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Given the fact that we are constrained to publish only selected entries, we heartily thank all authors for their contributions.

From the outset, the whole Editorial Team has worked hard with cohesion and passion. A huge credit goes to them!

On behalf of the Editorial Board,

Prashant Kumar

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STAFF ADVISOR'S NOTE

DR. SONIA GOEL
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The revived Journal of the Ramjas Economics Society, is now into its 4th year, and has stood the test of time. It is a successfully established and well-circulated student journal. What started off as an ambitious experiment is today the pride of the Department of Economics.

Over the years, the journal has served as a catalyst for the development of our students' capabilities by encouraging them to explore their subject beyond the realm of the classroom. To this end, the Journal of the Ramjas Economics Society has been a very important anchor for grooming the students into budding professionals of tomorrow. Additionally, the Society under the leadership of an elected Student Council organizes seminars, talks, panel discussions and career counseling to inculcate the practice of applying classroom economics to community, society, country and the world at large. The experience that they gain from the publication is tremendous. This edition of the journal is the culmination of several weeks of dedicated hard work by our team of editors.

I sincerely hope that you find this edition intriguing and informative, and enjoy reading it as much as we did making it.

Happy Reading!

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EDITOR'S NOTE

MAAJID MEHABOOB CHAKKARATHODI

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EDITOR-IN-CHIEF

Critical Thinking: The need of the hour to understand our Volatile, Uncertain, Complex and Ambiguous economic conditions

I am delighted to introduce the 4th edition of the Journal of The Ramjas Economics Society. This edition comes out at a time of great churn in the world of economics, both domestically and internationally.

While we see a rising trend of protectionist policies around the globe, the question of sustainable development has also taken center stage. The mounting income inequalities beckon us to re-examine the structural issues of our economic system. The Indian government has implemented the much-awaited GST, and students of economics, as usual, have been busy following the zeitgeist – behavioral economics, universal basic income, and crypto currency.

These events considerably impact undergraduate students, as they constantly try to link the real-world phenomena with the theories they learn in the classroom. The primary motive of our journal is to provide students an exciting opportunity to explore the vast interdisciplinary nature of economics. The journal aspires to be engaging, integrative and challenging.

Ideally, a Bachelor of Arts in Economics should provide the student a fine liberal arts education integrated with specialized knowledge of economic history, theory, and statistical methods. A true liberal arts education, by definition, equips students with the tools of learning, critical thinking, and eloquent expression. Arguably, the liberal arts component is often devalued in the present system.

One of the results of this is that most students presume tools of analysis they are being taught to be value-neutral. Let me give you a few examples. The concept of consumer surplus and producer surplus are seen by many as ideologically neutral. But through a closer look, we can realize that the market demand curve used in this analysis is derived by summing up the utilities of all the individuals – from the person who has the highest willingness to pay to the person with the lowest. Note that we are giving the same value to the richest and poorest individual's utility. This is in essence 'utilitarianism'. Another concept is the Coase Theorem which is frequently cited in policy to explain the optimal pollution level. Among the many assumptions in the theorem, the central one is that 'transfer of wealth does not change production patterns'. Similarly, the First Fundamental Theorem and Second Fundamental Theorem also require around seven conditions to hold.

In this way, much of the economic analyses students learn may seem like 'positive analysis', but they certainly contain inherent assumptions and value-judgments which are seldom explicitly pointed out in textbooks. Therefore when economists opine that a particular policy "ought" to be implemented, the debates that follow are essentially about conflicting worldviews. It boils down to questions of ethics and morality from where these worldviews arise. But unfortunately, the diversification of disciplines in the modern era had divorced ethics from all of the sciences.

In this increasingly post-modern world, there is an urgent need to integrate ethics into economics. In the book "On Ethics and Economics", Amartya Sen provides a terse synthesis of the relevant literature on ethics and economics. The foundation of Sen's arguments rests in the view that economics, as it has emerged, can be made more productive by paying greater and more explicit attention to the ethical considerations that shape human behavior and judgment.

Another matter of contention is the larger problem of higher education across India, which gives teachers very limited autonomy. This constricts the course structure, not allowing better course designs to evolve as opposed to foreign universities. Therefore the students themselves need to take initiative for a worthwhile college degree. The Journal of The Economics Society is an initiative in that direction – shifting the focus to being more investigative and intuitive through a ‘research-based’ approach. It seeks to assist students in independent research, critical reasoning, at the same time dealing with contemporary economic issues.

This edition has a series of articles and papers that span a wide array of topics. It includes write-ups on the Indian economy, evaluation of various policies, and writings on other contemporary topics which have significant relevance. Some students have tried to develop robust microeconomic models while others have conducted top-notch primary research. All the members of the editorial board have put in much effort to bring out this journal. I hope you enjoy reading it.

AN INTERVIEW WITH DEVASHISH MITRA



Dr. Devashish Mitra is the Professor of Economics and Gerald B. and Daphna Cramer Professor of Global Affairs at the Maxwell School, Syracuse University. He was the Chair of the Economics Department at Syracuse University.

His research and teaching interests are in International Trade, Political Economy and Development Economics. More specifically, he has worked on the role of politics in general and of interest groups in particular in the determination of trade policy; and on the impact of trade on productivity growth and labor market outcomes.

The Rajasthan government, among other states of India has initiated labour reforms in order to address the problem of 'missing middle' in the labour-intensive manufacturing sector of India. How far do you think this would have the desired impact?

This is a good start but a lot more needs to be done. It will certainly encourage firms with less than 100 regular workers to expand to a certain extent and hire more regular workers. Often these firms hire casual or contract workers to circumvent restrictive labor laws. That will stop and more regular workers will be hired. The regular or permanent jobs are better than temporary or contract jobs. Also, permanent workers have a greater incentive to learn on the job and firms have a greater incentive to invest in them.

In your article 'Why NITI Aayog's Job Creation Plan Can't Ignore Robotization', you have mentioned the government's plan to set up Coastal Employment Zones. What impacts will CEZs have on the population living within its radius and will the benefits arising from the setting up of CEZs outweigh the negative effects (if any)?

There will always be trade-offs. But the government needs to be serious about job creation. Otherwise, as one of my friends says, India's demographic dividend will become a demographic curse. CEZs will generate jobs and the benefits from job creation, at least for the next couple of decades, will outweigh the kinds of costs you may have in mind.

How do you see FTAs [Free Trade Agreements] vis-à-vis multilateral agreement like the TFA [Trade Facilitation Agreement] which was recently signed by WTO member countries? On one hand, WTO and the World Bank have often been accused of pandering to the interests of developed countries by pushing terms more favourable to them, and on the other hand, developing countries usually have to accept a relatively weaker position while signing FTAs with developed countries. Do you think it is all about choosing the lesser of two evils for developing countries?

I support multilateral trade agreements within the WTO. The TFA was about making ports and customs procedures more efficient. There should be no doubt that these improvements should be made. Within the WTO and the World Bank, China, India and other BRICS countries have become very powerful. By forming common-interest coalitions, these countries have acquired bargaining power. Also, economic growth has made these countries more powerful. In fact, when it comes to bilateral trade agreements or FTAs with developed countries outside the WTO, India's bargaining power is lower than in multilateral agreements under the WTO since coalitions with other developing countries are not possible in most FTAs or bilateral deals.

You have been a vocal advocate of FDI in retail in India. The Union Cabinet, earlier this year, approved 100% FDI in single-brand retail through the automatic route. Do you see such a move coming for multi-brand retail in the near future given the opposition that such measures have drawn from various quarters? To what extent is FDI in multi-brand retail necessary for alleviating the sufferings of Indian farmers?

No, I don't see FDI liberalization in multi-brand retail taking place soon. Politically, it might not be feasible since owners of small shops are an important part of BJP's base. Multi-brand retail can create jobs. It also will have linkage effects through investment in storage facilities, transportation etc. It will cut the profits of

middlemen, giving farmers a better deal. Consumers will be the biggest beneficiaries.

In the article 'Why Trump's Anti-Globalisation Agenda is Bad for America', you had noted that the recent studies about wages and job losses in the US have not taken into account a possible increase in automation due to restriction of trade. How do protectionist trade policies lead to a rise in automation and how will this affect the wages and employment in the US?

Protectionism can destroy global production networks. Inputs produced in China will become more expensive in the US, since tariffs will have to be paid. The cost of getting products assembled in China will be higher for the same reasons. Producing inputs domestically and assembling them in the US will be even more expensive due to much higher wages in the US. Thus the benefit from automation will be much greater under protectionist policies since automation will save corporations the high American labor costs or the high tariff-inclusive costs of inputs produced in China. Once this automation takes place, it will mechanize not only all the tasks that were being performed abroad previously but also a large number of domestic jobs. Of course, that will lower the demand for labor and therefore also lower wages and employment.

The US has recently announced a string of tough trade measures against China which has fuelled fears of a looming trade war. Do you see China's predatory trade practices that have undermined both its partners and the trading system (for instance, forcing US businesses to transfer valuable technology to Chinese firms and restricting access to Chinese markets) as the trigger behind such a move? How will the move towards protectionism owing to national interests impact Asian economies like India?

It turns out that while these actions were supposed to be targeted at China, they are hurting other countries considerably. One example is the tariff on steel. Due to antidumping tariffs on Chinese steel already in place, the US imports very little steel from China, so the new

tariff will be felt by other trade partners unless they are able to negotiate exceptions with the US. Note also that China is putting tariffs on agricultural products produced by swing states and by people in rural areas who are part of Trump's base. Producers in the US who rely on exporting are being hurt as a result. So ultimately the US tariffs will probably be lifted due to pressure from their exporters. India will not have much to gain since there already are more efficient producers in countries like Vietnam. India has failed to grasp its comparative advantage in labor-intensive products due to restrictive regulations on labor and land. Even Bangladesh is outperforming India in textile and apparel exports.

Many of the policy decisions taken by the NDA government to boost the 'Make in India' project has

been seen by many, including you, to emulate characteristics of policies of the pre-1991 protectionist era. How should the government frame policies to boost the manufacturing sector without having a protectionist tone?

There are no easy fixes here. The government will have to bring about reforms in regulations related to labor and land. Those are politically not easy. Also, the government should consider reducing tariffs on inputs, especially within industries like electronics. Cheaper inputs will boost the production of the final product. Processing or assembly of inputs in the electronics industry can be done with low-skilled labor and can generate hundreds of thousands of jobs, as was done in China.

STABILITY IN THE MARKET FOR E-RICKSHAW SERVICES

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The author won the Best Paper award for the Paper Presentation event under the 16th Annual Winter Conference organised by the Department of Economics, Ramjas College.

ABSTRACT

Following paper is an attempt to model the market for e-Rickshaw services. In Delhi, most e-rickshaws operate near metro stations and bazaars to carry people to and from nearby localities. Government of India has been pondering over whether to intervene in the market by necessitating licenses or creating other barriers. Given the abundance of qualitative studies and the lack of theoretical ones which seek to understand the dynamics of this new and peculiar market, this paper is a miniscule step in the directions of the latter. The first section notes the various characteristics of this market and discusses the inadequacies in using methods prevalent in economic theory for modelling the market. The second and third sections model the two different states in the market, viz. cooperation and competition, respectively. The fourth section outlines the conditions necessary for a particular state to exist and also points out the characteristics of equilibrium (and stable) state.

Keywords: E-rickshaw, Co-operation, Competition, Linear-location model, Stability

JEL Classification: L19, C62, D49

The notion of stability has, for a long time, been a major source of interest among economists. (Hotelling, 1929) introduced the famous “Linear Location Model” and made the observation that, in many markets, it is rational for producers to make their products as similar as possible, which is now referred to as Hotelling’s law. His paper serves as an excellent generalisation of the duopoly model which was first introduced by Cournot and later revised by Bertrand. Hotelling proposed that markets in reality exist somewhere between the extremes of perfect competition and monopoly. Hotelling also outlines the conditions under which there will be stability in competitive markets and draws several analogies from his Linear Location Model.

I believe that the notion of stability, albeit of a different kind, is demonstrated beautifully in the market for e-Rickshaw services and to explore them, I consider the markets which usually operate near metro stations or local bazaars. The market for e-rickshaws can be thought of as an extreme case of Hotelling’s linear location model, where all the “sellers” collect at one particular point and have homogenous products, and therefore, they charge the same price and behave in similar manner. It is therefore possible to comment on the general behaviour in the market by studying the case of a single service provider. Frequent users of this service would agree that two distinct types of behaviours can be observed in this market. On some occasion, one might observe that the service providers cooperate with each other, taking turns while making trips; on other occasions, the service providers compete against each other, trying to score maximum number of trips possible. If they adopt the former exercise, each operator will get approximately equal

passengers and the market will proceed in a stable manner with each operator making approximately the same revenue. If they practice the latter, some operators might get more trips, some less and some might end up with no trips at all. The services in this market are homogeneous in nature and therefore, passengers are indifferent between operators.

Simple eyeballing makes it tempting to think of this market along the lines of an oligopolistic competition or Cournot or Bertrand type. However, I argue that both could be misleading in this case. Since the services are homogenous, and who gets a particular trip would ultimately depend on the consumers, two important things are not very clear, a) how the service providers can select the right amount of “quantity supplied” (in this case, the number of trips that each service provider makes) and b) that even if everyone charges a price at the level of marginal cost, are the service providers going to cooperate or compete.

Another possible method of going about the market for e-rickshaw services could be along the lines of an n -player assurance game or “stag hunt”, as it is commonly known. Each player (service provider) has two possible actions, “cooperate” (c) and “not cooperate” (nc). Now, cooperation is not going to make sense if sufficiently larger number of players decide not to cooperate. If many players are competing for trips, then there is no sense for other players to cooperate, since there is no guarantee that the trips will be equally divided among those who decide to cooperate and eventually, they too, will switch to “not cooperate”. Similarly, if relatively larger number of players are cooperating, then those who are not will be better off by switching to “cooperate”. Thus, there are two Nash equilibria, (c,c,c,\dots,c) and (nc,nc,nc,\dots,nc) .

Although the implications are satisfactory, the analysis is not in that it does not help us obtain the conditions under which a particular equilibrium is attained. The existence of two equilibria raises the possibility that one equilibrium might more likely be the outcome of the game than the other (Osborne, 2004). Therefore, to

find the conditions under which a particular equilibrium is more likely, we need a different approach.

An important motivation behind the proposed model is the idea that, in this market, cooperation itself leads to an opportunity cost. When service providers agree to cooperate, they take trips turn by turn. After making a trip, they have to wait for their turn. By waiting for their turn, they miss out some trips which they could have made had they not cooperated. This extra revenue lost due to cooperation is conceived as an opportunity cost and forms an essential part of the analysis both when players cooperate and when they compete. As we shall see, this opportunity cost is what makes stability arise naturally. The following section proposes a partial equilibrium model to study this market, taking demand as a given function of price.

To facilitate the model, it is assumed that the demand is concentrated at two points between which the rickshaws operate. Suppose now, that T is the total time for which the rickshaws operate and t_0 is the time taken in one trip. It is further assumed that the total demand for trips, D , is uniformly distributed over T . Let n be the number of e-rickshaws providing services in the area. Lastly, it is assumed that when the market is stable, the demand is evenly distributed among all the operating e-rickshaws. We now try to study how individual service providers maximize profits in the two different states.

Keeping in mind the assumptions made above, following functions can be constructed to represent the scenario faced by each individual service provider under cooperation,

$$TC_i^c = r + p \left(\frac{T}{t_0} - \frac{D}{n} \right) + c \quad (1)$$

$$TR_i^c = p \frac{D}{n} \quad (2)$$

In the above equations, r is the daily rent and c is the cost of charging the battery rickshaws². The second term in (1) gives the total revenue lost during the time the operator spent between consecutive trips; this will be called the “*opportunity cost of cooperation*”. It is also assumed that $\frac{\partial D}{\partial p} < 0$ and $\frac{\partial^2 D}{\partial p^2} < 0^2$.

Having described the behaviour of all the relevant variables, maximisation problem can now be set up. Each operator will solve the problem,

$$\max_p \pi_i^c = p \frac{D}{n} - r - c - p \left(\frac{T}{t_0} - \frac{D}{n} \right) \tag{3}$$

The first order condition is,

$$\frac{d\pi_i^c}{dp} = 2 \frac{p}{n} \frac{\partial D}{\partial p} + 2 \frac{D}{n} - \frac{T}{t_0} \tag{4}$$

Solving for p ,

$$p = \frac{1}{2} \frac{\left(\frac{Tn}{t_0} - 2D \right)}{\frac{\partial D}{\partial p}} \tag{5}$$

Since $\frac{\partial D}{\partial p} < 0$, for the first order condition to give a valid result, a necessary condition is,

$$\frac{Tn}{t_0} < 2D \tag{6}$$

That is, for price to be valid, the maximum possible number of total trips made must be less than twice the total number of trips that are demanded. Put another way,

$$n < 2 \frac{Dt_0}{T} \tag{7}$$

(7) says that n must be less than twice the ratio of total number of trips demanded and maximum number of trips that each service provider can make. That is, for a valid value of p , the number of service providers must be less than twice the number of e-rickshaws required, if each e-rickshaw makes the maximum number of trips

(T/t_0). If this condition is not satisfied, the practice of cooperating and dividing the demand equally will not lead to setting of any plausible price.

Second order condition yields,

$$\frac{d^2 \pi_i^c}{dp^2} = 2 \frac{p}{n} \frac{\partial^2 D}{\partial p^2} + \frac{4}{n} \frac{\partial D}{\partial p} \tag{8}$$

If (7) holds, then, $\frac{\partial^2 \pi_i^c}{\partial p^2} < 0$ and the profits are maximised (given our assumptions regarding $\frac{\partial D}{\partial p}$ and $\frac{\partial^2 D}{\partial p^2}$). The maximum profits that each service provider earns, therefore, is

$$\pi_i^c = - \frac{n \left(\frac{T}{t_0} - \frac{2D}{n} \right)^2}{2 \frac{\partial D}{\partial p}} - r - c \tag{9}$$

We now try to study the case where the service providers compete against each other. Our earlier assumption of demand being uniformly distributed through time plays an important role here by making the analysis easier. It should be noted that no generality is lost here since, even if demand is not distributed uniformly over time, the case studied here can be thought of as a “smoothed out” rendition of the same. It can also thought of as the case where service providers consider “average demand” to make decisions. The uniformity assumption implies that the level of demand at any point in $(0, T)$ is same (δ , say).

¹ Both r and c are considered constant (or, “fixed”) costs.

² That is, demand decreases with an increase in price at a decreasing rate. This assumption is made in order to reflect poor substitutability of e-rickshaws as a mode of transport.

Figure 1: Total demand for trips (D) is uniformly distributed over T.



Source: Author's estimates

Since the total demand is equal to D ,

$$\int_0^T \delta dt = D \tag{10}$$

$$\delta = \frac{D}{T} \tag{11}$$

Now, we can go on to model the market without cooperation. Suppose X_i is the number of trips that each service provider *expects* while competing for trips. Since service providers are homogeneous, it can be assumed that consumers are indifferent between them. Therefore, each service provider that is present in the market at a particular point of time has equal likelihood of scoring a particular trip. Since we assume that demand is uniformly distributed and that t_0 is constant, the number of service providers competing for trips at any point of time will be same throughout the time period and this will be given by $\bar{n} = n - \delta = n - DT$. That is, at any point in time, there will be D/T rickshaws *completing* a trip and $n-D/T$ rickshaws waiting in the market *competing* for trips.

Trips are scored during the time spent waiting in the market competing for trips (or, the time in which no trips are being made). The waiting time periods are

spread throughout the time period $(0, T)$ and the *total expected waiting time* will be given by $T - t_0 X_i$. Now, given uniformly distributed demand, we can “collect” demands in all these short time periods together to calculate the total demand for trips during the total expected waiting time as $\int_0^{T-t_0 X_i} \frac{D}{T} dt$. Finally, given \bar{n} , the expected number of trips can be calculated as,

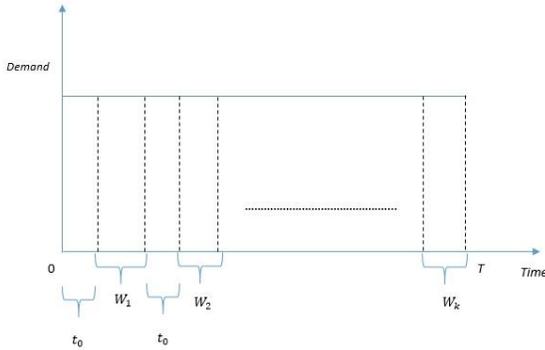
$$X_i = \frac{1}{\bar{n}} \left[\int_0^{T-t_0 X_i} \frac{D}{T} dt \right]$$

$$X_i = \frac{TD}{Tn+D(t_0-1)} \tag{12}^3$$

What is being done can more easily be understood by the following diagram. Suppose a service provider makes her first trip at $t = 0$. At t_0 she completes her trip and now has to wait for W_1 for her next trip. At the end of W_1 she gets the second trip and again takes t_0 to complete the trip. After completing the second trip, she again waits for W_2 . Since she expects to make X_i trips, she must expect a waiting time of $\sum W_i = T - t_0 X_i$. Furthermore, since demand is uniform across all W_i 's, we can “collect” all the demand in all the W_i 's together to calculate the total demand in the market throughout the time spent by each service provider in the market. Once we calculate the demand, we divide it among \bar{n} homogenous service providers.

³ Note that the expression for expected number of trips is appropriate in the sense that $\frac{\partial X_i}{\partial D} = \frac{T^2 n}{(Tn+D(t_0-1))} > 0$ and $\frac{\partial X_i}{\partial n} = -\frac{TD^2}{(Tn+D(t_0-1))} < 0$ as one would intuitively anticipate.

Figure 2: Time taken to complete a trip and waiting time between two trips



Now, since the service providers are competing and not cooperating, they do not conceive the revenue lost during the time spent in the market waiting for trips (ω) as a part of their cost function, rather, they seek a price which minimizes this lost revenue. Essentially, each service provider would solve,

$$\min_p \omega_i = p \left(\frac{T}{t_0} - X_i \right) = p \left(\frac{T}{t_0} - \frac{TD}{Tn + D(t_0 - 1)} \right) \quad (13)^4$$

$$\frac{\partial \omega_i}{\partial p} = \frac{T}{t_0} - \frac{TD}{Tn + D(t_0 - 1)} - p \frac{T^2 n}{(Tn + D(t_0 - 1))^2} \frac{\partial D}{\partial p} \quad (14)$$

$$p = \frac{(tn - D)(Tn + D(t_0 - 1))}{t_0 T n \frac{\partial D}{\partial p}} \quad (15)$$

For (15) to yield a valid result, it must be the case that $n < D/T$. It can also be easily seen that, when $n < \frac{D}{T}$, $\frac{\partial^2 \omega}{\partial p^2} > 0$. The idea is quite intuitive. What this condition suggests is that the exercise of competition makes sense only up till the point when the number of service providers is such that they do not have to wait for trips. Of course, in that case, it does not matter whether they are competing or not since everyone is making maximum possible trips due to small number of service providers. Given (15), the expected profit for each service provider is given by:

$$\pi_i^{nc} = \frac{D(Tn - D)}{nt_0 \frac{\partial D}{\partial p}} - r - c \quad (16)$$

It is easy to see that the moment n becomes greater than D/T , expected profits become negative and competition ceases to be an acceptable exercise. However it must be noted that, when $n < D/T$, waiting time actually equals zero and the profit would then turn out to be $p \frac{T}{t_0} - r - c$, with the constraint of fixed demand (D). Since this results in positive profits, given free entry and exit, n will increase and eventually, it will become larger than D/T , where competition is no longer feasible.

From the analysis above, it is now possible to obtain a range for which cooperation would be a feasible practice in the market. In the last section, it was found that whenever n becomes larger than D/T , expected profits turn negative and cooperation, then, becomes the only feasible option if all the service providers are to stay in the market. We also know that it is viable to “sell” for the service providers only up to the point where price equals the marginal cost. (1) and (5), can be solved to see that this happens when $n = 2 \frac{Dt_0}{T} + \frac{\partial D}{\partial p}$. Now, when n is greater than this it is not viable for service providers to “sell”. Furthermore, note that $2 \frac{Dt_0}{T} + \frac{\partial D}{\partial p} < 2 \frac{Dt_0}{T}$ and thus, by (7), it is still feasible to cooperate. Therefore, cooperation is the only feasible practice and the market could be stable only when,

$$\frac{D}{T} < n \leq 2 \frac{Dt_0}{T} + \frac{\partial D}{\partial p} \quad (17)$$

Even if the market starts with n lower than D/T , positive profits will lead to entry of more service providers. As soon as n becomes greater D/T , expected profits become negative. The more important question at this point, therefore, would be, does this ensure cooperation? Indeed, the moment service providers start cooperating, positive profits are earned. Over

⁴ Note that the problem has been set up thusly just to reflect the idea of competition. The results do not change even if we

maximize profits. Of course, maximizing pX_i and minimizing $-pX_i$ yield the same results.

medium to long run, given positive profits and free entry and exit, more service providers enter the market and continue to enter until, $n = 2 \frac{Dt_0}{T} + \frac{\partial D}{\partial p}$, at which point, price equals marginal cost, service providers cooperate, and every service provider earns the same revenue. Also, at this level of n , price equals $\frac{T}{2t_0}$. But does this guarantee that as soon n becomes larger than D/T , players immediately start cooperating?

It could be argued that service providers never cooperate and free entry and exit always keep n below D/T . But this leaves out much of the possible profits which could be earned by cooperation and moreover, we do see markets where the service providers cooperate. The contradiction may be put to rest by invoking what Kauhik Basu calls "Public Good Urge". (Basu, 2010) argues that "individuals do often act in the interest of what they consider to be their group...Once people are persuaded that a particular behaviour, if undertaken by all, is good for the group, they have a tendency to undertake the behaviour." Therefore, it can be argued that cooperation will arise by itself in the market and ultimately, price would fall to the level of marginal cost. It must also be noted that, the level of price under cooperation will be higher. Under competition, the level of price is likely to fall to the level of marginal cost, since, if it does not, then any one

reducing the price can capture almost all demand. Also, even if price falls to the level of marginal cost in case of cooperation, this price is going to be higher than that in case of competition, since the marginal cost in this case is higher due to the opportunity cost of cooperation. Hence, even though there are additional costs of cooperation, these costs are compensated by a higher price. Therefore, *it is the cost of cooperation which leads to cooperation itself.*

Hence, I argue that the market for e-rickshaw services obtains stability by itself, given free entry and exit. While it is possible that the equilibrium of the kind (nc, nc, nc, \dots, nc) exists at the beginning, over the period of time, it transforms into the equilibrium of the kind (c, c, c, \dots, c) and that too, without any external stimulus. It is possible that the service providers resort to competition when n becomes larger than $2 \frac{Dt_0}{T} + \frac{\partial D}{\partial p}$, but, under competition, some would be able to more trips, some less and some no trips at all. Eventually, some will leave the market, given free exit, and n will get back to the equilibrium level at which price is $\frac{T}{2t_0}$. Therefore, the market becomes stable by itself and there is no tendency for deviation. This also implies that, theoretically, any level of demand would be fulfilled by the market with suitable adjustments of p and n over time and ultimately, price would again fall to the level of marginal cost.

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BEHAVIOURAL ECONOMICS: A CHALLENGE TO MAINSTREAM ECONOMIC MODELS

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1. INTRODUCTION

Behavioural economics is a relatively new field that combines insights from psychology, judgement, decision making and economics to generate a more accurate understanding of human behaviour. Economics has long differed from other disciplines in its belief that most if not all human behaviour can be easily explained by relying on the assumption that our preferences are well-defined and stable across time and are rational. Behavioural economics emerged against the backdrop of the traditional economic approach known as the rational choice model. The basic message of behavioural economics is that humans are hard-wired to make judgement errors and they need a nudge to make decisions that are in their own best interest. This approach complements and enhances the rational choice model.

2. THE RATIONAL CONSUMER

Economists try to build efficient models by making simplifying assumptions about consumer behaviour. One of the most common assumptions being that the consumer is rational, that is, a consumer that believes in maximising his/her utility. Such simplistic assumptions have allowed economists to come up with powerful models and analyse different markets and economic issues. However, deviations from this rational behaviour can be noted, as humans might try to make rational decisions having limited willpower and cognitive abilities. Decisions can be guided by self-interest but may also depend on fairness and equity. Such insights from psychology into economic analysis has sprouted the field of behavioural economics.

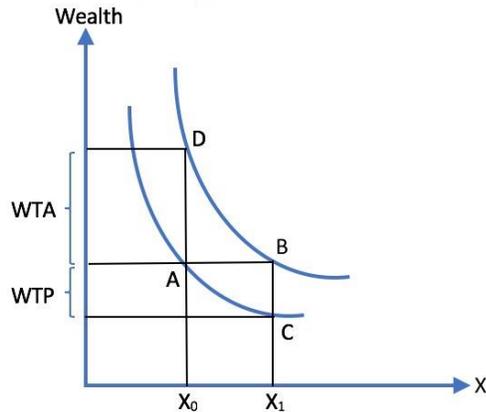
3. ENDOWMENT EFFECT

Thaler coined the term 'endowment effect' for the tendency of individuals to value items more just because they own them. Endowment effect can be understood by taking an example from a study by Richard Thaler, Daniel Kahneman & Jack Knetsch, in which participants were given a mug and then offered the chance to sell or trade it for an equally valued alternative. It was found that the amount participants required as compensation for the mug once their ownership of the mug was established (willingness to accept) was twice as high as their willingness to pay to acquire the mug (willingness to pay).

A neoclassical explanation by Hanemann (1991) :

When an individual is given good X, such that he moves from point A (quantity: X_0) to point B (quantity: X_1). Their willingness to pay is represented by the vertical distance BC, because after giving up that amount of wealth the individual is indifferent between points A and C. However, an individual who gives up good X and moves from point B to point A, their willingness to accept is represented by the vertical distance AD because after receiving that much wealth the individual is indifferent between point B and D. The willingness to accept (WTA) is thus larger than the willingness to pay (WTP).

