire. These four services were Birth Certificate registration (Health Department), Driver's License application (RLA, Transport Department), Marriage registration (Revenue Department) and Death certificate registration (Health Department). This stratification was inspired by Centrelink's division of service applications, mapped according to the different stages in a citizen's life (consequently being the services that most citizens would require). These responses were then analysed to understand the user's experience with the entire application process as well as the ways in which the user would recommend improving on the experience. [5]

Use of public service delivery systems over time - Using case study of AS in Haryana

Prior to the implementation of *AS*, Haryana citizens requiring services would have the following options:

- To directly visit the Government Department office for the service/ scheme
- To opt for a G2C service / scheme through an agent
- To visit local level village camps organized for Government schemes and services.

At present, Haryana citizens have the following options:

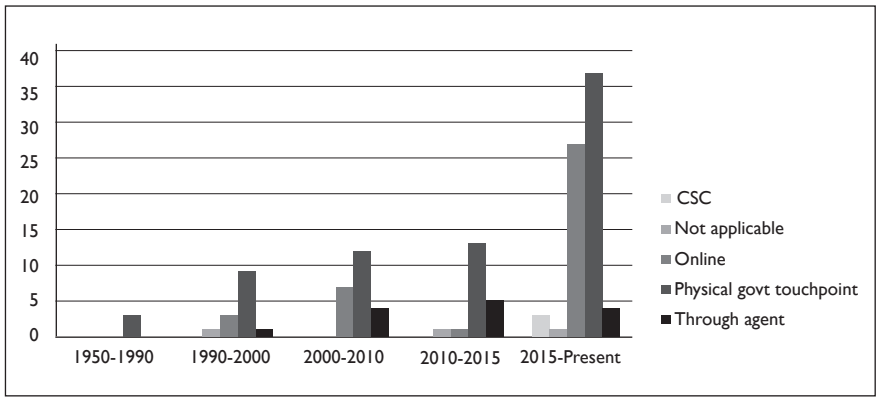
- To apply online through the AS platform
- To visit a local *kendra*/CSC and have an operator apply on their behalf
- To directly visit the Government Department office for the service/ scheme

5 Questionnaire is attached in annexure

- To opt for a G2C service/scheme through an agent (who will then have to choose option 1 or 2)

The responses of 300 respondents through an online questionnaire indicates that the number of users of physical government touchpoints has remained the most commonly chosen option, across time, as demonstrated below.

Figure-1: Use of Delivery System Over Time



The 2015-present time bracket has presented citizen users with the most number of delivery system options. The nature and composition of the physical government touchpoint itself, has evolved over time and gone through the following variations:

- Original Department Office - Citizen would directly need to apply here with physical copies of all documents. In case of high demand services such as driving licenses, the queues and consequently, waiting time would be longer since the department office with limited counters was the only place where one could apply for the service. The absence of automated queue management infrastructure would result in rent seeking by low level officials who had the power to move applicants up the queue, in exchange for monetary (or other) favours. Moreover, a citizen could only avail one service/scheme at the specific, designated office and would often have to travel between multiple locations for something like a business registration license which may require permissions from more than one department.
- Common Service Centres - As mentioned previously, the CSC was an access point established under the NeGP. State administrations across the country were beginning to digitise their services (although the rate and scale of this varied vastly). This digitisation decentralised the process of application and service delivery which meant that one could

apply without traveling to a specific department office. It also allowed the applicant to apply for services of multiple departments, thus creating what is known as a 'one-stop centre'. However, due to low technological literacy as one moves from urban to rural spaces, as well as decreasing accessibility to internet enabled devices, these web features could not be as extensively utilised across a population. The CSC played the role of an intermediary in this process and bridged this gap. This was the first step towards bringing the service application process closer to the citizen instead of the citizen having to bear the cost of time and money to approach the system.

- AS kendra / Bhawan - The AS kendras are an evolution of the CSC model, specific to Haryana. The AS online platform took the concept of the 'one stop centre' to the next level by creating a 'one-stop platform'. This meant that now, the application, tracking and grievance redressal process for all departments were aggregated for use through a single digital interface. Other states have similar models where certain services (mostly licenses and registrations for individuals such as birth certificates or driving licenses) are available on a common platform. Some states also have their own version of a CSC as demonstrated in Table-1. However, AS is the platform which has aggregated the largest number of services and schemes. While the AS platform enables users to directly apply on the online platform, the issues with accessibility and technological literacy remain. The *kendras* have been set up as intermediary stations wherein operators can apply on behalf of citizens.

What the above evolution shows is that the physical government touchpoint has transformed from being the sole space for application of public services to a form of helpdesk for the various online platforms, a conduit through which the citizen can use the online platform despite hurdles of accessibility and literacy.

The 2015-present period sees a sharp increase in the use of the online option which in this case means the direct use of an online platform by the respondent. This can be attributed to a number of reasons including the internet becoming more accessible in the last decade, greater technological literacy and the simplification of online platforms.

A couple of questions were asked to the respondents, on a 3 point Likert scale, with the aim of examining both their frequency of use of the internet as well as their familiarity with the use of online platforms such as e-commerce platforms (eg Amazon, Flipkart) and other online applications such as *AS*. The correlation between the familiarity with online platforms and mode of delivery used, shows that those who are most familiar with

use of online platforms tend to use the mode as compared to those who aren't as familiar and prefer to use physical govt touchpoints.

What we want to examine here are the features of these various modes of delivery that influence citizen choices. For those who are choosing to go to a physical govt touchpoint, are they signalling an active preference for the touchpoint or are they signalling an aversion towards the alternative i.e., the online platform.

If we compare the reasons why users choose a physical touchpoint versus an online platform, there are some recurring themes that show up.

Figure-2: Relationship Between User's Familiarity with Online Portals and Choice of Delivery Mode

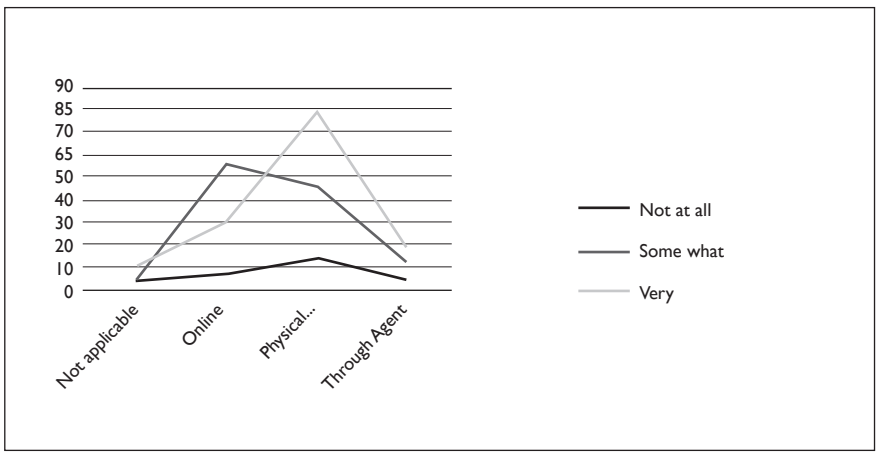


Figure-3: Why Did You Choose to go to A Government Physical Touch-point?

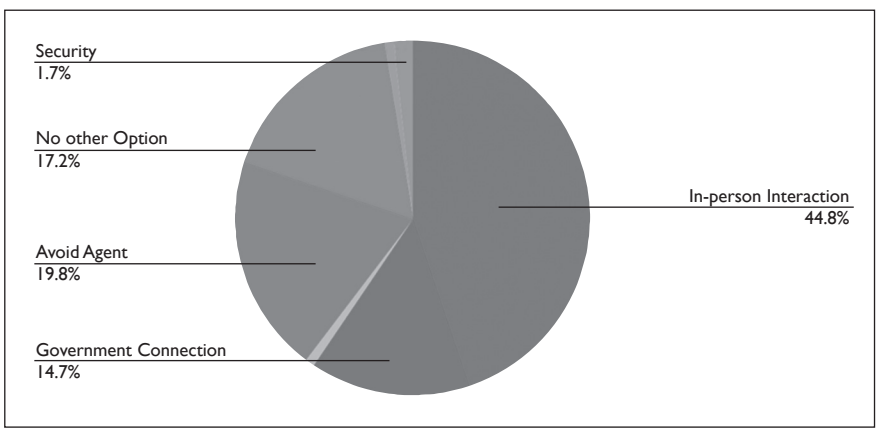
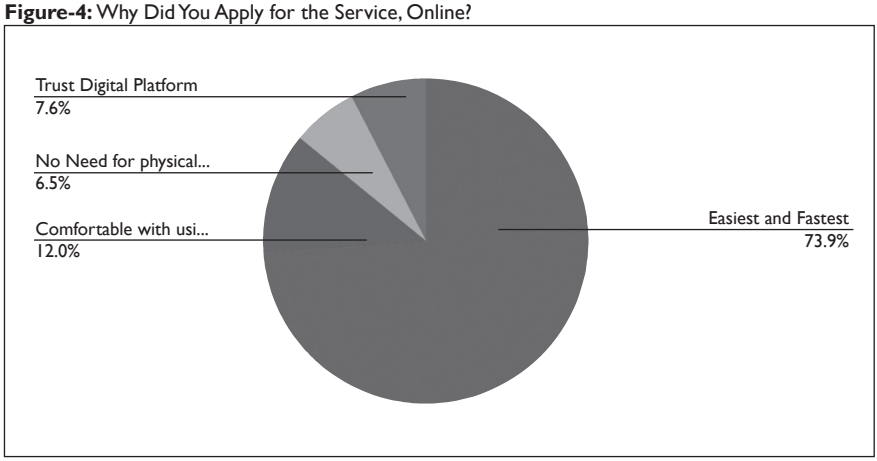


Figure-4: Why Did You Apply for the Service, Online?



The most common reason for choosing a physical touchpoint is the preference for an in-person interaction while for those choosing the online option is that it was the "easiest and fastest option". All respondents were asked what features they found most appealing about the mode of delivery they used. A comparison of the three modes of delivery, the most common reason behind their use and the features most commonly found appealing are given below. There seems to be a common theme across the columns and rows which is that they are mostly process focused. The user-friendliness or lack thereof a particular process is what influences a user's choice of mode of service delivery.

Table-4: Breakdown of Most Common Responses on Choosing A Particular Delivery Mode

Mode	Physical Government Touchpoint	Online Platform	Through Agent
Most common reason	In-person interaction	Easiest and fastest	Process difficulty
Preferred features	Friendly operators Step by step guidance Less waiting time	Clear instructions Clear guidelines on document requirements Simple, short forms User friendly web-design	Process too complex, would trust an agent to do it better

While the online AS platform lays out all instructions for a particular application and has a common interface, it still requires a certain amount of navigation by a novel user. This may be a challenge for those who aren't familiar with the use of online platforms in general. For such users,

the presence of an official who they can directly place their request with, replaces this navigation process. As evident by Table-4, these users prefer to visit a *kendra* which is equipped with officials who can navigate the platform and apply on their behalf. One may argue that the visit to the *kendra* comes with a cost as well. This includes time and money needed to travel to the *kendra* as well the opportunity cost of whatever else they had to do on that particular day. On the other hand, AS does have a helpline which the user may contact in case of queries. However, the helpline is a backup for the user, it only exists to assist the user for specific queries they may require help with. Therefore, it cannot be considered equivalent to the physical presence of an operator. For the user, the choice then becomes between spending time, navigating an unfamiliar platform with the risk of making a mistake versus spending time and money, travelling to a *kendra*/ CSC to have someone perform the same task for them. In both cases, the online platform of *AS* is being used and effort is being made to actively reduce the physical movement of files where possible.

The responses reveal simplicity of process and transparency of information (such as number of steps, service fees to be paid etc) as the most desirable features of a public service delivery system. Enhancement of both of these features would help empower the citizen with more information and the ability to use the public service delivery system to their advantage A citizen who is aware of their rights and their dues will be able to reduce their reliance on external agents as well as the discretion of bureaucrats.

Scope for Improvement

This paper has discussed how AS as a platform incorporates features that optimises the user experience for citizens. While a lot of these features are designed keeping user experience in mind, citizens themselves have had little say in the design of the platform or the potential improvement of the same. This is true of most policy interventions in India which typically allow for very limited citizen input. Since the most frequent interaction that a citizen has with their administration, is through the delivery of public services, it is the intuitive next step to include them in the process of auditing the public service system as well. A citizen-led audit has the ability to capture a diverse range of needs and problems that users may encounter with the platform, which administrators themselves may not have information on. In fact, the United Nations Committee of Experts on Public Administration (CEPA), in its resolutions of 2018 and 2019 (Committee of Experts on Public Administration 2020) iterated that service to citizens should be a priority when it comes to the transformation of public administration and emphasized the enlarged role citizens can play in monitoring administrative institutions and holding them accountable.

At present, there are three potential ways in which auditing of government services takes place:

- Through internally constructed award and penalty systems such as the performance metrics instituted by AS.
- Through internally conducted review meetings
- Through government appointed regulators who exercise varying levels of independence.
- Through the supervision of elected representatives at the district, state and central levels. However, this depends entirely on the discretion and will of individual representatives.

Currently, citizens' grievances are captured through the platform, in the form of 'tickets'. The pace of resolving these 'tickets' is aggregated into a 'ticketing score' which reflects a department's ability to resolve problems experienced by users. The platform also briefly experimented with a citizen feedback system in 2018 in which citizens would be asked for their feedback, post service delivery which could then be displayed on a citizen feedback dashboard.

With the technology that is available to the state administration, via the Digital Haryana Cell (DHC) and the National Informatics Centre (NIC), designing an annual citizen audit of Antyodaya Saral would be a robust next step in further enhancing accountability and transparency of the system. This audit can be executed through a simple survey instrument such as an online questionnaire that can be administered on an annual basis to as many citizens in a district as possible. Citizens can be interviewed via phone calls as well, subject to state capacity. This survey will serve the purpose of directly capturing citizen woes, opinions and advice into a database that can be updated every year. AS will thus have the benefit of input from not only public administration experts but also from the very consumers that it seeks to serve. Citizens can also be encouraged to form small, elected bodies at the panchayat or district level, in order to monitor the functioning of their local *kendras*.

Conclusion

Antyodaya Saral has made multiple strides towards establishing a public service delivery system that is smart, efficient and most importantly user-friendly. This last criteria is of special importance in a country like India wherein a large number of citizens continue to struggle with issues of literacy and accessibility. By establishing both physical centres in every district and an online platform with a standardised application system (across government departments), AS has pushed reform in the public service delivery space, closer to the citizen. This model, borne out of the combined

technological and administrative expertise of the Haryana government and external consultants such as Samagra can very well be emulated across other Indian states who are currently either functioning through the State Service Delivery Gateway or continue to have separate processes for different departments. However, the state has a responsibility to not only provide a cutting edge platform but also simultaneously help build the capacity of the citizens to be able to use such a platform effectively. As AS continues to expand the selections of services and schemes it offers, the state should continue to work on accessibility issues such that Antyodaya Saral, true to its name, is able to reach every last citizen.

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ANNEXURE

The following questionnaire is part of a study conducted by the Chief Minister's Good Governance Associates, Haryana and the Trivedi Centre for Political Data, to assess citizens' needs vis-a-vis online public service delivery platforms. The information provided by you will be kept anonymous and the compiled data will be released in a public paper on the above topic. Time taken to fill out form: 10 minutes

* Required

A) Personal Information

1) Age group*

a) 18-21 b) 21-30 c) 31-40 d) 41-50 e) 51-60

f) 61-70 g) 71-80 h) 80+

2) Gender*

a) Male b) Female c) Prefer not to say d) Other

3) Educational qualifications*

a) Graduated higher secondary school (Class 12)
b) Graduated high school (Class 10)
c) Graduated middle school (Class 8)
d) Undergraduate degree
e) Professional Degree (MBA/LLM ETC)
f) Master's degree
g) Other:

4) Residence location*

a) City b) Town c) Village

5) Kindly state the District and State where you are presently residing*

B) Internet Usage

1) For what purpose do you use the internet?*

a) Official work b) Studies c) Entertainment

d) To place orders / applications for goods and services

e) All of the above

2) How familiar are you with using online platforms (eg Amazon, Flipkart, Antyodaya SARAL)*

a) Very b) Somewhat c) Not at all

C) Antyodaya Saral

1) Which of these services have you availed from the government? (For yourself or on behalf of someone else)*

a) Birth certificate b) Driver's licence

c) Marriage registration certificate d) Death certificate

e) None of the above f) All of the above

2) Which Indian State have you availed this service in?*

3) When did you apply for this service?

Year	Birth Certificate	Death Certificate	Marriage Registration Certificate	Driver's License
Pre-1950				
1950-1990				
1990-2000				
2000-2010				
2010-2015				
2015-Present				

4) What was the last service you applied for? *

5) How did you apply for this document? *
   a) Through agent b) Physical Government touchpoint
   c) Online d) Not applicable

D) Through agent

1) Why did you go through an agent?
   a) I did not know the process b) The process was too complex
   c) I did not want to risk making mistakes
   d) I did not have the time to do it myself
   e) I trust an agent to do it better than myself
   f) Other:

2) Have you availed any other service through an agent? If yes, which one?

E) Physical Government Touchpoint

1) Why did you choose to go to a government physical touch-point?
   a) You prefer in-person interaction
   b) You wanted to avoid the use of an agent
   c) You aren't sure about the security of the internet application
   d) You knew someone within the Government setting, and hence this was easier for you.
   e) There was no other option available
   f) Other:

F) Online application

1) Why did you apply for the service, online?
   a) It is the easiest and fastest method
   b) You are comfortable with using the internet application
   c) You trust digital payment portals
   d) You trust in the data and document privacy of the internet
   e) You do not wish to physically step out and do not feel the need for human-to-human interaction for this
   f) The service is not that complicated
   g) Other:

G) Right to Service Act

1) Are you aware of the timelines of service delivery mandated by the RTS Act? *
   a) Yes
   b) No (Move to next section)
2) Was the service delivered within the RTS timeline?
   a) Yes
   b) No

H) Service delivery feedback

1) How much time did it take for the service to be delivered? *
   a) 1 day
   b) 1-2 weeks
   c) 2-3 weeks
   d) More than 3 weeks
   e) Other:
2) Were you satisfied with the speed of delivery of service? *
   a) Very
   b) Somewhat
   c) Not at all
3) Were you satisfied with the quality of service? *
   a) Very
   b) Somewhat
   c) Not at all
4) If not, why?
5) Kindly state the number of years of difference between the last service to the first service you opted for from the Government (if applicable)*
6) Has there been any improvement you have noticed in Govt. service delivery, comparing from the first and latest service you opted for? *
   a) Yes
   b) No

   If yes, kindly check the areas of improvement listed below.*
   a) Compliance to RTS timelines (delivered promptly)
   b) Clear guidelines on application processes
   c) Better Government touchpoints (online platforms, citizen service centres, etc.)

d) Online processes
e) Enhanced transparency and tracking systems
f) Other:

If no, kindly state in brief what hindered your process.*

a) Public service delivery
b) How would you prefer to avail a public service from the government?*
c) Online application
d) Agent
e) Physical government touchpoint
f) Depends on what the service is

7) What are the top 3 factors that you consider when using an online platform?*
   a) User friendly web design
   b) Clear instructions
   c) Simple, short forms
   d) Clear guidelines on documents to be attached
   e) Secure payment gateway
   f) Ability to track the application post submission
   g) Ability to interact with the backend support – call centre/chat centre
   h) None, I do not trust the internet due to privacy and data issues
   i) None, I am not tech savvy and am afraid of making mistakes

8) What are the top 3 factors that you consider when using a government physical touchpoint?*
   a) Vicinity to my home
   b) Friendly operators
   c) Less waiting time
   d) Infrastructure (seating ability, lights, air conditioning, etc.)
   e) Step-by-step guidance by operators on applying
   f) Call centre for follow-ups and checking
   g) None of the above

9) What do you dislike about government online platforms?*
   a) The lack of awareness
   b) Risk of data theft
   c) Afraid to make digital payments
   d) Complicated websites
   e) Lack of proper guidance
   f) Other:

10) What do you dislike about agents?*
   a) Premium on price
   b) Lack of trust
   c) Other:

11) What do you dislike about government physical touch-points?*
   a) Queues
   b) Red tapism and hour long lunch breaks
   c) Shabby infrastructure
   d) Staff
   e) Differential treatment to customers with influence
   f) Corruption and bribes
   g) Other:

12) Which of these services would you prefer to have offline?*
   a) Birth certificate
   b) Death certificate
   c) Marriage registration certificate
   d) Driver's license
   e) None

13) Have you ever used Antyodaya SARAL? If yes, what improvements/feedback would you suggest for the same?

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Need to Strengthen the Role of Public Health Institutions Amidst Corona Virus Pandemic: A Study in India

Vasantha Gouri*

Abstract

After the introduction of LPG (liberalization privatization and globalization), public institutions gradually lost their monopoly in India. Prompt and better quality of service provision helped many private companies to capture Indian consumer market. Private institutions could create their impact on basic service sectors also like education and health, particularly in urban metropolitan cities. At the same time the Government struggles to provide education and health services to the rural poor with the help of existing public institutions despite their non-satisfactory performance. In fact, the public institution system itself weakened due to their gradual and phase-wise privatization. The spirit of the welfare state also disappeared as the egalitarian society goal converted into 'growth-oriented economy'.

Despite providing the best services, the private sector is profit oriented and cannot survive without profit making. This need and greed of the private sector with regard to profit accumulation further widened the bridge between rich and poor. While the rich become further rich, the poor are unable to have access to basic health care needs owing to insufficient and inefficient public health care system. It is estimated that every 2 persons per second in the country are pushed into poverty due to heavy health care costs. Attack of corona virus pandemic once again emphasizes the need to strengthen our public institutions as private sector cannot venture into projects that do not bring monetary benefits. Health insurance schemes provided by the government engaging private sector partnership appear to be inadequate. Moreover, the market never regulates healthcare in public interest.

Currently the public health care system in India is overburdened with COVID-19 patients and private health institutions are charging exorbitant prices up to one lakh a day in the city hospitals. This paper focuses on functional loopholes of public health institutions in India, their inability

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to prevent spread of virus in the community and possible solutions to be adopted to minimize the loss of lives and protect maximum citizens from falling prey to the pandemic.

Keywords: CoronaVirus Pandemic, Poverty, Private Health Care Providers, Public Health Care System

Introduction

Public institutions across the world have undergone tremendous changes in their structure and functions during this 21st century. Public sector has been constantly changing and reforming, no part of the planet could escape this impulse. In fact, the demand for an effective and good governance is always on the rise. Governments all over the world are finding it difficult to adapt to information age since most of them continue to function, as a part of industrial age. Emergence of knowledge-based economies, globalization and modern IT are other developments are changing citizen expectations. Government during the industrial era was characterized by clear cut rules and government officials were expected to abide by the rules while on duty. There were continuous debates held on administration – the roles played by the government, private sector and civil society. However, their interlinkage is an absolutely necessary precondition for economic prosperity & social justice. (Yang, 2020)

While certain countries in Europe are well known for their inefficient bureaucratic public sector, in other countries it is in a better position-efficient and innovative. One practical problem observed was that almost all public sector organizations set with ambiguous goals to achieve. They have inconsistent and unclear objectives. Hence measurement of goals or assessment of development becomes very difficult in a situation where there is a constant conflict and competition between values. (Walle, 2009) With increasing competition as an effect of Globalization, Public Sectors all over the world are under tremendous pressure to improve their standards of services.

Public Sector in India

Post second world war, large number of countries in Asia,Africa and Latin America achieved independence from European colonialism after forgoing their wealth and resources for generations together and hence these countries were in dire need to improve their socio-economic conditions. Therefore, public sector played an important role in management and governance of their economies. In India also Public sector undertakings in post-independence period played a major role in building socio-economic base of the country. PSUs therefore were accorded as 'vehicles of their sustained

development. With the passage of time and increased income and living standards, the public expectations and aspirations raised but the capacity of PSUs did not increase. (Gakhar, 2020) Poor performance of public sector especially in education, health and social sciences has been subject to lot of debate in the last few decades. Corruption, lack of accountability, inefficiency, poor incentive mechanisms and oversized governments – are inherent in the state-run-systems today. Acute shortfall of human resources is another chronic problem effecting the ability of public sector throughout the country. This is reflected not just in numbers, but inadequacy in training and qualification of the personnel involved. For example, ina recent study of five states (Rajasthan, Odisha, Himachal Pradesh,Karnataka and Delhi) conducted by the Centre for Policy Research, it was revealed that 70% of district education officers, 42% of Block education officers, have dual charge i.e., in charge of more than one district or block. (Sinha K. B., 2018)

Indian administration during and after the phase Liberalization Privatization and Globalization (LPG) is worth noticing. On one hand the private sector slowly gained popularity and public trust, the reverse happened with the public sector. The 1991 Economic policy and reforms also encouraged the entry of private sector into the business and service domains hitherto reserved for public sector. Private institutions could create their impact on basic service sectors like education and health, to wealthier class of people particularly in urban metropolitan cities. At the same time Government, to this day struggles to provide basic services to poor particularly in the rural areas. There is lot of dissatisfaction among the public regarding the health and education services provided despite good salary packages provided to the public servants when compared to remuneration of private employees having problems of job insecurity. Concerns were raised about declining standards of public administration and this led to dualities in India's economic performance – confident and dynamic private sector & increasingly hierarchical government sector; private sector as winners in booming market economy and those left behind; rising remuneration of skilled labour& millions of uneducated youth seeking employment – there is remarkable underperformance in the provision of public services by all sectors of government. Thus, lot of debates and discussions are about the 'perennial inadequacies of public infrastructure' (Acharya, 2009)

Government Health Sector

India is having a strong and consistent health care sector filled with qualified and experienced doctors nurses and other paramedical forces. The hierarchy of health care sector right from the village level to district headquarters is well designed but not sufficiently updated along with the growing population and changing time. As a result the number of doctors or hospital beds are very insufficient when compared to the growing

population. Yearly budged sanctioned for health sector is one of the lowest between 1.1 to 1.4% of GDP and hence the medical equipment used or the methods of treatment used are very outdated. In India whose current per capita GDP is more than 2000 USD, health care financing is neither sufficient, efficient nor equitable. Government spending on public health care in India has been around 1.1 to 1.4 % of GDP over the last decade and public spending out of their pockets to fill the gap has been nearly 65%. About 55 millions of Indians are forced into poverty in a single year as they have to fund their own health emergencies and out of them 38 million fell below poverty line for spending on medicines alone as per a study done by Public Health Foundation of India. (Bhattacharya, 2020)

India's new health policy (2017) turned its attention towards private sector in its aim to achieve universal health coverage. Government seeks to involve private sector to fill the gaps in its public service through a well-planned purchasing of health care from private facilities and clinics. NHP acknowledge that 'Government services won't be able to keep up with the growing demands of the public' (Bader, 2017)

Challenges Confronting Public Health in India

India has been suffering from rising burden of communicable and non-communicable diseases from time to time. Also, India has been passing through a period of demographic transition wherein the rise in elderly population can be noticed that affect Indian public health. Another challenge was about controlling Maternal Mortality Rate (MMR) and Infant Mortality rate (IMR).

Re-emerging and seasonal diseases like Malaria, SARS H1N1, Swinflu etc. often keep troubling the Indian population. Health problems increase due to lack of awareness about good health practices and denial of access to balanced diet and safe drinking water particularly in rural areas. Despite implementation of National Rural Health Mission (NRHM) since 2005, public health system in India is still facing many challenges.

Some common reasons for public sector underperformance are corruption, lack of accountability, poor incentives offered and oversized government structure. The following attributes are discussed in detail. Apart from the above some attributes are discussed below:

Insufficient infrastructure: As per the world bank statistics, India is having only 0.5% beds per 1000 population.

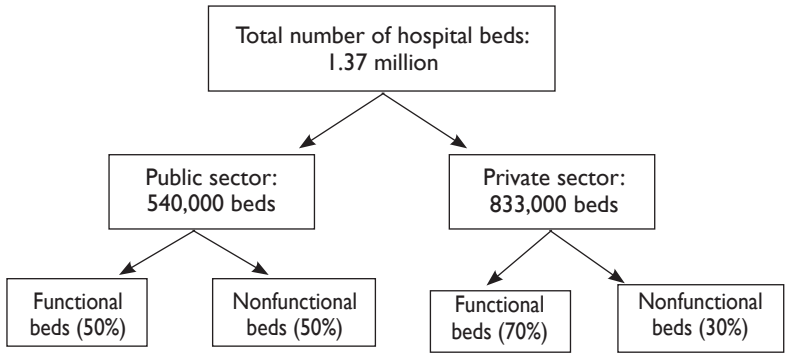
Table-1: Comparison Between the Availability of Hospital Beds /1000 Population In Different Countries

No of Beds /1000 pop	0.5	1.0	4.2	1.4	1.8	2.0
Country	India	Indonesia	Sri Lanka	Kenya	Botswana	Zambia

Source: https://data.worldbank.org/indicator/SH.MED.BEDS.ZS

The following Table-2 makes a comparison between hospital beds availability in public and private health sectors in India.

Table-2: Indicating Comparison Between Hospital Beds Availability in Public & Private Sector



Source: R. Mehta, B. Gulshan, A. P. Singh, and M. Khejriwal, "A Peek into the Future of Healthcare: Trends for 2010, Technopak perspective: A quarterly report," Quoted in 'High Level Expert Group Report on Universal Health Coverage for India, Instituted by Planning Commission of India, 2010.

