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Staff Advisor's Note

I am happy to introduce the fourth volume of the Ramjas Economic Review. The Department of Economics and The Ramjas Economics Society continues its tradition of encouraging students to undertake research by publishing peer reviewed scholarly articles. The Department believes that research work by students is an important part of education and has taken initiatives to introduce programmes to foster research. The first Annual Winter Conference was held in 2002 and the first journal was published in 2004. The Ramjas Economics Society Research Project Programme was started in 2012 sure to provide a platform for students to undertake survey-based research.

The editorial board started their work in the middle of the pandemic, sending the call for papers and then going through the submitted articles to shortlist them. Shortlisted articles were reviewed by two to three reviewers and articles have been accepted after the suggested revisions have been incorporated. The editorial board has been working hard for almost a year to bring out this issue, and they must be congratulated on bringing out a superb fourth issue of the Ramjas Economic Review. Writing quality research papers takes a lot of time and effort, and the young researchers must be congratulated for writing their research papers for the journal. I take this opportunity to congratulate the editorial board for their superb work and to thank the faculty for reviewing the shortlisted papers. I hope readers find the articles interesting, informative and engaging, and enjoy reading it.

Dr. Mihir Pandey
Staff Advisor
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Editor-in-Chief 's Note

I take immense pleasure in presenting on behalf of the Editorial Board, the fourth volume of our journal, Ramjas Economic Review (ISSN: 2582-6093). The Department of Economics, Ramjas College has for years fostered a culture of research, critical thinking and heterodox thought. This journal yet again stands as a testimony to its success. This year, we have been delighted to have an extremely acclaimed external review board consisting of both esteemed individuals from India and abroad. Further, we have been fortunate to receive several submissions from renowned colleges all over the world including the University of London and UC Berkeley.

However, it would be naive to say that these achievements are of this editorial board alone. "Stand on the shoulders of giants" is perhaps one of the first few sentences that one reads when they begin their journey of writing a research paper. The quote is a metaphor that reminds us that our ideas, our research, and our work don't come from our efforts alone, but rely on the work of all those who came before us. The quote stands true even in the context of our journal. Be it in 2019, when Anindya and his team relaunched and rebranded the journal, or in 2020, when Fizza and her team succeeded in getting the journal ISSN accreditation, making it one of the few registered journals at the University of Delhi, or in 2021, when Rijul and his team managed to bring in submissions from colleges from all parts of the country with a diversity of themes — every year, the journal has crossed set limits and built a stronger foundation for the incoming editorial board.

I would like to extend my gratitude to all the authors for their wonderful submissions and their patience throughout the long process. Every submission is a product of hours of work and research put in by the authors, and screening them to select only a few entries was a very challenging process. After the initial screening, the entries are put through a rigorous double-blind review process, which is then followed by revisions, further rounds of editing and a test of academic integrity in the form of a plagiarism test. This is then followed by designing, multiple drafts and further editing, after which the journal takes the polished shape that it has today.

I am thankful to our reviewers who provided each paper with deep and insightful feedback, making it a much better version of itself. I would also like to thank our faculty members for constantly encouraging and supporting the editorial board. I would like to thank Dr. Pawan Kumar, our Teacher In-Charge,

and Dr. Mihir Pandey, our Staff Advisor for their assistance, advice and support in ensuring the smooth functioning of our editorial process. I would also like to give a special mention to Dr. Apoorva Gupta for her constant guidance, availability and helping the team coordinate with all the faculty members. Lastly, I would like to remember Prof. Deb Kusum Das, whose enthusiasm and commitment to research we hope to embody within our journal.

Lastly, I am indebted to G Soundharya, Deputy Editor-in-Chief, for her constant support and efforts throughout the year in managing the entire team and a big thanks to Namit Mahajan for his efforts in leading the designing of the journal. I am also thankful to the other editors - Ashi Agarwal, Krisha Kapur, Aastha, Aleena Treesa Dominic, Mehakdeep Kaur and Soumyadeep Khan for their dedication and efforts towards the publication of the journal. I am also grateful to Varsha from the Student Council of The Ramjas Economics Society for going well beyond her duties and providing the editorial board with constant support and insights. I look forward to seeing them carry on the legacy of the journal next year. I hope in the coming editions the Editorial Board will be a close group of brilliant individuals whose work and dedication continue to take this journal to a higher platform and enable more undergraduates to showcase their research.

Sanjana Saxena
Editor-in-Chief
Ramjas Economic Review

ABOUT

Ramjas Economic Review is a peer–reviewed academic journal for undergraduate students to showcase their research pertaining to the discipline of economics. Our mission is to provide a channel through which students can publish their scholarly findings to share with the research community at large. Though we are largely an undergraduate-run publication, we work under the guidance of the faculty of the University of Delhi, especially during the peer review process.

DISCLAIMER

The opinions expressed in this journal belong to the contributors and do not necessarily reflect the viewpoints of the Editorial Board, the Faculty Review Board or the External Review Board of Ramjas Economic Review.

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Note for Late Prof. Deb Kusum Das

Late Prof. Das at the 2018 SAESM Conference

The Department of Economics, Ramjas College grieves the loss of Professor Deb Kusum Das, a cheerful and valiant personality, with immense love for Economic theories and concepts. Professor Das was an exceptional teacher, he had mastered the art of delivering knowledge to a diverse set of students.

Professor Das had a 35-year association with Ramjas College, which the Department will cherish forever. An eminent economist and an excellent professor, he has touched the hearts of many and made indispensable contributions to the field of economics. His area of research focused on Labour, Trade, and Indian Economics and was associated with the KLEMS project. He is also accredited as an editor of multiple economics and academic books. He received the EXIM Bank IEDRA Award 2004 for his doctoral dissertation, "Some Aspects of Productivity and Trade in Indian Industry". He was the driving force behind the creation of the South Asian Economics Students' Meet (SAESM).

Beyond this, Professor Deb Kusum Das was instrumental in the creation and continuation of this very journal. He, along with the department of economics, sought to instill a culture of rigorous academic research within the students of the college. This being the fourth volume of the journal is a testament to the success of these efforts. We hope to continue the legacy of this journal, and only grow its reach and impact on students not only across the nation but across the globe.

Let There Be Light: Addressing Heterogeneity in Welfare Gains from Rural Electrification in India

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Abstract

Who benefits more from rural electrification in India? In this paper, the author uses panel data from 2005 to 2012 to examine how welfare from electrification varies with respect to the social-group, income, and legality of connection of rural households in India. Using instrumental variables in a first-difference model and in quantile regression, we find heterogeneity in several dimensions of welfare. Electrification benefitted marginalised groups more through reductions in fuel usage, increased agricultural income, hours of study-time and work-hours for women, and higher likelihood of escaping poverty. On the other hand, dominant groups saw greater marginal benefits in most income and expenditure categories, male study-time and work-hours, as well as in the likelihood of having amenities in the household. Quantile regression estimates of welfare revealed a U-shaped pattern: the poorest and richest tended to benefit more than middle-income groups. Legal connections generally experienced greater marginal benefits than illegal connections, though the latter saw greater reductions in non-renewable fuel usage. Gains from electricity access were more heterogeneous than gains from quality of supply, suggesting that improvements on the intensive margin of electrification may be more effective in mitigating historical inequities.

JEL Classification: I30, O18, Q40
Keywords: Rural Electrification, Welfare Gains, Instrumental Variables, IHDS, India, Intensive Margin

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1 Introduction

Does electrification bring significant welfare gains to rural households? There are ample theoretical reasons to believe that the answer ought to be yes. Intuitively, one can expect better educational outcomes resulting from improved lighting that enables children to study later into the night. Access to electronic appliances reduces time spent on chores, enabling homemakers to invest in other activities (e.g., sewing) that can be income-generating. Businesses can remain open longer, and devices such as radios and television can increase exposure to information, thereby improving access to opportunities.

Despite many such plausible reasons, the evidence for welfare gains from rural electrification remain mixed. Some studies find large gains in income and consumption (Khandker et al 2009, Khandker et al. 2012); others report moderate gains (Chakravorty et al. 2014), while still others, notably Bensch et al. (2011), using administrative data from Rwanda, find no gains at all.

This is because there are several factors that obscure the effect of rural electrification on household welfare. First, there is possibility of endogeneity resulting from the joint determination of electricity acquisition and increases in income and consumption, thereby making it difficult to establish the direction of causality (Aklin et al. 2020). Recent papers have also shown that the quality of electricity matters more than mere electricity acquisition (Chakravorty et al. 2014). However, in India, both grid extension and intensification are non-random, and depend on observed and unobserved factors such as topography, electoral politics, and self-perceived gains from electrification, leading to self-selection bias and systematic heterogeneity at district-and-household levels (Aklin et al. 2020). Finally, in India, an estimated 27% of all electricity generated is lost to power theft, meaning that many households are electrified via illegal connections (Central Electricity Authority 2020). Returns to electricity are likely to vary depending on whether it is stolen or not, but no study has attempted to address this gap as of yet.

The main objective of this paper is thus to understand how household welfare from rural electrification varies across multiple dimensions. In essence, the author aims to answer the following question: Who benefits more from rural electrification, how, and by how much? Here, the main focus is on three sources of heterogeneity: social-group (caste), income, and legality of electricity connection. To address issues of endogeneity, the author has used the instrumental variables technique in a first-difference panel model. To examine the distribution of benefits by income-groups, quantile regression is used. The analysis is based on a balanced sample of households from two waves of the Indian Human Development Survey (2005 and 2012). The richness of this dataset allows the author to assess the impact of electrification on a wide range of socioeconomic variables.

The remainder of the paper is structured as follows: Section 2 situates our research in the existing literature. Section 3 describes the data, while Section 4 elucidates our estimation strategy. In Section 5, 6, and 7, we discuss our results by social-group (caste), income, and legality of connection respectively. Section 8 concludes, and Section 9 presents the tables from our analysis.

2 Literature Review

In early 21st century, scholars had attempted to analyse the relationship between electrification and development in India, but due to a lack of sufficiently granular data, were unable move beyond simple correlation and make causal links (Barnes et al. 2003; Cust et al. 2007). However, following the launch of India's national rural electrification program, Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) in 2005, several studies used quasi-experimental techniques to establish causation. These analyses mostly focused on village-level dynamics, ignoring changes within households (Usmani & Fetter 2020; Burlig & Preonas 2016; Kooijman-van Dijk 2012).

While later studies have turned toward household gains, they have either focused on only one dimension of welfare i.e., income, consumption, etc. (Rao 2013), or been limited to state-wide effects (Millinger et al. 2012; Thomas et al. 2020), or evaluated only the extensive margin of electrification efforts (Khandker et al. 2014), overlooking the effect of the reliability of power supply on welfare. Some of these concerns have recently been addressed in the literature. For instance, a growing body of work has studied electrification at the intensive margin i.e., how additional hours of electricity affects returns (Samad & Zhang 2016; Sedai et al. 2020). Walle (2015) distinguishes between internal (household) and external (village-level) effects while analysing long-run returns to electrification, although their data is old (1981-98).

Differences in electrification benefits across gender (Samad & Zhang 2019) and income-groups have also been studied (Khandker et al. 2014), though the latter relies on cross-sectional data, so is unable to capture changes in returns to electricity over time. Finally, in discussing the distributional impact of electricity access, this paper contributes to a rich dialogue on the impact of energy welfare schemes on caste and income inequality in India (Saxena and Bhattacharya 2018; Pelz and Urpelainen 2020). In the following sections, the author limits their discussion to only those heterogeneities that we believe have not yet been well-documented in the literature.

3 Data

The author uses household-level data from the 2005 and 2012 waves of the Indian Human Development Survey (IHDS), a nationally-representative panel survey that collects information on a wide-range of socio-economic factors, including data on electricity.[1] The 2005 dataset covers 41,554 households from 383 districts in 33 states and union territories, covering 97.5% of the Indian population. For the 2012 round, 83% of the original households were interviewed, along with 2,134 new households, resulting in a total of 42,152 households (Desai and Vanneman 2012). For this paper, the author restricts the dataset to rural areas. The author only considers households interviewed in both rounds. Therefore, the final sample consists of 18,388 households.[2]

[1]For analysis, we create the variable "Quality of Electricity" by subtracting "Average Hours of Power Outage" (given by IHDS) from 24 for each household. This represents the average daily hours of electricity received by household.

[2]In cases where households split between 2005 and 2012, the 2012 households are matched with their parent household in 2005 using a matching ID provided by IHDS.

All monetary variables are deflated to 2005 prices using the IHDS deflator.

3.1 Descriptive Statistics

Table 1 reveals that overall, electrification rate increased from 69 per cent in 2005 to 82% in 2012, an average growth-rate of approximately 2 per cent a year. However, this masks considerable inter-state heterogeneity. While areas such as Delhi were almost fully electrified by 2005 (97%), less than 40% of households in Bihar had electricity in 2012. All regions, however, witnessed rapid electrification during this period, largely due to the launch of RGGVY in 2005. While RGGVY expanded electricity access to over 17.5 million rural households by 2011, its results on the intensive margin were criticised heavily (Sreekumar and Dixit 2011). Connected households experienced large power outages, and nightlight data showed that many villages remained dark for several years after being connected (Min and Gaba 2016). This is reflected in the sample which shows that average quality of supply deteriorated between 2005 and 2012.

Table 1: Sample Electrification Rate and Quality of Supply

	2005	2012
Percentage households electrified	68.99	82.33
Average quality of electricity (hrs/day)	14.47	13.66
Observations	18388	22329

Source: Author's calculations based on IHDS 2005 & 2012.

Table 2 denotes the summary statistics of outcome variables. Here, the author finds that kerosene consumption and time spent on bio-fuel were less in households with electricity, although the means are only significantly different for 2012. Both absolute and growth-rates of income and expenditure are greater in households with electricity. Electrified households are much less likely to be poor, and have systematically better access to basic amenities: flush toilet, piped water, motor-vehicle, and cell-phone. On average, children study more and adults work longer hours in connected households. Notably, however, female labour force participation rate and likelihood of borrowing does not depend on the connection status of the household. These comparisons are consistent across both survey years.

Table 2: Summary Statistics of Outcomes by Access to Electricity

Variables	2005		2012	
	Electricity	Non-Electricity	Electricity	Non-Electricity
Kerosene Consumption (litres/month)	3.65 (0.22)	3.31 (0.93)	3.05 (0.53)*	2.68 (0.32)
Time Spent on Bio-Fuel Collection (min/wk.)	109.6 (11.16)	109.0 (9.49)	135.7 (12.43)*	103.4 (11.06)
Per Capita Agri Income /1000 (Rs/yr.)	3.43 (4.7)*	7.22 (5.2)	4.67 (3.6)*	9.46 (5.4)
Per Capita Non-Agricultural Wage /1000 (Rs/yr.)	2.95 (2.82)	7.45 (10.2)	3.81 (15.1)	10.06 (12.3)
Annual Household Income /1000 (Rs/yr.	46.9 (36.0)*	100.2 (60.6)	50.2 (52.9)*	111.9 (100)
Below Poverty Line [a]	0.39 (0.18)*	0.16 (0.09)	0.34 (0.24)*	0.16 (0.10)
Annual Household Income /1000 (Rs/yr.	46.9 (36.0)*	100.2 (60.6)	50.2 (52.9)*	111.9 (100)
Annual hh. Consumption Expenditure /1000 (Rs/yr.)	59.5 (72.6)*	106.1 (110.2)	62.7 (80.1)*	109.4 (120.2)
Food Expenses (Rs/yr.)	18.7 (25.2)*	23.0 (30.1)	20.8 (18.5)*	27.5 (30.0)
Non-food Expenses (Rs/yr.) [b]	13.4 (15.1)*	33.9 (35.4)	16.7 (20.3)*	35.0 (38.6)
Medical Expenses /1000 (Rs/yr.) [c]	0.38 (0.14)*	0.54 (0.27)	0.43 (0.35)*	0.48 (0.56)
Loan from Bank (0/1) [d]	0.50 (0.24)	0.46 (0.41)	0.58 (0.51)	0.58 (0.43)
Number of Loans in the Past 5 Years	1.66 (2.12)	1.41 (1.52)	1.70 (2.04)	1.88 (1.90)
Flush Toilet in the Household (0/1)	0.03 (0.01)*	0.17 (0.09)	0.05 (0.01)*	0.31 (0.20)
Pipe Water in the House (0/1)	0.03 (0.01)*	0.22 (0.14)	0.03 (0.01)*	0.25 (0.14)
Household Owns Any Motor Vehicle (0/1)	0.02 (0.01)*	0.18 (0.12)	0.05 (0.01)*	0.27 (0.15)
Household Owns At Least 1 Cell-Phone (0/1)	0.00 (0.00)*	0.05 (0.02)	0.50 (0.38)*	0.80 (0.66)
Time spent in studies by boys (hours/month)	17.8 (20.3)*	25.6 (32.9)	21.9 (27.4)*	30.3 (34.5)
Time spent in studies by girls (hours/month)	15.2 (12.1)*	23.1 (20.2)	19.9 (15.0)*	28.8 (30.7)
Employment for Men (hours/week)	40.3 (26.0)*	48.5 (32.5)	34.8 (30.2)*	42.7 (29.0)
Employment for Women (hours/week)	13.7 (8.2)*	17.9 (12.1)	11.9 (6.3)*	16.2 (14.4)
Labour Force Participation by Women [e]	0.514 (0.31)	0.473 (0.40)	0.565 (0.30)	0.526 (0.32)

Source: Author's calculations based on IHDS 2005 & 2012.

Notes: Standard deviation in parenthesis. Hh = Household. *: The means of outcome variable of households with and without electricity are statistically different at 5%.

[a]: Defined as the likelihood of a household to be poor, where "poor" is defined using state-wise poverty lines.

[b]: Non-food expenses exclude medical and business-related expenses.

[c]: Refers only to out-patient medical costs. [d]: Defined as whether household borrowed from a bank in the preceding 5 years. [e]: Female labour force participation is calculated as the ratio of working women to total working-age women.

4 Methodology

4.1 First Difference Estimator

We first operationalise a base model for estimating the impact of electrification:

$$Y_{ijt} = \alpha + \beta X_{ijt} + \gamma C_{jt} + \lambda D_{ijt} + \eta(D_{ijt} * E_{ijt}) + \theta_i + \theta_{it} + \epsilon_{ijt} \quad (1)$$

Where i indexes a household, j denotes district, and t time period. Y_{ijt} denotes the outcome variable of interest. The outcome variables of the study are listed in Table 2. X_{ijt} is a vector of all household-level control variables.[3] C_{jt} is a vector of district-level controls.[4] D_{ijt} is a dummy variable denoting electrification status of household i in district j at time t (1

[3]Age, gender, and education of household head, size of household, access to tap water and toilets, ownership of land and non-land assets, maximum schooling of adults aged 18 and above, and home ownership status.

[4]Log of average annual income of households, population density, presence of paved roads, banks, markets, presence of social programs (government employment, adult education, etc.), whether crop-yield is below normal, and prices of alternate fuels).

for electrified, 0 for not). E_{ijt} denotes the average daily hours of electricity received by a household. This represents quality of power supply. $\theta_{\ i}$ and $\theta_{\ jt}$ are household and district-time fixed-effects, while $\epsilon_{\ ijt}$ is the idiosyncratic error term.

While fixed-effects control for heterogeneity from observed household and district characteristics, an OLS estimation of Equation (1) will likely be biased due to endogeneity and simultaneity between D_{ijt}, E_{ijt} and Y_{ijt}. This is due to the non-random nature of grid expansion highlighted in Burlig & Preonas (2016) such that unobserved household-and-district characteristics are correlated with both electricity acquisition and outcome variables.

In this case, assuming household-level unobserved characteristics are time-invariant, the author addresses the problem of endogeneity by differencing Equation (1) to eliminate unobserved time-invariant factors. Since there are only two time-periods (2005 = 0, 2012 = 1), this gives us:

$$\begin{aligned} Y_{ij1} - Y_{ij0} = (\alpha_1 - \alpha_1) + \beta\left(X_{ij1} - X_{ij0}\right) + \gamma\left(C_{j1} - C_{j0}\right) + \lambda\left(D_{ij1} - D_{ij0}\right) + \eta\left(D_{ij1} * \right. \\ \left. E_{ij1} - D_{ij0} * E_{ij0}\right) + \left(\theta_i - \theta_i\right) + \left(\theta_{j1} - \theta_{j0}\right) + \left(\varepsilon_{ij1} - \varepsilon_{ij0}\right) \end{aligned} \tag{2a}$$

Or,

$$\Delta Y_{ijt} = \beta \Delta X_{ij} + \gamma \Delta C_j + \lambda \Delta D_{ij} + \eta \Delta\left(D_{ij} * E_{ij}\right) + \theta_j + \Delta\varepsilon_i \tag{2b}$$

Where $\theta_{\ j}$ is district fixed-effects. Since time-invariant household fixed-effects are differenced out, Equation (2b) should ideally give unbiased estimates of the welfare from electrification. However, there remain some concerns regarding dynamic effects of electrification. If unobserved time-varying fixed-effects are introduced into Equation (1) and then differenced, we get:

$$\Delta Y_{ijt} = \beta \Delta X_{ij} + \gamma \Delta C_j + \lambda \Delta D_{ij} + \eta \Delta\left(D_{ij} * E_{ij}\right) + \Delta\eta_i + \theta_j + \Delta\varepsilon_i \tag{3}$$

Where $\eta_{\ it}$ represents the time-varying household effects. As the author finds, time-varying effects are not eliminated by first-differencing, so it is possible that a fixed-effects estimation as in Equation (2b) would be biased.

4.2 Instrumental Variables

As discussed above, fixed-effects differencing depends on the assumption of time-invariance of unobserved factors. This may not hold true in this case. To address this, the author uses an instrumental variable (IV) approach to induce exogenous variation in electricity access and quality. The chosen instrument is "average household electricity-hours of districts in a state, except the district of the i-th household". Using a district-level instrument allows the author to eliminate any potential for reverse causality at the household-level. This is because the mean hours of household electricity of other districts in the state are expected to influence i-th household's access and reliability of power supply, both through proximity to grid as well as through presence of government programs (instrument relevance). However, it is not expected to directly affect outcome variables (exclusion restriction). Outcomes

such as household income, consumption, and education depend primarily on occupation, initial wealth, assets, household size, school quality of the district, and possibly household electricity access (Sedai et al. 2020).

The first-stage of the IV approach are estimated using the following equations:

$$\Delta D_{ij} = \beta \Delta X_{ij} + \gamma \Delta C_j + \lambda \Delta Z_{ij} + \theta_j + \Delta \varepsilon_i \tag{4}$$

$$\Delta E_{ij} = \beta \Delta X_{ij} + \gamma \Delta C_j + \lambda \Delta Z_{ij} + \theta_j + \Delta \varepsilon_i \tag{5}$$

Where Z_{ijt} represents the average daily hours of household electricity of all districts in the state except district j of household i at time t. Equation (4) is estimated using a Probit model, while Equation (5) is estimated as a regression model. The predicted values of ΔD_{ij} and ΔE_{ij} from the first stage i.e., ΔD_{ij} and ΔE_{ij}, are then used to estimate Equation (2b):

$$\Delta Y_{ijt} = \beta \Delta X_{ij} + \gamma \Delta C_j + \lambda \Delta \underline{D}_{ij} + \eta \Delta \left(\underline{D}_{ij} * \underline{E}_{ij} \right) + \theta_j + \Delta \varepsilon_i \tag{6}$$

Table 3 shows results from the first-stage IV regression. The Kleibergen-Paap's rk Wald F-statistic measuring weak instruments is also reported, and the author finds that the F-statistic is considerably higher than its critical value of 11 (Staiger and Stock, 1997), meaning that weak instrument is not a problem in the analysis. In both cases, model (1) is run without district fixed-effects, while the model (2) includes it. The effect on both dependent variables reduces once district fixed-effects are introduced. Column (2) of connection status implies that for a one-hour increase in average electricity hours in other districts of the state, the probability of a household being electrified increases by 4.2% on average. On the other panel, Column (2) of quality of supply indicates that for a one-hour increase in average electricity-hours in other districts of the state, the quality of electricity of an electrified household increases on average by 0.699 hours.

Table 3: First-Stage Regression Estimates

	Connection Status		Quality of Supply	
	(1)	(2)	(1)	(2)
(Avg. Electricity Hours Other Districts in State)	0.061[b]	0.042[a]	0.858[a]	0.699[a]
	(0.017)	(0.019)	(0.219)	(0.187)
Observations	55513	55513	41683	41683
K-P F-stat (weak ident)	42.2	36.6	4.2	5.6

Source: Author's calculations based on IHDS 2005 & 2012.
Notes: Heteroscedasticity robust standard errors in parenthesis. Significance: [a]: $p < 0.01$, [b]: $p < 0.05$. K-P F-stat is greater than 11 for all specifications, meaning that the instrument is strong. Column (1) excludes district fixed-effects, while Column (2) includes it.

5 By Caste

Academics have documented persistent patterns of caste-based inequality in policy implementation (Dreze and Sen 2013; Bros & Couttenier 2010). While research has shown clear

inequities in energy access, less is understood about how social biases differentially affect welfare from energy programs (Aklin et al. 2020). Thus, in this section, the author addresses how ensuing benefits from electrification vary with respect to the caste of the household.[5] For comparison, the author has also included Muslims in the analysis.

5.1 Descriptive Statistics

In Table 4, the author find that Forward Castes (FCs)—the historically privileged castes —recorded the highest percentage of electrified households in both rounds of IHDS (84 % and 94.6% respectively). This was followed by Other Backward Classes (OBCs), Scheduled Castes (SCs), and Muslims. While Scheduled Tribes (STs) recorded the lowest electrification rate in 2005 (54.1%), they also witnessed the fastest increase in electricity access between 2005 and 2012 (by 22.9%). In general, disadvantaged groups witnessed quicker growth in electricity access.[6]

Table 4: Sample Characteristics by Social-Group

Social Group	Year	Percentage Households Electrified	Avg. Quality of Electricity (hrs/day)	Obs.
Scheduled Caste	2005	66.5	14.12	6457
	2012	80.6	12.33	6250
Scheduled Tribe	2005	54.1	13.58	2973
	2012	77.0	13.78	3031
Other Backward Classes	2005	72.8	13.71	10204
	2012	83.0	11.36	9704
Forward Castes	2005	84.0	17.41	5127
	2012	94.6	15.29	5129
Muslims	2005	60.1	13.39	2671
	2012	81.0	11.31	2529

Source: Author's calculations based on IHDS 2005 & 2012.

The story on the intensive margin, however, is far less impressive. All social groups (except STs) registered a decrease in the average quality of electricity between 2005 and 2012. Although FCs witnessed the sharpest decline (by 2.23 hours), they also received the highest average daily hours of electricity in both years (17.4 and 15.2 hours respectively). Marginalised groups (SCs, STs, OBCs, and Muslims) received electricity for about half a day on average. Such large power outages are reflective of the lack of policy focus toward infrastructure development to support the growing electricity demand.

5.2 Split-Sample Estimation and Results

Since the author is concerned with comparing marginal effects, the sample can be split and Equations (2b) and (6) can be separately estimated by social-group. Tables 5 and 6 show estimates of how electricity access and quality affect outcomes by social-groups respectively.

[5]For simplicity, we define "household caste" as the caste of the head of the household. In doing so, we lose some information since differences in the castes of household members may indirectly affect welfare gains by influencing accessibility to resources. However, only about 5 percent of the families in the IHDS dataset are products of inter-caste marriages, so the simplification does not seriously compromise our estimates.

[6]SCs, STs, OBCs, and Muslims are collectively referred to as marginalized/backward groups.

All models include district fixed-effects. As the author finds, there is considerable heterogeneity in marginal welfare among social-groups. While in most cases the results show larger benefits for Forward Castes, there are some notable exceptions.

[Table 5 here][7]

For instance, marginalised groups experienced a greater reduction in fuel usage due to electrification. IV-estimates show that while electricity access decreased monthly kerosene consumption by 0.34 litres for FCs, for marginalised groups, the reduction ranged between 0.42 and 0.56 litres (STs and SCs respectively). The negative effect of electricity access and quality (as shown in Table 6) on bio-fuel collection time was also larger in backward groups. These results are statistically significant at 5-percent level.

Aside from agricultural income, all income and expenditure variables showed larger increases in Forward Castes. Electricity access to village pumps accelerates groundwater extraction which enables irrigation of high-yielding crops (Smith and Urpelainen 2016). This increases agricultural income, and since lower-castes are disproportionately employed in farming (Mosse 2018), this channel of benefits expectedly affects them more. With respect to other monetary variables, FCs, on average, have higher income and better access to village markets (Thorat and Lee 2005). As a result, FCs can more easily buy productivity-enhancing appliances that proportionately increase both income and expenditure.

[Table 6 here]

Both access and quality effects for amenities (flush toilet, cell-phone and motor-vehicle) were positive and largest for FCs. Availability of such amenities are strongly linked with geographical factors (Kemmler 2007). Village-level studies reveal that marginalised groups tend to reside in outlying areas, and despite the availability of power supply, such remotes areas lack the infrastructure to provide these amenities (Sadath and Acharya 2017). However, non-FC groups experienced a greater reduction in the likelihood of being poor.

6 By Income

Next, the author examines how benefits from electricity vary with respect to income and expenditure levels of households. Richer households have significantly better endowments and can thus derive greater benefits from electrification. However, research thus far has remained ambiguous, with studies either producing conflicting results (Samad & Zhang 2016; Khandker et al. 2014), or focussing on specific segments of the income distribution (Bhattacharyya and Das 2017). We contribute to this debate by estimating welfare across various categories of income and expenditure.

6.1 Quantile Regression

Quantile regression is used to estimate the effect of the independent variable on different quantiles of the dependent variable's distribution. For this exercise, the author uses a semi-

[7]Larger tables have been presented together in Section 9 ("Tables") of this paper.

parametric approach to examine quantile treatment effects (QTE) of household electrification on income and expenditure of households. The author follows the method developed in Koenker and Bassett (1978). Following the notation in previous equations, we define our base model as follows:

$$Q_\tau\left(Y_{it} \mid HD_{it}, D_{it}, E_{it}\right) = \alpha_\tau + \beta_\tau HD_{it} + \lambda_\tau D_{it} + \eta_\tau E_{it} + \theta_i + \varepsilon_\tau, \tau\epsilon[0,1] \tag{7}$$

Where $\mathrm{Q}_\tau\left(Y_{it} \mid HD_{it}, D_{it}, E_{it}\right)$ denotes the quantile τ of outcome Y_i in time t, conditional on HD_{it}, D_{it} and E_{it}. All outcome variables are mentioned in Table 7. It is a vector of household and district-level controls. The QTE of electrification in a given survey-year is:

$$\lambda_\tau = \Delta_\tau = Q_\tau\left(Y_1\right) - Q_\tau\left(Y_0\right) \tag{8}$$

Where $Q_\tau\left(Y_1\right)$ and $Q_\tau\left(Y_0\right)$ are respective quantiles τ of Y_1 and Y_0, and Y_1 and Y_0 are outcomes with and without electricity. The QTE between the two-periods (2005 and 2012) is:

$$Q_\tau \Delta Y_{it} = \Delta\alpha_\tau + \beta_\tau \Delta HD_i + \lambda_\tau \Delta D_i + \eta_\tau \Delta E_i + \theta_j + \varepsilon_\tau \tag{9}$$

Where $\theta_{\ j}$ represents district fixed-effects. The author uses AZ the IV implementation of Equation (9) using the "ivqr" package in R. In Table 7, we report aggregate effects of electrification (conditional on electricity quality) by income and expenditure quantiles, and Figure 1 presents them visually.

6.2 Results and Discussion

Figure 1 reveals a U-shaped pattern in the effect of electrification across income groups. For all categories, marginal benefits for the highest and lowest quantiles were high, while middle quantiles (30th and 50th) tended to benefit the least in percentage terms. Households in the 10th quantile of agricultural income, for instance, witnessed a 15.9% increase in their agricultural income due to electrification, while households in 50th and 90th quantiles showed 10.1% and 24.4% increases respectively. Contrary to previous studies, the results show that benefits from electrification favour both the richest and the poorest.

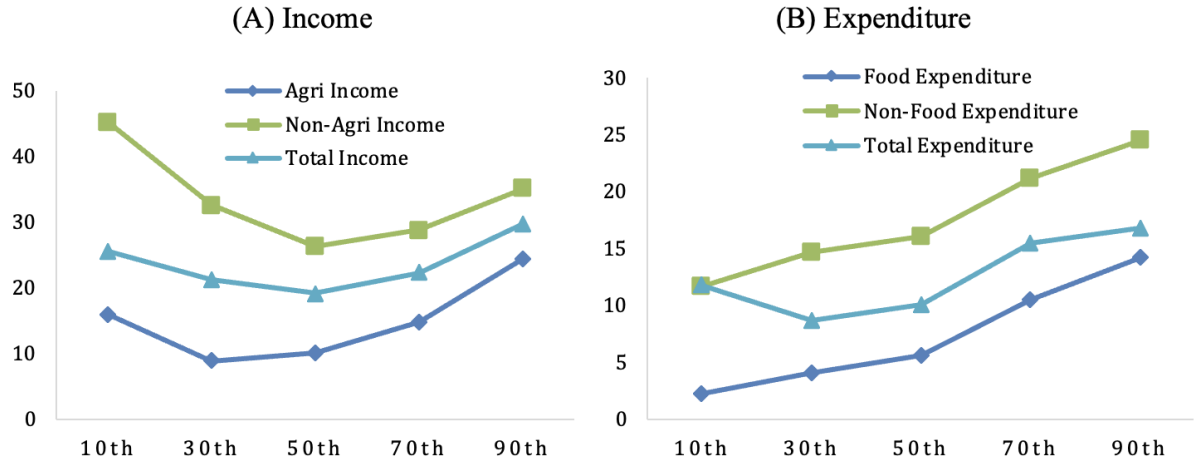
Table 7: Quantile Regression Estimates of Electrification on Income and Expenditure

Quantile (Percentile)	Agri Income	Non-Agri Income	Total Income	Food Expenditure	Non-Food Expenditure	Total Expenditure
10th	0.159 [c]	0.452 [a]	0.255	0.023 [b]	0.117 [c]	0.118 [b]
	(0.001)	(0.014)	(0.102)	(0.002)	(0.001)	(0.019)
30th	0.089 [c]	0.326 [a]	0.212 [b]	0.041 [b]	0.147	0.087 [a]
	(0.002)	(0.017)	(0.089)	(0.005)	(0.004)	(0.009)
50th	0.101 [c]	0.263 [b]	0.192	0.056 [c]	0.161	0.101 [c]
	(0.003)	(0.021)	(0.077)	(0.004)	(0.005)	(0.037)
70th	0.148 [b]	0.288 [b]	0.223 [c]	0.105 [a]	0.212 [a]	0.155 [c]
	(0.012)	(0.032)	(0.067)	(0.002)	(0.032)	(0.072)
90th	0.244 [b]	0.351 [b]	0.297 [c]	0.142 [c]	0.245 [b]	0.168 [c]
	(0.014)	(0.048)	(0.085)	(0.007)	(0.058)	(0.080)

Source: Author's calculations based on IHDS 2005 & 2012.

Notes: Marginal effects are reported. Significance: [a]: $p < 0.01$, [b]: $p < 0.05$, [c]: $p < 0.10$. Standard errors in parentheses are clustered at the district-level. All variables are expressed in log form.

Figure 1: Quantile Regression Estimates of Welfare from Electricity Access



Source: Author's calculations based on IHDS 2005 & 2012
Notes: The figures are created using the coefficients from Table 7. All variables were expressed in log form and have been converted to percentage here.

As Panel (B) of Figure 1 shows, benefits of electrification accrue more to higher expenditure quantiles (though the line for total expenditure is also somewhat U-shaped). Households in the highest quantile (90th) of food expenditure accumulate benefits that are over six times as much as those in the 10th quantile (2.3% compared to 14.2%). Generally, electrification impacts are higher across income than expenditure quantiles. This is not surprising since it is expected that when electrification increases income, households (especially poorer ones) are likely to be more conservative in raising their spending. This is supported by studies in India which show that incomes rise proportionately faster than expenditure following positive productivity shocks (Jayachandran 2006).

The U-shaped pattern seems puzzling at first, but there are several good reasons for it. As discussed earlier, there are many channels through which electrification benefits a household: greater working hours through lighting, productivity enhancing appliances that free time from domestic labour, improved access to opportunities via cell-phones and television, etc. Of course, the rich can exploit these channels to a greater extent which explains why their marginal benefits are high. On the other hand, electrification effects can also be poor-favouring (Samad and Zhang 2016). For poor households in rural India, electricity as well as basic agricultural machinery is fully subsidised (owing to The Electricity Act, 2003), therefore even marginal improvements in productivity via use of electrified equipment can significantly increase their relative income as they do not need to pay electricity bills (Dinkelman 2011).

However, Table 7 suggests that it is electrification's impact on non-agricultural income that is most poor-favouring: The 10th quantile witnessed a 45.2% increase, compared to only 26.3% for the 50th quantile. Since the poor mainly use electricity for lighting, this suggests that the main channel of benefits come from increased working hours. Rathi and Vermaak (2018) showed that household electrification delayed dinner-time by one hour on average (by raising productive hours) while increasing women's income by 20%. In richer households,

benefits seem to come from the use of varied appliances that increase productivity. Many commercial appliances are only profitable when power supply is reliable, and since upper quantiles have a higher willingness to pay, they receive more stable connections which help maximise returns to electrification (Bensch et al. 2011). This is supported by the author's findings that electrification's impact on non-food expenditure is highly rich-favouring (24.5% for 90th quantile, compared to only 11.7% for 10th quantile).

In this narrative, middle quantiles seem to be stuck: their incomes are too high to be significantly improved by increased working hours alone, but not high enough to be able to afford the appliances and stable connection that can optimise gains from electrification. This hypothesis is partly supported by Fried and Lagakos (2017) who show that rural electrification in Kenya most significantly raised the marginal products of labour of the lowest-paying occupations (traditional farming) as well that of business owners. Overall, these findings highlight the need for policymakers to address the cost element of reliable connections so that investments into appliances can be profitable for all income groups.

7 Legality of Connection

7.1 Defining an Illegal Connection

Finally, we compare the electrification benefits by legality of the household connection. We identify a household as "illegally" obtaining electricity if they report access to electricity but do not receive or pay bills despite not being covered under government schemes.[8] Households that report paying to neighbours for electricity are also defined as illegal connections. As shown in Table 8, illegal connections accounted for roughly 17% of the electrified households in 2005 and 11% in 2012. Generally, they faced much poorer quality of electricity. In 2012, a legal connection had electricity for 14.5 hours a day on average, compared to 8.64 hours for an illegal connection. As we would expect given their poorer quality of electricity,

Table 8: Sample Characteristic by Legality of Connection

	2005		2012	
	Legal	Illegal	Legal	Illegal
Average Quality of Electricity (hrs/day)	15.86	10.33	14.51	8.64
Observations	10529	2157	16361	2022

Source: Author's calculations based on IHDS 2005 & 2012.

Table 9 shows that illegal connections consumed significantly higher kerosene and spent more time on bio-fuel collection. They were almost thrice as likely to be below the poverty line, and per capita agricultural and non-agricultural income incomes of legal connections were higher for both years. Households with illegal connections had an average annual

[8]The IHDS questionnaire asks separate questions for payment of bills and coverage by energy subsidy programs. We create a dummy variable "Legality of Connection" by combining answers to the aforementioned questions.

consumption expenditure of 51,800 INR, compared to 69,700 INR for legal connections in 2012. With respect to specific categories of expenditure, while annual non-food expenditure was significantly higher in legally connected households (30,300 INR compared to 24,700 INR in 2012), food and medical expenses of the two samples were not statistically different.

Legally connected households are almost twice more likely to borrow from a bank, though interestingly, there is no difference between the total number of loans taken in 5 years between the two samples. With respect to amenities, legally connected households are more likely to have both flush toilets, piped water, and motor vehicle, though the latter is only significant in 2012. Children in illegally connected households study lesser hours. In 2005, a boy in a typical legally connected household studies for 26.9 hours a month compared to 22 hours a month in illegally connected households. Employment hours for both men and women showed a similar trend, though noticeable, female labour force participation showed the opposite pattern: In 2005, 68.6% of working-age females participated in the labour force, compared to only 45.5 per cent in legally connected households.

Table 9: Summary Statistics of Outcomes by Legality of Connection

Variables	2005		2012	
	Legal	Illegal	Legal	Illegal
Kerosene Consumption (litres/month)	2.99 *	3.98	2.2 *	3.45
Time Spent on Bio-Fuel Collection (min/wk.)	98.33 *	140.2	90.8 *	134.6
Per Capita Agri Income /1000 (Rs/yr.)	8.05 *	4.45	10.7 *	6.26
Per Capita Non-Agricultural Wage /1000 (Rs/yr.)	8.26 *	6.80	11.33 *	9.87
Annual Household Income /1000 (Rs/yr.)	103.9 *	90.4	114.9 *	93.5
Below Poverty Line	0.12 *	0.36	0.13 *	0.32
Annual hh. Consumption Expenditure /1000 (Rs/yr.)	113.5 *	87.5	117 *	89.98
Food Expenses (Rs/yr.)	23.7	22.9	28.2	27.6
Non-food Expenses (Rs/yr.)	37.2 *	20.2	40.3 *	24.7
Medical Expenses /1000 (Rs/yr.)	0.56	0.49	0.50	0.46
Loan from Bank (0/1)	0.55 *	0.27	0.63 *	0.29
Number of Loans in the Past 5 Years	1.43	1.30	1.94	1.77
Flush Toilet in the Household (0/1)	0.21 *	0.09	0.32	0.27
Pipe Water in the House (0/1)	0.22	0.22	0.25	0.24
Household Owns Any Motor Vehicle (0/1)	0.20	0.16	0.28	0.25
Household Owns At Least 1 Cell-Phone (0/1)	0.05	0.03	0.85 *	0.58
Time spent in studies by boys (hours/month)	26.9 *	22.0	33.7 *	23.1
Time spent in studies by girls (hours/month)	23.8 *	22.9	29 *	26.9
Employment for Men (hours/week)	49.3 *	46.1	43.8 *	40.3
Employment for Women (hours/week)	19.2 *	15.5	18 *	13.6
Labour Force Participation by Women	0.455 *	0.686	0.501 *	0.740

Source: Author's calculations based on IHDS 2005 & 2012.
Notes: Standard deviation in parentheses. *: The means of outcome variable of households with and without electricity are statistically different at 5%.

7.2 Results

Table 10 presents the estimates of Equations (2b) and (6) by legality of connection. Here we focus on the effect of an additional hour of electricity supply. In general, instrumental variable estimates reveal larger effects than the simple first-difference model, implying a more significant causal relationship once unobserved heterogeneity is accounted for.

Several counterintuitive patterns emerge here. The author finds that marginal improvements in quality of electricity reduced fuel consumption by a greater extent in households with illegal connections. An additional hour of electricity reduced kerosene consumption by 0.186 litres a month for legally connected households, compared to 0.213 litres for illegal connections. This may reflect a degree of self-selection. Households that obtain illegal connections are often poorer, and farther away from markets where bio-fuel is available (Sadath and Acharya 2017). Whereas legally connected households usually have access to alternative sources such as LPG, illegally connected households are more dependent on kerosene and bio-fuel for all activities, therefore additional electricity proportionately reduces use of non-renewables by a greater margin for these households as they are more dependent on it to begin with.

Table 10: Effect of Electricity Hours on Outcomes by Legality of Connection

Variables	Legal		Illegal	
	FD	FD-IV	FD	FD-IV
Kerosene Consumption (litres/month)	-0.084 [a] (0.004)	-0.186 [a] (0.004)	-0.085 [a] (0.021)	-0.213 [a] (0.042)
Time Spent on Bio-Fuel Collection (min/wk.)	-9.23 [b] (1.063)	-10.41 [a] (1.423)	-14.24 [b] (3.6)	-12.85 [c] (2.74)
Log Per Capita Agri Income (Rs/yr.)	0.028 [b] (0.012)	0.031 [a] (0.013)	0.012 [b] (0.016)	0.015 [b] (0.005)
Log Per Capita Non-Agricultural Wage (Rs/yr.)	0.042 [a] (0.005)	0.053 [c] (0.005)	0.037 [a] (0.007)	0.038 [c] (0.002)
Log Annual Household Income (Rs/yr.)	0.011 [b] (0.008)	0.026 [b] (0.002)	0.010 [b] (0.010)	0.009 [b] (0.010)
Below Poverty Line	0.014 [c] (0.012)	0.019 [c] (0.007)	0.032 [c] (0.008)	0.025 [c] (0.007)
Log Annual hh. Consumption Expenditure (Rs/yr.)	0.007 [b] (0.066)	0.008 [b] (0.065)	0.004 [c] (0.074)	0.006 [c] (0.035)
Log Food Expenditure (Rs/yr.)	0.012 [a] (0.004)	0.011 [a] (0.005)	0.008 [b] (0.006)	0.008 [c] (0.005)
Log Non-food Expenses (Rs/yr.)	0.018 [a] (0.063)	0.024 [b] (0.032)	0.015 [b] (0.118)	0.017 [c] (0.043)
Log Medical Expenses (Rs/yr.)	0.002 [c] (0.011)	-0.005 [c] (0.014)	-0.008 (0.035)	-0.01 [b] (0.034)
Loan from Bank (0/1)	0.000 (0.012)	0.002 (0.012)	0.000 (0.013)	0.001 (0.021)
Number of Loans in the Past 5 Years	0.142 [a] (0.025)	0.097 (0.025)	0.086 (0.028)	0.128 (0.029)
Flush Toilet in the Household (0/1)	0.004 (0.05)	0.005 [c] (0.043)	0.002 [c] (0.029)	0.003 [c] (0.030)
Pipe Water in the House (0/1)	0.000 (0.001)	0.002 (0.001)	0.008 (0.001)	0.008 (0.001)
Household Owns Any Motor Vehicle (0/1)	0.001 (0.019)	0.001 (0.002)	0.002 (0.005)	0.002 (0.005)
Household Owns At Least 1 Cell-Phone (0/1)	0.012 [c] (0.028)	0.010 [b] (0.025)	0.003 [c] (0.005)	0.005 [c] (0.007)
Time spent in studies by boys (hours/month)	0.279 [c] (0.028)	0.282 [c] (0.025)	0.221 [c] (0.005)	0.343 [c] (0.007)
Time spent in studies by girls (hours/month)	0.42 [a] (0.059)	0.441 [a] (0.039)	0.287 [a] (0.043)	0.33 [a] (0.097)
Log Employment for Men (hours/week)	0.010 [b] (0.002)	0.009 [b] (0.004)	0.014 [c] (0.003)	0.014 [c] (0.007)
Log Employment for Women (hours/week)	0.019 [c] (0.009)	0.026 [c] (0.005)	0.023 [b] (0.009)	0.033 [b] (0.003)
Labour Force Participation by Women	0.007 (0.004)	0.009 (0.014)	0.003 (0.012)	0.006 (0.008)
District Fixed-Effects	Yes	Yes	Yes	Yes
Observations	26891	26891	4179	4179

Source: Author's calculations based on IHDS 2005 & 2012.