Figure 1: Hanemann's Endowment Effect Explanation



4. LOSS AVERSION

There are several explanations for the phenomenon of the endowment effect. One of the most prominent basis lies in the idea of loss aversion. According to this idea, the prospect of selling or losing an item has a stronger influence on the decision making than purchasing or gaining the item. In other words, it is more painful to lose something than to gain something. This idea is widely used in marketing techniques. The prospect of selling or losing the mug has a stronger influence than purchasing or gaining the mug. This discrepancy manifests itself in the different prices. The prospect of losing the mug for the seller is more significant than the prospect of gaining the mug for the buyer, thus the seller is willing to accept \$6 while the consumer is willing to pay \$3.

5. PROSPECT THEORY

Prospect Theory is a behavioural model that shows how people decide between alternatives that involve risk and uncertainty. It demonstrates that people think in terms of expected utility rather than absolute outcomes. Prospect theory (Kahneman & Trvesky, 1979) was developed by framing risky choices, and it indicates that people are loss-averse, and since individuals dislike losses more than an equivalent gain,

they are more willing to take risks, in order to avoid a loss.

I) A prospect of gain :

A) A certain win of \$250, versus

B) A 25% chance to win \$1000 and a 75% chance to win nothing?

II) A prospect of loss :

C) A certain loss of \$750, versus

D) A 75% chance to lose \$1000 and a 25% chance to lose nothing?

Tversky and Kahneman's work shows that responses are different if choices are framed as a gain (I) or a loss (II). When faced with the first type of decision, a greater proportion of people will opt for the riskless alternative A), while for the second problem people are more likely to choose the riskier D). This happens because we dislike losses more than we like an equivalent gain.

6. MENTAL ACCOUNTING & CONSUMER CHOICE

This important concept of behavioural economics can be understood by looking at the work of Richard Thaler, Amos Tversky and Daniel Kahneman on the idea of mental accounting. The premise of mental accounting lies in the idea that consumers do not treat all of their money (or other resources) as if they have a huge pile of it. Consumers rather tend to have separate mental accounts and such accounts are based on people's goals. When the money (or other resources) is spent, consumers keep track of it based on the mental account it came from.

SCENARIO 1:

A person decides to watch a movie and purchases a ticket worth ₹10. After reaching the theatre door, the person realises that he has lost the ticket.

In this scenario, according to the survey carried out by Kahneman and Tversky

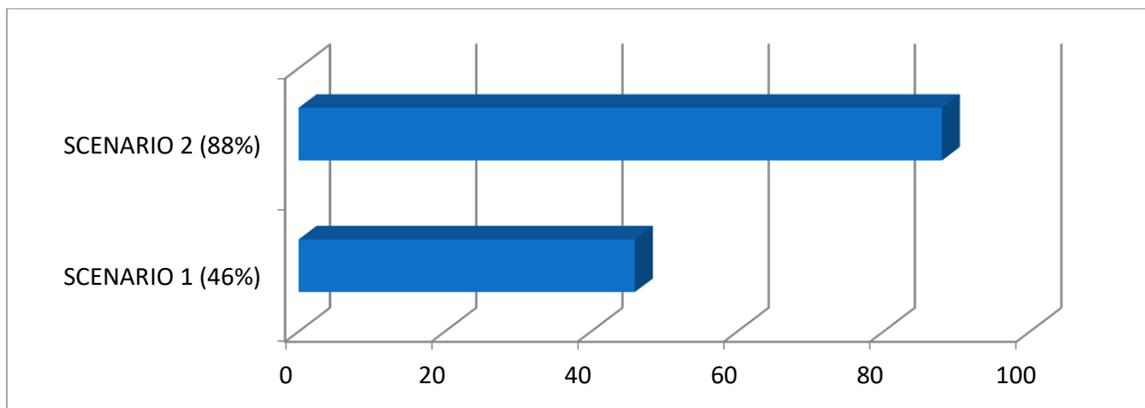
54% said they'd probably just head back home.

SCENARIO 2:

In another scenario, assume that the person goes to purchase a ₹10 worth ticket from the cashier. But the person now realises that he has lost his ₹10 bill.

In the same survey, when asked if people would like to purchase the ticket, 88% people said they'd probably go watch the movie.

Figure 2: Response to Purchasing Another Ticket



Source: (Kahneman and Tversky, 1981)

In both cases, there is a loss of ₹10. But losing a ₹10 worth ticket enters into the mental account of say 'entertainment'. Perhaps the person does not want to spend too much on entertainment so he/she chooses not to spend another ₹10 and have a total expenditure of ₹20. However, in the case of losing a ₹10 bill, it is not clear in which mental account the loss must be accounted for.

We use different mental accounts all the time, our minds just naturally keep things separate. However, our intuition to keep things separate violates a classic economic principle: the idea that money should be fungible. Is a ₹10 worth ticket the same as a ₹10 bill? For an economist, it should be. But for our minds, not so much.

7. CONCLUSION

John Maynard Keynes famously wrote about how the economy is driven by the animal spirit — or human psychology. Economics took an important turn some four decades ago when models of the macroeconomy began to be built on assumptions about individual human behaviour — or microeconomic foundations. The first such models assumed the representative human being was perfectly rational. Rational expectations assumption in modern macroeconomics has led too many people to believe that all economists have a uni-dimensional view of human nature.

Behavioural economics poses a powerful challenge to that assumption at the level of individual decision-making and further enhances the understanding of economics. The challenge is to integrate its insights into

mainstream models that look at the broader economy. Some of the recent Nobel Prize awards—including the most recent to Richard Thaler, shows the process has already begun.

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NIPPING THE BUD: FACTORS AFFECTING FEMALE DROPOUT RATES

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Development concerns today are becoming increasingly focused on gender bias and gender inequality (Chakravarty, 1998) which make development efforts hollow without a more inclusive and equitable outcome. At the confluence of this concern lies the issue of female children dropping out of schools. The positive contribution of female literacy towards lowering fertility rates, infant and child mortality and reducing population growth has been well established and makes it a major driver of social development (Kingdon, 1999). The education of women heralds improvement in the nutrition level among children and health care practices. Yet, it must be borne in mind that the matter of female literacy is pertinent not just because of the positive social and economic spillovers of education among females but more importantly because of the opportunity education holds for them, like any other able individual, to lead a fulfilling and creative life. Efforts have undoubtedly been made to bring the female child under the ambit of education. Unfortunately, they have fizzled out as half-hearted attempts or pending goals. The wastage of human resource is a particularly acute problem amongst female students. Analysis of dropout statistics reveals a disturbing insight; dropout rates have consistently remained higher for female students than for male students (Choudhury, 2006). This skewed trend stems from social, cultural and economic reasons that are generally seen as falling broadly under three categories: (i) family related reasons (socio-economic status, family size, parental education); (ii) school related reasons (infrastructure of schools, quality of teachers and education being imparted, academic

performance, interest in school and school work, distance from school and security); (iii) personal reasons (onset of puberty and personal and physical discomfort arising thereof, extenuating circumstances like marriage, financial pressure to work) (Weber, 1989).

This matches with the results from India-specific studies. In a study of District Primary Education Programme it was found that “general household characteristics like income, caste, occupation and education level of parents continue to determine access, attendance, completion and learning achievements” (Ramchandran & Saihjee, 2002). Family is a crucial unit in a country like India which is largely deeply rooted in tradition. A study of female children in West Bengal revealed that the strongest factors behind school participation, enrolment and dropouts were household factors such as parental schooling, household income and father’s occupation (Sengupta & Guha, 2002). Along with these, caste and religion came out as significant determinants (which will be discussed later) as well.

Other familial factors are the family size and the number of siblings. These factors become significant because a large family size could put financial constraints on families with limited means. Moreover, the need for looking after younger siblings has often come up in studies and reports as an impediment to female education. A study revealed that an increase in the family size by one increases the chances of dropping out by 1.7 times. Going by a number of empirical investigations in the country it can be concluded that larger families inflict more educational

disadvantages than smaller families (Choudhury, 2006). These factors are likely to have a larger impact in the education prospects of the female children due to the gender bias against them in the allocation of the family resources.

However, unlike the relation with family size, studies in India have reached inconclusive results about the influence of parental education (as to which parent's education impacts more) on dropout rates among children. A study holds the father's education to be more significant with the chances of student dropout reducing by 16 percent for every year's increase in the father's education (Choudhury, 2006). Similar conclusions have been reported by a study in West Bengal (Sengupta & Guha, 2002). However, contradictory results have been observed by Zeba A Sathar, 1994.

While family units still have some control over their monetary resources, there are nevertheless some social endowments that are beyond the control of an individual. Religion and Caste are examples of such social endowments and are significant determinants of an individual's socio-economic status. Among students those who are Muslim are less likely to continue in school as compared to their Hindu and Sikh peers (Borooah, 2003). As per a study, Muslim children are 1.9 times more likely to drop out of schools than Hindu or Sikh students (Choudhury, 2006). The argument provided for the increased dropout rates among the Muslim children stems from the positive influence of higher educated parents on education attainment and comes after analysis of the 1991 census data and the 43rd and 50th round of the NSSO. Communities that were able to reap the benefits of education earlier passed the advantage further down the line and in this respect the Muslims lagged behind. At the time of independence Hindus were in a better position to gain from secondary education while the Muslims were waiting to catch up in literacy and primary education (Bhat & Zavier, 2005). Often, the conservative values of Muslim households reflect in the lower probability of female Muslim children in enrolling in schools, higher likelihood of dropping out and lower grade completion

levels in comparison to those from Hindu families (Sengupta & Guha, 2002). Owing to social discrimination and atrocities born of the caste system, the children of the backward classes have also shown lower enrolment and higher dropout rates in comparison to those from Hindu families. A child from a backward caste is 3.2 times more likely to dropout than a child from a privileged caste (Choudhury, 2006). While the efforts of the government have led to some improvement in their status, however, it has not been substantive enough to make up for centuries of marginalisation and entrenched prejudices. Similar trends have also been noticed in the case of tribal communities (Sengupta & Guha, 2002).

As per the data from 52nd round of National Sample Survey (NSS), the lack of interest on part of the child is the major factor behind dropouts among both male and female students with 37 per cent responses to that effect in both rural and urban areas. The reason behind this disinterest among students ranges over expectations from and worthiness of education being received. Parents discourage female children from pursuing studies because they do not believe in its utility for in their minds their daughters will soon get married and eventually manage a household only. To parents, by continuing with her education a female child tends to become 'over-qualified', making it difficult for her to get a hand in marriage. From their perspective, marriage may seem as a way of ensuring for the provision of the female child in adulthood and protection against financial risks. The social influence also at play here sees marriage as a guard against the dangers and stigma of pre-marital sex. Education is demonised for instilling 'non-conformist' zeal among 'impressionable' female children as well (Chowdhury, 1994). Moreover, seeing that the economic benefits of spending on the education of the female child will accrue to the family that she is married into and not the natal family which is making the investment also deters parents from sending their daughters to school (Sengupta & Guha, 2002).

However, studies and surveys have shown that the intensity of these factors lessens with the transition

from rural to urban areas. This is likely to be due to the modernising influence of the urban spaces. Better economic opportunities in the urban areas also ease out the financial constraints and the improved access to education positively influences its attainment. Urban areas have a greater demand for a skilled labour force which gives an impetus towards human resource development. As per the data from 52nd round of National Sample Survey (NSS) which highlights the reasons behind female children dropping out of schools, 'Parents not interested in studies' affect 17 per cent and 11 per cent female children in rural and urban areas respectively. A higher proportion of female children get absorbed in domestic duties than the male children in rural (6.7 per cent) and urban (6.3 per cent) areas. This fall in percentages from rural to urban areas potentially points to a more equitable treatment of children in urban areas which come with modern values.

Familial fears and expectations are a part of the social fabric which changes at its own pace but access to quality education is dependent on the policy structure and reach which changes with governments. A study on a large Indian database constructed by National Council for Applied Economic Research (NCAER) led to the observation that while only 11 per cent children lived in villages without a primary school, 30 per cent resided in villages with or without a middle school (Borooah, 2003). Distance from school translates into distance from education. In the remote parts of the country, children have to walk for hours over kilometers to reach their school. For the female children this problem gets compounded with additional security concerns. For them a longer journey from home means a greater risk of sexual assault on the way and this, regrettably, comes as no surprise given India's unfortunate infamy for not having a completely safe environment for women.

Female students have also expressed a fear of bathrooms (if they are there) which have not been gender-segregated. To them it puts them at a vulnerable spot and prone to bullying and harassment from fellow male students and to avoid this they often miss school while menstruating (Lives, 2015).

Sometimes due to lack of availability of pad/cloth in school, female children often go back to their homes and simply not come back. There is an absence of dialogue and a certain stigmatisation around menstruation which makes it difficult for adolescent girls to physically and mentally deal with this natural process. In the absence of a support system at school or particular encouragement at home, female children often dropout after hitting puberty.

Security and distance couple with infrastructural inadequacies and qualitative deficiencies of the government schools to disenchant female children from pursuing education. With priorities skewed towards enrolment than functioning, government schools continue to remain plagued with teacher absenteeism and under-qualification, insufficient sanitation and crumbling infrastructure.

Female children have to encounter additional social, economic, cultural, logistical, and attitudinal hurdles in their pursuit of education. They have to fight not only with the ideals of a patriarchal society, but also their spirit which would die without any form of encouragement. Family is centric to most of the constraints preventing female children from pursuing education. Family size has a direct relationship with the dropout rate in the Indian context, while income varies inversely. Parental education has shown to play a definite role. However, results have been inconclusive with regard to which parent (the mother or the father) has the greater role to play. Family's social standing in the caste hierarchy, religious outlook, and orthodox expectations are significant impediments to the access of education for the female children. Educational attainment is also prevented by security concerns and distance from schools. The inadequate infrastructure, teacher absenteeism and poor quality of education being imparted act as discouraging elements as well. These are the major factors which nip the potential of the female children in the bud by prompting their dropping out of schools.

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ROSCA: WHY DO PEOPLE PARTICIPATE IN IT? AN EMPIRICAL STUDY IN URBAN SLUMS OF DELHI

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ABSTRACT

Participating in ROSCA allows members to buy indivisible goods, commit to savings, and get insured against financial contingency in a framework which is both flexible and simple. ROSCA fulfils the demand for financial services like savings and credit in a unique way that caters to the specific needs of the urban slum households which formal financial institutions such as Banks cannot, thereby making ROSCA a popular informal financial institution among urban slum households.

Keywords: ROSCAs; Informal finance; Savings; Credit; Urban slums; India

JEL Classification: D71; G21; G22; O16; O17

1. INTRODUCTION

“ROSCA is the poor man's bank, where money is not idle for long but changes hands rapidly, satisfying both consumption and production needs.”

- F.J.A. Bouman (1983)

Rotating Savings and Credit Association (hereafter referred to as ROSCA), also known as committees, can be defined as a self-selected, voluntarily formed group of individuals who agree to save and contribute a pre-committed amount of money in every period towards the creation of a fund. This fund is then used to allot fixed amounts to each member in turn in accordance with some pre-arranged principle such as through an order determined by list, lottery, or auction. Once a member has received the fund, s/he is excluded from any allotments until the ROSCA ends, but must continue to participate in contributing to the fund. In random/ lottery ROSCA, a member is randomly chosen (by lottery) for the allotment of the fund. In the next period, the process repeats itself except that the previous winner is excluded from the lottery so that the probability of a member receiving the fund in any period is increasing (Besley, Coate, and Loury, 1993). It continues until each member of the ROSCA has been

given the fund once. On the other hand, a bidding ROSCA is a scheme which uses competitive bidding to determine the rank order in which loans are awarded to ROSCA members. The higher the winning bid of an auction, the higher the interest rate implicit in the loan awarded to the auction's winner. The auction mechanism thus allows a bidding ROSCA to allocate a loan flexibly to the member with the greatest concurrent need for funds (Klonner 2003). ROSCA is thus, a special type of microcredit organization that largely meets the credit needs of the poor. By aggregating individual funds and channelling them to individual members, ROSCAs play an important intermediation function, based on revolving funds. They do not require physical capital as collateral. Instead, repayment is based on reciprocity and social pressure.

The poor households in urban slums pose complex challenges to financial institutions. Due to information asymmetry and high monitoring costs, financial institutions like banks refrain from lending to the poor. Against the backdrop of missing credit from formal financial institutions, ROSCA emerges as a popular source of financial services like savings and credit for households in slums. Not much study has been done concerning the relevance of institution like ROSCA in the lives of urban slum dwellers in a mega city like Delhi where financial institutions like banks are geographically accessible. Thus, it becomes vital to understand the role of institutions like ROSCA in shaping up the lives of urban poor.

The study was carried out from January to February 2017, and we collected primary data from sixty households in the slums of Anna Nagar (Indraprastha) and Timarpur in Delhi. Random sampling was done using the tools of interview and questionnaire. The research question that this study aims to answer is: Why do people in urban slums participate in ROSCAs? Using the data collected, the study found and analyzed factors that motivate urban slum dwellers to be a ROSCA member.

ROSCA fund allows members to buy indivisible goods and acts as insurance in case of financial contingency. As a mechanism for exhibiting self-control in the presence of time-inconsistent preferences, ROSCA allows a member to commit to savings. In addition to these, ROSCA's innate quality of flexibility provides an incentive to participate in it.

Section 2 talks about background and motivation for the study. Section 3 mentions the existing literature on various reasons for ROSCA participation. In section 4, we analyze our sample and discuss the research methodology. In section 5, an in-depth analysis of factors for ROSCA participation is done. Section 6 conclusively discusses the factors for ROSCA participation that have been featured in the study. It also talks about implications and limitations of our study.

2. BACKGROUND

2.1. WHY DON'T BANKS LEND TO THE POOR?

Due to information asymmetry, the advancement of credit to poor households in urban slums suffers from the problem of adverse selection and moral hazard which, in turn, results in high monitoring costs and high risk of default. Rajan and Zingales (2003) blame the "tyranny of collateral" in making credit inaccessible to the poor. The poor often don't possess titles to their property, and hence cannot pledge collateral demanded by banks. Most of the poor have little or no credit history. Kedir, Disney, and Dasgupta (2011) point out that an increasing proportion of households have access to basic saving and deposit institutions, but developed institutions for raising investment capital (arising from the lack of a formal venture capital market, of sophisticated credit scoring agencies, etc.) are missing. This perhaps forms the rationale for the existence of alternative institutions like ROSCAs that can extend credit to the poor. It is, therefore, clear that a germane finance model for poor urban households remains a key gap in administering financial services to

them. Bouman (1983) highlights that against this background, ROSCA materializes as poor man's bank, where money is not idle for long but changes hands rapidly, satisfying both consumption and production needs.

2.2. WHY IS ROSCA PARTICIPATION WIDELY PREVALENT?

ROSCAs are found throughout the world, from Africa to Latin America to Asia including India. They are one of the most common informal financial channels, in particular for the poor and low-income households. It is imperative to understand what makes ROSCA such a widely accepted system. This paper also aims to delve into its structure and the role that it plays in the lives of the people, mainly urban poor. It is crucial to study ROSCA vis-à-vis banks to understand the lacunas of banks that ROSCAs can fill. ROSCA makes financial services like credit and insurance available, accessible and affordable to its members who are often overlooked by banks. Evaluating the role of ROSCAs can also help us to recognize relevant policy measures that could be undertaken to increase financial inclusion among the poor and low-income households.

Drawing from these, this study aims to answer questions of why do people participate in ROSCAs and what importance or role does it play in the lives of urban slum dwellers?

3. LITERATURE REVIEW

Rotating Savings and Credit Associations (ROSCA) is one of the most common informal financial institutions in the world. They are existent in countries with greatly different levels economic development. Initial literature suggests that ROSCAs are primarily institutions that allow individuals to save in order to purchase an indivisible durable good. Besley, Coate, and Loury (1993) suggest that individuals join ROSCAs to purchase indivisible goods by taking advantage of inter-temporal gains from trade. However, further research on ROSCAs brought into light other reasons

for participation. Ardener (1995) contended that individuals participate in ROSCAs to insure themselves against financial emergencies. He implied that distant, cumbersome and impersonal banking systems could never match the speed with which close and trustworthy members of a ROSCA react. Klonner (2003) also emphasized on the same aspect by showing how risk-averse individuals can insure themselves against unforeseen risks by participating in a ROSCA. Anderson and Baland (2002), using data from African nations asserted that participation in ROSCA is done by women as a strategy against intra-household conflict.

The next breakthrough article in the field of ROSCA was by Gugerty (2005). He refuted the theory that participation in ROSCA is to purchase indivisible goods. He said, "*There is no relationship between the lumpiness of ROSCA purchases and the allocation mechanism as an indivisible good model might suggest*" (Gugerty, 2005). He stated that individuals participate in ROSCAs to commit to saving since ROSCAs provide a collective mechanism of individual self-control in the presence of time-inconsistent preferences and the absence of any commitment technologies. The paper also mentions that an individual would want to tie himself to a saving pattern since he/she is prone to procrastination, i.e., he/she would rather save in the future than today.

ROSCA is also considered as a social and cultural institution with participants receiving considerable returns apart from ROSCA funds. The members receive valuable information on wide range of topics and get advice on many issues. Socializing in ROSCA might also lead to a cost-effective benefit. (Ardener, 1995).

Studies show that default rate in ROSCA is low, the inherent problem does not manifest itself. The studies point to the reliance on social collateral (network connections between individuals can be used as social collateral to secure informal borrowing) to avoid defaults (Chiteji, 2002). There might exist incentives for those who complete the full term of ROSCA, e.g., the promise of advancement in line in future ROSCAs (Van den Brink and Chavas, 1997). The avoidance of default

is essential for the sustainability of ROSCA because when defaults are high, profitability from ROSCA is low. Chiteji (2002) argues that there exists a negative relationship between the size of ROSCA and the ability to enforce the ROSCA contract. This idea also resonates in the Olson's logic of collective action, i.e., larger the group size easier free riding becomes and thus, more difficult would be collective action. However, researchers like Ostrom et al. (2006) challenge this idea by stating that larger groups are more efficient because they have command over a larger resource base.

The literature on the comparison of ROSCAs with Banks is small. Due to information asymmetries, banks do not extend credit to all individuals, even when they have a deposit-taking option. The monitoring costs experienced by the bank contribute to the existence of ROSCAs. The greater the monitoring costs, more are the individuals who are left to seek out ROSCA financing. (Chiteji, 2002). Thus, it points out to the existence of financial dualism in developing countries where both formal and informal financial systems exist simultaneously. For most of the ROSCA members, using formal systems is time taking, complicated and cumbersome or there is no freedom to spend money in the area they want. (Bisrat, et al. 2012). Kedir, Disney, and Dasgupta (2011) also conclude that ROSCAs and Banks can simultaneously co-exist.

4. METHODOLOGY

The study was based on primary research conducted in the slums of North East Delhi and East Delhi. Primary data was collected through individual interview with the help of a questionnaire. The questionnaire was systematically divided into two parts; the first part was devoted to questions about the structure and functioning of ROSCAs, and in the second part respondents were also made to answer questions on banks to understand the working of ROSCA vis-à-vis banks. The final questionnaire was prepared after conducting and evaluating the pilot survey which was carried out on a smaller sample size. The field survey

was divided into phases wherein pilot survey was followed by the main survey. The main survey was conducted from January to February 2017.

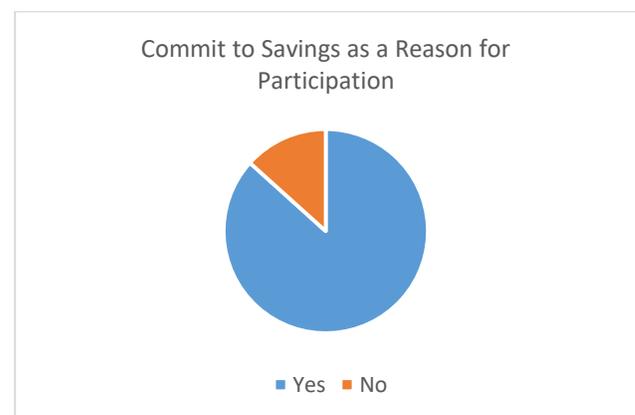
Households were selected using random sampling, and one member who was also a ROSCA participant was surveyed from each household. The primary survey included 60 data points, 30 data points from the slum of Anna Nagar (Indraprastha, East Delhi) and 30 data points from a slum in Timarpur (North East Delhi). Both the slum were unauthorized, but the residents were permanent.

5. FACTORS RESPONSIBLE FOR ROSCA PARTICIPATION

5.1 COMMITMENT TO SAVINGS

It wasn't considered as a reason for participation in ROSCAs until Gugerty (2005) brought the issue into the limelight. Thereafter, it was considered as the most important reason for participation in ROSCAs. He argued that ROSCAs provide a mechanism for exhibiting self-control in the presence of time-inconsistent preferences thereby resulting in a high degree of commitment to savings. This factor is essentially true and holds out even today. Out of 60 respondents, 52 (86.7%) reported that commit to savings is indeed a reason for participation in a ROSCA.

Figure 1



Source – Author's calculation based on survey data

An individual who is a participant in a ROSCA has to mandatorily set aside an amount equal to his/her monthly ROSCA contribution at the beginning of every month. It ensures that a particular amount is set aside every month as savings in the form of ROSCA contribution. One may argue that an individual can simply keep the money in his house or may choose to deposit it in the bank. However, the mechanism is completely different in these cases. If he/she chooses to keep it in the house, then the money may get spend due to the human tendency to spend more when there is available money. If he/she chooses to deposit the money in the bank, then it is easy to withdraw the money through ATMs and by visiting the bank itself, even if there's little need for money. Although it depends on the preferences and self-restrain capacity of the individual, generally it is incredibly tough to commit to a particular amount every month.

ROSCA provides an effective mechanism that enables a person to exercise a strong commitment to savings. Thus, by making their ROSCA contribution, an individual can save up certain money which would have got spend otherwise.

5.2 FLEXIBILITY

The structure of ROSCA is such that it provides unparalleled flexibility to its participants regarding a number of factors. Flexibility is one of the greatest advantages of the ROSCA system. Participants have a choice regarding the type of ROSCA they want to take part in, the number of members in the ROSCA and the fixed monthly amount that they want to contribute in. This doesn't mean that different participants can contribute a different monthly amount within the same ROSCA. Flexibility in ROSCA means that the participants always have a choice to switch to a different ROSCA where the monthly contribution amount is as per his/her need. Similarly, a person has a choice whether to participate in a bidding or a lottery ROSCA. Flexibility in ROSCA means that there are multiple ROSCAs each

with a different set of rules and people can choose which ROSCA to participate in.

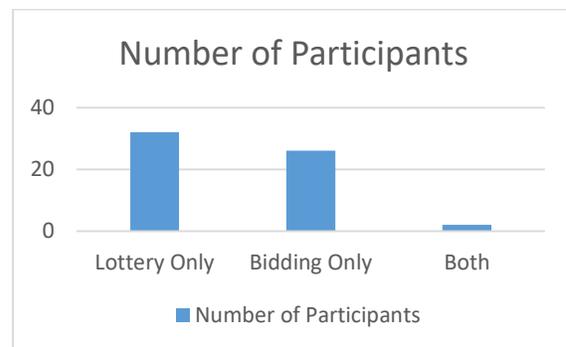
ROSCA system is also flexible regarding the fact that participants have a choice to shift to a ROSCA of their choice if they have any personal issue with the cashier in case of late payment. Individuals also shift to a different ROSCA in case of fraud by a member or the cashier.

Flexibility is an important aspect in the ROSCA system as it allows individuals to participate in an informal financial system that is very specific to their needs or requirements. It is one of the primary reasons for satisfaction in the system.

a) ROSCA Type

It was found that out of 60 respondents, 32 participated in Lottery ROSCA only, 26 participated in Bidding ROSCA only, and 2 participated in both Lottery and Bidding ROSCA. (Figure 2) The participants choose the type of ROSCA they want to take part in based on their preference. Reasons for participation might differ depending on the type of ROSCA. The most common reason for participation in a Lottery ROSCA is to commit to savings and insurance against financial contingencies. Whereas those participating in Bidding ROSCA do so to earn a profit and have access to ROSCA pot as per their need.

Figure 2



Source - Author's calculation based on survey data

b) Change in Monthly ROSCA Contribution

This section compares the Monthly ROSCA Contribution of the previous ROSCA Cycle in which the participant was taking part in, with the current one in which the same individual is taking part in. The ROSCA might be the same or a different one, but the individual we are analysing is the same one.

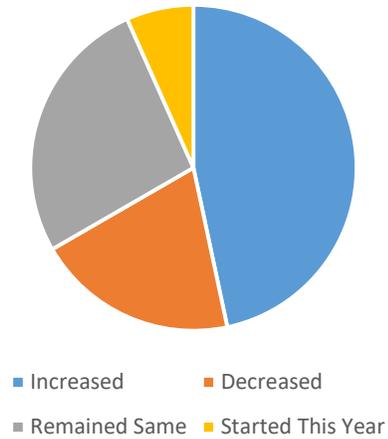
Out of the 60 respondents, 28 (46.7%) reported an increase in monthly ROSCA contribution, 12 reported a decrease whereas 16 reported an unchanged ROSCA contribution. 4 respondents started taking part in ROSCA for the first time.

Overall 40 out of 60 respondents (66.67%) reported changes in their monthly ROSCA contribution in comparison with previous ROSCA cycle. This is a substantial amount of respondents reporting changes in monthly ROSCA contribution. It shows the high degree of flexibility in ROSCA structure where participants have the liberty to switch to a different ROSCA more suitable as per their current needs.

Individuals switching to a ROSCA with a higher or lower monthly contribution can be attributed to the fact that their income might have increased or decreased hence they do not want to commit to a higher amount of savings. An increase in monthly contribution also implies continued trust in the ROSCA structure. The individual might choose to contribute a higher amount monthly because he/she might need to save a greater amount in the current period. Hence, he/she would want to commit to saving a higher amount each month. The need for higher savings arises to finance children's education or marriage.

Figure 3

Change in ROSCA Contribution



Source - Author's calculation based on survey data

c) Change in ROSCA

Flexibility in ROSCA also comes from the freedom to select a ROSCA based on the current requirements of the participant. Participants change their ROSCA if they prefer to shift to a bidding ROSCA from a lottery ROSCA or vice-versa. They also change their ROSCA because of a different choice of monthly contribution or the ROSCA size, i.e., number of members in a ROSCA. Apart from that, an individual also changes his/her ROSCA because of non-payment of pot on time or due to fraud by a cashier or member. Individuals also change their ROSCA if they have a personal issue against the cashier.