Shortage of Human Resources: Absence of required personnel at every stage of administrative structure along with inadequacies in the training and qualification of the same indicates the severity in the shortage of skilled human resources. Shortage in crucial health sectors is below the internationally accepted norms. As per WHO data percentage of nurse and midwife personnel in India is at 2.04 per 1000 population compared to 5.22 in South Africa, 4.124 in Malaysia & 7.44 in Brazil. As per rural health statistics (2018) there are 37% vacancies to be filled in male health workers category at sub-centers and 24% of doctor's vacancies to be filled up at Primary Health Centers (PHC)s. (Sinha, 2020).The following table indicates the shortage in government staff in controlling public health and thereby fail in providing adequate health facilities to needy poor people particularly with reference to the rural areas.

Table-3: Indicating Overall Vacancies in the Public Health Sector

Indicator	Shortfall
% of subcenters without ANM	3.2%
% of PHCs without doctor	3.8%
% subcenters without regular water supply	25.5%
% subcenters without electric supply	25.5%
% subcenters without all whether motorable roads	6.6%
% of PHCs without regular electric supply	8.0%
% PHCs without regular water supply	10.7%
% PHCs without all-weather motor able roads	5.8%

Source: RHS Bulletin, 2012, MOHFW [2]

A study conducted in 2012 with regard to accessibility of health facilities within physical reach found that only 37% of citizens were able to access health facilities within 5 km distance. Research show that rural Indians are fighting more odds like diseases, malnourishment, weakness and premature death. Study further indicates that many PHCs lacked basic infrastructure facilities like doctors, wards, beds toilets nurses labor rooms and medicines (Kasturi, 2018). According to Rural health statistics of GOI (2015) about 10.4% of sanctioned posts of auxiliary nurse and mid wives are vacant and 40.7% of male health workers and 27% of Doctors posts at PHCs were vacant (Kasturi, 2018).Skewed distribution of the available manpower is one major reason for neglection of hospitals in rural areas. Number of doctors available is 4 times in urban areas when compared to rural villages. According to WHO out of 57 countries facing Human Resource inadequacies in health sector, India is ranking 52nd.(Bajpai, 2014)

Partnership with Private Health Care Sector

Inability of Public health sectors to provide quality health services compel the poor to seek services from private sector. Private health sector in India consists of large volume of health services but with little or no regulation. They often charge high for consultation or for treatment of diseases. The poor borrow money or sell their livelihood to meet the costs. Public sector partnership with private health services (PPP) is therefore a device considered to regulate inefficiencies in Public health services and make available the best services at marginal prices to the poor.

Private sector in health care gained public trust and confidence over a period of time since public sector slowed down after LPG. As per NFHS (National Family Health Survey)-3, 70% of the Indian households in urban areas and 63% of families in rural areas depend upon private sector. Confidence of public on private sector remarkably increased and this is due to private sector's ability to quickly respond to public needs and its capability to rapidly adapt to new technologies and maximize their usage.

Government in order to provide better and sufficient health facilities to the poor at affordable prices, forged partnership with private sector as evident under the different partnership models formed like – contract, BOT (Built operation and Transfer), Joint ventures, public-private mix, franchising etc. Networking of government hospitals including PHCs (Primary health Center) with private hospitals is also done across different states in the country today with Tamil Nadu as first state to initiate in this low-cost model. (Stalin, 2013)

Public Health Sector During Current COVID-19 Scenario

Novel Corona virus disease outbreak, first surfaced in China last year (2019) spread throughout the world and escalated into a pandemic leading

to declaration of national health emergencies in several nations. This virus causing acute respiratory syndrome is highly communicable and hence complete lockdown was practiced in many nations as a result number of businesses, services came to a halt. Lakhs of people lost their livelihoods and undergoing mental agony and frustration.

Ministry of Health and Family welfare, its supporting organizations and other civic bodies and their representatives have been in the forefront regularly announcing clinical and non-clinical guidelines and protocols based on the latest evidences on the spread of virus. Free COVID-19 tests under 'Ayushman Bharat scheme' as well as additional insurance coverage of 50 lakhs for our street level bureaucrats in health sector was announced. Further state governments collaborated with private sectors and academia to use ICT, Artificial intelligence (AI), Big Data Analytics for efficient contact tracing, geo fencing and quarantine management of suspects. Public policies like 'Arogyasetu' at national level, TamilNadu quarantine monitoring, and Maharastra's Mahakavach, chatbots in 24x7 command and call centers are among many remedies already under implementation.

As a part of treatment, all the states in the country have scaled up COVID-19 specific hospitals within short period of time. Tie-ups with NGOs, hotels, conversion of train coaches into isolation centers, utilizing robots to supply food and medicine to the COVID patients (Tamil Nadu), use of humanoids to deal with patients at hospital reception are some of the innovative measures to protect our healthcare workers. Apart from the above, volunteering, usage of telemedicine apps and facility management solutions are helping the states in satisfying the health demands of the public.

As far as testing and tracing is concerned, lot many inadequacies surfaced. Insufficient supply of testing kits and unreliable methods of testing led to slow identification of infected population. Private sector was involved for testing but this led to complaints about the high prices charged and unreliable results as well. There has been a strong advocacy for rapid and community testing in order to exit from lockdown situation. Later many academic, research and private institutions were permitted to manufacture low-cost testing kits.

Apart from testing, supply of PPE kits (doctors and other medical staff) hand sanitizers, masks and ventilators was slow and insufficient. In some states doctors and nurses are using raincoats and helmets to protect themselves from the deadly virus. All these situations can prove to be dangerous for thickly populated country like India.

As per the latest statistics India witnessed a massive surge of cases in the past one month. As on 14th Sept 2020, 49,30,236 confirmed cases and 80000 deaths took place (Sharma, 2020). By November 19, 2020 the total

number of cases increased to 89,58,484 confirmed cases and death toll increased to 1,31,578. (Oneindia.com, 2020)

Maharashtra has been the worst effected state by the pandemic followed by Tamil Nadu, Karnataka and Uttar Pradesh. One positive aspect is that the country continues to have the highest recovery rate in the world recorded as 92%. Some other facts that help Indians and limit the spread of virus are- tropical temperature, malarial endemicity, long history of BCG vaccine, proportion of aged population in India is 3.3% only.

While the COVID-19 cases were slowing down in January 2021 it was a sign of relief for many. Normal life resumed with the removal of restriction on work places markets and malls. Also, schools and colleges resumed to function since February 2021. However, this happiness and relief did not last longer as Corona second wave staged a comeback and cases with corona infections slowly and steadily began to rise since March 2021.

Corona Virus: Second Wave

By 3rd April 2021, India has been consistently recording the highest number of daily cases, globally surpassing US, Brazil on an average. Second wave appears to be spreading faster than the first wave that peaked in mid-September last year. Loosening the restrictions on public mobility, low testing, tracing and tracking system as the pandemic advanced besides the rise in public mobility could be the reasons behind the increasing second wave. (Radhakrishnan, thehindu.com, 2021)

Second wave of COVID-19 is different from the first wave in terms of symptoms, age of people being infected and spatial distribution. This time young people under 45 years and children also are getting infected. 80000 kids were infected in the five states – Maharashtra, Chhattisgarh, Uttar Pradesh, Karnataka and New Delhi from April 1st onwards. New symptoms along with traditional ones are – pink eyes, loose motions and hearing impairment were detected in the patients infected during this second wave of COVID-19. (Dutta, 2021)

Situation of Health Care Sector in India During Second Wave of COVID-19

Despite several health care reforms; Indian health sector unprepared to tackle the rapid spread of Corona virus. Amid sharp rise in the COVID cases, the daily positivity rate in the last 12 days doubled from 8% to 16.7%. A consistent rise was observed in the positive cases since April 12th though the testing increased marginally. (SushmiDey, 2021) On one hand, India recorded the fastest spread of 1 million COVID-19 cases in a matter of merely 6 days moving from 13 million to 14 million with daily case load of over 2 million cases rising each day. On the other hand, India did

not improve on the health infrastructure part and there are only 8.5 hospital beds /1000 population; 8 physicians /1000 population. Thus, the country's healthcare sector is not equipped to handle such a huge crisis. Inefficiency, dysfunction and acute shortage of healthcare delivery resources in public health sector do not match up with needs of growing population. Further, 80% of the population does not have health insurance coverage and 68% have limited or no access to essential medicines. (Mishra, 2021)

States of Maharashtra, Delhi, Punjab along with TamilNadu and Karnataka are worst effected by COVID-19 as maximum number of positive cases are found here also, they are falling short of essential health infrastructure and equipment particularly oxygen cylinders and ventilators. Keeping in view the shortage of oxygen cylinders, government decided to divert supply of oxygen cylinders from industries to medical purposes. Demand for oxygen cylinders to COVID-19 patients is 60% of the total production. Delhi, Maharashtra, Madhya Pradesh and Uttar Pradesh are witnessing a major spike in oxygen demand. Railways will be roped in to operate 'Oxygen Express' along with green corridors for fastest movement of liquid medical gas in cryogenic tankers across the country.(TOI, 2021)

22 critically ill Corona patients died on 21st April afternoon in Nashik's Municipal corporation run 'Jakir Hussain Hospital after their oxygen supply was disrupted for more than an hour due to leakage in the tank providing oxygen. Eleven out of them were on ventilators aged between 33 to 75 years. State government announced ex-gratia of 5 lakhs for each of their families. This kind of mistakes on part of hospital administration proves to be costly for many of those families who might have lost their breadwinners. (Pawar, 2021)

Vaccine Vows**:** Though vaccines having 80 to 90% efficiency have been prepared by India and supplied to the whole world, yet their supply for population within the country has become very difficult. Owing to the vaccine shortage the inoculation program came to a halt for one day in Telangana on 19th April, 2021. Prior to that several states bearing the burden of COVID-19 cases like Maharashtra, New Delhi, Chhattisgarh, Madhya Pradeshetc experienced continuous shortage of vaccine availability.

It is a matter of pride to recall that India was able to produce the most effective vaccinesa) COVAXIN India's indigenous COVID-19 vaccine by Bharat Biotech is developed in collaboration with the Indian Council of Medical Research (ICMR) – National Institute of Virology. b) COVISHIELD (NIV and Serum Institute of India's COVID-19 vaccine is a version of the Oxford-AstraZeneca vaccine that manufacturers in India produce locally). These vaccines were successfully exported several countries in the world and thereby our country generated trust and fame. However, inoculating Indian population has been slow. With rise in

COVID-19 second wave efforts were made to speed up the vaccination drive and this is not going as per schedule due to insufficient vaccine reserves. India has not yet vaccinated 1/5th of its population whereas countries like Israel vaccinated 60% of its citizens already. Thus India being world largest vaccine producer has included every one above 45 years for vaccination but so far vaccinated only one in 25 persons when compared to one in every two in Britain and one in every three in United States (Mishra, www.livmint.com, 2021).India has administered 6,840 doses per 1 lakh people as of April 8, lower than the world average of 9,410 doses. It is very unfortunate to observe – though India is able to manufacture vaccines, unable to effectively vaccinate all its citizens at a faster pace when compared with other countries(Radhakrishnan, thehindu.com, 2021) With many states falling short of vaccine, Government has cleared the import of Russian made Sputnik Vaccine to speedup inoculations in the country.

The following table indicates India's vaccination status:

Table-4: Indicating Vaccination doses administered for 1 lakh people

Countries	March 1st 2021	March 15th 2021	April 8th 2021
UK	31,410	39,040	55,830
USA	22,990	32, 620	52, 290
Brazil	3,980	5600	11,750
China	3,650	4,510	10,780
World	**3,990**	**4,930**	**9,410**
Russia	3,590	5,280	9,510
India	1,080	2,390	6840

Source: https://www.thehindu.com

Lockdowns and Night curfews to contain spread of COVID-19: Several state governments in the country have imposed restrictions on public movement in order to control the spread of virus. New Delhi Government imposed week long lockdown since 19th April 2021. Allahabad High court directed Uttar Pradesh Government to impose lockdown in 5 cities – Allahabad, Varanasi, Lucknow, Kanpur and Gorakhpur. Also, a penalty of 1000 rupees were imposed on persons who did not wear masks at public places. Maharashtra Government already imposed statewide curfew since 14th April up to 1st May 2021 in view of rising cases and shortage of medical supplies. Kerala and Punjab Governments imposed night curfews and made RT-PCR tests compulsory for all the domestic travelers. Rajasthan has already imposed weekend lockdown and has extended it further up to 3rd May 2021 since the daily cases in this state crossed ten thousand. Chattisgarh Government has announced complete lockdown in 8 districts under its administrative control. Jammu & Kashmir, Odisha, Gujarat,

Karnataka & Haryana all of them have imposed night curfew in some of their districts and urban cities. Telangana Government also imposed night curfew based on the High court directions on 20th April 2021 that will continue up to 1st May 2021. While curfews and lockdowns might result in serious losses for Indian economy and adversely affect the livelihoods of many particularly the migrant labourers and daily wage coolies as observed last year, Government of India considers it to be the last option to control the virus and has left to state governments to decide upon the matter keeping in view the local conditions and virus spread in their states.

Thus, pandemic has exposed basic problems in Indian health sector wherein there are no beds available in hospitals, many patients with deteriorating health condition is kept waiting due to lack of hospital beds, ICU ward or oxygen cylinders. Private hospitals in this situation squeeze money from the patients and every part of treatment can be accessed only after paying exorbitant prices. Further private corporate hospitals charge exorbitant prices from the COVID infected patients for basic treatment. Cashless health insurance schemes and Life insurance schemes are today not coming to the rescue of the COVID patients. Hence, the country needs more Government controlled hospitals and focus must shift from disease management to health management, patient education and prevention measures.

To Conclude

Handling a pandemic in a densely populated country like India is a herculean task. Demographically India is having large number of working age population who earn their living being employed in various formal and informal sectors. The poor migrant labourers and daily wage labours were the worst hit during the pandemic last year when complete lockdown was imposed. Loosing livelihood was more painful for them than falling prey to the new virus COVID-19. Complete halt of the public conveyance forced them to walk to their native places under the scorching sun. Public health and sources of livelihood were slowly disrupted based on these causes and effects of imposing lockdown in order to contain the virus. Hence during this second wave of Corona which has already proved to be more deadly than first (as more than 3 lakh getting infected and around 2600 deaths recorded in one day as on 25th April 2021) government left it on the states to decide regarding curfew or lockdown to be imposed depending upon the seriousness of the virus infections in their localities. Controlling the virus without disturbing the economy is need of the hour.

Thus, in India, high population density, poor socio-economic conditions and insufficient health care resources are major barriers for development to overcome. There exists a wide gap between policy making, enforcement, monitoring and evaluation of policies relating to the health sector resulted in weak public health system. WHO recently stated ‘future of Pandemic

will depend upon how India handles it'? In this dynamic society, with unique challenges that threaten the health of population, it is imperative that Government, private sector and community organizations collaborate to work towards better health policies and practices. Government also has to ensure that public develops awareness and not fear about the Covid-19 virus and its mutations.

The Way Forward

- Government needs to increase the COVID-19 testing on a large scale so that the infected persons are quickly identified. Tracing, Testing and Treating the COVID-19 patients should be done in every nook and corner of the country.
- COVID response and recovery measures need to be expedited. There is a need to keep pace with the fast-spreading virus and hence testing and tracing should be increased at a faster pace. More number of people should be tested every day so that the virus spread can be traced properly and controlled thereby.
- Districts in the country are classified into red orange and green zones depending upon the residents infected with COVID-19. Red zones need to get faster and effective healthcare attention.
- Strong guidelines need to be framed and implemented with regard to communication, surveillance, monitoring, testing and analysis at COVID hotspots, containment and clear zones.
- Easing and reimposing restrictions to contain the spread of virus should be repeated several times, depending upon an area and extent of virus spreading in that local area.
- Regular public health programs, like immunizations should continue without interruptions.
- Health system need to be strengthened with forging proper and ideal collaborations with private sector, sort out new methods of working and once again create a most reliable brand of public service
- Manpower crisis in the health care sector should be handled with appropriate recruitments in the required posts and encourage targeted vocational training to the existing human resources.
- Virtual consultations by healthcare professionals will become the mainstream care delivery method to be practiced during the post-pandemic phase
- Robotics can be utilized to promote social distancing.
- More number of hospital beds and medication facilities should be made available so that no COVID patient suffers and dies due to lack of treatment.
- Coordination should increase between Centre and state governments with regard to supply of vaccine doses and medical facilities to the

needy people.

- Vaccination process should speed up so that a greater number of people can be protected from COVID-19.
- It is the joint responsibility of Centre and State governments to work at providing all lifesaving drugs and medical facilities like oxygen cylinders etc to the patients in all hospitals across the country.
- Government should be able to lay down strict protocols for COVID-19 patients' treatment and no private players should be allowed to take advantage of the situation and squeeze the patients for money.
- There is a need to spread increased awareness among the public about the virus and its latest mutations and measures stay away from the virus.
- COVID infected patients must be taught to improve their physical and psychological strength to fight the virus instead of getting panicked.

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Profiles on Socio-economic Conditions of Dalit in Selected Villages in Karnataka State, India

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Abstract

Indian villages are almost all are unique. There is a different in socio-economic and cultural activities. The socio-economic conditions are plays a predominate role in Indian villages. There are two class systems in Indian villages. One group is touchable (class) and other one is ex-untouchable (class). The study conducted secondary and primary data. In the first stage entire state was divided into three main regions namely; North, Central, and South Karnataka. In the second stage, two districts in each region with highest SC population were selected. In third stage, two villages were selected in each district, based on highest SC population. The final stages, in each of the selected village 150 sample households were selected. Thus the total household selected is 1,800. The main findings of the study are: In Karnataka state; almost all villages Dalit socio-economic capabilities are less. The Sosale and Muguru village Dalits economic capabilities are better than other villages. This village is very near to Cauvery River and villagers were received sufficient water from river for cultivation for their crops. Further Dalits are educated and employed different institutions. Same situations were exists in Muguru village but next to Sosale village. Finally, the Dalits of Adivala village with regards to capabilities they are better than rest of nine villages. The study suggests that wherever, income sources are available, there capabilities are higher like in case of Sosale and Muguru villages.

Keywords: Dalit, Karnataka, Socio-economic Condition

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Introduction

Indian villages are almost all in same nature. But there is a different socio-economic and cultural activity. The socio-economic conditions are plays a predominate role in Indian villages. There are two class systems in Indian villages. One group (class) is touchable and other one is ex-untouchable (class). All BCs and OCs are comes under the touchable sect, whereas SCs comes under the ex-untouchable (untouchable) caste. The touchable are having all kind of economic power in terms of land, assets, money resources and political power. They are rulers of the village and the country. In addition to that they are the owner of the Industry, land and business activities. In contrast that the Dalits (SCs) main activities are working in agricultural, non-agricultural labour work and cultivating small piece of land and work menial jobs in their villages. Majority of the non-Dalits are not allowed Dalit people inside their houses. This paper focusing on the problems are facing by Dalits day to day life in their villages.

Methodology

The study conducted secondary and primary data. In the first stage entire state was divided into three main regions namely; North, Central, and South Karnataka. In the second stage, two districts in each region with highest SC population were selected. The selected districts are Belagavi (Belgaum) and Kalaburagi (Gulbarga) in North Karnataka; Chitradurga and Davanagere in Central Karnataka; and Mysuru and Tumakuru in South Karnataka. In third stage, two villages were selected in each district based on highest SC population. The selected villages are: Harugeri and Mugalkhoda in Belgavi district; Srinivas Saradgi and Ravoor in Kalaburagi; Naikanahatti and Adivala in Chitradurga; Towdur and Uchangidurga in Davanagere; Sosale and Muguru in Mysuru; Madalur and Kodigenahalli in Tumakuru (Table-1).

Table-1: Population Details of the Selected Villages

Regions	Districts	Name of the Village	Population	SC Population	Share of SC Population in the Total Population	Share of Village in the District's Population
North Karnataka	Belagavi	Harugeri	28754	5846	20.3	1.30
		Mugalkhoda	25835	5579	21.6	1.24
	Kalaburagi	Srinivas saradagi	7523	4374	58.1	0.89
		Ravoor	12117	3794	31.3	0.77
Central Karnataka	Chitradurga	Nayakanahatti	15545	2759	17.7	0.83
		Adivala	7550	2692	35.7	0.81
	Devanagere	Towdur	6113	3387	55.4	1.07
		Uchangidurga	9781	2823	28.9	0.89

Regions	Districts	Name of the Village	Population	SC Population	Share of SC Population in the Total Population	Share of Village in the District's Population
South Karnataka	Mysuru	Sosale	7260	5084	70.0	1.34
		Muguru	8393	2995	35.7	0.79
	Tumakuru	Madalur	6518	1951	29.9	0.45
		Kodigenahalli	7075	1764	24.9	0.41

Source: India Census, 2011.

The final stages, in each of the selected village 150 sample households were selected. Thus the total household selected is 1,800 (Maruthi I and Pesala Busenna (2015), Maruthi I and Pesala Busenna (2015), Maruthi I and Pesala Busenna (2016), Maruthi I and Pesala Peter (2016), Maruthi I and Peter Pesala (2017), Maruthi I and Pesala Busenna (2017) and Maruthi I and Peter Pesala (2018). The main objective of the paper is to investigate the socio-economic conditions of Dalits.

The Purpose of Village Studies

According to Srinivas (2012), economist and anthropologist and sociologists were studied village studies in India. The village studies were the mile stone in the development of social sciences. After Second World War people were interested and essential to study the changes in villages. The method of participation observation and presentation of the data were well useful in terms of theoretical and comparative studies across the subject. According to author the field work was very important to social anthropology as comparative sociology and other social sciences. Political sciences people were also doing field work for knowing the voters behaviors and this is useful to the political parties. Srinivas (2012) emphasized that most of the Indian poor people were exploited by other the dominate caste. There was a caste exploitation was taken places in villages. He finds that, field work gives way which is real, partially real and which is not real. A field work experience is crucial for his intellectual development (Srinivas, 2012). In address to above said points, we selected village studies for assessing the socio-economic conditions of Dalit households in Karnataka state for deep and depth study.

Profile of Ravoor Village

Ravoor village located in Chitapur taluk of Kalaburagi district. The village is 12 Kms away from Chitapur town. Ravoor village is connected to Kalaburagi by double road. Ravoor village was very rich granite business. In spite of this rich resource endowment the Dalits' of Ravoor were poor.

Dalit households do not have granite mines. The total population of the village is 12,117 and out of this male population is 6,098 and female 6,019. The total household in the village is 2,248. The average family size is 5.4. Of the SC total population account for 3,794. Within SC male population is 1,913 and that of female is 1,881. The ST population is very negligible at 33. The total literate population is 5,888 and of which male literates are 3,456 and female 2,432(Census; 2011).

Education and Health Facilities

The Ravoor village has Primary and Higher secondary Government schools. In addition to this, private schools were also functioning in the village. Economically sound households send their children to private school at Wadi town and other towns. One Pre University College was located in the village. Interested parents send their children to Chitapur town for undergraduate education. Some Dalits families were sending their children to private schools. There were three banks were operating in the village. The reason to opening of three banks in the village was financial transaction done by the owner of the stone mining, small contractors, middle men and fairly high population in the village. Primary Health Centre (PHC) was situated in the village. It's functioning up to the people satisfaction. Almost all in the village make use of hospitals resources.

Cultural Activities

The Church was located in Madiga sub-caste of scheduled caste colony/ area. Few of the Madiga caste persons were converted into Christianity. Dalits enter into all the temples and worship gods and goddess except in Hanuman temple. When asked the reason to not allowing Dalits inside the Hanuman temple, their reply was that, there is caste system in the village.

Caste System among the Scheduled Caste

Caste systems exist within the SCs. Four sub-castes persons were lives in the village. The Lambanis were considered as superior in the hierarchy and they were not facing any social discrimination. The next position occupied by Vaddar. The third in the position was Holeyas. This group also faces discrimination in the village. In the fourth place comes that of by Madiga caste. Madiga people were also facing caste discrimination in the village.

Socio-economic Conditions

Ravoor village was a rich village as it has endowed with stone mines. The stone mines, belong to upper castes. The Dalits in the village work as causal and daily wage labourers in the mines, and they earn ₹ 250 to ₹ 600 per day. Some of the other caste households were migrated to Mumbai for earning better income. In Ravoor village, many of the SCs households do not have separate bath rooms in their houses. Some women take bath inside the house, itself and some of others in front of the houses, at dark

hours. Similarly, most of the Dalit households do not have toilets. Open defection was the practice for majority of population.

Profile of Srinivasa Saradagi Village

Srinivasa saradagi village is situated on 15 Kms away from the district headquarter. It has good road connectivity from district headquarter. The village total population is 7,523 and out of that male account to 3,881 and that of female is 3,642. The number of households in the village is 1,299. The average family size is 5.78. The population of SC (58%) total population is 4,373 of which male population is 2,280 and female is 2,094. The ST total population is 11. The total literate population in the village is 3,399 of which male literates 2,118 and that of female 1,281. The village had some hamlets (Thandas) which were non-revenue villages. The Lambani castes (community) reside in these Thandas. There was one Post Office in the village and it was functioning well. Punjab National Bank (PNB) was working in the village and was providing banking facilities. For further details please find in Busenna and Maruthi (2015).

Profile of Harugeri Village

Harugeri village is located in Raybag taluk of Belagavi district. Harugeri is at 18.9 kms from taluk (Raybag) headquarter. Harugeri is a Hobli. The total population of the village is 28,754 and of which male population is 14,681 and female population is 14,073. The total households of the village are 5,567 and the average family size is 5.2. The share of SC population in the village is 20.3 per cent. The total SC population in the village is 5,846; of which male population is 3,002 and that of female 2,844. The total illiterate population is (17,499) higher than the literate (11,255) population. Of total literates of male population is (9,906), higher than the female literates (7,593). The total workers are 10,604; of which male workers are higher (7,563) than the female (3,041) workers (Census; 2011). The GP office was located in the village, and functioning quite well. The drainage system was in poor condition at the time of our field work. Lack of drainage system, water overflows in some places and stagnate in some places. Villagers threw garbage waste on the open grounds. The garbage was not cleaned in timely and as a result pigs were creating nuance in the village.

Education and Health Facilities

Harugeri village has all kinds of educational facilities. Primary schools were located in different localities of the village. Government and private high schools also exist in the village. In addition, one Government Degree college one Post Graduate centers are located in the village. The village was very big and also a Hobli and as such all kinds of facilities were available within the village. Illiteracy rate was higher among the Dalits.

A primary health centre (PHC) was located in the village. Besides many private clinics were also providing health services in the village. Health workers visit all households in the village periodically.

Cultural Activities

One Jain Bhavan was located in the village. Only Jains were allowed in this temple. The priest in this temple was naked. The other temples in the village were Hanuman and others. There was no entry Dalits to this temple. The Dalits protested against this practice and once forcibly enter the hanuman temple.

Socio-economic Conditions

The capabilities of Dalits in terms of socio- economic conditions were low. The main occupations were agriculture labour, non-agriculture labour and very few of them were small and marginal farmers. And some of them were working in construction work. Majority of the Dalit households do not have owned toilets. Open defecation was the common practice.

Devadasi System in the Village

In the village some of the women were engaged as a Devadasi. During the childhood of girl, their parents dedicated them to goddess Yellamma (Yellamma is female god). After this dedication the girls' have to serve the Yellamma. And she has to do ritual things to Yellamma. After puberty the girl will have relationship one male person in the village. In the village male persons bet on the woman. The highest bidder will have relation with the woman. The person can have relationship with the women as long as he wishes the women. Some Devadases move to Mumbai, Pune and Bangalore to open brothel houses and practice prostitution. All most all Devadasi were not happy with their profession. Unknowingly and circumstance lead them into to this profession.

Profile of Mugalkhoda Village

Mugalkhoda was situated in Raybag taluk in Belagavi district. The total area of Mugalkhoda was 5,206 hectares. The total population of the village is 25,835 and of which male population is 13,113 and female population 12,722. The share of Dalit population in the total population is 20.6 per cent. The total SC population of the village is 5,579; of which male population is 2,816 and that of female 2,763. The literates (14,066) are higher than the illiterates (11,769). Among the literates; male literates (8,071) are higher than the female literates (5,995). The total main workers in the village are 11,063. Of this male workers (6,878) are higher than the female workers (4,185).

Health Facilities

There was one PHC in the village and it was functioning properly. Most of the Dalit people get treatment in the Government hospital. One private clinic was also functioning in the village. Some Dalits were getting treatment from private clinic.

Cultural Activities

Villagers perform all kinds of cultural activities in the village. Almost all Hindu festivals were celebrated in the village. Dalits were not allowed to enter into the temples in the village. Although Dhobis services were available in the village, but they discriminate against the Dalits by not washing their clothes. Barber shops were there in the village and they do not discriminate against the Dalits.

Devadasi System in the Village

Nearly 60 to 70 Devadasi women were in the village. The Devadasi main head quarter was located at Ghattaprabha. With regard to prostitution by the Devadasi, the Devadasi Committee takes decision.

Socio-economic Conditions

The socio-economic conditions of the Dalits were very poor in the village. Most of them were landless labour. Very few were marginal and small farmers. Due to poverty prostitution was highly practices and women were dedicated to Devadasi to Goddesses Yellamma. Majority of the Dalit households do not have toilets in their houses and largely practice to open defecation.

Profile of Kodigenahalli Village

Kodigenahalli village was located in Madhugiri taluk of Tumakur district. This village is very near to border state of Andhra Pradesh (10 km). The villagers were able to speak Kanada and Telugu language. The total population of the village is 7,075; of which male population is 3502, and female population is 3,573. The female population is higher by 71 persons. The total households in the village is 1,667 and the average family size is 4.2 (2011 Census). The share of SC population in the total population is about 25 per cent. The total SC population of the village is 1,764; of which male population is 870 and that of female 894. The female population is higher than the male population in the Dalit households. The total literates in the village are 4,981. The male literates (2,728) are higher than the female literates (2,253). The total workers are 3,551 and of which male workers (2,191) are higher than the female workers (1,360).