Notes: Significance: [a]: $p < 0.01$, [b]: $p < 0.05$, [c]: $p < 0.10$. All outcome variables are differenced. Standard errors in parentheses are clustered at the district-level. Information regarding control and instrumental variables will be found in Section (4a) and (4b) respectively.

Almost all income and expenditure variables show greater proportionate increase in legally connected households. For instance, an additional hour of electricity raises agricultural income by 3% for legally connected households, while by only 1.5 percent for illegally connected households. However, medical expenses showed an opposite trend. While an additional hour of electricity reduces medical expenditure by only 0.5% for legally connected households, illegally connected households witness a 1% reduction, i.e., double the effect. Illegally connected households also had a greater likelihood of escaping poverty (marginal effect of 2.5%, compared to 1.9%). This may once again reflect some self-selection: Households are sufficiently motivated to obtain an illegal again (despite the greater risk) only when they know they will benefit significantly from it (Aklin et al. 2020). Similar to the caste results, while electricity quality did not impact likelihood of borrowing from a bank, it increases total number of loans by a greater margin in illegally connected households, though the effects were small. An additional hour increased number of loans by 0.128 for illegal connections, compared to 0.09 for its counterpart.

Results for amenities were inconclusive. The instrumental variable estimates of the likelihood of having piped water, flush water, and motor-vehicle were statistically insignificant, even at 10%. The effect of electricity hours is generally greater for legally connected households with respect to both educational and labour-market variables, and benefits greater more to women than men. An additional hour of electricity, for instance, increased women's hours worked by 3.3%, compared to 1.4% for men in illegally connected households. This is consistent with the aforementioned idea that electricity benefits women more as they bear the brunt of household work (Kohlin et al 2011). Finally, female labour force participation was also not significantly affected by electricity quality.

8 Conclusion and Policy Recommendations

Provision of electricity is considered a central aspect of rural development. In this paper, the author examined how benefits from rural electrification varied with respect to the social-group and income of the household. To do so, the author used instrumental variables techniques on household data from 2005 to 2012. Similar to Chakravorty (2014), the author found that instrumental variable estimates generally revealed larger benefits than the simple first-difference model, meaning that the causal impact of electrification is greater after controlling for unobserved heterogeneity.

The author documents heterogeneity in several dimensions of welfare, and find that generally, electrification is associated with significant benefits across all income and social-group categories. Marginalised groups benefited more through reductions in fuel usage, increased agricultural income and hours of study-time and work for women, and in the likelihood of escaping poverty. On the other hand, dominant groups saw larger marginal benefits in most income and expenditure categories, male study-time and work-hours, as well as the likelihood of having amenities in the household. Quantile regression estimates of welfare with respect to income and expenditure revealed a U-shaped pattern. The poorest and richest tended to benefit more than middle-income groups. Finally, illegal connections not only experienced longer outages, but also lesser marginal benefits in most dimensions of welfare.

Welfare from electricity access tended to vary more than from quality of supply, meaning that improving the reliability of connections can be effective in mitigating the unequal effects of electrification. Frequent power outages and voltage fluctuations in non-dominant households prevent investment into appliances that maximise returns to electrification. However, from a policy-perspective, while efforts should be made to make electricity cheap, subsidies should not fully cover its cost. As Burgess et al. (2020) shows, treating electricity as a right results in inefficient power use and lower bill payments, which then prevents expansion of reliable connections.

To improve last-mile connectivity, state governments can also deploy renewable energy-based solutions. In fact, the price of LED lights and lithium-ion batteries (main components of solar home-systems) have reduced by over 70% in the last ten years, much faster than the price of electricity (IRENA 2019). This paper highlights the need to evaluate electrification projects across multiple dimensions, not just along the extensive margin. Indeed, national governments would benefit from adopting multi-faceted evaluation indices such as the Global Tracking Framework (GTF) launched by the World Bank and the United Nations under the Sustainable Energy for All (SE4ALL) program. Finally, since this study focusses on household benefits, the author is unable to understand how rural electrification affects structural transformation and migration patterns. In the longer-term, these may be the channels through which the full effect of electrification is realised.

A. Tables

Table 5: Impact of Access to Electricity on Outcomes by Social Group

Variables	Forward Castes		Scheduled Castes		Scheduled Tribes		OBCs		Muslims	
	FD	FD-IV	FD	FD-IV	FD	FD-IV	FD	FD-IV	FD	FD-IV
Kerosene Consumption (litres/month)	-0.145 [a] (0.002)	-0.344 [a] (0.005)	-0.397 [c] (0.032)	-0.562 [a] (0.035)	-0.232 [a] (0.022)	-0.422 [a] (0.025)	-0.552 [b] (0.002)	-0.449 [a] (0.006)	-0.333 [b] (0.022)	-0.541 [a] (0.025)
Time Spent on Bio-Fuel Collection (min/wk.)	-38.2 [c] (1.244)	-40.6 [b] (1.155)	-52.346 [a] (1.341)	-61.526 [b] (1.421)	-32.0 (0.957)	-41.5 [c] (1.015)	-45.3 [c] (1.121)	-54.2 [b] (1.241)	-58.3 [c] (1.253)	-51.8 [b] (1.279)
Log Per Capita Agri Income (Rs/yr.)	0.088 [a] (0.025)	0.100 [c] (0.024)	0.189 [a] (0.041)	0.191 [c] (0.083)	0.201 [a] (0.029)	0.212 (0.059)	0.101 [a] (0.045)	0.144 [a] (0.074)	0.257 [a] (0.025)	0.163 [c] (0.026)
Log Per Capita Non-Agricultural Wage (Rs/yr.)	0.372 (0.027)	0.431 [a] (0.028)	0.233 (0.012)	0.258 [b] (0.012)	0.20 [c] (0.01)	0.223 [a] (0.01)	0.384 [a] (0.014)	0.289 [a] (0.012)	0.301 [a] (0.019)	0.298 [a] (0.02)
Log Annual Household Income (Rs/yr.)	0.2805 [a] (0.052)	0.311 [a] (0.068)	0.167 (0.058)	0.191 [b] (0.059)	0.144 [a] (0.058)	0.1615 (0.059)	0.3205 [b] (0.036)	0.226 [b] (0.036)	0.251 [a] (0.037)	0.255 (0.048)
Below Poverty Line	-0.062 (0.001)	-0.058 [a] (0.001)	-0.078 [b] (0.006)	-0.099 [a] (0.006)	-0.087 (0.006)	-0.102 [a] (0.006)	-0.114 [b] (0.003)	-0.124 [a] (0.003)	-0.152 [b] (0.004)	-0.135 [c] (0.003)
Log Annual hh. Consumption Expenditure (Rs/yr.)	0.162 [a] (0.025)	0.181 [b] (0.027)	0.142 (0.028)	0.169 [a] (0.031)	0.121 (0.028)	0.101 [a] (0.031)	0.125 [b] (0.017)	0.107 (0.019)	0.12 (0.017)	0.124 [a] (0.019)
Log Food Expenses (Rs/yr.)	0.026 [b] (0.002)	0.042 (0.002)	0.052 (0.002)	0.088 (0.002)	0.078 (0.002)	0.089 (0.002)	0.01 [c] (0.001)	0.021 (0.001)	0.091 (0.001)	0.151 (0.001)
Log Non-food Expenses (Rs/yr.)	0.31 (0.144)	0.329 [a] (0.158)	0.233 (0.147)	0.254 [a] (0.148)	0.577 [b] (0.147)	0.399 [a] (0.148)	0.292 [a] (0.091)	0.401 (0.092)	0.111 (0.102)	0.246 [a] (0.112)
Log Medical Expenses (Rs/yr.)	0.012 (0.003)	-0.027 (0.004)	0.013 [b] (0.003)	0.014 (0.004)	-0.014 (0.003)	-0.012 (0.004)	-0.019 (0.001)	-0.028 (0.002)	-0.015 (0.002)	0.018 [c] (0.002)
Loan from Bank (0/1)	0.000 (0.000)	0.01 (0.002)	0.000 (0.000)	0.02 (0.002)	0.02 (0.000)	0.02 (0.002)	0.01 (0.000)	0.01 (0.001)	0.03 (0.000)	0.01 (0.001)
Number of Loans in the Past 5 Years	0.519 [b] (0.031)	0.622 [a] (0.038)	0.671 [a] (0.023)	0.388 [a] (0.018)	0.54 [a] (0.031)	0.651 [b] (0.038)	0.344 (0.019)	0.495 [a] (0.023)	0.841 [a] (0.016)	0.461 [a] (0.012)
Flush Toilet in the Household (0/1)	0.043 [b] (0.002)	0.068 [b] (0.002)	0.011 [b] (0.002)	0.052 [b] (0.002)	0.038 (0.002)	0.084 [b] (0.002)	0.066 (0.001)	0.074 [b] (0.001)	0.089 [b] (0.001)	0.078 (0.001)
Pipe Water in the House (0/1)	0.023 (0.004)	0.044 (0.005)	0.023 (0.002)	0.012 (0.003)	0.041 (0.003)	0.067 (0.004)	0.089 (0.003)	0.063 (0.002)	0.101 (0.000)	0.072 (0.000)

Household Owns Any Motor Vehicle (0/1)	0.012 [a] (0.001)	0.023 [b] (0.001)	0.034 [b] (0.002)	0.021 [a] (0.001)	0.03 (0.002)	0.021 [a] (0.001)	0.03 [b] (0.001)	0.031 (0.000)	0.016 [a] (0.000)	0.012 [a] (0.000)
Household Owns At Least 1 Cell-Phone (0/1)	0.082 [a] (0.041)	0.054 [a] (0.045)	0.035 [c] (0.044)	0.026 [b] (0.031)	0.024 [a] (0.044)	0.045 [a] (0.031)	0.033 [b] (0.027)	0.031 [a] (0.019)	0.081 [a] (0.029)	0.019 [a] (0.032)
Time spent in studies by boys (hours/month)	4.047 [b] (0.023)	4.815 [b] (0.029)	3.03 [a] (0.023)	2.81 [c] (0.271)	6.95 [a] (0.123)	3.88 [c] (0.179)	7.22 [b] (0.076)	4.20 [a] (0.111)	6.17 [a] (0.016)	2.04 [a] (0.020)
Time spent in studies by girls (hours/month)	3.01 (0.127)	2.99 [a] (0.116)	4.21 (0.123)	3.87 [a] (0.096)	5.28 [a] (0.123)	4.02 (0.096)	3.77 (0.077)	5.55 (0.060)	2.38 [a] (0.09)	1.65 [a] (0.083)
Log Employment for Men (hours/week)	0.108 [a] (0.002)	0.069 [a] (0.001)	0.078 [c] (0.002)	0.111 [c] (0.001)	0.146 [c] (0.002)	0.096 [a] (0.001)	0.167 [a] (0.001)	0.177 [c] (0.000)	0.202 [c] (0.001)	0.066 (0.000)
Log Employment for Women (hours/week)	0.134 [a] (0.021)	0.233 [c] (0.031)	0.355 [a] (0.021)	0.382 [a] (0.031)	0.562 [a] (0.021)	0.455 [a] (0.031)	0.231 [a] (0.013)	0.308 [b] (0.019)	0.084 (0.015)	0.093 [a] (0.022)
Labour Force Participation by Women	0.027 (0.001)	0.015 (0.002)	0.052 (0.001)	0.067 (0.002)	0.08 (0.001)	0.092 (0.002)	0.023 (0.002)	0.068 (0.001)	0.023 (0.003)	0.011 [c] (0.001)
District Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10133	10133	12032	12032	5481	5481	18674	18674	4998	4998

Source: Author's calculation based on IHDS 2005 & 2012.

***Notes*:** Significance: [a]: $p < 0.01$, [b]: $p < 0.05$, [c]: $p < 0.10$.

All outcome variables are differenced. Standard errors in parentheses are clustered at the district-level. FD = First Difference estimates. FD-IV: First Difference estimate with Instrumental Variables. OBC = Other Backward Classes. Information regarding control and instrumental variables will be found in Section (4a) and (4b) respectively.

Table 6: Impact of Quality of Electricity on Outcomes by Social Group

Variables	Forward Castes		Scheduled Castes		Scheduled Tribes		OBCs		Muslims	
	FD	FD-IV	FD	FD-IV	FD	FD-IV	FD	FD-IV	FD	FD-IV
Kerosene Consumption (litres/month)	-0.052[a] (0.104)	-0.093[a] (0.094)	-0.128[a] (0.352)	-0.208[a] (0.582)	-0.241[b] (0.107)	-0.154[a] (0.025)	-0.842 [b] (0.124)	-0.128 [a] (0.094)	-0.152 [a] (0.284)	-0.177 [a] (0.118)
Time Spent on Bio-Fuel Collection (min/wk.)	-9.34 (0.325)	-10.25[a] (0.925)	-1.58 [a] (0.645)	-11.28[a] (0.657)	-7.41 [b] (0.759)	-14.66[a] (0.719)	-18.95 [a] (0.726)	-10.39 [a] (0.76)	-15.5 [a] (0.761)	-8.35 [c] (0.779)
Log of Per Capita Agri Income (Rs/yr.)	0.072 [b] (0.004)	0.045 [b] (0.005)	0.026 [b] (0.002)	0.037 [c] (0.019)	0.038 [a] (0.003)	0.024 [a] (0.074)	0.003 [b] (0.030)	0.011 [a] (0.008)	-0.22 [c] (0.017)	0.041 [a] (0.005)
Log of Per Capita Non-Agricultural Wage (Rs/yr.)	0.037 [b] (0.344)	0.068 [a] (0.295)	0.004 (0.085)	0.043 [a] (0.059)	0.003 [b] (0.058)	0.003 [c] (0.059)	0.452 [a] (0.037)	0.034 [b] (0.046)	0.026 [b] (0.021)	0.008 [c] (0.052)
Log of Annual Household Income (Rs/yr.)	0.017 [a] (0.689)	0.03 [a] (0.481)	0.063 [b] (0.582)	0.028 [b] (0.584)	0.025 [a] (0.549)	0.029 [a] (0.571)	0.001 [b] (0.568)	0.02 [a] (0.562)	0.052 [a] (0.567)	0.025 [a] (0.566)
Below Poverty Line	-0.012[a] (0.004)	-0.013[b] (0.004)	-0.011[b] (0.075)	-0.02 [a] (0.031)	-0.017[a] (0.028)	-0.023[a] (0.031)	-0.049 [a] (0.111)	-0.024 [a] (0.055)	-0.006 [c] (0.045)	-0.018 [c] (0.5)
Log of Annual hh. Consumption Expenditure (Rs/yr.)	0.009 [a] (0.045)	0.016 [a] (0.094)	0.019 [c] (0.015)	0.004 [c] (0.002)	0.007 [c] (0.002)	0.013 [c] (0.002)	0.259 [a] (0.06)	0.015 [c] (0.055)	0.158 [a] (0.078)	0.008 [a] (0.058)
Log of Food Expenses (Rs/yr.)	0.011 (0.753)	0.008 (0.851)	0.001 (0.582)	0.008 (0.24)	0.001 (0.663)	0.005 (0.475)	0.000 [c] (0.241)	0.007 (0.441)	0.002 (0.754)	0.002 (0.597)
Log of Non-food Expenses (Rs/yr.)	0.014 [a] (0.044)	0.019 [a] (0.075)	0.04 [c] (0.073)	0.014 [a] (0.058)	0.004 [a] (0.084)	0.007 [a] (0.048)	0.005 [b] (0.019)	0.005 [c] (0.054)	0.2 [b] (0.084)	0.015 [c] (0.077)
Log of Medical Expenses (Rs/yr.)	-0.235 (0.083)	-0.005 (0.099)	0.002 (0.084)	0.007 (0.077)	0.017 [c] (0.079)	0.006 [c] (0.043)	0.004 (0.021)	0.012 (0.038)	-0.089 (0.079)	-0.017 (0.027)
Loan from Bank (0/1)	0.025 [a] (0.002)	0.004 [a] (0.001)	0.001 [b] (0.039)	0.001 [a] (0.143)	0.021 [b] (0.006)	0.002 [a] (0.014)	-0.013 [a] (0.019)	0.000 [a] (0.022)	0.001 [c] (0.018)	0.001 [a] (0.02)
Number of Loans in the Past 5 Years	0.006 (0.001)	0.067 [a] (0.017)	0.268 [a] (0.102)	0.119 [a] (0.026)	0.039 [a] (0.005)	0.088 [b] (0.004)	0.332 [b] (0.009)	0.072 [a] (0.006)	0.004 [b] (0.028)	0.129 [a] (0.039)
Flush Toilet in the Household (0/1)	0.015 (0.002)	0.009 (0.021)	0.035 (0.089)	0.012 (0.03)	0.002 (0.004)	0.004 (0.005)	-0.004 (0.037)	0.047 (0.015)	0.029 (0.053)	0.053 (0.054)
Pipe Water in the House (0/1)	0.005 [a] (0.003)	0.004 [a] (0.032)	0.000 [b] (0.077)	0.003 [b] (0.043)	0.018 [b] (0.002)	0.003 [b] (0.032)	0.000 [b] (0.072)	0.000 [b] (0.035)	0.001 [b] (0.088)	0.001 [c] (0.057)
Household Owns Any Motor Vehicle (0/1)	0.001 (0.012)	0.002 [a] (0.048)	0.000 [b] (0.067)	0.001 [b] (0.053)	0.000 [c] (0.007)	0.001 [b] (0.058)	0.023 [b] (0.08)	0.001 [c] (0.048)	0.002 [b] (0.061)	0.002 [b] (0.072)
Household Owns At Least 1 Cell-Phone (0/1)	0.005 [c] (0.014)	0.037 [a] (0.004)	0.000 [a] (0.085)	0.02 [b] (0.205)	0.352 [a] (0.053)	0.016 [a] (0.013)	0.038 [a] (0.059)	0.049 [a] (0.11)	0.031 [b] (0.098)	0.057 [b] (0.074)

Time spent in studies by boys (hours/month)	0.264 (0.042)	0.573 (0.005)	0.073 (0.038)	0.239 (0.041)	0.193 (0.245)	0.382 (0.074)	0.173 (0.044)	0.284 (0.432)	0.405 (0.016)	0.475 (0.02)
Time spent in studies by girls (hours/month)	0.167 [c] (0.158)	0.229 [a] (0.325)	0.451 [a] (0.428)	0.384 [b] (0.827)	1.336 [c] (0.083)	0.405 [a] (0.629)	1.06 [b] (0.084)	0.571 [b] (0.888)	0.217 [b] (0.09)	0.219 [b] (0.083)
Log Employment for Men (hours/week)	0.006 [b] (0.059)	0.012 [b] (0.055)	0.002 [c] (0.018)	0.002 [c] (0.088)	0.253 [a] (0.032)	0.094 [b] (0.072)	0.04 [b] (0.05)	0.012 [b] (0.002)	0.049 [b] (0.001)	0.014 [b] (0.000)
Log Employment for Women (hours/week)	0.004 [a] (0.093)	0.021 [a] (0.72)	0.03 [b] (0.042)	0.038 [a] (0.004)	0.138 [b] (0.006)	0.031 [c] (0.005)	0.026 [c] (0.031)	0.035 [c] (0.028)	0.003 [b] (0.015)	0.001 [a] (0.022)
Labour Force Participation by Women	0.001 (0.017)	0.002 (0.002)	0.001 (0.001)	0.001 (0.014)	0.000 [c] (0.04)	0.001 [a] (0.044)	0.002 (0.074)	0.004 (0.049)	-0.001 [c] (0.000)	-0.006 [a] (0.001)
District Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8917	8917	8783	8783	3617	3617	14565	14565	3498	3498

Source: Author's calculation based on IHDS 2005 & 2012.

Notes: Significance: a: $p < 0.01$, b: $p < 0.05$, c: $p < 0.10$.

All outcome variables are differenced. Standard errors in parentheses are clustered at the district-level. Independent variable "Quality of Electricity" is defined as "Average number of hours of electricity a household receives daily" and is a continuous variable ranging from 0 to 24. FD = First Difference estimates. FD-IV: First Difference estimate with Instrumental Variables. OBC: Other Backward Classes. Information regarding control and instrumental variables will be found in Section (4a) and (4b) respectively.

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Impact of Male Socio-Economic Factors on Crimes Against Women

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Abstract

The authors attempt to analyse the determinants of crime against women, with an emphasis on male factors. The paper attempts to empirically analyse various theories that affect attributes like Gross Enrolment Ratio, Unemployment, and Per Capita Income on the rate of crimes against women. The analysis is done using panel data of 15 Indian states for a period of 2 years. It tests whether there is a significant relationship between the factors listed above and the crime rate, and further analyses the reasoning for the positive or negative associations with crimes against women. Three important results emerge. First, there exists a negative association between the gross enrolment ratio and crimes against women in India. Second, unemployment and per capita income have a positive association with crimes against women. By highlighting men's impact on major aspects of crimes against women, this paper captures the influence that gender mainstreaming of policy can improve the safety of women.

JEL Classification: B54, C51
Keywords: Crimes against women, male socio-economic factors, gender mainstreaming

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1 Introduction

Across the Indian subcontinent, gender inequality, and its resultant biases has led to unequal opportunities and poor living standards. This disparity is observed at all income levels, ages, and social classes. Due to this, the men and women often lead significantly contrasting lives in India—which thus leads to disparity in the levels of power and authority – women are often discouraged from pursuing any careers, and have to spend many hours in the day engaged in unpaid care work, while men are actively encouraged to participate in economic activity. Moreover, at the household level and beyond, women who exert little to no power may often be subject to violence and abuse.

According to the Declaration on the elimination of Violence Against Women by the United Nations, the term 'violence against women' is described as an act of gender-based violence that results in or is likely to result in physical, sexual, or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or private life. (Declaration on the Elimination of Violence against Women, 1993).

Violence against women is a widespread problem in India. A 2011 survey reported that 20Indian men admit to forcing their wives or partners to engage in sexual intercourse, 24Indian men had committed sexual violence at some point during their lives, and 38men admit they have physically abused their partners. Moreover, in many instances, these crimes go unreported for reasons that range from social stigmas to familial pressure.

The majority of cases under crimes against women out of total Indian Penal Code (IPC) crimes against women[1] were registered under 'Cruelty by Husband or His Relatives' (31.9%) followed by 'Assault on Women with Intent to Outrage her Modesty' (27.6%), 'Kidnapping Abduction of Women' (22.5%) and 'Rape' (10.3%) (Tiwary 2020).

Power dynamics play a crucial role in creating imbalances wherein women are dependent on the men of their family for a livelihood, which is substantiated by the theory of male chauvinism. Furthermore, women are made to feel insecure, incomplete, ineffective, and inefficient without males. Based on this, the male is regarded as the dominant while the female is expected to be docile – which enables men to be able to exploit women (Niaz, 2003). Thus, these power imbalances exacerbate instances of crimes against women.

WHO estimates that nearly 1 in 3 women worldwide face either physical and sexual intimate partner violence or non-partner sexual violence in their lifetime (Violence against women Prevalence Estimates, 2018). In India, over 16 women out of every 100 thousand are sufferers of domestic violence. According to National Crime Records Bureau (NCRB) data, domestic violence holds the largest share in total crimes against women, even though these cases primarily go unreported. As per the data, 89,097 cases related to crimes against women were registered across India in 2018. The figures indicate not much has improved when compared to the figure of 86,001 cases reported under this head in 2017. However, despite

[1]See appendix for detailed list of crimes that are considered under the umbrella of crimes against women.

an increase of 1.3 per cent in the registration of cases in 2018 over 2017 with 50,07,044 cases, the crime rate per lakh population has declined from 388.6 in 2017 to 383.5 in 2018 (Jain, 2020); implying that as more women feel less reluctant to report their crime with time the whole pie like crime rates structure shrinks even though the portion/slice of reported (not actual) crime increases

Crime and economics have a defined relation. The former imposes economic and monetary costs on individuals and society, creating insecurity and propagating a sense of fear, thereby setting psychological expenses (Zhen Cui and Devika Hazra, 2017). For policy-making directed towards curbing crime, it is imperative to understand the factors — social, demographic, socioeconomic, or macroeconomic — that influence crime in a society. Further, individual characteristics such as demographic data of age and education, interpersonal and community contexts impact crime. (Capaldi et al., 2012; Ellsberg & Heise, 2005; Michau, Horn, Bank, Dutt & Zimmerman, 2015).

In this paper, the authors have attempted to model and understand the different male socioeconomic factors which may lead to crimes against women and have drawn conclusions regarding whether and how factors such as enrolment ratios, employment, and per capita income affect crimes against women.

Our paper is structured in the following manner: Section 2 entails our review of the existing literature, and Section 3 expands on the data and methodology used. In Section 4 we present and discuss the econometric model and estimations of our research. We have compiled our analysis and results in Section 5 and Section 6 provides the scope for further research. We conclude our paper in Section 7.

2 Literature Review

There is extensive literature on the nature of the relationships that exist between crime and economic indicators. Theoretical studies have predicted both positive and negative associations of crime with economic activities. These theories, along with the sociological General Strain Theory (GST), state that certain strains or stressors, derived from factors such as lack of income or lack of quality education, increase the likelihood of individuals committing a crime. It explains the influence that these variables may have on crimes against women (Kaufman, 2009).

Additionally, the Resource Theory (Goode, 1971) argues that emerging gender equality creates challenges to the entitlements and power that patriarchy provides to men, such as when women begin to gain employment outside the home and have greater access to financial resources, or when women have higher educational attainment than men. Some men respond to these challenges by exerting their dominance via physical violence in the form of domestic violence or sexual assault. This theory shows that it is not all men under patriarchy who perpetrate violence, but rather men who feel that their dominance is threatened in personal relationships (K. L.Anderson, 1997; Basile, Hall, & Walters, 2013; Choi, Cheung, Cheung, & David, 2014; Mason et al., 2008; Moe & Bell, 2004). When patriarchy fails to give men the power they feel they deserve in relationships, they then resort to violence to gain the

upper hand. Thus, the existence of the patriarchal system enforces an environment where women have next to no control of their social setting.

One widely investigated prediction of resource theory is that male partner with lower resources are more likely to become Intimate Partner Violence (IPV) perpetrators. The report gathered that insufficient resources are associated with a higher prevalence of violence at the individual level, i.e., for either partner in the relationship and at the household level. In the considerable empirical literature investigating this idea, the evidence is generally supportive. (Bettio & Ticci, 2017)

Unemployment and income can have both positive and negative associations with crime rates, which can be observed in the Cantor and Land (1985) model. This model suggests that the effect of unemployment on crime results from two opposing pathways. The first is the motivational effect which states that as a population's economic conditions begin to deteriorate, i.e., there are inadequate jobs and incomes, it leads to an increased level of criminal motivation within that population. The second is the opportunity effect, which states that as a result of deteriorating economic conditions, individuals find themselves in routine, home-based activities, and in the short run, have reduced access to public spaces and exposure to social interaction, thereby resulting in a reduced opportunity for crime to be committed.

Considering both these studies together, it implies that when the pathway of motivation dominates opportunity, there is a positive association between crimes against women and unemployment and income and a negative association when the pathway of opportunity dominates motivation.

Adding to this, the Social Disorganization Theory establishes links between violent crimes in urban areas and lower economic status. According to this, growth in urban areas leads to the physical, economic, and social decline of residential areas close to the central business districts, which draws migration of poorer individuals. As a result of this process, areas with a low average socioeconomic status will also have higher residential instability, which in turn will create social disorganization (Bursik and Grasmick, 1993). This social disorganization can reduce social capital and the ability of members of a community to control the behaviour of individuals and groups within the community. Losing control of people's behaviour prevents residents from creating a safe and orderly community, and thereby increases rates of crime and violence. It is important to note that these processes that link poverty with population turnover are specific to urban settings. In rural settings, poor populations may be stable, and the link between economic status and crime may break down.

Further, there are many theories that support a negative relationship between education and crime. First, education increases the opportunity cost of crime and the cost of time potentially spent in prison. Further, education may also make individuals more risk-averse, further reducing the propensity to commit crimes. Lastly, education exposes individuals to stereotypes and inequalities and provides an avenue for discussing gender roles. Education also helps in providing a rational space to understand and develop positive attitudes, helping

further reduce and disincentivize crimes against women.

We believe that this paper uniquely contributes to the intersecting field of economics and gender in two ways. First, it employs an intensive panel data analysis on the rate of crimes against women and other variables. Second, it opts for a unique analysis through a gendered lens, which focuses primarily on the impact of male factors and their influence on the rate of crimes against women.

3 Data and Methodology

The paper uses state-wise secondary data available from various government sources taken for two years – 2017 & 2018, as listed in the table below. Data for 15 Indian states has been taken on four variables: Crimes Against Women, Per Capita Income, Male Unemployment & Male Gross Enrollment Ratio.

To compensate for data inconsistencies, specific demographic and economic indicators have been selected based on the literature review to understand better the rationale behind including the Gross Enrollment Ratio of Males, Weighted Average Unemployment Rate of Males and Per Capita Income as explanatory variables.

Before proceeding further, it is essential to note that survey evidence reports that Crimes Against Women (including domestic violence, sexual assault, sexual harassment, eve-teasing, and stalking) are typically under-reported. This is further established in the National Family Health Survey (NFHS) – 5's data. The United Nations estimates that 1 in 3 women worldwide have experienced sexual or physical violence in their lifetime. Additionally, marital rape, although morally considered a crime, has not been criminalized under Indian Law. Underreporting of crime occurs due to various reasons, such as embarrassment, financial dependency, fear of retaliation, victim-blaming, low conviction rates, and a tedious and painfully slow bureaucratic procedure. Determining the extent of this underreporting is helpful to conclude the difference between the incidence of violence against women and reporting of violence against women. Using NCRB data is reliable, as it prevents the inclusion of false reports and provides annual data. However, it leads to underreported crime, affecting the data quality and making the available data incomplete, adversely impacting the quantitative study.

Crime Rate against women is the dependent variable that specific indicators mentioned above shall be explained in their relationship with the former. Crime Rate has been taken as a sum of reported incidents under IPC (Indian Penal Code) and SLL (Special and Local Laws)[2]. While Crimes Against women are influenced by various socio-demographic, political, cultural, economic, and legal factors, one binding or critical issue is the perpetrators of these crimes, who are overwhelmingly men. Further, the IPC recognizes rape as an act that can be committed only by a man.

[2]See Appendix for detailed explanation

Table 1: Description of Data Sources

Data	Classification	Sources
Crime Rate	Dependent	National Crime Records Bureau
Gross Enrolment Ratio ofMales	Independent	Ministry of Human Resource Development
Weighted Average Unemployment Rate of Males	Independent	Reserve Bank of India
Per Capita Income	Independent	Economic Statistical Organization Punjab; Central Statistical Organization, New Delhi
Rural-Urban Composition	For Calculation Purposes	Census India, Provisional Population Tools

Source: Authors' descriptions.

A brief discussion of various attributes is given below.

Table 2 : Description of The Variables

Conceptual Variable	Measurable Variable	Variable	Description
Crimes Against Women	Reported Rate of Crimes Against Women	CAW	The crime rate of (reported) violence against women calculated as a crime per one lakh of population in states i
Male Education	Gross Enrolment Ratio of Males	GER	Gross Enrolment Ratio of Males in states i
Unemployment of men	Weighted Average Unemployment Rate of Males	UNEM	Weighted Average Unemployment Rate of Males in states i
income	Per Capita Income	PCI	Per Capita Income (NSDP) at current year prices in states i

Source: Authors' descriptions.

The Descriptive Statistics for the data are given as follows:

Table 3 : Descriptive Statistics

	CAW	GER	UNEM	PCI
Mean	74.92	26.54	57.27	126291.1
Median	65.65	24.2	54.39	99512.5
Standard Deviation	31.24	6.804	24.46	53488.99
Minimum	35.6	18.1	0	56861
Maximum	177.8	769.8	145.66	226409

Source: Authors' calculations.

4 Econometric Model and Estimation Methods

To understand the impact of male socio economic factors on crimes against women, we hypothesize that education and per capita income have a negative relationship with crimes against women – that is, an increase in the value of these variables will decrease the value of the crimes against women, and unemployment will have a positive relationship with crimes against women – that is, higher unemployment rates for men will increase crimes against women. The econometric model used in this paper takes the form given in Equation (1) below:

$$ln(CAW)_i = \beta_0 + \beta_1 GER_i + \beta_2 UNEM_i + \beta_3 PCl_i + u_i \tag{1}$$

Cross-sectional data for fifteen states is taken over the period of two time periods - 2017 & 2018. The effect of 3 variables: Gross Enrolment Ratio of Males, Weighted Average Unemployment Rate of Males[3] , and Per Capita Income have been taken as explanatory variables, and their effect on the natural log of Crimes Against Women, has been estimated.

The estimation methods which have been used in this study are Pooled OLS estimation, Fixed Effects estimation and Random Effects. The econometric model given in equation (1) has been estimated by all three estimation methods. The decision regarding the most appropriate estimation method has been made based on the Hausman test, and Breusch-Pagan Lagrange Multiplier test.

From the results of these tests, we concluded that the estimation of the random effects would provide consistent results for the study.

[3]The Unemployment Rates of States have been estimated based on the weighted average of Urban and Rural Unemployment Rates, taking the percentage share of each state's total population by residence based on 2011's Census.

5 Results Analysis

Table 4: Results of the Regression (Pooled OLS Regression)

Independent Variable	Coefficient (Pooled OLS)	Coefficient (Fixed Effects)	Coefficient (Random Effects)	Coefficient (Random Effects)[4]
Intercept	4.2738*** (13.2426)	-	4.2217*** [13.4211]	4.2217*** (19.0626)
GER	-0.033347* (-2.2726)	-0.0035112 (-1.5512)	-0.03295* [-2.3099]	-0.03295** (-3.3948)
UNEM	0.0064718* (2.4395)	0.0091084* (2.2892)	0.0068983** [2.6310]	0.0068983** (3.7071)
PCI	0.00000396 (2.0291)	0.0000047330 (1.5314)	0.0000038096* [2.1169]	0.0000038096** (3.3560)
R Square	0.31038	0.45268	0.40588	
Adjusted R Square	0.22418	-0.47777	0.33162	

Source: Authors' calculations.
Notes: ( ) - t values; [ ] - z values
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

In this section, the results based on the Pooled OLS, Fixed Effects and Random Effects estimation methods are presented. Based on the results of our tests namely: the F-test, Hausmantest, and the Breusch-Pagan Lagrange Multiplier test, correct estimation method(s) have been determined. Table 4 shows the results of various panel data regression models.

As concluded from the diagnostic tests, the random effects estimation method provides for the most consistent results - hence, the discussion of the regression results will be based on the results of the Random Effects Estimation. In this analysis, all explanatory variables considered in the study – that is, Gross Enrolment Ratio, Per Capita Income and Unemployment Rates have a significant impact on Crimes Against Women.

We further tested the estimated model for the three assumptions of OLS - homoscedasticity, the absence of autocorrelation & multicollinearity.

Multicollinearity was diagnosed by calculating the Variance Inflation Factors for the explanatory variables – as all VIF values ranged between 1-2 - we thus concluded the presence of low multicollinearity in the model. We conducted the Breusch-Godfrey test to diagnose autocorrelation, and thereby concluded that no autocorrelation was present among the estimators. We also tested the data for homoscedasticity using the Breusch-Pagan test and concluded that heteroscedasticity was present in the model. The model was hence corrected for heteroscedasticity and has been presented in table 4. The results of diagnostic tests have been provided in the appendix to this paper.

We find that Gross Enrolment Ratio, Weighted Unemployment and Per Capita Income are significant at a 99% significance level. Further, Gross Enrolment Ratio has a negative rela-

tionship, and Weighted Unemployment and Per Capita Income have a positive relationship.

Subsequently, the result of the Gross Enrolment Ratio of men (GER) supports the theory that an increase in education reduces the rate of Crime Against Women. The negative sign of the coefficient signifies this inverse relationship. This implies that education exposes individuals to discussing gender roles, stereotypes, and inequalities, and helps in providing a rational space to understand and develop positive attitudes. It also implies that an increase in education increases the opportunity cost of crime and the cost of time potentially spent in prison. Hence, an increase in education acts as a deterrent and helps in reducing Crimes Against Women.

Unemployment is positively related to crime against women, which implies that an increase in the weighted unemployment of men leads to an increase in crime against women. This result supports the motivation effect, implying that low levels of employment result in an increased level of criminal motivation within that population, and an increased level of crime.

Per Capita Income, too, is positively related to crime against women, which means an increase in income leads to an increase in crime. There are a few possible explanations for this result. The first is that since this variable is not gender-specific, i.e, it is not determined just by male income, but by all incomes, it could be that an increase in income empowers individuals with greater social capital and legal options, which could lead to an increase in the reporting of crimes against women. Secondly, Social Disorganization Theory is known to not hold in rural areas and considering that the Indian population majorly lives in rural areas, and the data of Per Capita Income is aggregated for the population as a whole (it is not segregated into rural and urban), the effect of the rural indicator may dominate the urban indicator, resulting in the data not supporting the Social Disorganization Theory.

6 Scope for Further Research

The paper tries to measure the impact of male factors on crimes against women. This research can be enhanced by checking the impact of these factors on not just women, but also on gender minorities. Further research can be done by taking different indicators of these factors, with intersections of other social, cultural, and legal factors into account, such as conviction rates, reporting rates, effects of alcohol consumption, marriage, etc. to check the relationship between men and crimes against women. Further, potential studies can attempt to quantify the effect of the abstract structure of patriarchy on various indicators of women empowerment. There is an essential requirement to research and further understand the impact such factors can have on women and gender minorities, not only to reduce the impacts of gendered crime but also to frame policies and laws that can help uplift and empower them.

Moreover, this study takes into account two years' worth of data on these factors due to the unavailability of appropriate data sets. However, the study can be further enhanced to get more accurate results if a larger panel of data is considered.

7 Conclusion

This paper recognizes that Crimes Against Women are influenced by various socio-demographic, cultural, economic, and legal factors such as GER, HH, PCI, CAW. Through extensive empirical research, one binding or critical issue identified that the perpetrators of these crimes are overwhelmingly men. To examine and model the association of crimes against women and men-related economic factors, namely Gross Enrolment Ratio, Unemployment, Per Capita Income, and Sex Ratio.

Upon interpretation, the authors found that Gross Enrolment Ratio, Weighted Unemployment, and Per Capita Income have a significant impact, while the Sex Ratio of states has an insignificant impact. In terms of relationship, the analysis depicts that Gross Enrolment Ratio is the only variable that is negatively related to Crimes Against Women. The remaining variables, i.e., Unemployment, Per Capita Income, and Sex Ratio, are positively related to Crimes Against Women.

Quantifying crimes against women reveal heartbreaking results, thus emphasizing the fact that there is an imminent need for sensitization of men and women alike, the former to understand and introspect the patriarchal societal ways they live by and the latter not to take the onus of the crime. Despite measures taken by lawmakers in reducing crimes against women, it is evident that women are yet to establish a position of status in society; strategies to minimize the occurrence of crime against women should be complemented by interventions to build personal capacity and resources because these offer the potential to improve the living circumstances of women. Women suffer isolation, inability to work, loss of wages, lack of participation in regular activities, and limited ability to care for themselves and their children and are inflicted with significant health consequences. (Violence against Women, 2021) Furthermore, educating women about their fundamental rights and focusing on their empowerment should be a priority for the nation's welfare. Policies and programs need to address the enormous social and economic costs of crime, which have long-lasting ripple effects throughout society. Gender mainstreaming should be an essential part of government policymaking, taking into account the interests and concerns of all genders. It is important to remember that while reducing crime against women is an important step, it is just one step of the long road of equity and empowerment.

A Appendix

A.1 IPC Crimes against Women (Crime Head-wise & States /UT-wise) - 2018:

Murder with Rape/Gang Rape Dowry Deaths (Sec. 304B IPC); Abetment to Suicide of Women (Sec. 305/306 IPC); Miscarriage (Sec. 313 & 314 IPC); State/UT Acid Attack (Sec. 326A IPC); Attempt to Acid Attack (Sec. 326B IPC); Cruelty by Husband or his relatives (Sec. 498 A IPC); Kidnapping & Abduction of Women (Total) [Kidnapping & Abduction (Sec. 336 IPC), Kidnapping & Abduction in order to Murder (Sec. 364 IPC), Kidnapping for Ransom (Sec. 364A IPC), Kidnapping & Abduction of Women to compel her for marriage (Sec. 366 IPC)]; K&A of Women to compel her for marriage (Total) [Women (Above 18 yrs), Kidnapping & Abduction of Women to compel her for marriage (Sec. 366 IPC) Procuration of Minor Girls (Sec. 366A IPC) Importation of Girls from Foreign Countries (Sec. 366B IPC), Kidnapping and Abduction of Women – Others (Secs.363A, 365, 367, 368, 369 IPC) Human Trafficking (Sec. 370 & 370A IPC) Selling of Minor Girls (Sec. 372 IPC)]; Rape (Sec. 376 IPC) State/UT Buying of Minor Girls (Sec. 373 IPC), Rape (Total) A) Women (18 Yrs. And above) B) Girls (Below 18 yrs); Attempt to Commit Rape (Sec. 376/511 IPC) [Attempt to Commit Rape (Total) A) Women (18 Yrs. And above) B) Girls (Below 18 yrs)]; Assault on Women with Intent to Outrage her Modesty (Sec. 354 IPC); Assault on Women with Intent to Outrage her Modesty (Total), A) Women (18 Yrs. And above), B) Girls (Below 18 yrs); Insult to the Modesty of Women (Sec. 509 IPC); Insult to the Modesty of Women (Total) A) Women (18 Yrs. And above) B) Girls (Below 18 yrs)

A.2 SLL Crimes against Women (Crime Head-wise & States /UT-wise) - 2018:

Dowry Prohibition Act, 1961; Immoral Traffic (Prevention) Act 1956 (Women Victims cases only) [Immoral Traffic (Prevention) Act, 1956 (Total) A) Procuring, inducing Children for the sake of prostitution (Section 5) B) Detaining a person in premises where prostitution is carried on (Section 6)]; Immoral Traffic (Prevention) Act 1956 (Women Victims cases only) [C) Prostitution in or in the vicinity of public places (Section 7) D) Seducing or soliciting for prostitution (Section 8) E) Other Sections under ITP Act]; Protection of Women from Domestic Violence Act; Cyber Crimes/Information Technology Act (Women Centric Crimes only) [Cyber Crimes/Information Technology Act (Women Centric Crimes only) (Total) A) Publishing or Transmitting of Sexually Explicit Material (Sec. 67A/67B (Girls) IT Act) B) Other Women Centric Cyber Crimes (Ex. Blackmailing/ Defamation/Morphing/ Fake Profile)]; Protection of Children from Sexual Violence Act (Girl Child Victims only)[Protection of Children from Sexual Violence Act (Girl Child Victims only) (Total) A) Child Rape (Sec. 4 & 6 of POCSO Act) / Sec. 376 IPC) B) Sexual Assault of Children (Sec. 8 & 10 of POCSO Act) / Sec. 354 IPC) C) Sexual Harassment (Sec. 12 of POCSO Act) / Sec. 509 IPC)]; Protection of Children from Sexual Violence Act (Girl Child Victims only) D) Use of Child for Pornography/Storing Child Pornography Material (Sec. 14 & 15 of POCSO Act) E) POCSO Act (Sections 17 to 22) / Other offences of POCSO Act F) POCSO Act

r/w Section 377 IPC / Unnatural Offences, Indecent Representation of Women (Prohibition) Act, 1986.]

A.3 Multicollinearity

Variable	Variance Inflation Factor
GER	2.673701
UNEM	1.074347
PCI	2.740375

Source: Authors' calculations.

A.4 Breusch-Pagan Test for Heteroscedasticity

Test	Test-statistic	p-value	Result
Breusch-Pagan Test	8.0734	0.04452	Evidence of Heteroscedasticity

Source: Authors' calculations.

A.5 Correction for Heteroscedasticity

Independent Variable	Coefficient	Robust Standard Error	T-statistic
Intercept	4.2217***	0.22146	19.0626
GER	-0.032950**	0.0097061	-3.3948
UNEM	0.0068983**	0.0018608	3.7071
PCI	0.0000038096**	0.0000011352	3.3560

Source: Authors' calculations.

A.6 Breusch-Godfrey Test for Serial Correlation

Model	Chi-square statistic	p-value	Alternative Hypothesis	Null Hypothesis
Random Effects	0.10588	0.7449	Serial correlation in idiosynacratic errors	Accepted

Source: Author's calculations.

A.7 Hausman Test

To decide between Fixed Effects Random Effects Estimation, we conducted the Breusch-Pagan Lagrange Multiplier Test, wherein:

H_0:Random Effects Model would give consistent Results
H_A: Fixed Effects Model would give consistent Results

A.8 Breusch-Pagan Lagrange Multiplier Test

To decide between Pooled OLS & Random Effects Estimation, we conducted the Breusch-Pagan Lagrange Multiplier Test, wherein:

H_0: Random Effects Model would give consistent Results
H_A: Pooled OLS Model would give consistent Results

The results of both tests are given as follows:

Test	**P-value**		**Estimation Method Preferred**
Hausman Test	0.8909	Null Accepted	Random Effects
Breusch-Pagan Lagrange Multiplier Test	0.2889	Null Accepted	Random Effects

Source: Authors' calculations.