Out of 60 respondents, 25 (41.7%) reported having changed their ROSCA at some point in time, while 35 (58.3%) reported that they hadn't changed their ROSCA. (Figure 4) It means that 41.7% participants have been able to switch to a ROSCA as per their preference. This is indicative of the high degree of flexibility in the ROSCA system.

It was observed that among those who changed their ROSCA, 32% did so because of fraud or a personal issue against the cashier and another 32% changed their

ROSCA due to a change in their ROSCA preference. (Figure 5)

Figure 4

Change in ROSCA

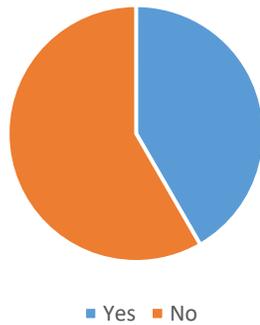
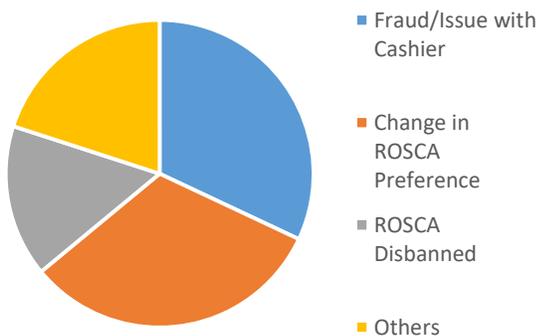


Figure 5

Reasons for Change



Source - Author's calculation based on survey data

d) Diversification

Flexibility in ROSCA can be used in another useful way too. The ROSCA structure has no restriction concerning participation in multiple ROSCAs. If an individual has higher savings, and he/she can pay the monthly ROSCA contribution of both ROSCAs, then he/she can take part in both of them. The existence of this aspect allows individuals to diversify their portfolio. Diversification allows individuals to mitigate their risks and enables them to have greater control over their pot. For

example, an individual could participate in a bidding and a lottery ROSCA. He/she can be sure of receiving a fixed amount from the lottery ROSCA irrespective of the profit/loss or no return from the bidding ROSCA. The risks would have been more had the individual invested the entire amount in the bidding ROSCAs. Through diversification, an individual also ensures greater control over his/her pot. By participating in two ROSCAs, an individual has a greater chance of receiving a pot at any given point in time. If he/she doesn't receive it from one ROSCA, then he/she may approach the other.

5.3. INSURANCE

One of the primary reasons why people participate in ROSCA is to insure against financial contingencies. It has already been mentioned by Ardener (1995). However, the literature fails to explain the advantages in ROSCA structure over banking systems that make individuals participate in ROSCAs rather than banks to insure themselves from financial emergencies.

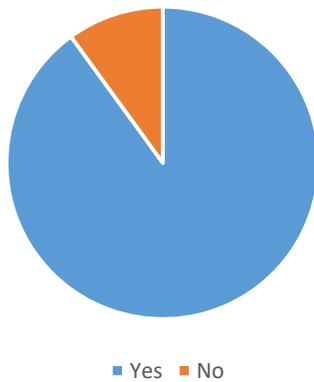
Out of 60 respondents, 49 (82%) reported that insurance against financial contingencies is one of the reasons why people participate in ROSCA. However, in a lottery ROSCA, one has to wait for his/her turn and only then on can have access to the funds. In a bidding ROSCA, one can have access to the funds by bidding higher than other members, but it would mean huge losses in the transaction. So how does the ROSCA insure individuals against financial contingencies is a big question to answer?

This can be explained by the existence of a different kind of flexibility in the ROSCA. The earlier mentioned aspects of flexibility are regarding the ROSCA structure or type. However, ROSCA being an informal system also exhibits flexibility within its system. It means certain rules upon which the ROSCA is based upon, is bypassed or skipped in certain special cases. However, such flexibility within the structure has some significant implications.

ROSCA participants were asked whether they are willing to change their pot position when another member has an emergency (medical emergency, etc.). Out of 60 respondents, 54 responded that they are willing to change their pot position. It means 90% of respondents are willing to allow the needy member an easy access to funds. It is indicative of the trust between members and in the ROSCA system.

Figure 6

Willing to Change Pot Position



Source - Author's calculation based on survey data

However, willingness doesn't imply actual implementation. Hence the questionnaire included two follow-up questions – whether a similar favor has been asked by the individual and whether the request was accepted or not.

Concerning the first question, 37 respondents reported that they have asked for the same favor whereas 23 respondents reported that they haven't. It shows that a significant 62% respondents have requested for the same favor. However requesting for a change in pot position doesn't guarantee its implementation in the ROSCA. Hence the second question was asked to those who reported that they requested for a change in pot position at some point in time. Among the 37 respondents who reported to have asked for a change

in pot position, 34 reported that their request was accepted.

It is a clear indication of the flexibility within the ROSCA structure. 92% respondents reported that their request for a change in pot position due to an emergency was accepted. It shows the ability of the members to understand a fellow member's situation and grant him/her access to the fund which might turn out to be lifesaving. It is the presence of this human element that makes ROSCA such an effective system.

Figure 7

Have You Asked for the Same Favour?

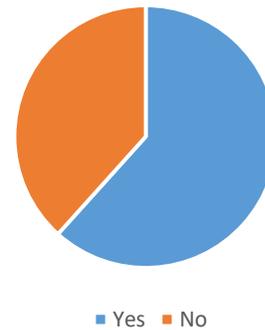


Figure 8

Was Your Request Accepted?



Source - Author's calculation based on survey data

ROSCA system also exhibits a form of flexibility in the case of penalty charged upon its members. The penalty

in ROSCA is defined as the additional charge per day, levied in excess to the monthly contribution in case of late payment of monthly ROSCA contribution. (Usually, a day in the 1st week of every month is the fixed day for payment of monthly contribution). As per survey results, the penalty is levied in 70% of ROSCAs which is ₹50 on an average. However, its implementation is carried out generally in a conditional manner. If a member cannot pay on time due to a certain emergency in his/her family, then their case is understood and late payment is accepted. In that case, the cashier pays for that particular member for the time being. Later when the member can pay the amount, he/she returns the money to the cashier. In certain cases, the ROSCA is skipped for that particular month. The following flexibility or conditional implementation of penalty is only possible due to high trust factor in ROSCA, the reasons for which have been mentioned earlier.

The existence of the power to "bend the rules" into one's favor plays an important role in securing against financial emergencies. The high degree of these factors ensures that one has quick access to funds in times of financial emergencies. One may argue that a similar service can be provided by banks as well. However, credit accessibility from banks is a time taking and cumbersome process with low chances of getting credit, especially for these slum residents. As the name itself suggests that it is an emergency, it is important that the individuals have access to the funds in a short span.

5.4. SIMPLICITY

Participation in a ROSCA neither requires a member to go through the cumbersome process of documentation and nor is the participant subject to the tyranny of collateral. This keeps the structure simple and removes some of the disincentives to participation in ROSCA.

Figure 9

Documentation in ROSCA

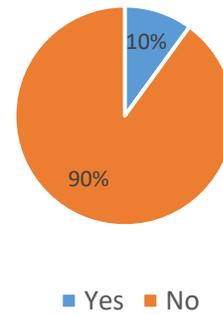
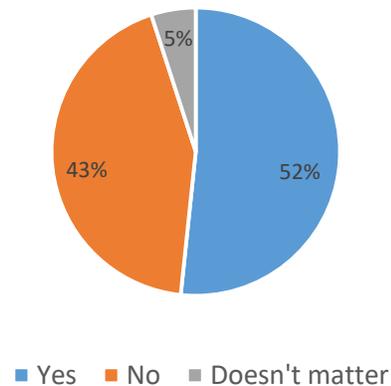


Figure 10

Preference for Documentation



Source: Authors' calculation based on survey data

Only 10% of the ROSCA members had to submit documents to establish their credibility. However, almost 52% of respondents reported that some rudimentary documentation such as identity proofs should be submitted in ROSCA to ensure credibility and curb default.

Figure 11

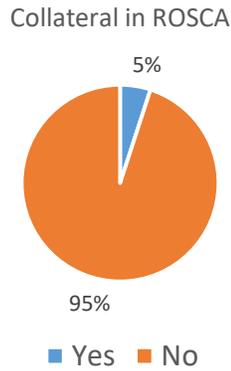
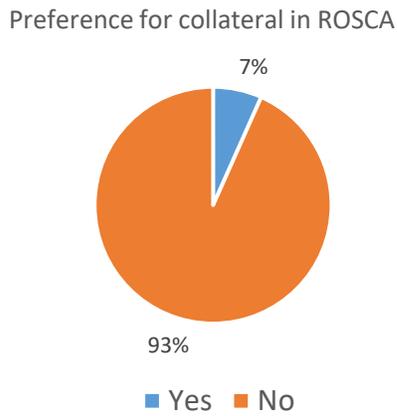


Figure 12



Source: Authors' calculation based on survey data

95% of the respondents were not required to commit any explicit collateral to borrow funds from ROSCA, and when asked whether collateral should be made compulsory or not, 93% replied in negative. This is an important aspect because the residents of surveyed slums do not possess legal titles. In the absence of titles, making collateral compulsory to borrow funds can restrict the formation of ROSCAs. Moreover, the preference for collateral above shows that members do not wish to commit other forms of collateral as well.

Figure 13

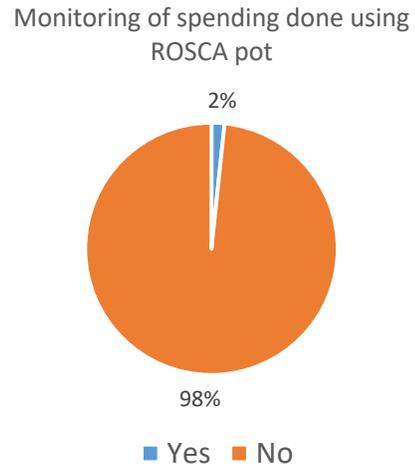
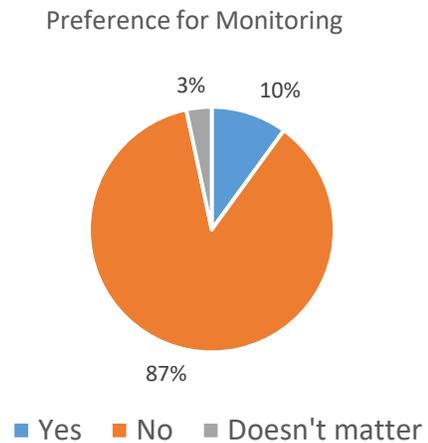


Figure 14



Source: Authors' calculation based on survey data

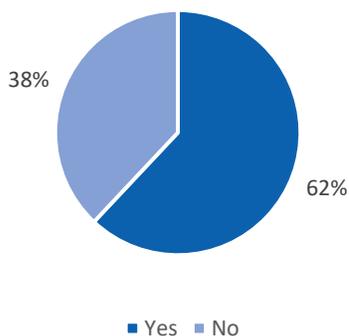
Also, out of 60 respondents in our study, 98% reported that no monitoring is done in their respective ROSCA and only 10% of the respondents preferred monitoring to curb defaults due to moral hazard problem. The respondents were of the view that spending done using ROSCA pot constitutes a private decision of the household and other members of the ROSCA should not be entitled to invade their financial privacy.

5.5. INDIVISIBLE GOODS

Existing studies on ROSCAs tells us that one of the reasons why people participate in ROSCAs is to buy indivisible goods which are lumpy investment and often cost more than what they earn on a monthly basis. The intertemporal gains from trade attract them to ROSCAs. When asked about the motive to participate in ROSCA, 62% of our respondents stated that they took part in ROSCA to buy indivisible goods. Of them about 68% were females and all were married. Out of all the women participating in ROSCAs to buy indivisible goods, 40% were in the age group 30-40 years and 28% were in age group 40-50 years. This shows that ROSCA serves a very important purpose by allowing women to accumulate assets that they otherwise find difficult to buy. ROSCA also helps them to carry out lumpy expenditure in family ceremonies, and in many cases, female respondents told us that investment in indivisible goods through ROSCA helps them in the future, for instance in daughter’s marriage. Similarly, of all the men participating in ROSCA to buy indivisible goods about 72% were in the age group of 20-40 years which is the prime working age group.

Figure 15

Purchase of indivisible goods using ROSCA pot



Source: Authors’ calculation based on survey data

Furthermore, 41.67% of the total sample were unemployed and of them 60% participated in ROSCAs

to buy indivisible goods. Also, about 68% of wage earners and salary earners in our sample participated in ROSCAs to buy indivisible goods. If look at the data on nature of employment and participation in ROSCAs to buy indivisible goods, we found that about 52% of the people working in private sector and 85% of the self-employed participated in ROSCA to buy indivisible goods.

Thus, ROSCA helps the urban poor residing in slums to undertake purchase of indivisible goods that are sold in discrete quantities like television sets, refrigerators, etc. which, in turn, enhances the quality of life of these people.

6. CONCLUSION

The study documents factors responsible for ROSCA participation. ROSCA plays a pivotal role in the life of surveyed slum dwellers as it gives fund that allows members to buy indivisible goods and acts as insurance in case of financial contingency. ROSCA allows a member to commit to savings as a mechanism for exhibiting self-control in the presence of time-inconsistent preferences. ROSCA’s intrinsic qualities in the form of flexibility and simplicity also incentivize urban slum dwellers to participate in it.

Out of 60 respondents, 82% reported that insurance against financial contingencies is one of the reasons why they participate in ROSCA. There is undoubtedly a correlation between ROSCA participation and insurance against financial emergency, but the causal relation is unclear. It might be the case that people participate in ROSCA because they don't have insurance or else they do not go for insurance because they trust that ROSCAs will deliver when required. Notwithstanding, providing insurance can make the lives of people more stable and secure. The role of government becomes paramount to provide insurance to people at subsidized rates. Life cover and accidental insurance under Pradhan Mantri Jan Dhan Yojana could

be promoted, and more awareness should be generated about such schemes.

There are some limitations to our study. Although, our study points out that the framework of group lending through ROSCA functions well but the role of other forms of group lending in the lives of urban poor, for instance, group lending by microfinance institutions (MFIs) have not been studied. A comprehensive analysis of the role of MFIs alongside ROSCAs could be

scope for future research. This study limits itself to only ROSCA participants and explores the reason due to which they participate in ROSCAs. However, we have not surveyed non-ROSCA members to find out why they don't participate in ROSCAs. Surveying non-ROSCA members can also shed some light on limitations of ROSCA system.

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RESOURCE CURSE: A BRIEF STUDY OF VARIOUS FACTORS

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1. MEANING OF RESOURCE CURSE

Natural resources play a crucial role in the development of a country as they facilitate the process of its economic growth. A country having large reserves of minerals has the potential for long-term development of its industrial sector by providing inputs and thus sustaining high economic growth. The failure of the country to benefit itself from its huge mineral reserves and its inability to distribute benefits accruing from natural resources to its citizens is referred as “resource curse”⁵. This situation creates a paradox of having large resources but the government’s inability to extract and distribute the benefits. It has been observed in various studies in several countries that mineral-rich countries tend to perform poorly as compared to their less mineral rich counterpart countries. Table 1⁶ shows that as one moves up the income ladder the natural resource wealth falls and produced capital wealth⁷ increases.

Table1. Wealth and Per capita Wealth by Type of Capital and Income Group, 1995 and 2005

Income group	1995				
	Total wealth (US\$ billions)	Per capita wealth (US\$)	Intangible capital (%)	Produced capital (%)	Natural capital (%)
Low income	2,447	5,290	48	12	41
Lower-middle income	33,950	11,330	45	21	34
Upper-middle income	36,794	73,540	68	17	15
High-income OECD	421,641	478,445	80	18	2
World	504,548	103,311	76	18	6
	2005				
Low income	3,597	6,138	57	13	30
Lower-middle-income	58,023	16,903	51	24	25
Upper-middle income	47,183	81,354	69	16	15
High-income OECD	551,964	588,315	81	17	2
World	673,593	120,475	77	18	5

Source: World Bank (2011)

However, the empirical study regarding the negative relationship between natural wealth and development did not find the relationship significant⁸ as the paradox does not apply to all the mineral-rich countries and due to some prevailing economic and political situations⁹, the resources have a negative impact on these countries and therefore turn out to be a curse for the country rather than a boon.

Following are some economic, political and social situations which prevail in areas facing resource curse.

⁵ It has been named after the country Dutch where this phenomenon was first observed. (Coutinho, 2011)

⁶ The table has been reproduced from Canuto, O., & Cavallari, M. (n.d.). Natural Capital and the Resource Curse. Retrieved from <http://siteresources.worldbank.org/EXTPREMNET/Resources/E/P83.pdf>.

⁷ The figures for lower middle-income group have inflated due to the presence of China in that group.

⁸Refer Canuto, O., & Cavallari, M. (n.d.). Natural Capital and the Resource Curse. Retrieved from <http://siteresources.worldbank.org/EXTPREMNET/Resources/E/P83.pdf>

⁹ Refer (Coutinho, 2011), (Anshasy), (The Resource Curse: The Political and Economic Challenges of Natural Resource Wealth)

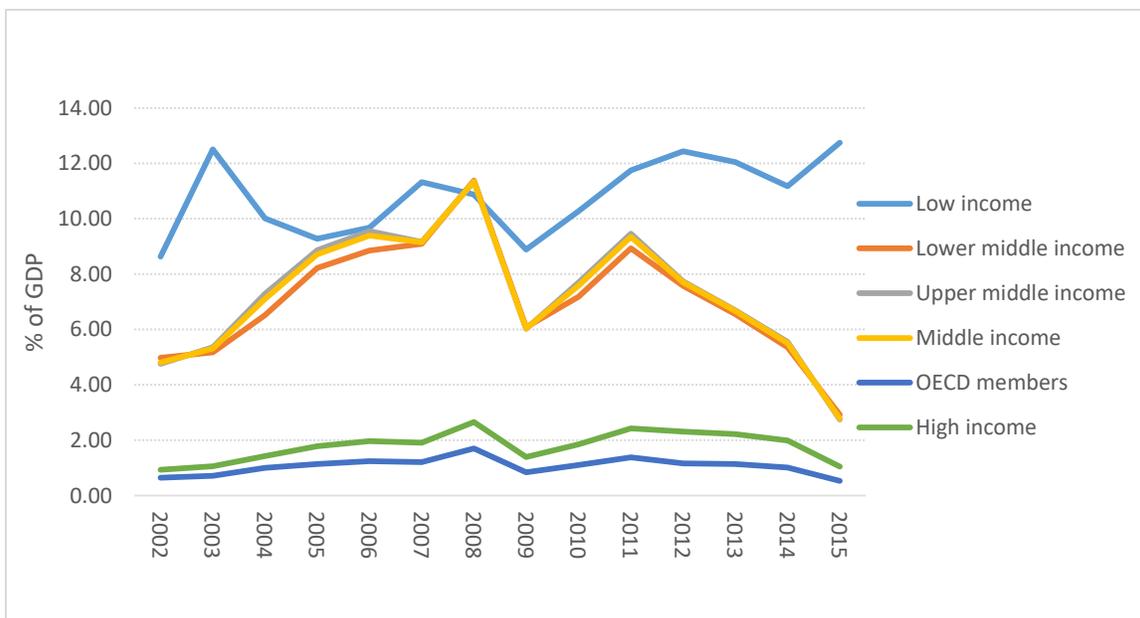
2. COMPONENTS OF TAX REVENUE- MAJOR SHARE OF TAX FROM MINERALS

The tax paid by the citizens to the government gives them the power to hold the government accountable for its actions and demand the basic services for which the citizens are entitled. When a large share of government’s tax revenue accrues to the income tax, the government becomes more responsible or more democratic in nature as the accountability of the government towards public increases. On the other hand, if the government is less dependent on income tax for its expenditure and a major portion of its tax revenue accrues to taxes from mineral resources, it becomes less responsible to its citizens. Therefore, more the share of income tax in the revenue of the

government, more is the government responsible to its people.

In mineral-rich countries in general and states in particular, taxes on mineral reserves is an important source of government’s tax revenue. The larger the share of taxes on minerals and less the share of income tax, the government tends to be less responsible to its people and therefore less development takes place in mineral-rich areas. Figure 1 roughly proves the argument made above that the low-income countries have greater percentage share of natural resources rent in GDP as compared to high-income countries.

Figure 2: Total natural resources rent (% of GDP)



Source: Author’s Calculation from World Bank Data¹⁰

3. GOVERNMENT SPENDING LEVEL AND ITS COMPOSITION

The government allocates its funds for the development of the country and that of its population. The government has many avenues for investing its

¹⁰Estimates based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium" (World Bank, 2011).

funds. The government invests in the education sector, health sector and other such sectors which directly adds to the development of the society. The government also invests in mega projects such as highways, bridges, and infrastructure which facilitates the economic growth of the country but locks in a large amount of funds for a long duration. In the mineral-rich sectors, if the share of taxes from minerals tends to be large, the government in the resource-rich areas tends to spend more on government salaries, megaprojects, unnecessary subsidies and less on health, education and social security benefits which directly benefits its population.

4. DUTCH DISEASE

The discovery of more natural resources or an increase in the profits from natural resources can negatively affect other non-resource tradable sector and the economy as a whole of that area. This negative impact on natural resources is known as "Dutch Disease". The discovery of natural resources or an increase in profits attracts domestic as well as foreign capital to the resource sector thus appreciating the domestic currency. The appreciation of the domestic currency increases the demand for domestic currency leading to inflation. The prices of domestic non-resource abundant tradable goods increase, thus leading to declining of their exports and increasing imports. Therefore, natural resources can negatively impact the economy by causing inflation and decreasing the demand for tradable goods in the domestic as well as foreign market. Another negative impact is on the labor force. The increased profits in the natural sector increase the wages thus shifting labor from tradable goods sector to resource sector thus negatively impacting other sectors. Therefore, an abundance of natural resources may lead to de-industrialization and contraction of other sectors. The presence of Dutch disease in the mineral-rich areas hinders the growth of

other sectors and the presence of weak institutional support further worsens the situation.

5. WEAK INSTITUTIONAL ARRANGEMENT AND PROPERTY RIGHTS

A weak institutional arrangement in the mineral-rich areas may lead to underutilization of natural resources and improper extraction of benefits from them. With the presence of weak property rights in such areas, any windfall gain from natural resources will influence people to establish their control over land in order to extract the benefits of the mineral-rich land. The interest groups will try to influence institutions to allocate the resources in their areas, and in the presence of weak institutional arrangement, the resources may be distributed to unproductive avenues thus hindering the process of growth. Also, due to weak property rights, there tend to be more cases of land conflicts in these areas among various stakeholders such as the owner of the land, government bodies, companies extracting minerals. The cases of conflicts might further increase in scheduled areas where the land is commonly owned and there are many claimants to the property. On the other hand, strong institutional arrangement and well-defined property rights will restrict any such influence of interest groups and the resources will be distributed to productive activities. Again, looking at Table 1, there is a negative relationship between intangible wealth¹¹ and the natural wealth of a country.

6. CONCLUSION

The negative relationship between natural resource wealth and the development of a country is empirically weak and factors discussed above indeed play an important role in determining whether the natural wealth a country possesses will turn out to be a curse

¹¹ The intangible wealth of a nation includes its institutional arrangement, governance, law and order, educational attainment, R&D etc.

or a boon. The countries endowed with vast natural resources and still faring poorly in the development process must understand the importance of good governance. The problems arising because of natural resources can be tackled if there are efficient institutions working to protect property rights, well-functioning markets to avoid Dutch disease and government expenditure concentrated more on basic

services rather than locking up resources for long period of time. The scope of this article is limited to providing theoretical arguments for why some economies despite having vast natural resources fare poorly and more empirical research needs to be done to show strong relationship between the factors discussed and the resource curse.

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A STUDY ON RAJASTHAN RURAL LIVELIHOOD PROJECT

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Rajasthan Rural Livelihood Project (RRLP) is a government of Rajasthan initiative funded by the World Bank for the purpose of poverty reduction in the year 2010. It covers BPL families and other poor families who were not included in the BPL list. RRLP intent to focus and support the BPL families' overall development by the way of providing credit, additional source of income, enhancing the income from existing sources and creating productive assets. The project has four main components. The first component is institution building and social empowerment. The objective of this component is to help the poor mobilize themselves into Self Help Groups (SHGs), and gradually develop their own capacity to initiate and expand sustainable livelihoods activities. The second component is the community investment support. The objective of this component is to support asset creation of SHGs and their federations and identify and support innovative approaches to improve the livelihoods of the rural poor. The third component is the skill development and employment promotion. The objective of this component is to support beneficiaries to capture new employment opportunities through the establishment of a structured mechanism for skill development and job creation. The fourth component is the project implementation support. This component focuses on the efficient implementation of the scheme at the ground level. The project covers 5,769 villages under its purview and has a three tier system. At the lowest level there are Self Help Groups. A Self Help Group is a group of 10-12 women belonging to below poverty line families. At the second level there is Village

organization which is a group of 20 SHGs. VO provides various funds to different SHGs and it receive two funds namely – Start-up fund of Rs. 50000 and Vulnerability reduction fund of Rs 150000. Cluster Level Federation is at the top and it comprises of 30 Village organizations and provides funds to them. It is also responsible for solving disputes between SHGs and VOs. It receives a start up fund of Rs 3,50,000.

Initially a SHG group is formed and the members are encouraged to save a minimum of Rs.10 per week. Any member of the SHG can take a loan from this pooled amount at an interest rate of 1.5% - 2% per month. A proper record of all the transactions is kept by one literate member. Once they start functioning they can join a pre existing Village organisation by paying an admission fee of Rs.100 per member to the VO. A bank account is also opened in the name of the SHG and all the funds that are transferred from Village organisation to SHG is done through this bank account. If the SHG is regular in its meetings, savings, bookkeeping, taking loans and repaying them, for 3 months, it qualifies for a grant of Rs. 15000 from the Village Organisation. This grant is called Tranche 1. In the next 3 months SHG is linked through bank i.e. it receives a loan of Rs. 50000 from bank. This loan is given on the basis of good repayment history of the SHG. Then, after 6 months of functioning, a Micro Credit Livelihood Plan (MCLP) is prepared for each and every SHG member. This includes their family details, income source and expenditure details. In the first round 5 of the most vulnerable members are given a loan of Rs.20000 each

for investment purpose. When these members repay their loan rest of the members receive Rs.20000 each. The investment purpose is decided by the member and the management together. The loan for the investment plan is provided by the Village organisation and it amounts to Rs.110, 000. This loan is called Tranche 2 or Community Investment Fund. SHG members can invest in livestock, Agriculture (improving the productivity – Well, Motor) or business. Since it is a loan from VO to SHG, SHG repays it back to VO and VO further repays it back to CLF. In case of an emergency, any SHG member can approach VO, through their SHG, for a loan without interest. VO covers this loan from Vulnerability Reduction Fund.

The SHG members can take three types of loans from the SHG. The short term loans also known as micro loans, are given for liquidity crunches. The loans amount can vary from Rs. 100 to Rs. 10000. The long term loans are call macro loans and its amount varies from Rs. 5000 to Rs. 50000. The investment loan is called Micro credit livelihood plan loan and its aim is to help poor people generate some additional income. The interest rate for all the three loans varies from 1.5% to 2% and is decided by the group together. The loan is to be repaid back in installments of Rs 1000 plus the interest every month.

A survey was conducted in Rajwas, village of Rajasthan. The aim was to assess the efficacy of the project by comparing SHG and Non SHG women of the same village. Both the groups included BPL families with similar employment activities and lifestyle. The significance of financial inclusion provided by the scheme was mapped in terms of member's access to the credit facilities, their sources of credit and the affordability of loans measured in terms of interest rate offered by different sources and their collateral requirement. It was found that a SHG member took multiple loans whereas on an average a Non SHG member took just one loan in the past three years. The magnitude of loan was also found to be higher in case of SHGs. This supports the claim that members of SHG have better accessibility to credit. It was further

discovered that this increase in availability of loans was largely due to the introduction of the scheme. However, it is crucial to take into account the presence of persistent dependency of the SHG members on non-institutional sources. This may be because of the unavailability of large sum of money from the SHG due to low corpus. They may also resort to non-institutional sources in case of emergency situations. Even though SHG members are still dependent on the non-institutional sources; this dependency ratio has declined considerably as compared to the Non-SHG members who still take a large chunk of its loan amount from non- institutional sources.

A resident of Rajwas has various options when it comes to source of credit. For short term as well as long term loans he can turn to moneylender, landlord, relatives and bank - KCC. So, why should SHG loans be preferred over them? It was found that the interest rate offered by SHG and moneylender (for short-term loans) is the same but SHGs prove to be better because unlike moneylender and landlord, it does not require any collateral for availing credit. Also, long term loans from Moneylender are available at a higher interest rate as compared to the SHG.

Although KCC provides loans at lower interest rate than SHG, it is not preferred to SHG by the members. This is plausibly because of the complexities associated with the banking system in terms of paper work and various other formalities for accessing credit. Another plausible reason is that KCC provides loans only for agricultural purposes while people require loans for numerous other activities too. It also hikes up the interest rate to 24% per year in case of default in the repayment. This brings us to the affordability of SHG loans and the study shows that out of the total loans, taken by the sample in the past three years from the SHG, the default rate was approximately 3% and the total pending loans were approximately 7%. All the other loans were successfully paid with interest. Looking at the aggregate of all the loans (Micro, Macro and MCLP), the default rate is not beyond the level of significance. But, it is significantly high i.e., 17.6%, in the Macro loans

which have comparatively longer repayment period than the other loans. MCLP loans are also long-term loans with same installments as that of Macro loans but they did not have any default rate. This difference can also be explained with the intuition that there might be a greater sense of responsibility among the SHG member regarding the repayment of MCLP loans which were loaned by the VO to the SHG and not given from the corpus collected. Micro loans have a negligible default rate of only 1.6% with no pending loans. It could be because it is easier and more convenient for the SHG members to handle small loans given for short durations than the large ones which are spread over longer durations.