Education and Health Facilities

Kodigenahalli was a very big village and also a Hobli. In this village all

types of educational institutions exists. Two primary schools were located in different localities of the village. One High school was functioning in the village. The Dalits send their children to Government schools and very few of them send their children to private schools. In the village one Pre-University college was located and functioning well. One Primary health centre was located in the village. In addition to that other six private clinics were also providing health services to the public.

Cultural Activities

Kodigenahalli village has many temples and also located in different places in the village. They are: Eswar, Narasimha swamy, Kollapuramma (goddesses), Dondamma (Goddeses-located in SC colony), Sri Rama (located in SC colony) and also Hanuman temple. During festivals, every day morning inside the temples use mikes. A Church was located away from the village. Some of the Dalit people worship in the Church on Sundays. Dalits were not allowed inside the Hanuman temple.

Socio-economic Conditions

The Dalits main activities were agriculture labour, cultivating small pieces of land, during slack season. Dalits were seeking employment opportunities in urban areas and cities. Most of the Dalits are economically weak and socially pathetic conditions even today. Large numbers of Dalit households do not have toilets. Women defecate in open during night. Similarly there was no bathroom in the houses of Dalits. In a majority of households Dalit women take bath in front of the houses before down and nights.

Profile of Madalur Village

Madalur is located in Sira taluk of Tumakuru district of Karnataka state. The total population of the village is 6,518 and of which male population is 3,348 and female 3,170. The total households are 1,394. The average size of the family is 4.7. The share of SC population in to total population is 29.9 per cent. The total SC Population is 1,951; of which male population is 1,029 and that of female 922. The total literates are 4,046 and within this the male literates (2,359) are higher than the female (1,687) literates. The total worker in the village is 3,424. The male workers (2,016) are higher than the female workers (1,408). Canara Bank was operating and it provides loans to farmers. A GP office was located in the village and doing well. Drainage system was also provided by GP in the village, but maintenance was poor. Pigs wander everywhere village.

Education and Health Facilities

Government Primary and High schools were located in Madalur village and in addition to that private schools were also exists. There was no college in this village. But the Dalit children were unable to study higher education

due to lack financial support and socio-economic reasons. Primary health centre in the village provides health facilities to the people of the village and it was functioning well. There was one private clinic in the village. A pharmacy shop was also exists in the village.

Cultural Activities

Different social groups' people reside in the village. A few temples were there in the village, they are: Hanuman and Lakshmi temples. The so called OCs and BCs not allow Dalits into the temples. The Dalits worship from outside the temple. Dhobi services were available in the village, but they don't wash the clothes of Dalits. In the case of barbers they do service for Dalits also.

Socio-economic Conditions

Dalits main occupation was agriculture labour and few households have small piece of land. The socio and economic condition of Dalits were poor. Dalits were demoralized a lot in the village. Majority of the Dalits do not have owned toilets in their houses. Open defecation was the common service. Dalits households in this village were very poor and their economic condition was very pathetic.

Profile of Towdur Village

Towdur village is situated in Harapanahalli taluk on Davanagere district. The total population of the village is 6,113, of which, male population is 3,175 and that of female 2,938. The total population of Dalits is 3,387 and within this the male population is 1,735 and that of female 1,652. Dalits population is account for 55 per cent. The total household in the village is 1,201 and within these Dalit households are nearly 665. The average family size of the village is 5.1. The total literates in the village is 4,026 of which, male literates are 2,372 and female 1,654. The total workers are 3,306 and male workers (1,862) are higher than the female workers (1,444) (Census; 2011). The GP office was situated in the village and it was functioning quite well. The village has drainage system but the maintenance was not good.

Education and Health Facilities

The village is a small compared to other selected villages. Although the village was small but educational institutional like Primary and High school facilities were available in the village community. Majority of the Dalits send their children to Government school and a few are private schools. There was no primary health centre (PHC) and no private clinic in the village. Majority of the Dalits go to neighbor villages for their health checkup. Sometimes health workers visit Dalit households and other caste households in the village.

Cultural Activities

Barber shops were there in the village. Barbers do cut hair to Lingayats', Vokkliger, Kurubas etc. Barbers do not cut hair to Dalits. Dalits do not protest because of their poor conditions and also depend agriculture labour in the upper caste owned land.

Socio-economic Conditions

People belonging to different social groups reside in the village. The important caste groups were Lingayats and Brahmins, Vokkaligar, Kurabas and Dhobis, Scheduled Castes (Madara, Bhovi) and Scheduled Tribe. Some Dalits rear pigs in the village. Most of the Dalits were landless labourer. The economic conditions of Madhara community households' were poor. Very few of the Dalits households were having owned toilet facilities in their houses.

Profile of Uchangidurga Village

Uchangidurga is a village in Harappanahalli taluk of Davangere District. The total population of village is 9,781. Of which, male population is 4,926 and most of female population 4,855. The total SC population is 2,834 and female population (1,415) is higher than the male population (1,408). The share of Dalit population in the total population is 29 per cent. The total households in the villages 1,947 of which, Dalit households are 562. The average size of the family is five. The total literates are 5,647 of which, male literates (3,194) are higher than the female literates (2,453). The total number of workers is 5,792. Of which, male workers is 3,075, which is higher than the female workers (2,717). There was one Pragathi Krishana Grameena Bank branch in the village and which was provides loans to the farmers. A GP office was located in the village and its functioning was good.

Education and Health Facilities

Government Primary and High School facilities were available in the village. In addition to that there was one private primary school and one Government college was working in the village. Majority of the Dalit children go to Government school and a very few to the private school. One primary health centre was located in the village and it was provides health facilities to the people. It's functioning was very good. In addition to that there was one private health clinic in the village. Majority of Dalit families get treatment Government hospital.

Cultural Activities

Uchangamma temple was located in the village and it was a famous temple in the Taluk. This was an historical temple and huge number of people

comes from different areas to visit temple. In contrast to this Dalits were not allowed into the Hanuman temple. Devadasi systems prevail in the village. Dhobi services were available in the village, but they do not wash Dalit people clothes. Barbers do service to all communities including Dalits.

Socio-economic Conditions

The caste composition of Lingayats, Kurbas and Vokkaliger and SCs (Madara and Bhovi) were the broad social groups in the village. The economic conditions of SCs were poor. Among the Dalits Bhovis were better than Madaras in terms of own lands education and employment. Caste discrimination still exists in the village. Bhovi is sub-caste of Scheduled Caste and they were not facing discrimination and they were touchable, whereas Madara is sub-caste of Scheduled Caste and they were untouchable in the village. Open defecation was the common practice in the village. The concerned authorities have to create awareness about importance of good sanitation.

Profile of Nayakanahatti Village

Nayakanahatti is a village in Challakere taluk in Chitradurga district of Karnataka State. Its total population is 15,545 of which male population is 7,823 and that of female 7,722. The total household in village is 3,161 of which, Dalit households are 561. The number of persons per household is five. The Dalit in the total population is 2,759. Of this male population is 1,385 and female population is 1,374. The total literates are 10,118 and within this male literates (5,672) are higher than the female literates (4,446). The total workers are 8,037 and of this male workers (4,742) are higher than the female workers (3,295) (Census; 2011). A GP office was located in the village and its functioning was quite good. A good drainage system exists in upper colony, whereas open drainage system was provided in SC colony. There was no proper maintenance of drainages in SC colony. Caste biased exists in the village.

Education and Health Facilities

Government primary school and high schools were functioning in the village. In addition to that there was one private school in the village. A Sanskrit school was also their and it was run by Math. An ITI institute was also available in the village. A primary health centre was located in the village, and it was working up to community satisfaction. There was one private clinic which supplements health needs of the people. Dalits get treatment from both governments & private hospitals. Health workers visit the Dalit households.

Cultural Activities

Tipperudraswamy, Hanuman, Pennahobleshwar were the notable temples. The Dalits were allowed inside the temples. A Church was situated in the village and all caste people enter in to the Church and pray in the Church.

Socio-economic Conditions

In the village, majority of the SCs were poor. Madara people have small land and their main occupation was agriculture and non-agriculture labour work. A few of the Dalits own piece of land. The overall economic conditions of Dalit were poor. Illiteracy, high practicsm of alcoholism, lack of employment opportunities due to illiterate and low income were the main reasons for being poor. Majority of the Dalits household do not have toilets in their houses. As a result they practice of open defecation. Only few of Dalit households have toilet facilities.

Profile of Adivala Village

Adivala village is situated in Hiriyur taluk on Chitradurga district. The total population of the village is 7,550 of which male population is 3,662 and that of female 3,888. The total households in the village are 1,842 and of which the Dalit households number about 657. The average family size in the village is 4.1. The total population of Dalits is 2,692. Of which female population is 1,393 which is higher than the male population (1,299). The share of Dalits population in the total population is around 36 per cent. The total literate in the village is 4,641 and of these male literates (2,483) are higher than, that of female literates (2,158). The total number of workers in the village is 3,834. Male workers (2,197) are higher than female workers (1,637) (Census; 2011). A GP office was located in the village. It's functioning quite well. Roadside open drainage system exists in the village. But the drainage was maintained properly.

Educational Institutions

Government primary and high schools were located; all poor and weaker section family children seek education in these schools. There was one primary health centre in the village. In addition to that, private clinics also exist. Dalits visit Government as well as private hospitals.

Cultural Activities

Dhobi services were available in the village but not for Dalits. Still caste discrimination prevails in the village. However barbers were available in the village and they do not discriminate against Dalits. Yerragunteswara and Kariamma were the notable temples in the Dalit colony.

Socio-economic Conditions

A few Dalit households run buddy shops. Some of them have two wheeler

vehicles. Nearly 20 to 30 per cent of Dalits educated up to intermediate and degree level. Nobody was employed in government office (job). Only a fewer of Dalit households have toilets facilities in the village. Open defecation was the common practice by the Dalits in the village.

Profile of Sosale Village

Sosale village is located in T. Narasipura taluk of Mysuru district in Karnataka state. The total population of the village is 7,260. The female population (3,634) is almost equal to male population (3,626). The total SC population of the village is 5,084 and male population (2,532) is lesser than the female population (2,552). The total households are 1,568 and in this the Dalit households number 1,000. The average person per family is 4.6. The share of Dalits in the total population is 70 per cent. Majority of the Dalits are residing in the village. The total literates are 4,288 and of which male literates (2,342) are higher than the female literates (1,946). The total workers in the village is 3,325, of which, male workers (2,274) are higher than that female workers (1,051). A GP office was located in the village. It was functioning well.

Education and Health Facilities

Government primary schools were located in different areas in the village. There was no higher school in the village, and children of this village go to the neighboring village for high school. There was one primary health centre in the village and its functioning quite well. In addition to that one private clinic facility was available in the village. Dalits visit both hospitals for their treatment.

Cultural Activities

The village has many temples like Honna Gevi, Ubalswami, Ganapahti, Veerabadra swamy, Hanuman, Kodal Gopal Krishna swamy, Malla harshamma and Maramma temples. The Dalits people allowed entering into all temples in the village. Dhobi and barber services were not available in the village. The important castes in the village are: Lingayaths, Muslims, Ganiga, Kumbara, Voikkliger and Kurvas and Scheduled Caste (Holeyas). Dalits were having around two acres of land for burial ground to the Scheduled Caste community in the village.

Socio-economic Conditions

Dalits economic conditions in the village were quite good. Some Dalit persons were educated and got employment in public sector and also in private sector. The Dalits also have lands and cultivating paddy. Cauvery River was flow near to the village. A few of Dalits built good houses and their lifestyle was also very good. Further a few of Dalits posses' tractors and Lorries. The Dalits of Sosale village possesses high capabilities

compared to the Dalits of other villages. Within the SC caste; only Holeyas were residing in the village. Other community and backward castes do not allow Dalits into their houses. And also the practice of two glass system exists in the work places. Dalit women cannot to shake hands of OCs and BC women. If Dalit women were coming near to other community women, immediately they will give some space to Dalits women. Majority of the Dalits have toilets facilities in their houses. Those who do not have toilets and they were practicing open defecation.

Profile of Muguru Village

Muguru village is located in T.Narsipura taluk of Mysuru district in Karnataka. The total population of the village is 9,393 and of within female population (4,276) is higher than the male population (4,117). The village Dalit population is 2,995 of which male population (1,435) is lesser than the female population (1,560). The share of Dalit population in total population is 36 per cent. The total households in the village are 1,835 and the number of Dalits households is 650. The average size of the family is 4.6. The total literates of the village is 4,452, and of which, male literates (2,351) are higher than the female literates (2,351). The total workers in the village are 3,334. Of this male workers (2,550) are higher than the female workers (784). A GP office was situated in the village and it was working well. Open roadside drainage system exists in the village and their maintenance was also good.

Educational Facilities

The Government primary and high schools were located in different places in the village. In addition to that, a private high school and Pre University College was also available in the village.

Cultural Activities

Villagers were very keen to celebrate all kind of festivals in the village. Many temples such as: Thibbadevi, Eswar, Manteswamy, Dubalvva and Veerabadhra were located in different parts of the village. Dalits enter all temples. A Church also located in the village and there was no discrimination across the castes. Dhobis services were available in the village, but they do not wash Dalits clothes. Barbers do not discriminate against Dalits in the village. The main caste groups were: Lingayats, Vokkaligar, Kurubas, Ganigas, Muslims, Scheduled Caste (Holeyas and Madigas) and Scheduled Tribe.

Socio-economic Conditions

Cauvery river flow very near to Muguru village and almost all Dalits families use river water for cultivation. In Muguru village, some Dalit households' economic conditions were good. They have little bit of land

and engaged in agriculture and allied activities. Few people employed in government and private sectors. Almost all Dalits were cultivating paddy crops in their land. A few Dalit built good houses. Some were educated and their capabilities were higher than the illiterate Dalits. Nearly 60 per cent of Dalits have toilets in their houses.

Conclusions

According to our close observation, Sosale and Muguru villages Dalit economic conditions were slightly improved due to two villages were located in very near to Cauvery River. Cauvery river water was flow in these villages and villagers were cultivating two crops per year. In addition to that, Dalit were able to get employment and earning good remuneration. Due to these, some Dalit were educated and working in private and public sectors. Because of these reasons Dalit conditions slightly improved in these villages. In contrast that Madulur, Kodigenhalli, Nayakanahatti, Adivala, Towdur and Uchangidurga villages Dalit economic conditions were not changed much due to there was no better economic sources as compared to Sosale and Muguru. Without livelihood source, economic development is very difficult.

In the case of Harugeri and Mugalkhoda villages Devadai system was practicing in their villages due to this reason Dalit economic conditions were worsened. In these two villages Dalit were facing social and economic discrimination. But, Srininivas saradagi and Ravoor villages, Devadasi system was not practiced, but, majorities of the Dalits were landless labour; few of them were small farmers. Small farmers' main irrigation source was rain. Due to this Dalits were very poor and economical discrimination was prevailed. In Srinivas sardagi village Dalits economic conditions were very pathetic.

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Government Size and Economic Growth: An Econometric Estimation of Returns to Governance

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Abstract

This paper aims to understand whether the size of government spending is leading to optimal marginal returns to governance in India. The effect of government size on economic growth in an endogenous growth framework is examined. The relationship between gross value added output, combined government spending and gross capital formation in India is estimated for 34 years from 1980-81 to 2013-14 by the VAR and SVAR methods. The estimated results show that government expenditure negatively affects economic growth with a three year lag and a non-linear inverted U-shaped Dick Armey Curve in India. The results suggest that India has already achieved the highest attainable growth for the given size of government and is operating at the negative part of the curve with diminishing returns to public expenditure. The government should cut down its expenditure for positive effects of governance on the economy, in view that this expenditure will affect growth only after some years from now.

Keywords: Causality, Economic Growth, Endogeneity, Governance, Government Expenditure, Government Size, Vector Autoregression

Introduction

The significance and role of government are always important for growth and development in any economy. Where the private markets exist on a large scale, the government regulates them. Where the private sector market fails, the government provides a market there. The government operates with the aim to protect the interest of the citizens of the country and work for people's welfare. If the level of governance is too low, the private firms

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exploit the markets and consumers and if the government role is too high, it becomes too restrictive and hampers the function of the markets and growth of the economy. There is an optimal level of governance at which a government can operate in order to achieve the highest attainable growth given its resources. But,what is the optimal size and the role of government in a liberal economy for achieving efficient and sustained economic growth is not clear. Even if there exists an optimal government expenditure for economic growth, it is poorly understood or misunderstood.

Milton Friedman (1997), in a comparison of the United States with Hong Kong, notes that: "Government has an essential role to play in a free and open society. Its average contribution is positive; but I believe that the marginal contribution of going from 15% of the national income to 50% has been negative". Friedman suggests that the threshold where the government's role in economic growth is probably somewhere between 15 and 50 percent of the national income or output. Therefore, it is very important to decide the exact level of governance a country should be operating at in order to achieve higher growth. While the government role in the economy is extensively studied, both theoretically and empirically, the size of government is not clearly defined and well understood. Generally, it is understood that the size of government is not the number of employees on the government payroll but the level of governance or public expenditure in an economy. Therefore, the effect of government expenditure on economic growth is the analytical approach to study the government size and growth relationship.

In India, government spending contributes almost 30 percent to the growth of the economy. As a developing country whether India's economic growth is positively or negatively related to the size of government or negatively is not yet clearly identified. An analysis of the size of government and its effects on the economy is useful to understand what India should do with its public spending in order to achieve higher economic growth or whether India has already achieved the optimum and sustainable level of governance at some point in time at a particular level of public spending. Determining the returns to government expenditure is very important given the sizable public expenditure.

Therefore, this paper attempts to understand whether the size of government spending is leading to positive or negative marginal returns to governance. The paper attempts to identify the optimal government size i.e. government expenditure for sustained economic growth in India and estimate the causal relationship between public expenditure and economic growth in an endogenous framework. The period of the analysis is 34 years from 1980-81 to 2013-14. In the estimation, the vector autoregression (VAR) and structural VAR (SVAR) techniques are used in order to estimate

the effect of government expenditure on economic growth in India considering the endogeneity of the variables.

Review of Literature

Adolph Wagner (1911) first developed the law of 'increasing state activity'. The law states that the absolute and relative expansion of the public sector leads to economic growth at the cost of private sector growth. The expanding government accompanies social progress and rising incomes. Following the Great Depression of 1929, the magnum opus of John Maynard Keynes' (1936) General Theory has become the driving force for economic policy that has set the scene for regulation of the economy, setting aside the neoclassical presumption liberal market economy and no government intervention in economic functions. Still, the macro growth models in the Keynesian tradition like the Harrod-Domar model relegate the role for government in the growth process, for economic growth is entirely dependent on capital formation via aggregate demand or aggregate supply, the determinants of which are exogenous.

The Solow (1956) type neoclassical growth model that favours little state intervention in the market economy, posit that economic growth comes from the exogenous technical change and that per capita income will converge to a steady-state level in the long-run. As all the determinants of growth are exogenous in the neoclassical liberal world, the government has little role to play and as the market forces adjust to any policy change, there is no real influence of government or policies on the growth rate of the economy. At the most the government expenditure may have some effect on growth during the temporary period of transition to steady-state growth. Therefore, the role of government in the growth process is insignificant and hence is not subjected to critical analysis in the standard neoclassical growth models.

In contrast, the endogenous growth theories of Romer (1986; 1990), Lucas (1988), Barro (l990), Grossman and Helpmen (1990) and Rebelo (1991) formulate economic growth as endogenous via government spending on human capital formation, infrastructure, research and development, technology and innovation. In the endogenous growth models, public investments social and economic overheads generate externalities and technical change is itself endogenously determined. Hence not only the transition and steady-state growth rates are endogenous, but also the long-run economic growth rate. As the entire economic system functions endogenously, the government role is active and inevitable in the process of economic growth.

Dick Armey (1995) in an analysis of the nexus between government size and economic growth in the US for 51 years from 1947 to 1997 finds that

the effect of government expenditure on economic growth is nonlinear, an inverted U-shape curve reflecting the law of diminishing returns. The size of the government is measured by the ratio of government expenditure to the GDP of an economy. Based on the Armey Curve, Vedder and Gallaway (1998) formulate the government expenditure-economic growth relationship as:

$$y = \alpha + \beta g - \gamma g^2 + \delta t + \varepsilon \quad ...(1)$$

where y is the output, g is the government size and t represents the time trend. The expected sign of β is positive as an increase in government expenditure carries some beneficial effects on the output of the economy and as further increments in government size adversely affect the functioning of the economy, the sign of the γ is to be negative. Note that the squared term increases faster in value than the linear term of public expenditure. Hence, the beneficial effects of government spending will eventually be wiped out by the adverse effects, ultimately leading to a downward-sloping part of the Armey curve as output grows due to growth in the other growth influencing factors like capital and human resources, and technological change that are unrelated to government size.

Rati Ram(1986) attempts to determine the optimal size of government to optimise growth in a framework of a two-sector economy, the government and non-government. The neoclassical type growth equation is specified as:

$$\frac{dy}{y} = \alpha\left(\frac{i}{y}\right) + \beta\left(\frac{dl}{l}\right) + \gamma\left(\frac{g}{y}\right) + \varepsilon \quad ...(2)$$

where dy/y is the growth rate of GDP, i/y is the investment, dl/l is the rate of growth of population, and g/y is the ratio of public expenditure to GDP. The study uses the Summers-Heston data for 115 countries for 21 years from 1960 to 1980. The estimated results show that the size of the government affects economic growth positively and the marginal externality effect of government size is generally positive.

Cheng and Lai (1997) use a trivariate framework that includes economic growth, government expenditure and money supply for South Korea over the period 1954-94 applying the vector error correction method. The study finds that the causality between government expenditure and economic growth is bidirectional and economic growth and that money supply plays a significant role in economic growth in South Korea.

Alshahrani and Alsadiq (2014) analyse the short-run and long-run effects of six categories of public expenditure on economic growth during 1969-2010 in Saudi Arabia applying different econometric estimation methods. The vector error correction model estimates show that public

investments and healthcare expenditure, along with private domestic investment, positively influence the long-run economic growth. In the short-run trade openness and government spending on the housing sector increase production.

In India, Das and Kar (2016) use an endogenous growth model in order to understand the effect of public expenditures in education,health and physical infrastructure on economic growth from 1975 to 2012 applying the structural vector autoregression model. The study tries to find whether such investments are commensurate with the demographic dividend in India as the shares of public expenditure on education and health are the base for human capital growth in the country, quantity and quality of the workforce and ultimately the growth rate of the GDP per capita. The estimated results reveal that an increase in public health expenditure has a positive effect on the labour force participation of the working-age population. But, higher public expenditure on education and training drives workers away from the labour market.

Data and Methodology

This study focuses on the causal relationship between government size and economic growth in order to optimise economic growth in India. This study follows the theoretical approach of Rati Ram, in which economic growth is related to investments, labour growth and government expenditure. Empirically, this study uses secondary data for 34 years over 1980-81 to 2013-14 and the structural vector autoregression estimation method. Economic growth is measured by the total value of the output of the economy and the size of government is measured by the combined government expenditure of the centre and states. The data on gross value added (GVA) output is obtained from the Economic Survey of India, Ministry of Finance (2015-16). The data on the combined government expenditure (CGE) and gross capital formation (GCF) are obtained from the Indian Public Finance Statistics, Ministry of Finance, Government of India (1980-81 to 2015-16).

Theoretical Model

The model proposed by Rati Ram (1986) consists of a two-sector production function, the government sector (g) and the non-government sector (n), the outputs (y) of both of which are functions of capital (k) and labour (l). In addition, the government sector output acts as an externality on the outputs in the other sectors. The production functions are as specified as:

$$y_g = f(k_g, l_g) \quad ...(3a)$$

$$y_n = m(k_n, l_n, g) \quad ...(3b)$$

The total inputs are given as:

$$k = k_g + k_n \quad ...(4a)$$

$$l = l_g + l_n \quad ...(4b)$$

The outputs of the two sectorssum to total output (y) of the economy:

$$y = y_g + y_n \quad ...(5)$$

Let λ be the deviation of the ratio of marginal factor productivity in the two sectors:

$$\frac{f_k}{m_k} = \frac{f_l}{m_l} = (1 + \lambda) \quad ...(6)$$

If the input productivity is higher in the government sector, λ will be positive. Without externality of the government expenditure, given a set of prices, λ=0 means an efficient allocation of resources that optimises the output. However, the marginal productivity in the non-government sector is likely to be higher as they operate in a highly competitive environment. But the non-government sector faces a lot of regulations imposed by the government. The government sector is inefficient because it is plagued by many issues like corruption, red tape, lack of funds, etc.

Totally differentiating the total output (y) function:

$$dy = \mathrm{d}y_g + \mathrm{d}y_n = \left(f_k dk_g + f_l dl_g\right) + (m_k dk_n + m_l dl_n + m_g dg) \quad ...(7)$$

where m_g indicates the marginal externality effect of government activities on non-government sectoral output. The change in capital stock is the investment and therefore total investment of the economy is the horizontal summation of investment made in the two sectors:

$$i = i_g + i_n \quad ...(8)$$

Therefore, the change in total output of the economy is given by:

$$dy = m_k dk_n + m_l dl_n + m_g dg + f_l dl_g + f_k i_g \quad ...(9)$$

$$= m_k dk_n + m_l dl_n + m_g dg + m_l(1+\lambda) dl_g + m_k(1+\lambda) i_g$$

$$= m_k dk_n + m_l dl_n + m_g dg + m_l dl_g + \lambda m_l dl_g + m_k i_g + \lambda m_k i_g$$

$$= m_k(i_n + i_g) + m_l(dl_n + dl_g) + m_g dg + \lambda(m_l dl_g + m_k + m_k i_g)$$

$$= m_k i + m_l dl + m_g dg + \lambda(m_l dl_g + m_k + m_k i_g) \quad ...(10)$$

Also, $dg = m_k(1+\lambda) i_g + m_l(1+\lambda) dl_g = (1+\lambda)(m_k i_g + m_l dl_g)$ ...(11)

Therefore, $(m_k i_g + m_l dl_g) = [dg/(1+\lambda)]$ ...(12)

Hence, $y = m_l dl + m_k i + m_g dg + \lambda\left[\frac{dg}{(1+\lambda)}\right]$ ...(13)

$$= m_l dl + m_k i + \left\{\left[\frac{\lambda}{(1+\lambda)}\right] + m_g\right\} dg \quad ...(14)$$

Following Bruno (1968), let the real marginal productivity of labour is linearly related to output per capita per labour:

$$m_l = \beta(y/l) \quad ...(15)$$

Denoting $m_k = \alpha$, the change in output of the economy can be written as:

$$dy = \alpha\left[\frac{i}{y}\right] + \beta\left(\frac{dl}{l}\right) + \left\{\left[\frac{\lambda}{(1+\lambda)}\right] + m_g\right\} dg \quad ...(16)$$

A more convenient specification to analyse the effect of the size of government on growth is to use the ratio measure (g/y) (Rubinson, 1977; Landau, 1983). After some manipulations, Rati Ram finally specifies the growth equation as:

$$\frac{dy}{y} = \alpha\left[\frac{i}{y}\right] + \beta\left(\frac{dl}{l}\right) + \gamma\left[\frac{g}{y}\right] \quad ...(17)$$

where dy/y is the growth rate of GDP, i/y is the investment, dl/l is the growth rate of population and g/y is the ratio of government expenditure to GDP. Thus, economic growth is a function of investment, labour growth and the ratio of government expenditure to output.

Empirical Specification: VAR Model

Assuming that economic growth depends only on government expenditure and capital stock of government and economic growth is inclusive of growth in labour, none of the growth determinants is exogenous. Therefore, as the variables are interdependent and hence the estimating structural equations consists of all endogenous variables. The structural vector autoregressive (SVAR) model is specified as:

$$\begin{aligned} y_t &= b_{10} + b_{12}g_t + b_{13}k_t + c_{1i}y_{t-i} + d_{1i}g_{t-i} + f_{1i}k_{t-i} + \varepsilon_{yt} \\ g_t &= b_{20} + b_{21}y_t + b_{23}k_t + c_{2i}y_{t-i} + d_{2i}g_{t-i} + f_{2i}k_{t-i} + \varepsilon_{gt} \\ k_t &= b_{30} + b_{31}y_t + b_{32}g_t + c_{3i}y_{t-i} + d_{3i}g_{t-i} + f_{3i}k_{t-i} + \varepsilon_{kt} \end{aligned} \quad ...(18)$$

where ε_{yt}, ε_{gt} and ε_{kt} are white noise error terms which are pure innovations or shocks with standard deviations σ_y, σ_g and σ_k respectively. The error terms of each equation also contain the indirect contemporaneous effect of the other two variables if their coefficients are not zero.