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A Firm Level Critical Analysis of the Role of Privatisation in Economic Growth

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Abstract

The aim of this paper is to understand the impact of privatisation on growth. It aims to survey the lived experience of several countries and attempts to dissect privatisation's effect through the microeconomic framework of an individual firm and its indicators before and after privatisation by using statistical techniques such as hypothesis testing and Analysis of Sample Mean Difference method. This paper also highlights the lack of uniformity in evidence regarding privatisation over the several years of research. It concludes by suggesting relevant policy alternatives in the Indian context with respect to privatisation.

JEL Classification: L33, O12
Keywords: Privatisation, Economic Growth, Disinvestment, Deregulation

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1 Introduction

There is a vast literature on the effects of privatisation on several economies. It is commonly believed that privatisation leads to better efficiency due to competition between firms and this competition also maximises the utilisation of resources, and henceforth should be embraced by all economies alike. This rationale has led to several developing countries, including some dirigisme economies, adopting it to some degree. However, though there is enough literature advocating the need for privatisation, the academic research on the real effects on the economy post-privatisation, is relatively less. This paper is an attempt to review and analyse precisely that.

Though there are different theories of privatisation and various economists define it differently, for this paper, the author adopts a broad definition of privatisation which is as follows, "privatisation may be considered any material transaction by which the state's ultimate ownership of corporate entities is reduced". It generally entails three aspects which are: denationalisation (selling state-owned assets), deregulation (introduction of competition into statutory monopolies), and contracting out production of state-owned goods to the private firms (Kay & Thompson 1986).

Most of the neoliberal developed economies of the Global North have embraced privatisation to heal the "ailing and overblown" public sector industries and to "reform" these industries to improve services to the taxpayers and general public. The developing nations, on the other hand, face a disturbing dilemma of introducing privatisation as international financial institutions such as the World Bank and IMF want these states to make "structural adjustments" which shrink the role of the State before they provide development loans (Letza et al., 2004). The process of Privatisation first started with the Thatcher government and soon spread to different parts of the world as one of the defining features of capitalist, right-wing governments.

Primarily, mainstream economic literature provides two fundamental differences between the public and private sectors (Haskel & Szymanski 1992):

Objective: The objectives of a public sector vary widely, including but not limited to profit maximisation. Since the objectives are decided by the government, whose main aim is re-election, the objectives also include worker and producer benefits, as well as consumer benefits, all of which comprise the electorate. The private sector firms on the other hand have the sole motive of profit maximisation.

Constraints: Private firms aim to maximise their objective under the constraint of a bankruptcy threat, while the state-owned firms, do not function under any such constraint due to the financial support extended to them by the State. These two differences are commonly used to characterise and compare the efficiency of the public and private sectors.

When a government decides to privatise, it can be because of a myriad of reasons such as revenue generation, the political climate, or because of ideological purposes. However, the major arguments that are used against privatisation are that complete privatisation will include a

loss of PSUs that are strategically important to the country, profit channelisation abroad in case of privatising to a foreign investor, and most importantly, the fall in employment that follows privatisation. Therefore, a major debate that is centred around the discourse on privatisation is that the government has 'no business being in business' implying that the State is inherently inefficient in proper management of companies as it cannot possibly foresee the market forces of demand and supply and take appropriate action.

While privatisation has its advantages and disadvantages, the link between economic growth and privatisation was established, rather later. The justification for economic growth due to privatisation was based on the microeconomic foundations such as better performance due to incentives and ideas of profit maximisation in private firms caused by the role of the invisible hand (Cook & Uchida 2001). The prevailing narrative for transfer from public ownership to private ownership was that state-owned firms generally pursued objectives other than profit maximisation. These SOEs were portrayed as irresponsible, depending on government support and most importantly poor performers 'undervaluing the potential of these firms'. In such a situation publicly-owned enterprises crowded out private enterprises in their access to credit and erected statutory barriers to preserve the monopoly status of publicly-owned enterprises. It was argued that the net effect of a change in ownership from public to private would be improved economic efficiency and over time an increase in investment (Cook & Uchida 2001).

In the case of India, privatisation began in 1991 and since then it has been adopted in varying degrees. Generally, privatisation in the Indian context has taken the following forms (Sapat 2007):

Greenfield Privatisation: This procedure is also called 'parallelisation' by some Economists. It was adopted in India in the initial period of its privatisation when industries that were strictly reserved for the government were opened up for the private sector to participate and introduce competition. Sectors, where this has been applied, are automobile manufacturing, power, aviation, infrastructure development, telecommunication services, and television. The telecommunications sector had been relaxed to introduce private players and the airline sector, which just had one player at the time of independence- Air India that was owned by the Government of India, today has more than five players, all because of this parallelisation introduced by the government of India.

Marketization: This included the introduction of 'performance contracts' known as MOU or Memorandum of Understanding to increase government efficiency and make the SOE more business-oriented. Between 1990-1993, approximately 120 PSEs signed or were identified to sign MOUs.

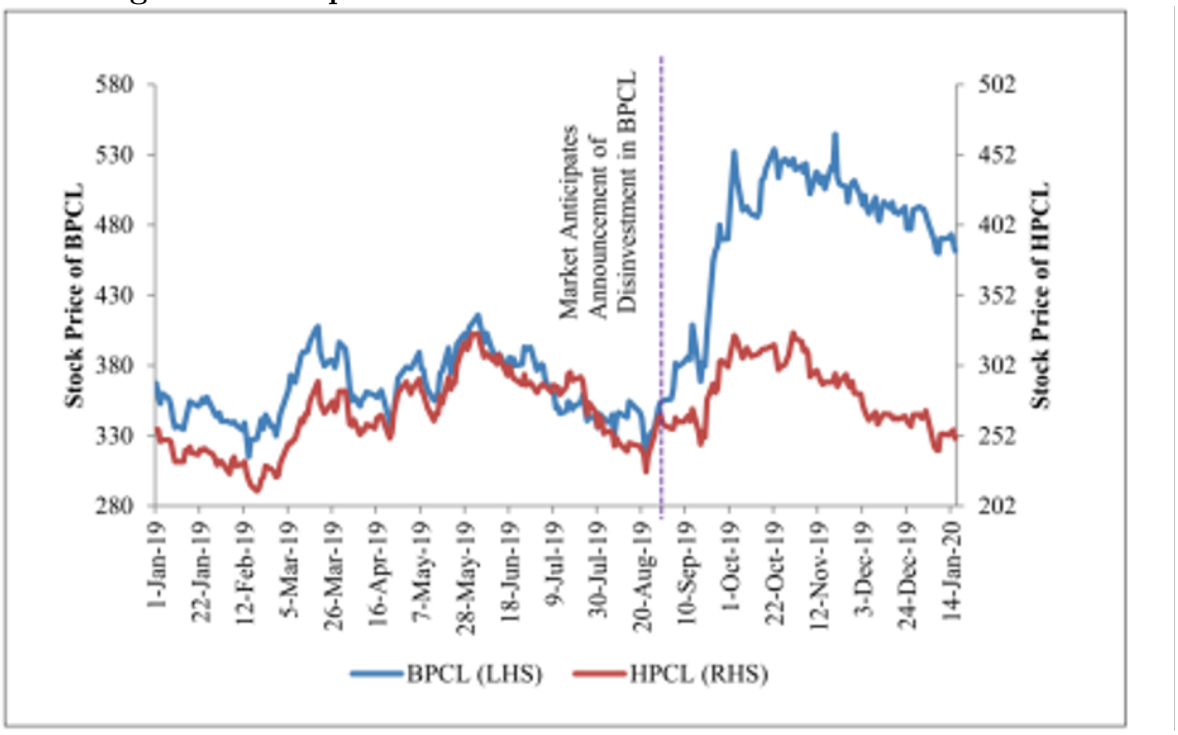
Disinvestment: This measure involves the sale of all or part of the company to private investors and can also include the formal liquidation of the public sector enterprise, leading to its dissolution.

Budgetary Constraint: This was adopted in India to mitigate the popular perception that PSU cannot function effectively due to the financial support they get from the State. There-

fore, budget cuts were introduced so that these firms do not receive privileges, subsidies, grants, etc. which helps them compete in the free market to improve efficiency. For example, earlier Sick Industrial Companies were referred to the Board for Industrial and Financial Reconstruction (BIFR), for suggesting a restructuring plan. BIFR has now been dissolved and this work is being done by NCLT under the Companies Act, 2013 and Insolvency and Bankruptcy Code, 2016. Further, the Board for Reconstruction of Public Sector Enterprises (BRPSE) was created in 2004 to advise the Government on the restructuring or revival plan of referred CPSEs. However, the same has been wound up in November 2015. Thereafter concerned administrative Ministries/ Departments are responsible to monitor the sickness of CPSEs functioning under them and take timely redressal measures with the approval of the competent authority.

The Economic Survey of India (2019) also argues that since stock markets are considered as an index of the present value of future clash value, they highlight the case of BPCL which received huge gains in the stock market post an announcement of privatisation in comparison to HPCL which was performing similarly to BPCL before this announcement. According to the survey, these companies would most likely perform better under private control due to factors like technology up-gradation and efficient management practices; thereby creating wealth and adding to the economic growth of the country.

Figure 1: Comparison of Stock Prices of BPCL and HPCL



Source: Indian Economic Survey (2019)

In this background context, privatisation is being aggressively proposed as the best mechanism to revive the ailing CPSEs and ensure economic growth. However, as we will see ahead, this analysis is not completely error-free.

However, before proceeding further, it is important to define the variable 'growth' in this paper. 'Growth' here explicitly implies 'Economic Growth', that is the growth in variables like output or income in the real terms as well as the impact on the operating efficiency and the 'return on capital' as the literature suggests these to be the most important factors in determining efficiency, which is important for our analysis to determine the 'Economic Growth'. It must also be mentioned that any attempt to understand the change in economic growth due to ownership change is complicated by the fact that economic growth can exacerbate or improve due to several 'unquantifiable' factors which contribute to the growth of a firm.

2 Literature Review

Private industries are assumed to be intrinsically advantageous when compared to public sector industries, especially in the West. This popular perception has led many of the developing industries to adopt "reform policies" which consist mainly of privatising public sector enterprises (Megginson & Sutter 2006).

2.1 Impact on Output and Employment

Megginson & Sutter (2006) create a compilation of a myriad of the studies that took place to analyse privatisation in different industries of different countries as well as their impact on real variables of the economy such as output and employment. According to them, almost all the studies documenting the post-privatisation effect on the firms record a 'significant increase' (Megginson & Sutter 2006) in output, efficiency, capital investment spending and profitability and therefore suggest that privatisation should be adopted. However, there is significant variation in estimating the impact of privatisation on employment. The majority of the studies surveyed, excluding a few, recorded a drop in the employment level of these firms, and sometimes, the magnitude of this decline is massive. While the reason behind this has not been elaborated by the paper, it safely concludes that privatisation does not automatically mean worker layoffs by the former SOEs, though that does happen generally, until there are no sudden huge gains in revenues to offset the cost of maintaining such large workforce.

Pollitt & Smith (2002) use a social cost-benefit analysis method to record the post-privatisation performance of the British Railways, one of the first big experiments of privatisation. They use the methodology adopted by Jones et al. which is based on the total change in welfare resulting from privatisation and secondly, its impact on three stakeholders: consumers, producers and the government. They conclude that during the period of British privatisation, the output of the industry grew drastically and significantly. In terms of efficiency, post-privatisation, the per unit cost fell sharply by around 2.7% per annum whereas before that it rose around 1% per annum. Therefore, in their opinion, private railways are slightly more efficient than public railways (Pollitt & Smith, 2002). They also argue that output quality is no less, and in fact, is probably better and that consumers gained considerably more in the private railways than before that, such that the safety statistics suggest that privatised railways continued to show declining risks of accidents at a faster rate as compared to public railways. The paper made a significant observation by concluding that a private

structure where the shareholders demand a return on their investment, generally leads to enhanced efficiency, which, according to them, is yet to be recorded by structures under government ownership.

However, Haskel & Szymanski (1992) create a model of a firm's transfer from the public to the private sector. The paper observes that when entering into a privatised field, an SOE is placed under superior monitoring which forces it to reduce costs, thereby increasing profits. It models the cost of a firm explicitly as wages of the workers based on the bargaining theory of wage determination. Another assumption is that private firms are under regulation and there is no asymmetric information while bargaining, either in the public or in the private sector. According to them, the main driving difference between a private and a public firm is that of objectives and constraints. Their model predicts output, employment and wages fall, whereas profits rise when the objectives of a firm become that of profit maximisation. They also hypothesise, through their model, that the fall in wages majorly explains the rise of profits of a private firm. They employ data from 17 firms that were publicly owned and observed that the results of their model were consistent with the data they analysed.

2.2 Implementing Privatisation: Complex Calculus of Economics and Politics

Though these papers study the theory of privatisation by examining the empirical evidence, there is a significant difference in the method and region of implementation as well. Bortolotti et al. (2001) generates evidence from a panel of 34 countries over a two-decade period from 1977-99, suggesting that privatisation works better typically in wealthy countries (presumably of the first world) that are endowed with liquid stock markets. Their initial empirical analysis suggests that privatisation is characterised by high public debt. In most of the developing countries, more often than not, privatisation is preceded by high government debt, and the governments expect that the windfall revenue gain will help them square off public accounts. They also find theoretical evidence that privatisation is a tool for the right-wing parties in power to help diffuse what they term as "popular capitalism", achieving the political objective of garnering support for a market economy. They also suggest, based on empirical evidence, that the extent of privatisation varies across countries mainly due to the development of stock markets. The size of the issue of an SOE is directly proportional to the liquidity of the stock market as it helps governments absorb more revenue at once (Bortolotti et al. 2001).

Estrin & Pelletier (2015) studied the impact of privatisation in Sub-Saharan Africa where it happened in successive waves, with some countries being privatised before the others. They also incorporate data regarding privatisation in South Asian countries and conclude that in developing countries, privatisation alone does not generate economic benefits. The success of privatisation, they claim, depends more importantly on the regulatory framework under which it would be monitored and executed, especially in third-world developing countries where the lack of such regulatory agencies can lead to monopolisation and a decline in consumer welfare. They also note that in developing countries, some of which are transition economies, privatisation alone cannot enhance company performance. They state that the

institutional and business environment in which privatisation takes place plays a crucial role in determining the enhancement of a company's performance. In countries where the legal system does not function effectively and there is a high level of corruption, private ownership on its own, cannot determine a better company performance. They further segregate the privatisation experience of developing countries according to different sectors. They cite Clarke et al. (2005) to show that in the case of the banking sector, privatisation has mostly and majorly improved the performance of the banking firms. They also note that in this case, full privatisation has turned out to be more beneficial than partial privatisation and they cite evidence from Brazil, where denationalised banks that were fully privatised performed better than those in which the government retained minority shareholding. However, the evidence is not so succinct in the case of privatisation of the utility sector. In the case of telecommunication, for example, they note that while privatisation is related to decrease in costs and an increase in per capita access, it is negatively correlated with 'connection costs' and that it works only in the presence of a strong and independent regulatory agency (Estrin & Pelletier 2015). In the case of other utilities such as electricity, they concluded that there was no evidence that privatisation leads to improved labour productivity, or higher capital utilisation, or higher output, until and unless there is no strong and independent regulator.

2.3 Privatisation and the 'Myth of Efficiency'

While all these studies unanimously affirm that privatisation brings efficiency, Letza et al. (2004) aim to deconstruct this 'myth of efficiency' by researching several empirical and theoretical evidences. They note that efficiency has nothing to do with privatisation and rather it mainly depends on the organisation and functioning of the firm. They quote evidence from Australia and Queensland showing that the public sector can achieve better 'economic efficiency' than the private sector if there is enough supervision. They cite a study of 12 public sector companies that were privatised in the 1980s and record that privatisation had little to no role in their economic growth and that there was no strong correlation between privatisation and labour productivity. There is repeated emphasis on 'imaginative restructuring' to enhance the accountability of the employees and suggests that public sector outcomes can be improved solely by adopting this rather than privatising these firms and expecting them to achieve public sector outcomes. They make a stark and quite unpopular observation by claiming that 'privatisation is not the panacea' and in fact, suggest that it has not been very successful in developing countries. The paper suggests that one of the reasons for the conflicting results between these cross- sectional studies could be methodological bias, in that, the good performance of the private firms might not be due to privatisation but instead, due to the boom of the business cycle. Data selection could also pose another problem. They cite a study (Martin and Parker 1995) that examined 11 firms over five different periods ranging from nationalisation, pre-privatisation, the announcement of privatisation, post-privatisation and a recession over two factors: profitability and value-added per worker over the value-added economy and stated that the hypothesis "privatisation is unequivocally more efficient than nationalisation" is difficult to accept.

Similarly, Naguib (2009) also studies the effect of privatisation on economic growth in Argentina from 1971 to 2000. The paper creates a time series error correction model from

1971 to 2000 (the advantage of such a model being that it combines short-run and long-run economic growth) and understands whether privatisation was a 'success' in Argentina as the World Bank claims. Since Argentina privatised almost all of its SOEs, based on the findings of the previous papers, one would expect that privatisation had a positive effect on the Argentinian economy. Naguib (2009), however, reports the opposite. He found that privatisation had long-run negative effects on the economy of Argentina, mainly because of the pace with which it was implemented and at the same time, any regulatory agency was absent. The initial regulatory agencies were established in 1990 after two of its biggest industries, airlines and telephone were already privatised. The paper also argues about the fact that economic growth is generally achieved by privatising the manufacturing sector, whereas, in Argentina, 89% of the total privatisation investment was in the energy and infrastructure sector (Naguib 2009), possibly because of its resource abundance. However, it is important to note that the analysis made by Naguib (2009) cannot be directly implemented to study the impact of privatisation on other developing countries as the time series model falls short on certain aspects. For instance, this model cannot be used to compare the effect of privatisation on different countries. Furthermore, while the results are true for Argentina, the model might not hold the same results for other developing countries because of the differences that arise due to country-specific differences.

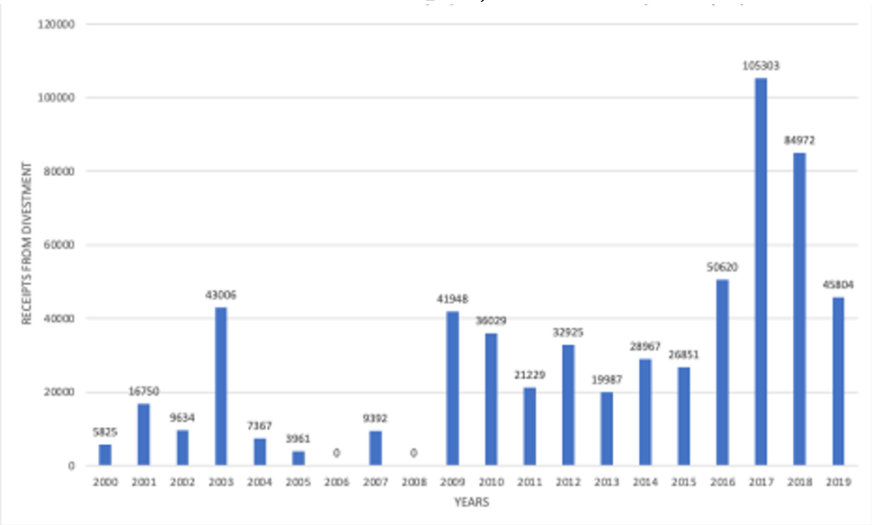
3 Research Methodology and Data Analysis

To understand this impact of privatisation at a more intensive firm-level analysis, the author takes the case of Paradeep Phosphates which was privatised in 2002. The author generates a convenience sample of 12 years, such that the sample has data of 6 years before privatisation and 6 years after privatisation. (Meher and Sahoo, 2011). To eliminate the inflation effect, the ratios are calculated using indexed values rather than actual values. Before privatisation, the base year is taken to be 1996 (The first year of the sample before privatisation) and for after privatisation data, 2002 (The first year of the sample post-privatisation) is taken as the base year. A T-test hypothesis on the mean difference before and after privatisation is then performed. The means taken is that of two ratios which are the PAT (Profits After Tax) ratio to understand the difference in operational efficiency post-privatisation and NCA (Net Current Assets) ratio to understand the long-term financial position.

Profit After Tax refers to the amount that remains after a company has paid off all of its operating and non-operating expenses, other liabilities and taxes. This profit is what is distributed by the entity to its shareholders as dividends or is kept as retained earnings in reserves.

Net current assets are the aggregate amount of all current assets, minus the aggregate amount of all current liabilities. There should be a positive amount of net current assets on hand since this implies that there are sufficient current assets to pay for all current obligations. If the net amount is negative, it could be an indicator that a business is having financial difficulties, and will need additional funding fairly soon.

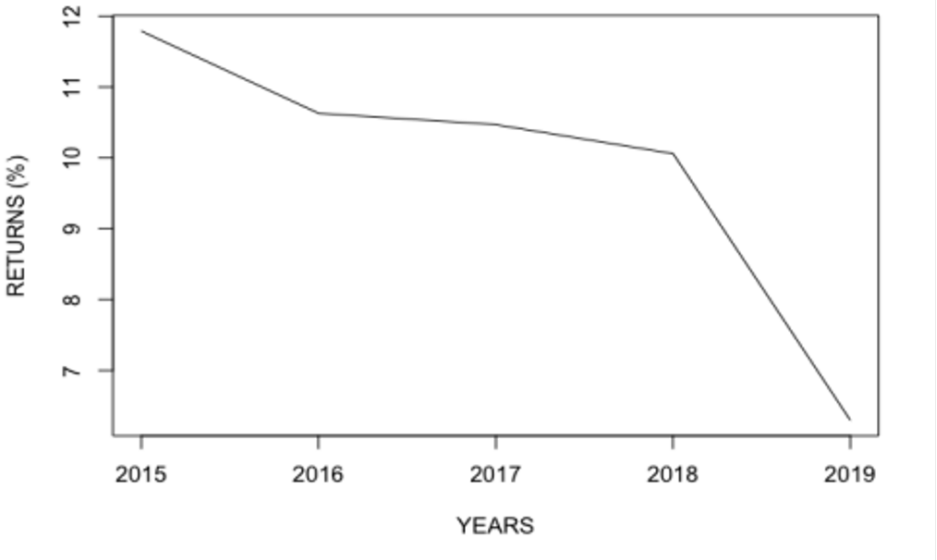
Figure 2: Inflation-Adjusted Total Receipts (CR) from Disinvestment (2019 Rupee)



Source: Author's Visualisation from the DPAM Report.

Data from Public Enterprises Survey suggests that between 2014-18, the proportion of contractual and casual workers increased from 36% to 53% and the number of regular workers declined from 9.5 lakh in 2014 to 7.1 lakh in 2018 (Mathew 2020). This data has been recorded in the backdrop of record privatisation by the government in that period, suggesting that there is a negative relationship between privatisation and employment levels. According to the economist Jayati Ghosh, the explanation for this negative relation is that it has a lot to do with private investors preferring "to begin with less-than-ideal levels of employment to allow for greater flexibility in both the number of workers and the contracts under which they are employed" (Mathew 2020).

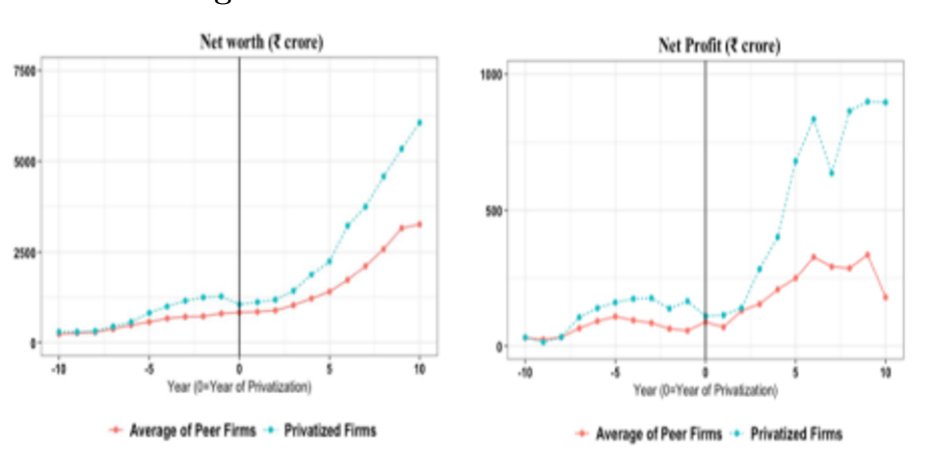
Figure 3: Return on Capital Employed by CPSEs



Source: Author's Visualisation from the CAG Report.

Return on Capital is defined as the ratio of a company's earnings before interest and taxes and the capital employed by the firm, where Capital Employed= Paid up Share capital + Free Reserves and surplus + Long term loans – Accumulated losses- Deferred Revenue Expenditure. ROCE is a measure of the company's financial health, profitability and the efficiency with which it deploys capital. As is clear from the above time series plot, the gross ROCE of all the CPSEs was declining marginally from 2015-18 after which there was a drastic drop in 2019. According to the CAG report, this has happened in the backdrop of these CPSEs employing more capital and still observing a decrease in their annual EBIT. This serves as evidence to the observations made by several papers that Public Sector Enterprises become inherently efficient since the government aims to pursue non-business strategies like retaining employees, infusing high levels of non-necessary capital, etc. to uphold political agendas and completely sidelining the company's profitability and other financial aspects. This has been true in the case of India as well.

Figure 4: Net Worth and Net Profit



Source: Indian Economic Survey (2019-20).

This time-series data plot of the privatised CPSE firms and their peers which are still under government control highlights the impact of privatisation on a fir level. This shows that before year 0, i.e., the year of privatisation, both kinds of firms have similar performance in terms of net worth and net profit, however, post year 0, there is a drastic and exponential jump in the performance of privatised CPSEs which shows that, at a firm level, privatisation significantly improves net worth and net profit of the firms.

3.1 Hypothesis test results for PAT: Testing Operational Efficiency

$H_0 : \mu_0 = \mu_1$

$H_1 : \mu_0 \neq \mu_1$

Where μ_0 is the mean ratio before privatisation and μ_1 is the mean ratio after privatisation.

The data is as follows, with 1996-97 chosen as the base year to index before disinvestment values and 2002-03 being chosen as the base year after disinvestment values.

Table 1: Profit after Tax Data

BEFORE DISINVESTMENT						AFTER DISINVESTMENT					
1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
100	298	164	8	398	732	100	118	39	1	89	58

Source: Author's calculations.

Results of the T-Test ratio for the mean at a 95% confidence level are as follows:

Table 2: t-Test: Paired Two Samples for Means

	Pre-Divestment	**Post-Divestment**
Mean	283.333	67.5
Variance	67665.0667	1878.7
Observations	6	6
Pearson Correlation	0.2606	
Hypothesized Mean Difference	0	
df	5	
t Stat	2.0952	
P(T<=t) one-tail	0.0451	
t Critical one-tail	2.0150	
P(T<=t) two-tail	0.0902	
t Critical two-tail	2.5705	

Source: Author's calculations.

Therefore, since the two-tail P value at 0.05 level of significance is 0.09 and P-Value > Level of Significance, the evidence suggests that there is no mean difference between PAT before divestment and PAT after divestment. Thus, there is no statistically significant improvement in the efficiency of the firm, post divestment.

3.2 Hypothesis Test Results for Net Current Assets: Financial position of the Firm

$H_0 : \mu_0 = \mu_1$

$H_1 : \mu_0 \neq \mu_1$

Where μ_0 is the mean ratio before privatisation and μ_1 is the mean ratio after privatisation. The data is as follows, with 1996-97 chosen as the base year to index before disinvestment values and 2002-03 being chosen as the base year after disinvestment values.

Table 3: Net Current Assets

BEFORE DISINVESTMENT						AFTER DISINVESTMENT					
1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
0	30	55	45	80	90	0	100	200	175	90	157

Source: Author's calculations.

Results of the T-Test ratio for the mean at a 95% confidence level are as follows:

Table 4: t-Test: Paired Two Samples for Means

	Variable 1	**Variable 2**
Mean	50	120.333
Variance	1090	5298.6667
Observations	6	6
Pearson Correlation	0.5912	
Hypothesized Mean Difference	0	
df	5	
t Stat	-2.8928	
P(T<=t) one-tail	0.0170	
t Critical one-tail	2.0150	
P(T<=t) two-tail	0.0340x	
t Critical two-tail	2.5705	

Source: Author's calculations.

Therefore, since the two-tail P value at 0.05 level of significance is 0.03 and P-Value < Level of Significance, the evidence suggests that there is a mean difference between NCA before divestment and NCA after divestment. Thus, there is a statistically significant improvement in the financial position of the firm, post divestment.

4 Conclusion

The paper aimed to understand if privatisation has a strong impact on growth, using the microeconomic framework of a firm. Based on the data analysis and research conducted, it is clear that there is no unambiguous response to the question and the answers vary according to the different ways the questions are contextualised. The statistical examination of the financials of Paradeep Phosphates suggests that the disinvestment of the firm led to no statistically significant growth in output but does improve the financial position of the firm in the long term.

To further understand the impact of privatisation on profits, the author cites the results of the descriptive statistics employed by Analysis of Sample Mean Difference technique in the Economic Survey (2019). Based on the results, one can suggest that there is no uniform

positive impact of privatisation. While some firms record an increased gross revenue, a minor group also records a decline. But overall, we see that this approach attributes an increase of approximately Rs. 827.65 crores in gross revenue to privatisation. The Analysis of Sample Mean Difference approach also suggests a significant increase in gross revenue after privatisation suggesting that overall, it has a positive impact on the financial position of the firm.

However, it should be understood that the Analysis of Sample Mean Difference approach also suffers from statistical inaccuracies. For instance, it does not take into account the size of the firms that are taken into consideration. It is highly possible that a huge increase in one of the large CPSEs completely offsets the negative impact that some firms might incur, or overvalue the impact privatisation has on these firms. An important assumption in using the Analysis of Sample Mean Difference technique is that there should be a parallel shift post-intervention in the values of the treatment group to make sure that the impact is certainly due to exogenous policy. However, it is quite clear that in this case, this assumption is violated (Jain 2021). Furthermore, the basket of firms used for comparison will almost always suffer from selection bias until a large-scale study of every single firm or at least a more representative firm representing all the different industries and market capitalisation, gets rid of this bias.

Therefore, this analysis is not completely error-free and fails to capture important background economic events such as deregulation of the economy and the incentives provided to private companies by the government during the phase of promoting privatisation. At the same time, this microeconomic framework of a single firm is not applicable for other firms as well since each has a different divestment experience and large-scale data is required to find some robust evidence.

It has been observed that this standard benefit of 'enhanced financial position' due to privatisation lies in the agency of ownership and this entire proposition of "Privatisation improves efficiency" is fundamentally dependent on how agents respond to competition. While this proposition sounds infallible in theory, data suggests that the correlation is not so strong. If the State finds a way to infuse that 'competitiveness' and 'accountability' into public sector employees, then PSUs can function as well as private enterprises. In reality, privatisation does not lead to growth unambiguously and different countries have had different experiences with privatisation (Megginson and Sutter 2006), precisely because of the political and economic contexts in which they were introduced.

In the Indian context, it is important to note that full privatisation is not the solution to the declining efficiency of the CPSEs. The government should instead, focus on better alternatives such as MOUs, budget constraints, etc. If at all it decides to completely privatise, then first the government should make sure that it proposes legal amendments to make sure that the government regulators, especially in the utility sector are strong and independent, not just on paper but in practical application as well.

The privatisation project in India is standing on the knife's edge with so many CPSEs lined up for complete privatisation with no focus on attempts to enhance the efficiency or to improve and create regulatory agencies to avoid market failures such as monopoly or price explosion in sectors with inelastic demand, as was the case in Argentina.

To conclude, the Indian PSU performance revival must incorporate a more structured approach involving categorisation of firms into different groups according to past performance, future profitability, revival chances, etc. The choice of policy tools should be customised according to these categories and segments. This would mean that privatisation with proper regulatory provisions would be introduced only for some firms with no further scope of revival, whereas for others strategic disinvestment and other procedures discussed above would be the more viable and desirable policy option. Mere reduction of the solution to complete privatisation would indicate the laxity of the State as well as the narrow lens through which public sector enterprises have been evaluated over the past, due to limited research and theories lacking evidence of long- term impacts (Jain 2021).

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How Safe is the Delhi Metro? Insights from a Survey

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Abstract

Feelings of insecurity and lack of personal safety in public modes of transport have significant economic and human capital costs. This is more pronounced in developing countries where there is a greater dependence on such modes. South Asia is home to a vast majority of people who use public transport on a regular basis. This paper analyses the perception of safety amongst women and gender minority users of the Delhi Metro. My analysis finds that (i) an individual's comfort with strangers has a sensitive relationship with how safe they feel in the metro and (ii) individuals who consider the route from their place of residence to the nearest metro to be safe are more likely to feel safe. Based on such results, policy recommendations are offered to make the metro service in the city more gender-friendly and inclusive.

JEL Classification: C1, I3, H8
Keywords: Personal Safety, Metro, Delhi, Women, Gender

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1 Introduction

The use of public transport by ordinary people is a common sight in South Asia. Within public transport, an area that is increasingly being acknowledged is a distinct lack of personal safety. There is widespread academic and policy literature that acknowledges the pervasiveness of fear regarding the lack of personal security in public transportation systems around the world (see Mahmoud and Currie 2010, Gardner 2017, Heather Allen et al. 2018). This fear exists since individuals share their personal space in public which increases their chances of being victimised and harassed. This has dire consequences for the physical mobility of individuals, especially those who belong to marginalised and under-represented groups. For example, unsafe public transport in urban areas can inhibit people's ability to take advantage of the educational and employment opportunities that cities have to offer. Previous research (Mohan 2018, Asian Development Bank 2013) finds that fear of harassment in public transport may compel women to take up poorly-paid, menial jobs which are near their place of residence instead of jobs that may be far but for which they are better suited and qualified. Borker (2020) finds that such risk has repercussions on women's human capital formation via college choice. Finally, from a Capabilities Approach to Human Development, Nussbaum (2005) argues that fear has a negative impact on people's capabilities. Most public transport systems are gender-blind and do not take into account the diverse needs and requirements of women and gender minority (WGM) users. Personal safety is one such aspect that commands more attention. According to a study, developing countries, such as those in Latin America, have some of the most unsafe public transport systems for women in the world (Lockhart 2016).

This study focuses on the perception of safety amongst WGM users of the Delhi metro. Various surveys and reports have labelled Delhi to be highly unsafe for them due to the widespread prevalence of gender-based crimes. As per National Crime Records Bureau, Delhi has one of the highest crime rates against women in the country. This has ramifications on the type of transport they use, i.e., between private and public modes (Goswami and Pillai 2016). It was one of the 11 cities to be included in a study that revealed that 91% of urban women in India find public transport to be unsafe (Shah and Raman 2019).[1]Although some studies focus on Delhi's public transport system as a whole, the metro deserves separate attention. It is justified on the following grounds. First, the metro has a system of gender-based reservation that is unprecedented in public transport. The first coach of the metro is reserved for ladies. Furthermore, throughout the metro, certain seats are reserved exclusively for women. Secondly, with a combined daily ridership of nearly four million people, it is one of the most popular modes of transport in Delhi. It is favoured over other modes due to its connectivity throughout the city, affordability and convenience. Presently, there is an ongoing policy deliberation about making Delhi's public transport system more safe and more inclusive. There are several schemes initiated in this regard. A study of the present kind will help in understanding which aspects of the metro need to be improved upon.

[1]Furthermore, the Lockhart (2016) study mentioned above found Delhi to have the 4th most dangerous public transportation system for women amongst the 15 largest capital cities across the globe.

To study the prevalence of safety concerns, a survey was deployed. This paper discusses the survey results and analyses the factors that influence the perception of safety amongst respondents. The rest of the paper is structured as follows: Section two discusses the literature. Section three describes the methodology. Following that, survey results are analysed in Section four. Section five brings out some policy recommendations following which I conclude the study.

2 Literature Review

2.1 Gender and Public Transport

Gender is one of the least understood sociodemographic variables in transport policy research (Asian Development Bank 2013). However, it is a key aspect that needs to be accounted for. The need to study gender in transportation stems from the understanding that men and women have different travel patterns and behaviours. There are significant differences in terms of transport mode, duration of travel, distance etc. (Ng and Acker 2018) In particular, it is important to note that women in urban areas engage in trip chaining, i.e., combining multiple, short destinations in one trip due to the gendered division of work where women have to take multiple trips to fulfil domestic and caretaking obligations (Peters 2013). Since they have to go to various places in just one trip, they might also have to incur higher costs for transportation. To avoid paying exorbitant fares, women prefer using cheaper modes of transport. It is therefore no wonder that women tend to use public transport significantly more times when compared to men (Duchene 2011, Rukmini 2018). In spite of this, transport policy, in general, tends to be largely ignorant towards the needs of women. These needs include, among others, aspects like affordability, comfort and a sense of personal safety (to be discussed next). Physical mobility is a hugely gendered phenomenon with men being at the centre of it. Although scholars have started acknowledging this gap, they largely confine their discussion to differences between women and men. This binary focus on men and women, thereby, often ignores other genders. While there are some studies that go beyond binary gender identities in public transport (Lubitow 2020), a significant number of them are based in Western countries. The present study lays its focus on women and other gender minorities using public transport in a developing country context.

2.2 Women, Safety and Public Transport

Threats to one's personal safety, both actual and perceived, act as a major hindrance in using public transport. Previous research (Ouali et al 2020) reveals that there is a statistically significant gender difference in how safe an individual perceives public transport to be. It is found that women are more fearful and feel more unsafe than men while using public transport. There are various reasons behind this difference. Women's fear regarding the lack of personal safety may stem due to limited surveillance, enclosed spaces with limited exits, dark and deserted spaces or previous incidents of sexual or verbal harassment (see Chowdhury et al 2020, Vanier et al 2017, Condon et al 2007). Surveys from around the world reveal the extent to which the issue of women's sexual harassment is pervasive. The issue is more serious in the developing world. For example, Kash (2019) finds that 37% of female users of public

transport in Colombia and Bolivia reported ever being harassed while commuting. There are various sociodemographic and psychological factors that influence the perception of safety amongst women in the use of public transport. This includes age, ethnicity, education, relative comfort with strangers (Condon et al 2007; Currie and Mahmoud 2013), among others.

Given the prevalence of such incidents on a routine basis, women develop 'avoidance behaviours' to feel safer (Vanier 2017; Gardner 2017). These behavioural adjustments include actions such as avoiding the use of public transport at night, carefully choosing the route and time of travel, and keeping others frequently informed of their location among many others. They may also limit their use of public transport or give it up altogether. While using public transport, women may prefer to travel with a companion, stay closer to other women or stand next to "safe people" (Kash 2019, Chowdhury 2020). This highlights the fact that women, in general, have to go out of their way to feel secure in public transport.

2.3 The Case of India and Delhi

Due to rapid urbanisation and the resulting need for sustainable transport, various modes of public transportation are increasingly becoming common in Indian cities. The most popular form of public transport across cities is hailed to be buses. As per the 72nd Round of the National Sample Survey Office, nearly 62% of households in urban India reported using buses. Many cities have developed Bus Rapid Transit Systems (BRTS) in order to fill the huge demand for bus services. Some cities (such as Delhi, Bangalore etc.), in addition to the BRTS, also have a comprehensive metro rail system that commuters can use.

Previous research on safety in Indian public transport reveals the prevalence of fear regarding lack of personal safety amongst women (Verma 2019, Shah and Raman 2019, Viswanath et al., 2015). A major reason behind this fear is the incidence of sexual harassment. Depending on which survey data one looks at, the rates of such incidents can vary across states and cities. For instance, in the Verma (2019) study which was conducted in Ahmedabad and Bangalore, about 10% and 38% of the respondents in the respective cities felt unsafe while using public transport due to such instances. Similar figures can be found for Mumbai, Kochi and other major cities. In order to ameliorate these fears, there have been various steps to ensure women's safety. These include women-only buses, reservations in the metro, unified systems at state and national levels for GPS tracking via emergency buttons and video recording in buses and many others. However, they have not yielded desirable results (Shah et al. 2017).

This study is unique on two fronts. Firstly, gender minority individuals are rarely taken into account in discussions related to transport policy. Most studies on safety in public transport in India consider women only. This paper focuses on WGM users since it will help us in forming policy suggestions that will make the metro service inclusive in the right sense of the term. Secondly, focusing on the unique features of the metro will help us in understanding if any mode-specific characteristics influence safety perception.

3 Methodology

Given the discussion in the previous sections, this paper aims to study the perception of safety amongst WGMs in the Delhi metro. For that, a primary survey was conducted. It was targeted toward individuals who identify themselves either as a 'Woman' or as a gender minority. It was designed keeping in mind past studies that have focused on this issue. Additionally, discussions were also held with users to understand the nuances of their metro travel habits. There were four sections in the survey. The first one dealt with the respondents' socio-economic background. Next, there was a section that captured patterns in their metro usage in terms of frequency, purpose etc. Following that, the third section dealt with their perception of safety in the metro in a variety of contexts. The last section contained views on some proposed policy measures to enhance women's security. The following section brings out the survey results. I first present descriptive statistics about the respondents and their safety perceptions. Following that, I use ordinal logistic regression to understand the factors associated with the perception of safety in the Delhi metro.

4 Survey Results

4.1 Descriptive Analysis

There were 177 respondents to the survey. After accounting for all missing values, 171 eligible respondents were considered for the analysis undertaken here.[2] Table 1 gives a summary of the socioeconomic background of the respondents. The median age of the sample is 20 years. Most of the participants (around 70 per cent) are students who are currently pursuing an undergraduate course. Nearly a quarter of them have an annual family income of more than INR 20 lakhs. At least 36 per cent of them have access to a car to meet their regular transport needs. About 65 per cent of them live less than 10 minutes away from their nearest metro station.

Around 65 per cent of respondents stated that they preferred the women's coach over other coaches. This is the first indication of the prevalence of women's fear in the metro since they are "relatively" safer in the reserved compartment as opposed to the non-reserved ones. 63.2 per cent of them said that they used the reserved coach more frequently than the unreserved ones. 13 per cent of the respondents travelled daily in the metro while nearly 38 per cent travelled multiple times in a week. The most frequent use of the metro was for attending college/university (73 per cent of the time). This should not be a surprise given that most of the respondents were students. The most commonly used metro routes were the Yellow and Blue Lines with 71 per cent and 55 per cent of the respondents choosing these respective lines for their regular metro commute. This can be attributed to the fact that these lines have multiple exchange points which allow users to travel to far off places in the city. 65 per cent of the respondents selected two or more routes.

[2]Survey data can be made available upon reasonable request.

Table 1: Respondent Background

Characteristic	Groups	Percentage of Respondents
Annual Family Income	Less than 5 LPA	11.69
	Between 5-10 LPA	24
	Between 10-15 LPA	21.63
	Between 15-20 LPA	17.54
	More than 20 LPA	25.14
Private owned Transport	None	25.73
	Yes, a 2-wheeler	11.11
	Yes, a 4 wheeler	35.67
	Both 2 and 4 wheelers	27.49
Occupation	Student	82.45
	Others	1.18
	Employed	16.37
Education	School	2.93
	Undergraduate	73.1
	Postgraduate (Masters and Higher)	23.97
Religion	Hinduism	75.43
	Others	24.57
Time required to travel from home to the nearest metro station	Less than 5 minutes	25.14
	Less than 10 minutes	40.35
	Less than 20 minutes	23.98
	More than 20 minutes	10.53

Source: Survey responses.

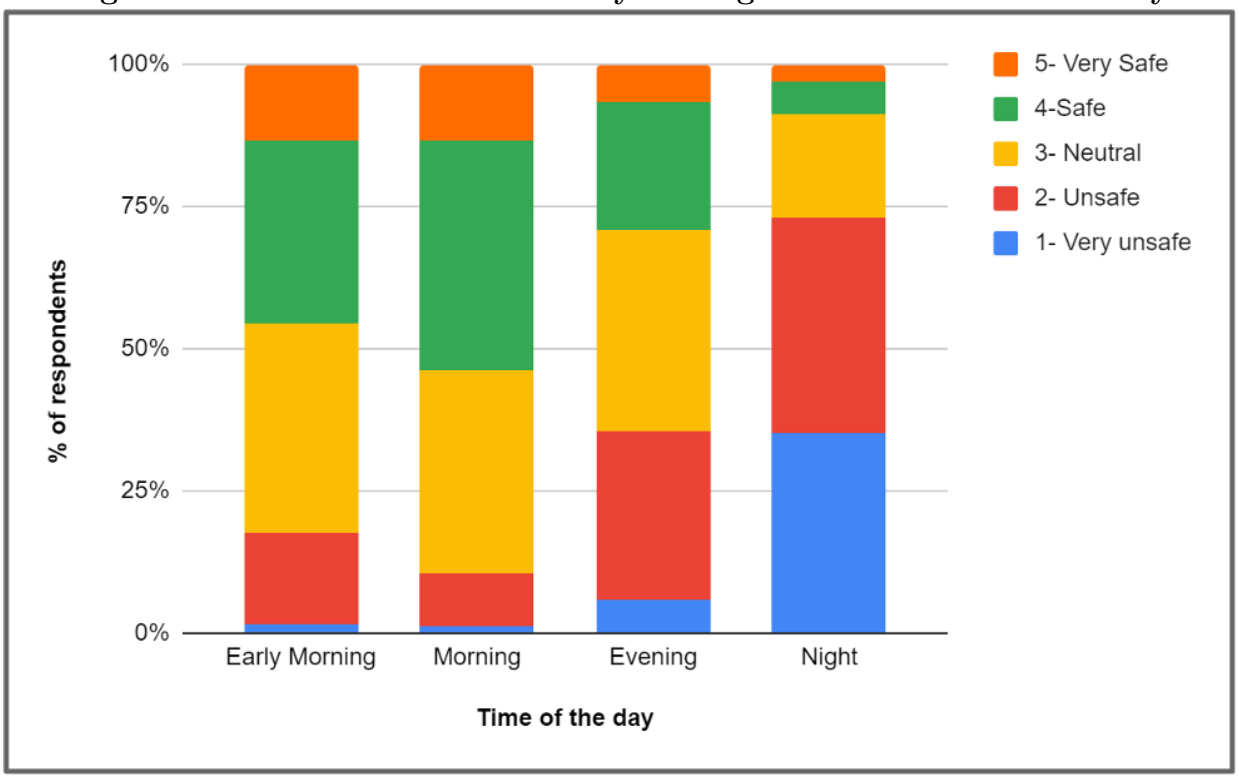
4.2 The Perception of Safety

Respondents were asked to rate how safe they feel in the non-reserved or general compartments of the metro. There were 5 levels of ratings: "Very Unsafe", "Unsafe", "Neutral", "Safe" and "Very Safe". This was done to remove the biases (feelings of more safety) due to the use of the reserved coach that could arise. Following Currie and Mahmoud (2013), safety ratings were marked on a scale of 1 to 5 with the former indicating "very unsafe" and the latter indicating "very safe". They were asked to rate their perceived level of safety in various scenarios of the day. Figure 1 describes their responses. 'Early Morning' is defined as the time before 8 AM and 'Night' has been defined as the time after 8 PM for the study.