On the other hand, Non SHG member's default rate is much higher than the SHG's whereas their pending rate is almost equal. This suggests that SHG is being less exploitative than the Non institutional sources of credit.

In the study, it was also attempted to track the purposes of the loans taken by both SHG and Non SHG members. For simplification, the loans were divided into two groups: Productive and Non-Productive loans. **Productive loans** include loans taken for Agricultural activity, Livestock rearing, Business, Well construction, Freeing Mortgaged land and Education. **Non-Productive loans** include loans taken for Consumption, Health and Marriage. Also, Productive loans were assumed to be better than the non-productive loans because they help in increasing the ability to generate more income in the future.

The findings suggested that SHG members took higher proportion of their loans for the productive purpose. Whereas the Non SHG group took a higher proportion of its loan for non-productive purposes which adds to their expenditure. This explains the higher default rate of the Non SHG group. The SHG group took smaller per head loan for non-productive purpose and found themselves in a better position in terms of the rate of default.

The hypothesis that higher proportion of productive loans lead to higher income has been supported by this

study. The SHG group's savings and income was found to be proportionately higher than that of the Non-SHG group. The Non SHG group had negative savings which could be because of the higher proportion of non productive loans which increases expenditure without adding to the income. In the long run, negative savings might disappear as members cut short their expenditure according to their income. It was found that variation in income and savings was due to increased productive loans. SHG members were able to generate additional revenues and even profits from each productive activity. Activities such as Livestock rearing and Tailoring gave the highest returns.

Caste wise distribution of income and expenditure for both the groups was also taken into account. The chosen sample consisted of two major backward castes namely OBC and SC. The income and savings of both the castes belonging to the SHG group was found to be proportionately higher than that of the Non SHG ones. After comparing OBC and SC groups belonging to SHG, it was evident that the OBC group benefited more from this scheme

The most crucial aspect of this study is that it assesses the real effects of the increase in income of the SHG members on Education, Housing characteristics and Asset accumulation.

In order to measure the impact of RRLP on the quality of life, the data was collected on the children's education for both SHG and Non-SHG faction and there was no major difference between the schooling pattern, resulting into the conclusion that the income enhancement due to scheme had no major impact on the quality of education. Similarly, there was not any significant difference between the SHG and Non-SHG housing characteristics. So this scheme did not affect the type of house that the sample owns.

Finally, the asset holding of both SHG and NON SHG were compared and it was observed that only a small proportion, i.e. 20% of the members bought assets after the scheme.

Maximum number of people invested in Motorcycles. Although, the higher savings generated by the scheme did help a few people to invest in the assets, but the number is not very significant for us to conclude that the scheme had remarkable impact on the lives of the people.

This study also traces the distribution of assets amongst the SHG and NON SHG group. On an average, there is not much difference between the asset holding of SHG and NON SHG group.

Increase in incremental income did not affect the quality of life much. This implies that high interest rate is sucking up all the funds, leaving the SHG members in the same state. High interest rate is required to meet the operational cost of the SHG. Hence, there is a tradeoff between the two.

To conclude, SHG did improve access to credit of its members but it charges high interest rate which is a necessary evil because it covers the operational cost of the SHG. Even with a high interest rate, the default rate

was found to be low. One plausible exposition for this behavior is that the SHG members take higher proportion of their loans for productive purposes which in turn strengthen their repayment capability. One of the primary objectives of the scheme was to provide a permanent source of income to the SHG members. Our study showed, that only a handful of businesses were established and most of the productive loans were used up for livestock rearing and agricultural activities. Given the magnitude of the scheme and the cost incurred by the government, the results are not very remarkable. However, given some time, credit access can have significant economic effects in the long run. Also, the management should focus more on the MCLP loans because these loans have a direct impact on beneficiary's income.

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KUDUMBASHREE – A SCHEME FOR POVERTY ERADICATION AND WOMEN EMPOWERMENT

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Poverty eradication and women empowerment are matters of extreme importance for all countries in the modern world. Policies for poverty eradication are indispensable for the development of a nation, and development will be complete only when men and women get equal opportunities in the society. Self Help Groups (SHGs) play an important role in the economic, social and personal development of women (Minimol & Makesh, 2012). SHGs are predominantly found in South and Southeast Asia. These groups usually have 10-20 members who contribute a nominal amount at regular intervals, and the sum collected is lent to the members of the group, according to their needs.

Varma (2014) stated, “In a country that has been criticized as lacking commitment to women’s rights, one program in the southwest state of Kerala has been quietly serving as an example that a government can indeed successfully empower women, both economically and socially.” This statement has been made with reference to Kudumbashree, a unique poverty eradication scheme initiated by the government of Kerala in 1998 with the support of the government of India and NABARD. The word ‘Kudumbashree’ means “prosperity of the family” in Malayalam (the local language of Kerala). The objective of this program is to eradicate poverty and help in the socio-economic and personal development of women by forming SHGs at different levels, for providing easy microcredit and entrepreneurship opportunities (Varma, 2014).

The structure of Kudumbashree is federal and has three tiers. The first and most basic level is the Neighborhood

Group (NHG). There are 10-20 members in one NHG. The members are usually from the same locality and have similar financial backgrounds. NHGs have regular meetings, and the members pool their savings. This sum is used for providing loans to match the credit requirements of members. The next tier is the Area Development Society (ADS). It is governed by committee members who are elected from those NHGs which form the ADS. The elected committee supervises and provides assistance to the NHGs. The apex level in the three-tier structure is the Community Development Society (CDS). These bodies are governed by the provisions of the Travancore-Cochin Literary, Scientific and Charitable Societies Registration Act, 1955, and acts as a link between the state government and the various ADS(s) which come under it. (“Community Structure”, n.d.)

The objectives of Kudumbashree can be broadly classified as thrift and credit, micro-entrepreneurship, social and personal development, and bank linkage (Anupama, 2015). The NHGs under the Kudumbashree program operate in a way that inculcates the habit of thrift amongst the members, and the savings are used to provide easy credit at negligible rates of interest. Kudumbashree encourages women to mobilize themselves into groups and initiate income-generating entrepreneurship ventures. For bank linkage, the banks rate the NHGs on the basis of a 15 point index introduced by NABARD. This index is used to judge the performance of the group, and the NHGs are linked to various banks based on their rating (Anupama, 2015). The banks use ‘social collateral’ for recovering the loans given to NHGs, i.e., each member is pressurized to pay by other members of the group (John, 2009). For the

financial year 2017-18, the total amount collected internally by the NHGs amounted to 241.68 crores, and the total amount of internal loans amounted to 984.54 crores. ("Micro Finance", n.d.)

Initially, the program had numerous challenges. Women, especially from rural or backward areas were reluctant to come out of their homes and participate in NHG meetings. The microcredit system was not functioning properly, and there were many defaulters. Many women utilized the bank loan for personal purposes and the loans had to be written off as the entrepreneurship had no profits that could be used for repaying the loan. Also, some men did not initially support the idea of women leaving the house and earning for themselves. Lack of teamwork and disputes between members were some of the other challenges for the NHGs. Many business ideas were not successful because of lack of skills in the entrepreneurs.

Effective training programs devised by the government and CDS have helped the NHGs in overcoming many of the initial challenges. General orientation, skill development, team building, entrepreneurship development, accounting training, and performance improvement are some of the training programs offered by Kudumbashree.

Kerala has been witnessing many significant social changes after the introduction of the Kudumbashree project. Through this program, the women have made their entry into many areas of employment and entrepreneurship which are dominated by men. The various accolades awarded to Kudumbashree and the numerous success stories indicate that the Kudumbashree mission is slowly, but surely producing results. In Kannur, a northern district of Kerala, 2 groups of women have formed 'panchari melam' bands (percussion ensembles). Also, the members of the Kudumbashree mission are engaged in a hybrid version of the traditional percussion art coupled with rhythmic foot movements, 'singari melam'. These women are

making their presence felt in the field of traditional percussion ensembles, an art form usually performed by men. (Nazeer, 2008) There has been a significant increase in the number of such bands across Kerala in the last five years, and these bands are in high demand for performing at inaugurations, weddings, etc. There are around 45 bands in Kerala, and each member earns 750-1500 rupees for one performance. Members of these bands earn a decent amount through their performances, and performing in front of crowds has boosted their confidence (Madathil, 2013). Kudumbashree members have stepped into many male-dominated areas of employment like masonry, taxi service, fast food service, commercial crop cultivation, etc.

Balasabhas are collective groups for children formed under Kudumbashree. These groups are formed for the overall development of children. The members of Balasabha are exposed to a democratic environment, and undergo interactive training in various aspects of health, personal development, sex education, computer literacy, etc. At present, there are 66,743 Balasabhas and each Sabha consists of 15-30 children. Balasabhas aim at enhancing the capabilities of children so that the effects of poverty do not get transmitted to the next generation (Praghabaldas, 2017). Kudumbashree has 2 more flagship social development projects- Asraya and BUDs. Asraya is a program for identification and rehabilitation of destitute people, and BUDs are schools for differently abled children. At present, Kudumbashree has managed to establish 63 BUDs in Kerala, where differently abled children are given education, training, and care. ("Social Development," n.d.)

Involvement in Kudumbashree gives women economic independence, which helps them in developing confidence and self-respect. The thrift and credit system encourages women to use money judiciously, and the easy availability of credit makes them depend less on the males in their family. The CDS, along with

the government has approved various income generating ventures, and many of these were suggested by the members of Kudumbashree units. The micro-entrepreneurship listed under Kudumbashree include fast food stalls and tea stalls, manufacturing of pickles, jams, and curry powders, waste management, cultivation of paddy, banana, and other vegetables, painting services, animal husbandry, masonry, manufacturing of soaps and detergents and handicraft making (Dinesh, 2014). A study by Beena & Sari (2014) on Kudumbashree shows that more than half of the respondents felt that they could see economic and personal development within themselves and that there was some development in their respective families as well. The major reason for these developments must have been the fact that the financial independence achieved through the availability of credit and the income received through the micro-entrepreneurship of Kudumbashree gave the women higher decision making power and increased their social participation, along with increasing their confidence and equipping them to effectively handle the finance in their family.

It cannot be denied that the project still has shortcomings and challenges to overcome. A number of Kudumbashree micro-entrepreneurship ventures have been closed down, or are running on losses because of poor management, lack of teamwork, internal disputes, politicization, or poor choice of business ideas. Many

members of micro-entrepreneurship programs admitted that after their incomes started going up, there was a fall in savings because their expenditures had also increased drastically (Beena & Sari, 2014). A fall in savings indicates a failure of the thrift and credit system, which is the backbone of the Kudumbashree program. The CDS and concerned authorities should ensure that the members are educated about the importance of saving a part of their income, for the economic development of their families, and for ensuring the long-term sustainability of the program. Also, the members should be given proper assistance in identifying and implementing feasible projects, and proper training should be imparted in the fields of accounting, management, and teamwork for maximum efficiency.

The Kudumbashree mission has transformed the lives of millions of families in Kerala, facilitating economic development through thrift, easy credit schemes and income-generating projects, and ensuring social development by increasing the self-confidence, decision making power, and awareness of the members of the program. Nearly half of Kerala's population is associated with this mission (Sanandakumar & Krishnakumar, 2014), and improvements in current ventures along with fresh and inclusive initiatives can establish this program as one of the most effective schemes for poverty eradication and women empowerment in India.

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AN ANALYSIS OF WORK AND MODELLING UNIVERSAL BASIC INCOME

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ABSTRACT

This paper attempts to trace the history of work and use the analytical premise to argue for reasons behind the centrality of work in modern life and how this centrality is currently being threatened with the rise of automation and increasing redundancy of human capital. It then argues for a radical alternative in order to preserve income security of the working class in the context of a post-work society by providing a Universal Basic Income and then provides a rudimentary mathematical framework for implementation. Policy implications of income redistribution through providing a basic income is traced from the mathematical analysis and certain model limitations are also specified.

Keywords: Work, Automation, Universal Basic Income, Inequality

INTRODUCTION

In most cultures, work predicates the survival of an economy. The economy of any given culture primarily comprises of institutions which produce and distribute goods and services. The extent of modernity and quality of such institutions although, may vary spatially and temporally.

Economic and sociological literature is abound with the analysis of work and its impact on society. The frequency of writings on the subject increased exponentially with the onset of the Industrial Revolution. Durkheim (1964) and Marx were one of the first intellectuals to assess the conditions of the working class, analyzing how transition from individualized production to factory-based production resulted in alienation. Other sociologists such as Weber, focused on the genesis of new types of authoritarian hierarchical forms that emerged in modern industrial systems.

However, it is practically impossible to come to a consensus on standard definition of what constitutes as “work”. The term has acquired a plethora of definitions and understanding in various realms, to come to a commonly understood and standardized definition of work is bound to leave out some aspect or another. Work can either be conceived as creation of a new product(s) or a mundane, trite involvement in everyday banalities. It can also be used to refer to activities undertaken in the domestic and non-market spheres such as households. This difference in understanding becomes even more divergent in the academic sphere, which has seen a disquieting series of attempts to

standardize the definition of work. (Granter, 2009) However for the purpose of analysis, Andre Gorz's understanding of work in the context of modern capitalist societies is sufficient. Work, according to Gorz, can be defined as a series of activities undertaken for the fundamental purpose of earning a remuneration which may or may not be commensurate to the task performed. (Gorz, 1997)

1. HISTORICAL CONCEPTION OF WORK

In ancient times, work was perceived as a base and menial form of activity which was at best relegated to the lowest rungs of society due to its mundane nature, i.e. to slaves and other form of indentured labor. It was seen as something that prevented humans from indulging in other forms of pleasure seeking activities such as arts, hunting, philosophy and governance, which were monopolized by the upper echelons. Work was only seen as a necessity for bodily survival (Frayne, 2015). The attitudinal transformation towards work coincided with the rise of non-orthodox forms of religion, mercantilism and the decline in the power of feudal lords. Before this transformation, the prevalent attitude was the almost universal prioritization of leisure over profits or any kind of financial reward. It was loquaciously characterized by Weber, "a man does not 'by nature 'wish to earn more and more money, but simply to live as he is accustomed to live and earn as much as necessary for that purpose" (Weber, 2003).

However, the rise of global trade in commodities associated with the Age of Exploration led to an increase in global trade flows and generated the need for a constantly engaged working class to ensure continuity in the free movement of trade and services. This was also a time when Europe's population was cut short by a third due to the Black Death. Not only did it create a dearth of a functional, working class population but also prompted the then rising forms of non-orthodox religions such as the Protestant movement to endorse the idea of work as a virtuous end in itself, a narrative which was also supported by

the newly rich mercantilist class to achieve their material ends. There was a conflation of ideas such as dedication to work and salvation, which were propagated as different sides of the same coin. The permeation of puritanical ethics in work culture led to further rationalization and standardization of procedures within professional spaces, be it commerce, academia, administration etc. (Kalberg, 1980). This is the process that led to the rise of the modern spirit of capitalism, driven by commitment to hard work and its consequent reward in terms of profitability and quantitatively measurable growth.

2. CENTRALITY OF WORK IN MODERN LIFE

In the neoliberal era, work has occupied a predominant space in the human psyche. It has become the primary mechanism for the distribution of income and therefore, the channel to fulfil material needs and a means to achieve social and economic mobility. This centrality is moreover reinforced by the rise of consumerism in capitalist societies (Stavrakkais). The desire and ability to earn more money is fueled by how and where the money is spent. An increase in income necessitates an improvement in lifestyle driven by aspirational values generated by mass media or by social circles (which have a tendency to be homogeneous and stratified in terms of class). This creates an interlocking cycle of working harder to earn more income and obtain access to even higher pathways of social and economic status.

However, more significant than the socio-economic value of work, is its cultural value. In most societies, getting a job to earn a livelihood acts as a cultural marker of adulthood and financial independence (Frayne, 2015). Moreover, education systems are oriented in a manner that prioritize qualification earning over academic learning since knowledge systems are themselves perceived as an entry point to earn a living. This is also evident in the ever-increasing demand for jobs in industries which offer higher returns on education in the least possible timespan. Moreover,

the perception of education itself has become one of a risk-taking, entrepreneurial activity with the expectation of pay-offs in a particular time period due to the increasing costs attached with it. Therefore, even attainment of education can be thought of as ‘work’ simply by virtue of its remuneration-oriented undertaking (Maisano, 2012).

Having or not having the ability or opportunity to undertake work can also be seen from the lens of its associated stigma. Ideas like “being unemployed” or “unpaid jobs” are still looked down upon simply due to lack of a monetary value attached to it. This monetary obsession is grounded in economic theories propounded by the neoclassical school of economics. Specifically, support for the existence of economic phenomena such as “voluntary unemployment”¹² has gained traction across the political spectrum since it offers a politically convenient justification to shrug off the burden of correcting structural problems that create conditions for unemployment such as labor market frictions, demand-supply mismatch and the blind faith in the clearing of markets.

Unemployment has also become an economic weapon to control other critical aspects of the economy such as inflation (due to the inverse relationship between both of them given by the NAIRU¹³ theory). This technocratic faith in the power of economic theories prompts governments to systematically maintain a specific level of unemployment to presumably keep inflation under check. The impact of this political toying with economic theory shifts the burden of unemployment from the state’s failure to the individual. Finally, the glorification of work gets concretized in grand narratives such as the American Dream, that encapsulates elements of consumerism, capitalism and hard work into an appealing body of inviolable ethos and just like that, the centrality of work becomes embedded in the fabric of our lives while pertinent problems such as

disproportionate returns to labor, its exploitation and the concentration of wealth in the hands of few go unnoticed by the masses.

3. CRISIS OF WORK AND RISE OF AUTOMATION

Despite the centrality of work in modern life, disenchantment and stagnation in work is not unknown to a majority of the working class in the modern society (Frayne, 2015). There are various attributive factors such as a constant fear of losing jobs to machines (especially so in the manufacturing sector), performing standardized tasks in a mechanical fashion, low incomes and lack of incentives to name a few. This coincides with the rise of skill-biased technological change (Violante), where those who have better access to education and skills are compensated with better opportunities and returns. The problem with this setup is with how it prioritizes those with privilege and access to material resources. This kind of growth has become a priority in the developed world, where it has been envisaged as an alternative to periodic stagnation of economic growth and falling labor productivity.

The advancement of technology has engendered one very specific manifestation: automation. It can be defined as the utilization of technology to perform mechanical tasks in order to minimize the use of human resources and other associated costs. Automation in the 21st century has taken two broad forms: artificial intelligence (when machines can act intelligently like humans) and machine learning (mathematical framework often used to solve tasks within artificial intelligence). While previous technological changes either replaced physical strength or allowed ease of performing tasks (wheel, lever, for instance) or augmented the human capacity to think (calculators,

¹² People choose not to work willingly if the prevailing real wage rate is greater than their current wage rate

¹³ Non-accelerating inflation rate of unemployment refers to a level of unemployment below which inflation rises. It was first introduced by Franco Modigliani and Lucas Papademos in 1975.

initial computational technology), automation-driven economic growth has the ability to duplicate an attribute that has been historically monopolized by humans: intelligence.

This radical new form of technological advancement allows for automation of tasks that require utilization of cognitive abilities. Even though automation possesses vast potential to increase economic growth, it also has the capability to disrupt the status quo insofar as work is concerned. There are efficiency and distributional problems inherently associated with the growth of automation. The incidence of potential job-loss is tilted disproportionately towards the lower-paid, lower-skilled and less-educated working class since they are the ones mostly engaged in mechanical tasks. This has already led to a decline in their demand in the job market, a consequent fall in wages and a rise in inequality. Furthermore, the long-term effects can be even more deleterious. Given that increases in productivity due to automation do not necessarily translate into wage increments for the median worker (an efficiency problem) (Card & DiNardo, 2001) the benefits of automation consequently accrue only to a very small class of individuals (programmers, developers, entrepreneurs) and production factors (capital) significantly more than others (a distributional problem). Moreover, with the rise of the gig economy and zero-hour contracts, the obligation owed to labor by firms has also declined steadily, especially in the information technology sector, thus leading to an erosion of job security.

Taking aforementioned analysis into account, predicting the future of the job market and the income security of the current workforce is extremely difficult. More critical is the question of how income accrued from work will be affected in the shifting paradigm of capital-driven output generation. There is already an increasing schism of inequality across the developing and developed world which can be partly attributed to technologically-biased economic growth. Unemployment rates are increasing globally, the

economic recovery in the aftermath of financial crises is unable to generate employment and nominal income growth has either stagnated or has been systematically gravitated to upper echelons of the working class, namely top executives and middle level management (Equilar, 2016). All these problems have persisted despite large scale policy-driven and institutional reform. Therefore, a radical alternative is required for envisioning the future of work and engagement with these aforesaid structural problems is crucial

Various alternatives have been proposed over time and most of them focus on creating more jobs. However, I intend to look at an alternative that is not only being debated upon in Western liberal democracies extensively in status quo, but also has critical implications for the way work and society will be organized in the future. Instead of generating jobs that pay, governments are now discussing the viability of providing an alternative that might tackle the potential inability to create jobs in the future: a universal basic income.

4. UNIVERSAL BASIC INCOME

Historically disguised under various terminologies and vindicated with a broad spectrum of argumentation, UBI is a simple, yet complex idea. The most rudimentary definition of UBI has two components: an unconditional cash transfer entitlement and its universal applicability irrespective of present income or employment status (Van, 2012).

However, before moving into a formal inquiry of UBI, certain clarifications are in order. Given the vast body of literature around the subject, it is impossible to incorporate every facet while analyzing certain specific issues. Moreover, I leave the mechanics of implementation, political dynamics and questions of affordability aside from an analytical perspective, despite the fact that they are all critical policy dimensions. After explaining certain significant features and variations of UBI, I intend to look at the

distributional impact of UBI by constructing a rudimentary mathematical model to analyze the effects of a universal basic income on the levels of inequality in a society.

4.1 FEATURES OF UBI

Cash payment: Instead of providing in-kind subsidies, UBI is provided in cash without any conditionalities on its consumption or saving.

Regularized periodicity of payment: There can be multiple frequency-based caveats depending on the modalities of the proposed policy. Periodicity can be monthly, annually etc.

State is the sole agency of dissemination: Even though the dynamics of accountability can differ, in principle, the state should hold monopoly over providing a basic income as a welfare-enhancing measure. This also means that the state will be responsible for obtaining the requisite amount of funding to implement the policy.

Redistributive intentions: The fundamental motive of providing UBI should be a clear intention to enhance standard of living uniformly and targeted reduction of income inequality.

Paid to individual rather than households: To achieve standards of fairness, this policy is implemented at the individual level. Moreover, even if UBI is paid individually, the amount paid can still be dependent on the household composition. It is empirically well established that an increase in the household size has an inverse relation with the per capita cost of living. UBI programs can distribute differential incomes on an individual level after accounting for people's household situation.

4.2. POLICY VARIATIONS

Without-Means Test: Simply put, this variation pays the same level of cash benefit to every individual irrespective of their income status. The problem with this variation however, is the evident inability to

engage with systemic inequality, rather reinforcing it, unless integrated with a progressive taxation structure.

With-Means Test (Van, 2005): In this variation, UBI paid to each individual will vary with their income level. This can be done by stratification of income into various brackets and then deciding the amount contingent on the proportion of population lying within a particular bracket. Even though it is a relatively complex proposition, it is extremely effective in systematically targeting income inequality.

Without-Work Requirement: What can potentially distinguish UBI from current working-class welfare programs in the West such as American Earned Income Tax Credit or UK's Working Families Tax Credit (Dilnot & McCrae, 1999) is that it will not be restricted to those who have jobs or who had jobs in the past or their present welfare entitlements. A more recent variant has also been the exclusion of willingness to work as a criteria for providing UBI, which is especially gaining more importance as people who are losing jobs to automation may not be willing to acquire new skills and therefore, not willing to work.

5. A PRELIMINARY MATHEMATICAL MODEL FOR INCOME REDISTRIBUTION THROUGH UBI

I develop a rudimentary model of income redistribution via UBI. Assume a 10-people world with the following income levels:

Table 1: Hypothetical Income of Individuals

Individual	Current Income
1	1200
2	356
3	232
4	134
5	56
6	900
7	546
8	678
9	425
10	999

Source: Author's calculation

The state provides UBI at an individual level. I will assess the inequality levels before and after the policy prescription and furthermore analyze the consequential income convergence. This policy prescription does not factor household income variations while calculating UBI (however, individuals can be stratified into households and weights can be attached to the number of people living in a household)

The specific assumptions of the model are:

1. There is no exogenous annual change in income, i.e. once UBI is given at the current income level, individuals have no other source of income apart from an annual UBI. (This is merely a simplifying assumption)
2. All the collected tax revenue is distributed as UBI (the model can be modified to tweak the proportion of tax distributed as UBI)

A progressive taxation model is implemented, the structure of which is as follows:

Table 2: Tax Brackets

Income Level	Tax
Greater than 1000 ($y > 1000$)	60%
Less than 1000 but greater than 200 ($1000 > y > 200$)	25%
Less than 200 ($y < 200$)	10%

Source: Author's calculation

The aforementioned tax rates are arbitrary, but can be optimized by assigning proportional weights to income distribution and proportion of population in different tax brackets.

UBI is given after deducting tax liabilities and is calculated as follows:

Let tax rate be "r", total population be "n" and total income be "y_n"

Total tax revenue "t" is calculated by multiplying income with tax rate and summing it across all observations, while applying differential tax rates according to the income distributions.

$$t = \sum_{n=1}^k (y_n)(r)$$

UBI is then calculated by simply dividing total tax revenue t by the total population n

$$UBI = \frac{t}{n} = \frac{\sum_{n=1}^k (y_n)(r)}{n}$$

The following table shows the breakdown of calculating the income of individuals after taxes are collected and redistributed as UBI.

Table 3: Tax collection after UBI implementation

INDIVIDUAL	y_n	$y_{\text{post-tax}}$	TAX COLLECTION	$y_{\text{post-UBI}}$		
A	1200	480	720	657.3		
B	356	267	89	444.3	Mean Income	552.6
C	232	174	58	351.3	Total Tax Collected	1773
D	134	120.6	13.4	297.9	Average Tax	177.3
E	56	50.4	5.6	227.7		
F	900	675	225	852.3		
G	546	409.5	136.5	586.8		
H	678	508.5	169.5	685.8		
I	425	318.75	106.25	496.05		
J	999	749.25	249.75	926.55		

Source: Author’s calculation

Where,

$$\text{Post-Tax Income} = (y_n)(1 - r)$$

$$\text{Tax Collected from one individual} = (y_n)(r)$$

$$\text{Post-UBI Income} = (y_n)(1 - r) + \frac{\sum_{n=1}^k (y_n)(1-r)}{n}$$

For example, Post-UBI Income of individual “A” in Year 2 can be calculated as follows:

$$\text{Post-UBI Income}_A = (1200)(0.4) + \frac{1773}{10} = 657.3$$

Similarly, in Year 3, we can again repeat the process,

$$\text{Post-UBI Income}_A = (657.3)(1 - 0.25) + \frac{1381.5}{10} = 631.125$$

Iterations of providing annual UBI can be repeated and convergence in income can be observed. Iteration at the aforementioned tax rates and income levels over 40 years has been provided in the appendix. Note that the

tax brackets in which individuals lie will also change as their income levels change.

I now turn to look at the policy dimensions of this simple exercise in redistribution. Given the welfare-enhancing outlook of this policy, I first assess its impact on the level of inequality in this 10-person society. A popular measure of quantifying inequality is the Gini coefficient, which ranges from 0 (perfect equality) to 1 (perfect inequality). It is a numerical encapsulation of the Lorenz curve, which arranges the population from poorest to richest, and shows the cumulative proportion of the population on the horizontal axis and the cumulative proportion of expenditure (or income) on the vertical axis (World Bank). Furthermore, it satisfies all the fundamental properties of a good inequality measure (Population principle, anonymity principle, relative income principle, Lorenz principle and Dalton-Pigou Principle). It is calculated as follows:

$$G = \frac{1}{2n^2\mu} \sum_{j=1}^m \sum_{k=1}^m n_j n_k |y_j - y_k|$$

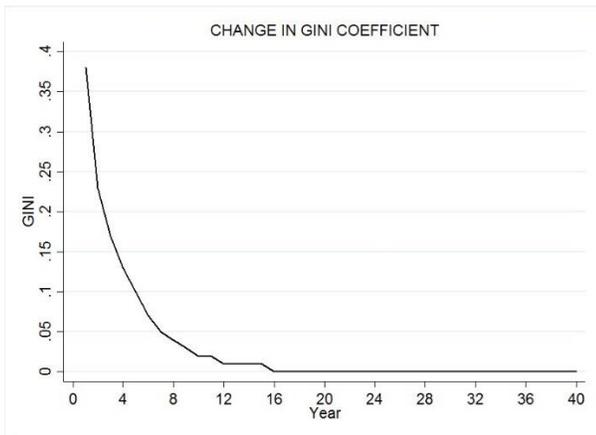
G is calculated for 10 years and the following values are obtained:

Table 4: Gini Co-efficient of individuals

Year	Gini
1	0.376
2	0.228
3	0.171
4	0.128
5	0.096
6	0.072
7	0.054
8	0.04
9	0.03
10	0.02

Source: Author's calculation

Figure 1: Graphing the change in Gini Coefficient across iterated income redistribution via UBI



Source: Author's calculation

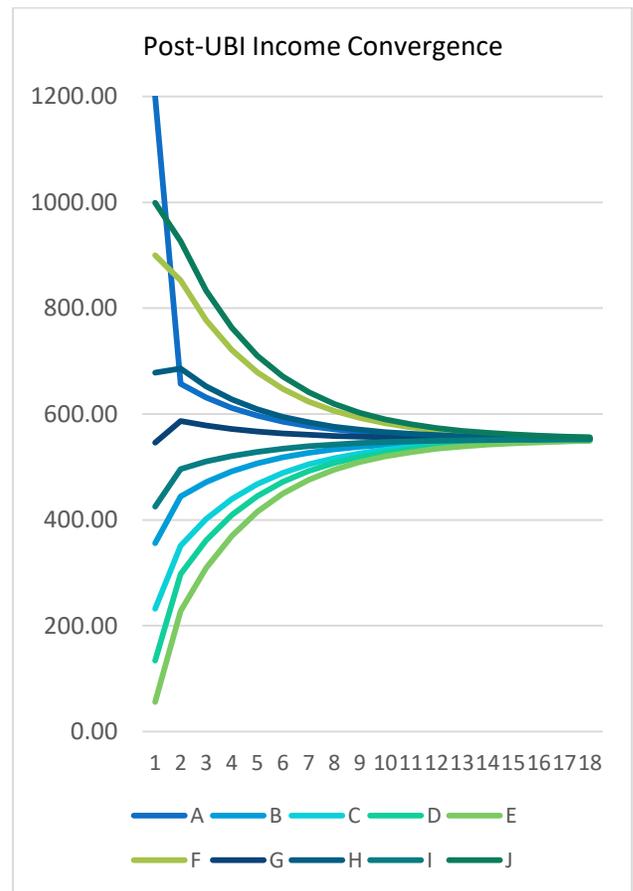
5.1. PRELIMINARY OBSERVATIONS

Continuous implementation of income redistribution via UBI leads to convergence at the mean income level. The number of years required for convergence can

change depending on the growth rate of income (assumed constant in this model). In the neoliberal era, income growth of the top one percentile has been sharply higher via-a-vis the bottom 20th percentile. If the rate of income growth is greater than the rate of decline in inequality, then this policy will be ineffective.