In matrix notation, the SVAR model is specified as:

$$\begin{bmatrix} 1 & b_{12} & b_{13} \\ b_{21} & 1 & b_{23} \\ b_{31} & b_{32} & 1 \end{bmatrix} \begin{bmatrix} y_t \\ g_t \\ k_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \\ b_{30} \end{bmatrix} \begin{bmatrix} c_{1i} & d_{1i} & f_{1i} \\ c_{2i} & d_{2i} & f_{2i} \\ c_{3i} & d_{3i} & f_{3i} \end{bmatrix} \begin{bmatrix} y_{t-i} \\ g_{t-i} \\ k_{t-i} \end{bmatrix} + \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{gt} \\ \varepsilon_{kt} \end{bmatrix} \quad ...(19)$$

Or $Bx_t = \Gamma_0 + \Gamma_i x_{t-i} + \varepsilon_t$ ...(20)

where x denotes the three endogenous variables and i denotes the lag length. The reduced form VAR model for this endogenous system can be specified as:

$$x_t = B^{-1}\Gamma_0 + B^{-1}\Gamma_i + \varepsilon_t \quad ...(21)$$

The estimating equations are specified as the lagged values of all endogenous variables:

$$\begin{aligned} y_t &= \alpha_{10} + \beta_{1i}y_{t-i} + \beta_{1i}g_{t-i} + \beta_{1i}k_{t-i} + \varepsilon_{yt} \\ g_t &= \alpha_{20} + \beta_{2i}y_{t-i} + \beta_{2i}g_{t-i} + \beta_{2i}k_{t-i} + \varepsilon_{gt} \\ k_t &= \alpha_{30} + \beta_{3i}y_{t-i} + \beta_{3i}g_{t-i} + \beta_{3i}k_{t-i} + \varepsilon_{kt} \end{aligned} \quad ...(22)$$

where the error terms arecomposite of three shocks and specified as:

$$\varepsilon_{1t} = \frac{\varepsilon_{yt} - b_{12}\varepsilon_{gt} + b_{13}\varepsilon_{kt}}{1 - b_{12}b_{21} - b_{13}b_{31}}, \quad \varepsilon_{2t} = \frac{\varepsilon_{gt} - b_{21}\varepsilon_{yt} + b_{23}\varepsilon_{kt}}{1 - b_{12}b_{21} - b_{13}b_{23}}, \quad \varepsilon_{3t} = \frac{\varepsilon_{kt} - b_{31}\varepsilon_{yt} + b_{32}\varepsilon_{kt}}{1 - b_{13}b_{31} - b_{13}b_{23}} \quad ...(23)$$

Since ε_{yt}, ε_{gt} and ε_{kt} are white noise error terms, ε_{1t}, ε_{2t} and ε_{3t} are also whitenoise error terms.

Empirical Analysis

Table-1 presents the descriptive statistics of the variables in the empirical analysis of the causal relationship between government size and economic growth in India. The mean value of GVA is about Rs.25 lakh crore. In 1980-81,the CGE was 27 percent of GVA and in 2013-14, the CGE has been about 30 percent of GVA. Hence, both central and state governments combined have contributed more than a quarter to the growth of the economy in 1980 which has increased to 30 percent over the span of 34 years. On average, the state and central government have spent about 28 percent on the growth of the economy in these 35 years. The gross capital formation has increased from Rs.8.5 lakh crores to Rs.34.8 lakh crores during the period. on average, the combined private and public sector capital formation by the economy contributes about 34 percent to the economic growth of India.

Table-1: Descriptive Statistics of Variables

Variable	Description	Mean	Std. dev.
GVA	Gross value added is the total output of the government, measured as the total output of the economy minus the intermediate consumption (Rs.crores).	25011591	2886242
CGE	Combined government expenditure is the total expenditure incurred by the centre and state governments, measuring the size of government (Rs.crores).	709122.3	820425.8
GCF	Gross capital formation is the net increase in the physical assets of the private and public sectors (Rs.crores).	856705.5	1076514

The trend in the three variables over the time period presented in Figure-1 shows an exponential trend. As such the estimation cannot be done using the data as it will provide biased and inconsistent estimators. Hence, the natural log of all the variables are taken and the trend of log variables show linearity, as shown in Figure-2, and then used in the estimation.

Figure-1: Trend of GVA, CGE and GCF

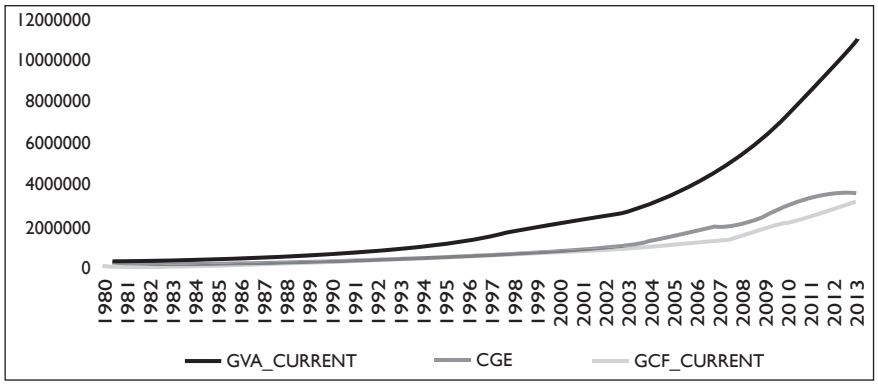
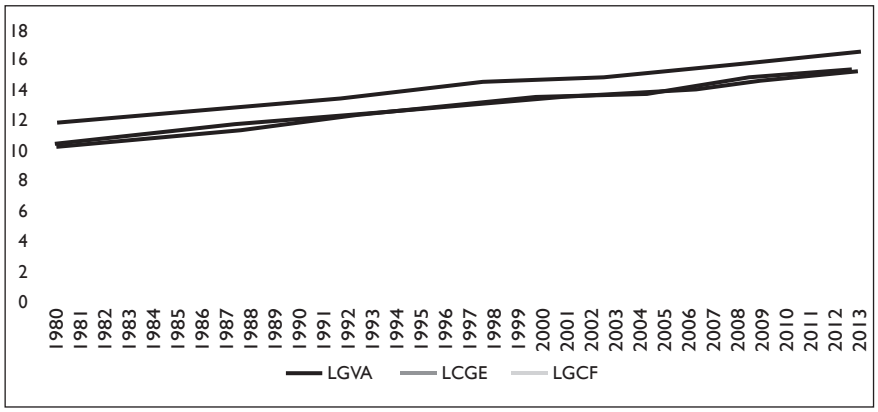


Figure-2: Logarithmic Trend of GVA, CGE and GCF



Stationarity Test: As the series hasa linear trend at the levels form and hence are not stationary series. The Augmented Dickey-Fuller (ADF) test is used to test for the unit root in the series of variables. The null hypothesis for the ADF test is that the series has a unit root and the alternative hypothesis is that the series doesn't have a unit root. The presence of unit root in the series means the autocorrelation coefficient is one and therefore the series is considered to be autocorrelated and therefore non-stationary. The ADF test at levels shows that the probability values are very high

at 95 percent confidence level and hence the series are non-stationary in their levels form. At first difference, the null hypothesis of the presence of unit root is rejected as the probability values are less than 5 percent, and all the series have become stationary and hence all the series are I(1) i.e., integrated of order (1).

Table-2: ADF Unit Root Test

Variable	At Level*	At First Difference*
lnGVA	0.962	0.026
lnCGE	0.804	0.000
lnGCF	0.822	0.000

Note: * P-values at 5 percent significance level.

Cointegration Test: Next, the variables are to be checked for the presence or not of any long-run equilibrium relationship between the variables. The Johansen cointegration test is used to check for cointegration. First, the hypothesis tests for none of the equations are cointegrated, and if the equations are cointegrated, then how many equations are cointegrated is checked by the probability values. Since the variables are I(1) process and if there is cointegration, then vector error correction mechanism (VECM) has to be used in order to check for the short-run disequilibrium. If the series are not cointegrated, then the vector autoregression (VAR) is used in order to estimate the contemporaneous effect of variables. Table-3 presents the Johansen cointegration test results. Both the trace statistics and maximum eigen value statistics for the hypothesis of none of the equations being cointegrated are very high at 95 percent confidence level. Hence, there is no cointegration between the three variables, and the VAR estimation method is to be used.

Table-3: Johansen Cointegration Test

Hypothesied No. of CE(s)	Trace Statistics			Maximum Eigen Statistics		
	Eigen Value	Trace Statistic	0.05 Critical Value	Eigen Value	Maximum Eigen Statistic	0.05 Critical Value
None*	0.752	66.632	29.797 (0.000)	0.752	41.795	21.132 (0.000)
At most 1*	0.484	24.838	15.495 (0.001)	0.484	19.830	14.265 (0.006)
At most 2*	0.154	5.009	3.841 (0.025)	0.154	5.009	3.841 (0.025)

Note:Unrestricted cointegration rank test. * Rejection of null hypothesis at the 0.05 level. MacKinnon-Haug-Michelis (1999) p-values in parentheses.

Optimal Lag Length Selection: Before proceeding with estimation, lag length selection is to be done. It suggests how many autoregressive terms

should be included in the model so that model is fit for the estimation. If too many lags are included, the degrees of freedom decreases and too few lags give rise to specification bias. Therefore, selecting appropriate lag length is very important and the optimal lag length is revealed by some information criteria like LR test, sequential modified LR test, final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC) and Hannan-Quinn (HQ) information criterion. The results of lag length criteria are presented in Table-4. All the lag length criteria show that the suggested lag length is 4, except AIC criteria. Therefore, the set of equations including 4 lags make the model fit for estimation.

Table-4: Lag Length Selection Tests

Lag	lnL	LR	FRE	AIC	SIC	HQ
0	17.902	-	1.18e-05	-1.028	-0.886	-0.983
1	156.631	239.188	9.40e-09	-9.975	-9.409	-9.797
2	167.262	16.130	8.60e-09	-10.087	-9.097	-9.777
3	180.330	17.124	6.89e-09	-10.368	-08.953	-9.924
4	207.634	30.128	2.19e-09*	-11.630	-9.791*	-11.054*
5	218.207	9.479	2.43e-09	-11.738*	-9.475	-11.030

Note: * Lag order selected by the criterion.

Causality Test: The Granger causality test is used to find the directional relationship i.e. whether there exists unidirectional or bidirectional causality between the variables. The Granger causality test results presented in Table-5 show that CGE Grangercause GVA, and GVA as well as CGE Granger cause GCF at 95 percent confidence level. And 90 percent level of confidence, even GCF Granger cause GVA.

Table-5: Granger Causality Test

Null hypothesis	F-statistic	Prob.
CGE does not Granger cause GVA	7.164**	0.0008
GVA does not Granger cause CGE	0.646	0.638
GCF does not Granger cause GVA	1.942***	0.141
GVA does not Granger cause GCF	3.824**	0.017
GCF does not Granger cause CGE	2.451	0.078
CGE does not Granger cause GCF	3.061**	0.039

Note: **. ***Significant at 5, 10 percent levels.

VAR Estimates**:** TheVAR model consists of the lagged values of all the endogenous variable in the system. The estimating equations are specified as:

$$lnGVA_t = \alpha_{10} + \beta_{11} lnGVA_{t-1} + \beta_{12} lnGVA_{t-2} + \beta_{13} lnGVA_{t-3} + \beta_{14} lnGVA_{t-4} + \beta_{15} lnCGE_{t-1} + \beta_{16} lnCGE_{t-2} + \beta_{17} lnCGE_{t-3} + \beta_{18} lnCGE_{t-4} + \beta_{19} GCF_{t-1} + \beta_{110} GCF_{t-2} + \beta_{111} GCF_{t-3} + \beta_{112} GCF_{t-4} + \varepsilon_{1t} \quad ...(24)$$

$$lnCGE_t = \alpha_{10} + \beta_{11} lnGVA_{t-1} + \beta_{12} lnGVA_{t-2} + \beta_{13} lnGVA_{t-3} + \beta_{14} lnGVA_{t-4} + \beta_{15} lnCGE_{t-1} + \beta_{16} lnCGE_{t-2} + \beta_{17} lnCGE_{t-3} + \beta_{18} lnCGE_{t-4} + \beta_{19} GCF_{t-1} + \beta_{110} GCF_{t-2} + \beta_{111} GCF_{t-3} + \beta_{112} GCF_{t-4} + \varepsilon_{2t} \quad ...(25)$$

$$lnGCF_t = \alpha_{10} + \beta_{11} lnGVA_{t-1} + \beta_{12} lnGVA_{t-2} + \beta_{13} lnGVA_{t-3} + \beta_{14} lnGVA_{t-4} + \beta_{15} lnCGE_{t-1} + \beta_{16} lnCGE_{t-2} + \beta_{17} lnCGE_{t-3} + \beta_{18} lnCGE_{t-4} + \beta_{19} GCF_{t-1} + \beta_{110} GCF_{t-2} + \beta_{111} GCF_{t-3} + \beta_{112} GCF_{t-4} + \varepsilon_{3t} \quad ...(26)$$

As the lagged values of the variables are exogenous and error terms are serially uncorrelated, the estimation of the specified set of equations is by the method of ordinary least squarestreating each equation asa single equation.

Table-6: VAR Estimates of GVA, CGE and GCF

Variable	Gross Value Added	Combined Government Expenditure	Gross Capital Formation
$lnGVA_{t-1}$	1.291* (5.866)	-0.793 (1.491)	2.299* (2.528)
$lnGVA_{t-2}$	-0.569** (2.145)	-0.204 (0.318)	-2.869** (2.623)
$lnGVA_{t-3}$	-0.142 (0.539)	0.626 (0.987)	-1.251 (1.154)
$lnGVA_{t-4}$	0.090 (0.528)	-0.432 (1.056)	1.971* (2.818)
$lnCGE_{t-1}$	-0.004*** (0.053)	0.754* (3.929)	0.768** (2.338)
$lnCGE_{t-2}$	0.168 (1.402)	-0.479 (1.660)	-0.586 (1.188)
$lnCGE_{t-3}$	-0.302** (2.201)	0.273 (0.827)	-0.581 (1.027)
$lnCGE_{t-4}$	0.303* (3.722)	0.089 (0.455)	0.706** (2.102)
$lnGCF_{t-1}$	0.026 (0.381)	0.311*** (1.907)	0.322 (1.153)
$lnGCF_{t-2}$	0.063 (1.023)	0.201 (1.363)	-0.555** (2.188)
$lnGCF_{t-3}$	0.021 (0.386)	-0.026 (0.196)	-0.175 (0.760)
$lnGCF_{t-4}$	0.036 (0.605)	0.498* (3.454)	-0.096 (0.391)
Constant	0.792** (3.310)	3.744* (4.528)	-0.730 (0.516)
R-square	0.98	0.98	0.98

Note: Absolute t-values in parentheses. *, **, *** Significant at 1, 5, 10 percent levels.

The estimated VAR results show that the first and second lags of GVA and the first, third and fourth lags of CGE have a significant impact on current gross value added,This shows that economic growth in the current year is affected by the economic growth of the previous two years and combined government expenditure in previous years. The combined government expenditure is influenced by its own previous year value and by the first and fourth lagged values of GCF, implying that CGE depends on gross capital formation over years. However, the lagged values of GVA do not affect the current level of central and state government expenditures. The current level of gross capital formation is determined by both the GVA and CGE in previous years. The capital formation today carries the impact

of the previous year's economic growth, the previous year's combined government expenditure and capital formation did two years back.

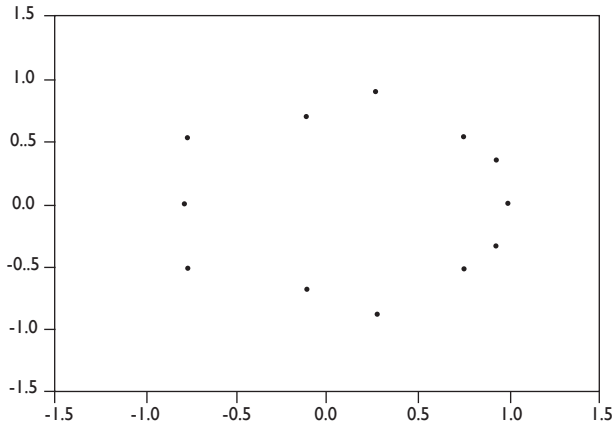
The stability and stationarity of the VAR model are calculated by the characteristic roots, presented in Table-7 and Figure-3. The stability condition requires characteristic roots of a sequence to lie outside the unit root circle. If this holds true then after iterations and the sequence has finite and time-invariant mean and variance. With the inverse of characteristic roots of the autoregressive polynomial, all the roots are expected to lie within the unit root circle. As Table-7 and Figure-3 shows all the characteristic roots of each polynomial equation lie within the unit root circle. Therefore, the VAR model achieves stability and hence each sequence y_t(GVA) g_t(CGE) and k_t (GCF) has finite and time-invariant mean and finite and time-invariant variance.

Table-7: Inverse Roots of AR Characteristic Polynomial

Root	Modulus
0.993	0.993
0.931-0.3345	0.992
0.931+0.887	0.992
0.273-0.887	0.928
0.273+0.887	0.928
-0.766-0.523	0.928
-0.766+0.523	0.928
-0.756-0.528	0.922
0.756+0.528	0.922
0.783	0.783
-0.115-0.688	0.698
-0.115+0.688	0.698

Note: No root lies outside the unit circle. VAR satisfies the stability condition.

Figure-3: Stability of VAR Model
Inverse Roots of AR Characteristic Polynomial

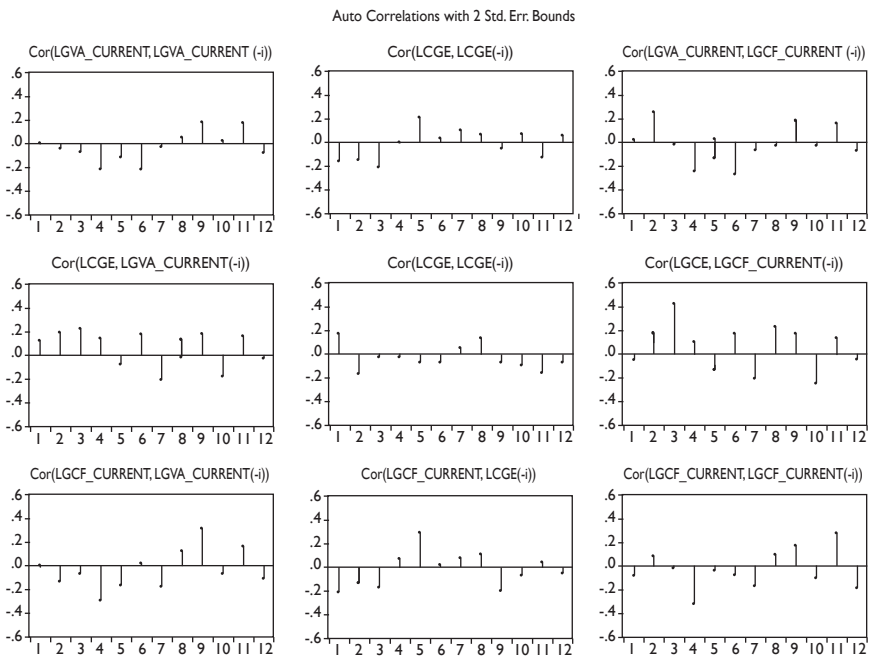


Residual Test: The residual heteroskedasticity test and correlogram are presented in Table-8 and Figure-4. The null hypothesis is that the residuals are not heteroskedastic and the alternative hypothesis is that the residuals are heteroskedastic. Table-8 shows that the null hypothesis is not rejected at the 5 percent level of significance. The correlogram presented in Figure-4 shows that all the spikes lie within the two dotted lines and therefore we can say that the residuals ε_{1t}, ε_{2t} and ε_{3t} are pairwise and serially uncorrelated. Therefore, the residuals are homoscedastic and are uncorrelated.

Table-8: Residual Heteroskedasticity Test

Residual	R-square	F-value	Prob.	Chi-square	Prob.
res1*res1	0.828	1.005	0.558	24.850	0.414
res2*res2	0.774	0.715	0.740	23.232	0.508
res3*res3	0.905	1.974	0.232	27.137	0.298
res2*res1	0.830	1.019	0.550	24.910	0.411
res3*res1	0.916	2.280	0.183	27.489	0.282
res3*res2	0.846	1.145	0.486	25.383	0.385
Joint chi-square test		150.274	Prob.	0.343	

Figure-4: Correlogram of GVA, CGE and GCF Residuals



SVAR Estimates: As each equation in the VAR model is estimated by the OLS method, the same cannot be done for equations in the SVAR model because the variables carry a contemporaneous effect and residuals also carry indirect contemporaneous effects. Hence, the estimation

procedure has to impose some restrictions. The VAR model estimation has 45 parameters, 39 coefficients, 3 variances and 3 covariances, whereas the SVAR system has to estimate 48 parameters, 3 intercept terms, 36 autoregressive coefficients, 6 feedback coefficients and 3 standard deviations. Therefore, 48 parameters in the structural equations cannot be estimated using 45 parameters in reduced form equations. So, three restrictions should be imposed on structural equations in order to estimate the SVAR system. Only by restriction of three parameters, the SVAR system is identified, otherwise, it is an under-identified system. Imposing three restrictions makes the system exactly identified, and if more than three restrictions are imposed, the system is over-identified. The restrictions can be imposed from causality results or using $[(n^2 - n/2)]$ where n is the number of endogenous variables.

The three restrictions imposed on the SVAR system are based on causality results. Since GCF does not granger cause GVA and GVA and GCF do not Granger cause CGE, $\beta_{13}=0$, $\beta_{21}=0$ and $\beta_{23}=0$. Therefore, the residual structure can be specified as:

$$\varepsilon_{1t} = \varepsilon_{yt} - \beta_{12}\varepsilon_{gt},\ \varepsilon_{2t} = \varepsilon_{gt},\ \varepsilon_{3t} = \varepsilon_{kt} + \beta_{31}\varepsilon_{yt} + \beta_{32}\varepsilon_{gt} \quad ...(27)$$

The restrictions manifest that ε_{yt} and ε_{gt}, the unobserved structural innovations or shocks affect the contemporaneous value of y_t, whereas $\varepsilon_{yt}\varepsilon_{gt}\varepsilon_{kt}$ shocks affect the contemporaneous value of g_t. Only ε_{gt} shocks affect the contemporaneous value of g_t. Therefore, y_t does not have any contemporaneous effect of g_t. Similarly, g_t does not have any contemporaneous effect on other variables and k_t has a contemporaneous effect on both y_t and g_t. The observed value of ε_{21} is completely attributable to pure shocks of g_t sequence. The estimated SVAR results are presented in Table-9, which is the contemporaneous effect of variables on each other. With restrictions on three parameters, $\beta_{13}=\beta_{21}=\beta_{23}=0$, only β_{12}, β_{31} and β_{32} are estimated. Out of the three estimates, only β_{13} is statistically significant, and therefore only GVA has a contemporaneous effect on GCF. CGE does not have a contemporaneous effect on either GVA and or GCF.

Table-9: SVAR Estimates of GVA, CGE and GCF

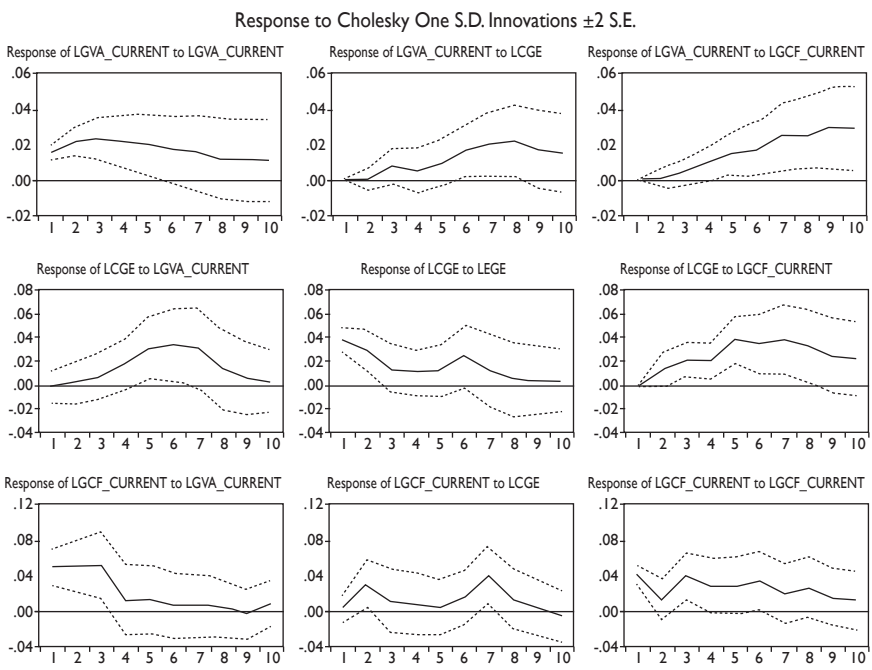
Equation	Coefficient	Std. error	z-statistic	Prob.
C(1)	0.011	0.182	0.063	0.950
C(2)	2.323*	0.183	12.723	0.000
C(3)	0.006	0.461	0.014	0.989
Log-likelihood		-82.758		
LR test chi-square		546.251	Prob.	0.00

Note: * Significant 1 percent level.

Impulse Response Function: The dynamic causality analysis by the Impulse Response Functions (IRF) traces the time path of reactions to

shocks given to the variables in the VAR system. In Figure-5, the IRFs are shown for 10 years, when one standard deviation shock is given to the log of variables how they react. When GVA is given one standard deviation shock, the GVA series initially increases and then decreases after the 3rd period, but it does not become negative. The CGE series responses to a one standard deviation shock given to GVA is an inverted U shape. The GCF series remains constant to a one standard deviation shock given to GVA until three periods and then starts decaying, become negative in the 9th period and turning positive immediately in the 10th period. For one standard deviation of a shock given to the CGE series, the GVA series remains zero at first and thereafter starts increasing, the CGE series declines but does not become negative and the GCF series fluctuates and becomes zero in the 9th period and turns negative in the 10th period. When one standard deviation shock is given to the GCF series, the GVA series starts from zero and keeps on increasing, the CGE series increases at first and then starts declining, while the GCF series declines gradually.

Figure-5: Impulse Response Functions



Conclusion

This paper analyses the causal relationship between government size and economic growth in India in order to optimise growth in a mixed developing

economy context. More specifically, this study examines whether the size of government spending has any positive or negative effect on economic growth. As government expenditure is sizable and impacts the economy, the marginal return to governance is of crucial importance for the allocation of resources. Over the years,economic growth, along with various other factors,is also determined by government expenditure. In turn, the government also decides public expenditure on the basis of the growth of the economy. Under such a scenario, both government expenditure and economic growth are interdependent, creating an endogenous environment. Hence,this paper estimates the causal relationship in an endogenous system by VAR and SVAR methods. The paper covers a time span of 34 years from 1980-81 to 2013-14. Economic growth is measured by gross value added and size of government by combined centre and state governments expenditures.

The estimated results show that the combined government expenditure has no immediate effect on the economic growth in India. The government expenditure has a lagged effect on growth, after three years. Further, government expenditure negatively affects economic growth in the sense that further increase in government expenditure leads to a decline in economic growth. This suggests the inverted U-shaped Dick Armey Curve in India, a non-linear relationship between governance and economic growth. The same can be seen in the VAR estimates where the coefficients show negative and positive signs alternatively. This shows that India is operating at the negative part of the curve and has already achieved the highest attainable growth for the given level of government. In fact, the estimated relationship reflects the law of diminishing returns. Therefore, the government should cut down its expenditure in order to generate a positive effect of public expenditure on economic growth, keeping in mind that government expenditure will affect the growth only after some years from now.

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Local Government Finances in the Context of Fiscal Decentralisation: A Study of Pune Municipal Corporation

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Abstract

Urban Local Governments (ULGs) are important institutions which provide vital civic infrastructure services to the citizens and firms in Indian cities. They need fiscal autonomy and support from upper tier governments in order to provide the civic infrastructure services effectively. Following the global trend, India has laid down foundation for fiscal decentralisation through the Constitutional Amendment Act (CAA), 1992. Yet, it is not fully achieved in practice; upper tier governments continue to wield power and influence on the ULG finances. This paper makes an assessment of the finances of the ULG of a major Indian city – Pune – in the context of fiscal decentralisation. We analyse the financial status of the Pune Municipal Corporation (PMC) by examining the trends and patterns of major financial parameters in the light of the changing fiscal autonomy of the PMC due to the intervening actions of upper tier governments. We find that these intervening actions of the upper tier governments have had an impact on the PMC finances – both revenue and expenditure fronts. Such interventions have rendered the PMC finances to become fragile and vulnerable to reduced spending on the civic infrastructure services. It, therefore, raises questions on the fiscal autonomy of the ULGs and also about the progress on fiscal decentralisation in India that was to usher in after the CAA.

Keywords: Fiscal Decentralisation, Trends and Patterns, Upper Tiers of Government, Urban Local Government (ULG), ULG Finances

Introduction

India has been on urbanisation path with its urbanisation levels rising significantly from less than 10% before independence to over 30% in the

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last Census. The country is expected to become urbanised to the level of 40% or above by 2030 AD, rendering it with more than 590 million people living in the cities (MGI 2010). Some argue that India's pace of urbanisation has not been adequate enough in the creation of a large number of jobs in urban areas (Kundu, 2006; Kundu and Ray 2012). Yet, much of the economic growth and development has been propelled by the cities, as evident from their rising share of the country's GDP; they have potential to play a much larger role in the economic development to an extent of adding up to 1-1.5% annual growth rate (MGI 2010). The cities, however, need to provide adequate basic/civic infrastructure services in order to assume this role, and the Urban Local Governments (ULGs) have to ensure the provision of such civic infrastructure services to the citizens and firms.

ULGs have long been existing in India as the institutions that provide various civic infrastructure services in the urban areas. The colonial government initially created them as a part of the provincial government, but quickly made them as autonomous institutions with some support and control of national and provincial governments. With the federal structure of government setting the stage after the independence, local governments came under the full control of the next tier of government – State government. Although it brought an advantage of assistance coming from State government, over the years, it led to the loss of autonomy and undermined the decision making powers of ULGs. In other words, it led to a dependency on State government for their needs, including the fiscal ones, and rendered them vulnerable to intervening State and Central government actions and policy changes.