Data shows that 47 per cent of users feel either safe or very safe while using the non-reserved compartment of the metro during the "early morning" period. The morning period sees a continuation in the feeling of safety with 54 per cent of the respondents stating the same. Only 18 per cent and 11 per cent of people felt either unsafe or very unsafe in these respective periods. However, as evening and night time approaches, the change in the perception of safety is starkly evident. During the evening, 36 per cent of those surveyed stated they felt either unsafe or very unsafe. This figure shoots up to 73 per cent after 8 PM. This is in line with previous studies that show WGM users feel more unsafe during the night as compared

to daytime while using public transport.

Figure 1: Perceived Levels of Safety During Various Times of the Day



Source: Author's Visualisation from survey responses.

About 72 per cent of people stated that they had a fear of being stared/ogled at. This was followed by the fear of being physically harassed (61 per cent). Table 2 shows the results of the experiences faced by the respondents. It also includes information on whether they have come across other people who have experienced safety issues in the metro. While most of the respondents did not face any direct attack, nearly a third of them faced threats. Furthermore, a majority of them had heard or seen others face threats/attacks in the metro. This is an important fact to understand since the experience of other individuals can influence the safety perceiving calculus of an individual in a negative sense.

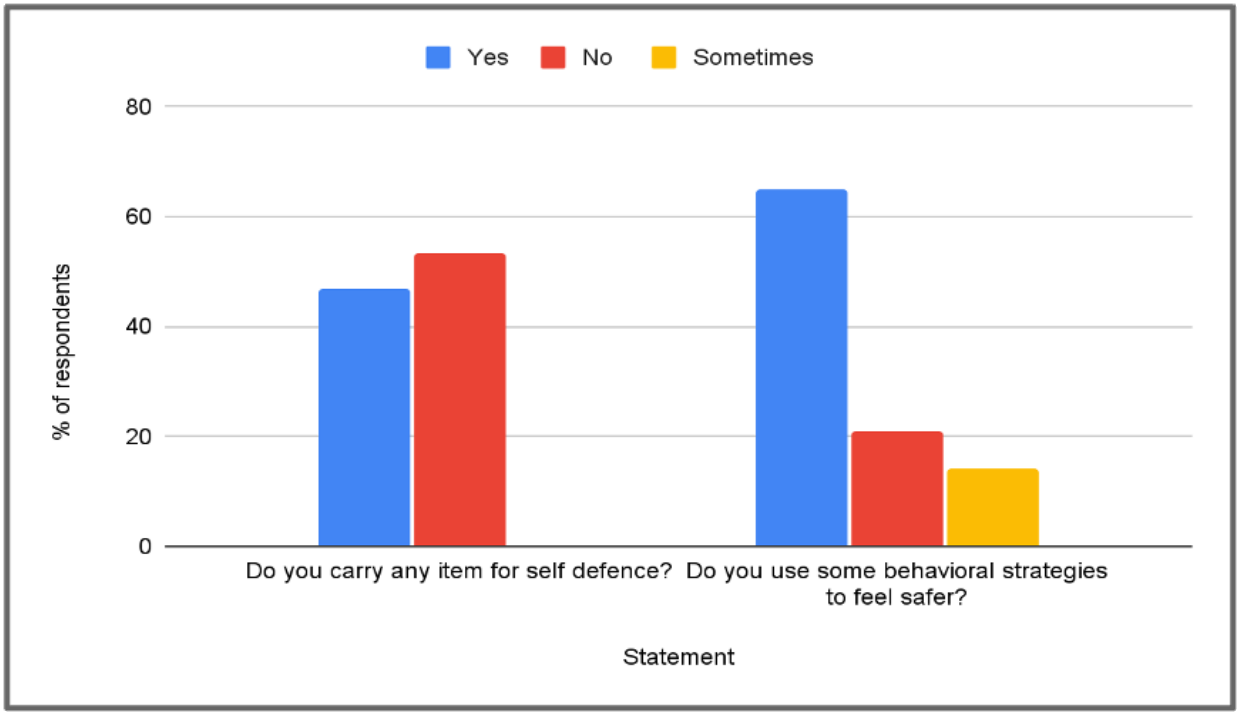
Table 2: Past Experiences

Experience	Yes (% of respondents)	No (% of respondents)
Have you ever faced an attack in the metro	15.8	84.2
Have you ever faced a threat in the metro	35.67	64.33
Have you ever seen or heard others getting threatened or attacked in the metro	64.9	35.1

Source: Survey response.

Amongst those who chose 'Yes' on having faced safety issues themselves (threat or attack), the most common methods of dealing with the issue were to (i) *move away from the perpetrator and* (ii) *ignore the incident.* Nearly 72 per cent of victims chose to do either of these. Only a fifth of the victims chose direct confrontation. It is often the case that the victim is not believed when they register a complaint since the burden of proof lies on them. Consequently, they choose to stay silent. Figure 2 gives brief information on measures taken by respondents to protect themselves from safety threats. While a majority of them did not carry an item for self-defence, nearly 65 per cent of the respondents adopted behavioural responses to feeling safer in the metro. The most common tactics used were (i) "covering chest with bag" (ii) "standing next to 'safe' people" (iii) "standing near to the door" and (iv) "frequently using a phone".

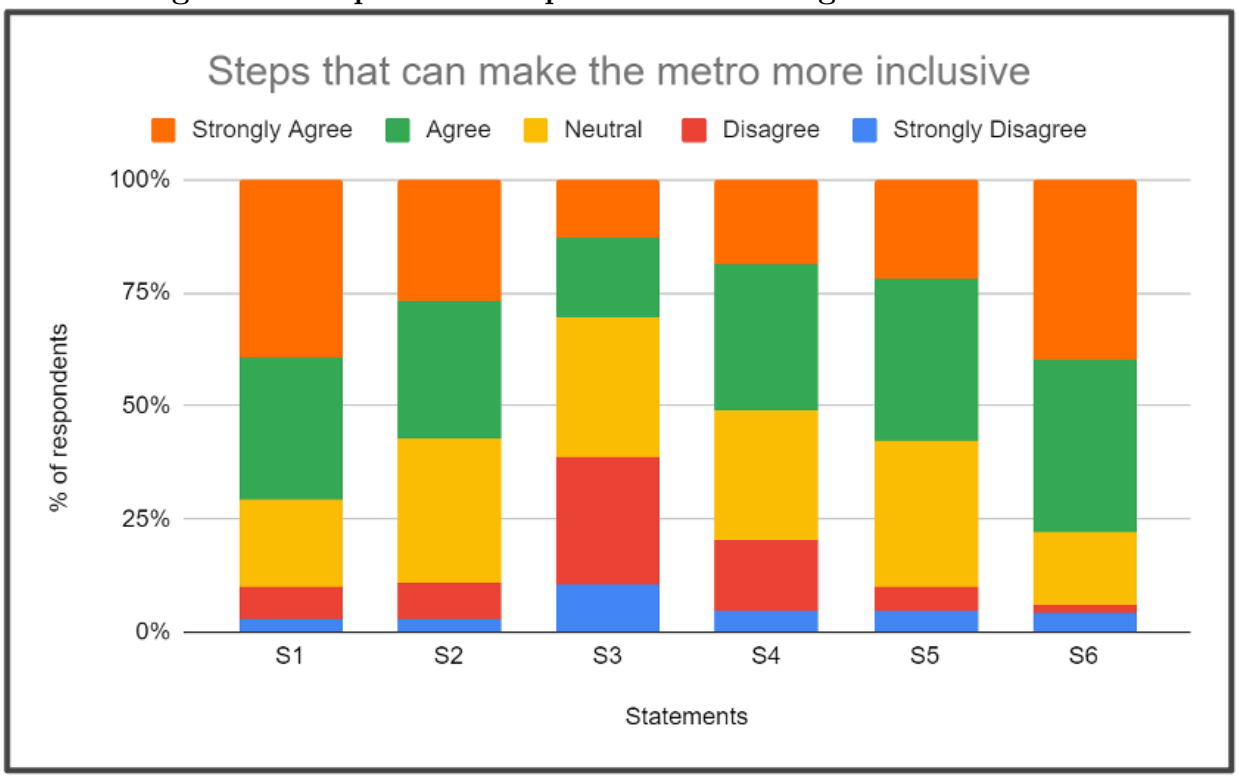
Figure 2: How Respondents Dealt in Case of Threats to Safety



Source: Author's Visualisation from survey responses.

Respondents were also asked their opinion on some steps that would make the metro safer and more inclusive. Figure 3 presents the results. The statements are in Appendix A.1. Most respondents felt seeing more women as security guards or metro staff would also be beneficial (S5 and S6). They also stated that having a panic button in the general coaches to alert security officials would enhance their safety (S1). While many supported the idea of more reservation of seats in the metro for WGM users (S4), there was not much convincing support for 'women- only' metros (S3). Having additional security within the metro cars, particularly at the intersection of the reserved coach and the following compartment (S2) would be useful for safety purposes.

Figure 3: Respondents' Opinions on Making the Metro Safer



Source: Author's Visualisation from survey responses.

4.3 Factors Affecting the Perception of Safety

To understand the factors that affect safety levels, I employ ordinal logistic regression analysis. The survey had four questions that directly dealt with the perception of safety. As shown in Figure 1, respondents felt considerably safe in the daytime (Early Morning and Morning). It was only during the Evening and Night time that we see a sizable shift in the feeling of (in)security. Hence, it was decided to keep the safety scores of evening and night time as the 2 dependent variables in the study. Given that these variables are categorical in nature, logistic regression is the most appropriate econometric tool. The use of such a method is common in transport safety research (Verma et al 2020). There is ordinality in the response variables due to which I have chosen the ordinal logistic regression.

The survey contained several questions that might influence how safe one feels in the metro. Based on the past literature and several discussions with some participants, it was initially decided to keep the responses to the questions given in the following table as the independent variables in the study.

Table 3: Description of Variables

Sr. No	Question	Response Type
1.	Have you ever faced an attack in the metro?	Binary; yes or no
2.	Have you ever faced a threat in the metro?	Binary; yes or no
3.	How safe is the route from your home to the nearest metro station is safe?	Categorical; Very Unsafe, Unsafe, Neutral, Safe, Very Safe
4.	Do you agree that there is adequate lighting in the metro and its premises?	Categorical; Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
5.	Do you agree that there is adequate surveillance in the metro and its premises?	Categorical; Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree
6.	How comfortable are you travelling alone with strangers in the metro?	Categorical; Very Uncomfortable, Uncomfortable, Neutral, Comfortable, Very Comfortable
7.	Which religious group do you belong to?	The group with which respondents identified themselves with
8.	Which social background do you belong to?	The group with which respondents identified themselves with
9.	Do you carry any items for self-defence?	Binary; yes or no
10.	Have you ever heard or seen someone else get threatened or attacked in the metro?	Binary; yes or no

Source: Author's descriptions.

After initial modelling, I dropped the variables regarding adequate lighting, surveillance[3] and attacks. This was because including them in various models led to the violation of a key assumption of ordinal regression: proportional odds/parallel regression assumption. Since ordered logistic regression gives us cumulative logits, the underlying assumption is that each independent variable has the same effect on all categories of the outcome. Due to the violation, they were dropped from the analysis.

The dependent variables have 5 levels going from 'Very Unsafe' to 'Very Safe'. Lower categories indicate higher feelings of insecurity. Let us now discuss the independent variables. For my binary responses, I have created dummies. I have coded '1' for 'Yes' in all such responses mentioned in Table 3 and allotted '0' for the base category, No. This means, for example, if a respondent said *yes to having faced* a threat in the metro, they have been re-coded as '1'. Similarly, if a respondent said *no to hearing or seeing someone else getting threatened or attacked,* they have been re-coded as '0'. For the categorical variables too, I have created dummies. For route safety, the base category is *'Very Unsafe'* while for comfort with strangers, the base category is *'Very Uncomfortable'*. I have taken 4 dummies for each variable since there are 5 levels in both of them. In total, for route safety and comfort with strangers, I have 8 dummies. For reasons of parsimony, I have combined the responses on religion and social background and created a new variable called Majority[4] that takes a value '1' when a respondent is Hindu and belongs to the 'General' or unreserved category.

Previous research has shown that past incidents can influence how safe one feels in the metro. Therefore, one needs to control for it. Due to this, all models included 'threat' as an independent variable. I ran separate regressions with various combinations of independent variables. In total, 5 models were chosen; three with evening safety as the dependent variable and two with night safety. The results from the model including evening safety are mentioned in Tables 4 (a) to (c) and those from including night safety in Tables 5 (a) and (b). For checking the parallel regression assumption, the *omodel* command in Stata has been used. All final models fulfilled the required assumptions (see appendix 7.2). All models are significant (as noted by the LR statistic and the corresponding p-value).

[3]Questions on infrastructure were included as they were deemed fit due to the literature on the subject. A detailed discussion has been avoided due to space constraints. Information on these variables can be made available on request.

[4]Religions other than 'Hinduism' have been categorised as 'Minorities' under Section 2(c) of the National Commission of Minorities Act, 1992. I have also included categories like atheists, non-religious etc. under minorities. For social background, individuals who belong to General or Unreserved categories are labelled as majorities due to their relatively higher representation and greater access in public spaces. While one can incorporate the finer dynamics of social discrimination in India in this analysis (even within minority religions, SCs fare worse than those who belong at the top of the caste system), that is beyond the scope of this paper.

Table 4a: Model 1: Dependent Variable - Safety during Evening

Variable	Coefficient	P-value	Odds-Ratio
Threat	-1.034	0.00***	0.355
Unsafe Route	-0.395	0.48	0.673
Neutral Route	0.472	0.35	1.603
Safe Route	0.941	0.06*	2.563
Very Safe Route	1.708	0.00***	5.518
Cut 1	-2.87		
Cut 2	-0.46		
Cut 3	1.22		
Cut 4	3.16		
LR Statistic ($\tilde{\chi}^2_5$)	30.68		
P-value (LR Statistic)	0.00		

Source: Author's calculations.
Notes: P-values: *** significant at 1%, ** significant at 5 % and * significant at 10 %

Table 4b: Model 2: Dependent Variable - Safety during Evening

Variable	Coefficient	P-value	Odds-Ratio
Threat	-1.075	0.00***	0.341
Uncomfortable with strangers	0.877	0.09*	2.404
Neutral with strangers	1.608	0.00***	4.993
Comfortable with strangers	2.221	0.00***	9.221
Very Comfortable with strangers	2.661	0.00***	14.306
Cut 1	-2.078		
Cut 2	0.413		
Cut 3	2.143		
Cut 4	4.107		
LR Statistic ($\tilde{\chi}^2_5$)	39.850		
P-value (LR Statistic)	0.000		

Source: Author's calculations.
Notes: P-values: *** significant at 1%, ** significant at 5 % and * significant at 10 %

Table 4c: Model 3: Dependent Variable - Safety during Evening

Variable	Coefficient	P-value	Odds-Ratio
Threat	-1.004	0.00***	0.367
Self Defence	-0.652	0.02**	0.521
Cut 1	-3.607		
Cut 2	-1.295		
Cut 3	0.300		
Cut 4	2.159		
LR Statistic ($\tilde{\chi}_2^2$)	18.6		
P-value (LR Statistic)	0.0001		

Source: Author's calculations.
Notes: P-values: *** significant at 1%, ** significant at 5 % and * significant at 10 %

Table 5a: Model 4: Dependent Variable - Safety during Night

Variable	Coefficient	P-value	Odds-Ratio
Threat	-0.873	0.00***	0.417
Heard/Seen others get threatened or attacked	-0.732	0.018**	0.481
Cut 1	-1.468		
Cut 2	0.275		
Cut 3	1.693		
Cut 4	2.881		
LR Statistic ($\tilde{\chi}_2^2$)	16.780		
P-value (LR Statistic)	0.000		

Source: Author's calculations.
Notes: P-values: *** significant at 1%, ** significant at 5 % and * significant at 10 %

Table 5b: Model 5: Dependent Variable - Safety during Night

Variable	Coefficient	P-value	Odds-Ratio
Threat	-1.020	0.00***	0.361
Majority	0.309	0.302	1.362
Cut 1	-0.805		
Cut 2	0.904		
Cut 3	2.280		
Cut 4	3.452		
LR Statistic ($\tilde{\chi}_2^2$)	12.25		
P-value (LR Statistic)	0.0022		

Source: Author's calculations.
Notes: P-values: *** significant at 1%, ** significant at 5 % and * significant at 10 %

It is often argued that the interpretation in odds ratio is more intuitive than that from the logit scale. The odds ratio from Model 1 tells us that those who have previously faced any threat have lower odds (less than 1) of being in higher categories of the outcome when one controls for other factors. That is, individuals who have previously faced a threat are *less likely* to feel secure in the metro *ceteris paribus*. The result is statistically significant. For route safety, all comparisons are to be made with reference to those whose route from their home to the nearest metro station is very unsafe. People whose routes are comparatively safer are *more likely* to be in the higher rather than lower categories of the outcome; i.e., they are *less likely* to feel insecure in the metro during the evening. Here, the data shows that the groups whose routes are "Unsafe" or "Neutral" are not statistically significantly different from those whose routes are "Very Unsafe". The difference steps in only when the route is either "Safe" or "Very Safe". Model 2 has a similar interpretation in terms of threat. However, it reveals something intriguing in terms of comfort with strangers. Here the base category is "Very Uncomfortable". The comfort odds ratio suggests that individuals who are comfortable with strangers in the metro have higher odds of feeling safe in the metro. The p-value of each comfort dummy is significant. This implies that people's comfort level with strangers has a sensitive relationship with their level of perceived safety; i.e., even a small increase in the level of comfort with strangers can improve an individual's odds of feeling safe in the metro.

Hence, one can say that comfort with strangers is a crucial determinant of how safe one feels in the metro. This result mirrors the findings of Currie and Mahmoud (2013). Model 3 states that those who carry an item for self-defence have lower odds of feeling safe in the metro. This result is rather strange since one would expect that those who carry such an item would have an additional sense of security due to their ability to protect themselves via the use of such an item in case any threat/attack looms. One possible justification for this is that individuals who carry an item might have been influenced by the experiences faced by others. In such a case, they are likely to be more sceptical about their safety in public spaces (like the metro) in the first place. Carrying an item for self-defence in such a case might not be as effective as one would believe. Additional research might be able to throw more light on this aspect. The results are statistically significant.

Models 4 and 5 pertain to safety during night-time. Table 5(a) tells us that respondents who have heard or seen others face a threat or attack in the metro have lower odds of feeling safe. The interpretation of 'Threat' in Model 4 is qualitatively similar to the models that used evening safety as the dependent variable: those with previous experience of having faced threats are less likely to feel safe. Model 5 tells us that those who have a majority status (Hindu and Unreserved category) have higher odds of being in higher categories of the outcome; i.e., they are more likely to feel safe. However, the p-value associated with the variable is insignificant at any conventional level of significance. This indicates that there is no significant difference between the majority and minority groups.

5 Policy Suggestions

There is a dire need to improve the security measures of the Delhi metro system to encourage more participation from WGM users. Several ongoing policy measures aim to solve this. Based on the descriptive analysis and regression results presented above, the paper offers the following policy recommendations:

1. A frequent issue that comes up in policy formulation is that of who are the intended beneficiaries. This allows policymakers to choose between either a 'targeted approach' (where benefits are to be accrued for a specific category of individuals) or a 'universal approach' (where everyone gets the benefits). The results indicate that there is no difference amongst WGM users from both majority and minority groups. Hence, steps undertaken to make the metro more inclusive must follow a universal approach that includes WGM users from all backgrounds.

2. There needs to be a concerted effort aimed towards the improvement of last-mile connectivity from the metro to an individual's residence. For this, municipal authorities along with the Delhi Metro Rail Corporation need to jointly take proactive roles. Some ways by which this can be achieved are as follows:

   (a) Starting feeder-bus services in all metro stations for WGM passengers. Greater attention must be laid on stations that lie around the outskirts of the city which are often the most at-risk. While such a program already exists, it is not operational in many areas. Furthermore, it is non-gender-segregated. Since public buses are also a place where they can get victimised and harassed, women-only transport must be organised for their movement.

   (b) Safety audits for other popular modes of transport that specialise in last-mile connectivity like rickshaws and auto-rickshaws must be thoroughly undertaken. This may include (among other things) police verification of the service providers, increased usage of pink autos (known for having female drivers) near metro areas.

   (c) Many individuals might prefer to cover the last stretch of the journey using non-motorised forms of transport. This includes modes like walking or bicycling. Towards this, municipal authorities should ensure that the roads connecting metro stations to residential areas are properly maintained. The creation of well-lit walking areas around the station equipped with functional streetlights, among other amenities, must be taken into consideration.

3. Since comfort with strangers has a very essential effect on the perception of safety, certain *nudges* can be employed to relieve them of their discomfort. For this, there is a proposal to employ more women and individuals belonging to gender minority groups as metro staff, refreshment vendors, and cleaning staff. The survey revealed that around 31 per cent of respondents 'agreed' and 'strongly agreed' that there should be more women as staff. Seeing more women in a space that is heavily populated by men would gradually alleviate their feelings of potentially being victimised and harassed.

4. Existing mechanisms for women's safety must be strictly enforced. More security guards in different parts of the station must be allocated. Steps must be taken to ensure that adequate measures are taken to promote inter-compartment safety, particularly for the first and second coaches in the moving direction.

There also needs to be an improvement in the infrastructural quality of the metro service. Although my regression results did not incorporate this aspect due to statistical reasons, one cannot downplay the importance of good quality infrastructure when it comes to public transport. Improvement in this sense necessitates the provision of ample lighting within the metro premises. In terms of surveillance, regular monitoring of metro activity via the use of state-of- the-art technology must be strictly enforced. However, suitable safeguards and provisions must be in place so that such surveillance measures do not impinge on an individual's right to privacy and allied rights and privileges. Installation of panic buttons in the non-reserved compartments of the metro must also be undertaken. It would alert security officials in the nearest station about any untoward incident so that rapid action can be taken.

6 Conclusion

How safe one feels in a public space has far-reaching consequences on several aspects of their being. It influences their participation in the economy and society around them. This is particularly true for socially-disadvantaged groups. The main objectives of this paper were to understand: (i) the prevalence of fear amongst WGM users of the Delhi metro and (ii) factors that influence the perception of safety. Towards that, I ran a survey and analysed the respondents. The results highlighted in the paper confirm the following: (a) fear is prevalent amongst WGM users of the metro (b) feelings of insecurity in the metro shoot up as evening and night time approach.

The safety level experienced by one in the metro is influenced by many factors. Among them, how comfortable one is with strangers seems a highly sensitive factor. Route safety to the nearest metro also influences how safe one would feel in the metro. Based on these results, policy prescriptions are offered that would be useful in alleviating feelings of insecurity in the metro. There is an urgent need for the Metro Corporation to work with municipal authorities to achieve the greater goal of making Delhi more gender-friendly and inclusive. As for this study, there are a few limitations that future research should tackle. The sample was restricted in terms of demographic variables. Most of the respondents were young, undergraduate students. Given that a significant portion of them often use public transport for meeting their daily transportation needs, I believe this limitation can be excused for this study. Nonetheless, future studies should take into account age-related and employment characteristics. This paper can also be extended by including safety perceptions in varied locations within the station to bring out more meaningful insights. Lastly, the availability of better gender-segregated data will allow researchers to view this issue in a more nuanced way.

A Appendix

A.1 Statements in Figure 3

S1: There needs to be a panic button in general compartments of the metro to alert metro security about an incident.

S2: There should be greater security between the reserved coach and the second compartment.

S3: There should be women-only metros as well.

S4: There needs to be a greater reservation of space for women and gender minorities in the metro.

S5: There should be security officials within the metro car.

S6: Seeing more women as metro staff will make me feel safer.

A.2 Likelihood Ratio Test for Proportionality of Odds Across Response Categories

Model	Chi-Square Statistic	P-value
1	17.23	0.305
2	22.56	0.068
3	5.34	0.501
4	6.24	0.397
5	1.39	0.967

Source: Author's calculations.

The null hypothesis of the test is that the regression lines are parallel. Taking a conventional level of p-value at 0.05, we fail to reject the null hypothesis in any of the 5 regression models. Hence, we conclude that the data fulfils the required assumption.

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Unpaid Internships in India: An Exploration into The Factors and Benefits Among Students

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Abstract

The paper seeks to explore the costs and benefits of an unpaid internship that is routinely undertaken by students. The paper attempts to identify the factors which motivate the students to take up internships that do not adequately compensate for the work performed by them. Primary data was used for the study collected through an online survey conducted using Google Forms. The paper is divided into 5 parts: introduction/motivation, literature review, methodology, results, conclusion, and policy recommendations.

JEL Classification: J24, J28, J33, J83, L21

Keywords: Learning Outcomes, Career Development, Micro-Internship

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1 Introduction

An internship can formally be defined as the period of work experience offered by an organisation for a limited time. Internships are generally undertaken by students to acquire job experience, help them become aware of their strengths and possible weaknesses, apply their skills to the industry, or improve their resumes.

A trend has been observed in recent years wherein an increasing number of students are seen/found to be taking up internships during their undergraduate education to acquaint themselves with the experience of working in an office and the industry of their choice. Platforms such as LinkedIn, Dare to Compete, Internshala have made it easier for both students to find internships and firms to find young interns. However, in recent months there has been a spike in the unpaid internships undertaken by students. Unpaid Internships do not offer any stipend or salary to the interns for the work performed for the firm/organisation, yet many students willingly enrol themselves in them. As a result, the organisations gain at the cost of the interns boosting their output and at the same time saving themselves the cost of actually paying the students. However, in doing so the firm denies the interns the basic right to get paid for any kind of work performed by the labour.

2 Objectives

The focus of our study is to attempt to explore:

- Reasons for students willingly undertaking internships that would not provide them the due recognition and wages for their work;
- Influence of gender and level of education on the willingness and tendency to undertake unpaid internships in India;
- Study the relevance of the skills provided by unpaid internships in career and skill development.

3 Literature Review

The benefits of unpaid internships don't seem to be strictly financial, graduates typically report higher job satisfaction and better health than those that haven't attained a minimum of a bachelor's degree. Achieving a better degree not solely advantages the individual, however additionally society gains by increasing productivity within the labour force and thus prod economic process. The benefits of unpaid internships need to be assessed to comment on their worth for a student's career growth. (Held 2016)

Understanding the impact of unpaid internships on university student career development and employment outcomes, assignments can be outlined, and different types of intentional reflection could facilitate students in investing certain growth opportunities, notably early in their educational careers. Meanwhile, paid internships—which square measure additionally closely tied to skilled talent development—may be inspired later. (Crain 2016)

Unpaid internships are often perceived as an unethical practice by for-profit firms, depriving the interns of remuneration for their work. Another study by Montacute (2018), pointed out that internships still are unpaid, unadvertised, and unfair. This highlights the high price of operating unpaid within Britain, however, analysis suggests that a lot of youngsters are still being asked to figure unpaid. To boot, analysis in the study suggests that a lot of employers still offer internships informally, lock up youngsters while not having skilled networks and contacts.

Paid internships remain desirable but simultaneously difficult to get. The question of merit is present in the case of paid internships and somewhat ignored in an unpaid internship. This can be understood from the firm's perspective. There are concerns that some employers are either unaware that their interns ought to be paid, or that some employers are exploiting the dearth of clarity within the law to avoid paying their interns. Montacute (2018) researched in the UK and found that due to immense competition, firms receive many better applicants who accept to work with no or very little pay. This results in limiting the opportunities through unfair selection and exploitation of potential applicants without connections. This paper concluded that the recruitment process should be based on merit and all internships should be advertised publicly.

Good internships mostly paid come out to be like a privilege to the candidates with contacts and network. The same path the candidates take to create a potential professional network requires a pre-existing network to get hold of valuable and worthy internships. This is mentioned in (Montacute 2018) that a good number of internships are never advertised and are offered through informal networks which creates a division among the inspiring interns. In this backdrop, unpaid internships turn out to be the last option for interns lacking contacts and networks in the job market, therefore, rendering an unethical and unfortunate practice of hiring interns and not rewarding them monetarily for their work.

Internships are generally undertaken for gaining valuable industry experience and for securing employment or increasing chances of securing employment post completing education. However, whether internships in reality help or not in finding employment after graduation is a different question. This was explored in a study conducted by (Rajakangas 2008) which explored the effect of internships as part of studies and whether they contributed to preparing students for work. It was found that there exists a general consensus among students that the internships do provide valuable experience and practical knowledge even though they may not always culminate in acquiring a job after completing graduation. It helped them to decide whether or not to take up a job in a particular sector.

Not everyone can afford to take up unpaid internships. However, completely abolishing unpaid internships or enforcing strict regulations may make the lives of the already disadvantaged even worse. This was pointed out in a study conducted by (Merrick 2013) which draws the conclusion that students consider an unpaid internship better than no internship and argues that abolishing unpaid internships will increase unemployment. In such a situation paid internships could be acquired either through connections or by going around the law. In both cases, the disadvantaged would be worse off and would not even gain any

experience that an unpaid internship could have otherwise provided.

The perceptions of students engaged in an internship, and the content of internships provided by the top companies in Taiwan were explored in a study conducted by (Cheng and Chen 2013). Internships do benefit both students and employers and were seen as a way to solve the graduate unemployment issue. It was also found that students valued professional learning more than social learning but also believed that internships could help them in shaping their career path in the future and improve their employment opportunities.

Gardner (2011) found that women in the USA were more likely to take up unpaid internships whereas men preferred to work in paid internships for for-profit companies. However, the widespread belief that students from wealthy families are better able to secure internships was found to be baseless. Low-income students participated more in unpaid internships while students from high-income groups had a greater inclination to take up work in for-profit companies.

4 Data

4.1 Methodology

The study uses primary data collected through an online survey with a sample size of 78. The survey form was circulated amongst the students throughout India. Pre-testing of the questionnaire was carried out with a sample of 9 and changes were made to the questionnaire accordingly. The project only considers the unpaid internships undertaken by students for for-profit organisations (i.e excluding NGOs) for the period Jan 2020-September 2021. The response rate was 78 against the expected rate of 100. A follow-up survey was conducted to collect additional information. The response rate was 41. The results of the survey were interpreted using tools of statistical analysis. Confidentiality of data sources was maintained, and ethical considerations were upheld while writing the academic paper.

4.2 Participants and Data Collection

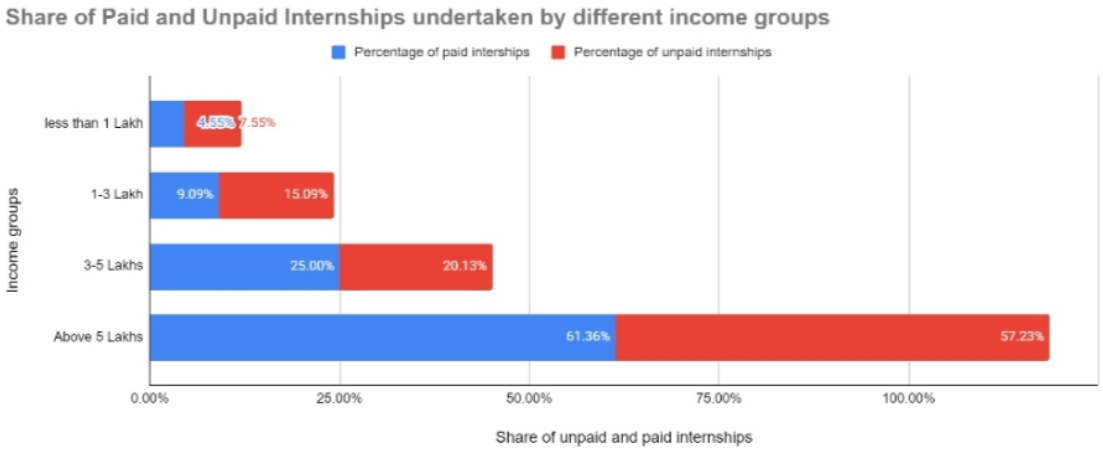
The survey was conducted through the online mode taking into account the pandemic situation prevailing in the country. The respondents were approached through social media platforms such as LinkedIn, and WhatsApp. The target audience was the students living in India who had worked as unpaid interns during the period January 2020-October 2021. The period was chosen taking into consideration that it was the lockdown phase in India.

Most of the respondents (53) in the sample were in the age group of 17-20 while 25 respondents were in the age group of 21-23. 63 respondents were female while 15 respondents were male. Therefore, due to the absence of a sizeable male population in the sample, the study cannot point in any particular direction with respect to the effect of gender on undertaking unpaid internships. 72 of the respondents belonged to the General category and therefore the study does not capture the effect of caste on undertaking work as unpaid interns. The sample consists of Indian students mostly pursuing graduation. The course of study being pursued and the college was not asked in the main survey form.

4.3 Results

Before the final analysis was carried out in MS Excel, data was cleaned for the missing values and outliers. Analysis was conducted using the tools of Microsoft Excel. According to the results of the survey, 71.8% of the respondents (56) were in the age group 17-20 whereas 28.2% of the respondents belonged to the age group 21-23 (22) wherein, 80.8% of the respondents were female (63) and 19.2% of the respondents were male (15).

Figure 1: Share of Paid and Unpaid Internships undertaken by Different Income Groups



Source: Authors' Visualisation from survey responses.

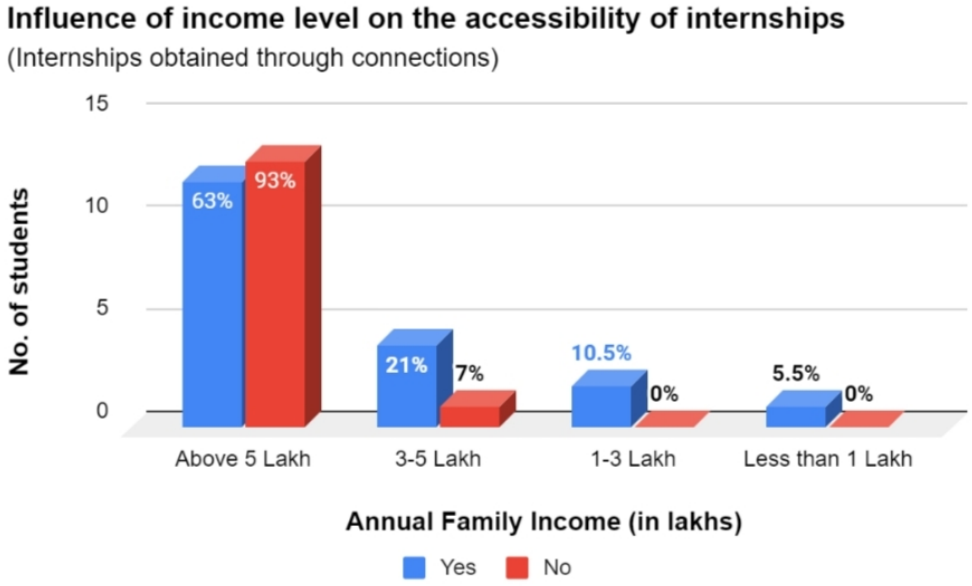
According to the results of the survey, 8 percent of the unpaid internships were undertaken by the respondents belonging to the group earning less than 1 lakh annually. For the same period, the percentage of unpaid internships undertaken by the respondents belonging to the 1-3 lakh income group stood at 15%. The percentage of unpaid internships undertaken were 20% and 57% for the respondents belonging to 3-5 Lakhs and above 5 lakhs respectively. Thus, as per the sample, the percentage of unpaid internships undertaken seems to increase as the annual income rises. This could be because at higher income levels, there is little or no incentive among students to undertake a paid internship because they are well-off whereas, at lower income levels, there is a greater incentive to earn extra money because of a poor living standard.

While 5 % of paid internships were undertaken by the respondents from the group earning less than 1 lakh annually. For the same period, the percentage of paid internships undertaken by the respondents belonging to the 1-3 lakh income group stood at 9.09%. The percentage of paid internships undertaken by the respondents were 25% and 61.36% from the 3-5 lakhs and above 5 lakhs income groups respectively. Thus, as per the sample, the percentage of paid internships undertaken rises with the increase in the annual income.

As per the sample data, the percentage of unpaid internships undertaken by the respondents from the income groups of less than 1 lakh and 1-3 lakhs is more than the percentage of paid internships undertaken by the respondents from these categories. On the other hand,

for the respondents belonging to the higher income groups, (i.e. income group of 3-5 Lakhs and above 5 Lakhs) it's the opposite. As the unpaid internships do not duly compensate the intern for their work therefore this results in the exploitation of the intern. Since a higher share of the internships are being done by those coming from a lower-income group so it would apparently seem that they would also be the ones getting more exploited. However, this has not been empirically proven and can therefore be regarded as a theoretical notion.

Figure 2: Influence of Income Level on the Accessibility of Internships[1]

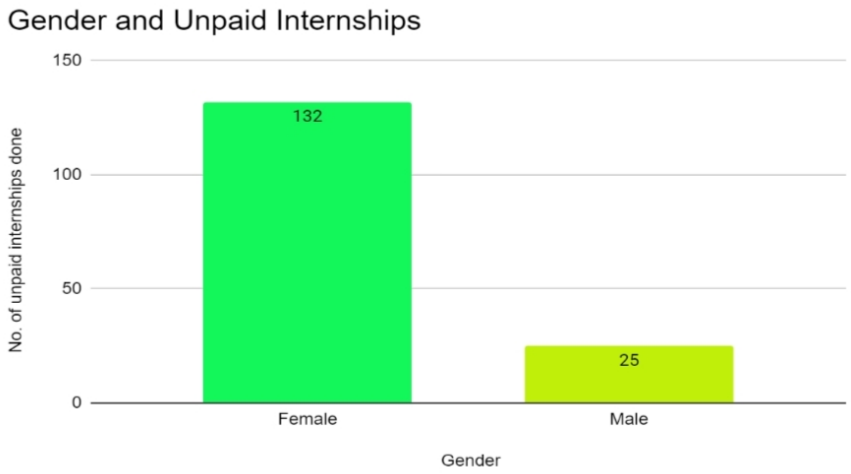


Source: Authors' visualisation from survey responses.

According to the results of the survey, 63% of the respondents belonging to an income level above 5 lakhs undertook internships through networking whereas 21% of the respondents earning 3-5 lakhs annually undertook internships through personal/professional connections. Approximately 10.5% of the respondents from the income group of 1-3 lakhs were able to obtain internships through their known connections while 5.5% of the respondents earning less than 1 lakh annually undertook internships through networks. On the other hand, 93% of the respondents belonging to the income level above 5 lakhs stated that they did not receive internships by capitalising on their networks; 7% of the respondents belonging to the income group earning 3-5 Lakhs stated that they had not obtained an internship through personal connections. Based on the results, we can conclude that lower the income level, poorer is the accessibility of students to undertaking internships through connections. However, a conflicting result arises since a very large proportion of respondents were also unable to obtain internships through personal/professional connections. Thus, we are tempted to conclude that income level would have no influence on accessibility of internships however, this may be sample-specific.

[1]The graph is based on the results obtained from the follow-up survey. There were 41 respondents in the follow up survey.

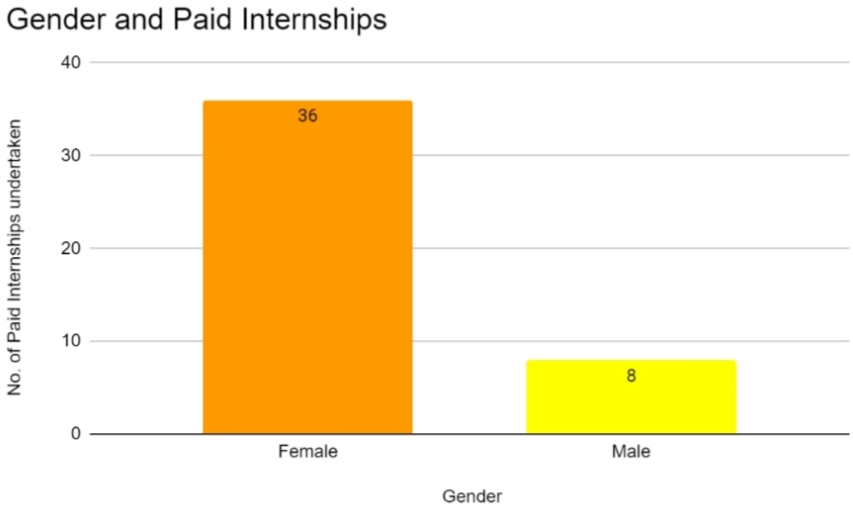
Figure 3: Gender and Unpaid Internships[2]



Source: Authors' visualisation from survey responses.

Based on the sample, on an average female respondents tend to take work as unpaid interns more than male respondents.

Figure 4: Gender and Paid Internships

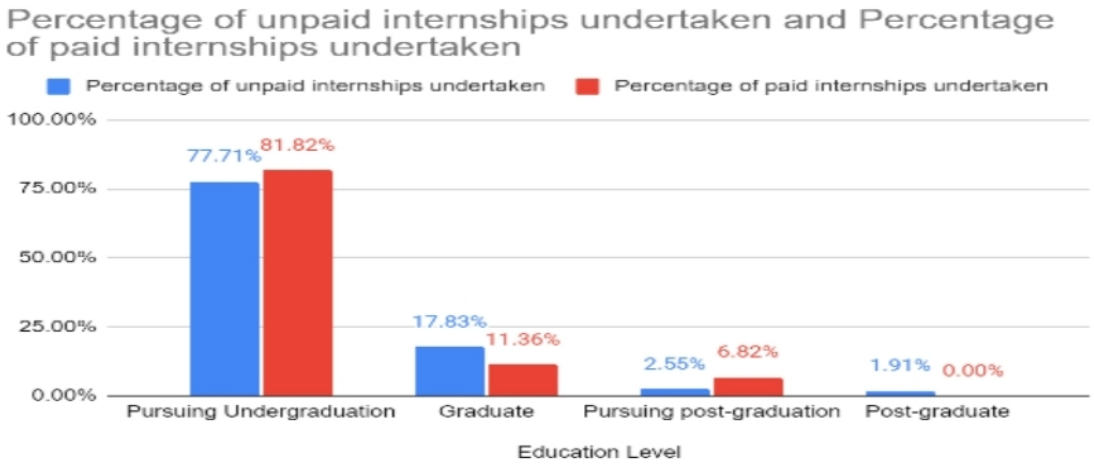


Source: Authors' visualisation from survey responses.

Based on the sample, females on average tend to take paid internships more than males. Thus, based on Figure 4 and Figure 5 we are tempted to conclude that there is a greater tendency in female respondents to undertake internships than male respondents. However, this may not give an accurate picture since a very small percentage of the respondents were male.

[2]Note: The average number of internships taken by males and females is studied.

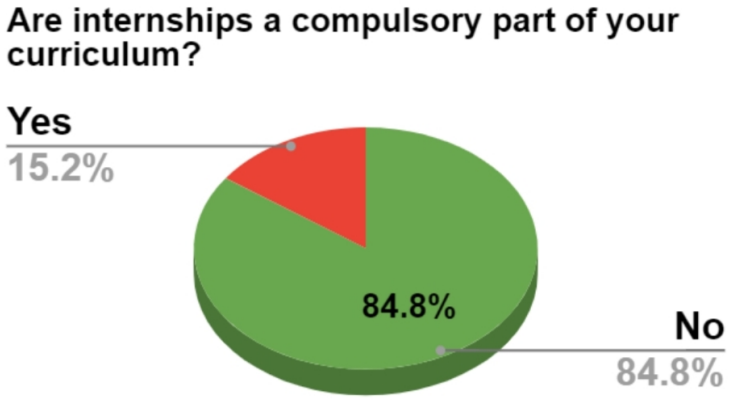
Figure 5: Share of Unpaid and Paid Internships by Education Level



Source: Authors' visualisation from survey responses.

According to the results of the survey, 77.71% of the unpaid internships for the period Jan 2020-September 2021 were undertaken by the respondents who are currently pursuing graduation. For the same period, 17.83% of the unpaid internships were undertaken by the graduated students and only 2.55% of the unpaid internships were taken up by the respondents who are currently pursuing post-graduation. As per the survey, only 1.91% of the unpaid internships were undertaken by post-graduate students. Thus, as the students attain a higher education level, and become more skilled they tend to take fewer unpaid internships. 81.82% of the paid internships were undertaken by the respondents who are currently pursuing their graduation. As per the survey, 11.36% of the paid internships were undertaken by graduate students whereas only 6.82% of the paid internships were undertaken by students pursuing their post-graduation. As per the results of the survey, no post-graduate respondent undertook a paid internship. This is contrary to the notion that as the education level increases and the more skilled the worker becomes, the more bargaining power in the labour market. But the observed results may be sample-specific since only 2 respondents in the survey were post-graduates. Therefore, this trend may not generalise well to the entire population.

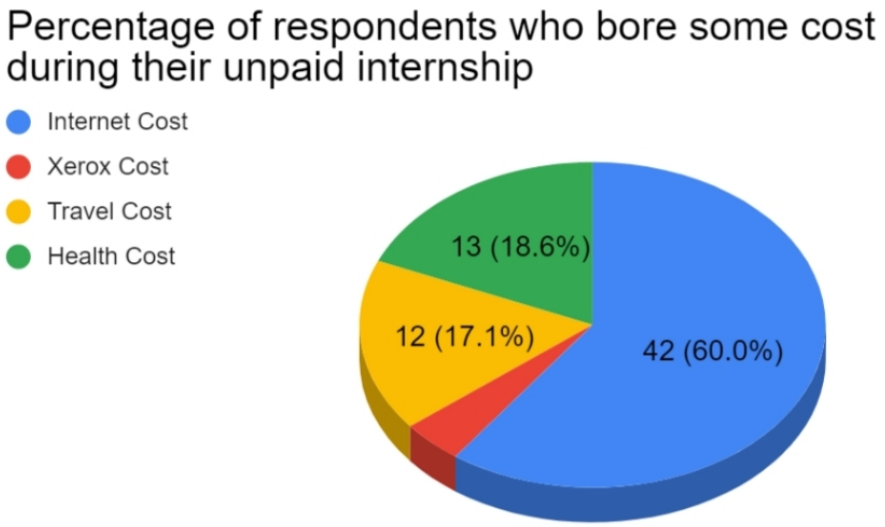
Figure 6: Internships: Compulsory or Not?[3]



Source: Authors' visualisation from survey responses.