The number of years in which income convergence occurs is inversely proportional to tax rates, which play an important role in deciding the amount to be redistributed as UBI and the rate of decline in inequality. The rate of tax imposed on every income strata is also critical since it might disincentivize work.

Figure 2: Convergence in income after repeated income redistribution via UBI



Source: Author's calculation

5.2. IMPROVING MODEL ACCURACY

By no means is this model a fully accurate representation of reality. However, by controlling for extraneous variables, it can be conclusively proven that UBI can act as an effective leveler of income, provided certain assumptions hold true. There are certain other aspects that might assist in dropping more such assumptions, thus making the model as realistic as possible.

Exogenous income growth can be incorporated in the model in two distinct forms: either as a uniform increase in income (unrealistic, but helps in simplification of analysis) or as a disproportionate increase in income across different strata. This will assist in the determination of tax rates for every bracket.

Since most incomes are nominal in nature, an inflation adjustment can be made to determine real income growth and adjust the provision of UBI to counteract the effects of inflation or deflation since it directly affects the purchasing power of individuals.

Optimization of tax rates on the basis of population proportion lying in specific income brackets. This can be accounted for by setting up dynamic optimization models that maximize tax rates at any given income level and minimize the time period to reduce Gini coefficients.

Finding a general equation that incorporates tax rates and number of years required to reduce Gini coefficient to a specific value. This equation can have far-reaching policy implications since it can improve the decision making process for welfare-enhancing policies, formulating progressive taxation structures, assessing the costs and benefits of income redistribution and create realistic targets for poverty reduction.

CONCLUSION

Although this paper adopts a myopic, utopian and a mathematized perspective on a multidimensional issue of providing Universal Basic Income, it also acts as a reminder of its theoretical validity, if not its pragmatic viability. There has been a lot of political and ideological polarization ever since the dawn of Industrial Revolution on this pertinent issue. However, the bottom line is that in an unequal world where the original starting line decides how much individuals are likely to succeed, we need a radical alternative to envision how we intend to correct such deficiencies. Despite various institutional reforms, we still continue to live in an era where the world around us continues to become more unequal every day. A Universal Basic Income may not necessarily be the best alternative, but it is an avant-garde to initiate a radical reassessment of inequality.

Today, various nations across the world are carrying out the basic income experiment. Netherlands agreed to carry out a Municipal Social Assistance Experiment in Utrecht (Wavern, 2017). Finland has finalized "Perustulokeikeilu", a trial to provide a 2000-people experimental group with 560 euros a month as stipend. Alaska is giving unconditional annual dividends to all its citizens by creating an Alaskan Permanent Fund, the revenue for which is generated by oil wealth (Howard, 2012) among other trials.

These examples not just show the extent of the problems discussed in the paper but also the extent to which conventional wisdom has failed to adequately address them, which in turn has made countries more accommodating towards the idea of a basic income. What remains to be seen is how politically sustainable such alternatives are.

Not delving into the socio-political debate surrounding basic income is deliberate. It requires a detailed characterization of the historical and ideological background on which the current polarization is predicated upon. What remains to be understood is how much nations will choose to prioritize the

reduction of inequality in the coming years since such factors will be crucial in deciding economic outcomes and growth. Furthermore, how much will automation perversely impact job creation is also a question which will be decided by national priorities.

alternative to ensure economic survival and only those who adapt to the change shall subsist.

As a concluding remark, even though work predicates the survival of an economy, its demise requires an

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PLANNED OBSOLESCENCE: MAKING PROBLEMS, SELLING SOLUTIONS

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1. MEANING

Planned obsolescence is a strategy done in order to deliberately limit the lifespan of products so that consumers feel the urge to repair or replace them. Companies producing electronic devices, washing machines, clothes and even books follow this strategy to earn profits in the long term. There are several ways in which planned obsolescence can be practiced. For instance, the products are designed in such a way that some of the important parts worn out within few years. Repair, if possible, costs as much as a new product and therefore, consumers tend to replace it. This is common in washing machines and printers. In case of mobile phones and laptops, companies launch new technology or new updates incompatible with the old devices, again leading to new purchase by the users. Planned obsolescence is not just limited to durable goods but also prevalent in the fashion industry. This happens when designers change the styling of products so that customers buy them due to a decrease in the desirability of unfashionable goods. This is common in case of clothes.

2. HISTORY

“Furniture and clothing and other commodities should have a span of life, just as humans have. They should be retired, and replaced by fresh merchandise. It should be the duty of the State as the regulator of business to see that the system functions smoothly.” This was said by the man who coined the term planned obsolescence.

Bernard London encouraged legal obsolescence to expand consumption in his famous article “Ending the Depression through Planned Obsolescence”. In 1954, Brooke Stevens popularized the phrase by his talk on planned obsolescence at a conference. The first instance of this strategy was in the 1920s when General Motors decided to launch new car models every year. This challenged Ford’s firm belief in simplicity and designs to scale. However, GM was able to capture the market and soon its sales outnumbered Ford’s. Though GM faltered after the energy crisis of the 1970s, planned obsolescence still continued, only to spread to a large number of products.

3. TYPES OF PLANNED OBSOLESCENCE

I. TECHNOLOGICAL

First and most important type of obsolescence is technological. Consumers are easily driven by such changes and can be fooled into believing that it has made the product more efficient. To some extent, we can agree that technological advancements have been of great help to the consumers when it comes to smart phones, automobile or gas stoves. However, these changes are expensive and demanding. Hence, to attract more consumers, companies bring about minor changes in designs or functions to sell more in the name of technology. To compare the new iPhone X with the previous models, we can see that the wider screen display and face recognition are the only new features. (If possible, calculate the profit margin increased by Apple compared with the previous model, also if possible try to find out the cost of new

technology introduced to give a comparative picture.) These changes cannot be considered as a major technological modification yet it has helped Apple make more money by taking advantage of the consumers 'confusion.

II. MANIPULATED FAILURES

Easy to carry out and most difficult to identify, manipulated obsolescence has become quite common now. Manufacturers just have to produce goods with cheap material to make sure it fails to work in few years. Batteries, spare parts, printers are few examples of things which are deliberately made to wear out. Although such practices are forbidden in some countries, it usually passes undetected because of low consumer interference and awareness. Some common examples of manipulated failures like Apple iPod's batteries (here, in the footnote provide the article or news report where this charge was proven), printers and lightbulbs have already been discussed above.

III. PERCEIVED OBSOLESCENCE

This strategy works by changing designs or styles of the products. Products like clothes and footwears are desired for their looks rather than their utility. For such goods, the designers can easily bring about change in their appearances and, therefore, make the old ones useless. Brooks Stevens was a promoter of this strategy and attracted many consumers through appealing designs. This was further promoted by the belief (in the footnote mention the article where this 'social belief' was mentioned/proven) that buying new products showed one's social status and people would actually feel embarrassed owning an old cell phone or car for that matter.

4. ECONOMIC THEORY

¹⁴ Martin [1962], Kleiman and Ophir [1966], Levhari and Srinivasan [1969], and Schmalensee [1970] all notes the flawed analyses behind it.

¹⁵J. Guiltinan "Creative Destruction and Destructive Creations: Environmental Ethics and Planned

Even amidst the widespread prevalence of planned obsolescence, the economic theory behind it seems notably weak.¹⁴ Maintaining steady revenue is a challenge for every producer. But when the good is more durable, the consumer comes back fewer times to the producer. The second-hand goods is also a detriment because it competes with the first-hand goods, often exacerbating the problem. Businesses, therefore, argue that obsolescence can increase revenue and curb competition. Technology has enabled and advanced the ability of faster production and adaptability to changing demand.¹⁵ So they advocate that the costs accrued to changing the mix of products in their economies of scale model will be covered by the increased revenue.

Natural questions arise: Won't customers pay less for products with shorter life? Why would a profit-maximization firm choose an inefficient durability?

Jeremy Bulow¹⁶ tries to address this issue by creating a theory for planned obsolescence. Assuming durability as a proxy for obsolescence, combined with a perfect second-hand market, Bulow comes with certain results. A monopolist not threatened with the entry has an incentive to use planned obsolescence. An oligopolist or a monopolist expecting future entry faces a Cournot-Nash competition. Although they have similar considerations as compared to a monopolist, the durability will affect the future competitor's future strategies. Thereby to deter entry, such firms have an incentive to produce goods with longer durability. On the other hand, oligopolists can collide to set the industry durability limits; also leading to planned obsolescence. Although this model gives desirable results, its weakness would be its primary assumptions (state the assumptions in the footnote) which greatly simplifies the model. Other theoretical models like

Obsolescence," *Journal of Business Ethics* 89, pp.19-28, 2009.

¹⁶J. Bulow, "An economic theory of planned obsolescence", *Quarterly Journal of economics*, Vol. 101 No. 4, pp. 729-750, 1986.

those espoused by Benjamin and Kormendi¹⁷ indicates that under certain conditions (state the conditions in the footnote if available), profitability can be increased by limiting durability. However, substantial quantitative data is not available to verify the claims of these theoretical models.

5. CASE STUDY

LIGHT BULB

This is one of the oldest and most important examples of planned obsolescence. You would be surprised to know that a bulb made in the 19th century has lasted for one hundred and fifteen years which is impossible for the bulbs sold in this era. This change in the durability of light bulbs is an evidence of the theory of planned obsolescence. In the 1920s, the prominent light bulb producing companies like Germany's Osram, UK's Associated Electrical Industries and USA's General Electric formed the 'Phoebus Cartel'. They together planned to use a technology to limit its lifetime to one thousand hours. These manufacturers saw an immense increase in the sale of their bulbs by using delicate bulbs. The cartel sold 335.7 million bulbs in 1926 which increased to 420.8 million in four years. Therefore, just by making delicate and less efficient bulbs, the cartel was able to use planned obsolescence in their favour.

APPLE IPHONE

Apple has been in the headlines for its peculiar ways of carrying out planned obsolescence. Lawsuits have been filed in three countries- US, Israel, and France. The French authorities have started investigating a complaint filed by a consumer rights group against the company. The company is alleged to have slowed down the old models of the much celebrated "iPhones" through a new software update to motivate consumers to buy their new products. However, the company claimed to have done it to avoid battery issues. Despite

this, the company has been involved in several other ways of planned obsolescence. For instance, the screws used in this product are such that the device can only be dismantled by the authorized centers, thus making repair difficult and expensive.

Spare parts like the iPod's battery cost \$49 which is the same price at which you can buy a new iPod. Hence it is not wrong to say that costly repairs, new upgrades, and software advancements are few ways in which Apple has been successful in increasing sales.

6. IMPACT

The outdated phone you threw, the refrigerator you replaced due to high repair cost and the printer you changed because of costly ink refills are all taken and dumped away in developing countries. The dark side of planned obsolescence is that most of these products in the landfill are still working.

These products are disposed of inappropriately, causing immense harm to the environment. For instance, phones contain lead, cadmium which keeps on collecting in the landfills and enter the soil. Another problem which arises due to planned obsolescence is the issue of disposables. Things like shopping bags, bottles, and even cameras are treated as use and throw items and contribute to waste and according to the UN, around 50 million tons of electronic waste is being dumped each year.

7. ETHICS

In an increasingly post-modern world, the ethics of exploiting planned obsolescence doesn't seem to be in consensus. While it may seem that purposeful reduction in durability is unethical, producers argue that it is not illegal by law, helps advances in innovation and provides employment.

¹⁷D.K. Benjamin, and R.C. Kormendi, "The Interrelationship between Markets for New and Used

Durable Goods," *The Journal of Law and Economics*, vol. 17, no. 2, pp. 381-401, 1974

On the other hand, consumer's perception about the product seems positively affected by technological obsolescence. Frequent updates are seen as improvements to their device, and consumers positively respond by buying frequently. This sheds light on the consumerist narrative: "I Shop, therefore I am". The 20th century saw the rise of consumerism through planned obsolescence and advertisements, given the crisis of excess supply. Conspicuous consumption is now seen as the path to self-fulfillment. This seems merely as a display of status (through surplus) as opposed to any functionality or usefulness.¹⁸ In this consumerist culture, the regard to ethical issues of planned obsolescence seems to be in murky waters. However, the biggest externality of this is the environmental effects. Higher production leads to more pollution and waste. This is a challenge for the human race, and often the people who are affected by the negative externalities are not the ones who enjoy the benefits.

8. CONCLUSION

Increasingly there has been a focus on encouraging consumers to prefer eco-efficient, more sustainable products, and services. Therefore, sustainable product development is now a motivating force for many product development engineers and designers. But as Iyer (1999) points out, this "green" behavior may not be enough. He notes that the "anthropocentric view" means that the consumers will not make choices that reduce their human quality of life, which makes achieving the desirable outcome difficult. Pro-environment product design and marketing practices and innovative government policies may alleviate the problem over time. But fundamentally, planned obsolescence boils down to the question of ethics and morality; of what ought to be done. Therefore while addressing this issue, we must take into account its context in the history of economics. Amartya Sen deftly diagnoses the separation of morality and economic choice with the advent of Utilitarianism. Keeping that in mind, the challenge is to cultivate ameliorative ideas and methodologies to find better solutions.

¹⁸Thorstein Veblen, *The Theory of the Leisure Class: An Economic Study of Institutions* (1899). ISBN-13: 978-1537426730

ECONOMIC WARFARE

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Since long, civilizations have witnessed war which leads to destruction and loss of resources; both human and physical. War, no doubt, is a dismal proposition, and no matter how hard it might be to accept this fact, but it is a bitter truth that nations do fight among each other for various monetary or pecuniary benefits. . Throughout the years, human warfare has become more sophisticated; to enunciate in other sense more 'destructive'. From axe made up of stone and stick to metal armor and swords, to cross bow, to rifle and bayonets, to machine gun and sniper, now the era of ballistic and more recently nuclear warfare has emerged. More recently, with the advent of global trade, a new weapon has emerged- Economics. It may sounds amusing, intriguing even, but economics has been used as a weapon by nations to fight battles which could not be fought by force.

In a very popular movie, "Batman Begins" , the notorious villain 'Ra's Al Ghul' asserts that they tried to rattle'Gotham' by using economics forces prior to adopting other methods. However, their efforts were went in vain but the question that arises is, "is it possible to destroy populations using economic activities". Intuitively, it is indeed possible to weaken, if not critically damage a nation using economic forces. Economic warfare or economic war involves "an economic strategy based on the use of measures (e.g. blockade) of which the primary effect is to weaken the economy of another state. Economic wars between nations are not an unknown fact, but the method is so subtle that it can be initiated without breaking any peace accord among nations (which could attract attention from UN and other international organizations). It uses, or threatens to use, economic policies against a country in order to weaken its economy and thereby reduce its political and military power. Economic warfare also includes the use of

economic means to compel an adversary to change its policies or behavior or to undermine its ability to conduct normal relations with other countries.

In today's globalized world, interdependence among nations makes it even more convenient to use such methods. The theory is that countries are intertwined to such an extent that, a rogue state excluded from normal trade and financial relations will be forced to reconsider its political options. The tools adopted include export embargoes, import restrictions and financial sanctions. They also include covert actions: counterfeiting currency to discredit state finances, using agents to stir up labor disputes, deploying rebel forces against strategic targets like electricity plants and oil refineries, road, ports and railways, the food supply system and most importantly disrupting the main export industries.

Though there is not much literature devoted to this area that is not the case with its practical manifestations. The methods are subtle, yet they are being observed since ages or since the time two countries decided to wage war against each other in lieu of domestic protections. Economic warfare consisting of blockades and the interception of contraband among belligerents has been practiced since before the Peloponnesian War (431–404 BC) in ancient Greece. During his term as president, Richard Nixon called for United States to wage war against Chile, retaliating to Chile's decision of electing a Marxist Chief of state and nationalizing American owned business. However he didn't call for Marines or Navy but instead attacked Chile's export, assaulted its finances and blocked its import of food and spare parts. As a result the economy came to a screeching halt. Using its allies, US also sabotaged the international credit facilities. As a result, unemployment soared and

inflation rate topped 1000 percent. More instances can be observed from more recent incidences. Oil is perhaps the most strategic good used to wage war. The oil rich countries of OPEC and especially Saudi Arabia have been able to dominate the world market by restricting import to rival nations. Two most prominent cases are the two oil shocks of 1973 and 1979. The US being the main victim, has now discovered shale gas resources so that it can domestically produce energy, thereby acting as a counter against the policies of the Saudis.

Since the victory of Donald Trump, under the motto 'to make America great again', he appears to believe that the quickest way to create new jobs and improve living standards of Americans, requires revamping and restructuring US global economics relationships, particularly with China. We know that the US can mount a military operation anywhere in the world but whether it can compete economically across the globe is much less certain. Trump clearly intends to change that and could use an arsenal of trade sanctions, economic tariffs and market access to do so. In such a situation using military power is not only senseless but will be expensive to the US. A more familiar example could be observed by considering the much discussed 'Doklam' issue. India is a sprawling market for Chinese manufactured goods and hence is essential for Chinese exporters. During the 'Doklam issue', radical organizations proclaimed the slogan of 'Boycott Chinese products'. Though the ideology was cultivated and propagated to instill nationalist feelings, its logic was more economic than a layman could perceive. China, often regarded as the 'world's factory' survives to a large extent on exports (the conventional view is that China's growth has been largely domestically driven which is somewhat misguided.) If somehow, Indians boycott Chinese goods then there will be a reduction in world demand for Chinese goods; considering the 'Standard Trade Model' of International Trade theory, this would result in fall in relative price of Chinese exports leading to a worsening of their terms of trade.

We have seen that economic warfare is not as uncommon as it appears. It is not that visible only because none of the involved nations openly declare clashes amongst them. However a question that may arise is that 'Is it even effective to wage war in such a way?' or 'Are there any repercussions associated with such form for the attacking country?'. This brings us to the effectiveness of economic warfare. A regression analysis of such a study is tedious and requires expertise, however an intuitive argument could be studied. The effectiveness of such Economic Weapons depends on a large number of factors. One such factor is the capability of the afflicted country to either produce the affected good domestically or to acquire it from other global producers. For example, efforts by the United States to oust Fidel Castro from power in Cuba by maintaining a decades-long embargo were frustrated by increased trade between Cuba and Mexico, Canada, and Western Europe. Another factor comes from the fact that Economic warfare is considered to be an inexpensive or more cost effective counter part of military operation as it can impose economic cost on the other nation's domestic economy. For instance, a consumer in a country might have to pay a higher price for a domestically produced good than it could have from international trade (it loses its competitive advantage). Another reason for which economic means are undertaken are to weaken the military capability of the opponent. However, it is limited by the ability of the adversary's government to redistribute domestic wealth towards the military or other institutions to compensate for distortion caused by the policies of the other nation. It also depends on the size of the nation. A relatively small country like Prague or Bangladesh, undoubtedly cannot affect the much developed nations like US, UK or Japan.

Economic Warfare though appearing to be a promising weapon for political fights among nations has its own limitations. Since the advent of international exchange of goods, countries are waging such wars among themselves causing economic, political and social damages to their rivals. As put by a famous adage, 'War is indubitably worse for all, its impact is worst felt by

humanity'. No such war creates a win-lose situation. In fact, it creates a lose-lose situation for all. Still such methods are extensively adopted by countries to wage silent war among them. Though several bodies like UN or WTO dispute settlement body has been enacted,

their operation is limited to suggestions rather than giving direct verdicts. Such mandating rules cannot resolve conflict among nations, but can reduce the aggravating effect of economic weapons.

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OPEN DEFECATION IN INDIA: CAUSES AND CONSEQUENCES

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ABSTRACT

India is home to more than half of the world's population that defecates in the open, and it has seen a plodding progress in ending open defecation when compared with other countries. This paper critically evaluates different reasons advanced for the country's dismal performance in the area of sanitation while it also looks at recent research that holds cultural idiosyncrasies responsible for the abysmal record. After identifying and qualifying the factors underlying the widespread open defecation in rural India, we briefly outline its consequences on India's economic growth via its adverse impact on children's physical growth and cognitive development.

1. INTRODUCTION

Open defecation, as defined by UNICEF, refers to the practice whereby people go out in fields, bushes, open bodies of water, or other open spaces (rather than a toilet) to defecate. According to the Joint Monitoring Programme ¹⁹ (JMP) estimates, about 882 million people or 12% of the world's population defecated in the open in the year 2015, and more than half of these individuals lived in India (about 520 million or 40% of India's population).

India's situation is peculiar since people in India have been adopting alternatives to open defecation slower than those in other developing countries have been. This peculiarity is borne by the data as well: India's share of the world's open defecation numbers has grown from about 56% in 2000 to 60% in 2015 which does not match the country's fast growth rates (and relatively higher incomes) in the corresponding period. We compare India's performance relative to other countries/sub-national regions in detail in the next section.

Moreover, the situation in rural India is more severe than in urban areas. According to NSSO's Swacchta Status Report 2016, which is based on its rapid survey carried out during May-June 2015, 55.5% of rural households contributed to Open Defecation compared to 8.9% of their urban counterparts. There are inter-state disparities as well. More than 65% rural households in Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Uttar Pradesh and Odisha defecate in the

¹⁹ The joint WHO/UNICEF Joint Monitoring Programme provides regular global reports on drinking-water and

sanitation coverage by collecting data through government census, DHS, WHO or UNICEF surveys. JMP's data is available online at www.washdata.org

open compared with less than 5% in Mizoram, Kerala, Nagaland, Manipur, Meghalaya and Sikkim. (Swachhta Status Report, 2016)

However, the policy response to this grave issue has been lackadaisical and whenever active, has often been misguided. Past programmes, such as Central Rural Sanitation Programme, Total Sanitation Campaign and Nirmal Bharat Abhiyan, have primarily focussed on latrine construction. However, the issue of open defecation doesn't seem to arise because of lack of access to latrines; the Sanitation Quality, Use, Access and Trends (SQUAT) survey²⁰ data shows that 40% of households in the survey's sample with a working latrine had at least one member who defecated in the open. The Indian government's Swachh Bharat Abhiyan, launched in 2014, did improve over the failures of previous government campaigns by explicitly, albeit limitedly, focussing on changing people's attitude towards using the toilet for defecation. However, its approach has often been problematic since there is an overt focus on numbers of toilets constructed and less emphasis on their actual use.

Given this context, this paper looks at rural India and identifies the causes of such high-spread open defecation and its consequences for the future human capital and growth of the Indian economy. Section II compares India with other regions/countries and looks at the inter-state performance which helps us debunk

some of the commonly-held beliefs about open defecation in India and understand the unique causes of the problem in India. Section III draws the pathways and linkages between sanitation and health, outlines the immediate consequences of open defecation on child health, and the resultant drag on income-earning potential of the affected.

2. FACTORS UNDERLYING OPEN DEFECATION IN INDIA

2.1. INCOME

It is commonly assumed that people in Indian villages defecate in the open because they cannot afford to build a latrine for themselves. This view, which sees affordability of toilets as a significant factor, has also guided the actions of the Indian government whose sanitation programmes have, in the past, focussed on funding the building of toilets in rural households. However, the table below, which looks at India, its neighbours and Sub-Saharan Africa, presents a different picture, one which shows that countries and regions with per capita GDP less than that of India have much less open defecation (as a proportion of population practising it). For instance, Nepal's GDP per capita is less than half of India's; yet, 35% of its rural people defecate in the open as opposed to 56% in India.

²⁰SQUAT survey was conducted by the r.i.c.e institute between November 2013 and March 2014 in the states of Haryana,

Bihar, Uttar Pradesh, Madhya Pradesh and Rajasthan. For more information, refer to Coffey et al. (2014)

Figure 1: Open Defecation in India: International Comparison

	Atleast Basic (Rural)	Limited (Rural)	Unimproved (Rural)	Open Defecation (Rural)	Poverty rate (National)	GDP per capita (PPP current) dollars	Access to improved drinking water source (rural)
Year	2015	2015	2015	2015	Multiple	2015	2015
India	34	7	3	56	21.2	6126.5	90
Pakistan	48	9	24	19	6.1	4998.8	90
Bangladesh	43	19	38	0	18.5	3335.3	98
Sri Lanka	95	2	0	3	1.9	11777.9	94
Nepal	45	14	6	35	15	2449.8	89
Bhutan	57	4	39	0	2.2	8236.4	100
Sub Saharan Africa	20	9	38	32	41	3705.2	59

Source: World Bank Databank (2015)

Note: First four columns contain data on the type of sanitation facility available which was taken from JMP report for the year 2015. Poverty rates are based on World Bank's international poverty line of \$1.90 per capita per day and pertain to different years for different countries. Data on access to improved drinking water source has also been taken from JMP while GDP per capita data was taken from World Bank's databank.

One could argue that per capita GDP hides essential income inequalities between these countries, in response to which we can look at the extreme poverty rates (as defined by the World Bank's \$1.90-a-day poverty line) for these countries in comparison with India. The Sub-Saharan African region's poverty headcount ratio stands at 41% which is nearly double that of India's, yet, its open defecation rate is full 24 percentage points lower than that of India. Moreover, Bangladesh and India have similar poverty ratios which do not correspond to the vast gulf between their sanitation outcomes; there is no open defecation in Bangladesh while the majority of India's rural populace practises it.

A comparison of rural poverty and open defecation rates of Indian states reveals a similar non-existence of a strong relationship between the two in India. We look at Census 2011 data for open defecation while we take poverty rates from the results of the Tendulkar Methodology set by the former Planning Commission²¹. Note that the census collected information on the availability of a latrine; hence, the proportion of households having 'no latrine' in the census data has been taken to be the same as the one practising open defecation. We can see from the table that there is only a tenuous relationship between poverty and open defecation for Indian states. Although some states like Kerala, Sikkim and Tripura have low poverty and open defecation rates, there are states with small rural

²¹See Table 2: Inter-State comparison in the appendix

poverty rates like Andhra Pradesh (11%), Jammu and Kashmir (11.5%) and Tamil Nadu (15.8%) that have very high open defecation rates (67.8%, 61.4% and 76.8%, respectively). On the other spectrum, we have states like Manipur and Mizoram with high rural poverty rates (38.8% and 35.4%) but low open defecation incidence (14% and 15.4%). We also have, in the data, states like Assam and Bihar that have similar rural poverty ratios (33.9% and 34.1%) but very different open defecation rates (40.4% for Assam versus 82.4 % for Bihar). Naturally, the correlation coefficient between these two indicators stands at a low 0.43.

2.2. ACCESS TO WATER

Another explanation cited for India's high open defecation record is access to water. It is argued that people defecate in the open since they do not have access to water to clean their latrines. However, as is evident in table 1, access to an improved drinking water source is similar among the South Asian countries and yet there is a clear difference in India's open defecation rates from others. Moreover, India's rural OD rates are 24 percentage points higher than Sub-Saharan Africa's despite the fact that 90% of India's rural population had access to an improved drinking water source compared with 59% for Sub-Saharan African countries. Kumar, Murgai and Spears (2015) looked at 2012 JMP data and found that 87% of countries with less access to improved water in rural areas than India had lower defecation rates. They also looked at Census 2011 data on access to water (there are three categories: households with piped water, those with water near the home and those with water away from home) and found that 46.6% of rural households with piped water defecated in the open. Also, 80.7% of households with water away from home defecated in the open as opposed to the 77.6% of those with water near their homes. These findings suggest that access to water does not have a substantial effect on open defecation in rural India. (Kumar, Murgai and Spears, 2015) Additionally, in a study to gauge the impact of the total sanitation campaign in Odisha, Barnard et al. (2013)

sampled 447 households of which 321 households had a latrine. Of the 1933 individuals that lived in these 321 houses, only 47% reported always using a latrine while 37% reported defecating in the open (others reported utilising it sometimes or usually). It is pertinent to note here that only 1 household ascribed the non-use to water being distant from the house.

2.3. GENDER

It is often argued that men are less concerned about toilets and public sanitation than women for the reasons that men's requirements in discharging bodily functions are less complex and that women perceive embarrassment, fear and anxiety in defecating in the open. (Pardeshi, 2009) Also, women need to go out in the dark of early morning in order to relieve themselves and often suffer from unnecessary urinary and genital infections because they abstain from drinking water due to unavailability of toilets (personal and community) (Doron and Jeffrey, 2014). In their SQUAT survey, researchers from r.i.c.e. Institute observed that among households with a latrine, men were more likely to defecate in the open than women (a difference of 10-15 percentage points for most age groups) except for among young children who may be unable to go out in the open themselves. They also noted that open defecation decreased with age for young women with access to latrines which could either be due to their preference for latrine use or the North Indian cultural norm of keeping women in their reproductive years inside the home. (Coffey et al., 2014)

However, it is also true that women defecate in the open in groups, and this often provides them with a chance to socialise and escape the strict rules of conformity at home. Coffey et al. (2017) document an interview with a young woman in Haryana who defecates in the open: "The reason that (I and my sisters-in-law) go outside (to defecate) is that we get to wander a bit... you know, we live cooped up inside." Moreover, it is important to note that women do not hold enough bargaining power in the household to

demand the building of a latrine even if they wanted one. In fact, Coffey, Spears and Vyas (2017) find a weak association between latrine adoption and newly married women joining the household in their study involving the IHDS ²² dataset. However, Stopnitzky (2017) evaluated Haryana government's programme of 'No toilet, No bride' which encouraged bride's family to demand a latrine before agreeing to marry a male suitor and found that the programme increased latrine ownership, especially in areas with skewed sex ratios²³. However, care should be taken that toilets are not solely sold as a women's issue since this may confine them inside their homes instead of empowering them.