The Constitutional Amendment Act (CAA), 1992 was an attempt to change this position by making provisions for the autonomous functioning of ULGs as well as by establishing inter-government transfers as a legitimate fiscal share of ULGs. It, however, did not bring in any major changes in the relationship between the lower tier i.e., local governments, and upper tiers i.e., State and Central governments; the upper tiers of governments continued to exercise control – both administrative and financial – on local government. It is also observed that some of their actions intervene in the functioning as well as finances of local governments, often to their detriment. There is a general concern that the practical outcomes in Indian federal structure are different from the spirit of CAA 1992 i.e., full decentralisation has not been happening at the level of lower tiers of government (Ravindra Prasad and Pardhasaradhi 2020). As a result, many ULGs are not able to meet with the challenge of providing civic infrastructure services to the citizens and firms, particularly in the wake of rising population and economic activities. Therefore, it becomes imperative to analyse the finances of ULGs in the backdrop of attempts for fiscal decentralization in India.

In this context, this paper makes an attempt to understand whether and how the actions of upper tiers of government impact upon local government finance (and concomitant service delivery)through an empirical study of Pune city. The current study is aimed at addressing two major research questions:

- How do the upper tiers of government intervene (or, act) in local government?
- Whether and how such interventions impact on local government finances?

The organisation of the paper is as follows: The current section provided the background to the current research and laid down an introduction to it; the next section will perform review of fiscal decentralisation in theory and practice as well as existing studies on municipal financial assessment with regard to civic service delivery performance; the subsequent section lays down the study methodology, including the choice of focus city; the penultimate section performs an analysis of the financial performance of focal city in the form of trends and patterns of major parameters of ULG finance in the background of upper tier government actions that undermine fiscal decentralisation; the final section concludes based on the findings of the study.

Literature Review

Fiscal federalism is an important feature of decentralised governments in a federal system. The theory of fiscal federalism is primarily concerned with the assignment of functions (to the different levels of government) and appropriate fiscal instruments for carrying out functions (Musgrave 1959; Oates 1972). Decentralisation theory is traditionally concerned with the provision of local public goods and services by the local governments. Local governments are most suitable when it comes to their provision due to the advantages of being close to people aids the elicitation of public preferences and appropriate for efficient production (based on the equivalence of marginal costs and benefits) (Oates 2005). McLure (1983) also states that benefit taxes are the appropriate instruments that can be used by the local governments, as the payments are *quid pro quo* to the benefits received by them. Fiscal decentralization, therefore, concerns with the appropriation of powers to levy appropriate taxes to collect revenue and expend them on the provision of public goods and services to citizens, in other words, it refers to the autonomy in making fiscal decisions. The theoretical arguments favouring decentralisation have found their acceptance in practice in many countries and decentralisation wave has swept across the nations in 1980s and 1990s (Bahl and Linn 1995).

However, subsequently, there have been attempts to reinforce centralisation and to make the sub-national governments less important in political, administrative and fiscal terms. Fiscal decentralisation was not practiced so much after 2000s, when the pursuit of economic growth push made national governments more powerful, as observed empirically. Chatry (2017), for example, notes that fiscal decentralisation is often the weak linkage of decentralisation reforms (when compared to administrative and political decentralisation) in the OECD countries, which leads to insufficient own financial resources at the hands of ULGs when compared to the spending responsibilities transferred to them (due to unfunded or under-funded mandates) as well as the lack of adequate transfers to local governments to meet the requirement (of service delivery). Quite often, ineffective fiscal decentralisation reduces the fiscal capacity (both revenue raising and spending) of the ULG, which in turns affects its service delivery i.e.,low levels of fiscal autonomy and continuous changes in powers to raise tax and non-tax revenue bring in fiscal stagnation and make the ULG unable to meet provide better civic services and improve the quality of life of citizens (NALA 2018).

Although there has been a good amount of literature on the fiscal decentralisation in developed nations, there has been very little with reference to India. In fact, much of the literature emerged after the CAA, 1992, which sought to bring-in functional clarity to local governments and suggested mechanism for supplementing their finances through the finance commissions. As a result, Chattopadhyay (2004) notes, municipal finances have improved in a majority of the ULGs in India. However, that was in the first decade after the CAA, 1992;subsequently, the fiscal improvements began to wane off and local governments began to become dependent upon national and state governments[1]. This was particularly the time when restructuring of taxes and other levies also began to get shaped up. The local governments suffered in the process due to the loss of tax powers[2] and they were not compensated for the same; even when compensation was made, it was fixed by the national or state government that remained static for a long time. Upper tiers of governments also affected the finances of local governments by either controlling the tax/levy rates or giving exemptions to many taxable units from local government taxes[3]. Therefore, in the process, the deterioration of finances of local governments would have affected their fiscal operation,which would have also affected their service delivery as well. Yet, this issue is not much researched empirically in India i.e., whether and how local government finances are affected by the acts of upper tiers of governments.

1 Pethe and Lalwani (2006) note that the ULGs in Maharashtra became more dependent upon State government for their effective functioning.
2 Some state governments like Punjab and Haryana have abolished property tax in some cities
3 Government properties, in many states, are exempt from paying property tax

However, there are relatively a good number of studies on municipal finances as well as the civic infrastructure service delivery in India. Much of the literature has originated after the CAA, 1992, which first brought the ULGs into the attention in the context of broader public finance. Even the early studies that matched the CAA 1992 e.g., NIPFP (1995), find that the finances of the ULGs were weak and inadequate resources were deployed by them for the development of civic infrastructure services. The Rakeshmohan Committee Report (GoI 1996) also found that the investment requirement of the urban infrastructure services was very large in India. Mathur and Thakur (2004) assessed the fiscal performance of municipal bodies using the conventional approach of examining revenue and expenditure performance as well as by comparing their expenditure with the spending norms of Zakaria Committee (1963); they find that the municipal finances and spending on civic infrastructure services required significant improvement.

An assessment of the finances of 35 major ULGs in India by Mohanty et al (2007) found that there was a significant under-spending on the urban civic services when compared to the expenditure norms of Zakaria committee. The ULGs also did not fare well on other fiscal and financial parameters. In a study at the ULG finances at State level, Pethe and Lalvani (2006) conclude that the finances of ULGs in Maharashtra state were not in good condition and fiscal devolution to them was not adequate enough to meet the fiscal needs. Sridhar (2007) as well as Sridhar and Reddy (2010) also find that municipal finances were in fragile state and spending on civic services was not adequate when compared to financial norms. Another recent comprehensive study of the finances of ULGs in 17 major Indian states by Mathur (2011) also finds that the municipal revenue was not growing adequately, where as the municipal expenditure was rising at an alarming pace.

Literature review implies that decentralisation is far from complete and effective in India; the ULGs struggle to have adequate finances to meet with the urban service delivery. Most of the empirical studies assess the finances of ULGs by examining the trends and structure of the major financial parameters of municipal revenue and expenditure. In this traditional approach taken by several studies, they take a cross section of cities and states to draw macro policy implications. There is a research gap of not many studies that concern with one or a few ULGs by taking either case study or comparative study approach. While the cross-sectional studies examine some major parameters of ULG finances that are relevant to macro or policy level reforms, they do not point to the same for an individual or similarly positioned ULG. Also, none of them studied how ineffective decentralisation undermines local government autonomy

(through any actions of upper tiers of government)to impact on ULG finances and service delivery. With this research gap, the current study makes an attempt to contribute to the literature through a case study of the ULG – Pune Municipal Corporation (PMC) – of a major Indian city – Pune.

Methodology

Choice of Focal City and Issue

Pune is the eighth largest city in India in terms of the total population of its urban agglomeration, which was 50,57,709 according to the Census (2011). The city population within municipal limits is 31,24,458 as recorded in Census (2011). Pune is a city with a long history of urbanisation dating to 17th Century, when it was founded by the Maratha rulers. It is considered as the cultural capital of Maharashtra state. Pune city is strategically located close to Mumbai (about 120 km away), with which it has close economic ties. It is the second largest city in Maharashtra state, next to Mumbai. The Pune Municipal Corporation (PMC) is the ULG concerning Pune city[4].

Pune is also known as the 'Oxford of the East' with the presence of a large number of institutions of higher education, research and training. Pune city is perhaps India's first '*motown*'; it is a hub of automobile and related industries that form a large auto cluster in the city with the presence of the industrial units of engineering/design, manufacturing, intermediates, ancillaries, accessories, trade and support services. In fact, almost every large automobile manufacturer vies to have presence in Pune and the city leverages its institutional base very well to remain *numerouno* in it. The city economy has, however, been undergoing a lot of change in the recent past with the rapid rise of Information Technology (IT) and allied services. The city is leveraging its large institutional base and proximity to Mumbai to challenge other major IT destinations in India in a short span of time. Also, the rise of manufacturing and services sectors led to a spurt in the growth of real estate development and construction activity in the city in the last decade.

The PMC jurisdiction extends over 331sq km geographical area. The PMC area is divided into four zones, 15 administrative wards and 76 electoral wards (also known as Prabhag). The choice of PMC is highly relevant for a study on municipal finances and civic services in the context of fiscal decentralisation, as Pune used to levy 'Octroi', an entry tax imposed by the ULG on the goods imported for the consumption of city population. Octroi is an old and archaic consumption tax first levied during the British rule; but, it is a highly buoyant and liquid source of revenue for

4 PimpriChinchwad Municipal Corporation (PCMC) is another ULG neighboring Pune city within the PMR area. However, the current study is confined to the Pune city only.

the cities. However, the levy of Octroi went against the federal structure of India, as it was considered as a barrier to inter-state trade[5]. Hence, along with other Indian states, Maharashtra abolished the Octroi in its municipal corporations in 2013.

There is a lot of debate that with no alternates to Octroi put in place, the ULGs stare at a loss of huge revenue and their budgets may go haywire. In fact, some of the ULGs like the Municipal Corporation of Greater Mumbai (MCGM) fought it hard in the court of law until 2015 for the lack of any alternate source producing such magnitude of resources to the ULG. Compensation in lieu of Octroi provided by some State governments e.g., Andhra Pradesh, was stagnant and not buoyant over time. The Maharashtra State government allowed the introduction of Local Business Tax (LBT) in place of Octroi in April 2013. LBT is a consumption tax that can be levied by the ULGs on the value of goods sold by the businesses/ enterprises in city jurisdiction. However, its implementation proved to be a major hurdle with the non-compliance and strong protests by local traders. After the change of political party in power in the State in 2015, the new government first exempted a large number of them from LBT payment i.e., those with value turnover less than 50 crores, leaving only large players as tax payers. With the introduction of the Goods and Services Tax (GST) by the Union Government in July 2017, the LBT was subsumed into it and stands to be abolished. Such actions of upper tiers of government would impact ULG revenue.

Apart from the major intervention of abolition of Octroi by the State government, there are also other interventions of both Central and State government which could also have impacted the municipal finances of Pune. The Government of Maharashtra adopted the Real Estate Regulation Act (RERA) in 2016, which made it compulsory for all building permissions come under the purview of the Act. Given the lack of clarity on the compliances and procedure associated with the RERA requirements, several construction firms withheld their construction projects / plans and it took some time for them fall in line with the requirements of the Act. In the meantime, the PMC would have suffered from a revenue loss on building permission fees, development charges etc. Further, the Central Government demonetized currency in 2016, which led to several individuals and firms devoid of cash for transactions. This led to a complete halting or slowdown of several economic activities, which also led to loss of revenue to the municipal government e.g., shop license fees/lease rentals, delayed/ deferred property tax receipts etc. Yet, the impact of such interventions of

5 The demand for abolition of octroi began in mid-1990s on the ground of barrier to inter-state movement of goods. The subsequent arguments also pointed to the delays caused by it in check posts, the productivity losses, increase in the prices of goods subject to the distortionary tax, and frequently led to corruption, in addition to its cost of collection being high.

the upper tier governments on the municipal finances is not studied much, which the study attempts to make for the PMC, the ULG of Pune city.

Study Approach

The current study performs an analysis of the finances of PMC, in the backdrop of upper tier government interventions, based on the secondary data. The annual budget documents that contain the financial information pertaining to the ULG as well as the financial capacity report were obtained from the PMC. The financial data pertinent to the study objectives were extracted from these documents so as to use as the main data. The study uses conventional approach to perform the financial analysis of the PMC by examining the trends and patterns of various public financial parameters with observation of how the upper tier government actions impacted during the intervening years. The annual budget documents lay down municipal financial data in the form of provisional estimates (for current year), revised estimates (of last year) and actuals (for previous year). Accordingly, the data were sorted in both the above terms in the analysis. Further, the municipal financial data in budget documents are expressed in current prices, which mask the effect of inflation. Therefore, they were also transformed into the data in constant prices using the following formula:

F (constant prices) = {F (current prices) / Price Deflator}, Where,

F is any municipal financial parameter

Price Deflator is ratio of price indices of current to reference year (WPI_t/WPI_0)

Further, the analysis also included any possible effect of city's growing population on the municipal financial aggregates by examining the trends and patterns of major municipal financial parameters per capita (at current prices). These are derived based on the population projections on the census population figures for the year 2011 while making use of the average annual population growth of preceding three decades for population projection. Average growth rates are used here to avoid the influence of any extraordinary circumstances on the city's growth momentum in any period. The conventional approach of examining the trends and patterns of financial parameters has been taken to understand how the upper-tier government actions impact on local government finances in the intervening year of the time period.

The analysis of PMC finances follows the broader framework of public financial analysis (or, fiscal analysis) by examining the pattern as well as trends of major financial parameters of PMC on both revenue and capital accounts. It helps us to understand whether the PMC finances are strong and healthy (particularly, in the wake of actions of upper tier governments). The financial analysis was performed by examining the growth rates of various financial parameters both on revenue and capital accounts. The CAGR of

various financial parameters is computed by the following formula; it is also compared with other studies and discussed:

$$g = \{(F_n/F_0)^{1/n} - 1\}$$

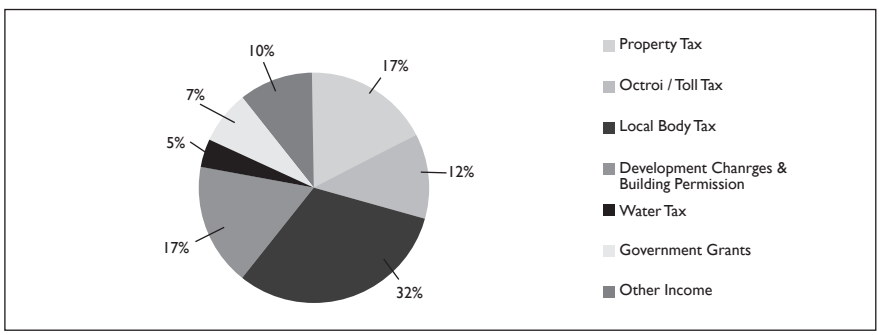
Where, g is the Compounded Annual Growth Rate (CAGR)
F is any municipal financial parameter
n is the time period

Trend and Pattern Analysis of Municipal Finance

Revenue Income

Figure-1 shows the structure of the average revenue income of the PMC during the period. The major revenue income sources of the PMC are: (i) Property Tax (ii) Goods based taxes such as (a) Octroi/ Toll Tax (until 2013) and (b) Local Body Tax (LBT) post- octroi abolition in 2013 (iv) Development & Building permission charges (v) Water Tax (vi) Government Grants (vi) Other Income. Evidently, goods based tax such as Octroi/ LBT forms an important revenue source with a bulk of revenue (44%) coming from it; it is followed by Development Charges and Building permissions (17%) and Property tax (17%) respectively.

Figure-1: Pattern of Total Revenue Income of PMC



Figures-2a and 2b show the trend of aggregate and per capita revenue income respectively of the PMC in current and constant prices. The aggregate revenue income(at current prices) grew at a CAGR of 13.72% during 2009-10 to 2015-16. It is on lower side when compared to the annual growth rate of all municipal governments in India (GoI 2013) as well as that of Maharashtra (Mathur 2011). In particular, the aggregate revenue income of the PMC flattened in 2013-14 due to the abolition of Octroi, it recovered thereafter with the LBT coming in lieu of Octroi. However, a rather sharp decline in 2016-17 was on account of following multiple shocks due to intervening actions / policies of upper tier governments which affected PMC revenues:

- First, the demonetisation of currency took place in 2016 that affected individuals and enterprises in many ways; several construction firms would have withheld their plans and would not have applied for building permissions and neither paid development charges;
- Second, the Real Estate Regulation Act (RERA) was implemented in 2016, which brought real estate development activities and firms under regulation. As the firms take time to meet the new requirements, the construction projects would have been put on hold and, therefore, non-realisation of building permission fee and development charges;
- Third, the LBT was first diluted by the new State government in August 2015 with the exemption from it given to small and medium enterprises and its eventual abolition, which would have reduced the revenue realised by PMC in that and following years.

The impact on revenue income of PMC is much sharp during the intervening years i.e., 2013-14 and 2016-17, when we account for the population rise by examining the trend of revenue income per capita. It is, therefore, certain that the actions of the upper tier governments have caused a revenue loss to local government exchequer.

Figure-2a: Trend of Aggregate Revenue Income of PMC

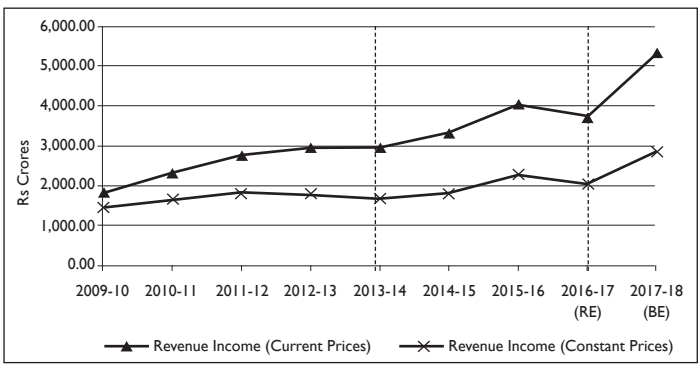
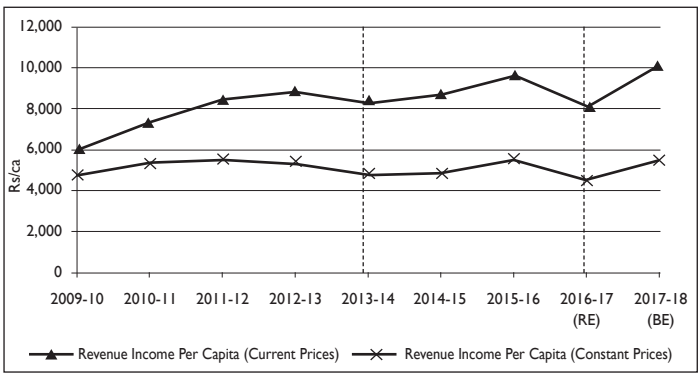
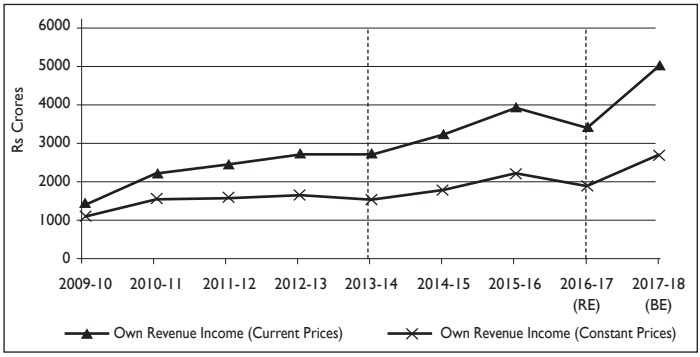


Figure-2b: Trend of Per Capita Revenue Income of PMC



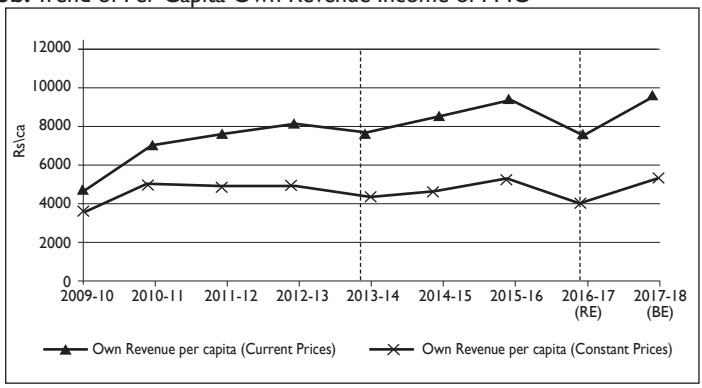
Revenue income of the PMC comprises both own and non-own sources. While non-own revenue sources e.g., government grants and other income, are some what immune to revenue shock events mentioned, the own revenue sources of revenue are expected to get impacted more severely. Figure-3a and 3b show the trends of aggregate and per capita own revenue income of the PMC in both current and constant prices. The trend of own revenue income also follows that of revenue income. While aggregate own revenue income of PMC has more than doubled during 2009-10 to 2015-16 (at a CAGR of 20% during the period); it only doubled in terms of constant prices. PMC's aggregate own revenue income declined marginally during 2013-14 due to Octroi abolition and recovered thereafter with introduction of LBT. However,it declined rapidly in year 2016-17 on account of shocks due to multiple events that were discussed earlier i.e., demonetisation, RERA and LBT issues.

Figure-3a: Trend of Aggregate Own Revenue Income of PMC



The trends of own revenue income per capita shown in Figure-3b follow those that of the aggregates; but, the impact is rather sharp as we account for population rise. In particular, we see a dip in 2013-14 and sharp decline during 2016-17.

Figure-3b: Trend of Per Capita Own Revenue Income of PMC



Own revenue income of PMC can be decomposed into two major sources – tax and non-tax revenue income. It is important to see which of these two major revenue sources was hit hard by the actions of upper tier governments.

Figure-4a shows the trends of aggregate tax and non-tax revenue income of the PMC. Tax revenue aggregate income (current prices) of PMC grew at a robust pace of 20% CAGR and more than doubled during 2009-10 to 2015-16. However, it was almost flat in terms of current prices in 2016-17 and the corresponding one in constant prices declined, implying that the upper tier government actions discussed above had significantly changed the growth trend of tax revenue income (though it did not result in a decline). Non-tax revenue income (current prices) of the PMC grew at 20% CAGR during 2009-10 to 2015-16, but it suffered from a large decline during 2016-17 (below the level of 2013-14) due to the shocks of demonetization, RERA and LBT issues.

Figure-4a: Trends of Tax and Non-Tax Revenue Income of PMC

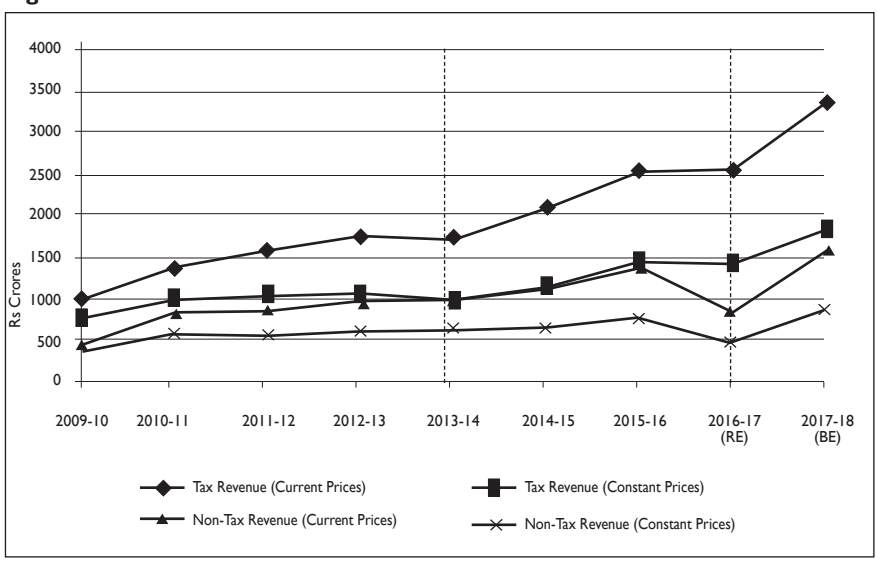
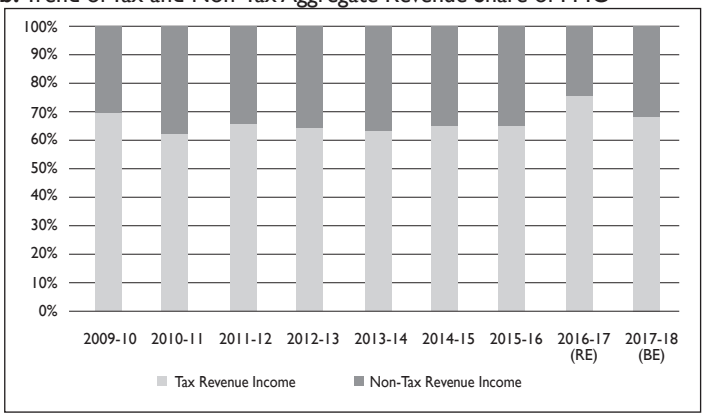


Figure-4b shows the relative share of tax and non-tax revenue income (in current prices) of the PMC. Although tax revenue forms the bulk share of own revenue income throughout the period, its share has declined since after 2013-14 when Octroi was abolished. In the year 2016-17, the non-tax revenue was hit hard by RERA, demonetization and LBT issues. Therefore, we can infer that while Octroi abolition would have hit the tax revenue income hard, the RERA, demonetisation and LBT issue would have hit the non-tax revenue rather hard.

Figure-4b: Trend of Tax and Non-Tax Aggregate Revenue Share of PMC



We will further decompose the tax and non-tax revenues in terms of revenue income sources and examine their trends so as to observe the effects of upper tier government actions on the major sources of each of them.

- *Tax Revenue Income*

  Property tax and Goods tax[6] are the major tax revenue sources of the PMC. Figure-5 shows the trend of property and goods tax revenue of the PMC.

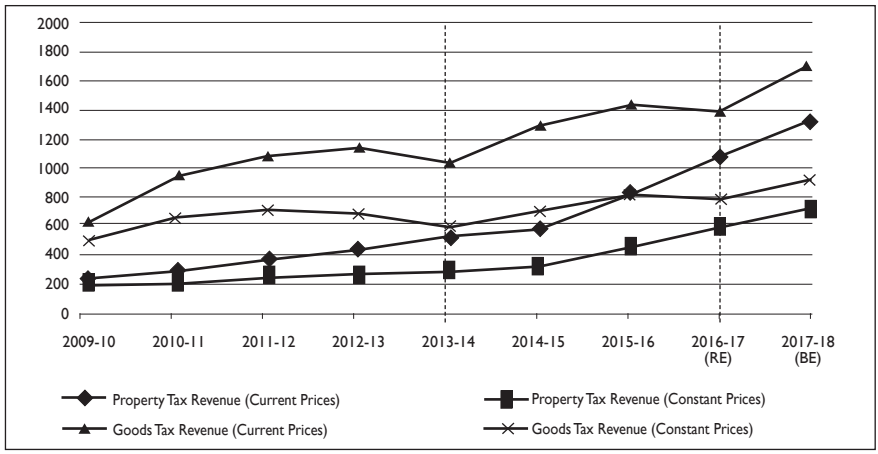
  - Property tax is the second most important revenue source of the PMC; it provides a stable revenue income to any ULG as properties are immobile. Property tax revenue grew steadily at a CAGR of 22.5% during 2009-10 to 2015-16. The high growth rate of property tax is on account of the rapid development of real estate and property development sector in Pune since after 2009-10, which would have brought more properties under tax net. Further, property tax rate hike has become a common annual feature since after 2010-11 (Indian Express 2017)[7]. Being a wealth tax on immobile source, the property tax revenue was largely immune to the external revenue shock events like Demonetization, RERA and GST.
  - Goods tax is the most revenue spinning income source for the PMC. It is levied as (i) Octroi/toll tax until 2012-13 (ii) Local Body Tax (LBT) from 2013-14 onwards. Octroi was abolished in 2013-14 and LBT was introduced in lieu of it. Octroi revenue strongly grew at a CAGR of 22% from during 2009-10 to 2012-13, after which it plummeted

6 Goods taxes like octroi or LBT are levied on the value of goods being brought into the city or sold in it. They may be akin to Sales Tax imposed by the State Government but are legally in the purview of urban local government. Tax rate levied is much smaller than that of sales tax.

7 This is more in the recent past after 2013-14, perhaps in an attempt to ameliorate tax revenue as a response to the abolition of octroi.

in 2013-14. LBT revenue grew steadily at a CAGR of 10.6% during the period of 2013-14 to 2015-16. Evidently, LBT revenue is not as buoyant as Octroi, which it replaced with. It strengthens the argument that the abolition of local government tax power by the upper tiers of governments gives rise to a loss of local government tax revenue income and any other tax alternates or compensations may not yield revenue as buoyant as the existing tax.

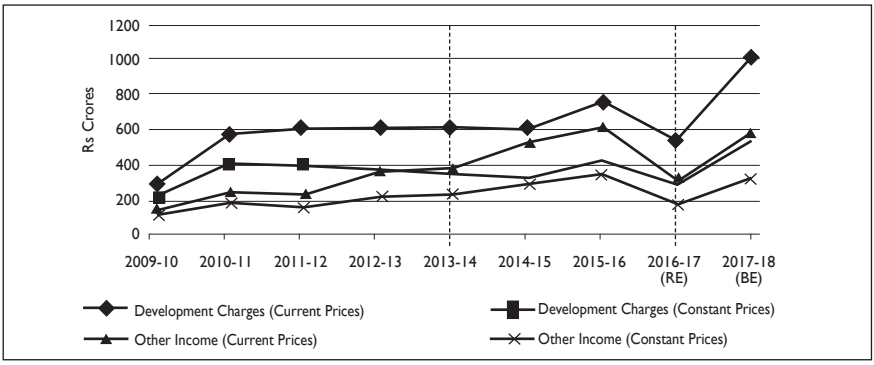
Figure-5: Trends of Major Components of Tax Revenue Income of PMC



- *Non-Tax Revenue Income*

  Non-tax revenue income of the PMC is primarily in the form of Development and Building permission charges. Other income is also another such source. Figure-6 shows the trend of these non-tax revenue sources of the PMC over time. Development and building permission charges is an important non-tax revenue source for PMC and it has been a stable source over time, primarily due to the booming construction and real estate sector in the city. It has more than doubled during 2009-10 to 2015-16, registering a CAGR of 17.16%, which is higher than that of urban Maharashtra (Mathur 2011). The sharp revenue decline in 2016-17 is perhaps on account of the upper tier government actions of currency de-monetisation, introduction of RERA and LBT issues explained earlier. These shocks created uncertainty, and estate developers responded by putting a halt to development projects, thereby dwindling the revenue to PMC. Other income of PMC arises from various administrative fees/ charges and rental income from municipal properties also amounts to significant size, but it is highly fluctuating though grown over time to a significant number until 2015-16. The multiple shocks mentioned above have affected this income source as well, as reflected from the fall of it in 2016-17.