According to the survey results, 15.2% of the respondents stated that the internships were part of their curriculum whereas 84.8% of the respondents stated that the internships were not a part of their curriculum i.e. they had participated voluntarily.

Figure: 7: Costs of Working in Unpaid Internships



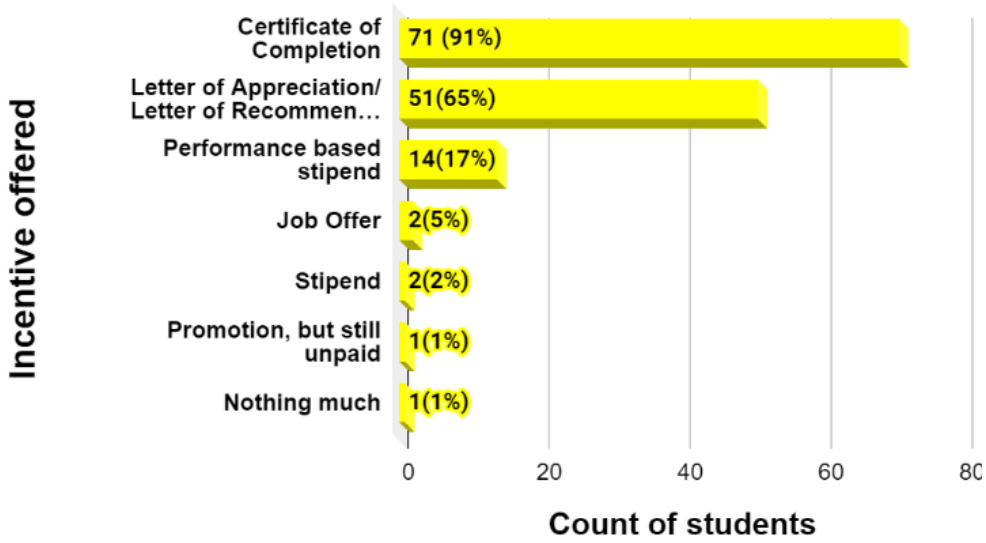
Source: Authors' visualisation from survey responses.

It was observed that 60% of the respondents (42) bore internet costs in their unpaid internships. 18.6% (13) were affected physiologically and/or psychologically during the tenure of their unpaid internship and thereby bore some health costs. 17.1% of the respondents (12) bore travel costs during their tenure as unpaid interns. Approximately 4.3% of the respondents (3) bore xerox costs during their unpaid internship. As seen in fig 7 and as per

[3]The graph is based on the results obtained from the follow-up.

a sample of students pursuing undergraduate (assumed not earning) have to pay internet costs and health costs and travel costs which is a matter of concern and strong evidence of exploitation of interns when compared to the incentives.

Figure 8: Incentives for Taking up Unpaid Internships

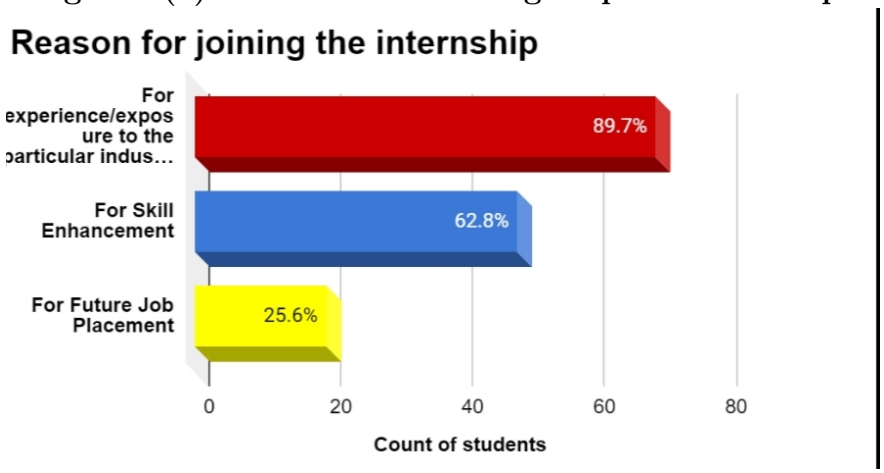


Source: Authors' visualisation from survey responses.

Taking about the incentives for taking up unpaid internships, 91% of the respondents (71) were given certificates of completion for their work as unpaid interns. 65% of the respondents (51) also received a letter of appreciation and/or a letter of appreciation from their respective employer organisation. Moreover, a relatively small proportion of the respondents (14), roughly 17%, received a performance-based stipend for their tenure as unpaid interns.

As per the survey, only a negligible percentage (5%) of those who worked as unpaid interns ended up with a job offer. The survey found that 2% received a stipend from their unpaid internship and 1% earned a promotion but it too was unpaid. As per the results of the survey, 1% of the respondents who undertook unpaid internships did not receive any recognition for the work done by them.

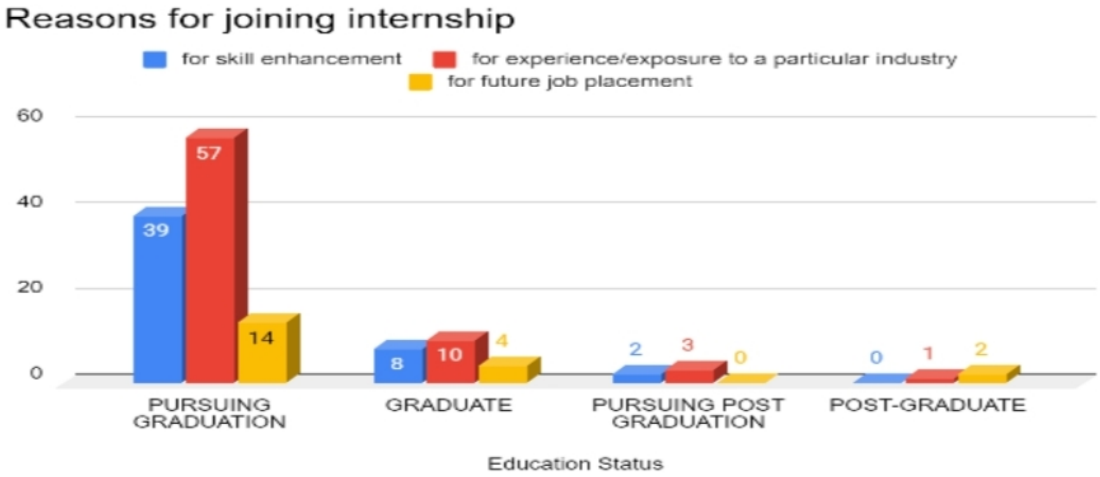
Figure 9(a): Reasons for Joining Unpaid Internship[4]



Source: Authors' visualisation from survey responses.

According to the results of the survey, 89.7% of the respondents cited experience/exposure to the given industry as the reason for having taken the unpaid internship. Approximately 62.8% of the sample which constitutes more than half of the respondents also stated skill enhancement as a factor in motivating them to take up the unpaid internship. Only a quarter of the respondents (25.6%) cited future job placement as a reason for undertaking work as an unpaid intern.

Figure 9(b): Reasons for Joining Internships



Source: Authors' visualisation from survey responses.

According to the survey, 39 of the respondents currently pursuing graduation cited skill enhancement as the reason for joining the unpaid internship. Skills matter more than just a certificate and as per Figure 9 (reasons for joining internship) students join internship for skill enhancement and exposure and not merely for a certificate, whereas the result of Figure

[4]Note: The figure has been drawn incorporating the intersections since the respondents had multiple motives for joining the internship.

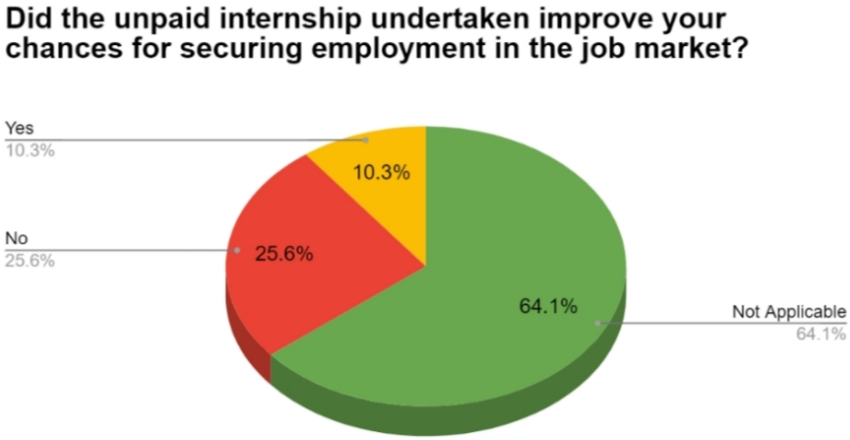
8 shows that certificate and LOR is given as an incentive to majority. But, for a large share of the undergraduates, experience/exposure to a particular industry was the main reason which led them to take up unpaid internships. For very few respondents, however, future job placement motivated them to undertake work as unpaid interns. Within graduates, 10 respondents cited experience/exposure to a particular industry as the reason for undertaking unpaid internships whereas only 4 respondents cited future job placement as the factor that motivated them to take up the unpaid internship.

Figure 10: Learning Outcomes from Undertaking Unpaid Internships

Source: Authors' visualisation from survey responses.

According to the results of the survey, 83.3% of the respondents who undertook unpaid internships agreed that it contributed substantially in their skill development such as development of soft skills, technical skills, managerial skills etc. Whereas 2.6% of the respondents who worked as unpaid interns believed that their internship did not contribute substantially in their development of skills.

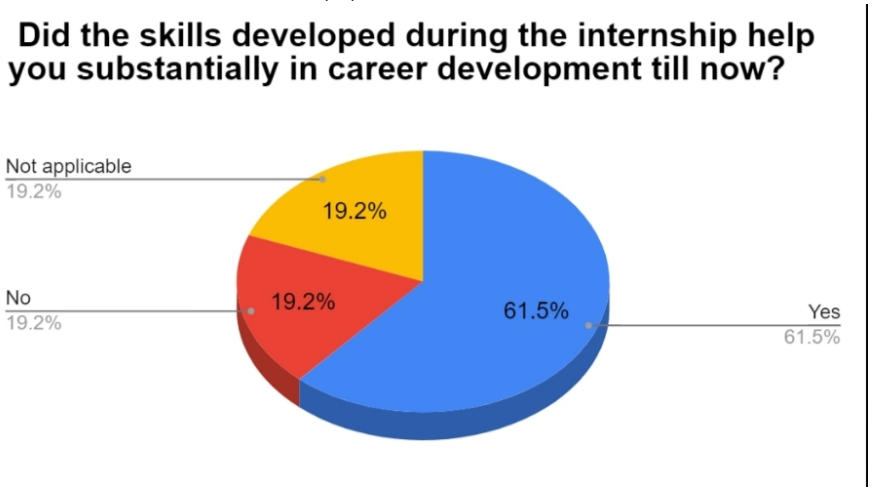
Figure 11(a): Unpaid Internships and Career Development



Source: Authors' visualisation from survey responses.

It was found that for 10.3% of the respondents the unpaid internship that they undertook significantly improved their chances of securing employment in the job market. However, for 25.6% of those who took unpaid internships the chances of securing employment had not improved. As per the survey, 64.1% of the respondents who undertook unpaid internships were not eligible to enter the job market (in the sense that they are not a part of the working population) and therefore this analysis could not be made for this share of the sample.

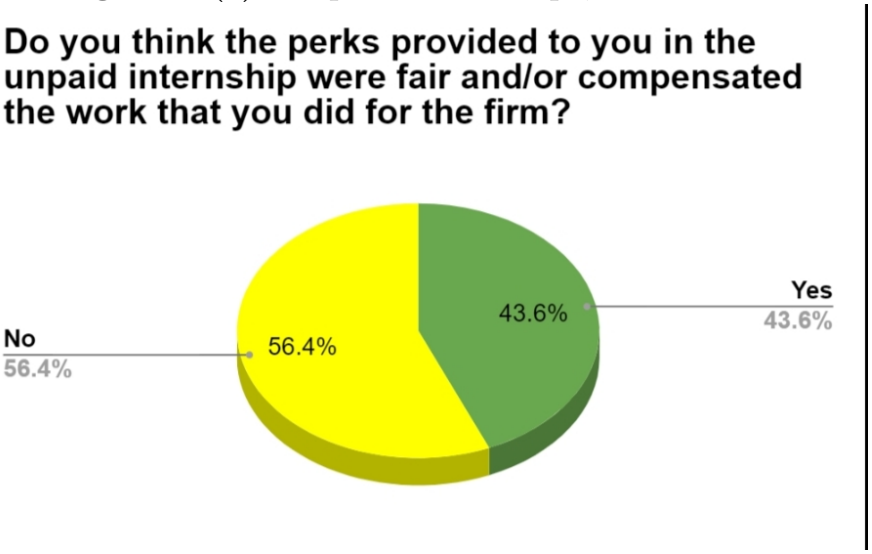
Figure 11(b): Do the Skills Help?



Source: Authors' visualisation from survey responses.

As per the survey, for 61.5% of the respondents, the skills acquired during their unpaid internships helped them substantially in career development. However, for 19.2% of the respondents, the skills developed during their unpaid internships had no impact on their career development. However, 19.2% of the respondents have not entered the job market and therefore this analysis could not be made for this share of the sample

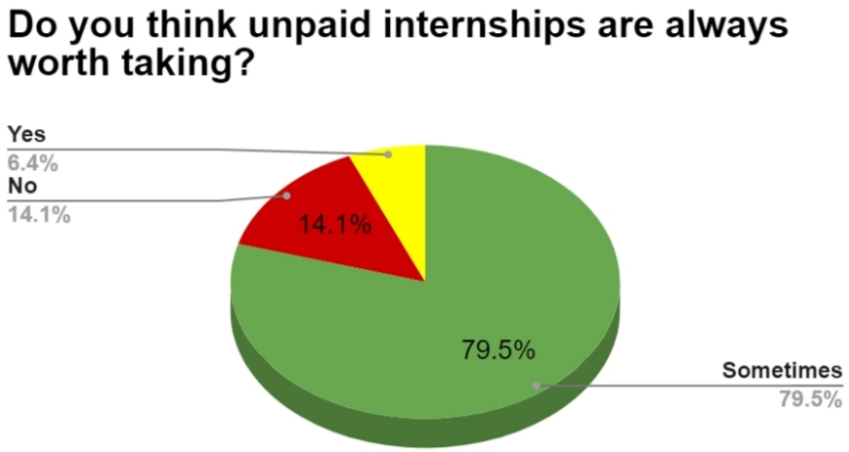
Figure 12(a): Unpaid Internships; Fair or Not?



Source: Authors' visualisation from survey responses.

According to the results of the survey, a significant proportion of the respondents (56.4%) believed that the perks offered to them for their unpaid internship did not duly compensate for the work they did for the firm. However, 43.6% of the respondents believed that the perks provided to them by their employer/organisation recognized and compensated them fully.

Figure 12(b): Unpaid Internships; Worth it or Not?



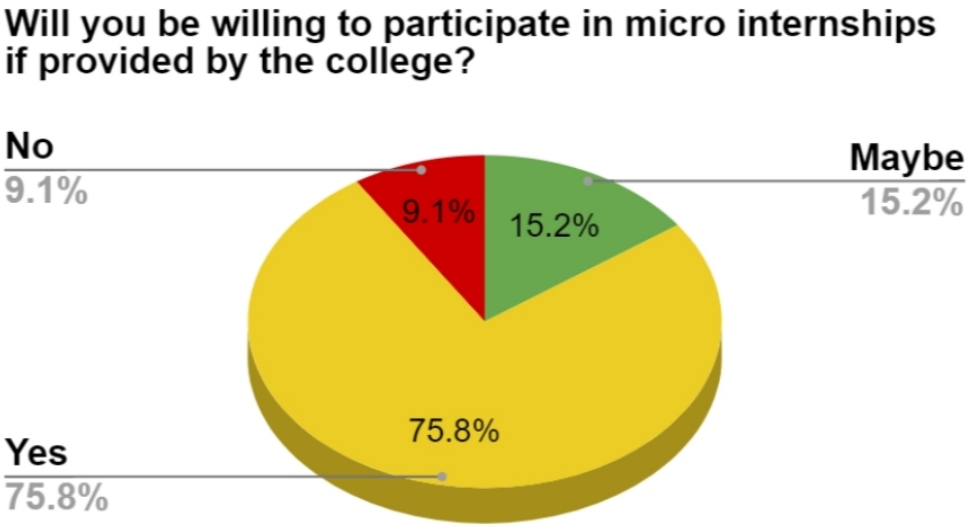
Source: Authors' visualisation from survey responses.

It was found that a very small share of the respondents, that is, 6.4% believed that unpaid internships were always worth taking as opposed to 14.1% of the respondents who believed that unpaid internships were not worth their while. As per the survey, 79.5% of the respondents stated that unpaid internships may not always be worth undertaking.

The respondents have worked as unpaid interns with various organisations and at different positions. Assuming that the revenue of the firm will be generated only by labour output and productivity and keeping other contributing factors constant, and if the majority of the students across India take up unpaid internships one could point out that the firms have been able to save costs by not paying the intern and have also profited by the efforts of the intern. The firms instead of paying the interns according to their work provide to them a certificate/letter of recommendation which the interns, especially those pursuing graduation, willingly take in the hope of improving their CV.

As per the survey, it was found that most of the respondents felt that the perks received, and the skills acquired were not following the work performed by them for the organisation. However, this is a theoretical proposition. For this to be empirically proved, company data is required of sales and the number of unpaid interns employed during a specific time. This is out of the scope of this project. Further research can be done to empirically test this theoretical consideration.

Figure 13: Willingness of Students to Participate in Micro-internships[5]



Source: Authors' visualisation from survey responses.

More than half (75.8%) of the respondents were willing to participate in the micro-internships if the college were to provide them. However, 9.1% of the respondents were unwilling to participate in micro-internships.

5 Conclusion and Policy Recommendations

We have not taken the supply side factors into account because of unavailability of data. It was found in the survey that many of the respondents felt that the perks received, and the skills acquired were not following the work performed by them for the organisation. However, this is a theoretical proposition. For this to be empirically proved, company data is required of sales and the number of unpaid interns employed during a specific time. This is out of the scope of this project. Further research can be done to empirically test this theoretical consideration.

Unpaid internships are often perceived as an excellent way to commence building one's skilled network, develop skills, and acquire valuable feedback from professionals and experts. This also turns out to be a decent indicator of whether you'll like your future profession. As stated by (Ravishankar, 2021) in Harvard Business Review while internships have high worth within the job market, analysis shows that forty-third of internships by for-profit firms, square measure unpaid. Not paying associate interns for their work, time, and energy isn't simply unfair, it's unethical and exploitative.

With the advent of the COVID-19 pandemic, the number of virtual internships has skyrocketed-most of them being unpaid; naturally exhibiting the same virtues and vices of unpaid labour. One way to work in the direction of ending the vices would be the introduction of micro-

[5]The graph is based on the results obtained from the follow-up survey.

internships at different levels of education.

5.1 Introduction and Implementation of Micro-Internships:

A micro-internship holds the characteristics of a short-run, paid project for college-going students. Every project is extremely specific and might vary from content creation to knowledge analysis to analysis work. The project will extend from a week-long assignment to a one-month engagement mode might be virtual or on the website. Unlike summer internships, a micro-internship would be obtainable throughout the year, which means a corporation can run a standard summer post-program and still use the micro-interns year-round.

Micro-internships for firms, provide how to diversify their worker pipeline, and forge relationships with young talent. For college students, they provide a wonderful opportunity to achieve real-world expertise and connections with additional flexibility and fewer barriers to access. All at once, micro-internships will cut back inequalities inherent within the ancient billet paradigm by providing valuable skilled coaching to a broad array of scholars, firms that add micro-internships to their hiring strategy would be likely to profit.

Indian educational institutions can incorporate such a model to reduce the urge of the fresher student to enrol themselves in certain irrelevant and futile internships, instead encouraging them to indulge in enlightening and fruitful internships. This can be further classified into 2 methods:

- **Internship-inclusive course curriculum:** Certain courses in India have internships as a compulsory component of their course curriculum. An introduction of micro-internship would require an institution to get involved in ensuring that the students get hold of their compulsory internship but ensuring that the internship was worth undertaking and was duly completed.

- **Internship-exclusive course curriculum:** For some courses like B.A. and BSc. in institutions like Delhi University which do not include an internship as a compulsory component, implementation of micro-internship would require some specific steps to be taken care of.

A systematic regulatory body can be established within the campus to act as watch guards to ensure a fair and just flow of internships. Such a body would aim to eliminate the factor of attaining the internships through just personal and professional connections encouraging enrollment in internships through merit moreover making sure that the relevance of the micro-internship does not get compromised. This would not be a herculean task as with micro internships the topic of the paid project is specific and would obliterate the chance of enrolling in futile and irrelevant internships.

Alumni of every institution are a valuable asset and can contribute to the micro-internship unit. Alumni can organise camps to recruit students and invite other employers and companies to provide micro-internship opportunities. This would help in narrowing the internship access gap existing in the traditional internships.

With the incorporation of such a micro-internship cell, the students stand a chance to cover several ill-effects associated with unpaid internships in particular and reap genuine benefits from their experiences.

A Appendix

SECTION 1: Personal Profile

2. 1.1) Name *

3. 1.2) Age *
Mark only one

17-20
21-23
24-26

4. 1.3) Gender *
Mark only one
Female
Male
Prefer not to say
Other:

5. 1.4) Caste:
Mark only one

General
SC
ST
OBCs
Other:

6. Marital Status
Mark only one

Married
Unmarried
Divorced

Separated

7. Annual Family Income (INR) *
Mark only one

Less than 1 Lakh
1-3 Lakh
3-5 Lakh
Above 5 Lakh

8. Education Status *
Mark only one

Pursuing Graduation
Graduate
Pursuing Post-Graduation
Post-graduate

Section 2

2.1) Position(s) of Unpaid Internship (held till-date): *

Tick all that apply.

Campus Ambassador
Content Writer
Data Analytics Intern
Graphic Designer
HR Intern
Research Intern
Sales/Marketing Intern
Operations Intern
Social Media Marketing
Other:

2.2. Platforms helpful for finding internship: *
Tick all that apply.

Internshala
LinkedIn
Dare 2 Compete
Career Opportunity Cell
Other:

2.3) How many UNPAID internships have you done till now? (Jan 2020-present) *

2.4) How many PAID internships have you done till now (Jan 2020-present)? *

2.5) Duration of unpaid Internship: (on an average) *
Mark only one oval.

Less than 1 month
1-3 months
4-6 months
Above 6 months

2.6) Hours worked per week: (on an average) *

2.7) Reason for joining internship *

Tick all that apply.

For experience/exposure to the particular industry
For Skill Enhancement
For Future Job Placement
Other:

2.8) Work culture exhibited at your internship: *

Tick all that apply.

Healthy work environment
Flexible working hours
Professional
Promised but not delivered
Availability of Work from Home Facility Other:

2.9)(A) Incentives Offered *

Tick all that apply.

Certificate of Completion
Letter of Appreciation/ Letter of Recommendation
Performance-based stipend
Job offer Other:

2.9) (B) If you received a performance-based stipend, how much did you earn?

2.10) Mention the costs that you bore during the tenure of the internship: (Choose Not Applicable if no cost was incurred) *

Tick all that apply.

Travel Cost
Xerox Cost
Internet Cost
Not Applicable
Other:

2.11)(A) Did any of the internships have a negative impact on your health? (physiological or psychological issues) *
Mark only one oval.

Yes
No

2.11)(B) If yes, then did your firm offer health benefits(E.g.: sick leaves, flexible schedules)? *
Mark only one oval.

Yes
No
Not Applicable (for those who chose no in the previous question)

2.11)(C) Further, was the organisation/employer sensitive to the health problems you faced? *
Mark only one oval.

Yes
No
Not Applicable

2.12) Learning outcomes from the internships/ Major takeaway: *

Tick all that apply.

Skills (E.g.: Managerial Skills, Technical Skills, Writing Skills etc.)
Exposure in a particular industry
Soft skills
Other:

2.13) Have the internships done till now, contributed positively to your skill development? *
Mark only one oval.

Strongly Agree
Agree
Neither
Agree nor disagree
Disagree
Strongly Disagree

2.14) Did the skills developed during the internship help you substantially in career development till now? *
Mark only one oval.

Yes
No
Not applicable

2.15)(A) Did the unpaid internship undertaken improve your chances of securing employment in the job market? (Choose Not Applicable if you have not entered the labour market/are not currently seeking a job) *
Mark only one oval.

Yes
No
Not Applicable

2.15)(B) If chosen yes in the previous question, explain how. (Write no if not applicable)
2.16) Do you think the perks provided to you in the unpaid internship were fair and/or compensated for the work that you did for the firm? *
Mark only one oval.

Yes
No

2.17)(A) Do you think unpaid internships are always worth taking? *
Mark only one oval.

Yes
No
Sometimes

2.17)(B) Explain your choice(Yes?, No?, Sometimes) in the previous question. *

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Do Coalition Governments Provide Better Developmental Outcomes in the Indian States?

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Abstract

There is an increasing interest in understanding the influence of political structures on economic variables. In particular, there has been quite some focus on understanding the effects of government composition on outcomes. However, there are certain gaps in the literature. Do coalition governments differ from absolute majority governments with respect to such indicators? This paper tries to analyse the relationship between coalition governments and developmental outcomes for Indian states over the period 2000-2019. We find that coalition governments are statistically different from absolute majority governments in terms of development performance. We find that the former are negatively related to development outcomes; coalition governments lead to lower developmental progress as opposed to single- party/absolute majority governments.

JEL Classification: H70, I31, P48, O15
Keywords: Coalitions, Development, Growth, Politics

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1 Introduction

What is the role of a government? This age-old question has many answers. Some of the most common responses include being responsible for maintaining law and order, enforcing civil rights, providing security and defence against foreign invasion etc. From an economic perspective, governments correct for market failures, redistribute resources and offer public goods which the citizens might not be able to provide for themselves (Stiglitz & Rosengard 2015; Hindriks & Myles 2013) This is particularly true for democratic governments. They are concerned with the welfare of the citizens, not entirely due to altruistic reasons but because they want to get re-elected to public office (as the public choice theorists tell us). Consequently, they undertake activities that aim to raise overall living standards in the hopes of influencing voters.

Electoral processes bring out different types of governments. This can range from absolute majorities where a single political party alone wins comfortably more than the required number of seats to win the elections to coalition governments that see the coming together of several parties to form a majority, based on some common ground, ideological or otherwise. Be it the Bharatiya Janta Party (BJP) in India, Maldivian Democratic Party in the Maldives, Awami League in Bangladesh or the Druk Nyamrup Tshogpa in Bhutan — over the past few decades, there has been a rising trend in the creation of Majority and Absolute Majority Governments[1] in South Asia. With South Asia hosting roughly a quarter of the world's population and being considered the new face of the world's emerging economies, it is imperative to critically analyse the socio-economic and developmental implications of the political environment of these countries.

This is an important question to consider since previous literature tells us that the composition of government has a bearing on the type of policies that are chosen. We lay our focus on India. The country follows the federal system of government, with legislative power divided into two levels, the Union government and State governments. Each level's jurisdiction is laid out in the Seventh Schedule of the Constitution which divides the powers of the two into the Union List, the State List and the Concurrent List. State Legislature can be divided into 2 houses: the Legislative Assembly (popularly known as the Vidhan Sabha) and Legislative Council (known as Vidhan Parishad). The Vidhan Sabha is the real authority of power and decision-making in a state. Its members are chosen directly by the people. As for the Vidhan Parishad, it is the upper house of the state legislature whose members are selected via indirect means. Furthermore, all states have a Vidhan Sabha but not necessarily a Vidhan Parishad (only 6 states have it). Therefore, our study focuses on the Legislative Assembly election outcomes.

"Indian states provide us with an unusual microcosm and macrocosm for studying the processes of development: a microcosm since the states are constituent units of a larger system, and a macrocosm because the units are themselves so large that they can be studied as

[1] An absolute majority government is one in which one contesting party holds a comfortable majority of seats in a legislature. The majority is a 'working majority' and it is usually large enough to have its legislation passed without any risk of parliamentary defeat.

total systems" (Wiener 2015). This presents us with the perfect opportunity to compare patterns of development in varied political systems functioning within the single framework of a country. All states have the same legal system, constitution and administration but the internal compositions of the governing parties can vary.

For a long time since its independence in 1947, India saw a dominant role played by one single party both at the national and regional levels of politics. It was the Indian National Congress (INC). Associated with the freedom struggle, INC enjoyed great popularity amongst the masses. In the first general elections held in 1951-52, the party won 364 of the then 499 seats in the Lok Sabha. Its dominant run at the national level continued till the 1970s. However, the elections following the imposition of the Emergency in the mid-1970s saw the creation of the first-ever coalition government in Indian politics led by the Janata Party under Morarji Desai.

Although the INC did return to power in the early 1980s, there were intermittent periods of both majority and coalition governments. However, the period from the late 1990s to 2014 saw the emergence of what is called "coalition politics" on the national level. The first coalition government to complete a full 5-year term was under Atal Bihari Vajpayee from 1998 to 2004. This was followed by the Congress-led United Progressive Alliance (UPA) which won the elections in 2004 and 2009. In both 2014 and 2019, the BJP secured a majority on its own and formed governments at the Centre with the National Democratic Alliance (NDA). At the State Level, the first coalition government was set up back in 1952 in Kerala. This indicates that there is greater electoral competition amongst political parties at the state level. Another important feature of state-level politics is the dominant role played by regional parties. However, it has grown immensely since the advent of coalition politics at the national level (Ziegfeld 2012) Given the rather long association of Indian politics with coalition governments, it becomes imperative to study how (if any) developmental outcomes differ across coalition and majority governments.

The main objective of this paper is to understand how the political composition of state governments affects and influences human development outcomes. If one party has an absolute majority, it can freely implement policies and actions without any dependence on other political parties. On the other, if no single party has control over half of the seats, parties will have to form coalitions and make the decisions together. In essence, we aim to answer the following question: Do coalition governments perform better with respect to development indicators? If so, why and by how much? This is an important question that previous literature has not answered satisfactorily. While there are studies that focus on different economic aspects of coalition governments in India, (Lalvani 2005; Dutta, n.d.) to the best of our knowledge no paper has tried to understand the developmental outcomes of coalition governments at the state level. Our study tries to fill this gap.

Our paper is structured in the following manner: Section 2 entails our review of the existing literature, and Section 3 expands on the data and methodology used. In Section 4, we present and discuss the findings of our research. We conclude our paper in Section 5 and provide the scope for further research.

2 Literature Review

Through our review of current literature, we believe that there are two potential outcomes of having a majority government, both of which will have opposing results.

Firstly, we believe that by exploiting their majority status, governments can easily pass various policies and other initiatives and measures to improve development outcomes. After all, if there is no effective or 'real' opposition, there is a scant scope for policies or laws to not be passed. Khemani and Wane (2008) find that, under reasonable assumptions, single-party governments incur greater public expenditure and impose higher taxes. Such governments provide public goods for reaping electoral benefits. This can improve the standards of living of the people as greater investments are made in areas like education, healthcare, social security etc.

Further, the concentration of political power with one party creates an aspect of indivisibility in terms of indivisibility of spending and decision making, which can lead absolute majorities to spend more (Ronny & Odendahl 2012), and make faster decisions. Extending this, coalition governments may not be able to quickly and effectively pass policies and make decisions for the development of the region. Differing party interests or motivations can result in the tabling of bills, and the prevention of desired development outcomes. Therefore, a coalition may not be able to agree on projects and ends up implementing few or none.

Secondly, it is plausible that due to the Common Pool Problem and the externalisation of costs in coalitions, coalition governments may provide better developmental outcomes. The model suggests that when coalition governments are formed, all of its constituent parties wish to target spending to their core electoral groups. Costs, however, are externalised and spread across and shared by all parties of the coalition. This results in higher spending than in the case that one party would be governing. This implies that there is an increase in spending to deliver targeted benefits when coalitions form governments (Meriläinen 2013).

Supporting this, the research of Bawn, K. and Rosenbluth F (2006) suggests that the more parties in government at the budget-passing time, the larger is the public sector. Similar to Meriläinen (2013), they state that "a government coalition of many parties behaves differently than a single-party coalition of many interests because of electoral accountability. A single party in the government is accountable for all policy decisions it makes; if it wants to keep its majority, it must promote the collective interest of a broad support base (Cox 1987). Participants in multi-party coalition governments, by contrast, are held primarily responsible for only a subset of policy decisions, for the policy areas in which they have the biggest stake, and the biggest impact."

We believe these differences in expenditures are crucial in shaping developmental outcomes. This is a fairly straightforward assumption one can undertake. Countries that have higher expenditures may be in a better position to ensure that their citizens are able to access a better standard of living. Going by this logic, governments that incur higher expenditures also enjoy better development outcomes. Gupta et al (1999) find that expenditure allocation is crucial for health and education services in society. In a similar manner, Rajkumar and

Swaroop (2008) show that public spending and outcomes are linked in the desired manner when good governance prevails.

This study is unique on two fronts. Firstly, it studies the impact of concentration of political decision-making power on development indicators in an Indian context. While there have been studies that analyse the impact of local governments and their formations on public spending, taxation, etc, we believe this might be the first study to do an in-depth analysis of Indian State governments. Secondly, the paper further contributes to the existing research in the intersecting fields of development economics and political science. Instead of national, cross-country comparisons, it emphasises the comparison of development outcomes of units within the same political system, with the same institutional background.

3 Data and Methodology

3.1 The Model

$$Y = f(C) \tag{1}$$

Where Y is a measure of developmental outcome such as the Human Development Index (HDI).

It is considered to be a better proxy for overall development as compared to other yardsticks like per capita Gross Domestic Product (GDP). This is because HDI is multifaceted in the sense that it takes into account a broader definition of development. It takes 3 dimensions namely:

1. Long and healthy life;
2. Knowledge and;
3. Standard of Living.

The calculation of the HDI can be seen in Appendix A.2.

C in equation (1) refers to a coalition government. We consider coalition governments that are forced coalitions. While a coalition exists when multiple parties come together to form a government, there are instances where one party alone in the coalition captures enough seats to form a majority[2]. We do not consider this form of a coalition in our study since there is no real coercion, political or otherwise, for such a government to take into account the

[2]An illustration from our data might be useful here: The Left Front Alliance in West Bengal consists of various parties including the Communist Party of India (Marxist). A party requires 148 out of 294 seats to win a majority in the state assembly. In the 2006 West Bengal State Assembly elections, the Left Front amassed 233 seats in the assembly elections out of which 176 seats alone were won by the Communist Party of India (Marxist). We consider such instances to form a majority government despite being under coalition or alliance.

consideration of other groups. As long as it satisfies the demands of its core constituency, the possibility of reelection is high. A forced coalition, in this paper, refers to a coalition that is formed when no single party has garnered enough seats to form a majority and seeks the support of other parties to form a government. Such a government will be forced to distribute any gains across different groups in order to increase their chances of re-election.

We augment equation (1) by including other factors that influence development. In a recent paper, Tripathi (2021) studies the relationship between urbanisation and development in a cross-country analysis. While urbanisation enhances economic activity, its relationship with people's capabilities and well-being is largely understudied. The study finds that the relationship between the two depends on how one measures urbanisation. For some proxies like the total urban population, the relationship is positive. While for others, such as the urban population growth rate, it is negative. Overall, the study argues for promoting measures of urbanisation to achieve higher human development.

In a similar cross-country analysis, Shah (2016) finds that fertility is negatively associated with HDI. The relationship between fertility rates and development is rather ambiguous. Many cross-sectional studies have found a negative relationship between the two. However, some authors conclude that the relationship turns positive beyond a certain level (HDI value of 0.86) (see Myrskala et al 2009, Harttgen and Vollmer 2013). In a study based in Pakistan, Qasim and Chaudhary (2015) analyse disparities in development. They employ various indicators of industrialisation and social development. The study finds that population density is also an essential factor in promoting development. Various studies also include a measure of material prosperity like per capita income or its growth rate to understand the developmental process better (Bhowmik 2019).

$$Y = f(C, TFR, UR, PD) \tag{2}$$

where TFR is total fertility rate, UR is urbanisation and PD is population density.

3.2 Data and Variables

Our study considers a panel dataset of 20 states[3] in India over the period 2000-2019. The main data source for our study is GlobalDataLab. It is a repository of subnational developmental indicators for various countries across many years. It is hosted by Radboud University. For coalitions, we have seen election results available on the Election Commission of India website and other internet sources. The variables chosen in the analysis undertaken here are defined in Table 1.

[3]Data of newly formed states and their original states during this time period was not considered. For example, in 2014 Andhra Pradesh was split into Telengana and Andhra Pradesh. The data of both these states is not considered.

Table 1: Variable Description

Conceptual Variable	**Observable Variable**	**Variable Type**	**Definition**	**Source**
Development	Subnational Human Development Index (SHDI)	Dependent	It is the average of the subnational values of 3 dimension indexes- education, health and standard of living. It is similar to the HDI produced by the UNDP, only that it is applied to the subnational level.	Global Data Lab
Coalitions	Coalition	Independent	Forced coalition as described in section 3.1.	Election Commission of India
Fertility	Total Fertility Rate	Control	Average number of children born to a woman if they were to experience the exact age-specific fertility rates throughout life.	Global Data Lab
Urbanisation	Population in Urban Areas	Control	Percentage of population in urban areas in the state	Global Data Lab
Population Density	Population Density	Control	Number of people living in a place divided by its total area	Global Data Lab; for total area we have taken Census 2011 data.

Source: Authors' descriptions.

3.3 Econometric Model and Estimation

Based on the discussion in the paper so far, we estimate the following equation:

$$Y_{it} = \beta_1 + \beta_2 Cogov_{it} + \beta_3 Urbani_{it} + \beta_4 Density_{it} + \beta_5 Totalfer_{it} + u_{it} \quad (3)$$

i=1,2,3...20

t=1,2,3...20

Here, i refers to the cross-sectional subjects in the dataset i.e., states of India while t refers to the time dimension starting from 2000 to 2019. For descriptive statistics, please see Table 1. Y stands for the subnational HDI, urbani refers to the percentage of people living in urban areas of a state, density refers to population density and totalfer stands for total fertility rate. U is the error term. Our main variable of interest is Cogov which stands for coalition governments. It is a dummy variable specified as: Cogov = 1, if in a given state in a given year there is a coalition government and 0, otherwise.

Table 2: Descriptive Statistics

Variable	Mean	Maximum	Minimum	Median	Observations
shdi	0.619	0.782	0.455	0.621	400
cogov	0.4	1	0	0	400
urbani	32.39	84.3	8.81	30.95	400
density	350.75	1155.77	13.45	321.99	400
totalfer	2.49	6.2	0.93	2.325	400

Source: Authors' calculations.

We have a balanced panel with N = T. We estimate equation (3) using pooled OLS estimation, random effects estimation and fixed effects estimation. Pooling estimates are very likely to be erroneous in our case since they do not take into account the inherent heterogeneity amongst our cross-sectional units. In intuitive terms, we believe that fixed effects are the most suitable method of estimation since our sample does not constitute a random drawing. Furthermore, econometric theory tells us that fixed-effects estimates are also consistent (Gujarati and Gunasekar 2017). We nonetheless estimate the equation using all 3 methods and decide on the most appropriate method based on statistical testing.

4 Results and Interpretation

4.1 Regression Results

Table 3: Estimation Results

Variables	Pooled Estimates	Fixed Effects Estimates	Random Effects Estimates
intercept	0.69825***	-	0.74762***
	(0.012092)		(0.016179)
cogov	0.012636*	-0.014392***	-0.01438***
	(0.0049622)	(0.0031177)	(0.0032044)
urbani	0.0020867***	0.00028904	0.0012287***
	(0.00018)	(0.00039196)	(0.00033649)
density	-0.00005517***	0.00014232***	0.000051471*
	(0.00000)	(0.000029057)	(0.000022934)
totalfer	-0.053011***	-0.07439***	-0.072278***
	(0.00336)	(0.0023089)	(0.0023216)
Adjusted R^2	0.54693	0.81955	0.80796
F-statistic (p-value)	121.414	458.789	
	(0.000000)	(0.000000)	
F-statistic(p-value)	-	-	1682.69
			(0.000000)

Source: Authors' calculations using R.
Significance codes 0'***', 0.001 '**', 0.01 '*', 0.05 '.' Standard errors are in brackets.

In order to choose which estimation method (amongst the 3) is the best, we conducted the Hausmann test and the LM test. The test statistics along with the respective hypotheses are mentioned in the Appendix (see A.1). As per the BP-LM test and Hausmann test, we conclude that the Fixed Effects method is the most appropriate one for our study.

4.2 Diagnostic testing

Before interpreting the results, it is suitable to conduct diagnostic tests to get accurate estimates. We test for multicollinearity, serial correlation and heteroscedasticity. The results from the tests are in the following tables. For testing heteroscedasticity, we use the Breusch Pagan test while for serial correlation, we use the Breusch-Godfrey test. All 3 tests were run on R.

Table 4: Multicollinearity

Variable	Variance Inflation Factor
cogov	1.007488
urbani	2.050223
density	1.669374
totalfer	1.374421

Source: Authors' calculations.

Table 5: Heteroscedasticity Results

Test	Test Statistic	p-value	Result
Breusch Pagan Test	24.418	6.586e-05	Evidence of Heteroscedasticity

Source: Authors' calculations.

Table 6: Serial Correlation Results

Test	Chi-Square Statistic	p-value	Result
Breusch-Godfrey	310.13	$<$ 2.2e-16	Evidence of Serial Correlation

Source: Authors' calculations.

As far as the issue of multicollinearity is concerned, our VIFs are less than 4. This indicates that this should not be an issue with our results. However, the BP-LM test tells us that our model suffers from heteroscedasticity. Additionally, there is the presence of serial correlation in our results. Due to this, our estimates are not reliable. In order to get precise and reliable estimates, we need to account for these issues. Therefore, we compute serial correlation and heteroscedasticity consistent standard errors. The results of the same are mentioned in Table 7.

The variable of interest in our study is cogov. From Table 7, we see that the coefficient of cogov has a negative sign. Our estimates, therefore, suggest that there exists a negative relationship between coalition governments and development. The estimate of cogov reveals that coalition governments, on average, have an HDI value of 0.00144 units lower than that of a non-coalition or majority government ceteris paribus. The result is statistically significant. The signs of our control variables are correct and as per our expectations. Our results are consistent with the findings of previous studies, which concur that coalition governments are associated with lower levels of development.

Table 7: Serial Correlation and Heteroscedasticity Corrected Estimates

Variable	Estimates	Standard Errors
cogov	-0.01439216***	0.00278449
urbani	0.00028904	0.00079179
density	0.00014232	0.00007528
totalfer	-0.07438974***	0.00619468

Source: Authors' calculations using R.
Significance codes 0'***', 0.001 '**', 0.01 '*', 0.05 '.' Standard errors are in brackets.

5 Conclusion

The purpose of our paper was to understand if and how coalition governments affect overall development. This is an important question to consider since the political composition of a government has bearing on the type of policies undertaken by them. Our study aimed at answering this question in the context of India. We find that coalition governments are, on average, negatively associated with developmental outcomes. This result corroborates the findings of previous studies. In terms of Indian literature, our findings resonate with Lalwani (2005) who argues that although the fiscal performance of coalitions government is impressive, they do not take politically hard decisions which might be necessary to improve the overall standards of living.

Our study can be improved upon via further research. While we do not make any causal claims, it is necessary to understand the underlying mechanisms which are responsible for such a negative relationship. There are many directions in which this study can be expanded into study governments across countries, specifically analysing the trends prevalent in South Asian countries that are increasingly moving towards majority governments. Further, the study can be made more rigorous using advanced tools.

A Appendix

A.1

(a) Hausmann Test (for choosing between Fixed and Random Effects)

H_0: Both methods give consistent estimators

H_A: Random Effects Method gives consistent estimators

Table 8: Hausmann Test

Test	Chi-Square Statistic	p-value	Appropriate Method
Hausmann	23.288	0.0001109	Fixed Effects

Source: Authors' calculations.

(b) Breusch Pagan Lagrange Multiplier (BP/LM) Test (for choosing between Pooled OLS and Random Effects)

H_0: Both methods give consistent estimators

H_A: Random Effects Method gives consistent estimators

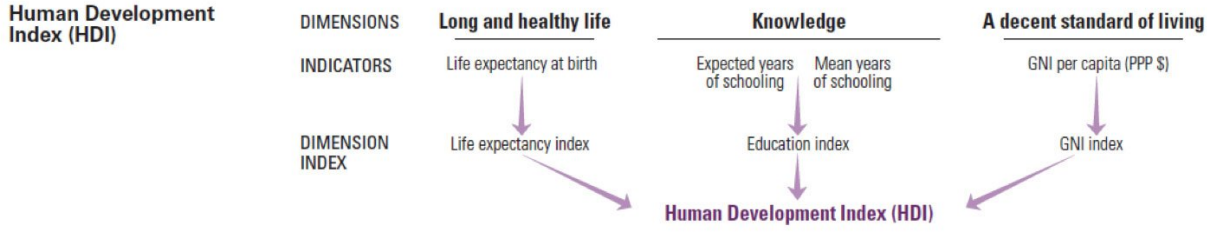
Table 9: Breusch Pagan Lagrange Multiplier (BP/LM) Test

Test	Chi-Square Statistic	p-value	Appropriate Method
BP-LM	1556.9	0.0000	Random Effects

Source: Authors' calculations.