2.4. EDUCATION

It can be seen from a country-wide comparison that 82% of countries with worse adult literacy rates than India have lower open defecation rates (Coffey and Spears, 2017). Also, though there is a high correlation (-0.84) between female literacy and open defecation in Indian states²⁴, it is clear that there are various states with similar levels of female literacy and yet very different OD outcomes. One example is Tamil Nadu which has similar rural female literacy as Punjab, Uttarakhand and West Bengal but has much higher open defecation.

Moreover, as Coffey and Spears (2017) observe from the 2012 IHDS Survey data, 32% of rural households in which a member has a bachelor's degree, defecate in the open. They report that 51% of Indian rural households where the highest educated adult completed secondary school defecate in the open; the figure for Bangladesh stands at 4%. Moreover, in the Barnard et al. (2013) study in Odisha, the most commonly reported benefit of latrine use was health benefits, regardless of the fact if the household had no latrine, had a latrine but did not use it or had a latrine

and at least one member used it. Indeed, a higher proportion of households with no latrine reported health benefits than households with at least one member using it. However, the above study also found that households in which the female head had been to secondary school were more likely to use the latrine provided by the government.

Additionally, Coffey, Spear and Vyas (2017) found a statistically significant yet weak association between education (education levels of male and female members of households) and latrine adoption by households between 2005 and 2012. They report, "in 49% of households, the most educated male has six years of education or less, and 81% have a most educated male with ten years of education or less. This four-year difference – a large 32 point shift in the percentile rank of the household – is linearly associated with the household being only about four percentage points more likely to switch to a toilet or latrine. The coefficients on female education in these controlled regressions are similarly small in magnitude."

2.5. (LACK OF) GOVERNANCE

It is common to hear corruption and improper implementation as reasons for the failure of many government programmes. Take for instance the Total Sanitation Campaign (TSC) which was launched by the Indian government in 1999 and was led by the Department of Drinking Water and Sanitation. The department reported rural sanitation coverage of 68% in 2011 which was significantly higher than the 31% coverage reported by the 2011 census. Given that the 2001 census reported 22% rural sanitation coverage, it means that only one in five toilets reportedly constructed under the TSC were built (Hueso and Bell, 2013). They attributed the failure of the campaign to low state priority for rural sanitation, misdirected

²² India Human Development Survey (IHDS) is nationally representative panel dataset collected in 2005 and 2012 by National Council of Applied Economic Research and University of Maryland. Available at <https://ihds.umd.edu/>

²³Stopnitzky (2017) also observes that the programme was more successful in areas where women were relatively scarce (high male-biased sex ratios), thus giving them more bargaining power in the marriage market

²⁴See Table 2: Inter-State comparison in the appendix

accountability, infrastructure-focussed bureaucracy (instead of focussing on demand), flawed monitoring system, and corruption among other factors.

While the above factors can explain TSC's failure, it is pertinent to ask ourselves if other countries that have better sanitation outcomes than India necessarily better in governance and policy implementation. Coffey and Spears (2017) looked at the World Bank's Ease of Doing Business Index and noted that 83% of the countries that are more difficult to do business in than India have a lower rate of open defecation. Additionally, Mundle, Chowdhury and Sikdar (2016) have constructed a Governance Performance Index (GPI)²⁵ and have accordingly ranked 19 Indian states on their performance on the index. Gujarat, Tamil Nadu, and Andhra Pradesh sit at the top of the table (i.e., the states with best governance indicators) which is in contrast with their disappointingly high open defecation rates; there are similar but limited disparities for other states as well. Thus, we cannot count lack of governance as a dominant hurdle in India's path of eliminating open defecation.

2.6. RELIGION AND CASTE

Writing in the EPW, Anand Teltumbde evocatively proclaims that "Bharat (India) will not be swachh unless the caste ethos is completely eradicated." (Teltumbde, 2014) Though some may balk at the forceful conclusion adopted by him, recent research does provide evidence of a possibly strong association between caste²⁶ and sanitation (Coffey et al., 2017; Spears and Thorat, 2015; Coffey et al., 2014). Deeply

enmeshed with the caste system is the concept of ritual purity which may not at all times be the same as physical cleanliness. For instance, an accidental physical contact with a Dalit can clearly not be physically unclean but it is still considered ritually impure in many areas in India. Indeed, one of the reasons for the caste divisions is that some castes are ritually purer than others. (Harper, 1964)

Hence, we need to consider two factors now. First, ritual purity is distinct (though overlapping to some extent) from physical cleanliness in Hinduism. Secondly, higher castes are believed to be (ritually) purer than lower castes; this idea has been reinforced through the imposition of ritually impure jobs such as manual scavenging and carcass disposal on Dalits. Because of these factors, the work of cleaning pit latrines²⁷ is not only physically dirty but also ritually impure. Thus, higher-caste households reject such latrines because they cannot welcome the idea of cleaning the pit latrines themselves (and also consider it ritually impure to build a latrine inside their houses) while Dalit households abandon them in order to challenge their social position, i.e., to tackle the centuries-long discrimination that they have had to face. (Coffey and Spears, 2017)

One of the implications of this aversion to pit-emptying is reflected in the rejection of affordable pit latrines by Indian villagers. Coffey et al. (2017) note that a Bangladeshi pit latrine costs only about Rs 3000 while the Swachh Bharat Abhiyan subsidises latrines in India at Rs 12000. Nevertheless, Indian villagers tend to

²⁵See Appendix Table 3: Governance Performance Index for the Indian States for the year 2011

²⁶The caste system refers to a hereditary social division prevalent in Hinduism (while also practised to some extent by Indian Christians and Muslims) in which individuals are divided into social groups (castes or jatis) by their parents' caste. Such divisions are highly restrictive vertical groupings with some castes deemed to be 'high' while some 'low' in social status. In the lowest rung of this stratification live the Dalits which have historically been relegated to performing menial (and often ritually impure) occupations such as, but not limited to, carcass

disposal, manual scavenging and collecting kafan after cremation. Their history is one of high discrimination, from Dalit children not being allowed to study with non-Dalits in classrooms to an accidental touch between a non-Dalit and Dalit leading to the former's defilement. It is also to note that discrimination exists within the Dalits as well; for instance, the caste associated with manual scavenging, the Bhangis, "faces discrimination from higher castes as well Dalit castes considered less polluting than them." (Coffey, Gupta and Spears, 2016)

²⁷ Manual scavenging has been banned in India through Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.

spend even a greater amount than this because they build larger pits than what can be constructed under Rs 12000²⁸. They construct larger pits because of two reasons: they hold an incorrect idea of how much time a government-provided pit takes to fill up and even when they know this, they construct larger pits that can last around 15-20 years to avoid the task of emptying them. (Coffey et al., 2017)

Another implication of ritual impurity being associated with having toilets in homes is the non-use of constructed latrines. Indeed, the above study also found that 40% of Hindus who owned a government-constructed latrine chose to defecate in the open. While this could be partly attributed to the incomplete/faulty construction of such latrines, such an explanation fails to account for the fact that less than 10% of Muslims who owned a government latrine opted for open defecation. Coffey et al. (2017) conclude that this “consistent with a story in which Hindus are more concerned about pit emptying than Muslims” while noting that Indian Muslims also hold concerns about polluting effects of latrines and pit emptying (compared with Muslims in other parts of the world).

Spears and Thorat (2015) used the 2012 IHDS data to test whether there was a relationship between untouchability and open defecation in rural areas in India. Among their findings was the result that villages with higher untouchability practices (measured by the fraction of households reporting that they practise it) also had higher open defecation (measured by latrine ownership). The statistically significant and strong relationship between the two holds even after controlling for income and education (including health knowledge) levels. Moreover, this relationship was specific which means that the prevalence of

untouchability did not have a significant relationship with health beliefs, modernity and social conservatism.

Thus, one is persuaded to recognise the fact that sanitation in the rustic landscape is deeply entrenched in cultural and status values because of which it is necessary to devise improvements in terms of perceived cultural values rather than solely focussing on epidemiological benefits and infrastructural (supply-side) bottlenecks. In this section, we looked at various explanations that are commonly forwarded for widespread open defecation in rural India and tried to qualify them in the light of recent evidence and research in the area. In the next section, we draw the relationship between sanitation and health, and attempt to quantify the effects of open defecation on India’s economic development.

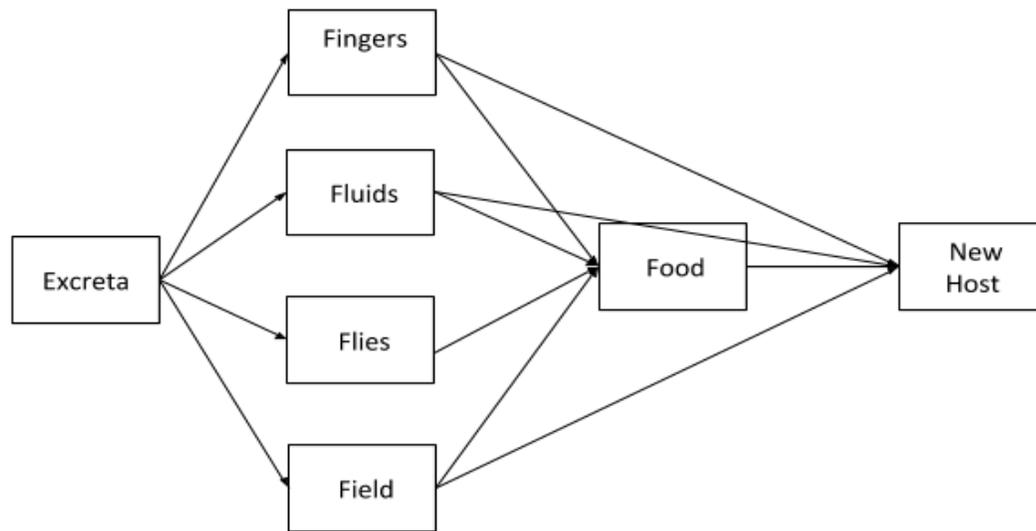
3. CONSEQUENCES OF OPEN DEFECATION

Open defecation poses a threat to public health because a person’s action of defecating in the open has negative externalities on the health of other individuals, especially of children, through diseases such as diarrhoea, environmental enteropathy, parasitic infections, and cholera among others. Such maladies which, when they don’t cause mortality among the young, lead to malnutrition and stunting, and hamper learning outcomes. These deleterious effects carry through an individual’s life, reducing their capability to lead a life of their choice. The primary transmission of faecal pathogens from an infected host to a new host can be visualised through the following F-diagram which was conceptualised by Wagner and Lanoix (1958):

²⁸ Coffey et al. (2017) note that the volume of the median privately constructed pit in their survey was 250 cubic metres

opposed to the 60 cubic metres volume of WHO-recommended pits

Figure 2: Transmission Channel of faecally – transmitted infection



It is essential to understand that it is not one's sanitation behaviour that affects health outcomes but it is the neighbourhood sanitation behaviour that influences the health of an individual. In this sense, it is the open defecation of one's neighbours, rather than the household's own, that matters the most. Interestingly, Geruso and Spears (2015) found that moving from a locality where everybody defecates in the open to an area where nobody defecates in the open results in a more significant drop in child mortality than moving from the bottom quintile to the top quintile of asset wealth. Moreover, Coffey and Spears (2017) (conservatively) computed that about 200,000 children under the age of 5 would not die each year if India were to become open defecation free.

Given that open defecation results in a large number of deaths, another critical question is what happens to those children who do not die but are nonetheless exposed to faecal pathogens. We find the answer in stunting which is often considered an indicator of undernutrition. It is not only a reflection of a child's early development (Chambers and Medeazza, 2013) but also a predictor for future earnings since height is positively correlated with cognitive development (Case and Paxson, 2008).

Epidemiologically, open defecation causes stunting through diarrhoea, environmental enteropathy and parasitic infections which impede absorption of essential nutrients during a child's growth years. Empirically, Hammer and Spears (2016) analysed data from a randomised controlled trial of sanitation programme in Maharashtra and found a 0.3-0.4 standard deviation increase in children's height-for-age z-scores because of the sanitation intervention. Another study by Gertler et al. (2015) estimated the causal relationship between open defecation and child height and found that eliminating open defecation from a village (with 100% open defecation initially) resulted in an increase of child height by 0.44 standard deviations.

As described earlier, low heights are an indicator of insufficient cognitive development. This is true because diseases that hinder physical growth are often the same as those which prevent cognitive ability from growing to its potential. For instance, Spears (2011) studied the effect of height of Indian children in the IHDS dataset on their cognitive achievement and reported that being one standard deviation taller was associated with being 3.4 percentage points more likely to be able to write,

even after controlling for early-life conditions (the effect was around 2.4 percentage points for reading and 1.8 percentage points for math; all were significant at the 0.1% significance level). Hence, open defecation affects cognitive development of children which in turn influences their wages when they grow up. (Lawson and Spears, 2015)

One can also estimate the economic impact of poor sanitation by looking at its sectoral effects. The Economics of Sanitation Initiative²⁹ did precisely this by computing health, water, access time and tourism-related impacts of inadequate sanitation in India for the year 2006. It concluded that the total annual economic impact amounted to \$53.8 billion which was 6.4% of India's GDP in 2006; of this, the impact of health-related effects stood at \$38.49 billion which was nearly 72% of the total.

4. CONCLUSION

Though this paper cannot claim to have studied open defecation in its entirety, a useful image of the issue does arise from it: one that accepts its complexity and intricacy in India. It is simply not a numbers game, one that would be concerned with supply-side solutions to the problem of lack of toilets but is a complication steeped in gender, religion, caste, and corruption. Its consequences reach far beyond the immediate health effects on children; it worsens their prospects and deprives them of the capability they would want to lead the life of their choice. If not solved, it will create a

future workforce marred by constant ill-health and low cognitive abilities, thus gravely impeding India's path to growth and development.

However, this leads to another question: how do we end open defecation? The answer: there is no one or simple solution. The standard government policy of subsidising latrine construction has had and will have only limited success since low income is not a major hurdle in latrine construction. There is, thus, a need to move away from traditional campaigns and towards innovative, state-specific and holistic sanitation campaigns. Moreover, the problem of non-use of constructed latrines by some household members remains high in India. As discussed in section II, cultural values play a crucial role in shaping an individual's choice of using the available facilities; any government programme that does not attempt to change these values will see only limited success. A related issue is that government collects household-level data on latrine ownership and not latrine use³⁰. Therefore, the government needs to formulate and conduct a nationwide household survey on latrine use so that its policies can be tracked for their efficacy in terms of latrine use in addition to the number of latrines constructed.

Policymakers should keep in mind that only a concerted action plan that takes into account the multi-dimensional nature of sanitation in India, targets people's behavioural and cultural values, and tracks latrine use will be successful in ending the scourge of open defecation from Indian villages.

²⁹Economic Impacts of Inadequate Sanitation in India (2011)

³⁰Although the Swacchta Status Report (2016) does contain information on latrine use, Coffey and Spears (2017) point out that the NSSO Rapid Survey's data (on which the report is based) likely contains over-reporting of latrine use because the questionnaire did not ask a person-level question but had a column for all village households on a single form. Moreover, there was no proper question on the form (no reference period

was specified nor was the question's description balanced). With regards to GraminSwacchSurvekshan Report 2016, they observe that the districts chosen were not representative of the whole country and were "chosen purposively chosen to be high-performing districts." The problem of an unbalanced question on open defecation persisted in this survey as well. (Coffey and Spears, 2017)

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CASE STUDY: HOW INCENTIVES WORK

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1. INTRODUCTION

In economics, incentives matter so much that some economists even define the discipline of economics as the study of incentives. An incentive is a motivating factor that makes us do something or take a decision. Incentives play an important part of economic activity and an important role in human lives. Our decisions, our actions, whether good or bad, constructive or destructive are largely dependent on incentives.

Sometimes the purpose of an incentive with which it was initially instigated in the organization/society might backfire and would result in unexpected consequences.

In this article, I would like to explain and analyze the strategies adopted by groups in real-world situations. For this, I use an anecdotal case study of my school from some years ago.

My school came up with a new idea to deal with the poor English communication skills of the students. The plan was aimed to make students communicate in English. For this, every class group was divided into 4 teams of red, blue, green and yellow. Every individual in each group was given 5 plastic token coins of the same color that represents their team. If a student of one group finds any other student from another group talking in a regional language, the former would give the latter a coin and the latter needs to keep it with him until the end of the day. Simply put, If you were found talking in a regional language with someone by

the other team students of your class, you will receive one coin from the one who found you. Then you'll be having the below represented pattern of coins in your pocket if you belong to the red group.

Figure 1: Pattern of coins for a person belonging to red group



The teacher would take count of every individual, enquire how many coins have been received and given. A point to be carefully noted is that when a person receives a coin, it means he was found talking in regional language. So he actually gets a negative 1 point. Similarly, if a person gives a coin to someone, it means he found another teammate and therefore gets +1 point. So if a student X received 2 coins from student Y and gave one coin to student Z, his/her score would be $-2+1=-1$.

Table 1: Scores of students belonging to various groups

	RED	BLUE	GREEN	YELLOW
Coins received	-12	-5	-17	-18
Coins given	+15	+1	+8	+20
end score	+3	+4	-9	+2

In this way, the respective class teacher of every section would take account, the number of coins given and received by every group as a whole and make a balance sheet. The team which has got the biggest positive integer would be announced as “the winner of the day”. Also, the student who would show a substantial improvement would be praised in the class and occasionally gets rewarded with a pen or a book by the class teacher.

In this way, the school authorities thought of improving the communication skills among the students by providing them such incentives.

Indeed, it worked well, but only for a few days. After some time, students started to lose motivation for making their team win. However, they were afraid of a teacher making complaints against them to their parents about their poor scores. If a student gets negative score frequently, he/she would be punished with extra homework. This made students behave in a very unusual way.

Students started to make agreements by exchanging coins among themselves. When the teacher comes to every individual, one would claim that he/she received

some amount of coins from some and gave his coins to some other person. For example, say, student A would make a false claim before teacher that he had received two coins and gave one coin to some other student and that other student would accept it. In this way, everyone helped each other. The students used to change their partners and days of the trade so that the teacher wouldn't doubt them. It continued for some time and the colored coins even acquired some basic functions of money. In the long term, the incentives provided to students deliberately created value to the coins. The coins were durable, portable, divisible and uniform. These characteristics of colored token coins are very similar to that of commodity money.

During the time of exams, the students used to exchange coins in return for helping/copying in exams or sharing the snackbox during break times. For example, say, individual A would approach and accept five coins(-5 points) for this day and give no coins in return if individual B helps him pass out the exam (or) X would ask Y to get some of his maggie in return for receiving 4 coins(-4 points) that day. The typical thing is that after the teacher's counting and announcing of the winner, everyone would take back their own coins and

by the next day, they all start fresh. (everyone having 5 coins in their pocket)

The teachers slowly started to doubt what's happening in the class but they kept quiet. The reason for this mysterious behavior will be explained in the analysis part. Things became messy only when students came to know that the coins they're using were similar to the tokens used in a nearby bakery. Some students used them for a plate of panipuri. Realising this, both the school authorities and bakery shops stopped the usage of token coins. The school authorities ordered all the class teachers to collect back all the coins and imposed a fine of Rs. 20 per coin lost/used.

2. ANALYSIS

If we closely examine what happened in the above illustration, we get to know that the students have just behaved in a rational way to achieve Pareto efficient equilibrium. This analysis would help us to understand how incentives sometimes backfire vanishing out the very behavior they're meant to encourage. In the beginning, when the school authorities introduced coin system, the students got two incentives in the short term.

INCENTIVE 1(POSITIVE INCENTIVE): To make their respective teams "winner of the day". This is motivated by their self-interest and made them talk in English.

INCENTIVE 2(NEGATIVE INCENTIVE): Not to get scolded by teachers and parents by getting more coins as it is a shame among classmates also.

These two incentives combined to make students act in a way they're intended to, as forecasted by the school authorities. Teachers also initially got the

incentive/payoff for taking up this task in the form of respect among colleagues/principal and also expectations of promotions or rewards in case of good results.

The first alteration came with students. The students realized that they're disappointing and spoiling their friendship by charging them with coins. The cost of the team winning seemed to be more when they've got to lose the friendship.

The extrinsic incentives work to induce people to do what was incentivized, but that is not all they do. They can also affect other intrinsic motivation. The extrinsic incentive of their own team winning the day got diminished and it even damaged the intrinsic motivation of talking in English. However, the second incentive of avoiding rebukes from teachers and parents remained. This made students get into an agreement within themselves before every end of the day irrespective of teams. When the extrinsic motivation crowds out intrinsic motivation, incentives backfire.

THE INCENTIVE FOR TEACHERS:

Some teachers slowly started to doubt students as there is no significant growth in their speaking skills even after months. Even though, they never complained it to higher authorities as they considered that it would put even more burdensome tasks upon them. Atleast, students remained silent without chattering during class hours and it was satisfactory for them.

The below table represents how the incentives worked in the short term and backfired in the long-term:

Table 2: Impact of incentives on students and teachers

		SHORT TERM	LONG TERM
STUDENTS	incentive 1	to win points To make team win	to make team win got vanished. To win points still remained (No change)
	Incentive 2	To avoid rebukes from parents and teachers	
TEACHERS	Incentive	expected promotions, respect among colleagues	Completely vanished
RESULT		SYNERGIC INCENTIVE	PERVERSE INCENTIVE

Incentives are often recommended for fostering behavioral change. As the discussion above shows, incentives may fail or even backfire. Offering incentives might send signals to the incentivized that the task is either difficult or undesirable. And this is what happened in our case in the long run. The incentives worked as synergic incentives in the short run, fostering the purpose of its inception, but, turned perverse in the long run bringing out unintended results.

3. PARETO EFFICIENT EQUILIBRIUM IN THE LONG TERM

Every student in his/her verge of improving scores used to make agreements with different individuals everyday. They'd reach a point of stability in agreement and this can be compared to Pareto efficient equilibrium in a simple case.

The teacher generally used to scold students if they get less than -1 or messages a complaint to parents if it is even less. So students have a negative incentive of not scoring below -1 points. For suppose, consider that student B accepted 2 coins from A. A's net score would be +2 and B's net score of points would be -2. Both A and B work for Pareto improvement. B is worse off with -1 point. To avoid rebukes from teachers, B would, in

turn, make a counter trade of one coin to A. Then A's net score is $+2-1=+1$, B's net score is $-2+1=-1$. A readily accepts this as he is still better off with +1 points. This combination of exchange is reversed between A and B some other day. The students at the end achieve stable equilibrium as both of them have no tendency to move from the point and both of them considered it as the best option available. The Pareto efficient equilibrium was achieved everyday as students used to exchange partners and number of coins traded. This achievement of Pareto efficient equilibrium can only be

considered/explained when the partners involved are only two.

4. CONCLUSION:

The detailed analysis of the above illustration helps understand incentives and their short-term and long-term effects. The examination of the working of incentives can help us in framing more effective policies.

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SOCIAL SECURITY – INSURANCE PLAN OR TICKING TIME BOMB?

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With the United States passing \$20 trillion dollars in debt, a significant area of study coming to light is the need for a government spending reduction. But the primary cause of their long-term fiscal insolvency is not Foreign Aid or Defence Spending, it is programs like Social Security and Medicare. In 2016, the U.S. government devoted almost a quarter of its federal budget alone on Social Security itself (approximately \$948 billion). To put this into perspective, the annual spending on defense the same year amounted to \$604 billion – around 15%. To make matters worse, the government estimates an 81% increase in Social Security spending from 2010 to 2021. Even in U.K., Social Security comprised of 34% of total spending of the 2017 budget. To understand why this imposes a huge problem, one needs to understand why Social Security is not sustainable in the long term.

As Franklin Roosevelt put it, it is a form of “social insurance” to the elderly or disabled created after the Great Depression. It was advertised as an insurance program or a transfer payment. But it is neither of them. The Congressional Budget Office of the United States claims that Social Security fund is likely to go broke by 2029, so this means that the generation funding it may or may not even receive the benefits. In other words, unlike a standard insurance scheme, they are not legally entitled to any money when they retire because the government can alter the benefits at any time – which it has to, in order to prevent a fiscal disaster. But one might ask – why will it be one? This is because it is not a transfer payment. Social Security taxes do not entirely fund the benefits. It does not have enough assets to cover its liabilities. Therefore,

this program (just like Medicare) is partially funded by borrowing. The deficit is only going to widen when they expand the program.

The Social Security Trust Fund in the U.S.A. runs a surplus every year - \$2.85 trillion at the beginning of 2017. But unlike any private sector trust fund, this money is not invested in real assets like stocks, bonds or mortgages. It is entirely used to buy a special kind of Treasury Bond that can only be redeemed by the Social Security Administration. Basically, the government is borrowing from Social Security (or itself). The sole way to repay is by borrowing from or taxing future taxpayers when the IOU's mature. Renowned economists like Thomas Sowell have compared Social Security to fraudulent practices of Bernie Madoff and Charles Ponzi. The similarity is that the investors are not paid using any income-generating asset – the first round of investors receive returns only using funds from the next group of investors, and thus an unending cycle is created.

With stagnant wages, job growth rate nearing zero and an aging population; the beneficiaries are growing at a faster pace than the workers currently covering them. In 1950, the United States had 35 million workers who paid Social Security taxes for around 220,000 retirees – a 160 to 1 ratio. But by 2031, the SSA has forecasted this number to drop to 2.1 workers for one retiree. The Baby Boomers all across Europe and the U.S. got a high-yielding return on their investment. Observing the trends, the current workers are clearly paying into a scheme for which the costs majorly exceed the benefits. Obviously, they can be paid off by printing money to maintain the program's solvency. But, this

will merely add to the debt burden. Also, the benefits are inflation-indexed, so the real value of the returns will practically be worthless.

Realistically, the benefits should be tightened by adopting a method called “means testing” i.e. the ones who are wealthier get lesser in benefits. Basically, it should be made a welfare program directed towards the needy and not an entitlement to all. This is one of the many solutions facing the problem, what is a viable option in the long term? Social Security destroys the incentive to save, and bringing that back will have two advantages. Savings is what drives investment and growth in the economy. Secondly, the money stays in your own account; it is not spent. If the idea behind this program was that people are too reckless with their money, the government can make it mandatory to have a comprehensive savings account. Singapore and Hong Kong have adopted this approach where working citizens and their employers make monthly contributions to a Provident Fund for their retirement, housing, and healthcare needs. The payroll tax dedicated to Social Security is funded in the same manner.

Chile has had a privately administered system of a Pensions Savings Account since 1981. Along with having a positive impact on the labor market, it also gives the individual the freedom to decide for himself. The savings rate in Chile almost tripled from 1986 (less than 10%) to 1996 (almost 29%). According to Nobel Prize-winning economist Milton Friedman, the present participants (funders and beneficiaries) should receive a Social Security bond equal to the current expected value of their benefit streams. Following that, it should be shut down. This would also call for the government to finance the unfunded liability.

Crippled with high taxes and student debt, the middle class is being hurt the most because they are unable to leave aside any savings. They have become dependent on Social Security benefits, which are uncertain. Any dialogue about reforming this program is equated with snatching money away from the ones currently enrolled in it. It would be bad politics to even suggest such an idea in countries where the elderly form the majority voter base. Nevertheless, it is essential to think of an alternative solution and recognize the costliness of such an unsound scheme.

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UNIVERSAL BASIC INCOME: IDEOLOGICAL SUCCESS AND AN ECONOMIC FAILURE

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1. INTRODUCTION

Universal Basic Income (UBI) can be loosely defined as a periodic cash transfer unconditionally delivered to all citizens on an individual basis, without means-test or work requirement. It is basically centered on the concept that all individuals should have access to a basic income in order to procure basic goods and lead a decent life, by virtue of them being citizens. UBI is supported by many across the globe for it is considered to be the baton bearer for ideas like social justice, anti-paternalism, equity etc. While it may, no doubt, be conducive in bringing such ideals into greater practice, the concern of this article shall be whether it is economically feasible or not. Broadly, it has three components- universality, un-conditionality and agency. Examination of UBI from these aspects will give us possible answers.

2. WHY AN IDEOLOGICAL WINNER?

Firstly, the UBI rests majorly on the theory of social justice and is seen as a propounder of that- and I do not dispute the claim. John Rawls' popular theory on social justice, called 'Veil of Ignorance' can very well claim UBI as an example. It suggests a manner of policy formation in which the makers imagine themselves behind a veil wherein they don't know their social identities like economic background, caste, sex etc. He suggested that this way the policies made would benefit everyone, but not at the cost of anyone. UBI's components of universality and unconditionality quite adequately capture this. Secondly, implementation of UBI is intended to have a favourable result on the

society by reducing poverty. Next, UBI is intended as a transfer payment targeted at individual beneficiaries and not units like households as a whole, which means even women will have access to it separately. Hence, it can also be called as anti-paternalistic and giving the agency of women a boost. Besides, there is strong support for it because it is believed to be providing the marginal benefit of improving the status-quo. Lastly, inter alia, another strong ground for UBI to gain brownie points ideologically is that it liberates incentive to work. That is, since all people have access to a minimum basic income to support them, they will not be ready to accept the exploitative rates of their labour, just to make ends meet. Instead, the UBI, in these terms is considered as pro-creativity and productive.

3. ECONOMIC UNFEASIBILITY

Among the many ideological aspects where UBI emerges as a hero, we now examine its economic credibility. Firstly, UBI is a cash transfer and cash transfers raise the income of the households for each unit of labour they already supply. So, they can afford to reduce the labour supplied without much commensurate effect on their income. A look at the larger picture tells us that since now human resources are not operating at their optimal capacity (that is less than from what they were earlier operating at, if we assume them to be operating most efficiently earlier), the economy shifts from producing at a point on the Production Possibility Frontier to a point under it.