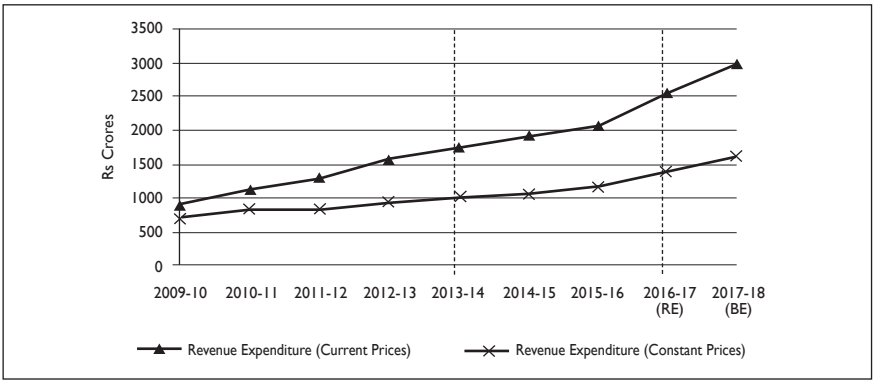
Figure-6: Trend of Major Components of Non-Tax Revenue Income of PMC



Revenue Expenditure

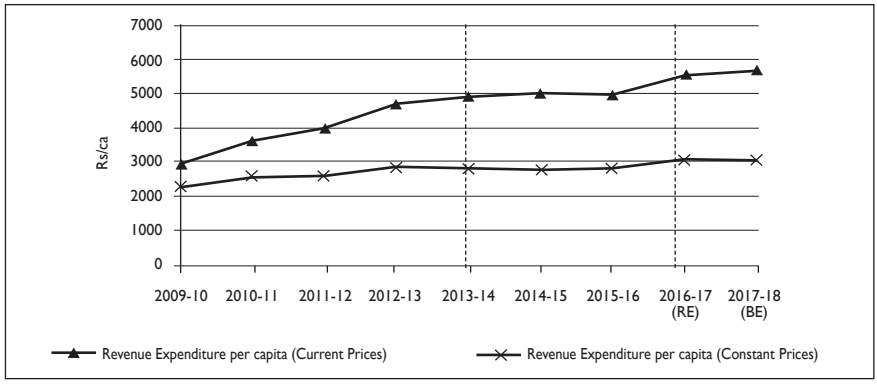
It is also important to see whether the income shocks to ULG due to upper tier government actions are also echoed on expenditure side, as ULGs follow 'balanced budget rule'[8]. Figures 7a and 7b show the trend of aggregate and per capita revenue expenditure of the PMC. The aggregate revenue expenditure (current prices)grew steadily over time, as expected with any ULG, to become more than doubled during 2009-10 to 2015-16 registering a CAGR of 14.87%, which is slightly above that of urban Maharashtra (Mathur 2011). However, the revenue expenditure growth of PMC is lower than that of revenue income. Revenue expenditure growth appears to have been immune to the revenue shocks during 2013-14 and 2016-17 discussed earlier. However, the trends of per capita revenue expenditure reflect a flattened growth after both the time points. In fact, the effect is more glaring when we observe the trend constant prices. It, therefore, implies that the revenue income shocks due to the actions of upper tier governments got translated into revenue expenditure adjustments of the PMC in the subsequent years, especially when we account for inflation.

Figure-7a: Trend of Aggregate Revenue Expenditure of PMC



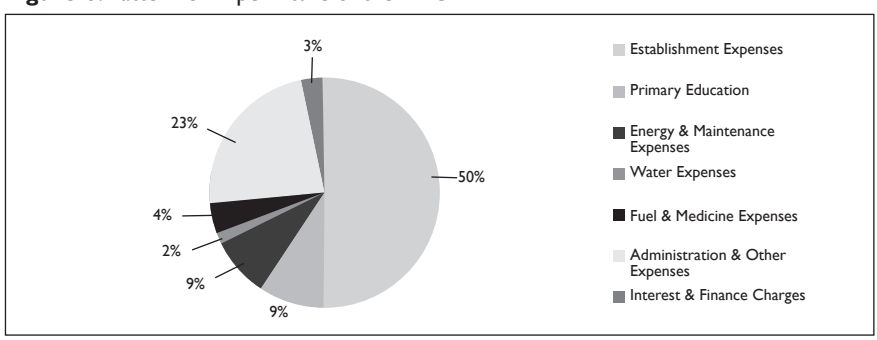
8 It refers to the principle followed by the ULGs in making budgets such that their total income and total expenditure are equal and no budget deficit is allowed in the process of budget making.

Figure-7b: Trend of Per Capita Revenue Expenditure of PMC



Apart from observing trends, it is important to see where most of the expenditure is incurred i.e., what is the quality of expenditure. The major revenue expenditure categories of the PMC are: (i) Establishment expenses (ii) Primary education expenses (iii) Energy and maintenance expenses (iv) Water expenses (v) Fuel & Medicine expenses (vi) Administration & Other expenses(vii) Ward-level works (viii) Depreciation, Interest and Finance charges. All of them are recurring expenses such as staff salary, materials and O&M[9]. Figure-8 shows the average revenue expenditure pattern of PMC during the study period. Evidently, establishment expenses form the bulk of revenue expenditure (at 50%); followed by Administration and Other expenses (23%), Primary Education (9%) and Energy and Maintenance (E&M) expenses (9%) respectively. Fuel & Medicines, Interest and finance charges and Water expenses formed a small share. The revenue expenditure pattern of the PMC is lopsided with a rather high spending on Establishment and Administration (E&A). It is not in line with some prudential expenditure structure norms that suggest 50-60% for E&M, 25-33% for E&A and 7-25% for Others.

Figure-8: Pattern of Expenditure of the PMC



9 The nature of ward level works is not known i.e., whether improvements to assets (recurring type) or development of assets (capital type) but they are included in as recurring.

O&M Expenditure

It is also important to see whether the impact on revenue expenditure had any implication for civic service delivery. The trend of O&M expenditure on civic services can be examined for this purpose. Figures 9a and 9b show the trend of aggregate and per capita O&M expenditure of the PMC (which comprises Energy and Maintenance (E&M) expenses as well as Water expenses). The aggregates trend shows that the O&M expenditure has been increasing over time, but at a rather small pace, which is a concern for rapidly populating city like Pune. The O&M expenditure in current prices grew at 7% during 2009-10 to 2015-16, which is much lower than that of revenue expenditure. The per capita O&M expenditure (current prices) also reflects the same trend. The O&M expenditure figures in constant prices show a rather flat trend and those on per capita basis show a decline in real terms. While inadequately growing O&M Expenditure by PMC is a major concern, but it may be low because Pune city has topographical advantage as far as water supply, storm water drains and sewerage are concerned and streetlights are also being modernised to LED requiring little operation and maintenance. Yet, a decline in O&M expenditure is a concern for civic service delivery.

Figure-9a: Trend of Aggregate O&M Expenditure of PMC

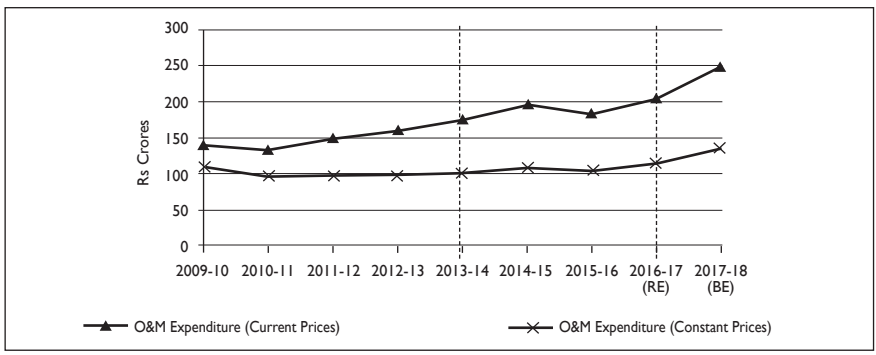
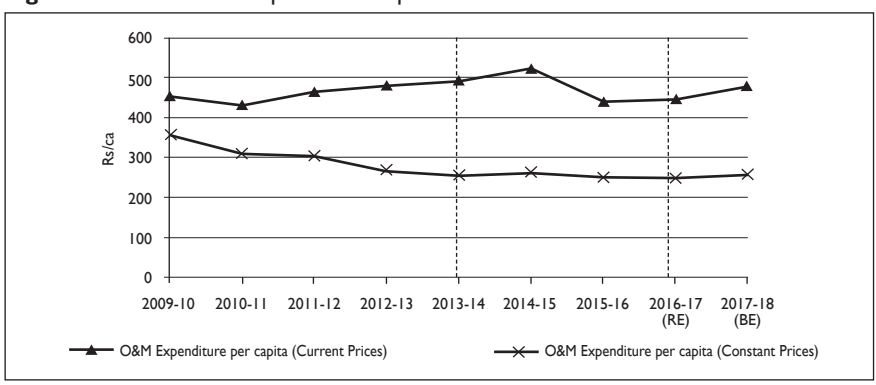


Figure-9b: Trend of Per capita O&M Expenditure of PMC



Capital Expenditure

Capital expenditure is an important component of municipal expenditure towards new asset creation, which can either enhance or improve civic service delivery. Apart from the revenue expenditure getting impacted by the actions of upper tier governments, it is also important to see if capital expenditure is also affected. Figures 10a and 10b show the trend of the PMC capital expenditure and per capita capital expenditure over time. The capital expenditure on works was cyclical and remained flat most part of the time (with a large provision made in last fiscal year). It registered an annual growth of 1.5% during 2009-2015, which is much lower than that of revenue income far lower than that of urban Maharashtra. The per capita Capital expenditure growth was fluctuating and declining (especially, when we see in terms of constant prices). Poor capital expenditure is perhaps due to the dependency on government grants and fluctuating revenue surplus of the PMC. Therefore, civic service delivery expansion would not have been happening, while the population was rising, during 2013-2016.

Table-10a: Trend of Capital Expenditure of PMC

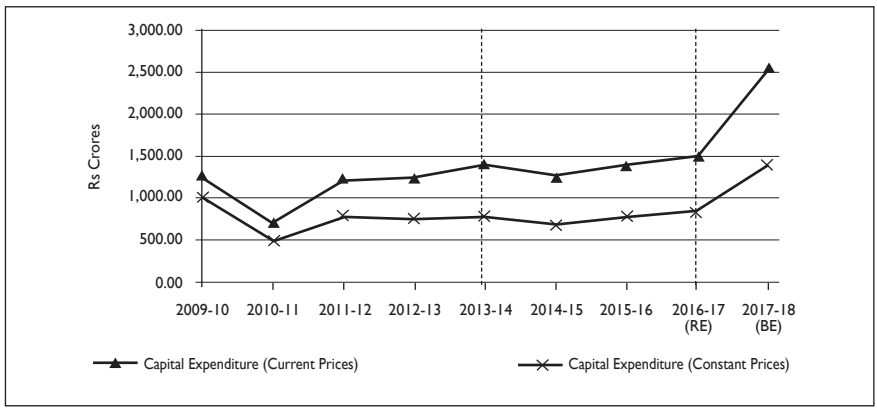
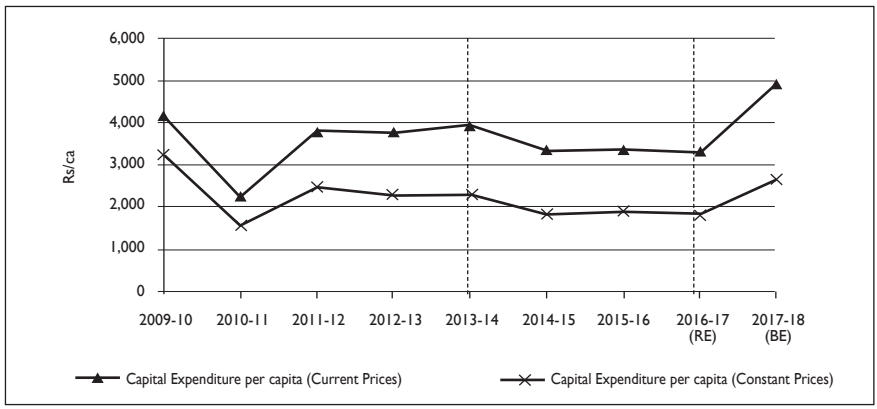


Table-10b: Trend of Per Capita Capital Expenditure of PMC



Conclusions

The analysis of the finances of the PMC brings to the fore again the issue of fiscal decentralisation or 'financial autonomy' of the ULGs. The revenue income sources of the ULGs are provided for in the State Act on Municipal Corporations. Any levy of new taxes (or, abolition of existing taxes) is vested with the State Government, rendering ULG finances vulnerable to the State government decisions. This is clearly the case of PMC – which experienced the abolition of Octroi and introduction of LBT – both carried out by the State Government. The subsequent limiting of the scope of LBT and its eventual abolition was also done by the State Government. The introduction of GST led to further intervention of Central Government in local finances (through subsuming LBT into GST and eventual compensation for the loss of it). All these have impacted the revenue income as well as expenditure of the PMC.

The PMC also suffered from revenue shocks due to the State legislations like the RERA Act 2016 and Demonetization by the Central Government, which show the vulnerability of local government finances to the policy decisions of upper tier governments. The revenue income shocks got translated into expenditure adjustments in the corresponding year. Moreover, the quality of expenditure by the PMC implies that the revenue expenditure on the O&M of services has been low and not growing at much over time. Low and stagnating level of O&M expenditure lead to lower levels of civic infrastructure services to citizens and firms. Capital expenditure has also been stagnant and declining to the detriment of new asset formation, which is required for an enhancement in civic service delivery.

The 74th CAA also emphasized upon increasing the autonomy of ULGs. Besides mandating regular elections to the council of ULGs and specifying functional domain of ULGs, the CAA also emphasized upon making the ULGs as autonomous bodies with regard to mobilising their own financial resources and expending them on providing various civic services[10]. Therefore, the Central and State governments are expected to do act in this spirit i.e., their actions should not lead to a loss of autonomy in revenue raising or expenditure making. Yet, both the tiers of government act against the spirit of the CAA 1992 and indulge in such actions that undermine the financial autonomy of ULGs in many ways: they intervene in taxation or user charge levy by limiting the scope of such tax/non-tax instrument by giving exemptions, they restrict the ULG from adopting/revising suitable tax rates or fees/charges, or they may even abolish tax/user charge levy and/or bring in another set of tax/non-tax instrument. The financial assessment of PMC clearly point to such actions of the upper tiers of government tend to restrict the potential revenue (thereby, expenditure) of the ULG as well as affect its service delivery performance.

10 Besides the autonomy of ULGs to raise and spend financial resources, the CAA 1992 has also emphasized upon inter-governmental fiscal transfers from Central and State governments to the ULGs in order to overcome the constitutionally built-in horizontal and vertical imbalances

The large ULGs in Maharashtra have been traditionally dependent upon Octroi as a major source of revenue income, which made them vulnerable to revenue shocks, as Octroi levy became an inter-state trade issue that the State governments were keen to resolve. By depending on Octroi, the ULGs like Pune have neglected property tax for some time and woke up to the shock of Octroi abolition in 2013. Although, the PMC has taken several steps to improve property tax compliance and collections, it is yet to move onto a GIS based property taxation system (as done in Bangalore) that identifies all properties in the city and aids to bring them under tax net. There is a proposal for integrating databases of property registration, building permission and property taxation, which is yet to translate into action. PMC follows Annual Rateable Value (ARV) based taxation system (which is improvised with area based rating value); but the experience of MCGM (Mumbai) shows that Capital Value based system may yield more tax revenue due to easiness in the determination of capital value.

Further, even whatever little revenue strength of PMC is not getting translated into increased spending on civic services or improved service delivery as was the case of Bangalore in the past (Savage and Das Gupta 2006). This is evident from a slow growth of O&M spending by PMC. Moreover, the revenue income and expenditure aggregates show relatively good growth but they mask the population effect. The per capita revenue aggregates show a lower growth when compared to aggregates, which again implies that the revenue spending is not growing in commensurate with population growth. Pune is also as laggard when it comes to reforming civic services as was the experience of failed PPP project in water supply (WSP 1999). Capital expenditure has been almost flat most of the time and not able to commensurate with the rising city population i.e., per capita capital expenditure shows a decline over time. The analysis implies the need for more spending on civic services (both capital and revenue expenditure)that also requires stable and growing revenue income. On the whole the PMC finances appear to be fragile due to their vulnerability to upper tier government actions, but one may look forward to their improvement in future.

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Family Expenditure on Engineering Education in India and its Determinants

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Abstract

Research on family expenditures on education in India is not abundant; there are a few studies on higher education; but research on the determinants of family expenditure on engineering education is very scanty; there are hardly a handful of studies. As a result, systematic knowledge of the nature and type of family expenditure on higher education is severely limited. Of late the significance of studies on family expenditures on higher education is increasingly understood in general and in the context of declining pubic budgets and when alternative methods of funding of education are being explored and cost recovery methods are being introduced.

Using the data collected from about 7,000 students studying for their Bachelor's degree in engineering in forty-eight engineering institutions – colleges, universities, Indian Institutes of Technology and National Institutes of Technology – in four states in India, it is attempted in the present paper to examine the extent of family expenditure on engineering education and its determinants. The robust OLS estimates suggest that family's social, economic, and educational factors exercise considerable influence on levels of family expenditures on engineering education in India. The paper is a modest attempt but forms an important addition to the limited literature on the subject on India and helps in making informed public policy making.

Keywords: Caste, Engineering Education, Family Expenditure, Gender, Government Institutions, Household Income, Private Institutions

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Introduction

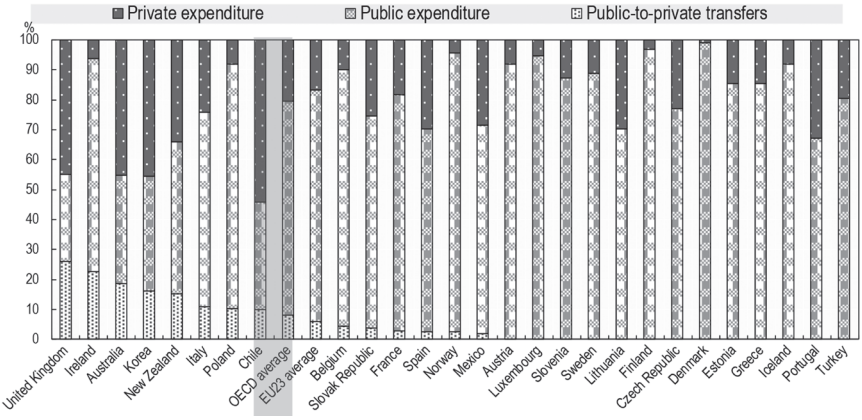
Expenditure on education consists of expenditure incurred in two major domains: public and household. Both are important for the overall social investment in education to be optimum (Majumdar 1983). Normally there are important complementarities between the two; but often the two either complement each other or in some contexts substitute each other (Tilak 1991; Wolf & Zohlnhöfer 2009; OECD 2020b); in some cases, they can be neither substitutes nor complements. In any case, both are critical for the education process, as in the absence of either of them, optimal investment does not take place. As public and family expenditures[1] on education are crucial for children's development and learning, "current family spending patterns may have significant consequences for future generations' well-being" (Lunn & Kornrich 2018, p. 159). How much should parents spend on their children's education? This is an important question for reasons of distributive justice, and economic efficiency, as it is generally not desirable in either case to base human capital investments in children on the parents, and their incomes (Hoxby 1998, p.309). While there are no precise answers to this question, a few considerations are widely recognised as important when discussing this issue. First, education, including higher education is a public good, benefiting all in the society. Second, promotion of equal access to education is an important objective of every modern welfare state. Third, ability to pay of the families or individual choices should not determine the policies on financing of education, including the decisions by the families to enroll their children in education, and their financing.

What are the current patterns of family financing of education? Available statistics show that in many countries households meet a sizeable part of total investment in education; further families in many developing countries spend far higher amounts on education than those in developed countries. Even among the poorest countries, household expenditures on education are sizeable. This is true as shown in Figure-1 even in case of higher education. With families meeting sizeable parts of the costs of education, they are increasingly recognised as 'hidden funders' of education (Huebler & Lega 2017).

For a long time, it was believed that families in India do not spend much on education, and that education, including higher education is provided by the State nearly free to everyone or it is highly subsidised. Such a presumption remained unchallenged for a long time, as evidence on family expenditures on education in India has been scarce.

1 OECD and a few others refer to family (or household) expenditure on education as private expenditure, some others use terms as 'consumption expenditure', 'out-of-pocket expenditure', 'parental expenditure', and 'student expenditure.' They are broadly same, but for minor differences in some cases.

Figure-1: Public and Private (Household) Expenditure on Tertiary Education in OECD Countries, 2017



Note: International expenditure is aggregated with public expenditure.

Source: OECD/UIS/Eurostat (2020a).

It has remained for a long time as an unexplored terrain. The only source of data on family expenditure on education available for a long time has been the *National Accounts Statistics* (Government of India) that provides data on 'private final consumption expenditure' on education (earlier combined with recreation etc.). Until the National Sample Survey Organisation (NSSO) launched the 42nd round in 1986-87, which provided for the first time detailed data on household expenditure on education, the few studies conducted (e.g., Tilak 1985, 1991, 1995, 2000: Motkuri & Revathi 2020) were based only on *National Accounts Statistics*. But since only an aggregate gross figure – for all levels of education together, and with no details by items is available from this source, analyses have been restricted, though some useful insights came out, such as: the size of expenditure incurred by households on education, relative to total private (household) expenditure, in comparison with government expenditure on education, or as a proportion of national income, estimates of coefficients of elasticity, and determinants of household expenditures. Factors considered for examination of determinants included household characteristics, individual characteristics, parental occupation, parental education, and a few supply side factors. Though the NSS initiated the education survey in 1986-87, it was the 52nd round conducted in 1995-96 which was the first survey extensively used by scholars expanding the framework of examining determinants of household expenditure on education. While the NSSO continues to conduct education surveys regularly, a few others such as the India Human Development Surveys (by the National Council of Applied Economic Research) and the National Family and Health Surveys (by the Indian Institute of Population Studies) have also been conducted in recent years, covering some aspects of education.

The National Sample Surveys conducted from 1986-87 (42nd round) onwards have provided valuable evidence to show that families do spend considerable amounts on education – on 'free' primary (Tilak 1996) to higher education. The evidence also shows that family expenditures incurred by students on higher education are growing fast, as shown in Table-1. The high level of expenditure may be beyond the economic capacity of many of the families in India (Nair 2004). The trend of increasing household expenses on education might imply growing inequity in education, which is a serious concern of a welfare state. After all, the high burden that the families face with high and increasing levels of family expenditures on higher education, creates a situation in which higher education would be unaffordable for most people in the low and middle income groups, and widens further the inequalities in education.

Research on the determinants of family expenditure on higher education is very valuable for public policy making, but it is virtually non-existent in India; many studies concentrated on primary or elementary or school education. But the significance of such studies on higher education is increasingly recognised, particularly in the context of dwindling pubic budgets and in the context of formulation of alternative public policies on financing of higher education, more specifically on the cost recovery measures in higher education. Public policies are being formulated based on feeble research evidence. In this backdrop, the paper may be seen a modest attempt to fill this major gap in policy research in economics of higher education in India, and in particular economics of engineering education.

Table-1: Family Expenditure on Higher Education in India (Rs.) per student/per annum

	All	Rural	Urban	Male	Female
General Higher Education					
2014					
Graduate	13,478	11,527	16,771	13,324	13,649
Post-Graduate & above	15,999	14,604	17,744	15,417	16,641
2007-08					
Above Higher Secondary	7,360	6,327	8,466	7,386	7,324
2014					
Professional & Technical Education					
Graduate	73,342	60,832	80,414	74,341	71,683
Post Graduate	71,431	52,358	82,181	68,152	75,891
Engineering Education					
Government	42,401	40,832	43,418	43,710	38,367
Government-Aided	69,996	61,516	74,291	70,248	67,873
Private (Unaided)	78,227	68,439	83,443	78,449	77,995

Source: NSSO (2016).

Why do families invest in education of their children? Some pose the same question as: how much people are willing to invest in their children's education? But this may not be right, as families may feel compelled to invest in, and may not be voluntarily 'willing' to spend on education. Typically families invest in education as they have high expectations from spending on education. Family investment in higher education is influenced by a wide variety of factors. Household investments in education exhibit characteristics of instrumental rationality as well as emotional expressions (Lin 2019). Keeping the emotional expressions such as love, respect, and treating it as a noble responsibility or an essential mechanisms of strengthening of family relationships through parental investments on children's education, however important they are, aside, the decision-making process of households regarding investment in education can be understood at least partly in terms of economic factors. Mostly families invest in education, anticipating significant life-time benefits from education – economic and non-economic. The net economic benefits of education are measured familiarly in terms of earnings and internal rates of return. Despite several limitations that the estimates of rates of return are associated with, they are found to be useful in educational planning, including in the investment decision making process both in the public and household domains. According to available evidence, rates of return to higher education are high both to the individual as well as to the society at large (Tilak 1987; Duraisamy & Duraisamy 1993; Carnoy et al 2012). In the life cycle model of household decisions at the micro economic level, if families realise that there would be sizeable social and economic returns to education, they may choose to invest in education in order to increase the earnings capacity and other benefits in future, even by refraining from present consumption. But if the income of the household is low, effective demand for higher education can be low, and there can be under – investment in education, resulting in a loss to the individual and society at large. Families may or may not necessarily be willing to borrow money for investing in education, as education is 'risky'; and moreover, the credit market for higher education is generally imperfect, and yet to be developed in many developing countries (Tilak 2003). Thus, it is mostly felt that the levels of investment of the households in education are related to household income levels. A general finding is that families with high income levels spend higher than families with low income levels on education. Even if the expected private rates of return – monetary and / or non-monetary – are attractive, households may not necessarily be spending on education constrained by ability to pay, and also by other economic, social and cultural factors, which are the principal focus of examination here.

It is also possible that families feel compelled to spend on education, if public efforts are inadequate, reflected in limited number of public institutions, and unsatisfactory quality of physical and human infrastructure available in those institutions. As a result, even poor households might spend on education out of compulsion. So one can say that the lower the quantum of public institutions and quality of infrastructure and other facilities in public institutions, *ceteris pari bus*, higher could be the level of household expenditure on education and vice versa. Hence household expenditure on education can be relatively higher in developing countries where public investment is low, than in rich countries. If the public provision of education is reasonably good, families may not feel the need for spending on their own, particularly on private education. Therefore, it can be argued that household expenditure substitutes public investments in education, as they fill the gap in investments, caused by shortages in public investments in developing countries. On the other hand, it is also argued that if government spends well on education and provides good quality education, households might feel enthusiastic and willingly contribute to education, and thus supplement pubic efforts. Thus household and government investments in education are related, either substituting or complementing each other. Supply related factors, thus, might be an important set of factors that determine the extent of household investments in education (Tilak 2002a). Family spending on education is not simply a voluntary choice of the households. If public funding falls and institutions raise student fees, households have no choice but to increase their expenditure.

Due to various social, cultural and personal reasons, families may have strong preference to spend on education of their children, or *vice versa*. In fact, several characteristics of the families, such as religion, caste, household size, educational and occupational levels of the parents, etc., which could be called social, economic, demographic, cultural, educational, occupational and other factors, might also influence the nature and quantum of expenditure that the households spend on education of their children. We examine in this paper the pattern of family[2] expenditure on engineering education in India and the determinants of the same.

2 While 'household' is the term used extensively in the literature, and some used, 'family' and 'household' interchangeably,'family' defined as consisting of two or more members who live in the same home and are related by birth, marriage or adoption, is a more appropriate term in Indian society, than household which is normally defined as consisting of one or more persons living in the same house, condominium or apartment, *who may or may not be related (*United Nations: *Multilingual Demographic Dictionary, New York, 1958),* though household extensively used in Indian literature too including in the National Sample Surveys. However, in this paper the distinction between the two is not strictly maintained.

Review of Literature

There is a vast amount of literature on household expenditure on education in many countries. Some researchers have compared household and public expenditure on education and examined the relationship between the two (Williams, 1983 in Australia; Tilak 2002a, Sarkar 2017a, Motkuri & Revathi 2020 in India), who have highlighted the complementary or substituting roles of each other. Apart from measuring the extent of household expenditure on education, and analysing growth, rural-urban, and male-female differences in it – some by drawing from Engel's law (curve) of family expenditure in economics (Lewbel & Houthakker 2008) which describes how household expenditure in absolute real terms or as a proportion of the household budget on a particular good or service varies with household income, and Working's (1943) statistical laws of family expenditure which state that distribution of household expenditure is influenced by a variety of factors such as family customs and standards, and the goods and services that the family have to choose, to mention a few; many scholars have examined the relationship between household income and household expenditure on education, and estimated coefficients of elasticity. As household expenditure has been found to vary by many other macro (e.g., economic growth, gross domestic product per capita) and household, including individual and family traits (e.g., gender, race, region, and caste), researchers have examined varying patterns of household expenditures on education. Some scholars have also attempted to examine various probable factors, including household income that influence household expenditure on education.