A.2 Calculation of HDI

Figure 1: Calculation of HDI



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Assessing The Extent and Mechanism of Informal Credit Amongst Urban Poor: Lessons for Governance

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Abstract

This paper examines the relationship between the deep rooted socio-economic deprivations and consequent credit behaviour of the urban poor. The author studies various factors like stable and sufficient income, agricultural land holding, financial inclusion and rate of interest. Drawing from detailed information collected through a primary survey in Delhi, the author found that high interest borrowing from informal sources by urban poor primarily because of lack of documentation, absence of safety net and information gap between formal lenders and urban poor. The policy suggestions predicated upon the the study includes empowering and availing already established grass-root governance networks in order to improve the accessibility of formal credit to the urban poor, ensuring income and employment safety nets in order to minimize short term exploitative borrowings for consumption, we also proposed some grounded policy suggestions which can be replicated from their rural governance counterparts for facilitating access to formal credit in socially and economically deprived urban populations.
JEL Codes: G530, G510, J180
Keywords: Informal credit, Financial Inclusion, Grassroot governance, Urban poverty.

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1 Introduction

In recent years, post liberalisation of the Indian Economy in the fourth phase of globalisation, the increasing trend of migration from rural to urban centres in South Asia has led to the phenomenon of "urbanisation of poverty". The Rangarajan Committee estimates nearly 102.5 million individuals living below the poverty line in urban India. Urban poverty is multidimensional but for the most part, it can be assessed as a monetary phenomenon where the poor lack any safety net and stand exposed to shocks of the economy (Wratten 1995). Lack of accessibility to formal credit is one of the major reasons behind this grim picture. As De Soto (2000) argues that urban poor are deprived of formal banking institutions due to a lack of collateral, like land, which forces them to borrow from informal credit sources.

Available literature establishes that access to credit is one of the most effective tools for poverty alleviation with economists like Muhammad Yunus (2003) arguing that 42% of the borrowers from Grameen Bank were able to cross the poverty line, as well as evidence from Burgess and Pande (2005) also suggests that government-led financial inclusion programs in rural India have significantly contributed in poverty reduction.

It has been observed that the urban poor face a greater hurdle than their rural counterparts in terms of accessibility to credit (Bhattacharjee et al. 2009) where the inclusion of Gram Panchayats and Block Development Committee had substantially improved the outreach and had led to the success of credit-based poverty alleviation programs like Integrated Rural Development Program in rural areas (Pulley 1989). On the other hand, there has been limited integration of urban grassroots governance in the financial inclusion programs despite the 74th amendment in Article 243W of the Indian constitution which expanded poverty alleviation as one of the roles of municipalities (Kennedy 2012).

This might be largely due to a lack of acknowledgement in the public policy sphere of the essentiality of credit for the urban poor and the inability of governments to forth-come with an innovative financial mechanism for credit delivery to low-income households (Igel & Srinivas 1996). The primary purpose of this paper is:

- To assess the extent of high interest borrowing in slums and low-income neighbourhoods and whether high interest credit can be ascribed informal lending in addition to gauging the perception of urban poor regarding formal credit and structural blockages they face while accessing it.

- To study the modalities and mechanisms under which these informal credit lending systems operate and whether it becomes more pervasive during times of distress like demonetisation and the coronavirus pandemic.

- Finally develop policy recommendations on how governments can intervene efficiently to mitigate the limitations of the more conventional formal credit structure to increase its accessibility to the urban poor based upon outcomes of the primary survey and through reviewing consultancy reports, periodicals and case studies from across the world.

The paper is structured as follows: the first section is introduction which locates the relevance, objective and gives a brief review of the relevant academic literature. The second section of the paper is research methodology followed by the author while investigating the issue at hand. The third section presents the findings of the research, focusing on the three key objectives of the study. Fourth section is discussion on results and interviews undertaken during research. The fifth section presents possible policy implications.

2 Methodology

The study adopts a similar methodology previously used by Dreze et al. (1997) and Besley et al. (2001) which employs both qualitative as well as quantitative methods to assess the extent and working nature of informal credit in low-income neighbourhoods, namely a slum rehabilitation colony and a slum.

2.1 Data Collection

A structured questionnaire was administered to 157 randomly selected households in two sites for the survey conducted between 1 to 15 October 2021. Apart from socio-demographic data on the households, the questionnaire also collected detailed information on household income and if the household has taken any loan, the source of that loan (informal or formal institutions), the purpose, type of collateral used, interest rate and the repayment terms.

To ensure representativeness in the sample, systematic random sampling is used selecting every third household from either side of the street from every block/cluster of the survey site.

In addition to this, interviews of local moneylenders,bank managers and politicians were also conducted to cultivate an understanding of the supply side of the informal credit market and gauge grassroots governance issues that might emerge while creating a more accessible formal credit disbursal mechanism for the urban poor.

2.2 Site Selection

The study was conducted among households in JJ colony Madanpur Khadar and the Noor Nagar slum in South East Delhi. The resettlement colony is divided into 8 blocks and was established by the Delhi government to resettle slum dwellers of Alaknanda and Ambedkar Nagar slums aiming at uplifting their lives in 2001. Delhi Development Authority (DDA) acquired the land and leased it to the beneficiaries of the schemes on an equal basis.

On the other hand, Noor Nagar slum has pucca and semi-pucca structures divided into two clusters and has sprawled over 600 sqm of public land.

These sites are considered ideal for the study as all the residents can be categorised as urban poor yet have very disparate social factors and will provide a diverse data-set so that extent of informal credit can be adequately evaluated.

2.3 Data sources

Meso level data from surveys of various previous studies and Delhi Urban Shelter Board's allotment list was used to assess the community profile and estimate sample size for the survey.

2.4 A note on definitions

Due to the multidimensional nature of urban poverty, the author uses relative sense of deprivation in terms of healthcare, sanitation and household income, tenure status to define poor households. This study adopts definitions provided by the National Sample Survey Organisation (NSSO) for the remaining metrics like the type of credit, the purpose of the loan, etc.

3 Results

The first set of analyses examined the extent of indebtedness in the sample, where Table 1 presents households that are currently under debt from any source. As shown in the table below, Noor Nagar slum reported significantly more acute indebtedness than the JJ colony Madanpur Khadar. Overall, indebtedness in the sample stands at 45.2%.

Table 1: Extent of Indebtedness
Households that have taken any loan

	Total households (approx.)	Households Surveyed	Households that are in debt	Proportion of Households indebted
JJ colony Madanpur Khadar	2600	142	58	40.14%
Noor Nagar Slum	90	15	13	86.66%
Total	2690	157	71	45.2%

Source: Survey responses.

The paper has defined loans borrowed from moneylenders, shopkeepers, friends and relatives as informal sources whereas loans taken from government banks, commercial banks and micro-finance institutions (MFIs) are termed as formal sources of lending. We find that nearly 78.8% of all loans were taken from informal sources. What is interesting about the data in Table 2 is that both sites of the survey have similar borrowing from informal lending sources while formal lending is relatively higher in Madanpur Khadar, perhaps due to a larger presence of Micro-finance Institutions in this area

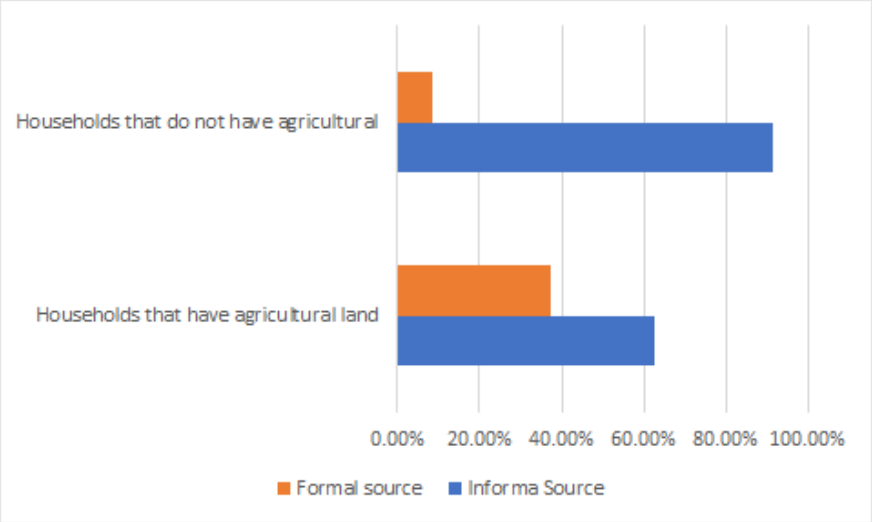
Table 2: Source of Borrowing
In proportion to total borrowing

Source	JJ Colony Madanpur Khadar	Noor Nagar Slum	*Total*
Formal	22.4%	15.3%	21.1%
Informal	77.5%	84.6%	78.8%

Source: Survey responses.

Figure 1: Source of Indebtedness of Households according to the Ownership of Agricultural Land

In proportion of indebted households according to their status of agricultural landholding



Source: Author's Visualisation from survey responses.

Figure 1 reveals that owning agricultural land among the urban poor is an important factor in providing access to formal credit. 37.5% of agricultural landholding debtors have borrowed from formal sources when only 21.1% have borrowed from these sources in the overall sample. Only 8.6% of the household that did not have any agricultural land were able to borrow from formal sources.

The Table 3 below illustrates the further breakdown of sources of borrowing. Moneylenders are still the major source of borrowing, accounting for 42.2% of all the borrowing in the sample, with borrowing from friends and relatives standing at 36.6% overall. The interesting thing to note is that friends and relatives are the key sources of borrowing in Noor Nagar rather than moneylenders in contrast with the JJ colony Madanpur Khadar.

Table 3: Detailed Source of Borrowing

In proportion to total borrowing

	Informal Source (%)			Formal Source (%)		
	Money Lender	Relative and friends	Shopkeeper	Government bank	Private bank	Co-operative/ micro-finance
JJ colony Madanpur Khadar	43.8	33.3	3.5	3.5	8.7	8.7
Noor Nagar Slum	38.4	46.17	7.6	15.84	0	0
Total	42.2	36.6	4.2	5.6	7.04	7.04

Source: Survey responses.

Table 4 shows that 85.7% of households, despite having a bank account, have borrowed from informal sources with both sites of the survey providing similar trends. In a further breakdown of these bank accounts, nearly 58.3% of accounts were Jan Dhan accounts with

Noor Nagar having 77.7% of all accounts as Jan Dhan accounts - which were mostly used for getting the benefit of direct transfer schemes. Most of the respondents never visited a bank for depositing savings due to which only 4.1% of households visited the bank many times over the three months.

Table 4: Status of Financial Inclusion of Indebted Households through Informal Sources

In proportion of households that have taken loans from informal sources

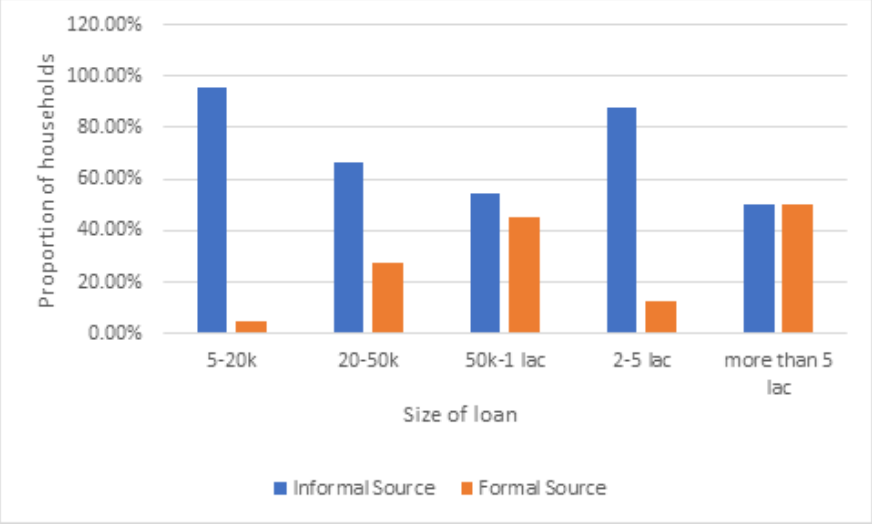
	Household having bank account (%)	Household having Jan Dhan account (Zero balance)(%)	Household having Savings account (%)	Visited bank in three months(%)			
				Many times	Few times	Once or twice	Not at all
JJ colony Madanpur Khadar	86.6	53.8	46.1	5.1	12.8	15.3	58.9
Noor Nagar Slum	81.8	77.7	22.2	0	22.2	11.1	55.5
Total	85.7	58.3	41.6	4.1	14.5	14.5	58.3

Source: Survey responses.

From Figure 2 below, we can infer that as the amount of loan increases the proportion of borrowing from formal sources also increases. As for the smallest loans that were ranging from Rs.5000 to Rs.20,000 only 4.7% of total borrowing were from a formal source. This measly share of formal lending becomes equal to informal lending in loans that ranged more than Rs. 5 lakhs.

Figure 2: Source of Borrowing for Different Sizes of Loan

The proportion of households that have taken loans from informal sources in the corresponding range

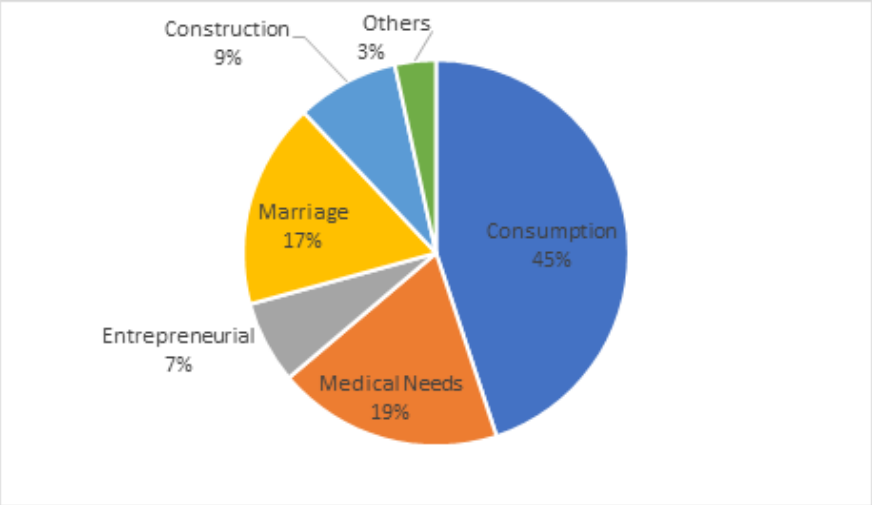


Source: Author's Visualisation from survey responses.

Figure 3 shows that the major purpose of borrowing in the informal credit market is consumption with 45.6% of all informal borrowing being carried out for consumption. Borrowing for marriage and medical needs stand at 17.5% and 19.2% of all informal loans respectively.

Figure 3: Purpose of Borrowing from an Informal Source

In proportion of total households that have taken loans from informal sources

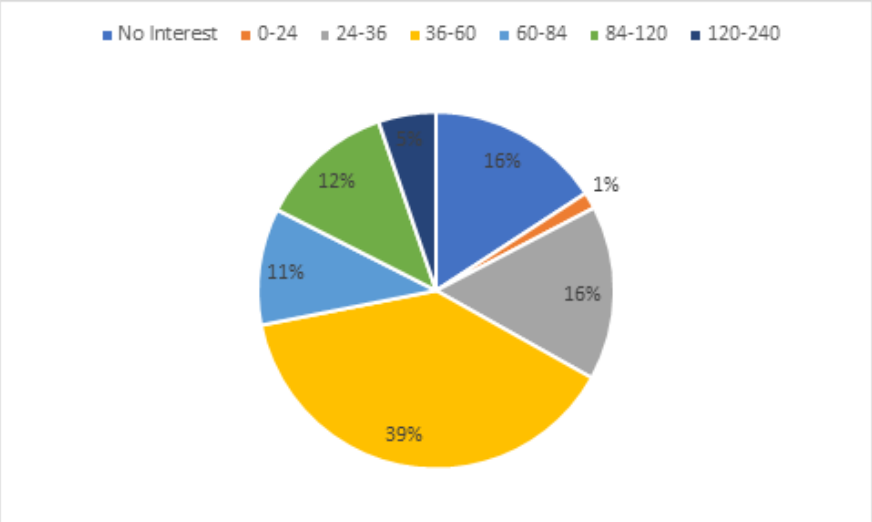


Source: Author's Visualisation from survey responses.

From Figure 4, it can be inferred that the majority of informal lending is operating at an interest rate of 36% to 60% per month. Now if we look at the data in Table 5, the interest rate for all of the loans from formal sources fell into the range 0-24% of interest rate which was considerably lower than the rate of borrowing from other informal sources.

Figure 4: Incidence of Interest Rate in Informal Lending

In proportion of households that have taken loans from informal sources



Source: Author's Visualisation from survey responses.

The highest rate of borrowing was from the moneylender. Nearly 86% of the borrowing from moneylender was at the cost of interest rate ranging from 36-240% per month whereas 48% of the total borrowing from friends and relatives fell into this range. Data from the Table 5 when seen in tandem with the data in Figure 4 shows the gravity of the situation

- a major part of the sample is borrowing at a usurious rate of interest. For lending from shopkeepers, it was mostly implicit that it was carried out in-kind by purchasing goods from the shopkeeper due to which none of the shopkeepers charged any interest.

Table 5: Interest Rate by Source

In proportion of households that have taken loans from informal sources

Range of Interest rate *(Per cent per year)*	No Interest	0-24	24-36	36-60	60-84	84-120	120-240
Money Lender	0	0	13.3%	53.3%	10%	16.6%	6.6%
Relative and friends	24%	8%	20%	24%	12%	12%	0
Shopkeeper	100%	0	0	0	0	0	0
Formal sources	0	100%	0	0	0	0	0

Source: Survey responses.

Figure 5 shows that as the income level increases the likelihood of borrowing from formal sources also increases. This result further supports the finding of Figure 2 as it shows that 57 out of 68 total indebted households with income less than Rs.10,000 tend to borrow from informal sources as these households are also those who have relatively lower saving rates than other households in the sample.

Figure 5: Income Level-wise Pattern of Indebtedness

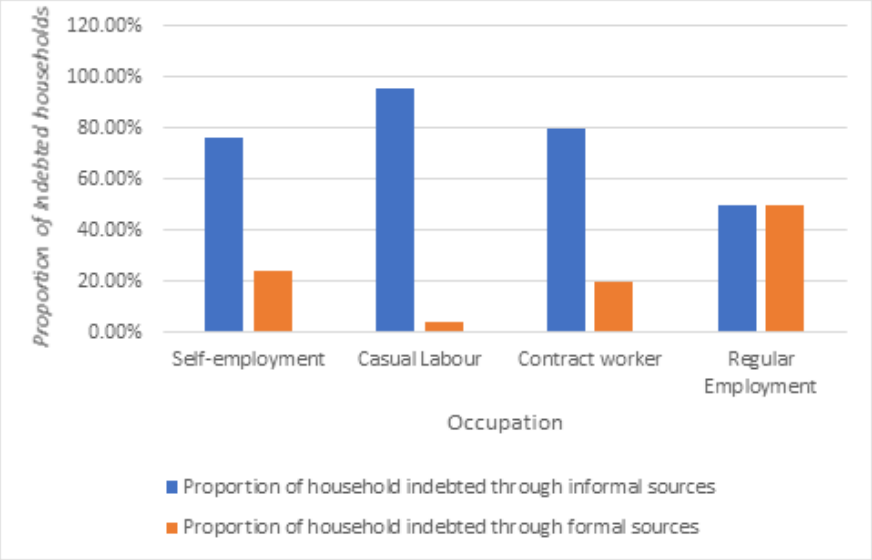
In proportion of total households that have taken loans from the corresponding source

Source: Author's Visualisation from survey responses.

We can see through Figure 6 that casual laborers are most likely to borrow from informal sources of credit. 95.80% of the indebted households having casual labor as their primary occupation are borrowing from informal sources of credit whereas 50% of those regularly employed are borrowing from formal sources.

Figure 6: Occupation-wise Pattern of Indebtedness

In proportion of total households belonging to the corresponding occupation that has taken loan

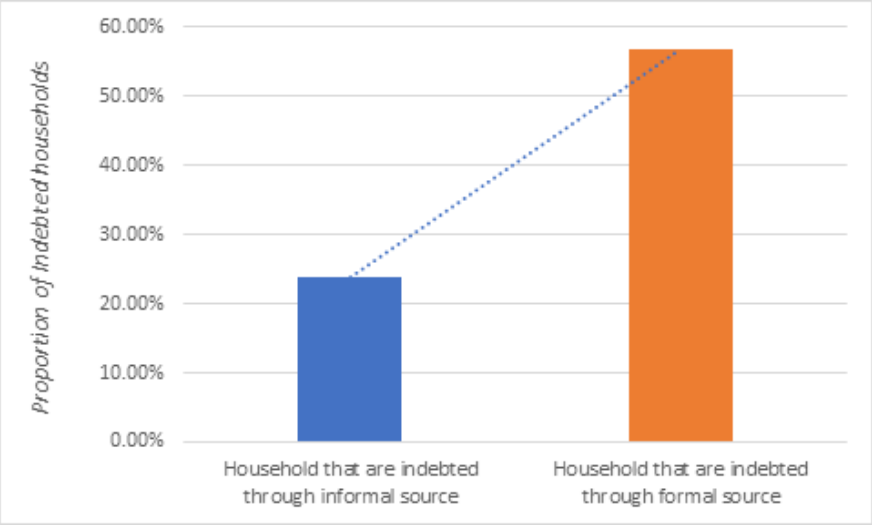


Source: Author's Visualisation from survey responses.

It can be inferred from Figure 7 that 56.7% of the households that were indebted through formal sources had any individual that could read or write fluently whereas only 23.9% of the households that were indebted from informal sources had any individual that could read or write fluently. This implies that education can be an important detriment in accessing formal credit.

Figure 7: Status of Educational Attainment

The proportion of households in which any adult can read and write

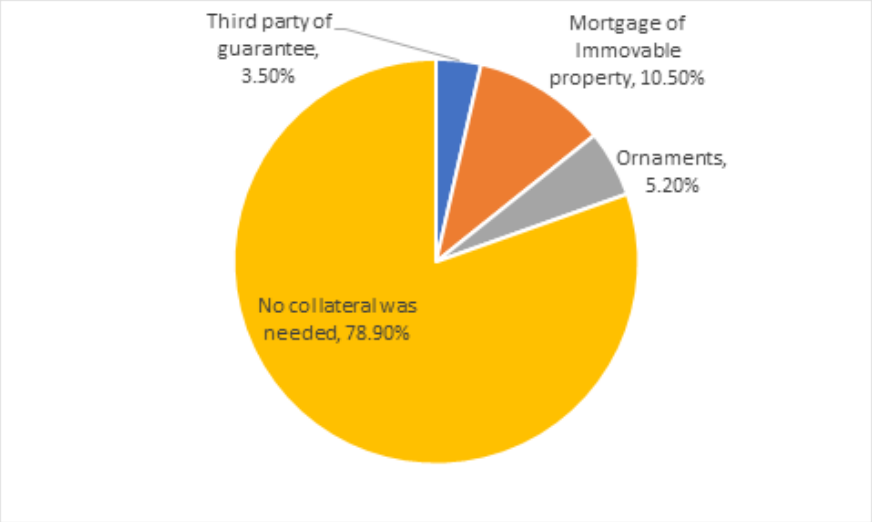


Source: Author's Visualisation from survey responses.

Figure 8 shows that in 79% of the cases of informal lending, there was no collateral needed for lending. This can be attributed to the fact that most of the loans were of a small amount and that most of the families in the sample were living on subsistence with no collateral to place in the first place. It is interesting to note that 10.5% of the informally indebted houses were using their house as collateral which, by the DDA rules, cannot be transferred or even used as collateral in formal lending due to JJ colony being a slum rehabilitation colony.

Figure 8: Nature of Collateral in Informal Lending

In proportion of total households that have taken loans from informal sources



Source: Author's Visualisation from survey responses.

In the sample, 75.4% of respondents reported that they had to take some sort of borrowing from informal sources due to the pandemic which again points to the absence of a safety net in the sample that leads to borrowing. When we see Table 6 in contrast with Figure 3, we find that the lending for consumption increased substantially in times of distress like Covid-19 induced lockdowns and especially had an impact on incomes of those who were active in the informal economy.

Table 6: Incidence of Informal Indebtedness due to COVID-19 Lockdown

In proportion of total households that have taken loans from informal sources

In proportion to total informal indebtedness	Purpose of such loan *(In Proportion of total loans taken due to Covid-19 lockdown)*				
	Consumption	Medical Needs	Entrepreneurial	Marriage	Construction
75.4%	60.4%	13.9	11.6%	13.9%	0

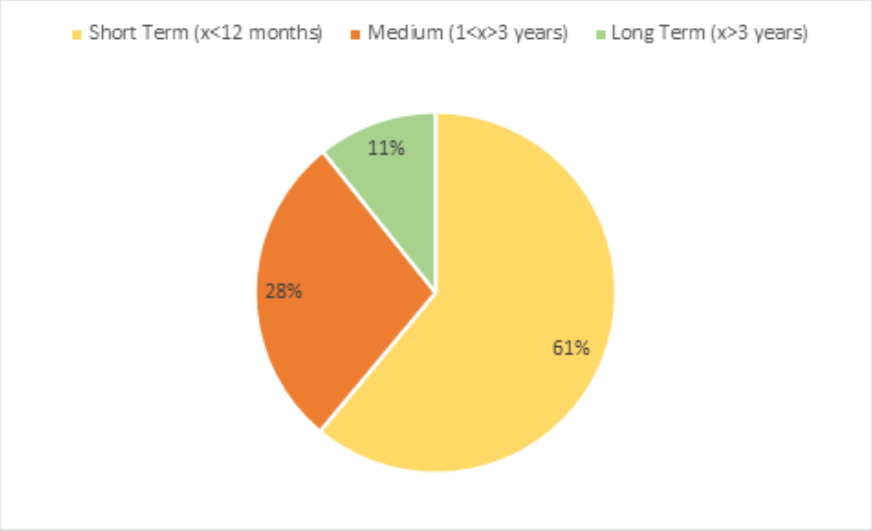
Source: Survey responses.

Lending in an informal credit system does not follow a fixed period of repayment. Rather, in most of the cases, the indebted were just repaying the loans as their means allowed them to pay, with some only able to pay back interest on the loan while the principal amount staying

the same. However, it can be inferred from Figure 9 that as 61% of the loan were repaid within 12 months of the borrowing, most of the lending in the informal credit market is for the short term.

Figure 9: Timespan of Informal Loan

In proportion of total households that have taken loans from informal sources



Source: Author's Visualisation from survey responses.

Only 45.6% of the households which had taken loans from informal sources knew that banks lend at a lower rate of interest. This showcases that there is a huge information gap between the formal sources of credit and the urban poor, which can also be attributed to low level of educational attainment. 70.7% think that getting a bank loan is difficult with one of the major reasons being the paperwork and documentation required to get formal loans. 35% also reported being unable to get loans from the bank due to a lack of collateral. Other problems were also shared by the respondents such as difficulty in travelling to the bank as they were far away and old people above 60 not getting any loan due to the age limit in credit disbursal.

Table 7: Perception Regarding Formal Sources of Lending in Informally Indebted Households

In proportions to total indebted households

Aware of lower interest in banks (%)	Getting bank loan difficult(%)	Reason for difficulty in getting bank loan (%)			
		Paperwork/ Documents	Insistence on collateral security	Lack of business plan	Others
45.6	70.7	50.8	35.08	1.75	8.7

Source: Survey responses.

4 Discussion

In line with the objective of the study, the results indicate that an overwhelming majority of the urban poor are still borrowing from informal sources like moneylenders at usurious interest rates despite financial inclusion schemes like Pradhan-Mantri Jan Dhan Yojna[1]. This also explains the wariness of respondents in borrowing - many reported missing meals to cut down expenses rather than borrowing. Thus, only in dire need was borrowing carried out from moneylenders whereas many assumed rejections from formal sources.

When we further analyse this indebtedness, it reveals that there are several hurdles that decide the source of borrowing for the urban poor. A higher proportion of informal borrowing in Noor Nagar Slum could indicate that the relative level of deprivation has an impact on the indebtedness, since respondents in JJ colony Madanpur Khadar were relatively well-off with secure land tenure. This finding is consistent with that of Varley (2002) who also reported that slum-dwellers prefer borrowing from relatives and friends due to the cohesive nature of slum communities and the flexibility it provides. However, it's also interesting to note that residents of JJ colony Madanpur Khadar are deprived of formal credit facilities by government regulations itself as they cannot mortgage their property with the bank for credit and have not been provided with alternatives either.

One unanticipated finding was that, even among the urban poor, ownership of agricultural land is an important factor in getting access to formal credit. This type of borrowing was particularly from Grameen development banks like Prathma Bank or through governmental schemes like Kisan credit. Many also reported selling agricultural land for construction of their house in the city. It can thus be suggested that agricultural land acts as a safety net for the urban poor. A possible explanation for this result may be the ease of getting formal credit in the rural context - Dreze et al. (1997) found that public institutions accounted for 80% of the total outstanding debt in the rural context.

Overall, the savings level was quite low in the sample with most of the respondent's reporting never going to the bank to deposit savings (only 4.1% have frequently visited the bank). On the other hand, the households that did not have bank accounts resorted to a similar argument: as they were living on subsistence with virtually no savings, the need to have a bank account never arose or their bank accounts were closed due to low balance due to even flagship financial inclusion schemes of Government of India like Pradhan Mantri Jan Dhan Yojna (PMJDY)[2] had little impact on the borrowing pattern of the urban poor as having a bank account does not guarantee having access to formal credit or even financial literacy. Hence, most of the Jan Dhan accounts were merely used to get the benefit of direct transfer schemes (e.g.Vidhwa pension). This result further supports the finding that 88.2% of total households with income less than Rs.10,000 tended to borrow from informal sources as these households were also those who had relatively lower saving rates compared to other

[1]The maximum age for loan application approval is decided unilaterally by Individual banks, however, most lenders set it's age limit ranging from 60-70 years of age.

[2]These are special savings accounts specifically targeting the poor opened under Pradhan Mantri Jan Dhan Yojana were maintenance of minimum balance requirement is waived off.

households in the sample. Meanwhile, those who reported a higher income - which often also meant having regular employment in the formal sector - tended to borrow from formal sources.

The nature of borrowing in the informal credit market was often found to be for a small amount, for the short term and often borrowed for consumption. This can be because of two main reasons: (1) consumption is not considered a productive activity by the restrictive lending policies of the formal lending institutions Besley et al. (2001) and (2) the cost of processing and filing for loans can be relatively high if the amount of borrowing is low. (Braverman and Guasch 1986).

The pattern of borrowing in the sample corroborates with the nature of borrowing where we find that respondents with a less stable income stream, e.g. those who work on daily wages, have a higher proportion of borrowing from the informal credit market. Such households reported going without any work for fortnights at a time which results in them borrowing for consumption. Due to this financial uncertainty, informal lending has a comparative advantage over formal lending because of the flexibility it provides in the repayment of the loan.

Also, while interacting with the local bank manager, we found that having income proof, such as pay slips and income tax returns, is an important determinant in accessing institutional credit. Therefore, 50% of those that have regular employment were able to borrow from formal sources which is much higher than those who work in the informal sector and are paid in cash. Even contract workers in most cases were paid in cash by the contractor (Thekedaar) at the end of the month.

These results imply a lack of safety net for the urban poor which results in them borrowing merely for consumption. It also showcases low saving levels among the urban poor because they need to borrow in times of unexpected expenses like medical emergencies and huge outlays in occasions like marriages. Any improvement in access to formal credit will provide them with a much-needed safety net and thereby increase their disposable income. Further, as disposable income rises, low-income households tend to spend more on education and healthcare, which might finally pave their way out of the poverty trap (Alderman et al 2001).

The following Table 8 is based on the descriptive interviews carried out with the moneylenders to understand the supply side of the informal credit. In addition to that, this information was also corroborated with accounts provided by borrowers to cross-check the information provided. Moneylenders were hesitant to divulge information as most of their income were untaxed and believed that openly talking about it might result in complications with the authorities due to which many tried to hide their real monthly income.

Table 8: Forms of Informal Lending

Form of Informal Lending	Rationale	Working Example
Daily wage repayment loan	This type of loan is given to those who have a high risk of defaulting like migrant labourer's and daily wage earners. This high risk is balanced by high-interest rates per month and repaid within a short period as well. The amount of loans is small. Usually, moneylender collects a particular fixed amount at the end of the day at a commonplace like Sabzi Mandi	For example, if the principal amount is 10,000 then a daily repayment of 100 for 120 days is fixed which means applicable interest rate is 20%. There is Nothing is fixed as penalty on defaulting but it depends on case to case basis but can be like Rs.10-20 extra per day.
Large Loan Repayment	This loan is given out to those who are in the knowledge circle of the moneylender that is those who are living in the same neighborhood for many years, being from the same village as the moneylender or had taken and returned the money before from the moneylender. This has no repayment terms often is flexible returned according to the means of the borrower. It is taken usually for 6 months or more.	Let's say the principal amount is 50,000 then by a monthly interest rate of 2% means applicable annual interest rate is 24% which equals to 62,000 on final repayment. Nothing is fixed as penalty on defaulting but it depends on case-to-case basis

Society/Committee	The idea behind this is to have a common safety net where people usually friends pool in their money from which any members of the committee can borrow at a very low-interest rate. Whatever interest income is earned it is divided equally among members	There are a fixed number of members usually 12-15 members. Money is pooled by every member contributing a fixed amount. The time period of this is equal to the member if there are 15 members that it runs till 15 months. If a member wants to borrow an amount, then he has to bid an amount above the principal that he has to pay eventually. This extra amount above the principal is equally distributed among the member. Repayment is very flexible in that it can be adjusted according to the borrower situation, even if it gets delayed by 2-3 months no penalty is charged.

5 Policy Implication

The findings of the paper attribute the root cause of indebtedness induced by informal borrowing majorly to exclusion, poverty and unemployment. Therefore, a key policy priority should be to plan for mitigating these factors.

Firstly, policy can tackle the issue of asymmetry of information between the urban poor and the formal sources of lending. Banks suffer from an inability to evaluate profiles of the urban poor and micro-finance institutions suffer from a lack of infrastructural ability to manage a large segregated population. Here, the municipal agencies and Self-Help Groups (SHGs) can leverage their access to such households to integrate them with the banks by providing information on loans and analysis of profiles of the borrower in such segregated neighbourhoods. Furthermore, the banks along with municipal agencies and SHG should be made to hold awareness lectures ('Chaupals') within the neighbourhood at a predefined time where a bank representative can present all the information about the financing programs. After the lecture, a candid conversation addressing the queries and apprehensions of the member of the household should be held to build up a last-mile network of communication. The banks can also incentivize skill-development programs through loans, enacting a similar framework to that adopted by the Municipality of Belém. In the Fundo Municipal de Geração de Emprego e Renda Ver-o-Sol program (Barboza and Spink 2002), it engages NGOs

to train unemployed people to be self-employed entrepreneurs, who will later be provided with credit to finance their projects. Since the lack of documentation of such households on residence, domicile, income, etc. is one of the major obstacles in their access to formal credit, a provision for a third-party guarantee or pre-assessment of profiles of household with a considerate and minimum documentation process should be put in place to provide immediate credit when the need arises.

Secondly, fixed repayment terms and collateral requirements came out as major hurdles towards accessing formal finance. We can imitate a similar repayment schedule adopted by O Banco do Povo de Belém (Bank of People of Belém) which provides a cushion for up to 120 days of delay with the possibility of renegotiating repayment terms before taking any coercive steps for recovering the loan (Barboza and Spink 2002). A two-pronged approach can be adopted to resolve the issue of collateral: where the local government and NGO networks active in low-income areas are entrusted with formulating joint-savings groups similar to the already prevalent committee (see Table 8) which are in turn connected with banks where collective savings can act as collateral and members as guarantor for the loan. As we found that the majority of the sample was living in the same place for more than 5 years we can learn from intervention in Mexico where Banco Azteca accepted movable household assets like furniture, electronic appliances as collateral (Bruhn and Love 2009). Strengthening of land titles with the withdrawal of reasonable restrictions on transferability rights in slum rehabilitation colonies after a certain period of time can also be availed to ease access to formal finance of residents.

Lastly, the most impoverished section of the community is also the most excluded section in terms of formal credit as they are the ones borrowing for consumption due to unstable income, majorly consisting of persons being employed as casual labour. A special credit line can be provided to this section as Dasgupta, 1995 argues "At the margin, consumption of basic needs amounts to investment". However, such extension of credit might be a temporary and band-aid solution to the problem of indebtedness. The most appropriate intervention would be an employment guarantee or targeted basic income scheme like Famılia Cidada implemented in Brazil which provides half the minimum wage to families that meet the established profile of the State's service network, in addition, the program innovates, having goals as to the permanence of children in school, the socioeconomic emancipation (Barboza and Spink 2002).All taken together with involvement of grassroot governance will provide a more urban poor friendly credit lending framework as well as a monitorable framework for banks.

A Appendix

A.1 SAESM Household Survey 2021

District: / / Block/Town: / / .

Area: /_____/ Basti: _____/

Hamlet/Mohalla: /_____

Date: /_____/_____/2021/

Name of investigator /___/ Phone no (optional): /_____

A. Household Details	
1. Full name of household head: /_____/(s/o)(d/o)(w/o)/_____ /	
2. Number of household members: (nuclear family only)	
3. Main occupations: [1 = Farming; 2 = Non-agricultural self-employment; 3 = Casual labour; 4 = Contract worker; 5 = Regular employment; 6 = Housework; 7 = Other; 9 = Unclear]	
4. Category: [1 = SC; 2 = ST; 3 = OBC; 4 = General; 9 = Unclear]	
5. Household Income (Monthly) [1=less than 10,000;2=10000;3=15000;4=20000;5=25000;5=30000;6=More than 30000]	
6.Do you own land/Flat in the city [1=Yes;2=No]	
7. Can any adult in the house read/write: [1=Yes;2=No]	
8.Do you have agricultural land in the village[1=Yes;2=No]	
9.If yes, then how much land do you own in the village (Bighas)	

10. No. of years living in the same neighborhood [1=0 to 1 yrs;2=2 to 3 years;3=4 to 5 years;4=More than 5 years]	
B. Status of Financial Inclusion	
11. Does anyone in the family have bank account [1= Yes;2=No]	
12.if yes, then type of Bank [1=Private;2=Public;3=Cooperative]	
13. if yes, then account type [1=Jan Dhan Account (zero balance account);2=Savings Account]	
14.if yes, then how frequently have you visited the bank in last 3 months? [1 = Many times; 2 = A few times; 3 = Once or twice; 4 = Not at all; 9 = Unclear]	
15. if yes, does anyone in family hold ATM card [1=Debit Card;2=Credit Card;3=No Card]	
16.if no, then why have you not opened the account yet? [1=Lack of document;2= Bank refused;3= Cultural/religious reason;9=Other(specify)] Remark=	
C. Information About Credit Status of The Family	
17.Have you taken any loan? [1=Yes;2=No]	
Fill Only If the Household is Indebted	
18. Purpose of Loan [1=Consumption;2=Medical Treatment; 3=Entrepreneurial; 4=Marriage;5=others(specify);6=construction]	
19. Source of Loan [1=Informal 2=Formal]	
20. Loan taken on behalf of [1=Male;2=Female;3=Transgender]	
21. Amount of Loan 1=5-20k;2=>20-50k;3=>50k-1 lac;4=>1-2 lac;5=>2-5 lacs;6=more than 5 lacs	

22. Detailed Source of Loan [1=government bank;2=co-operative society;3=commercial bank; 4= employer; 5=money lender;6=relatives and friends;7=shopkeeper;8=others]	
23. Rate of Interest for The Loan (Monthly): [0=No interest;1=2 - 3%;2=>3 - 5%;3=>5 – 7;4=>7 – 10;5=>7 – 10;6=>10 – 20;7=>0-2%]	
24. Type of collateral used: [1=guarantee by third party;2=mortgage of immovable property;3=ornaments;4=No collateral was needed;5=other type of security(specify)] Remark:	
25. If mortgaged, type of mortgage [1=Simple Mortgage;2=Usufructuary Mortgage;3= Mortgage by Conditional Sale]	
26. Since when are you repaying the loan? [1=Short Term<12 months;2=Medium Term 1<x>3yrs; 3=Long Term>3yrs]	
27. Have you taken any loan during/due to Covid-19 Pandemic/Demonetisation [1=Yes;2=No]	
27a.if yes, source of that loan [1=Informal;2=Formal]	
Fill Only If Loan Is Taken from Informal Source	
28. Whether aware of lower interest rates in banks [1=Yes;2=No]	
29. Whether getting bank loans difficult [1=Yes;2=No]	
30. If yes, reasons for [1=Paperwork/Form fill up difficult;2=Insistence on collateral security; 3=Lack of business plan;4=Others(specify)]	

Use the last page for Additional Comment	

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A.2 SAESM Moneylender Survey 2021

District: /_____/ Block/Town: /. /

Area: /_____/ Basti: /_____/

Hamlet/Mohalla: /_____/ Date: /__/__/2021/ Name

of investigator: /_____/Phone no (optional): /_____

_____/

A. Personal Details	
1. Full name of Moneylender: /_____/(s/o)(d/o)(w/o)/_____ /	
3. Main occupations: [1 = Farming; 2 = Non-agricultural self-employment; 3 = Casual labour; 4 = Contract worker; 5 = Regular employment; 6 = Housework; 7 = Other; 9 = Unclear]	/ / / /
4. Category: [1 = SC; 2 = ST; 3 = OBC; 4 = General; 9 = Unclear]	
5. Income (Monthly)	
6.Do you own land/Flat in the city [1=Yes;2=No]	
7. Number of years of education:	
8.Do you have agricultural land in the village[1=Yes;2=No]	
9.If yes, then how much land do you own in the village (Bighas)	
10.No. of years living in the same neighbourhood [1=0 to 1 yrs;2=2 to 3 years;3=4 to 5 years;4=More than 5 years]	
C. Information About Lending Activity	
11.Total Amount of money you have lent right now?	

12.Rate of Interest of lending (Monthly)	/ / / / / /
13. Do number of borrowers increase during times of distress like demonetization and covid-19 pandemic? [1 = Increase; 2 = Decline; 3 = More or less same; 4 = Unable to tell; 9 = Unclear]	
14.If differential rate of interest exists, then basis of such differentiation Remark:	
B. Status of Financial Inclusion	
15. Does you have bank account [1= Yes;2=No]	
16.If yes, then type of Bank [1=Private;2=Public;3=Cooperative]	
17. If yes, then account type [1=Jan Dhan Account (zero balance account);2=Savings Account;3=Current]	
18. If yes, then how frequently have you visited the bank in last 3 months? [1 = Many times; 2 = A few times; 3 = Once or twice; 4 = Not at all; 9 = Unclear]	
19. If yes, do you hold ATM card [1=Debit Card;2=Credit Card;3=No Card]	
C. Information About Credit Status	
20. Have you taken any loan? [1=Yes;2=No]	
Fill Only If the Moneylender is Indebted	
21. Purpose of Loan [1=Consumption;2=Medical Treatment; 3=Entrepreneurial; 4=Marriage;5=others(specify);6=for lending further]	
22. Source of Loan [1=Informal 2=Formal]	
23. Detailed Source of Loan [1=government bank;2=co-operative society;3=commercial bank; 4= employer; 5=money lender;6=relatives and friends;7=shopkeeper;8=others]	
24. Rate of Interest for The Loan (Monthly): [1=2 - 3%;2=>3 - 5%;3=>5 – 7;4=>7 – 10;5=>7 – 10;6=>10 – 20]	
25. Type of collateral used: 1=guarantee by third party;2=mortgage of immovable property;3=ornaments;4=No collateral was needed;5=other type of security(specify)	

Remark:	
26. If mortgaged, type of mortgage [1=Simple Mortgage;2=Usufructuary Mortgage; 3= Mortgage by Conditional Sale]	
27. Type of loan [1=Short Term<12 months;2=Medium Term 1<x>3yrs; 3=Long Term>3yrs]	

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The Impact of Economic and Human Development Factors on Discrimination Against Women

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Abstract

Through this study, we attempt to understand the impact of standards of living, economic participation, and knowledge attainment at the basic and specialized levels on discrimination faced by women. This has been achieved by establishing a relationship between primary education attainment, secondary education attainment, and female employment with the Social Institutions & Gender Index value using econometric modeling. We collected data for 66 countries worldwide, and estimation was done using regression analysis. The results implied that these variables under consideration significantly impact discrimination against women. Economic growth, primary education completion, and women's participation in economic activity help decrease gender discrimination in nations and contribute to the upliftment of women.

JEL Classification: B54, C51
Keywords: Education, Discrimination Against Women, Female Labour Force Participation

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1 Introduction

In recent years of economic growth, extraordinary achievements have been made by women in almost all countries. However, this spurt in the growth of women's economic status has not been uniform, whether considered across nations or compared to the gain experienced by men within the same country. A study conducted by Mckinsey & Co. evaluated 15 indicators and aggregated them to a gender parity score to calculate global progress in achieving gender equality; it was seen from the study results that in 2015, the global gender parity score was 0.60; and in 2019, it rose marginally to 0.61. (Krishnan et al 2020). Moreover, significant variation was seen in the growth patterns for different regions.

A significant part of women's empowerment that has taken place in the last few years can be attributed to education and the increasing willingness and ability of women to participate in the economy, despite the discrimination facing them. Sixty years ago, almost 50 percent of women had no formal schooling, and their average level of educational attainment was just 3.3 years. (Jakiela & Hares 2019) By 2010, only a fifth of adult women had no formal schooling, and their average attainment had increased to 7.7 years. (Jakiela & Hares 2019)

The discrimination women face translates into disadvantages in real life, such as decreased job opportunities, lower valuation of services and labor, financial freedom, and freedom of expression. Currently, only six countries worldwide pay women and men equal amounts in wages. (Schmidt 2019) Educating women will help them be aware of their rights and hence, will be able to fight against social evils such as domestic violence, dowry demand, low wages, and others. Moreover, education helps women understand concepts of equality and self-respect and help raise their economic and social status. These will also help women deal with more subtle forms of discrimination.