Secondly, for the UBI to achieve its intended target, allocation of resources is a crucial aspect. Studies show

that it is a $y=f(x)$ function, where the resources allocated to districts are a function of their ability to spend them. Statistically, richer districts are known to have better administration. Hence, more resources should technically be allocated to richer districts but that gives rise to the dilemma of better allocation of resources at the cost of sacrificing the development of poorer districts. Hence, the inclusion error is created by the universality element of UBI.

Thirdly, there seems to be a hugely apparent paradox in the scheme. It is widely believed that UBI can potentially unlock credit constraints in the form of higher income. This is because there is a direct relation between income levels and proportion of formal loans. However, there is another side to it. Since UBI is universal in nature, it raises income levels on the aggregate level thereby pushing up the income threshold itself. Going by the consumption function, we know that higher income implies higher consumption expenditure. This in turn leads to inflation.

Still, this is not the end of the story.

As inflation rises, the RBI's policy aimed at targeting it, such as increasing Repo rate and CRR, reduces credit availability. So in practice, UBI, in the long run dampens also the short run effect of releasing credit constraints.

Next, since UBI is a cash transfer, its 'real' value tends to be determined by inflation in the economy. So over time, the same amount of cash transfers may not buy the same amount of goods. It is therefore important to index it to prices such that the amount gets revised periodically. Here, politics plays a vital role and many times keeps the UBI from achieving the goal. Though normative, but it is still a failure of the policy. There is one way of tackling this issue that is fixing the UBI at a constant percentage of the GDP. However, its effect can only be determined on its real implementation.

Also, there are so many issues in targeting. One way suggested for setting up UBI is self-targeting i.e. a system where the beneficiaries regularly verify themselves in order to avail UBI. However, it will

adversely affect the lower income groups since their opportunity cost of time (in the sense of per day wages, hourly incentives etc., is high and therefore economically unfeasible).

4. IS IT VIABLE IN THE INDIAN CONTEXT?

In India, the primary issue is of providing financial security to the economically weaker sections. The advantage that UBI offers in a developing country like India is that here UBI can be pegged at relatively lower levels than if compared to more developed and richer nations, but will still wield considerable benefit. It is quite correct that despite the fact that it might incur a fiscal cost of about 3% of the GDP, it will still outperform public food distribution system and fuel subsidies. However, if this is true then it is only reasonable to question if it will at all be economically relevant to run the fair price shops?

Another inter-related question is that while most of the capital expenditure that the government incurs right now on economic and social services mostly focus on the nutritional requirements of people and accordingly aim to achieve those goals. However, if they are scrapped to make way for UBI, how effective will it be to hand over money, with endless means of spending it, in lieu of the earlier schemes of eradicating health woes?

Also, the flipside of eliminating these wide subsidies would require a sharper increase in prices than the case when budget subsidies are withdrawn.

It is suggested that an acceptable level of the UBI could be an income equivalent of the poverty line. However, the total cost of providing this income to all Indians would be nearly equal to the Union Government's budget, and hence difficult to be made accessible due to budgetary constraints.

A pilot study conducted by UNICEF and Self Employed Women's Association (SEWA) in a few villages in Madhya Pradesh in 2011 showed that a monthly unconditional grant of Rs. 300 to each adult and Rs. 150

to each child led to considerable improvements in their lives. However, adjusting this amount for inflation, with a variable UBI (with different entitlements), would be an additional function for the bureaucracy. (Courtesy: www.livemint.com)

The natural question then is- can we afford it?

In India, the concern is not limited to cash transfers but accessibility of basic services to the masses. Presently, there already exist a number of government transfer schemes and scholarships. However, the lack of basic infrastructure paves way for leakages and corruption. Instead of focusing on eliminating these glitches, when an additional provision such as the UBI would be initiated, the demand for infrastructure will rise without a considerable rise in its supply. The challenge for Indian government is to improve the general accessibility of the universal basic services for all citizens. The UBI cannot be a substitute for that.

UBI is definitely not the answer to poverty in India. Venal officers suck up a lot of money from the poor and there is no clear way of identifying who should receive ration and who should not. Hence, the universality component of the scheme is also a slippery slope.

5. CONCLUSION

Ultimately, there are certain things that this scheme does not address and which can also be seen as its failures in some senses. For instance, if the UBI includes children, can it not induce households to have more children and adversely impact the government's population control programme? Another concern is as regards its funding. There are suggestions that this pressure can be eased on other fronts such as asking people to voluntarily give up subsidies. However, taking the example of this voluntary giving up of subsidies, is it not possible that on one hand if the people who were earlier wrongly availing the subsidy, now give it up to avail UBI (not taking into consideration the universality element here), wrongly again? As far as the emphasis on boosting women's agency goes, we need to keep in mind that no economic policy flourishes without political and sociological considerations. Similarly, in rural India, a lot of women are able to work and step out of the confines of their houses citing reasons like financial independence and enhancement of family income. If the UBI serves it to them unconditionally, can it be effectively said that UBI liberates women?

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THE CASE OF MISSING WOMEN: UNDERSTANDING DECLINING FEMALE LABOUR FORCE PARTICIPATION IN INDIA

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There has been a lot of discussion regarding the demographic transition that India has been going through, with falling fertility rates and death rates and a swelling up of the labour force. While this demographic transition has the potential to reap dividends, it could also turn into a disaster lest the youth is productively employed. One of the major precursors to reaping a demographic dividend is the rise in female labour force participation rates that accompanies a fall in fertility rates. In India, the historically low female labour force participation rate has been a drag on the economy and a major hindrance to the modernisation of the labour market. Now, this historically low rate is also falling. The Indian story of a falling female labour force participation rate despite strong growth, rising wages, and a decline in total fertility rates presents a puzzle that is contrary to what has been predicted by standard development theories and by the experience of other countries including China, Bangladesh etc³¹. As stated in the ILO's Global Employment Trends 2013 report, out of

131 countries with available data, India ranks 11th from the bottom in female labour force participation.

1. TRENDS

In 2012-13, India's Real GDP grew at 5.6% and increased to 7.6% in 2015-16³². During this period, the female labour force participation rates (FLFP) fell from 42.7% to 31.1%³³. The main highlight is that the female labour force participation rate in rural areas is continuously declining³⁴, while that in the urban areas is showing a marginal increase even as the overall rate continues to fall. Infact, 53% of the total fall is attributed to a drop in participation rates in rural India, among those aged 15 to 24 years³⁵.

³¹ With the exception of Turkey

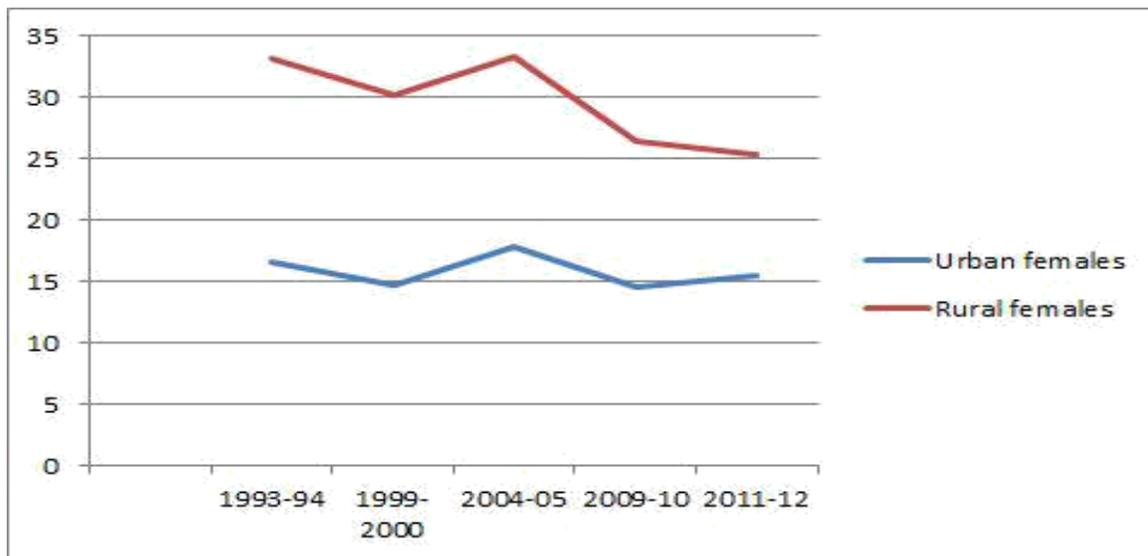
³² Ministry of Finance Monthly Economic Report, April 2016

³³ National Sample Survey, Employment and Unemployment Schedule, 61st, 66th and 68th rounds, and Labour Bureau's 2013-14 annual employment unemployment data.. (Consist of estimates for females 15 years or above in age)

³⁴ Close to 22 million women left the agricultural sector between 2004-05 to 2009-10; 19 million of these were self employed.

³⁵ Further, a larger number of the working women end up in marginal or subsidiary employment in comparison to the earlier years.

Figure 1: Female labour force participation in Urban and rural areas



Source: ILOSTAT database (International Labour Organization), and World Bank population estimates

In the current essay, the factors considered to study the low FLFP rates are: the effect of unearned household incomes, the effect of increasing enrollments in secondary education, limited female mobility across sectors, measurement issues, employment opportunities and finally, other cultural and social factors.³⁶

2. THE EFFECT OF UNEARNED INCOME: INCOME AND SUBSTITUTION EFFECTS

Of all the factors that affect FLFP rates, the simplest is the effect of unearned income (in the form of husband's wage, family wealth etc). In Neoclassical theory, labour supply decisions depend on labour-

leisure choice i.e. on income and substitution effects³⁷. It is highly likely that with rising growth, as the incomes and wages of the male workers in the household rises, the income effect outweighs the substitution effect and females choose to supply lesser labour. This effect is higher for females than for males because of the traditionally accepted roles of men and women in the Indian society.

To illustrate, between 1999-2000 to 2004-05, real wages in the agricultural sector were stagnant and growth in this sector was not statistically significant. However, this period witnessed a large increase in the FLFP rates in the agricultural sector due to distress employment. Out of the 18.5 million people who joined the agricultural labour force in this period,

³⁶ When studying the effects of any factor, all other factors are held as constant.

³⁷ Any expected wage is an opportunity cost of not working and thus, contributes to both substitution and income effects while unearned incomes contribute to the income effects. Based on the substitution effect, as wages

rise people will choose to work more. However, as wages rise, people might choose to reduce their labour hours because they feel richer due to higher income. An increase in unearned income (non-labor income or labor income earned by other household members, particularly the husband) reduces the marginal utility of the women's earnings and therefore reduces labor force participation

16.9 million were women³⁸. However, between 2004-05 to 2009-10, as the real wages in the agricultural sector rose³⁹, close to 22 million women left the workforce due to rising incomes at the household level. This clearly shows that increasing household incomes play an important role in determining the FLFP rates controlling for other factors.

3. EDUCATION LEVELS AND LACK OF EMPLOYMENT OPPORTUNITIES

Increasing enrollments of women in secondary education are also believed to form an important explanation for declining FLFP rates⁴⁰.

As seen from table1, the enrollment ratio of both rural and urban females in the age group of 15-24 years has risen steadily from 1993-94 to 2011-12. In addition, the mean years of education after 14 years i.e. secondary schooling has also been on the rise in both rural and urban areas.

While increasing education levels among women is a positive trend, its effect on FLFP rates requires greater attention. Most human capital theories estimate rising FLFP rates with rising education, however, a U-shaped curve is hypothesised to exist between the educational status and FLFP in India.

Among the poorest sections of the society, with the added-worker effect and large fluctuations associated with household incomes, the participation rate among women is high. At high levels of education, on the other hand, high potential wages raise the opportunity cost of not working and swamp the negative forces, thus inducing women to work. This is also because the stigma associated with women working in the service sector is lesser. It has been observed around the world that women in the labour force across the world tend to cluster in certain occupations, especially in the services sector⁴¹. Between these two levels of education, women may be discouraged to seek work because of large income effects, lower access to service sector and other socially acceptable jobs. Thus, education seems to play a major role in affecting the preferences of women and their willingness to actively seek a job.

As education levels rise, as has been the case in India, women prefer certain kind of jobs (especially white-collar jobs). Lack of access to these contributes to educated women being discouraged from participating in the labour force⁴². How the education-labour force participation link evolves over time depends on the structure of labour demand growth in the economy and the status associated with different types of work.⁴³

³⁸ Further, this effect was seen across all income groups in the rural areas, primarily because close to 40% of even the rich rural households tend to live just above subsistence levels and were thus, adversely affected by the slowdown in the agricultural wages.

³⁹ Due to government schemes to increase the rural sector employment, chiefly due to NREGA (National Rural employment guarantee act) which aims to enhance livelihood security in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work

⁴⁰ Rangarajan et al. (2011)

⁴¹ World Bank, 2011; Gaddis and Pieters, 2012

⁴² Desai et al., 2010

⁴³ For instance, in 1989, almost 65% of the highly educated women were employed in public administration and education. In 2009, this share had fallen to 45%. Further, although the share of women in other sectors like finance and business services has increased overtime, these account for a very less portion of the overall female employment. Thus, as the demand for white-collar jobs is limited to women with a graduate degree or above, the employment growth decline in major sectors like public administration and services might be an important contributor

Table 1: Enrolment ratio and Mean years of Education after 14 years in NSSO rounds

NSSO Rounds	Enrolment Ratio		Mean Years of Education after 14 Years	
	Rural female	Urban female	Rural female	Urban female
1993–1994	8.4	27.8	1.7	2.5
1999–2000	11.3	29.9	1.8	2.7
2004–2005	14.8	33.2	1.9	2.7
2009–2010	15.2	34.5	2.1	3.2
2011–2012	19.7	35.7	2.1	3.4

Source: Esitimates based on various NSSO rounds

to declining FLFP rates. This effect is further exacerbated due to limited female labour mobility between sectors due to occupational segregation and the attached stigma.

4. A PROBLEM OF MEASUREMENT

A third potential contributor to the falling FLFP rates in India is a large number of women who report attending to domestic duties as their primary status. In 2009-10, the number of women attending to domestic duties in India was 216 million, which is larger than the population of Brazil. Among these, 12.7 million women had a graduate degree and

above. A major reason behind this is the very belief that it is the responsibility of a woman to undertake all domestic duties. This is even manifest in the fact that men were excluded from the role of domestic work and from all records of extra-domestic work in NSS 55th round. This demonstrates a growing patriarchal role demarcation in India. It is widely seen as very dignified for men to be uninvolved with domestic matters.

Table 2: Number of females who reported attending to domestic duties in 2009-10 and the increase in this number between 2004-05 to 2009-10

	Not literate	Primary and middle	Secondary and higher	Graduate and above	Total
In 2009-10	84.8	81.4	37.1	12.7	216.1
Increase between 2004-05 and 2009-10	13.0	16.8	14.4	4.6	49.4

Source: Estimates based on NSSO 2011 (all figures in millions)

As is indicated by the table above, there was an increase in the number of females attending to domestic duties by around 50 million, in which the share of women with a graduate degree and above was 4.6 million.

In rural areas, the number of women who report primarily attending to domestic duties has been steadily rising from 2004-05 to 2011-12 and was at a staggering rate of 92% in 2011-12.

During this period, a sharp decline in rural female participation in the labour force was registered.⁴⁴

Table 3: Responses of Rural Women in the NSSO EUS Reporting Activity Status as Domestic Duties under Codes 92 and 93

	1993-19 94	1999-2000	2004-2005	2009-2010	2011-2012
Required to spend most of the time in domestic duties (%)	88	89.8	88	89	92
Out of the females in (1), the percentage of females reporting 'no other person to do domestic duty' as the reason for being engaged in domestic duties	55	56	55	62	60

Source: Estimates based on various NSSO rounds

There are several problems that this trend creates: Firstly, as the contribution of women to household duties and other care duties is not

⁴⁴ In the same period, the number of women in the urban areas who reported attending to domestic duties first rose and

then declined. During this period, a marginal rise in the urban female labour force participation rates was noticed.

accounted for in the National Income Accounts, there is a severe underreporting of female labour participation rates⁴⁵.

However, these are productive economic activities as, if women did not do these work, someone else would have to be employed to do them and be paid for it. Although the System of National accounts includes the production of goods for self-consumption within its purview, it does not include the 'invisible work' done by women which takes several forms including, but not limited to, cooking, reproductive activities, care and other responsibilities⁴⁶. This mis-measurement may not only affect the level but also the trend in the participation rates.

Secondly, as women are traditionally expected to take care of all household responsibilities, it limits their ability and willingness to take up formal employment⁴⁷.

There is an opportunity cost in terms of time as well as in terms of wages that could have been received if the same activities were conducted outside the household. This cost time constraint restricts them from pursuing employment opportunities⁴⁸.

However, as a positive change, it is also noted that there has been a fall in the number of women not willing to work. Around one-third of females above 15 years of age in rural areas and more than one-fourth in

urban areas, who were engaged in domestic duties (by usual principal activity), were willing to accept work opportunities at the household premises, if such work were made available. Specifically, there was a strong willingness among females primarily involved in household chores to take up tailoring work within their premises. This highlights the benefits that can be reaped by providing skill training to such females in vocational occupations such as tailoring, beauty-related work etc. Further, there should be institutional support to help them obtain the required loans, market their products and overcome any logistical difficulties. Currently, only 2-3% of the workforce in India receives some form of formal training.

Therefore, in a way, the declining trend in the female work participation rate highlights the lack of skill training and employment opportunities for females.

5. OTHER FACTORS

While the factors mentioned above are important contributors to declining FLFP rates, several other factors operate at different levels to dissuade women from seeking employment. Workplace safety concerns, the widespread pay-gap between men and women working at the same position and with the same level of education and skills, the fear of harassment,

⁴⁵ Further, the International Labour Organisation equates the homemaker with a student, terming housework activities as 'non-economic', and the work of homemakers as voluntary. However, a major question is whether a homemaker's work really voluntary. In the Indian context, this is highly controversial as almost 60% of the women in the rural areas attending to domestic duties claim that the lack of people to attend to domestic duties is the reason from their being engaged in domestic work.

⁴⁶ As traditional surveys cannot capture this work adequately, time-use surveys can be used to capture such activities.

⁴⁷ To illustrate the effect that having a broader definition of national income and including household responsibilities might have, a few facts might help. A study conducted by the

Organization for Economic Cooperation and Development (OECD) in its 26 member countries and three emerging economies of India, China and South Africa

⁴⁸ Between 1999-2000 and 2004-05, due to rural distress, the number of women who reported their principal activity status as 'attending to domestic duties', fell sharply and consequently, the female labour force participation rates rose. However, as the female labour force participation rates in 2004-05 declined (due to a rise in household incomes), the number of women attending to domestic duties also rose. This shows that time constraint restricts most women from pursuing both formal employment and household duties together.

especially prevalent in the informal sector, contribute to the low participation rates.

Additionally, socio-cultural factors such as caste, marital status etc. play an important role in restricting access of women to formal employment. The process paid work. For instance, it has been noted that married women work less than single women because working decisions for the former are not entirely voluntary and are made by the household (in which the woman has very low bargaining power).

6. SUGGESTIONS

There are two reasons to be interested in the declining female labour force participation rates: the intrinsic level and the functional level. Females are an important part of the society and are responsible for its efficient functioning. Thus, they deserve equal access to employment opportunities that will provide them agency, greater bargaining power and allow them to be agents of economic growth. At a functional level, capturing the demographic dividend is contingent upon productive employment of females.

1. As argued above, the problem of declining female labour force participation rates is a result of various factors working at different levels and in tandem, each supplementing the effects of the others. A few steps that policymakers can take to reverse the current trend are:

2. Methods must be devised to better capture unpaid work done by women. The magnitude of

of housewifization and sanskritization is common⁴⁹. This is a vicious cycle in the sense that usually women without a means of earning income have a lesser bargaining power in the household which reinforces gender discrimination and further restricts access to

unpaid work by women in India is extremely large⁵⁰. Thus, if this gender parity were to be tackled, we are looking at some big-time growth in our GDP.

There must be a move towards equal sharing of work at the household level so that women have more time to devote to formal employment opportunities. This can be facilitated by policies such as longer maternity leaves, contractually fixed working hours (at least for women) and most importantly, the introduction of longer paternity leaves⁵¹. This will be an important step by allowing men to infrastructural development must be prioritised in order to reduce the time taken by women in attending to domestic duties.

3. The importance of dedicated skill training, especially in rural areas and among women with low levels of education, can hardly be overemphasized⁵². This can be achieved through infrastructural development, hiring females for teaching purposes in rural areas, providing greater incentives for women to attend these vocational schools by ensuring the availability of non-farm jobs that match their educational potential⁵³. As highlighted before, the willingness of women to take up part-time and full-time vocational employment is high. If

⁴⁹ Chakravarti, 1993; George, 2002; Poitevin and Rairkar, 1993

⁵⁰ According to some studies, if that unpaid work were to be valued and compensated in the same way as paid work, it would contribute US\$300 billion a year to India's economic output

⁵¹ Currently, paternity leaves are largely absent in the private and unorganised sectors and even otherwise, the leaves are of a very short duration. The Paternity Benefit Bill, 2017 is due to be tabled soon in the Parliament under which men might be be

eligible for leave up to 30 days as paternity leave. This will include men in the private and the unorganised sectors as well

⁵² One of the main drivers of the East Asian Miracle was the human capital formation through adequate skill training

⁵³ Such as jobs in the rural manufacturing sector that allows women to work from their households or as a community so as to avoid the stigma associated with women working in the manufacturing sector.

successfully teamed with skill training, the rural FLFP rates will increase drastically from the current 23.5% to around 39%. In addition, micro-finance and self-help groups must be promoted as these provide women with access to economic opportunities and promote discussions on a variety of social issues.

4. Subsidies for female employment in sectors less explored by women must be provided for a fixed time period so as to promote female mobility across different sectors. This can take the form of the government incentivizing certain sectors to employ more women. For example, the government could consider paying a part of the income of women in certain sectors.

5. Decent working conditions must be ensured and policies must be devised to ensure safety especially in the unorganized sector as women are heavily represented in the informal economy where their exposure to the risk of exploitation is usually greatest. Further, gender sensitization must be actively

promoted and females should be encouraged to speak up against harassment at work. There should also be transparency in the wages paid and stricter punishments against gender-biased pay.

While all of the above tackle certain aspects of the problem, a cultural shift is necessary. Gender-specific constraints must be evaluated and policies must be formed accordingly. The goal should not be to increase just participation rates but ensure decent working conditions for women.

As highlighted by Amartya Sen, the agency of women is a significant driver of an economy not just in terms of growth rates, but also in terms of its effects of nutrition of children, better healthcare and ultimately, towards creating a better society. Women agency has the power to lead to 'development' in the true sense of the word. Thus, it is about time that we start talking about the 'gender dividend' in conjunction with the demographic dividend in India⁵⁴

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REVISITING THE COMMONS: SUSTAINABLE RESOURCE MANAGEMENT STRATEGIES FOR INCLUSIVE GROWTH

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ABSTRACT

Conceptualizing anthropogenic climate change as the modern day 'tragedy of commons', the study simulates the effects—1.15% lesser CO₂ emissions, 2.62% lesser use of coal for meeting energy needs and 2.29% lesser fuel usage by 2025—of introducing a nominal 'carbon-indexed energy tax' of ₹ 400 on all fuel users. Its distributional consequences and regressive nature prompted an evaluation of the "fairness" and effectiveness of various carbon pricing strategies—quotas, cap and trade, compensation—using Hardin's analogy. Although inclusive growth and sustainable management of the commons seems elusive, local enforcement and public participation can ensure it. The paper also recommends cross-border CPR management and intra-regional cooperation (BCAs and disaster management) for long-term green growth across South Asia.

1. INTRODUCTION

An ecosystem confronts human populations as both "a given and a variable" (Herring, 1987) and while societies adapt to meet certain ecological constraints, they struggle to recognize natural limits until 'tragedies' arise. Hardin's (1968) classic paper 'The Tragedy of the Commons' expounded that within an open-access resource system, individual actors to maximize their self-interest behave contrary to the common good of all users by degrading the common resource.

The fate of South Asia's famed 'commons'—forest and marine—has been intertwined with a central dynamic of sub-continental history: the need to carve one's livelihood and habitat from nature without encroachment. The 'counter-finality' posed by such decisions of rational actors (individuals) increase local pressures on conservation of the instrumental value of ecological systems and the socio-economic development of South Asia hinge directly on its ability to regenerate its commons to create a steady opportunity/person ratio.

This paper seeks to focus on mitigation and adaptation efforts by governments to combat anthropogenic climate change in South Asia, in cognizance with the fact that climate related risks including riverine, coastal and urban floods, severe malnutrition, heat waves, etc. could undermine the growth prospects of South Asian economies (IPCC, 2014). Using the framework of carbon-indexed Pigouvian energy taxes, applied to market activities that generate negative externalities, this paper studies the exploding demand for fossil fuels and its impact on the atmospheric commons. It also explores other 'progressive' alternatives to sustain the commons. The objectives are:

- To examine the role of a 'carbon-indexed energy tax' in effectively reducing global CO₂ emissions and encouraging sustainable use of atmospheric commons.

- To understand the distributional consequences of a carbon-indexed energy tax and related concerns of 'fuel poverty' among lower income groups.
- To suggest sustainable self-governance initiatives as a 'progressive alternative' that ensure inclusive growth and equitable access to the forest and marine commons.

Centred on a relevant hypothesis—"a carbon-indexed energy tax can effectively avert the modern-day tragedy of the commons i.e. anthropogenic global warming", the paper shall examine the escalating conflict between utilization of an existing habitat-cum-common pool resource i.e. the environment as a 'sink' and the pressing need to limit human interference in the functioning of natural systems (or deep ecology).

Recognising the importance of low carbon emissions and accelerated conservation efforts for sustainable management of commons across South Asia, the paper shall involve recommendations on a similar line : adequate border provisions and intra-regional cooperation to reduce 'carbon leakages' and to check movement of carbon-intensive activities from regulated jurisdictions to 'pollution havens', promoting climate resilient development, harmonisation of carbon tax regimes across SAARC nations, assisting disaster management efforts and integrated management of forests and oceans for carbon sequestration.

The paper is organised as follows : Section 1 comprises an introduction to the paper with the background, objectives and hypothesis of the study. Section 2 presents a literature review of common pool resource management with special emphasis on Pigouvian taxes, property rights and local self-governance initiatives and identifies the

research gap. Section 3 outlines the methodology (E3-India model) and data sources of the study. Sections 4 and 5 present the major findings of the study and use economic theory to suggest a solution to achieve the policy objective of reducing atmospheric CO₂ emissions — carbon pricing. In Section 6, the author uses 'The Tragedy of the Commons' to examine the 'fairness' of levying a carbon-indexed energy tax and suggests "progressive" alternatives or measures to manage global commons and ensure inclusive growth. Section 7 concludes with a summary of the major arguments of the paper.

2. REVIEW OF LITERATURE

The tragedy of the commons (Hardin, 1968) was essentially the failure of collective social institutions to arrest the externalities of self-interest maximising behaviour of individual actors from ruining a common pool resource to the disadvantage of all individuals in the social system. The theoretical alternatives within the tragedy paradigm assumed that no cooperative strategies would emerge among individual shepherds maximising gains from a given pasture.

As a consequence, many policy analysts including Smith (1981), Demsetz (1967) and Johnson (1972) have called for the imposition of private property rights for sustainable management of local commons. Welch (1983) argued that "the establishment of full property rights is necessary to avoid the inefficiency of overgrazing" and was concerned over the imposition of private ownership on a set of unwilling local users. Such private ownership would divide the land into separate parcels and assign individual rights to hold, use and transfer the same assigned share of land wherein each herder will be playing a game against nature in a smaller terrain rather than a game against another player in a larger terrain

(Ostrom,1990).

However, as Clark (1980) pointed out, the difficulty in "establishment of individual property rights" in case of non-stationary resources like marine fishery resources and its exclusion of large classes of society in South Asia with significant human costs has made the tragedy difficult to counteract. Hence, another solution to the commons dilemma is Hobbesian : "a powerful state which could enforce its will on subjects for their own good" and this Leviathan centralized power with accurate information could provide equitable access to the local commons.

Coasean market-based trading mechanisms, named after Coase (1960) such as tradable permits, allowances and certificates and Pigouvian instruments of fines and taxation, named after Pigou (1932) are two variants of the above approach with governments playing a supervisory role to reduce atmospheric emissions. Eliminating the uncertainty in price setting, tradable permits are priced according to market forces of demand and supply and traded by emitting corporations, often involving high transaction costs (Lloyd, 2007). On the other hand, Slesser and King (2002) advocate the phased replacement of an income tax by a Pigouvian energy tax (with lower transaction costs) applied to market activities that generate negative externalities in a bid to internalise the marginal social damage at the efficient level of pollution.

Carruthers and Stoner (1981) argued that without public control, "overgrazing and soil erosion of communal pastures, or less fish at higher average cost" would happen and such centralized control is key "if economic efficiency is to result from their development." On the contrary, Herring (1987) concluded that the permeability of the local state to powerful and exploitative interests in the subcontinent, incomplete information (which

leads to sanctioning errors) and a clear absence of political will to protect ecological systems prevent it from resolving the tragedy effectively.

There's a third possible solution to the tragedy — cooperation and social learning among the individuals using the commons. Axelrod (1984) has argued that in repeated games involving use of common property resources, cooperation becomes a live possibility and conflict produces self-correcting change. Likewise, Ostrom (1990) in her noted book 'Governing the Commons' provides examples of successful local mechanisms to preserve their source of livelihood —the commons. She also articulated a set of 'eight design principles' (Ostrom, 2005) to facilitate sustained, self-organised management of the commons and it has had profound implications for the indigenous communities' access to local commons. Also, Chhatre and Agrawal (2008) conclude from IFRI studies in India that "government involvement may be negatively associated with forest condition" in some contexts, while community management of forests may be better suited to meet local requirements.

The literature thus suggests that climate change mitigation strategies could significantly influence the sustainable use of atmospheric, forest and marine commons. Carbon -indexed energy taxes can adversely affect growth and income distribution of an economy and this paper also mulls over various demand management strategies for inclusive growth and equal access to the commons. The present paper differs from previous studies in this area in, mainly, its use of policy parameters derived from the E3-India model to show the impact of a carbon-indexed energy tax on atmospheric emissions in the Indian context and its analysis of Hardin's analogy to ascertain the 'fairness' of carbon

pricing strategies.

and Net State Domestic Product series.