Income elasticities of educational expenditure have been estimated by several scholars in many countries (Hashimoto & Health 1995 in Japan; Psacharopoulos et al 1997 in Bolivia; Tilak 2002a in India; Psacharopoulos & Papakonstantinou 2005 in Greece; Tansel & Bircan 2006 in Turkey; Omori 2010 in the USA; and Xiaolei & Smyth 2011 in case of China). Based on coefficients of income elasticity at all-India level, Tilak (1991) has concluded that households do not necessarily respond more promptly than government to educational needs in India, contrary to what Schultz (1981) has argued.

When determinants of household expenditure on education are examined, family income or economic level measured by proxy variables has been found to be having significant incremental effect on family expenditure on education. A positive relationship between household income and investment in education (in absolute values) has been found in many studies, the probability of spending on education increasing with every increase in household income (or total expenditure) level (e.g., Tan 1985; King 1998; Psacharopoulos et al 1997; Kanellopoulos & Psacharopoulos

1997; Acevedo & Salinas 2000; Psacharopoulos & Mattson 2000; Tilak 2000, 2002a; Urwick 2002; Tansel & Bircan 2006; Omori 2010; Qian & Smyth 2011; Shafiq 2011; Acar et al 2016; Asankha & Ajantha 2020; Rizk & Owusu-Afriyie 2014; Acerenza & Gandelman 2017; Demiroglari & Gürler 2020). But economic burden of expenditure is higher on families with lower incomes (Duraisamy & Duraisamy 2016; Lakshmansamy 2021), as poorer households tend to spend a higher proportion of their budgets on education than richer households. In other words, as income levels rise families tend to spend proportionately a lower proportion of their income on education. Like in many other countries, in Greece poorer families were found to be spending a higher share of their income on the education of their children (Psacharopoulos & Papakonstantinou 2005). In a few other studies, the patterns turned out to be the other way. For example, Kanellopoulos & Psacharopoulos (1997) reported in the context of Greece, that households belonging to the bottom 20 percent of the expenditure distribution spent only 6.5 percent of their annual income on education, whereas it was 55.8 percent in case of households belonging to the upper 20 percent. According to the evidence provided by Sengupta et al (2008), rich households in India spend on education a higher proportion of their total consumption expenditure. While generally it is right that of the families who actually spend money on their children's education, it is the low-income households that use a higher share of their household budget for education – overall as well as on individual items, this pattern is not universal. For example, Carsten et al (2015) found considering all families / households in Germany, that higher-income families spend more on education, *both in absolute and relative terms*" (emphasis added). As this proportion is usually interpreted as the relative value or importance the families attach to education, one cannot exactly state that it is the poor or the rich income groups which attach higher value to education than others, though many have asserted that the poor families do attach higher value to education, as they do not possess much any other capital.

Education seems to be a necessity for all, the coefficient of income elasticity being of the order of 0.2–0.3 between household expenditure and household income. In addition, families spend privately more than the state in order to prepare for the entrance examinations and while studying at the university. Family expenditures are income elastic overall, the coefficients of elasticity but are very different in magnitude for lower income compared to higher income families. For example, Bayar (2016) has reported that low income households have higher income elasticity of education expenditures in African societies; Jenkins et al (2019) have found in a study on Nigeria that the income elasticity of education expenditures are approximately four times greater for households

in the bottom two-thirds of the income distribution than for those on the top one-third of the income distribution. Zhang & Zhou (2017) who have analysed household expenditure on education in China, observed that the expenditure has a positive effect on the scores of the students, particularly among those who are in top quintiles of academic achievement. Examining the determinants of household expenditure on school education in rural India, Tilak (2002a) has concluded that households tend to spend more on education with the increase of their income, the value of the coefficient of income elasticity being 0.2. Most of these studies found that household income is an important determinant of household expenditure on education.

There is, however, a threshold level of income for it to have an effect on household spending. For instance, Nahm & Hyung (2009) reported that households with relatively low education level do not increase investment on education than those with relatively high education level until their income level approaches some threshold level; once that is reached, investment on education begins to increase. Another finding reported by Nahm & Hyung (2009) on income elasticity tells us that private education is a 'normal' good, indicating that households invest more and more at any income levels as their income increases.

Several scholars have paid serious attention to examining gender differences in household expenditure on education (e.g., Tan 1985; Panchamukhi 1990; Hashimoto & Heath 1995; Kanellopoulos & Psacharopoulos 1997; Acevedo & Salinas 2000; Psacharopoulos & Mattson 2000; Tilak 2000, 2002a, b; Li & Tsang 2003; Gong et al 2005; Kingdon 2005; Tilak & Nalla Gounden 2005; Yueh 2006; Chaudhuri & Roy 2006; Tansel & Bircan 2006; Dang 2007; Aslam & Kingdon 2008; Maasterson 2012; Lancaster et al 2008; Carvalho & Kassouf 2009; Azam & Himaz 2010; Shafiq 2011; Zimmermann 2012; Masterson 2012; Saha 2013; Iddrisu et al 2018; Kumar 2017). Pro- male bias in spending on education was reported to be prominent in India and in several other countries (Subramaniam & Deaton 1991; Tilak 2002a; Kingdon 2005; Choudhury 2012; Zimmermann 2012; Azam & Kingdon 2013; Sarkar 2017b). Datta & Kingdon (2019) further observe that gender bias in enrolment in and expenditure on education are related; and examination of one, ignoring the other does not give a complete picture. Many studied these two as if they are independent of each other. Many of these studies are on school education. Such gender differences have been observed to be high in higher education also (Chaudhuri & Roy 2006; Lancaster et al 2008; Kambhampati 2008; Kaul 2018). Quite a few studies (e.g., Aslam & Kingdon 2008; Himaz 2009), have confirmed that the variation in household investment in education by gender is due to the parents' preference for better quality education for boys over girls as parents assume that higher spending means quality. Households' preference for boys

as against girls in investing in education is widely prevalent and such a preference widens further at higher levels of education. But the preferences or biases are not same in all countries or in all areas of a country or in case of all age groups of children in a country. For example, when geographical area and age-group specific regression models are run separately on the data on a district in Jammu & Kashmir (Beg & Bhatt 2021), the results show that in the rural areas in the age-group of 15-18 years, there is a significant gender bias favouring boys in annual expenditure on education; and the results do not show any significant differences in household's education expenditure in case of urban areas. In urban China, there was a higher level of spending on younger boys (aged 13 to 15) and older girls (aged 16 to 18), based on which Yueh (2006) questions the general interpretation of pro-male (or pro-female) bias in household spending on education.

There are quite a few studies in which pro-female bias was observed (Acrenza & Gandelman 2017). Some might feel that investment on girls' education might help in reducing dowry as some boys might willingly marry higher educated girls with less or even without any dowry, anticipating that their total household earnings would be higher in future because of girl's higher education and corresponding employment. In Kerala one finds a pattern of higher spending on girls than on boys (Layan 2013). Expenditure per pupil is higher on girls' education than on boys' education in Maharashtra, Karnataka and Rajasthan in India (Panchamukhi 1990), in Tamil Nadu (Tilak & Nalla Gounden 2005) and in a few other states in India where large a scale UNICEF survey was conducted on elementary education (Mehroltra (2005).

Similarly, households in urban Bangladesh were less likely to spend on education of the boys than of the girls, holding all else constant (Shafiq 2011). Gender discrimination in household expenditure on education does not necessarily exist in all cases (Acerenza & Gandelman 2019; Tilak 2000; Dang 2007). Ganpule (2018) in a study on Mumbai has found that household expenditure on education (from grade I to graduate level) of girls is related to household income, but not in case of expenditure on boys. There is also some interactive effect of economic conditions and gender of the student on household spending. As Sarkar (2017b) has found, while household income has a significant effect on family spending on higher education of their children in India, the effect is higher in case of girls' education. According to Masterson (2012), asset ownership affects female bargaining power within households which result in gender bias in expenditure on education in Paraguay. Interplay of gender of the child with parental economic status has also been highlighted by some. An interesting hypothesis known as Trivers-Willard (1973) hypothesis, has been mothers in good economic conditions invest more in sons, whereas mothers in

poorer conditions invest more in daughters (described by Hopcraft & Martin 2016). On average, as Begum et al (2014) have concluded there is "no systematic inherent gender bias among parents, yet inherently biased parents allocate resources in a discriminatory manner" within the family. Moreover, bias against girls, bias against girls' education, and bias against spending on girls' education need to be distinguished. But it has been rarely attempted.

Apart from household income and gender of the student, a variety of household factors are generally found to be very important determinants of household investments in education in many studies. Numerous studies have also highlighted the importance of caste in influencing family expenditure on education in India (Choudhury 2012; Gangopadhyay & Sarkar 2013; Sarkar 2017b), and race in Sri Lanka (Asankha & Ajantha 2020). Family expenditures on education differ across racial and ethnic groups in many countries. However, the differences are not actually not found to be statistically significant in some studies. For example, Luo & Holden (2014a; also 2014b) have shown that when one compares families with similar household incomes and parental education levels, the household expenditures on higher education are essentially the same across all racial and ethnic groups; as parents' education and income level increase, so do the expenditures for higher education. They conclude from their study on the USA that "from another perspective, socioeconomic differences, not differences in race or ethnicity, have a greater influence on how families value higher education investments."

Several empirical studies have noted that parental education has a significant positive influence on household investments on education (e.g., Brown 2006; Quang 2012; Acrenza & Gandelman 2017; Kuvat & Ayvaz Kizilgöl 2020). In a study on Cyprus (Andreou 2012) it was found that in addition to household income, education of the head of the household, number of children in the household, and region were the most important determinants of household expenditure on education. Among the many household factors, education of the head of the household figures prominently, apart from household income. That educated parents (and other educated adults) are likely to be more aware of the future benefits of education and hence spend more on it, is established in a good number of studies in several countries (e.g., Tan 1985; Kanellopoulos & Psacharopoulos 1997; Minello & Blossfeld 2017; Tilak 2002b; Chaudhuri & Roy 2006; Dang 2007; Omori 2010; Masterson 2012; Saha 2013; Gangopadhyay & Sarkar 2014; Sarkar 2017b). According to Psacharopoulos & Mattson (2000), an increase in the years of schooling of the head of household by one year leads to an increase in household expenditure on primary education by eight percent in Bolivia.

The education level of the head of the household has an incremental effect on private spending in China (Yueh 2006) and USA (Omori 2010). Some available research evidence also shows that the mother's education is having a higher effect on household expenditure on education than father's education (e.g., Tansel & Bircan 2006; Kambhampati 2008; Shafiq 2011). Emerson & Souza (2007) also reported that mother's education has a higher effect on daughters' school attendance than father's impact on sons' school attendance in Brazil. Saha (2013, p. 233) has reported that the higher the educational level of the parents/guardians, the greater is the level of expenditure on education of their off- springs in India. There are very few exceptions to this on the importance of education of the parents / head of the household. According to Mahmood et al (1992), education of the head of the household is not an important determinant of children's education; it only influences life styles of the people. Thus, it is not only gender of the child / student, but also the gender of the head of the household which also matters. Differential effects of mother's education and father's education on family spending on education are widely noted. Moreover, it is not just the mother's or father's, the decision to spend and how much to spend on education of the children in a family are also significantly influenced by the very gender of the head of the household (Jenkins et al 2019). In addition to household factors, macro-economic factors like gross domestic product, public expenditure, availability of educational institutions and their quality, are also found to be important by some scholars (Tilak 2000; Layan 2014).

Large households have to spend higher proportions of their income on essential items such as food, accommodation, clothing and other related items, leaving little amounts of resources for education, which also get diluted across number of siblings in the household, not necessarily uniformly (Downey 1995). Hence, the per student expenditure made by the households on education and the size of the family or 'sibship' (Downey 1995) can be expected to be inversely related, as has been found in a number of studies in many countries (e.g., McMahon 1974; Psacharopoulos & Mattson 2000; Tilak 2000, 2002a; Tansel & Bircan 2006). Demiroglari & Gürler (2010) have clearly found that there is a trade-off between the family investment made on the child and the number of children in the household. Single child households in China tend to spend more than the families with more than one child (Lin 2019). We also find exceptions to this. In urban Bangladesh it has been found that the presence of older children in the family does not affect the decision of the households on the quantum of spending on education (Shafiq 2011). It is not just the number of children in a household, more importantly, the characteristics of the children – gender, age, order, education status etc., also matter in the distribution of family resources. For example, it

has been found in case of Viet Nam that households with more primary-school-age or secondary school-age children spend more on education, while households with pre-school-age or college-age children spend less on education (Quang 2012). Parents may also be willing to spend more on the education of those children who perform better in their education than others (Asadi 2020). According to Steelman & Powell (1991), in case of US, parental investments in higher education of their children are shaped by their income, the number of children, and also by many other characteristics, gender of parent and child, academic achievement of child, marital status, education, and educational aspirations and so on. They may have mixed – stronger and weaker effects. Thus, many studies confirm the influence of family structure on family investments in education.

Among the various items of household expenditure on education, expenditure on coaching or tutoring has been considered specifically by some and how this is influenced by various social, economic, educational and locational factors (Mitra & Sarkar 2019). According to a CARE Ratings study (Sindhwani 2019), Indian students are somewhat surprisingly found to be spending enormously high on their higher education even when job prospects are not bright. As some (e.g., Chandrasekhar & Ghosh 2020) have warned, this is "increasingly risky given the terrible state of the job market" and the high household expenditure and graduate unemployment "may well boomerang on society". Besides finding that professional / technical education costs to the households much higher than general education, the study also reports that between 2007 and 2018, household costs on professional education have increased by more than 50 percent. Among various professional disciplines in terms of household costs, the increasing order is: law, management, information technology, engineering and medicine, law costing the least and the medicine the highest. Choudhury (2019) has examined the determinants separately of expenditure on fee and non-fee items in engineering education. While based on an analysis of National Sample Survey data in India, Tilak & Choudhury (2021) note that non-fee expenditure on engineering education forms only one-fourth of total (fee plus non-fee) expenditure). Choudhury & Kumar (2021) have found that non-fee expenditure on engineering education is almost same as expenditure on fees in engineering education in Odisha. In a different study on engineering education in a backward state (Odisha) in India, Choudhury (2019) has found that household expenditure constitutes about 30 percent of the family income in the rural tribal population. Household expenditure in Turkey was sizeable on private schooling and tutoring, as per the study by Acar et al (2016). Further, analysing in the Engle curve framework, it has been found that for middle (and upper) income groups, education is a luxury good, as they spend higher amounts

on quality, while low income groups consider it as a necessity. Further, as Choudhury has found caste, religion and the type of institution in which the student is enrolled are the most significant determinants of household spending. In another study on engineering education in Delhi, annual average household expenditure on undergraduate engineering education was observed to be higher for students interested in undertaking postgraduate study and beyond, compared to the students who did not wish to pursue further education after their undergraduate degree studies (Choudhury 2012).

Thus one can note that though there is a good number of studies in many countries on family expenditure on education, in India such literature is not abundant; the small number also got confined to primary or school education. In case of higher education there are hardly a handful of studies; and it is further scanty is in case of technical or engineering education.

While family expenditure on education and its determinants have been examined in the literature, very few studies have focused on engineering education in India. Since engineering education is relatively more expensive than general higher education, and even other branches of professional / technical higher education, except medicine, engineering education may require special attention. But for the study by Choudhury (2012, 2019; Choudhury & Kumar 2021)[3], there are very few studies on family expenditure on engineering education in India. Hence the present paper may be seen as an important addition to the existing limited literature, though it does not claim any advances in theoretical or methodological aspects. It does, however, shed light on parental preferences expressed through expenditures on their children's engineering education.

Methodologically, while estimating simple income elasticity coefficients, double log regression equations are used extensively, and in most studies on determinants of household expenditure, ordinary least squares regression equation, in some cases logit or probit and also occasionally Tobit model have been used. Studies on India also used mostly the data of the National Sample Surveys, and a few (Tilak 1994; Tilak 2002a) the India Human Development Surveys (National Council of Applied Economic Research) and National Family and Health Surveys, and very few are based on the household or student / graduate based surveys conducted at micro level.

3 The study by Choudhury (2012) is based on a sub-sample of the sample that is used here, and examines the same questions that are examined here. The methodology and analysis are also broadly similar; and some of the research results are also identical. In a sense, the same methodology and analytical framework, including definition and measurement of variables, are applied here to a broader database here. Choudhury's study was conducted under the supervision of the present author. The chapter on household expenditure took the form of a paper (Choudhury 2013) which was submitted to a conference. Choudhury (2019) and Choudhury & Kumar (2021) have also used broadly the same framework.

For example, Tilak (2005) used a UNICEF survey in Tamil Nadu. Even with respect to studies on other countries, national level consumption / expenditure and income surveys are extensively used. Very few studies are based on large sized student based surveys.

Database and Descriptive Aspects on Family Expenditure on Engineering Education

The paper is based on primary data collected through a purposive random survey of about 7,000 students enrolled in 48 institutions of engineering education in four major states, namely (National Capital Region of) Delhi[4], Karnataka, Maharashtra, and Tamil Nadu in India. These four states witnessed rapid growth of engineering education in the country. In fact, Karnataka, Maharashtra and Tamil Nadu are the states which took initial lead in setting up large numbers of institutions. Engineering education has expanded very fast in south and western parts of India, followed by a couple of states in north India. The presence of engineering education is rather minimum in central and eastern India. Karnataka and Tamil Nadu are in the south, Delhi in the north and Maharashtra is in the west; thus they represent the three major regions in the country where engineering education grew fast. A pre-tested structured questionnaire has been administered on all the students in the final semester / year of under graduate (first) degree level studies in selected departments – mechanical, civil / electrical, electronics, computer science, and information & technology (IT) related departments. While mechanical, civil and electrical engineering are traditionally highly popular branches of engineering, in recent years, electronics engineering, computer science engineering and IT engineering have become more popular. We term these two groups respectively as conventional or 'traditional' and 'modern' or IT-related branches / streams of engineering here. Information collected through a questionnaire was supplemented with information gathered from interviews conducted with the students. The institutions surveyed include Indian Institutes of Technology (IITs), National Institutes of Technology (NITs) – earlier known as Regional Engineering Colleges (RECs), state universities and colleges, and private universities and private colleges. IITs and NITs are funded by the union (central) government, state universities and state colleges by state (provincial) governments, and private universities and colleges are mostly funded through student tuition, supplemented by other non-state sources, which are generally very small. Private institutions of course enjoy access to research and special funds provided by the state under different heads

4 The survey data on only Delhi was used by Choudhury (2012).

and the students in private institutions can access state-subsidised loans and fee-reimbursement by the state. Thus the sample includes public, state-aided private and private (self-financing also known as unaided) institutions. We refer to unaided / self-financing institutions here simply as 'private.' State-aided private institutions are very few in India, and the other type of private institutions accounts for about 85-90 per cent of the engineering education in the country, both in terms of institutions and student enrolments. Our sample also represents the relative distribution of the variety of institutions in the country. Since government-aided private institutions are very few in number, and are funded by the state, they follow almost all rules, regulations, practices applicable to government institutions, we combine 'public' and state-aided private into one category as public, unless otherwise mentioned, as against private institutions. Comparison of public and private institutions also forms a focus of the study. Most of the colleges offer only under graduate study programmes, while universities, IITs and NITs enroll students for master's level engineering programmes and research programmes as well, in addition to undergraduate studies. But we considered only the students in the final year of first (bachelor's) degree studies in all the selected institutions. The educational and socioeconomic profiles of students are varied.[5] Thus, the sample represents the diversity of the institutions and the students in terms of geographical coverage, variety of institutions, and other features, prevalent in Indian higher education, though the numbers of sampled institutions and the students are small compared to the large network of institutions and vast student population. The survey was conducted in the context of a large international study covering BRIC countries (Brazil, Russian Federation, India and China) (Carnoy et al 2003), of which the author is a part. The sample selection of states, institutions and departments and the design were based on the considerations of the larger study. States and colleges were chosen based on purposive random sampling. All the students in the fourth (final) year/ semester of their studies who were present at the time of survey have formed the sample of the survey. The reason for selecting fourth year students was: their likely better ability to give nearly authentic and comprehensive information on household expenditure incurred and other aspects, as they were nearly completing their bachelor's degree level studies.

Family expenditure on education includes the expenditure incurred by students / their parents / families on education on tuition fees, other fees (registration fee, library fees, examination fees, development fees, fees on games and sports, etc.), accommodation, food, transport, textbooks, stationery, reference books and other study material, computers / laptops /

5 See Tilak (2020b, c) for a socioeconomic and educational profiles of the students surveyed.

ipads, internet connections, mobile phones, and other necessary items. It also includes expenditure incurred on improving communications in English language, which has become an important essential component among many students in higher education in India in the recent years. These expenses on various items are broadly classified into three categories here somewhat arbitrarily: (a) expenditure on fees which includes tuition fees, library fees, examination fees, fees on games and sports, etc., which are compulsory payments to the institution; (b) non-fee expenditures like accommodation, food, transport, textbooks and reference books, stationery and other materials; and (c) 'additional' or 'extra' expenditure on items and activities such as improving communication skills in English language, computers, internet connections, mobile phones, etc. Normally private tutoring / coaching also figures in such expenditures, but in case of undergraduate engineering students this has been very rare. The 'total' family expenditure on education is the sum total of all the three components; and all the three components of family expenditure are important as every item is strongly or otherwise related with the educational process. While household cost or investment includes opportunity costs of education or foregone earnings, household expenditure does not include it.

Expenditure on both fees and non-fee items may vary by socioeconomic background of the students, the institution one studies, and other characteristics, as some might get full or partial tuition waivers, and some might get scholarships or some other financial assistance from the state or institution, which may reduce net family expenditure on education. But for tuition waivers, expenditure on fee may not vary much by socioeconomic background of the students, in a given type of institution. On items of non-fee expenditure some might spend higher or smaller amounts than others, but variations may not necessarily be very large. On the other hand, *additional* expenditure is more elastic to family income on the one hand, and the needs of the students on the other, as in some cases students might avoid or spend higher or lower amounts on additional items. For example, some students may purchase reference books, laptops, and others may use the facilities available in the institution or share the facilities available with other students. In some cases, institutions provide laptops to all the students 'free', the costs of which are often actually charged to the students under fee or different heads.

Table-2 presents a few details on family expenditure on engineering education in India, based on our survey. First, we note that family expenditure on engineering education in India is substantial, in absolute terms and as a share in the total family income. On average, families spend around Rs.1.47 lakh annually per student on undergraduate level of engineering education. Fee accounts for 35.2 percent, non-fee items 33.6 percent and additional items 31.2 percent of the total. Annual average fees

paid by the students on average was Rs.51.7 thousand which constituted 35 percent of the total family expenditure on engineering education. Tuition fees accounts for as high as 80 percent in total fees and the rest 20 percent is accounted by library fees, examination fees, fees on games, sports, etc. Tuition fees forming a large share in the total fees is common, though there exists some inter-institutional differences in the proportion of tuition fees and other fees to total fees. Tuition fee varies between government institutions and private institutions on the one hand, and between several private institutions or between several public institutions even within a state, as explained later.

Expenditure on non-fee related items, which is, on average, of the order of Rs. 49.4 thousand per year, constitutes nearly 34 percent of the total expenditure. Almost 40 percent of non-fee expenditure goes towards dormitory and food while the rest is incurred on textbooks, stationery and other items. As hostel facilities in public institutions are not adequate and in many institutions they may not exist, students have to incur huge expenditure on accommodation and food.

Table-2: Family Expenditure per Student on Engineering Education (per Annum)

Items of Expenditure	Per Student Family Expenditure	Percentage of Total	Percentage of Annual Family Income
Fees			
Tuition fees	42,089	28.65	13.49
Other fees	9,610	6.54	3.08
Total	51,699	35.19	16.57
Non-fee Expenditure			
Dormitories / Housing	18,952	12.90	6.08
Food	13,910	9.47	4.46
Textbooks and other study material	3,911	2.66	1.25
Transport	5,398	3.67	1.73
Others	7,221	4.92	2.31
Total	49,392	33.62	15.83
Additional Expenditure			
Communication in English language	9,378	6.38	3.01
Computer / laptop	11,883	8.09	3.81
Internet connections and mobile phones	7,458	5.08	2.39
Entrainment / other related expenses	11,647	7.93	3.73
Others	5,457	3.71	1.75
Total	45,823	31.19	14.69
Grand Total	1,46,914	100	47.09

Source: Author's survey

As a result, students coming from outside have to take private accommodation on rent, which is normally high and accordingly have to spend more. Further, as they stay away from the campus, they have to spend on daily commuting (transport) also. Students are found to be spending 11 percent of the non-fee (or six percent of the total family) expenditure on daily transport. The expenditure on additional items was Rs.45.8 thousand which forms 31 percent of the total. Coaching and tutoring for improving their communication skills in English language, means an additional expenditure of Rs.9.4 thousand on average.

All this forms about half of the total family income. Expenditure per student on total fees accounts for 16.5 percent of average family income – tuition fee 13.5 percent, and other fees three percent. Expenditure on non-fee items is also more or less equally sizeable: it amounts to 15.8 percent of the family income; and *additional* expenditure, 14.6 percent. It is quite possible that all the students do not necessarily spend on their education only from their family income; some might take educational loan, some might be lucky to get scholarships and others some financial assistance to support their studies.[6] Generally scholarships are available in government institutions better than in private institutions.

There exist large differences in per student expenditure on higher education in India between public and private institutions (Salim 1994). The family expenditure on engineering education is nearly 50 percent higher if the wards are studying in private institutions than in the government institutions, as shown in Figure-2. It is Rs.1.1 lakh in government institutions and Rs. 1.65 lakh in private institutions. Students studying in private institutions are found to be spending 2.5 times higher than what the students in government institutions spend. The difference in total fees is largely because of differences in tuition fees, which is Rs.21 thousand in public institutions, and Rs.52.7 thousand in private institutions. Tuition fee though partly regulated by state,[7] is obviously much higher in private institutions compared to government institutions.

Expenditure on non-fee items such as accommodation/dormitory or housing, food, transport, textbooks and other study related material is also higher for the students enrolled in private institutions (Rs.56.5 thousand) than for those who are in government institutions (Rs.37.4 thousand). Much of the difference in the non-fee related expenditure may be accounted by costs of accommodation, as already noted.

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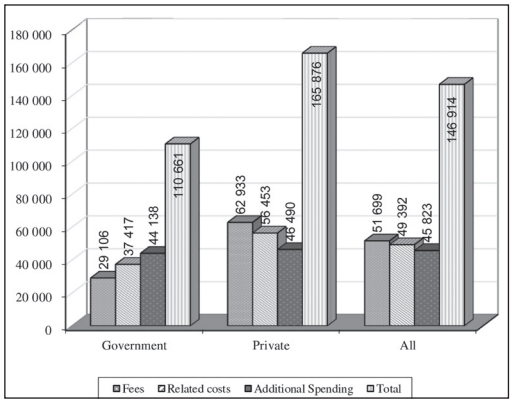
6 In our sample, 4.4 percent of the students received tuition waivers and 12 percent scholarships. We do not have data on the corresponding amounts. See Tilak (2020a) for details on some of these aspects.

7 Fees in universities are fixed by the universities; in the government colleges they are decided by the state, and in case of private institutions fees are determined by state-appointed fee regulating committees in respective states.

Figure-2: Family Expenditure (Rs.) on Engineering Education in India, by Type of Educational Institutions



Source: Author's Survey

There is no much difference in case of expenditure on *additional* items, between the public and private institutions. On the whole, per student family expenditure on all the heads (fees, non-fee items and additional items) is higher in private than government institutions. Family expenditure also varies by streams of engineering: IT-related subjects (e.g., electronics engineering, computer science engineering, and information technology) cost 19 percent higher than standard traditional branches of engineering (e.g., mechanical, electrical and civil).

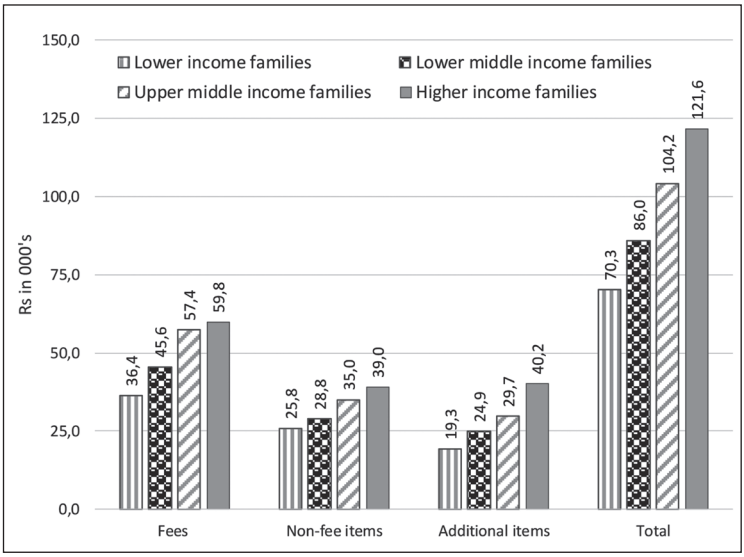
One of the striking features we note here relates to significant differences in family expenditures on education by social and economic classes. Family expenditure varies systematically with family income as shown in Figure-3, and also by gender and caste groups. Students belonging to lower income families incurred an expenditure on average Rs.70.3 thousand per student, while the corresponding figure for the students belonging to higher income families[8] was Rs.1.21 lakh. The increasing pattern by rising family income holds in case of all the three categories of items of spending (fees, non-fee and additional).