Educating women is not only crucial for their economic empowerment but also for economic development. Women make up nearly half of the population in these nations, and due to discrimination, cannot contribute to economic activity to their maximum potential. It is estimated that the limited educational opportunities provided to girls, and barriers to completing 12 years of education, cost countries between $15 trillion and $30 trillion in lost lifetime productivity and earnings. (Wodon et al 2018). An education free of harmful gender norms has direct benefits for boys, too. In many countries, standards around masculinity can fuel disengagement from school, child labor, gang violence, and recruitment into armed groups. (Jakiela & Hares 2019)

Education is one of the most important drivers for ending poverty, boosting shared prosperity, and improving health, gender equality, peace, and stability. This study attempts to understand how different educational and economic factors impact the widespread discrimination against women.

The flow of the paper is as follows: Section 1 introduces the topic and broad theme of the paper, and section 2 discusses the literature available on this theme. Following this, the theoretical framework followed in the paper is discussed in section 3. Section 4 discusses the data sources of the variables under study. The econometric model and estimation methods

are discussed in Section 5, and the analysis and interpretation of the results have been discussed in section 7. Section 8 concludes the paper and summarizes the results

2 Literature Review

A wide range of studies have been conducted in the thematic areas of economic development, education, and financial literacy and the impact these have on the overall well-being and development of women - as well as the social & economic benefit that comes out of the upliftment of women. Women empowerment, and hence, discrimination is multi-dimensional - and must be looked at from different angles - through this study, we address two of these angles - one is of economic empowerment, by understanding how discrimination against women varies if their participation in the economy varies. Another angle is one of social empowerment. Here, Social empowerment implies giving power or authority to an individual to improve their livelihood - that is, through educating women. (Bhatia & Singh 2019)

According to a qualitative study undertaken by Shetty and Hans in 2015, lack of education is one of the root causes of women's exploitation and negligence. In India, women are revered and deemed valuable; however, they are largely absent from the context of economic development - which can be connected to a lack of good educational opportunities provided to them, as, for a woman to have a large enough, significant impact on the economic development & institutional structure of a country, she must receive a proper education. Moreover, literacy and education can help women understand their constitutional rights and legislative provisions made to strengthen and empower them. The authors hence conclude that women's educational & economic development and their empowerment are correlated conceptually and methodologically. Thus, promoting education among women is of great importance in empowering them.

According to a report published by OECD in 2011, the economic empowerment of women is defined by their capacity to contribute towards the growth processes in a way that recognizes the value of their contributions and makes a fair distribution of their wealth to enhance the access of economic resources. The decision and ability of women to participate in the labor force is the outcome of various economic and social factors that interact at both the household and societal levels (Banerjee 2019). Women are likely to engage in unpaid care work, as dictated by societal norms and traditions. Unpaid care work limits the agency, mobility, and time of the women to interact with economic systems, as time spent on one activity would evidently reduce the time they can spend on any other. These constraints eventually lead to women not being able to participate in economic activity & have a limited hold on household resources - which skews the power dynamics that already exist in households.

Economically empowering women is vital both to apprehend women's rights and to achieve broader development goals such as economic growth, poverty reduction, and social welfare. A sustainable and equitable social structure comprises social and economic empowerment, financial literacy, and financial freedom of women to access the formal financial system (Siddik 2017). Economic empowerment is also defined as when women have both the ability to succeed and advance economically and the power to make and act on financial decisions

(Golla 2016) hence, we conclude that financial literacy is a large aspect of women's economic empowerment and overall well-being.

A paper published in 2020 by Ferdous et al talks specifically of the impact of financial literacy on the decision-making and economic empowerment of rural women. The paper discusses the various measures of women's economic empowerment: decision-making power, control over income & expenditure, leadership in the community, control over time allocation & financial well-being. These variables are then expressed as consequences of financial literacy. It is seen from the results of the paper that financial literacy has a significant impact on women's economic empowerment among the rural poor in Sri Lanka - as the financial literacy of women increases by one unit, Women's Economic Empowerment increases by 0.362 units.

Gender gaps favoring males - in education, health, personal autonomy, and more-are systematically larger in poor countries than in rich countries. (Jayachandran 2015) According to an article by Oxfam, 75 percent of women in developing regions are in the informal economy - where they are less likely to have employment contracts, legal rights or social protection, and are often not paid enough to escape poverty. 600 million are in the most insecure and precarious forms of work.

According to Kabeer, (2012) not only does women's access to employment and education opportunities reduce the likelihood of household poverty but resources in women's hands have a range of positive outcomes for human capital and capabilities within the household. According to an article by Oxfam, despite some important progress to change this in recent years, in no country have women achieved economic equality with men, and women are still more likely than men to live in poverty. While economic growth on its own is not always sufficient to promote gender equality, the outcomes of economic growth appear to be far more positive when it is accompanied by an expansion in women's employment and education.

3 Empirical Framework

Through this study, we attempt to understand the differential impacts of economic advancement and development of men and women on the discrimination faced by women. Women empowerment, and hence, discrimination is multidimensional - and must be looked at from different angles - through this study, we address two of these angles - one is of economic empowerment, by understanding how discrimination against women varies if their participation in the economy varies. Another angle is one of social empowerment. Here, Social empowerment implies giving power or authority to an individual to improve their livelihood - that is, through educating women.

The analysis takes account of the following variables as the measures for different stages of economic and social empowerment: Economic Growth, Primary and Secondary Education Completion - measured by the secondary school enrollment ratio and tertiary school enrollment ratio, respectively, and the overall female economic participation measured by the female labor force participation.

We have taken these variables into account as they represent different levels of development in

women - if a woman has completed primary education, she represents minimal development of knowledge and signifies a lower understanding of discrimination. If she has completed secondary education, she has some, but not very high knowledge and hence a relatively higher understanding of discrimination. Hence, through this - we can understand how social empowerment through education impacts the discrimination faced by women at different stages. For the purpose of this study, we assume that women's participation in the economy represents the highest development of women; that is - economic empowerment - as women's employment and income-generating capacity enable financial independence in women and help them uplift themselves. (Lim 2002)

The GDP per capita is considered a proxy to analyze the country's growth and economic standards of living. Literature suggests that an increase in income levels, both across nations and within one country, reduces the discrimination faced by women. (Cingano 2014) Gender inequality is strongly associated with income inequality over time and across countries of all income groups. An increase in various measures of gender inequality is related to an increase in net income inequality by almost 10 points. (International Monetary Fund 2021)

We consider the secondary educational attainment of women as an indicator of their completion of primary schooling. Primary education years are, in general, the foremost level of formal education provided to children in their formative years. During this period, children learn at a faster rate than at any other time in their lives, developing basic cognitive and socio-emotional skills that are fundamental for their future achievements in school and later on as an adult. (OECD Early Learning Matters 2018). Children of all genders may pick up on traits and subconscious biases that lay the base for their future conscious and subconscious behaviors. As the brain develops significantly during a child's early years, it is at its highest levels of plasticity than at any other point in our lifetime. As a result, during this period, children are especially sensitive to external stimuli - and are more likely to pick up different attitudes and behaviors from their surroundings. (OECD Early Learning Matters 2018). Hence, understanding the relationship between women's primary education attainment and discrimination faced by them allows us to evaluate the effect of schooling on children's behavior and gives us an idea of the behaviors primary education and schooling instill in these children.

Moreover, primary schooling does not focus much on specialization and skill development; hence, we can draw a contrast between discrimination at levels of primary education and advanced levels of education. It has been observed that countries with high levels of education among men rarely have substantial gender gaps. (Jakiela & Hares 2019). We believe that primary education attainment must be negatively correlated with discrimination against women, however, the extent of its impact should be lower than the impact of higher education.

To measure the secondary education attainment of women, we use the tertiary school enrollment ratio of women. Secondary education enables children to develop a better understanding of the world, as well as better understand their rights. Modern economies and their labor markets need people with sophisticated knowledge, skills, and competencies that

cannot be developed only through primary or low-quality secondary schooling (Sahlberg, 2007), hence, secondary schooling is not only important to develop cognitive thinking and specialized skills, but it also plays a large role in future growth prospects of women. Hence, we believe that secondary education would create a significant positive impact on the discrimination faced by women, that is, an increase in women completing secondary education would imply a decrease in the discrimination faced by them. Enabling women to participate in the economy allows them to improve their sense of self-assurance and helps them learn new skills - this, in turn, increases their share of household resources and gives them more power and financial independence. Moreover, as more women participate in the economy, they gain larger ownership of economic resources and assets, which ultimately helps them gain access to and control over productive resources, access to work, control over their own time, lives, and bodies; and increased voice, agency and meaningful participation in economic decision-making at all levels.

Hence, we believe that women's economic empowerment can lower the discrimination against them significantly. Labor force participation is an important marker of women's participation in economic life - and is constrained by social norms, insecurity, and lack of access to capital or resources. (Jakiela & Hares 2019).

4 Data and Methodology

The paper uses country-wide data figures for the year 2019 for 66 countries compiled from OECD and World Bank datasets. The dependent variable under consideration is the nations' Social institutions and gender index calculated by OECD, a proxy variable used to quantify the discrimination against women. The independent variables used in the study are GDP per capita, female secondary school enrollment, female tertiary school enrollment, and female labor force participation for the year 2019.

To quantify the discrimination against women, we use the Social Institutions, and Gender Index (SIGI) developed for nations worldwide by the OECD Development Centre (SIGI Methodological Background Paper 2014). SIGI quantifies discriminatory social institutions - which include unequal inheritance rights, child marriage, violence against women, and unequal land and property rights.

The Index takes values between 0 and 100 , wherein a lower value signifies lower discrimination and a higher value signifies higher discrimination. Discrimination in social institutions includes formal and informal laws, attitudes, and practices that restrict women's access to rights, justice, and empowerment opportunities. This index is calculated based on qualitative and quantitative data provided on the discrimination faced by women in every country. The index considers the following forms of discrimination: discrimination in the family, restricted physical integrity, restricted access to productive and financial resources, and restricted civil liberty. (SIGI Methodological Background Paper 2014) As SIGI quantifies the level of discriminatory social institutions in each nation, we thereby use it as a quantitative measure for systemic discrimination faced by women in each nation.

We consider the secondary educational attainment of women as an indicator of their com-

pletion of primary schooling, and to measure the secondary education attainment of women, we use the tertiary school enrollment ratio of women. For the purpose of this study, we assume that the number of women enrolled in secondary education is exactly equal to the number of women who completed primary education - that is, no women have dropped out after completion of primary education. We take a similar assumption with women enrolled in tertiary education - that is, no women have dropped out of school post the completion of their secondary education. These assumptions allow us to take secondary and tertiary enrollment ratios as a proxy for completion of primary and secondary education, respectively.

The description of the data on the dependent and independent variables has been given in the following table:

Table 1: Description of the Data Sources

Data	Units	Variable	Classification	Year	Source
Social Institutions & Gender Index	N/A	SIGI	Dependent Variable	2019	OECD
GDP Per Capita	Dollars	gdppc	Independent Variable	2019	World Bank
Female Secondary School Enrollment Ratio	Percent	fsenrsec	Independent Variable	2019	World Bank
Female Tertiary Education Enrollment Ratio	Percent	fsenrter	Independent Variable	2019	World Bank
Female Labor Force Participation	Percent	flfpr	Independent Variable	2019	World Bank

Source: Authors' descriptions.

The descriptive statistics for the data have been summarized as follows:

Table 2: Descriptive Statistics

Variable	Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum
SIGI	8.10	15.97	21.80	23.96	28.38	58.70
gdppc	786.9	4427.6	14292.3	22428.9	41910.5	85334.5
flfpr	14.59	45.60	54.65	52.46	58.22	83.89
fsenrsec	32.02	88.72	101.98	98.40	111.04	165.74
fsenrter	2.453	38.23	73.842	67.22	98.04	150.05

Source: Authors' calculations.

To understand the impact of these economic and social empowerment factors, we hypothesize that economic development, women's primary and secondary educational attainment & their participation in the economy will lower the discrimination faced by them - that is, an increase in the value of these variables will decrease the value of the Social Institutions & Gender Index (signifying lower discrimination).

Hence, the estimated regression equation takes the following form:

$$sigi = \beta_o + \beta_1 \log(gdppc) + \beta_2 flfpr + \beta_3 f\text{senrsec} + \beta_4 f\text{senrter} + u_i \tag{1}$$

5 Econometric Model

The study measures the impact of economic development factors on the discrimination faced by women. The independent variables undertaken in the study are the GDP per capita, the secondary and tertiary school enrollment ratio of women, and the female labor force participation. These variables quantify the economic standards of living, educational attainment of women, and women's participation in the economy respectively. The statistical analysis has been done using regression analysis.

The decision regarding the most appropriate econometric model has been made after performing the following diagnostic tests: The Breusch Pagan test (for heteroskedasticity), and Ramsay's RESET test (for functional form). The Variance Inflation factors for the variables (to check multicollinearity) have also been calculated. The description and the results of these tests have been provided in the appendix to this paper. The functional form has also been decided based on the various scatter plots showing the relationship between the dependent variables and the independent variable given in the appendix.

As seen from scatter plots, the GDP per capita shows an approximately logarithmic relationship with the values of the Social Institutions and Gender Index. The other variables considered in the study - namely, female labor force participation, female secondary school enrollment ratio, and female tertiary school enrollment ratio show an approximately linear relationship.

The econometric model used in this paper takes the form of a lin-log model as follows:

$$\text{sigi} \ = \beta o + \beta 1 \log(gdppc) + \beta 2 flfpr + \beta 3 f \ \text{senrsec} \ + \beta 4 f \ \text{senrter} \ + u_i$$

Table 3: Description of the Variables under Study

Conceptual Variable	Measurable Variable	Variable	Description
Discrimination Against Women	Social Institutions & Gender Index	sigi	The Social Institutions & Gender Index is a cross-country measure of discrimination against women. It takes values between 0 and 100 - the higher the value, the more discrimination women face in the given country.
Standards of Living	GDP Per Capita	gdppc	GDP per capita is the gross domestic product divided by the midyear population of a nation.
Women's Economic Participation	Female Labor Force Participation	flfpr	Labor force participation rate is the proportion of the female population aged 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.
Basic Educational Attainment of women	Female Gross Enrollment Ratio (Secondary)	fsenrsec	The gross enrollment ratio is the ratio of total enrollment, regardless of age, to the age group population that officially corresponds to the level of education shown. In this study, this variable is used to represent the proportion of women who have completed primary education (and hence, have enrolled in secondary education).
Secondary Educational Attainment of women	Female Gross Enrollment Ratio (Tertiary)	fsenrter	The gross enrollment ratio is the ratio of total enrollment, regardless of age, to the age group population that officially corresponds to the level of education shown. In this study, this variable is used to represent the proportion of women who have completed secondary education.

Source: Authors' descriptions.

6 Results & Analysis

Table 4: Results of the Regression

Independent Variable	Coefficient	Standard Error	T-statistic
Intercept	81.34499***	8.90775	9.132
log(Gdppc)	-3.20609*	1.24777	-2.569
flfpr	-0.27077***	0.07159	-3.782
fsenrsec	-0.11848*	0.05600	-2.116
fsenrter	-0.02321	0.04899	-0.474
R^2	0.6115		
Adjusted R^2	0.586		

Source: Authors' calculations.
Significance Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

In this section, we discuss the results of the regression. We see that a change in the dependent variable can be attributed to changes in all independent variables considered in the study except the gross enrollment ratio of women in tertiary education. Hence, variations in Female Labor Force Participation, GDP per capita and Female Secondary School Enrollment Ratio can cause variations in the Social Institutions & Gender Index. From the adjusted R squared value, we see that the independent variables can predict the variation in the dependent variable to the extent of approximately 59%. From the sign of the coefficients, we see that GDP per capita, female labor force participation, and primary education attainment negatively correlate with SIGI. This implies a negative relationship between these variables.

A unit percentage increase (relative change) in the GDP per capita of a country enables an absolute decrease of 0.032 units in the Social Institutions & Gender Index. This is evident as a higher per capita GDP has historically been observed to lower gender discrimination. A higher GDP per capita implies a higher level of economic development and well-being in a country. Hence, it also means more increased access to financial resources and overall higher standards of living. The benefits of increasing GDP will impact all sections of society positively, hence, furthering economic development. Moreover, a higher GDP per capita could arise from increased participation in economic activity by women, who make up 50% of the population and can help improve the total output of countries.

A unit increase in the secondary school enrollment ratio will lower the Social Institutions & Gender Index by a value of 0.118. This result is supported by older literature which shows that an increase in education level reduces the discrimination faced by women in society. It is evident that countries with higher education levels exhibit lower gender discrimination; hence, primary education attainment positively influences the attitudes and biases of male and female children. Moreover, Girls who receive an education are less likely to marry young and more likely to lead healthy, productive lives. They earn higher incomes, participate in the decisions that most affect them, and build better futures for themselves and their families. ("Girls' Education" 2022) A unit increase in the percentage of women participating

in the labor force will lower the gender discrimination index by 0.27 units. This result does not come as a surprise, as women who work will be able to be more in control of their finances, gain financial independence as well as will hold a larger share of their household incomes, which will make them less dependent on the men of their family, and hence, less vulnerable to exploitation. Moreover, women participating in economic activity implies that labor markets are also becoming more accessible to women - which is also an indicator of women's empowerment. Interestingly, this coefficient is higher than the school enrollment ratio, implying that participating in the economy will lower discrimination against women to a larger extent as compared to completing primary education.

Hence, we can see from the significant results that increasing women's education and participation in the economy prove significant in empowering them. We also see from the results that labor force participation is a more impactful solution to the upliftment of women and lowering the discrimination faced by them in society.

7 Conclusion

This study attempted to understand the impact of standards of living, economic participation, and knowledge attainment at the primary and specialized levels on discrimination faced by women. These were characterized as human development and economic factors, which would potentially translate into women's economic and social empowerment. As seen from the results of our study, it is evident that these factors play a significant role in understanding and battling gender differences and discrimination. However, these are not stand-alone measures.

Education is often quoted as a solution to the problem of gender disparity; however, it is not stand alone. To fully solve the problem of gender disparity, the education imparted to children must be done so in such a way that it does not translate to gender biases as they grow up. Educating and economically empowering women will help women understand the discrimination against them; however, alongside this empowerment, we must also break down and eradicate discriminatory social structures through education and unlearning.

As discussed above, we also saw that female labor force participation - that is, women's participation in economic activity plays a significant role in empowering them - however, an important consideration is that women's economic participation should also be accompanied by an increase in financial literacy and an increase in their participation in formal financial institutions. Additionally, an increase in economic activity does not necessarily imply a decrease in the time spent undergoing unpaid care work. According to statistics reported by the International Labor Organization (ILO), women in Asia spend nearly 4.1 times the time spent by men in unpaid care work and subsequently work more hours in a day than men, even if they are involved in some form of economic activity. Women's unpaid work subsidizes the cost of care that sustains families, supports economies, and often fills in for the lack of social services. Yet, it is rarely recognized as "work." ILO Data from 64 countries in 2018, which represents two-thirds of the world's working age population shows that 16.4 billion hours per day are spent in unpaid care work - the equivalent to 2 billion people working

eight hours per day with no remuneration. Moreover, women perform approximately 76% of this unpaid care work.

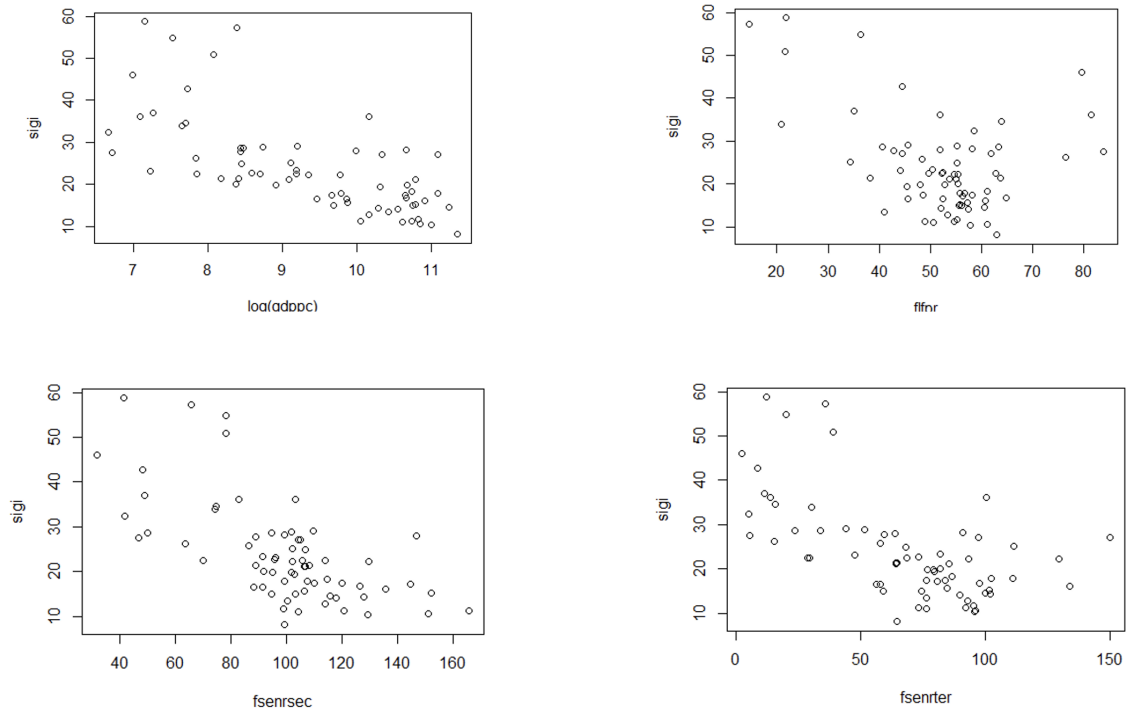
According to an article by UN Women, Unpaid care and domestic work are valued to be 10 and 39 percent of the Gross Domestic Product. They can contribute more to the economy than the manufacturing, commerce, or transportation sectors - and with the onset of climate change, women's unpaid work in farming & gathering is growing even more without receiving the valuation & monetary compensation that must be provided for work. This is a significant reason women everywhere are unable to achieve financial independence and are forced to depend on the men of their family - and often face discrimination and, in extreme cases - abuse.

It is evident that women who are not employed in economic activity or do not receive any form of education face large amounts of discrimination, however; to truly eradicate discrimination against women, only encouraging economic participation and education, while ignoring the systemic discriminatory social structures is not the way to go. While these surely help combat discrimination in some ways, these are not standalone measures, rather, tools that can be used to combat this problem.

A Appendix

A.1 Scatter Plots of Social Institutions & Gender Index with Explanatory Variables

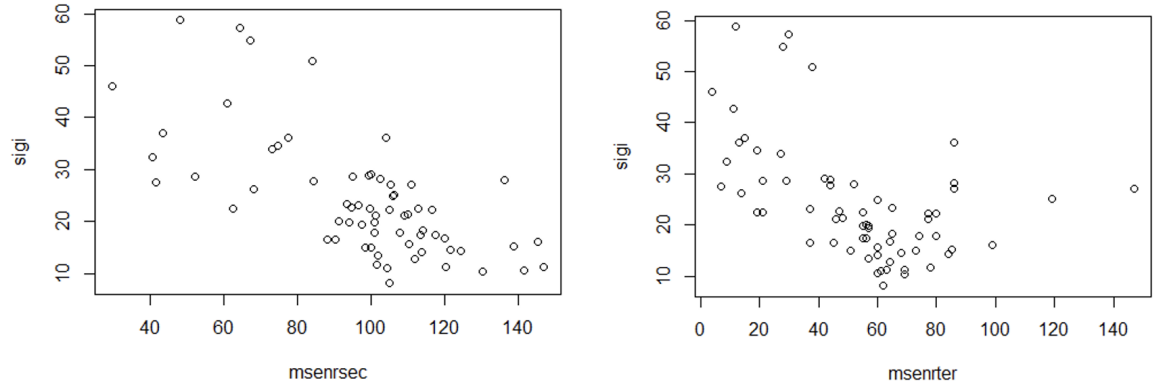
Figure 1: Social Institutions & Gender Index with Explanatory Variables



Source: Authors' calculations.

A.2 Scatter Plots of Social Institutions & Gender Index with Male Variables

Figure 2: Social Institutions & Gender Index with Male Variables



Source: Authors' calculations.

A.3 Diagnostic Tests

A.3.1 Variance Inflation Factors for testing Multicollinearity

(Calculates variance-inflation and generalized variance-inflation factors (VIFs and GVIFs) for linear, generalized linear, and other regression models.)

(small VIF values indicate low correlation among variables under ideal conditions VIF < 3. However it is acceptable if it is less than 10 .)

Table 5: VIF Test for Multicollinearity

Variable	log(*gdppc*)	flfpr	fsenrsec	fsenrter
VIF	3.381204	1.034869	2.784153	3.468135

Source: Authors' calculations.

A.3.2 Breusch-Pagan test for testing heteroskedasticity

(p-value < 0.05 to assume homoscedasticity)

(The Breusch-Pagan test fits a linear regression model to the residuals of a linear regression model (by default the same explanatory variables are taken as in the main regression model) and rejects if too much of the variance is explained by the additional explanatory variables.

Under null hypothesis the test statistic of the Breusch-Pagan test follows a chi-squared distribution with parameter (the number of regressors without the constant in the model) degrees of freedom.)

Studentized Breusch-Pagan test: $BP = 12.492, \text{df} = 4, \text{p-value} = 0.01404$

A.3.3 Ramsay's RESET test for functional form:

(The RESET test is a popular diagnostic for correctness of functional form. The basic assumption is that under the alternative the model can be written in the form y = X∗ beta +Z∗ gamma. Z is generated by taking powers either from the fitted response, the regressor variables, or the first principal component of X. A standard F-Test is then applied to determine whether these additional variables have significant influence. The test statistic under H_0 follows an F distribution with parameter degrees of freedom.)

RESET $= 4.7023$, $df_1 = 2$, $df_2 = 59$, **p-value** $= 0.01274$

Hence, at 1% Significance level, this model does not have a specification error.

A.4 About the SIGI

The OECD Development Centre's Social Institutions and Gender Index (SIGI) is a cross-country measure of discrimination against women in social institutions (formal and informal laws, social norms, and practices) across 180 countries.

The four dimensions included in the SIGI: The SIGI covers four dimensions of discriminatory social institutions, spanning major socio-economic areas that affect women's lives: Discrimination in the family, Restricted physical integrity; Restricted access to productive and financial resources; and Restricted civil liberties.

The SIGI's variables quantify discriminatory social institutions such as unequal inheritance rights, child marriage, violence against women, and unequal land and property rights. Through its 180 country profiles, country classifications, unique database, and its innovative simulator, the SIGI provides a solid evidence base to effectively address the discriminatory social institutions that hold back progress on gender equality and women's empowerment and allow policymakers to scope out reform options and assess their likely effects on gender equality in social institutions.

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The Political Economy of Crony-Capitalism and Dis-investment: A Dynamic Game-Theoretic Model

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Abstract

In this paper, we demonstrate the role of cronyism in the determination of production subsidy and privatization in a three-stage mixed oligopoly game-theoretic model. The incumbent political party exploits the public sector to reap the benefits from the donations provided by the private firms in exchange for concessions provided to them in the form of production subsidies. Unlike the benevolent public sector which maximizes social welfare, we assume that the incumbent political party maximizes its aggregate political payoff, which is the weighted average of expected payoff from winning the re-election bid and social welfare. We carry out a couple of comparative statics to analyse the effects of variation in political preference of the incumbent party, an increase in the magnitude of backlash and privatization. We obtained that conflict of interest arises between the incumbent political actor and the private firm while privatizing the public sector, the private sector gains from privatization at a cost to the welfare of the economy while the political party is the net loser. We make an additional comment that democracy incentivises cronyism and prevents the corporate-political nexus to cease.

JEL Classification: D43, D45, D72, I11, I18, L32
Keywords: COVID-19, Cronyism, Dis-investment, Political party, Vaccine, Healthcare, Lobbying.

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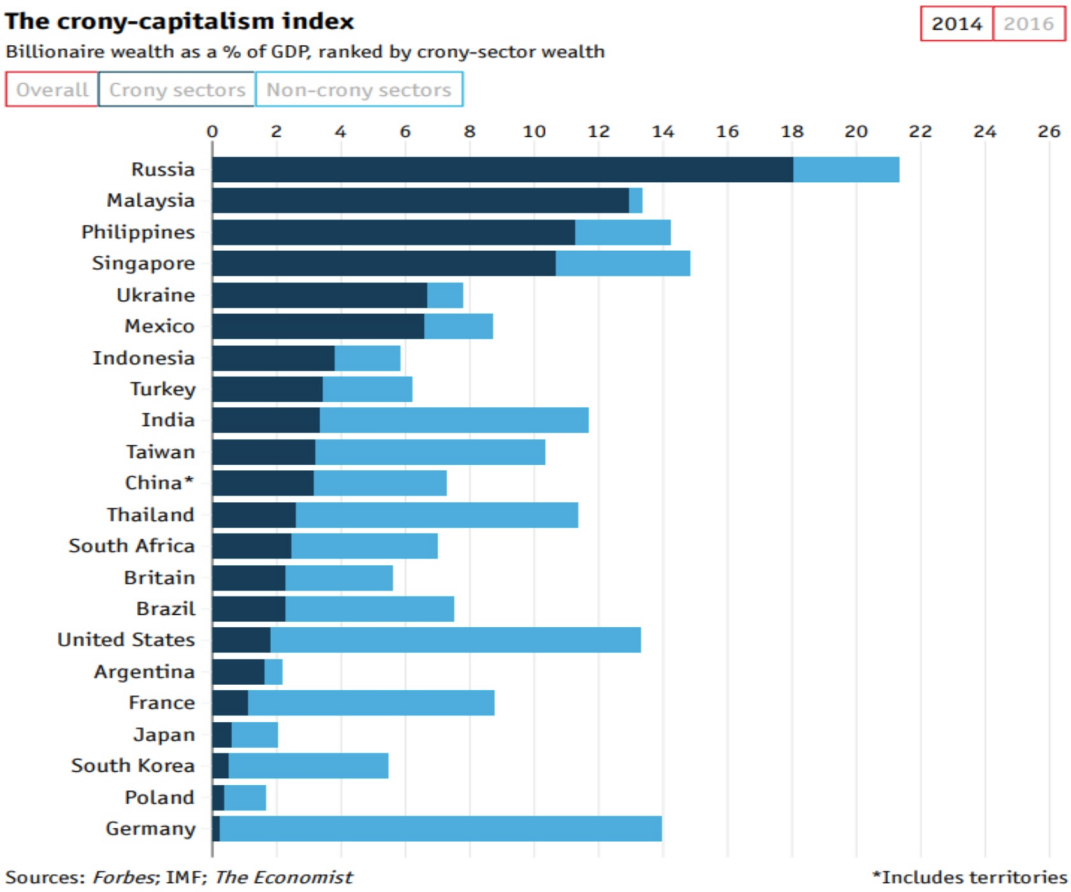
1 Introduction

The phenomenon of favouritism, lobbyism, and crony capitalism in India has been a key factor in shaping the private and the public sectors operating at this point of time. Crony capitalism is an economic set-up in which enterprises thrive as the return on money amassed through collusion between the influencers of the business and the political class. These manipulations lead to ease of obtaining permits, grants from the administrations, tax breaks, strategies with an aim of corporate welfare, favouritistic monetary policies and other concessions from the government. Earlier, India witnessed an incidence of favouritism in the telecom sector where certain companies were burdened with the cumulative amount of taxes whereas a specific corporate giant was favoured with strategic policies and was allowed to set low penetrative prices to capture a large proportion of the market.

Figure 1: The Crony-capitalism Index
Billionaire Wealth as a % of GDP



Source: Forbes, IMF, The Economist.

The Diagram portrays the Crony-capitalism index, which aims to indicate whether the livelihood of the people from a certain country or city with a capitalist economy is easily affected by Crony-capitalism or not.

Industries which are prone to monopoly, any form of over-powering collusion, require licensing and highly depend on the government which may be selected are considered for construction of this index. (For example: coal, timber, defence, deposit-taking banking and investment banking infrastructure, ports, airports, real estate and construction, steel and other metals, mining and commodities, utilities and telecom services.) Then, the total wealth of the world's billionaires who are vigorously involved in rent-heavy industries from the data of Forbes must be calculated. Results can be achieved from the ratio of billionaire wealth to Gross Domestic Product in their own countries, a higher ratio of billionaire wealth to GDP indicates a higher possibility of suffering from the incidence of Crony-capitalism. The aim of this paper is to capture the incidence of favouritism, lobbying, and crony capitalism in the healthcare sector of a developing nation.

We can relate this situation to the vaccine production market in India as well. There has been an evident multidimensional influence of the SARS-CoV-2 virus on several economies (both developed and developing nations), which has pushed India along with other countries into an unprecedented spiral. The global outbreak has also had a huge impact on the health-care domain and disrupted the entire global supply chain of the industry. The pandemic has affected 150 million people and caused more than 3 lakh deaths across the world. The lack of healthcare infrastructure in developing and underdeveloped countries has acted as an instigator and made the impact of COVID-19 more effective. Shortages in oxygen concentrators, medical ventilators and most importantly anti-virus vaccines have been identified as some of the key issues which are required to be addressed urgently. As a large nation, India has a population of 996 million adults which states the requirement of 1932 million doses of vaccine. In order to meet this requirement within a year, India needs to manufacture at least 5 million vials of vaccines per day, whereas the combined production by Bharat Biotech and Serum Institute only adds up to 3.8 million vials of vaccines per day among which 15 per cent vials are moved aside as aid due to prior diplomatic commitments. These aforementioned figures are palpable.

World Health Organization suggests a 1:1000 doctor to patients' ratio and a 1:300 nurse to patients' ratio, while our nation could only manage to have a doctor for 1511 patients' and one nurse for 670 patients. As compared to the USA which has 3 hospital beds for 1000 people and China with 4 beds for 1000 people, India has only 1.4 beds available for 1000 people approximately. USA spends around 8 per cent and China spends 2 per cent of their GDP on the development of health-care, whereas India manages to spend a mere 1 per cent for expenditure on health. The figures explain the imperative need for funds which must be channelized towards public healthcare infrastructure and development.

The private healthcare sector in India caters to 70% of the healthcare demand. It was pretty evident, how the susceptibility of the Indian healthcare sector was exposed after COVID-19 bolstered the pursuit of universally affordable healthcare systems. The government spending on the healthcare sector had been quite appalling, with less than 5 per cent budgetary provisions over the previous decades. The privatization of the healthcare sector happened before 1991 with the tacit consent of the government of India itself. The private healthcare is not only trusted by the majority (due to ins and outs like corruption in public setups among

many other reasons) but the private sector also participates by contributing a distinguished amount of revenue to the government. With a predicted trend of disinvestments in the government sector enterprises and the announcement of upcoming fiscal policies to support corporate set-ups, the private healthcare sector is undoubtedly the future of the healthcare system in India. Even though the Union budget 2021 stated a 137% increase in the healthcare expenditure from 94,452 crores to 2,23,846 crores for the F.Y 2021-22. These additional allocations were mainly driven by expenditure on vaccination, Jal Jeevan Mission, grants for local bodies and grants for augmentation in the healthcare sector through the finance commission for water sanitation, hence, the vulnerable factors of the healthcare sector weren't addressed appropriately. Due to the closure of public vaccine manufacturing units over a decade ago, the government is bound to hinge on private entities like Bharat Biotech and Serum Institute. These institutes have been permitted to sell the vaccines in the open market and to charge differential prices, which is a key factor behind the instability in the vaccine market equilibrium. Due to government support and opaque pricing policies, these firms have been able to extract super-profits during these unprecedented times. Even when the government has legal powers to resolve this predicament, an absence of political willingness to do so has been observed.

Given all these, we refer to the aforementioned situations and attempt to provide an explicit political foundation to the existing theory of mixed oligopoly by demonstrating how public policies are systematically used to rig the private market at a cost to aggregate the welfare of the economy in ways that maximizes the politically connected actors in a democratic setup. We incorporate the atomistic behaviour of the incumbent political party and election arithmetic in the decision-making process for the choice of the optimal rate of subsidy under both mixed oligopolistic market structure and pure private oligopoly. Cronyism is captured in terms of the donations provided by the lobby of the private firms, in return for concessions obtained from the incumbent political party in terms of production subsidies. Unlike the existing studies that assume welfare-maximizing benevolent government, we assume that the incumbent political party that faces an election maximizes its aggregate payoff, which is a weighted average of its expected payoff from the re- election bid and the welfare of the economy. We make a two-fold comparison. First, for given values of the political variables, the results under mixed-oligopoly political equilibria and private oligopoly political equilibria are compared. Second, we compare the effect of variation in the political attitude of the incumbent party towards power away from the welfare of the economy and an increased magnitude of backlash, which weakens the tie of cronyism. In this model, we use a three-stage game to analyse the above scenario.

The results of the paper reflect a conflict of interest between the agents, viz., the political party, the private firms, the consumers, and the economy as a whole. For instance, we obtained that privatization improves the profits of the private sector while it lowers the equilibrium payoff to the incumbent political party. On the other hand, the amount of donations is high owing to the privatization of public firms. This concludes that if private firms enjoy the first mover advantage, then they can manage to improve their profit by donating more while the political party becomes the ultimate loser. The results of the paper are limited to a democratic setup in which the risk of losing office prevails. In other forms of

government, such as monarchy, autocracy etc. in which there exist no risk of losing power except for the backlash from the public protest which can be easily suppressed in such a setup. Interestingly, our paper demonstrates that democracy itself provides an incentive endogenously to the incumbent political party to indulge in cronyism even if the political party is the ultimate loser. To the best of our knowledge, no other theoretical analysis of mixed- oligopoly has taken this approach to incorporate the political dimension explicitly.

2 Review of Literature

The literature on mixed oligopoly has substantially analysed the determination of optimal subsidy assuming private firms maximize profit and public firm maximize welfare under both homogenous good simultaneous Cournot-Nash competition (White 1996; Theotoky 2001; Escrihuela-Villar and Gutiérrez-Hita 2018; Matsumura and Kanda 2005 etc.) and differentiated good Bertrand-price competition (Barcena- Ruiz 2007; Barcena-Ruiz and Sedano 2011 etc.). The commonality of these existing works includes the assumption that the government that owns the public-sector firm is a benevolent social welfare maximizer while choosing its production level and the rate of subsidy. However, in reality, we seldom find such a benevolent government in existence. With an exception to the above studies, White (2002) and Matsumara and Tomaru (2013) have considered the political biasedness in choice of subsidy and public firm's output by assuming that the public sector maximizes weighted welfare with politically biased weights assigned to consumer surplus, private profits and public profit. Although these studies have attempted to incorporate the role of politics in a mixed-oligopolistic structure, however, the political foundation of these studies do not explicitly incorporate the behaviour of the politician. No motivations are provided behind such politically biased weighted welfare function.

3 The Model

We consider an economy with *'N'* private firms and one public sector firm competing in a homogenous commodity market, respectively. There is a unit mass of homogenous consumers. The preference of the representative consumer is described by the following strictly concave utility function:

$$V(Q) = aQ - \frac{1}{2}Q^2 \quad ; V' > 0, V'' < 0 \tag{1}$$

where, $Q = q_G + \sum_{i=1}^{N} q_i$, and q_G, q_i are the amount of public good and each private commodity $i = \{1, 2, \ldots, N\}$ consumed by the consumer, respectively facing the unit P $V(Q) - P\left(q_G + \sum_{i=1}^{N} q_i\right)$ price. The representative consumer maximizes the net utility, which yields the following inverse demand function

$$P = a - q_G - \sum_{i=1}^{N} q_i \tag{2}$$

The firms have homogenous technologies which imply an identical increasing marginal cost, bq_i. We assume there are no fixed costs since we are not considering any entry decision of firms.

We here introduced the atomistic behaviour of the incumbent political party that faces an election. The incumbent political party offers some concession to the firms in the form of production subsidies $\left(^{S}\right)$ which reduces the firm's marginal cost of production. The lobby of the private firms, in return for concession obtained from the incumbent political party, donates an amount D to the political fund of the incumbent party. The party requires these funds to improve its chance of getting re-elected. In other words, the higher is the amount of D, the greater will be the probability (ρ) of getting re-elected.

The incumbent political party faces a backlash for unfair favouritism to the private firms in exchange for illegal donations by the private firms. This backlash is described by the function $\gamma\left(s\sum_{i=1}^{N}q_i\right)$, where, $\gamma'(.) > 0$ which implies that the magnitude of backlash is strictly increasing in the amount of concession provided to the private firms. Thus, $\gamma(.\ )$ captures the legal/public threat faced by the political party for its nexus with the private firms while in power. If the incumbent party gets re-elected, then it could suppress the backlash at least up to the next election. However, if it loses the re-election bid, then it has to face backlash.

The aggregate utility of the incumbent political party (U) is the weighted average of its expected payoff from the re-election bid and the welfare of the economy with weights α and $1-\alpha$, respectively:

$$U = \alpha\left\{\rho(D)\Omega - (1-\rho(D))\gamma\left(s\sum_{i=1}^{N}q_i\right)\right\} + (1-\alpha)W \tag{3}$$

The welfare of the economy (W) is given by the sum of consumer surplus (CS), producer surplus less the aggregate expenditure on subsidies [1].

$$W = CS + \pi_G + \sum_{i=1}^{N}\pi_i - s\left(q_G + \sum_{i=1}^{N}q_i\right) \tag{4}$$

where, π_G and π_i are the profits of the public sector and the private sector firm, respectively.

Given the rate of concession (subsidy) the profits of the representative private firm and the public firm are given by the following:

$$\pi_i = q_i\left(a - q_G - \sum_{i=1}^{N}q_i\right) - \frac{1}{2}bq_i^2 + sq_i - D \tag{5}$$

$$\pi_G = q_G\left(a - q_G - \sum_{i=1}^{N}q_i\right) - \frac{1}{2}bq_G^2 + sq_G \tag{6}$$

[1] In a vibrant democracy, failed policies or biased favouritism result in public outrage. Some examples include the ongoing farmer-protest in India against the incumbent National Democratic Alliance (NDA) government which resulted in complete overall defeat of the incumbent leading party of the NDA alliance in the local elections in the Punjab state of India, which is dominantly an agriculture-based state. The backlash can also be political where the new party in power throws legal cases on the former officeholders using government vigilant agencies and judiciary. The misuse of government machinery for such political vigilance is common in countries with weak legal and judiciary institutions

3.1 Mixed Oligopoly Political Equilibria

We consider the scenario of mixed oligopoly political equilibria in a three-stage game. The timing of the game is as follows.

Stage 1: the private firm chooses the amount of donation, ' D ' by maximizing its profit in equation (5).

Stage 2: the incumbent political party announces the rate of concession (subsidy) ' s ' which maximizes its payoff in equation (3).

Stage 3: the private firms and the public firm chooses the level of output which maximizes equation (5) and equation (3) simultaneously, respectively.

The model is solved using the backward induction method to obtain the subgame perfect Nash-equilibrium outcomes.

Maximizing equation (3) and (5) simultaneously and considering the symmetric private output, i.e., $q_i = q_j \forall i \neq j \in \{1, 2, \ldots, N\}$ we obtain the following two reaction functions, respectively

$$q_G(b+1) + Nq_i = a \tag{7}$$

$$q_G + (N+1+b)q_i = a + s \tag{8}$$

Solving equation (7) and (8) we obtain the third-stage Cournot equilibrium outputs

$$\left.\begin{array}{l} q_G(s) = \frac{a(b+1)-Ns}{b^2+(N+2)b+1} \\ q_i(s) = \frac{ab+(b+1)s}{b^2+(N+2)b+1} \end{array}\right\} \tag{9}$$

We assume the following:

Assumption 1:

$$(i) N < \frac{a(b+1)}{s} \qquad \text{(ii) } D < \frac{\{(a+s)b+s\}^2(b+2)}{2\{b^2+(N+2)b+1\}^2}$$

A sufficiently higher number of private firms (N) or sufficiently smaller market size (a) for a given level of ' s ' would make the public-sector firm unsustainable. Assumption 1(i) is also crucial for a positive level of the equilibrium price level. Assumption 1 (ii) is necessary for $\pi_i(s) > 0$. In other words, the nexus between the private sector and the political party in power will break down if assumption 1 (ii) is violated.

The level of output in equation (9) yields the following profit function for the public sector firm and the private firm, respectively

$$\pi_G(s) = \frac{\{a(b+1) - sN\}\{(a+2s)b^2 + ((N+4)s+a))\,b + 2s\}}{2\{b^2 + (N+2)b + 1\}^2} \tag{10}$$

$$\pi_i(s, D) = \frac{\{(a+s)b + s\}^2(b+2)}{2\{b^2 + (N+2)b + 1\}^2} - D \tag{11}$$

We now proceed to the second stage of the game. At this stage, the incumbent political party chooses the rate of concession (subsidy) provided to the firms to maximize its weighted utility in equation (3). Solving the first-order condition, we obtain the second-stage optimal value of the subsidy

$$s(D) = \frac{ab\left\{\frac{(b+1)(1-\alpha)}{\{b^2+(N+2)b+1\}} - \alpha(1-\rho(D))\gamma'(.)\right\}}{(b+1)\left\{\frac{(1-\alpha)(N+b+1)}{b^2+(N+2)b+1} + 2\alpha(1-\rho(D))\gamma'(.)(b+1)\right\}} \tag{12}$$

Assumption 2:

$$\text{(i) } \frac{(1-\alpha)(b+1)}{\alpha(1-\rho(D))\{b^2+(N+2)b+1\}} > \gamma'(.) > 0 \text{ (ii)} \quad \rho'(D) > 0, \rho''(D) < 0$$

It has been mentioned that the magnitude of backlash is increasing in the total amount of concession provided to the private sector, however, assumption 2 (i) imposes the necessary restriction of the range of $\gamma'(.)$ for which $s(D)$ will be necessarily positive. Assumption 2 (ii) is the second-order necessary condition for a private firm's profit maximization while choosing the amount of D in stage 1.