3. MODEL

The paper employs the E3-India model, a dynamic macro-econometric simulation model which is similar in design to the E3M3 model. Designed to assess energy and climate policy in a highly empirical structure, the model combines an accounting framework with a set of parameters that have been estimated econometrically from a detailed time-series database. Covering 28 states and four union territories, the E3-India model comprises of three modules:

(A) ECONOMY MODULE

The economic module comprises multiple loops of interdependence between the sectors such as the income loop, investment loop and the trade loop which explain the relationships between output and input (Type I multiplier), output, employment and incomes (Type II multiplier) and output, production capacity and demand for investment goods respectively. Demographic factors and economic policy rates such as tax rates, growth in public expenditure, interest and exchange rates, etc. are treated as exogenous variables.

Apart from wages, three econometric price equations are used in the model to represent domestic production prices, import prices and export prices and estimated at the sectoral level. It also accounts for important social indicators such as sectoral employment and working hours, unemployment, an estimate of real income distribution, etc. The data sources for economic variables are the Census of India, NSSO Surveys on Employment and Unemployment, Household Expenditure and Employment Situation, RBI State Finances : A Study of Budgets, MOSPI Gross

(B). ENERGY MODULE

The energy module is constructed, estimated and solved for each energy user and energy carrier at the state level. Although it can be described as a top-down model in its energy modelling, the E3-India model finds a bottom-up sub-model in the electricity supply sector. Global oil prices and energy policies are treated as exogenous variables. The power-sector model is modelled on an innovative technology diffusion model known as FTT: Power (Future Technology Transformations for the Power Sector) featuring constraints on the supply of renewable resources.

The data sources for the energy variables are MOSPI data on installed capacity, generation and consumption, E3ME national coal, oil, gas, electricity and biomass consumption data, E3ME national fuel prices, E3-India Output data and E3-India Population data.

(C). EMISSIONS MODULE

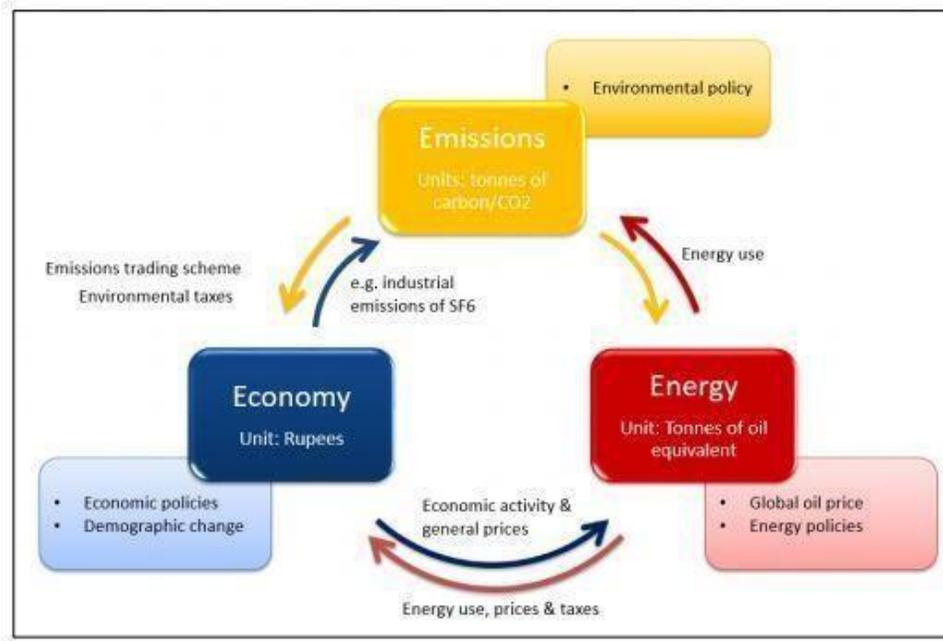
The emissions sub-model calculates CO2 emissions generated from end users of various fuels and from the primary use of fuels in the energy industries itself. CO2 emissions and the source of emission factors forms the relationship between energy consumption and emissions. The model adopts a direct measure of technological progress by using cumulative gross investment,

but this is altered by using data on R&D expenditure to form a quality adjusted measure of investment.

Time-series data for CO2 emissions, disaggregated by energy user is calculated using national emission coefficients.

Figure 1 shows how the three modules of the model interact with each other with the exogenous variables shown nearby.

Figure : E3-India Model – Simplified Versio



Source: Cambridge Econometrics, The E3-India Model Manual: Volume 5

4. EQUATIONS

The key macroeconomic identity relationships² used in the model are as follows (Cambridge Econometrics, 2017) :

GDP IDENTITY:

$$RGDP = RSC + RSK + RSG + RSX - RSM + RSS$$

CALCULATION OF OUTPUT:

$$QR = QRY + QRC + QRK + QRG + QRX - QRM + QRR$$

CALCULATING GVA:

$$YRF = YR - YRQ - YRT$$

CONSUMER PRICES:

$$PCR = (BQRC * PQRD * CR) * ((1+CRTR) / CR)$$

CONSUMER PRICE INDEX :

$$PRSC = \text{sum}(PCR * CR) / RSC$$

CALCULATING REAL INCOMES:

$$RRPD = (\text{sum}(YRW * YRE) + RRI) / PRSC$$

AGGREGATE ENERGY DEMAND:

$$PREN = PFR0(.) / PRYR$$

DISAGGREGATE ENERGY DEMAND EQUATION:

$$PFRP = PFRF(.) / PFR0(.)$$

AGGREGATE CONSUMPTION EQUATIONS :

$$RRLR = 1 + (RLR - DLN(PRSC)) / 100 \quad [\text{real rate of interest}]$$

$$RRPD = (RGDI / PRSC) \quad [\text{real gross disposable income}]$$

Disaggregate consumption equations :

$$SHAR = (VCR(.) / VCRT) / (1 - (VCR(.) / VCRT)) \quad [\text{consumers' budget share, logistic form}]$$

$$RRPD = (RGDI / RPSC) / RPOP \quad [\text{real gross disposable income}]$$

$$PRCR = VCR(.) / CR(.) / PRSC \quad [\text{real price of consumption}]$$

$$RRLR = 1 + (RLR - DLN(PRSC)) / 100 \quad [\text{real rate of interest}]$$

INVESTMENT EQUATION :

$$RRLR = 1 + (RLR - DLN(PRSC)) / 100$$

EXPORT PRICE EQUATIONS :

$$PQWE = QMC(.) * PM \quad [\text{world commodity price index}]$$

$$YRULT = (YRLC(.) + YRT(.)) / QR(.) \quad [\text{unit labour and tax costs}]$$

IMPORT PRICE EQUATIONS :

$$PQWE = QMC(.) * PM \quad [\text{world commodity price index}]$$

$$YRULT = (YRLC(.) + YRT(.)) / QR(.) \quad [\text{unit labour and tax costs}]$$

DOMESTIC INDUSTRY PRICE EQUATIONS:

$$PYH = (VQR(.) - VQRX(.)) / (QR(.) - QRX(.)) \quad [\text{price of home sales by home producers}]$$

$$YRUC = YRUM(.) + YRUL(.) + YRUT(.) \quad [\text{unit costs}]$$

$$YRUL = YRLC(.) / YR(.) \quad [\text{unit labour cost}]$$

$$YRUT = YRT(.) / YR(.) \quad [\text{unit tax cost}]$$

$$YRUM = (BQRY(.) * YR(.)) * PQRD(.) \quad [\text{unit material cost}]$$

Employment equation :

$$LYLC = (YRLC.) / PYR(.) / YREE(.)$$

INDUSTRIAL AVERAGE WAGE EQUATIONS:

$$YRWE(.) = \text{SUM OVER } I, J \quad (I, J = \text{all other industries and regions}) \quad [\text{external industry wage rates}] \quad (LN(YRW(I)) * YRLC(I) / \text{SUM}(YRLC(I)))$$

LABOUR PARTICIPATION RATE:

$$LRP = LABF / POP$$

5. RESULTS

The E3-India model is employed to develop, first and foremost, a 'no-policy' benchmark scenario, conventionally known as the baseline or business-as-usual (BAU) scenario and then, counterfactual scenarios are developed to derive policy lessons after comparing the two.

BASELINE SCENARIO:

To develop the baseline scenario, the given E3-India model is solved using the E3-India Model Manager software under the assumption of a 'no market-based climate change mitigation policy such as carbon tax, energy tax, etc. and an average annual growth in coal (6.80%) and oil (6.94%) prices, given GDP growth rates of India's major trading partners and Rest of the World.

In the baseline scenario, the projected user emissions of CO₂ grew from 4,56,364.75 units (in '000 tonnes of

carbon) in 1995 to 13,58,739.43 units (in '000 tonnes of carbon) in 2025 with year on year growth rates of CO₂ emissions peaking around the new millennium — 14.57% in 1996 and 11.59% in 2002 and later stabilising in the range of 3.1% - 4.1% post early 2000s with the last few years (2021-2025) showing a significant 1% reduction in rate of growth of emissions.

Estimates of coal use for energy needs (in '000 tonnes of oil equivalent) too show an increasing trend — from 2,36,024.80 units in 1995 to about 8,78,860.40 units in 2025. In a manner similar to that of the user emissions, year on year growth rates of coal use can be seen to be increasing around 2000s with rates as high as 13.87% in 1999 and 8.95% in 2002. Recording a sharp fall post 2002, the growth rates tend to be sticky and stabilises at around 2.7% in the early half of 2020s.

Albeit recording an increase from 1,90,449.81 units in 1995 to 5,44,760.49 units in 2025, fuel use (in '000 tonnes of oil equivalent) shows only a steady movement of about 2.4%-2.6% with respect to year on year growth in fuel usage.

POLICY SCENARIO:

A policy scenario is developed for a domestic carbon-indexed energy tax policy with revenue recycling i.e. the tax is revenue-neutral and all revenues from a ₹ 400 tax (per tonne of carbon) levied on all energy

6. MAKING A CASE FOR CARBON-INDEXED ENERGY TAX

This part of the paper advances an 'carbon-indexed energy tax' as a practical solution to address the demand-supply mismatch with respect to energy resources (especially fossil fuels). Carbon pricing realigns economic incentives in such a way that demand for carbon-based fuels is reduced.

There are two kinds of externalities associated with non-renewable or carbon-based energy sources — user-on-user externality (i.e. congestion costs due to

users of all fuels is used to reduce income tax within the region (in accordance with H1). The scenario is obtained by solving the given E3-India model in the E3- India Model Manager software under the following assumptions : a uniform carbon-indexed energy tax of ₹ 400 (from 2005) with full coverage of all energy users of all fuels, import and domestic production of fuels to be charged but exemption of exports from tax coverage, price elasticities shall remain unchanged and the net effect on consumer prices to affect relative consumption of goods and services based on their carbon content.

Results show that projected user emissions of CO₂ will be 1.15% lesser — reduction in CO₂ emissions of about 15,658.24 units (in '000 tonnes of carbon) — than baseline in a mere span of 20 years (i.e. by 2025) with year-on-year growth rates of user emissions (CO₂) tending to less than 3% around early 2020 from about 3.7%-3.9% growth in 2010s.

Similarly, coal use for energy will be 2.62% lesser — reduction in coal use worth 22,996.978 (in '000 tonnes of oil equivalent) — than baseline by 2025 and the projected year-on-year growth of the coal use around 2025 resembles mid-2000s at just about 2.5%. Fuel use (in '000 tonnes of oil equivalent) too shows a significant reduction of about 2.29% i.e. 12,475.79 units at 2025 levels with year-on-year growth rates falling to a much lower 2.2%.

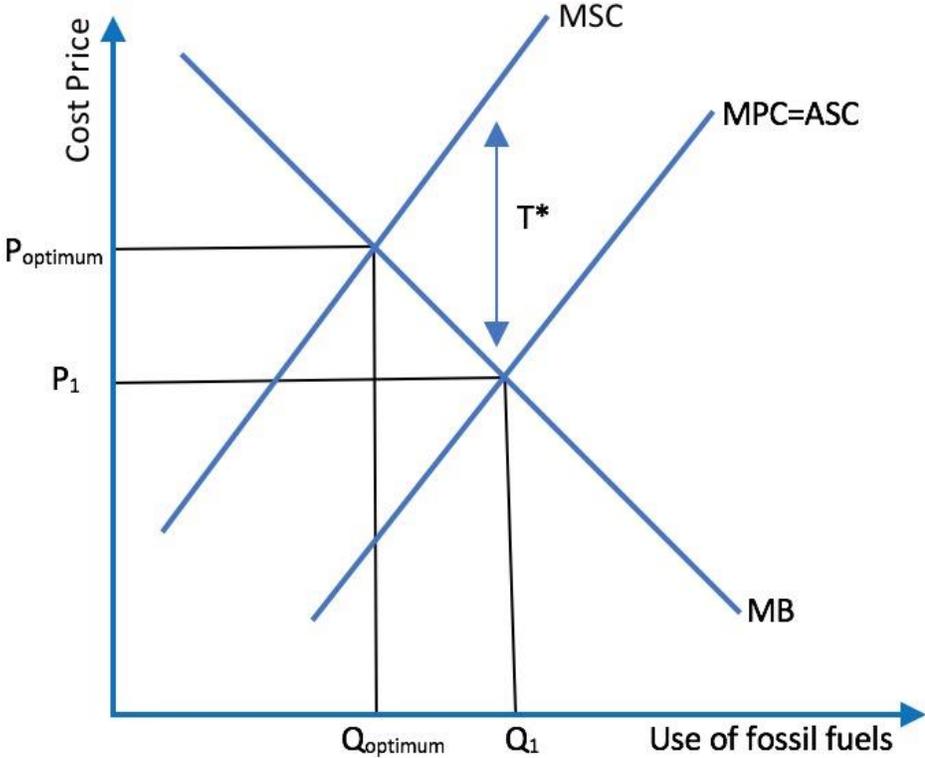
high demand for private transport) and pollution of the environment. When a person demands fossil fuels, he/she is only concerned with the marginal private cost (MPC) but not the cost of the negative externality in question i.e. pollution of the environment. Social cost incorporates all the costs associated with a particular economic activity and hence marginal social cost (MSC) is the sum of both MPC accruing to the individual and the cost of pollution he/she imposes on the other energy users. Rational individuals shall continue to exploit or overuse the given fossil fuel as long as their marginal private benefit (MPB) exceeds

MPC and if left unabated, the externality may result in a market failure i.e. anthropogenic climate change.

In Fig.2, the traditional demand curve which represents the marginal benefit (MB) cuts the MSC curve at a lower level of fossil fuel use than its intersection with the ASC curve. Q_{opt} is the social optimum level of fossil fuel use on the same demand

curve, beyond which problems of pollution arise. To bring the level of fossil fuel use from Q_1 to Q_{opt} ., the price needs to be increased by introducing a 'tax' T^* equivalent to $P_1 - P_{opt}$ on each fuel user contributing to degradation of the atmospheric commons.

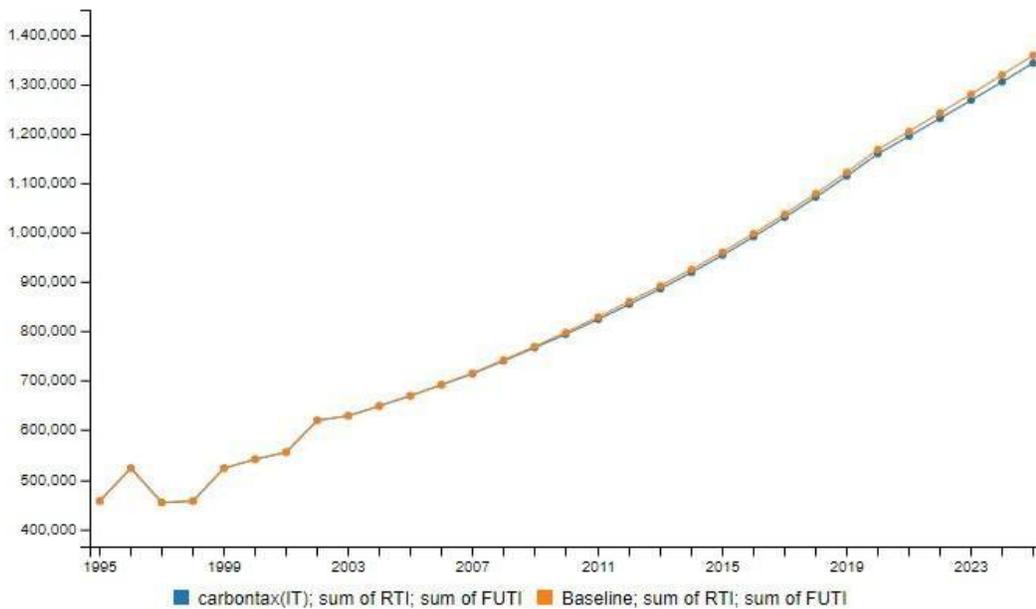
Figure 2: Using Tax Policy to 'optimise' pollution



The above figure suggests that if left unregulated, the divergence between the MPC and MSC curves will continue to grow and result in peaking social costs. To resolve this tragedy of energy depletion or degradation of atmospheric commons, a carbon-based energy tax is helpful.

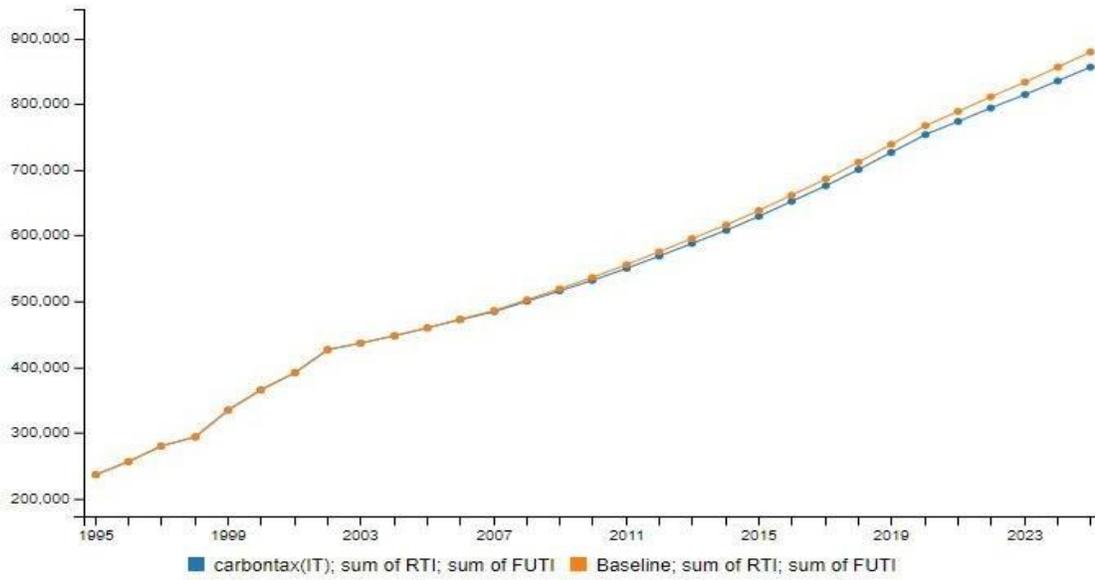
Figures 3,4 and 5 validate the same theoretical approach, as a nominal ₹ 400 tax on all energy users of all fuels leads to a 1.152% lesser CO2 emissions, 2.617% lesser use of coal for meeting energy needs and 2.29 % lesser fuel usage by 2025. Although the replacement of an income tax by an carbon-indexed energy tax offers minimal deviations from the baseline in the short-run, significant benefits will accrue from fossil fuel substitution later on, proving H1.

Figure 3 : User emissions of CO2 (in '000 tonnes carbon)



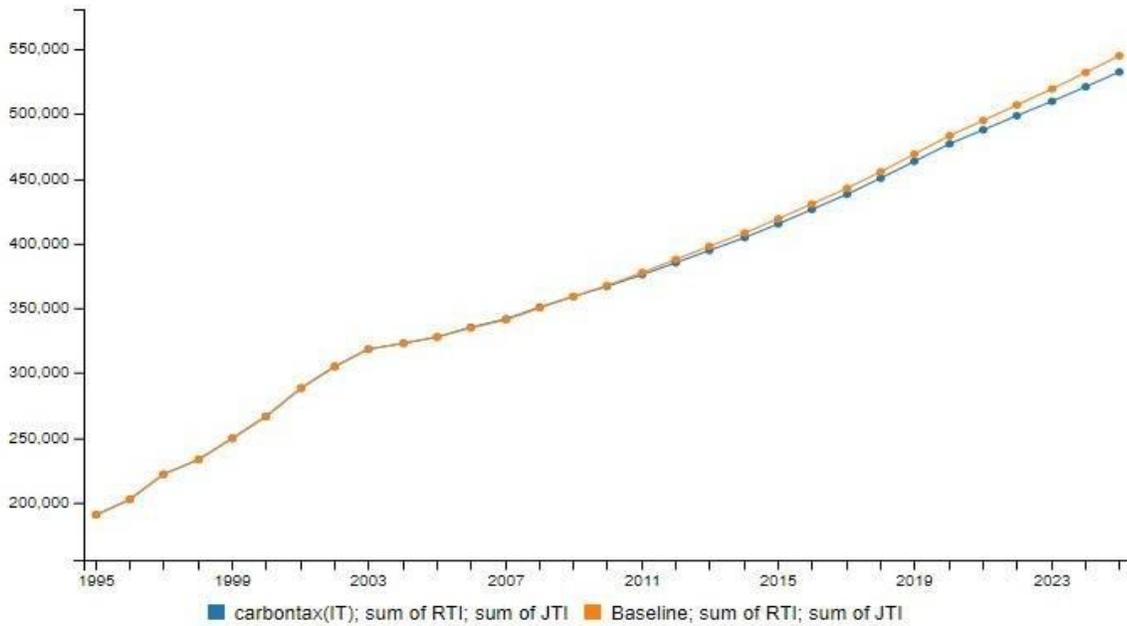
Source : Author's estimates (derived from the model figures).

Figure 4 : Coal use for energy (in '000 tonnes of oil equivalent)



Source : Author's estimates (derived from the model figures).

Figure 5 : Fuel use (in '000 tonnes of oil equivalent)



Source : Author's estimates (derived from the model figures).

7. MANAGING THE COMMONS

The following are different methods of pricing carbon which corrects the previously discussed market failure and equates MPC with the MSC. Using the concept of 'Tragedy of the Commons' advanced by Hardin (1968), this section seeks to identify a relatively 'fair' system of carbon pricing while analysing the effectiveness of these demand management strategies. To sustain the life of the metaphorical pasture, the following methods could be adopted:

(A) NOT ALL SHEEP WILL BE ALLOWED TO GRAZE

Every shepherd can have only a certain number of sheep (say, two) grazing at a time and this would manage the insatiable utility maximizing behaviour of individual herder and ensure social equity. In the context of atmospheric commons, the demand for even one vehicle which runs on non-renewable fuel and the derived demand for fossil fuels is too much to maintain ambient air quality. Given India's population of 1.324 billion³ and growing purchasing power of its middle-class, this method would work only if the 'quota' per person is just a small fraction (carpooling, fishing quotas) or if the infamous 'odd-even' rule (Delhi), which required odd and even numbered (last two digits of the vehicle registration number) vehicles to run on alternate days, was imposed.

A modified version of this argument would entitle the herder to buy a sheep that is always allowed to graze. Applying it to the case of industrial emissions and its role in climate change, the 'cap and trade' system of reducing pollutants by trading pollution permits is a classic example.

Although it enjoys certainty in emission levels and an inelastic demand for these permits (since corporations are prohibited from pollution without a requisite license/permit), the risk of a carbon leakage exists as emissions may shift from existing sectors to less-efficient sectors with no

mitigation policy i.e. a 'pollution haven'. Small-scale industries are at a disadvantage in this system as it has few resources to offset rising emissions via a re - investment in a clean energy initiative like the Clean Development Mechanism (CDM) and hence, it cannot be considered 'fair'.

(B). THE SHEPHERD MUST PAY FOR HIS SHEEP TO GRAZE ON THE GREENEST GRASS

This solution is similar to heavily charging individuals or corporations for exploiting resource rich but fragile forest and marine commons such as Sundarbans, eastern Himalayas and the mineral abundant central Indian districts of Chhattisgarh and Jharkhand. Conservation pressures are rife as the forest commons become a source of conflict between local users "seeking an extension of livelihoods", statist claims to conservation and management and private interests which seeks to limit either processes (Herring, 1987). However, with open access commons transitioning to privatized property at the margins and a shrinking ecological zone in the present age, any compensation by the metaphorical shepherd would not save the commons from inevitable degradation and won't be fair to other users.

(C). THE SHEPHERD MUST PAY IN PROPORTION TO THE DAMAGE HE CAUSES

If a shepherd allows his sheep to graze a smaller parcel of land as compared to another shepherd grazing his sheep over a larger pocket of land, it follows that the former causes less damage to others and to the life of the commons. Since the first shepherd generates a lower negative externality, this method is fair in the sense that he pays less than the second shepherd. Thus, according to this 'polluter-pays' principle, those who cause more pollution by a higher fossil fuel consumption will have to pay a higher tax than the others. This principle is of direct relevance to marine commons where the polluters may be held responsible for habitat damage, dumping of effluents and rehabilitation of affected areas.

Although it is often touted as a cost-effective and equitable form of taxation, carbon-based taxes can be regressive in nature. Bowen (2011) finds that the lower-income groups spend a large proportion of income on energy and in poorer countries, least well off have very poor access to fossil fuel energy. In such a scenario, rising energy bills against given energy requirements can occupy a large share of per capita disposable income and lead to acute 'fuel poverty'. However, such distributional consequences may be mitigated by offsetting their disproportionate burden via compensatory payments, reducing other distortionary taxes, improving energy efficiency etc.

(D). COMMUNITY MANAGEMENT OF THE PASTURE

However, the lack of inclusivity decreases the political viability of each of these demand management strategies. Ostrom's (1990) idea of how "a community of citizens can organize themselves to solve the problems of institutional supply, commitment and monitoring" motivates the author to analyse sustainable management of commons by local users which is not limited by the individual's ability to pay.

(D.1) CASE STUDY: COMMUNITY FOREST GOVERNANCE IN THE INDIAN HIMALAYAS

The ecologically diverse state of Himachal Pradesh is nestled in the western Himalayas and houses over 3,200 identified plant species including Himalayan pine, oak, deodar, silver fir and so on. Critical to hill agriculture, the forests also contribute directly to livelihoods by providing resin, raw material for paper and pulp, wood packing cases, etc. Institutional arrangements such as cooperatives, sacred forests, corporate clan-owned forests, etc. govern and ensure public participation in the management of the forested landscape of Himachal Pradesh.

Agrawal and Chhatre (2006) collected data on 205 forests, sampling equally from the lower, middle and high hills of Himachal Pradesh and 95 of them were jointly managed by village communities. After holding multiple interviews with multiple individuals and decision makers involved in the local community institutions, they developed a Forest Condition Index ranging from 1 - 5 (1-very bad forest condition and 5-very good forest condition) and a resulting OLS regression equation for forest condition — a linear function of a suite of causal variables (biophysical, economic, demographic, institutional and socio-political variables).

Measuring duration of community-based conservation, institutional enforcement via fines and the involvement of government or forest department officials in decision making, the authors examine if these institutional variables are key to the forest condition. Edmonds (2002) asserts the importance of local control in reducing resource extraction from forests.

In a similar fashion, Agrawal and Chhatre's (2006) results indicated that all five institutional variables used were highly statistically significant. Although duration of community management of forests is positively correlated to thriving forest condition, the presence of a guard runs in the negative direction, probably implying that in forests maintained in good conditions, there's less need for enforcement. Co-management of forests with forest officials is negatively related to forest condition and signifies the known bureaucratic reluctance against participating in co-management.

(E). INTRA-REGIONAL COOPERATION

In view of rising 'carbon leakages' and shifting of energy-intensive sectors to pollution havens or even from carbon priced to non-carbon priced economies in a bid to improve overall economic competitiveness, it becomes imperative for South Asian nations to harmonise their carbon tax regimes and initiate cross-border provisions

in addition to Nationally Appropriate Mitigation Actions (NAMAs). Such border carbon adjustments (BCAs) encourage emission reductions abroad by motivating foreign producers to become more carbon-efficient and to persuade nations to assume legally binding abatement targets (Neuhoff, 2011).

Integrated management of cross-border common property resources such as the mangrove forests in Sundarbans involve peaceful resolution of water conflicts between India and Bangladesh. Shared political commitment and promotion of regional mechanisms to implement and oversee disaster risk management (early warnings and climate forecasting systems) can help South Asia adapt better to climate change, with beneficial effects on regional stability and resilient communities.

8. CONCLUSION

As anthropogenic climate change unfolds itself to be 'the modern day tragedy of commons', the paper discusses the intensifying conflict between man and nature - his utilization of the environment as a 'sink' and its eventual degradation. Using the E3-India model to simulate the effects of an 'carbon-indexed energy tax' with revenue recycling, this paper shows that a nominal tax (say, ₹ 400) on all

energy users of all fuels leads to 1.152% lesser CO₂ emissions, 2.617% lesser use of coal for meeting energy needs and 2.29% lesser fuel usage by 2025.

Although a carbon-based energy tax equates MPC and MSC with cost-effectiveness, its distributional consequences and regressive nature prompts an analysis of the fairness and effectiveness of other forms of carbon pricing—quotas, cap and trade, compensation, etc.—using Hardin's classic analogy. Notably, inclusive growth and sustainable management of forest and marine commons is best achieved in the hands of local users and via institutional enforcement as in the case of forests in the Indian Himalayas. Border carbon adjustments (BCAs) and intra-regional cooperation on disaster management can help South Asia build resilient communities and adapt better to the global environmental crisis.

The study was limited by the lack of national data on 'Common Property Resources in India' post the 54th Round of NSSO Survey (January-June, 1998). Nevertheless, the present paper adds to the existing literature by using the relatively new E3-India model to derive carbon-tax based policy lessons on climate change adaptation and mitigation and analyses the 'fairness' of carbon pricing strategies using Hardin's classic metaphor—the tragedy of the commons.

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