After fees, students belonging to high income families spend the second highest amount (Rs.40,166) on additional items like improving communication skills in English language, computers, internet connections, mobile phone, etc. As we have already noted, this pattern by family's economic status – rich families spending more on the education of their children than the lower income and poor families – is established in many studies in India and in other countries, as mentioned earlier.

8 The families are classified by annual income into four groups: as lower income families (annual family income below Rs.1 lakh), lower middle income families (annual family income of Rs.1 to 5 lakh), upper middle income families (annual family income of Rs.5 to 10 lakh) and higher income families (annual income above Rs.10 lakh).

Figure-3: Family Expenditure on Engineering Education, by Items and by Income Group

(Rs. in Thousands)



Source: Author's Survey

Here too we note clearly that the higher the family income, higher is the expenditure per student. However, the family expenditure is less elastic to income, with the coefficient of elasticity being 0.138; it is higher in case of women, but still much below 1.

Gender differences also exist in case of family expenditure on engineering education, though the differences are not very marked. Families spend Rs.1.49 lakh per student in case of boys and Rs.1.39 lakh on girls. On all the three heads – fee, non-fee and other expenditure, spending by the male students is higher than the female students. This pattern is also not uncommon in many countries, as we have already noted. It has been widely reported that family investment on education of the girls is not at par with that on boys in many societies, including in India, partly attributable to intra-family discrimination, and gender bias against women. We find a similar picture here. Such a bias might originate from pre-existing beliefs or gender stereotyping due to socio-cultural or religious norms.

Table-3 also shows differences in family expenditure on education across social categories of population. Families belonging to scheduled tribes[9] spend the least, i.e., Rs.96,648 per student per annum, while the expenditure of the families belonging to general category is the highest, Rs.1.59 lakh.

9 Scheduled castes, Scheduled tribes, and 'other backward' castes who constitute officially recognised disadvantaged strata of the society are eligible for not only reservations in admissions in higher education and employment but also for some specific subsidies such as concessions in fees, and scholarships.

Scheduled caste families spend a total of Rs.1.14 lakh and 'other backward classes' Rs.1.21 lakh. As the tuition and other fees for the students belonging to scheduled castes and scheduled tribes are subsidised with partial or full waivers, one finds a big difference particularly in fees paid by the various social groups. The expenditure incurred by scheduled tribe students on fees on average is about 37 percent of the fees paid by the general category students. The corresponding figures are 58 percent in case of scheduled castes, and 72 percent in case of other backward castes.

Table-3: Family Expenditure on Engineering Education per Student (Rs per Annum)

	Fees	Non-fee Items	Additional Items	Total
By Gender				
Male	52,479	50,516	46,263	1,49,258
Female	49,521	45,931	44,286	1,39,738
By Social (Caste) Category				
Scheduled Caste	32,760	40,619	40,625	1,14,004
Scheduled Tribe	23,951	33,852	38,845	96,648
Other Backward Classes	40,584	41,708	38,888	1,21,180
General	57,226	53,445	48,540	1,59,211
By Type of Institution				
Government	29,106	37,417	44,138	1,10,661
Private	62,933	56,453	46,490	1,65,876
By Stream of Engineering				
Traditional	46,586	42,392	40,861	1,29,839
IT-related	53,930	52,367	47,839	1,54,136

Source: Author's Survey

Thus, we note wide variations in family expenditure on education by individual and household characteristics such as gender, caste, religion, and family income. Variations in family expenditure represent inequalities in access to higher education. They also contribute to further widening of inequalities in the society.

Method

To examine the determinants of family expenditure on education, the main analytical tool used in the literature is the household expenditure function. A typical expenditure function is a regression equation that relates household expenditure to its determinants. Both from the point of view of empirical investigation and policy use, the expenditure function facilitates analysis of the family expenditure in a framework appropriate for econometric estimation. The model that figures prominently in most of the literature on household decision making behaviour, derived from the economic theory of consumer demand, which also forms the basis for the present investigation, is the model developed by Becker (1975), which is mostly an 'individual' maximizing model, and Behrman et al (1982) which

is described in the literature as the 'family' model.[10] It may not be possible to distinguish between the two, as some variables are common in both. Often both models are considered by the researchers. McMahon (1984) has provided a more specific model on examining why families invest in education.

The conceptual model underlying a typical expenditure function can be expressed as a functional relationship that relates expenditures to its determinants:

$$\text{FAM\_EXPR} = f\ (\ X_i\ )$$

where FAM_EXPR refers to family expenditure on education, and X_i to a set of independent variables. Thus it is a modified Engel function, expressing family expenditure on education as a function of household income and a set of household characteristics. We run an ordinary least squares regression equation, expressing dependent variable in terms of natural logarithm, as

$$ln\text{FAM\_EXPR} = \alpha + \beta_i\ X_i + \varepsilon$$

where *ln*FAM_EXPR refers to logarithm of family expenditure on engineering education per student per annum, β_i is a set of regression coefficients to be estimated that measures the extent to which various explanatory variables influence the family expenditure on education, and ε the error term. The coefficients β_i indicate the change in the levels of expenditures associated with a one-unit change in the given independent variable. α is the intercept term; it gives the mean effect of all the variables excluded in the model on the dependent variable; or it is simply interpreted as the average value of the dependent variable when the values of all the explanatory variables are set equal to zero.

A similar equation for student fees is also estimated separately, considering the fees as a function of a small set of variables,

$$ln\ \text{FEES} = f\ (X_i),$$

where X_i includes type of institution, caste, gender, parental characteristics, rank in the competitive entrance examination and merit of the students.

Determinants of Family Expenditure

Given the pattern of family expenditure described earlier, one can expect economic, and demographic characteristic features of the families to have considerable influence on the levels of family expenditures on education. Secondly, expected rates of return would considerably influence the family investments in education (Kambhampati 2008), implying that the higher the rates of return to education, the higher would be the present levels

10 For discussion on the two methods, see Ermisch & Francesconi (2000).

of family investments and vice-versa. But unfortunately rates of return do not figure in our model here, mainly constrained by availability of data in a usable form[11]. Gender and caste, and size of the family – as an indicator of 'demographic burden' on the families apart from economic ability are also included in the function. In addition, as we have seen the amount of expenditure incurred by the families on education to significantly vary with the type of institution, stream of engineering currently enrolled in, and academic background of the students, these variables are also considered. Students who have studied in private schools at secondary level, and / or in English medium (which is available mostly in private schools) might get habituated to higher levels of spending, compared to their counterparts who have graduated from government schools and in local language as the medium. Similarly students with higher educational aspirations – who have intentions or plans for further higher education (after completing bachelor's degree in engineering), may spend higher amounts on acquiring additional knowledge and material. All these variables are considered here.

In all, constrained by the availability of data, only a few important socio-economic, demographic and educational variables are considered here, which are grouped into four categories: (a) individual characteristics such as gender, caste, and religion, (b) family factors such as family's economic status, parental education, parental occupation and place of residence, (c) academic background of the students that includes type of higher secondary school (public or private) attended, medium of instruction, board of examinations, and academic performance (percentage of marks secured at higher secondary level) and (d) current educational aspects of the students such as type of institution (public or private) currently attending, stream of study (modern/IT-related or traditional), receipt of scholarship, educational loan, engagement in part-time work, and further educational aspirations. Thus, while hypothesizing which factors are related to family expenditures on education, we borrow, as suggested by Steelman & Powell 1991), mainly from the human capital theory (Becker 1975), status-attainment model (Blau & Duncan 1967) and also intra-family resource-dilution hypothesis (Blake 1989), each of which formed the basis for a large number of previous studies, apart from including a few other variables.

The following is the full specification of the OLS equation used for the estimation of factors influencing household expenditure on engineering education:

11 Estimates of rates of return are available at macro level (Carnoy et al 2012); but they cannot be used in the household expenditure functions.

$$ln\ FAM\_EXPR = \alpha + \beta_1 GENDER + \beta_2 SC + \beta_3 ST + \beta_4 OBC + \beta_5 HINDU + \beta_6 MUSLIM + \beta_7 SIKH + \beta_8 lnFAM\_Y + \beta_9 FATHOCP\_PROF + \beta_{10} FATHOCP\_BUS + \beta_{11} MOTHOCP\_PROF + \beta_{12} MOTHOCP\_BUS + \beta_{13} FATHER\_ED + \beta_{14} MOTHER\_ED + \beta_{15} SIBLINGS + \beta_{16} NATIVITY + \beta_{17} OWN\_HOUSE + \beta_{18} SEC\_SCH\_LOCATION + \beta_{19} SEC\_SCH\_TYPE + \beta_{20} SEC\_MEDIUM + \beta_{21} SEC\_BOARD + \beta_{22} SEC\_MARKS + \beta_{23} ENGG\_INST\_PVT + \beta_{24} STREAM\_STUDY + \beta_{25} PART\_TIME + \beta_{26} SCHOLARSHIP + \beta_{27} LOAN + \beta_{28} ED\_ASP + \varepsilon$$

Many of the variables are binary variables, taking the value of zero or 1. Table-A1 in the Appendix gives the list of all the endogenous and exogenous variables, variables along with their notation and definition and Table-A2 gives a few summary statistics including means and standard deviations of these several variables.

Determinants of Family Expenditure: Results and Discussion

Table-4 presents the OLS results of the multiple regression equation of family expenditure on engineering education per student.[12]

First, our results support the general view about the prevalence of pro-male bias in family spending on engineering education in India, though it is not very high. Male students spend 11 percent higher than female students. Many families might still tend to feel that the return on the investment made by the families on girls' education would not accrue to their family; rather it would flow to the in-laws' families after marriage. In addition, it is also reported that families fear that expenditure on girls' higher education might work like 'negative dowry' in Indian society (Tilak 1992), as higher educated girls look for further higher educated boys for their marriage who, in turn, expect higher amounts of dowry. Though this country-wide phenomenon is changing rapidly, it is still perceived to be dominant in rural areas and among traditional and orthodox families.

12 The problem of multi-collinearity is not expected to be serious, because of large sample size; and double-log multiple regression equation is used, considering logarithmic form of variables that are measured in continuous cardinal numbers and others in binary form, in the estimation here to avoid the problem of heteroscedasticity. See Gujarati (1985). Further, if the interrelationship among the collinear variables is stable, it does not pose any problem for prediction purposes (Maddala, 1977).

Table-4: OLS Estimate of the Determinants of Family Household Expenditure on Engineering Education

Variable	Coefficient	Robust Standard Error
Individual Characteristics		
GENDER	0.1134***	0.047
SC	-0.2439***	0.094
ST	-0.4407**	0.152
OBC	-0.0402	0.057
GENERAL	Reference	
HINDU	-0.1159**	0.056
MUSLIM	0.0826	0.102
OTHERS	Reference	
Family-related Factors		
*ln*FAM_Y	0.0713*	0.026
FATHOCP_PROF	0.0088	0.050
FATHOCP_BUS	0.0933**	0.045
FATHOCP_OTHER	Reference	
MOTHOCP_PROF	0.0087	0.050
MOTHOCP_BUS	-0.0759	0.097
MOTHOCP_OTHER	Reference	
FATHER_ED	0.0008	0.007
MOTHER_ED	0.0039	0.006
SIBLINGS	0.0051	0.021
NATIVITY	-0.2146***	0.043
OWN_HOUSE	-0.1876***	0.064
Student's Academic Background		
SEC_SCH_LOCATION	0.1517**	0.072
SEC_SCH_TYPE	0.0328	0.043
SEC_MEDIUM	0.0623	0.062
SEC_BOARD	-0.2459***	0.045
SEC_MARKS	0.0006	0.002
Student's Current Education Status		
ENGG_INST_TYPE	0.6141***	0.0048
STREAM_STUDY	-0.0166	0.042
PART_TIME	0.0990*	0.056
SCHOLARSHIP	0.0306	0.052
LOAN	0.0870*	0.060
ED_ASP	-0.0478	0.0366
Intercept	3.3195***	0.355
R-Square	0.219	
F –Value (27,1603)	17.39***	
Number of Observations	6131	

Note: *** = statistically significant at 0.01 level of significance; ** = 0.05 significance level; * = 0.10 significance level

Source: Based on Author's Survey

Second important individual trait that determines the family spending on engineering education is the social category. Confirming the general trend that students belonging to scheduled caste and scheduled tribe categories spend significantly less than the students belonging to general category, it has been found here that scheduled tribe and scheduled caste students spend respectively 44 percent and 24 percent less than general category students

(GENERAL). But the coefficient of OBC is found to be statistically not significant. It is also a common knowledge that other backward castes are not as backward as scheduled castes or tribes in education or in economic levels.

As in case of many studies cited earlier, we find a positive relationship between the amount of family expenditure and annual income of the family. The annual income of the family influences positively it's spending on engineering education and the coefficient is statistically significant at 10 percent level. The coefficient suggests that with an increase of Rs.100 in income, the family spending on engineering education rises by 7 percent. Economic status forms one of the most significant determinants of family expenditure on higher education. In addition to family income, we have also used ownership of a house by the family as an additional proxy for the economic status. But this variable turns out to be negatively related to family expenditure. Probably this is because the students whose family owns a house spend less as compared to the students whose family does not own a house, as the former ones do not have to spend on boarding and lodging particularly if the house is located in the same place as the institution where the student is studying.

As already noted, many previous studies have shown that the parents' education or education of the head of the household – a stock variable, has a significant positive effect on family expenditure on education. But in the present study, parents' – father's or mother's education seems to have no significant effect on family expenditure on education; the coefficients are equivalent to almost zero in value, and statistically not significant. This is indeed perplexing, needing further probe. The results do not validate the 'status maintenance model' in terms of education across generations.

Occupations of both the father and the mother (categorised as professional work, business and others) have been separately considered here to test their effect on family expenditure on engineering education. The results suggest that parents' occupation matters: if the father is engaged in business occupations (FATHEROCP_BUS), it influences positively family expenditure. No other variable on occupation has any significant effect. The observed effects of the independent variables on the characteristics of the parents – occupation and education are not consistent with many earlier studies. Like in a few studies (e.g., Shafiq 2011), here too 'demographic burden' measured in terms of number of children in the family, turns out to be not a statistically significant factor in case of expenditure on engineering education by the families in India. The intra-family resource-distribution hypothesis has perhaps no relevance in engineering education, while this has been found to be holding in case of school education, as estimated by Tilak (2002a) and many others.

Another important household factor determining the probability of family spending on engineering education is the residential status of the students (NATIVITY). As expected the coefficient is negative in value and statistically significant. Students belonging to the same state where the institution is located are spending less by 21 percent than the students who in-migrate from other states. Those who come from other states have to obviously spend higher amounts.

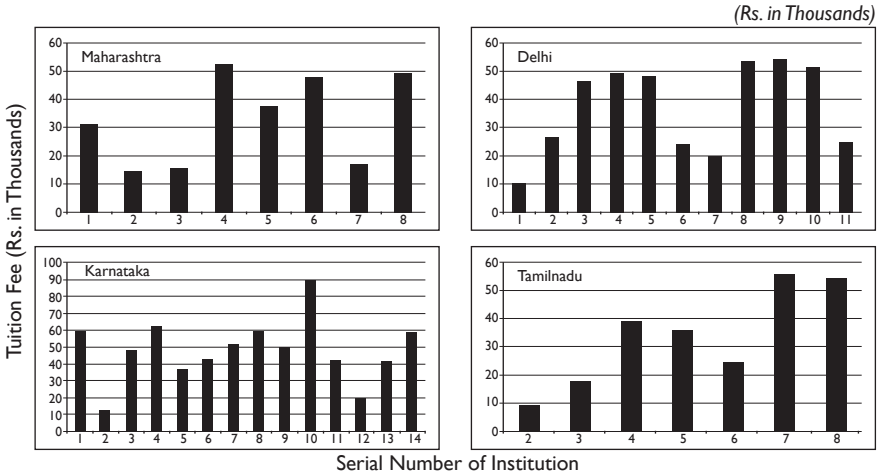
Another set of variables considered here covers students' academic background (relating to senior secondary level of education). However, among the five variables considered in the equation under student's academic background, only SEC_SCH_LOCATION and SEC_BOARD are found to be statistically significantly related to family expenditure. Location of the secondary school from where the student has graduated (SEC_SCH_LOCATION), considered here as a proxy for the rural / urban background of the students in the regression model has been found to be statistically significant. However, quite interestingly, contrary to general understanding, the expenditure on engineering education is higher for the students who have completed their senior secondary school located in rural areas, than those who studied in urban areas. While this needs to be probed further, it can be stated that probably this could be due to the socioeconomic background of the students who studied in rural / urban areas. A higher proportion of students from rural areas who come to engineering studies might be from relatively higher economic backgrounds, while in case of urban areas they might include a good proportion of lower and middle income groups. Secondly, students from rural background may have to spend additionally on improving their communication skills in English language and skills with computers and other modern technology. The coefficients of other academic background variables like SEC_SCH_ TYPE, SEC_MEDIUM and SEC_MARKS are statistically not significant.

Regression results reported in Table-4 show a positive relationship between the type of institution (public or private) the student is currently enrolled for undergraduate engineering education (ENGG_INST_TYPE) and family expenditure on education. More clearly, students in private institutions spend 61 percent higher than students studying in public institutions and the regression coefficient is statistically significant at one percent level of significance. This is one of the most important variables in terms of value of the coefficient and also the standard error. This may suggest the need to effectively regulate student fees in private institutions and at the same time to increase the number of public institutions and their intake. However, the other important variable, the stream of discipline of study (STREAM_STUDY) has no statistically significant influence on family expenditure on engineering education. But the two other variables,

viz., part-time engagement in work and availing of student loans, matter, both having positive effects on family expenditure. Educational loan increases the total family expenditure on education. Students who take loans spend nine percent higher than the students who do not avail educational loan. But SCHOLARSHIP has no significant effect on family expenditure, though it seems to be marginally but positively influencing the expenditure. Scholarship may be partly substituting family expenditure. As already noted, only a small fraction of students gets scholarships, and the amount of scholarship may not be very high, compared to fee and other costs of education. Lastly, the results show that students' engagement in part-time work increases the family spending on education by 10 percent. The additional earnings made with part-time work, are probably incurred as additional expenditure on engineering education.

We have already noted that fee is an important item of total family expenditure on education and that it varies by different characteristics of the students and the institutions. Interestingly fee also varies not only between different institutions, but also between different institutions within a state – particularly among different private institutions. Fees used to be uniformly same for long in all private institutions in a state, as determined by a state-level fee regulating committee at regular intervals, often every year; and another level of fee is charged uniformly in all public institutions. But subsequently the committee began setting fee levels for each private institution separately. All government colleges in a state levy a uniform level of fees, while each university sets its own fee level; and IITs and NITs decide independently of other institutions. As a result of all this, one notices wide variations in fee levels between several institutions, as shown in Figure-4 in case of the institutions in our sample in the four states.

Figure-4: Average Tuition Fees paid by Students in Selected Engineering Education Institutions



Source: Author's Survey

The regression estimates of the fee equation given in Table-5 also lead us to make a few interesting observations. As one expects, higher the rank of the student in the entrance examination[13] lower could be the fees, as students get admitted in public institutions, or at subsidised fee rates in private institutions. If one belongs to the disadvantaged sections of students – scheduled castes, scheduled tribes, other backward classes, the fee she/ he has to pay would be lower. These students get either fee waivers, or are charged reduced rates. Fee is also lower if one is a female.

Table-5: Tuition Fees (Rs in thousands) Paid by Students as a Function of Student Characteristics and Type of Institution

Variable	Model 1	Model 2	Model 3	Model 4
% Marks in entrance exam	-0.61***	-0.66***	-0.69***	-0.37***
Caste: Scheduled caste	-26.50***	-23.28***	-31.52**	-43.48***
Caste: Scheduled tribes	-33.19***	-29.34***	-81.17***	-49.29***
Caste: Other backward classes	-17.02***	-13.39***	-0.40	-15.00
Gender: Female	-1.62	-2.30	-2.30*	-3.64***
Mother: higher general education		9.06***	8.98***	7.17***
Mother: higher professional education		8.46***	8.41***	7.43***
Father: higher general education		3.28	3.43*	4.26**
Father: higher professional education		3.64	3.90*	5.15**
Test Score of Scheduled castes			0.11	0.38*
Test Score of Scheduled tribes			0.72**	0.47
Test score of OBCs			-0.16	0..06
Type of Institution: Public				-28.79***
Intercept	96.71***	92.26***	94.03***	75.65***
Number of observations	4117	4097	4097	4097
R-square	0.08	0.09	0.10	0.17

Source: Based on Author's Survey

Notes: reference variables: gender (male=0); parents' education, secondary school; caste, other; college, private.

*** = statistically significant at 0.01 level of significance

* = 0.10 significance level

** = 0.05 significance level

13 Entrance examinations are conducted by central board and several state boards, besides in some cases by institutions. Prominent boards are: Central Board of School Education (CBSE), and the Council for the Indian School Certificate Examination, a private body that conducts Indian Certificate of Secondary Education examination (ICSE) both of which conduct examinations at all-India level, hence known as central boards; and various state (provincial government) boards at state level. About 90 per cent of students in our sample are from CBSE board and 8 per cent from different state boards. Only 25 students (2 per cent of the total students covered in the survey) had completed their senior secondary examination through ICSE board, which is also a central board. The several boards conduct different examinations and adopt different methods. Hence the ranks are not comparable across boards. Hence they need to be standardized. But it is complicated to standardize the ranks, as it may involve arbitrary methods and values. So they are not standardized. For the same reason they were not used in the earlier equation. Hence, results here relating to the coefficient of ranks need to be interpreted with caution. Same limitation applies to test scores.

Interestingly, mother's education (proxy for economic and social status) has a positive effect on the tuition fees paid by the students: higher the level of education – general or professional, higher would be the fees. Probably higher educated parents prefer private institutions that charge high levels of fees (see Tilak 2020c). But we have noted in the family expenditure function, education of parents turning out to be statistically not significant. As it is understood, if one goes to public institution, she / he has to pay lower levels of fees than those who go to private institutions. Though these results are in expected directions, it is important to note that there are variations in tuition fee levels even among the public institutions. This is of course common in private institutions. The explanation of varying effect of various factors helps in making more effective and equitable policies in engineering education in India.

Concluding Observations

Analysis of patterns and determinants of family expenditure – on higher education provides valuable insights into families' preferences that would be useful for decision making at household level as well as for public policy making regarding funding of higher education. As more than four-fifths of the students in engineering education in India are enrolled in the private self-financing universities and colleges, one can infer that more than 80 percent of the engineering education is substantially funded by families rather than through the public exchequer. The families are no more 'hidden' funders of education. This makes more important to analyse the pattern of family expenditure on engineering education, as families meeting a disproportionately high proportion of the costs of education have a lot of implications for access, quality and equity, which in turn have their own effects on the entire social fabric. However, we have analysed here only a few aspects of family expenditure, and in analysing its determinants only a few important factors could be considered. There are many other important factors that determine the family expenditure on education, but we could not consider them in the multiple regression equation. Important omissions include level of government expenditure, employment rates and rates of return associated with engineering education. We could not consider specifically any supply side factors, constrained by the availability of data. Secondly, we have considered total (gross) family expenditure on education. It would have been more appropriate to consider net expenditure, after adjusting for scholarships on which unfortunately we do not have required data.

Some of the findings that we have arrived here conform and a few contrast to theoretical postulates and some of the earlier research evidence; some results require further probing. Families spend considerably high amounts

on engineering education of their children. On average a family spends nearly half of the average income of the family on its ward's engineering education. Of the total, fee alone accounts for nearly one third. Expenditure in case of students enrolled in private institutions is much higher than in case of those enrolled in government institutions. Given that a large part of engineering education is in private sector, majority of students spend a lot on engineering education. There exists a small degree of pro-male bias in household investment on engineering education. There are also wide variations in family spending by social (caste and religion) and economic characteristics. Family's economic, educational, and social factors exercise significant influence on the levels of family expenditures on engineering education in India.

High level of family expenditure on higher education will have negative effect on access to higher education; and secondly, wide variations in it reflect high levels of inequalities in access to higher education. In fact, as Lunn & Kornrich (2018, p. 147) have observed, household spending on education is 'a mechanism of social stratification'; hence egalitarian societies should not allow high levels of family expenditures on education. Societies that like to expand higher education, and aim at providing equitable access to higher education, have to think of effective public subsidisation policies that reduce the need for high level of family expenditures on education.

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Appendix

Table-A1: Variables used in the Regression Analysis, Their Definition and Notation

FAM_EXPR	Family Expenditure per student per annum on engineering education (Rs.)	
Individual characteristics		
GENDER	Gender of the student = 1 if female, 0 otherwise	
Caste	Caste of the student SC =1 if SC, 0 otherwise ST = 1 if ST, 0 otherwise OBC = 1, if belonging to other backward classes, 0 otherwise GENERAL = 1, if general (non-reserved) category, = 0 otherwise (reference category)	
Religion		
HINDU	Hindu	= 1, if the student is Hindu, = 0, otherwise
MUSLIM	Muslim	= 1, if the student is Muslim, = 0, otherwise
OTHERS	[Sikh, Jain, Buddhist, Christian]	= 1, if the student belongs to others = 0, otherwise
Family-related factors		
lnFAM_Y	Annual income of the family (in Rs.) (logarithmic form)	

Parents' occupation
Father's occupation

FATHOCP_PROF	= 1, if professional/technical worker, 0 otherwise
FATHOCP_BUS	= 1, if businessman, 0 otherwise F
FATHOCP_OTHERS	= 1 if belonging to other occupations, 0 otherwise

Mother's occupation

MOTHOCP_PROF	= 1, if professional/technical worker, 0 otherwise
MOTHOCP_BUS	= 1, if businessman, 0 otherwise
MOTHOCP_OTHERS	= 1 if belonging to other occupations, 0 otherwise

Parental Education

FATHER_ED: actual years of schooling of father
MOTHER_ED: actual years of schooling of mother

SIBLINGS: Number of siblings in the family

NATIVITY = 1, if the student belongs to the state where the institution is located; = 0, otherwise, i.e., if the student has come from other states

OWN_HOUSE = 1, if the student's family owns a house; = 0, otherwise

Student's Academic Background (at School level)

SEC_MARKS : % of marks secured in the board (school-end) examination
SEC_MEDIUM : medium of instruction at the school = 1 if English, =0 otherwise
SEC_BOARD : Board under which secondary school studies were completed
= 1, if the student has studied under state board;
= 0, otherwise, i.e. if the student has studied under central board
SEC_SCH_TYPE : Type of management of the school in which the student studied
: = 1, if the student completed senior secondary schooling in a private school;
= 0, otherwise, i.e., if the student completed secondary schooling in Government/government-aided private school.
SEC_SCH_LOCATION : Location of the school, =1 if located in rural areas, =0 otherwise

Student's Current Education

ENGG_INST_TYPE : Type of institution the student is currently studying
: = 1, if the student is enrolled in a private institution;
: = 0, otherwise, i.e., if the student is enrolled in a government institution.
STREAM_STUDY : Stream/branch of Engineering Discipline in which the student is enrolled
: =1 if enrolled in modern/IT-related courses, =0 otherwise

SCHOLARSHIP Scholarship
=1, if received any scholarship, =0 otherwise
LOAN : Education Loan (from a commercial bank)
=1, if taken any loan, =0 otherwise
PART_TIME : Engagement in part time work
=1, if engaged in, =0 otherwise

Educational Aspirations
ED_ASP : Educational Aspirations of the student
=1, if the student intends to go for further studies, =0 otherwise

Table-A2: Summary Statistics of the Variables used in the Regression Analysis

Variables	N	Mean	Standard Deviation	Min	Max
Individual Characteristics					
GENDER	6623	0.29	0.45	0	1
SC	6623	0.07	0.26	0	1
ST	6623	0.02	0.14	0	1
OBC	6623	0.19	0.40	0	1
GENERAL	6623	0.71	0.45	0	1
RELIGION					
HINDU	6,461	0.88	0.32	0	1
MUSLIM	6,461	0.03	0.18	0	1
OTHERS	6,461	0.08	0.28	0	1
Family-related Factors					
*ln*FAM_Y	6076	12.33	0.96	10.82	14.04
FATHOCP_PROF	6121	0.20	0.40	0	1
FATHOCP_BUS	6121	0.20	0.40	0	1
FATHOCP_OTHERS	6121	0.60	0.49	0	1
MOTHOCP_PROF	4948	0.15	0.36	0	1
MOTHOCP_BUS	4948	0.08	0.28	0	1
MOTHOCP_OTHERS	4948	0.76	0.43	0	1
FATHER_ED	6550	14.57	3.91	0	17
MOTHER_ED	6516	12.94	4.74	0	17
SIBLINGS	6518	1.46	0.94	0	6
NATIVITY	6033	0.63	0.48	0	1
OWN_HOUSE	4899	0.09	0.29	1	0
Student's Academic Background					
SEC_MARKS	6141	78.89	11.19	30.29	100
SEC_MEDIUM	6079	0.15	0.35	0	1
SEC_BOARD	6306	0.66	0.48	0	1
SEC_SCH_TYPE	6014	0.72	0.45	0	1
SEC_SCH_LOCATION	4746	0.11	0.32	0	1
PRE_COACHING	5212	0.53	0.50	0	1
Student's Current Education Status					
ENGG_INST_TYPE	6623	0.66	0.47	0	1
STREAM_STUDY	6623	0.69	0.46	0	1
*Ln*FAM_EXPR	5900	4.15	0.91	0.61	7.01
SCHOLARSHIP	6581	0.18	0.39	0	1
LOAN	6033	0.10	0.30	0	1
PART_TIME	6294	0.10	0.30	0	1
Educational Aspirations					
ED_ASP	4017	0.593727	0.491198	0	1

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