Substituting equation (12) in all the preceding equations, the profit of the private firm boils down to the following expression, termed as equation (11.1)

$$\pi_i(D) = \frac{\{(a+s(D))b + s(D)\}^2(b+2)}{2\{b^2 + (N+2)b + 1\}^2} - D$$

Finally, in this stage, the private firm chooses the amount of donation ' D ' to maximize the equation (11.1). The first-stage optimal value of D solves the following

$$\frac{(b+2)(1-\alpha)\gamma'(.)\rho'(.)b(a+b+N+1)\{(a+s)b+s\}}{N\{b^2+(N+2)b+1\}^2\{(N+b+1)b + 2\gamma'(.)(1-\rho(.))\}^2} = 1 \tag{13}$$

3.2 Private Oligopoly Political Equilibria

In this section, we consider the complete privatization of the public sector firms. This implies that the firm G chooses its output level by maximizing its profit in equation (6) simultaneously competing with other ' N ' private sector firms. The timing of the game

remains unchanged, however, in stage 1 all $(N+1)$ private firms choose the amount of D unlike in the case of mixed-oligopoly in which the public sector firm had not to pay any donation and in stage 3 these $(N+1)$ private firms maximize profit.

Using the backward induction method to solve the game, the third stage level of output and profit of each private firm is obtained as follows, respectively

$$q_i(s) = \frac{a+s}{2+N+b} \quad \forall i \in \{1, 2, \ldots, N+1\} \tag{14}$$

$$\pi_i(s, D) = \frac{(a+s)^2(2+b)}{2(2+N+b)^2} - D \tag{15}$$

Assumption 3:

$$D < \tfrac{(a+s)^2(2+b)}{2(2+N+b)^2} \text{ for } \quad \pi_i(s, D) > 0$$

The second-stage value of $s(D)$ is obtained by maximizing equation (3) solves the following:

$$\frac{(1-\alpha)(N+1)\{a - s(N+b+1)\}}{(N+b+2)} = \alpha(1-\rho(D))\gamma'(.)(a+2s)(N+1) \tag{16}$$

Finally, we obtain the first stage choice of D by maximizing equation (15) which leads to the following first-order condition.

$$\frac{d\pi_i}{dD} = \frac{(2+b)(a+s)}{(N+b+2)^2}\frac{\partial s(D)}{\partial D} - 1 = 0 \tag{17}$$

4 Comparative Statics and Numerical Results

In this section, we construct a numerical example to illustrate the effect of change in the attitude of the incumbent political party towards retaining power and compare the results of mixed-oligopolistic structure and privatization. A shift of attitude of the political party towards electoral payoff is captured by an increase in the value of α.

We define $\gamma = ks\sum_{i=1}^{N} q_i$ (or, $\gamma = ks\sum_{i=1}^{N+1} q_i$) for mixed (or, private) oligopolistic competition, receptively and $\rho = D/(D+1)$ such that assumptions 1-3 are satisfied. For the given parametric values of $a = 50, N = 2, b = 1$ and $k = 1$ we obtain the following numerical results for all other variables when the value of α is increased from 0.3 to 0.5 under both mixed and private oligopoly. The arrows within the parentheses indicate the direction of change of the endogenized variables against change in the value of α for a given structure of the oligopoly (mixed or pure private).

Proposition 1: An increase in α leads to (i) decrease in equilibrium output of each private firm, q_i (ii) an increase in equilibrium output of the public sector firm, q_G (iii) fall in per-unit subsidy, s (iv) fall (rise) in the level of donation, D under mixed (private) oligopoly (v) fall (rise) in profit level of both private and public firm in a mixed (private) oligopoly (vi) a fall

Table 1: Comparative results under mixed and private oligopoly against variation in the value of α

	$\boldsymbol{\alpha = 0.3}$		$\boldsymbol{\alpha = 0.5}$	
Variables	Mixed Oligopoly	Private Oligopoly	Mixed Oligopoly	Private Oligopoly
q_i	10.7649	12.2298	8.6922(↓)	12.084(↓)
q_G	14.2351	–	16.3077(↑)	–
S	7.2948	11.490	1.0767(↓)	10.4239(↓)
D	2.3879	27.6687	2.3299(↓)	41.6587(↑)
π_i	171.4378	609.4089	111.0025(↓)	615.5318(↑)
π_G	205.1605	–	150.5302(↓)	–
U	655.9297	468.1498	482.2825(↓)	450.1432(↓)
W	926.7033	854.0559	903.8420(↓)	811.4895(↓)

Source: Author's calculations.

in the weighted utility of the incumbent political party and (vii) a fall in the welfare of the economy.

A higher concern for political power (higher α) in the objective of the incumbent government induces the political party to lower the rate of corporate subsidy. This is because there exists a political risk of losing the election which imposes the cost of backlash on the political party by the legal authorities in proportion to the amount of concession provided to the private firms in form of subsidy. To reduce the expected risk of backlash the incumbent political party lowers the amount of concession provided to the private firms by lowering the rate of subsidy. Given that private firms enjoy a first-mover advantage in terms of choice of the amount of donation, thus firms would reduce the donation to the political party to maximize its profit in stage 1. This produces a counterproductive outcome for the political party in terms of a fall in the level of its aggregate weighted utility, U (proposition 1 (vi)). This is because, on one hand, the level of donation falls which lowers its utility from the re-election bid. On the other hand, the aggregate welfare of the economy declines.

Corollary 1: An increase in α raises the equilibrium profit level of the private firm in a pure private oligopoly while it lowers private profit in a mixed oligopoly.

We define the nature of oligopoly by superscript ' M ' for mixed oligopoly and ' P ' for pure-private oligopoly.

Proposition 2: For any given level of α, (i) $s^M < s^P$ (ii) $D^M < D^P$ (iii) $\pi^M < \pi^P$ (iv) $U^M > U^P$ and (v)$W^M > W^P$.

Proposition 2 leads to an interesting result of a conflict of interest between the incumbent political party and the private sector firms. Privatization benefits the private firms (proposition 2-iii) while it deteriorates the aggregate weighted utility of the incumbent political party (proposition 2-iv). The welfare of the economy worsens owing to privatization. The logic behind this can be explained as follows. With the privatization of the public firm, the

Table 2: Comparative Results Under Mixed Oligopoly Against Variation in the Value of k

Variables	Mixed Oligopoly	
	$\boldsymbol{k = 0.5}$	$\boldsymbol{k = 1}$
q_i	9.5393	10.7649(↑)
q_G	15.4607	14.2351(↓)
S	3.6179	7.2948(↑)
D	0.4284	2.3879(↑)
π_i	172.7619	171.4378(↓)
U	696.4978	655.9297(↓)
W	992.4981	926.7033(↓)

Source: Author's calculations.

competition in the private sector increases for a share of the market power which led to a larger amount of donation to the political party to avail the concession of production subsidy, thus donation increases. The profit of each private firm improves because in the former case of mixed oligopoly market power was relatively low owing to the choice of output in the public sector by maximizing the weighted average of political payoff and social welfare, however, in the case of pure private oligopoly the market power of private improves given that the former public firm now maximizes its profit. The level of output corresponding to the weighted average of political payoff and welfare maximization in a mixed oligopoly is higher than the level of output corresponding to profit maximization in a private oligopoly. Proposition 1 and proposition 2 also proves that when optimal subsidies are used in a mixed oligopoly or pure private oligopoly in presence of political equilibrium neither outputs nor profits of the private sector and the public sector are equalized which is a direct departure from the existing theoretical results of the mixed oligopoly with the comparable underlying structure of the firms.

We now consider the effect of an increase in the intensity of backlash in terms of an increase in k for the following given values of the parameters: $\alpha = 0.3, a = 50$, $N = 2$ and $b = 1$.

Proposition 3: An increase in k leads to (i) an increase in the amount of donation by the private sector to the political party (ii) an increase in the rate of subsidy (iii) an increase in profits of the private firm (iv) a fall in the utility of the incumbent political party and (v) deterioration of welfare of the economy.

This implies that with a stronger vigilance on the incumbent political party, the private firm gains in terms of higher profits and enjoying a higher rate of concession (production subsidy) in exchange for a higher amount of donations, at the cost to the welfare of the economy (proposition-v) while the political party in power also loses.

5 Conclusion

While several facets of mixed oligopoly models have been analysed in the scholarship, there exists no theoretical analysis which considers the role of an atomistic political agent which becomes relevant for the determination of various policy variables. In this paper, we attempt to fill the gap in the mixed oligopolistic models by explicitly accounting for electoral arithmetic in the determination of the equilibrium rate of subsidy and the decision of privatization in a democracy.

We explore the mixed-oligopolistic political equilibria in terms of the nexus that persist between the private sectors competing simultaneously and the incumbent party, which may be explained by the situation where a specific private vaccine manufacturer may form a nexus with the incumbent political party. The private sector firms provide donations to the party in power in exchange for concession obtained from the latter in terms of production subsidy. The problem is described using a three-stage game theoretic model and solved using backward induction. We carried out comparative statics to analyse the effect of an increase in preference of the incumbent government towards power in terms of larger weight to re-election bid and lesser weight to aggregate social welfare and the effect of an increase in the magnitude of backlash facing the political party if it loses the re-election bid. We obtained that the private sector firm gains in terms of higher profit owing to privatization of the public sector firm, while the incumbent political party loses. Interestingly, the incumbent political party loses at equilibrium and lowers the rate of subsidy, however, the private firms continue to provide a higher amount of donation to the political party.

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Factors Affecting Internet Data Consumption amongst College Students during the Pandemic

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Abstract

This paper seeks to evaluate the factors affecting Internet data consumption amongst undergraduate and postgraduate students during the COVID-19 Pandemic and the subsequent lockdown in India. The paper uses data obtained from a primary survey of Internet users to determine the effect of various factors on the consumption of Internet data. The changes are evaluated through the lens of six major socio-economic indicators that are age, gender, income level, occupation, area of residence, and social category. We find that there has been a significant increase in Internet data consumption in the post-Pandemic period and there are several changes in the patterns of consumption. We also find that family income, expenditure on the Internet and time spent on the Internet significantly affect Internet data consumption.

JEL Classification: C51, D12, J15, J16, L86, O33
Keywords: Least Squares Estimation, Consumer Sentiment, Expenditure, Taste, Inequality, Gender Discrimination, Digital Divide, Internet, Internet Services, Technological Impact, Technology Adoption

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1 Introduction

The COVID-19 pandemic and the subsequent shift to online functioning for work, leisure, and other activities initiated massive changes in Internet services and consumption. Prior to the pandemic, India had been experiencing a rapid rise in Internet users, reaching 420 million by June 2017 (Agarwal 2017). By 2020, the estimated number of active internet users reached around 620 million. 58% were male, and most of them were from urban areas.Millions of users, especially in rural India were coming online for the first time. The pandemic, despite the massive economic crisis it has induced, has also resulted in an explosion in internet usage, both in terms of volume and subscribers.

As per telecom regulator TRAI, India had a total of 688 million broadband subscribers in September 2020 out of which just 22.26 million were fixed broadband subscribers. The top broadband players (wired and wireless) were Reliance Jio (355.93 million), Bharti Airtel (127.83 million), Vodafone Idea Ltd (112.19 million), and BSNL (21.52 million) (TRAI 2020). India's fixed broadband penetration at 6 per cent is much lower than other countries.

India's internet consumption rose by 13% since the lockdown was put in, according to telecom ministry data. The price of accessing data in fixed and mobile broadband is almost similar. The daily average consumption in this period was 9% higher than data used on March 21, the day the nationwide lockdown was announced, and 13% more than on March 19.

Speed Test, a site that analyses internet access performance across the globe, showed a 6% decline in fixed line speeds and 18% in mobile speeds when compared to the week of March 2 in its latest report on tracking COVID-19's impact on speeds around the world which was updated on April 15. As per the report, India's current broadband speed is an average of 36.17 megabits per second (Mbps) and mobile download speed is 9.67 Mbps (Rizzato 2020). OpenSignal, a mobile analytics company, analysed the download speed experience of smartphone users in India from late January until early July to understand their experience before and during the pandemic lockdown.

The Internet data speeds as well as levels and amount of usage vary by social categories such as caste and gender, as well as economic indicators such as income and occupation. Numerous reports have been conducted to evaluate these relationships. Internet use has increased considerably in recent years across the world. A report by the Pew Research Center (Jacob, Bishop and Chwe 2018) found that there has been a steady increase in internet use among developing and emerging economies. However, the digital divide persists with per capita income, age, education and in some cases, gender differentiating use of the internet. The report observes that young people are far more likely than old people to use the internet.

Internet use also increases with an increase in education. Furthermore, males are more likely to use the internet than females in developing economies.

Students especially have been affected by these inequalities. The lockdown has led to a dramatic shift in the educational sector as schools and universities across the world have

shifted their classes to video conferencing platforms like Zoom and Google Meet (Pandey and Pal 2020). In India, the access to these platforms is a lot more unequal and the transition has not been the same for everyone, mediated by demographic and class factors.

This paper explores the factors affecting Internet data consumption using a multiple regression model. It uses socio-economic variables such as gender, caste, place of residence, household income, spending on Internet and Internet speed to determine a relationship. In the following section, we look at existing literature that evaluates the effect of some of these factors on Internet data consumption. After the literature review, we look at the survey data used in the research and the research methodology and then discuss the results from the regression model.

2 Literature Review

The pandemic and the subsequent lockdown have had a profound impact on the way the internet is used. Among students, this has meant an increase in consumption, although this has not been uniform. Fernandes et al. (2020) look at the impact of lockdown on internet use among adolescents in several countries including India. The paper finds that adolescents increased their use of social media sites and streaming services during the course of the lockdown. The paper also looks at the impact of internet use on well-being and finds a strong relationship between compulsive online behaviours and symptoms of depression and loneliness. Kapasia et al. (2020) assess the impact of the lockdown on university students in West Bengal. The paper finds that during the lockdown, around 70% of the students were engaged in online learning. They faced various problems including depression, anxiety, poor Internet connectivity and an unfavourable study environment. These problems were found to be acute, especially for students from remote areas and marginalised sections.

Jahan et al. (2021) investigate the changes in Internet use behaviours and addiction rates among Bangladeshi students during the pandemic using a cross-sectional study. 71.6% of the participants reported experiencing internet addiction. Risk factors for internet addiction were found to be smartphone addiction, depression and anxiety. Subudhi and Palai (2020) study the degree, importance and impact of consumption of the Internet during the COVID lockdown. Anand et al. (2018) investigate internet addiction amongst engineering university students in Mangaluru, Karnataka. Gender, duration of use, time spent per day, frequency of internet use, and psychological distress all predicted internet addiction, similar to factors predicting normal internet use.

Besides the general increase in consumption, the 'digital divide' has also come to the fore during the pandemic. According to Dasgupta, Lall and Wheeler (2001), the digital divide is more due to a lack of telecommunications rather than a lack of access to Information Technology. Kamssu et al. (2004) investigate the impact of information technology (IT) infrastructure, Internet Service Providers (ISPs), and socio-economic factors on Information and Communications Technology (ICT) access and use. The paper finds a significant relationship between these factors and the adoption of the internet.

Previous studies show that age, occupation, gender, place of residence, caste and income all

considerably affect internet use. While a lot of literature focuses on the demographic factors affecting the adoption of the internet, Buselle et al. (1999) look at the demographic factors that predict internet use. It was found that gender and age were significant demographic predictors of use, younger males being heavier users. Ahamed and Siddiqui (2020) analyse data from National Sample Survey (NSS) conducted in 2017-18, on 'Household Social Consumption on Education in India'. The survey finds that only one out of 10 households own a computer. There is also a stark rural-urban disparity.

Rajam, Reddy and Banerjee (2021) analyse the digital divide between disadvantaged caste groups and others. It finds that more than half of the caste-based digital gap is attributable to differences in educational attainment and income between the disadvantaged caste groups and others. Kumar and Kumara (2018) find a significant rural-urban gap in access to ICT (Information and Communications Technology).

Tewathia, Kamath and Ilavarasan (2020) similarly find that higher education, caste, occupation and ownership of assets significantly affect internet use. Less educated, lower-income groups, and marginalised caste groups neither have (Information and Communications Technology) ICT assets nor the skills to use them. Also, the highest adult education in a household, caste, and the primary source of income of the household differentiate ICT ownership and use. Overall, ICT ownership and usage are significantly different for different socio-economic groups in India. Thus, these are all critical factors in looking at the effect on Internet consumption.

3 Data and Methodology

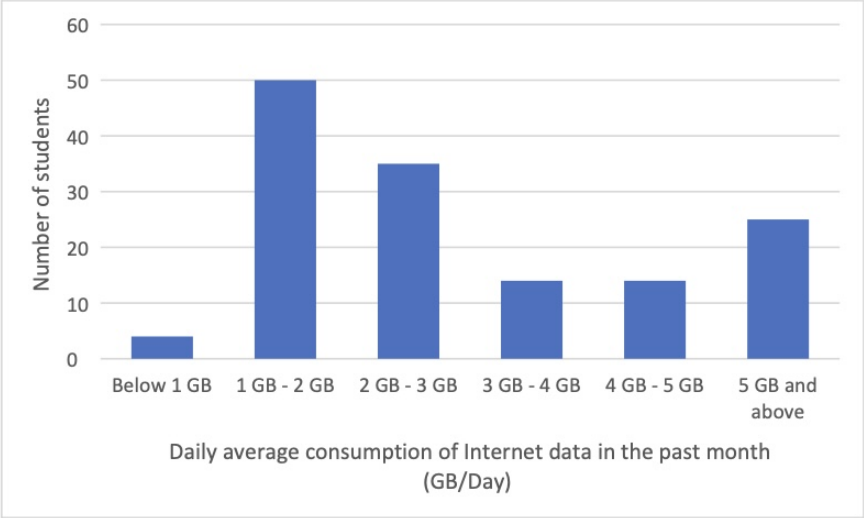
3.1 Data Description

We use primary survey data to evaluate the impact of the pandemic on Internet data consumption. A cross-sectional study was conducted between October 26 and November 28, 2020 through a survey form administered online to gauge information about each of the aforementioned variables. The online survey conducted through Google Forms was circulated to get responses from a diverse array of respondents. A sample survey was also administered prior to administering it at large to account for errors and corrections. Participation in the survey was voluntary and informed consent was taken prior to administering the survey. Only aggregated responses were evaluated, such that confidentiality and anonymity were maintained. The questionnaire for the survey is attached in the appendix in section 9e. In the main survey, a total of 192 responses were received. To control for education and occupation, we select a subset of 142 responses consisting of respondents identifying themselves as students between the ages of 17-23, i.e., undergraduate and postgraduate students in India. We present in this section the significant observations we find from the data.

1. Consumption of Internet Data

Most students consume between 1 GB to 3 GB of data on average every day, although a significant number (17.6%) consume more than 5 GB per day. This reflects the necessity of internet data for students.

Figure 1: Daily Average Consumption of Internet Data in the Past Month by Students

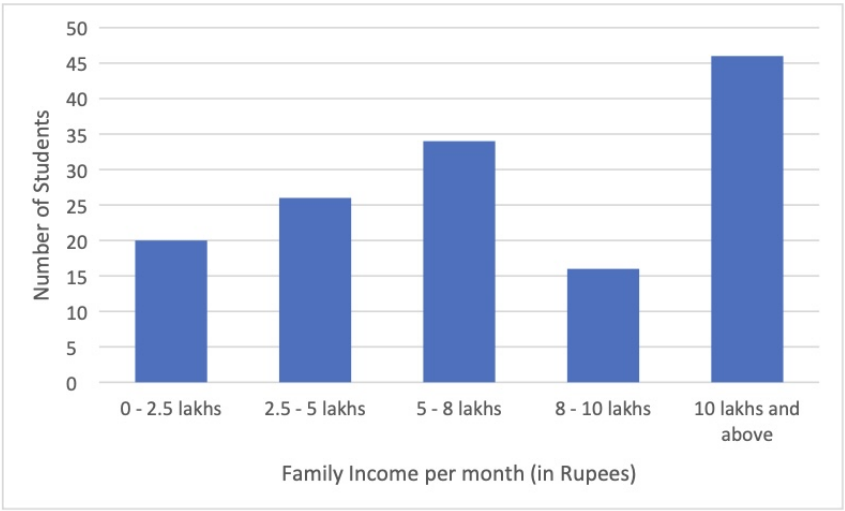


Source: Authors' Visualisation from survey responses.

2. Family Income

Family Income is distributed across the different categories, although there is a significant number, 32.4% of students, who have family income above 10 lakhs per month. Thus, the survey sample is economically well-off relative to the overall population.

Figure 2: Family Income Per Month of the Students

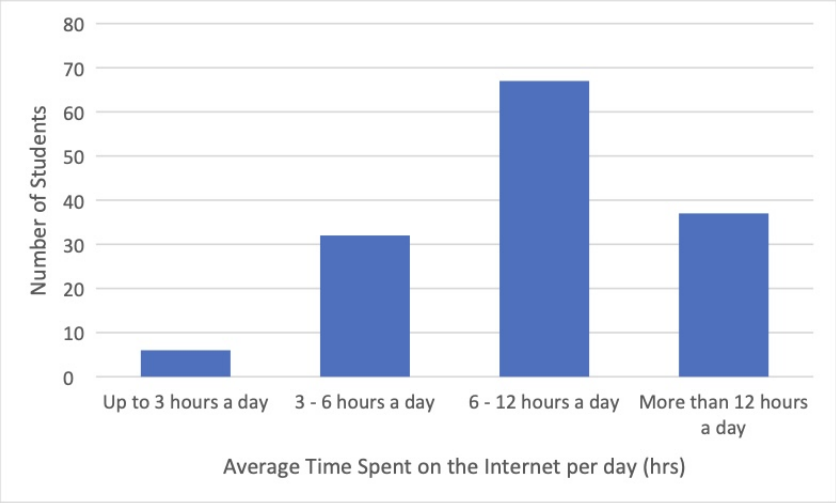


Source: Authors' Visualisation from survey responses.

3. Time Spent on the Internet

Most students in the survey sample spend more than 6 hours per day on the Internet. This also reflects the importance internet holds over students' lives.

Figure 3: Average Time Spent on the Internet by Students

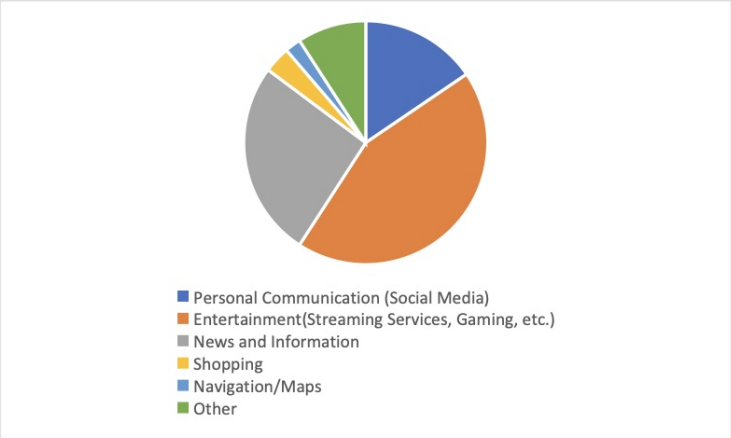


Source: Authors' Visualisation from survey responses.

4. Type of Internet activity consuming most data

43.7% of students spend most of their internet data on consuming entertainment, while 26.1% spend most data on news and information. Furthermore, 15.5% of students spend most of their data on news and information. A very small section spends it on shopping, navigation or other activities. Thus, entertainment and news and information are the most data-consuming activities for students.

Figure 4: Type of Internet consuming most data per day among students

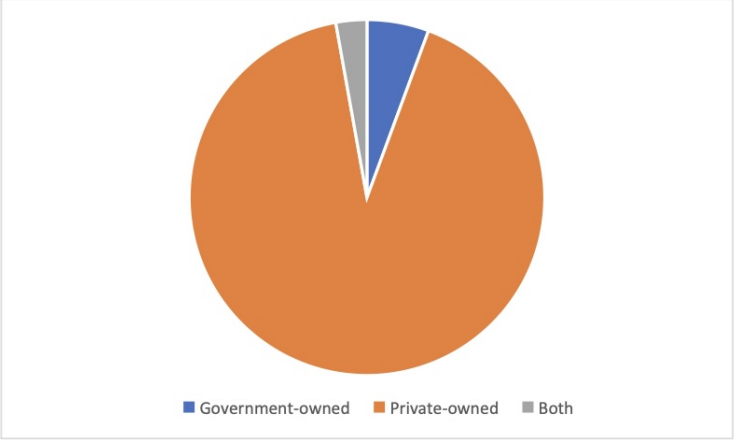


Source: Authors' Visualisation from survey responses.

5. ISP Type

91.5% of students in the survey use a private Internet Service Provider, whereas 5.6% use a government-owned service provider. This reflects the reliance on private companies for internet services.

Figure 5: Internet Service Provider Type of the Students

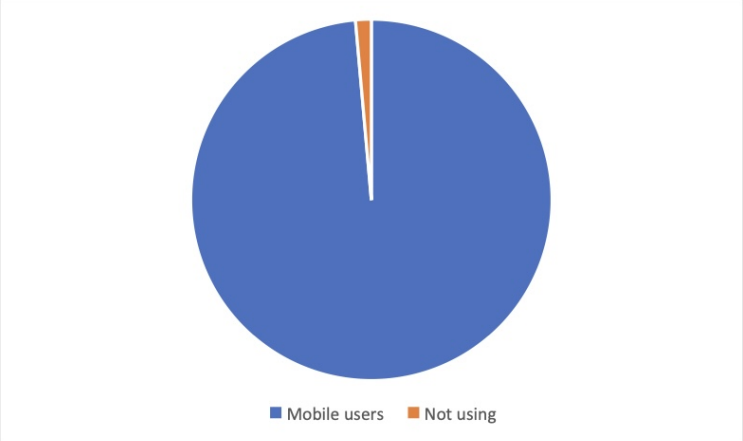


Source: Authors' Visualisation from survey responses.

6. Mobile users

98.6% of the students in the sample use Mobile Data regularly, thus reflecting the importance of phones in internet use.

Figure 6: Share of students using Mobile phones to access the Internet



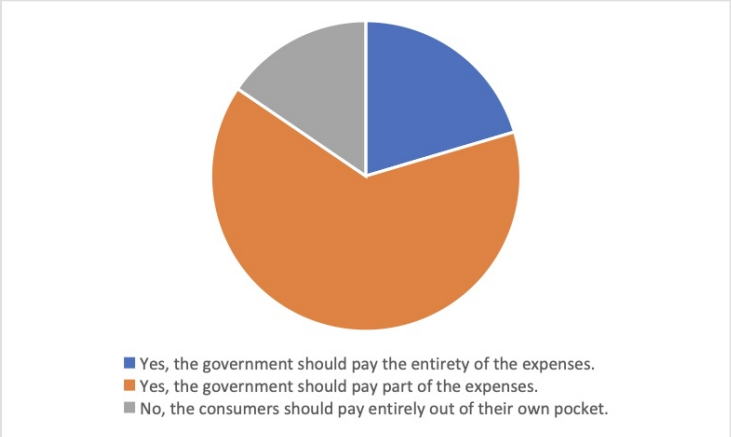
Source: Authors' Visualisation from survey responses.

7. Internet as a public utility

20.4% of the students support the idea of the government providing Internet as a public utility and paying expenses entirely, while 64.1% feel that the government should only pay a

part of the expenses. 15.5% of respondents oppose the idea and feel that consumers should pay for the Internet entirely out of their own pocket. Thus, we see significant support for government intervention in providing internet access.

Figure 7: Opinion of Students on government paying for Internet expenses

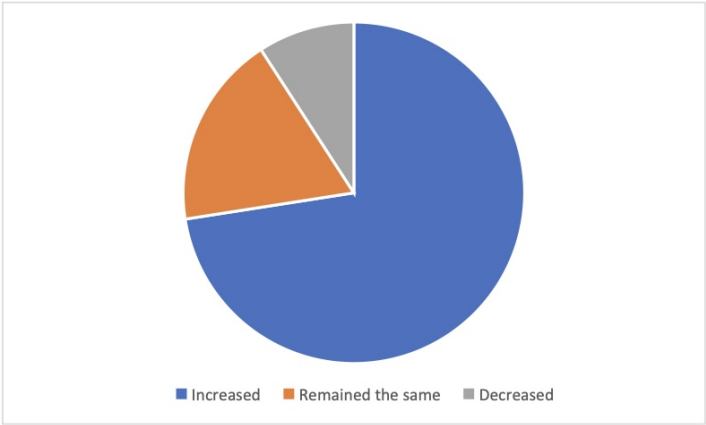


Source: Authors' Visualisation from survey responses.

8. Change in data usage

72.5% of surveyed students found an increase in data usage after the pandemic as compared to before, whereas 18.3% found their data usage to have remained more or less the same. Only 9% of respondents experienced a decline in data usage. This reflects the increased reliance on internet for education and other essential activities.

Figure 8: Change in Data Usage of the Students after the Pandemic as compared to before

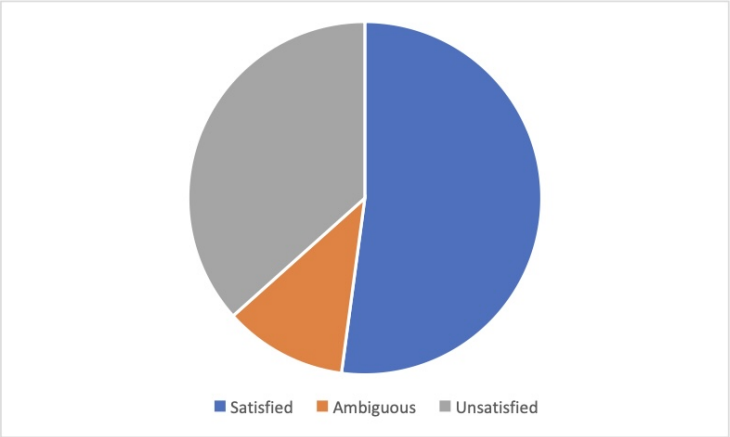


Source: Authors' Visualisation from survey responses.

9. Satisfaction with Internet Speed

52.1% of students reported being satisfied with their internet speed whereas 11.3% were ambiguous about their satisfaction level. A significant number, 36.6% of respondents, were unsatisfied with the speed of their internet connection. This indicates that internet speed remains an issue for many students.

Figure 9: Student Satisfaction with Internet Speed



Source: Authors' Visualisation from survey responses.

3.2 Econometric Model

The survey data provided options grouped into intervals for questions, due to the lack of accurate exact information on specific variables from the participants. Long (1997), Stewart (1983) and Tobin (1958) provide the method to be used for estimating the parameters of a linear model when the dependent variables fall in a certain interval on a continuous scale. A hybrid of probit analysis and multiple regression is recommended. However, as probit is beyond the scope of this paper, we use Ordinary Least Squares (OLS) method for multiple linear regression. Cross-sectional data for 142 students in the age group of 17-23 is used. The effect of gender, place of residence, caste, family income, expenditure on internet and internet speed on usage of internet data is analysed. Following is the model used for estimation:

$$datause = \beta_0 + \beta_1 \text{ gender }_i + \beta_2 \text{ residence }_i + \beta_3 \text{ categ }_i + \beta_4 \ln(\text{faminc})_i + \beta_s \ln(\text{intspend})_i + \beta_6 \text{ inttime }_i + \beta_7 \text{ intspeed }_i + u_i \quad (1)$$

The descriptive statistics of the variables used in the model are mentioned in the Appendix in Section 9a. The description of these variables is as follows –

Table 1: Description of Data

Conceptual Variable	Observable Variable	Description
Usage of Internet data	datause	Daily average consumption of Internet data in the past month (GB/Day)
Gender	gender	0: Male; 1: Female
Place of residence	residence	0: Urban area; 1: Rural Area
Caste	categ	0: General, 1: Category (OBC/SC/ST)
Family Income	ln(faminc)	Log of Family Income per month
Expenditure on Internet	ln(intspend)	Log of sum of family expenditure on WiFi and Individual Expenditure on Mobile Data per month
Time spent on Internet	inttime	Average time spent on Internet per day (hours/day)
Internet Speed	intspeed	Internet download speed in Mbps

Source: Authors' descriptions.

4 Analysis

Table 2: Regression Results

Variable	Coefficient	Standard Error	t	Pr>|t|[2]	Lower-Bound (95%)	Upper-Bound (95%)
Intercept	2.070	2.194	0.943	0.347	-2.270	6.410
Gender	0.213	0.216	0.990	0.324	-0.213	0.640
Residence	-0.128	0.806	0.158	0.874	-1.723	1.467
categ	0.134	0.299	0.449	0.654	-0.458	0.726
ln(faminc)	-0.269	0.132	2.032	**0.044****	-0.530	-0.007
ln(intspend)	0.500	0.120	4.169	**<0.0001*****	0.263	0.737
inttime	0.078	0.035	2.228	**0.028****	0.009	0.147
intspeed	0.000	0.001	0.214	0.831	-0.001	0.001

Source: Authors' calculations.

Table 3: Regression Statistics

Observations	142
Sum of Weights	142
Degree of Freedom	134
R^2	0.212
Adjusted R^2	0.170

Source: Authors' calculations.

The above table mentions the regression coefficients of the dependent variables along with the standard errors and p-values. The partial coefficient correlation matrix for the variables is listed in Appendix section 9b. Goodness of fit statistics are mentioned in Appendix section 9c

whereas the multicollinearity tests are in section 9d. We find no significant multicollinearity or heteroscedasticity for the data set.

R2 is a measure of goodness of fit of the model. The value of 0.212 indicates that the model explains 21.2% of the changes in the dependent variable. The adjusted R2 gives a value of 0.17, indicating that the model explains 17% of the changes in the dependent variable.

We use t-test values to check for significance of the variables. Time spent on the Internet is found to be significant at 99% level of significance, whereas family income and time spent on Internet are significant at 95% level of significance. Gender, place of residence, caste and internet speed are not found to be significant at all. We evaluate the reasons for significance and signs of the coefficients.

1. Gender

Gender is not found to significantly predict internet data use at all three levels of significance. This could be due to similar data use patterns amongst male and female students. Studies show that women face disadvantages in using the internet due to socio-economic disadvantages that they experience. However, since this data is not representative and selects a subset of the population, it could be an anomalous result specific to this data set.

2. Place of residence

Place of residence is also not found to significantly predict internet data use at all three levels of significance. Again, the use of unrepresentative data set of college students who would be more likely to come from privileged backgrounds would change the dynamics.

3. Caste

Similar insignificant results are also observed for caste due to above mentioned reasons.

4. Family Income

Family Income is found to be significant in determining Internet data consumption at 95% level of significance. However, the coefficient of family income is surprisingly found to be negative. This can be interpreted specific to the data, as it consists largely of higher income students, increase in family income leads to fall in share of expenditure on Internet and reliance on non-personal data services. We find that if family income increases by 100% on average, Internet data use goes down by about 0.27 units.

5. Expenditure on Internet

Expenditure on Internet is found to be significant in determining Internet data consumption at 99% level of significance. The coefficient is positive, indicating that a 100% increase in Internet expenditure leads to an increase in Internet data use of about 0.5 units.

6. Time spent on Internet

Time spent on Internet is found to be significant in determining Internet data consumption at 95% level of significance, The coefficient is positive, indicating that a 100% increase in time spent on Internet leads to an increase in Internet data use of about 0.08 units.

7. Speed of Internet

Internet speed is not found to be significant in determining Internet data use at all three levels of significance. This could be due to the necessary nature of Internet use, as the responses by students indicate. Thus, regardless of the speed of internet, students need to use it on a regular basis and thus internet data consumption is not significantly affected by it.

5 Conclusion

The major finding of our paper is that family income, expenditure on internet and time spent on Internet significantly affect internet consumption. The negative relationship with family income can indicate decrease in reliance on personal data. The impact of expenditure and time spent on Internet is reflective of their impact on Internet use. However, gender, place of residence, caste and internet speed are not found to significantly affect Internet consumption. This can be due to non-representative nature of the data set as discussed in the analysis. Furthermore, we also obtain several insights on Internet consumption patterns of college students. Almost all students use mobile data and private Internet Service Providers. Entertainment and news and information are the Internet activities that consume most data for the largest number of students. For most students, Internet consumption has increased after the Pandemic, with mixed satisfaction regarding Internet speeds. Further research on this topic can be done using more representative data sets. The limitations of this paper other than the unrepresentative data set are the use of OLS method using midpoints instead of ordered probit. A more detailed analysis is required to evaluate the changes in Internet data consumption on these lines.

A Appendix

A.1 Descriptive Statistics

Table 4: Descriptive Statistics

Variable	Observations	Minimum	Maximum	Mean	Std. Deviation
datause	142	0.500	5.000	2.827	1.402
gender	142	0.000	1.000	0.507	0.502
residence	142	0.000	1.000	0.965	0.185
categ	142	0.000	1.000	0.155	0.363
ln(faminc)	142	11.513	13.710	12.482	0.881
ln(intspend)	142	4.605	8.700	6.879	0.903
inttime	142	1.500	12.000	8.451	3.008
intspeed	142	0.000	2000.000	57.722	195.173

Source: Authors' calculations.

A.2 Partial Correlation Coefficient Matrix

Table 5: Partial Correlation Coefficient Matrix

	gender	residence	categ	ln(faminc)	ln(intspend)	inttime	intspeed	datause
gender	1							
residence	-0.036	1						
categ	-0.045	-0.024	1					
ln(faminc)	-0.067	0.182	0.05	1				
ln(intspend)	0.161	-0.013	-0.15	-0.162	1			
inttime	0.129	0.022	-0.029	-0.12	0.088	1		
intspeed	0.016	0.032	-0.062	-0.175	-0.012	-0.08	1	
datause	0.161	-0.051	-0.031	-0.25	0.371	0.223	0.027	1

Source: Authors' calculations.

A.3 Multicollinearity Statistics

Table 6: Multicollinearity Statistics

	gender	residence	catge	ln(faminc)	ln(intspend)	inttime	intspeed
Tolerance	0.958	0.958	0.972	0.892	0.928	0.955	0.949
VIF	1.044	1.044	1.029	1.122	1.078	1.047	1.054

Source: Authors' calculations.

A.4 Goodness of Fit Statistics

Table 7: Goodness of Fit Statistics

Observation	142
Sum of Weights	142
Degree of Freedom	134
R^2	0.212
Adjusted R^2	0.17
Mean	1.63
Squared Root	
Root Mean Square of the Errors	1.277
Mean Absolute Percentage Errors	51.273
Durbin-Watson Statistic	2.56
Mallows Cp Coefficient	8
Akaike Information Criterion	77.146
Schwarz's bayesian Criterion	100.792

Source: Authors' calculations.

A.5 Questionnaire

Section 1

Email, Age, Gender, Social Category, State/Union Territory, Current Area of Residence,Profession, Family Income per Annum

Section 2 - Internet Services Usage Patterns

1. Does your place of work/study provide you with Internet services?
   - Yes
   - No
2. Which of the following mediums do you use to access the Internet? (Select all that apply)
   - Cable
   - Fiber Optics
   - Digital Subscriber Line
   - Dial-Up
   - Satellite Internet
   - Mobile Broadband
   - Other
3. Which of the following do you use more often to access the Internet?
   - Mobile Broadband
   - Wi-Fi
4. What type of Internet Service Provider do you use?
   - Government-owned
   - Private-owned
   - Other
5. Please name your Internet Service Provider companies (Airtel, Jio, etc.)
6. Which devices do you use to access the Internet?

- Mobile/Smartphone
- PC
- Laptop
- Tablet
- Other

7. Are you working or studying from home since the Pandemic began?
   - Yes
   - No
8. On an average, approximately how often do you use the Internet?
   - More than 12 hours a day
   - 6 - 12 hours a day
   - 3 - 6 hours a day
   - Up to 3 hours a day
   - Few times a week
   - Few times a month
   - Rarely
9. How often does your job/line of work or study require you to access the Internet?
   - More than 12 hours a day
   - 6 - 12 hours a day
   - 3 - 6 hours a day
   - Up to 3 hours a day
   - Few times a week
   - Few times a month
   - Rarely
10. Which type of personal activity do you spend approximately the most time using theInternet on? (With 1 being the highest and 6 being the lowest)

- News and Information
- Entertainment (Streaming Services, Gaming, etc.)
- Personal Communication (social media)
- Shopping
- Navigation/Maps
- Other

Section 3 –Data Usage Patterns

1. What is your approximate average daily consumption of data for using Internet in thepast month?
   - Below 1 GB
   - 1 GB - 2 GB
   - 2 GB - 3 GB
   - 3 GB - 4 GB
   - 4 GB - 5 GB
   - 5 GB and above
2. What was your approximate average daily consumption of data for using Internetbefore the pandemic?
   - Below 1 GB
   - 1 GB - 2 GB
   - 2 GB - 3 GB
   - 3 GB - 4 GB
   - 4 GB - 5 GB
   - 5 GB and above
3. How has your Internet Data usage changed post the 2020 Pandemic as compared tobefore? (Scale of 1-5)
4. Which type of personal activity consumes most of your Internet Data? (With 1 beingthe highest and 6 being the lowest)
   - News and Information

- Entertainment (Streaming Services, Gaming, etc.)
- Personal Communication (social media)
- Shopping
- Navigation/Maps
- Other

5. On an average, approximately what percent of your total Internet data is used for thepurpose of studying/working from home? *
   - 0% - 25%
   - 25% - 50%
   - 50% - 75%
   - 75% - 100%
   - Not sure
6. What is your approximate current average monthly expenditure on Mobile Data forusing the Internet? *
   - ₹0 - ₹200
   - ₹200 - ₹500
   - ₹500 - ₹1000
   - ₹1000 - ₹2000
   - ₹2000- ₹3000
   - ₹3000 and above
   - Do not use Mobile Data
7. What was your approximate average monthly expenditure on Mobile Data for usingthe Internet before the Pandemic? *
   - ₹0 - ₹200
   - ₹200 - ₹500
   - ₹500 - ₹1000
   - ₹1000 - ₹2000

- ₹2000- ₹3000
- ₹3000 and above
- Did not use Mobile Data

8. What is your household's approximate current average monthly expenditure on Wi-fi for using the Internet? *
   - ₹0 - ₹200
   - ₹200 - ₹500
   - ₹500 - ₹1000
   - ₹1000 - ₹2000
   - ₹2000- ₹3000
   - ₹3000 and above
   - Do not use Wi-Fi
9. What was your household's approximate average monthly expenditure on Wi-fi for using the Internet before the Pandemic? *
   - ₹0 - ₹200
   - ₹200 - ₹500
   - ₹500 - ₹1000
   - ₹1000 - ₹2000
   - ₹2000- ₹3000
   - ₹3000 and above
   - Did not use Wi-fi

Section 4 –Internet Speed

This section asks you questions about the speed of your Internet. You can use the following link to conduct an online speed test to determine the download speed of your Internet connection. The information is relevant to questions asked in this section. The site is safe and does not use your personal data.

https://www.speedtest.net/

1. From the test above, what is the download speed of your Internet connection (inMbps)?
2. Are you satisfied with the speed of your Internet connection? (Scale of 1-10)
3. Do you support the government providing Internet as a public utility?
    - Yes, the government should pay the entirety of the expenses.
    - Yes, the government should pay part of the expenses.
    - No, the consumers should pay entirely out of their own pocket.
4. Please respond with any feedback, comments and/or questions that you have for this survey.

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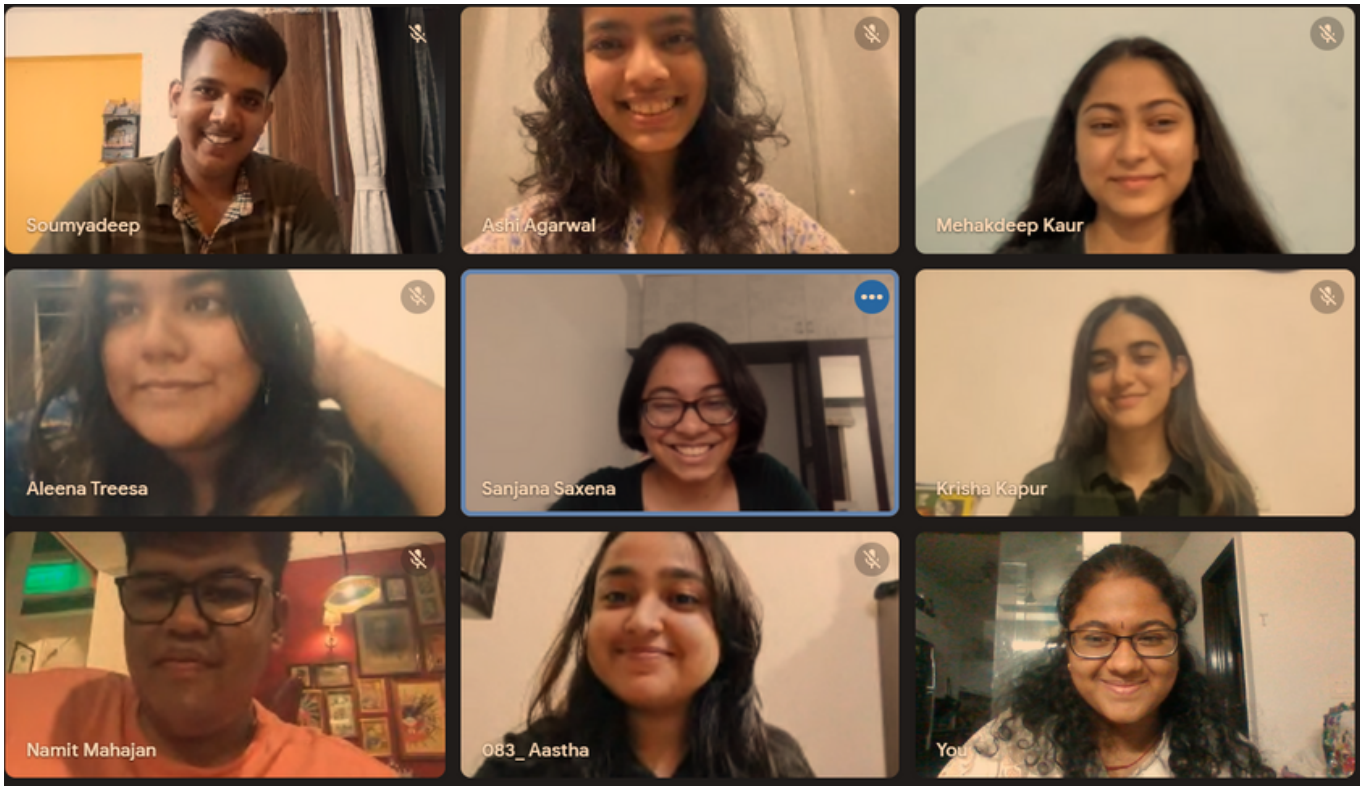

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